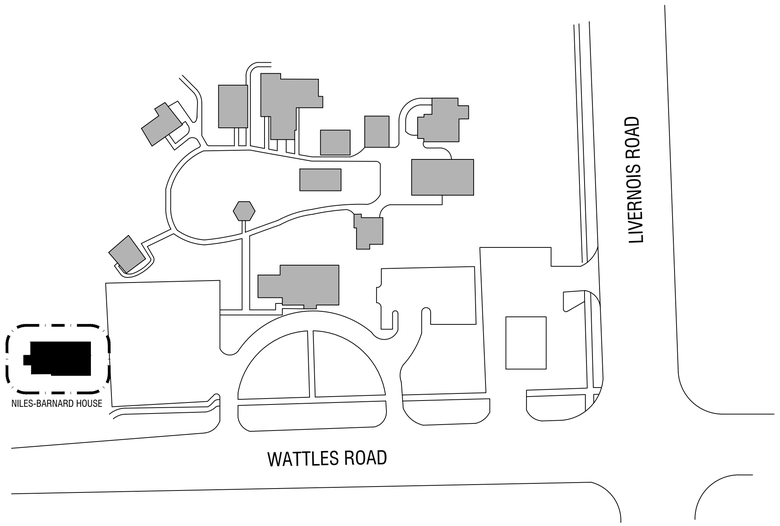
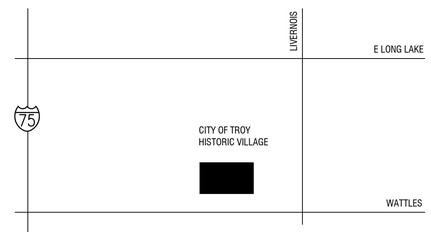
City Of Troy Michigan, Troy Historic Village

Niles-Barnard House Renovation



TROY HISTORIC VILLAGE PLAN
NOT TO SCALE
N



LOCATION PLAN
NOT TO SCALE
N

OWNER:

City Of Troy Michigan, Troy Historic Village
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Troy, Michigan
248.524.4907
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GENERAL NOTES:

1. GENERAL NOTES APPLY TO ALL DRAWINGS.
2. DO NOT SCALE DRAWINGS. IF DIMENSIONS CANNOT BE DETERMINED OR DOCUMENTS ARE IN CONFLICT, THE CONTRACTOR SHALL OBTAIN CLARIFICATION FROM THE ARCHITECT PRIOR TO CONTINUATION OF WORK
3. CONTRACTOR SHALL MAINTAIN THE IMMEDIATE CONSTRUCTION SITE IN A SECURE, CLEAN AND SAFE MANNER.
4. FIELD VERIFY ALL PROJECT CONDITIONS PRIOR TO THE START OF WORK AND AS NEEDED THROUGHOUT THE DURATION OF CONSTRUCTION. BRING ANY DISCREPANCIES, WHICH MAY SIGNIFICANTLY AFFECT NEW CONSTRUCTION WORK TO THE ATTENTION OF THE ARCHITECT FOR REVIEW.
5. FLOOR PLAN DRAWINGS ARE COMPOSITES OF EXISTING CONSTRUCTION TO REMAIN AND NEW CONSTRUCTION. EXISTING CONSTRUCTION IS SHOWN IN LIGHTER, OUTLINE FORM. NEW CONSTRUCTION IS INDICATED WITH HEAVIER LINEWORK AND MAY ADDITIONALLY BE IDENTIFIED BY NOTE, KEYNOTE, LARGER SCALE DETAIL REFERENCE, OR MATERIAL PATTERN (REFER ALSO TO LEGENDS).
6. KEEP MEANS OF EGRESS OPEN, ILLUMINATED, AND FREE OF OBSTRUCTIONS AT ALL TIMES.
7. VERIFY THE DIMENSIONS, LOCATIONS, ELEVATIONS AND ARRANGEMENT OF ALL ITEMS ASSOCIATED WITH INSTALLATION OF EQUIPMENT AND RELATED MECHANICAL AND ELECTRICAL WORK. COORDINATE OPENINGS AND PENETRATIONS BETWEEN TRADES.
8. INFORMATION SHOWN IN ONE LOCATION ON THE DRAWINGS IS THE SAME AS IF SHOWN ON MULTIPLE LOCATIONS.
9. TYPICAL CONDITIONS ARE NOTED ONLY ONCE.
10. REFER TO PROJECT INFORMATION SHEET FOR EACH DISCIPLINE FOR MATERIAL / REFERENCE SYMBOLS AND ABBREVIATIONS.

Bidding

PROJECT No. 0128-18-0020

DATE: 09-30-2019

DRAWING INDEX:

I Certify That The Structural Plans Were Prepared Under My Direct Supervision

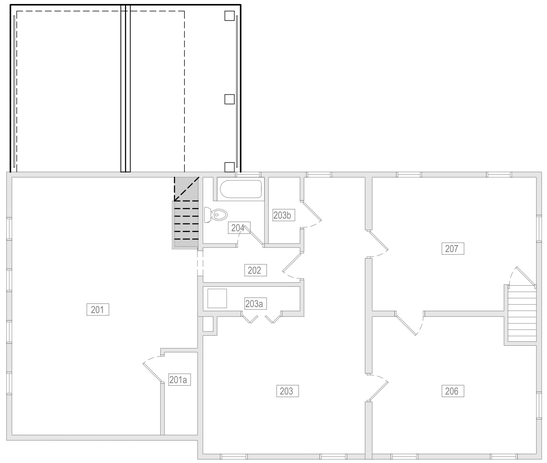
I Certify That The Architectural Plans Were Prepared Under My Direct Supervision

I Certify That The Mechanical/Electrical Plans Were Prepared Under My Direct Supervision

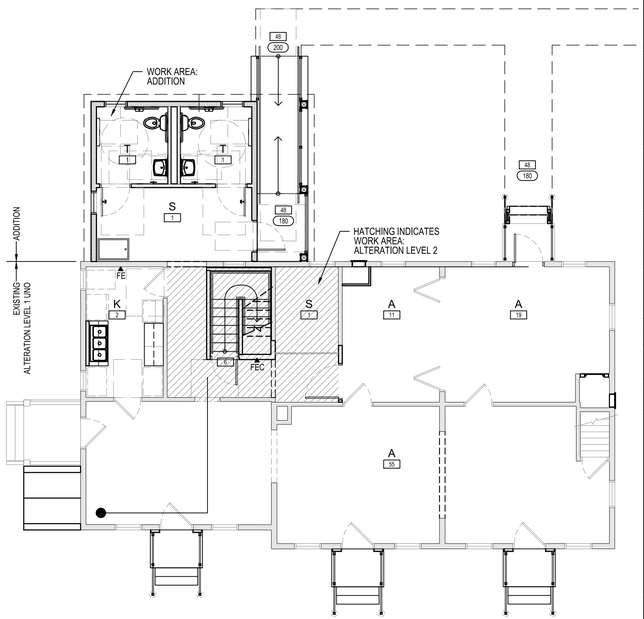
DRAWING PATH: P:\0126_0165\0128180020_Niles-Barnard_House_Renovations\Drawings\Arch\2-Arch Desktop\New Facilities Project\Sheets\General\G-000 COVER.dwg Sep 12, 2019 - 1:50pm

0128-18-0020 City Of Troy Michigan, Troy Historic Village Niles-Barnard House Renovation

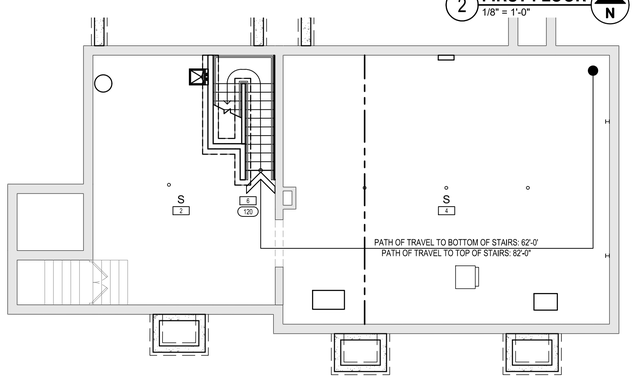
NOTE:
SECOND FLOOR NOT ACCESSIBLE BY PUBLIC NOR USABLE SPACE BY OWNER



3 SECOND FLOOR
1/8" = 1'-0"



2 FIRST FLOOR
1/8" = 1'-0"



1 BASEMENT
1/8" = 1'-0"

MICHIGAN REHABILITION CODE

COMPLIANCE METHOD : WORK AREA

CLASSIFICATION OF WORK (REFER TO PLAN FOR LOCATIONS)

ALTERATIONS LEVEL 1 (CHAPTER 7)

BUILDING ELEMENTS AND MATERIALS (702)

INTERIOR FINISHES SHALL COMPLY WITH CHAPTER 8 OF THE MBC

INTERIOR WALL AND CEILING FINISHES	CLASS C (TABLE 803.11) TYPICAL ROOMS
INTERIOR FLOORS	DOC FF-1 OR ASTM D2859 COMPLIANCE/ CLASS I

FIRE PROTECTION (703)

MAINTAINS LEVEL OF PROTECTION PROVIDED

MEANS OF EGRESS (704)

MAINTAINS LEVEL OF PROTECTION PROVIDED

ENERGY CONSERVATION (708)

PROVIDING INSULATION IN EXTERIOR WALLS OF FIRST AND SECOND FLOOR

ALTERATIONS LEVEL 2 (CHAPTER 8)

GENERAL (801)

COMPLY WITH LEVEL 1 REQUIREMENTS

ALL NEW CONSTRUCTION ELEMENTS, COMPONENTS, SYSTEMS, AND SPACES SHALL COMPLY WITH THE REQUIREMENTS OF MICHIGAN BUILDING CODE.

EXCEPTION: NEWLY INSTALLED ELECTRICAL EQUIPMENT SHALL COMPLY WITH SECTION 808

FIRE PROTECTION (804)

FIRE ALARM SYSTEM SHALL BE INSTALLED (NFPA 72) - SMOKE DETECTORS INSTALLED

ACCESSIBILITY (806)

COMPLY WITH SECTION 410
EXISTING ACCESSIBILITY SHALL BE MAINTAINED OR IMPROVED UPON FOR ALTERATIONS (410.3):
-ACCESSIBLE ROUTE INTO BUILDING (RAMP AT ADDITION)
-NEW FIXTURES INSTALLED

ELECTRICAL (808)

ALL NEWLY INSTALLED ELECTRICAL EQUIPMENT AND WIRING RELATING TO WORK DONE IN WORK AREA TO COMPLY WITH NFPA 70

MECHANICAL (809)

MECHANICAL SYSTEM UPGRADES TO COMPLY WITH 2015 MICHIGAN MECHANICAL CODE

PLUMBING (810)

PLUMBING FIXTURE COUNTS TO COMPLY WITH NEW OCCUPANT LOAD

ADDITION (CHAPTER 11)

HEIGHTS AND AREAS (1102)

WITHIN ALLOWABLE BUILDING HEIGHTS AND AREAS

CODE EXCEPTIONS

APPLICABLE CONSTRUCTION CODES AND STANDARDS

ALLOW ALTERNATIVE FOR STAIRWAYS AND GUARDS:
MRCEB2015
1012.11 STAIRWAYS AND GUARDS. EXISTING STAIRWAYS SHALL COMPLY WITH THE REQUIREMENTS OF THESE PROVISIONS. THE CODE OFFICIAL SHALL GRANT ALTERNATIVES FOR STAIRWAYS AND GUARDS IF ALTERNATIVE STAIRWAYS ARE FOUND TO MEET THE INTENT OF THESE PROVISIONS
REQUEST CONSIDERATION OF ALTERNATIVE HANDRAIL EXTENSIONS AND CONTINUITY
REQUEST RISER HEIGHT INCREASE TO 7-1/2" MAXIMUM
REQUEST OMISSION OF REQUIRED LANDING BEFORE DOORWAY AT TOP OF STAIRS
ALLOW NO DRINKING FOUNTAIN. DRINKING FOUNTAINS AVAILABLE WITHIN FACILITIES, KITCHEN PROVIDES SOURCE FOR WATER IF NECESSARY

BUILDING SUMMARY

BUILDING CODE INFORMATION

BUILDING	2015 Michigan Rehabilitation Code for Existing Buildings

Following codes when referenced by Michigan Rehabilitation Code for Existing

BUILDING	2015 Michigan Building Code
MECHANICAL	2015 Michigan Mechanical
PLUMBING	2015 Michigan Plumbing
ELECTRICAL	2017 National Electrical Code
ENERGY	Michigan Uniform Energy Code referencing ANSI/ASHRAE/IESNA standard 90.1-2013
FUEL GAS CODE	2015 International Fuel Gas
FIRE	2015 International Fire Code
FIRE ALARM	NFPA 72 2013 Fire Alarm
ACCESSIBILITY	ANSI A117.1 - 2009 - Accessible and Usable Buildings and Facilities

PROJECT INFORMATION

USE AND OCCUPANCY

OCCUPANCY CLASSIFICATION	GROUP A - Assembly (A-3)/GROUP S -Storage (S-1)
USES	
BASEMENT:	STORAGE (MECHANICAL)
1ST FLOOR:	ASSEMBLY (TABLES AND CHAIRS), KITCHENETTE, GENERAL STORAGE
2ND FLOOR:	NOT ACCESSIBLE BY PUBLIC NOR USABLE SPACE BY OWNER
MIXED OCCUPANCIES	YES
OCCUPANCY SEPARATION	NO
INCIDENTAL USE OCCUPANCY SEPARATION	NO

TYPE OF CONSTRUCTION

CONSTRUCTION TYPE	VB

GENERAL BUILDING INFORMATION		ALLOWED (A-3)
BASEMENT	1,670 SF	
FIRST FLOOR	1,670 EXISTING	6,000 SF
SECOND FLOOR	1,675 SF	
STORIES	2 STORIES	1 STORIES
NOTE: SECOND FLOOR NOT ACCESSIBLE NOR USABLE BY PUBLIC NOR STAFF		
BUILDING HEIGHT	18'-2"	55'-0"

FIRE AND SMOKE PROTECTION FEATURES

EXTERIOR WALL OPENINGS (TABLE 705.8)	UNPROTECTED, NONSPRINKLERED (UP,NS)
FIRE SEPARATION 30' OR GREATER	NO LIMIT
FIRE WALLS (SECTION 706)	NOT REQUIRED
FIRE BARRIERS (SECTION 707)	NOT REQUIRED
FIRE PARTITIONS (SECTION 708)	NOT REQUIRED
SMOKE BARRIERS (SECTION 709)	NA
SMOKE PARTITIONS (SECTION 710)	NA

FIRE PROTECTION SYSTEMS

AUTOMATIC SPRINKLER SYSTEM:	NO	TYPE: NA
STANDPIPE SYSTEM:	NO	CLASS: NA
PORTABLE FIRE EXTINGUISHERS	YES	
FIRE ALARM AND DETECTION:	NO	
SMOKE DETECTION:	NO	
EMERGENCY VOICE/ALARM COMMUNICATION	NO	
SMOKE CONTROL	NO	

MEANS OF EGRESS

COMMON PATH OF TRAVEL	REFER TO PLAN DRAWINGS	
MEANS OF EGRESS SIZING		
STAIRS	.3 INCHES PER OCCUPANT	
OTHER EGRESS COMPONENTS	.2 INCHES PER OCCUPANT	
NUMBER OF EXITS		
OCCUPANT LOAD PER STORY	MINIMUM NUMBER OF EXITS	
1-500	2	
SPACES WITH ONE EXIT	MAX OCCUPANT LOAD	MAX COMMON PATH OF TRAVEL
S	29	100(OL </ 30) ; 75 (OL > 30)
TRAVEL DISTANCE	200'	
COMMON PATH OF TRAVEL	100'	

PLUMBING CODE INFORMATION (MPC 403.1)

Occupant Load : 89

	REQUIRED		PROVIDED	
	MALE	FEMALE	MALE	FEMALE
Assembly (A-3)				
Water Closets	1	1	1	1
Lavatories	1	1	1	1
Drinking Fountains	1		see exemptions	
Service Sinks	1		1	

LIFE SAFETY PLAN LEGEND

0 : CALCULATED OCCUPANT LOAD OF ROOM OR CUMULATIVE OCCUPANT LOAD AT EGRESS COMPONENT (MBC TABLE 1004.1.2)
0 : CAPACITY OF EGRESS COMPONENT
- PER MBC (2015), SECTIONS 1005.3.1 AND 1005.3.2
: LINE OF EGRESS TRAVEL
(X'-X') - TRAVEL DISTANCE TO EXITS
C.P.T. (X'-X'): COMMON PATH OF TRAVEL

FEC FEC : FIRE EXTINGUISHER CABINET
FULLY RECESSED CABINET, JL INDUSTRIES AMBASSADOR SERIES OR EQUIVALENT, RECESSED, TRIMLESS, SOLID DOOR, FLUSH POOL HANDLE, COLOR TO BE SELECTED BY ARCHITECT.

FE FE : FIRE EXTINGUISHER AT ORDINARY HAZARDS (MBC 906.1)
PROVIDE WALL BRACKET, JL INDUSTRIES MARK TYPE OR EQUIVALENT.
2 ABC FIRE EXTINGUISHERS PROVIDED

OHM
ARCHITECTS ENGINEERS PLANNERS
34000 Plymouth Road
Livonia, MI 48150
PH 734.522.6711 | F 734.522.6427
OHM-ADVISORS.COM

SEAL

REVISIONS:
1 ISSUED FOR BIDS 09/30/2019

DATE 09/30/2019 | PROJ NUMBER 0126-18-0020 | ARCH C O | PROJ MGR C O | CADD V V

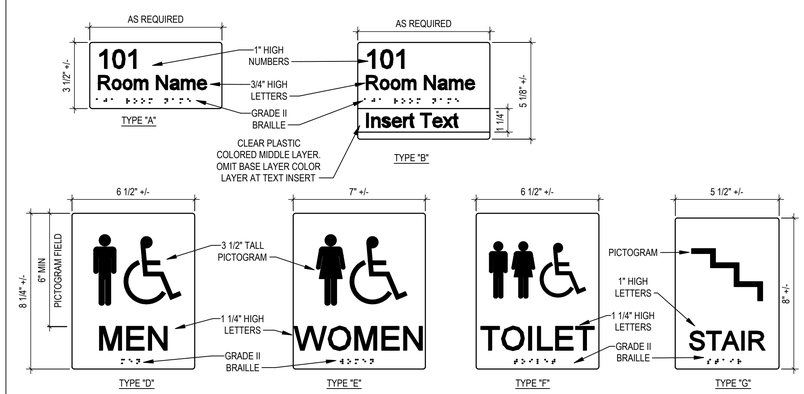
City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road
CODE COMPLIANCE

SHEET G-101

ABBREVIATIONS

SPECIAL	
&	AND
@	AT
A	
A/C	AIR CONDITIONING
AB	ANCHOR BOLT
ABBRV	ABBREVIATION
ACST	ACOUSTICAL
ACT	ACOUSTICAL CEILING TILE
ADA	AMERICANS WITH DISABILITIES ACT
ADDM	ADDENDUM ADJ ADJACENT
ADJT	ADJUST(ADJUSTABLE)
ADMIN	ADMINISTRATION
AFF	ABOVE FINISHED FLOOR
AGGR	AGGREGATE
AHU	AIR HANDLING UNIT
ALT	ALTERNATE ALUM ALUMINUM
ANCH	ANCHOR
ANN	ANNUNCIATOR
ANOD	ANODIZE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
AP	ACCESS PANEL
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL (ARCHITECT)
ASB	ASBESTOS
ASPH	ASPHALT
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
B	
B.PL	BASEPLATE
BB	BULLETIN BOARD
BBR	BASEBOARD RADIATION
BCS	BABY CHANGING STATION
BD	BOARD
BF	BOTH FACES
BITUM	BITUMINOUS
BL	BOTTOM LAYER
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BLW	BELOW
BM	BEAM
BOF	BOTTOM OF FOOTING
BOT	BOTTOM
BRDG	BRIDGING
BRG	BEARING
BRKT	BRACKET
BS	BOTH SIDES
BSMT	BASEMENT
BT	BENT
BTU	BRITISH THERMAL UNIT
BTWN	BETWEEN
BUR	BUILT-UP ROOF
C	
C	COURSES
C TO C	CENTER TO CENTER
CAB	CABINET
CER	CERAMIC
CERT	CERTIFIED
CG	CORNER GUARD
CHFR	CHAMFER
CI	CAST IRON
CIP	CAST-IN-PLACE
CIR	CIRCLE
CJ	CONTROL JOINT
CKBD	CHALK BOARD
CL,	CENTER LINE
CLG	CEILING
CLO	CLOSET
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
CNR	CORNER
CNTR	COUNTER
CO	CLEAN OUT
COL	COLUMN
COMPR	COMPRESSIBLE
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONSULT	CONSULTANT
CONT	CONTINUOUS
CONTR	CONTRACTOR
CONV	CONVECTOR
COORD	COORDINATE
CORR	CORRIDOR
CPT	CARPET
CT	CERAMIC TILE
CTR	CENTER
CUH	CABINET UNIT HEATER
CW	COLD WATER
D	
D	DEEP
DAT	DATUM
DBL	DOUBLE
DEG	DEGREE
DEMO	DEMOLITION
DET	DETAIL
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DIFF	DIFFUSER
DIM	DIMENSION
DIR	DIRECTORY
DISP	DISPENSER
DIST	DISTANCE
DK	DECK
DL	DEAD LOAD
DMPF	DAMP PROOFING
DN	DOWN
DR	DOOR
DS	DOWNSPOUT
DW	DISHWASHER
DWG	DRAWING
DWL	DOWEL
DWR	DRAWER
E	
E	EAST
EA	EACH
EC	ELECTRICAL CONTRACTOR
EE	EACH END
EF	EACH FACE
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRICAL
ELEV	ELEVATOR
EMER	EMERGENCY
ENCL	ENCLOSE
ENG	ENGINEER
ENTR	ENTRANCE
EP	ELECTRIC PANEL
EQ	EQUAL
EQUIP	EQUIPMENT
ES	EACH SIDE
EW	EACH WAY
EWC	ELECTRIC WATER COOLER
EXC	EXCAVATION
EXH FN	EXHAUST FAN
EXP	EXPANSION (EXPOSED)
EXP STR	EXPOSED STRUCTURE
EXST	EXISTING
EXT	EXTERIOR
F	
F/F	FACE TO FACE
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FAI	FRESH AIR INTAKE
FC	FOOD SERVICE CART
FD	FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FDN	FOUNDATION
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FF	FINISHED FLOOR
FHC	FIRE HOSE CABINET
FIN	FINISH / FINISHED
FIXT	FIXTURE
FLG	FLOORING
FLR	FLOOR
FLUOR	FLUORESCENT
FR	FRAME
FRTW	FIRE RETARDENT TREATED WOOD (PRESSURE TREATED)
FSP	FIRE STANDPIPE
FT	FOOT / FEET
FTG	FOOTING
FURN	FURNISH
FUT	FUTURE
FWC	FABRIC WALL COVERING
G	
GA	GAGE
GAL	GALLON
GALV	GALVANIZED
GB	GRAB BAR
GEN	GENERAL
GL	GLASS
GR	GRADE
GRD	GROUND
GRH	GRAVITY RELEASE HOOD
GYP	GYPSUM
GYP BD	GYPSUM BOARD
H	
HB	HOSE BIBB
HC	HOLLOW CORE
HD	HEAD
HDR	HEADER
HDW	HARDWARE
HDWD	HARDWOOD
HK	HOOK
HM	HOLLOW METAL
HND	HAND DRYER
HNDRL	HANDRAIL
HORIZ	HORIZONTAL
HOSP	HOSPITAL
HP	HIGH POINT
HPDL	HIGH PRESSURE DECORATIVE LAMINATE
HPDL-SS	HPDL SOLID SURFACE
HR	HOUR
HT	HEIGHT
HTG	HEATING
HTR	HEATER
HVAC	HEATING-VENTILALITING-AIR CONDITIONING
HW	HOT WATER
HxWxD	HEIGHT BY WIDTH BY DEPTH
I	
ID	INSIDE DIAMETER
IF	INSIDE FACE
IN	INCH(ES)
INCAND	INCANDESCENT
INCL	INCLUDE(ED)(ING)
IND	INDIVIDUAL
INSUL	INSULATION
INT	INTERIOR
INV	INVERT
IR	INSIDE RADIUS
J	
J-BOX	JUNCTION BOX
JAN	JANITOR
JS	JANITOR SINK
JST	JOIST
JT	JOINT
K	
KD	KNOCK DOWN
KIT	KITCHEN
KO	KNOCKOUT
KOP	KNOCKOUT PANEL
L	
L	LENGTH
LAB	LABORATORY
LAM	LAMINATE / LAMINATED
LAV	LAVATORY
LB	POUND
LDG	LANDING LEVEL
LEV	LEVEL
LFT	LEFT
LG	LONG
LH	LEFT HAND
LIN	LINEAR (LINEAL)
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LOC	LOCATION
LONG	LONGITUDINAL
LP	LOW POINT
LT	LIGHT
LTG	LIGHTING
LVC	CABINET MOUNTED LAVATORY
LVR	LOUVER
LVW	WALL MOUNTED LAVATORY
M	
M	METER (METRIC MEASURE)
MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MB	MARKERBOARD
MBC	MICHIGAN BUILDING CODE
MECH	MECHANICAL
MEZZ	MEZZANINE
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MO	MASONRY OPENING
MR	MIRROR
MRS	MIRROR ABOVE SINK
MTD	MOUNTED
MTL	METAL
MTR	METER (UTILITIES)
N	
N	NORTH
NA	NOT APPLICABLE
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
O	
O/O	OUT TO OUT
OA	OVERALL
OBC	OHIO BUILDING CODE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OFF	OFFICE
OH	OVERHEAD
OPH	OPPOSITE HAND
OPNG	OPENING
OPP	OPPOSITE
P	
P	POLE
P/L	PROPERTY LINE
PAR	PARALLEL
PARA	PARAGRAPH
PB	PUSH BUTTON
PCC	PRE-CAST CONCRETE
PCF	POUNDS PER CUBIC FOOT
PCT	PORCELAIN TILE
PERIM	PERIMETER
PL	PLATE
PLAM	PLASTIC LAMINATE
PLAS	PLASTER
PLATF	PLATFORM
PLMB	PLUMBINING
PLYWD	PLYWOOD
PNL	PANEL
POL	POLISHED
PR	PAIR
PREFAB	PREFABRICATED
PREFIN	PREFINISHED
PROJ	PROJECTION
PROJSCR	PROJECTION SCREEN
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	PRESSURE TREATED
PTD	PAPER TOWEL DISPENSER AND WASTE RECEPTACLE
PNT	PAINT
PTEN	POST-TENSION
PTN	PARTITION
PTR	PAPER TOWEL RECEPTACLE
PVC	POLYVINYL CHLORIDE
PVT	PAVER TILE
Q	
QT	QUARRY TILE
QTY	QUANTITY
R	
R	RISER
RAD	RADIUS
RD	ROOF DRAIN
REC	RECESS
RECT	RECTANGULAR
REF	REFERENCE(REFRIGERATOR)
REINF	REINFORCE
REL	RELOCATE
REQD	REQUIRED
REV	REVISE(REVISION)
RH	RIGHT HAND
RM	ROOM
RO	ROUGH OPENING
RS	ROUGH SAWN
RT	RIGHT
S	
S	SOUTH
S&V	STAIN & VARNISH
SAB	SOUND ATTENUATION BLANKET
SAF	SPRAY ACOUSTICAL FINISH
SAP	SUSPENDED ACOUSTIC PANEL
SCHED	SCHEDULE
SCD	SEAT COVER DISPENSER
SCR	SHOWER CURTAIN, ROD, AND HOOKS
SD	SOAP DISPENSER
SECT	SECTION
SEF	SEAMLESS EPOXY FLOORING
SF	SUPPLY FAN
SHS	SHOWER SEAT
SHT	SHEET
SIM	SIMILAR
SLV	SLEEVE
SMK	SMOKE DETECTOR
SND	SANITARY NAPKIN DISPENSER
SNV	SANITARY NAPKIN VENDOR
SOG	SLAB ON GRADE
SPA	SPACE(S)(ING)
SPEC	SPECIFICATION
SPKR	SPEAKER
SQ	SQUARE
SQ FT	SQUARE FOOT
SQ IN	SQUARE INCH
SS	SOLID SURFACE
SST	STAINLESS STEEL
STD	STANDARD
STL	STEEL
STOR	STORAGE
STR	STRAIGHT
STRUCT	STRUCTURE(AL)
SUP	SUPPRT
SUSP	SUSPENDED
SV	SHEET VINYL
SW	SWITCH
SWG	SWITCHGEAR
SYM	SYMMETRICAL
SYS	SYSTEM
T	
T	TREAD
T&B	TOP & BOTTOM
T&G	TONGUE & GROOVE
TB	TACKBOARD
TEL	TELEPHONE
TEMP	TEMPERATURE / TEMPERED
TEN	TENSION
TER	TERRAZZO
THK	THICK
THRES	THRESHOLD
TOB	TOP OF BEAM
TOC	TOP OF CONCRETE
TOM	TOP OF MASONRY
TOR	TOP OF RAIL
TOS	TOP OF STEEL
TOT	TOTAL
TOW	TOP OF WALL
TP	TOILET PAPER DISPENSER
TR	TRASH RECEPTOR
TS	TACK STRIP
TV	TELEVISION
TYP	TYPICAL
U	
UH	UNIT HEATER
UNCTR	UNDERCOUNTER
UNF	UNFINISHED
UNO	UNLESS NOTED OTHERWISE
UR	WALL MOUNTED URINAL
V	
V	VENT
VB	VINYL BASE
VCT	VINYL COMPOSITE TILE
VENT	VENTILATION
VERT	VERTICAL
VNR	VENEER
VP	VAPOR PROOF
VR	VAPOR RETARDER
VT	VINYL TILE
VTR	VENT THRU ROOF
VWC	VINYL WALL COVERING
W	
W	WEST
w/	WITH
w/o	WITHOUT
WC	WATER CLOSET
WD	WOOD
WDB	WOOD BASE
WDW	WINDOW
WF	WIDE FLANGE
WG	WIRE GLASS
WH	WATERHEATER
WP	WATER PROOF
WPT	WORK POINT
WSP	WEATHER STRIP
WT	WEIGHT
WTR	WATER
WVW	WOOD VENEER WALL COVERING
WWF	WELDED WIRE FABRIC
Y	
YD	YARD

SIGNAGE LEGEND

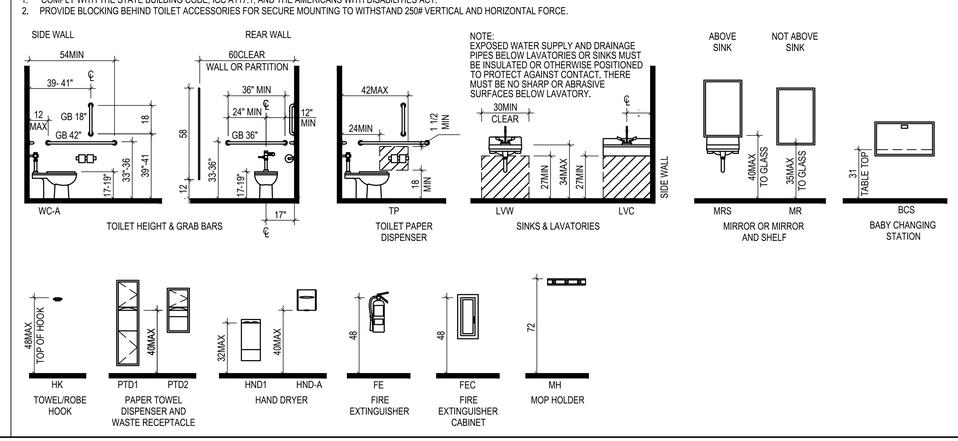


1. SIGN MATERIAL SHALL BE MFR'S STD NON-GLARE W/ COLORED BACKGROUND.
2. LETTERS SHALL BE RAISED 1/32".
3. PICTOGRAMS AND LETTERS SHALL BE CONTRASTING COLOR.
4. COMPLY WITH CABO/ICC A117.1-2009 SECTION 703 SIGNAGE

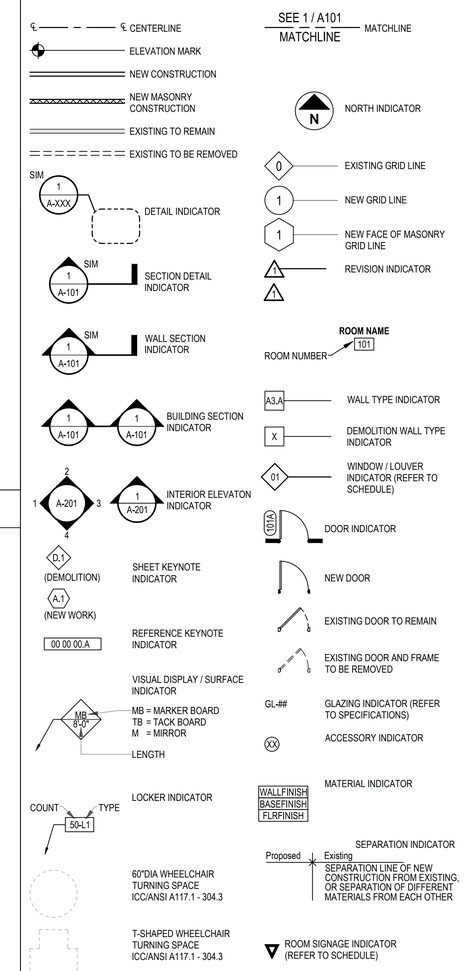
MOUNTING LOCATIONS LEGEND

GENERAL NOTES:

1. COMPLY WITH THE STATE BUILDING CODE, ICC A117.1, AND THE AMERICANS WITH DISABILITIES ACT.
2. PROVIDE BLOCKING BEHIND TOILET ACCESSORIES FOR SECURE MOUNTING TO WITHSTAND 250# VERTICAL AND HORIZONTAL FORCE.



ARCHITECTURAL SYMBOLS LEGEND



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Peter Basso Associates Inc
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5145 Livernois, Suite 100
Troy, Michigan 48098-3276
Tel: 248-879-5666
Fax: 248-879-0007
www.PeterBassoAssociates.com
PBA Project No.: x

SEAL

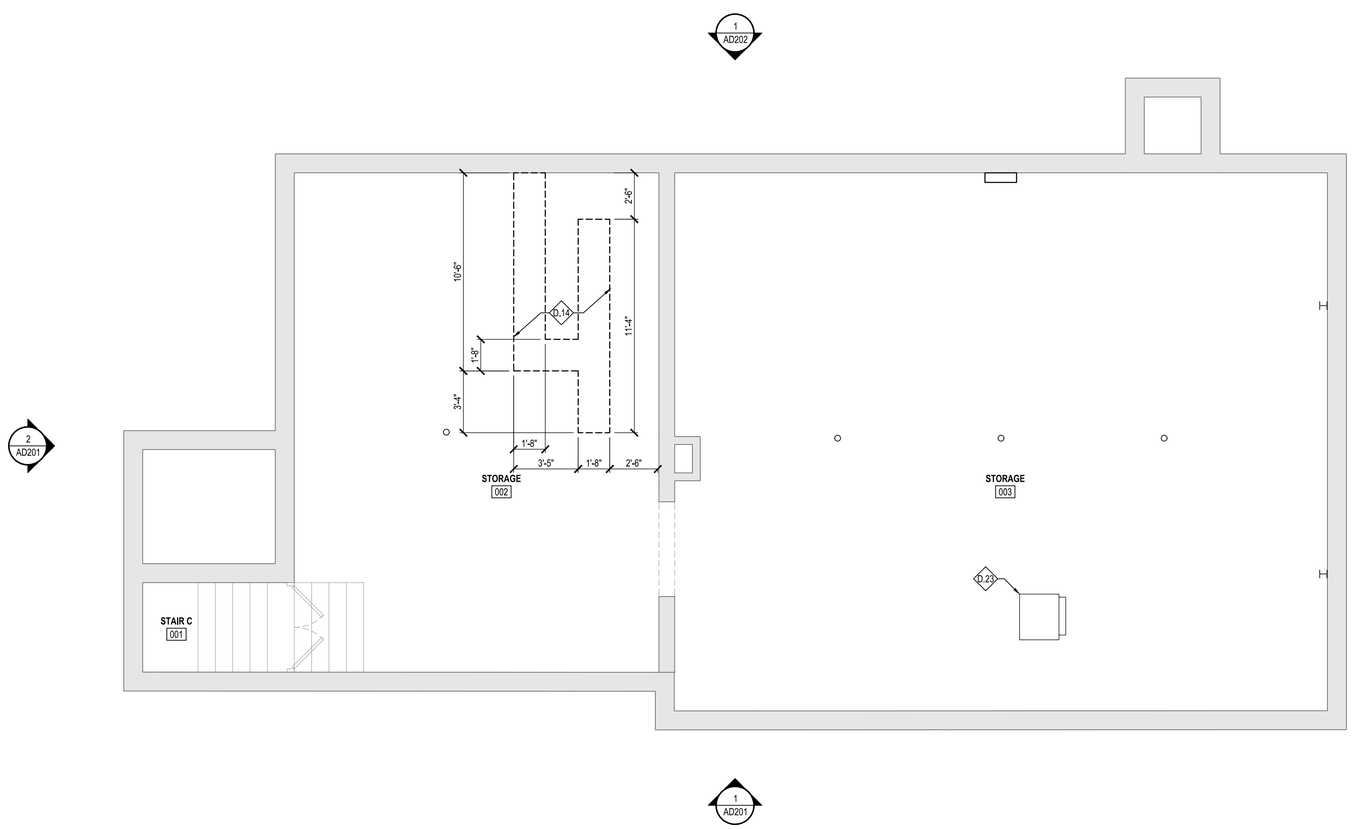
REVISIONS		
1	ISSUED FOR BIDS	09/30/2019

DATE	PROJ NUMBER	ARCH	PROJ MGR	CADD
09/30/2019	0126-18-0020	C O	C O	V V

City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

ARCHITECTURAL ABBREVIATIONS, SYMBOLS, AND LEGEND

SHEET A-001



1 **BASEMENT DEMOLITION PLAN**
1/4" = 1'-0"

N

GENERAL DEMOLITION NOTES

1. ALL DEMOLITION WORK IS TO BE COORDINATED WITH ABATEMENT WORK ESPECIALLY AS IT PERTAINS TO HISTORICAL FEATURES TO REMAIN OR REFURBISHED AND REMAIN EXPOSED.
2. EXTENT OF AREAS TO BE DEMOLISHED IS SHOWN SCHEMATICALLY ON DEMOLITION DRAWINGS. COORDINATE EXACT DIMENSIONS WITH DETAILS AND PLANS ON NEW CONSTRUCTION ARCHITECTURAL AND STRUCTURAL DRAWINGS.
3. WHERE BEARING WALLS ARE REMOVED OR EXISTING FLOOR STRUCTURE IS CUT OR REMOVED, PROVIDE SHORING TO SUPPORT LOADS UNTIL PERMANENT CONSTRUCTION IS IN PLACE. REFER TO STRUCTURAL DOCUMENTS FOR ADDITIONAL REQUIREMENTS.
4. SELECTIVE DEMOLITION SHALL BE CARRIED OUT TO PROVIDE SAFETY, SECURITY AND WEATHER-TIGHTNESS OF THE BUILDING AT THE END OF EACH DAY OF WORK. CONTRACTOR IS RESPONSIBLE FOR STORAGE AND REMOVAL OF DEBRIS IN ACCORDANCE WITH LOCAL JURISDICTIONAL REGULATIONS. CONTRACTOR SHALL MAINTAIN THE BUILDING AND CONSTRUCTION SITE IN A SAFE AND SECURE MANNER.
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6. WHERE SELECTIVE DEMOLITION RESULTS IN REMOVAL OF WOOD FLOOR, DOORS, WINDOWS, WOOD BASE OR SIMILAR WOOD TRIM OR DECORATIVE MATERIAL, REMOVE CAREFULLY AND SALVAGE FOR REUSE OR REPLICATION.
7. WHERE REMOVAL OF CASEWORK, MILLWORK, WALL ACCESSORIES, OR EQUIPMENT IS INDICATED, FILL HOLES AND PATCH EXISTING WALLS, BASE AND CEILINGS WHICH ARE TO REMAIN EXPOSED.
8. REMOVE ALL MISCELLANEOUS TILE CEILING CLIPS, WOOD BLOCKING TO REMAIN.
9. REMOVE ALL MISCELLANEOUS CARPET TACK STRIPS, PROTRUDING NAILS AND STAPLES. WHERE THERE IS UNCERTAINTY AS TO WETHER AN ITEM IS TO BE REMOVED, CONSULT WITH THE ARCHITECT.
10. REFER TO MECHANICAL, ELECTRICAL & PLUMBING DEMOLITION PLANS FOR ADDITIONAL INFORMATION. COORDINATE DEMOLITION WORK WITH EXISTING SECURITY AND TECHNOLOGY BY OTHERS.
11. WHERE REMOVING WALLS AND MOLDINGS, SALVAGE AND REUSE MOLDINGS WHERE POSSIBLE TO MATCH EXISTING.
12. DEMOLITION KEYNOTES CAN APPEAR ON PLANS OR ELEVATIONS, AND MAY NOT APPEAR ON EACH SHEET.
13. REMOVE MISCELLANEOUS ABANDONED CONDUITS AND WIRES.

DEMOLITION KEYNOTES

D.01 REMOVE DOOR, FRAME AND SILL. ENLARGE OPENING AS SHOWN ON NEW WORK FLOOR PLAN.
D.02 REMOVE FLOORING AND STRUCTURE FOR NEW STAIR, REFER TO STRUCTURAL FOR NEW FRAMING REQUIREMENTS OF OPENING..
D.03 REMOVE PARTITION FOR NEW OPENING, REFER TO STRUCTURAL FOR FRAMING REQUIREMENTS. SALVAGE WOOD TRIM FOR PATCHING AS REQUIRED.
D.04 REMOVE SIDING FOR NEW ADDITION WORK, COORDINATE EXTENT OF REMOVAL AND REPLACEMENT WITH NEW WORK. SALVAGE BOARDS AS REQUIRED FOR INFILL. REMOVAL OF SIDING TO BE LIMITED TO 4'-0" SECTIONS. PROVIDE SHEATHING IN SECTIONS REMOVED BEFORE REMOVING ADDITIONAL BOARDS.
D.05 APPROXIMATE EXTENTS OF NEW WORK.
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D.10 REMOVE STAIRS TO FIRST FLOOR.
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D.12 SALVAGE HISTORIC WALL MOUNTED ITEM.
D.13 REMOVE DOORS, WALLS, FIXTURES AND ACCESSORIES AS INDICATED. REMOVE FLOOR FINISH TO BASE SUBSTRATE. REMOVE PERIMETER WALL AND CEILING FINISHES AS REQUIRED FOR NEW WORK.
D.14 REMOVE SLAB TO ALLOW FOR NEW FOUNDATION. REFER TO STRUCTURAL 8/S0-2 FOR FOUNDATION DETAIL.
D.15 PREP FASCIA AND SOFFIT FOR NEW WORK.
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D.22 REMOVE AND SALVAGE STORM DOOR.
D.23 EXISTING MECHANICAL UNIT TO REMAIN, SEE MECHANICAL DRAWINGS FOR DUCTWORK DEMOLITION.
D.24 REMOVE PLASTER TO CLEAN EDGE, MAINTAIN AS MUCH PLASTER AS PRACTICAL. EXISTING LATH TO REMAIN.
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D.29 CEILING DEMOLITION: SALVAGE CROWN MOLDING FOR REUSE WHERE WALLS INDICATED TO BE REMOVED
D.30 CEILING DEMOLITION: SALVAGE CROWN MOLDING FOR REUSE, REMOVE FABRIC AND CEILING CLIPS.
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EXISTING WALL AND ASSOCIATED BASE TO BE DEMOLISHED

(X) NUMBER OF GLASS PANES TO BE REPLACED (CURRENTLY BROKEN, TYP)

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City of Troy, Michigan
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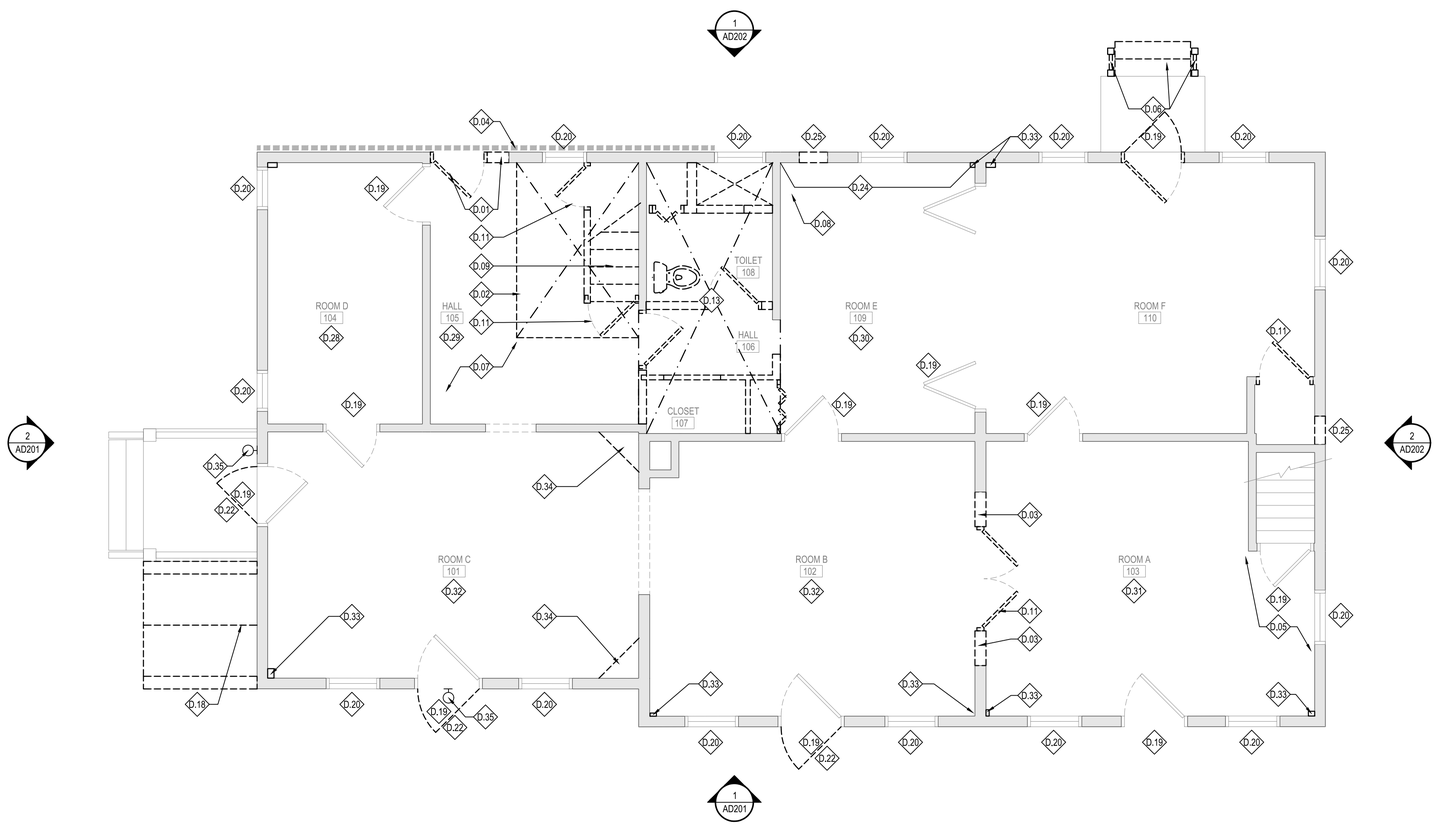
BASEMENT DEMOLITION PLAN

SHEET AD101



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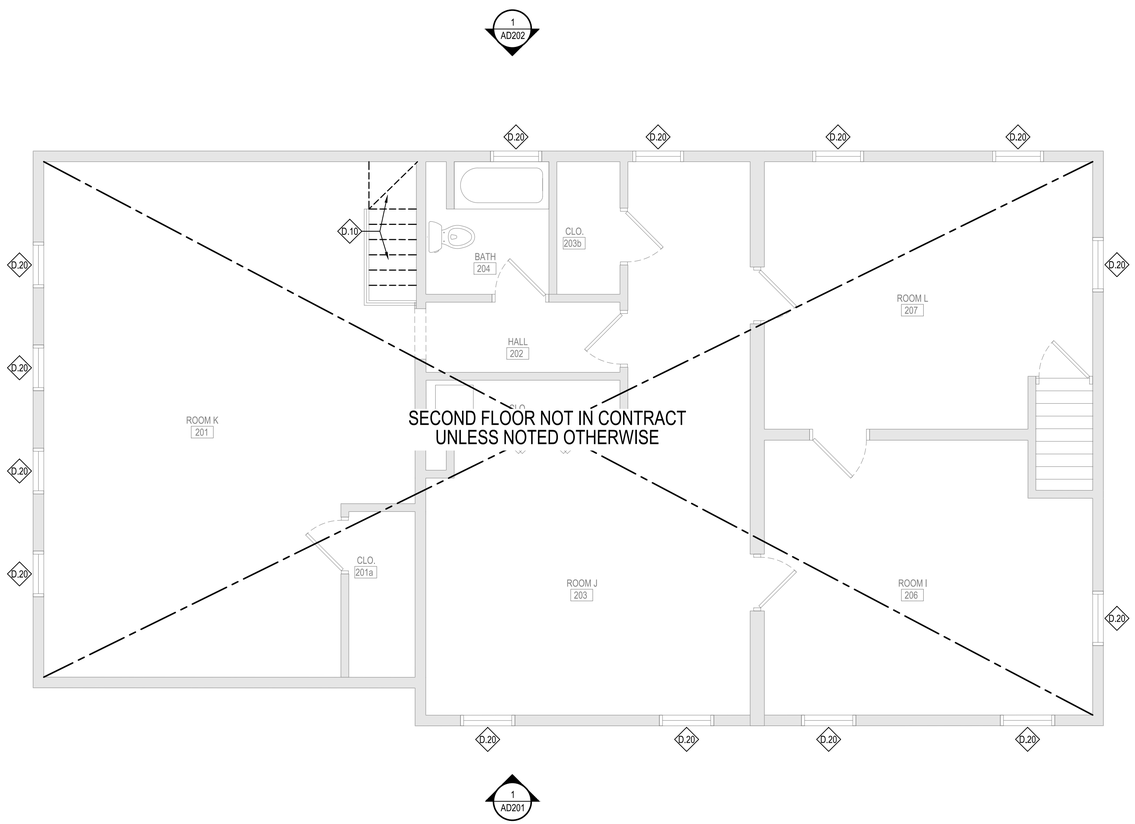
FIRST FLOOR DEMOLITION PLAN

SHEET AD102



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N

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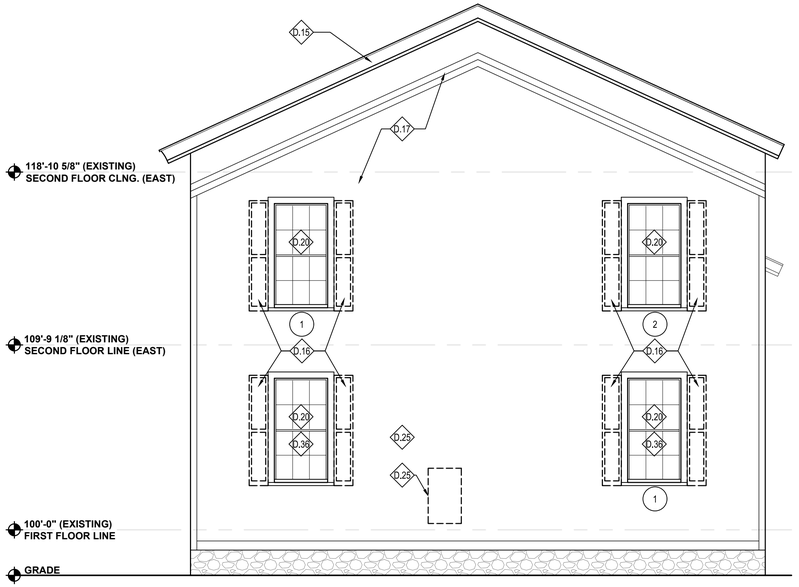
SECOND FLOOR DEMOLITION PLAN

SHEET AD103



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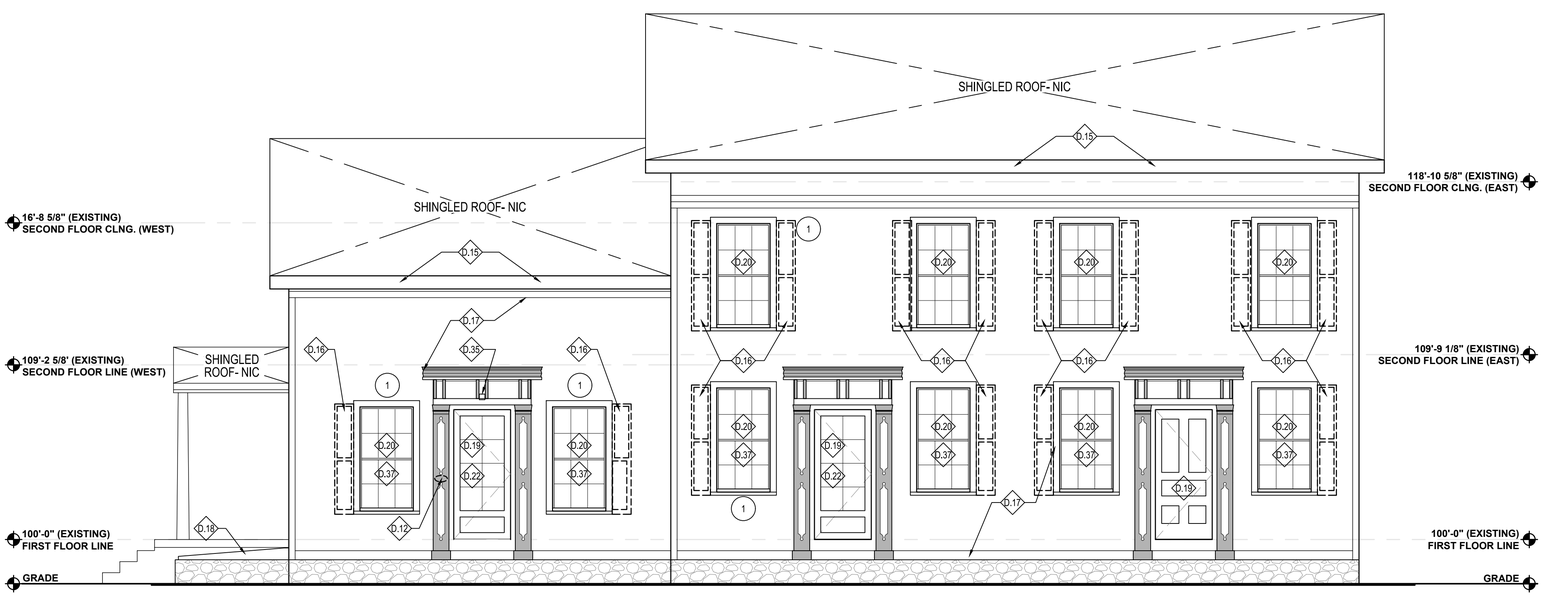

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2. EXTENT OF AREAS TO BE DEMOLISHED IS SHOWN SCHEMATICALLY ON DEMOLITION DRAWINGS. COORDINATE EXACT DIMENSIONS WITH DETAILS AND PLANS ON NEW CONSTRUCTION ARCHITECTURAL AND STRUCTURAL DRAWINGS.
3. WHERE BEARING WALLS ARE REMOVED OR EXISTING FLOOR STRUCTURE IS CUT OR REMOVED, PROVIDE SHORING TO SUPPORT LOADS UNTIL PERMANENT CONSTRUCTION IS IN PLACE. REFER TO STRUCTURAL DOCUMENTS FOR ADDITIONAL REQUIREMENTS.
4. SELECTIVE DEMOLITION SHALL BE CARRIED OUT TO PROVIDE SAFETY, SECURITY AND WEATHER-TIGHTNESS OF THE BUILDING AT THE END OF EACH DAY OF WORK. CONTRACTOR IS RESPONSIBLE FOR STORAGE AND REMOVAL OF DEBRIS IN ACCORDANCE WITH LOCAL JURISDICTIONAL REGULATIONS. CONTRACTOR SHALL MAINTAIN THE BUILDING AND CONSTRUCTION SITE IN A SAFE AND SECURE MANNER.
5. WHERE SELECTIVE DEMOLITION REQUIRES REMOVAL OR CUTTING OF HISTORIC SURFACES OR COMPONENTS, CUTS SHALL BE MADE NEATLY AND CAREFULLY WITHOUT DAMING MATERIALS TO REMAIN.
6. WHERE SELECTIVE DEMOLITION RESULTS IN REMOVAL OF WOOD FLOOR, DOORS, WINDOWS, WOOD BASE OR SIMILAR WOOD TRIM OR DECORATIVE MATERIAL, REMOVE CAREFULLY AND SALVAGE FOR REUSE OR REPLICATION.
7. WHERE REMOVAL OF CASEWORK, MILLWORK, WALL ACCESSORIES, OR EQUIPMENT IS INDICATED, FILL HOLES AND PATCH EXISTING WALLS, BASE AND CEILINGS WHICH ARE TO REMAIN EXPOSED.
8. REMOVE ALL MISCELLANEOUS TILE CEILING CLIPS, WOOD BLOCKING TO REMAIN.
9. REMOVE ALL MISCELLANEOUS CARPET TACK STRIPS, PROTRUDING NAILS AND STAPLES. WHERE THERE IS UNCERTAINTY AS TO WETHER AN ITEM IS TO BE REMOVED, CONSULT WITH THE ARCHITECT.
10. REFER TO MECHANICAL, ELECTRICAL & PLUMBING DEMOLITION PLANS FOR ADDITIONAL INFORMATION. COORDINATE DEMOLITION WORK WITH EXISTING SECURITY AND TECHNOLOGY BY OTHERS.
11. WHERE REMOVING WALLS AND MOLDINGS, SALVAGE AND REUSE MOLDINGS WHERE POSSIBLE TO MATCH EXISTING.
12. DEMOLITION KEYNOTES CAN APPEAR ON PLANS OR ELEVATIONS, AND MAY NOT APPEAR ON EACH SHEET.
13. REMOVE MISCELLANEOUS ABANDONED CONDUITS AND WIRES.

DEMOLITION KEYNOTES

D.01 REMOVE DOOR, FRAME AND SILL. ENLARGE OPENING AS SHOWN ON NEW WORK FLOOR PLAN.
D.02 REMOVE FLOORING AND STRUCTURE FOR NEW STAIR, REFER TO STRUCTURAL FOR NEW FRAMING REQUIREMENTS OF OPENING..
D.03 REMOVE PARTITION FOR NEW OPENING, REFER TO STRUCTURAL FOR FRAMING REQUIREMENTS. SALVAGE WOOD TRIM FOR PATCHING AS REQUIRED.
D.04 REMOVE SIDING FOR NEW ADDITION WORK, COORDINATE EXTENT OF REMOVAL AND REPLACEMENT WITH NEW WORK. SALVAGE BOARDS AS REQUIRED FOR INFILL. REMOVAL OF SIDING TO BE LIMITED TO 4'-0" SECTIONS, PROVIDE SHEATHING IN SECTIONS REMOVED BEFORE REMOVING ADDITIONAL BOARDS.
D.05 APPROXIMATE EXTENTS OF NEW WORK.
D.06 REMOVE WOOD STEPS AND HANDRAILS. CONCRETE AND STONE LANDING TO REMAIN.
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D.09 REMOVE STAIR ENCLOSURE AND STAIRS TO SECOND FLOOR.
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D.12 SALVAGE HISTORIC WALL MOUNTED ITEM.
D.13 REMOVE DOORS, WALLS, FIXTURES AND ACCESSORIES AS INDICATED. REMOVE FLOOR FINISH TO BASE SUBSTRATE. REMOVE PERIMETER WALL AND CEILING FINISHES AS REQUIRED FOR NEW WORK.
D.14 REMOVE SLAB TO ALLOW FOR NEW FOUNDATION. REFER TO STRUCTURAL 8/S0-2 FOR FOUNDATION DETAIL.
D.15 PREP FASCIA AND SOFFIT FOR NEW WORK.
D.16 REMOVE SHUTTERS.
D.17 PREP SIDING AND TRIM FOR NEW WORK.
D.18 CELLAR DOORS AND FRAME TO BE REMOVED, RECONSTRUCTED, MATCH LOOK AND CONSTRUCTION.
D.19 REFURBISHED DOOR, REFER TO NEW WORK PLAN AND A-601 FOR ADDITIONAL INFORMATION
D.20 REFURBISHED WINDOW, REFER TO NEW WORK PLAN AND 7/A-602 FOR ADDITIONAL INFORMATION
D.21 REMOVE PLUMBING FIXTURES AND ACCESSORIES COMPLETE, REFER TO PLUMBING DRAWINGS FOR ADDITIONAL INFORMATION.
D.22 REMOVE AND SALVAGE STORM DOOR.
D.23 EXISTING MECHANICAL UNIT TO REMAIN, SEE MECHANICAL DRAWINGS FOR DUCTWORK DEMOLITION.
D.24 REMOVE PLASTER TO CLEAN EDGE, MAINTAIN AS MUCH PLASTER AS PRACTICAL. EXISTING LATH TO REMAIN.
D.25 REMOVE SIDING AND FRAMING FOR INSTALLATION OF NEW LOUVER, REFER TO MECHANICAL AND ARCHITECTURAL DETAILS FOR ADDITIONAL INFO.
D.26 REMOVE MISMATCHED CORNER BOARD REPAIR
D.27 REMOVE WHOLE SIDING BOARDS WHERE DAMAGED.
D.28 CEILING DEMOLITION: REMOVE CLIPS FOR ATTACHMENT OF NEW CEILING, EXISTING SLEEPERS TO REMAIN.
D.29 CEILING DEMOLITION: SALVAGE CROWN MOLDING FOR REUSE WHERE WALLS INDICATED TO BE REMOVED
D.30 CEILING DEMOLITION: SALVAGE CROWN MOLDING FOR REUSE, REMOVE FABRIC AND CEILING CLIPS.
D.31 CEILING DEMOLITION: REMOVE REMAINS OF CLIP-IN CEILING TILES AROUND PERIMETER, REMOVE CEILING CLIPS AS REQUIRED FOR NEW WORK.
D.32 CEILING DEMOLITION: REMOVE REMAINS OF CLIP-IN CEILING TILES AROUND PERIMETER, EXISTING CROWN MOLDING AND WOOD SLEEPERS TO REMAIN.
D.33 COMPLETELY REMOVE BOX OUT AND ASSOCIATED PIPING, PATCH FLOOR WHERE NECESSARY.
D.34 REMOVE CABINET COMPLETELY.
D.35 EXISTING LIGHT TO BE REMOVED, PATCH SIDING/TRIM SEE ELECTRICAL.
D.36 REMOVE STORM WINDOW OR WINDOW SCREEN.
D.37 REFURBISHED STORM WINDOW, REFER TO A-602 FOR ADDITIONAL INFORMATION.
D.38 REMOVE PLYWOOD STORM DOOR.

LEGEND

EXISTING WALL TO REMAIN

EXISTING WALL AND ASSOCIATED BASE TO BE DEMOLISHED

(X) NUMBER OF GLASS PANES TO BE REPLACED (CURRENTLY BROKEN, TYP)

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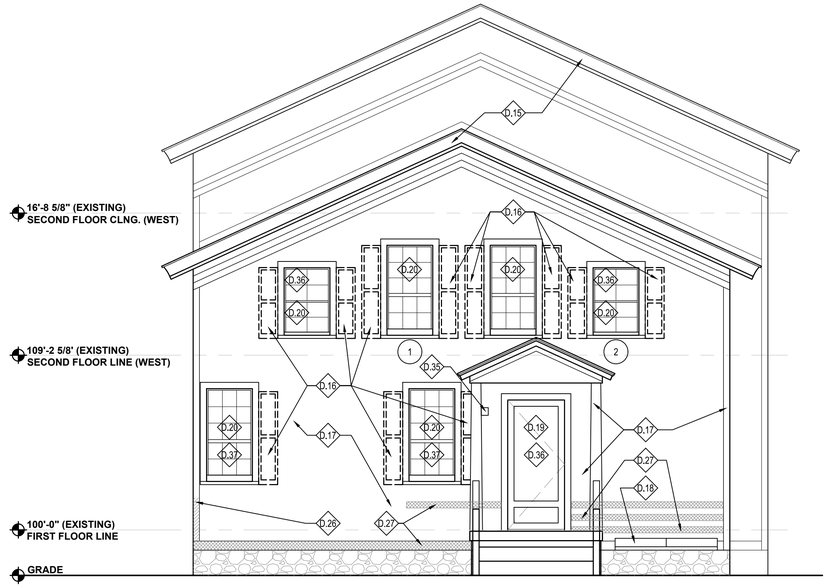
SEAL

REVISIONS		
1	ISSUED FOR BIDS	09/30/2019

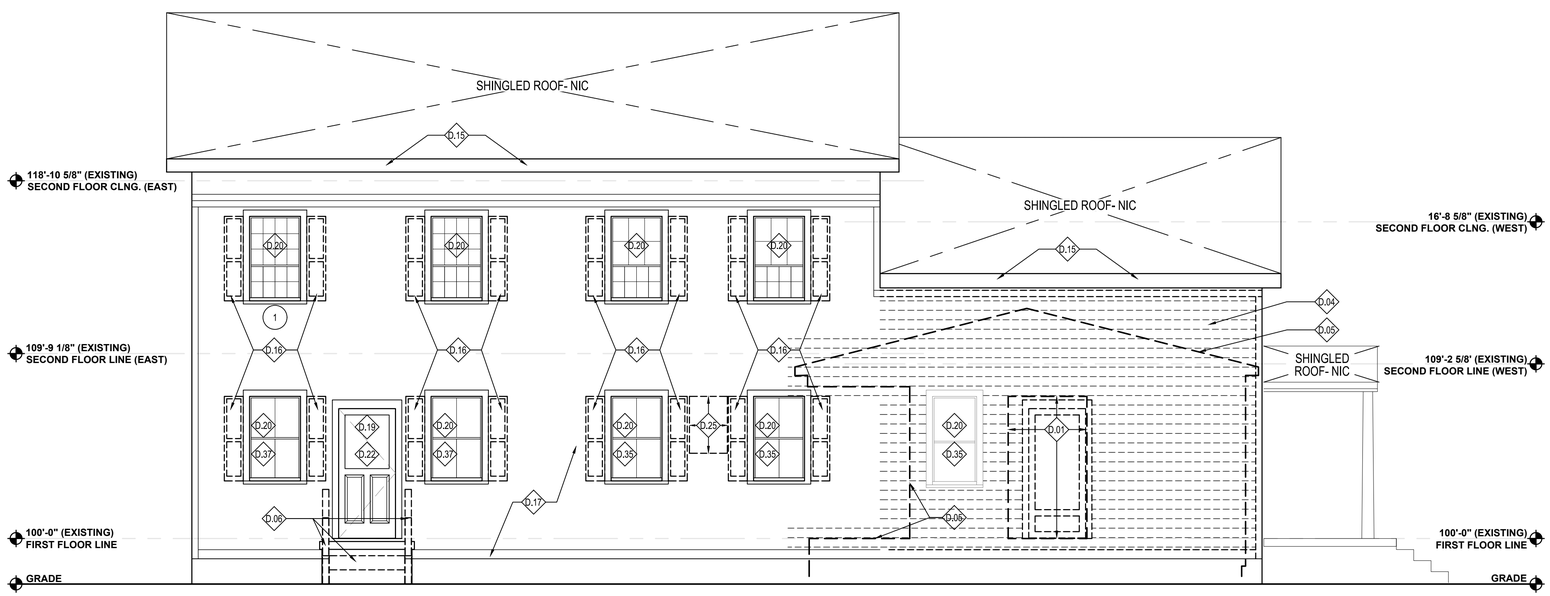
DATE	PROJ NUMBER	ARCH	PROJ MGR	CADD
09/30/2019	0128-18-0020	C O	C O	V V

City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road
EAST AND SOUTH DEMOLITION ELEVATIONS

SHEET AD201



2 WEST DEMOLITION ELEVATION
1/4" = 1'-0"



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SEAL

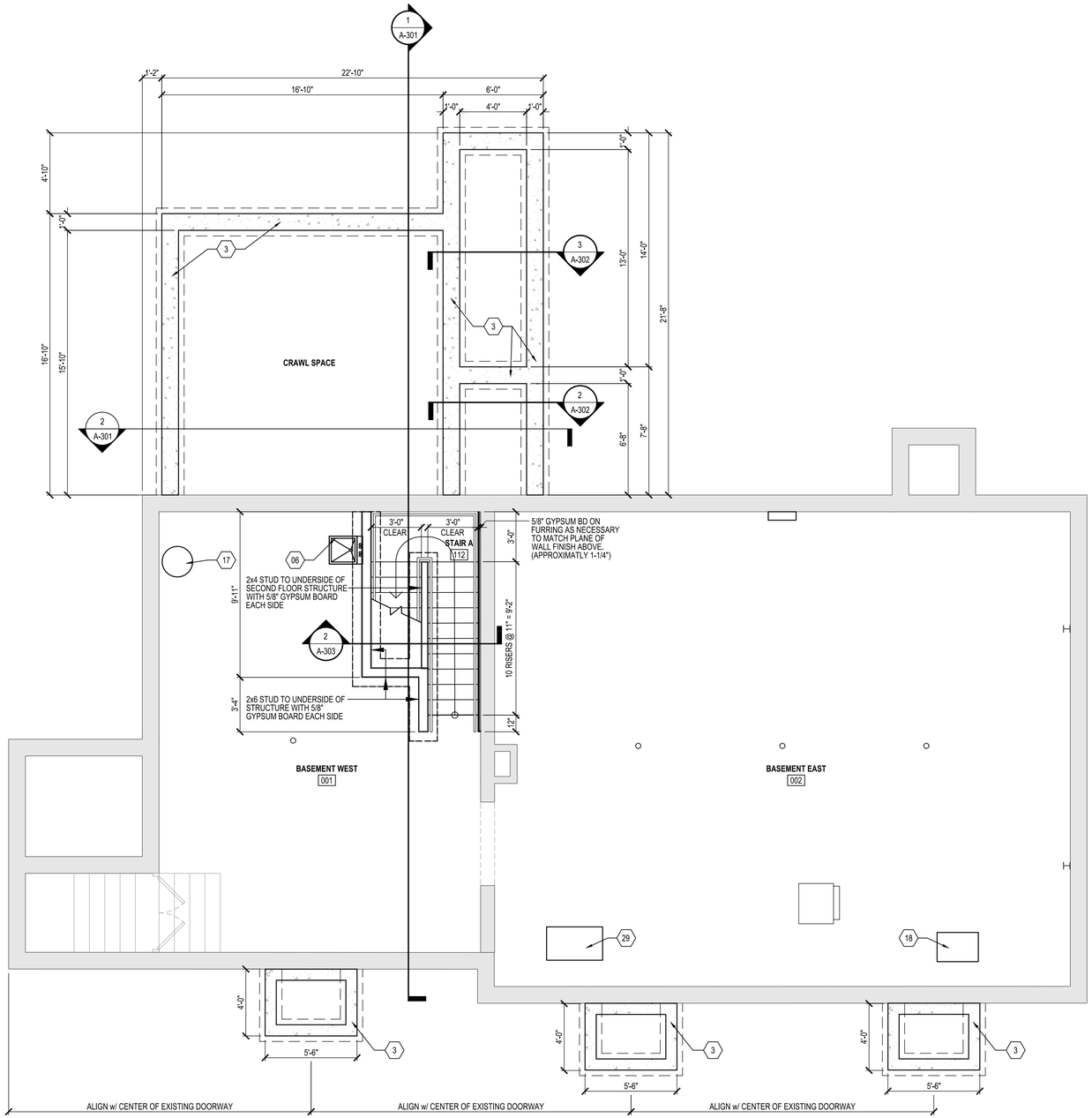
REVISIONS		
1	ISSUED FOR BIDS	09/30/2019

DATE	PROJ NUMBER	ARCH	PROJ MGR	CADD
09/30/2019	0128-18-0020	C O	C O	V V

City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

NORTH AND WEST DEMOLITION ELEVATIONS

SHEET AD202



1 **BASEMENT FLOOR PLAN**
1/4" = 1'-0"

GENERAL PLAN NOTES

1. FIRST FLOOR REFERENCE ELEVATION 100'-0" = 694.67.
2. ALL WALL DIMENSIONS ARE TO FINISHED FACE OF WALL, ROUGH OPENINGS FOR DOORS AND WINDOWS, AND FACE OF BRICK/CONCRETE OR FACE OF SHEATHING, UNO.
3. REFER TO CODE PLAN DRAWINGS (G-001) FOR LOCATIONS AND EXTENTS OF RATED ASSEMBLIES, AS WELL AS FIRE EXTINGUISHER LOCATIONS. IF PARTITION DESIGNATION DISCREPANCY OCCURS BETWEEN THE CODE DRAWING AND THE FLOOR PLANS, PROVIDE THE PARTITION TYPE INDICATED WITH THE MOST STRINGENT REQUIREMENTS.
4. REFER TO PROJECT INFORMATION SHEET (A-001) FOR MATERIAL /REFERENCE SYMBOLS AND ABBREVIATIONS
5. REFER TO DRAWING A-001 FOR TOILET ACCESSORIES AND MOUNTING DIAGRAMS.
6. REFER TO DRAWING A-601 FOR DOOR INFORMATION AND DETAILS
7. REFER TO A-602 FOR PUNCHED WINDOW TYPES AND DETAILS
8. REFER TO AI DRAWINGS FOR ROOM FINISHES.
9. WHERE NEW WALL CONSTRUCTION ABUTS EXISTING, IN-LINE, ON PLANS, DIRECTLY ALIGN NEW FINISH WALL SURFACE(S) WITH EXISTING.

NEW WORK PLAN KEYNOTES

1. MECHANICAL DUCT, REFER TO MECHANICAL DRAWINGS FOR SIZE AND ROUTING.
2. PROVIDE 2X STUD FRAMING, INFILL WITH GYPSUM BOARD EACH SIDE, ALIGN WITH FACE OF ADJACENT EXISTING FINISH.
3. FOUNDATIONS / FOOTINGS, REFER TO STRUCTURAL DRAWINGS.
4. MODIFY EXISTING FLOOR OPENING TO BE REUSED FOR NEW MECHANICAL GRILLE, PATCH OVERSIZED OPENINGS WITH WOOD TO MATCH EXISTING ADJACENT SURFACE. REFER TO MECHANICAL DRAWINGS FOR SIZING.
5. PROVIDE 5/16" MOISTURE RESISTANT GYPSUM BOARD ON EXISTING FINISH (PLASTER OR FIBERBOARD) ABOVE WAINSCOT REFER TO DETAIL 8/AI102 MOLDING TRANSITION DETAIL.
6. PROVIDE 1/4" GYPSUM BOARD ON EXISTING PLASTER WALLS ABOVE WAINSCOT, REFER TO DETAIL 8/AI102 FOR BASE AND MOLDING TRANSITION DETAIL.
7. PROVIDE FRP BOARD w/ 5/8" PLYWOOD BACKING ON EXISTING FINISH.
8. ACCESS PANEL: JL INDUSTRIES, TMW FLUSH ACCESS PANEL OR APPROVED EQUAL. SIZE 22"x30"
9. RELIEF AIR DUCT AND GRILLE TO EXTERIOR, REFER TO MECHANICAL DRAWINGS.
10. PATCH LOCATION OF PLUMBING ACCESS PANEL WITH NEW WALL.
11. PROVIDE NEW 5/8" GYPSUM BOARD AT EXISTING EXPOSED STUD WALL.
12. 24"X36" ACCESS PANEL TO CRAWL SPACE, REFER TO DETAIL 8/A-302.
13. RECONSTRUCT HATCH COVER TO BASEMENT, MATCH REMOVED EXISTING IN DESIGN AND CONSTRUCTION.
14. PROVIDE 5/8" GYPSUM BOARD WHERE PLASTER REMOVED AND LATH TO REMAIN.
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18. NEW FURNACE, REFER TO MECHANICAL DRAWINGS.
19. SIDEWALK BY OTHERS.
20. PROVIDE NEW CONCRETE STEPS AND METAL HAND / GUARDRAILS. REFER TO DETAIL 3/A-301
21. INFILL EXISTING STAIRWAY OPENING.
22. RIDGE VENT.
23. 2X4 STUD TO UNDERSIDE OF CEILING WITH 5/8" GYPSUM BOARD ONE SIDE.
24. 2X4 STUD TO UNDERSIDE OF CEILING WITH 5/8" GYPSUM BOARD ONE SIDE SIDE, ACOUSTIC BATTING.
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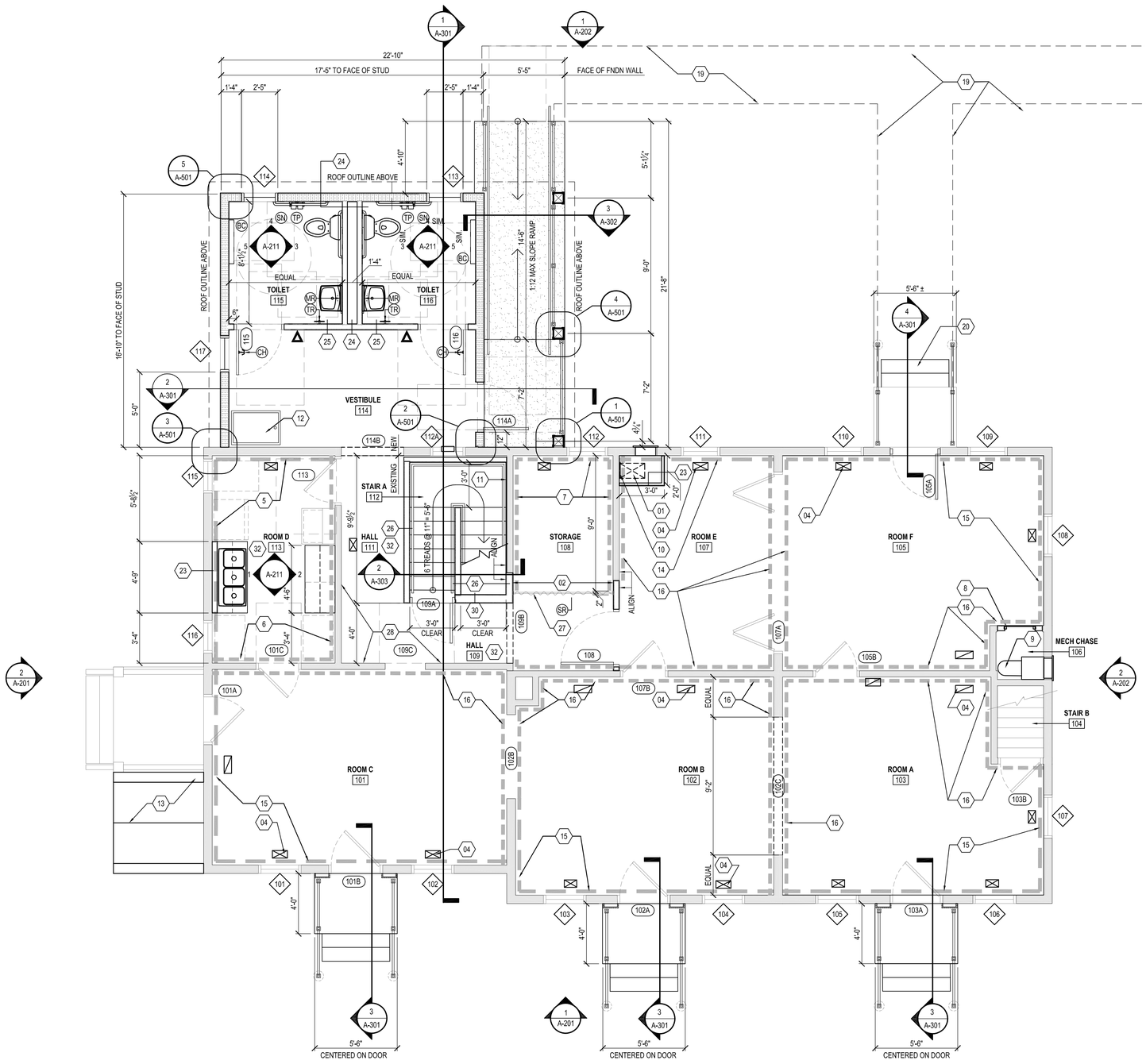
SEAL

REVISIONS:		
1	ISSUED FOR BIDS	09/30/2019

DATE	PROJ NUMBER	ARCH	PROJ MGR	CADD
08/30/2019	0126-18-2020	C O	C O	V V

City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road
BASEMENT FLOOR PLAN

SHEET A-101



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31. EAVE VENT - HARDIPLANK VENTED SOFFIT PANEL.
32. PROVIDE 1/2" PLYWOOD UNDERLAYMENT ON TOP OF BASE LAYER OF FLOORING.

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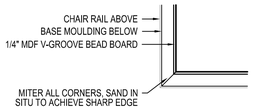
REVISIONS:	
1	ISSUED FOR BIDS 09/30/2019

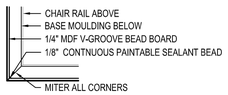
DATE	PROJ NUMBER	ARCH	PROJ MGR	CADD
09/30/2019	0126-18-0020	CO	CO	VV

City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road
FIRST FLOOR PLAN

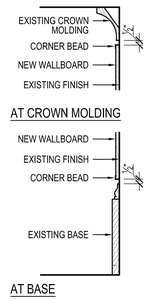
SHEET A-102



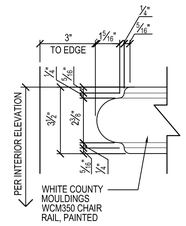
10 WAINSCOT OUTISDE CORNER DETAIL
3" = 1'-0"



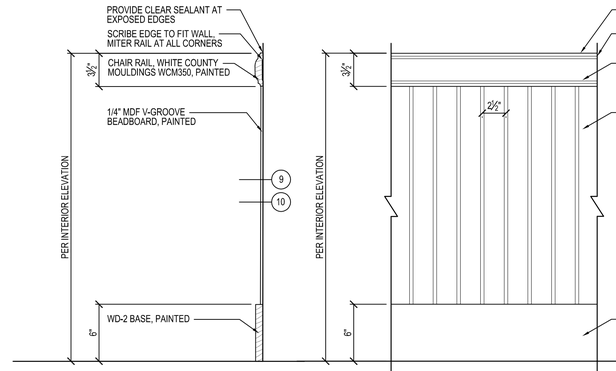
9 WAINSCOT INSIDE CORNER DETAIL
3" = 1'-0"



8 WALL TRANSITION DETAIL
N.T.S.

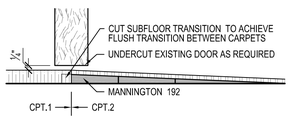


7 CHAIR RAIL RETURN END CONDITION
3" = 1'-0"

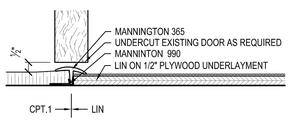


6 WAINSCOTING PROFILE
1-1/2" = 1'-0"

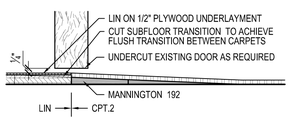
5 WAINSCOTING ELEVATION
1-1/2" = 1'-0"



13 TRANSITION AT LIN TO CPT.2
3" = 1'-0"



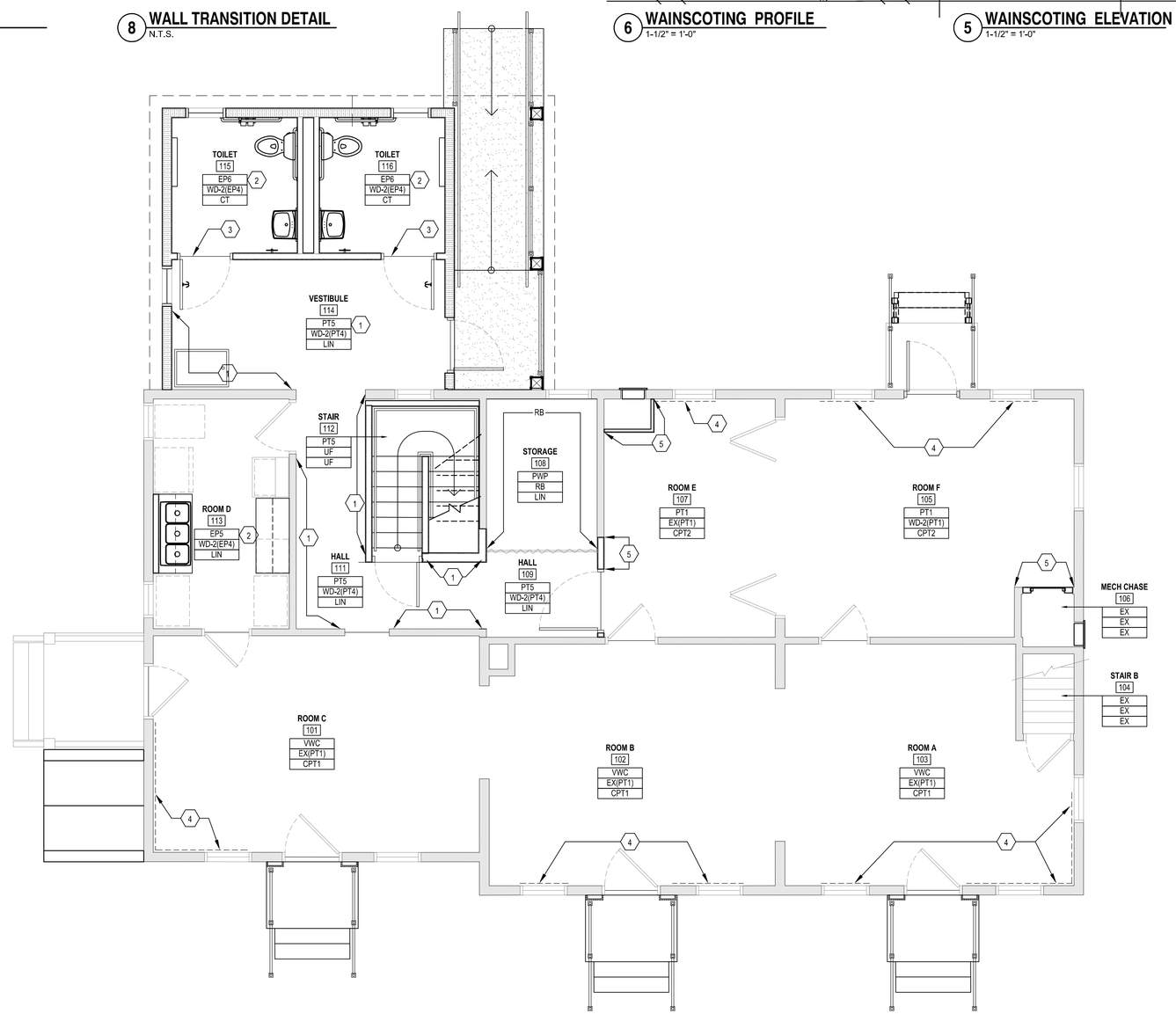
12 TRANSITION AT LIN TO CPT.2
3" = 1'-0"



11 TRANSITION AT LIN TO CPT.2
3" = 1'-0"

NOTE:
NEW WOOD TRIM PROFILES BASED ON COMMONLY AVAILABLE MOLDING PROFILES.

4 TYPICAL WOOD TRIM PROFILES
N.T.S.



1 FIRST FLOOR FINISH PLAN
1/4" = 1'-0"

GENERAL FINISH PLAN NOTES

1. REFER TO REFLECTED CEILING PLANS FOR CEILING TYPES, HEIGHTS, AND FINISH INFORMATION
2. AT CERAMIC TILE LOCATIONS, INSTALLER TO USE APPROPRIATE TROWEL TO ACCOMMODATE DIFFERENT TILE THICKNESSES.
3. PROVIDE ANTI-FRACTURE MEMBRANE AT ALL THINSET CERAMIC FLOOR TILE LOCATIONS, UNLESS OTHERWISE NOTED.
4. PROVIDE RESILIENT BASE AT TOE KICK OF ALL CASEWORK AND BEHIND ALL MOVABLE EQUIPMENT/APPLIANCES, WHEN SCHEDULED WITHIN A ROOM.
5. ALL WALL MOUNTED MECHANICAL EQUIPMENT (DIFFUSERS, GRILLES, ETC.) AND ELECTRICAL EQUIPMENT (PANELS, ETC.) SHALL BE PAINTED TO MATCH THE ADJACENT WALL COLOR. REFER TO MECHANICAL AND ELECTRICAL DRAWINGS FOR QUANTITIES AND LOCATIONS.
6. WHERE REMOVAL OR MODIFICATION TO A FINISH MATERIAL IS SHOWN, BUT NEW FINISHES ARE NOT SCHEDULED, PATCH AND REPAIR TO MATCH EXISTING FINISH CONDITION AS REQUIRED.
7. WHERE TWO DISSIMILAR FLOORING MATERIALS MEET, BUILD UP AND FEATHER IN UNDERLAYMENT OF THINNER PROFILE TO MEET THICKNESS OF ADJACENT FINISH.
8. ALL EXISTING WOOD BASE AND CROWN MOULDING TO BE PAINTED.
9. CROWN MOULDING, DOORS, DOOR AND WINDOW TRIM TO BE PAINTED TO MATCH PAINT COLOR OF BASE SCHEDULED IN EACH ROOM. REFER TO ROOM FINISH TAGS.

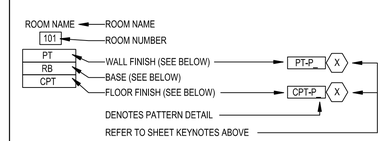
SHEET KEYNOTES

1. CHAIR RAIL LOCATION. REFER TO DETAIL 7/AI-102 FOR ADDITIONAL INFORMATION. CHAIR RAIL TO BE PAINTED PT5.
2. WAINSCOT LOCATION. REFER TO DETAIL 5/AI-102 FOR ADDITIONAL INFORMATION. WAINSCOT TO BE PAINTED PT4.
3. SOLID SURFACE THRESHOLD. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
4. INFILL BASE MOULDING WD-1.
5. PROVIDE BASE MOULDING WD-1 TO MATCH EXISTING.

FINISH LEGEND

ROOM FINISH TAGS
ROOM NAME AND NUMBER PLUS GENERAL ROOM FINISH INFORMATION.
FINISH TAGS SHALL APPLY TO ALL LIKE MATERIALS WITHIN A ROOM (UNO).

FINISH LEGEND
FINISH LEGEND IS GENERAL.
REFER TO SPECIFICATIONS FOR SPECIFIC FINISH INFORMATION.
MULTIPLE FINISH TYPES ARE DENOTED BY NUMBER FOLLOWING ABBREVIATION.



PL1 PLASTIC LAMINATE TYPE / COLOR (TAG APPLIES TO ALL CABINETS AND/OR COUNTERTOPS WITHIN THAT SPACE, UNO)

WALLS

EP	EPOXY PAINT
EX	EXISTING (NO NEW FINISH)
PT	PAINT
PWP	PROTECTIVE WALL PANEL
UF	UNFINISHED
VWC	VINYL WALL COVERING
WP	WOOD PANELING

BASE

EX	EXISTING (NO NEW FINISH)
NB	NO BASE
RB	RESILIENT BASE
UF	UNFINISHED
WD	WOOD BASE

FLOOR

CPT	CARPET
CT	CERAMIC TILE
EX	EXISTING (NO NEW FINISH)
HWD	HARDWOOD FLOORING
LIN	LINOLEUM
UF	UNFINISHED

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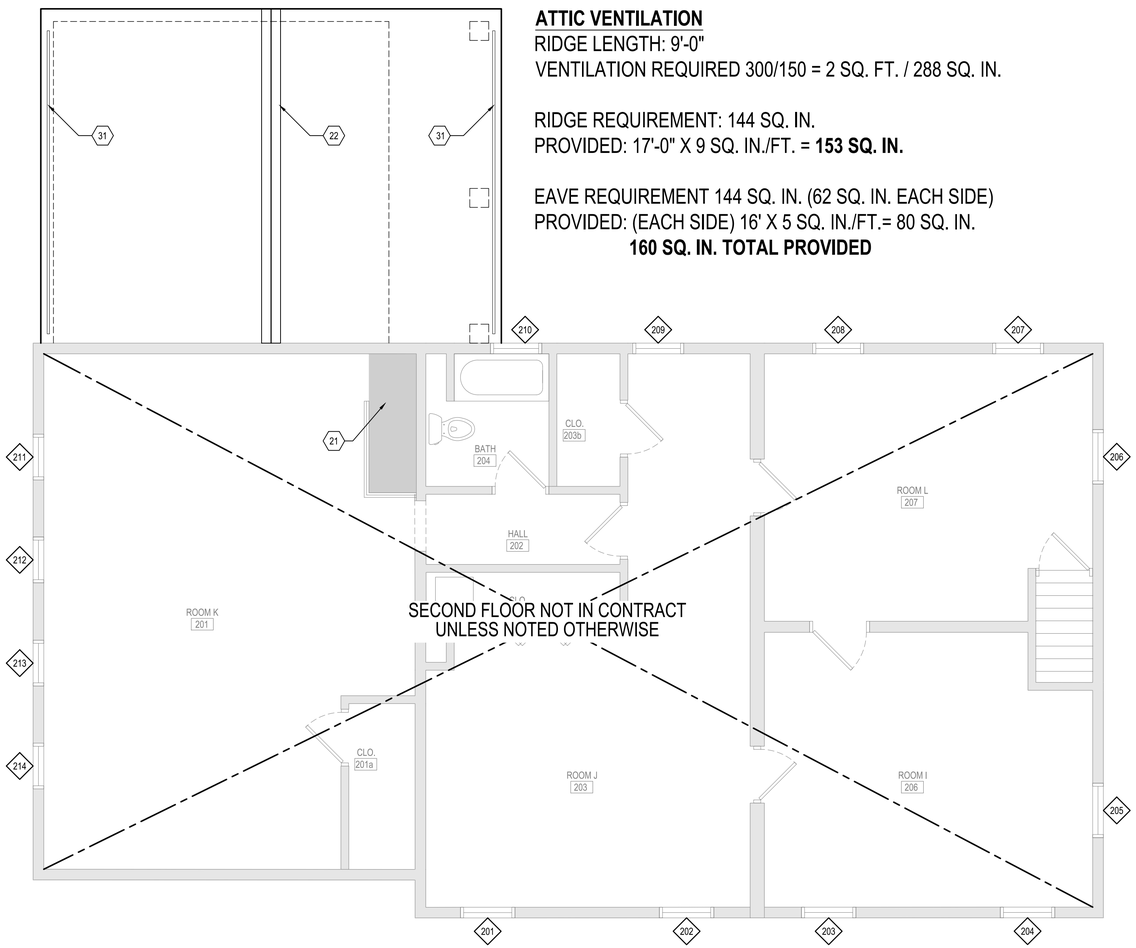
City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road
FIRST FLOOR FINISH PLAN

SHEET AI102



ATTIC VENTILATION

RIDGE LENGTH: 9'-0"

VENTILATION REQUIRED 300/150 = 2 SQ. FT. / 288 SQ. IN.

RIDGE REQUIREMENT: 144 SQ. IN.

PROVIDED: 17'-0" X 9 SQ. IN./FT. = **153 SQ. IN.**

EAVE REQUIREMENT 144 SQ. IN. (62 SQ. IN. EACH SIDE)

PROVIDED: (EACH SIDE) 16' X 5 SQ. IN./FT.= 80 SQ. IN.

160 SQ. IN. TOTAL PROVIDED

1 **SECOND FLOOR PLAN - NEW ROOF PLAN**

1/4" = 1'-0"

N

GENERAL PLAN NOTES

1. FIRST FLOOR REFERENCE ELEVATION 100'-0" = 694.67.
2. ALL WALL DIMENSIONS ARE TO FINISHED FACE OF WALL, ROUGH OPENINGS FOR DOORS AND WINDOWS, AND FACE OF BRICK/CONCRETE OR FACE OF SHEATHING, UNO.
3. REFER TO CODE PLAN DRAWINGS (G-001) FOR LOCATIONS AND EXTENTS OF RATED ASSEMBLIES, AS WELL AS FIRE EXTINGUISHER LOCATIONS. IF PARTITION DESIGNATION DISCREPANCY OCCURS BETWEEN THE CODE DRAWING AND THE FLOOR PLANS, PROVIDE THE PARTITION TYPE INDICATED WITH THE MOST STRINGENT REQUIREMENTS.
4. REFER TO PROJECT INFORMATION SHEET (A-001) FOR MATERIAL /REFERENCE SYMBOLS AND ABBREVIATIONS
5. REFER TO DRAWING A-001 FOR TOILET ACCESSORIES AND MOUNTING DIAGRAMS.
6. REFER TO DRAWING A-601 FOR DOOR INFORMATION AND DETAILS
7. REFER TO A-602 FOR PUNCHED WINDOW TYPES AND DETAILS
8. REFER TO AI DRAWINGS FOR ROOM FINISHES.
9. WHERE NEW WALL CONSTRUCTION ABUTS EXISTING, IN-LINE, ON PLANS, DIRECTLY ALIGN NEW FINISH WALL SURFACE(S) WITH EXISTING.

NEW WORK PLAN KEYNOTES

1. MECHANICAL DUCT, REFER TO MECHANICAL DRAWINGS FOR SIZE AND ROUTING.
2. PROVIDE 2X STUD FRAMING, INFILL WITH GYPSUM BOARD EACH SIDE, ALIGN WITH FACE OF ADJACENT EXISTING FINISH.
3. FOUNDATIONS / FOOTINGS, REFER TO STRUCTURAL DRAWINGS.
4. MODIFY EXISTING FLOOR OPENING TO BE REUSED FOR NEW MECHANICAL GRILLE, PATCH OVERSIZED OPENINGS WITH WOOD TO MATCH EXISTING ADJACENT SURFACE, REFER TO MECHANICAL DRAWINGS FOR SIZING.
5. PROVIDE 5/16" MOISTURE RESISTANT GYPSUM BOARD ON EXISTING FINISH (PLASTER OR FIBERBOARD) ABOVE WAINSCOT REFER TO DETAIL 8/AI102 MOLDING TRANSITION DETAIL.
6. PROVIDE 1/4" GYPSUM BOARD ON EXISTING PLASTER WALLS ABOVE WAINSCOT, REFER TO DETAIL 8/AI102 FOR BASE AND MOLDING TRANSITION DETAIL.
7. PROVIDE FRP BOARD w/ 5/8" PLYWOOD BACKING ON EXISTING FINISH.
8. ACCESS PANEL: JL INDUSTRIES, TMW FLUSH ACCESS PANEL OR APPROVED EQUAL. SIZE 22"x30"
9. RELIEF AIR DUCT AND GRILLE TO EXTERIOR, REFER TO MECHANICAL DRAWINGS.
10. PATCH LOCATION OF PLUMBING ACCESS PANEL WITH NEW WALL.
11. PROVIDE NEW 5/8" GYPSUM BOARD AT EXISTING EXPOSED STUD WALL.
12. 24"X36" ACCESS PANEL TO CRAWL SPACE, REFER TO DETAIL 8/A-302.
13. RECONSTRUCT HATCH COVER TO BASEMENT, MATCH REMOVED EXISTING IN DESIGN AND CONSTRUCTION.
14. PROVIDE 5/8" GYPSUM BOARD WHERE PLASTER REMOVED AND LATH TO REMAIN.
15. PROVIDE 5/16" MOISTURE RESISTANT GYPSUM BOARD ON EXISTING FINISH (PLASTER OR FIBERBOARD) REFER TO DETAIL 8/AI102 FOR BASE AND MOLDING TRANSITION DETAIL.
16. PROVIDE 1/4" GYPSUM BOARD ON EXISTING PLASTER WALLS, REFER TO DETAIL 8/AI102 FOR BASE AND MOLDING TRANSITION DETAIL.
17. NEW DOMESTIC WATER HEATER, REFER TO MECHANICAL DRAWINGS.
18. NEW FURNACE, REFER TO MECHANICAL DRAWINGS.
19. SIDEWALK BY OTHERS.
20. PROVIDE NEW CONCRETE STEPS AND METAL HAND / GUARDRAILS. REFER TO DETAIL 3/A-301
21. INFILL EXISTING STAIRWAY OPENING.
22. RIDGE VENT.
23. 2X4 STUD TO UNDERSIDE OF CEILING WITH 5/8" GYPSUM BOARD ONE SIDE.
24. 2X4 STUD TO UNDERSIDE OF CEILING WITH 5/8" GYPSUM BOARD ONE SIDE SIDE, ACOUSTIC BATTING.
25. 2X4 STUD TO UNDERSIDE OF CEILING WITH 5/8" GYPSUM BOARD EACH SIDE, ACOUSTIC BATTING.
26. 2X4 STUD TO UNDERSIDE OF CEILING WITH 5/8" GYPSUM BOARD EACH SIDE.
27. CLOSET ROD: EPCO ROUND MOUNTING FLANGE CLOSET ROD SUPPORT (EPC-857-ORB;) OIL RUBBED BRONZE OR APPROVED EQUAL. 1-5/19" ROD, BLACK. MOUNT @ 7'-4" AFF. PROVIDE BLOCKING IN WALL FOR ATTACHMENT.
28. CLEAN EXISTING WALLS, PATCH PENETRATIONS, PROVIDE TWO LAYERS OF SKIM COAT OVER EXISTING WALLS TO PROVIDE LEVEL 4 FINISH.
29. ENERGY RECOVERY UNIT, REFER TO MECHANICAL.
30. 2X6 STUD TO UNDERSIDE OF CEILING WITH 5/8" GYPSUM BOARD EACH SIDE.
31. EAVE VENT - HARDIPLANK VENTED SOFFIT PANEL.

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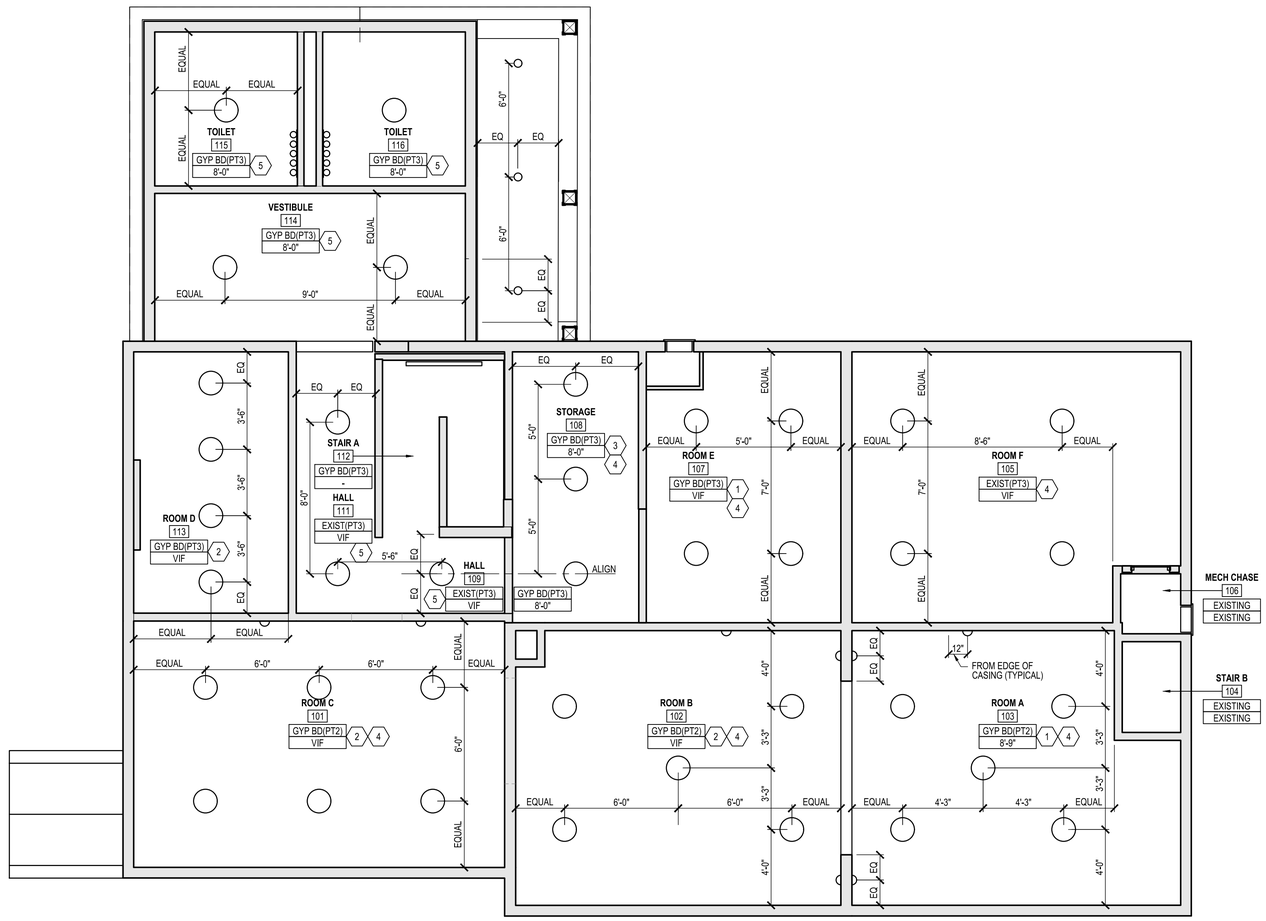
City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

SECOND FLOOR PLAN - NEW ROOF PLAN

SHEET A-103



1 **FIRST FLOOR REFLECTED CEILING PLAN**
1/4" = 1'-0"

N

GENERAL RCP NOTES

1. REFER TO MECHANICAL AND ELECTRICAL DRAWINGS FOR QUANTITY & TYPE OF CEILING MOUNTED FIXTURES & DEVICES, ETC.
2. REFERENCE MECHANICAL AND ELECTRICAL DRAWINGS FOR MOUNTING LOCATIONS OF ITEMS WHERE NO CEILING IS REQUIRED OR INDICATED
3. COORDINATE SIZE AND LOCATION OF ALL ACCESS PANELS WITH MECHANICAL AND ELECTRICAL DRAWINGS.
4. ALL FRAMES ON HVAC DIFFUSERS LOCATED IN GYP BD. CEILINGS SHALL BE PAINTED TO MATCH THE CEILING COLOR
5. REFER TO ELECTRICAL DRAWINGS FOR LIGHTING FIXTURE SCHEDULE

SHEET KEYNOTES

1. PROVIDE 2X4 FRAMING LAID HORIZONTALLY TO BOTTOM OF EXISTING CEILING. FASTEN AT EACH FLOOR JOIST w/ (2) #10X4" FLAT HEAD WOOD SCREWS. PROVIDE SHIMS AS REQUIRED TO PROVIDE LEVEL CEILING. ATTACH 3/8" GYPSUM BOARD TO FRAMING.
2. ATTACH 3/8" GYPSUM BOARD TO EXISTING WOOD FRAMING.
3. PROVIDE 2X FRAME FOR DROP CEILING. ATTACH TO WALLS OR CEILING ABOVE.
4. EXISTING MOULDING TO REMAIN. FILL IN AS REQUIRED TO MATCH. REFER TO FINISH PLAN FOR PAINT INFORMATION.
5. NEW CROWN MOULDING CM-1, REFER TO FINISH PLAN FOR PAINT INFO.

LEGEND

CEILING FINISH KEY
ROOM NAME AND NUMBER PLUS GENERAL CEILING FINISH AND HEIGHT UNLESS NOTED OTHERWISE BY FINISH KEY.

FINISH KEY
SPECIFIC FINISH INFORMATION WHERE VARIED FROM CEILING FINISH KEY

ROOM NAME ← ROOM NAME
101 ← ROOM NUMBER
ACT / 9'-0" → CEILING FINISH ABBREVIATION (SEE BELOW) → ALUM / 8'-10"
CEILING HEIGHT (A.F.F.)

CEILING FINISH ABBREVIATIONS

ACT	ACOUSTICAL LAY-IN CEILING TILE
EXIST.	EXISTING
EXP(P)	EXPOSED CONSTRUCTION - TO BE PAINTED
EX-GYP(P)	EXISTING GYPSUM BOARD - TO BE PAINTED
GYP BD(P)	GYPSUM BOARD - TO BE PAINTED
PT	PAINT
UF	UNFINISHED

LIGHTING FIXTURES
REFER TO ELECTRICAL FOR DESIGNATIONS AND SPECIFICATIONS

- SURFACE MOUNT DOWNLIGHT
- RECESSED DOWNLIGHT
- SURFACE MOUNT WALL SCONCE
- SURFACE (WALL) MOUNT VANITY FIXTURE

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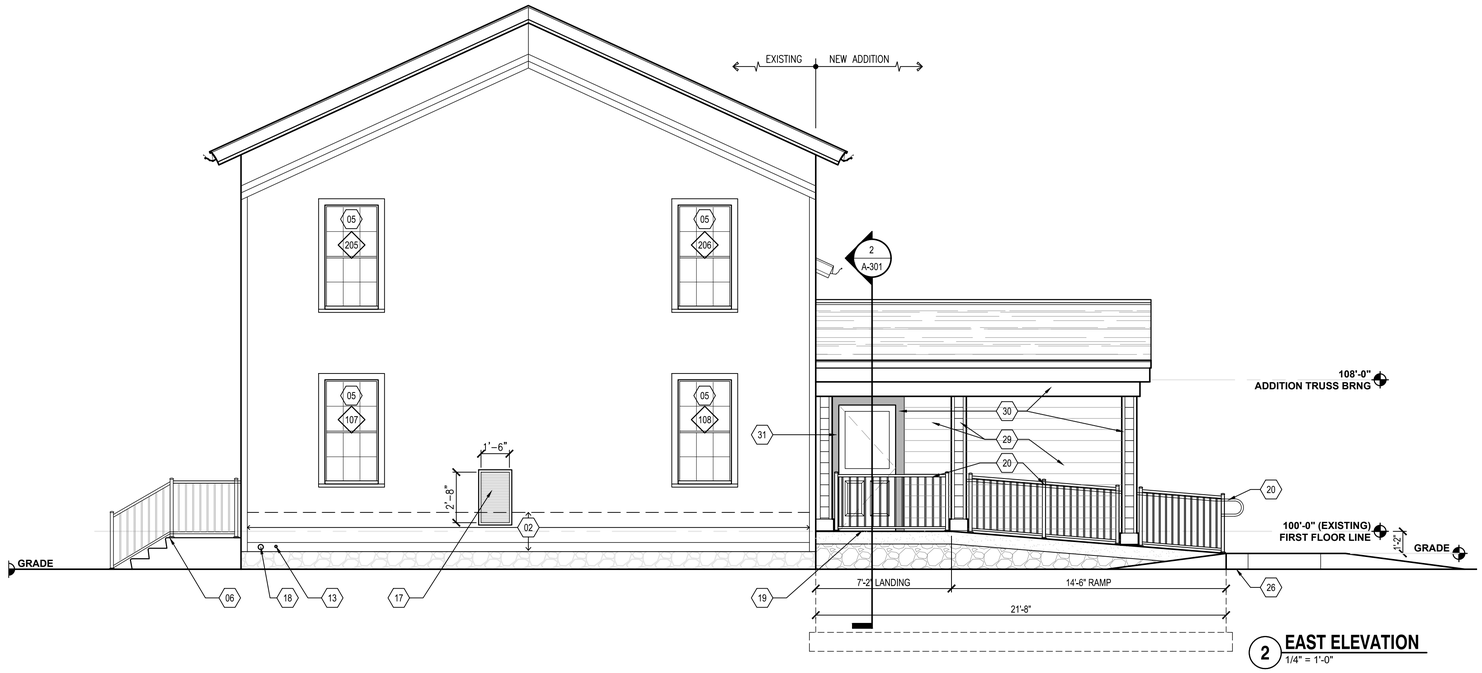
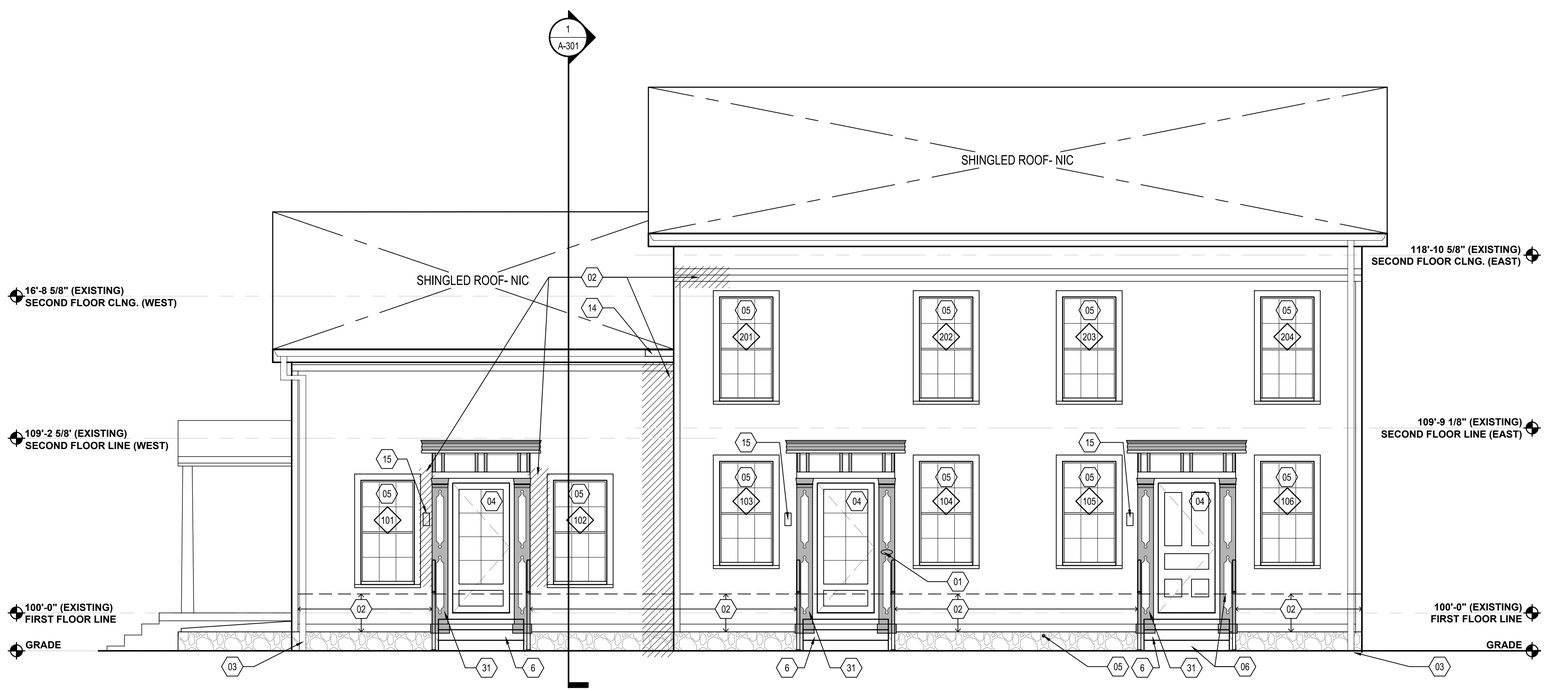
City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road
FIRST FLOOR REFLECTED CEILING PLAN

SHEET A-104



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



1 **SOUTH ELEVATION**
1/4" = 1'-0"

GENERAL ELEVATION NOTES

1. PREP. AND PAINT ALL EXTERIOR WOOD SURFACES. PROVIDE ADDITIONAL PAINTING AS INDICATED AND PER SPECIFICATIONS. PAINT EXPOSED VENTS, LOUVERS, AND SIMILAR ITEMS TO MATCH ADJACENT SURFACES.
2. EXTEND EACH DOWNSPOUT DOWNWARD AND PROVIDE ELBOW TERMINATION. CONNECT TO UNDERGROUND EDGE DRAIN (PROVIDED & INSTALLED BY CITY).

SHEET KEYNOTES

1. REINSTALL PLAQUE.
2. IN ADDITION TO BASIC PAINTING TREATMENT, PROVIDE ADDITIONAL PAINT PREP FOR SEVERELY WEATHERED SURFACES PER SPECIFICATIONS (TYPICAL AT LOWER COURSES OF SIDING WHERE INDICATED).
3. CONNECT DOWNSPOUT TO NEW UNDERGROUND EDGE DRAIN (PROVIDED & INSTALLED BY CITY).
4. REFURBISHED DOOR, REFER TO A-601 FOR ADDITIONAL INFORMATION
5. REFURBISHED WINDOW, REFER TO A-602 FOR ADDITIONAL INFORMATION
6. NEW CONCRETE LANDING & CONCRETE STEPS W/ HANDRAILS.
7. CELLAR DOORS: IN ADDITION TO BASIC PAINTING TREATMENT, PROVIDE ADDITIONAL PAINT PREP FOR SEVERELY WEATHERED SURFACES PER SPECIFICATIONS.
8. REPLACE 3-PIECE SKIRT BOARD WITH ONE BOARD CONTINUOUS FROM CORNER TO PORCH.
9. REMOVE MISMATCHED CORNER BOARD REPAIR. REPLACE WITH WOOD MILLED TO PROPER THICKNESS TO MATCH EXISTING.
10. REPLACE WHOLE SIDING BOARDS WHERE DAMAGED, WHERE RAIL MEETS HOUSE.
11. REPLACE EXISTING FLASHING WITH LEAD-COATED COPPER STEPPED FLASHING.
12. REPAIR HOLE IN SIDING; REMOVE SIDING TO NEAREST STUDS, PATCH IN NEW PIECE OF SIDING TO MATCH EXISTING.
13. PROVIDE NEW H.B. COORDINATE W/ MECHANICAL.
14. PATCH MISSING SECTION OF DOWNSPOUT WITH NEW TO MATCH EXISTING.
15. NEW LIGHT, REFER TO ELECTRICAL.
16. THIS NOTE UNUSED.
17. NEW WD. FRAMED WD. LOUVER., PTD. (AREA: 4 SF; FREE AREA: 2 SF).
18. NEW FURNACE FLUE (CONCENTRIC VENT). COORDINATE FINAL LOCATION w/ MECHANICAL REQUIREMENTS.
19. NEW CONCRETE STEPS, METAL RAILINGS, EXISTING CONCRETE LANDING.
20. ALUMINUM HAND RAIL & POSTS.
21. CUT OUT DAMAGED PORTION OF FASCIA AND FRIEZE BOARD TO NEAREST RAFTER ENDS; REPLACE WITH NEW BOARDS OF MATCHING THICKNESS.
22. PROVIDE NEW GUTTER & DOWNSPOUT, MATCH PROFILE OF EXISTING.
23. REMOVE & REINSTALL MISALIGNED CORNER BOARDS.
24. SCRUB CLEAN, TREAT ALGAE WITH BLEACH SOLUTION, ALLOW TO DRY FULLY, PREP FOR SEVERELY WEATHERIZED SURFACES PER SPECIFICATIONS; PAINT.
25. APPLY SEALANT AROUND TRIM BOARD; PRIME AND PAINT.
26. APPROXIMATE LINE OF NEW GRADE, BOTH SIDES OF SLOPED CONCRETE WALK (PROVIDED BY CITY).
27. CULTURED STONE.
28. INFILL MISSING SECTION OF GUTTER.
29. FIBER CEMENT SIDING
30. FIBER CEMENT TRIM
31. PAINT PT-8

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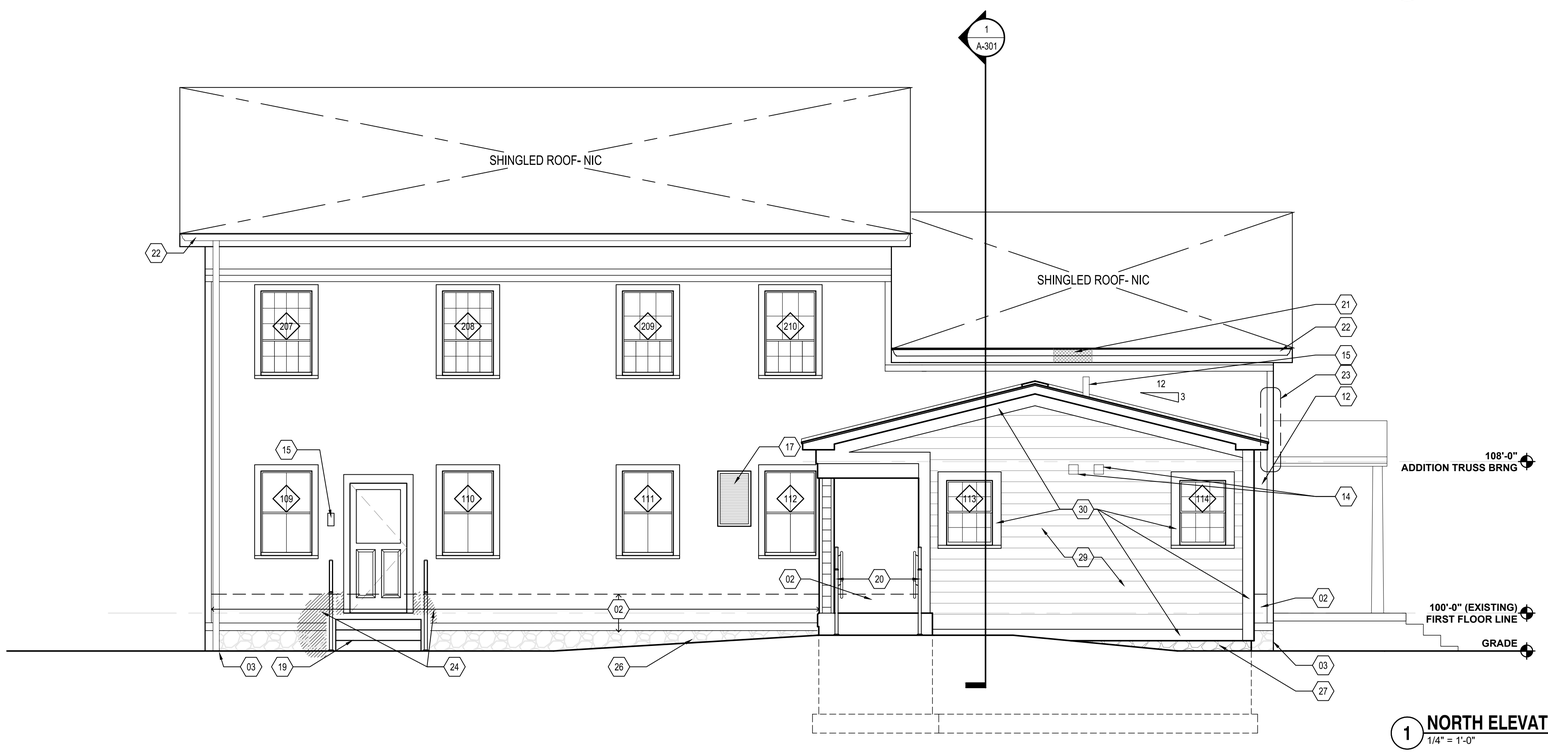
City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

SOUTH AND EAST ELEVATIONS

SHEET A-201

2 WEST ELEVATION
1/4" = 1'-0"



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

GENERAL ELEVATION NOTES

1. PREP, AND PAINT ALL EXTERIOR WOOD SURFACES. PROVIDE ADDITIONAL PAINTING AS INDICATED AND PER SPECIFICATIONS. PAINT EXPOSED VENTS, LOUVERS, AND SIMILAR ITEMS TO MATCH ADJACENT SURFACES.
2. EXTEND EACH DOWNSPOUT DOWNWARD AND PROVIDE ELBOW TERMINATION. CONNECT TO UNDERGROUND EDGE DRAIN (PROVIDED & INSTALLED BY CITY).

SHEET KEYNOTES

1. REINSTALL PLAQUE.
2. IN ADDITION TO BASIC PAINTING TREATMENT, PROVIDE ADDITIONAL PAINT PREP FOR SEVERELY WEATHERED SURFACES PER SPECIFICATIONS (TYPICAL AT LOWER COURSES OF SIDING WHERE INDICATED).
3. CONNECT DOWNSPOUT TO NEW UNDERGROUND EDGE DRAIN (PROVIDED & INSTALLED BY CITY).
4. REFURBISHED DOOR, REFER TO A-601 FOR ADDITIONAL INFORMATION
5. REFURBISHED WINDOW, REFER TO A-602 FOR ADDITIONAL INFORMATION
6. NEW CONCRETE LANDING & CONCRETE STEPS W/ HANDRAILS.
7. CELLAR DOORS: IN ADDITION TO BASIC PAINTING TREATMENT, PROVIDE ADDITIONAL PAINT PREP FOR SEVERELY WEATHERED SURFACES PER SPECIFICATIONS.
8. REPLACE 3-PIECE SKIRT BOARD WITH ONE BOARD CONTINUOUS FROM CORNER TO PORCH.
9. REMOVE MISMATCHED CORNER BOARD REPAIR. REPLACE WITH WOOD MILLED TO PROPER THICKNESS TO MATCH EXISTING.
10. REPLACE WHOLE SIDING BOARDS WHERE DAMAGED, WHERE RAIL MEETS HOUSE.
11. REPLACE EXISTING FLASHING WITH LEAD-COATED COPPER STEPPED FLASHING.
12. REPAIR HOLE IN SIDING; REMOVE SIDING TO NEAREST STUDS, PATCH IN NEW PIECE OF SIDING TO MATCH EXISTING.
13. PROVIDE NEW H.B. COORDINATE W/ MECHANICAL.
14. PATCH MISSING SECTION OF DOWNSPOUT WITH NEW TO MATCH EXISTING.
15. NEW LIGHT, REFER TO ELECTRICAL.
16. THIS NOTE UNUSED.
17. NEW WD. FRAMED W/D. LOUVER., PTD. (AREA: 4 SF; FREE AREA: 2 SF).
18. NEW FURNACE FLUE (CONCENTRIC VENT). COORDINATE FINAL LOCATION w/ MECHANICAL REQUIREMENTS.
19. NEW CONCRETE STEPS, METAL RAILINGS, EXISTING CONCRETE LANDING.
20. ALUMINUM HAND RAIL & POSTS.
21. CUT OUT DAMAGED PORTION OF FASCIA AND FRIEZE BOARD TO NEAREST RAFTER ENDS; REPLACE WITH NEW BOARDS OF MATCHING THICKNESS.
22. PROVIDE NEW GUTTER & DOWNSPOUT, MATCH PROFILE OF EXISTING.
23. REMOVE & REINSTALL MISALIGNED CORNER BOARDS.
24. SCRUB CLEAN, TREAT ALGAE WITH BLEACH SOLUTION, ALLOW TO DRY FULLY, PREP FOR SEVERELY WEATHERIZED SURFACES PER SPECIFICATIONS; PAINT.
25. APPLY SEALANT AROUND TRIM BOARD; PRIME AND PAINT.
26. APPROXIMATE LINE OF NEW GRADE, BOTH SIDES OF SLOPED CONCRETE WALK (PROVIDED BY CITY).
27. CULTURED STONE.
28. INFILL MISSING SECTION OF GUTTER.
29. FIBER CEMENT SIDING
30. FIBER CEMENT TRIM
31. PAINT PT-8

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1	ISSUED FOR BIDS	09/30/2019

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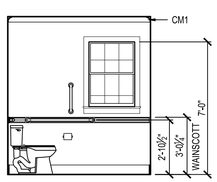
09/30/2019	0128-18-0020	C O	C O	V V

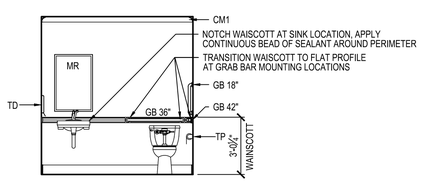
City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

NORTH AND WEST ELEVATIONS

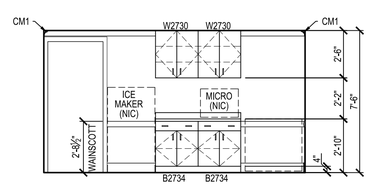
SHEET A-202



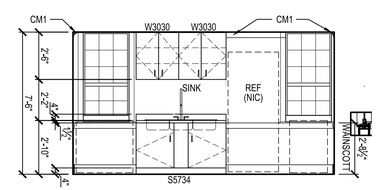
4 **TOILET 115, 116 SIM**
1/4" = 1'-0"



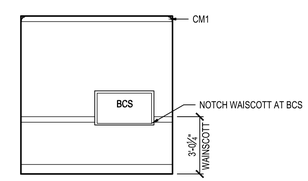
3 **TOILET 115, 116 SIM**
1/4" = 1'-0"



2 **ROOM D 113**
1/4" = 1'-0"



1 **ROOM D 113**
1/4" = 1'-0"



5 **TOILET 115, 116 SIM**
1/4" = 1'-0"

GENERAL CASEWORK NOTES

1. CABINET WIDTHS TO BE BASED ON MODULE INCREMENTS OF 3" UNO.
2. PROVIDE FILLER PANELS TO FINISH OUT TO SCRIBE CABINETS TO WALL.
3. PROVIDE FILLER PANELS AND TRIM WHERE EQUIPMENT IS LOCATED WITHIN CABINETS.
4. PROVIDE FINISHED END PANELS END RETURNS AT OPEN ENDED CABINETS, KNEE SPACES, AND ACCESSIBLE SINKS.
5. PROVIDE 1 ½" THICK FINISHED END PANEL AT FREE STANDING END OF ACCESSIBLE SINKS AND KNEE SPACES.
6. WHEN FILLER PANELS ARE REQUIRED AT BOTH ENDS OF CASEWORK TERMINATION. BOTH FILLER PANELS SHALL BE EQUAL WIDTH.
7. PROVIDE WALL BRACKET SUPPORTS AT 36" OC MAX TO SUPPORT COUNTERTOP AT CONTINUOUS KNEE SPACE.
8. PROVIDE END SPLASH WHEN COUNTERTOP IS ADJACENT TO WALL AT SIDES.
9. PROVIDE ADJUSTABLE SHELVES IN CABINETS AT THE FOLLOWING LOCATIONS UNO ON ELEVATIONS
   A. BASE CABINET - 1 SHELF
   B. FULL HEIGHT CABINET - 5 SHELVES, 1 FIXED
   C. WALL CABINET - 2 SHELVES
   D. NOTE: SHELVES TO BE 3/4" THICK FOR SPANS UP TO 32" AND 1" THICK FOR SPANS UP TO 36"

SHEET KEYNOTES

LEGEND

CASEWORK INDICATOR

CABINET TYPE (SEE ABBREVIATIONS BELOW)
WIDTH IN INCHES (TWO DIGITS)
HEIGHT IN INCHES (TWO DIGITS)
DEPTH IN INCHES (TWO DIGITS), IF DIFF. FROM TYPICAL
SPECIAL CONDITION (SEE ABBREVIATIONS BELOW)

S2436-12-RF

CABINET TYPES

B	BASE CABINET
BC	BASE BLIND CORNER
C	BASE CORNER
DX-	DRAWER BASE (X = QTY.)
LS	LAZY SUSAN CORNER
M	MICROWAVE BASE
O	OPEN BASE CABINET
S	SINK BASE
T	TALL CABINET
TC	TALL CUSTOM
W	WALL CABINET
WC	WALL CORNER
WO	OPEN WALL CABINET

SPECIAL CONDITIONS

A	ACCESSIBLE
AP	APRON
E	FINISHED END PANEL
F	SCRIBE FILLER
L	LOCKABLE
RF	REMOVEABLE FRONT
SB	SUPPORT BRACKET
SP	SUPPORT PANEL

ACCESSIBLE CABINETS
- WALL CABINET
  BOTTOM SHELF @ 48" MAX
- BASE CABINETS
  34" COUNTER HEIGHT

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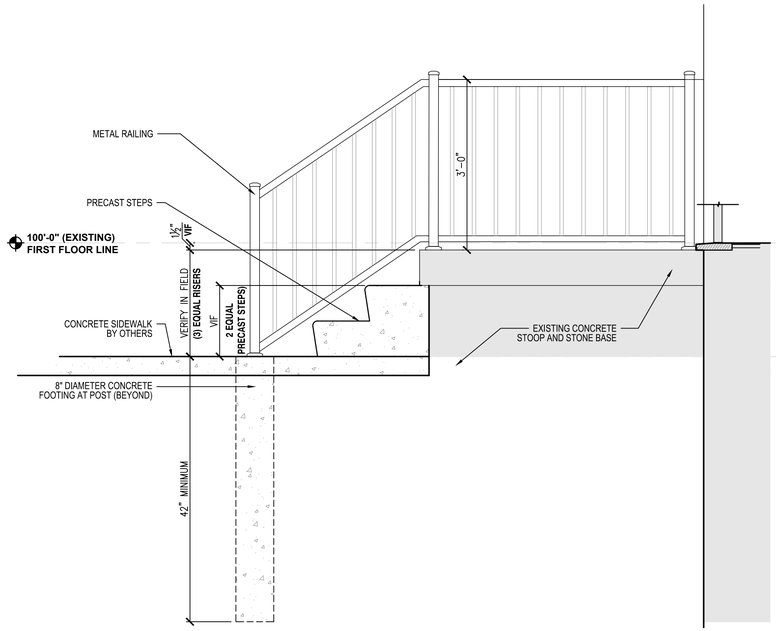
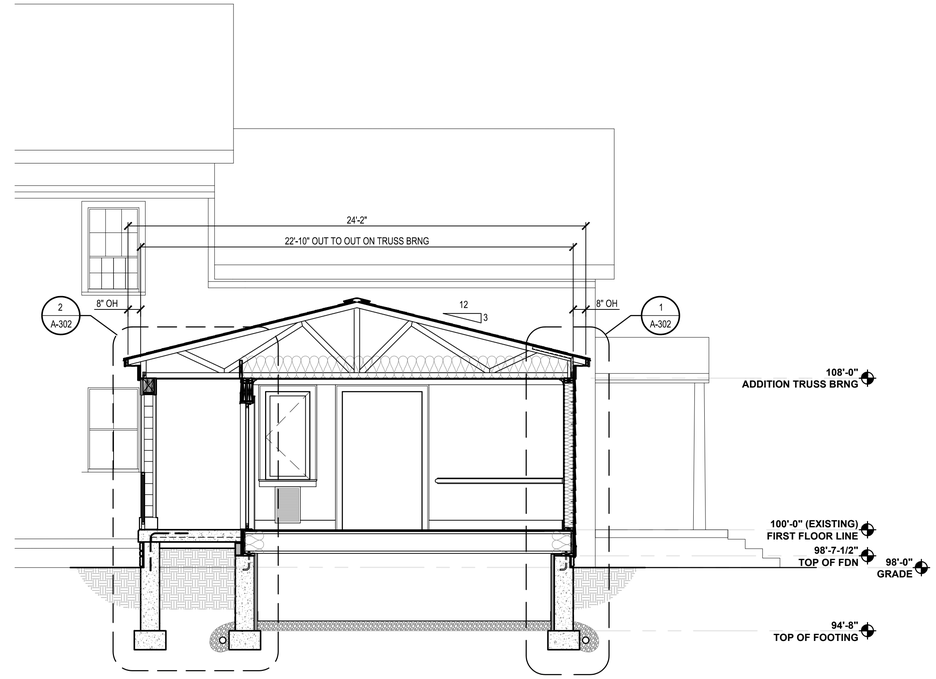
Niles-Barnard House Renovation
60 W. Wattles Road

INTERIOR ELEVATIONS

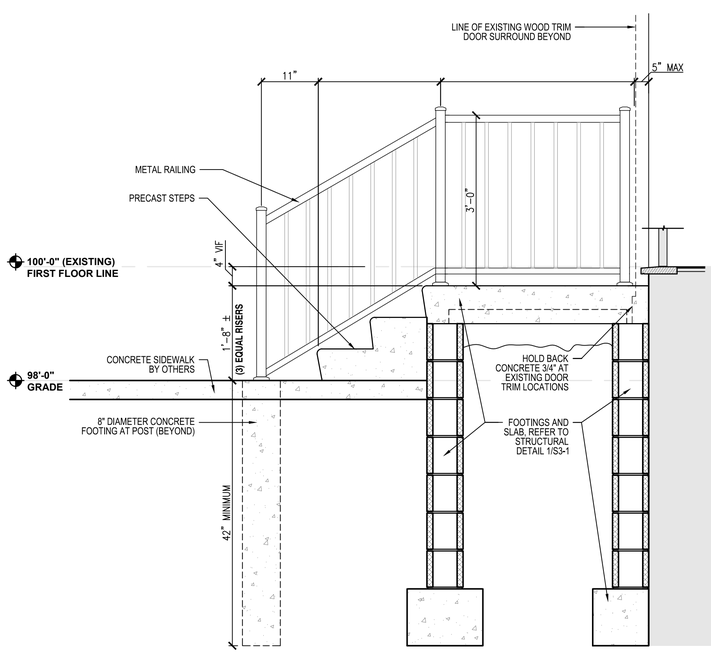
SHEET A-211



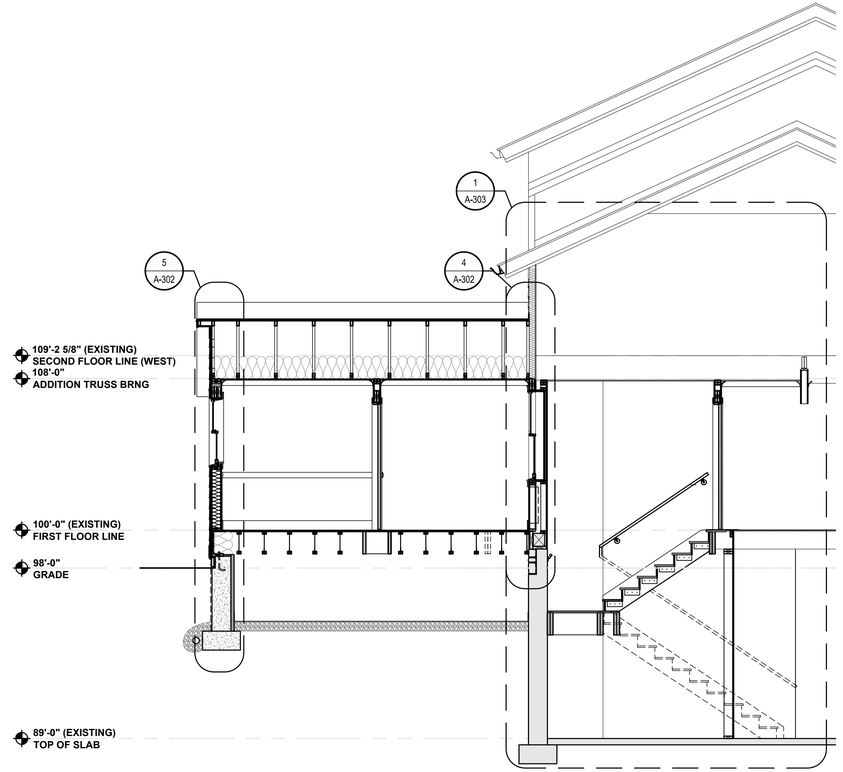
4 **CONCRETE STEPS AND RAILING AT DOOR 101A**
3/4" = 1'-0"



2 **SECTION TROUGH ADDITION VESTIBULE**
1/4" = 1'-0"



3 **TYPICAL NEW STOOP**
3/4" = 1'-0"



1 **SECTION TROUGH ADDITION AND NEW STAIRWAY**
1/4" = 1'-0"

GENERAL BUILDING SECTION NOTES

SHEET KEYNOTES

LEGEND

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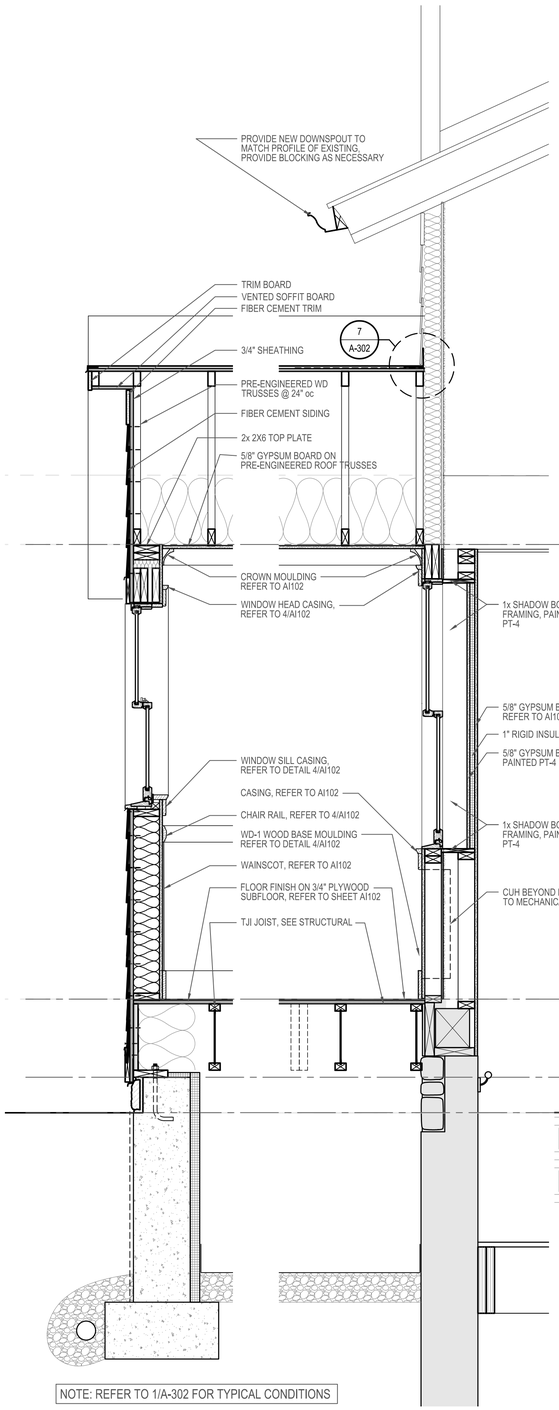
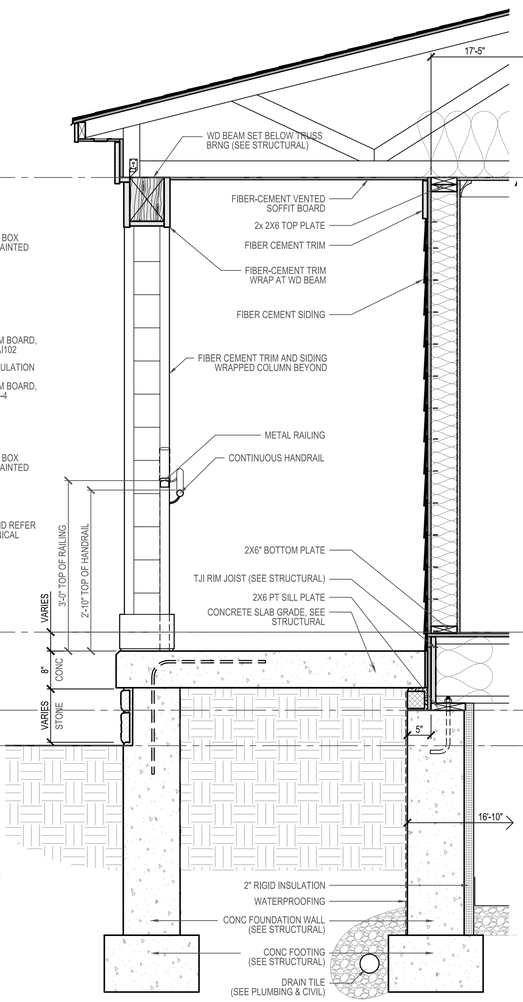
City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road
BUILDING SECTIONS

SHEET A-301

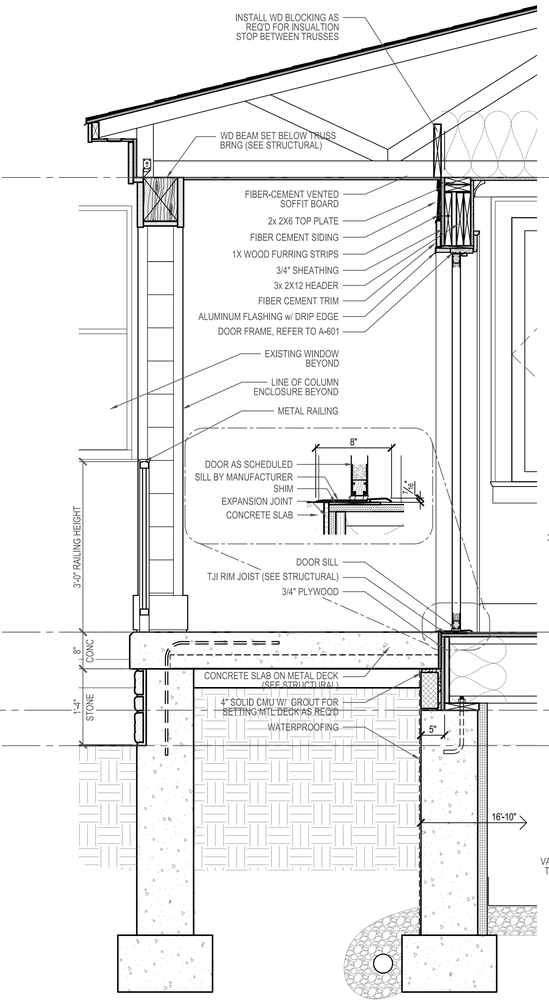


NOTE: REFER TO 1/A-302 FOR TYPICAL CONDITIONS

5 WALL SECTION AT ADDITION EXTERIOR WALL AND WINDOW
3/4" - 1'-0"



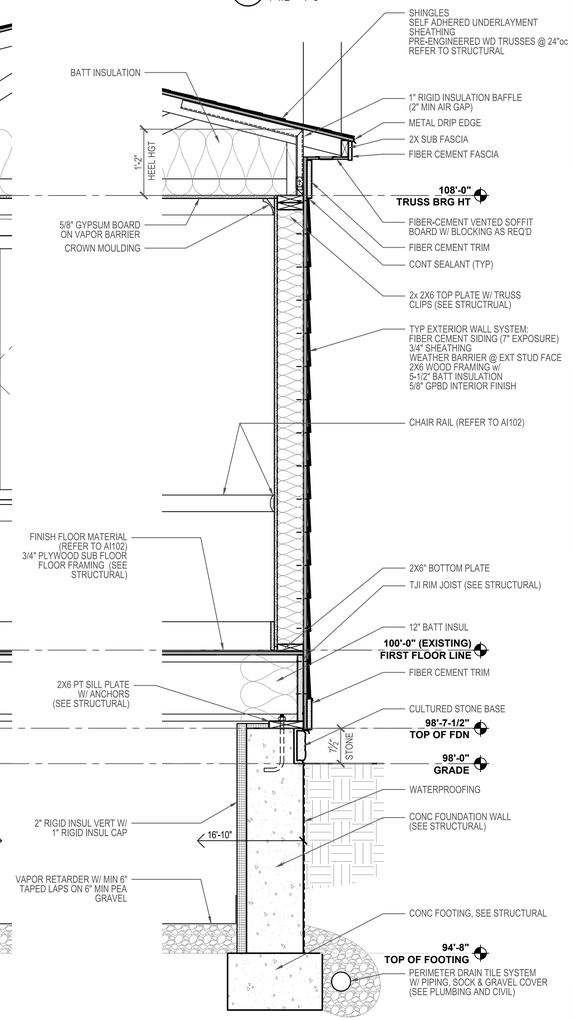
4 WALL SECTION AT EXISTING EXTERIOR WALL
3/4" - 1'-0"



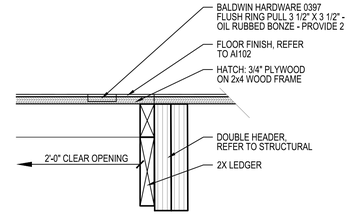
NOTE: REFER TO 1/A-302 FOR TYPICAL CONDITIONS

3 SECTION AT RAMP
3/4" - 1'-0"

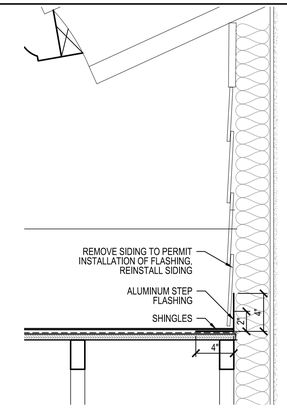
2 SECTION AT RAMP
3/4" - 1'-0"



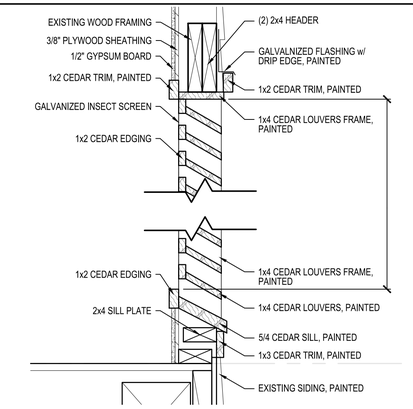
1 WALL SECTION AT ADDITION EXTERIOR WALL
3/4" - 1'-0"



8 ACCESS HATCH DETAIL
1-1/2" - 1'-0"



7 STEP FLASHING DETAIL
1-1/2" - 1'-0"



6 WOOD LOUVER DETAIL
1-1/2" - 1'-0"

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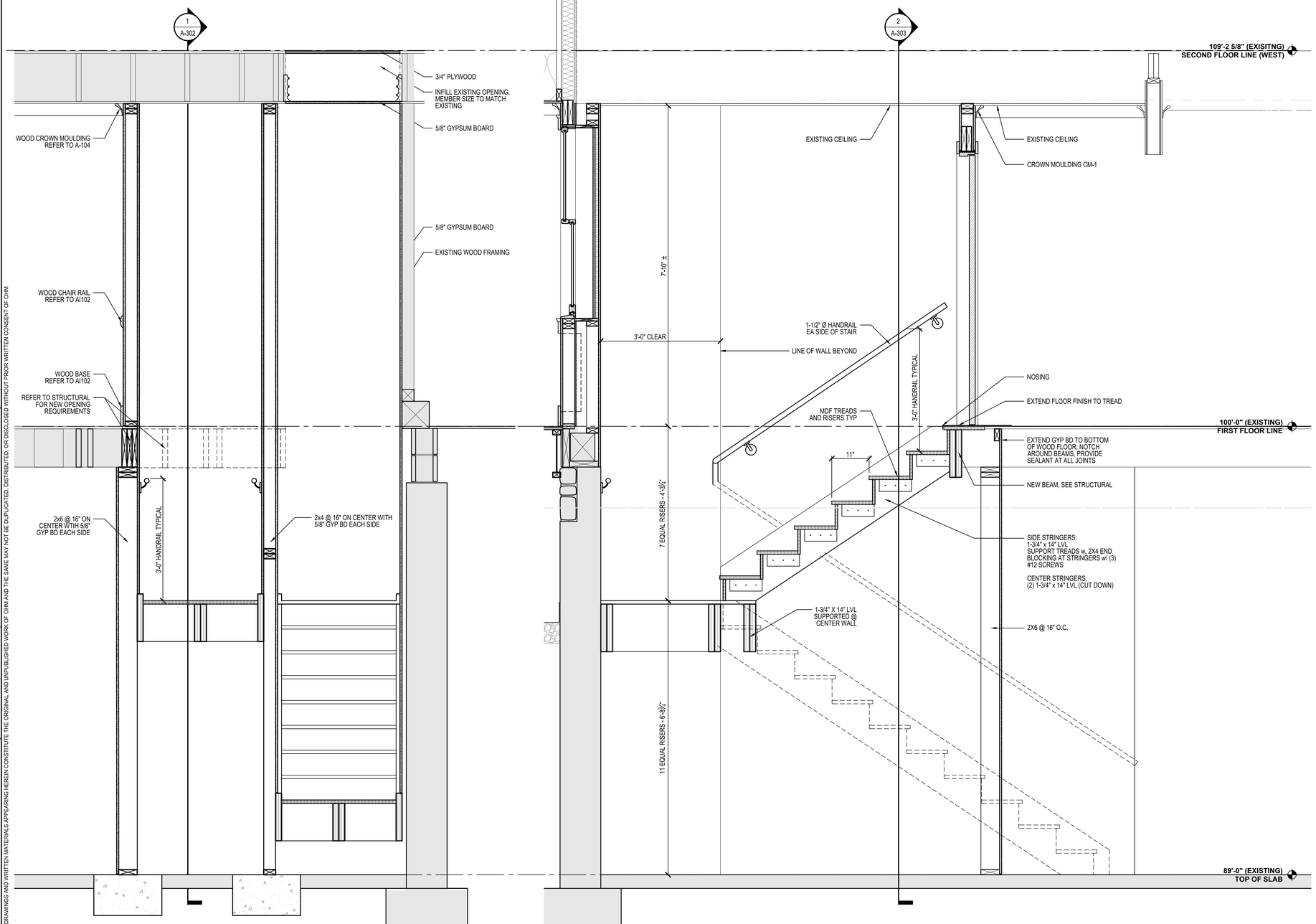
City Of Troy Michigan, Troy Historic Village
Niles-Barnard House Renovation
60 W. Wattles Road

WALL SECTIONS

SHEET A-302

DRAWING PATH: P:\0126_0165\0128180020_Niles-Barnard_House_Renovations\Drawings\Arch\2-Arch Desktop\New Facilities Project\Sheets\Elevations and Sections\0128-18-0020-A-302 WALL SECTIONS.dwg Sep 12, 2019 - 1:53pm



2 **STAIR SECTION**
3/4" = 1'-0"

1 **STAIR SECTION**
3/4" = 1'-0"

GENERAL SECTION DETAIL NOTES

SHEET KEYNOTES

LEGEND

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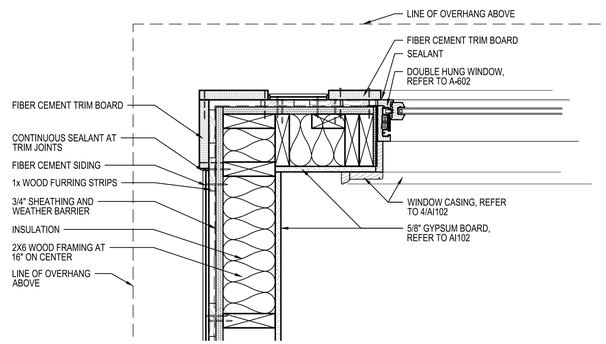
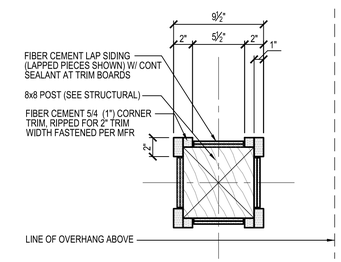
City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

STAIR SECTIONS AND DETAILS

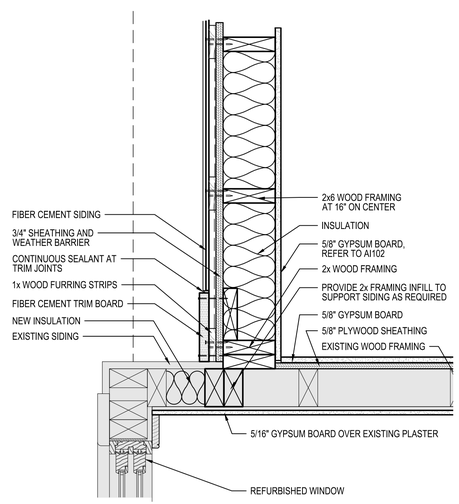
SHEET A-303



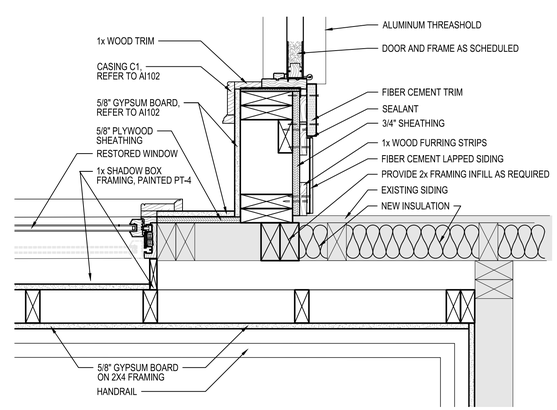
5 DETAIL AT CORNER
1-1/2" = 1'-0"



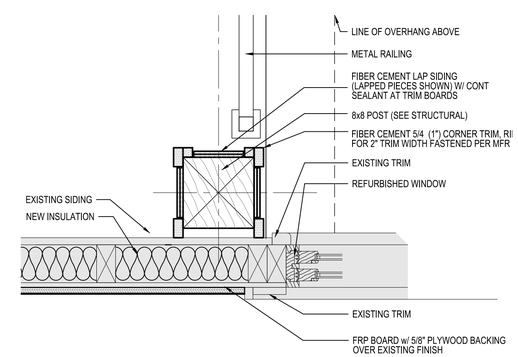
4 DETAIL AT PORCH COLUMN
1-1/2" = 1'-0"



3 DETAIL AT CONNECTION
1-1/2" = 1'-0"



2 DETAIL AT WINDOW INFILL AND EXTERIOR DOOR
1-1/2" = 1'-0"



1 DETAIL AT COLUMN
1-1/2" = 1'-0"

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City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

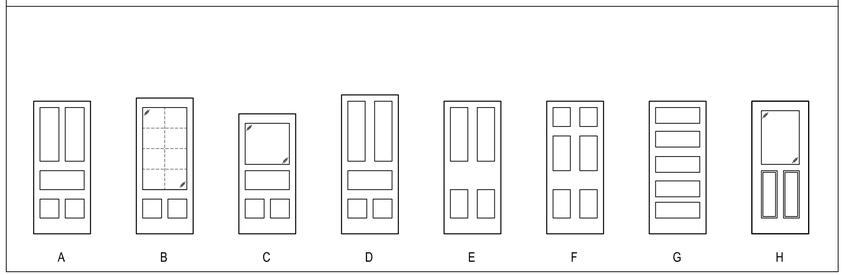
TYPICAL DETAILS

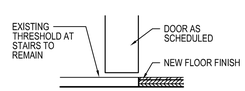
SHEET A-501

DOOR, FRAME & HARDWARE SCHEDULE

MARK	SIZE		DOOR					FRAME						DETAIL			RATING	DOOR/FRAME RESTORATION	HDWR	REMARKS
	WIDTH	HEIGHT	NEW	EXIST	TYPE	MAT'L	FINISH	NEW	EXIST	TYPE	MAT'L	FINISH	GLAZING	HEAD	JAMB	THRSH				
101A	2'-11 ½"	6'-4"		X	C	S&R, WD	STRIP, PNT		X		WD	STRIP, PNT	EXIST	2/A-601 SIM.	2/A-601 SIM.	1/A-601		RESTORE	1	PROVIDE 8/4 WHITE OAK SILL TO REPLACE EXIST.
101B	2'-11 ¼"	6'-5"		X	A	S&R, WD	STRIP, PNT		X		WD	STRIP, PNT		2/A-601	2/A-601	1/A-601		RESTORE	2	PROVIDE 8/4 WHITE OAK SILL TO REPLACE EXIST.
101C	2'-8"	6'-9"		X	G	S&R, WD	STRIP, PNT		X		WD	STRIP, PNT				9/A-601		RESTORE	3	
102A	3'-2"	6'-8 ½"		X	B	S&R, WD	STRIP, PNT		X		WD	STRIP, PNT	EXIST	2/A-601	2/A-601	1/A-601		RESTORE	2	PROVIDE 8/4 WHITE OAK SILL TO REPLACE EXIST. PROVIDE NEW DIVIDERS PER DOOR ELEVATION INDICATED.
102B	5'-7"	6'-8" ±		X					X		WD	STRIP, PNT						RESTORE		
102C	9'-2"	7'-5 ½"						X			WD	PNT		5/A-601	6/A-601					ENLARGE EXISTING OPENING
103A	3'-2 ¼"	6'-9"		X	A	S&R, WD	STRIP, PNT		X		WD	STRIP, PNT		2/A-601	2/A-601	1/A-601		RESTORE	2	PROVIDE 8/4 WHITE OAK SILL TO REPLACE EXIST.
103B	2'-8"	6'-8"		X	F	S&R, WD	STRIP, PNT		X		WD	STRIP, PNT				11/A-601		RESTORE	3	
105A	3'-0"	6'-8"±	X		A	WOOD	PNT	X			FGL/ WD	PNT		2/A-302	4/A-601	2/A-302			9	DOOR TO BE PELLA ARCHITECTURAL SERIES WOOD DOOR
105B	2'-10"	6'-10"		X	F	S&R, WD	STRIP, PNT		X		WD	STRIP, PNT				10/A-601		RESTORE	3	
107A	12'-0"	7'-4"		X	D	S&R, WD	STRIP, PNT		X		WD	STRIP, PNT						RESTORE	4	FOUR PANEL BI-FOLD DOORS
107B	2'-10 ½"	6'-9 ½"		X	F	S&R, WD	STRIP, PNT		X		WD	STRIP, PNT				10/A-601		RESTORE	3	
108	3'-6"	6'-8"	X		E	WD	PNT	X			WD	PNT		8/A-601	7/A-601	9/A-601			6	
109A	3'-0"	6'-8"	X		E	WD	PNT	X			WD	PNT		8/A-601	7/A-601	1/A-303			5	
109B	4'-0"	6'-8"						X						5/A-601						ENLARGE EXISTING OPENING
109C	2'-8"	6'-8"±							X		WD	STRIP, PT		6/A-601 SIM	6/A6-01	9/A-601 SIM		RESTORE		
113	2'-10 ¾"	6'-10 ½"		X	E	S&R, WD	STRIP, PNT		X		WD	STRIP, PNT	EXIST			9/A-601		RESTORE	3	
114A	3'-0"	6'-8"	X		H	FIBERGLASS	PNT	X			FGL / WD	PNT		2/A-302	4/A-601	2/A-302			8	
114B	4'-2 ½"±	7'-3-1/2"						X			WD	PNT		5/A-601						
115	3'-0"	6'-8"	X		E	WD	PNT	X			WD	PNT		8/A-601	7/A-601				7	
116	3'-0"	6'-8"	X		E	WD	PNT	X			WD	PNT		8/A-601	7/A-601				7	

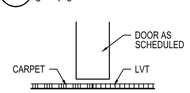
DOOR TYPES



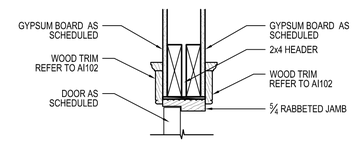


11 **THRESHOLD - AT STAIRWAY**
3" = 1'-0"

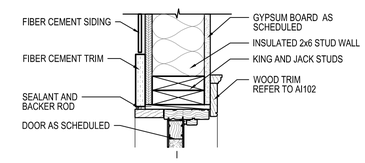
10 **THRESHOLD - CARPET TO CARPET TILE**
3" = 1'-0"



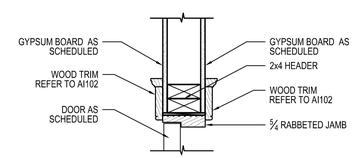
9 **THRESHOLD - CARPET TO LVT**
3" = 1'-0"



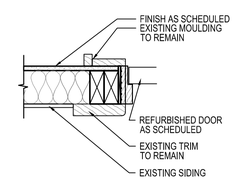
8 **HEAD - NEW INTERIOR DOOR IN NEW WALL**
1 1/2" = 1'-0"



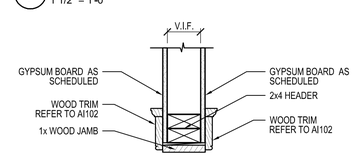
4 **JAMB @ EXTERIOR DOOR IN NEW WALL**
1 1/2" = 1'-0"



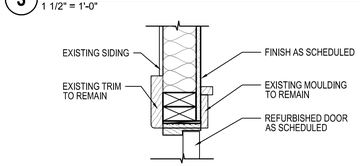
7 **JAMB - NEW INTERIOR DOOR IN NEW WALL**
1 1/2" = 1'-0"



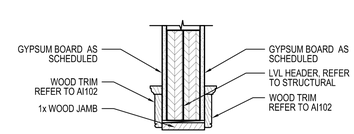
3 **JAMB @ EXTERIOR DOOR IN EXIST. WALL**
1 1/2" = 1'-0"



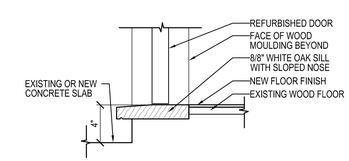
6 **JAMB @ CASED OPENING**
1 1/2" = 1'-0"



2 **HEAD @ EXTERIOR DOOR IN EXIST. WALL**
1 1/2" = 1'-0"



5 **HEAD @ CASED OPENING**
1 1/2" = 1'-0"



1 **SILL @ EXTERIOR DOOR**
1 1/2" = 1'-0"

GENERAL DOOR/FRAME NOTES

1. FIELD VERIFY ALL DIMENSIONS.
2. IN ADDITION TO INFORMATION SHOWN HERE, REFER TO SPECIFICATIONS FOR DETAILED DESCRIPTION OF DOOR RESTORATION.
3. COORDINATE FINAL UNDERCUTS OF DOORS WITH FINAL FLOOR FINISH TREATMENT AND CONDITIONS.

DOOR / FRAME RESTORATION

A. RESTORE DOORS TO FULL OPERABILITY AND WEATHERTIGHTNESS (EXTERIOR DOORS).
B. DOOR RESTORATION AT EXTERIOR DOORS INCLUDES FRAMES AND SILLS.
C. STABILIZE AND REPAIR WOOD DOORS TO RE-ESTABLISH STRUCTURAL INTEGRITY AND WEATHER RESISTANCE WHILE MAINTAINING THE EXISTING FORM OF EACH ITEM.
i. REPAIR WOOD DOORS BY CONSOLIDATING, PATCHING, SPLICING, OR OTHERWISE REINFORCING WOOD WITH NEW WOOD MATCHING EXISTING WOOD OR WITH SALVAGED, SOUND, ORIGINAL WOOD.
ii. WHERE PORTIONS OF A DOOR COMPONENT ARE DEEPLY DAMAGED, ROTTED, OR MISSING, PROVIDE DUTCHMAN PATCHES. DUTCHMAN PATCHES SHALL BE FITTED TIGHTLY WITH HAIRLINE JOINTS, GLUED IN PLACE, AND SANDED SMOOTH TO BLEND WITH ADJACENT SURFACES. WHERE DUTCHMAN PATCHES INCLUDE PROFILES, PROFILES SHALL MATCH EXISTING ADJACENT PATCHES, AND SHALL BE SANDED TO BLEND INTO EXISTING PROFILES.
iii. WHERE BUILDING-UP OF DOOR EDGES OR BOTTOMS IS NECESSARY TO ACHIEVE A TIGHT FIT, OR TO ADJUST TO DISTORTED OPENINGS, NEATLY CUT WOOD BACK TO SOUND SURFACE WITH A UNIFORM MATING SURFACE. BUILD UP WITH NEW WOOD EPOXIED TO EXISTING, AND CLAMP. FILL SMALL GAPS. SAND SMOOTH TO BLEND WITH ADJACENT SURFACES.
D. STRIP PAINT TO BARE WOOD, REPAINT.

LEGEND

EXIST	EXISTING
HC	HOLLOW CORE
HM	HOLLOW METAL
IG	INSULATING GLASS
OBS	OBSCURE GLASS
PNT	PAINT
PR	PAIR
SC	SOLID CORE
S&R	STILE AND RAIL
STN	STAIN
TEMP	TEMPERED GLASS
VAR	VARNISH
WD	WOOD

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SEAL

REVISIONS:
1 ISSUED FOR BIDS 09/30/2019

DATE	PROJ NUMBER	ARCH	PROJ MGR	CADD
09/30/2019	0126-18-0020	CO	CO	VV

City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road
DOOR SCHEDULE AND DETAILS

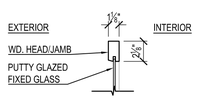
SHEET A-601

WINDOW SCHEDULE

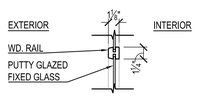
MARK	REPAIR TYPE	CONFIGURATION	SIZE		FINISH		DETAIL			GLAZING	WOOD STORM WDO.	OPERABLE / FIXED	REMARKS
			WIDTH	HEIGHT	INTERIOR	EXTERIOR	HEAD	JAMB	SILL				
101	A	6 OVER 6	2'-10 ½"	5'-5 ½"	PAINT	PAINT				E.T.R.	R	O	1 BROKEN PANE; REPLACE L. PARTING STOP
102	A	6 OVER 6	2'-10 ½"	5'-5 ½"	PAINT	PAINT				E.T.R.	R	O	1 BROKEN PANE
103	A	6 OVER 6	2'-10 ½"	5'-5 ½"	PAINT	PAINT				E.T.R.	R	O	REPLACE R. PARTING STOP
104	A	6 OVER 6	2'-10 ½"	5'-5 ½"	PAINT	PAINT				E.T.R.	R	O	
105	A	6 OVER 6	2'-10 ½"	5'-5 ½"	PAINT	PAINT				E.T.R.	R	O	REPLACE R. PARTING STOP
106	A	6 OVER 6	2'-10 ½"	5'-5 ½"	PAINT	PAINT				E.T.R.	R	O	REPLACE R. PARTING STOP
107	A	6 OVER 6	2'-10 ½"	5'-5 ½"	PAINT	PAINT				E.T.R.	R	O	
108	A1	6 OVER 6	2'-10 ½"	5'-5 ½"	PAINT	PAINT				E.T.R.	R	O	TOP SASH RACKED; REPLACE R. PARTING STOP
109	B	2 OVER 2	2'-8 ¼"	4'-1 ½"	PAINT	PAINT				E.T.R.	R	O	MISSING R. SASH SPACER (LOW)
110	B	2 OVER 2	2'-8 ¼"	4'-1 ½"	PAINT	PAINT				E.T.R.	R	O	REMOVE WD. TRIM PIECE AT SILL
111	B	2 OVER 2	2'-8"	4'-1 ½"	PAINT	PAINT				E.T.R.	R	O	RESTORE LOWER SASH; TIGHTEN JOINTS; MISALIGNED MEETING RAIL
112	B	2 OVER 2	2'-8 ½"	4'-3"	PAINT	PAINT				E.T.R.	R	O	REMOVE OBSCURE PLASTIC PANEL ON INTERIOR
112A	A	N/A	2'-4 ½"	4'-8"	PAINT	PAINT				E.T.R.		O	ADJUST FRAMING AS REQUIRED FOR RELOCATION AS ILLUSTRATED ON SECTIONS 2/A-301 AND 4/A-302
113	NEW	6 OVER 6	2'-9"	3'-5"	PAINT	PAINT	3/A-602	2/A-602	1/A-602	LOW E ARGON OBS		O	WOOD DOUBLE HUNG WINDOW - PELLA ARCHITECT SERIES 3341
114	NEW	6 OVER 6	2'-9"	3'-5"	PAINT	PAINT	3/A-602	2/A-602	1/A-602	LOW E ARGON OBS		O	WOOD DOUBLE HUNG WINDOW - PELLA ARCHITECT SERIES 3341
115	C	9 OVER 6	2'-5"	4'-8"	PAINT	PAINT	–	–	–	E.T.R.	R	O	TIGHTEN BOTTOM R. JOINT OF UPPER SASH
116	C	9 OVER 6	2'-4"	4'-7"	PAINT	PAINT	–	–	–	E.T.R.	R	O	REPLACE BOTH REMOVABLE STOPS; STRAIGHTEN TOP SASH; TIGHTEN BOTTOM JOINTS OF UPPER SASH; REMOVE & RESET LOWER RAIL OF UPPER SASH
117	NEW	6 OVER 6	2'-5"	3'-11"	PAINT	PAINT	3/A-602	2/A-602	1/A-602	LOW E ARGON		0	WOOD DOUBLE HUNG WINDOW - PELLA ARCHITECT SERIES 2947
201	A1	6 OVER 6	2'-10 ½"	5'-5"	PAINT	PAINT	–	–	–	E.T.R.	R	O	
202	A1	6 OVER 6	2'-10 ½"	5'-5"	PAINT	PAINT	–	–	–	E.T.R.	R	O	REPLACE R. PARTING STOP; REPLACE R. REMOVABLE STOP (NON-ORIG.), NEW TO MATCH HISTORIC
203	A1	6 OVER 6	2'-10 ½"	5'-5"	PAINT	PAINT	–	–	–	E.T.R.	R	O	RESET BOTTOM RAIL OF UPPER SASH; TIGHTEN JOINTS
204	A1	6 OVER 6	2'-10 ½"	5'-5"	PAINT	PAINT	–	–	–	E.T.R.	R	O	RESET BOTTOM RAIL OF UPPER SASH; REPAIR LOWER R. STOOL AND REMOVABLE STOP
205	A1	6 OVER 6	2'-10 ½"	5'-5"	PAINT	PAINT	–	–	–	E.T.R.	R	O	RESET BOTTOM RAIL OF UPPER SASH
206	A1	6 OVER 6	2'-10 ½"	5'-5"	PAINT	PAINT	–	–	–	E.T.R.	R	O	REPLACE BOTTOM RAIL OF LOWER SASH; RESET L. REMOVABLE STOP; REPLACE R. REMOVABLE STOP; RESET R. PARTING STOP
207	D	12 OVER 8	2'-8"	4'-2"	PAINT	PAINT	–	–	–	E.T.R.	R	O	REMOVE TACK STRIP; REPLACE BOTTOM RAIL OF LOWER SASH (POSSIBLY WHOLE SASH); 1 BROKEN PANE; REMOVE & RESET BOTTOM RAIL OF UPPER SASH; TIGHTEN JOINTS
208	D	12 OVER 8	2'-8"	4'-2"	PAINT	PAINT	–	–	–	E.T.R.	R	O	REMOVE WD. STRIP AT TOP RAIL OF LOWER SASH; TIGHTEN JOINTS AT BOTTOM R. CORNER OF LOWER SASH
209	D1	6 OVER 8	2'-8"	4'-2"	PAINT	PAINT	–	–	–	E.T.R.	R	O	REPLACE BOTTOM RAIL AT UPPER SASH; TIGHTEN BOTTOM R. JOINT AT LOWER SASH; SASHES MISALIGNED
210	D	6 OVER 8	2'-8"	4'-2"	PAINT	PAINT	–	–	–	E.T.R.	R	O	REMOVE TACK STRIP AT PLEXI; RESET BOTTOM RAIL OF TOP SASH; TIGHTEN JOINTS; REPLACE RIGHT 3 HORIZ. MUNTINS AT LOWER SASH
211	D	6 OVER 8	2'-1"	3'-4 ½"	PAINT	PAINT	–	–	–	E.T.R.	R	O	TIGHTEN BOTTOM L. JOINT OF LOWER SASH; REMOVE & RESET PARTING STOPS; HEAVILY WEATHERED; SURFACE CONSOLIDATION; POSSIBLY REPLACE ALL REMOVABLE STOPS W/ NEW PROFILE
212	D	9 OVER 6	2'-4"	4'-6"	PAINT	PAINT	–	–	–	E.T.R.	R	O	RESET L. REMOVABLE STOP; REPAIR/REPLACE R. REMOVABLE STOP; REMOVE & RESET PARTING STOPS; HEAVILY WEATHERED; SURFACE CONSOLIDATION; POSSIBLE REPLACE ALL REMOVABLE STOPS W/ NEW PROFILE
213	D	9 OVER 6	2'-4"	4'-6"	PAINT	PAINT	–	–	–	E.T.R.	R	O	REPAIR BOTTOM JOINTS OF LOWER SASH; TIGHTEN MUNTIN JOINTS; REMOVE & RESET PARTING STOPS; HEAVILY WEATHERED; SURFACE CONSOLIDATION; POSSIBLY REPLACE ALL REMOVABLE STOPS W/NEW PROFILE
214	D	6 OVER 6	2'-1"	3'-4 ½"	PAINT	PAINT	–	–	–	E.T.R.	R	O	REPAIR BOTTOM L. REMOVABLE STOP; 1 BROKEN PANE; REMOVE & RESET PARTING STOPS; HEAVILY WEATHERED; SURFACE CONSOLIDATION; POSSIBLY REPLACE ALL REMOVABLE STOPS W/ NEW PROFILE

ABBREVIATIONS:

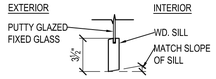
E.T.R.	EXISTING TO REMAIN
F	FIXED
HORIZ.	HORIZONTAL
L.	LEFT
N/A	NOT APPLICABLE
O	OPERABLE
OBS	OBSCURE GLASS
R	RESTORE
R.	RIGHT
WD	WOOD
WDO.	WINDOW



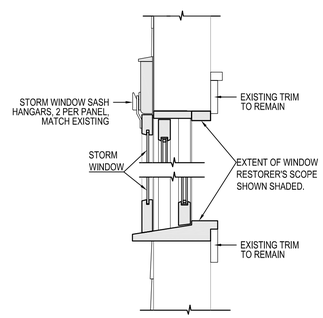
7 STORM WINDOW HEAD (JAMB SIM.)
1 1/2" = 1'-0"



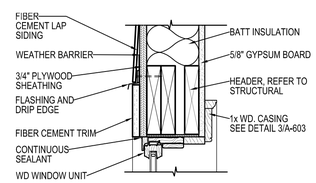
6 STORM WINDOW RAIL
1 1/2" = 1'-0"



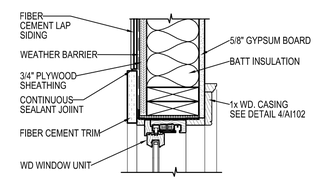
5 STORM WINDOW SILL
1 1/2" = 1'-0"



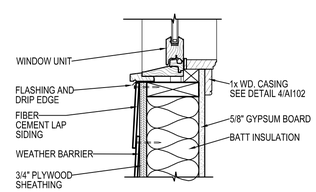
4 WINDOW RESTORATION SCOPE
1 1/2" = 1'-0"



3 HEAD DETAIL @ NEW WALL
1 1/2" = 1'-0"



2 JAMB DETAIL @ NEW WALL
1 1/2" = 1'-0"



1 SILL DETAIL @ NEW WALL
1 1/2" = 1'-0"

GENERAL GLAZING NOTES

1. EXISTING WINDOW RESTORATION: THE GENERAL INTENT OF WINDOW RESTORATION IS TO RESTORE THE WINDOWS TO OPERABLE WEATHERTIGHT CONDITION, WITH SOUND COMPONENTS, AND TO CREATE A VISUALLY RESTORED, HISTORICALLY ACCURATE FINISHED APPEARANCE WITH REPAIRS CONCEALED FROM VIEW.
2. EXISTING WINDOWS ARE FROM SEVERAL PERIODS AND ARE NOT ALL IDENTICAL IN COMPONENT SIZES, CONFIGURATIONS, AND PROFILES. WHERE RESTORATION OR REPLICATION OF COMPONENTS CALLS FOR MATCHING EXISTING, THE INTENT IS TO MATCH EXISTING ON THAT SPECIFIC WINDOW.
3. FIELD VERIFY ALL DIMENSIONS.
4. PROVIDE WOOD STORM WINDOW WHERE SCHEDULED. REFER TO DETAILS ON SHEET A-602. STORM WINDOWS SHALL BE CUSTOM MILL SHOP FABRICATED, FABRICATED OF WHITE PINE OR DOUGLAS FIR, USING MORTISE AND TENON JOINS; CLEAR ANNEALED GLASS WITH PUTTY GLAZ.
5. PRODUCTS:
   a. SOURCES FOR SASH LIFTS, SASH LOCKS, PULLEYS, SASH CORD:
      i. BLAN WINDOW HARDWARE INC.
      ii. BRONZE CRAFT CORPORATION (THE)
      iii. PHELPS COMPANY
      iiiv. CROWN CITY HARDWARE CO.
   b. WEATHERSTRIPPING SETS: REESE, NGP
   c. WOOD CONSOLIDANT: READY-TO-USE EPOXY BASED WATER VISCOSITY PRODUCT
      i. BASIS OF DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ABATRON, INC.: LIQUIDWOOD OR A COMPARABLE PRODUCT BY ONE OF THE FOLLOWING
         1. CONSERV EPOXY LLC
         2. GOUGEON BROTHERS, INC.
         3. SYSTEM THREE RESINS, INC.
   d. GLAZING
      i. REUSE EXISTING GLASS LIGHTS IN RESTORED WINDOWS.
      ii. WHERE EXISTING IS UNUSABLE OR BROKEN, REPLACE WITH SALVAGED GLASS WITH SIMILAR SURFACE CHARACTER OR REPRODUCTION TRADITIONAL GLASS WITH SIMILAR SURFACE CHARACTER. REFER TO DIVISION 1 "UNIT PRICING" FOR ADDITIONAL REQUIREMENTS.
      iii. GLAZING COMPOUND: MODIFIED OIL TYPE, SEMI-HARDENING. USE ONE OF THE FOLLOWING PRODUCTS:
         1. SARCO MULTIGLAZE TYPE M
         2. SARCO DUAL GLAZE

WINDOW RESTORATION

THE FOLLOWING MINIMUM TREATMENTS ARE TO BE APPLIED TO ALL WINDOWS SCHEDULED FOR RESTORATION. APPLY ADDITIONAL TREATMENTS TO WINDOWS WHERE INDICATED IN THE WINDOW SCHEDULE IN THE "REPAIR TYPE" AND "REMARKS" COLUMNS.

BASIC SASH TREATMENT:

a. REMOVE SASH FROM FRAMES.
b. REMOVE EXISTING GLASS, GLAZING COMPOUND AND GLAZING POINTS FROM SASH; SALVAGE GLASS; WHERE GLAZING POCKETS ARE DETERIORATED, CONSOLIDATE WITH LOW VISCOSITY EPOXY AND FILL VOIDS WITH THICKENED EPOXY. REINSTALL GLASS WITH NEW GLAZING POINTS AND GLAZING COMPOUND.
c. WHERE GLASS IS BROKEN, REPLACE WITH SALVAGED GLASS OR RESTORATION GLASS.
d. STRIP PAINT FROM HARDWARE; RESTORE TO OPERABLE CONDITION.
e. STRIP FINISHES FROM ALL SURFACES TO BARE WOOD.
f. DISASSEMBLE SASH.
g. INSPECT JOINTS FOR CONCEALED DETERIORATION; ASSESS CONDITION OF JOINTS AND COMPONENTS, INCLUDING, BUT NOT LIMITED TO: MORTISES AND TENONS, PEG HOLE ENLARGEMENT, CONDITION OF MATING SURFACES, CONDITION OF WOOD AROUND HARDWARE ATTACHMENT FASTENERS. CONDITION OF MUNTINS. REPORT TO ARCHITECT.
h. WHERE JOINTS HAVE FAILED, FABRICATE NEW PEGS FOR MORTISE AND TENON JOINERY.
i. REASSEMBLE SASH USING NEW PEGS AND GLUE. REASSEMBLE TO FIT TIGHTLY INTO EXISTING FRAMES. BUILD UP RAILS AND STILES WITH WOOD EPOXIED TO EXISTING COMPONENTS WHERE NECESSARY TO PROVIDE TIGHT FIT IN EXISTING FRAME.
j. SAND WOOD SURFACES DOWN TO SOUND MATERIAL.
k. CONSOLIDATE ROT AT BOTTOM OF BOTTOM RAIL WITH LOW VISCOSITY EPOXY. FILL VOIDS WITH LOW VISCOSITY EPOXY.
l. CLAMP AND GLUE SPLITS WITH EPOXY.
m. REPLACE UNREPAIRABLE COMPONENTS WITH NEW TO MATCH EXISTING.
n. FILL HOLES AND CHECKS WITH LOW VISCOSITY EPOXY.
o. APPLY INSECT REPELLANT.
p. PROVIDE WEATHERSTRIPPING ON TOP, SIDE AND BOTTOM RAILS AND MEETING RAILS. COORDINATE WITH FRAME WEATHERSTRIPPING.
q. PREP AND FINISH ALL SURFACES AS SCHEDULED.
r. REINSTALL SASH IN RESTORED FRAMES.
s. RESET REMOVABLE STOPS; REPAIR WHERE DAMAGED OR MISSING.
t. REINSTALL HARDWARE.

BASIC FRAME TREATMENT:

a. SEE TO DETAIL 7/A-602 FOR LINE OF DEMARCATION BETWEEN WINDOW RESTORATION SCOPE AND INTERIOR WOOD REFINISHING SCOPE.
b. REMOVE INTERIOR STOPS AND PARTING STOPS TO PERMIT SASH TO BE REMOVED FROM FRAMES.
c. REMOVE RETROFIT WEATHERSTRIPPING.
d. REMOVE MISCELLANEOUS FASTENERS, HARDWARE, GUIDES OR OTHER APPURTANCES THAT ARE NOT SCHEDULED FOR REUSE.
e. STRIP FINISHES FROM INTERIOR AND EXTERIOR SURFACES.
f. INSPECT FRAMES FOR CONCEALED DETERIORATION; ASSESS CONDITION OF COMPONENTS, INCLUDING, BUT NOT LIMITED TO: LOOSE, DAMAGED OR DETERIORATED TRIM. CONDITION OF WOOD SURFACES, EVIDENCE OF ROT, SPLITTING AND CRACKING, AND CONDITION OF WOOD AROUND HARDWARE ATTACHMENT FASTENERS. REPORT TO ARCHITECT.
g. REPAIR DAMAGED COMPONENTS BY CLAMPING AND GLUING, FILLING AND/OR BUILDING UP SURFACES WITH THICKENED EPOXY, OR DUTCHMAN REPAIRS.
h. REPLACE UNREPAIRABLE COMPONENTS WITH NEW TO MATCH EXISTING.
i. SAND SURFACES TO SOUND WOOD.
j. SAND DEEPLY OXIDIZED SILLS TO SOUND WOOD. FILL SMALL HOLES, CHECKS AND/OR SPLITS WITH THICKENED EPOXY. WHERE POSSIBLE, CLAMP AND GLUE SPLITS BEFORE RESTORTING TO FILLING.
k. CONSOLIDATE EXTERIOR JAMB COMPONENTS WHERE THEY REST ON SILLS WITH LOW VISCOSITY EPOXY.
l. APPLY INSECT REPELLANT.
m. PREP AND FINISH ALL SURFACES AS SCHEDULED.
n. PROVIDE NEW WEATHERSTRIPPING AT HEAD AND JAMBS. COORDINATE WITH SASH WEATHERSTRIPPING.
o. REINSTALL HARDWARE.
p. SECURE LOOSE EXTERIOR TRIM.

LEGEND

PAINT:

P-1 EXTERIOR PRIME/PAINT COLOR TO BE SELECTED BY ARCHITECT.
P-2 INTERIOR PRIME/PAINT COLOR TO BE SELECTED BY ARCHITECT.

REPAIR TYPE:

A PARTIALLY RESTORED PREVIOUSLY REQUIRES ADDITIONAL RESTORATION. LEFT & RIGHT REMOVABLE STOPS MISSING; REPLACE WITH NEW TO MATCH EXISTING. RESECURE PARTING STOPS. REMOVE ALUMINUM WEATHER STRIPPING, REPLACE WITH NEW AS SPECIFIED.

A1 ALIGN SASH; ADJUST SASH PINS. PROVIDE NEW WEATHERSTRIP AS SPECIFIED.

B ADD WEATHERSTRIP, REALIGN SASH. NOTE: THESE WINDOWS HAVE NO PARTING STOPS. SASHES SLIDE DIRECTLY AGAINST ONE ANOTHER. THESE WINDOWS HAVE NO MUNTINS.

C NOTE: THESE WINDOWS HAVE NO PARTING STOPS. SASHES SLIDE DIRECTLY AGAINST ONE ANOTHER. THESE WINDOWS HAVE NO MUNTINS.

D NOTE: THESE WINDOWS HAVE NO PARTING STOPS. SASHES SLIDE DIRECTLY AGAINST ONE ANOTHER. THIN MUNTINS. CONSOLIDATE DRIED OUT WOOD, DOUBLE LOWER RAIL AT UPPER SASH - REMOVE AND REINFORCE.

D1 NO DOUBLE LOWER RAIL, AT UPPER SASH - REINFORCE.

N NEW WINDOW.

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SEAL

REVISIONS:		
1	ISSUED FOR BIDS	09/30/2019

DATE	PROJ NUMBER	ARCH	PROJ MGR	CADD
09/30/2019	0126-18-0020	C O	C O	V V

City of Troy, Michigan
Nlies-Barnard House Renovation
60 W. Wattles Road
WINDOW SCHEDULE AND DETAILS

SHEET A-602

STRUCTURAL NOTES

General

1. These notes are to be read in conjunction with these drawings. In the event of conflict between the information on the drawings and these notes, the more stringent requirements shall govern.

2. The contractor is responsible for coordinating the Architectural, Mechanical and Electrical work with the work shown on these drawings. Discrepancies and/or interferences shall be reported to the architect immediately. Check with electrical and mechanical contractors for conduits, pipe sleeves, etc., to be embedded in concrete, and masonry.

3. Contractor shall verify all dimensions and existing conditions before beginning work. Contractor shall take field measurements and be responsible for same.

4. It is the contractor's responsibility to provide adequate shoring and bracing during construction to account for all forces, including but not limited to; forces from gravity, earth, wind, and unbalanced forces due to construction sequence.

5. For conditions not expressly shown use details shown for obviously similar conditions.

6. No openings shall be made in any structural member unless specifically shown on the structural drawings or unless approved in writing by the Structural Engineer.

7. Support details for, Architectural, Mechanical, Electrical, and Plumbing equipment is based upon available information of manufacturer. Contractor shall coordinate requirements of actual equipment supplied with details and shall provide any additional framing required.

8. Reproductions, in whole or in part, of Engineer's design documents, shall not be used as shop drawing plans and/or details. Shop drawings that are prepared from Engineer's design documents will be rejected.

9. Contractor shall allow ten (10) working days, not including weekends or holidays, for each submittal and resubmittal review. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

Design

1. The design of the structure is in accordance with State of Michigan Building Code 2015 Edition, including the referenced standards given in Chapter 35. Additional referenced standards shall be the latest edition published by the named organization.

2. Warning: The structural integrity of the building shown on these plans is dependent upon completion according to plans and specifications. Structural members are not self-bracing and shall be shored and/or braced by the contractor as necessary until stabilized by virtue of completed connections.

Foundations

1. The slab on grade shall rest on a minimum of six (6) inches granular fill, compacted to at least 95% of the maximum density (as defined by the ASTM D 1557 Modified Proctor Test.)

2. All footings shall bear on undisturbed soil,or competent rock, having a minimum safe bearing capacity of 3,000 psf. Remove all weathered rock and of loose material from beneath bottom of footing elevation and fill with lean concrete up to the bottom of footing elevation if pockets of loose material or weathered rock are found below the bottom of footing elevation within the footing area.

3. Isolated footings shall be lowered, and piers and/or walls shall be added, or increased in height as approved by the Architect, where soil or rock of the specified bearing capacity is found at a lower elevation than the bottom of footing elevation indicated on the drawings.

4. The bottoms of all exterior wall and pier footings shall be minimum 4'-0" below finished grade. If the building will be under construction during freezing weather, or if the building interior will nt be maintained above freezing during the winter months, all interior foundations shall be depressed 4'-0" below construction grade for frost protection. If such additional footing depth will cause undermining of adjacent existing footings or structures, underpinning of existing adjacent footings as required.

5. Edges of footings shall not be placed at a greater than 1 vertical to 2 horizontal slope with respect to any adjacent footing or excavation, unless underpinning or shoring and bracing of existing footing or excavation is provided. Underpinning shall be done so as not to cause settlements of existing structure and shall be such that complete contact is achieved between new underpinning and existing concrete.

6. Backfilling against foundation walls shall not be done until concrete and/or masonry has been cured to attain sufficient strength, 7 days minimum, and walls are properly shored and/or braced. Backfill foundation walls with earth on both sides of the wall by alternately placing backfill on each side so that height of backfill does not differ by more than 1'-0" from other side.

7. All backfill within building lines shall be clean well graded granular fill and shall be compacted to achieve 95% Modified Proctor Density. Fill shall be placed in 9" maximum lifts.

8. The contractor shall safeguard and protect all excavations, and adjacent structures, pavements, and utilities. All excavations shall be kept free of water. The contractor is responsible for the design, installation, maintenance, and removal of all shoring, bracing, and dewatering required to properly construct the foundations and to protect adjacent structures, pavements and utilities. Do not remove shoring such as sheet piling if it will cause settlement or damage to existing or new structures, pavement, and/or utilities.

9. Maximum length of foundation placed in one operation shall not exceed 60 feet.

10. The foundation contractor shall refer to Mechanical and Electrical Drawings for all locations of trenches, pits, conduits, etc. not shown on the Structural Drawings.

Concrete

1. All concrete work shall conform to the requirements of the American Concrete Institute ACI 301, 318, and SP-66 (315 included as a chapter), latest editions.

2. All concrete shall be normal weight concrete having a minimum compressive strength at 28 days as follows:

   A. Footings & Underpinning=.....4,000 psi
   B. Walls and Piers=.....4,000 psi
   C. Interior Slab on Grade=.....4000 psi
   D. Exterior Slab on Grade=.....4,500 psi Air Entrained

3. No concrete shall be placed until concrete design mixes and previous tests have been submitted for each class of concrete noted above and have been approved by the engineer. Concrete proportions shall be based upon field experience and/or trial batches per ACI 301 and ACI 318. The controlled concrete to be used shall conform to the approved design mix. The use of any additives not present in the design mix is prohibited.

4. Representative test cylinders will be taken from the concrete placed each day in accordance with concrete specifications.

5. The contractor is responsible for providing drawings for review of all joints in the concrete work, including construction, expansion, contraction and movement joints. Drawing shall be submitted at least two weeks prior to expected start of work. Joint locations shall comply with recommendations and requirements described in ACI 224, latest edition.

6. Reinforcing steel shall be deformed bars of intermediate grade new billet steel conforming to current requirements of ASTM A 615 Grade 60 or ASTM A 706, Grade 60. All hooks shall be standard hooks, unless otherwise noted. All laps shall be class 'B' laps except the minimum lap length shall be 24" unless noted otherwise.

7. Welded wire reinforcement (WWR) shall conform to ASTM A 185.

8. All WWR shall be spliced so that the overlap of the outermost cross wires of each adjoining sheet is not less than the spacing of the cross wires plus two inches, unless noted otherwise.

9. For all slabs on grade where not otherwise specified, use 6 x 6 – W2.9 x W2.9 WWR.

10. Minimum concrete cover over reinforcing, unless otherwise shown, shall be 1" for interior face of walls, 2" for exterior face of walls, 3" for footings and other structural concrete deposited against ground, 2" for concrete permanently exposed to earth or weather, 1 1/2" for pier ties and beam stirrups.

11. All concrete structural members shall be placed for their full depths in one operation. Construction joints, such as day's end placement joints, shall be located in the middle third of the span, reinforcing to run through the joint, bulkhead, key and roughen joints. Remove laitance prior to next pour.

12. For additional concrete work not shown on structural drawings, see Architectural, Mechanical and Electrical drawings.

13. Provide accessories and bar supports in accordance with "ACI Detailing Manual -2004" ACI SP-66, latest edition.

14. Concrete shall not be placed until preparations have been approved by the Testing and Inspection Agency, including formwork, reinforcement, embedments, and accessories.

15. Reproductions, in whole or in part, of Engineer's design documents, shall not be used as shop drawing plans and/or details.

Masonry

1. Concrete masonry units shall be normal weight units and shall conform to ASTM C 90 with a minimum design compressive unit strength of 1,900 psi and a prism strength of 1,500 psi. Concrete masonry construction shall conform to the following standards:

   A. Building Code Requirements for Masonry Structures, ACI 530/ASCE 5.
   B. Specifications for Masonry Structures, ACI 530.1/ASCE 6.
   C. Hot and Cold Weather Masonry Construction by the Masonry Industry Council.

2. Mortar for concrete masonry shall conform to ASTM C 270, Type M for all below grade units. At above grade units, use Type S at concrete masonry units and Type N at clay masonry.

3. Reinforcing for concrete masonry shall conform to ASTM A 615 Grade 60. Minimum bar lap shall be in accordance with the above described standards or 24", whichever is greater.

4. Grout for bond beams and to fill cores of walls shall conform to ASTM C 476, with a minimum compressive cylinder strength of 3,000 psi at 28 days. Grout shall be vibrated and re-vibrated after initial water loss to insure complete filling of cores.

5. Place ladder type horizontal joint reinforcing with preformed lapped corner reinforcing at 16" o.c. vertically in all masonry walls U.O.N.

   A. Joint reinforcing shall conform to ASTM A 951, be galvanized and have side wires of 9 gage minimum conforming to ASTM A 82 U.O.N.

   B. At concrete walls with brick veneer provide continuous vertical dovetail slot anchors at 16" o.c. horizontal spacing with triangular wire ties into the veneer at 16" o.c. vertical spacing.

   C. All joint reinforcing and veneer ties shall be hot dip galvanized.

6. Vertical control joints of a key type as indicated on the plans are to be placed in all masonry walls at intervals not to exceed 24 feet apart. The contractor shall furnish a control joint location plan for the Architect's approval if the plans do not sufficiently describe the location of all required control joints.

7. The discontinuous ends of all masonry walls shall be solidly grouted a minimum of 8" or one block cell and reinforced for their full height with one #4 bar unless otherwise noted.

Structural Steel

1. All structural steel work shall conform to the AISC "Steel Construction Manual" 13th edition which includes the AISC 303 "Code of Standard Practice for Steel Buildings and Bridges"; the "Specification for Structural Steel Buildings"; and the "RCSC Specification for Structural Joints Using ASTM A 325 or A 490 boltsStructural steel shall conform to the latest edition of the following ASTM designations:

   A. Structural steel shapes, except channels, bars, angles, and plates: A 992 Grade 50 having a minimum yield strength of 50 ksi or A 572, Grade 50 having a minimum yield strength of 50 ksi unless noted otherwise on the plans.

   B. Steel channels, bars, angles, and plates shall be A 36 having a minimum yield strength of 36 ksi unless noted 50 ksi on the plans in which case they shall be ASTM A 572 Grade 50. (Fy = 50 ksi).

   C. Steel Pipe – A 501 having a minimum yield strength of 36 ksi or A 53 Grade B, type E or S having a minimum yield strength of 35 ksi.

   D. Square, round, and rectangular tubing – A500, Grade B, having a minimum yield strength of 46 ksi.

2. Bolts shall conform to the following ASTM designation, latest edition: High strength bolts – A 325; anchor rods – F 1554, Grade 36 unless noted otherwise on the drawings. All bolts shall be snug tight unless noted slip critical or S. C. on plans unless otherwise noted. All bolts that carry loads in tension shall be fully pretensioned.

3. All bolts shall be 3/4" diameter, open holes 13/16" diameter, unless otherwise shown or noted. Use high strength bolts for steel framing connections.

4. All welding electrodes shall conform to the E 70 series of the specification for mild steel arc welding electrodes ASTM A 233, latest edition.

5. All welding shall be done by certified, licensed welders and shall be in conformance with the structural welding code of the American Welding Society ANSI/AWS D1.1-latest edition.

6. No penetrations are permitted through structural steel members unless indicated on structural drawings or approved by Engineer.

7. Approval of the engineer shall be mandatory for the use of cutting torch in the field.

8. All grout under steel plates shall be non-shrink "pre-mix" type and shall have a minimum compressive strength of 5,000 psi, tested in accordance with concrete specifications. Use non-staining grout at exposed locations.

9. For miscellaneous steel construction not shown on Structural drawings, see Architectural, Mechanical and Electrical drawings.

10. The steel fabricator may substitute heavier sections in place of the sections shown on the drawings to achieve economy of repetition, for availability or to take advantage of rolling mill production schedules so long as the changes are made known to the Architect and Structural Engineer and are acceptable to both.

11. All structural steel shall be painted with one shop-applied coat of rust inhibiting primer after surface preparation by the Society for Protective Coatings (SSPC) SP3 "power tool cleaning", unless noted otherwise. Steel structure that is permanently exposed on the exterior shall be hot dip galvanized according to ASTM A 123.

12. Reproductions, in whole or in part, of Engineer's design documents, shall not be used as shop drawing plans and/or details.

Saw Cutting Existing Concrete and/or Masonry

1. Saw cutting of new openings in existing concrete and/or masonry walls shall be done without overcutting beyond the boundaries of the intended opening. Any structural repairs required by the structural engineer as a result of overcutting beyond the boundaries of an opening shall be paid for by the saw cutting contractor. See drawings for additional information.

Field Drilled Adhesive Anchors

1. Basis of design for field drilled adhesive anchors shall be Hilti HIT-HY200 (HIT-HY70 in Masonry) Adhesive Anchors as manufactured by HILTI, or equivalent product by ITW Ramset/Redhead, Powers Fasteners, or Simpson Strong-Tie Anchor Systems. For substitution purposes, signed and sealed calculations shall be provided, indicating the substituted anchor meets the capacity requirements of the detailed anchor.

2. Use only code-approved anchors with valid ICC-ESR evaluation report for use in the base material shown on the Construction Documents. Submit ICC-ESR evaluation report to Structural Engineer and Special Inspection Agent for approval. Do not install anchors until submittal is returned "approved".

3. All post-installed adhesive anchors shall conform to AC-308. Installer of post-installed adhesive anchors shall be trained by anchor manufacturer.

4. Anchors of the diameter and embedment shown on the drawings shall be installed in strict accordance with manufacturer's recommendations under the continuous supervision of an independent testing agency. Where the provisions of the above referenced documents are in conflict, the most restrictive requirement shall govern. Provide minimum 3/4" diameter anchors with standard embedment at locations not indicated.

5. Clean existing concrete surface to solid structural concrete. Grind smooth for full steel contact and to prevent gaps between steel and concrete. Alternatively, provide non-shrink grout in all voids between steel and base material.

6. The contractor shall create a template at each adhesive anchor connection location **prior** to fabricating holes in connecting plates or rolled shapes. Templates shall be made by first locating existing reinforcing steel using non-destructive testing equipment and then drilling anchor holes such that no conflict exists with the existing reinforcing. Anchor locations in the field may be relocated, if approved by the E.O.R. a maximum of 1 1/2" from the dimensions shown on the drawings to avoid conflicts with the existing reinforcing steel. However, do not exceed minimum or maximum anchor spacings or edge distances per manufacturer's requirements.

7. All abandoned holes drilled in concrete shall be completely filled with structural grade epoxy.

8. Typically, holes in connection plates shall be no more than 1/16" larger than the adhesive anchor rod diameter. If larger diameter holes are used for erection purposes the contractor must provide plate washers. Plate washers must be welded to the connection plate to transfer the load. Welding must take place after holes are drilled, but prior to adhesive installation to avoid burning the adhesive.

Field Drilled Expansion Bolts

1. Field drilled expansion bolts shall be HILTI KWIK Bolt 3 anchor bolts as manufactured by the HILTI Corp., or ITW, Powers Fasteners, Simpson-Tie Anchor Systems equivalents. Submit I.C.C. ES report or similar data for each type of anchor proposed for use. Do not install anchors until submittal is returned "approved".

2. Only one length bolt shall be present on the job site for a given bolt diameter, unless otherwise specified on the drawings.

3. Expansion bolts of the diameter and embedment shown on the drawings shall be installed in accordance with the contract documents and the recommendations of the manufacturer. Where provisions of the above referenced documents are in conflict, the most restrictive requirement shall govern.

4. Expansion bolts shall be installed perpendicular to the face of the concrete being drilled. The maximum tolerance for deviation from perpendicular shall be 10 degrees. All expansion bolts installed outside of the specified tolerance shall be considered unacceptable.

5. The contractor shall create a template at each expansion bolt connection location **prior** to fabricating holes in connecting plates or rolled shapes. Templates shall be made by first locating existing reinforcing steel with a pachometer and then drilling bolt holes such that no conflict exists with the existing reinforcing. Bolt locations in the field may be relocated a maximum of 1 1/2" from the dimensions shown on the drawings to avoid conflicts with the existing reinforcing steel. However, do not exceed minimum or maximum bolt spacings or edge distances shown on the drawings.

6. Submit drawings of templates showing hole locations **prior** to fabrication of connecting plates or rolled shapes.

7. Holes drilled in the concrete shall be the diameter as recommended by the manufacturer. The hole diameter shall not exceed the maximum diameter at any location along the length of the bolt.

8. Foreign material shall not be placed in the holes that receive expansion bolts.

9. All abandoned holes drilled in the concrete shall be completely filled with epoxy.

10. Follow manufacturer's requirements for minimum edge distance and spacing to obtain full anchor capacity.

11. Installation of expansion bolts shall be monitored by the testing laboratory to insure bolts are installed correctly and that manufacturer's required installation torques are obtained.

12. Typically holes in connection plates shall be no more than 1/16" larger than the expansion bolt diameter. If larger diameter holes are used for erection purposes the contractor must provide plate washers. Plate washers must be welded to the connection plate or rolled shape to transfer the load.

Design Loads

ROOF LOADS:

Superimposed Dead Load:	15 psf

SNOW LOADS:

Ground Snow:	25 psf
+ Applicable Drift per ASCE 7	

FIRST FLOOR LOADS:

Superimposed Dead Loads:	15 psf
Superimposed Live Loads:	100 psf

Wood Framing

1. All wood framing shall conform to the "Timber Construction Manual" by the American Institute of Timber Construction and the "National Design Specification for Wood Construction" by the American Forest & Paper Association – American Wood Council.

2. Wood for floor and roof framing shall conform to the following:

   A. Joists, Beams, and Lintels/Dimension Lumber

      Douglas Fir-Larch (DF)
      No. 2 or better (WWPA/NLGA)

      a. Bending Fb=.....900 psi
      b. Shear Fv=.....180 psi
      c. Mod. Elas. E=.....1,600,000 psi

      Southern Pine (SP)
      No. 2 or better (SPIB)

      a. Bending Fb=.....975 psi
      b. Shear Fv=.....175 psi
      c. Mod. Elas. E=.....1,600,000 psi

   B. Laminated Veneer Lumber Beams (LVL):

      a. Bending Fb=.....2,900 psi
      b. Shear Fv=.....285 psi
      c. E=.....2,000,000 psi

   C. Parallel Strand Lumber (PSL):

      a. Bending Fb=.....2,900 psi
      b. Shear Fv=.....290 psi
      c. E=.....2,000,000 psi

   D. LSL Rim Boards (Timberstrand by Trus Joist or Equal):

      1 1/4" Minimum thickness x depth of floor framing.
      a. Bending Fb=.....1,700 psi
      b. E=.....2,000,000 psi

   E. Wood "I Joists":

      a. "T.J.I." by Truss Joist MacMillan
      b. "L.P.I." by Louisiana Pacific
      c. "G.P.I." by Georgia Pacific

   All wood "I joists" shall be used according to the manufacturer's requirements, including use of squash blocks, doublers, stiffeners, bridging, and proper fastenings. Follow manufacturer's hole cutting instructions for locations of holes in webs for plumbing and wiring. Do not cut or notch chords. Floor live load = 100 PSF. Defelection limit = Span/480.

3. Plywood floor deck and wall sheathing shall be identified with the appropriate grade trademark of the APA – The Engineered Wood Association and shall meet the requirements of the latest edition of "U.S. Product Standards, PS 1 for Construction and Industrial Plywood". Plywood thickness is shown on the drawings.

4. Glue for wood construction shall comply with specification AFG-01 of the APA – The Engineered Wood Association.

6. All wall, floor and roof sheathing is to be orientated perpendicular to its supporting member, unless otherwise noted.

RDA / STRUCTURAL ENGINEERING ABBREVIATIONS LIST

WORD	ABBR.	WORD	ABBR.	WORD	ABBR.
ALTERNATE	ALT	FLOOR	FL	PLATE	PL
ANCHOR BOLT	AB	FLOOR DRAIN	FD	POINT	PT
APPROXIMATE	APPROX	FOOT	FT	POUNDS PER SQ. IN.	PSI
ARCHITECTURAL	ARCH	FOOTING	FTG	PREFABRICATED	PREFAB
ASSEMBLY	ASSY	FORCE	F	PRESTRESSED	PST
AVERAGE	AVG	FOUNDATION	FDN	PROJECT	PROJ
BACK TO BACK	B TO B	GAGE or GAUGE	GA	RADIUS	R or RAD
BASE PLATE	BP	GALVANIZE	GALV	REFERENCE	REF
BEAM	BM	GRADE	GR	REFERENCE LINE	REF L
BENDING MOMENT	M	GRATING	GRTG	REINFORCE	REINF
BLOCK	BLK	HORIZONTAL	HORIZ	REQUIRED	REQ'D
BOTTOM	BOT or B	INCH	IN	RIGHT	RT
BOTTOM CHORD	BC	INFORMATION	INFO	RIGHT HAND	RH
BOTTOM OF CONCRETE	B/C	INSIDE FACE	IF	ROOF DRAIN	RD
BOTTOM OF STEEL	B/S	INSULATION	INS	ROUGH OPENING	RO
BUILDING	BLDG	INTERIOR	INT	SCHEDULE	SCH
CEILING	CLG	INVERT	INV	SECTION	SECT
CENTER	CTR	JOINT	JT	SEPARATE	SEP
CENTER LINE	CL	KIP (1000 LB.)	K	SHEET	SH
CENTER TO CENTER	C/C	KIPS PER SQ. FT.	KSF	SHORT LEG HORIZONTAL	SLH
CLEAR	CLR	KIPS PER SQ. IN.	KSI	SHORT LEG VERTICAL	SLV
COLUMN	COL	LANDING	LDG	SHORT SLOTTED HOLE	SSH
CONCRETE	CONC	LEFT	LT	SIDE	SD
CONCRETE MASONRY UNIT	CMU	LEFT HAND	LH	SIMILAR	SIM
CONNECTION	CONN	LENGTH or LONG	LG	SLOPE	S or SL
CONSTRUCTION	CONST	LENGTH OVER ALL	LOA	SLOTTED	SLOT
CONSTRUCTION JOINT	CJ	LIVE LOAD	LL	SOUTH	S
CONTINUE / CONTINUOUS	CONT	LONG LEG HORIZONTAL	LLH	SPECIFICATION	SPEC
CONTRACTOR	CONTR	LONG LEG VERTICAL	LLV	SQUARE	SQ
CORPORATION	CORP	LONG SLOTTED HOLE	LSH	SQUARE FOOT	SQ FT
COVER	CVR	MACHINE	MACH	SQUARE INCH	SQ IN
CYLINDER	CYL	MAINTENANCE	MAINT	STAINLESS STEEL	SS
DEAD LOAD	DL	MANUFACTURE (R) (ING)	MANUF	STANDARD	STD
DEPARTMENT	DEPT	MASONRY OPENING	MO	STEEL	STL
DETAIL	DET	MATERIAL	MATL	STIFFENER	STIFF
DIAGONAL	DIAG	MAXIMUM	MAX	STONE	STN
DIAMETER	DIA or Ø	MECHANICAL	MECH	STRUCTURAL	STRUC
DIRECTION	DIR	METAL	MET	SURFACE	SURF
DISTANCE	DIST	MILES	M	SYMMETRICAL	SYM
DOWEL	DWL	MINIMUM	MIN	SYSTEM	SYS
DOWN	DN	MISCELLANEOUS	MISC	TECHNICAL	TECH
DRAWING	DRWG	NEAR FACE	NF	TEMPERATURE	TEMP
EACH	EA	NEAR SIDE	NS	TENSION	TENS
EACH FACE	EF	NEGATIVE	NEG	THICK / THICKNESS	THK
EACH WAY	EA WAY	NORMAL	NOR	THREAD	THD
EAST	E	NORTH	N	TONGUE & GROOVE	T & G
ELECTRICAL	ELEC	NOT TO SCALE	NTS	TOP & BOTTOM	T & B
ELEVATION	EL	NUMBER	NO	TOP OF CONCRETE	T/C
ELEVATOR	ELEV	ON CENTER	OC	TOP OF STEEL	T/S
ENGINEER	ENGR	OPENING	OPNG	TOTAL	TOT
EQUAL	EQ	OPPOSITE	OPP	TYPICAL	TYP
EXISTING	EXIST	OUTSIDE DIAMETER	OD	UNLESS OTHERWISE NOTED	U.O.N.
EXPANSION JOINT	EXP JT	OUTSIDE FACE	OF	VARIABLE	VAR
EXTERIOR	EXT	OUTSTANDING LEG	OSL	VERTICAL	VERT
FABRICATE	FAB	OVERALL	OA	WEIGHT	WT
FACE TO FACE	F TO F	OVERHEAD	OVHD	WEST	W
FAR SIDE	FS	PAINTED	PTD	WITH	W/
FEET	FT	PARALLEL	PAR	WITHOUT	W/O
FINISH	FIN	PERPENDICULAR	PERP	WORKING POINT	WP
FLANGE	FLG	PIECE	PC	YARD	YD
		PRESSURE PRESERVATIVE TREATED	P.P.T.	DIR. ABBR. ie: NORTH EAST	N-E

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REVISIONS:
1 ISSUED FOR BIDS 09/30/2019

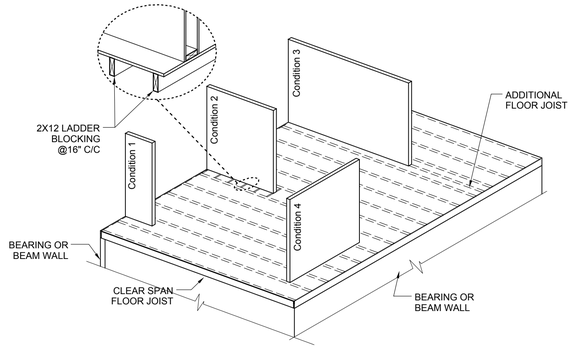
DATE	PROJ. NUMBER	ENG.	PROJ. MGR.	CADD
09/30/2019	RDA 19022	S.M.R.	N.M.	N.M.

City of Troy, Michigan
Niles - Barnard House Renovation
60 W. Wattles Road

STRUCTURAL NOTES

SHEET S0-1

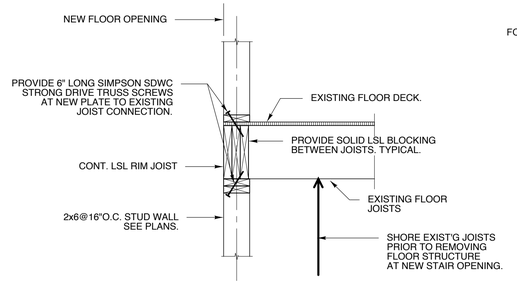
ISSUED FOR BIDS - September 30, 2019



Condition 1:	When the partition is 4'-0" or less, no additional joist support is necessary
Condition 2:	When the partition is between 4'-0" and half the length of the floor joist, use the detail as shown above to block between the floor joists.
Condition 3:	When the partition is greater than half the length of the floor joist, add an additional floor joist below the partition, or if plumbing is required to pass through, provide offset joists with ladder blocking between.
Condition 4:	When a partition spans more than two joists in the perpendicular direction, no additional support is needed.

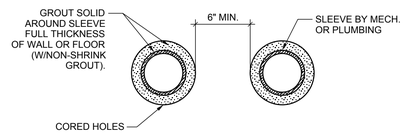
14 / S0-2 Framing Conditions for Non-Loadbearing Partitions

(ABOVE WOOD JOISTS) NOT TO SCALE



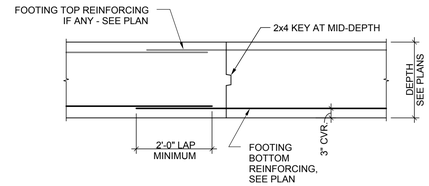
9 / S0-2 New Stud Bearing Wall Detail

SCALE:3/4"=1'-0"



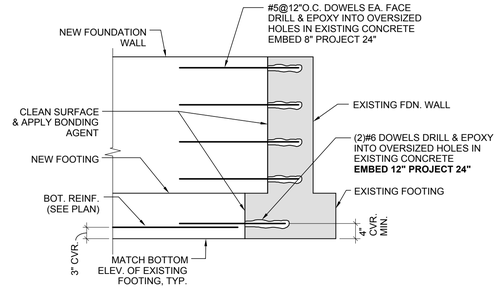
10 / S0-2 Typical Coring and Sleeve Detail

AT PIPE THROUGH CONCRETE OR MASONRY NOT TO SCALE



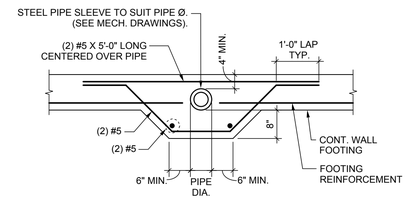
5 / S0-2 Typical Construction Joint in Continuous Footing

LOCATE AT 30'-0" MAX. SPACING NOT TO SCALE



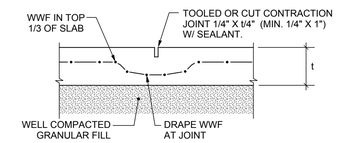
1 / S0-2 Typical Detail Joint New to Existing Footing

NOT TO SCALE



6 / S0-2 Typical Section thru Wall Footing at Pipe Location

NOT TO SCALE

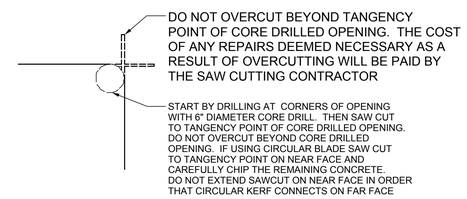


NOTE: SAW CUT JOINT WITHIN 12 HOURS AFTER SLAB PLACEMENT. DELAY FILLING W/ JOINT SEALANT AS LONG AS POSSIBLE

2 / S0-2 Typical Slab on Grade Contraction Joint

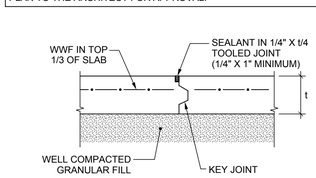
NOT TO SCALE

NOTE: THE PURPOSE OF SLAB ON GRADE JOINTING IS TO BREAK THE SLAB POURS INTO SIZES THAT ARE MANAGEABLE FOR FINISHING AND TO LIMIT TOTAL SHRINKAGE. PLACE CONSTRUCTION JOINTS SUCH THAT THE MAXIMUM SLAB POUR SIZE IS LIMITED TO 60'-0" X 60'-0". SLAB POURS SHALL BE SQUARE IF POSSIBLE, BUT IN NO CASE SHALL THEY BE GREATER THAN TWICE AS LONG AS THEY ARE WIDE. CONTRACTION JOINTS SHALL SUBDIVIDE A SLAB POUR INTO APPROXIMATELY 15'-0" X 15'-0" OR SMALLER AREAS. JOINTS SHALL BE PLACED WHERE POSSIBLE TO ALIGN WITH MAIN COLUMN LINES AND TO ELIMINATE RE-ENTRANT CORNERS IN THE SLAB.
PROVIDE SLAB JOINT PATTERN AS SHOWN ON THE DRAWINGS, OR IF NOT SHOWN, CONTRACTOR SHALL SUPPLY A PROPOSED JOINT LAYOUT PLAN TO THE ARCHITECT FOR APPROVAL.



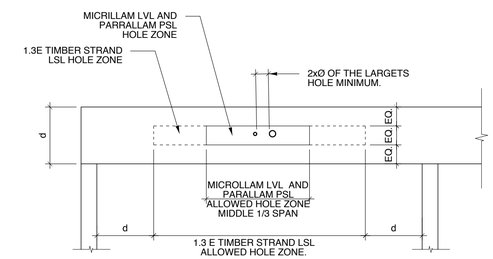
7 / S0-2 Typical Detail at New Openings in Masonry and/ or Monolithic Concrete

NOT TO SCALE



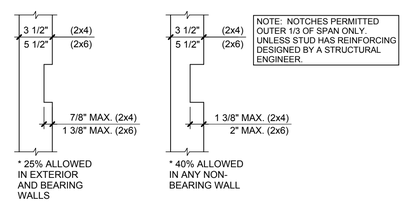
3 / S0-2 Typical Slab on Grade Construction Joint

NOT TO SCALE



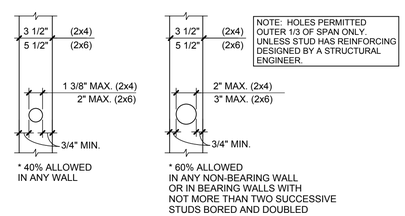
15 / S0-2 Allowable Holes in LVL Headers and Beams

NOT TO SCALE



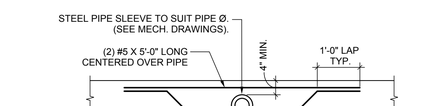
11 / S0-2 Permitted Notches in 2x4 and 2x6 Studs

* THESE PERCENTAGES REFER TO STUDS OF ANY SIZE NOT TO SCALE



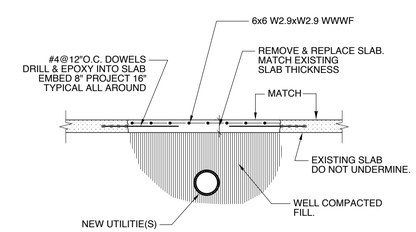
12 / S0-2 Permitted Bored Holes in 2x4 and 2x6 Studs

* THESE PERCENTAGES REFER TO STUDS OF ANY SIZE NOT TO SCALE



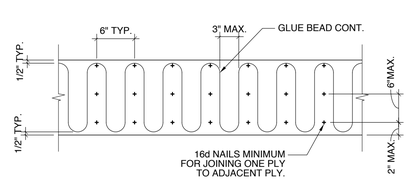
8 / S0-2 New Stud Wall Footing Detail

SCALE:3/4"=1'-0"



4 / S0-2 New Utility Pipe Below Existing Slab on Grade

NOT TO SCALE



13 / S0-2 Spreading Glue on Plys of Multiple Ply Beams and Nailing Pattern

SEE STRUCTURAL NOTES FOR GLUE TYPE. NOT TO SCALE

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LOADING SCHEDULE AND TYPICAL DETAILS

SHEET S0-2

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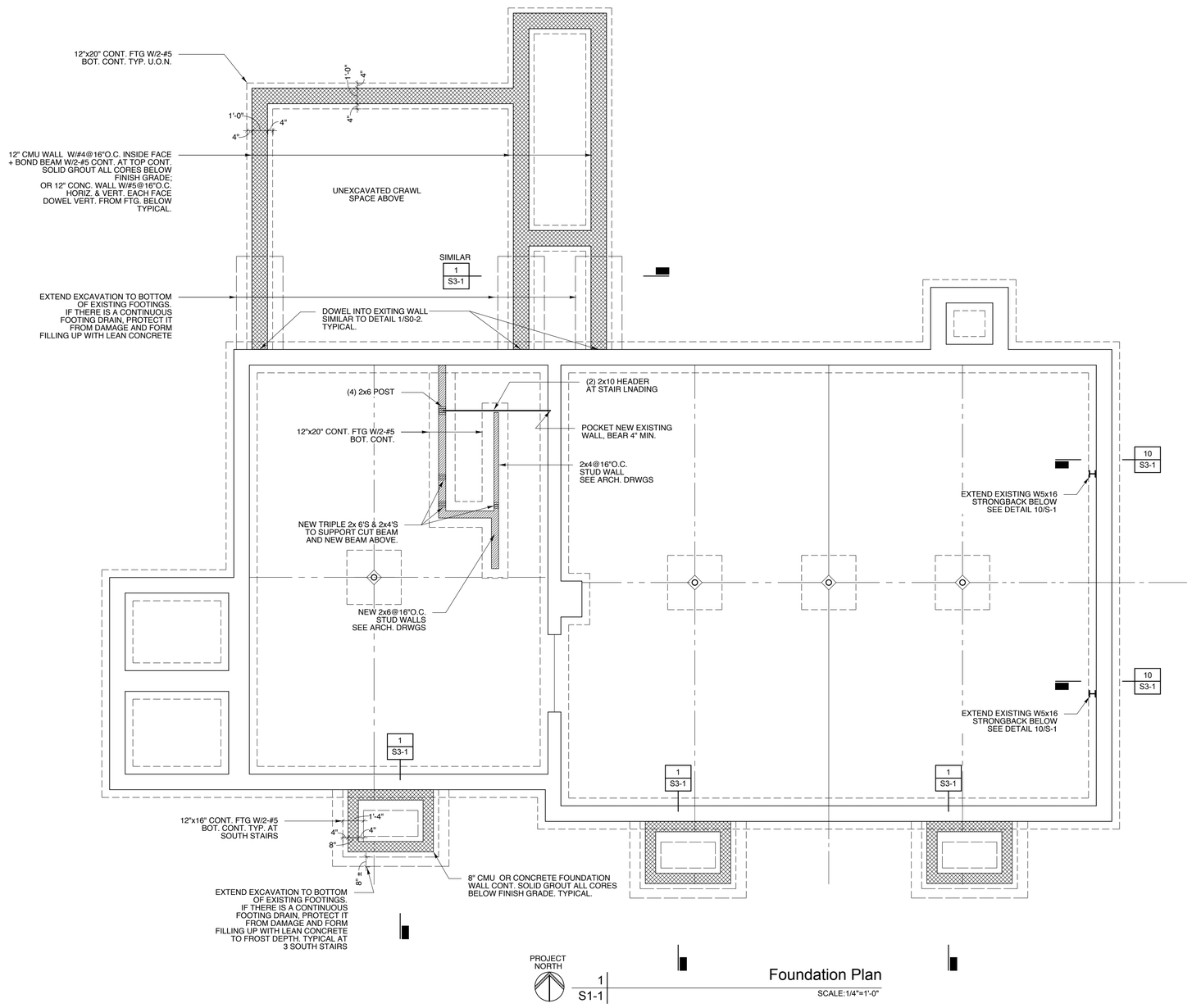

1
S1-1

Foundation Plan

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

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FOUNDATION PLAN

SHEET S1-1

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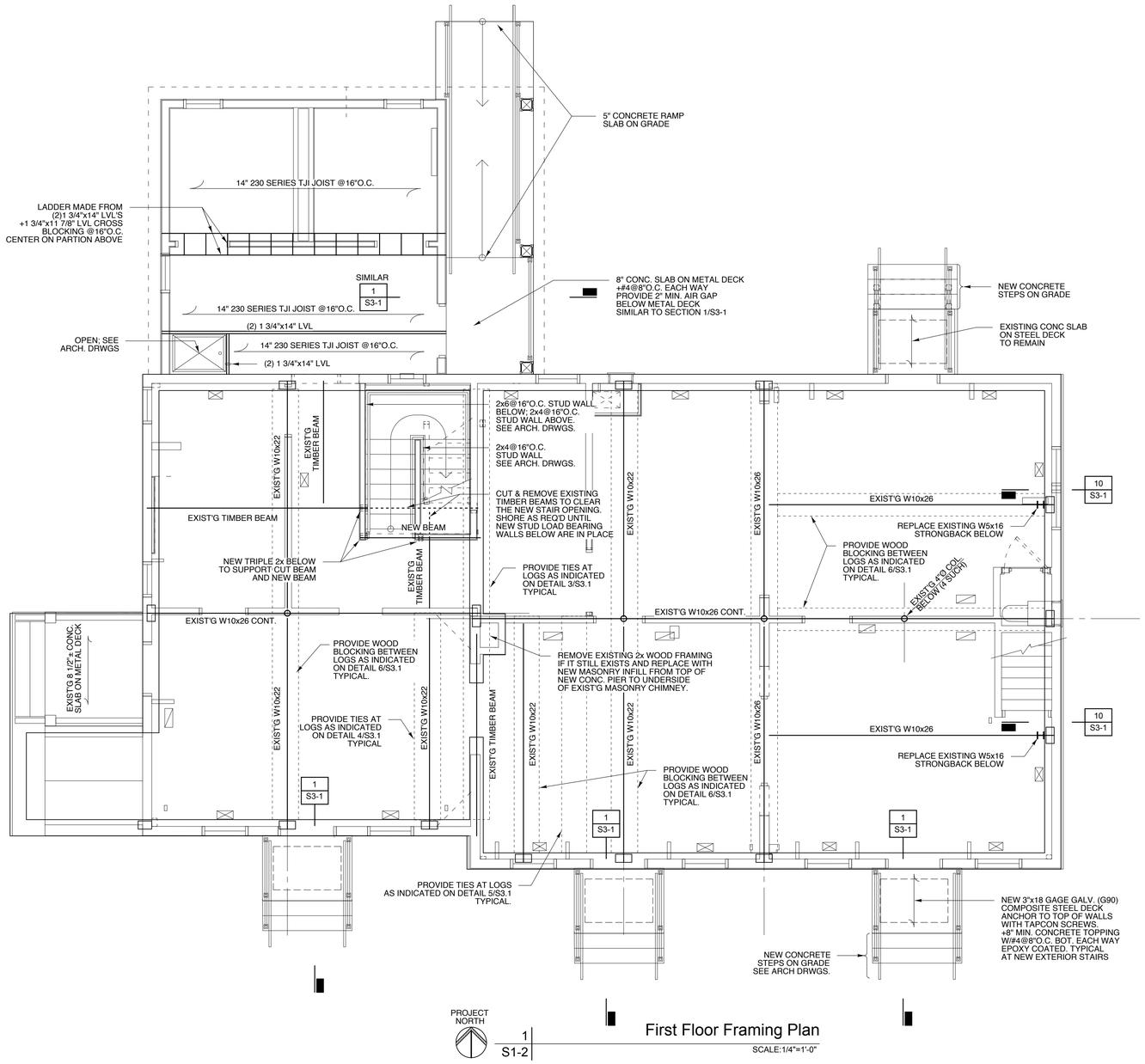

1
S1-2

First Floor Framing Plan

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

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FIRST FLOOR FRAMING PLAN

SHEET S1-2

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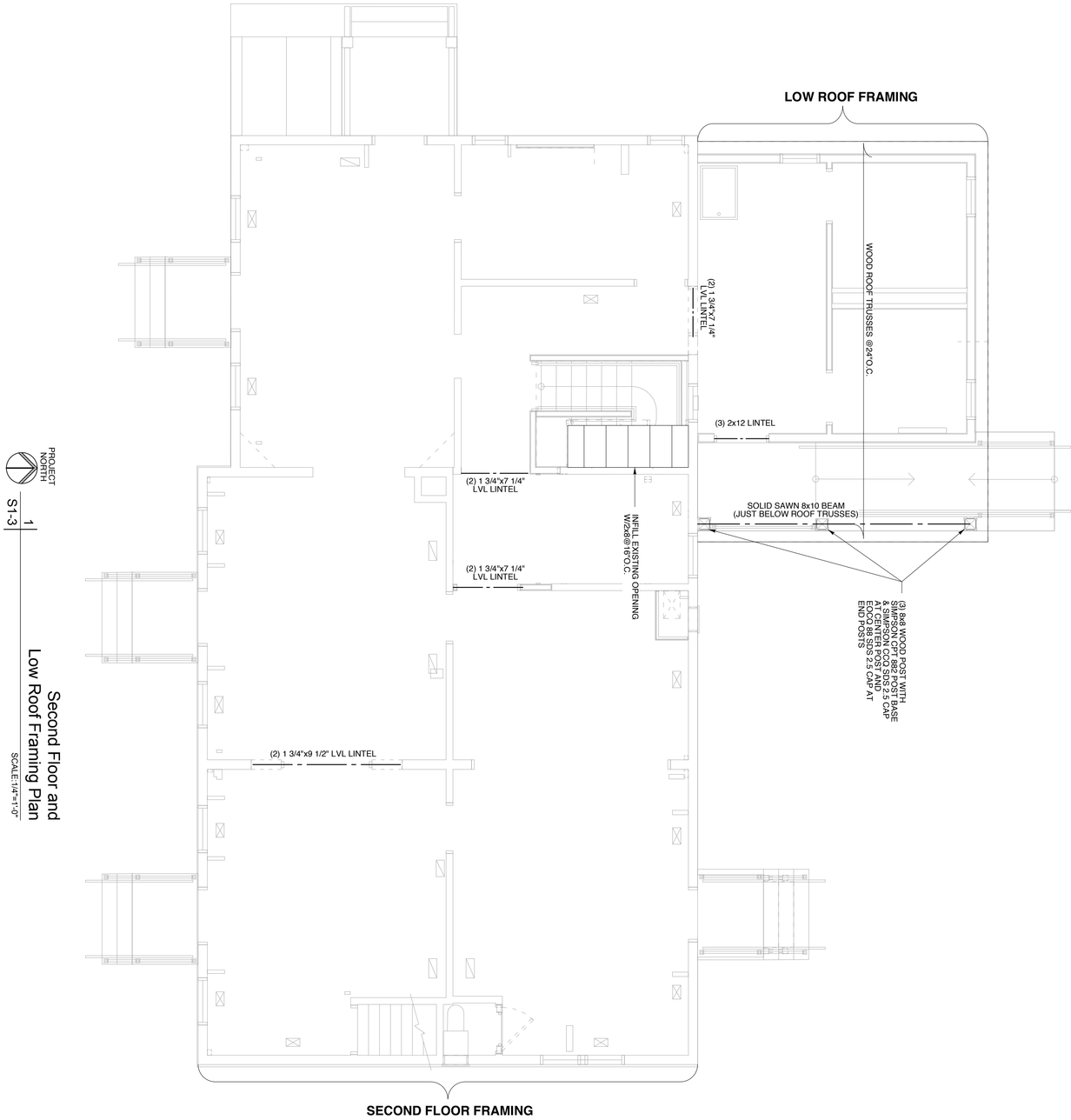

SHEET	DATE	PROJ. NUMBER	ENG.	PROJ. MGR.	CADD
S1-3	09/30/2019	RDA 19022	S.M.R.	N.M.	N.M.

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ROOF FRAMING PLAN

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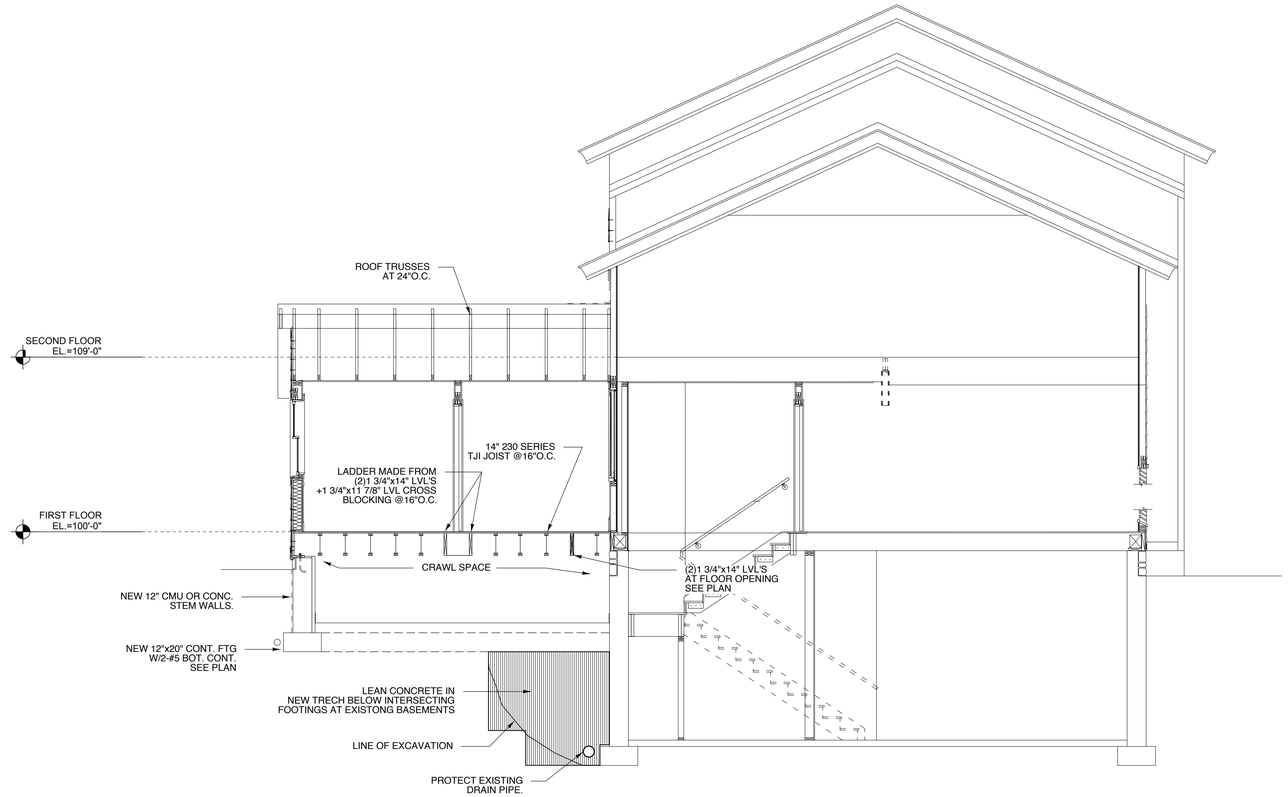

1 / S2-1 Building Section at New Addition

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

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BUILDING SECTION

SHEET S2-1

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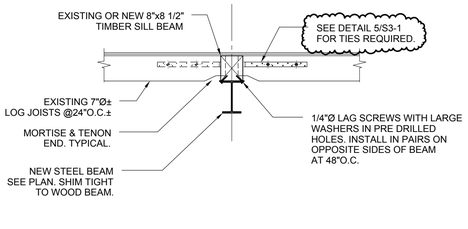
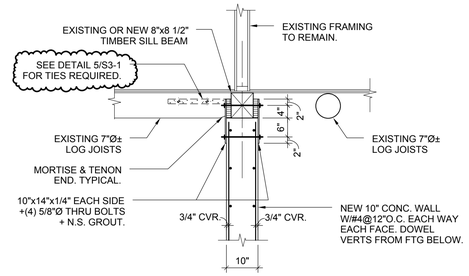
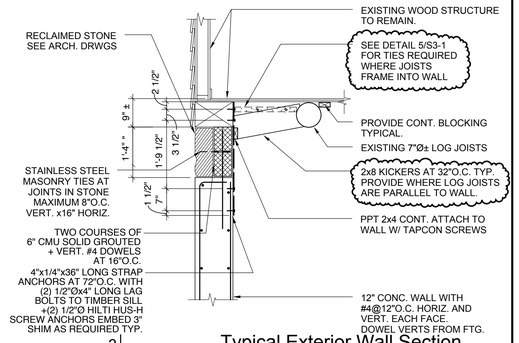


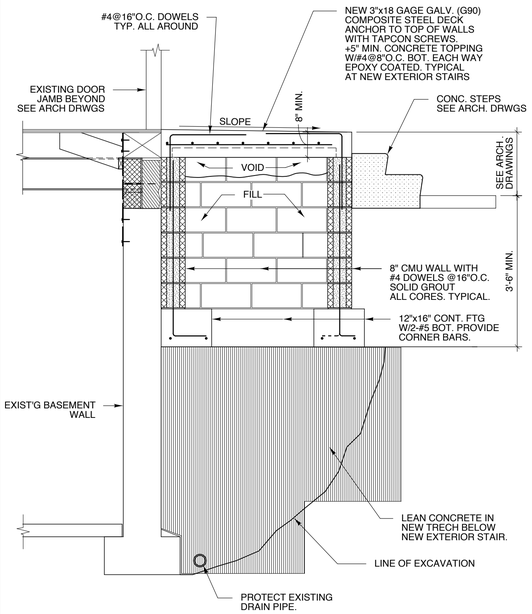
4 S3-1 Detail



3 S3-1 Typical Interior Wall Section

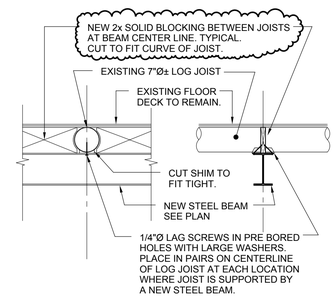


2 S3-1 Typical Exterior Wall Section

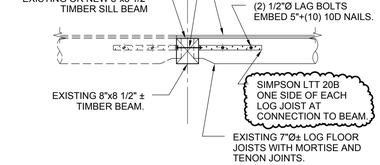


1 S2-1 Typical Section at New Exterior Stairs

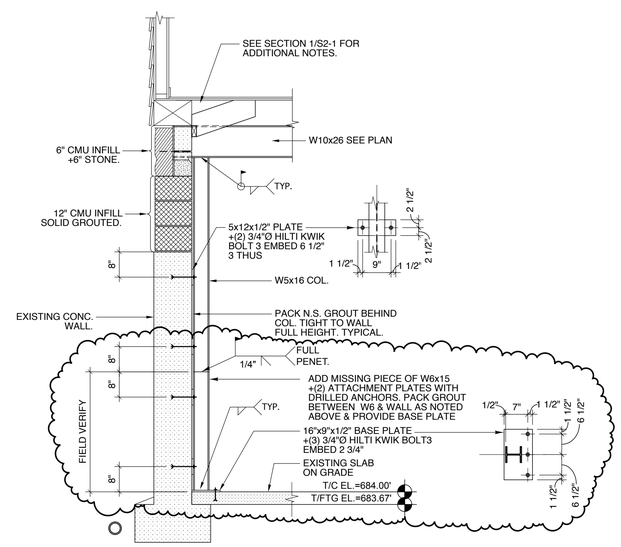
THESE DETAILS WERE DESIGNED IN 2009 PRIOR TO MOVING THE BUILDING TO IT'S CURRENT LOCATION .
CLOUDED ITEMS HAVE NOT BEEN COMPLETED PER ORIGINAL DESIGN AND NEED TO BE COMPLETED AS PART OF THIS PROJECT



6 S3-1 Typical Detail at Log Joist Supported by New Steel Beam



5 S3-1 Typical Tie at Mortise and Tenon Floor Joist to Beam Joints



10 S3-1 Section at East Wall

AT THE TWO BEAMS WHICH ENDED UP IN THE HOUSE MOVER BEAM POCKETS.

9 S3-1 Not Used

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STRUCTURAL DETAILS

SHEET S3-1

ISSUED FOR BIDS - September 30, 2019

MECHANICAL ABBREVIATION LIST

ABBREVIATION	DESCRIPTION
A	COMPRESSED AIR
A(__#)	COMPRESSED AIR (SPECIFIC PSIG)
AAV	AUTOMATIC AIR VENT
ACC	AIR COOLED CONDENSER
ACCU	AIR COOLED CONDENSING UNIT
AD	ACCESS DOOR
AD	AREA DRAIN
AE	AIR EXTRACTOR
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
ALT	ALTERNATE
AMP	AMPERE
APD	AIR PRESSURE DROP
AR	ARGON
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATION AND AIR-CONDITIONING ENGINEERS
ASR	AUTOMATIC SPRINKLER RISER
AUX	AUXILIARY
AV	ACID VENT
AVTR	ACID VENT THROUGH ROOF
AW	ACID WASTE
BAS	BUILDING AUTOMATION SYSTEM
BCU	BLOWER COIL UNIT
BDD	BACKDRAFT DAMPER
BFF	BELOW FINISHED FLOOR
BFP	BACKFLOW PREVENTER
BHP	BRAKE HORSEPOWER
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
BWV	BACKWATER VALVE
C	COMMON
CAP	CAPACITY
CAV	CONSTANT AIR VOLUME
CB	CATCH BASIN
CC	COOLING COIL
CD	COLD DECK
CD	CONDENSATE DRAIN
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CH	CHILLER
CHW	CHILLED WATER
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CLG	COOLING
CNDS	CONDENSATE
CNDS (__#)	CONDENSATE (SPECIFIC PSIG)
CO	CLEAN OUT
CO2	CARBON DIOXIDE
CONT	CONTINUATION OR CONTINUED
CONTR	CONTRACTOR
CONV	CONVECTOR
COP	COEFFICIENT OF PERFORMACE
CP	CIRCULATING PUMP
CRU	CONDENSATE RETURN UNIT
CSS	CLINICAL SERVICE SINK
CT	COOLING TOWER
CUH	CABINET UNIT HEATER
CW	DOMESTIC COLD WATER
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
D&T	DRIP AND TRAP
DA	DISCHARGE AIR
DAT	DISCHARGE AIR TEMPERATURE
DB	DRY BULB
DDC	DIRECT DIGITAL CONTROL
DEG	DEGREE
DFU	DRAINAGE FIXTURE UNITS
DIA	DIAMETER
DMPR	DAMPER
D/N	DAY/NIGHT
DN	DOWN
DNZ	DOWNSPOUT NOZZLE
DS	DUCT SILENCER
DT	DRAIN TILE
DTC	DRAIN TILE CONNECTION
DWH	DOMESTIC WATER HEATER
DWG	DRAWING
(E)	EXISTING
E	EXHAUST GRILLE OR REGISTER
EA	EACH
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	EXPANSION COMPENSATOR
ECUH	ELECTRIC CABINET UNIT HEATER
EDB	ENTERING DRY BULB
EER	ENERGY EFFICIENCY RATIO
EES	EMERGENCY EYE WASH / SHOWER
EEW	EMERGENCY EYE WASH
EF	EXHAUST FAN
EFF	EFFICIENCY
EHC	ELECTRIC HEATING COIL
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRICAL
EMS	ENERGY MANAGEMENT SYSTEM
ERL	ENERGY RECOVERY LOOP
ERLR	ENERGY RECOVERY LOOP RETURN
ERLS	ENERGY RECOVERY LOOP SUPPLY
ERU	ENERGY RECOVERY UNIT
ESH	EMERGENCY SHOWER
ESP	EXTERNAL STATIC PRESSURE
EUH	ELECTRIC UNIT HEATER
EWB	ENTERING WET BULB
EWC	ELECTRIC WATER COOLER
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
F	FIRE PROTECTION
°F	DEGREES FAHRENHEIT
F&B	FACE AND BYPASS
F&T	FLOAT AND THERMOSTATIC
FA	FACE AREA
FCU	FAN COIL UNIT

ABBREVIATION	DESCRIPTION
FD	FLOOR DRAIN
FTD	FUNNEL FLOOR DRAIN
FH	FIRE HYDRANT
FHC	FIRE HOSE CABINET
FHR	FIRE HOSE RACK
FHV	FIRE HOSE VALVE
FLA	FULL LOAD AMPS
FLR	FLOOR
FM	FLOW METER
FMS	FLOW MEASURING STATION
FPM	FEET PER MINUTE
FP	FIRE PUMP
FPTU	FAN POWERED (AIR) TERMINAL UNIT
FS	FLOOR SINK
FSEC	FOOD SERVICE EQUIPMENT CONTRACTOR
FT	FEET
FTR	FINNED TUBE RADIATION
FV	FACE VELOCITY
G	NATURAL GAS
GA	GAUGE
GAL	GALLON
GRH	GRAVITY RELIEF HOOD
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
H	HYDROGEN
HB	HOSE BIBB
HC	HEATING COIL
HD	HOT DECK
HEPA	HIGH EFFICIENCY PARTICULATE ARRESTANCE
HL	HIGH LIMIT
HOA	HAND/OFF/AUTO
HP	HEAT PUMP
HP	HORSEPOWER
HPCW	HIGH PRESSURE DOMESTIC COLD WATER
HPHW	HIGH PRESSURE DOMESTIC HOT WATER
HPHWR	HIGH PRESSURE DOMESTIC HOT WATER RETURN
HPL	HEAT PUMP LOOP
HPLR	HEAT PUMP LOOP RETURN
HPLS	HEAT PUMP LOOP SUPPLY
HR	HOUR
HTG	HEATING
HV	HEATING VENTILATING
HVAC	HEATING, VENTILATING, AIR CONDITIONING
HWH	HOT WATER HEATING
HWHR	HOT WATER HEATING RETURN
HWHS	HOT WATER HEATING SUPPLY
HW	DOMESTIC HOT WATER
HW(__)	DOMESTIC HOT WATER (SPECIFIC TEMP °F)
HWR	DOMESTIC HOT WATER RETURN
HX	HEAT EXCHANGER
HZ	HERTZ
IAQ	INDOOR AIR QUALITY
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IH	INTAKE HOOD
IN	INCHES
IR	INFRARED HEATER
IW	INDIRECT WASTE
JC	JANITOR'S CLOSET
JP	JOCKEY PUMP
KW	KILOWATT
KWH	KILOWATT-HOUR
LAT	LEAVING AIR TEMPERATURE
LAB	LABORATORY
LAV	LAVATORY
LBS	POUNDS
LDB	LEAVING DRY BULB
LL	LOW LIMIT
LPC	LOW PRESSURE CONDENSATE
LPS	LOW PRESSURE STEAM
LRA	LOCKED ROTOR AMPS
LWB	LEAVING WET BULB
LWT	LEAVING WATER TEMPERATURE
MA	MIXED AIR
MAT	MIXED AIR TEMPERATURE
MAU	MAKE-UP AIR UNIT
MAX	MAXIMUM
MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
MCA	MEDICAL COMPRESSED AIR
MCA	MINIMUM CIRCUIT AMPACITY
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MEZZ	MEZZANINE
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MMBH	MILLION BRITISH THERMAL UNITS PER HOUR
M/S	MOTOR STARTER
MTD	MOUNTED
MTR	MOTOR
MV	MANUAL AIR VENT
MVAC	MEDICAL VACUUM
N	NITROGEN
N2O	NITROUS OXIDE
NC	NOISE CRITERIA
NC	NORMALLY CLOSED
NCTC	NORMALLY CLOSED TIMED CLOSED
NCTO	NORMALLY CLOSED TIMED OPEN
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NOTC	NORMALLY OPEN TIMED CLOSED
NOTO	NORMALLY OPEN TIMED OPEN
NO	NOT IN CONTRACT
NO	NORMALLY OPEN
NOM	NOMINAL
NPCW	NON POTABLE COLD WATER

ABBREVIATION	DESCRIPTION
O	OXYGEN
OA	OUTSIDE AIR
OAT	OUTSIDE AIR TEMPERATURE
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER/CENTER TO CENTER
OD	OUTSIDE DIAMETER
OED	OPEN ENDED DUCT
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
OL	OVERLOAD
ORC	OVERFLOW RAIN CONDUCTOR
ORD	OVERFLOW ROOF DRAIN
OS&Y	OUTSIDE SCREW AND YOKE
OV	OUTLET VELOCITY
OWS	OPERATOR WORKSTATION
PACU	PACKAGED AIR CONDITIONING UNIT
PBD	PARALLEL BLADE DAMPER
PC	PUMPED CONDENSATE
PCW	PROCESS COOLING WATER
PCWR	PROCESS COOLING WATER RETURN
PCWS	PROCESS COOLING WATER SUPPLY
PD	PRESSURE DROP (FEET OF WATER)
PH	PERIMETER HEAT
PHR	PERIMETER HEAT RETURN
PHS	PERIMETER HEAT SUPPLY
PNL	PANEL
PPM	PARTS PER MILLION
PRESS	PRESSURE
PRV	PRESSURE REDUCING VALVE
PSAN	PUMPED SANITARY
PST	PUMPED STORM
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH - ABSOLUTE
PSIG	POUNDS PER SQUARE INCH - GAUGE
PW	PURIFIED WATER
PWR	PURIFIED WATER RETURN
PWS	PURIFIED WATER SUPPLY
(R)	RELOCATED
R	RETURN GRILLE OR REGISTER
RA	RETURN AIR
RAT	RETURN AIR TEMPERATURE
RC	RAIN CONDUCTOR
RCP	RADIANT CEILING PANEL
RD	ROOF DRAIN
REQD	REQUIRED
REF	ROOF EXHAUST FAN
RF	RETURN FAN
RH	RELATIVE HUMIDITY
RL	REFRIGERANT LIQUID
RLFA	RELIEF AIR
RPM	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION
RTU	ROOFTOP UNIT
S	SUPPLY AIR DIFFUSER OR GRILLE
SA	SOUND ATTENUATOR
SA	SUPPLY AIR
SAN	SANITARY WASTE
SAT	SUPPLY AIR TEMPERATURE
SECT	SECTION
SF	SUPPLY FAN
SH	SHOWER
SK	SINK
SMR	SNOW MELT RETURN
SMS	SNOW MELT SUPPLY
SP	STATIC PRESSURE
SPEC	SPECIFICATION
SPKLR	SPRINKLER
SQFT	SQUARE FOOT/SQUARE FEET
S/S	START/STOP
SS	SERVICE SINK
ST	STORM
STD	STANDARD
STK	STACK
STM	STEAM
STM(__#)	STEAM (SPECIFIC PSIG)
S/W	SUMMER/WINTER
SW	SWITCH
T	TRANSFER GRILLE
TC	TEMPERATURE CONTROL
TC	TEMPERING COIL
TCP	TEMPERATURE CONTROL PANEL
TD	TRENCH DRAIN
TEMP	TEMPERATURE
TEMP	TEMPORARY
TH	TERMINAL HEATING
THA	TOTAL HEAT ABSORBED
THR	TERMINAL HEATING RETURN
THR	TOTAL HEAT REJECTED
THS	TERMINAL HEATING SUPPLY
TSP	TOTAL STATIC PRESSURE
TU	(AIR) TERMINAL UNIT
TV	TURNING VANES
TYP	TYPICAL
UH	UNIT HEATER
UL	UNDERWRITER'S LABORATORY
UON	UNLESS OTHERWISE NOTED
UR	URINAL
UV	UNIT VENTILATOR
V	VALVE
V	VENT
VAC	VACUUM
VAV	VARIABLE AIR VOLUME
VB	VACUUM BREAKER
VD	VOLUME DAMPER (MANUALLY ADJUSTABLE)
VOL	VOLUME
VFC	VARIABLE FREQUENCY CONTROLLER
VTR	VENT THROUGH ROOF
VTU	VENTURI TERMINAL UNIT
VUV	VERTICAL UNIT VENTILATOR
W	WASTE
W&V	WASTE AND VENT
WB	WET BULB
WC	WATER CLOSET
WC	WATER COLUMN
WG	WATER GAUGE
WH	WALL HYDRANT
WPD	WATER PRESSURE DROP
WT	WEIGHT
XFMR	TRANSFORMER

TEMPERATURE CONTROL - PARTIAL SYMBOLS LIST

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
CO2	CARBON DIOXIDE SENSOR	OS	OCCUPANCY SENSOR
CO	CARBON MONOXIDE SENSOR	PT	PRESSURE TRANSMITTER
DPT	DIFFERENTIAL PRESSURE TRANSMITTER	SP	STATIC PRESSURE SENSOR OR PROBE
FM	FLOW METER		VALVE - 2 WAY CONTROL VALVE
	GUARD FOR STAT OR SENSOR		VALVE - 3 WAY CONTROL VALVE
H	HUMIDISTAT OR HUMIDITY SENSOR (AS DEFINED ON TC DRAWINGS)	T	THERMOSTAT OR TEMPERATURE SENSOR (AS DEFINED ON TC DRAWINGS)

NOTE: LIST OF ADDITIONAL SYMBOLS & ABBREVIATIONS ASSOCIATED WITH TEMPERATURE CONTROLS ARE IDENTIFIED ON TC DRAWINGS.

MECHANICAL SYMBOL LIST

PIPING SYMBOLS

SYMBOL	DESCRIPTION
AV	AIR VENT - AUTOMATIC
MV	AIR VENT - MANUAL
BFP	BACKFLOW PREVENTER
	CATCH BASIN
	CIRCULATING PUMP
CO	CLEAN OUT - IN FLOOR
CO	CLEAN OUT - FLANGE
	DIRECTION OF FLOW
	DIRECTION OF PITCH - DOWN
	FINNED TUBE RADIATION
	FIRE PROTECTION - SIAMESE CONNECTION - FREE STANDING
	FIRE PROTECTION - SIAMESE CONNECTION - WALL MOUNTED
	FIRE PROTECTION - SPRINKLER HEAD, CONCEALED
	FIRE PROTECTION - SPRINKLER HEAD, PENDANT
	FIRE PROTECTION - SPRINKLER HEAD, UPRIGHT
	FIRE PROTECTION - SPRINKLER HEAD, SIDEWALL
	FLOOR DRAIN
	FLOOR DRAIN - ELEVATION
FD	FLOOR DRAIN - FUNNEL
	FLOOR DRAIN - FUNNEL, ELEVATION
	FLOW MEASURING DEVICE (FOR TEST AND BALANCING)
FS	FLOW SWITCH
FM	FLOW METER
HB	HOSE BIBB
MH	MANHOLE
	OPEN SITE DRAIN
	PIPE - ANCHOR
	PIPE - CAP OR PLUG
	PIPE - ELBOW DOWN
	PIPE - ELBOW UP
	PIPE - EXPANSION JOINT OR COMPENSATOR
	PIPE - FLANGE
	PIPE - HOSE AND BRAID FLEXIBLE CONNECTION
	PIPE - RUBBER FLEXIBLE CONNECTION
	PIPE - GUIDE
	PIPE - TEE DOWN
	PIPE - TEE UP
	PIPE - UNION
P/T	PRESSURE AND TEMPERATURE TEST PLUG
	PRESSURE GAUGE AND COCK
	REDUCER - CONCENTRIC
	REDUCER - ECCENTRIC
	ROOF/OVERFLOW DRAIN
	STEAM TRAP - FLOAT AND THERMOSTATIC
	STEAM TRAP - BUCKET
	STRAINER
	STRAINER WITH VALVE AND BLOW-OFF
	THERMOMETER
	TRAP
	VALVE - ANGLE
	VALVE - BALL
	VALVE - BUTTERFLY
0.5	VALVE - BALANCE (i.e. BALANCE VALVE TO 0.5 GPM)
0.5	VALVE - COMBINATION BALANCE & FLOW MEASURING (i.e. BALANCE VALVE TO 0.5 GPM)
	VALVE - CHECK
	VALVE - SPRING CHECK
	VALVE - GAS (MANUAL)
	VALVE - GLOBE
	VALVE - ISOLATION
	VALVE - NEEDLE
	VALVE - OS&Y
	VALVE - PLUG
	VALVE - PRESSURE REGULATING
	VALVE - PRESSURE REDUCING
	VALVE - PRESSURE RELIEF
	VALVE - PRESSURE & TEMPERATURE RELIEF
VTR	VENT THROUGH ROOF
WH	WALL HYDRANT

DOUBLE LINE PIPING SYMBOLS

SYMBOL	DESCRIPTION
	FLANGE
	FLEX CONNECTION
	STRAINER - BASKET
	STRAINER - Y TYPE
	VALVE - 2 WAY CONTROL
	VALVE - 3 WAY CONTROL
	VALVE - BUTTERFLY
	VALVE - CHECK
	VALVE - DETECTOR CHECK
	VALVE - OS&Y HORIZONTAL STEM
	VALVE - OS&Y VERTICAL STEM

DUCTWORK SYMBOLS

SYMBOL	DESCRIPTION
TU-101	AIR TERMINAL UNIT
TU-101	AIR TERMINAL UNIT WITH HEATING COIL
VTU-101	VENTURI AIR TERMINAL UNIT
VTU-101	VENTURI AIR TERMINAL UNIT WITH HEATING COIL
	DAMPER - HORIZONTAL FIRE (EXISTING, NEW)
	DAMPER - HORIZONTAL FIRE / SMOKE (EXISTING, NEW)
	DAMPER - SMOKE (EXISTING, NEW)
	DAMPER - VERTICAL FIRE (EXISTING, NEW)
	DAMPER - VERTICAL FIRE / SMOKE (EXISTING, NEW)
BDD	DAMPER - BACK DRAFT
M	DAMPER - MOTORIZED
	DAMPER - VOLUME (MANUALLY ADJUSTABLE)
	DIFFUSER - BLANK OFF
	DIFFUSER - LINEAR SLOT
	DIFFUSER - SQUARE OR RECTANGULAR
	DUCT CROSS SECTION - SUPPLY
	DUCT CROSS SECTION - RETURN
	DUCT CROSS SECTION - EXHAUST
	DUCT - FLEXIBLE CONNECTION
	DUCT - FLEXIBLE DUCT
	DUCT TAKE-OFF - ROUND CONICAL
	DUCT TAKE-OFF - RECTANGULAR WITH SHOE TAP
	ELBOW - RECTANGULAR WITH TURNING VANES
	ELBOW - RECTANGULAR/ ROUND SMOOTH RADIUS
	ELBOW DOWN - RECTANGULAR
	ELBOW DOWN - ROUND
	ELBOW UP - RECTANGULAR
	ELBOW UP - ROUND
	FAN - AXIAL
	FAN - CENTRIFUGAL (ELEVATION)
	HEATING COIL
D	INCLINED DROP IN DIRECTION OF AIRFLOW
R	INCLINED RISE IN DIRECTION OF AIRFLOW
	INTAKE OR RELIEF HOOD
	REGISTER - RETURN OR EXHAUST
	REGISTER - RETURN WITH BOOT
	REGISTER - TRANSFER GRILLE
	ROOF EXHAUST FAN
	TRANSITION - CONCENTRIC
	TRANSITION - ECCENTRIC
	UNIT HEATER - HORIZONTAL THROW
	UNIT HEATER - VERTICAL THROW

DOUBLE LINE DUCTWORK SYMBOLS

SYMBOL	DESCRIPTION
	DUCT TAKE-OFF - RECTANGULAR WITH SHOE TAP
	DUCT TAKE-OFF - ROUND CONICAL
	ELBOW - RECTANGULAR WITH TURNING VANES
	ELBOW - RECTANGULAR SHORT RADIUS WITH SPLITTER VANES
	ELBOW - ROUND
	ELBOW - RECTANGULAR SMOOTH RADIUS
	ELBOW DOWN - RECTANGULAR
	ELBOW DOWN - ROUND
	ELBOW UP - RECTANGULAR
	ELBOW UP - ROUND
	HEATING COIL
D	INCLINED DROP IN DIRECTION OF AIRFLOW
R	INCLINED RISE IN DIRECTION OF AIRFLOW
	TRANSITION - CONCENTRIC
	TRANSITION - ECCENTRIC

MECHANICAL DRAWING INDEX

STANDARD METHODS OF NOTATION

S-1 10# 350-4	SUPPLY DIFFUSER WITH SCHEDULE TAG "1", 10" DIAMETER NECK SIZE 350 CFM TYPICAL FOR 4
R-1 22x22 640-2	RETURN REGISTER WITH SCHEDULE TAG "1", 22"x 22" NECK SIZE 640 CFM TYPICAL FOR 2 EXHAUST REGISTER E DESIGNATION SIMILAR.
TU-101	AIR TERMINAL UNIT WITH HEATING COIL NO. 101 WITH SERVICE CLEARANCE SHOWN
VTU-101	VENTURI AIR TERMINAL WITH HEATING COIL NO. 101 WITH SERVICE CLEARANCE SHOWN
8	PIPE DIAMETER NOTATION ALL SIZES IN INCHES
8#	
22x10 / 18x14Ø	DUCT SIZE NOTATION ALL SIZES IN INCHES
	OVAL DUCT RECTANGULAR DUCT
1	CONSTRUCTION NOTE NUMBER
EF 1	EQUIPMENT DESIGNATION, (i.e. EXHAUST FAN NUMBER 1)
HW-1	PIPING RISER DESIGNATION (i.e. HOT WATER RISER NUMBER 1)
	NEW SYSTEM COMPONENT
	EXISTING SYSTEM COMPONENT TO REMAIN
	POINT OF NEW CONNECTION SYMBOL
1 M5.1	SECTION OR PLAN NUMBER
	SHEET WHERE SECTION IS DRAWN
	AREA OF ENLARGEMENT
	PLAN NUMBER
1 M5.1	SHEET WHERE ENLARGED PLAN IS DRAWN
1 M5.1	SECTION OR PLAN NUMBER **SECTION OR ENLARGED PLAN** SCALE: 1/8" = 1' - 0" SHEET WHERE SECTION IS CUT OR ENLARGED PLAN IS REFERENCED
SHEET M1.0 SHEET M1.1	MATCH LINE
	HEAVY LINE WEIGHT INDICATES NEW WORK
	LIGHT LINE WEIGHT INDICATES EXISTING EQUIPMENT OR REFERENCED INFORMATION
	GRAY LINE INDICATES BACKGROUND INFORMATION
	DASHED LINES INDICATE PIPING ROUTED BELOW SLAB OR GRADE
	HATCH MARKS INDICATE EQUIPMENT OR MATERIALS TO BE DISCONNECTED AND REMOVED.

NOTE: SOME SYMBOLS AND ABBREVIATIONS SHOWN MAY NOT APPLY TO THIS PROJECT.

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SEAL

REVISIONS:		
1	ISSUED FOR BIDS	09/30/2019

DATE	PROJ.NUMBER	ARCH	PROJ.MGR	CADD
09/30/2019	01/28-18-0020	C O	EMG	AFL

City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

MECHANICAL STANDARDS AND DRAWING INDEX

SHEET M0.1

MECHANICAL GENERAL REQUIREMENTS

A. REFERENCES: MECHANICAL AND PHYSICAL PROPERTIES OF ALL MATERIALS, AND THE DESIGN, PERFORMANCE CHARACTERISTICS, AND METHODS OF CONSTRUCTION OF ALL ITEMS OF EQUIPMENT, SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF THE VARIOUS, APPLICABLE STANDARD SPECIFICATIONS.

B. PERFORMANCE REQUIREMENTS: SYSTEMS COMPONENTS PRESSURE AND TEMPERATURE RATINGS: NOT LESS THAN INDICATED AND AS REQUIRED FOR SYSTEM PRESSURES AND TEMPERATURES.

C. QUALITY ASSURANCE:

1. SCOPE OF WORK: FURNISH ALL LABOR, MATERIAL, EQUIPMENT, TECHNICAL SUPERVISION, AND INCIDENTAL SERVICES REQUIRED TO COMPLETE, TEST AND LEAVE READY FOR OPERATION THE MECHANICAL SYSTEMS AS SPECIFIED AND AS INDICATED ON DRAWINGS.

2. ORDINANCES AND CODES: PERFORM ALL WORK IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL ORDINANCES AND REGULATIONS, THE RULES AND REGULATIONS OF ASHRAE, NFPA, SMACNA AND UL, UNLESS OTHERWISE INDICATED.

3. SOURCE LIMITATIONS: EQUIPMENT OF THE SAME OR SIMILAR SYSTEMS SHALL BE BY THE SAME MANUFACTURER.

4. TESTS AND INSPECTIONS: PERFORM ALL TESTS REQUIRED BY STATE, CITY, COUNTY AND/OR OTHER AGENCIES HAVING JURISDICTION. PROVIDE ALL MATERIALS, EQUIPMENT, ETC., AND LABOR REQUIRED FOR TESTS.

5. SEQUENCE AND SCHEDULE: WORK SO AS TO AVOID INTERFERENCE WITH THE WORK OF OTHER TRADES. BE RESPONSIBLE FOR REMOVING AND RELOCATING ANY WORK WHICH IN THE OPINION OF THE OWNER'S REPRESENTATIVES CAUSES INTERFERENCE.

6. LABELING REQUIREMENT FOR PACKAGED EQUIPMENT: ELECTRICAL PANELS ON PACKAGED MECHANICAL EQUIPMENT SHALL BEAR UL LABEL OR LABEL OF OTHER NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) (ITSNA, CSA, ETC.).

7. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100, BY AN NRTL ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE.

D. CODES, PERMITS AND FEES:

1. UNLESS OTHERWISE INDICATED, ALL REQUIRED PERMITS, LICENSES, INSPECTIONS, APPROVALS AND FEES FOR MECHANICAL WORK SHALL BE SECURED AND PAID FOR BY THE CONTRACTOR. ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES, RULES AND REGULATIONS.

2. WORK SHALL BE EXECUTED IN ACCORDANCE WITH THE RULES AND REGULATIONS SET FORTH IN LOCAL AND STATE CODES. PREPARE ANY DETAILED DRAWINGS OR DIAGRAMS WHICH MAY BE REQUIRED BY THE GOVERNING AUTHORITIES. WHERE THE DRAWINGS AND SPECIFICATIONS INDICATE MATERIALS OR CONSTRUCTION IN EXCESS OF CODE REQUIREMENTS, THE DRAWINGS AND SPECIFICATIONS SHALL GOVERN.

E. THE DRAWINGS SHOW LOCATION AND GENERAL ARRANGEMENT OF EQUIPMENT, PIPING AND RELATED ITEMS. FOLLOW DRAWINGS AS CLOSELY AS ELEMENTS OF THE CONSTRUCTION PERMIT.

F. MATERIAL AND EQUIPMENT MANUFACTURERS:

1. EQUIPMENT: ALL ITEMS OF EQUIPMENT SHALL BE FURNISHED COMPLETE WITH ALL ACCESSORIES NORMALLY SUPPLIED WITH THE CATALOG ITEMS LISTED AND ALL OTHER ACCESSORIES NECESSARY FOR COMPLETE AND SATISFACTORY OPERATING SYSTEM. EQUIPMENT AND MATERIALS SHALL BE NEW AND SHALL BE STANDARD PRODUCTS OF MANUFACTURERS REGULARLY ENGAGED IN THE PRODUCTION OF FIRE PROTECTION; PLUMBING; HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT; AND SHALL BE MANUFACTURER'S LATEST DESIGN.

2. PACKAGE UNIT EQUIPMENT COMPONENTS THAT ARE FACTORY ASSEMBLED SHALL MEET, IN DETAIL, PRODUCTS NAMED AND SPECIFIED IN EACH SECTION OF MECHANICAL AND ELECTRICAL SPECIFICATIONS.

3. WHERE EQUIPMENT CHANGES ARE MADE THAT INVOLVE ADDITIONAL ELECTRICAL WORK (LARGER SIZE MOTOR, ADDITIONAL WIRING OF EQUIPMENT, ETC.) THE MECHANICAL TRADES INVOLVED SHALL COMPENSATE THE ELECTRICAL TRADES FOR THE COST OF THE ADDITIONAL WORK REQUIRED.

G. INSPECTION OF SITE: VISIT SITE, EXAMINE AND VERIFY CONDITIONS UNDER WHICH WORK MUST BE CONDUCTED BEFORE SUBMITTING PROPOSAL. SUBMITTING OF PROPOSAL IMPLIES THAT CONTRACTOR HAS VISITED SITE AND UNDERSTANDS CONDITIONS UNDER WHICH WORK MUST BE CONDUCTED. NO ADDITIONAL CHARGES WILL BE ALLOWED BECAUSE OF FAILURE TO MAKE THIS EXAMINATION OR TO INCLUDE ALL MATERIALS AND LABOR TO COMPLETE WORK.

H. SUBMITTALS: SUBMIT PROJECT SPECIFIC SUBMITTALS FOR REVIEW.

I. DELIVERY, STORAGE, AND HANDLING: STORAGE AND PROTECTION: PROVIDE ADEQUATE WEATHER PROTECTED STORAGE SPACE FOR ALL MECHANICAL EQUIPMENT AND MATERIALS DELIVERIES TO THE JOB SITE. STORAGE LOCATIONS WILL BE DESIGNATED BY THE OWNER'S REPRESENTATIVE. EQUIPMENT STORED IN UNPROTECTED AREAS MUST BE PROVIDED WITH TEMPORARY PROTECTION.

J. INSTRUCTION OF OWNER PERSONNEL: BEFORE FINAL INSPECTION, INSTRUCT OWNER'S DESIGNATED PERSONNEL IN OPERATION, ADJUSTMENT, AND MAINTENANCE OF MECHANICAL EQUIPMENT AND SYSTEMS AT AGREED UPON TIMES. A MINIMUM OF 24 HOURS OF FORMAL INSTRUCTION TO OWNER'S PERSONNEL SHALL BE PROVIDED FOR EACH BUILDING. ADDITIONAL HOURS ARE SPECIFIED IN INDIVIDUAL SPECIFICATION SECTIONS.

K. WARRANTY: CONTRACTOR SHALL WARRANTY THAT MECHANICAL INSTALLATION IS FREE FROM DEFECTS AND AGREES TO REPLACE OR REPAIR, TO OWNER'S SATISFACTION, ANY PART OF THIS MECHANICAL INSTALLATION WHICH BECOMES DEFECTIVE WITHIN A PERIOD OF ONE YEAR (UNLESS SPECIFIED OTHERWISE) FROM THE DATE OF SUBSTANTIAL COMPLETION FOLLOWING FINAL ACCEPTANCE, PROVIDED THAT SUCH FAILURE IS DUE TO DEFECTS IN EQUIPMENT, MATERIAL, WORKMANSHIP OR FAILURE TO FOLLOW CONTRACT DOCUMENTS. FILE WITH OWNER ANY AND ALL WARRANTIES FROM EQUIPMENT MANUFACTURERS INCLUDING OPERATING CONDITIONS AND PERFORMANCE CAPACITIES THEY ARE BASED ON.

L. MECHANICAL DEMOLITION WORK: DEMOLITION OF EXISTING MECHANICAL EQUIPMENT AND MATERIALS SHALL BE DONE BY THE CONTRACTOR UNLESS OTHERWISE INDICATED. INCLUDE ALL ITEMS SUCH AS, BUT NOT LIMITED TO, EXISTING PIPING, PUMPS, DUCTWORK, SUPPORTS AND EQUIPMENT WHERE SUCH ITEMS ARE NOT REQUIRED FOR PROPER OPERATION OF MODIFIED SYSTEM. IN GENERAL, DEMOLITION WORK IS INDICATED ON DRAWINGS. HOWEVER, THE CONTRACTOR SHALL VISIT JOB SITE TO DETERMINE FULL EXTENT AND CHARACTER OF THIS WORK.

M. REFRIGERANT INSTALLATION AND DISPOSAL: PERFORM ALL WORK RELATED TO REFRIGERANT CONTAINED IN AIR CONDITIONERS, AND SIMILAR EQUIPMENT, INCLUDING RELATED PIPING, IN STRICT ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:

1. ASHRAE STANDARD 15 AND RELATED REVISIONS: SAFETY CODE FOR MECHANICAL REFRIGERATION.

2. ASHRAE STANDARD 34 AND RELATED REVISIONS: NUMBER DESIGNATION AND SAFETY CLASSIFICATION OF REFRIGERANTS.

3. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (US EPA) REQUIREMENTS OF SECTION 8 08 (PROHIBITION OF VENTING AND REGULATION OF CFC) AND APPLICABLE STATE AND LOCAL REGULATIONS OF AUTHORITIES HAVING JURISDICTION.

N. RECOVERED REFRIGERANT IS THE PROPERTY OF THE CONTRACTOR. DISPOSE OF REFRIGERANT LEGALLY, IN ACCORDANCE WITH APPLICABLE RULES AND REGULATIONS.

O. WORK IN EXISTING BUILDINGS:

1. OWNER WILL PROVIDE ACCESS TO EXISTING BUILDINGS AS REQUIRED. ACCESS REQUIREMENTS TO OCCUPIED BUILDINGS SHALL BE IDENTIFIED ON THE PROJECT SCHEDULE. CONTRACTOR, ONCE WORK IS STARTED IN EXISTING BUILDING, SHALL COMPLETE SAME WITHOUT INTERRUPTION IN ORDER TO RETURN WORK AREAS AS SOON AS POSSIBLE TO OWNER.

2. ADEQUATELY PROTECT AND PRESERVE ALL EXISTING AND NEWLY INSTALLED WORK. PROMPTLY REPAIR ANY DAMAGE TO SAME AT CONTRACTOR'S EXPENSE.

3. CONSULT WITH OWNER'S REPRESENTATIVE AS TO METHODS OF CARRYING ON WORK SO AS NOT TO INTERFERE WITH OWNER'S OPERATION ANY MORE THAN ABSOLUTELY NECESSARY. ACCORDINGLY, ALL SERVICE LINES SHALL BE KEPT IN OPERATION AS LONG AS POSSIBLE AND THE SERVICES SHALL ONLY BE INTERRUPTED AT SUCH TIME AS WILL BE DESIGNATED BY THE OWNER'S REPRESENTATIVE.

4. PRIOR TO STARTING WORK IN ANY AREA, OBTAIN APPROVAL FOR DOING SO FROM A QUALIFIED REPRESENTATIVE OF THE OWNER WHO IS DESIGNATED AND AUTHORIZED BY THE OWNER TO PERFORM TESTING AND ABATEMENT, IF NECESSARY, OF ALL HAZARDOUS MATERIALS INCLUDING BUT NOT LIMITED TO, ASBESTOS. CONTRACTOR SHALL NOT PERFORM ANY INSPECTION, TESTING, CONTAINMENT, REMOVAL OR OTHER WORK THAT IS RELATED IN ANY WAY WHATSOEVER TO HAZARDOUS MATERIALS UNDER THE CONTRACT.

P. WORK INVOLVING OTHER TRADES: CERTAIN ITEMS OF EQUIPMENT OR MATERIALS SPECIFIED IN THE MECHANICAL DIVISION MAY HAVE TO BE INSTALLED BY OTHER TRADES DUE TO CODE REQUIREMENTS OR UNION JURISDICTIONAL REQUIREMENTS. IN SUCH INSTANCES, CONTRACTOR SHALL COMPLETE WORK THROUGH AN APPROVED, QUALIFIED SUBCONTRACTOR AND SHALL INCLUDE FULL COST FOR SAME IN PROPOSAL.

Q. ACCEPTANCE PROCEDURE: UPON SUCCESSFUL COMPLETION OF START-UP AND RECALIBRATION, BUT PRIOR TO BUILDING ACCEPTANCE, SUBSTANTIAL COMPLETION AND COMMENCEMENT OF WARRANTIES, ARCHITECT/ENGINEER SHALL BE REQUESTED IN WRITING TO OBSERVE THE SATISFACTORY OPERATION OF ALL MECHANICAL SYSTEMS.

1. CONTRACTOR SHALL DEMONSTRATE OPERATION OF EQUIPMENT AND CONTROL SYSTEMS, INCLUDING EACH INDIVIDUAL COMPONENT, TO OWNER AND ARCHITECT/ENGINEER.

2. AFTER CORRECTING ALL ITEMS APPEARING ON THE PUNCH LIST, MAKE A SECOND WRITTEN REQUEST TO THE OWNER AND ARCHITECT/ENGINEER FOR OBSERVATION AND APPROVAL.

3. AFTER ALL ITEMS ON PUNCH LIST ARE CORRECTED AND FORMAL APPROVAL OF MECHANICAL SYSTEMS IS PROVIDED BY ARCHITECT/ENGINEER, CONTRACTOR SHALL INDICATE TO THE OWNER IN WRITING THE COMMENCEMENT OF THE WARRANTY PERIOD.

BASIC MECHANICAL MATERIALS AND METHODS

A. PIPE, TUBE, AND FITTINGS:

1. REFER TO INDIVIDUAL PIPING SECTIONS FOR PIPE, TUBE, AND FITTING MATERIALS AND JOINING METHODS.

2. PIPE THREADS: ASME B1.20.1 FOR FACTORY-THREADED PIPE AND PIPE FITTINGS.

B. JOINING MATERIALS:

1. REFER TO INDIVIDUAL PIPING SPECIFICATIONS FOR SPECIAL JOINING MATERIALS NOT LISTED BELOW.

2. UNIONS: PIPE SIZE 2 INCHES AND SMALLER: FERROUS PIPE: MALLEABLE IRON GROUND JOINT TYPE UNIONS. UNIONS IN GALVANIZED PIPING SYSTEM SHALL BE GALVANIZED. COPPER TUBE AND PIPE: BRONZE UNIONS WITH SOLDERED JOINTS.

3. FLANGES: PIPE SIZES 2-1/2 INCH AND LARGER: FERROUS PIPE: STANDARD WEIGHT FORGED STEEL WELD NECK FLANGES. COPPER TUBE AND PIPE: SLIP-ON BRONZE FLANGES.

4. PIPE-FLANGE GASKET MATERIALS: SUITABLE FOR CHEMICAL AND THERMAL CONDITIONS OF PIPING SYSTEM CONTENTS.

5. FLANGE BOLTS AND NUTS: ASME B18.2.1, CARBON STEEL, UNLESS OTHERWISE INDICATED. SQUARE HEAD BOLTS AND NUTS ARE NOT ACCEPTABLE.

6. SOLDER FILLER METALS: ASTM B 32, LEAD-FREE, ANTIMONY-FREE, SILVER-BEARING ALLOYS. INCLUDE WATER-FLUSHABLE FLUX ACCORDING TO ASTM B 813.

7. BRAZING FILLER METALS: AWS A5.8, BCUP SERIES, COPPER-PHOSPHORUS ALLOYS FOR GENERAL-DUTY BRAZING, UNLESS OTHERWISE INDICATED; AND AWS A5.8, BAG1, SILVER ALLOY FOR REFRIGERANT PIPING, UNLESS OTHERWISE INDICATED.

C. PIPE THREAD COMPOUNDS:

1. PIPE THREAD COMPOUNDS FOR THE FLUID SERVICE COMPATIBLE WITH PIPING MATERIALS PROVIDED.

2. COMPOUNDS FOR POTABLE WATER SERVICE AND SIMILAR APPLICATIONS ACCEPTABLE TO U.S. DEPARTMENT OF AGRICULTURE (USDA) OR FOOD AND DRUG ADMINISTRATION (FDA). COMPOUNDS CONTAINING LEAD ARE PROHIBITED.

3. INORGANIC ZINC-RICH COATINGS OR CORROSION INHIBITED PROPRIETARY COMPOUNDS FOR GALVANIZED CARBON STEEL SYSTEMS TO COAT RAW CARBON STEEL SURFACES, IN LIEU OF SUBSEQUENT PAINTING. MANUFACTURERS: CARBOLINE CARBO-ZINC 12 | TNEMEC; KOPPERS.

4. GRAPHITE AND OIL OR PROPRIETARY CORROSION INHIBITED COMPOUNDS SUITABLE FOR SYSTEM TEMPERATURES FOR STEAM OR CONDENSATE. MANUFACTURERS: WKM, DIVISION OF COOPER INDUSTRIES, INC., KEY GRAPHITE PASTE | OTHER APPROVED.

5. USE TETRAFLUOROETHYLENE (TEFLON) TAPE 2 TO 3 MILS THICK FOR NATURAL GAS SYSTEM THREADED JOINTS. MANUFACTURERS: CADILLAC PLASTIC; PERMACEL | OTHER APPROVED.

D. DIELECTRIC FITTINGS: PROVIDE DIELECTRIC FITTINGS AS SCHEDULED ON THE DRAWINGS.

1. DIELECTRIC-FLANGE KITS:

a. MANUFACTURERS: ADVANCE PRODUCTS & SYSTEMS, INC. | CALPICO, INC. | CENTRAL PLASTICS COMPANY | PIPELINE SEAL AND INSULATOR, INC. | WATTS WATER TECHNOLOGIES, INC.; WATTS REGULATOR CO.

2. DIELECTRIC NIPPLE/WATERWAY FITTINGS:

a. MANUFACTURERS: ANVIL INTERNATIONAL, INC.; GRUVLOK MANUFACTURING; DI-LOK NIPPLES | ELSTER GROUP; PERFECTION CORP.; CLEARFLOW | PRECISION PLUMBING PRODUCTS, INC.; CLEARFLOW | SIOUX CHIEF MANUFACTURING CO., INC. | TYCO FIRE & BUILDING PRODUCTS; GRINNELL MECHANICAL PRODUCTS; FIGURE 407 CLEARFLOW | VICTAULIC CO. OF AMERICA; STYLE 47 CLEARFLOW.

E. MECHANICAL SLEEVE SEALS:

1. DESCRIPTION: MODULAR SEALING ELEMENT UNIT, DESIGNED FOR FIELD ASSEMBLY, TO FILL ANNULAR SPACE BETWEEN PIPE AND SLEEVE.

2. MANUFACTURERS: ADVANCE PRODUCTS & SYSTEMS, INC. | CALPICO, INC. | METRAFLEX CO. | PIPELINE SEAL AND INSULATOR, INC., THUNDERLINE LINK SEAL.

F. SLEEVES:

1. STEEL PIPE: ASTM A53, TYPE E, GRADE B, SCHEDULE 40, AND 0.375 INCH WALL BLACK.

2. STEEL PIPE: ASTM A53, TYPE E, GRADE B, SCHEDULE 40, AND 0.375 INCH WALL GALVANIZED, PLAIN ENDS.

3. CAST IRON: CAST OR FABRICATED "WALL PIPE" EQUIVALENT TO DUCTILE-IRON PRESSURE PIPE, WITH PLAIN ENDS AND INTEGRAL WATERSTOP, UNLESS OTHERWISE INDICATED.

4. STACK SLEEVE FITTINGS: MANUFACTURED, CAST-IRON SLEEVE WITH INTEGRAL CLAMPING FLANGE. INCLUDE CLAMPING RING AND BOLTS AND NUTS FOR MEMBRANE FLASHING.

G. ESCUTCHEONS: MANUFACTURED WALL AND CEILING ESCUTCHEONS, WITH AN ID TO CLOSELY FIT AROUND PIPE, TUBE, AND INSULATION OF INSULATED PIPING AND AN OD THAT COMPLETELY COVERS OPENING.

H. EPOXY BONDING COMPOUND: TWO-COMPONENT SYSTEM SUITABLE FOR BONDING WET OR DRY CONCRETE TO EACH OTHER AND TO OTHER MATERIALS.

1. MANUFACTURERS: EUCO 452 #450, EUCLID CHEMICAL CO. | EPOBOND, L & M CONSTRUCTION CHEMICALS | SIKADUR 87, SIKA CORP.

I. LEAK DETECTOR SOLUTION: COMMERCIAL LEAK DETECTOR SOLUTION FOR PIPE SYSTEM TESTING.

1. MANUFACTURERS: AMERICAN GAS AND CHEMICALS INC., LEAK TEC | COLE-PARMER INST. CO., LEAK DETECTOR | GUY SPEAKER CO. INC., SQUIRT 'N BUBBLES.

J. PIPE ROOF PENETRATION ENCLOSURES: MINIMUM 18 GAGE WELDED GALVANIZED STEEL CONSTRUCTION. INTEGRAL BASE PLATE. BUILT-IN FULLY MITERED CANT. FACTORY INSTALLED INSECT AND DECAY RESISTANT WOOD NAILER. FACTORY INSTALLED 1-1/2 INCH THICK, 3 POUNDS PER CUBIC FOOT DENSITY RIGID INSULATION. EPDM COMPRESSION MOLDED RUBBER CAP FOR SINGLE OR MULTIPLE PIPES AS REQUIRED. STAINLESS STEEL DRAW-BAND CLAMPS.

1. MANUFACTURERS: PATE COMPANY | PORTALS PLUS, INC. | THYBAR CORPORATION, THYCURB.

MOTORS

A. MANUFACTURERS: DAYTON | TOSHIBA INTL. | BALDOR ELECTRIC/RELIANCE | NIDEC MOTOR CORPORATION; U.S. ELECTRICAL MOTORS | REGAL BELOIT/GE COMMERCIAL MOTORS | REGAL BELOIT/LEESON | REGAL BELOIT/MARATHON | SIEMENS.

B. MOTOR CHARACTERISTICS:

1. MOTORS 1/2 HP AND LARGER: THREE PHASE, UNLESS OTHERWISE INDICATED.

2. MOTORS SMALLER THAN 1/2 HP: SINGLE PHASE, UNLESS OTHERWISE INDICATED.

3. FREQUENCY RATING: 60 HZ.

4. VOLTAGE RATING: NEMA STANDARD VOLTAGE SELECTED TO OPERATE ON NOMINAL CIRCUIT VOLTAGE TO WHICH MOTOR IS CONNECTED.

5. SERVICE FACTOR: 1.15 FOR OPEN DRIPPROOF MOTORS; 1.0 FOR TOTALLY ENCLOSED MOTORS.

6. DUTY: CONTINUOUS DUTY AT AMBIENT TEMPERATURE OF 105 DEG F AND AT ALTITUDE OF 3300 FEET ABOVE SEA LEVEL.

7. CAPACITY AND TORQUE CHARACTERISTICS: SUFFICIENT TO START, ACCELERATE, AND OPERATE CONNECTED LOADS AT DESIGNATED SPEEDS, AT INSTALLED ALTITUDE AND ENVIRONMENT, WITH INDICATED OPERATING SEQUENCE, AND WITHOUT EXCEEDING NAMEPLATE RATINGS OR CONSIDERING SERVICE FACTOR.

8. BRAKE HORSEPOWER INPUT SHALL NOT EXCEED 90 PERCENT OF THE RATED MOTOR HORSEPOWER.

9. ENCLOSURE: OPEN DRIPPROOF (ODP) FOR MOTORS INSTALLED INDOORS AND OUT OF THE AIRSTREAM. TOTALLY-ENCLOSED FAN-COOLED (TEFC) FOR MOTORS INSTALLED OUTDOORS OR WITHIN THE AIRSTREAM.

C. POLYPHASE MOTORS:

1. DESCRIPTION: NEMA MG 1, DESIGN B, MEDIUM INDUCTION MOTOR.

2. EFFICIENCY: MOTORS 1 HORSEPOWER TO 200 HORSEPOWER SHALL BE PREMIUM EFFICIENT MOTORS MEETING REQUIREMENTS OF NEMA PREMIUM EFFICIENCY MOTOR PROGRAM. EFFICIENCY OF THE MOTOR SHALL BE DETERMINED BASED ON NEMA MG1. THE NOMINAL EFFICIENCIES SHALL MEET OR EXCEED TABLE 12-12.

3. EFFICIENCY: FIRE PUMP MOTORS, C-FACE MOTORS, JP AND JM FRAME MOTORS, AND MOTORS OVER 200 HORSEPOWER SHALL BE ENERGY EFFICIENT MOTORS. EFFICIENCY OF THE MOTOR SHALL BE DETERMINED BASED ON NEMA MG1. THE MINIMUM EFFICIENCIES, NOMINAL EFFICIENCIES AND SHALL MEET OR EXCEED TABLE 12-11.

D. MOTORS USED WITH VARIABLE FREQUENCY CONTROLLERS:

1. PREMIUM-EFFICIENT MOTORS: CLASS B TEMPERATURE RISE; CLASS F INSULATION.

2. SHAFT GROUNDING: PROVIDE A MEANS TO PROTECT MOTOR FROM COMMON MODE CURRENTS IN ACCORDANCE WITH NEMA MG1-31.4.4.3.

a. MANUFACTURERS: ELECTRO STATIC TECHNOLOGY, INC.; AEGIS.

E. SINGLE-PHASE MOTORS

1. TYPE: TO SUIT STARTING TORQUE AND REQUIREMENTS OF SPECIFIC MOTOR APPLICATION.

2. SHADED-POLE MOTORS: FOR MOTORS 1/20 HP AND SMALLER ONLY.

F. ADJUSTING: ALIGN MOTORS, BASES, SHAFTS, PULLEYS AND BELTS. TENSION BELTS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.

PIPE FLEXIBLE CONNECTORS, EXPANSION FITTINGS AND LOOPS

A. MATERIALS FOR ANCHORS:

1. STEEL SHAPES AND PLATES: ASTM A 36/A 36M.

2. BOLTS AND NUTS: ASME B18.10 OR ASTM A 183, STEEL, HEX HEAD.

3. WASHERS: ASTM F 844, STEEL, PLAIN, FLAT WASHERS.

4. MECHANICAL FASTENERS: INSERT-WEDGE-TYPE STUD WITH EXPANSION PLUG ANCHOR FOR USE IN HARDENED PORTLAND CEMENT CONCRETE, AND TENSION AND SHEAR CAPACITIES APPROPRIATE FOR APPLICATION.

5. CHEMICAL FASTENERS: INSERT-TYPE-STUD BONDING SYSTEM ANCHOR FOR USE WITH HARDENED PORTLAND CEMENT CONCRETE, AND TENSION AND SHEAR CAPACITIES APPROPRIATE FOR APPLICATION.

6. CONCRETE: PORTLAND CEMENT MIX, 3000 PSI MINIMUM. REFER TO DIVISION 3 SECTION "CAST-IN-PLACE CONCRETE" FOR FORMWORK, REINFORCEMENT, AND CONCRETE.

7. GROUT: ASTM C 1107, FACTORY-MIXED AND -PACKAGED, DRY, HYDRAULIC-CEMENT, NONSHRINK, NONMETALLIC GROUT; SUITABLE FOR INTERIOR AND EXTERIOR APPLICATIONS.

B. RUBBER FLEXIBLE CONNECTORS/EXPANSION JOINTS:

1. ASTM F 1123, FABRIC-REINFORCED RUBBER WITH EXTERNAL CONTROL RODS OR CABLES, AND COMPLYING WITH FSA'S "TECHNICAL HANDBOOK: NON-METALLIC EXPANSION JOINTS AND FLEXIBLE PIPE CONNECTORS."

a. MANUFACTURERS: FLEX-WELD, INC./KEFLEX | MASON INDUSTRIES, INC.; MERCER RUBBER CO. | METRAFLEX, INC. | SENIOR FLEXONICS, INC.; PATHWAY DIVISION | TWIN CITY HOSE, INC. | VIBRATION MOUNTINGS & CONTROLS, INC.

2. MATERIAL: EPDM.

3. END CONNECTIONS: FULL-FACED, INTEGRAL, STEEL FLANGES WITH STEEL RETAINING RINGS.

4. COATING: FACTORY APPLIED HYPALON PAINT FOR OUTDOOR APPLICATIONS.

C. HOSE AND BRAID FLEXIBLE CONNECTORS:

1. MANUFACTURERS: ADSCO MANUFACTURING, LLC. | FLEX-WELD, INC. | HYSPAN PRECISION PRODUCTS, INC. | METRAFLEX, INC. | SENIOR FLEXONICS, INC.; PATHWAY DIVISION | TWIN CITY HOSE, INC.

2. FLEXIBLE CONNECTORS FOR COPPER PIPING: MULTIPLE-PLY PHOSPHOR-BRONZE CORRUGATED HOSE WITH BRONZE OUTER BRAID, COPPER FERRULE, AND COPPER PIPE END CONNECTIONS.

3. FLEXIBLE CONNECTORS FOR STEEL PIPING: MULTIPLE-PLY STAINLESS-STEEL CORRUGATED HOSE WITH STAINLESS STEEL OUTER BRAID, AND STEEL PIPE END CONNECTIONS.

4. MINIMUM PRESSURE RATING: 150 PSIG, UNLESS OTHERWISE INDICATED.

5. MAXIMUM TEMPERATURE RATING: 450 DEG F FOR COPPER PIPING CONNECTORS, 800 DEG F FOR STEEL PIPING CONNECTORS.

D. EXPANSION COMPENSATORS:

1. DOUBLE-PLY CORRUGATED STEEL, STAINLESS-STEEL, OR COPPER-ALLOY BELLOWS IN HOUSING WITH INTERNAL GUIDES, ANTITORQUE DEVICE, AND REMOVABLE END CLIP FOR POSITIONING.

a. MANUFACTURERS: ADSCO MANUFACTURING, LLC. | FLEX-WELD, INC./KEFLEX | HYSPAN PRECISION PRODUCTS, INC. | METRAFLEX, INC. | SENIOR FLEXONICS, INC.; PATHWAY DIVISION | TWIN CITY HOSE, INC.

2. MINIMUM PRESSURE RATING: 200 PSIG, UNLESS OTHERWISE INDICATED.

3. CONFIGURATION FOR COPPER PIPING: TWO-PLY STAINLESS-STEEL BELLOWS AND BRONZE OR STAINLESS-STEEL SHROUD.

4. END CONNECTIONS FOR COPPER TUBING: SOLDER JOINT.

5. CONFIGURATION FOR STEEL PIPING: TWO-PLY STAINLESS-STEEL BELLOWS AND CARBON-STEEL SHROUD.

6. END CONNECTIONS FOR STEEL PIPE: NPS 2 AND SMALLER: THREADED. NPS 2-1/2 TO NPS 4: FLANGED OR WELD.

E. FLEXIBLE-HOSE EXPANSION JOINTS:

1. MANUFACTURED ASSEMBLY WITH TWO FLEXIBLE-METAL-HOSE LEGS JOINED BY LONG-RADIUS, 180-DEGREE RETURN BEND OR CENTER SECTION OF FLEXIBLE HOSE; WITH INLET AND OUTLET ELBOW FITTINGS, CORRUGATED-METAL INNER HOSES, AND BRAIDED OUTER SHEATHS.

a. MANUFACTURERS: FLEX-HOSE CO., INC. | METRAFLEX, INC.; METRALOOP | TWIN CITY HOSE, INC.

2. FLEXIBLE-HOSE EXPANSION JOINTS FOR COPPER PIPING: COPPER-ALLOY FITTINGS WITH SOLDER-JOINT END CONNECTIONS.

3. FLEXIBLE-HOSE EXPANSION JOINTS FOR STEEL PIPING: CARBON-STEEL FITTINGS WITH THREADED END CONNECTIONS FOR NPS 2 AND SMALLER AND FLANGED OR WELD END CONNECTIONS TO MATCH PIPING SYSTEM FOR NPS 2-1/2 AND LARGER.

F. ALIGNMENT GUIDES:

1. STEEL, FACTORY FABRICATED, WITH BOLTED TWO-SECTION OUTER CYLINDER AND BASE FOR ALIGNMENT OF PIPING AND TWO-SECTION GUIDING SPIDER FOR BOLTING TO PIPE.

a. MANUFACTURERS: ADSCO MANUFACTURING, LLC. | FLEX-WELD, INC. | HYSPAN PRECISION PRODUCTS, INC. | METRAFLEX, INC. | SENIOR FLEXONICS, INC., PATHWAY DIVISION.

G. SLIDING/GUIDING DEVICES:

1. FOR PIPE SIZE NPS 4 AND SMALLER ON ALL HOT PIPING, PROVIDE GUIDES EQUAL TO FLEXONICS SEMI-STEEL SPIDER AND GUIDING CYLINDER PIPE ALIGNMENT GUIDES FOR ALL EXPANSION JOINTS AND LOOPS. PROVIDE PIPE ALIGNMENT GUIDES IN QUANTITIES AT ALL LOCATIONS AS REQUIRED ACCORDING TO THE MANUFACTURER'S DESIGN CRITERIA AND RECOMMENDATIONS. PIPE ALIGNMENT GUIDES SHALL SERVE TO GUIDE THE EXPANSION JOINTS, LOOPS OR BENDS.

a. MANUFACTURERS: B-LINE SYSTEMS, INC.; A DIVISION OF COOPER INDUSTRIES; FIGURE 3281 SERIES | SENIOR FLEXONICS | SYPRIS TECHNOLOGIES; TUBE TURNS DIVISION | U.S. FLEXIBLE METALLIC TUBING CO., KELFLEX TYPE M | METRAFLEX, INC.

2. FOR PIPE SIZES NPS 6 AND LARGER AND ALL GUIDES ON COLD PIPING, FURNISH PRE-ENGINEERED PRE-INSULATED GUIDES WITH PUBLISHED VERTICAL AND LATERAL LOAD RATINGS. CONSTRUCTION SHALL CONSIST OF AN INSULTED SHIELD CONTAINING STRUCTURAL CALCIUM SILICATE (100 PSI NON-LOAD BEARING AND 600 PSI LOAD BEARING) ENCASED IN 360 DEGREES OF OVERLAPPING SHEET METAL. A 36 STEEL CLAMPS TORQUED ONTO INSULATED SHIELD WITH RECOMMENDED CATALOG TORQUE VALVES. SLIDE SERVICE SHALL BE STAINLESS STEEL TO POLYETHYLENE OR TEFLON WITH A MAXIMUM COEFFICIENT OF FRICTION OF 0.15.

a. MANUFACTURERS: PIPE SHIELDS, INC. B3000, B4000, B7000 AND B8000 SERIES | CARPENTER AND PATERSON, INC. | RILCO MFG. HG 3000, HG 4000, HG 7000, AND HG 8000 SERIES.

METERS AND GAGES

A. METAL-CASE, LIQUID-IN-GLASS THERMOMETERS:

1. MANUFACTURERS: AMETEK, INC.; U.S. GAUGE DIV. | MILJOCO CORPORATION | REOTEMP INSTRUMENT CORPORATION | TRERICE, H. O. CO. | WEISS INSTRUMENTS, INC. | WEKSLER INSTRUMENTS OPERATING UNIT; DRESSER INDUSTRIES; INSTRUMENT DIV.

2. CASE: DIE-CAST ALUMINUM OR CHROME-PLATED BRASS, 9 INCHES LONG.

3. TUBE: RED OR BLUE READING, ORGANIC-LIQUID FILLED, WITH MAGNIFYING LENS.

4. CONNECTOR: ADJUSTABLE TYPE, 180 DEGREES IN VERTICAL PLANE, 360 DEGREES IN HORIZONTAL PLANE, WITH LOCKING DEVICE.

5. STEM: COPPER-PLATED STEEL, ALUMINUM, OR BRASS FOR THERMOWELL INSTALLATION AND OF LENGTH TO SUIT INSTALLATION.

6. ACCURACY: PLUS OR MINUS 1 PERCENT OF RANGE OR PLUS OR MINUS 1 SCALE DIVISION TO MAXIMUM OF 1.5 PERCENT OF RANGE.

B. THERMOWELLS: SAME AS MANUFACTURER OF THERMOMETER BEING USED. PRESSURE-TIGHT, SOCKET-TYPE METAL FITTING MADE FOR INSERTION INTO PIPING AND OF TYPE, DIAMETER, AND LENGTH REQUIRED TO HOLD THERMOMETER. BRASS FOR COMPATIBLE SERVICES LESS THAN 353 DEG F; ANSI 18-8 STAINLESS STEEL FOR ALL OTHERS TO SUIT SERVICE. FURNISH EXTENSION NECK TO ACCOMMODATE INSULATION WHERE APPLICABLE.

C. PROVIDE THE FOLLOWING TEMPERATURE RANGES FOR THERMOMETERS:

1. DOMESTIC COLD WATER: 30 TO 130 DEG F OR 0 TO 120 DEG F.

2. DOMESTIC HOT WATER: 30 TO 180 DEG F.

3. ALL OTHER LOCATIONS: AS INDICATED ON DRAWINGS.

HANGERS AND SUPPORTS

A. PIPE HANGERS, SUPPORTS, AND ACCESSORIES SHALL COMPLY WITH THE FOLLOWING:

1. MSS SP-58, PIPE HANGERS AND SUPPORTS – MATERIALS, DESIGN AND MANUFACTURE.

2. MSS SP-69, PIPE HANGERS AND SUPPORTS – SELECTION AND APPLICATION.

3. MSS SP-89, PIPE HANGERS AND SUPPORTS – FABRICATION AND INSTALLATION PRACTICES.

B. HANGER ROD MATERIAL: THREADED, HOT ROLLED, STEEL ROD CONFORMING TO ASTM A 36 OR ASTM A 575.

C. STEEL PIPE HANGERS AND SUPPORTS: MSS SP-58, TYPES 1 THROUGH 58, FACTORY-FABRICATED COMPONENTS.

1. MANUFACTURERS: ANVIL INTERNATIONAL, INC. | B-LINE BY EATON | CARPENTER & PATERSON, INC. | HILTI USA | PENTAIR ELECTRICAL & FASTENING SOLUTIONS | PHD MANUFACTURING, INC.

D. TRAPEZE PIPE HANGERS: MSS SP-69, TYPE 59, SHOP- OR FIELD-FABRICATED PIPE-SUPPORT ASSEMBLY MADE FROM STRUCTURAL-STEEL SHAPES WITH MSS SP-58 HANGER RODS, NUTS, SADDLES, AND U-BOLTS.

E. METAL FRAMING SYSTEMS: DESCRIPTION: MFMA-3, SHOP- OR FIELD-FABRICATED PIPE-SUPPORT ASSEMBLY MADE OF STEEL CHANNELS AND OTHER COMPONENTS.

1. MANUFACTURERS: B-LINE BY EATON | HILTI USA | POWER-STRUT A PART OF ATKORE INTERNATIONAL | UNISTRUT A PART OF ATKORE INTERNATIONAL.

F. THERMAL-HANGER SHIELD INSERTS: DESCRIPTION: INSULATION INSERT ENCASED IN 360 DEGREE SHEET METAL SHIELD.

1. MANUFACTURERS: AMERICAN MECHANICAL INSULATION SALES INC. (AMIS) | B-LINE BY EATON | PENTAIR ELECTRICAL & FASTENING SOLUTIONS | PIPE SHIELDS, INC. | RILCO MANUFACTURING COMPANY, INC. | VALUE ENGINEERED PRODUCTS.

G. ROOF TOP PIPE STANDS: SHOP-FABRICATED ASSEMBLIES MADE OF MANUFACTURED CORROSION-RESISTANT COMPONENTS TO SUPPORT ROOF-MOUNTED PIPING.

1. MANUFACTURERS: B-LINE BY EATON | ECO SUPPORT PRODUCTS | PENTAIR ELECTRICAL & FASTENING SOLUTIONS | MAPA INDUSTRIES | MIRO INDUSTRIES | PORTABLE PIPE HANGERS.

H. EQUIPMENT SUPPORTS: WELDED, SHOP- OR FIELD-FABRICATED EQUIPMENT SUPPORT MADE FROM STRUCTURAL-STEEL SHAPES.

I. MISCELLANEOUS MATERIALS: ASTM A 36/A 36M, STEEL PLATES, SHAPES, AND BARS; BLACK AND GALVANIZED.

MECHANICAL VIBRATION CONTROLS

A. EQUIPMENT TO BE ISOLATED IS SCHEDULED ON THE DRAWINGS.

B. VIBRATION ISOLATORS:

1. TYPE 3 SPRING ISOLATORS: FREESTANDING, OPEN-SPRING ISOLATORS.

a. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE MASON INDUSTRIES, INC.; TYPE SLF OR A COMPARABLE PRODUCT BY ONE OF THE FOLLOWING: AMBER/BOOTH COMPANY, INC. | KINETICS NOISE CONTROL, INC. | VIBRATION ELIMINATOR CO., INC. | VIBRATION MOUNTINGS & CONTROLS/KORFUND | VIBRO-ACOUSTICS.

C. PROVIDE FLEXIBLE ELECTRICAL CONNECTIONS IN THE FORM OF LARGE RADIUS, 360 DEGREE LOOP OF FLEXIBLE CONDUIT FOR ALL VIBRATION ISOLATED EQUIPMENT. PIPING SERVICES (EXCEPT INLET AND OUTLET WATER CONNECTIONS FOR PUMPS) SHALL BE MADE WITH 360 DEGREE LOOPS OF REINFORCED NEOPRENE HOSE, WHICH ARE ATTACHED USING NIPPLES OF APPROPRIATE GENDER. ALL SERVICE CONNECTIONS MADE WITH NEOPRENE HOSE SHALL HAVE SHUT-OFF VALVES BETWEEN THE HOSE AND THE SUPPLY SERVICE.

MECHANICAL IDENTIFICATION

A. MANUFACTURERS: SETON | BRADY | EMED | CRAFTMARK | BRIMAR INDUSTRIES, INC. | MARKING SERVICES INC. (MSI) | KOLBI PIPE MARKER CO.

B. EQUIPMENT NAMEPLATES: METAL, WITH DATA ENGRAVED OR STAMPED, FOR PERMANENT ATTACHMENT ON EQUIPMENT.

1. LOCATION: ACCESSIBLE AND VISIBLE.

2. FASTENERS: AS REQUIRED TO MOUNT ON EQUIPMENT.

C. EQUIPMENT MARKERS: ENGRAVED, COLOR-CODED LAMINATED PLASTIC. INCLUDE CONTACT-TYPE, PERMANENT ADHESIVE.

1. SIZE: 2-1/2 BY 4 INCHES FOR CONTROL DEVICES, DAMPERS, AND VALVES; 4-1/2 BY 6 INCHES FOR EQUIPMENT.

D. PIPE MARKERS:

1. GENERAL REQUIREMENTS FOR MANUFACTURED PIPE LABELS: PREPRINTED, COLOR-CODED, WITH LETTERING INDICATING SERVICE, AND SHOWING FLOW DIRECTION.

2. PRETENSIONED PIPE LABELS: PRECOILED, SEMIRIGID PLASTIC FORMED TO COVER FULL CIRCUMFERENCE OF PIPE AND TO ATTACH TO PIPE WITHOUT FASTENERS OR ADHESIVE.

3. SELF-ADHESIVE PIPE LABELS: PRINTED PLASTIC WITH CONTACT-TYPE, PERMANENT-ADHESIVE BACKING.

4. PIPE LABEL CONTENTS: INCLUDE IDENTIFICATION OF PIPING SERVICE USING SAME DESIGNATIONS OR ABBREVIATIONS AS USED ON DRAWINGS, PIPE SIZE, AND AN ARROW INDICATING FLOW DIRECTION.

a. FLOW-DIRECTION ARROWS: INTEGRAL WITH PIPING SYSTEM SERVICE LETTERING TO ACCOMMODATE BOTH DIRECTIONS, OR AS SEPARATE UNIT ON EACH PIPE LABEL TO INDICATE FLOW DIRECTION.

b. LETTERING SIZE: AT LEAST 1-1/2 INCHES HIGH.

E. DUCT LABELS

1. DUCT MARKERS: VINYL, 2-INCH MINIMUM CHARACTER HEIGHT, WITH PERMANENT PRESSURE SENSITIVE ADHESIVE. INCLUDE DIRECTION AND QUANTITY OF AIRFLOW, AIR HANDLING UNIT OR FAN NUMBER, AND DUCT SERVICE (SUCH AS SUPPLY, RETURN, AND EXHAUST).

a. ADHESIVE: CONTACT-TYPE PERMANENT ADHESIVE, COMPATIBLE WITH LABEL AND WITH SUBSTRATE.

2. DUCT MARKERS: ENGRAVED, COLOR-CODED LAMINATED PLASTIC. INCLUDE DIRECTION AND QUANTITY OF AIRFLOW, AIR HANDLING UNIT OR FAN NUMBER, AND DUCT SERVICE (SUCH AS SUPPLY, RETURN, AND EXHAUST). INCLUDE CONTACT-TYPE, PERMANENT ADHESIVE.

a. FASTENERS: STAINLESS-STEEL RIVETS OR SELF-TAPPING SCREWS.

MECHANICAL INSULATION

A. ACCEPTABLE PIPE, DUCT, AND EQUIPMENT INSULATION MATERIALS AND THICKNESSES ARE SCHEDULED ON THE DRAWINGS.

B. FIELD-APPLIED JACKETING SYSTEMS DESCRIPTION:

1. ACCEPTABLE JACKETING MATERIALS ARE SCHEDULED ON THE DRAWINGS. WHERE NOT SCHEDULED, THE FOLLOWING APPLY:

a. PIPING WITHIN ENERGY RECOVERY UNITS: TYPE 304 STAINLESS STEEL, SMOOTH: 0.010 INCH THICK. SEAMS AND JOINTS CALKED WITH CHEMICALLY RESISTANT SEALER.

C. PIPE INSULATION MATERIALS:

1. FLEXIBLE ELASTOMERIC: CLOSED-CELL, SPONGE- OR EXPANDED-RUBBER MATERIALS. COMPLY WITH ASTM C 534, TYPE I FOR TUBULAR MATERIALS.

a. PRODUCTS: AEROFLEX USA, INC.; AEROCEL TUBE AND SHEET | ARMACELL LLC; AP ARMAFLEX | IK INSULATION GROUP; K-FLEX; INSUL-TUBE AND INSUL-SHEET.

2. GLASS-FIBER, PREFORMED PIPE INSULATION: TYPE I, 850 DEG F MATERIALS: GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 547, TYPE I, GRADE A, WITH FACTORY-APPLIED ASJ OR ASJ-SSL.

a. PRODUCTS: JOHNS MANVILLE; MICRO-LOK | KNAUF INSULATION; 1000 PIPE INSULATION | MANSON INSULATION INC.; ALLEY-K | OWENS CORNING; FIBERGLAS PIPE INSULATION.

D. DUCTWORK INSULATION MATERIALS:

1. BLANKET INSULATION: GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 553, TYPE II AND ASTM C 1290, TYPE III WITH FACTORY-APPLIED FSK JACKET.

a. PRODUCTS: CERTAINTEED CORP.; DUCT WRAP | JOHNS MANVILLE; MICROLITE | KNAUF INSULATION; DUCT WRAP | MANSON INSULATION INC.; ALLEY WRAP FSK | OWENS CORNING; ALL-SERVICE DUCT WRAP.

2. BOARD INSULATION: GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 612, TYPE IA OR TYPE IB. FOR DUCT AND PLENUM APPLICATIONS, PROVIDE INSULATION WITH FACTORY-APPLIED FSK JACKET. FOR EQUIPMENT APPLICATIONS, PROVIDE INSULATION WITH FACTORY-APPLIED ASJ.

a. PRODUCTS: CERTAINTEED CORP.; COMMERCIAL BOARD | FIBREX INSULATIONS INC.; FBX | JOHNS MANVILLE; 800 SERIES SPIN-GLAS | KNAUF INSULATION; INSULATION BOARD | MANSON INSULATION INC.; AK BOARD | OWENS CORNING; FIBERGLAS 700 SERIES.

E. INSULATING CEMENTS, ADHESIVES, TAPES, AND SEALANTS: USE MANUFACTURER RECOMMENDED PRODUCTS.

F. MASTICS: MATERIALS SHALL BE COMPATIBLE WITH INSULATION MATERIALS, JACKETS, AND SUBSTRATES; COMPLY WITH MIL-C-19565C, TYPE II.

G. FIELD-APPLIED JACKETS: FIELD-APPLIED JACKETS SHALL COMPLY WITH ASTM C 921, TYPE I, UNLESS OTHERWISE INDICATED.

1. PVC JACKET: HIGH-IMPACT-RESISTANT, UV-RESISTANT PVC COMPLYING WITH ASTM D 1784, CLASS 16354-C; THICKNESS AS SPECIFIED; ROLL STOCK READY FOR SHOP OR FIELD CUTTING AND FORMING.

a. PRODUCTS: JOHNS MANVILLE; ZESTON AND CEEL-CO | P.I.C. PLASTICS, INC.; FG SERIES | PROTO PVC CORPORATION; LOSMOKE | SPEEDLINE CORPORATION; SMOKESAFE.

2. PVC FITTING COVERS: HIGH-IMPACT-RESISTANT, UV-RESISTANT PVC COMPLYING WITH ASTM D 1784, CLASS 16354-C, AND INCLUDING FLEXIBLE GLASS FIBER INSULATION INSERTS.

a. PRODUCTS: JOHNS MANVILLE; ZESTON AND CEEL-CO | P.I.C. PLASTICS, INC.; FG SERIES | PROTO PVC CORPORATION; LOSMOKE | SPEEDLINE CORPORATION; SMOKESAFE.

3. ALUMINUM JACKET: COMPLY WITH ASTM B 209, ALLOY 3003, 3005, 3105 OR 5005, TEMPER H-14. SHEET AND ROLL STOCK READY FOR SHOP OR FIELD SIZING OR FACTORY CUT AND ROLLED TO SIZE.

a. PRODUCTS: PABCO-CHILDERS METALS; ITW INSULATION SYSTEMS; METAL JACKETING SYSTEMS | RPR PRODUCTS, INC.; INSUL-MATE.

DOMESTIC WATER PIPING

A. REGULATORY REQUIREMENTS: COMPLY WITH REQUIREMENTS IN PUBLIC LAW 111-380, "REDUCTION OF LEAD IN DRINKING WATER ACT," ABOUT LEAD CONTENT IN MATERIALS THAT WILL BE IN CONTACT WITH POTABLE WATER FOR HUMAN CONSUMPTION.

B. PIPING SYSTEM MATERIALS ARE SCHEDULED ON THE DRAWINGS.

C. DRAWINGS INDICATE VALVE TYPES TO BE USED. WHERE SPECIFIC VALVE TYPES ARE NOT INDICATED, THE FOLLOWING REQUIREMENTS APPLY:

1. HOT-WATER-PIPING, BALANCING DUTY: CALIBRATED BALANCING VALVES.

2. DRAIN DUTY: HOSE-END DRAIN VALVES.

D. TRANSITION AND SPECIAL FITTINGS WITH PRESSURE RATINGS AT LEAST EQUAL TO PIPING RATING MAY BE USED IN APPLICATIONS BELOW, UNLESS OTHERWISE INDICATED.

OHM

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SEAL

REVISIONS:		
1	ISSUED FOR BIDS	09/30/2019

DATE	PROJ NUMBER	ARCH	PROJ MGR	CADD
09/30/2019	0128-18-0020	CO	EMG	AFL

City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

MECHANICAL SPECIFICATIONS

SHEET
M0.2

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E. FLANGES MAY BE USED ON ABOVEGROUND PIPING, UNLESS OTHERWISE INDICATED.
F. HARD COPPER TUBE: ASTM B 88, TYPE L, WATER TUBE, DRAWN TEMPER.
1. COPPER PRESSURE FITTINGS: ASME B16.18, CAST-COPPER-ALLOY OR ASME B16.22, WROUGHT- COPPER, SOLDER-JOINT FITTINGS. FURNISH WROUGHT-COPPER FITTINGS IF INDICATED.
2. BRONZE FLANGES: ASME B16.24, CLASS 150, WITH SOLDER-JOINT ENDS. FURNISH CLASS 300 FLANGES IF REQUIRED TO MATCH PIPING.
3. COPPER UNIONS: MSS SP-123, CAST-COPPER-ALLOY, HEXAGONAL-STOCK BODY, WITH BALL-AND-SOCKET, METAL-TO-METAL SEATING SURFACES, AND SOLDER-JOINT OR THREADED ENDS.

G. GENERAL-DUTY VALVES; AND DRAIN VALVES ARE SPECIFIED IN "VALVES."
H. BALANCING VALVES ARE SPECIFIED IN "DOMESTIC WATER PIPING SPECIALTIES."
I. PIPE HANGER AND SUPPORT DEVICES ARE SPECIFIED IN "HANGERS AND SUPPORTS." INSTALL THE FOLLOWING:
1. VERTICAL PIPING: MSS TYPE 8 OR TYPE 42, CLAMPS.
2. INDIVIDUAL, STRAIGHT, HORIZONTAL PIPING RUNS: ACCORDING TO THE FOLLOWING:
a. 100 FEET AND LESS: MSS TYPE 1, ADJUSTABLE, STEEL CLEVIS HANGERS.
b. LONGER THAN 100 FEET: MSS TYPE 43, ADJUSTABLE ROLLER HANGERS.
c. LONGER THAN 100 FEET: MSS TYPE 49, SPRING CUSHION ROLLS, IF INDICATED.
3. MULTIPLE, STRAIGHT, HORIZONTAL PIPING RUNS 100 FEET OR LONGER: MSS TYPE 44, PIPE ROLLS. SUPPORT PIPE ROLLS ON TRAPEZE.
4. BASE OF VERTICAL PIPING: MSS TYPE 52, SPRING HANGERS.

J. INSTALL SUPPORTS ACCORDING TO "HANGERS AND SUPPORTS."
K. SUPPORT VERTICAL PIPING AND TUBING AT BASE AND AT EACH FLOOR.
L. ROD DIAMETER MAY BE REDUCED 1 SIZE FOR DOUBLE-ROD HANGERS, TO A MINIMUM OF 3/8 INCH.
M. INSTALL HANGERS FOR COPPER TUBING WITH THE FOLLOWING MAXIMUM HORIZONTAL SPACING AND MINIMUM ROD DIAMETERS:
1. NPS 3/4 AND SMALLER: 60-INCHES WITH 3/8-INCH ROD.
2. NPS 1 AND NPS 1-1/4: 72 INCHES WITH 3/8-INCH ROD.
3. NPS 1-1/2 AND NPS 2: 96 INCHES WITH 3/8-INCH ROD.
4. NPS 2-1/2: 108 INCHES WITH 1/2-INCH ROD.
5. NPS 3 TO NPS 5: 10 FEET WITH 1/2-INCH ROD.

N. INSTALL SUPPORTS FOR VERTICAL COPPER TUBING EVERY 10 FEET.
O. SUPPORT PIPING AND TUBING NOT LISTED ABOVE ACCORDING TO MSS SP-69 AND MANUFACTURER'S WRITTEN INSTRUCTIONS.
P. TEST DOMESTIC WATER PIPING AS FOLLOWS:
1. CAP AND SUBJECT PIPING TO STATIC WATER PRESSURE OF 150 PSIG. ISOLATE TEST SOURCE AND ALLOW TO STAND FOR FOUR HOURS. LEAKS AND LOSS IN TEST PRESSURE CONSTITUTE DEFECTS THAT MUST BE REPAIRED.
2. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS AND RETEST PIPING OR PORTION THEREOF UNTIL SATISFACTORY RESULTS ARE OBTAINED.
3. PREPARE REPORTS FOR TESTS AND REQUIRED CORRECTIVE ACTION.

Q. CLEAN AND DISINFECT POTABLE DOMESTIC WATER PIPING AS FOLLOWS:
1. PURGE NEW PIPING AND PARTS OF EXISTING DOMESTIC WATER PIPING THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED BEFORE USING.
2. USE PURGING AND DISINFECTING PROCEDURES PRESCRIBED BY AUTHORITIES HAVING JURISDICTION OR, IF METHODS ARE NOT PRESCRIBED, PROCEDURES DESCRIBED IN EITHER AWWA C651 OR AWWA C652 OR AS DESCRIBED BELOW:
a. FLUSH PIPING SYSTEM WITH CLEAN, POTABLE WATER UNTIL DIRTY WATER DOES NOT APPEAR AT OUTLETS.
b. FILL AND ISOLATE SYSTEM ACCORDING TO EITHER OF THE FOLLOWING: FILL SYSTEM OR PART THEREOF WITH WATER/CHLORINE SOLUTION WITH AT LEAST 50 PPM OF CHLORINE. ISOLATE WITH VALVES AND ALLOW TO STAND FOR 24 HOURS. FILL SYSTEM OR PART THEREOF WITH WATER/CHLORINE SOLUTION WITH AT LEAST 200 PPM OF CHLORINE. ISOLATE AND ALLOW TO STAND FOR THREE HOURS.
c. FLUSH SYSTEM WITH CLEAN, POTABLE WATER UNTIL NO CHLORINE IS IN WATER COMING FROM SYSTEM AFTER THE STANDING TIME.
d. SUBMIT WATER SAMPLES IN STERILE BOTTLES TO AUTHORITIES HAVING JURISDICTION. REPEAT PROCEDURES IF BIOLOGICAL EXAMINATION SHOWS CONTAMINATION.
3. PREPARE AND SUBMIT REPORTS OF PURGING AND DISINFECTING ACTIVITIES.

GENERAL-DUTY VALVES FOR PLUMBING

A. QUALITY ASSURANCE:
1. REGULATORY REQUIREMENTS: COMPLY WITH REQUIREMENTS IN PUBLIC LAW 111-380, "REDUCTION OF LEAD IN DRINKING WATER ACT," ABOUT LEAD CONTENT IN MATERIALS THAT WILL BE IN CONTACT WITH POTABLE WATER FOR HUMAN CONSUMPTION.
2. NSF COMPLIANCE: NSF 61 AND NSF 372 FOR VALVE MATERIALS FOR POTABLE-WATER SERVICE.

B. TWO-PIECE, REGULAR PORT BRONZE BALL VALVES WITH STAINLESS-STEEL TRIM: TYPE 316 STAINLESS-STEEL BALL AND STEM, REINFORCED TFE SEATS, BLOW-OUT-PROOF STEM, WITH ADJUSTABLE STEM PACKING, SOLDERED OR THREADED ENDS; AND 150 PSIG SWP AND 600-PSIG CWP RATINGS.
1. MANUFACTURERS: APOLLO VALVES; BY CONBRACO INDUSTRIES, INC.; SERIES 70LF-140/240 | HAMMOND VALVE | MILWAUKEE VALVE COMPANY; MODEL UPBA100S/150S | NIBCO INC.; MODELS S-580-70-66-LF/T-580-70-66-LF | WATTS WATER TECHNOLOGIES, INC.

C. DRAIN VALVES: BALL-VALVE-TYPE, HOSE-END DRAIN VALVES:
1. BRONZE BALL VALVE AS SPECIFIED IN THIS SECTION. LEAD FREE CONSTRUCTION IS NOT REQUIRED.
2. OUTLET: THREADED, SHORT NIPPLE WITH GARDEN-HOSE THREAD COMPLYING WITH ASME B1.20.7 AND CAP WITH BRASS CHAIN.

D. INSTALL VALVES WITH UNIONS OR FLANGES AT EACH PIECE OF EQUIPMENT ARRANGED TO ALLOW SERVICE, MAINTENANCE, AND EQUIPMENT REMOVAL WITHOUT SYSTEM SHUTDOWN.
E. LOCATE VALVES FOR EASY ACCESS AND PROVIDE SEPARATE SUPPORT WHERE NECESSARY.
F. INSTALL VALVES IN HORIZONTAL PIPING WITH STEM AT OR ABOVE CENTER OF PIPE. BUTTERFLY VALVES SHALL BE INSTALLED WITH STEM HORIZONTAL TO ALLOW SUPPORT FOR THE DISC AND THE CLEANING ACTION OF THE DISC.
G. INSTALL VALVES IN POSITION TO ALLOW FULL STEM MOVEMENT.
H. INSTALL CHECK VALVES FOR PROPER DIRECTION OF FLOW AND AS FOLLOWS:

DOMESTIC WATER PIPING SPECIALTIES

A. REGULATORY REQUIREMENTS: COMPLY WITH REQUIREMENTS IN PUBLIC LAW 111-380, "REDUCTION OF LEAD IN DRINKING WATER ACT," ABOUT LEAD CONTENT IN MATERIALS THAT WILL BE IN CONTACT WITH POTABLE WATER FOR HUMAN CONSUMPTION.
B. MINIMUM WORKING PRESSURE FOR DOMESTIC WATER PIPING SPECIALTIES: 125 PSIG, UNLESS OTHERWISE INDICATED.
C. BRONZE CALIBRATED BALANCING VALVES NPS 1/2 :
1. TYPE: BALL OR Y-PATTERN GLOBE VALVE WITH TWO READOUT PORTS AND MEMORY SETTING INDICATOR.
2. BODY: BRONZE.
3. MINIMUM FLOW RATE: 0.3 GPM.
4. MANUFACTURERS: ARMSTRONG INTERNATIONAL, INC. | ARMSTRONG PUMPS, INC. | FLO FAB INC. | GRISWOLD CONTROLS | BELL & GOSSETT; XYLEM INC. | NIBCO INC. | IMI INDOOR CLIMATE; TOUR & ANDERSSON | TACO, INC. | WATTS WATER TECHNOLOGIES, INC.; WATTS REGULATOR CO.

D. WATER-TEMPERATURE LIMITING DEVICES:
1. STANDARD: ASSE 1070.
2. PRESSURE RATING: 125 PSIG.
3. TYPE: THERMOSTATICALLY CONTROLLED WATER MIXING VALVE.
4. MATERIAL: BRONZE BODY WITH CORROSION-RESISTANT INTERIOR COMPONENTS.
5. CONNECTIONS: 1/2-INCH UNION OR 3/8-INCHCOMPRESSION; WITH INTEGRAL CHECK VALVES.
6. OUTLET TEMPERATURE RANGE: ADJUSTABLE FROM 85 DEG F TO 120 DEG F. SET AT 105 DEG F.
7. MINIMUM FLOW RATE: 0.5 GPM
8. VALVE FINISH: CHROME PLATED.
9. MANUFACTURERS: APOLLO VALVES; MODEL MVD (34D SERIES) | BRADLEY CORPORATION | LAWLER MANUFACTURING COMPANY, INC. | LEONARD VALVE COMPANY; SERIES 170 AND 270 | WATTS WATER TECHNOLOGIES, INC.; POWERS DIVISION; HYDROGUARD SERIES E480 AND LM495 | WATTS WATER TECHNOLOGIES, INC.; WATTS REGULATOR CO. | ZURN PLUMBING PRODUCTS GROUP; WILKINS DIV.

E. Y-PATTERN STRAINERS:
1. CWP: 200 PSIG MINIMUM, UNLESS OTHERWISE INDICATED.
2. SWP: 125 PSIG MINIMUM, UNLESS OTHERWISE INDICATED.
3. BODY: BRONZE FOR NPS 2 AND SMALLER; CAST IRON WITH INTERIOR LINING COMPLYING WITH AWWA C550 OR FDA-APPROVED, EPOXY COATING AND FOR NPS 2-1/2 AND LARGER.
4. END CONNECTIONS: THREADED OR SOLDERED FOR NPS 2 AND SMALLER; FLANGED FOR NPS 2-1/2 AND LARGER.
5. SCREEN: STAINLESS STEEL WITH ROUND PERFORATIONS, UNLESS OTHERWISE INDICATED.
6. DRAIN: PIPE PLUG.
7. MANUFACTURERS: NIBCO, INC. | MUELLER STEAM SPECIALTY | KECKLEY | YARWAY | SPENCE | METRAFLEX | SSI EQUIPMENT, INC. | WATTS WATER TECHNOLOGIES, INC.

F. HOSE BIBBS: STANDARD: ASME A112.18.1 FOR SEDIMENT FAUCETS.
1. BODY MATERIAL: BRONZE.
2. SEAT: BRONZE, REPLACEABLE.
3. SUPPLY CONNECTIONS: NPS 1/2 OR NPS 3/4 THREADED OR SOLDER-JOINT INLET.
4. OUTLET CONNECTION: GARDEN-HOSE THREAD COMPLYING WITH ASME B1.20.7.
5. PRESSURE RATING: 125 PSIG.
6. VACUUM BREAKER: INTEGRAL NONREMOVABLE, DRAINABLE, HOSE-CONNECTION VACUUM BREAKER COMPLYING WITH ASSE 1011.
7. FINISH: CHROME OR NICKEL PLATED.
8. OPERATION: OPERATING KEY.
9. INCLUDE OPERATING KEY WITH EACH HOSE BIBB.
10. INCLUDE INTEGRAL WALL FLANGE WITH EACH CHROME- OR NICKEL-PLATED HOSE BIBB.

G. WATER HAMMER ARRESTERS (COPPER TUBE TYPE):
1. STANDARD: ASSE 1010 OR PDI-WH 201.
2. TYPE: COPPER TUBE WITH PISTON.
3. SIZE: ASSE 1010, SIZES AA AND A THROUGH F OR PDI-WH 201, SIZES A THROUGH F.
4. MANUFACTURERS: MIFAB, INC. | PPP INC. | SIOUX CHIEF MANUFACTURING COMPANY, INC. | TYLER PIPE; WADE DIV. | WATTS DRAINAGE PRODUCTS INC. | WATTS WATER TECHNOLOGIES, INC.; WATTS REGULATOR CO.

DOMESTIC WATER CIRCULATION PUMPS

A. REGULATORY REQUIREMENTS: COMPLY WITH REQUIREMENTS IN PUBLIC LAW 111-380, "REDUCTION OF LEAD IN DRINKING WATER ACT," ABOUT LEAD CONTENT IN MATERIALS THAT WILL BE IN CONTACT WITH POTABLE WATER FOR HUMAN CONSUMPTION.
B. BASIS OF DESIGN UNITS ARE SCHEDULED ON THE DRAWINGS.
C. MANUFACTURERS: ARMSTRONG PUMPS INC. | BELL & GOSSETT; XYLEM INC. | GRUNDFOS PUMP CORP. | TACO, INC.
D. CONTROLS: REFER TO CONTROL DIAGRAMS.
E. EXAMINATION: EXAMINE ROUGHING-IN OF DOMESTIC-WATER-PIPING SYSTEM TO VERIFY ACTUAL LOCATIONS OF CONNECTIONS BEFORE PUMP INSTALLATION.
F. PUMP INSTALLATION:
1. COMPLY WITH HI 1.4.
2. INSTALL PUMPS WITH ACCESS FOR PERIODIC MAINTENANCE INCLUDING REMOVAL OF MOTORS, IMPELLERS, COUPLINGS, AND ACCESSORIES.
3. INDEPENDENTLY SUPPORT PUMPS AND PIPING SO WEIGHT OF PIPING IS NOT SUPPORTED BY PUMPS AND WEIGHT OF PUMPS IS NOT SUPPORTED BY PIPING. DO NOT USE PUMP MOTORS AS A SUPPORT POINT.

SANITARY WASTE AND VENT PIPING

A. PIPING SYSTEM MATERIALS ARE SCHEDULED ON THE DRAWINGS.
B. PIPING MATERIALS SHALL BEAR LABEL, STAMP, OR OTHER MARKINGS OF SPECIFIED TESTING AGENCY.
C. CAST-IRON SOIL PIPE SHALL BE MARKED WITH THE COLLECTIVE TRADEMARK OF CAST IRON SOIL PIPE INSTITUTE (CISPI).
D. COMPLY WITH NSF 14, "PLASTICS PIPING SYSTEMS COMPONENTS AND RELATED MATERIALS," FOR PLASTIC PIPING COMPONENTS. INCLUDE MARKING WITH "NSF-DWV" FOR PLASTIC DRAIN, WASTE, AND VENT PIPING; "NSF-DRAIN" FOR PLASTIC DRAIN PIPING; "NSF-TUBULAR" FOR PLASTIC CONTINUOUS WASTE PIPING; AND "NSF-SEWER" FOR PLASTIC SEWER PIPING.
E. SOLID-WALL PVC PIPE: SCHEDULE 40, ASTM D 2665, DRAIN, WASTE, AND VENT.
1. PVC SOCKET FITTINGS: ASTM D 2665, SOCKET TYPE, MADE TO ASTM D 3311, DRAIN, WASTE, AND VENT PATTERNS AND TO FIT SCHEDULE 40 PIPE.

F. INSTALL SOIL AND WASTE DRAINAGE AND VENT PIPING AT THE FOLLOWING MINIMUM SLOPES, UNLESS OTHERWISE INDICATED:
1. BUILDING SANITARY DRAIN: 1/8-INCH PER FOOT DOWNWARD IN DIRECTION OF FLOW, UNLESS OTHERWISE NOTED.
2. HORIZONTAL SANITARY DRAINAGE PIPING: 1/8-INCH PER FOOT DOWNWARD IN DIRECTION OF FLOW, UNLESS OTHERWISE NOTED.
3. VENT PIPING: 1/8-INCH PER FOOT DOWN TOWARD VERTICAL FIXTURE VENT OR TOWARD VENT STACK.

G. PIPE HANGERS AND SUPPORTS ARE SPECIFIED IN "HANGERS AND SUPPORTS." INSTALL THE FOLLOWING:
1. VERTICAL PIPING: MSS TYPE 8 OR TYPE 42, CLAMPS.
2. INSTALL INDIVIDUAL, STRAIGHT, HORIZONTAL PIPING RUNS ACCORDING TO THE FOLLOWING:
a. 100 FEET AND LESS: MSS TYPE 1, ADJUSTABLE, STEEL CLEVIS HANGERS.
b. LONGER THAN 100 FEET: MSS TYPE 43, ADJUSTABLE ROLLER HANGERS.
c. LONGER THAN 100 FEET, IF INDICATED: MSS TYPE 49, SPRING CUSHION ROLLS.
3. MULTIPLE, STRAIGHT, HORIZONTAL PIPING RUNS 100 FEET OR LONGER: MSS TYPE 44, PIPE ROLLS. SUPPORT PIPE ROLLS ON TRAPEZE.
4. BASE OF VERTICAL PIPING: MSS TYPE 52, SPRING HANGERS.

H. INSTALL SUPPORTS ACCORDING TO "HANGERS AND SUPPORTS."
I. SUPPORT VERTICAL PIPING AND TUBING AT BASE AND AT EACH FLOOR.
J. ROD DIAMETER MAY BE REDUCED 1 SIZE FOR DOUBLE-ROD HANGERS, WITH 3/8-INCH MINIMUM RODS.
K. INSTALL HANGERS FOR CAST-IRON SOIL PIPING WITH THE FOLLOWING MAXIMUM HORIZONTAL SPACING AND MINIMUM ROD DIAMETERS:
1. NPS 1-1/2 AND NPS 2: 60 INCHES WITH 3/8-INCH ROD.
2. NPS 3: 60 INCHES WITH 1/2-INCH ROD.
3. NPS 4 AND NPS 5: 60 INCHES WITH 5/8-INCH ROD.
4. NPS 6: 60 INCHES WITH 3/4-INCH ROD.
5. NPS 8 TO NPS 12: 60 INCHES WITH 7/8-INCH ROD.

L. INSTALL SUPPORTS FOR VERTICAL CAST-IRON SOIL PIPING EVERY 15 FEET.
M. TEST SANITARY DRAINAGE AND VENT PIPING ACCORDING TO PROCEDURES OF AUTHORITIES HAVING JURISDICTION OR, IN ABSENCE OF PUBLISHED PROCEDURES, AS FOLLOWS:
1. TEST FOR LEAKS AND DEFECTS IN NEW PIPING AND PARTS OF EXISTING PIPING THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED. IF TESTING IS PERFORMED IN SEGMENTS, SUBMIT SEPARATE REPORT FOR EACH TEST, COMPLETE WITH DIAGRAM OF PORTION OF PIPING TESTED.
2. ROUGHING-IN PLUMBING TEST PROCEDURE: TEST DRAINAGE AND VENT PIPING, EXCEPT OUTSIDE LEADERS, ON COMPLETION OF ROUGHING-IN. CLOSE OPENINGS IN PIPING SYSTEM AND FILL WITH WATER TO POINT OF OVERFLOW, BUT NOT LESS THAN 10-FOOT HEAD OF WATER. FROM 15 MINUTES BEFORE INSPECTION STARTS TO COMPLETION OF INSPECTION, WATER LEVEL MUST NOT DROP. INSPECT JOINTS FOR LEAKS.
3. FINISHED PLUMBING TEST PROCEDURE: AFTER PLUMBING FIXTURES HAVE BEEN SET AND TRAPS FILLED WITH WATER, TEST CONNECTIONS AND PROVE THEY ARE GASTIGHT AND WATERTIGHT. PLUG VENT-STACK OPENINGS ON ROOF AND BUILDING DRAINS WHERE THEY LEAVE BUILDING. INTRODUCE AIR INTO PIPING SYSTEM EQUAL TO PRESSURE OF 1-INCH WG. USE U-TUBE OR MANOMETER INSERTED IN TRAP OF WATER CLOSET TO MEASURE THIS PRESSURE. AIR PRESSURE MUST REMAIN CONSTANT WITHOUT INTRODUCING ADDITIONAL AIR THROUGHOUT PERIOD OF INSPECTION. INSPECT PLUMBING FIXTURE CONNECTIONS FOR GAS AND WATER LEAKS.
4. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS AND RETEST PIPING, OR PORTION THEREOF, UNTIL SATISFACTORY RESULTS ARE OBTAINED.
5. PREPARE REPORTS FOR TESTS AND REQUIRED CORRECTIVE ACTION.

DRAINAGE PIPING SPECIALTIES

A. DRAINAGE PIPING SPECIALTIES SHALL BEAR LABEL, STAMP, OR OTHER MARKINGS OF SPECIFIED TESTING AGENCY.
B. CLEANOUTS SHALL BE SAME NOMINAL SIZE AS THE PIPE THEY SERVE UP TO 4 INCHES. FOR PIPES LARGER THAN 4 INCHES NOMINAL SIZE, MINIMUM SIZE OF CLEANOUT SHALL BE 4 INCHES.
C. EXPOSED CAST-IRON CLEANOUTS:
1. STANDARD: ASME A112.36.2M FOR CAST IRON FOR CLEANOUT TEST TEE.
2. BODY MATERIAL: CAST-IRON SOIL PIPE T-BRANCH OR CAST-IRON SOIL PIPE TEST TEE AS REQUIRED TO MATCH CONNECTED PIPING.
3. CLOSURE: COUNTERSUNK OR RAISED-HEAD, BRASS OR BRONZE PLUG WITH TAPERED THREADS.
4. MANUFACTURERS: JOSAM COMPANY; JOSAM DIV.; SERIES 58910 | SMITH, JAY R. MFG. CO.; DIVISION OF SMITH INDUSTRIES, INC.; 4510 SERIES | TYLER PIPE; WADE DIV. | WATTS DRAINAGE PRODUCTS INC. | ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION.

D. CAST-IRON FLOOR CLEANOUTS (ON-GRADE INTERIOR FLOOR AREAS):
1. STANDARD: ASME A112.36.2M.
2. TYPE: ADJUSTABLE HOUSING.
3. BODY OR FERRULE: CAST IRON.
4. OUTLET CONNECTION: SPIGOT.
5. CLOSURE: BRASS OR BRONZE PLUG WITH TAPERED THREADS.
6. FRAME AND COVER MATERIAL AND FINISH: NICKEL-BRONZE, COPPER ALLOY WITH SCORIATED COVER IN SERVICE AREAS, AND RECESSED COVER TO ACCEPT FLOOR FINISH MATERIAL IN FINISHED FLOOR AREAS.
7. TOP LOADING CLASSIFICATION: MEDIUM DUTY.
a. MANUFACTURERS: JOSAM COMPANY; JOSAM DIV. | SMITH, JAY R. MFG. CO.; MODEL 4023S-F | SIOUX CHIEF MANUFACTURING COMPANY, INC. | TYLER PIPE; WADE DIV. | WATTS DRAINAGE PRODUCTS INC. | ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION.

E. CAST-IRON FLOOR CLEANOUTS (NOT-ON-GRADE INTERIOR FLOOR AREAS):
1. STANDARD: ASME A112.36.2M.
2. TYPE: ADJUSTABLE HOUSING.
3. BODY OR FERRULE: CAST IRON.
4. CLAMPING DEVICE: REQUIRED.
5. OUTLET CONNECTION: SPIGOT.
6. CLOSURE: BRASS OR BONZE PLUG WITH TAPERED THREADS.
7. FRAME AND COVER MATERIAL AND FINISH: NICKEL-BRONZE, COPPER ALLOY WITH SCORIATED COVER IN SERVICE AREAS, AND RECESSED COVER TO ACCEPT FLOOR FINISH MATERIAL IN FINISHED FLOOR AREAS.
8. TOP LOADING CLASSIFICATION: MEDIUM DUTY.
9. MANUFACTURERS: JOSAM COMPANY; JOSAM DIV. | SMITH, JAY R. MFG. CO.; MODEL 4333C | SIOUX CHIEF MANUFACTURING COMPANY, INC. | TYLER PIPE; WADE DIV. | WATTS DRAINAGE PRODUCTS INC | ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION.

F. CAST-IRON WALL CLEANOUTS (FINISHED WALL AREAS):
1. STANDARD: ASME A112.36.2M. INCLUDE WALL ACCESS.
2. BODY: HUB-AND-SPIGOT, CAST-IRON SOIL PIPE T-BRANCH OR HUBLESS, CAST-IRON SOIL PIPE TEST TEE AS REQUIRED TO MATCH CONNECTED PIPING.
3. CLOSURE: COUNTERSUNK OR RAISED-HEAD, DRILLED-AND-THREADED BRONZE OR BRASS PLUG WITH TAPERED THREADS.
4. WALL ACCESS: ROUND, FLAT, CHROME-PLATED BRASS OR STAINLESS-STEEL COVER PLATE WITH SCREW.
5. MANUFACTURERS: JOSAM COMPANY; JOSAM DIV.; MODEL 58790-20 | SMITH, JAY R. MFG. CO.; | TYLER PIPE; WADE DIV. | WATTS DRAINAGE PRODUCTS INC. | ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION.

G. CAST-IRON FLOOR DRAINS (TOILET ROOMS AND JANITOR'S CLOSET) FD-1:
1. STANDARD: ASME A112.6.3.
2. BODY MATERIAL: GRAY IRON.
3. SEEPAGE FLANGE: REQUIRED.
4. CLAMPING DEVICE: REQUIRED.
5. OUTLET: BOTTOM.
6. COATING ON INTERIOR AND EXPOSED EXTERIOR SURFACES: ENAMEL.
7. TOP OF BODY AND STRAINER FINISH: NICKEL BRONZE.
8. TOP SHAPE: ROUND.
9. DIMENSIONS OF TOP OR STRAINER: 7 INCH DIAMETER.
10. MANUFACTURERS: JOSAM COMPANY; JOSAM DIV. | MIFAB, INC. | SIOUX CHIEF MANUFACTURING COMPANY, INC.; FINISH LINE ADJUSTABLE DRAINAGE SYSTEM | SMITH, JAY R. MFG. CO.; MODEL 2010-A | TYLER PIPE; WADE DIV. | WATTS DRAINAGE PRODUCTS INC. | ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION.

H. CAST-IRON FLOOR DRAINS (MECHANICAL ROOMS) FD-1:
1. STANDARD: ASME A112.6.3.
2. BODY MATERIAL: GRAY IRON.
3. SEEPAGE FLANGE: REQUIRED.
4. CLAMPING DEVICE: REQUIRED.
5. OUTLET: BOTTOM.
6. COATING ON INTERIOR AND EXPOSED EXTERIOR SURFACES: ENAMEL.
7. SEDIMENT BUCKET: 3-3/4 INCHES DEEP, SLOTTED SEDIMENT BUCKET WITH LIFT BAR.
8. TOP OR STRAINER MATERIAL: CAST-IRON.
9. TOP SHAPE: ROUND.
10. DIMENSIONS OF TOP OR STRAINER: 11-1/2 INCH DIAMETER TRACTOR GRATE, 29 SQUARE INCHES OF FREE AREA. PROVIDE PARTIAL GRATE WHERE REQUIRED TO ACCEPT EQUIPMENT DRAINS.
11. TOP LOADING CLASSIFICATION: HEAVY DUTY.
12. MANUFACTURERS: JOSAM COMPANY; JOSAM DIV. | MIFAB, INC. | SMITH, JAY R. MFG. CO.; DIVISION OF SMITH INDUSTRIES, INC.; MODEL 2142 | TYLER PIPE; WADE DIV. | WATTS DRAINAGE PRODUCTS INC. | ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION.

I. AIR-GAP FITTINGS:
1. STANDARD: ASME A112.1.2, FOR FITTING DESIGNED TO ENSURE FIXED, POSITIVE AIR GAP BETWEEN INSTALLED INLET AND OUTLET PIPING.
2. BODY: BRONZE OR CAST IRON.
3. INLET: OPENING IN TOP OF BODY.
4. OUTLET: LARGER THAN INLET.
5. SIZE: SAME AS CONNECTED WASTE PIPING AND WITH INLET LARGE ENOUGH FOR ASSOCIATED INDIRECT WASTE PIPING.

J. FLASHING MATERIALS
1. COPPER SHEET: ASTM B 152/B 152M, OF THE FOLLOWING MINIMUM WEIGHTS AND THICKNESSES, UNLESS OTHERWISE INDICATED:
a. GENERAL APPLICATIONS: 12 OZ./SQ. FT.
b. VENT PIPE FLASHING: 8 OZ./SQ. FT.
2. ZINC-COATED STEEL SHEET: ASTM A 653/A 653M, WITH 0.20 PERCENT COPPER CONTENT AND 0.04-INCH MINIMUM THICKNESS, UNLESS OTHERWISE INDICATED. INCLUDE G90 HOT-DIP GALVANIZED, MILL-PHOSPHATIZED FINISH FOR PAINTING IF INDICATED.
3. ELASTIC MEMBRANE SHEET: ASTM D 4068, FLEXIBLE, CHLORINATED POLYETHYLENE, 40-MIL MINIMUM THICKNESS.
4. FASTENERS: METAL COMPATIBLE WITH MATERIAL AND SUBSTRATE BEING FASTENED.
5. METAL ACCESSORIES: SHEET METAL STRIPS, CLAMPS, ANCHORING DEVICES, AND SIMILAR ACCESSORY UNITS REQUIRED FOR INSTALLATION; MATCHING OR COMPATIBLE WITH MATERIAL BEING INSTALLED.
6. SOLDER: ASTM B 32, LEAD-FREE ALLOY.
7. BITUMINOUS COATING: SSPC-PAINT 12, SOLVENT-TYPE, BITUMINOUS MASTIC.

FUEL-FIRED DOMESTIC WATER HEATERS

K. RESIDENTIAL STYLE, POWER-VENT, STORAGE, GAS WATER HEATERS: COMPLY WITH ANSI Z21.10.1/CSA 4.1.
1. MANUFACTURERS:
a. BRADFORD WHITE CORPORATION.
b. LOCHINVAR CORPORATION.
c. SMITH, A. O. WATER PRODUCTS COMPANY.
2. STORAGE-TANK CONSTRUCTION: STEEL.
a. TAPPINGS: ASME B1.20.1 PIPE THREAD.
b. PRESSURE RATING: 150 PSIG.
c. INTERIOR FINISH: COMPLY WITH NSF 61 BARRIER MATERIALS FOR POTABLE-WATER TANK LININGS, INCLUDING EXTENDING LINING MATERIAL INTO TAPPINGS.
3. FACTORY-INSTALLED, STORAGE-TANK APPURTENANCES:
a. ANODE ROD: REPLACEABLE MAGNESIUM.
b. DIP TUBE: PROVIDE UNLESS COLD-WATER INLET IS NEAR BOTTOM OF TANK.
c. DRAIN VALVE: ASSE 1005.
d. INSULATION: COMPLY WITH ASHRAE/IESNA 90.1 OR ASHRAE 90.2.
e. JACKET: STEEL WITH ENAMELED FINISH.
f. BURNER: FOR USE WITH POWER-VENT WATER HEATERS AND FOR NATURAL-GAS FUEL.
g. AUTOMATIC IGNITION: ANSI Z21.20, ELECTRIC, AUTOMATIC, GAS-IGNITION SYSTEM.
h. TEMPERATURE CONTROL: ADJUSTABLE THERMOSTAT.
i. COMBINATION TEMPERATURE AND PRESSURE RELIEF VALVE: ANSI Z21.22/CSA 4.4. INCLUDE RELIEVING CAPACITY AT LEAST AS GREAT AS HEAT INPUT, AND INCLUDE PRESSURE SETTING LESS THAN WATER HEATER WORKING-PRESSURE RATING. SELECT RELIEF VALVE WITH SENSING ELEMENT THAT EXTENDS INTO STORAGE TANK.
4. POWER-VENT SYSTEM: EXHAUST FAN, INTERLOCKED WITH BURNER.
5. CAPACITY AND CHARACTERISTICS: REFER TO SCHEDULE ON DRAWINGS.

PLUMBING FIXTURES

A. SELECT COMBINATIONS OF FIXTURES AND TRIM, FAUCETS, FITTINGS, AND OTHER COMPONENTS THAT ARE COMPATIBLE.
B. REGULATORY REQUIREMENTS: COMPLY WITH REQUIREMENTS IN ICC A117.1, "ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES" FOR PLUMBING FIXTURES FOR PEOPLE WITH DISABILITIES.
C. REGULATORY REQUIREMENTS: COMPLY WITH REQUIREMENTS IN PUBLIC LAW 102-486, "ENERGY POLICY ACT," ABOUT WATER FLOW AND CONSUMPTION RATES FOR PLUMBING FIXTURES.
D. REGULATORY REQUIREMENTS: COMPLY WITH REQUIREMENTS IN PUBLIC LAW 111-380, "REDUCTION OF LEAD IN DRINKING WATER ACT," ABOUT LEAD CONTENT IN MATERIALS THAT WILL BE IN CONTACT WITH POTABLE WATER FOR HUMAN CONSUMPTION.
E. ACCEPTABLE PLUMBNG FIXTURES ARE SCHEDULED ON THE DRAWINGS.
F. FIXTURE SUPPLIES: CHROME-PLATED BRASS, LOOSE-KEY OR SCREWDRIVER ANGLE STOPS WITH BRASS STEMS, CHROME-PLATED COPPER RISERS, AND CHROME-PLATED WALL FLANGES.
1. MANUFACTURERS: BRASSCRAFT; A MASCO COMPANY | MCGUIRE MFG. CO., INC. | ANY OF THE APPROVED PLUMBING FIXTURE MANUFACTURERS.

G. PROTECTIVE SHIELDING PIPE COVERS (PSG-1): MANUFACTURED PLASTIC WRAPS FOR COVERING PLUMBING FIXTURE HOT- AND COLD-WATER SUPPLIES AND TRAP AND DRAIN PIPING. COMPLY WITH AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS.
1. MANUFACTURERS: ENGINEERED BRASS CO. | INSUL-TECT PRODUCTS CO.; A SUBSIDIARY OF MVG MOLDED PRODUCTS | MCGUIRE MANUFACTURING CO., INC. | PLUMBEREX SPECIALTY PRODUCTS INC. | TCI PRODUCTS; SG-200BV | TRUEBRO, INC. | ZURN PLUMBING PRODUCTS GROUP; TUBULAR BRASS PLUMBING PRODUCTS OPERATION.

H. FIXTURE SUPPORTS:
1. MANUFACTURERS: JOSAM COMPANY | MIFAB MANUFACTURING INC. | SMITH, JAY R. MFG. CO. | TYLER PIPE; WADE DIV. | WATTS DRAINAGE PRODUCTS INC.; A DIV. OF WATTS INDUSTRIES, INC. | ZURN PLUMBING PRODUCTS GROUP; SPECIFICATION DRAINAGE OPERATION.

I. DISPOSERS, D-1:
1. DESCRIPTION: CONTINUOUS-FEED, HOUSEHOLD TYPE FOOD-WASTE DISPOSER. INCLUDE RESET BUTTON; WALL SWITCH; CORROSION-RESISTANT CHAMBER WITH JAM-RESISTANT, CUTLERY- OR STAINLESS-STEEL GRINDER OR SHREDDER; NPS 1-1/2 OUTLET; QUICK-MOUNTING, STAINLESS-STEEL SINK FLANGE; ANTISPLASH GUARD; AND COMBINATION COVER/STOPPER.
a. MOTOR: 115-V AC, 1725 RPM, 3/4 HP WITH OVERLOAD PROTECTION.
2. MANUFACTURER: IN-SINK-ERATOR; A DIV. OF EMERSON ELECTRIC CO.

COMMON WORK RESULTS FOR HVAC

A. ENVIRONMENTAL REQUIREMENTS: DO NOT OPERATE EQUIPMENT FOR ANY PURPOSE, TEMPORARY OR PERMANENT, UNTIL DUCTWORK IS CLEAN, FILTERS ARE IN PLACE, BEARINGS LUBRICATED, AND FAN HAS BEEN TEST RUN UNDER OBSERVATION.

TESTING, ADJUSTING, AND BALANCING

A. GENERAL PROCEDURES FOR TESTING AND BALANCING:
1. PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM ACCORDING TO THE PROCEDURES CONTAINED IN AABC'S "NATIONAL STANDARDS FOR TESTING AND BALANCING HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS" OR NEBB'S "PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, AND BALANCING OF ENVIRONMENTAL SYSTEMS" AND THIS SECTION.
2. MARK EQUIPMENT AND BALANCING DEVICE SETTINGS WITH PAINT OR OTHER SUITABLE, PERMANENT IDENTIFICATION MATERIAL, INCLUDING DAMPER-CONTROL POSITIONS, VALVE POSITION INDICATORS, FAN-SPEED-CONTROL LEVERS, AND SIMILAR CONTROLS AND DEVICES, TO SHOW FINAL SETTINGS.

B. GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS:
1. PREPARE TEST REPORTS FOR BOTH FANS AND OUTLETS. OBTAIN MANUFACTURER'S OUTLET FACTORS AND RECOMMENDED TESTING PROCEDURES. CROSSCHECK THE SUMMATION OF REQUIRED OUTLET VOLUMES WITH REQUIRED FAN VOLUMES.
2. PREPARE SCHEMATIC DIAGRAMS OF SYSTEMS' "AS-BUILT" DUCT LAYOUTS, OR USE REDUCED SCALE CONTRACT DOCUMENTS WITH NOTATIONS.
3. FOR VARIABLE-AIR-VOLUME SYSTEMS, DEVELOP A PLAN TO SIMULATE DIVERSITY.
4. DETERMINE THE BEST LOCATIONS IN MAIN AND BRANCH DUCTS FOR ACCURATE DUCT AIRFLOW MEASUREMENTS.
5. CUT INSULATION, AND DRILL DUCTS FOR INSTALLATION OF TEST PROBES TO THE MINIMUM EXTENT NECESSARY TO ALLOW ADEQUATE PERFORMANCE OF PROCEDURES. AFTER TESTING AND BALANCING, CLOSE PROBE HOLES WITH NEAT PATCHES, NEOPRENE PLUGS, THREADED PLUGS, OR THREADED TWIST-ON METAL CAPS, AND PATCH INSULATION WITH NEW MATERIALS IDENTICAL TO THOSE REMOVED. RESTORE VAPOR BARRIER AND FINISH ACCORDING TO INSULATION SPECIFICATIONS FOR THIS PROJECT.
6. CHECK AIR FLOW WITHIN INTAKE PLENUMS AND MIXING BOXES OF AIR HANDLING UNITS FOR UNEVEN FLOW AND TEMPERATURE STRATIFICATION AND PREPARE A REPORT WITH PROFILE ELEVATIONS (TEMPERATURE AND VELOCITY) ON EACH COIL OR FILTER FACE FOR ARCHITECT.
7. LOCATE START-STOP AND DISCONNECT SWITCHES, ELECTRICAL INTERLOCKS, AND MOTOR STARTERS.
8. CHECK DAMPERS FOR PROPER POSITION TO ACHIEVE DESIRED AIRFLOW PATH.
9. CHECK FOR AIRFLOW BLOCKAGES.
10. CHECK CONDENSATE DRAINS FOR PROPER CONNECTIONS AND FUNCTIONING.
11. CHECK FOR PROPER SEALING OF AIR-HANDLING UNIT COMPONENTS.
12. CHECK FOR PROPER SEALING OF AIR DUCT SYSTEM.

C. GENERAL PROCEDURES FOR HYDRONIC SYSTEMS:
1. PREPARE TEST REPORTS WITH PERTINENT DESIGN DATA AND NUMBER IN SEQUENCE STARTING AT PUMP TO END OF SYSTEM. CHECK THE SUM OF BRANCH-CIRCUIT FLOWS AGAINST APPROVED PUMP FLOW RATE.
2. PREPARE SCHEMATIC DIAGRAMS OF SYSTEMS' "AS-BUILT" PIPING LAYOUTS, OR USE REDUCED SCALE CONTRACT DOCUMENTS WITH NOTATIONS.
3. PREPARE HYDRONIC SYSTEMS FOR TESTING AND BALANCING ACCORDING TO THE FOLLOWING, IN ADDITION TO THE GENERAL PREPARATION PROCEDURES SPECIFIED ABOVE:
a. OPEN ALL MANUAL VALVES FOR MAXIMUM FLOW.
b. CHECK EXPANSION TANK LIQUID LEVEL.
c. CHECK MAKEUP-WATER-STATION PRESSURE GAGE FOR ADEQUATE PRESSURE FOR HIGHEST VENT.
d. CHECK FLOW-CONTROL VALVES FOR SPECIFIED SEQUENCE OF OPERATION AND SET AT INDICATED FLOW.
e. SET SYSTEM CONTROLS SO AUTOMATIC VALVES ARE WIDE OPEN TO HEAT EXCHANGERS.
f. SET DIFFERENTIAL-PRESSURE CONTROL VALVES AT THE SPECIFIED DIFFERENTIAL PRESSURE. DO NOT SET AT FULLY CLOSED POSITION WHEN PUMP IS POSITIVE-DISPLACEMENT TYPE UNLESS SEVERAL TERMINAL VALVES ARE KEPT OPEN.
g. CHECK PUMP-MOTOR LOAD. IF MOTOR IS OVERLOADED, THROTTLE MAIN FLOW-BALANCING DEVICE SO MOTOR NAMEPLATE RATING IS NOT EXCEEDED.

D. TOLERANCES:
1. SET HVAC SYSTEM AIRFLOW AND WATER FLOW RATES WITHIN THE FOLLOWING TOLERANCES:
a. AIR HANDLING EQUIPMENT AND OUTLETS: PLUS OR MINUS 5 PERCENT. WHERE TERMINAL UNITS SERVE 6 OR MORE OUTLETS WITHIN A COMMON ROOM, INDIVIDUAL OUTLETS MAY VARY UP TO PLUS OR MINUS 10 PERCENT OF DESIGN FLOW RATES IF OVERALL ROOM SUPPLY IS WITHIN PLUS OR MINUS 5 PERCENT.
b. HEATING-WATER FLOW RATE: 0 TO MINUS 10 PERCENT.

METAL DUCTS

A. SHEET METAL MATERIALS: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE" FOR ACCEPTABLE MATERIALS, MATERIAL THICKNESSES, AND DUCT CONSTRUCTION METHODS, UNLESS OTHERWISE INDICATED. SHEET METAL MATERIALS SHALL BE FREE OF PITTING, SEAM MARKS, ROLLER MARKS, STAINS, DISCOLORATIONS, AND OTHER IMPERFECTIONS.
1. GALVANIZED SHEET STEEL: LOCK-FORMING QUALITY; COMPLYING WITH ASTM A 653/A 653M AND HAVING G90 COATING DESIGNATION; DUCTS SHALL HAVE MILL-PHOSPHATIZED FINISH FOR SURFACES EXPOSED TO VIEW.
2. STAINLESS STEEL: ASTM A 480/A 480M, TYPE 316.
3. REINFORCEMENT SHAPES AND PLATES: GALVANIZED-STEEL REINFORCEMENT WHERE INSTALLED ON GALVANIZED SHEET METAL DUCTS.

B. SEALANT MATERIALS:
1. JOINT AND SEAM SEALANTS, GENERAL: THE TERM "SEALANT" IS NOT LIMITED SOLELY TO MATERIALS OF MASTIC NATURE BUT ALSO INCLUDES TWO-PART ADHESIVE/OPEN-WEAVE FABRIC STRIP SYSTEMS, AND ELASTOMERIC SEALANT TAPE.

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SEAL

REVISIONS:
1 ISSUED FOR BIDS 09/30/2019

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09/30/2019	0128-18-0020	C O	EMG	AFL

City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

MECHANICAL SPECIFICATIONS

SHEET
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2. ELASTOMERIC SEALANT TAPE: 3 INCHES WIDE; MODIFIED BUTYL ADHESIVE BACKED.
   a. MANUFACTURERS: HARDCAST; FOIL-GRIP 1402 AND FOIL-GRIP 1402-181BFX.
3. WATER-BASED JOINT AND SEAM SEALANT: FLEXIBLE, MASTIC SEALANT, RESISTANT TO UV LIGHT WHEN CURED, UL 723 LISTED, AND COMPLYING WITH NFPA REQUIREMENTS FOR CLASS 1 DUCTS.
   a. MANUFACTURERS: HARDCAST; FLEX-GRIP 550 AND VERSA-GRIP 181 | POLYMER ADHESIVES; NO. 11 | UNITED MCGILL.
4. FLANGED JOINT MASTIC: ONE-PART, ACID-CURING, ELASTOMERIC JOINT SEALANT COMPLYING WITH ASTM C 920, TYPE S, GRADE NS, CLASS 25, USE O.
5. GASKETS: CHLOROPRENE ELASTOMER, 40 DUROMETER, 1/8 INCH THICK, FULL FACE, ONE PIECE VULCANIZED OR DOVETAILED AT JOINTS.

C. HANGERS AND SUPPORTS:
1. BUILDING ATTACHMENTS: CONCRETE INSERTS, OR STRUCTURAL-STEEL FASTENERS APPROPRIATE FOR CONSTRUCTION MATERIALS TO WHICH HANGERS ARE BEING ATTACHED.
2. HANGER MATERIALS: GALVANIZED SHEET STEEL OR THREADED STEEL ROD.
3. DUCT ATTACHMENTS: SHEET METAL SCREWS, BLIND RIVETS, OR SELF-TAPPING METAL SCREWS; COMPATIBLE WITH DUCT MATERIALS. ATTACHMENTS FOR STAINLESS STEEL AND PVC-COATED DUCT SHALL BE STAINLESS STEEL.
4. TRAPEZE AND RISER SUPPORTS: STEEL SHAPES COMPLYING WITH ASTM A 36/A 36M.
5. LOAD RATED CABLE SUSPENSION SYSTEM: TESTED TO FIVE TIMES THE SAFE WORKING LOADS AND VERIFIED BY THE SMACNA TESTING AND RESEARCH INSTITUTE.
   a. MANUFACTURERS: DUCTMATE INDUSTRIES, INC., CLUTCHER AND EZ-LOCK | DURO DYNE CORP., DYNA-TITE SYSTEM | GRIPPLE INC., HANG-FAST SYSTEM.
6. WELDED SUPPORTS: STRUCTURAL STEEL SHAPES WITH ZINC RICH PAINT. EQUIVALENT, PROPRIETARY DESIGN ROLLED STEEL STRUCTURAL SUPPORT SYSTEMS MAY BE USED IN LIEU OF MILL ROLLED STRUCTURAL STEEL.

D. RECTANGULAR DUCT FABRICATION: FABRICATE DUCTS, ELBOWS, TRANSITIONS, OFFSETS, BRANCH CONNECTIONS, AND OTHER CONSTRUCTION ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE" AND COMPLYING WITH REQUIREMENTS FOR METAL THICKNESS, REINFORCING TYPES AND INTERVALS, TIE-ROD APPLICATIONS, AND JOINT TYPES AND INTERVALS.

E. ROUND AND FLAT-OVAL DUCT AND FITTING FABRICATION:
1. DIAMETER AS APPLIED TO FLAT-OVAL DUCTS IN THIS ARTICLE IS THE DIAMETER OF A ROUND DUCT WITH A CIRCUMFERENCE EQUAL TO THE PERIMETER OF A GIVEN SIZE OF FLAT-OVAL DUCT.
2. ROUND, SPIRAL LOCK-SEAM DUCTS: FABRICATE SUPPLY DUCTS OF GALVANIZED STEEL ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE."
3. FLAT-OVAL, SPIRAL LOCK-SEAM DUCTS: FABRICATE SUPPLY DUCTS ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE."
4. MANUFACTURERS, ROUND AND FLAT-OVAL SPIRAL LOCK-SEAM DUCTS: EASTERN SHEET METAL (ESM) | LAPINE METAL PRODUCTS | LINX INDUSTRIES | MCGILL AIRFLOW CORPORATION | SEMCO INCORPORATED | SET DUCT MANUFACTURING | TANGENT AIR, INC. | UNIVERSAL SPIRAL AIR.

DUCT ACCESSORIES

A. QUALITY ASSURANCE: COMPLY WITH NFPA 90A, "INSTALLATION OF AIR CONDITIONING AND VENTILATING SYSTEMS," AND NFPA 90B, "INSTALLATION OF WARM AIR HEATING AND AIR CONDITIONING SYSTEMS."

B. BIRD SCREENS: NO. 2 MESH, 0.063 INCH DIAMETER GALVANIZED WIRE SCREEN WITH OPEN AREA OF NOT LESS THAN 72 PERCENT. CONCEAL SHARP EDGES BY ADDING METAL EDGING CONSISTING OF ROD, FLAT OR ANGLE IRON, OR 16 GAGE GALVANIZED SHEET STEEL TURNED OVER AT LEAST 3/4 INCH ON BOTH SIDES.

C. MANUAL VOLUME DAMPERS (LOW PRESSURE):
1. FACTORY FABRICATED, WITH REQUIRED HARDWARE AND ACCESSORIES. STIFFEN DAMPER BLADES FOR STABILITY. INCLUDE LOCKING DEVICE TO HOLD SINGLE-BLADE DAMPERS IN A FIXED POSITION WITHOUT VIBRATION. CLOSE DUCT PENETRATIONS FOR DAMPER COMPONENTS TO SEAL DUCT CONSISTENT WITH PRESSURE CLASS.
2. DAMPER HARDWARE: ZINC-PLATED, DIE-CAST CORE WITH DIAL AND HANDLE MADE OF 3/32-INCH- THICK ZINC-PLATED STEEL, AND A 3/4-INCH HEXAGON LOCKING NUT. INCLUDE CENTER HOLE TO SUIT DAMPER OPERATING-ROD SIZE. INCLUDE ELEVATED PLATFORM FOR INSULATED DUCT MOUNTING.
3. MANUFACTURERS: AMERICAN WARMING AND VENTILATING | ARROW UNITED INDUSTRIES | GREENHECK | KRUEGER | LOUVERS AND DAMPERS | NAILOR INDUSTRIES INC. | RUSKIN COMPANY | VENT PRODUCTS COMPANY, INC. | YOUNG REGULATOR COMPANY.

D. FIRE DAMPERS (CURTAIN STYLE):
1. DYNAMIC FIRE DAMPERS WITH CURTAIN STYLE BLADES, AND LABELED ACCORDING TO UL 555, MAXIMUM VELOCITY 2000 FPM, MAXIMUM STATIC PRESSURE 4 INCHES W.G.
2. FIRE RATING: AS REQUIRED BY WALL CONSTRUCTION.
3. FUSIBLE LINKS: REPLACEABLE, 212 DEG F RATED.
4. MANUFACTURERS: AIR BALANCE, INC. | GREENHECK | NCA MANUFACTURING, INC. | NAILOR INDUSTRIES INC. | RUSKIN COMPANY.

E. TURNING VANES:
1. FABRICATE TO COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE" FOR VANES AND VANE RUNNERS. VANE RUNNERS SHALL AUTOMATICALLY ALIGN VANES.
2. MANUFACTURED TURNING VANES: DOUBLE-VANE OR AIRFOIL-SHAPED, CURVED BLADES OF GALVANIZED SHEET STEEL SET INTO VANE RUNNERS SUITABLE FOR DUCT MOUNTING.
   a. MANUFACTURERS: AERO/DYNE COMPANY | DUCTMATE INDUSTRIES, INC. | DURO DYNE CORP. | WARD INDUSTRIES, INC.
3. ACOUSTIC TURNING VANES: DOUBLE-VANE CURVED BLADES OF GALVANIZED SHEET STEEL WITH PERFORATED FACES AND FIBROUS-GLASS FILL SET INTO VANE RUNNERS SUITABLE FOR DUCT MOUNTING.
   a. MANUFACTURERS: DUCTMATE INDUSTRIES, INC. | WARD INDUSTRIES, INC.

F. DUCT-MOUNTING ACCESS DOORS:
1. FABRICATE DOORS AIRTIGHT AND SUITABLE FOR DUCT PRESSURE CLASS. DOORS MAY BE FIELD FABRICATED IN ACCORDANCE WITH SMACNA STANDARDS, OR COMMERCIALLY PRODUCED.
2. DOOR: DOUBLE WALL, DUCT MOUNTING, AND RECTANGULAR; FABRICATED OF GALVANIZED SHEET METAL WITH INSULATION FILL AND THICKNESS AS INDICATED FOR DUCT PRESSURE CLASS. INCLUDE VISION PANEL WHERE INDICATED. INCLUDE BUTT OR PIANO HINGE AND CAM LATCHES.
   a. MANUFACTURERS: AIR BALANCE, INC. | GREENHECK | NAILOR INDUSTRIES INC. | RUSKIN COMPANY.
3. DOOR: DOUBLE WALL, DUCT MOUNTING, AND ROUND; FABRICATED OF GALVANIZED SHEET METAL WITH INSULATION FILL AND 1-INCH THICKNESS. INCLUDE CAM LATCHES.
   a. MANUFACTURERS: DUCTMATE INDUSTRIES, INC. | FLEXMASTER U.S.A., INC.
4. INSTALL DUCT-MOUNTING, RECTANGULAR ACCESS DOORS WITH LONG DIMENSION AT RIGHT ANGLES TO DIRECTION OF AIRFLOW AND OF LARGEST STANDARD SIZE WHICH CAN BE ACCOMMODATED IN DUCT. MAXIMUM SIZE: 21 BY 14 INCHES.

G. FLEXIBLE CONNECTORS:
1. FLAME-RETARDANT OR NONCOMBUSTIBLE FABRICS, COATINGS, AND ADHESIVES COMPLYING WITH UL 181, CLASS 1.
2. METAL-EDGED CONNECTORS: FACTORY FABRICATED WITH A FABRIC STRIP ATTACHED TO TWO STRIPS OF GALVANIZED SHEET STEEL, STAINLESS STEEL OR ALUMINUM SHEETS. SELECT METAL COMPATIBLE WITH DUCTS.
3. INDOOR SYSTEM, FLEXIBLE CONNECTOR FABRIC: GLASS FABRIC DOUBLE COATED WITH NEOPRENE.
4. OUTDOOR SYSTEM, FLEXIBLE CONNECTOR FABRIC: GLASS FABRIC DOUBLE COATED WITH WEATHERPROOF, SYNTHETIC RUBBER RESISTANT TO UV RAYS AND OZONE.
5. HIGH-TEMPERATURE SYSTEM, FLEXIBLE CONNECTORS: GLASS FABRIC COATED WITH SILICONE RUBBER.
6. HIGH-CORROSIVE-ENVIRONMENT SYSTEM, FLEXIBLE CONNECTORS: GLASS FABRIC WITH CHEMICAL-RESISTANT COATING.
7. MANUFACTURERS: ADSCO MANUFACTURING LLC. | DURO DYNE CORP. | SENIOR FLEXONICS PATHWAY. | VENTFABRICS, INC.

H. FLEXIBLE DUCTS, LOW AND MEDIUM PRESSURE:
1. FLEXIBLE DUCTS: INTERLOCKING SPIRAL OF GALVANIZED STEEL OR ALUMINUM CONSTRUCTION OR FABRIC SUPPORTED BY HELICALLY WOUND SPRING STEEL WIRE OR FLAT STEEL BANDS; RATED TO 6 INCHES WG POSITIVE AND 4 INCHES WG NEGATIVE FOR LOW AND MEDIUM PRESSURE DUCTS.
2. INSULATED FLEXIBLE DUCTS: FLEXIBLE DUCT WRAPPED WITH FLEXIBLE GLASS FIBER INSULATION, ENCLOSED BY A FIRE RETARDANT POLYETHYLENE VAPOR BARRIER JACKET; MAXIMUM 0.23 K VALUE AT 75 DEG F.
3. ACOUSTICAL PERFORMANCE SHALL BE TESTED IN ACCORDANCE WITH THE AIR DIFFUSION COUNCIL'S "FLEXIBLE AIR DUCT TEST CODE FD 72-R1, SECTION 3.0, SOUND PROPERTIES."
4. FLEXIBLE DUCT FITTINGS: GALVANIZED STEEL, TWIST-IN DESIGN WITH DAMPER. SIZE AS INDICATED.
5. FLEXIBLE DUCT CLAMPS: STAINLESS-STEEL BAND WITH CADMIUM-PLATED HEX SCREW TO TIGHTEN BAND WITH A WORM-GEAR ACTION, IN SIZES 3 THROUGH 18 INCHES TO SUIT DUCT SIZE.
6. MANUFACTURERS: FLEXMASTER U.S.A., INC. | AUTOMATION INDUSTRIES THERMAFLEX | HART & COOLEY, INC.

I. FLEXIBLE DUCT ELBOW SUPPORTS:
1. ELBOW SUPPORTS SHALL BE CONSTRUCTED OF DURABLE COMPOSITE MATERIAL AND BE FULLY ADJUSTABLE TO SUPPORT FLEXIBLE DUCT DIAMETERS 6 INCHES THROUGH 16 INCHES.
2. ELBOW SUPPORTS SHALL BE UL LISTED FOR USE IN RETURN AIR PLENUM SPACES.
3. MANUFACTURERS: AUTOMATION INDUSTRIES THERMAFLEX; FLEXFLOW ELBOW | SMART AIR & ENERGY SOLUTIONS; SMART FLOW ELBOW.

J. DUCT ACCESSORY HARDWARE: ADHESIVES: HIGH STRENGTH, QUICK SETTING, NEOPRENE BASED, WATERPROOF, AND RESISTANT TO GASOLINE AND GREASE.

DIFFUSERS, REGISTERS, AND GRILLES

A. AIR DIFFUSION DEVICES ARE SCHEDULED ON THE DRAWINGS.
1. MANUFACTURERS: KREUGER| NAILOR INDUSTRIES | PRICE INDUSTRIES | TITUS | TUTTLE & BAILEY.
2. PROVIDE PLASTER FRAMES FOR UNITS INSTALLED IN PLASTER CEILINGS.
3. PROVIDE GASKETS FOR SUPPLY TERMINAL AIR DEVICES MOUNTED IN FINISHED SURFACES.
4. AIR DIFFUSION DEVICE FACE AND VISIBLE TRIM: STANDARD OFF WHITE BAKED ENAMEL FINISH UNLESS NOTED OTHERWISE.
5. AIR DIFFUSION DEVICE INTERIOR SURFACES, INCLUDING BLANK-OFFS: BLACK MATTE FINISH.

FURNACES

MANUFACTURERS
CARRIER
LENNOX

SYSTEM DESCRIPTION
FURNISH A 4-WAY MULTIPOISE GAS-FIRED CONDENSING FURNACE FOR USE WITH NATURAL GAS OR GAS-FIRED CONDENSING FURNACE FOR USE WITH NATURAL GAS. FURNISH EXTERNAL MEDIA CABINET FOR USE WITH ACCESSORY MEDIA FILTER OR STANDARD FILTER.

QUALITY ASSURANCE
UNIT WILL BE DESIGNED, TESTED AND CONSTRUCTED TO THE CURRENT ANSI Z 21.47/CSA 2.3 DESIGN STANDARD FOR GAS FIRED CENTRAL FURNACES. UNIT WILL BE THIRD PARTY CERTIFIED BY CSA TO THE CURRENT ANSI Z 21.47/CSA 2.3 DESIGN STANDARD FOR GAS-FIRED CENTRAL FURNACES. UNIT WILL CARRY THE CSA BLUE STAR? AND BLUE FLAME? LABELS. UNIT EFFICIENCY TESTING WILL BE PERFORMED PER THE CURRENT DOE TEST PROCEDURE AS LISTED IN THE FEDERAL REGISTER. UNIT WILL BE CERTIFIED FOR CAPACITY AND EFFICIENCY AND LISTED IN THE LATEST AHRI CONSUMER'S DIRECTORY OF CERTIFIED EFFICIENCY RATINGS. UNIT WILL CARRY THE CURRENT FEDERAL TRADE COMMISSION ENERGY GUIDE EFFICIENCY LABEL.

DELIVERY, STORAGE, AND HANDLING
UNIT WILL BE SHIPPED AS SINGLE PACKAGE ONLY AND IS STORED AND HANDLED PER UNIT MANUFACTURER'S RECOMMENDATIONS.

DRAFT INDUCER MOTOR
DRAFT INDUCER MOTOR SHALL BE SINGLE-SPEED PSC DESIGN.

CASING
CASING SHALL BE OF .030 IN. THICKNESS MINIMUM, PRE-PAINTED STEEL. OUTDOOR-MOUNTED, AIR-COOLED, SPLIT-SYSTEM AIR CONDITIONER UNIT SUITABLE FOR GROUND INSTALLATION. UNIT CONSISTS OF A HERMETIC COMPRESSOR, AN AIR-COOLED COIL, PROPELLER-TYPE CONDENSER FAN, AND A CONTROL BOX. UNIT WILL DISCHARGE SUPPLY AIR UPWARD AS SHOWN ON CONTRACT DRAWINGS. UNIT WILL BE USED IN A REFRIGERATION CIRCUIT TO MATCH UP TO A PACKAGED FAN COIL OR COIL UNIT.

BLOWER WHEEL AND ECM BLOWER MOTOR
GALVANIZED BLOWER WHEEL SHALL BE CENTRIFUGAL TYPE, STATICALLY AND DYNAMICALLY BALANCED. BLOWER MOTOR OF ECM TYPE SHALL BE PERMANENTLY LUBRICATED WITH SEALED BALL BEARINGS, AND HAVE MULTIPLE SPEEDS FROM 600-1200 RPM OPERATING ONLY WHEN 24-VAC MOTOR INPUTS ARE PROVIDED. BLOWER MOTOR SHALL BE DIRECT DRIVE AND SOFT MOUNTED TO THE BLOWER HOUSING TO REDUCE VIBRATION TRANSMISSION.

PRIMARY HEAT EXCHANGERS
PRIMARY HEAT EXCHANGERS SHALL BE 3-PASS CORROSION RESISTANT ALUMINIZED STEEL OF FOLD-AND-CRIMP SECTIONAL DESIGN AND APPLIED OPERATING UNDER NEGATIVE PRESSURE.

SECONDARY HEAT EXCHANGERS
SECONDARY HEAT EXCHANGERS SHALL BE OF A STAINLESS STEEL FLOW-THROUGH OF FIN-AND-TUBE DESIGN AND APPLIED OPERATING UNDER NEGATIVE PRESSURE.

CONTROLS
CONTROLS SHALL INCLUDE A MICRO-PROCESSOR-BASED INTEGRATED ELECTRONIC CONTROL BOARD WITH AT LEAST 16 SERVICE TROUBLESHOOTING CODES DISPLAYED VIA DIAGNOSTIC FLASHING LED LIGHT ON THE CONTROL, A SELF-TEST FEATURE THAT CHECKS ALL MAJOR FUNCTIONS OF THE FURNACE, AND A REPLACEABLE AUTOMOTIVE-TYPE CIRCUIT PROTECTION FUSE. MULTIPLE OPERATIONAL SETTINGS AVAILABLE, INCLUDING BLOWER SPEEDS FOR HIGH HEAT, LOW COOLING, HIGH COOLING AND CONTINUOUS FAN. CONTINUOUS FAN SPEED MAY BE ADJUSTED FROM THE THERMOSTAT. FEATURES WILL ALSO INCLUDE TEMPORARY REDUCED AIRFLOW IN THE COOLING MODE FOR IMPROVED DEHUMIDIFICATION WHEN A TP-PRH EDGE? IS SELECTED AS THE THERMOSTAT

THERMOSTAT
COR WIFI THERMOSTAT MODEL TP-WEM01-A

AIR CONDITIONERS

MANUFACTURERS
CARRIER
LENNOX

SYSTEM DESCRIPTION
OUTDOOR-MOUNTED, AIR-COOLED, SPLIT-SYSTEM AIR CONDITIONER UNIT SUITABLE FOR GROUND OR ROOFTOP INSTALLATION. UNIT CONSISTS OF A HERMETIC COMPRESSOR, AN AIR-COOLED COIL, PROPELLER-TYPE CONDENSER FAN, AND A CONTROL BOX. UNIT WILL DISCHARGE SUPPLY AIR UPWARD AS SHOWN ON CONTRACT DRAWINGS. UNIT WILL BE USED IN A REFRIGERATION CIRCUIT TO MATCH UP TO A PACKAGED FAN COIL OR COIL UNIT.

QUALITY ASSURANCE
UNIT WILL BE RATED IN ACCORDANCE WITH THE LATEST EDITION OF ARI STANDARD 210.
UNIT WILL BE CERTIFIED FOR CAPACITY AND EFFICIENCY, AND LISTED IN THE LATEST ARI DIRECTORY.
UNIT CONSTRUCTION WILL COMPLY WITH LATEST EDITION OF ANSI/ ASHRAE AND WITH NEC.
UNIT WILL BE CONSTRUCTED IN ACCORDANCE WITH UL STANDARDS AND WILL CARRY THE UL LABEL OF APPROVAL.
UNIT WILL HAVE C-UL APPROVAL.
UNIT CABINET WILL BE CAPABLE OF WITHSTANDING FEDERAL TEST METHOD STANDARD NO. 141 (METHOD 6061) 500-HR SALT SPRAY TEST.
AIR-COOLED CONDENSER COILS WILL BE LEAK TESTED AND PRESSURE TESTED.
UNIT CONSTRUCTED IN ISO9001 APPROVED FACILITY.

DELIVERY, STORAGE, AND HANDLING
UNIT WILL BE SHIPPED AS SINGLE PACKAGE ONLY AND IS STORED AND HANDLED PER UNIT MANUFACTURER'S RECOMMENDATIONS.

EQUIPMENT
FACTORY ASSEMBLED, SINGLE PIECE, AIR-COOLED AIR CONDITIONER UNIT. CONTAINED WITHIN THE UNIT ENCLOSURE IS ALL FACTORY WIRING, PIPING, CONTROLS, COMPRESSOR, REFRIGERANT CHARGE PURON (R-410A), AND SPECIAL FEATURES REQUIRED PRIOR TO FIELD START-UP.

UNIT CABINET
UNIT CABINET, INCLUDING LOUVERED COIL GUARD, WILL BE CONSTRUCTED OF GALVANIZED STEEL, BONDERIZED, AND COATED WITH A POWDER COAT PAINT.

FANS
CONDENSER FAN WILL BE DIRECT-DRIVE FORWARD-SWEPT PROPELLER TYPE, DISCHARGING AIR UPWARD.

AIR CONDITIONER
CONDENSER FAN MOTORS WILL BE TOTALLY ENCLOSED, 1-PHASE TYPE WITH CLASS B INSULATION AND PERMANENTLY LUBRICATED BEARINGS. SHAFTS WILL BE CORROSION RESISTANT.
FAN BLADES WILL BE STATICALLY AND DYNAMICALLY BALANCED.
CONDENSER FAN OPENINGS WILL BE EQUIPPED WITH COATED STEEL WIRE SAFETY GUARDS.
COMPRESSOR
COMPRESSOR WILL BE HERMETICALLY SEALED.
COMPRESSOR WILL BE MOUNTED ON RUBBER SPLIT-POST VIBRATION ISOLATORS.
COMPRESSOR WILL BE COVERED WITH A SOUND ABSORBING BLANKET.
CONDENSER COIL
CONDENSER COIL WILL BE AIR COOLED.
COIL WILL BE CONSTRUCTED OF ALUMINUM FINS MECHANICALLY BONDED TO COPPER TUBES WHICH ARE THEN CLEANED,
DEHYDRATED, AND SEALED.
REFRIGERATION COMPONENTS
REFRIGERATION CIRCUIT COMPONENTS WILL INCLUDE LIQUID-LINE BACK-SEATING SHUTOFF VALVE WITH SWEAT CONNECTIONS,
VAPOR-LINE BACK-SEATING SHUTOFF VALVE WITH SWEAT CONNECTIONS, SYSTEM CHARGE OF PURON (R-410A) REFRIGERANT, AND COMPRESSOR OIL.
UNIT WILL BE EQUIPPED WITH HIGH-PRESSURE SWITCH, LOW PRESSURE SWITCH AND FILTER DRIER FOR PURON REFRIGERANT.

ELECTRICAL REQUIREMENTS
UNIT ELECTRICAL POWER WILL BE SINGLE POINT CONNECTION.
CONTROL CIRCUIT WILL BE 24V.

ENERGY RECOVERY VENTILATORS

A. MANUFACTURERS:
GREENHECK.
LOREN COOK COMPANY.
RENEWAIRE LLC.
RUSKIN COMPANY.
THERMAL CORPORATION; A DIVISION OF NAILOR INTERNATIONAL, INC.

B. DESCRIPTION: FACTORY ASSEMBLED AND TESTED; DESIGNED FOR EXTERIOR INSTALLATION; CONSISTING OF FIXED-PLATE OR ENTHALPY WHEEL HEAT EXCHANGER, SUPPLY-AIR FAN, EXHAUST-AIR FAN, FILTERS, DAMPERS, BASIC UNIT CONTROLS AND INTERFACE TO BAS.

C. CASING: MANUFACTURER'S DOUBLE-WALL GALVANIZED SHEET METAL CONSTRUCTION WITH EXTERIOR ENAMEL PAINT FINISH. UNITS HAVING SINGLE-WALL CASING CONSTRUCTION ARE NOT ACCEPTABLE.
1. FINISH ABLE TO WITHSTAND MINIMUM 500-HOUR SALT SPRAY TEST IN ACCORDANCE WITH ASTM B117.
2. HINGED ACCESS DOORS WITH NEOPRENE GASKETS FOR INSPECTION AND ACCESS TO INTERNAL PARTS.
3. MINIMUM 1-INCH- (25-MM-) THICK THERMAL INSULATION.
4. PERFORATED-METAL LINER ON SUPPLY-AIR FAN DISCHARGE SECTION.
5. KNOCKOUTS FOR ELECTRICAL AND PIPING CONNECTIONS.
6. EXTERIOR CONDENSATE DRAIN CONNECTION.
7. LIFTING LUGS.

D. SUPPLY-AIR FAN: AIRFOIL, OR BACKWARD INCLINED AS SCHEDULED, CENTRIFUGAL, DIRECT-DRIVEN OR V-BELT DRIVEN WITH FIXED MOTOR SHEAVES, GREASE-LUBRICATED BALL BEARINGS, AND MOTOR. MOUNT FAN AND MOTOR ASSEMBLY ON BASE WITH ELASTOMERIC ISOLATOR PADS.

E. EXHAUST FAN: FORWARD CURVED OR AIRFOIL, CENTRIFUGAL, BELT DRIVEN WITH ADJUSTABLE MOTOR SHEAVES, GREASE-LUBRICATED BALL BEARINGS, AND MOTOR. MOUNT FAN AND MOTOR ASSEMBLY ON BASE WITH ELASTOMERIC ISOLATOR PADS.

F. FILTERS: SIZE, TYPE, AND RATING AS SCHEDULED ON THE DRAWINGS, IN FILTER RACKS OR GALVANIZED-STEEL FRAMES AS REQUIRED BY FILTER TYPE.
1. AIR FILTER AND FILTER-HOLDING SYSTEM MANUFACTURERS:
   a. AAF INTERNATIONAL.
   b. ECO AIR.
   c. FARR CO.
   d. FLANDERS FILTERS, INC.

G. ELECTRICAL:
1. FACTORY INSTALLED AND WIRED, AND FUNCTIONALLY TESTED AT FACTORY BEFORE SHIPMENT.
2. SINGLE-POINT, FIELD-POWER CONNECTION TO FUSED DISCONNECT SWITCH.
   a. BRANCH POWER CIRCUIT TO EACH MOTOR, DEDICATED ELECTRICAL LOAD, AND CONTROLS WITH DISCONNECT SWITCH OR CIRCUIT BREAKER.
      1) NEMA KS 1, HEAVY-DUTY, FUSIBLE SWITCH WITH REJECTION-TYPE FUSE CLIPS RATED FOR FUSES. SELECT AND SIZE FUSES TO PROVIDE TYPE 2 PROTECTION ACCORDING TO IEC 60947-4-1.
      2) NEMA AB 1, MOTOR-CIRCUIT PROTECTOR (CIRCUIT BREAKER) WITH FIELD-ADJUSTABLE, SHORT-CIRCUIT-TRIP SET POINT.
   b. NEMA ICS 2, CLASS A, FULL-VOLTAGE, NONREVERSING MOTOR CONTROLLER, HAND-OFF-AUTO SWITCH, AND OVERCURRENT PROTECTION FOR EACH MOTOR.
   c. CONTROL-CIRCUIT TRANSFORMER WITH PRIMARY AND SECONDARY SIDE FUSES.
3. TERMINAL BLOCKS WITH NUMBERED AND COLOR-CODED WIRING TO MATCH WIRING DIAGRAM. SPARE WIRING TERMINAL BLOCK FOR CONNECTION TO EXTERNAL CONTROLS OR EQUIPMENT.

H. UNIT CONTROLS: SOLID-STATE CONTROL BOARD AND COMPONENTS CONTAIN AT LEAST THE FOLLOWING FEATURES:
1. SUPPLY-AIR FAN CONTROL RELAY.
2. EXHAUST AIR FAN CONTROL RELAY.
3. DEFAULT CONTROL TO ENSURE PROPER OPERATION AFTER POWER INTERRUPTION.
4. SERVICE RELAY OUTPUT.
5. UNIT DIAGNOSTICS AND DIAGNOSTIC CODE STORAGE.
6. FIELD-ADJUSTABLE CONTROL PARAMETERS.
7. INDOOR-AIR QUALITY CONTROL WITH CARBON DIOXIDE SENSOR.

I. ACCESSORIES:
1. DIRTY-FILTER SWITCH.

TEMPERATURE CONTROLS

J. THERMOSTAT CONTROL WHERE INDICATED.

K. OWNER INSTRUCTION AND TRAINING: PROVIDE A MINIMUM OF 4 HOURS OF ON-SITE INSTRUCTION AND TRAINING TO THE OWNER ON THE OPERATION OF THE CONTROL SYSTEMS FOR THE INITIAL INSTALLATION. INSTRUCTION AND TRAINING SHALL BE PERFORMED BY A COMPETENT CONTRACTOR REPRESENTATIVE FAMILIAR WITH THE CONTROL SYSTEMS OPERATION, MAINTENANCE AND CALIBRATION

L. CALIBRATION AND START-UP: AFTER INSTALLATION AND CONNECTION OF CONTROL COMPONENTS, TEST, ADJUST AND RE-ADJUST AS REQUIRED ALL CONTROL COMPONENTS IN TERMS OF FUNCTION, DESIGN, SYSTEMS BALANCE AND PERFORMANCE. MAKE SYSTEMS READY FOR ENVIRONMENTAL EQUIPMENT ACCEPTANCE TESTS

ACCEPTANCE PROCEDURE: UPON SUCCESSFUL COMPLETION OF START-UP AND RECALIBRATION AS INDICATED IN THIS SECTION, THE ARCHITECT SHALL BE REQUESTED IN WRITING TO INSPECT THE SATISFACTORY OPERATION OF THE CONTROL SYSTEMS. AFTER CORRECTING ALL ITEMS APPEARING ON THE PUNCH LIST, MAKE A SECOND WRITTEN REQUEST TO THE OWNER AND ARCHITECT FOR INSPECTION AND APPROVAL. AFTER ALL ITEMS ON THE PUNCH LIST ARE CORRECTED AND FORMAL APPROVAL OF THE CONTROL SYSTEMS IS PROVIDED BY THE ARCHITECT, THE CONTRACTOR SHALL INDICATE TO THE OWNER IN WRITING THE COMMENCEMENT OF THE WARRANTY PERIOD.

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SEAL

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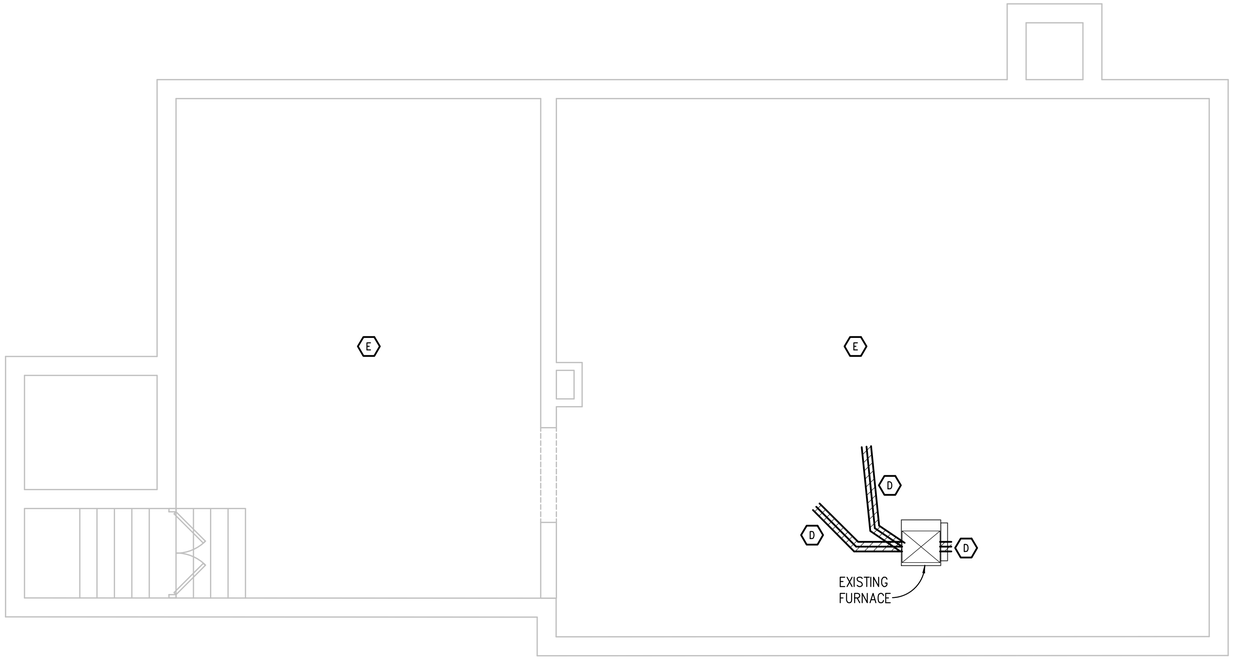
DATE	PROJ NUMBER	ARCH	PROJ MGR	CADD
09/30/2019	0126-18-0020	C.O.	EMG	APL

City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road
MECHANICAL SPECIFICATIONS

SHEET
M0.4

THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE. 1"



BASEMENT MECHANICAL DEMOLITION PLAN

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

MECHANICAL GENERAL DEMOLITION NOTES:

1. ANY INTERRUPTION OF EXISTING SERVICES AND/OR EQUIPMENT SHALL BE PERFORMED AT A TIME APPROVED IN ADVANCE BY THE OWNER'S REPRESENTATIVE.
2. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL EXTENT OF THE WORK. ACTUAL ROUTING AND SIZES OF EXISTING PIPING AND DUCTWORK MIGHT DIFFER TO A LIMITED EXTENT FROM WHAT IS SHOWN. MAJOR DISCREPANCIES BETWEEN THE DRAWINGS AND ACTUAL EXISTING CONDITIONS SHALL BE REPORTED TO THE ENGINEER.
3. THE EXACT EXTENT OF DEMOLITION SHALL BE AS REQUIRED BY THE NEW WORK.
4. ALL MECHANICAL ITEMS TO BE REMOVED SHALL BE REMOVED COMPLETE, INCLUDING ALL RELATED ITEMS SUCH AS HANGERS, SUPPORTS, CONTROLS, ETC. CAP ALL OPEN ENDED PIPES AND DUCTWORK.

(#) DEMOLITION KEY NOTES:

A. REMOVE EXISTING SHOWER AND ALL ASSOCIATED HW, CW, SAN, AND VENT PIPING COMPLETELY.

B. REMOVE EXISTING SANITARY STACK COMPLETELY.

C. REMOVE EXISTING WATER CLOSET AND ALL ASSOCIATED HW, CW, SAN AND VENT PIPING COMPLETELY.

D. REMOVE EXISTING DUCTWORK BACK TO POINT INDICATED AND CAP.

E. REMOVE ALL REMAINING MISCELLANEOUS HOT WATER HEATING PIPING ON THIS FLOOR.

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BASEMENT MECHANICAL DEMOLITION PLAN

SHEET MD1.0

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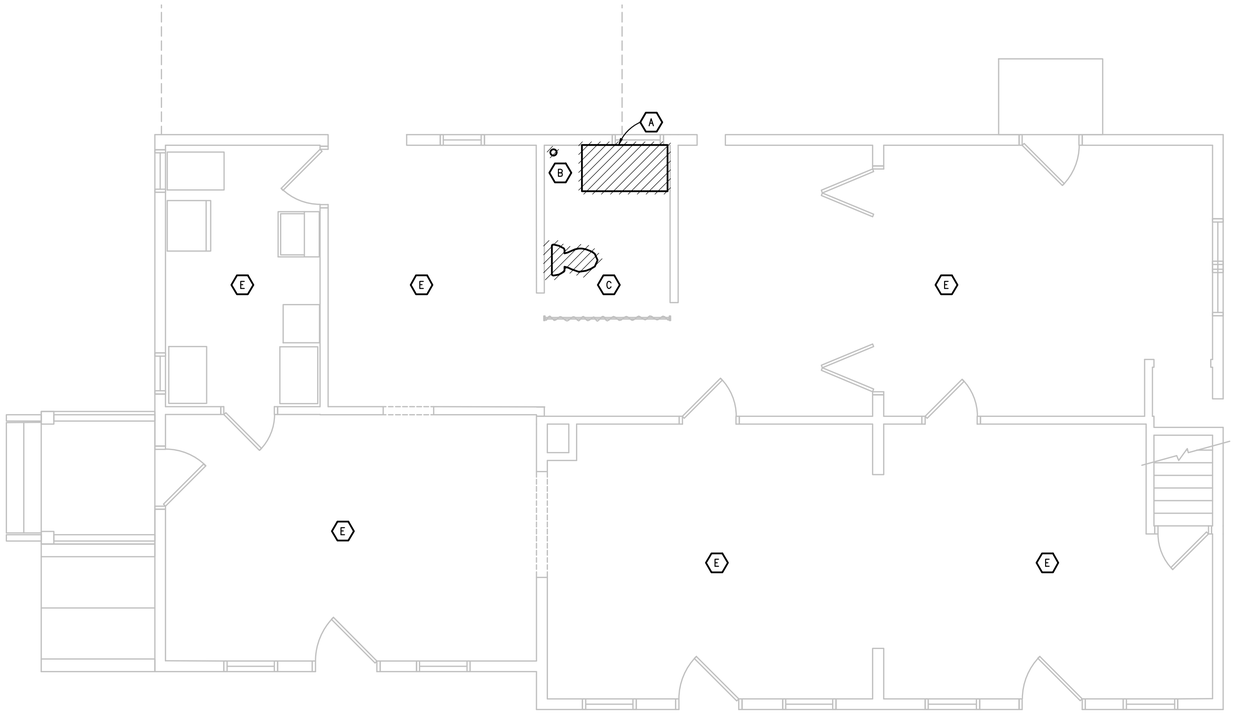

FIRST FLOOR MECHANICAL DEMOLITION PLAN

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

MECHANICAL GENERAL DEMOLITION NOTES:

1. ANY INTERRUPTION OF EXISTING SERVICES AND/OR EQUIPMENT SHALL BE PERFORMED AT A TIME APPROVED IN ADVANCE BY THE OWNER'S REPRESENTATIVE.
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FIRST FLOOR MECHANICAL DEMOLITION PLAN

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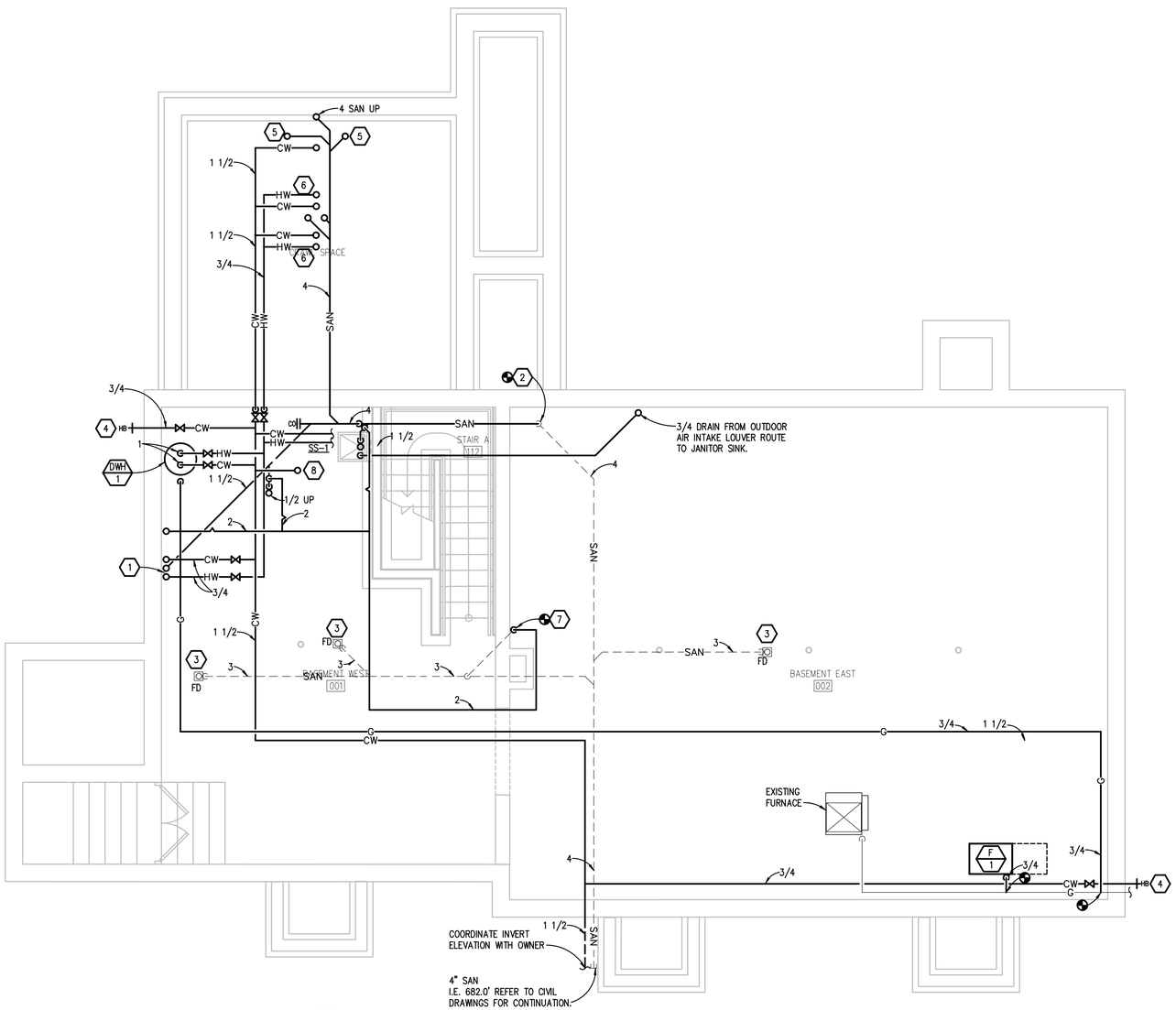

BASEMENT PLUMBING NEW WORK PLAN

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

PLUMBING GENERAL NOTES:

1. THESE DRAWINGS ARE DIAGRAMMATIC, AND REPRESENT THE GENERAL INTENT AND ARRANGEMENT OF SYSTEMS. THEY ARE NOT TO BE CONSIDERED FABRICATION/COORDINATION/SHOP DRAWINGS. COORDINATION WITH OTHER TRADES IS REQUIRED. PROVIDE THE ADDITIONAL FITTINGS AND OFFSETS THAT WILL BE REQUIRED TO COMPLETE EACH SYSTEM AND TO AVOID INTERFERENCES WITH ALL OTHER SYSTEMS INCLUDING THE STRUCTURE, SHEET METAL, OTHER PIPING SYSTEMS, ELECTRICAL CONDUITS, BUS DUCTS, CABLE TRAY, LIGHT FIXTURES, ETC. AND/OR OTHER SPACE CONSTRAINTS.
2. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
3. PIPING SHALL NOT BE INSTALLED ABOVE ELECTRICAL TRANSFORMERS, SWITCHBOARDS, PANELBOARDS OR MOTOR CONTROL CENTERS.
4. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
5. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
6. REFER TO ARCHITECTURAL PLANS FOR DIMENSIONED LOCATIONS OF PLUMBING FIXTURES.
7. HOT AND COLD WATER PIPING RUN-OUTS TO LAVATORIES AND SINKS SHALL BE 1/2" UNLESS OTHERWISE NOTED.
8. PLUMBING VENT PIPING THROUGH ROOF SHALL BE LOCATED A MINIMUM OF 10'-0" FROM ANY FRESH AIR INTAKE LOCATION AND A MINIMUM OF 18" CLEAR FROM THE INSIDE FACE OF PARAPET.
9. PROVIDE CODE REQUIRED CLEARANCE FOR ALL CLEANOUTS INSTALLED IN SANITARY WASTE AND VENT PIPING.
10. MINIMUM UNDERGROUND PIPE SIZE SHALL BE 3".
11. WATER SERVICE ENTRANCE PIPING SHALL BE BURIED WITH DEPTH OF COVER OVER TOP OF PIPE OF AT LEAST 72", OR WITH TOP OF PIPE AT LEAST 12" BELOW LEVEL OF MAXIMUM FROST PENETRATION, OR AS REQUIRED BY AUTHORITIES HAVING JURISDICTION, WHICHEVER IS DEEPEST.
12. THE DESIGN INTENT OF THE PROJECT IS FOR ALL DUCTS, PIPING AND RELATED ACCESSORIES BE INSTALLED CONCEALED IN CEILING AND WALL CONSTRUCTION WITH THE EXCEPTION OF NON-PUBLIC ROOMS (I.E. BASEMENT). WHERE THE EXISTING CONDITIONS ARE SUCH THAT IT IS NOT FEASIBLE TO CONCEAL THE DUCTS, PIPING AND RELATED ACCESSORIES, THE MECHANICAL CONTRACTOR SHALL NOTIFY THE ARCHITECT OF THE CONDITION AND SEEK AN ACCEPTABLE REMEDY PRIOR TO THE INSTALLATION OF ANY DUCTS, PIPING AND RELATED ACCESSORIES.

(#) CONSTRUCTION KEY NOTES:

1. HW, CW, AND SAN UP TO SK-1 ABOVE. REFER TO PLUMBING CONNECTION SCHEDULE FOR PIPE SIZES.
2. CONNECT NEW 4 SAN TO EXISTING 4 SAN CAPPED ABOVE FLOOR.
3. INSTALL TRAP SEALS ON ALL EXISTING SANITARY FLOOR DRAINS. JAY R. SMITH MODEL - QUAD CLOSE TRAP SEAL FIGURE 2692.
4. PROVIDE ASME A112.18.1 HOSE BIBB WITH GARDEN HOSE OUTLET CONNECTION, AND INTEGRAL VACUUM BREAKER COMPLYING WITH ASSE 1011. MANUFACTURERS: JAY R. SMITH, WATTS, WOODFORD MANUFACTURING, OR ZURN.
5. 4 SAN AND 3/4 CW UP TO WATER CLOSET ABOVE.
6. 1/2 HW, 1/2 CW, AND 1 1/2 SAN UP TO LAVATORY ABOVE.
7. CONNECT 2" VENT TO EXISTING VENT CAPPED ABOVE FLOOR.
8. ROUTE 1/2 CW UP TO ICE MACHINE. PROVIDE BACKFLOW PREVENTER WITH INTERMEDIATE ATMOSPHERIC VENT COMPLYING WITH ASSE 1012.

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City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

BASEMENT PLUMBING NEW WORK PLAN

SHEET M2.0

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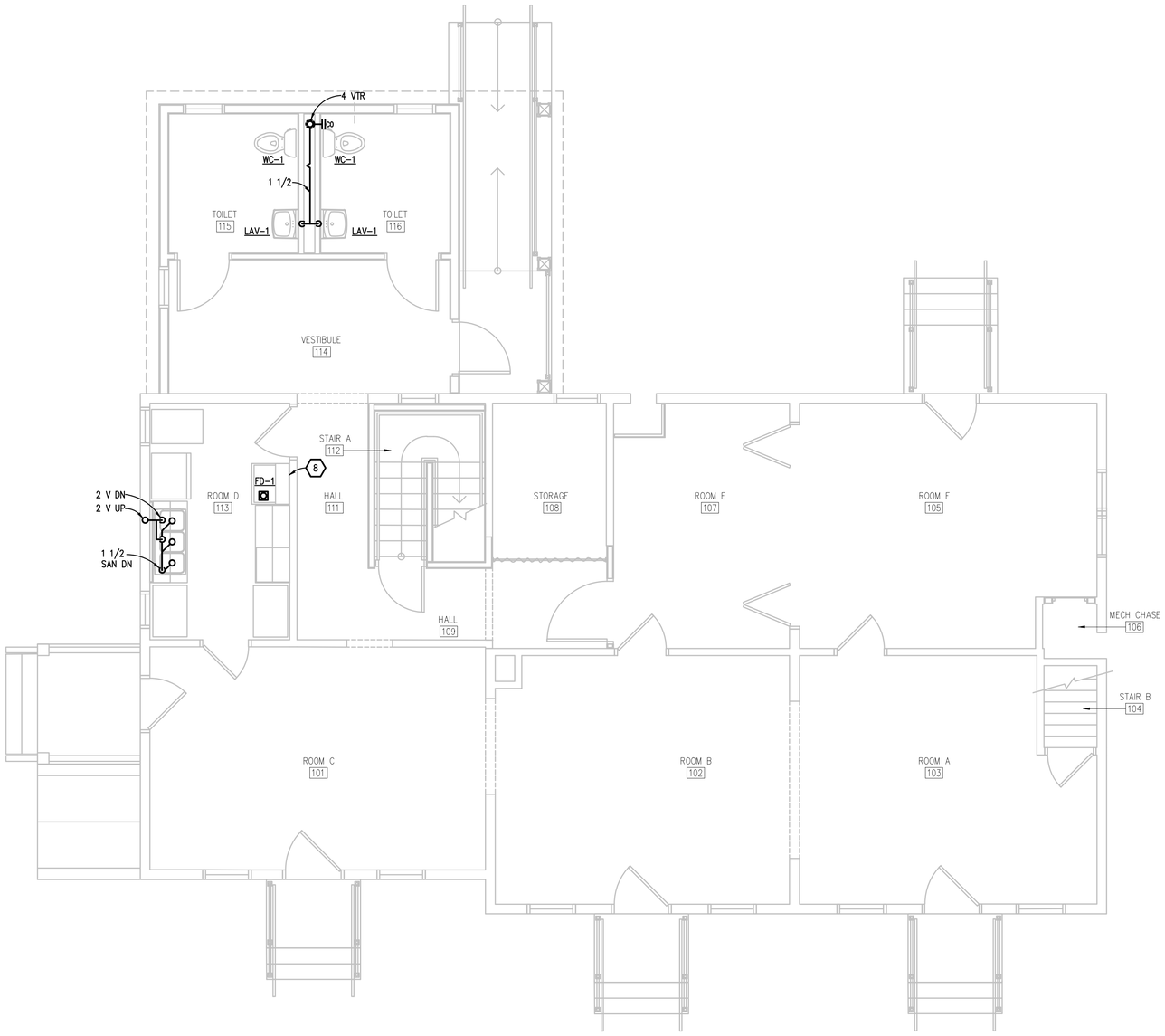

FIRST FLOOR PLUMBING NEW WORK PLAN

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

PLUMBING GENERAL NOTES:

1. THESE DRAWINGS ARE DIAGRAMMATIC, AND REPRESENT THE GENERAL INTENT AND ARRANGEMENT OF SYSTEMS. THEY ARE NOT TO BE CONSIDERED FABRICATION/COORDINATION/SHOP DRAWINGS. COORDINATION WITH OTHER TRADES IS REQUIRED. PROVIDE THE ADDITIONAL FITTINGS AND OFFSETS THAT WILL BE REQUIRED TO COMPLETE EACH SYSTEM AND TO AVOID INTERFERENCES WITH ALL OTHER SYSTEMS INCLUDING THE STRUCTURE, SHEET METAL, OTHER PIPING SYSTEMS, ELECTRICAL CONDUITS, BUS DUCTS, CABLE TRAY, LIGHT FIXTURES, ETC. AND/OR OTHER SPACE CONSTRAINTS.
2. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
3. PIPING SHALL NOT BE INSTALLED ABOVE ELECTRICAL TRANSFORMERS, SWITCHBOARDS, PANELBOARDS OR MOTOR CONTROL CENTERS.
4. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
5. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
6. REFER TO ARCHITECTURAL PLANS FOR DIMENSIONED LOCATIONS OF PLUMBING FIXTURES.
7. HOT AND COLD WATER PIPING RUN-OUTS TO LAVATORIES AND SINKS SHALL BE 1/2" UNLESS OTHERWISE NOTED.
8. PLUMBING VENT PIPING THROUGH ROOF SHALL BE LOCATED A MINIMUM OF 10'-0" FROM ANY FRESH AIR INTAKE LOCATION AND A MINIMUM OF 18" CLEAR FROM THE INSIDE FACE OF PARAPET.
9. PROVIDE CODE REQUIRED CLEARANCE FOR ALL CLEANOUTS INSTALLED IN SANITARY WASTE AND VENT PIPING.
10. MINIMUM UNDERGROUND PIPE SIZE SHALL BE 3".
11. WATER SERVICE ENTRANCE PIPING SHALL BE BURIED WITH DEPTH OF COVER OVER TOP OF PIPE OF AT LEAST 72", OR WITH TOP OF PIPE AT LEAST 12" BELOW LEVEL OF MAXIMUM FROST PENETRATION, OR AS REQUIRED BY AUTHORITIES HAVING JURISDICTION, WHICHEVER IS DEEPEST.
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CONSTRUCTION KEY NOTES:

1. HW, CW, AND SAN UP TO SK-1 ABOVE. REFER TO PLUMBING CONNECTION SCHEDULE FOR PIPE SIZES.
2. CONNECT NEW 4 SAN TO EXISTING 4 SAN CAPPED ABOVE FLOOR.
3. INSTALL TRAP SEALS ON ALL EXISTING SANITARY FLOOR DRAINS. JAY R. SMITH MODEL - QUAD CLOSE TRAP SEAL FIGURE 2692.
4. PROVIDE ASME A112.18.1 HOSE BIBB WITH GARDEN HOSE OUTLET CONNECTION, AND INTEGRAL VACUUM BREAKER COMPLYING WITH ASSE 1011. MANUFACTURERS: JAY R. SMITH, WATTS, WOODFORD MANUFACTURING, OR ZURN.
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6. 1/2 HW, 1/2 CW, AND 1 1/2 SAN UP TO LAVATORY ABOVE.
7. CONNECT 2" VENT TO EXISTING VENT CAPPED ABOVE FLOOR.
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City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

FIRST FLOOR PLUMBING NEW WORK PLAN

SHEET M2.1

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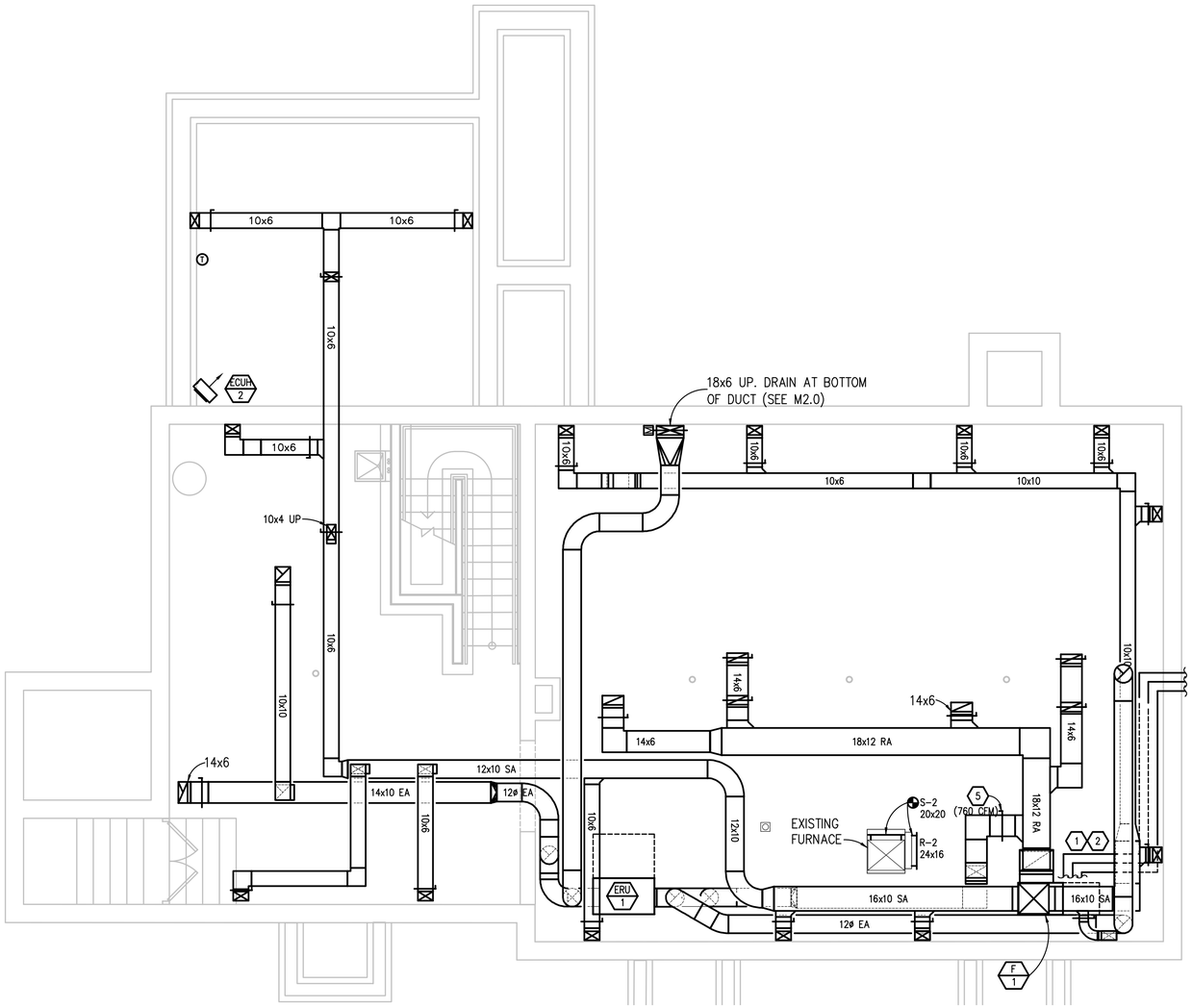

BASEMENT SHEET METAL NEW WORK PLAN

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

SHEET METAL GENERAL NOTES:

1. THESE DRAWINGS ARE DIAGRAMMATIC, AND REPRESENT THE GENERAL INTENT AND ARRANGEMENT OF SYSTEMS. THEY ARE NOT TO BE CONSIDERED FABRICATION/COORDINATION/SHOP DRAWINGS. COORDINATION WITH OTHER TRADES IS REQUIRED. PROVIDE THE ADDITIONAL FITTINGS AND OFFSETS THAT WILL BE REQUIRED TO COMPLETE EACH SYSTEM AND TO AVOID INTERFERENCES WITH ALL OTHER SYSTEMS INCLUDING THE STRUCTURE, SHEET METAL, OTHER PIPING SYSTEMS, ELECTRICAL CONDUITS, BUS DUCTS, CABLE TRAY, LIGHT FIXTURES, ETC. AND/OR OTHER SPACE CONSTRAINTS.
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3. PIPING AND DUCTWORK SHALL NOT BE INSTALLED ABOVE ELECTRICAL TRANSFORMERS, SWITCHBOARDS, PANELBOARDS OR MOTOR CONTROL CENTERS.
4. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
5. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
6. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR DIMENSIONED LOCATION OF GRILLES, REGISTERS, AND DIFFUSERS.
7. THE DESIGN INTENT OF THE PROJECT IS FOR ALL DUCTS, PIPING AND RELATED ACCESSORIES BE INSTALLED CONCEALED IN CEILING AND WALL CONSTRUCTION WITH THE EXCEPTION OF NON-PUBLIC ROOMS (I.E. BASEMENT). WHERE THE EXISTING CONDITIONS ARE SUCH THAT IT IS NOT FEASIBLE TO CONCEAL THE DUCTS, PIPING AND RELATED ACCESSORIES, THE MECHANICAL CONTRACTOR SHALL NOTIFY THE ARCHITECT OF THE CONDITION AND SEEK AN ACCEPTABLE REMEDY PRIOR TO THE INSTALLATION OF ANY DUCTS, PIPING AND RELATED ACCESSORIES.

CONSTRUCTION KEY NOTES:

1. ROUTE REFRIGERANT PIPING FROM INDOOR UNIT TO OUTDOOR AC UNIT AND CONNECT ACCORDING TO MANUFACTURER'S INSTALLATION INSTRUCTIONS.
2. ROUTE CONCENTRIC TYPE FLUE EXHAUST THROUGH SIDEWALL ACCORDING TO MANUFACTURER'S INSTALLATION INSTRUCTIONS. ROUTE CONDENSATE PIPING TO NEAREST SANITARY DRAIN.
3. CONNECT RELIEF AIR DUCT TO 18Wx32Hx18D SHEET METAL PLENUM.
4. CONNECT OUTSIDE AIR DUCT TO BOTTOM OF 30Wx32Hx18D OUTSIDE AIR INTAKE PLENUM. EXTEND DUCT UP INTO SHEET METAL PLENUM 4 INCHES. REFER TO OUTDOOR INTAKE PLENUM DETAIL.
5. BALANCE OUTSIDE AIR DAMPER TO CFM INDICATED.
6. CONNECT 24Wx36Hx24D OUTSIDE AIR INTAKE PLENUM TO LOUVER.
7. ROUTE 6" DUCT THROUGH ATTIC SPACE AND OUT SIDEWALL. PROVIDE SIDEWALL EXHAUST VENT CAP WITH HOOD.

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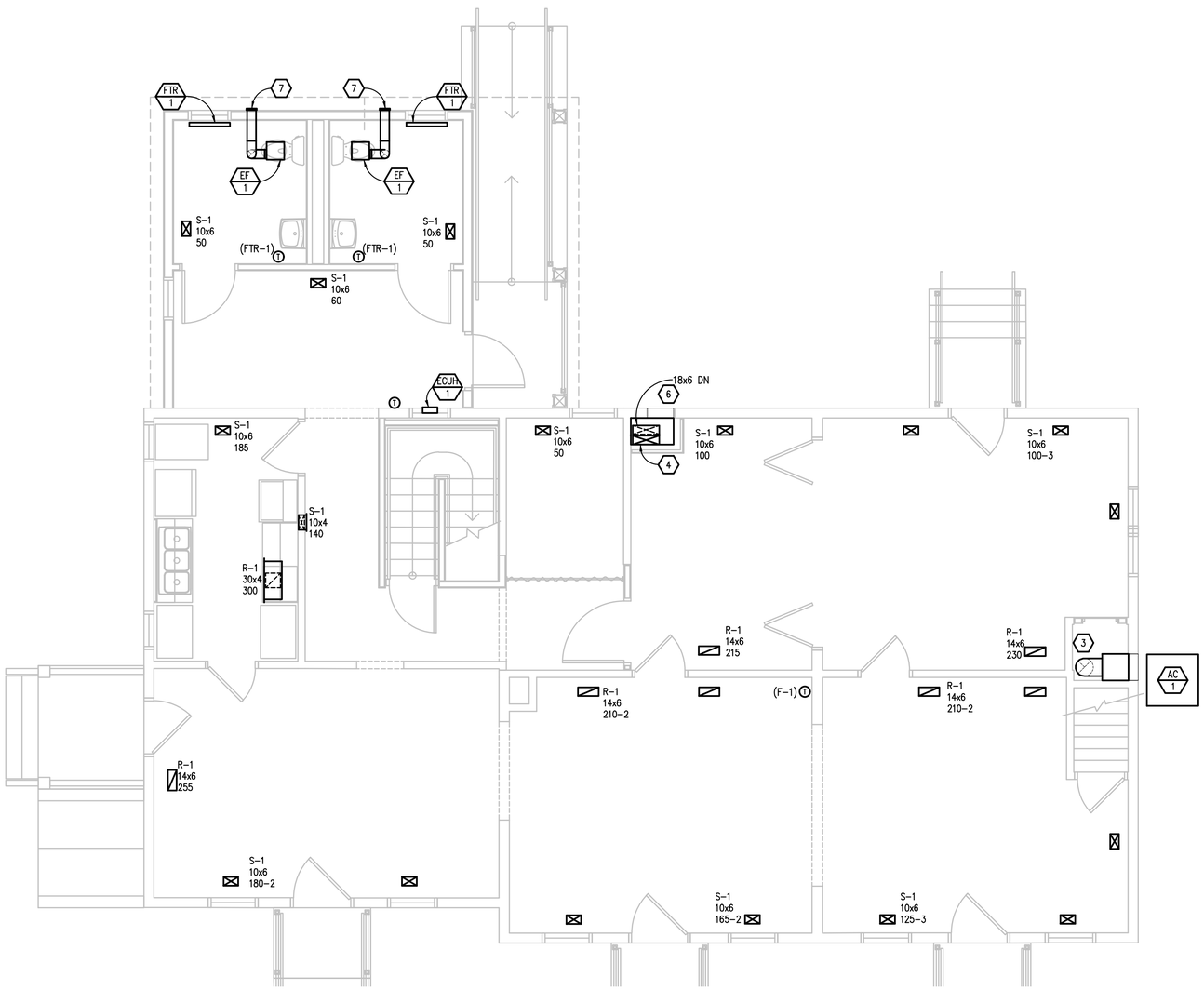
DATE 09/30/2019 | PROJ NUMBER 0128-18-A020 | ARCH C.O. | PROJ MGR EMG | CADD AFL

City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

BASEMENT SHEET METAL NEW WORK PLAN

SHEET M4.0

THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE. 1"



FIRST FLOOR SHEET METAL NEW WORK PLAN

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

SHEET METAL GENERAL NOTES:

1. THESE DRAWINGS ARE DIAGRAMMATIC, AND REPRESENT THE GENERAL INTENT AND ARRANGEMENT OF SYSTEMS. THEY ARE NOT TO BE CONSIDERED FABRICATION/COORDINATION/SHOP DRAWINGS. COORDINATION WITH OTHER TRADES IS REQUIRED. PROVIDE THE ADDITIONAL FITTINGS AND OFFSETS THAT WILL BE REQUIRED TO COMPLETE EACH SYSTEM AND TO AVOID INTERFERENCES WITH ALL OTHER SYSTEMS INCLUDING THE STRUCTURE, SHEET METAL, OTHER PIPING SYSTEMS, ELECTRICAL CONDUITS, BUS DUCTS, CABLE TRAY, LIGHT FIXTURES, ETC. AND/OR OTHER SPACE CONSTRAINTS.
2. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
3. PIPING AND DUCTWORK SHALL NOT BE INSTALLED ABOVE ELECTRICAL TRANSFORMERS, SWITCHBOARDS, PANELBOARDS OR MOTOR CONTROL CENTERS.
4. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
5. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
6. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR DIMENSIONED LOCATION OF GRILLES, REGISTERS, AND DIFFUSERS.
7. THE DESIGN INTENT OF THE PROJECT IS FOR ALL DUCTS, PIPING AND RELATED ACCESSORIES BE INSTALLED CONCEALED IN CEILING AND WALL CONSTRUCTION WITH THE EXCEPTION OF NON-PUBLIC ROOMS (I.E. BASEMENT). WHERE THE EXISTING CONDITIONS ARE SUCH THAT IT IS NOT FEASIBLE TO CONCEAL THE DUCTS, PIPING AND RELATED ACCESSORIES, THE MECHANICAL CONTRACTOR SHALL NOTIFY THE ARCHITECT OF THE CONDITION AND SEEK AN ACCEPTABLE REMEDY PRIOR TO THE INSTALLATION OF ANY DUCTS, PIPING AND RELATED ACCESSORIES.

(#) CONSTRUCTION KEY NOTES:

1. ROUTE REFRIGERANT PIPING FROM INDOOR UNIT TO OUTDOOR AC UNIT AND CONNECT ACCORDING TO MANUFACTURER'S INSTALLATION INSTRUCTIONS.
2. ROUTE CONCENTRIC TYPE FLUE EXHAUST THROUGH SIDEWALL ACCORDING TO MANUFACTURER'S INSTALLATION INSTRUCTIONS. ROUTE CONDENSATE PIPING TO NEAREST SANITARY DRAIN.
3. CONNECT RELIEF AIR DUCT TO 18Wx32Hx18D SHEET METAL PLENUM.
4. CONNECT OUTSIDE AIR DUCT TO BOTTOM OF 30Wx32Hx18D OUTSIDE AIR INTAKE PLENUM. EXTEND DUCT UP INTO SHEET METAL PLENUM 4 INCHES. REFER TO OUTDOOR INTAKE PLENUM DETAIL.
5. BALANCE OUTSIDE AIR DAMPER TO CFM INDICATED.
6. CONNECT 24Wx36Hx24D OUTSIDE AIR INTAKE PLENUM TO LOUVER.
7. ROUTE 6" DUCT THROUGH ATTIC SPACE AND OUT SIDEWALL. PROVIDE SIDEWALL EXHAUST VENT CAP WITH HOOD.

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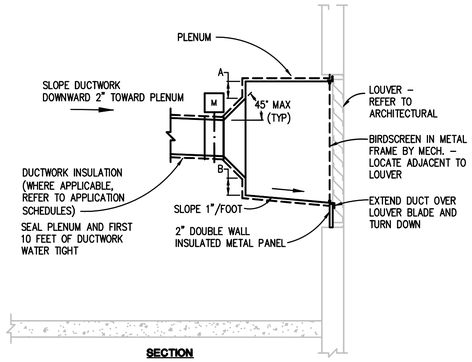
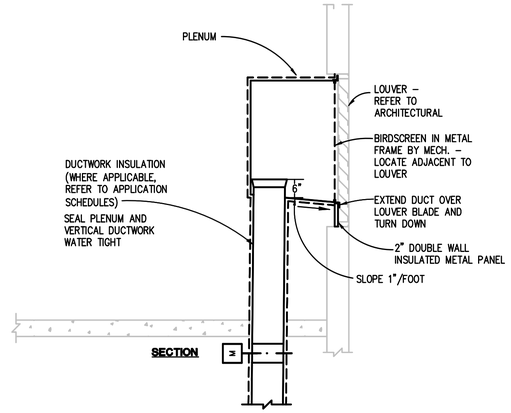
FIRST FLOOR SHEET METAL NEW WORK PLAN

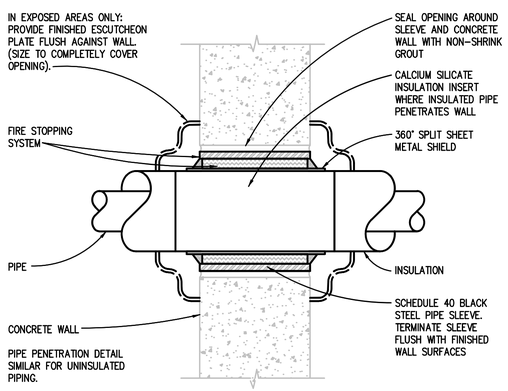
SHEET M4.1



RELIEF PLENUM DETAIL
NO SCALE

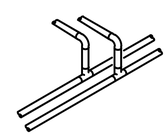


OUTDOOR AIR INTAKE PLENUM DETAIL
NO SCALE



DETAIL INDICATES THE INSTALLATION REQUIREMENTS FOR A FIRE RATED ASSEMBLY. FOR A NON-FIRE RATED ASSEMBLY PACK SLEEVED OPENING WITH INSULATION MATERIAL AND CAULK WITH NON-HARDENING SEALANT.

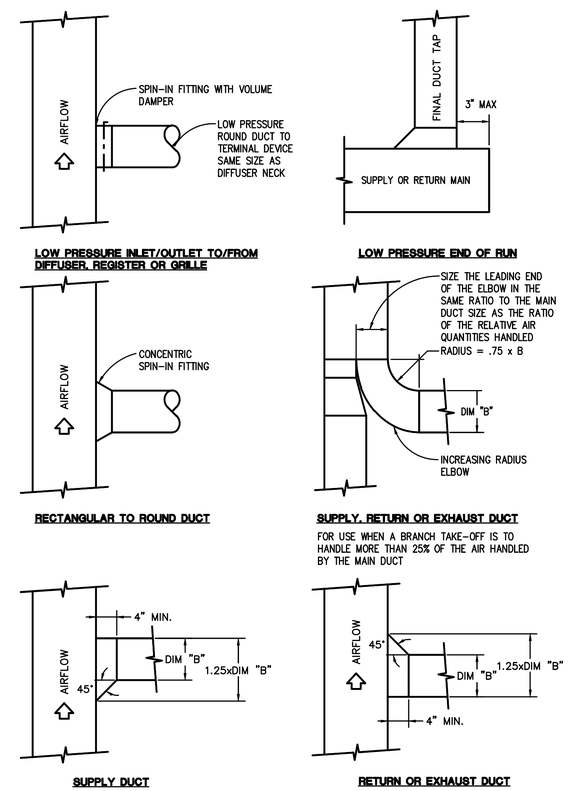
FIRE RATED AND NON-FIRE RATED POURED CONCRETE OR BLOCK WALL PIPE PENETRATION DETAIL
NO SCALE



BRANCH CONNECTION OFF TOP

APPLIES TO THE FOLLOWING SYSTEMS:
DOMESTIC WATER
NATURAL GAS

TYPICAL BRANCH TAKE-OFF CONNECTION PIPING DETAIL
NO SCALE



RECTANGULAR DUCT BRANCH TAKE-OFF DETAILS
NO SCALE

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MECHANICAL DETAILS

SHEET M6.1

DUCT SYSTEM APPLICATION SCHEDULE

AIR SYSTEMS	G90 GALV. SHEET METAL	DOUBLE-WALL LINED G90 GALV. SHEET METAL (SOLID INNER WALL)	DOUBLE-WALL LINED G90 GALV. SHEET METAL (PERF. INNER WALL)	G90 GALV. SHEET METAL WITH 1-INCH LINING	GALVANNEALED SHEET METAL	ALUMINUM	TYPE 304 STAINLESS STEEL	TYPE 316 STAINLESS STEEL	PVC COATED GALV. SHEET METAL (4X1)	PVC COATED GALV. SHEET METAL (1X4)	PVC COATED GALV. SHEET METAL (4X4)	16 GA. CARBON STEEL	ZERO-CLEARANCE PREFABRICATED RANGE HOOD EXHAUST DUCT	FABRIC	DESIGN PRESSURE CLASS (INCHES WG)	SEAL CLASS	MAX. ALLOWABLE LEAKAGE RATE (PERCENT)	KEYED NOTES
	DUCT MATERIAL																	
SUPPLY AIR WITHOUT TERMINAL UNITS	X														+2	A	5	
RETURN AIR WITHOUT TERMINAL UNITS	X														-2	A	5	
EXHAUST AIR WITHOUT TERMINAL UNITS	X														-2	A	5	
OUTSIDE AIR, RELIEF AIR AND EXHAUST AIR PLENUMS ADJACENT TO EXTERIOR LOUVERS		X													+/-6	A	5	

GENERAL NOTES

1. 'X' INDICATES ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED FOR A DUCT SYSTEM, CONTRACTOR MAY SELECT FROM THOSE INDICATED SELECTIONS.
2. 4 X 1 PVC-COATED GALVANIZED STEEL: FACTORY-APPLIED PVC COATINGS SHALL BE 4 MILS (0.10 MM) THICK ON EXTERIOR SHEET METAL SURFACES OF DUCTS AND FITTINGS EXPOSED TO CORROSIVE CONDITIONS AND MINIMUM 1 MIL (0.025 MM) THICK ON INTERIOR SURFACES.
3. 1 X 4 (4 X 1 REVERSE COATED) PVC-COATED GALVANIZED STEEL: FACTORY-APPLIED PVC COATINGS SHALL BE 4 MILS (0.10 MM) THICK ON INTERIOR SHEET METAL SURFACES OF DUCTS AND FITTINGS EXPOSED TO CORROSIVE CONDITIONS AND MINIMUM 1 MIL (0.025 MM) THICK ON EXTERIOR SURFACES.
4. 4 X 4 PVC-COATED GALVANIZED STEEL: FACTORY-APPLIED PVC COATINGS SHALL BE 4 MILS (0.10 MM) THICK ON SHEET METAL SURFACES OF DUCTS AND FITTINGS EXPOSED TO CORROSIVE CONDITIONS AND 4 MILS (0.10 MM) THICK ON OPPOSITE SURFACES.

KEYED NOTES

A. SCREWS, DAMPERS, OR PROJECTIONS OF ANY TYPE ON INTERIOR OF DUCT SURFACE ARE PROHIBITED.
B. DUCT SHALL BE LINED WITHIN 25 FEET UPSTREAM OF FANS.
C. ALL WELDED CONSTRUCTION.

DUCT SYSTEM INSULATION APPLICATION SCHEDULE

	FIBERGLASS BLANKET 0.75 LB/CU FT	FIBERGLASS BLANKET 1.0 LB/CU FT	FIBERGLASS BOARD 2.25 LB/CU FT	FIBERGLASS BOARD 6.0 LB/CU FT	FLEXIBLE ELASTOMERIC	ASTM E2336 2-HOUR FIRE RATED BLANKET	2-HOUR FIRE RATED BLANKET	ALUMINUM	SELF-ADHESIVE (FOR OUTDOOR APPLICATIONS)	KEYED NOTES
	INSULATION MATERIAL & THICKNESS (INCHES)							FIELD APPLIED JACKET MATERIAL		
DUCT SYSTEMS LOCATED INDOORS										
SUPPLY AIR EXCEPT AS NOTED BELOW		1.5								
OUTDOOR, SUPPLY, AND RETURN AIR IN ATTIC ABOVE INSULATED CEILINGS				2						
OUTSIDE AIR AND MIXED AIR, EXCEPT AS NOTED BELOW		1.5								

PLENUMS, DUCTS, AND DUCT ACCESSORIES NOT REQUIRING INSULATION:
- FIBROUS-GLASS DUCTS
- DOUBLE-WALL METAL DUCTS WITH INSULATION OF SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE AND ASHRAE/IESNA 90.1 - 2013
- METAL DUCTS WITH DUCT LINER OF SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE AND ASHRAE/IESNA 90.1 - 2013
- EXPOSED SUPPLY DUCT IN CONDITIONED SPACE SERVED BY THAT SYSTEM
- FABRIC SUPPLY DUCTS
- FACTORY-INSULATED FLEXIBLE DUCTS
- FACTORY-INSULATED PLENUMS AND CASINGS
- FLEXIBLE CONNECTORS
- VIBRATION-CONTROL DEVICES
- FACTORY-INSULATED ACCESS PANELS AND DOORS

GENERAL NOTES

1. 'X' OR THICKNESS IN INCHES INDICATE ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED FOR A DUCT SYSTEM, CONTRACTOR MAY SELECT FROM THOSE INDICATED SELECTIONS.
2. REFER TO METAL DUCT SECTION OF SPECIFICATIONS FOR DUCT LINING AND DOUBLE-WALL INSULATED DUCT.
3. REFER TO HVAC CASINGS SECTION OF SPECIFICATIONS FOR DOUBLE-WALL INSULATED PLENUMS.

PLUMBING PIPING & VALVE APPLICATION SCHEDULE

PIPE SIZE (INCHES)	SOFT COPPER TYPE K	HARD COPPER TYPE L	HARD COPPER TYPE M	CARBON STEEL (SCHED. 40)	CARBON STEEL (STD.)	GALV. STEEL (SCHED. 40)	PEX	PE PIPE	PE SHEATHED CARBON STEEL PIPE	CSST	NO-HUB CISP	PVC TYPE DWV	PP DRAINAGE PIPE	COPPER TYPE DWV	DUCTILE IRON PIPE	SOLDERED	BRAZED	WELDED	THREADED	FLANGED	GROOVED	INSERT & CRIMP	FUSION	PRESSURE-SEAL	MECHANICALLY-FORMED TEE	MECHANICAL JOINT	PUSH-ON-JOINT	SOLVENT WELDED	SOLDERED	FUSION	CISPI HUBLESS	HEAVY-DUTY HUBLESS	BALL	AGA BALL	GENERAL SERVICE BUTTERFLY	LUBRICATED PLUG	GATE	KEYED NOTES
	MATERIAL															PRESSURE CONNECTIONS												GRAVITY DWV CONNECTIONS					ISOLATION VALVES					
ABOVEGROUND DOMESTIC WATER (POTABLE AND NON-POTABLE) ON DISTRIBUTION SIDE OF METER - MIN. WORKING PRESS. & TEMP.: 125 PSIG AT 200 DEG F																																						
UP TO 4		X					ALTERNATE 2									X	X			X	X			X	X								X		X			A
ABOVEGROUND SANITARY WASTE & VENT - MIN. WORKING PRESS.: 10-FOOT HEAD OF WATER																																						
1-1/2 TO 15											X																				X							
UNDERGROUND SANITARY WASTE & VENT - MIN. WORKING PRESS.: 10-FOOT HEAD OF WATER																																						
3 TO 12											X																					X						
3 TO 12												X																X										
ABOVEGROUND COLD CONDENSATE DRAIN - MIN. WORKING PRESSURE: 10 FT. HEAD OF WATER																																						
ALL SIZES			X											X		X	X																					
ABOVEGROUND FUEL GAS - MIN. WORKING PRESS.: 100 PSIG																																						
UP TO 2				X														X	X															X				E

GENERAL NOTES

1. 'X' INDICATES ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED FOR A PIPING SYSTEM, CONTRACTOR MAY SELECT FROM THOSE INDICATED SELECTIONS.
2. DISSIMILAR-METAL PIPING JOINTS: CONSTRUCT JOINTS USING DIELECTRIC FITTINGS COMPATIBLE WITH BOTH PIPING MATERIALS.
   a. NPS 2 AND SMALLER: USE DIELECTRIC NIPPLE/WATERWAY.
   b. NPS 2-1/2 AND LARGER: USE DIELECTRIC FLANGE KITS.
3. USE UNIONS OR FLANGES AT VALVE AND EQUIPMENT CONNECTIONS.
4. PLUMBING EQUIPMENT DRAINS, VENTS, SAFETY VALVE PIPING, BLOWDOWN PIPING AND THE LIKE SHALL BE SAME PIPING MATERIAL AS ASSOCIATED PIPING SYSTEM.
5. GROOVED END VALVES MAY BE USED WITH GROOVED PIPING.

KEYED NOTES

A. GROOVED AND PRESSURE SEALED FITTINGS, JOINTS, AND COUPLINGS, IF INDICATED AS AN ACCEPTABLE SELECTION, MAY BE USED IN ACCESSIBLE LOCATIONS ONLY FOR THIS PIPING SYSTEM.
B. JOINTS ARE NOT PERMITTED ON UNDERGROUND WATER PIPING.
C. USE CAST IRON DRAINAGE PATTERN (DURHAM) FITTINGS.
D. INSTALL IN CONTAINMENT JACKET, REFER TO SPECIFICATIONS.
E. USE STEEL WELDING FITTINGS AND WELDED JOINTS IN PLENUM CEILINGS. VALVES, FLANGES, OR UNIONS ARE PROHIBITED.
F. NO JOINTS ALLOWED UNDERGROUND.

FUEL FIRED DOMESTIC WATER HEATER SCHEDULE

UNIT IDENTIFICATION	STORAGE CAPACITY GALLONS	FUEL TYPE	FIRING RATE MBH	RECOVERY GPH	E.W.T. °F	L.W.T. °F	MODULATION/ CONTROL TYPE	MODEL NUMBER	REMARKS
DWH-1	30	NATURAL GAS	35.5	69	40	140	AUTO	GTN030 35B	

NOTE:
1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBERS ARE LOCHINVAR UNLESS OTHERWISE NOTED.

PLUMBING CONNECTION SCHEDULE

UNIT IDENTIFICATION	CW INCHES	HW INCHES	SAN INCHES	VENT INCHES	REMARKS
WC-1	1 1/2	-	4	2	
LAV-1	1/2	1/2	1 1/2	1 1/2	
SK-1	3/4	3/4	1 1/2	1 1/2	
FD-1	-	-	3	-	
SS-1	3/4	3/4	3	-	

NOTE: INDIVIDUAL WATER LINE BRANCHES, WASTE LINES, VENTS, AND TRAPS FOR CONNECTION TO INDIVIDUAL FIXTURES, FIXTURE FITTINGS, AND SPECIALTIES SHALL BE IN ACCORDANCE WITH THE FOLLOWING SCHEDULE OR AS INDICATED ON DRAWINGS, WHICHEVER IS GREATER.

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MECHANICAL SCHEDULES

SHEET M7.1

FURNACE SCHEDULE

UNIT I.D.	AREA SERVED	SUPPLY FAN				COOLING SECTION – DX								ASSOCIATED AIR CONDITIONING UNIT	HEATING SECTION – GAS FIRED (NATURAL GAS)						FILTER SECTION				MAXIMUM UNIT DIMENSIONS			TOTAL UNIT ELECTRICAL					MODEL NO.	NOTES
		AIRFLOW CFM	MINIMUM OUTSIDE AIR FLOW CFM	E.S.P. IN. W.G.	HP	MIXED AIR		UNIT LEAVING AIR		NET UNIT CAPACITY		NUMBER OF CIRCUITS	REFRIG. TYPE	UNIT I.D.	AIR TEMP.		CAPACITY (MBH)		GAS PRESSURE TO GAS TRAIN IN. W.C.	MIN. NO. OF CAPACITY CONTROL STAGES	TYPE	MERV	AIR PRESS. DROP		LENGTH	HEIGHT	WIDTH	VOLTS	PHASE	MCA	MOP	OPTIONS/ ACCESSORIES		
						E.D.B. °F	E.W.B. °F	L.D.B. °F	L.W.B. °F	TOTAL MBH	SENSIBLE MBH				E.A.T. °F	L.A.T. °F	INPUT	OUTPUT					INITIAL IN. W.G.	FINAL IN. W.G.										
F–1	FLOOR 1	2000	760	0.5	1	80	67	59.48	58.14	56.86	44.32	2	PURON	AC–1	60	96	80	78	4.5–13.6	2	PLEATED	6	0.29	0.5	29.5	63.0675	21	115	1	14..7	20	--	59TP6A080E21--20	

NOTE:
1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBERS ARE CARRIER UNLESS OTHERWISE NOTED
3. DESIGN MINIMUM OUTSIDE AIRFLOW CFM (VENTILATION) LISTED IS BASED ON THE ESTIMATED MAXIMUM OCCUPANT LOAD.
4. MERV DESIGNATES THE "MINIMUM EFFICIENCY REPORTING VALUE" AS EVALUATED UNDER ASHRAE STANDARD 52.2 1999.
5. AIR HANDLING UNIT TOTAL STATIC PRESSURE FOR VARIABLE AIR VOLUME SYSTEMS IS BASED ON THE FILTER DIRTY AIR PRESSURE DROP AND AVERAGE/MIDLIFE FILTER AIR PRESSURE DROP FOR CONSTANT VOLUME SYSTEMS UNLESS NOTED OTHERWISE.
6. UNIT SHALL HAVE A SINGLE POINT ELECTRICAL CONNECTION WITH FACTORY INSTALLED DISCONNECT MEANS, STARTERS, AND CONTROLS.
7. REFER TO VIBRATION ISOLATOR APPLICATION SCHEDULE.

AIR CONDITIONING UNIT SCHEDULE

UNIT IDENTIFICATION	SYSTEM SERVED	TOTAL CAPACITY MBH	EER AT ARI CONDITIONS	REFRIGERANT TYPE	NUMBER OF CIRCUITS	NUMBER OF CONTROL STAGES	CONDENSER		CONDENSER FAN		COMPRESSOR		MODULATION/ CONTROL TYPE	ELECTRICAL					MODEL NUMBER	REMARKS
							DESIGN AMBIENT TEMPERATURE °F	MINIMUM AMBIENT TEMPERATURE °F	QUANTITY	FLA EACH	NUMBER OF COMPRESSORS	TYPE OF COMPRESSOR		VOLTS	PHASE	MCA	MOP	OPTIONS/ ACCESSORIES		
AC–1	F–1	56.86	12.0	PURON	2	2	95	40	1	1.3	1	SCROLL	AUTO	230	1	37.3	60	---	24ACB760A003	NOTE 4

NOTE:
1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBERS ARE CARRIER UNLESS OTHERWISE NOTED.
3. REFER TO AIR HANDLING UNIT/FURNACE DIRECT EXPANSION COOLING COIL SCHEDULE FOR ASSOCIATED COOLING COIL.
4. NON–FUSED DISCONNECT SWITCH PROVIDED BY ELECTRICAL CONTRACTOR.

ENERGY RECOVERY VENTILATOR SCHEDULE

UNIT IDENTIFICATION	SYSTEM SERVED	CAPACITY	SUPPLY AIR SIDE						EXHAUST AIR SIDE				FAN			ELECTRICAL				MODEL NO.	REMARKS
			AIRFLOW CFM	E.D.B ° F	E.W.B. ° F	L.D.B. ° F	L.W.B. ° F	MAX A.P.D. IN. W.G.	AIRFLOW CFM	E.D.B ° F	E.W.B. ° F	MAX A.P.D. IN. W.G.	SUPPLY MOTOR QUANTITY	EXHAUST MOTOR QUANTITY	POWER KW	VOLTS	PHASE	OPTIONS/ ACCESSORIES	FLA		
ERU–1 (SUMMER)	F–1	1.2 TON	760	92.0	73.0	82.0	68.3	0.5	540	75.0	62.6	0.5	2	2	0.373	208	1	---	4.8	HE1XINV	
ERU–1 (WINTER)	F–1	43.0 MBH	760	–2.0	–2.0	40.5	34.7	0.5	540	70.0	54.4	0.5	2	2	0.373	208	1	---	4.8	HE1XINV	

NOTE:
1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBERS ARE RENEWAIRE UNLESS OTHERWISE NOTED.

ELECTRIC FINNED TUBE RADIATION SCHEDULE

UNIT IDENTIFICATION	CAPACITY WATTS	ENTERING AIR TEMP °F	ENCLOSURE			ELEMENT			MODULATION/ CONTROL TYPE	ELECTRICAL					MODEL NUMBER	KEYED NOTES
			TYPE	LENGTH INCHES	HEIGHT INCHES	WIDTH INCHES	HEIGHT INCHES	NUMBER OF TIERS		VOLTS	PHASE	FLA	MOP	OPTIONS/ ACCESSORIES		
FTR–1	500	65	BASEBOARD	27.75	5.875	15.75	2.875	1	T–STAT	120	1	4.2	15	R2	903U00500B	NOTE 3

GENERAL NOTES:
1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBERS ARE INDEECO UNLESS OTHERWISE NOTED.
3. USE WITH HONEYWELL MODEL T822K1018 AS A THERMOSTAT.

SCHEDULES GENERAL NOTES:

TYPICAL FOR ALL SCHEDULE SHEETS:

1. REFER TO ELECTRICAL STANDARD SCHEDULES, ONE LINE DIAGRAM AND PANEL SCHEDULES FOR ADDITIONAL ELECTRICAL INFORMATION
2. PROVIDE THE FOLLOWING FACTORY–WIRED ELECTRICAL OPTIONS/ACCESSORIES WHERE INDICATED IN SCHEDULE:
   - A – NON–FUSED DISCONNECT SWITCH
   - B – UNIT SHALL BE SINGLE POINT ELECTRICAL CONNECTION WITH FACTORY INSTALLED DISCONNECTING MEANS AND ALL REQUIRED STARTERS AND CONTROLS
   - C – SERVICE RECEPTACLE
   - D – FUSED DISCONNECT SWITCH
   - E – COMBINATION STARTER
   - F – UNIT SHALL HAVE (2) SINGLE POINT CONNECTIONS WITH FACTORY INSTALLED DISCONNECTING MEANS AND ALL REQUIRED STARTERS AND CONTROLS. (1) CONNECTION SHALL BE FOR CONDENSING SECTION AND (1) CONNECTION SHALL BE FOR THE REMAINDER OF THE UNIT.
3. FOR MODULATION/CONTROL TYPE COLUMN, "VFC" INDICATES VARIABLE FREQUENCY CONTROLLERS, "AUTO" INDICATES AUTOMATIC OPERATION (CONTROLLED BY TEMPERATURE CONTROLS OR SELF CONTAINED CONTROLS), "MANUAL" INDICATES HAND OPERATION.
4. IF VARIABLE FREQUENCY CONTROLLERS ARE INDICATED TO BE PROVIDED AND ARE NOT INSTALLED INTEGRAL TO THE UNIT, VARIABLE FREQUENCY CONTROLLERS SHALL BE SUPPLIED BY THE MECHANICAL CONTRACTOR (UNLESS OTHERWISE NOTED) AND INSTALLED BY THE ELECTRICAL CONTRACTOR INCLUDING THE LINE SIDE AND LOAD SIDE WIRING TO THE MOTOR AND INCLUDING MISCELLANEOUS STEEL REQUIRED FOR THE SUPPORT AND MOUNTING OF THE VFC. REFER TO FLOOR PLANS FOR LOCATION.
5. WHERE EQUIPMENT IS INDICATED TO HAVE A SINGLE POINT ELECTRICAL CONNECTION, THAT EQUIPMENT SHALL COME COMPLETE WITH FACTORY INSTALLED STARTERS, MOTOR OVERLOAD PROTECTION, CONTACTORS, FUSING AND ALL NECESSARY INTERNAL WIRING AND CONTROLS. PROVIDE A FACTORY MOUNTED UNIT DISCONNECTING MEANS WHERE THE ELECTRICAL CONTRACTOR SHALL MAKE SINGLE POINT CONNECTION. INSTALL PACKAGED EQUIPMENT SUCH THAT THE ELECTRICAL CONNECTION AND CONTROLS ARE ACCESSIBLE AND HAVE CLEARANCES MEETING THE NATIONAL ELECTRICAL CODE.
6. WHERE PACKAGED EQUIPMENT IS PROVIDED, NAMEPLATE MUST INDICATE MAXIMUM OVERCURRENT PROTECTION BY HACR RATED CIRCUIT BREAKERS OR FUSES. IF FUSE PROTECTION ONLY IS INDICATED, PROVIDE A FUSIBLE DISCONNECT AND FUSES WITH THE UNIT.
7. WHERE EQUIPMENT IS DESIGNATED BY MANUFACTURER AND MODEL NUMBER, THIS IS THE BASIS OF DESIGN. IF THE CONTRACTOR ELECTS TO PROVIDE EQUIPMENT BY OTHER SPECIFIED MANUFACTURERS OR PROPOSED ALTERNATE EQUIPMENT BY THE BASIS OF DESIGN MANUFACTURER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REVISIONS TO ELECTRICAL REQUIREMENTS, STRUCTURAL LOADING, OR ARCHITECTURAL APPURTENANCES AND SHALL INCLUDE THE COST OF SUCH REVISIONS IN HIS BID.
8. WHERE EQUIPMENT IS SCHEDULED TO INCLUDE A SERVICE RECEPTACLE, PROVIDE A FACTORY MOUNTED SERVICE RECEPTACLE WITH APPROPRIATE FUSES AND TRANSFORMERS CONNECTED ON THE LINE SIDE OF THE UNIT DISCONNECT. PROVIDE A NAMEPLATE ON THE DISCONNECT SWITCH INDICATING THE PRESENCE OF LIVE POWER TO THE SERVICE RECEPTACLE WHEN THE UNIT DISCONNECT IS IN THE OFF POSITION.
9. SIZE ALL EQUIPMENT FEEDERS BASED ON THE LISTED MOP (MAXIMUM OVERCURRENT PROTECTION). REFER TO THE FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE ON THE ELECTRICAL STANDARD SCHEDULES SHEET.

GRILLE, REGISTER, AND DIFFUSER SCHEDULE

UNIT IDENTIFICATION	TYPE	FACE SIZE	NECK SIZE	FRAME TYPE	ACCESSORY	CONSTRUCTION	FINISH	MODEL NUMBER	REMARKS
S–1	GRILLE	DUCT SIZE PLUS 2"	SEE PLANS	TYPE 5 HEAVY DUTY	--	ALUMINUM	NOTE 2	CT–480	
S–2	GRILLE	DUCT SIZE PLUS 2–1/2"	SEE PLANS	SURFACE MOUNTED	--	STEEL	NOTE 2	300RL	
R–1	GRILLE	DUCT SIZE PLUS 2"	SEE PLANS	TYPE 5 HEAVY DUTY	--	ALUMINUM	NOTE 2	CT–480	
R–2	GRILLE	DUCT SIZE PLUS 2"	SEE PLANS	DUCT MOUNTED	--	STEEL	NOTE 2	33RL	
R–3	GRILLE	DUCT SIZE PLUS 2–1/2"	SEE PLANS	SURFACE MOUNTED	--	STEEL	NOTE 2	350RL	

NOTE:
1. MODEL NUMBERS ARE TITUS UNLESS OTHERWISE NOTED.
2. COLOR AND FINISH AS SELECTED BY ARCHITECT.

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SEAL

REVISIONS

1	ISSUED FOR BIDS	09/30/2019

DATE	PROJ NUMBER	ARCH	PROJ MGR	CADD
09/30/2019	0126-18-0020	C O	EMG	AFL

City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

MECHANICAL SCHEDULES

SHEET M7.2

PLUMBING FIXTURE SCHEDULE

UNIT IDENTIFICATION	WATER CLOSETS			TOILET SEAT MANUFACTURER/ MODEL	MANUFACTURER/MODEL	REMARKS
	FIXTURE MATERIAL	MOUNTING STYLE	CONSUMPTION GALLONS/ FLUSH			
WC-1	VITREOUS CHINA	FLOOR	1.28	OLSONITE	KOHLER TRESHAM/ K-3950-RA	

APPROVED MANUFACTURERS:
WATER CLOSETS – AMERICAN STANDARD, FERGUSON, KOHLER, SLOAN, ZURN
TOILET SEATS – BEMIS, CENTOCO, CHURCH, FERGUSON, OLSONITE, SANDERSON, ZURN

UNIT IDENTIFICATION	LAVATORIES/SINKS					FAUCET MANUFACTURER/ MODEL	MANUFACTURER/MODEL	REMARKS
	FIXTURE MATERIAL	MOUNTING STYLE	BOWL DIMENSIONS L x W x D INCHES	NUMBER OF BOWLS	OVERALL DIMENSIONS L x W x D INCHES			
LAV-1	VITREOUS CHINA	WALL HUNG	18" x 12" x 6 1/2"	1	22" x 18" x 7 1/2"	KOHLER KELSTON/ K-13491-4, POLISHED CHROME	KOHLER PINOIR/ K-2035-8	
SK-1	STAINLESS STEEL	UNDERMOUNT	13 1/2" x 16" x 10"	2	30 3/4" x 18 1/2" x 10"	KOHLER SIMPLICE / K-596, POLISHED CHROME	ELKAY/ELUH311810PD	
SS-1	ENAMEL STEEL	FLOOR MOUNT	20-1/8" x 17-3/4" x 11-5/8"	1	24" x 20" x 13-3/8"	INCLUDED WITH SERVICE SINK	FIAT PRODUCTS / FL-7	

APPROVED MANUFACTURERS:
LAVATORIES – AMERICAN STANDARD, KOHLER, SLOAN, ZURN
SINKS – ELKAY, JUST, MOEN
FAUCETS – AMERICAN STANDARD, CHICAGO, KOHLER, SLOAN, ZURN

NOTE:
1. ALL PLUMBING FIXTURES, EQUIPMENT, TRIM AND FITTINGS SHALL COMPLY WITH LOCAL, STATE AND FEDERAL REGULATIONS AND CODES, INCLUDING, BUT NOT LIMITED TO, WATER AND ENERGY CONSERVATION CODES. THE SCHEDULED AND/OR SPECIFIC PLUMBING FIXTURES AND EQUIPMENT REPRESENT THE MINIMUM CRITERIA AND SHALL BE THE BASIS FOR THE CONTRACTOR'S BASE BID. IF THE SCHEDULED OR SPECIFIED FIXTURES OR EQUIPMENT DO NOT COMPLY WITH GOVERNING CODES OR REGULATIONS IN ALL RESPECTS, THE CONTRACTOR SHALL PROVIDE AN ALTERNATE BID FOR COMPLYING FIXTURES, EQUIPMENT, TRIM OR FITTINGS. THE ABSENCE OF AN ALTERNATE BID SHALL BE CONSTRUED TO MEAN THAT THE CONTRACTOR'S BID INCLUDES ALL COSTS NECESSARY TO MEET ALL REGULATIONS AND CODES.

BATHROOM EXHAUST FAN SCHEDULE

UNIT IDENTIFICATION	SYSTEM SERVED	AIRFLOW CFM	T.S.P. IN. W.G.	MOTOR	MODULATION/ CONTROL TYPE	ELECTRICAL			MODEL NUMBER	REMARKS
				WATTS		VOLTS	PHASE	OPTIONS/ ACCESSORIES		
EF-1	TOILET 108	80	0.1	23.3	MANUAL	120	1	---	QTXEN080	
EF-2	TOILET 202	80	0.1	23.3	MANUAL	120	1	---	QTXEN080	

NOTE:
1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBERS ARE NUTONE UNLESS OTHERWISE NOTED.

ELECTRIC CENTRIFUGAL FAN CABINET UNIT HEATER SCHEDULE

UNIT IDENTIFICATION	CAPACITY MBH	AIR			FAN		DIMENSIONS			RECESS DEPTH INCHES	MODULATION/ CONTROL TYPE	ELECTRICAL					MODEL NUMBER	REMARKS
		AIRFLOW CFM	E.D.B. °F	L.D.B. °F	R.P.M.	TOTAL KW	LENGTH INCHES	HEIGHT INCHES	DEPTH INCHES			VOLTS	PHASE	FLA	MOP	OPTIONS/ ACCESSORIES		
ECUH-1	6.143	160	50	107	1060	1.5	16-1/16	22-3/4	5-7/8	4-5/16	NOTE 3	120	1	12.9	20	R2	933U01500B	
ECUH-2	6.143	160	50	107	1060	1.5	16-1/16	22-3/4	5-7/8	4-5/16	NOTE 3	120	1	12.9	20	R2	933U01500B	

NOTE:
1. REFER TO SCHEDULES GENERAL NOTES.
2. MODEL NUMBERS ARE INDEECO UNLESS OTHERWISE NOTED.
3. 24V RELAY WITH TRANSFORMER TO THERMOSTAT ON WALL.

ABOVEGROUND PLUMBING PIPE & ACCESSORY INSULATION APPLICATION SCHEDULE

	INSULATION MATERIAL & THICKNESS (INCHES)							FIELD-APPLIED JACKET MATERIAL			
	FLEXIBLE ELASTOMERIC	FIBERGLASS	MINERAL WOOL	POLYISOCYANURATE	PHENOLIC	CELLULAR GLASS	CALCIUM SILICATE	ALUMINUM	STAINLESS STEEL	PVC	KEYED NOTES
INDOOR PIPE SYSTEM AND SIZE (INCHES)											
DOMESTIC COLD WATER	1	1						X		X	A
DOMESTIC HOT WATER SUPPLY & RETURN 140 DEG F AND LESS:											
NPS 1-1/4 AND SMALLER	1	1						X		X	A
NPS 1-1/2 AND LARGER	1.5	1.5						X		X	A

UNLESS OTHERWISE INDICATED OR SCHEDULED, DO NOT INSULATE THE FOLLOWING:
FIRE SUPPRESSION PIPING
UNDERGROUND PIPING
LABORATORY GAS AND VACUUM PIPING
MEDICAL GAS AND VACUUM PIPING
FUEL GAS PIPING
FUEL OIL PIPING

GENERAL NOTES

1. 'X' OR THICKNESS IN INCHES INDICATES ACCEPTABLE SELECTION. IF MORE THAN ONE SELECTION IS INDICATED FOR A SYSTEM, CONTRACTOR MAY SELECT
FROM THOSE INDICATED SELECTIONS.
2. INSULATE PIPING WITHIN AIR HANDLING EQUIPMENT THE SAME AS INDOOR PIPING. PROVIDE ALUMINUM OR STAINLESS STEEL JACKET.

KEYED NOTES

A. PROVIDE FIELD APPLIED JACKET FOR PIPING EXPOSED IN EQUIPMENT ROOMS, STORAGE ROOMS, JANITORS CLOSETS, RECEIVING ROOMS, TEST AREAS, CIRCULATION AREAS AND SUCH AREAS SUBJECT TO DAMAGE, WITHIN 10 FEET (3 METERS) OF FINISHED FLOOR.
B. PROVIDE MANUFACTURER'S RECOMMENDED PROTECTIVE COATING FOR FLEXIBLE ELASTOMERIC THERMAL INSULATION.

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City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

MECHANICAL SCHEDULES

SHEET M7.3

ELECTRICAL SYMBOL LIST

(NOTE: SOME SYMBOLS AND ABBREVIATIONS SHOWN MAY NOT APPLY TO THIS PROJECT)

SYMBOL	DESCRIPTION
FX	FIXTURE TYPE
	LIGHTING FIXTURE
	DIRECT/INDIRECT LIGHTING FIXTURE
	EMERGENCY FIXTURE
	EMERGENCY FIXTURE
	NIGHT LIGHTING FIXTURE
FX-NL	LIGHTING FIXTURE
	WALL MOUNTED LIGHTING FIXTURE
	LIGHTING FIXTURE
	DIRECTIONAL LIGHTING FIXTURE
	PENDANT LIGHTING FIXTURE
	WALL SCONCE
	LIGHTING TRACK
	TRACK LIGHTING FIXTURE
	POLE MOUNTED LIGHTING FIXTURE
	POLE MOUNTED LIGHTING FIXTURE – POST TOP
	BOLLARD LIGHTING FIXTURE
	EMERGENCY LIGHTING UNIT
	EXIT LIGHTING FIXTURE WITH DIRECTIONAL ARROWS (SHADED AREA INDICATES FACE)
	EXIT LIGHTING FIXTURE WITH DIRECTIONAL ARROWS (SHADED AREA INDICATES FACE)
	EXIT LIGHTING FIXTURE – WALL MOUNTED
ELTD	EMERGENCY LOAD TRANSFER DEVICE
ALCR	AUTOMATIC LOAD CONTROL RELAY
LC	LIGHTING CONTROL DEVICE – REFER TO LIGHTING CONTROL SCHEDULE
123	ROOM CONTROL DESIGNATION – REFER TO LIGHTING CONTROL SCHEDULE
S	SINGLE POLE TOGGLE SWITCH
S2	TWO POLE TOGGLE SWITCH
S3	3 WAY TOGGLE SWITCH
S4	4 WAY TOGGLE SWITCH
K	KEY OPERATED SWITCH
K3	3 WAY KEY OPERATED SWITCH
K4	4 WAY KEY OPERATED SWITCH
D	DIMMER SWITCH
D3	3 WAY DIMMER SWITCH
DO	DIMMER OCCUPANCY SENSOR SWITCH
DL	LOW VOLTAGE DIMMER SWITCH
SP	PILOT SWITCH
	TRACK
	TRACK
	TRACK LIGHTING FIXTURE
	TRACK LIGHTING FIXTURE
	TRACK LIGHTING FIXTURE
	TRACK LIGHTING FIXTURE
	DIRECTIONAL LIGHTING FIXTURE
	DIRECTIONAL LIGHTING FIXTURE
	RECESSED LIGHTING FIXTURE
	RECESSED LIGHTING FIXTURE
	MULTIPLES LIGHTING FIXTURE
	STEP OR WALL RECESSED LIGHTING FIXTURE
	STEP OR WALL WALL RECESSED LIGHTING FIXTURE
	LED STRIP LIGHTING
	PENDANT LINEAR LIGHTING FIXTURE
	LINEAR LIGHTING FIXTURE
	SURFACE MOUNTED LINEAR LIGHTING FIXTURE
	UNDER CABINET LIGHTING FIXTURE
	UNDER CABINET LIGHTING FIXTURE
	DECORATIVE LIGHTING FIXTURE
	DECORATIVE LIGHTING FIXTURE
	DECORATIVE LIGHTING FIXTURE
	WALL SCONCE
	WALL SCONCE
	WALL MOUNTED LIGHTING FIXTURE
	WALL MOUNTED LIGHTING FIXTURE
	WALL MOUNTED LIGHTING FIXTURE
	WALL MOUNTED LIGHTING FIXTURE

SYMBOL	DESCRIPTION
TWC	TWO-WAY COMMUNICATION SYSTEM CALL STATION
TWCD	TWO-WAY COMMUNICATION SYSTEM AUTO DIALER
TWCA	TWO-WAY COMMUNICATION SYSTEM ANNUNCIATOR & COMMUNICATION PANEL
TWCP	TWO-WAY COMMUNICATION SYSTEM POWER SUPPLY WITH BATTERY BACK-UP
TWCDP	TWO-WAY COMMUNICATION SYSTEM AUTO DIALER POWER SUPPLY WITH BATTERY BACK-UP
RGP	REMOTE GENERATOR ANNUCIATOR PANEL
ATS	AUTOMATIC TRANSFER SWITCH
UPS	UN-INTERRUPTABLE POWER SUPPLY
CSX	LOW VOLTAGE CONTROL STATION "X" INDICATES TYPE
	SINGLE/DUPLEX RECEPTACLE
	SINGLE/DUPLEX RECEPTACLE CONTROLLED BY AUTOMATIC CONTROL DEVICE/SYSTEM
	QUAD RECEPTACLE
	ABOVE COUNTER DUPLEX RECEPTACLE (SIMILAR FOR TAMPER RESISTANT, QUADS, EMERGENCY, USB AND GFCI RECEPTACLES)
	DUPLEX RECEPTACLE-GROUND FAULT CIRCUIT INTERRUPTER
	DUPLEX EMERGENCY RECEPTACLE
	TAMPER RESISTANT RECEPTACLE
	QUAD TAMPER RESISTANT RECEPTACLE
	ABOVE COUNTER DUPLEX TAMPER RESISTANT RECEPTACLE
	DUPLEX UPS RECEPTACLE
	USB RECEPTACLE
	4 PORT USB CHARGING STATION
	CEILING MOUNTED DUPLEX RECEPTACLE
	POWER POLE
	SPECIAL RECEPTACLE – REFER TO ELECTRICAL STANDARD SCHEDULES
	MULTI-OUTLET RACEWAY
"X"	MULTI-SERVICE DROP SEE ELECTRICAL DETAILS AND DIAGRAMS SHEET "X" INDICATES TYPE
PTX	POKE-THROUGH ASSEMBLY "X" INDICATES TYPE
FBX	FLOOR SERVICE FITTING "X" INDICATES TYPE
AFX	ACCESS FLOOR SERVICE FITTING "X" INDICATES TYPE
RX	CORD REEL "X" INDICATES TYPE
S S	DUAL SWITCHING FOR INNER/OUTER LAMPS OF FLUORESCENT LIGHT FIXTURES
S3 S3	3-WAY DUAL SWITCHING FOR INNER/OUTER LAMPS OF FLUORESCENT LIGHT FIXTURES
S4 S4	4-WAY DUAL SWITCHING FOR INNER/OUTER LAMPS OF FLUORESCENT LIGHT FIXTURES
ST	DIGITAL TIME SWITCH
SI	ILLUMINATED TOGGLE SWITCH FOR CONTROL OF LIGHTING ON CRITICAL POWER-ILLUMINATED WHEN SWITCH IS IN "OFF" POSITION
SL	LOW VOLTAGE SWITCH
SO	OCCUPANCY SENSOR
SO2	OCCUPANCY SENSOR — REFER TO ELECTRICAL STANDARD SCHEDULES
OS X	OCCUPANCY SENSOR "X" INDICATES TYPE

SYMBOL	DESCRIPTION
CP	CONTROL PANEL
	MOTOR
VFC	VARIABLE FREQUENCY CONTROLLER.
	MANUAL CONTROLLER
	MAGNETIC CONTROLLER
	COMBINATION MAGNETIC CONTROLLER
	NON-FUSIBLE DISCONNECT SWITCH
	FUSIBLE DISCONNECT SWITCH
CB	ENCLOSED CIRCUIT BREAKER
	PUSH BUTTON STATION
	JUNCTION BOX
	HARD WIRE POWER CONNECTION
DP	AUTOMATIC DOOR CONTROLLER
PP	AUTOMATIC DOOR PUSH PAD OPERATOR
	GROUND ROD
	GROUND CONNECTION
X	CONDUIT SLEEVE WITH BUSHINGS LENGTH AS REQUIRED "X" INDICATES CONDUIT SIZE
	CONDUIT UP
	CONDUIT DOWN
	EMPTY BOX FOR FUTURE TELECOMMUNICATION OUTLET
	ABOVE COUNTER EMPTY BOX FOR FUTURE TELECOMMUNICATION OUTLET
	EMPTY BOX FOR FUTURE CEILING MOUNTED TELECOMMUNICATION OUTLET
X	TELECOMMUNICATION OUTLET "X" INDICATES TYPE
X	ABOVE COUNTER TELECOMMUNICATION OUTLET "X" INDICATES TYPE
X	TELECOMMUNICATION CEILING MOUNTED OUTLET "X" INDICATES TYPE
	REFER TO ELECTRICAL STANDARD SCHEDULES
	TELECOMMUNICATION BACKBOARD
TGB	TELECOMMUNICATION GROUNDING BUS BAR
TMGB	TELECOMMUNICATION MAIN GROUNDING BUS BAR
IC	INTERCOM OUTLET
S	SPEAKER
S	SPEAKER – WALL MOUNTED
MIC	MICROPHONE
VC	VOLUME CONTROL/STATION SELECTOR
B	SIGNALING BELL
	SINGLE FACE CLOCK – CEILING MOUNTED
	SINGLE FACE CLOCK – WALL MOUNTED
	DOUBLE FACE CLOCK – CEILING MOUNTED
S	DOUBLE FACE COMBINATION CLOCK/SPEAKER CEILING MOUNTED
	DOUBLE FACE CLOCK – WALL MOUNTED
S	DOUBLE FACE COMBINATION CLOCK/SPEAKER WALL MOUNTED
T/C	TIME CLOCK
C	CONTACTOR
P	PHOTOCELL
TT	TWIST TIMER

SYMBOL	DESCRIPTION
	SECURITY CAMERA
MD	MOTION DETECTOR
K	SECURITY KEY SWITCH
DC	DOOR CONTACT
KP	KEY PAD
CR	ACCESS CONTROL STATION
DB	DURESS PUSH BUTTON STATION
DE	DELAYED EGRESS
REX	REQUEST TO EXIT STATION
	CIRCUIT BREAKER
	DRAWOUT CIRCUIT BREAKER MANUALLY/ OPERATED
	DRAWOUT CIRCUIT BREAKER ELECTRICALLY/ OPERATED
	SWITCH
	AUTOMATIC OR MANUAL TRANSFER SWITCH
	FUSE
	TRANSFORMER
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	LIGHTNING ARRESTOR
X	PANELBOARD "X" INDICATES PANELBOARD NAME
	GROUND
	STRESS CONE TERMINATION
K	SECURITY KEY INTERLOCK
G	ENGINE GENERATOR
M	UTILITY METER
EMU	ELECTRONIC METERING UNIT
A	AMMETER
V	VOLTMETER
AS	AMMETER SWITCH
VS	VOLTMETER SWITCH
SPD	SURGE PROTECTIVE DEVICE
CR	CONTROL RELAY
TDR	TIME DELAY RELAY
	THERMAL OVERLOAD RELAY
	NORMALLY OPEN CONTACTS
	NORMALLY CLOSED CONTACTS
	N.O. PUSH BUTTON SINGLE CIRCUIT
	N.C. PUSH BUTTON SINGLE CIRCUIT
X-X	CABLE VAULT "X-X" INDICATES TYPE
	BRANCH CIRCUIT PANELBOARD
	LOAD CENTER
	MOTOR CONTROL CENTER
T	TRANSFORMER
	DISTRIBUTION PANEL
GB	GROUND BUS
PB	PLUG IN BUSWAY
FB	FEEDER BUSWAY

SYMBOL	DESCRIPTION
F	MANUAL FIRE ALARM BOX
SD	SMOKE DETECTOR
DD	DUCT SMOKE DETECTOR
CO	CARBON MONOXIDE DETECTOR
RT	REMOTE TEST STATION (FOR DUCT DETECTOR)
TD	THERMAL DETECTOR
BD	PROJECTED BEAM DETECTOR
F	FIRE ALARM BELL
F	FIRE ALARM AUDIBLE NOTIFICATION APPLIANCE
XX	FIRE ALARM VISUAL NOTIFICATION APPLIANCE "XX" INDICATES CANDELA RATING IF NO RATING SHOWN, APPLIANCE IS 15cd
XX	FIRE ALARM COMBINATION VISUAL/ AUDIBLE "XX" INDICATES CANDELA RATING IF NO RATING SHOWN, APPLIANCE IS 15cd
F XX	FIRE ALARM COMBINATION VISUAL/ AUDIBLE NOTIFICATION APPLIANCE- CEILING MOUNTED "XX" INDICATES CANDELA RATING IF NO RATING SHOWN, APPLIANCE IS 15cd
XX	FIRE ALARM VISUAL NOTIFICATION APPLIANCE CEILING MOUNTED "XX" INDICATES CANDELA RATING IF NO RATING SHOWN, APPLIANCE IS 15cd
F	FIRE ALARM AUDIBLE NOTIFICATION APPLIANCE – CEILING MOUNTED
F	FIREFIGHTERS PHONE JACK
FACP	FIRE ALARM CONTROL PANEL
FAA	FIRE ALARM ANNUNCIATOR PANEL
NAC	NOTIFICATION APPLIANCE CIRCUIT EXTENDER PANEL
IM	ADDRESSABLE MONITORING MODULE
CM	ADDRESSABLE CONTROL MODULE
TS	TAMPER SWITCH
FS	FLOW SWITCH
DR	MAGNETIC DOOR RELEASE

ELECTRICAL DRAWING INDEX

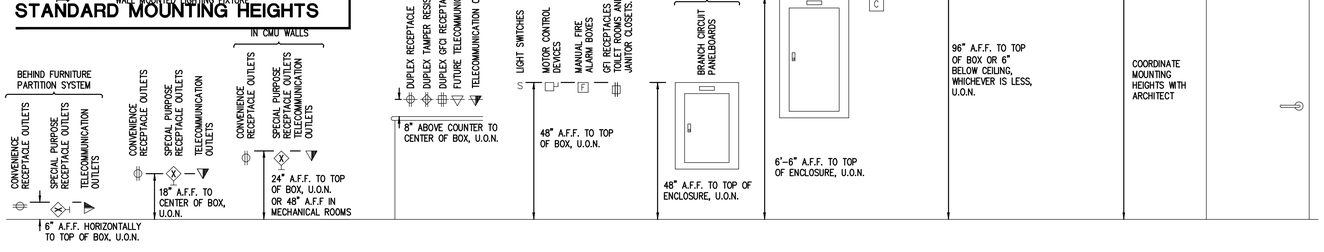
ELECTRICAL ABBREVIATION LIST

ABBREVIATION	DESCRIPTION
A	AMPERES
AF	AMPERES FRAME (BREAKER RATING)
AFCI	ARC FAULT CIRCUIT INTERRUPTER
A.F.F.	ABOVE FINISH FLOOR
AIC	AMPS INTERRUPTING CAPACITY
AL	AUDIENCE LEFT
AR	AUDIENCE RIGHT
AT	AMPERES TRIP (BREAKER SETTING)
ATS	AUTOMATIC TRANSFER SWITCH
AUX	AUXILIARY
BKR	BREAKER
BPS	BOLTED PRESSURE SWITCH
C	CONDUIT
CB	CIRCUIT BREAKER
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
CKT	CIRCUIT
CT	CURRENT TRANSFORMER
DEMO	DEMOLITION
DIM	DIMENSION
DISC	DISCONNECT
DP	DISTRIBUTION PANEL
DS	DOWNSTAGE
DWG	DRAWING
EBU	EMERGENCY BATTERY UNIT
EC	ELECTRICAL CONTRACTOR
ELEC	ELECTRICAL
EM/ EMERG	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
EO	ELECTRICALLY OPERATED
EPO	EMERGENCY POWER OFF
EWC	ELECTRIC WATER COOLER
EXIST	EXISTING
FA	FIRE ALARM
FLA	FULL LOAD AMPS
FLR	FLOOR
FOH	FRONT OF HOUSE
FSEC	FOOD SERVICE EQUIPMENT CONTRACTOR
FU	FUSE
G/GRD/EG	GROUND
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFP	GROUND FAULT PROTECTION
HOA	HAND-OFF-AUTO
HP	HORSEPOWER
HV	HIGH VOLTAGE
HZ	HERTZ
IG	ISOLATED GROUND
JB	JUNCTION BOX

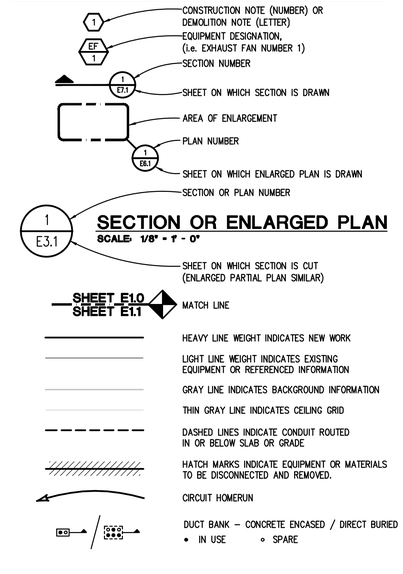
ABBREVIATION	DESCRIPTION
KV	KILOVOLT
KVA	KILOVOLT – AMPERES
KW	KILOWATT
KWH	KILOWATT – HOURS
LA	LIGHTNING ARRESTOR
LP	LIGHTING PANEL
LDP	LIGHTING DISTRIBUTION PANEL
MAX	MAXIMUM
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MDP	MAIN DISTRIBUTION PANEL
MECH	MECHANICAL
MIN	MINIMUM
MISC.	MISCELLANEOUS
MLO	MAIN LUGS ONLY
MTD	MOUNTED
MTG	MOUNTING
MTR	MOTOR
N	NEUTRAL
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NF	NON-FUSIBLE
NIC	NOT IN CONTRACT
NIL	NIGHT LIGHT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OC	ON CENTER
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED

ABBREVIATION	DESCRIPTION
P	POLE
PB	PUSHBUTTON STATION
PH	PHASE
PT	POTENTIAL TRANSFORMER
PDP	POWER DISTRIBUTION PANEL
RECEPT.	RECEPTACLE
RDP	RECEPTACLE DISTRIBUTION PANEL
RP	RECEPTACLE PANEL
RSC	RIGID STEEL CONDUIT
SCHED	SCHEDULE
SW	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
TB	TERMINAL BOX
TELECOM	TELECOMMUNICATIONS
TR	TAMPER RESISTANT
TTB	TELEPHONE TERMINAL BACKBOARD
TYP	TYPICAL
U.O.N.	UNLESS OTHERWISE NOTED
US	UPSTAGE
V	VOLTS
W	WIRE OR WATTS
WG	WIRE GUARD
WP	WEATHERPROOF
XFMR	TRANSFORMER
XP	EXPLOSION PROOF
(E)	EXISTING
(R)	RELOCATED

STANDARD MOUNTING HEIGHTS



STANDARD METHODS OF NOTATION



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1	ISSUED FOR BIDS	09/30/2019

DATE	PROJ NUMBER	ARCH	PROJ MGR	CADD
09/30/2019	0128-18-0020	C.O.	EMG	EMG

City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

ELECTRICAL STANDARDS AND DRAWING INDEX

SHEET E0.1

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FEEDER AND BRANCH CIRCUIT SIZING SCHEDULE - GENERAL PURPOSE

	OVERCURRENT DEVICE RATING (AMPERES)	COPPER CONDUCTORS: WIRE SIZE (AWG OR KCMIL) PHASE & NEUTRAL	COPPER CONDUCTORS: WIRE SIZE (AWG OR KCMIL) GROUND	COPPER CONDUCTORS: CONDUIT SIZE SINGLE PHASE 2 WIRE+G (1PH, 1N, 1G)	COPPER CONDUCTORS: CONDUIT SIZE SINGLE PHASE 3 WIRE+G (2PH, 1N, 1G)	COPPER CONDUCTORS: CONDUIT SIZE THREE PHASE 3 WIRE+G (3PH, 1G)	COPPER CONDUCTORS: CONDUIT SIZE THREE PHASE & NEUTRAL 4 WIRE+G (3PH, 1N, 1G)	ALUMINUM CONDUCTORS: WIRE SIZE (AWG OR KCMIL) PHASE & NEUTRAL	ALUMINUM CONDUCTORS: WIRE SIZE (AWG OR KCMIL) GROUND	ALUMINUM CONDUCTORS: CONDUIT SIZE SINGLE PHASE 3 WIRE+G (2PH, 1N, 1G)	ALUMINUM CONDUCTORS: CONDUIT SIZE THREE PHASE 3 WIRE+G (3PH, 1G)	ALUMINUM CONDUCTORS: CONDUIT SIZE THREE PHASE & NEUTRAL 4 WIRE+G (3PH, 1N, 1G)
	15-20	12	12	3/4"	3/4"	3/4"	3/4"	NOT ACCEPTABLE				
	25-30	10	10	3/4"	3/4"	3/4"	3/4"					
	35-40	8	10	3/4"	3/4"	3/4"	3/4"					
*	45-50	8 (6)	10	3/4"	3/4"	3/4"	3/4"					
*	60	6 (4)	10	3/4" (1")	3/4" (1")	3/4" (1")	1" (1 1/4")					
	70	4	8	1"	1 1/4"	1 1/4"	1 1/4"					
*	80	4 (3)	8	1"	1 1/4"	1 1/4"	1 1/4"					
*	90-100	3 (2)	8	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1	6	1 1/2"	1 1/4"	1 1/2"
*	110	2 (1)	6	–	1 1/4"	1 1/4"	1 1/4" (1 1/2")	1/0	4	–	1 1/2"	2"
*	125	1 (1/0)	6	–	1 1/4" (1 1/2")	1 1/4" (1 1/2")	1 1/2"	2/0	4	–	1 1/2"	2"
	150	1/0	6	–	1 1/2"	1 1/2"	1 1/2"	3/0	4	–	2"	2 1/2"
	175	2/0	6	–	2"	2"	2"	4/0	4	–	2"	2 1/2"
	200	3/0	6	–	2"	2"	2 1/2"	250	4	–	2"	3"
	225	4/0	4	–	2"	2"	2 1/2"	300	2	–	2 1/2"	3"
	250	250	4	–	2 1/2"	2 1/2"	2 1/2"	350	2	–	2 1/2"	3"
	300	350	4	–	2 1/2"	2 1/2"	3"	500	2	–	3"	3 1/2
	350	500	3	–	3"	3"	3"	2-4/0	2-1/0	–	2-2"	2-2"
	400	500	3	–	3"	3"	3"	2-250	2-1/0	–	2-2"	2-2 1/2"
	450	2-4/0	2-2	–	2-2"	2-2"	2-2 1/2"	2-300	2-1/0	–	2-2 1/2"	2-3"
	500	2-250	2-2	–	2-2 1/2"	2-2 1/2"	2-2 1/2"	2-350	2-1/0	–	2-2 1/2"	2-3"
	600	2-350	2-1	–	2-2 1/2"	2-3"	2-3"	2-500	2-2/0	–	2-3"	2-3 1/2"
	700	2-500	2-1/0	–	2-3"	2-3"	2-3"	2-600	2-3/0	–	2-3"	2-3 1/2"
	800	2-500	2-1/0	–	2-3"	2-3"	2-3 1/2"	3-400	3-3/0	–	3-3"	3-3 1/2"
	1000	3-400	3-2/0	–	3-3"	3-3"	3-3"	3-600	3-4/0	–	3-3 1/2"	3-3 1/2"
	1200	3-600	3-3/0	–	3-3 1/2"	3-3 1/2"	3-3 1/2"	4-500	4-250	–	4-3"	4-3 1/2"
	1600	4-600	4-4/0	–	4-3 1/2"	4-3 1/2"	4-3 1/2"	5-600	5-350	–	5-3 1/2"	5-4"
	2000	5-600	5-250	–	5-3 1/2"	5-3 1/2"	5-3 1/2"	6-600	6-400	–	6-3 1/2"	6-4"

* = SEE NOTE 4

NOTES:

1. CONTRACTOR TO SIZE FEEDERS AND BRANCH CIRCUITS BASED ON THIS SCHEDULE AND OVER CURRENT DEVICE SIZE, UNLESS NOTED OTHERWISE.
2. CONTRACTOR MAY COMBINE 20A CIRCUITS AS NOTED IN SPECIFICATION.
3. CONDUCTORS ARE BASED ON THHN/THWN UP TO AND INCLUDING #4/0. LARGER THAN #4/0 ARE BASED ON TYPE XHHW.
4. CONDUCTORS ARE BASED ON 90°C, 600V. INSULATED COPPER WIRE APPLIED AT 75°C FOR TERMINATION RATED 60/75°C OR 75°C. FOR TERMINATION RATED AT 60°C, USE CONDUCTORS AND CONDUIT SIZES INDICATED IN PARENTHESES.
5. CONDUIT SIZES ARE VALID FOR EMT OR RGS. CONDUIT SIZES SHALL BE ADJUSTED AS REQUIRED FOR OTHER TYPES OF CONDUIT.
6. ELECTRICAL CONTRACTOR TO COORDINATE WITH MECHANICAL CONTRACTOR AND PROVIDE REQUIRED WIRE SIZES TO ACCOMMODATE MECHANICAL EQUIPMENT LUG SIZES.
7. SIZE OF DISCONNECT SWITCH LOCATED AT EQUIPMENT SHALL BE SIZED BASED UPON OVERCURRENT PROTECTION OF THAT DEVICE.
8. OBTAIN APPROVAL FROM ENGINEER PRIOR TO INSTALLING DIFFERENT SIZE/QUANTITY OF CONDUCTORS TO OBTAIN AN EQUIVALENT AMPACITY.
9. SPLICE FROM ALUMINUM TO COPPER PRIOR TO ENTERING EQUIPMENT LISTED FOR USE WITH COPPER CONDUCTORS ONLY OR USE COPPER CONDUCTORS FOR THE ENTIRE LENGTH OF FEEDER.

FLOOR SERVICE FITTING ASSEMBLY SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER (SEE NOTE #2)	DEVICE CONFIGURATION	FLANGE/COVER MATERIAL & COLOR	SERVICE PLATE TYPE	MINIMUM DEPTH	MAXIMUM CONDUIT
FB1	POWER SINGLE GANG PLASTIC FLOOR BOX FLUSH SERVICE, WOOD FLOOR INSTALLATION, RESIDENTIAL, GANGABLE, 1 DUPLEX WITH FLIP DOOR	WIREMOLD 880 MP2	D	BS AL	FR	3 1/2"	2"

NOTES:

1. PROVIDE 1 1/4"C. FROM EACH TELECOM FLOOR BOX (GANG) TO ACCESSIBLE LOCATION IN CEILING.
2. OTHER ACCEPTABLE MANUFACTURERS ARE STEEL CITY, OR HUBBELL-RACO.
3. ALL PRODUCTS IN THIS SCHEDULE SHALL MEET AND EXCEED THE UL514A or UL514C SCRUB WATER EXCLUSION REQUIREMENT.
4. COORDINATE ALL TELECOM AND A/V OUTLETS WITH COMMUNICATIONS AND A/V CONTRACTORS.
5. FLANGE/COVER MATERIAL & COLOR TO BE SELECTED DURING SUBMITTALS.

ABBREVIATIONS:

PF = PARTITION FEED
D = DUPLEX RECEPTACLE
T = 2 TELECOM OPENINGS

BS = BRASS
AL = ALUMINUM
BK = BLACK
GY = GRAY (CONCRETE)
BZ = BRONZE
NK = NICKEL

FR = FLIP LID/RECTANGULAR
SL = SLIDES
F = FLIP COVER

OCCUPANCY SENSOR LEGEND

TYPE	DESCRIPTION
OS A	360° CEILING MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR
OS B	90° CEILING/WALL MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR
OS C	360° CEILING MOUNTED PASSIVE INFRARED OCCUPANCY SENSOR
OS D	360° CEILING MOUNTED ULTRASONIC OCCUPANCY SENSOR
OS E	360° CEILING MOUNTED ULTRASONIC OCCUPANCY SENSOR – CORRIDOR OPTIMIZED
So	WALL SWITCH OCCUPANCY SENSOR
So2	WALL SWITCH OCCUPANCY SENSOR – DUAL LEVEL SWITCHING
Do	WALL DIMMER SWITCH OCCUPANCY SENSOR

RACEWAY / CONDUCTOR / CABLE APPLICATION SCHEDULE

		WIRE: COPPER, TYPE THHN/THWN-2	WIRE: COPPER, TYPE XHHW-2	WIRE: ALUMINUM, TYPE XHHW-2 (100A AND ABOVE ONLY)	RACEWAY: ALUMINUM RIGID CONDUIT	RACEWAY: ELECTRICAL METALLIC TUBING (EMT)	RACEWAY: INTERMEDIATE METAL CONDUIT (IMC)	RACEWAY: RIGID STEEL CONDUIT (RSC)	RACEWAY: PVC COATED RIGID STEEL CONDUIT	RACEWAY: RIGID NON-METALLIC CONDUIT (RNC) TYPE EPC-40	RACEWAY: RIGID NON-METALLIC CONDUIT (RNC) TYPE EPC-80	RACEWAY: HIGH DENSITY POLYETHYLENE (HDPE) SCHEDULE 40	RACEWAY: HIGH DENSITY POLYETHYLENE (HDPE) SCHEDULE 80	RACEWAY: REINFORCED THERMOSET RESIN CONDUIT (RTRC) TYPE AG	RACEWAY: REINFORCED THERMOSET RESIN CONDUIT (RTRC) TYPE BG	RACEWAY: FLEXIBLE METAL CONDUIT (FMC)	RACEWAY: LIQUID TIGHT FLEXIBLE METAL CONDUIT (LFMC)	RACEWAY: SURFACE RACEWAY	CABLE/CORD: METAL CLAD TYPE CABLE WITH INSULATED GROUND WIRE (TYPE MC)	CABLE/CORD: ARMOR CLAD TYPE CABLE WITH INSULATED GROUND WIRE (TYPE AC)	CABLE/CORD: UNDERGROUND FEED CABLE (TYPE UF)	CABLE/CORD: TYPE SO	CABLE/CORD: VFC CABLE
FEEDERS – EXTERIOR	EXPOSED, SURFACE MOUNTED TO STRUCTURE		X	X			X	X	X					X									
	EXPOSED, WITH FREESTANDING SUPPORT		X	X			X	X	X					X									
	CONCEALED IN RETAINING WALL OR SIMILAR ELEMENT		X	X				X	X	X	X												
	BELOW PARKING LOTS AND ROADWAYS (NOTE 1)		X	X					X		X		X		X								
	BELOW GREEN SPACE (NOTE 1)		X	X					X	X		X			X								
	WITHIN 5' OF FOUNDATION WALL		X	X				X	X														
	ROOFTOPS (WHEN APPROVED BY ENGINEER)		X	X			X	X															
FEEDERS – INTERIOR	BELOW SLAB ON GRADE (NOTE 1)	X		X				X		X	X												
	EXPOSED, BELOW 10' AFF AND SUBJECT TO DAMAGE	X		X			X	X															
	EXPOSED, ABOVE 10' AFF UNFINISHED SPACES	X		X		X																	
	EXPOSED, FINISHED SPACES	X		X														X					
	DAMP AND WET LOCATIONS	X		X			X	X		X													
	CONCEALED, ACCESSIBLE CEILINGS	X		X		X													X	X			
	CONCEALED, INACCESSIBLE CEILINGS	X		X		X																	
	CONCEALED IN GYPSUM BOARD PARTITION WALLS	X		X		X													X	X			
	CONCEALED IN CMU WALLS	X		X		X																	
BRANCH CIRCUITS – EXTERIOR	EXPOSED, SURFACE MOUNTED TO STRUCTURE		X				X	X	X		X												
	EXPOSED, WITH FREESTANDING SUPPORT		X				X	X	X														
	CONCEALED IN RETAINING WALL OR SIMILAR ELEMENT		X					X		X													
	BELOW PARKING LOTS AND ROADWAYS (NOTE 1)		X					X		X		X											
	BELOW GREEN SPACE		X							X													
	WITHIN 5' OF FOUNDATION WALL		X					X															
	ROOFTOPS (WHEN APPROVED BY ENGINEER)		X	X			X	X															
BRANCH CIRCUITS – INTERIOR	BELOW SLAB ON GRADE (NOTE 1)	X								X													
	EMBEDDED IN ELEVATED CONCRETE SLAB (NOTE 1)	X								X													
	EXPOSED, BELOW 10' AFF AND SUBJECT TO DAMAGE	X					X	X															
	EXPOSED, ABOVE 10' AFF UNFINISHED SPACES	X				X																	
	CONCEALED, ACCESSIBLE CEILINGS (NOTE 2)	X				X													X				
	CONCEALED, INACCESSIBLE CEILINGS	X				X																	
	CONCEALED IN GYPSUM BOARD PARTITION WALLS	X				X									X				X				
	CONCEALED IN CMU WALLS	X				X																	
	EXPOSED, FINISHED SPACES	X																X					
	EXPOSED, UNFINISHED SPACES	X				X																	
	EXPOSED, EXISTING CONSTRUCTION	X																X					
	DAMP AND WET LOCATIONS	X					X	X	X	X							X						
SPECIAL APPLICATIONS	SERVICE ENTRANCE		X	X				X	X	X	X	X	X										
	CONNECTION BETWEEN VFC AND MOTORS, DISTANCE> 50'		X					X	X	X	X												X
	CLASS 1 CONTROL CIRCUITS	X				X																	
	CLASS 2 CONTROL CIRCUITS	X				X																	
	FIRE PUMP FEEDERS (NOTE 3)		X				X	X	X	X	X	X											
	EMERGENCY FEEDERS		X	X			X	X	X	X	X	X											
	CONNECTIONS TO TRANSFORMERS, MOTORS AND VIBRATING EQUIPMENT		X												X	X							
	NATATORIUMS AND POOLS, PUBLIC SPACES	X	X					X	X	X						X							
	POOL AND FOUNTAIN EQUIPMENT ROOMS	X	X					X	X	X						X							
	FOUNTAINS							X		X						X							
	MRI				X																		
	HAZARDOUS LOCATIONS																						

GENERAL NOTES

1. PROVIDE RIGID STEEL SWEEPS WHERE CONDUITS PENETRATE WALLS, CONCRETE SLABS, AND CONCRETE BASES.
2. REFER TO SPECIFICATIONS FOR RESTRICTIONS ON MC CABLE INSTALLATION.
3. CONDUIT AND WIRE ALLOWED WHEN ENCASED IN MINIMUM 2" CONCRETE.

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SEAL

REVISIONS:
1 ISSUED FOR BIDS 09/30/2019

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ELECTRICAL STANDARD SCHEDULES

SHEET E0.2

ELECTRICAL GENERAL REQUIREMENTS

A. SCOPE OF WORK: ALL MATERIAL SHALL BE NEW UNLESS OTHERWISE INDICATED. FURNISH ALL LABOR, EQUIPMENT, TECHNICAL SUPERVISION, AND INCIDENTAL SERVICES REQUIRED TO COMPLETE, TEST, AND LEAVE READY FOR OPERATION THE ELECTRICAL SYSTEMS AS SPECIFIED AND AS INDICATED ON DRAWINGS.
B. ORDINANCES AND CODES: PERFORM ALL WORK IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL ORDINANCES AND REGULATIONS, THE RULES AND REGULATIONS OF NFPA, NECA, AND UL, UNLESS OTHERWISE INDICATED.
C. UNLESS OTHERWISE INDICATED, ALL REQUIRED PERMITS, LICENSES, INSPECTIONS, APPROVALS AND FEES FOR ELECTRICAL WORK SHALL BE SECURED AND PAID FOR BY THE CONTRACTOR. ALL WORK SHALL CONFORM TO ALL APPLICABLE CODES, RULES AND REGULATIONS.
D. THE DRAWINGS SHOW THE LOCATION AND GENERAL ARRANGEMENT OF EQUIPMENT, ELECTRICAL SYSTEMS AND RELATED ITEMS. THEY SHALL BE FOLLOWED AS CLOSELY AS ELEMENTS OF THE CONSTRUCTION WILL PERMIT.
E. EXAMINE THE DRAWINGS OF OTHER TRADES AND VERIFY THE CONDITIONS GOVERNING THE WORK ON THE JOB SITE. ARRANGE WORK ACCORDINGLY, PROVIDING SUCH FITTINGS, CONDUIT, JUNCTION BOXES AND ACCESSORIES AS MAY BE REQUIRED TO MEET SUCH CONDITIONS.
F. COORDINATE ARRANGEMENT, MOUNTING AND SUPPORT OF ELECTRICAL EQUIPMENT WITH OTHER TRADES.
G. VISIT THE SITE, EXAMINE AND VERIFY THE CONDITIONS UNDER WHICH THE WORK MUST BE CONDUCTED BEFORE SUBMITTING PROPOSAL. THE SUBMITTING OF A PROPOSAL IMPLIES THAT THE CONTRACTOR HAS VISITED THE SITE AND UNDERSTANDS THE CONDITIONS UNDER WHICH THE WORK MUST BE CONDUCTED. NO ADDITIONAL CHARGES WILL BE ALLOWED BECAUSE OF FAILURE TO MAKE THIS EXAMINATION OR TO INCLUDE ALL MATERIALS AND LABOR TO COMPLETE THE WORK.
H. BIDS SHALL BE BASED UPON MANUFACTURED EQUIPMENT SPECIFIED. VOLUNTARY ALTERNATES MAY BE SUBMITTED FOR CONSIDERATION, WITH LISTED ADDITION OR DEDUCTION TO THE BID.
I. WARRANTY: CONTRACTOR SHALL WARRANTY THAT THE ELECTRICAL INSTALLATION IS FREE FROM DEFECTS AND AGREES TO REPLACE OR REPAIR, TO THE OWNER'S SATISFACTION, ANY PART OF THIS ELECTRICAL INSTALLATION WHICH BECOMES DEFECTIVE WITHIN A PERIOD OF ONE YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION FOLLOWING FINAL ACCEPTANCE, PROVIDED THAT SUCH FAILURE IS DUE TO DEFECTS IN THE EQUIPMENT, MATERIAL, WORKMANSHIP OR FAILURE TO FOLLOW THE CONTRACT DOCUMENTS.
J. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY TEMPORARY SERVICES INCLUDING EQUIPMENT AND INSTALLATION REQUIRED TO MAINTAIN OPERATION AS A RESULT OF ANY EQUIPMENT FAILURE OR DEFECT DURING WARRANTY PERIOD.
K. FILE WITH THE OWNER ANY AND ALL WARRANTIES FROM THE EQUIPMENT MANUFACTURERS INCLUDING THE OPERATING CONDITIONS AND PERFORMANCE CAPACITIES THEY ARE BASED ON.
L. CONSULT WITH THE OWNER'S REPRESENTATIVE AS TO THE METHODS OF CARRYING ON THE WORK SO AS NOT TO INTERFERE WITH THE OWNER'S OPERATION ANY MORE THAN ABSOLUTELY NECESSARY. ACCORDINGLY, ALL SERVICE LINES SHALL BE KEPT IN OPERATION AS LONG AS POSSIBLE AND THE SERVICES SHALL ONLY BE INTERRUPTED AT SUCH TIME AS WILL BE DESIGNATED BY THE OWNER'S REPRESENTATIVE.
M. ALL CUTTING, PATCHING AND REPAIR WORK SHALL BE PERFORMED BY THE CONTRACTOR THROUGH APPROVED, QUALIFIED SUBCONTRACTORS. CONTRACTOR SHALL INCLUDE FULL COST OF SAME IN BID.
N. PROVIDE ALL EXCAVATION, TRENCHING, TUNNELING, DEWATERING AND BACKFILLING REQUIRED FOR THE ELECTRICAL WORK. COORDINATE THE WORK WITH OTHER EXCAVATING AND BACKFILLING IN THE SAME AREA.
O. INSPECT THE INSTALLATION OF ALL EQUIPMENT PER THE MANUFACTURER'S RECOMMENDATION AND APPLICABLE CODES.
P. PROVIDE UL APPROVED FIRE-STOPPING SYSTEM FOR ALL PENETRATIONS PASSING THROUGH FIRE RATED ASSEMBLIES.
Q. COMPLY WITH NECA 1.
R. PROVIDE COMPLETE OPERATION AND MAINTENANCE INSTRUCTIONAL MANUALS COVERING ALL ELECTRICAL EQUIPMENT HEREIN SPECIFIED, TOGETHER WITH PARTS LISTS.
S. CONTRACTOR SHALL SUBMIT TO THE ARCHITECT/ENGINEER, RECORD DRAWINGS ON ELECTRONIC MEDIA OR MYLAR WHICH HAVE BEEN NEATLY MARKED TO REPRESENT AS-BUILT CONDITIONS FOR ALL NEW ELECTRICAL WORK.
T. SUBMIT FOR APPROVAL SHOP DRAWINGS FOR ELECTRICAL SYSTEMS OR EQUIPMENT LISTED BELOW:
   1. DISCONNECT SWITCHES
   2. WIRING DEVICES
   3. LIGHTING FIXTURES
   4. LIGHTING CONTROL SYSTEMS AND DEVICES

DEMOLITION WORK

A. IN GENERAL, DEMOLITION WORK IS INDICATED ON THE DRAWINGS. HOWEVER, THE CONTRACTOR SHALL VISIT THE JOB SITE TO DETERMINE THE FULL EXTENT AND SCOPE OF THIS WORK.
B. UNLESS SPECIFICALLY NOTED TO THE CONTRARY, REMOVED MATERIALS SHALL NOT BE REUSED IN THE WORK. SALVAGED MATERIALS THAT ARE TO BE REUSED SHALL BE STORED SAFE AGAINST DAMAGE AND TURNED OVER TO THE APPROPRIATE TRADE FOR REUSE. SALVAGED MATERIALS OF VALUE THAT ARE NOT TO BE REUSED SHALL REMAIN THE PROPERTY OF THE OWNER UNLESS SUCH OWNERSHIP IS WAIVED. ITEMS ON WHICH THE OWNER WAIVES OWNERSHIP SHALL BECOME THE PROPERTY OF THE CONTRACTOR, WHO SHALL REMOVE AND LEGALLY DISPOSE OF SAME, AWAY FROM THE PREMISES.
C. WHERE EQUIPMENT OR FIXTURES ARE REMOVED AND WALLS REMAIN, OUTLETS SHALL BE PROPERLY BLANKED OFF, CONDUITS CAPPED, AND CONDUCTORS REMOVED BACK TO SOURCE OR NEAREST UPSTREAM DEVICE REMAINING IN SERVICE. AFTER ALTERATIONS ARE DONE, THE ENTIRE INSTALLATION SHALL PRESENT A "FINISHED" LOOK, AS APPROVED BY THE ARCHITECT/ENGINEER. THE ORIGINAL FUNCTION OF THE PRESENT ELECTRICAL WORK TO BE MODIFIED SHALL NOT BE CHANGED UNLESS REQUIRED BY THE SPECIFIC REVISIONS TO THE SYSTEM AS SPECIFIED OR AS INDICATED.
D. REROUTE SIGNAL WIRES, LIGHTING AND POWER WIRING AS REQUIRED TO MAINTAIN SERVICE. WHERE WALLS AND CEILINGS ARE TO BE REMOVED AS SHOWN ON THE DRAWINGS, THE CONDUIT IS TO BE CUT OFF BY THE ELECTRICAL TRADES SO THAT THE ABANDONED CONDUIT IN THESE WALLS AND CEILINGS MAY BE REMOVED WITH THE WALLS AND CEILINGS BY THE ARCHITECTURAL TRADES. ALL DEAD-END CONDUIT RUNS SHALL BE PLUGGED AT THE REMAINING LINE OUTLET BOXES OR AT THE PANELS.
E. WHERE NEW WALLS AND/OR FLOORS ARE INSTALLED WHICH INTERFERE WITH EXISTING OUTLETS, DEVICES, ETC., THE ELECTRICAL TRADES SHALL ADJUST, EXTEND AND RECONNECT SUCH ITEMS AS REQUIRED TO MAINTAIN CONTINUITY OF SAME.
F. ALL ELECTRICAL WORK IN ALTERED AND UNALTERED AREAS SHALL BE RUN CONCEALED WHEREVER POSSIBLE. USE OF SURFACE RACEWAY OR EXPOSED CONDUITS WILL BE PERMITTED ONLY WHERE APPROVED BY THE ARCHITECT/ENGINEER.
G. EXISTING LIGHTING SHALL BE REUSED WHERE INDICATED ON PLANS. REUSED FIXTURES SHALL BE DETERGENT CLEANED, RELAMPED AND RECONDITIONED SUITABLE FOR SATISFACTORY OPERATION AND APPEARANCE.

GROUNDING AND BONDING

A. EQUIPMENT GROUNDING: COMPLY WITH NFPA 70, ARTICLE 250, FOR TYPES, SIZES, AND QUANTITIES OF EQUIPMENT GROUNDING CONDUCTORS, UNLESS SPECIFIC TYPES, LARGER SIZES, OR MORE CONDUCTORS THAN REQUIRED BY NFPA 70 ARE INDICATED.
B. PROVIDE EQUIPMENT GROUNDING CONDUCTORS IN EACH RACEWAY.

CONDUCTORS AND CABLES

A. CONDUCTOR MATERIAL: COPPER COMPLYING WITH NEMA WC 70; SOLID CONDUCTOR.
B. CONDUCTOR INSULATION TYPES: TYPE THHN-THWN
C. CONCEAL CABLES IN FINISHED WALLS, CEILINGS, AND FLOORS, UNLESS OTHERWISE INDICATED.
D. USE CONDUCTOR NOT SMALLER THAN 14 AWG FOR POWER AND LIGHTING CIRCUITS.
E. USE CONDUCTOR NOT SMALLER THAN 14 AWG FOR CONTROL CIRCUITS, PROVIDED BY ELECTRICAL CONTRACTOR.
F. SUPPORT COMMUNICATION CABLES ABOVE ACCESSIBLE CEILING, USING SPRING METAL CLIPS OR PLASTIC CABLE TIES TO SUPPORT CABLES FROM STRUCTURE. DO NOT REST CABLE ON CEILING PANELS.
G. USE "STA-KON" CONNECTORS TO TERMINATE STRANDED CONDUCTORS #10 AWG AND SMALLER TO SCREW TERMINALS.
H. CONDUCTOR AND INSULATION APPLICATIONS:
   1. BRANCH CIRCUITS, INCLUDING IN CRAWLSPACES: TYPE THHN-THWN, SINGLE CONDUCTORS TYPE MC CABLE. PROVIDE A DEDICATED NEUTRAL FOR EACH CIRCUIT.
   2. CLASS I CONTROL CIRCUITS: TYPE THHN -THHWN IN RACEWAY.
   3. CLASS II CONTROL CIRCUITS: POWER LIMITED CABLE

RACEWAYS AND BOXES

A. MINIMUM RACEWAY SIZE: 1/2-INCH TRADE SIZE.
B. INSTALL CONDUIT IN ACCORDANCE WITH NECA "NATIONAL ELECTRICAL INSTALLATION STANDARDS".
C. RACEWAY APPLICATIONS: REFER TO RACEWAY APPLICATIONS SCHEDULE ON SHEET E0.2.
D. INSTALL SURFACE RACEWAYS ONLY WHERE INDICATED ON DRAWINGS.
E. CONCEAL CONDUIT AND AC/MC CABLE WITHIN FINISHED WALLS, CEILINGS, AND FLOORS UNLESS OTHERWISE INDICATED.

IDENTIFICATION

A. COMPLY WITH ANSI A13.1, ANSI C2, NFPA 70, AND 29 CFR 1910.145.
B. COORDINATE IDENTIFICATION NAMES, ABBREVATIONS, COLORS, AND OTHER FEATURES WITH REQUIREMENTS IN THE CONTRACT DOCUMENTS, SHOP DRAWINGS, MANUFACTURER'S WIRING DIAGRAMS, AND THE OPERATION AND MAINTENANCE MANUAL, AND WITH THOSE REQUIRED BY CODES, STANDARDS, AND 29 CFR 1910.145. USE CONSISTENT DESIGNATIONS THROUGHOUT PROJECT.
C. COORDINATE INSTALLATION OF IDENTIFYING DEVICES WITH COMPLETION OF COVERING AND PAINTING OF SURFACES WHERE DEVICES ARE TO BE APPLIED, WITH LOCATION OF ACCESS PANELS AND DOORS.
D. INSTALL IDENTIFYING DEVICES BEFORE INSTALLING ACOUSTICAL CEILINGS AND SIMILAR CONCEALMENT.
E. WIRING DEVICES: USE ADHESIVE LABEL WITH BLACK FILLED LETTERING ON FACE OF WALL PLATE ON THE REAR OF THE FACEPLATE AND DURABLE WIRE MARKERS OR TAGS INSIDE OUTLET BOXES. LABELS SHALL BE CLEAR POLYESTER WITH BLACK LETTER, FONT SIZE OF 7. IDENTIFY PANELBOARD AND CIRCUIT NUMBER FROM WHICH SERVED.

WIRING DEVICES

A. STRAIGHT-BLADE-TYPE RECEPTACLES: COMPLY WITH NEMA WD 1, NEMA WD 6, DSCC W-C-596G, AND UL 498. CONFIGURATION 5-15R FOR 15A CIRCUITS OR 5-20R FOR 20A CIRCUITS DUPLEX RECEPTACLE. HUBBELL HBL 5362 OR EQUAL BY PASS & SEYMOUR OR COOPER.
B. GFCI RECEPTACLES: STRAIGHT BLADE, FEED-THROUGH TYPE, GENERAL DUTY GRADE, WITH INTEGRAL NEMA WD 6, CONFIGURATION 5-20R DUPLEX RECEPTACLE; COMPLYING WITH UL 498 AND UL 943. DESIGN UNITS FOR INSTALLATION IN A 2-3/4-INCH- (70-MM-) DEEP OUTLET BOX WITHOUT AN ADAPTER. HUBBELL GF5362 OR EQUAL BY PASS & SEYMOUR OR COOPER.
C. WALL SWITCHES: SINGLE AND DOUBLE-POLE SWITCHES: COMPLY WITH DSCC W-C-896F AND UL 20. HUBBELL WIRING DEVICE, KELLEMS 1220 SERIES OR EQUAL BY PASS & SEYMOUR, COOPER OR LEVITON.
D. LED LAMP DIMMER SWITCHES: LUTRON OR EQUAL, COMPATIBLE WITH LED DIMMING BALLASTS SPECIFIED.
E. DIMMERS:
   1. CONTROL: CONTINUOUSLY ADJUSTABLE SLIDER WITH PRE-SET; SINGLE-POLE OR THREE-WAY SWITCHING TO SUIT CONNECTIONS.
   2. INSTALL WALL DIMMERS TO ACHIEVE FULL RATING SPECIFIED AND INDICATED AFTER DERATING FOR GANGING ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.
   3. INSTALL UNSHARED NEUTRAL CONDUCTORS ON LINE AND LOAD SIDE OF DIMMERS ACCORDING TO MANUFACTURERS' WRITTEN INSTRUCTIONS.
F. WALL PLATES:
   1. PROVIDE RUSTIC TIN WALL PLATES IN FINISHED AREAS IN ROOMS A, B, AND C
      a. <https://www.houseofantiquehardware.com/tin-switch-plate-covers>
   2. PROVIDE OIL RUBBED BRONZE FINISH WALL PLATES IN FINISHED AREAS IN ROOMS E AND F
   3. PROVIDE IVORY WALL PLATES IN UNFINISHED AREAS.
   4. PROVIDE WEATHERPROOF WHILE-IN-USE COVERPLATES FOR WET LOCATIONS.
G. WIRING DEVICE COLOR SHALL BE IVORY IN ALL AREAS UNLESS OTHERWISE INDICATED OR REQUIRED BY NFPA 70.
H. CONNECT WIRING DEVICE GROUNDING TERMINAL TO OUTLET BOX WITH BONDING JUMPER. USE OF QUICK GROUND STRAP OR SCREW IS NOT ACCEPTABLE.

LIGHTING CONTROL DEVICES

A. COORDINATE OCCUPANCY SENSOR LOCATIONS, COVERAGES AND REQUIRED QUANTITIES WITH MANUFACTURER'S RECOMMENDATIONS. COVERAGE AREAS INDICATED ON THE DRAWINGS ARE FOR MINOR MOTION (6 TO 8 INCHES OF HAND MOVEMENT). PROVIDE ADDITIONAL OCCUPANCY SENSORS AND CONTROL UNITS AS REQUIRED TO ACHIEVE COMPLETE MINOR MOTION COVERAGE OF THE SPACE INDICATED.
B. OCCUPANCY SENSOR:
   1. WALL SWITCH PASSIVE INFRARED OCCUPANCY SENSOR: WATTSTOPPER PW-100 OR EQUAL.
   2. DUAL LEVEL SWITCHING PASSIVE INFRARED OCCUPANCY SENSOR: WATTSTOPPER PW-200 OR EQUAL.
   3. 360° CEILING MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR: WATTSTOPPER DT 300 OR EQUAL.
   4. 110° WALL MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR: WATTSTOPPER DT-200 OR EQUAL.
   5. 360° CEILING MOUNTED ULTRASONIC OCCUPANCY SENSORS: WATTSTOPPER "WT" SERIES OR EQUAL.
   6. 360° CEILING MOUNTED PASSIVE INFRARED OCCUPANCY SENSOR. WATTSTOPPER CI-200 OR EQUAL.
C. OCCUPANCY SENSOR CONTROL UNITS:
   1. DESCRIPTION: TRANSFORMER AND RELAY COMBINED IN SINGLE UNIT TO PROVIDE 24DC POWER TO SENSORS AND PROVIDE 20A CONTACT(S) FOR CONTROL OF LIGHTING LOADS AT 120 OR 277V. CONTROL UNIT INPUT POWER SHALL BE FROM UNSWITCHED LEG OF LIGHTING CIRCUIT IT IS CONTROLLING.
      a. CONTROL UNITS SHALL BE PROVIDED AS REQUIRED TO POWER CEILING MOUNTED OCCUPANCY SENSORS, CONTROL LIGHTING LOADS AND PROVIDE A MINIMUM OF ONE AUXILIARY CONTACT.
      b. OCCUPANCY SENSOR CONTROL UNITS SHALL MOUNT EXTERNAL TO 4"SQ JUNCTION BOX IN THE CEILING SPACE. ALL WIRING BETWEEN CONTROL UNIT AND OCCUPANCY SENSOR SHALL BE PLENUM RATED.
      c. LOCATE CONTROL UNIT IN ACCESSIBLE LOCATION IN GYP-BOARD CEILINGS, ADJACENT TO RETURN AIR GRILLES, OR PROVIDE ACCESS PANEL.
      d. ADDITIONAL AUXILIARY RELAY MODULES SHALL BE PROVIDED AS REQUIRED TO PROVIDE CONTROL OF ALL LIGHTING CIRCUITS AND ADDITIONAL AUXILIARY CONTACTS AS REQUIRED.
      e. IT IS ACCEPTABLE TO PROVIDE CONTROLS AND AUXILIARY CONTACTS AS REQUIRED INTEGRAL TO THE CEILING SENSOR, PROVIDED ALL REQUIRED CONTACTS ARE PROVIDED.
      f. MAXIMUM OF 3 SENSORS PER POWER PACK. VERIFY EXACT QUANTITIES REQUIRED WITH MANUFACTURER.

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

A. SUBJECT TO COMPLIANCE WITH REQUIREMENTS; PROVIDE PRODUCTS BY SQUARE D, EATON, GENERAL ELECTRIC, OR SIEMENS.
B. FUSIBLE AND NON-FUSIBLE SWITCHES: NEMA KS 1, QUICK MAKE, QUICK-BREAK LOAD INTERRUPTER ENCLOSED KNIFE SWITCH TYPE HD, WITH CLIPS OR BOLT PADS TO ACCOMMODATE SPECIFIED FUSES (IF REQUIRED), EXTERNALLY OPERABLE LOCKABLE HANDLE WITH CAPABILITY TO ACCEPT TWO PADLOCKS, AND INTERLOCKED WITH COVER IN CLOSED POSITION. SQUARE D OR EQUAL.
C. TOGGLE DISCONNECT SWITCH: HEAVY DUTY, 30A, 600 VOLT, DOUBLE OR THREE POLE AS REQUIRED, SINGLE THROW, MOTOR RATED SWITCH WITHOUT OVERLOAD PROTECTION. PROVIDE NEMA 1 ENCLOSURE AND PADLOCK ATTACHMENT.
D. MOLDED-CASE CIRCUIT BREAKER: NEMA AB 1, WITH INTERRUPTING CAPACITY TO MEET AVAILABLE FAULT CURRENTS. THERMAL-MAGNETIC CIRCUIT BREAKER WITH INVERSE TIME-CURRENT ELEMENT FOR LOW-LEVEL OVERLOADS AND INSTANTANEOUS MAGNETIC TRIP ELEMENT FOR SHORT CIRCUITS. ADJUSTABLE MAGNETIC TRIP SETTING FOR CIRCUIT-BREAKER FRAME SIZES 250 A AND LARGER.
E. MOLDED-CASE SWITCHES: MOLDED-CASE CIRCUIT BREAKER WITH FIXED, HIGH-SET INSTANTANEOUS TRIP ONLY, AND SHORT-CIRCUIT WITHSTAND RATING EQUAL TO EQUIVALENT BREAKER FRAME SIZE INTERRUPTING RATING.
F. COMPLY WITH APPLICABLE PORTIONS OF NECA 1, NEMA PB 1.1, AND NEMA PB 2.1 FOR INSTALLATION OF ENCLOSED SWITCHES AND CIRCUIT BREAKERS.
G. SET FIELD-ADJUSTABLE SWITCHES AND CIRCUIT-BREAKER TRIP AND TIME DELAY SETTINGS.

PANELBOARDS

A. MOLDED-CASE CIRCUIT BREAKERS: UL 489, WITH INTERRUPTING CAPACITY TO MEET AVAILABLE FAULT CURRENTS.
   1. THERMAL-MAGNETIC CIRCUIT BREAKERS: INVERSE TIME-CURRENT ELEMENT FOR LOW-LEVEL OVERLOADS, AND INSTANTANEOUS MAGNETIC TRIP ELEMENT FOR SHORT CIRCUITS. ADJUSTABLE MAGNETIC TRIP SETTING FOR CIRCUIT-BREAKER FRAME SIZES 250 A AND LARGER WITH RESTRICTED ACCESS COVER.

LIGHTING

A. PROVIDE LIGHTING FIXTURES AS INDICATED ON DRAWINGS AND PROJECT MANUAL.
B. INSTALL SPECIFIED ACCESSORIES AT FACTORY.
C. FIXTURES: SET LEVEL, PLUMB, AND SQUARE WITH CEILINGS AND WALLS. INSTALL LAMPS IN EACH FIXTURE.
D. SUPPORT LUMINAIRES INDEPENDENT OF CEILING FRAMING. SUPPORT RECESSED GRID LUMINARIES FROM TWO OPPOSITE CORNERS DIRECTLY TO STRUCTURE. WIRE OR ROD SHALL HAVE BREAKING STRENGTH OF THE WEIGHT OF FIXTURE AT A SAFETY FACTOR OF 3.
E. INSTALL RECESSED LUMINAIRES TO PERMIT REMOVAL FROM BELOW.
F. INSTALL RECESSED LUMINAIRES USING ACCESSORIES AND FIRESTOPPING MATERIALS TO MEET REGULATORY REQUIREMENTS FOR FIRE RATING.
G. INSTALL SURFACE MOUNTED LUMINAIRES AND EXIT SIGNS PLUMB AND ADJUST TO ALIGN WITH BUILDING LINES AND WITH EACH OTHER. SECURE TO PROHIBIT MOVEMENT.
H. TIGHTEN ELECTRICAL CONNECTORS AND TERMINALS ACCORDING TO MANUFACTURER'S PUBLISHED TORQUE-TIGHTENING VALUES. IF MANUFACTURER'S TORQUE VALUES ARE NOT INDICATED, USE THOSE SPECIFIED IN UL 486A AND UL 486B.
I. MAKE WIRING CONNECTIONS TO BRANCH CIRCUIT USING BUILDING WIRE WITH INSULATION SUITABLE FOR TEMPERATURE CONDITIONS WITHIN LUMINAIRE.
J. BOND PRODUCTS AND METAL ACCESSORIES TO BRANCH CIRCUIT EQUIPMENT GROUNDING CONDUCTOR.
K. CONNECT LUMINAIRES TO BRANCH CIRCUIT OUTLET BOXES PROVIDED UNDER RACEWAYS AND BOXES SECTION USING 1/2" FLEXIBLE CONDUIT.
L. CLEAN ELECTRICAL PARTS TO REMOVE CONDUCTIVE AND DELETERIOUS MATERIALS.
M. REMOVE DIRT AND DEBRIS FROM ENCLOSURES AND LENSES.
N. CLEAN PHOTOMETRIC CONTROL SURFACES AS RECOMMENDED BY MANUFACTURER.
O. CLEAN FINISHES AND TOUCH UP DAMAGE.
P. EXIT SIGNS: COMPLY WITH UL 924; FOR SIGN COLORS AND LETTERING SIZE, COMPLY WITH AUTHORITIES HAVING JURISDICTION.
   1. PROVIDE EXIT SIGNS WITH LIGHT-EMITTING DIODES, 70,000 HOURS MINIMUM OF RATED LAMP LIFE.
   2. SELF-POWERED EXIT SIGNS (BATTERY TYPE): INTEGRAL AUTOMATIC CHARGER IN A SELF-CONTAINED POWER PACK.
   3. BATTERY: SEALED, MAINTENANCE-FREE, NICKEL-CADMIUM TYPE WITH SPECIAL WARRANTY.
   4. CHARGER: FULLY AUTOMATIC, SOLID-STATE TYPE WITH SEALED TRANSFER RELAY.
   5. OPERATION: RELAY AUTOMATICALLY ENERGIZES LAMP FROM BATTERY WHEN CIRCUIT VOLTAGE DROPS TO 80 PERCENT OF NOMINAL VOLTAGE OR BELOW. WHEN NORMAL VOLTAGE IS RESTORED, RELAY DISCONNECTS LAMPS FROM BATTERY, AND BATTERY IS AUTOMATICALLY RECHARGED AND FLOATED ON CHARGER.
Q. EMERGENCY LIGHTING UNITS: SELF-CONTAINED UNITS COMPLYING WITH UL 924.
   1. BATTERY: SEALED, MAINTENANCE-FREE, LEAD-ACID TYPE WITH MINIMUM 10-YEAR NOMINAL LIFE AND SPECIAL WARRANTY.
   2. CHARGER: FULLY AUTOMATIC, SOLID-STATE TYPE WITH SEALED TRANSFER RELAY.
   3. OPERATION: RELAY AUTOMATICALLY TURNS LAMP ON WHEN POWER SUPPLY CIRCUIT VOLTAGE DROPS TO 80 PERCENT OF NOMINAL VOLTAGE OR BELOW. LAMP AUTOMATICALLY DISCONNECTS FROM BATTERY WHEN VOLTAGE APPROACHES DEEP-DISCHARGE LEVEL. WHEN NORMAL VOLTAGE IS RESTORED, RELAY DISCONNECTS LAMPS FROM BATTERY, AND BATTERY IS AUTOMATICALLY RECHARGED AND FLOATED ON CHARGER.
   4. WIRE GUARD: WHERE INDICATED, HEAVY-CHROME-PLATED WIRE GUARD PROTECTS LAMP HEADS OR FIXTURES.

INTEGRAL TIME-DELAY RELAY: HOLDS UNIT ON FOR FIXED INTERVAL WHEN POWER IS RESTORED AFTER AN OUTAGE; TIME DELAY PERMITS HIGH-INTENSITY-DISCHARGE LAMPS TO RE-STRIKE AND DEVELOP ADEQUATE OUTPUT.

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SEAL

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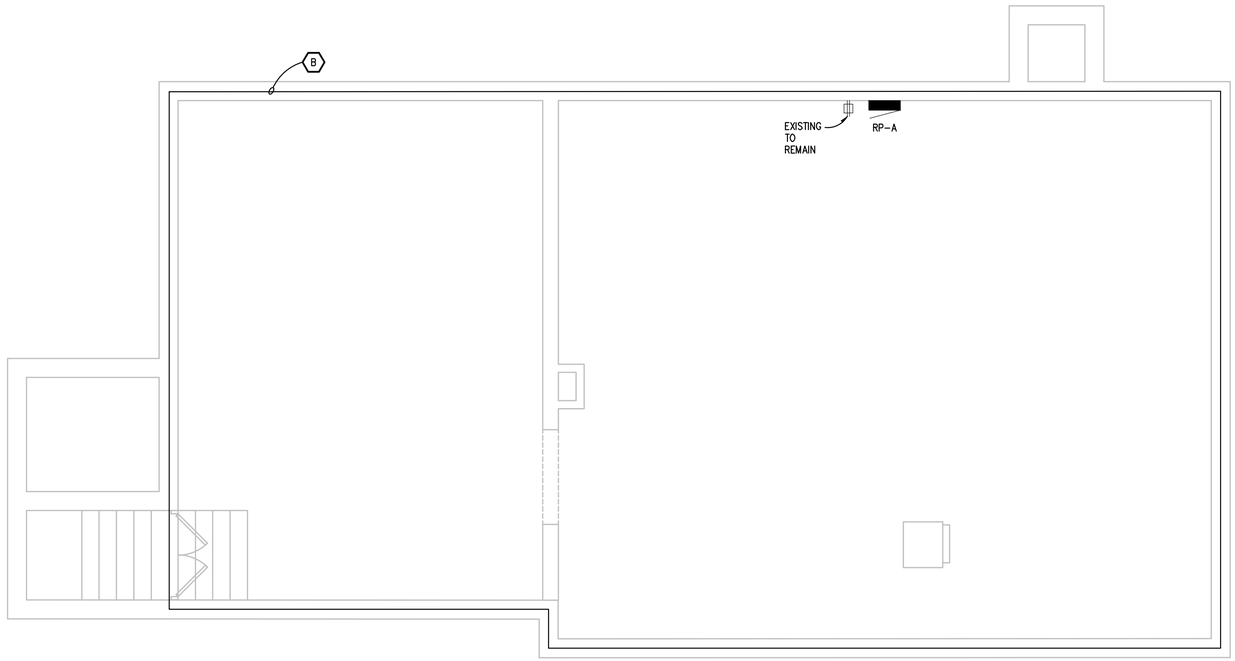
City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

ELECTRICAL SPECIFICATIONS

SHEET E0.3

THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE. 1"



BASEMENT ELECTRICAL DEMOLITION PLAN

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

ELECTRICAL DEMOLITION GENERAL NOTES:

1. VISIT THE SITE PRIOR TO SUBMISSION OF BID TO EXAMINE THE EXISTING CONDITIONS AND THE EXTENT OF DEMOLITION WORK.
2. EXAMINE THE DRAWINGS OF OTHER TRADES AND BE FAMILIAR WITH THE DEMOLITION REQUIRED BY OTHER TRADES. PERFORM ALL INCIDENTAL ELECTRICAL DEMOLITION AND/OR RELOCATION REQUIRED TO FACILITATE THE DEMOLITION WORK OF OTHER TRADES, WHETHER OR NOT SPECIFICALLY INDICATED.
3. REMOVE EQUIPMENT OR MATERIALS AS INDICATED ON PLAN WITH CROSS HATCHING. DEMOLITION SHALL INCLUDE, BUT NOT BE LIMITED TO, THOSE COMPONENTS SHOWN.
4. COORDINATE WITH NEW WORK PLANS, ONE LINE DIAGRAMS AND RISER DIAGRAMS FOR EXTENT OF DEMOLITION WORK.
5. PROVIDE PROPER SUPPORT FOR EXISTING TO REMAIN CONDUITS AND BOXES WHERE EXISTING SUPPORT IS TO BE REMOVED. RE-ROUTE BRANCH CIRCUIT CONDUITS AND RELOCATE JUNCTION BOXES AS REQUIRED TO FACILITATE INSTALLATION OF NEW EQUIPMENT AND SYSTEMS IN CEILING SPACES.
6. REMOVE ALL CONDUIT AND WIRE BACK TO THE SOURCE OR NEAREST UPSTREAM DEVICE REMAINING IN SERVICE.
7. MAINTAIN ELECTRICAL SERVICE TO ALL LIGHTING FIXTURES, DEVICES AND EQUIPMENT THAT ARE TO REMAIN. EXTEND CONDUIT AND WIRE AS REQUIRED WHERE DEMOLITION WORK AFFECTS ELECTRICAL SERVICE TO DOWNSTREAM LOADS THAT ARE TO REMAIN.
8. DISPOSE OF ALL MATERIALS OFF SITE AND INCLUDE ALL COSTS FOR DISPOSAL IN BID. ALL MATERIALS SHALL BE DISPOSED OF IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, INCLUDING TCLP TESTING, PROPER DISPOSAL AND/OR RECYCLING OF FLUORESCENT LAMPS.
9. PROVIDE BLANK COVER PLATES WHERE SWITCHES AND DEVICES ARE REMOVED BUT EXISTING WALLS REMAIN INTACT.
10. RING OUT AND TAG ALL CIRCUITS AFFECTED BY THIS ALTERATION AT BOTH ENDS. MARK ALL UNUSED CIRCUIT BREAKERS "SPARE".
11. PROVIDE UPDATED TYPED-IN DIRECTORIES FOR ALL PANELS AFFECTED BY THIS ALTERATION.
12. VERIFY ALL UNDERGROUND AND IN SLAB UTILITY LOCATIONS PRIOR TO SAW-CUTTING OR PENETRATING ANY FLOOR SLAB.
13. COORDINATE ANY SHUT DOWN OF EXISTING SERVICES AND EQUIPMENT THAT ARE REMAINING IN USE WITH THE OWNER'S REPRESENTATIVE. WHERE EXISTING BUILDING SERVICE IS REQUIRED TO BE SHUT DOWN, INCLUDE ALL ASSOCIATED OVERTIME COSTS TO PERFORM THIS WORK DURING WEEKENDS AND EVENINGS INCLUDE ALL COSTS FOR PROVIDING TEMPORARY POWER WHERE SHUT DOWNS MUST OCCUR FOR PERIODS LONGER THAN THESE HOURS. COORDINATE ELECTRICAL SHUT DOWNS WITH THE OWNER 72 HOURS PRIOR TO SHUT DOWN.

(#) DEMOLITION KEY NOTES:

A. REMOVE EXISTING DEVICES AND WIRING. NEW DEVICES AND WIRING TO BE PROVIDED IN NEW WORK.

B. EXISTING LIGHTING TO REMAIN.

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City of Troy, Michigan
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BASEMENT ELECTRICAL DEMOLITION PLAN

SHEET ED1.0

THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE. 1"

FIRST FLOOR ELECTRICAL DEMOLITION PLAN

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

ELECTRICAL DEMOLITION GENERAL NOTES:

1. VISIT THE SITE PRIOR TO SUBMISSION OF BID TO EXAMINE THE EXISTING CONDITIONS AND THE EXTENT OF DEMOLITION WORK.
2. EXAMINE THE DRAWINGS OF OTHER TRADES AND BE FAMILIAR WITH THE DEMOLITION REQUIRED BY OTHER TRADES. PERFORM ALL INCIDENTAL ELECTRICAL DEMOLITION AND/OR RELOCATION REQUIRED TO FACILITATE THE DEMOLITION WORK OF OTHER TRADES, WHETHER OR NOT SPECIFICALLY INDICATED.
3. REMOVE EQUIPMENT OR MATERIALS AS INDICATED ON PLAN WITH CROSS HATCHING. DEMOLITION SHALL INCLUDE, BUT NOT BE LIMITED TO, THOSE COMPONENTS SHOWN.
4. COORDINATE WITH NEW WORK PLANS, ONE LINE DIAGRAMS AND RISER DIAGRAMS FOR EXTENT OF DEMOLITION WORK.
5. PROVIDE PROPER SUPPORT FOR EXISTING TO REMAIN CONDUITS AND BOXES WHERE EXISTING SUPPORT IS TO BE REMOVED. RE-ROUTE BRANCH CIRCUIT CONDUITS AND RELOCATE JUNCTION BOXES AS REQUIRED TO FACILITATE INSTALLATION OF NEW EQUIPMENT AND SYSTEMS IN CEILING SPACES.
6. REMOVE ALL CONDUIT AND WIRE BACK TO THE SOURCE OR NEAREST UPSTREAM DEVICE REMAINING IN SERVICE.
7. MAINTAIN ELECTRICAL SERVICE TO ALL LIGHTING FIXTURES, DEVICES AND EQUIPMENT THAT ARE TO REMAIN. EXTEND CONDUIT AND WIRE AS REQUIRED WHERE DEMOLITION WORK AFFECTS ELECTRICAL SERVICE TO DOWNSTREAM LOADS THAT ARE TO REMAIN.
8. DISPOSE OF ALL MATERIALS OFF SITE AND INCLUDE ALL COSTS FOR DISPOSAL IN BID. ALL MATERIALS SHALL BE DISPOSED OF IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, INCLUDING TCLP TESTING, PROPER DISPOSAL AND/OR RECYCLING OF FLUORESCENT LAMPS.
9. PROVIDE BLANK COVER PLATES WHERE SWITCHES AND DEVICES ARE REMOVED BUT EXISTING WALLS REMAIN INTACT.
10. RING OUT AND TAG ALL CIRCUITS AFFECTED BY THIS ALTERATION AT BOTH ENDS. MARK ALL UNUSED CIRCUIT BREAKERS "SPARE".
11. PROVIDE UPDATED TYPED-IN DIRECTORIES FOR ALL PANELS AFFECTED BY THIS ALTERATION.
12. VERIFY ALL UNDERGROUND AND IN SLAB UTILITY LOCATIONS PRIOR TO SAW-CUTTING OR PENETRATING ANY FLOOR SLAB.
13. COORDINATE ANY SHUT DOWN OF EXISTING SERVICES AND EQUIPMENT THAT ARE REMAINING IN USE WITH THE OWNER'S REPRESENTATIVE. WHERE EXISTING BUILDING SERVICE IS REQUIRED TO BE SHUT DOWN, INCLUDE ALL ASSOCIATED OVERTIME COSTS TO PERFORM THIS WORK DURING WEEKENDS AND EVENINGS INCLUDE ALL COSTS FOR PROVIDING TEMPORARY POWER WHERE SHUT DOWNS MUST OCCUR FOR PERIODS LONGER THAN THESE HOURS. COORDINATE ELECTRICAL SHUT DOWNS WITH THE OWNER 72 HOURS PRIOR TO SHUT DOWN.

(#) DEMOLITION KEY NOTES:

A. REMOVE EXISTING DEVICES AND WIRING. NEW DEVICES AND WIRING TO BE PROVIDED IN NEW WORK.

B. EXISTING LIGHTING TO REMAIN.

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FIRST FLOOR ELECTRICAL DEMOLITION PLAN

SHEET ED1.1

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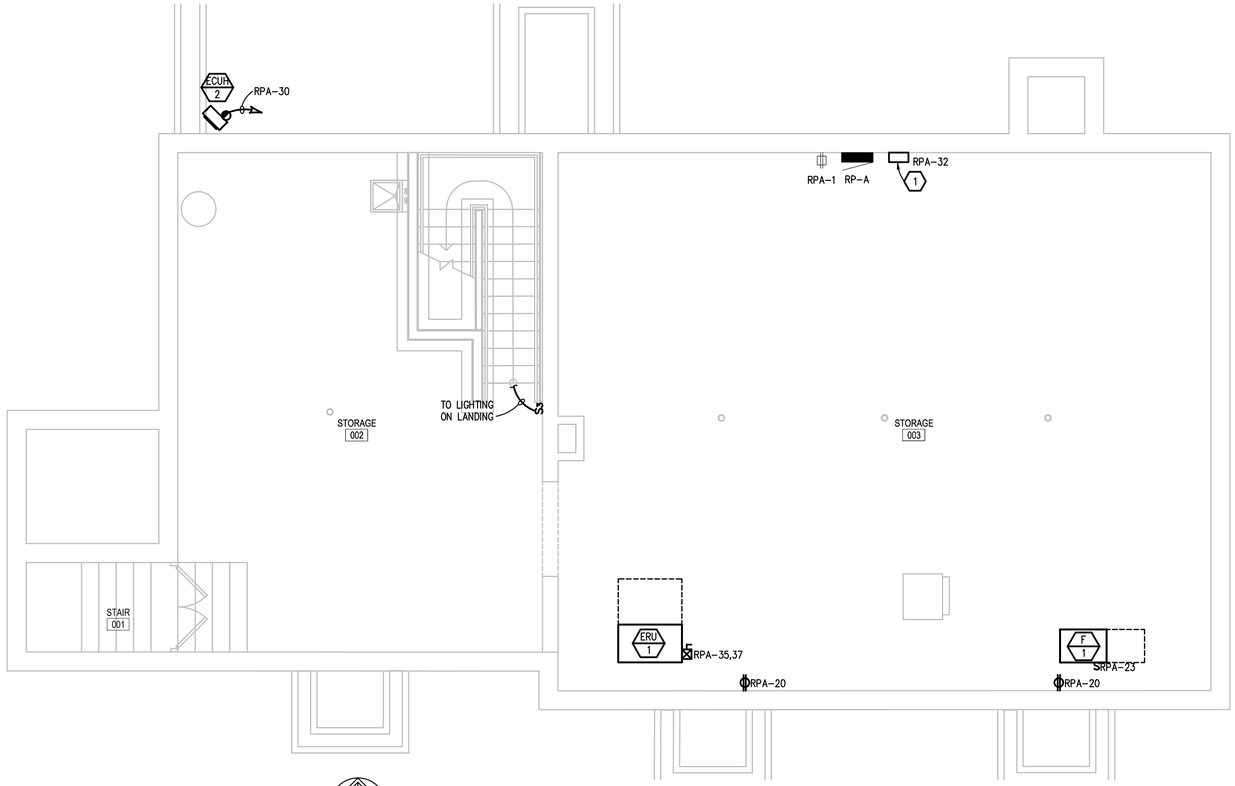

BASEMENT ELECTRICAL NEW WORK PLAN

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

ELECTRICAL GENERAL NOTES:

1. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS, BUT ARE NOT TO BE CONSIDERED FABRICATION DRAWINGS. COORDINATE WITH OTHER TRADES, AND PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS, AND OFFSETS.
2. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
3. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
4. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
5. REFER TO PROJECT MANUAL FOR LIGHTING FIXTURE PACKAGE CUTSHEETS.
6. MOTOR CIRCUIT PROTECTION SHALL BE SIZED IN ACCORDANCE WITH MOTOR CIRCUIT SIZING SCHEDULES SHOWN ON "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS OTHERWISE NOTED.
7. COORDINATE THE MOUNTING HEIGHTS OF DEVICES WITH ARCHITECTURAL ELEVATIONS AND THE TRADES INSTALLING THE WORK.
8. COORDINATE EXACT LOCATIONS OF ALL FLOOR SERVICE FITTINGS AND POKE-THROUGH ASSEMBLIES WITH FINAL FURNITURE LAYOUT DRAWINGS.
9. REFER TO MECHANICAL SCHEDULE SHEETS FOR ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT. PROVIDE ALL CONNECTIONS, STARTERS, DISCONNECTS, ETC. AS REQUIRED BY SCHEDULES AND WHERE NOTED ELSEWHERE. VERIFY REQUIREMENTS OF ALL MECHANICAL EQUIPMENT WITH SHOP DRAWINGS SUBMITTALS. NOTIFY ENGINEER OF ANY CONFLICTS BETWEEN EQUIPMENT SUBMITTALS AND ELECTRICAL DRAWINGS. WHERE CIRCUIT SIZES ARE SHOWN ON THE ELECTRICAL DRAWINGS THAT DIFFER FROM WHAT IS INDICATED ON THE MECHANICAL SCHEDULES, PROVIDE THE CIRCUIT OF HIGHER AMPACITY.
10. REFER TO TEMPERATURE CONTROLS SHEETS FOR REQUIRED MOTOR CONTROLLERS. PROVIDE ALL ACCESSORIES INDICATED.
11. THE DESIGN INTENT OF THE PROJECT IS FOR ALL RACEWAYS, BOXES AND CABLING SYSTEMS BE INSTALLED CONCEALED IN CEILING AND WALL CONSTRUCTION WITH THE EXCEPTION OF NON-PUBLIC ROOMS (I.E. BASEMENT). WHERE THE EXISTING CONDITIONS ARE SUCH THAT IT IS NOT FEASIBLE TO CONCEAL THE RACEWAYS, BOXES AND CABLING SYSTEMS, THE ELECTRICAL CONTRACTOR SHALL NOTIFY THE ARCHITECT OF THE CONDITION AND SEEK AN ACCEPTABLE REMEDY PRIOR TO THE INSTALLATION OF ANY RACEWAYS, BOXES AND CABLING SYSTEMS.
12. FIRE ALARM SHALL BE INSTALLED BY TROY MUSEUM.
13. ALL LIGHTING FIXTURES WITH AN "E" SUFFIX SHALL BE CONTROLLED BY THE LIGHTING CONTROL IN THE SPACE, BUT SHALL BE POWERED BY BOTH THE NORMAL POWER CIRCUIT, AS WELL AS THE LIGHTING INVERTER, VIA AN EMERGENCY LOAD TRANSFER DEVICE. TRANSFER DEVICES SHALL BE LOCATED IN THE BASEMENT NEAR THE PANELBOARD AND SHALL BE LABELED USING OWNER'S FINAL ROOM DESIGNATIONS. ALL EXIT SIGNS SHALL BE CIRCUITED TO THE LIGHTING INVERTER.
14. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH OWNER'S SECURITY AND FIRE ALARM VENDER TO INSTALL WIRING AND BOXES FOR THE FIRE ALARM DEVICES, AS WELL AS POWER TO THE FIRE ALARM AND SECURITY PANELS.

CONSTRUCTION KEY NOTES:

1. CIRCUIT ALL EMERGENCY LIGHTING TO A NEW BODINE ELI-S-400 OR EQUAL INVERTER FOR EMERGENCY OPERATION THROUGH AN ELTD. ELTD SHALL BE COMPATIBLE WITH INSTALLED DIMMERS WHERE APPLICABLE. INSTALL THE INVERTER ADJACENT TO THE PANEL IN THE BASEMENT.
2. PROVIDE AN INTERMATIC ST01C OR SIMILAR ASTRONOMIC IN-WALL TIMER FOR CONTROL OF EXTERIOR LIGHTING. PROVIDE AN ALCR ON THE CIRCUIT TO ALLOW TRANSFER OF EMERGENCY LIGHTING FIXTURES TO THE LIGHTING INVERTER UPON LOSS OF NORMAL POWER. CIRCUIT TO THE CIRCUIT INDICATED AND THE LIGHTING INVERTER. MOUNT THE EXTERIOR LIGHTING TIMER ADJACENT TO THE PANELBOARD IN THE BASEMENT.
3. THIS FIXTURE WILL BE SELECTED BY THE OWNER. COORDINATE HEIGHT OF J-BOX WITH OWNER. 10-WATT LED LAMP MAXIMUM. CIRCUIT TO ASTRONOMIC TIMECLOCK, NORMAL CIRCUIT, AND EMERGENCY LIGHTING CIRCUIT WITH ALCR (SEE CONSTRUCTION NOTE 2)

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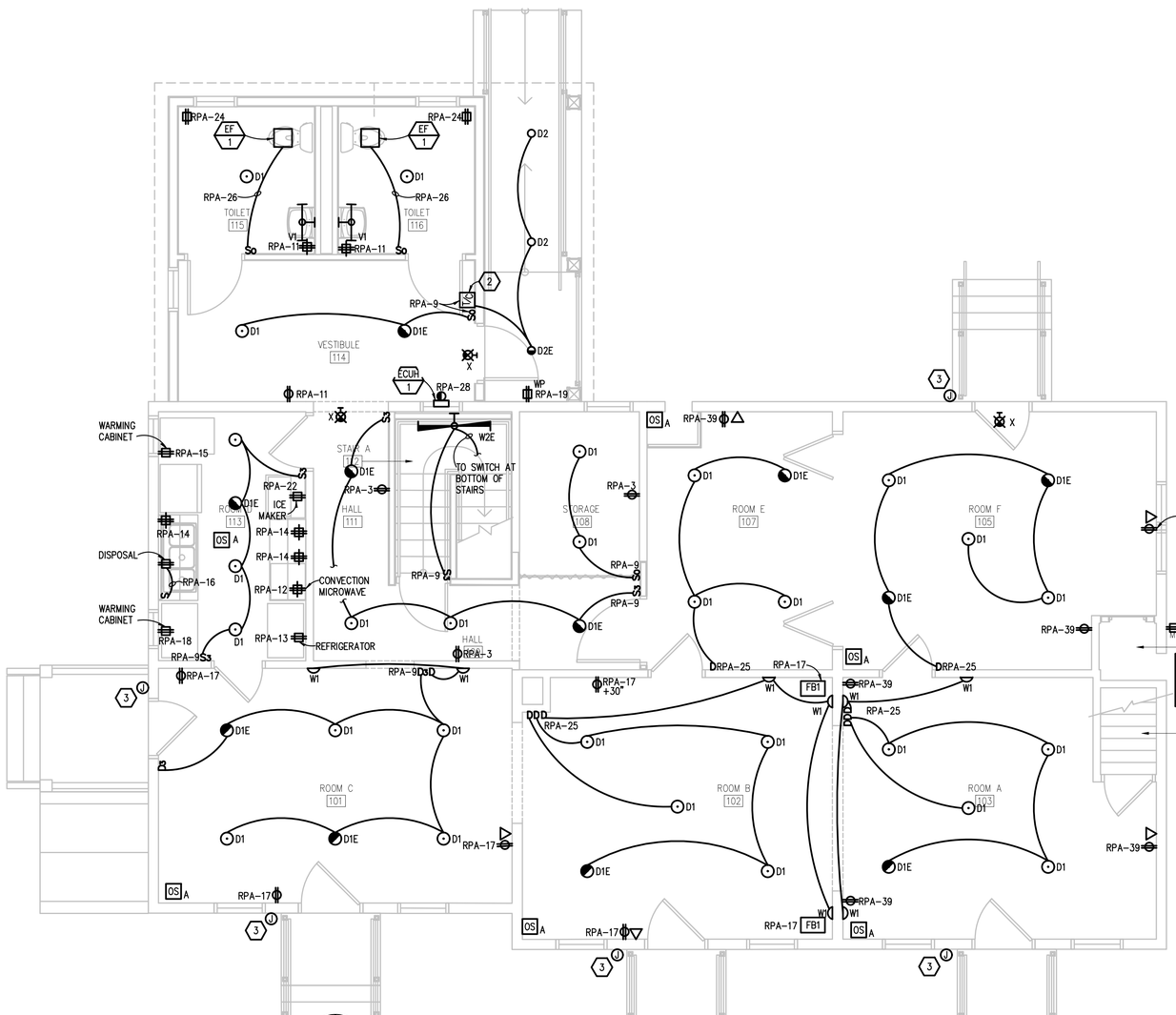
BASEMENT ELECTRICAL NEW WORK PLAN

SHEET E2.0

THE FOLLOWING DIMENSION EQUALS ONE INCH WHEN PRINTED TO SCALE. 1"



FIRST FLOOR ELECTRICAL NEW WORK PLAN

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

ELECTRICAL GENERAL NOTES:

1. THESE DRAWINGS REPRESENT THE GENERAL EXTENT AND ARRANGEMENT OF SYSTEMS, BUT ARE NOT TO BE CONSIDERED FABRICATION DRAWINGS. COORDINATE WITH OTHER TRADES, AND PROVIDE EACH SYSTEM COMPLETE, INCLUDING ALL NECESSARY COMPONENTS, FITTINGS, AND OFFSETS.
2. INSTALL SYSTEMS SUCH THAT REQUIRED CLEARANCE AND SERVICE ACCESS SPACE IS PROVIDED AROUND ALL MECHANICAL AND ELECTRICAL EQUIPMENT, AND AROUND ANY COMPONENTS WHICH REQUIRE SERVICE ACCESS.
3. COORDINATE AND PROVIDE ACCESS DOORS WITHIN INACCESSIBLE CEILING, SHAFT, AND CHASE AREAS FOR ALL COMPONENTS WHICH REQUIRE SERVICE ACCESS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
4. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED FOR THE PROPER SUPPORT OF ALL SYSTEMS.
5. REFER TO PROJECT MANUAL FOR LIGHTING FIXTURE PACKAGE CUTSHEETS.
6. MOTOR CIRCUIT PROTECTION SHALL BE SIZED IN ACCORDANCE WITH MOTOR CIRCUIT SIZING SCHEDULES SHOWN ON "ELECTRICAL STANDARD SCHEDULES DRAWING" UNLESS OTHERWISE NOTED.
7. COORDINATE THE MOUNTING HEIGHTS OF DEVICES WITH ARCHITECTURAL ELEVATIONS AND THE TRADES INSTALLING THE WORK.
8. COORDINATE EXACT LOCATIONS OF ALL FLOOR SERVICE FITTINGS AND POKE-THROUGH ASSEMBLIES WITH FINAL FURNITURE LAYOUT DRAWINGS.
9. REFER TO MECHANICAL SCHEDULE SHEETS FOR ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT. PROVIDE ALL CONNECTIONS, STARTERS, DISCONNECTS, ETC. AS REQUIRED BY SCHEDULES AND WHERE NOTED ELSEWHERE. VERIFY REQUIREMENTS OF ALL MECHANICAL EQUIPMENT WITH SHOP DRAWINGS SUBMITTALS. NOTIFY ENGINEER OF ANY CONFLICTS BETWEEN EQUIPMENT SUBMITTALS AND ELECTRICAL DRAWINGS. WHERE CIRCUIT SIZES ARE SHOWN ON THE ELECTRICAL DRAWINGS THAT DIFFER FROM WHAT IS INDICATED ON THE MECHANICAL SCHEDULES, PROVIDE THE CIRCUIT OF HIGHER AMPACITY.
10. REFER TO TEMPERATURE CONTROLS SHEETS FOR REQUIRED MOTOR CONTROLLERS. PROVIDE ALL ACCESSORIES INDICATED.
11. THE DESIGN INTENT OF THE PROJECT IS FOR ALL RACEWAYS, BOXES AND CABLING SYSTEMS BE INSTALLED CONCEALED IN CEILING AND WALL CONSTRUCTION WITH THE EXCEPTION OF NON-PUBLIC ROOMS (I.E. BASEMENT). WHERE THE EXISTING CONDITIONS ARE SUCH THAT IT IS NOT FEASIBLE TO CONCEAL THE RACEWAYS, BOXES AND CABLING SYSTEMS, THE ELECTRICAL CONTRACTOR SHALL NOTIFY THE ARCHITECT OF THE CONDITION AND SEEK AN ACCEPTABLE REMEDY PRIOR TO THE INSTALLATION OF ANY RACEWAYS, BOXES AND CABLING SYSTEMS.
12. FIRE ALARM SHALL BE INSTALLED BY TROY MUSEUM.
13. ALL LIGHTING FIXTURES WITH AN "E" SUFFIX SHALL BE CONTROLLED BY THE LIGHTING CONTROL IN THE SPACE, BUT SHALL BE POWERED BY BOTH THE NORMAL POWER CIRCUIT, AS WELL AS THE LIGHTING INVERTER, VIA AN EMERGENCY LOAD TRANSFER DEVICE. TRANSFER DEVICES SHALL BE LOCATED IN THE BASEMENT NEAR THE PANELBOARD AND SHALL BE LABELED USING OWNER'S FINAL ROOM DESIGNATIONS. ALL EXIT SIGNS SHALL BE CIRCUITED TO THE LIGHTING INVERTER.
14. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH OWNER'S SECURITY AND FIRE ALARM VENDER TO INSTALL WIRING AND BOXES FOR THE FIRE ALARM DEVICES, AS WELL AS POWER TO THE FIRE ALARM AND SECURITY PANELS.

(#) CONSTRUCTION KEY NOTES:

1. CIRCUIT ALL EMERGENCY LIGHTING TO A NEW BODINE ELI-S-400 OR EQUAL INVERTER FOR EMERGENCY OPERATION THROUGH AN ELTD. ELTD SHALL BE COMPATIBLE WITH INSTALLED DIMMERS WHERE APPLICABLE. INSTALL THE INVERTER ADJACENT TO THE PANEL IN THE BASEMENT.
2. PROVIDE AN INTERMATIC ST01C OR SIMILAR ASTRONOMIC IN-WALL TIMER FOR CONTROL OF EXTERIOR LIGHTING. PROVIDE AN ALCR ON THE CIRCUIT TO ALLOW TRANSFER OF EMERGENCY LIGHTING FIXTURES TO THE LIGHTING INVERTER UPON LOSS OF NORMAL POWER. CIRCUIT TO THE CIRCUIT INDICATED AND THE LIGHTING INVERTER. MOUNT THE EXTERIOR LIGHTING TIMER ADJACENT TO THE PANELBOARD IN THE BASEMENT.
3. THIS FIXTURE WILL BE SELECTED BY THE OWNER. COORDINATE HEIGHT OF J-BOX WITH OWNER. 10-WATT LED LAMP MAXIMUM. CIRCUIT TO ASTRONOMIC TIMECLOCK, NORMAL CIRCUIT, AND EMERGENCY LIGHTING CIRCUIT WITH ALCR (SEE CONSTRUCTION NOTE 2)

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PBA Project No.: 2019.0069

SEAL

REVISIONS		
1	ISSUED FOR BIDS	09/30/2019

DATE	PROJ NUMBER	ARCH	PROJ MGR	CADD
09/30/2019	0728-18-0020	C O	EMG	EMG

City of Troy, Michigan
Niles-Barnard House Renovation
60 W. Wattles Road

FIRST FLOOR ELECTRICAL NEW WORK PLAN

SHEET E2.1

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EXISTING PANELBOARD RP-A

#	LOAD TYPE	DESCRIPTION	CB TYPE	CB	VA	ØA	ØB	ØC	VA	CB	CB TYPE	DESCRIPTION	LOAD TYPE	#
1	R	PANEL GFCI	EXIST	20	180	180				20	EXIST	FURNACE	C	2
3	R	RECEPTS - HALL AND STORAGE	EXIST	20	720		2160		1440	20	EXIST	CLOSET, ROOM K, TOILET	R	4
5	C	SUMP	EXIST	20						20	EXIST	PARKING LOT LIGHTS	L	6
7	L	LIGHTS - BASEMENT	EXIST	20	1595	2855			1260	20	EXIST	TOILET, CLOSET, ROOM J	R	8
9	L	LIGHTS - FIRST FLOOR WEST	EXIST	20	1333		2413		1080	20	NEW	ROOM L & ROOM I	R	10
11	L	RECEPTS - TOILETS	EXIST	20	540			1740	1200	20	NEW	MICROWAVE	K	12
13	K	REFRIGERATOR	NEW	20	1000	1360			360	20	NEW	GENERAL RECEPTACLE	R	14
15	K	WARMING COUNTER	NEW	20	1000		2000		1000	20	NEW	DISPOSAL	K	16
17	R	RECEPTS - ROOM C AND B	NEW	20	1260			2260	1000	20	NEW	WARMING COUNTER	K	18
19	R	RECEPTS - OUTISDE GFCI	NEW	20	360	900			540	20	NEW	RECEPTS - BASEMENT	R	20
21		SPARE	NEW	20			1000		1000	20	NEW	ICE MAKER	K	22
23	NC	F-1	NEW	20	1411			2411	1000	20	NEW	FTR-1 RECEPTACLES	R	24
25	NC	LIGHTING - FIRST FLOOR EAST	NEW	20	1176	1231			55	15	NEW	EF-1/2	NC	26
27	NC	SPARE	NEW	20			1800		1800	20	NEW	ECUH-1	M	28
29	NC	F-2	NEW	20	1411			3211	1800	20	NEW	ECUH-2	M	30
31	NC	AC-1	NEW	60	3432	3882			450	20	NEW	LIGHTING INVERTER	C	32
33	NC		NEW		3432		3432					SPACE		34
35	M	ERU-1	NEW	15	500			500				SPACE		36
37	M		NEW		500	500						SPACE		38
39	R	RECEPTS - ROOM A, ROOM F	NEW	20	900		900					SPACE		40
						10908 ØA	13705 ØB	10122 ØC						

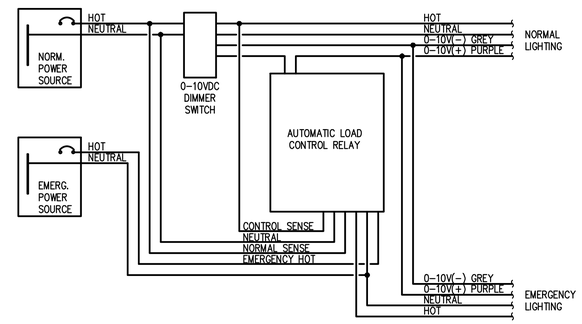
PANELBOARD INFORMATION

VOLTAGE: 208Y/120
BUS AMPACITY: 225A
MAIN TYPE: 200A MCB
MINIMUM A.I.C.:
MOUNTING: SURFACE

PANELBOARD LOCATION

BRANCH CIRCUIT CONNECTED LOAD:		FEEDER DEMAND LOAD:		OVERCURRENT LOAD:	
CONTINUOUS LOAD (C):	450	X 125%	563	X 100%	563
NON-CONTINUOUS LOAD (NC):	10917	X 100%	10917	X 100%	10917
KITCHEN LOAD (K):	6200	X 70%	4340	X 100%	4340
RECEPTACLE BASE LOAD (R):	9100	X 100%	9100	X 100%	9100
RECEPTACLE DEMAND LOAD (R):		X 50%		X 100%	
LIGHTING LOAD (L):	3468	X 100%	3468	X 125%	4335
TRACK LIGHTING (T):		(150VA/2FT)		X 125%	
MOTORS, HIGHEST LOAD (MH):		X 125%		X 100%	
MOTORS, REMAINING LOAD (M):	4600	X 100%	4600	X 100%	4600
TOTAL(KVA):	34.74	TOTAL(KVA):	32.99	TOTAL(KVA):	33.85
TOTAL (AMPS):	96.42	TOTAL (AMPS):	91.57	TOTAL (AMPS):	93.97

NOTES:



AUTOMATIC LOAD CONTROL RELAY FOR 0-10V DIMMING

NO SCALE

NOTES:

1. BASIS OF DESIGN IS LVS CONTROLS EPC-2-D. REFER TO SPECIFICATIONS FOR APPROVED MANUFACTURERS. ADJUST WIRING AS NECESSARY FOR OTHER APPROVED MANUFACTURERS.
2. PROVIDE ONE AUTOMATIC LOAD CONTROL RELAY PER SWITCHING CIRCUIT.

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ELECTRICAL PANEL SCHEDULES, DETAILS, AND DIAGRAMS

SHEET E7.1