NOVA PARKS

ATRIUM BUILDING ROOF REPLACEMENT

MEADOWLARK GARDENS
9750 MEADOWLARK GARDENS COURT
VIENNA, VA 22182

BID & PERMIT SUBMISSION O2 / 04 / 2021

ARCHITECT

ZHA ARCHITECTS, PC

4031 UNIVERSITY DRIVE, SUITE 100
FAIRFAX, VA 22030
TEL. (703) 352-1933
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OWNER

NOVA PARKS

5400 OX ROAD
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MECH/ELECT

R.G. VANDERWEIL ENGINEERS, LLP

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ABBREVIATIONS

(SOME ABBREVIATIONS SHOWN BELOW MAY NOT APPEAR ON THIS SET OF DRAWINGS)

A.B.	ANCHOR BOLT
A/C	AIR CONDITION
A.F.F.	ABOVE FINISH FLOOR
ALT.	ALTERNATE
ALUM.	ALUMINUM
APPROX.	APPROXIMATE
ARCH.	ARCHITECTURAL
AUX.	AUXILIARY
ATTEN.	ATTENUATION
BD.	BOARD
BIT.	BITUMINOUS
BLK'G.	BLOCKING
B.O.	BOTTOM OF
BM.	BEAM
BOT., BOTT.	BOTTOM
BR.	BRICK
BRZ.	BRONZE
BU.	BUILT-UP
C	COURSING
CER.	CERAMIC
C, COND.	CONDUIT
C.J.	CONTROL JOINT
CLG.	CEILING
CLR.	CLEAR
CMU	CONCRETE MASONRY UNIT
C.O.	CLEAN OUT
COL.	COLUMN
CONC.	CONCRETE
CONN.	CONNECTION
CONT.	CONTINUOUS
CONTR.	CONTRACTOR
C.T.	CERAMIC TILE
CTR.	CENTER
C.W.	COLD WATER
DBL.	DOUBLE
DET.	DETAIL
DIA.	DIAMETER, DIAGRAM
DN.	DOWN
DTLS.	DETAILS
DWG.	DRAWING
EA.	EACH
EF.	EXHAUST FAN
E.J.	EXPANSION JOINT
ELECT.	ELECTRIC
ELEV., EL.	ELEVATION
EQ.	EQUAL
EQUIP.	EQUIPMENT
E.W.	EACH WAY
E.W.C.	ELECTRIC WATER COOLER
EXT.	EXTERIOR
EXIST.	EXISTING
F.C.	FIRE CODE
F.D.	FLOOR DRAIN
F.E.	FIRE EXTINGUISHER
FIN.	FINISH
FF.	FINISH FLOOR
FLR.	FLOOR
FIXT.	FIXTURE
F.O.M.	FACE OF MASONRY
F.O.S.	FACE OF STUD
F.R.	FIRE RETARDANT
F.R.P.	FIBERGLASS REINFORCED PANEL
FRTW.	FIRE RETARDANT TREATED WOOD
F.S.	FLOOR SINK
FT.	FOOT
FTG.	FOOTING
F.V.	FIELD VERIFY PRIOR TO CONSTRUCTION
GA.	GAUGE
GALV.	GALVANIZED
G.C.	GENERAL CONTRACTOR
GOVT.	GOVERNMENT
G.P.M.	GALLONS PER MINUTE
GRD.	GROUND
G.W.	GREASY WASTE
GYP.	GYPSUM
H.B.	HOSE BIB
H.C.	HOLLOW CORE
H.D.	HAND DRYER
HEX.	HEXAGONAL
H.M.	HOLLOW METAL
H.C.	HANDICAP
HR.	HOUR
HT., HGT.	HEIGHT
H.W.	HOT WATER
ICF	INSULATION CONCRETE FORMS
I.D.	INSIDE DIAMETER
IN.	INCH
INT.	INTERIOR
INSUL.	INSULATION
JAN.	JANITOR
JST.	JOIST
JSTS.	JOISTS
JT.	JOINT
K.O.	KNOCK OUT
L	LONG
LAM.	LAMINATE
LAV.	LAVATORY
L.L.H.	LONG LEG HORIZONTAL
L.L.V.	LONG LEG VERTICAL
LOC.	LOCATION
L.P.	LOW POINT
LT.	LIGHT
MAS.	MASONRY
MAT'L.	MATERIAL
MAX.	MAXIMUM
MECH.	MECHANICAL
MEMB.	MEMBRANE
MEZZ.	MEZZANINE
MFR.	MANUFACTURER
MIN.	MINIMUM
MISC.	MISCELLANEOUS
MTD.	MOUNTED
MTL.	METAL
N.I.C.	NOT IN CONTRACT
NO., #	NUMBER
NOM.	NOMINAL
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
OFF.	OFFICE
O.H.	OVER HEAD
O/O	OUT-TO-OUT
OPNG.	OPENING
OPP.	OPPOSITE
PL.	PLATE
PLYWD.	PLYWOOD
PLWD.	PLYWOOD
P.O.S.	POINT OF SALE
PREFAB.	PREFABRICATED
P.S.F.	POUNDS PER SQ. FOOT
P.S.I.	POUNDS PER SQ. INCH
P.T.	PRESSURE TREATED
PTD.	PAINTED
PTN.	PARTITION
P.V.C.	POLYVINYL CHLORIDE
RAD. (R)	RADIUS
RD.	ROOF DRAIN
REBAR	REINFORCING BAR
RECEPT.	RECEPTACLE
REF.	REFERENCE
REINF.	REINFORCING
REQ'D.	REQUIRED
REV.	REVISED, REVISION
RM.	ROOM
R.O.	ROUGH OPENING
S	SOUTH
SAT	SUSPENDED ACOUSTICAL TILE
S.C.	SOLID CORE
SHT.	SHEET
SPEC.	SPECIFICATION / PROJECT MANUAL
S/S, S.S.	STAINLESS STEEL
STD.	STANDARD
STOR.	STORAGE
STL.	STEEL
STRUCT.	STRUCTURAL
SURF. MTD.	SURFACE MOUNTED
SUSP.	SUSPENDED
TOI	TOILET
TEL.	TELEPHONE
TEMP.	TEMPERATURE
THRU	THROUGH
T&G	TONGUE AND GROOVE
T.O.S.	TOP OF STEEL
TYP.	TYPICAL
U.C.	UNDER CUT
U.L.	UNDERWRITERS LABORATORY
U.O.N.	UNLESS OTHERWISE NOTED
UR.	URINAL
UTIL.	UTILITY
V.C.T.	VINYL COMPOSITION TILE
VEN.	VENEER
VENT.	VENTILATION
VERT.	VERTICAL
VEST.	VESTIBULE
V.I.F.	VERIFY IN FIELD
V.R.	VAPOR RETARDER
V.T.R.	VENT THRU ROOF
V.W.C.	VINYL WALL COVERING
W/	WITH
W.C.	WATER CLOSET
WD.	WOOD
W.H.	WATER HEATER
W/O	WITHOUT
W.P.	WATER PROOF
W.W.F.	WELDED WIRE FABRIC
W.W.M.	WELDED WIRE MESH
△	ANGLE
@	AT
℄	CENTER LINE
ø	DIAMETER

PROJECT DATA

PROJECT — ATRIUM BUILDING ROOF REPLACEMENT
MEADOWLARK GARDENS
9750 MEADOWLARK GARDENS CT.
VIENNA, VA 22182
TELEPHONE: 703-255-3631

OWNER — NORTHERN VIRGINIA REGIONAL PARK AUTHORITY
5400 OX ROAD, FAIRFAX STATION, VA 22039
TELEPHONE: 703.352.5900

ARCHITECT — ZHA ARCHITECTS INC.
4031 UNIVERSITY DRIVE, SUITE 100
FAIRFAX, VA 22030
TELEPHONE: 703.352.1933

SCOPE OF WORK

REPLACEMENT OF EXISTING ROOF TOP HVAC EQUIPMENT, ASSOCIATED DUCT AND ELECTRICAL WORKS.

IN THE FLAT ROOF AREA, REPLACEMENT OF EXISTING MEMBRANE ROOFING, ASSOCIATED FLASHING AND PENETRATION PROTECTION. EXTENSION OF EQUIPMENT CURB.

IN THE STANDING SEAM METAL ROOF AREA, REPLACEMENT OF PENETRATION PROTECTION, REPLACEMENT OF GUTTER LINER AND REPLACEMENT OF ROOF DRAIN COVERS.

DRAWING HIERARCHY

1. DO NOT SCALE THE DRAWINGS

2. NOTES APPLIED TO AN ELEMENT OF DRAWING SHALL APPLY TO ALL SIMILAR INSTANCES OF THAT ELEMENT IN OTHER DRAWINGS UNLESS NOTED OTHERWISE.

3. DOCUMENT INTERPRETATIONS IN THE EVENT OF CONFLICTING INFORMATION SHALL BE RESOLVED AS FOLLOWS:

- IN THE EVENT OF SMALL SCALE DRAWING CONFLICTS WITH LARGE SCALE DRAWING - THE LARGE SCALE DRAWING PREVAILS.
- IF A DRAWING CONFLICTS WITH A SCHEDULE THE SCHEDULE PREVAILS.
- IF A DRAWING OR SCHEDULE CONFLICTS WITH THE SPECIFICATIONS, THE SPECIFICATIONS PREVAIL
- IN THE EVENT OF A VARIANCE, ADDENDA PREVAIL OVER SPECIFICATIONS, DRAWINGS AND SCHEDULES
- IN THE EVENT OF A VARIANCE, REVISIONS PREVAIL OVER ADDENDA, SPECIFICATIONS, DRAWINGS AND SCHEDULES

CODES

- VIRGINIA UNIFORM STATEWIDE BUILDING CODE 2015
- INTERNATIONAL BUILDING CODE 2015
- INTERNATIONAL PLUMBING CODE 2015 (IPC)
- INTERNATIONAL MECHANICAL CODE 2015 (IMC)
- INTERNATIONAL FUEL GAS CODE 2015 (IFGC)
- INTERNATIONAL FIRE PREVENTION CODE 2015 + CH. 62 COUNTY CODE
- INTERNATIONAL ENERGY CONSERVATION CODE 2015
- ACCESSIBLE AND USEABLE BUILDINGS AND FACILITIES ICC/ANSI A117.1 2009

GENERAL NOTES

1. GENERAL CONTRACTOR SHALL FURNISH ALL LABOR AND MATERIALS NECESSARY FOR COMPLETE INSTALLATION AS DETAILED HEREIN. EACH CONTRACTOR SHALL RESPECT THE WORK OF OTHER CONTRACTORS AND IS RESPONSIBLE FOR AND LIABLE TO REPAIR OR REPLACE ANY DAMAGE CAUSED BY HIS WORK.

2. THE GENERAL CONTRACTOR SHALL PROVIDE ON-SITE WEATHER-PROTECTED STORAGE SPACE IN LOCATION DIRECTED BY OWNERS REPRESENTATIVE.

3. ALL WORK SHALL BE PERFORMED IN STRICT COMPLIANCE WITH LOCAL AND STATE CODES AND REGULATIONS HAVING JURISDICTION. THE CONTRACTOR SHALL PROTECT AND INDEMNIFY THE OWNER AND ARCHITECT AGAINST ANY CLAIM OR LIABILITY ARISING FROM VIOLATION OF ANY SUCH CODE OR REGULATION.

4. THE GENERAL CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED PERMITS, INSPECTIONS, AND APPROVALS.

5. WORKMANSHIP SHALL BE OF THE HIGHEST TYPE, AND MATERIALS USED OR SPECIFIED OF THE BEST QUALITY THAT THE MARKET AFFORDS. ALL INSTALLATIONS AND APPLICATIONS SHALL CONFORM TO THE MANUFACTURER'S SPECIFICATIONS.

6. THE GENERAL CONTRACTOR SHALL COORDINATE THE WORK OF ALL SUBCONTRACTORS FOR TRADES WHETHER THEY RECEIVE THEIR CONTRACT FROM THE CONTRACTOR OR OWNER. THE GENERAL CONTRACTOR'S INSTRUCTIONS SHALL BE FOLLOWED BY ALL TRADES.

7. THE MECHANICAL AND ELECTRICAL TRADES SHALL PREPARE ALL DRAWINGS REQUIRED TO SECURE A PERMIT FOR THEIR PORTION OF THE WORK. INSTALL THEIR WORK AS RAPIDLY AS THE OTHER WORK PERMITS, AND SHALL COMPLETE THE WORK BY THE TIME THE OTHER TRADES HAVE FINISHED.

8. EXAMINATION OF SITE AND DOCUMENTS: THE GENERAL CONTRACTOR, BEFORE SUBMITTING HIS PROPOSAL, SHALL VISIT THE SITE AND EXAMINE FOR HIMSELF ALL EXISTING CONDITIONS AND LIMITATIONS WHICH AFFECT THE CONTRACT. HE SHALL CAREFULLY EXAMINE ALL CONTRACT DOCUMENTS. TITLES AND SUBDIVISIONS IN THESE DOCUMENTS ARE FOR CONVENIENCE, AND NO REAL OR ALLEGED ERRORS IN ARRANGEMENT OF DOCUMENTS SHALL BE REASON FOR OMISSION OR DUPLICATION BY ANY CONTRACTOR.

9. THE OWNER RESERVES THE RIGHT TO AWARD OTHER CONTRACTS IN CONNECTION WITH THIS WORK. THE GENERAL CONTRACTOR SHALL AFFORD OTHER CONTRACTORS REASONABLE OPPORTUNITY FOR THE EXECUTION OF THEIR WORK AND SHALL PROPERLY CONNECT AND COORDINATE HIS WORK WITH THEIRS.

10. ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE UNLESS SPECIFIED OTHERWISE FOR A LONGER PERIOD OF TIME.

11. AT THE END OF EACH DAY, CONTRACTORS SHALL REMOVE ALL THEIR TRASH AND DEBRIS FROM THE SITE AND/OR WITHIN THE BUILDING (AREA SHOULD BE SWEPT CLEAN). IF TRASH AND DEBRIS ARE NOT REMOVED, THE OWNER MAY (AT HIS OPTION) PAY FOR ITS REMOVAL AND BACK CHARGE THE CONTRACTOR.

12. THE GENERAL CONTRACTOR SHALL COORDINATE THE LOCATION AND SIZE OF OPENINGS FOR VENTS, PIPES, INSERTS, BOXES, HANGERS, ETC.

13. THE GENERAL CONDITIONS FOR THIS CONTRACT SHALL BE AS CONTAINED IN THE BID DOCUMENTS

14. ALL ERECTION, DETAILS, MATERIALS, METHODS, ETC., SHOWN AND/OR NOTED ON ANY PLAN OR SECTION SHALL APPLY TO ALL OTHER SIMILAR LOCATIONS UNLESS OTHERWISE NOTED.

15. THE GENERAL CONTRACTOR SHALL SAFELY SHORE, BRACE, OR SUPPORT ALL WORK AS REQUIRED. THIS WORK SHALL BE THE FULL RESPONSIBILITY OF THE GENERAL CONTRACTOR AND NO ACT, DIRECTION, OR REVIEW OF ANY SYSTEM OR METHOD BY THE ARCHITECT SHALL RELIEVE THE CONTRACTOR OF THIS RESPONSIBILITY. ALL NEW CONSTRUCTION WORK IS TO BE PERFORMED IN STRICT ACCORDANCE WITH THE PROVISIONS LISTED UNDER CHAPTER 33 OF IBC 2012. CONTRACTOR SHALL FOLLOW SAFETY GUIDELINES ESTABLISHED BY OSHA AND OTHER LOCAL AND FEDERAL GUIDELINES.

16. IT IS NOT THE INTENT OF THESE DRAWINGS TO SHOW OR INDICATE ALL FASTENING OR FRAMING TECHNIQUES AND/OR DEVICES, OR TO SHOW ALL CONDITIONS PRESENT.

17. PROVIDE FIRE STOPPING AT PENETRATIONS THROUGH ANY EXISTING FIRE RATED ASSEMBLIES AROUND VENTS, PIPES, HIGH AND LOW VOLTAGE ELECTRICAL WIRING, DUCTS CHUTES THROUGH CEILINGS, FLOORS AND WALLS WITH UL TESTED AND APPROVED MEANS OF PENETRATION PROTECTION SYSTEM THAT INCLUDES FIRE SAFING AND PROTECTIVE COLLAR AS APPLICABLE.

18. CONCEALED INSULATION SHALL COMPLY WITH IBC 2015 TO HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25 AND SMOKE DEVELOPED INDEX OF NOT MORE THAN 450.

PHASING

1. GENERAL CONTRACTOR SHALL SUBMIT AN ALTERNATE BID TO COMPLETE THE WORK IN 5 SEPARATE PHASES. PHASE LOCATIONS HAVE BEEN IDENTIFIED ON MECHANICAL DRAWING M201 - DETAIL 5. PURPOSE OF THIS PHASING IS TO KEEP PORTIONS OF THE BUILDING IN OPERABLE CONDITION WHILE THE PROJECT IS IN PROGRESS.

2. INTEGRITY OF THE NEW ROOF IS IMPORTANT. GC SHALL OBTAIN RECOMMENDATIONS FROM THE ROOF MEMBRANE MANUFACTURER AND SUBMIT TO THE OWNER A NARRATIVE ON HOW THE JOINTS BETWEEN THE MEMBRANE INSTALLED IN SEPARATE PHASES BE TREATED. A DETAIL SEQUENCING FOR EACH PHASE AND FOR THE TOTAL PROJECT SHALL BE SUBMITTED IN THE FORM OF A SCHEDULE.

3. THE NORTH SIDE NARROW ROOF WORK SHALL BE COMBINED WITH THE AREA IDENTIFIED AS PHASE 5, THERE IS NO EQUIPMENT IN THIS AREA. AT GC'S OPTION THIS AREA CAN BEE COMBINED WITH ANY PHASE OF HIS CHOICE.

4. ANY SUGGESTED IMPROVEMENT TO THIS PHASING PLAN SHALL BE CONSIDERED BY THE OWNER, HOWEVER, ONLY AFTER THE AWARD OF THE CONTRACT.

CODE ANALYSIS

BUILDING WAS BUILT UNDER BOCA 1993/ VUSBC 1993. CODE INFORMATION NOTED BELOW IS ONLY TO SHOW IT'S CONFORMANCE TO THE CURRENT BUILDING CODE.

USE GROUP (IBC 303.4) — A-3 (EXISTING)

SPRINKLERED (IBC 903.2)	REQUIRED	PROVIDED
	OPTIONAL	YES (EXISTING)

BUILDING AREA (IBC TABLE 506.2)		ALLOWED/MAXIMUM	PROVIDED
FIRST FLOOR	G5F	24,000	9849 (EXISTING)

BUILDING HEIGHT (IBC TABLE 504.3 and 504.4)	ALLOWED/MAXIMUM	PROVIDED
	60' (2 STORIES)	27' / 1 STORY(EXISTING)

TYPE OF CONSTRUCTION (IBC 602.3)	PROVIDED
COMBUSTIBLE (NO MODIFICATION TO THE TYPE OF CONSTRUCTION)	5B (EXISTING)

FIRE RESISTANCE RATINGS (IBC TABLE 601)	REQUIRED/MINIMUM	EXISTING
STRUCTURAL FRAME	0 HOUR	0 HOUR
BEARING WALLS		
-INTERIOR	0 HOUR	0 HOUR
-EXTERIOR	0 HOUR	0 HOUR
NON-BEARING WALLS		
-INTERIOR	0 HOUR	0 HOUR
-EXTERIOR	0 HOUR	0 HOUR
FLOOR CONSTRUCTION	0 HOUR	0 HOUR
ROOF CONSTRUCTION	0 HOUR	0 HOUR
(NO MODIFICATION TO EXISTING FIRE RATINGS)		

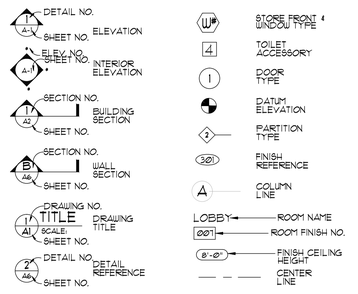
CALC. OCCUPANT LOAD (IBC 1004.1.2)	MAXIMUM (SF/OCC)
(NO CHANGE IN EXISTING OCCUPANT LOAD)	EXISTING
1ST FLOOR	

EGRESS WIDTH (IBC 1005)		REQUIRED/MINIMUM	PROVIDED
STAIRS (81 X Ø.3 = 222)	WITH SPRINKLER	44 INCHES	44 INCHES
DOORS (81 X Ø.15 = 111)	WITH SPRINKLER	32 INCHES	36 INCHES
(NO CHANGE TO EXISTING EGRESS CONDITION)			

INTERIOR FINISHES (IBC CH. 8)		REQD/MIN	PROVIDED
VERTICAL EXITS & PASSAGEWAYS	W/SPRINKLER	B	B
EXIT ACCESS CORRIDORS	W/SPRINKLER	C	C
ROOM & ENCLOSED SPACES	W/ SPRINKLER	C	C

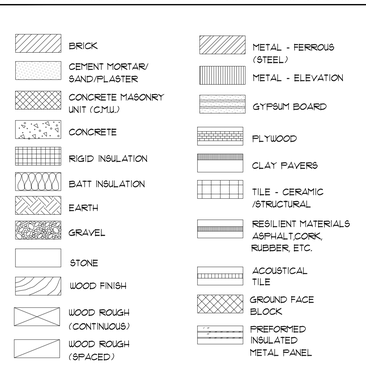
SYMBOLS

(SOME SYMBOLS SHOWN BELOW MAY NOT APPEAR ON THIS SET OF DRAWINGS)



MATERIALS

(SOME MATERIALS SHOWN BELOW MAY NOT APPEAR ON THIS SET OF DRAWINGS)



DRAWING INDEX

SEQUENCING

THE FOLLOWING IS ONLY A RECOMMENDATION. THE GC MAY WANT TO DEVELOP HIS OWN SEQUENCE FOR THE CONSTRUCTION AND PRESENT TO THE OWNER, OWNER'S AGREEMENT TO ANY SUCH PROPOSAL WOULD BE REQUIRED.

1. CLEAN ALL LOOSE ELEMENTS AND DEBRIS FROM THE ROOF SURFACE.

2. DISCONNECT ALL UTILITIES.

3. DISCONNECT DUCTS WHERE INDICATED ON THE DRAWING

4. REMOVE HVAC EQUIPMENT.

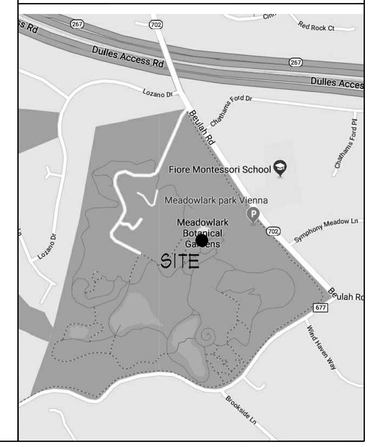
5. REMOVE ROOFING MEMBRANE, FLASHING AND OTHER ROOFING ACCESSORIES. PREPARE SURFACE FOR NEW INSTALLATION.

6. INSTALL ROOFING SYSTEM, GUTTER LINER AND OTHER ROOFING ACCESSORIES.

7. INSTALL NEW HVAC EQUIPMENT AND ALL REQUIRED ACCESSORIES.

8. RECONNECT UTILITIES TO MAKE EQUIPMENT OPERATIONAL. TEST ALL AND DEMONSTRATE OPERATIONAL PROCEDURES TO THE OWNER'S REPRESENTATIVE.

LOCATION MAP



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COMMONWEALTH OF VIRGINIA
CLIFFORD E. HURDLE
No. 0401.016732
REGISTERED ARCHITECT

REVISION	DATE	DESCRIPTION
	01/29/2021	BID & PERMIT SUBMISSION
	01/13/2021	90% DESIGN DOCUMENT SUBMISSION

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

ATRIUM BUILDING ROOF REPLACEMENT
MEADOWLARK GARDENS, FAIRFAX, VA

PROJECT NUMBER: 20105 — SCALE: AS SHOWN

PROJECT INFO, CODE ANALYSIS
DRAWING INDEX & SYMBOLS

CS.2

PLOTTED DATE:

SECTION 011100 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
A. This Section includes the following:
1. Work covered by the Contract Documents.
2. Type of the Contract.
3. Use of premises.
4. Work restrictions.
5. Specification formats and conventions.

1.3 WORK COVERED BY CONTRACT DOCUMENTS
A. Project Identification: Atrium Building Roof Replacement
1. Project Location: Meadowlark gardens, 9750 Meadowlark Garden Ct., Vienna, VA 22182
B. Owner: NOVA Parks
Owner's Representative: Mr. Todd Hafner, Senior Project Manager
NOVA Parks
5400 Ox Road, Fairfax Station, Virginia 22039
Email: thafner@nvrpa.org
Phone: 703-795-2297
C. Architect: ZHA Architects, PC, 4031 University Drive, Suite 100, Fairfax, VA 22030
D. The Work consists of the following:
1. The Work generally includes considerable selective demolition of the roofing including replacement of rooftop HVAC equipment and electrical components for the same. Work to generally include but not limited to; sheet metal work, Mechanical, Electrical and all other roofing related tasks.

1.4 TYPE OF CONTRACT
A. Project will be constructed under a single prime contract.

1.5 USE OF PREMISES
A. General: Contractor shall have full use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
B. Use of Site: Limit use of premises to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
C. Use of Existing Building: Maintain existing building in a weathertight condition throughout construction period. Repair damage caused by construction operations. Protect building during construction period.

1.6 WORK RESTRICTIONS
A. On-Site Work Hours: Work shall be generally performed inside the existing building during normal business working hours of 7:00 a.m. to 4:30 p.m., Monday through Friday, except otherwise indicated.
1. Weekend Hours: Only as approved by owner's representative.

1.7 SPECIFICATION FORMATS AND CONVENTIONS
A. Specification Format: The Specifications are provided in drawings and organized into Divisions and Sections using the 48-division format and CSI/CSC's "MasterFormat" numbering system.
1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. If necessary, insert paragraphs that explain Section-numbering and page-numbering systems used; add an explanation of line-numbering or alphanumeric paragraph-outline system used in the Specifications and the method of text subordination.
B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used)
END OF SECTION

SECTION 013300 - SUBMITTAL AND SUBSTITUTION PROCEDURES GENERAL

PART 1 GENERAL
1.01 SUMMARY

A. Section Includes:
1. Wherever possible throughout the Contract Documents, the minimum acceptable quality of workmanship and materials has been defined either by manufacturer's name and catalog number or reference to recognized industry standards.
2. To ensure that the specified products are furnished and installed in accordance with the design intent, procedures have been established for advance submittal of design data for its review and approval or rejection by the Architect.
3. This Section specifies administrative and procedural requirements for submittals required for performance of the work, including:
a. Contractor's Progress Schedule
b. Shop Drawings, Product Data, and Samples
c. Letters of Conformance
d. Certificates
e. Manufacturer Installation Instructions
4. Substitution Procedures
5. Manuals
6. Miscellaneous Submittals
B. Related Documents:
1. Letter of Conformance Form
2. Contractor's Substitution Request Form
C. Related Sections:
1. Contractual Requirements for Submittals: General Conditions
a. Two (2) copies of all Submittals, plus number of copies to be returned to Contractor, shall be submitted unless otherwise specified.
b. Provide additional copies as required for use in Project Record Documents.
2. Section 01 77 00 (01770) - Contract Closeout
3. Individual Submittals Required: Pertinent Sections of these Specifications.

1.02 SUBMITTALS

A. Coordination: Coordinate preparation and processing of Submittals with performance of construction activities. Transmit each Submittal sufficiently in advance of performance of related construction activities to avoid delay.
1. Coordinate each Submittal with fabrication, purchasing, testing, delivery, other Submittals and related activities that require sequential activity.
2. Coordinate transmittal of different types of Submittals for related elements of the work so processing will not be delayed by the need to review Submittals concurrently for coordination.
a. The Architect reserves the right to withhold action on a Submittal requiring coordination with other Submittals until related Submittals are received.
b. No extension of Contract Time will be authorized because of failure to transmit Submittals to the Owner's Representative sufficiently in advance of the work to permit processing.
B. Deliver Submittals to the Architect.
C. Submittal Preparation: Place a permanent label or title block on each Submittal for identification. Indicate the name of the entity that prepared each Submittal on the label or title block.
1. Provide a space approximately 10" x 10" on the label or beside the title block on Shop Drawings to record the Contractor's and Architect review and approval markings and the action taken.
2. Include the following information on the label for processing and recording action taken:
a. Project Name
b. Name of the Owner
c. Date
d. Name and Address of Architect
e. Name and Address of Contractor
f. Name and Address of Subcontractor or Vendor
g. Location Where Item is to be Used
h. Name of Manufacturer
i. Drawing Number and Detail References, as Appropriate
j. Certification by the Contractor
D. Submittal Transmittal: Package each Submittal appropriately for transmittal and handling. Transmit each Submittal from Contractor to Architect. Submittals received from sources other than the Contractor will be returned without action.
1. Transmit each submittal to the Architect with "AIA Document G810 - Transmittal Letter" and "Letter of Conformance".
2. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
3. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.
4. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that Contractor has reviewed the Submittal and verified that the information submitted complies with the Specifications and all other Contract Document requirements.
5. After Architect's review of Submittal, revise and resubmit as required, identifying changes made since previous Submittal.
6. When re-submittal is required for any reason, transmit under new letter of transmittal, indicating by reference to a previous Submittal that this is a re-submittal.
a. Identify on submittal all changes made since previous submission.
7. Distribute copies of reviewed Submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

All Submittals shall bear the stamp of approval of the Contractor submitting same as evidence that they have been checked by him, or they will be rejected.
a. Must be signed or initialed certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.
9. Schedule submittals to expedite the Project, and deliver to Architect. Coordinate submission of related items. Instruct parties to promptly report any inability to comply with provisions.

1.03 PROGRESS SCHEDULES
A. Submit initial Construction Progress Schedule in duplicate within 14 days after date of Owner-Contractor Contract. Submit in the form required by the General Conditions of the Contract.
B. Revise and resubmit as required.
C. Submit revised schedules with each Application for Payment, identifying changes since previous version.

1.04 LETTERS OF CONFORMANCE
A. Letter of Conformance: Short-form informational submittals which are to be used instead of shop drawings, product data and samples. They are also to be used to supplement shop drawings, product data and samples. A sample "Letter of Conformance" is located at the end of this Section. Use copies of this form for each submittal unless a more specific Letter of Conformance is located at the end of a particular Specification Section.
B. Within 30 days after date of Owner-Contractor Agreement, submit all Letters of Conformance indicating Contractor's selections for products proposed for use, with name of manufacturer, trade name, and model number of each product. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.
C. Procedure:
1. Submit the number of copies which the Contractor requires, plus two copies which will be retained by the Architect. Subject to the approval of the owner, all documents can be submitted electronically in .pdf file format would be acceptable. Scanned image of the sample in lieu of actual products would not be acceptable.
2. Submit completed Letter of Conformance for products selected as indicated within each Section.
3. Fill-in required information on form and sign in ink by person authorized to sign on behalf of the Contractor. If pdf files are submitted. Scanned or digital signatures would be acceptable.
4. Clearly identify applicable products, characteristics, models, and options. Attach supplemental information including product data to each Letter of Conformance as necessary to communicate all information specific to the product.
5. No modifications to form permitted.
6. Letters of Conformance are not to be used for substitution requests.
D. By submitting a Letter of Conformance, Contractor declares that the product identified by manufacturer's name and model number:
1. Is one of the product(s) specified
2. Is suitable for the intended use as defined within the Contract Documents, and
3. Will be provided and placed in operational condition in accordance with the Contract Documents and manufacturer's published instructions.

1.05 SHOP DRAWINGS
A. Where Shop Drawings are required, submit newly prepared information drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.
B. Shop Drawings shall be drawn at a scale to clearly indicate all of the above conditions and allow for corrections or modifications which the Architect may wish to make. The Architect shall be the sole judge as to the acceptability of manufacturer's literature and catalog sheets as Shop Drawings.
C. Shop Drawings shall clearly indicate all dimensional data for all parts of the item; types and materials for all connections; finishes; the exact relation of the item to adjacent materials and equipment in the completed structure including clearance, any necessary isolation, and fastening methods and devices; and mechanical and electrical connections.
D. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates, and similar Drawings. Include the following information:
1. Dimensions
2. Identification of Products and Materials Included
3. Compliance with Specified Standards
4. Notation of Coordination Requirements
5. Notation of Dimensions Established by Field Measurement
E. Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2" x 11", but no larger than 36" x 48".
F. Submit in the form of one reproducible transparency and one opaque reproduction, or three opaque reproductions plus required amount to be returned to Contractor. After review, reproduce and distribute to appropriate parties.
G. Do not permit Shop Drawing copies, without an appropriate final "Action" marking by the Architect, to be used in connection with the work.
H. The Contractors shall be responsible for distribution of additional prints to vendors, etc.

1.06 PRODUCT DATA
A. Where Product Data is required, collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings."
1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:
a. Manufacturer's Printed Recommendations
b. Compliance with Recognized Trade Association Standards
c. Compliance with Recognized Testing Agency Standards
d. Application of Testing Agency Labels and Seals
e. Notation of Dimensions Verified by Field Measurement
f. Notation of Coordination Requirements
g. Type and Model Numbers
2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
B. Distribution: Furnish copies of final Submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
1. Do not proceed with installation until a copy of Product Data applicable is in the installer's possession.
2. Do not permit use of unmarked copies of Product Data in connection with construction.

1.07 SAMPLES
A. Where Samples are required, submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, full color-range sets, and swatches showing color, texture, and pattern.
1. Mount, display, or package Samples in the manner specified to facilitate review of qualities indicated. Include the following:
a. Generic Description of the Sample
b. Sample Source
c. Product Name or Name of Manufacturer
d. Compliance with Recognized Standards
e. Availability and Delivery Time
2. Colors:
a. General: Unless the precise color and pattern is specifically described in the Contract Documents, whenever a choice of color or pattern is available in a specified product, submit accurate color charts and pattern charts to the Architect for his review and selection.
3. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between the final Submittal and the actual component as delivered and installed.
a. Where variation in color, pattern, texture, or other characteristics are inherent in the material or product represented, submit multiple units (not less than 3) that show approximate limits of the variations.
b. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
c. Refer to other Sections for Samples to be returned to the Contractor for incorporation in the work. Such Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample Submittals.
4. Preliminary Submittals: Where Samples are for selection of color, pattern, texture, or similar characteristics from a range of standard choices, submit a full set of choices for the material or product.
a. Preliminary Submittals will be reviewed and returned with the Architect's mark indicating selection and other action.
5. Maintain sets of Samples, as returned, at the Project site for quality comparisons throughout the course of construction.
a. Unless noncompliance with Contract Document provisions is observed, the Submittal may serve as the final Submittal.
b. Sample sets may be used to obtain final acceptance of the construction associated with each set.
B. Distribution of Samples: Prepare and distribute additional sets to Subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the work.
1. Field Samples specified in individual Sections are special types of Samples. Field Samples are full-size examples erected on site to illustrate finishes, coatings, or finish materials and to establish the standard by which the work will be judged.
a. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

1.08 CERTIFICATES
A. When specified in individual specification sections, submit certification by manufacturer to Architect, in quantities specified for Product Data.
B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect.

1.09 MANUFACTURER INSTALLATION INSTRUCTIONS
A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing to Architect.
B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

PART 2 PRODUCTS
2.01 SUBSTITUTIONS
A. Source Limitations: To the greatest extent possible for each unit of work, provide products, materials, or equipment of a singular generic kind from a single source.
B. Compatibility of Options: Where more than one choice is available as options for Contractor's selection of a product or materials, select an option which is compatible with other products and materials already selected (which may have been from among options for those other products and materials). Total compatibility among options, if not assured by limitations within contract documents, must be provided by Contractor. Compatibility is a basic general requirement of product/material selections.
C. Owner's Approval Required:
1. In addition to the following, refer to the General Conditions, Article 4, for additional requirements.
2. The Contract is based on the materials, equipment, and methods described in the Contract Documents.
3. The Contract Drawings and Specifications establish the "minimum standard of quality" each product and/or system must meet to be considered acceptable. Products of other manufacturers will be considered if the product and/or system meets or exceeds the "minimum standard of quality" established by the Contract Documents.
4. The Owner will consider proposals for substitutions under the "or approved substitution" and the "or approved equal" provision of materials, equipment, and methods, only when such proposals are accompanied by full and complete technical data and all other information required by the Owner and Architect to evaluate the proposed substitutions.
a. It will be the responsibility of the submitting Contractor to prove equality.
b. Request must include "Contractor's Substitution Request" Form, a copy of which is attached to this Section.
c. The Submittal shall include a line-by-line, item-by-item description of the specified and proposed product.
5. Requests for substitutions must be submitted to the Architect NO later than 60 days after date of Owner-Contractor Agreement.
6. DO NOT SUBSTITUTE MATERIALS, EQUIPMENT, OR METHODS UNLESS SUCH SUBSTITUTIONS HAVE BEEN SPECIFICALLY APPROVED FOR THIS WORK IN WRITING.
D. "Or Approved Equal" or "Or Approved Substitution"
1. Where the phrase "or approved equal" or "approved substitution" occurs in the Contract Documents, do not assume that material, equipment, or methods will be approved as equal by the Owner and Architect unless the item has been specifically approved for this work by the Owner.
a. Color choices will be one of the determining factors for approval.
2. The decision of the Owner will be final.
E. Availability of Specified Items:
1. Verify prior to bidding that all specified items will be available in time for installation during orderly and timely progress of the work.
2. In the event specified item or items will not be so available, so notify the Architect prior to the receipt of Bids.
3. Costs of delay caused on non-availability of specified items, when such delays could have been avoided by the Contractor, will be back-charged as necessary and shall not be borne by the Owner.
F. Whenever the Contractor secures approval for changing any items and such change involves a corresponding change or adjustment in any adjacent or related item, the responsibility for making the required change, or seeing that it is made, rests with the Contractor. The cost of these changes and/or adjustments shall be paid for by the Contractor unless it is otherwise agreed, in writing, at the time the change is approved. The acceptance of any change will not, in any way, relieve the Contractor from full compliance with the Contract Documents.

2.02 MANUALS
A. General: Where Manuals are required to be submitted covering items included in this work, prepare all such Manuals in durable plastic binders approximately 8-1/2 x 11 inches in size with at least the following:
1. Identification on or readable through the front cover stating the general nature of the Manual.
2. Neatly typewritten index near the front of the Manual furnishing immediate information as to location of all emergency data regarding the installation.
3. Complete instructions regarding operating and maintenance of all equipment involved.
4. Complete nomenclature of all replaceable parts, their part numbers, current cost, and name and address of nearest vendor of parts.
5. Copy of all guarantees and warranties issued.
6. Copy of approved Shop Drawing(s) with all data concerning all changes made during construction

2.03 MISCELLANEOUS SUBMITTALS
A. Inspection and Test Reports Not Performed by Owner: Classify each inspection and test report as being either "Shop Drawings" or "Product Data" depending on whether the report is specially prepared for the project or a standard publication of workmanship control testing at the point of production. Process inspection and test reports accordingly.

1PART 3 EXECUTION

3.01 COORDINATION OF SUBMITTALS
A. Refer to Section 005213, for requirements..
B. General: Prior to submittal for Architect's review, use all means necessary to fully coordinate all material, including the following:
1. Secure all necessary approvals from public agencies and others. Signify by stamp or other means that all required approvals have been obtained.
2. Clearly indicate all deviations from the Contract Documents.
C. The General Contractor shall submit a prioritized tabulation by date of Submittals required during the first 90 days of construction. List those Submittals required to maintain orderly progress of the work, and those required early because of long lead time for manufacture or fabrication.
1. These dates may be shown on Construction Project Schedule at Contractor's option.

3.02 TIMING OF SUBMITTALS
A. General
1. Make all Submittals enough in advance of scheduled dates for installation to provide all required time for reviews for securing necessary approvals, for possible revision and Resubmittals, and for placing orders and securing delivery.
2. In scheduling, allow a minimum of fourteen (14) full calendar days for the Architect's initial review following receipt of the Submittals. Allow additional time if the Architect requires coordination with subsequent Submittals.
a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related Submittals are received.
b. If an Intermediate Submittal is necessary, process the same as the initial Submittal. Allow fourteen (14) calendar days for reprocessing each Submittal.

LETTER OF CONFORMANCE

PROJECT: _____ PROJECT NO.: _____

CITY: _____ STATE: _____

CONTRACTOR: _____

The following product(s) has been selected for use in the above referenced project from the list of specified items.

Section Number: _____ Section Name: _____

Drawing Number(s): _____ Detail Number(s): _____

SPECIFIED ITEM TO BE USED:

_____

_____

_____

Statement of Conformance:

This Letter of Conformance is provided as a Submittal for Information in accordance with Section 01 33 00 - Submittals and Substitutions. The undersigned hereby declares that the Product identified above by manufacturer's name and model number is (one of) the product(s) specified and is suitable for the intended use as defined within the Contract Documents and will be provided and placed in operational condition in accordance with the manufacturer's published instructions and the Contract Documents.

SUBCONTRACTOR/SUPPLIER:

_____ Phone Number: ( ) _____
(Contact name of subcontractor/supplier offering above product)

_____
(Subcontractor / Supplier name and address)

CONTRACTOR:

_____ _____
(Contact name of Contractor) (Contractor signature and Title of Signatory)

CONTRACTOR'S SUBSTITUTION REQUEST
(Use separate form for each request)

Date: _____ Request No.: _____

TO: [Architect] [Owner's Representative] _____
Phone: _____ Fax: _____

PROJECT: _____ Project No.: _____
CONTRACTOR _____

SPECIFIED ITEM:
Section: _____ Page: _____ Paragraph: _____ Description: _____
Drawing Number(s): _____ Detail Number(s): _____

The undersigned request consideration of the following:

PROPOSED SUBSTITUTION: _____

REASON FOR NOT GIVING PRIORITY TO SPECIFIED ITEMS: _____

SAVINGS or CREDIT to OWNER for ACCEPTING SUBSTITUTE: $ _____

Attached data includes description, Specifications, Drawings, photographs, performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The undersigned certifies that the following paragraphs, unless modified by attachments, are correct:
1. Proposed substitution has been fully checked and coordinated with the Contract Documents.
2. The proposed substitution does not affect dimensions shown on Drawings.
3. The proposed substitution does not require revisions to mechanical or electrical work.
4. The undersigned will pay for changes to the building design, including architectural and engineering design, detailing, and construction costs caused by the requested substitution.
5. The proposed substitution will have no adverse affect on other trades, the construction schedule, or specified warranty requirements.
6. Maintenance and service parts will be locally available for the proposed substitution.

The undersigned further states that the function, appearance, and quality of the proposed substitution are equivalent or superior to the specified item.

Attachments: The attached data is furnished herewith for evaluation of the proposed substitution.
☐ Catalog ☐ Drawings ☐ Samples ☐ Reports ☐ Tests ☐ Other: _____

Submitted by:

_____ _____
(Firm) (Authorized Legal Signature)

_____ ( )
(Address) (Telephone)

For use by the Architect: ☐ Accepted ☐ Accepted as Noted ☐ Rejected: Submit Specified Item

BY: _____
(Authorized Signature)

Date: _____ Remarks: _____

END OF SECTION

SECTION 024119 - SELECTIVE DEMOLITION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specification Sections apply to work of this Section.

1.2 SUMMARY
A. This Section requires the selective removal and subsequent offsite disposal of the following:
B. Portions of existing buildings indicated on drawings and as required to accommodate new construction.
C. Relocation or temporary removal and protection of pipes, conduits, ducts, and other mechanical and electrical work.

1.3 QUALITY ASSURANCE
A. Contractor Qualifications: A company who specializes in the selective demolition of buildings with a minimum of 3 years experience on projects of a similar size and scope.

1.4 SUBMITTALS
A. Schedule indicating proposed sequence of operations for selective demolition work to Owner's Representative for review prior to start of work. Include coordination for shutoff, capping, and continuation of utility services as required.
B. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
C. Photographs of existing conditions of structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File with Owner's Representative prior to start of work.

1.5 JOB CONDITIONS
A. Occupancy: Owner will occupy portions of the building immediately adjacent to areas of selective demolition. Conduct selective demolition work in manner that will minimize need for disruption of Owner's normal operations.
B. Condition of Structures: Engineer/Architect assumes no responsibility for actual condition of items or structures to be demolished.
C. Protections: Provide temporary barricades and other forms of protection to protect Owner's personnel from injury due to selective demolition work.
D. Provide protective measures as required to provide free and safe passage of Owner's personnel to occupied portions of building.
E. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities or work to remain.
F. Protect from damage existing finish work that is to remain in place.
G. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.
H. Damages: Promptly repair damages caused to adjacent facilities by demolition work.
I. Utility Services: Maintain existing utilities to remain in service and protect them against damage during demolition operations.
J. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
K. Maintain fire protection services during selective demolition operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 PREPARATION
A. Cover and protect furniture, equipment, and fixtures from soilage or damage when demolition work is performed in areas where such items have not been removed.

3.2 DEMOLITION
A. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.
B. Demolish concrete in small sections. Cut concrete at junctures with construction to remain using power-driven masonry saw or hand tools: do not use power-driven impact tools unless authorized by Owner's Representative.
C. If unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of directive from Engineer, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

3.3 DISPOSAL OF DEMOLISHED MATERIALS
A. Remove from building site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose off site.
B. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.

3.4 CLEANUP AND REPAIR
A. General: Upon completion of demolition work, remove tools, equipment, and demolished materials from site.
B. Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain to condition existing prior to start operations.
END OF SECTION

ZHA ARCHITECTS
4031 University Drive, Suite 100, Fairfax, VA. 22030
Telephone: (703)352-1933 Fax: (703)691-9171

COMMONWEALTH OF VIRGINIA
TODD E. HURDLE
No. 0401 016732
ARCHITECT

REVISION	DATE	DESCRIPTION
DESIGNED BY:		
DRAWN BY:	07/09/2021	BID / PERMIT SUBMISSION
CHECKED BY:	07/9/2021	90% DESIGN DOCUMENT SUBMISSION
APPROVED BY:		

ATRIUM BUILDING ROOF REPLACEMENT
MEADOWLARK GARDENS, FAIRFAX, VA

PROJECT NUMBER: 20105 SCALE: AS SHOWN

SPECIFICATIONS

SP.1

PLOTTED DATE:

SECTION 070150.19 - PREPARATION FOR REROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Provisions of the Contract and of the Contract Documents apply to this Section.

1.2 SUMMARY
A. Section Includes:
1. Full tear-off of entire membrane roof.
2. Removal of base flashings.
3. Partial removal and reinstallation of metal roof for the installation of gutter liner and flashing at penetrations
B. Related Requirements:
1. Section 011000 "Summary of Work" for use of the premises and phasing requirements.

1.3 DEFINITIONS
A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.
B. Roof Tear-Off: Removal of entire existing roofing system including removal of insulation from deck/ substrate. .
C. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.
D. Existing to Remain: Existing items of construction that are not indicated to be removed.

1.4 ACTION SUBMITTALS
A. Product Data: For each type of product.
B. Shop Drawings: Include plans, sections, and details.
C. Temporary Roofing Submittal: Product data and description of temporary roofing system. If temporary roof remains in place, include surface preparation requirements needed to receive permanent roof, and submit a letter from roofing manufacturer, stating acceptance of the temporary roof and that its inclusion does not adversely affect the roofing system's resistance to fire and wind.

1.5 INFORMATIONAL SUBMITTALS
A. Qualification Data: For Installer.
1. Include certificate that Installer is approved by warrantor of existing roofing system.
2. Include certificate that Installer is licensed to perform asbestos abatement.
B. Fastener pull-out test report.
C. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, that might be misconstrued as having been damaged by reroofing operations. Submit before Work begins.
D. Landfill Records: Indicate receipt and acceptance of demolished roofing materials and hazardous wastes, such as asbestos-containing materials, by a landfill facility licensed to accept them.

1.6 QUALITY ASSURANCE
A. Installer Qualifications: Approved by warrantor of existing roofing system to work on existing roofing.
B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning roofing removal. Comply with hauling and disposal regulations of authorities having jurisdiction.
C. Reroofing Conference: Conduct pre-demolition conference at Project site.
1. Meet with Owner; Architect; Owner's insurer if applicable; testing and inspecting agency representative; roofing system manufacturer's representative; roofing Installer, including project manager, superintendent, and foreman; and installers whose work interfaces with or affects reroofing, including installers of roof deck, roof accessories, and roof-mounted equipment.
2. Review methods and procedures related to roofing system tear-off and replacement, including, but not limited to, the following:
a. Reroofing preparation, including roofing system manufacturer's written instructions.
b. Temporary protection requirements for existing roofing system components that are to remain.
c. Existing roof drains and roof drainage during each stage of reroofing, and roof- drain plugging and plug removal.
d. Construction schedule and availability of materials, Installer's personnel, equipment, and facilities needed to avoid delays.
e. Existing roof deck conditions requiring notification of Architect.
f. Existing roof deck removal procedures and Owner notifications.
g. Condition and acceptance of existing roof deck and base flashing substrate for reuse.
h. Structural loading limitations of roof deck during reroofing.
i. Base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that affect reroofing.
j. HVAC shutdown and sealing of air intakes.
k. Shutdown of fire-suppression, -protection, and -alarm and -detection systems.
l. Asbestos removal and discovery of asbestos-containing materials.
m. Governing regulations and requirements for insurance and certificates if applicable.
n. Existing conditions that may require notification of Architect before proceeding.

1.7 FIELD CONDITIONS
A. Existing Roofing System: EPDM membrane roofing.

B. Owner will occupy portions of building immediately below reroofing area. Conduct reroofing so Owner's operations are not disrupted. Provide Owner with not less than 48 hours' notice of activities that may affect Owner's operations.
1. Coordinate work activities daily with Owner so Owner can place protective dust and water-leakage covers over sensitive equipment and furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below work area.
2. Before working over structurally impaired areas of deck, notify Owner to evacuate occupants from below affected area. Verify that occupants below work area have been evacuated before proceeding with work over impaired deck area.
C. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.
D. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
E. Conditions existing at time of inspection for bidding are maintained by Owner as far as practical.
F. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.
1. Remove only as much roofing in one day as can be made watertight in the same day.

1.8 WARRANTY
A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during reroofing, by methods and with materials so as not to void existing roofing system warranty. Notify warrantor before proceeding.
1. Notify warrantor of existing roofing system on completion of reroofing, and obtain documentation verifying that existing roofing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS (NOT USED) PART 3 - EXECUTION

3.1 PREPARATION
A. Shut off rooftop utilities and service piping before beginning the Work.

B. Test existing roof drains to verify that they are not blocked or restricted. Immediately notify Architect of any blockages or restrictions.
C. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.
D. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.
E. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.
1. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new roofing system, provide alternative drainage method to remove water and eliminate ponding. Do not permit water to enter into or under existing roofing system components that are to remain.

3.2 ROOF TEAR-OFF
A. General: Notify Owner each day of extent of roof tear-off proposed for that day and obtain authorization to proceed.
B. Full Roof Tear-Off: Remove existing roofing and other roofing system components down to the deck.
1. Remove substrate board, vapor retarder, roof insulation, and cover board.
2. Remove wood blocking, curbs, and nailers.
3. Remove fasteners from deck or cut fasteners off slightly above deck surface.

3.3 DECK PREPARATION
A. Inspect deck after tear-off of roofing system.
B. If broken or loose fasteners that secure deck panels to one another or to structure are observed, or if deck appears or feels inadequately attached, immediately notify Architect. Do not proceed with installation until directed by Architect.
C. If deck surface is unsuitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with installation until directed by Architect.
D. Provide additional deck securement if indicated on Drawings.

3.4 INFILL MATERIALS INSTALLATION
A. Immediately after roof tear-off, and inspection and repair, if needed, of deck, fill in tear-off areas to match existing roofing system construction. Consult the Architect prior to any infill installation.
B. Install new roofing patch over roof infill area. If new roofing is installed the same day tear-off is made, roofing patch is not required.

3.5 BASE FLASHING REMOVAL
A. Remove existing base flashings. Clean substrates of contaminants, such as asphalt, sheet materials, dirt, and debris.
B. Do not damage metal counterflashings that are to remain. Replace metal counterflashings damaged during removal with counterflashings specified in Section 076201 "Flashing, Sheet Metal, and Roofing Accessories."
C. When directed by Architect, replace wood blocking, curbs, and nailers to comply with Section 061000 "Rough Carpentry."

3.6 DISPOSAL
A. Collect demolished materials and place in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
1. Storage or sale of demolished items or materials on-site is not permitted.
B. Transport and legally dispose of demolished materials off Owner's property.

END OF SECTION 070150.19

SECTION 07 53 23 (07530) - ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 GENERAL
1.01 SUMMARY
A. Section Includes:
1. Extent of flexible sheet roofing (FSR) is indicated on Drawings and is hereby defined to include non-traffic-bearing sheet membrane system intended for weather exposure as primary roofing.
2. Types of roofing systems specified in this Section utilizing flexible sheet roofing membranes include the following:
a. Fully Adhered System
3. Flexible sheet roofing membranes include the following:
a. Ethylene Propylene Diene Monomer (EPDM)
4. Roof insulation for use under EPDM system and all counterflashing and accessory items
B. Related Sections:
1. Section 07 62 00 (07620) - Sheet Metal Flashing and Trim
2. Section 07 92 00 (07920) - Joint Sealants
3. Division 23 Sections for HVAC Piping, Air Distribution and Equipment
1.02 REFERENCES
A. ASTM International Publications:
1. C208 "Standard Specification for Cellulosic Fiber Insulating Board"
2. C209 "Standard Test Methods for Cellulosic Fiber Insulating Board"
3. C165 "Standard Test Method for Measuring Compressive Properties of Thermal Insulations"
4. D412 "Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension"
5. D471 "Standard Test Method for Rubber Property-Effect of Liquids"
6. D573 "Standard Test Method for Rubber-Deterioration in an Air Oven"
7. D624(DieC) "Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers"
8. D746 "Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact"
9. D1079 "Standard Terminology Relating to Roofing, Waterproofing, and Bituminous Materials"
10. D1149 "Standard Test Method for Rubber Deterioration-Surface Ozone Cracking in a Chamber"
11. D2240 "Standard Test Method for Rubber Property-Durometer Hardness"
B. Code of Federal Regulations (CFR):
1. Appendix A of 40 CFR 763, Subpart E "Interim Transmission Electron Microscopy Analytical Methods--Mandatory and Nonmandatory--and Mandatory Section to Determine Completion of Response Actions".
C. FM Global (FMG) Standards:
1. "Factory Mutual Approval Guide" - Roof Assembly Classification
2. "Property Loss Prevention Data Sheets"
D. International Code Council (ICC): International Building Code
1. IBC (2000) Section 2603.4.
E. National Roofing Contractors Association (NRCA) Publications:
1. "Roofing & Waterproofing Manual", Current Edition.
F. Single Ply Roofing Industry (SPRI) Publications:
1. "Corrosion Test Procedure and Guidelines for Roofing Fasteners"
2. "Wind Load Design Guide for Low Sloped Flexible Membrane Roofing Systems"
G. Underwriter's Laboratories, Inc. (UL) Standards:
1. UL-263 - "Fire Tests of Building Constructions and Materials."
2. UL-580 - "Tests for Uplift Resistance of Roof Assemblies."
3. UL-790 - "Tests for Fire Resistance of Roof Covering Materials."
1.03 DEFINITIONS
A. Roofing Terminology: Refer to ASTM D1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
B. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.
C. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," after multiplication by a safety factor.
1.04 SUBMITTALS
A. Product Data: Submit "Letter of Conformance" in accordance with Section 01 33 00 (01330) indicating specified items selected for use in project with the following supporting data.
1. Submit specifications, installation instructions and general recommendations for manufacturers of flexible sheet roofing system materials, for types of roofing required. Include data substantiating that materials comply with requirements. Submit manufacturer's standard warranty form for review.
2. Provide certification or other data substantiating compliance with the requirements. Indicate by transmittal form that the installer has received a copy of manufacturer's installation instructions and recommendations.
B. Shop Drawings: Submit complete Shop Drawings showing roof configuration, sheet layout, seam locations, colors, vent and venting distribution strip locations, details at perimeter, and special conditions.
1.05 QUALITY ASSURANCE
A. Manufacturer. Obtain primary flexible sheet roofing from a single manufacturer. Provide secondary materials as recommended by manufacturer of primary materials.
B. Installer: A firm with not less than five years of successful experience in installation of roofing systems similar to those required for this project and which is licensed by manufacturer of primary roofing materials.
1. Work associated with flexible sheet roofing, including (but not limited to) vapor retarders, insulation, flashing and counterflashing, expansion joints, and flexible sheet joint sealers, is to be performed by installer of flexible sheet roofing.
C. Pre-Roofing Conference: Prior to installation of roofing and associated work, meet at project site, or other mutually agreed location, with installer, roofing sheet manufacturer, installers of related work, and other entities concerned with roofing performance, including (where applicable) Owner's insurer, test agencies, governing authorities, Architect, and Owner. The General Contractor shall record discussions and agreements and furnish copy to each participant. Provide at least 72 hours advance notice to participants prior to convening pre-roofing conference.
1. General Contractor's Superintendent and Roofing Subcontractor's Superintendent shall be present.
2. Agenda for Conference:
a. Purpose shall be to verify readiness of project requirements; review details, last minute changes, or corrections; review anticipated schedule of progress.
b. Warranties, guarantees, bonds, and other related issues.
D. Regulatory Requirements:
1. FM Global (FMG) Listing: Provide roofing system and component materials that have been evaluated by FM Global System for fire spread, wind uplift, and hail damage and are listed in "FM Global Approval Guide" for Class I construction, and use with other roofing materials, including insulation.
a. Provide roof-covering materials bearing FMG approval marking on bundle, package, or container indicating that material has been subjected to FMG's examination and follow-up inspection service.
2. FM Global (FMG): Roof Assembly Classification, 1-90 Construction.
3. All insulation in roof and wall assemblies shall be approved for use without an additional thermal barrier in accordance with IBC Section 2603.4. Contractor to submit test reports to local building department showing compliance.
1.06 PROJECT CONDITIONS
A. Weather: Proceed with roofing work when existing and forecasted weather conditions permit work to be performed in accordance with manufacturers' recommendations and warranty requirements.
B. Proceed with roofing work only after substrate and penetrating condition has been inspected and deemed to be satisfactory.
C. The Installer must examine the substrate and the conditions under which roofing work is to be performed and notify the Architect in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
D. Do not apply roofing to damp, frozen, dirty, dusty, or deck, surfaces unacceptable to manufacturer. Roof surface shall be free of ponded water, ice or snow.
1.07 DELIVERY, STORAGE, AND HANDLING
A. Storage of all insulation and roofing materials at site shall be in a dry place properly protected from the elements, as approved by manufacturer.
B. Wet Materials:
1. Insulation that has become wet before or after installation shall be removed and replaced. Drying out of wet insulation will not be permitted or acceptable for installation.
1.08 WARRANTY
A. Special Warranty:
1. The General Contractor, in conjunction with the authorized Roofing Contractor and the manufacturer of materials used, shall provide written warranty, agreeing to replace/repair defective materials and workmanship as required to maintain completed roofing system in watertight condition.
a. Warranty shall cover, at no cost to the Owner, all labor and materials required to repair or replace roofing, flashing, sheet metal, copings, and metal work against leaks or faulty workmanship. All costs for any of the above shall be absorbed by the General Contractor primarily, and his Roofing Contractor and materials manufacturer secondarily.
b. Warranty period is 15 years after date of Substantial Completion for labor and material with an additional five-year warranty (total of 20 years) on membrane material.
1) System shall be warrantied for all requirements specified, including for wind uplift as required under factory mutual classifications specified.
PART 2 PRODUCTS
2.01 GENERAL
A. Compatibility: Provide products which are recommended by manufacturers to be fully compatible with indicated substrates, or provide separation materials as required to eliminate contact between incompatible materials.
2.02 FULLY ADHERED SYSTEM EPDM MEMBRANE
A. Approved Manufacturers:
1. Roofing Products International, Inc. (800-628-2957)
a. "Royal Edge Fully Adhered System"
2. Carlisle Syntec Systems (800-479-6832)
a. "Sure-Seal Adhered Roofing System"
3. Versico Incorporated (800/992-7663)
a. "Versigard Adhered System"
4. Firestone Building Products (800-428-4442)
a. "Fully Adhered System"
B. Membrane: EPDM Membrane shall be supplied in .060 inch (60 mils) Non-reinforced, black, of standard sizes up to 40 feet in width and 125 feet in length, or the longest sheet possible, as required by each installation.
1. Exposed Face Color: Black.

PHYSICAL PROPERTY	SPECIFICATION VALUE	TEST METHOD
Tensile Strength	1305 psi min.	ASTM D412
Elongation	300% min.	ASTM D412
Tear Resistance	180 lb/in min.	ASTM D624(DieC)
Brittleness Temperature	Pass @ -40 deg. F.	ASTM D746
Shore A Hardness (3 second reading)	65 +/- 10	ASTM D2240
Ozone Resistance	No cracks, 7x	ASTM D1149 ASTM D1149 110mPa/166h 40 deg. C/ 50% extension
Heat Aging		ASTM D573 166h @125deg. C
Tensile Strength	1710 psi min	
Elongation	225% min.	
Water Absorption	+2% max	ASTM D471 7 days @70deg. C

C. Flashing: Shall be minimum .060" thickness, EPDM elastomer with factory applied adhesive backing, or field applied adhesive applied, as recommended by the manufacturer.
D. Joint Tape: Same material as membrane with adhesive or clean surface for solvent joint adhesion, as recommended by the membrane manufacturer.
E. Sealant: As recommended by the membrane manufacturer.
F. Bonding Adhesive: Shall be compatible with substrate materials to which the membrane is to be adhered, as recommended by manufacturer.
G. Lap and Water Stop Sealant: Shall be gun or trowel consistency for use in sealing flashing edges, as recommended by manufacturer.
H. Pourable Sealer: Compatible with materials with which it is used, as recommended by manufacturer.
I. Night Seal: Compatible with materials with which it is used, as recommended by manufacturer, to seal work in progress when inclement weather occurs or is expected.
J. Splice Wash: Material recommended by manufacturer.
K. Other Materials: Furnish other materials not shown or specified required for complete and proper installation of roof system, as recommended by the roofing manufacturer.

2.03 WALKWAY PADS
A. Flexible Walkway Pads: Factory-formed, nonporous, heavy-duty, solid-rubber, slip-resisting, surface-textured walkway pads, and acceptable to membrane roofing system manufacturer.
1. Approved Manufacturers:
a. "Pressure Sensitive Molded Walkway Pads"; Carlisle Syntec Systems (800-479-6832)
b. Approved substitution by EPDM Manufacturer.
2. Thickness:
a. Minimum: 0.162 inches
b. Maximum: 0.202 inches
3. Size: 30-inches x 30-inches
4. Color: Black
2.04 INSULATION
A. Approved Manufacturers:
1. "AC-Foam-II"; The Atlas Roofing Corp. (800-677-1476)
2. "Multi-Max FA-3"; Rmax, Inc. (800-845-4455)
3. Approved substitution by EPDM Manufacturer.
B. General: Provide insulating materials which comply with requirements indicated for materials, compliance with referenced standards, and other characteristics.
C. Polyisocyanurate Roof Insulation System:
1. Insulation shall be manufactured for use with Roofing Systems specified and approved for use by roofing manufacturer.
2. Material shall be factory fabricated from Polyisocyanurate Rigid Roof Insulation Board. Factory Mutual Global (FMG) Class I approved and Underwriter's Laboratories, Inc. (UL) classified Class A. Closed cell, polyisocyanurate core integrally laminated to medium weight fiber-reinforced felt facers both sides.
3. Board shall be cut, cleaned and vacuumed at the factory to form a rigid installation.
4. Minimum R-Value of 6.0 per inch of material. Rated R-Value shall be tested in accordance with Long Term Thermal Resistance (LTTR) values.
D. Asbestos Content of Insulations: Provide insulations which contain no asbestos of any type of mixture of types occurring naturally as impurities as determined by polarized light microscopy test per Appendix A of 40 CFR 763, Subpart E.
2.05 INSULATION ACCESSORIES
A. Provide adhesives and mechanical fasteners as recommended by insulation manufacturer for substrates encountered.
1. Fasteners: Metal fasteners and the insulation shall be approved by the membrane manufacturer to assure that required conditions are met to provide a membrane manufacturer's roof warranty. The type of fastener shall be appropriate for the substrate to achieve maximum withdraw and anti-corrosion characteristics. The membrane manufacturer approved fasteners shall also meet the following requirements.
a. FM 4470 SPRI Corrosion Test Procedure and Guidelines for Roofing Fasteners. To pass, the fasteners shall not accumulate more than 15 percent red rust after the "required number cycles" in the Kesternich cabinet.
1) The required number of cycles is as currently recommended by FMG and SPRI, but in no case shall it be less than 15.
2) Fasteners shall be buttress thread (threads 10 degree/45 degree angle) for static backout resistance.
2. Cold Fluid Applied Adhesive: Manufacturer's standard cold fluid applied adhesive formulated to adhere roof insulation to substrate.
a. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
B. Crickets (Tapered Insulation): Provide tapered insulation crickets sloped approximately ¼" per foot. Locate and arrange as indicated on drawings or as required to divert water at rooftop equipment or vertical obstructions.
1. Material: Provide one of the following types at Contractor's option:
a. Polyisocyanurate: Conform to requirements and manufacturers specified herein.
PART 3 EXECUTION
3.01 PREPARATION OF SUBSTRATE
A. General: Comply with manufacturers' instructions for preparation of substrate to receive FSR system.
B. Clean substrate of dust, debris, and other substances detrimental to FSR system work. Remove sharp projections. Do not apply sheet roofing to damp, frozen, dirty, dusty, or deck surfaces unacceptable to manufacturer. Roof surface shall be free of ponded water, ice, or snow.
C. Install flashings, and accessory items as shown, and as recommended by manufacturer even though not shown.
D. Prevent compounds from entering and clogging drains and conductors, and from spilling or migrating onto surfaces of other work.
3.02 INSPECTION
A. The Contractor shall be responsible for properly preparing the existing substrate to receive the roofing system. Installation shall not proceed until substrate is inspected and approved by the Owner's Representative.
B. Substrate shall have positive drainage and shall be verified by Contractor prior to installation of new materials.
C. Surface joints shall be less than 1/4" wide. All joints wider than 1/4" must be repaired with proper materials.
D. Verify that drains, sleeves, and curbs which pass through surfaces to receive roofing are rigidly installed. Secure these elements as required prior to the installation of roofing.
E. Surfaces to receive new materials shall be as required by manufacturer to ensure a proper bond.
F. Verify that surfaces are free of cracks, depressions, waves, or projections which may be detrimental to successful installation. Remove foreign materials.
G. Starting work of this Section means acceptance of substrate and site conditions.
3.03 INSTALLATION - GENERAL
A. Comply with the instructions and recommendations of the roofing materials manufacturer, except to the extent more stringent requirements are indicated.
B. Confinement of Materials: Do not allow fluid and plastic materials to spill or migrate beyond surfaces of intended application, or to flow into drains, conductors, or ceilings below.
C. Performance: It is required that roofing work be watertight for normal weather exposures, and not deteriorate in excess of manufacturer's published limitations.
3.04 INSTALLATION - ROOF DECK INSULATION
A. The insulation shall be installed mechanically-fastened to deck according to the roofing manufacturer's recommendations. Mechanical fasteners shall penetrate into the decking as required by FM Global and manufacturer of roofing materials.
1. Stagger joints in boards, forming a complete thermal envelope.
2. Fasteners shall be spaced a maximum of 2'-0" o.c. and there shall be one fastener installed at each and every corner of each board, and in addition, the pattern of fasteners shall conform to specified Requirements for wind uplift.
B. Multiple Layer Installation:
1. First Layer: Lay insulation units with long edge joints continuous and end joints staggered.
2. Second Layer: Install in same manner as first layer with joints between layers staggered. Mechanically fasten insulation to deck in accordance with FMG Loss Prevention Data Sheets 1-28 and 1-29S patterns in field, perimeter, and corners for 90 psf wind uplift resistance.
C. Lay insulation boards to moderate contact without forcing joints. Cut insulation to fit neatly to perimeter blocking and around protrusions through roof.
1. System shall fit tight within limitations of roofing manufacturer's specifications and not exceeding ¼" apart. All gaps greater than ¼" must be filled.
D. Place roof crickets and tapered insulation to required slope pattern in accordance with manufacturer's instructions.
E. Exposure: Do not install more insulation each day than will be covered by waterproofing by end of same day.
3.05 INSTALLATION - MEMBRANE
A. Adhere membrane roofing over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll membrane roofing and allow to relax before installing.
B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.
C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
D. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.
E. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeters.
F. Base Flashing Installation
1. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
2. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
3. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
4. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
5. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.
G. Edges of roofing shall be sealed at the end of each day's work and if inclement weather is expected during the work period.

3.06 INSTALLATION - WALKWAY
A. Flexible Walkways: Install walkway products in locations indicated. Adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.
3.07 FIELD QUALITY CONTROL
A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
B. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.
C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
3.08 PROTECTION
A. After completing roofing (including associated work), institute appropriate procedures for surveillance and protection of roofing during remainder of construction period. At the end of the construction period, or at a time when remaining construction will in no way affect or endanger roofing, make a final inspection of roofing and prepare a written report to Owner, describing nature and extent or deterioration or damage found.
B. Repair or replace (as required) deteriorated or defective work found at the time of final inspection to a condition free of damage and deterioration at the time of substantial completion and according to requirements of the specified warranty.
3.09 DEFECTIVE WORK
A. Refinish or remove and replace insulation surfaces not acceptable to receive roofing or where physical properties do not meet specified requirements.

END OF SECTION

PLOTTED DATE:

ZHA ARCHITECTS
4001 University Drive, Suite 100, Fairfax, VA 22030
Telephone: (703)352-1933 Fax: (703)691-9171

COMMONWEALTH OF VIRGINIA
CLIFFORD E. HURDLE
No. 0401 016732
REGISTERED ARCHITECT

REVISION	DATE	DESCRIPTION
	07/09/2021	BID 1 PERMIT SUBMISSION
	07/23/2021	90% DESIGN DOCUMENT SUBMISSION

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

ATRIUM BUILDING ROOF REPLACEMENT
MEADOWLARK GARDENS, FAIRFAX, VA

PROJECT NUMBER: 20105 SCALE: AS SHOWN

SPECIFICATIONS

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Manufactured through-wall flashing with counterflashing.
   2. Manufactured reglets.
   3. Formed roof-drainage sheet metal fabrications.
   4. Formed equipment support flashing.

B. Related Requirements:
   1. Section 06100 "Rough Carpentry" for wood nailers, curbs, and blocking.
   2. Section 07720 "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.

1.3 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.
   1. Include plans, elevations, sections, and attachment details.
   2. Detail fabrication and installation layouts, and keyed details. Distinguish between shop- and field-assembled work.
   3. Include identification of material, thickness, weight, and finish for each item and location in Project.
   4. Include details for forming, including profiles, shapes, seams, and dimensions.
   5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
   6. Include details of termination points and assemblies.
   7. Include details of roof-penetration flashing.
   8. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
   9. Include details of special conditions.
   10. Include details of connections to adjoining work.

1.5 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of coping and roof edge flashing that is SPRI ES-1 tested.

B. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
   1. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.9 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. Recycled Content of Copper-Sheet Flashing and Trim: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 40 percent.

D. Recycled Content of Steel-Sheet Flashing and Trim: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 or H01 temper.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Hussey Copper Ltd.
      b. Revere Copper Products, Inc.
   2. Nonpatinated Exposed Finish: Mill.
   3. Nonpatinated, Exposed, Lacquered Finish: Finish designations for copper alloys comply with system defined in NAAMM's "Metal Finishes Manual for Architectural and Metal Products."
      a. Mirror Polished (Lacquered): M22-06x (Mechanical Finish: buffed, specular; with clear organic coating); coating of "Incralac," solvent-borne, air-drying, methyl methacrylate copolymer lacquer with UV inhibitor, applied by air spray in two coats per manufacturer's written instructions to total thickness of 1 mil (0.025 mm).

C. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
   1. Exposed Coil-Coated Finish:
      a. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   2. Color: As selected by Owner from manufacturer's full range.
   3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

D. Stainless-Steel Sheet: ASTM A 240/A 240M,, dead soft, fully annealed; with surface.
   1. Finish: 2D (dull, cold rolled).

E. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 (Z275) coating designation; prepainted by coil-coating process to comply with ASTM A 755/A 755M.
   1. Surface: Smooth, flat and with manufacturer's standard clear acrylic coating on both sides.
   2. Exposed Coil-Coated Finish:
      a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   3. Color: As selected by Owner from manufacturer's full range.
   4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

2.3 UNDERLAYMENT MATERIALS

A. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.

B. Synthetic Underlayment: Laminated or reinforced, woven polyethylene or polypropylene, synthetic roofing underlayment; bitumen free; slip resistant; suitable for high temperatures over 220 deg F (111 deg C); and complying with physical requirements of ASTM D 226/D 226M for Type I and Type II felts.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Atlas Roofing Corporation; Summit.
      b. Engineered Coated Products; Nova-Seal II.
      c. Kirsch Building Products, LLC.;
      d. $M~SDP Advanced Polymer Products Inc~$m~12345683747 2~M$; Palisade.

C. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. (0.16 kg/sq. m)minimum.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
   1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
      a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
      b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
      c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
   2. Fasteners for Copper Sheet: Copper, hardware bronze or passivated Series 300 stainless steel.
   3. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
   4. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
   5. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

C. Solder:
   1. For Copper: ASTM B 32, with maximum lead content of 0.2 percent.
   2. For Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
   3. For Zinc-Coated (Galvanized) Steel: ASTM B 32, with maximum lead content of 0.2 percent.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

G. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 MANUFACTURED SHEET METAL FLASHING AND TRIM

A. Through-Wall, Ribbed, Sheet Metal Flashing: Manufacture through-wall sheet metal flashing for embedment in masonry, with ribs at 3-inch (75-mm) intervals along length of flashing to provide integral mortar bond. Manufacture through-wall flashing with interlocking counterflashing on exterior face, of same metal as flashing.
   1. Stainless Steel: 0.016 inch (0.40 mm) thick.
      a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
         1) Cheney Flashing Company; Cheney Flashing.
         2) Hohmann & Barnard, Inc.; STF Sawtooth Flashing.
         3) Keystone Flashing Company, Inc.; Keystone Three-Way Interlocking Thruwall Flashing.
         4) Sandell Manufacturing; Pre-Formed Metal Flashing.

B. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-mitered and -welded corners and junctions and with interlocking counterflashing on exterior face, of same metal as reglet.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   2. Basis-of-Design Product: Subject to compliance with requirements, provide or comparable product by one of the following:
      a. Cheney Flashing Company.
      b. Fry Reglet Corporation.
      c. Heckmann Building Products, Inc.
      d. Hickman, W. P. Company.
      e. Hohmann & Barnard, Inc.
      f. Keystone Flashing Company, Inc.
      g. National Sheet Metal Systems, Inc.
      h. Sandell Manufacturing.
   3. Material: Stainless steel, 0.019 inch (0.48 mm) thick.
   4. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
   5. Concrete Type: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
   6. Masonry Type: Provide with offset top flange for embedment in masonry mortar joint.
   7. Accessories:
      a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
      b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing's lower edge.
   8. Finish: With manufacturer's standard color coating.

2.6 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
   1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
   2. Obtain field measurements for accurate fit before shop fabrication.
   3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
   4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.

G. Do not use graphite pencils to mark metal surfaces.

2.7 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, 4-inch-(100-mm-) wide wall flanges to interior, and base extending 4 inches (100 mm) beyond cant or tapered strip into field of roof. Fabricate from the following materials:
   1. Aluminum: 0.032 inch (0.81 mm) thick.

2.8 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from the following materials:
   1. Copper: 16 oz./sq. ft. (0.55 mm thick).

B. Overhead-Piping Safety Pans: Fabricate from the following materials:
   1. Galvanized Steel: 0.040 inch (1.02 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
   1. Verify compliance with requirements for installation tolerances of substrates.
   2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
   3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).

B. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, according to manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.

C. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.

3.3 INSTALLATION, GENERAL

A. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
   1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
   2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

B. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.

C. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws.

D. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

E. Seal joints as required for watertight construction.
   1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
   2. Prepare joints and apply sealants to comply with requirements in Section 07920 "Joint Sealants."

3.4 ROOF-DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Parapet Scuppers: Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
   1. Anchor scupper closure trim flange to exterior wall and seal with elastomeric sealant to scupper.

3.5 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Through-Wall Flashing: Installation of through-wall flashing is specified in Section 04810 "Unit Masonry Assemblies."

C. Reglets: Installation of reglets is specified in Section 03300 "Cast-in-Place Concrete." Section 04810 "Unit Masonry Assemblies."

D. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches (100 mm) beyond wall openings.

3.6 MISCELLANEOUS FLASHING INSTALLATION

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

B. Overhead-Piping Safety Pans: Suspend pans from structure above, independent of other overhead items such as equipment, piping, and conduit, unless otherwise indicated on Drawings. Pipe and install drain line to plumbing waste or drainage system.

3.7 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.8 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean off excess sealants.

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

PLOTTED DATE:

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COMMONWEALTH OF VIRGINIA
CLIFFORD E. HURDLE
No. 0401 015732
REGISTERED ARCHITECT

REVISION	DATE	DESCRIPTION
	01/04/2021	BID + PERMIT SUBMISSION
	02/19/2021	90% DESIGN DOCUMENT SUBMISSION

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

ATRIUM BUILDING ROOF REPLACEMENT
MEADOWLARK GARDENS, FAIRFAX, VA

PROJECT NUMBER: 20105 SCALE: AS SHOWN

SPECIFICATIONS

SP.3

LEGEND

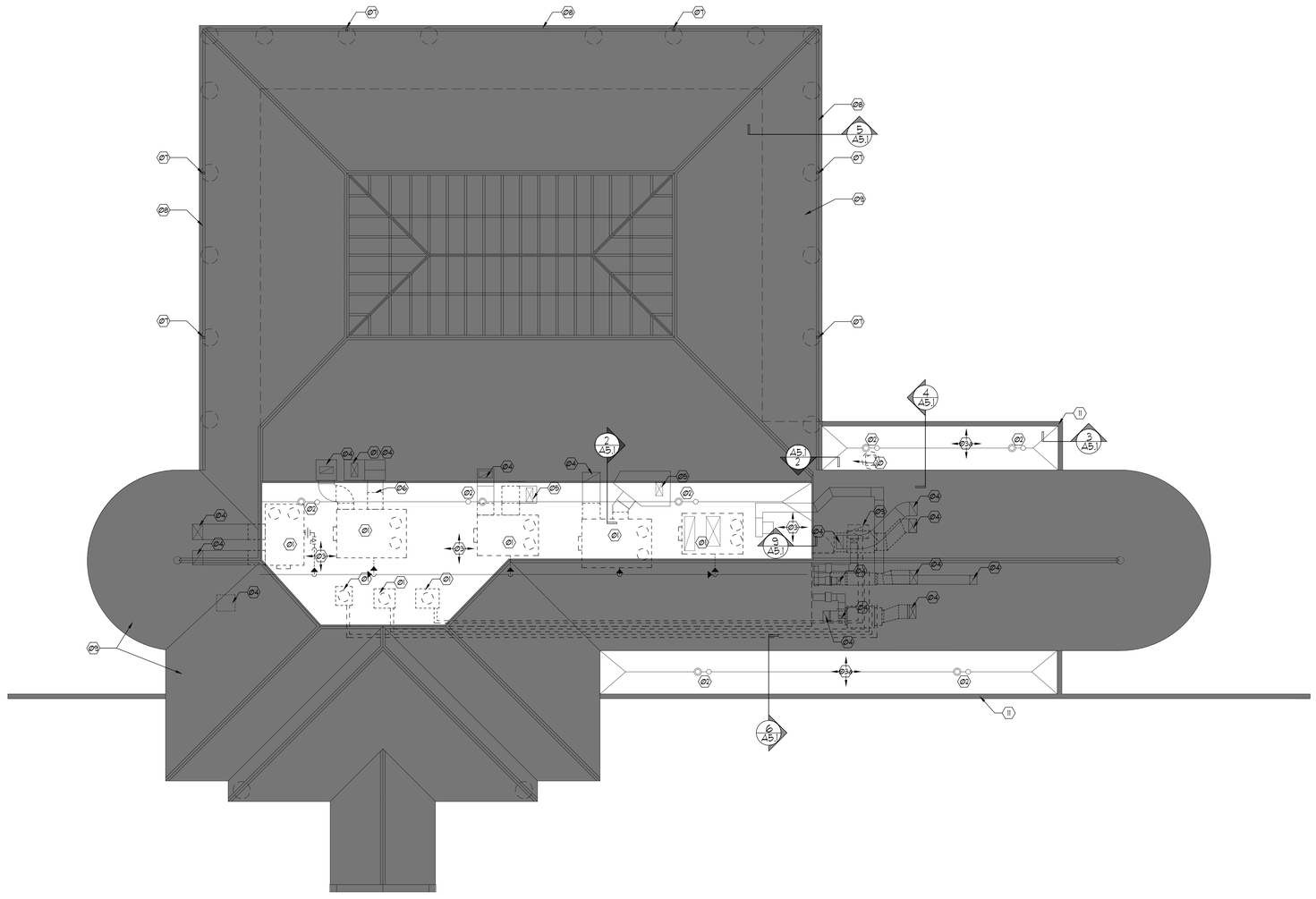
▨	SHADED AREAS ARE GENERALLY NOT IN THE SCOPE OF WORK UNLESS A SPECIFIC NOTE IDENTIFY A SPECIFIC ITEM IN THE AREA.

GENERAL DEMOLITION NOTES

1. GENERAL CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LOCAL, STATE AND/OR REGULATORY AGENCIES, CODES AND REGULATIONS FOR NEW CONSTRUCTION AND DEMOLITION WORK.
2. PRIOR TO REMOVAL OR CUTTING OF OPENINGS THROUGH STRUCTURAL MEMBERS, CONTRACTOR WILL PROVIDE ADEQUATE SHORING FOR ROOF AND OTHER STRUCTURAL LOADS. SUPPORTS SHALL NOT BE REMOVED UNTIL NEW STRUCTURAL SYSTEM IS IN PLACE.
3. PROCEED WITH DEMOLITION FROM TOP TO BOTTOM. DO NOT REMOVE ITEMS SUPPORTING OTHER MEMBERS WITHOUT PROVIDING TEMPORARY OR PERMANENT BRACING AS REQUIRED. SEE DRAWINGS FOR AREAS AND EXTENT OF DEMOLITION.
4. CONTRACTOR'S STORAGE TRAILER, OFFICE TRAILER, AND STAGING LOCATIONS ON BUILDING EXTERIOR WILL BE AS DIRECTED BY OWNER'S PROJECT MANAGER.
5. CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR WASTE DISPOSAL. LOCATE CONTAINERS AS DIRECTED BY OWNER'S PROJECT MANAGER.
6. COORDINATE DEMOLITION WORK WITH OWNER'S REPRESENTATIVE.
7. SEE MECHANICAL/ELECTRICAL/PLUMBING DRAWINGS FOR FOR DETAILED DEMOLITION INSTRUCTIONS ON UTILITIES AND EQUIPMENT.
8. COORDINATE LOCATIONS OF ALL NEW HVAC WORK WITH ARCHITECTURAL FLOOR PLAN.
9. ALL ABANDONED UTILITY LINES TO BE REMOVED AND/OR CAPPED OFF AS REQUIRED BY CODE. SEE M/E/P DRAWINGS FOR ADDITIONAL INFORMATION.
10. PATCH AND REPAIR ALL EXPOSED DAMAGED WALL, FLOOR, AND CEILING SURFACES TO MATCH ADJACENT UNDAMAGED SURFACES. PROPERLY REPAIR AND PREPARE ANY SUBSTRATES THAT ARE TO RECEIVE NEW FINISHES.
11. POTENTIAL CONSTRUCTION HAZARDS IF ANY, PROVIDE BARRIERS- WOOD FRAME WITH A PAINTED PLYWOOD FACE.
12. MAINTAIN EXISTING UTILITIES DURING CONSTRUCTION. NOTIFY ALL DISRUPTIONS AND PROVIDE INTERIM UTILITIES.
13. THE SCOPE OF DEMOLITION SHALL NOT BE LIMITED TO THE CONTENTS OF DEMOLITION DRAWINGS BUT SHALL INCLUDE ANY AND ALL WORK REQUIRED TO FACILITATE THE NEW CONSTRUCTION DESCRIBED IN THESE DOCUMENTS.
14. REPAIR OR REPLACE WALL, FLOOR AND CEILING. PENETRATIONS THAT ARE ABANDONED DUE TO DEMOLITION WORK. MATCH EXISTING ADJACENT CONSTRUCTION. ALSO, SEE MECHANICAL, ELECTRICAL AND PLUMBING DWGS.
15. PRIOR TO DEMOLITION G.C. SHALL CREATE AN INVENTORY IN CONSULTATION WITH OWNER AND PREPARE A FINAL LIST OF ITEMS TO BE SALVAGED FOR OWNER.

KEYED DEMOLITION NOTES: ⬡##

01	EXISTING MECHANICAL EQUIPMENT. SEE MECHANICAL DRAWINGS FOR SPECIFIC DEMOLITION INSTRUCTIONS.
02	REMOVE EXISTING ROOF DRAIN, & OVERFLOW DRAIN COLLARS AND COVERS. PREPARE AREA FOR NEW COLLAR AND DRAIN COVER. CLEAN ALL DRAIN PIPES WITH JETSTREAM TO REMOVE CLOGGING. CHECK FOR FREE FLOW OF STORM WATER. DEMONSTRATE THE RESULT TO OWNER'S REPRESENTATIVE. SEE DETAIL 2/A5.1 FOR ADDITIONAL INFORMATION.
03	EXISTING FLAT ROOF. REMOVE THE MEMBRANE AND INSULATION IN ITS ENTIRETY. PREPARE EXISTING ROOF DECK FOR NEW ROOF SYSTEM INSTALLATION.
03a	EXISTING FLAT ROOF. REMOVE THE MEMBRANE AND INSULATION IN ITS ENTIRETY. PREPARE EXISTING PLYWOOD ROOF SUBSTRATE DECK FOR NEW ROOF SYSTEM INSTALLATION. EXAMINE THE CONDITION OF THE SUBSTRATE TO DETERMINE WHETHER IT NEEDS REPLACEMENT. IF SUBSTRATE REPLACEMENT IS REQUIRED, INFORM THE ARCHITECT AND OWNER.
04	CLEAN FLASHING AT PENETRATION. REMOVE WHERE MATERIAL DETERIORATED. REPLACE WITH NEW FLASHING. TYPICAL AT ALL DUCT PENETRATION. SEE DETAIL 1/A5.1 FOR ADDITIONAL INFORMATION.
05	REMOVE EXISTING FLASHING. PREPARE SURFACE FOR NEW FLASHING INSTALLATION PENETRATION
06	INSTALL NEW FLASHING AT THE JOINTS WHERE NEW DUCT MEETS EXISTING. SEE MECHANICAL DRAWINGS FOR MORE INFORMATION
07	REMOVE/ CLEAN EXISTING DOWNSPOUT RING. CLEAN ALL DRAIN PIPES WITH JETSTREAM TO REMOVE CLOGGING. CHECK FOR FREE FLOW OF STORM WATER. DEMONSTRATE THE RESULT TO OWNER'S REPRESENTATIVE.
08	REMOVE EXISTING EPDM GUTTER LINER. CLEAN PLYWOOD SUBSTRATE AND PREPARE FOR NEW MEMBRANE LINER INSTALLATION.
09	EXISTING STANDING SEAM METAL ROOF TO REMAIN. CHECK ALL PENETRATION CONDITIONS TO VERIFY THE INTEGRITY OF THE EXISTING FLASHING. REPLACE AS REQUIRED.
09	EXISTING ATTIC ACCESS TO REMAIN. SHOWN HERE FOR REFERENCE ONLY
10	ALL EXHAUST HOOD VENTS SHALL BE TEMPORARILY REMOVED FOR ROOF INSTALLATION. REINSTALL WHEN ROOF IS INSTALLED. PROVIDE NEW FLASHING AS REQUIRED. EXTEND NEW FLASHING TO THE UNDERSIDE OF THE CAP FLANGE. SEAL AS REQUIRED. SEE DRAWING A 2.1 FOR ADDITIONAL INFORMATION.
11	REMOVE EXISTING METAL COPING THROUGHOUT, REMOVE BLOCKING. PREPARE TOP OF WALL FOR NEW COPING AND NEW BLOCKING.



1 ROOF PLAN
A1.2 SCALE: 1/8"=1'-0"

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RICHARD E. HURDLE
No. 0401 015732

REVISION	DATE	DESCRIPTION
	02/08/2021	BID & PERMIT SUBMISSION
	01/29/2021	90% DESIGN DOCUMENT SUBMISSION

DESIGNED BY: CHECKED BY:
DRAWN BY: APPROVED BY:

ATRIUM BUILDING ROOF REPLACEMENT
MEADOWLARK GARDENS, FAIRFAX, VA

PROJECT NUMBER: 20105 SCALE: AS SHOWN

ROOF DEMOLITION PLAN

D 1.1

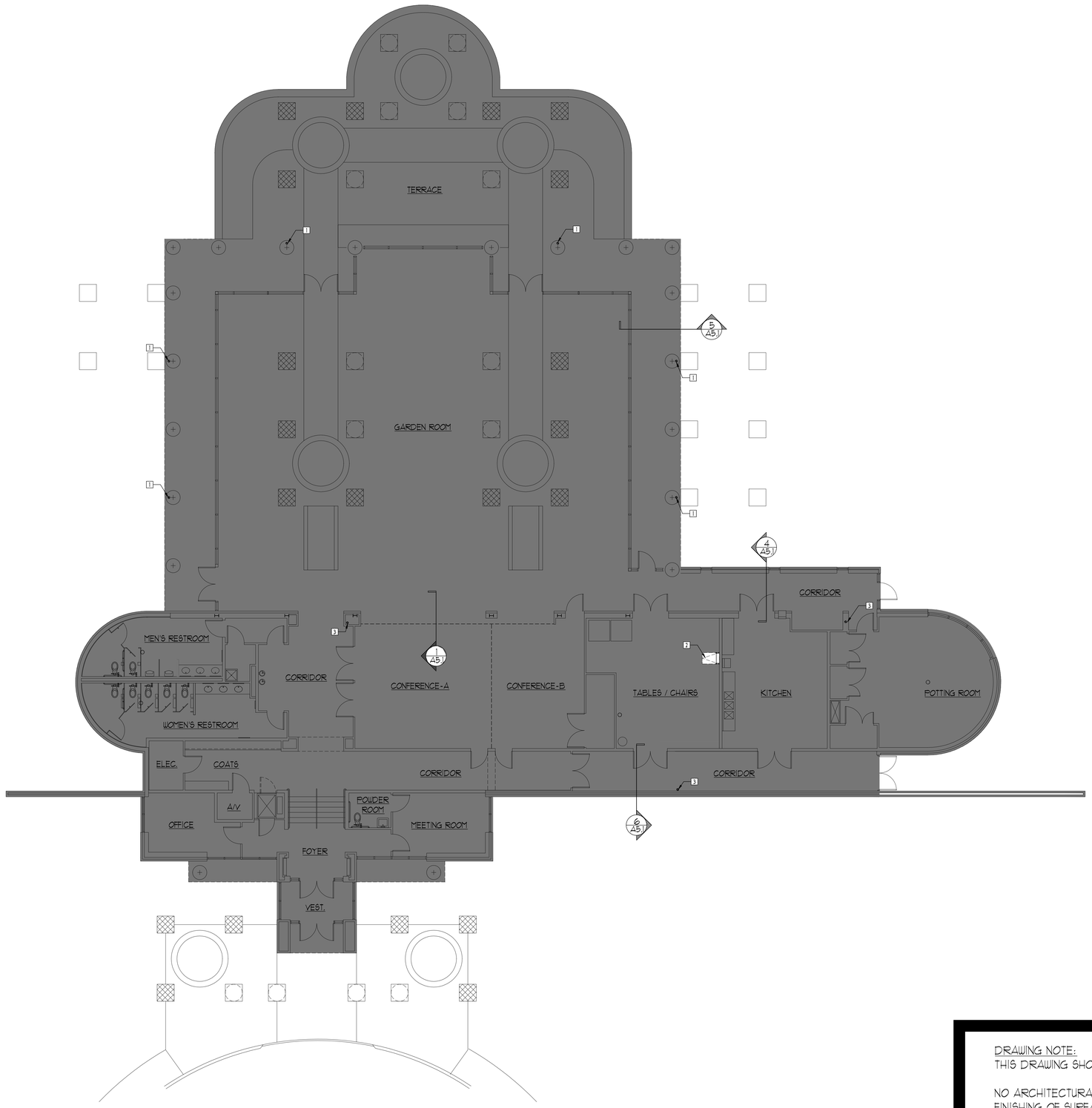
PLOTTED DATE:

LEGEND

- SHADED AREAS ARE NOT IN SCOPE OF WORK.
- EXISTING WALL TO REMAIN
- REMOVE EXISTING WALL
- EXISTING FURNITURE & FIXTURE TO BE REMOVED.
- EXISTING DOOR, FRAME & HARDWARE TO REMAIN.
- EXISTING DOOR, FRAME & HARDWARE TO BE REMOVED.
- [X] DEMOLITION KEY NOTES.
- E-FEC — EXISTING FIRE EXTINGUISHER CABINET
- E-FC — EXISTING FIRE HOSE CABINET

KEY NOTES: [X]

1. EXISTING DOWNSPOUT EMBEDDED IN EXISTING CONCRETE COLUMN.
2. EXISTING ATTIC ACCESS HATCH & LADDER.
3. EXISTING ROOF DRAIN LINES FROM FLAT ROOF ABOVE.



1 D1.1 DEMOLITION - 1ST FLOOR PLAN
SCALE: 1/8"=1'-0"

DRAWING NOTE:
THIS DRAWING SHOWS FIRST FLOOR FOR REFERENCE ONLY

NO ARCHITECTURAL WORK IN THIS AREA EXCEPT FOR PATCHING AND FINISHING OF SURFACES IMPACTED BY THE ROOF REPLACEMENT WORK ABOVE.

LIMITED MECHANICAL AND ELECTRICAL WORK IS REQUIRED IN THIS FLOOR. SEE M-E DRAWINGS FOR SCOPE.

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COMMONWEALTH OF VIRGINIA
RICHARD E. HURDLE
No. 0401 016732
REGISTERED ARCHITECT

REVISION	DATE	DESCRIPTION
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	06/25/2021	90% DESIGN DOCUMENT SUBMISSION

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

ATRIUM BUILDING ROOF REPLACEMENT
MEADOWLARK GARDENS, FAIRFAX, VA

PROJECT NUMBER: 20105
SCALE: AS SHOWN

1ST FLOOR PLAN

A1.1

PLOTTED DATE:

GENERAL NOTES:

1. REFER TO DWG D1.1 FOR GENERAL DEMOLITION NOTES.

LEGEND

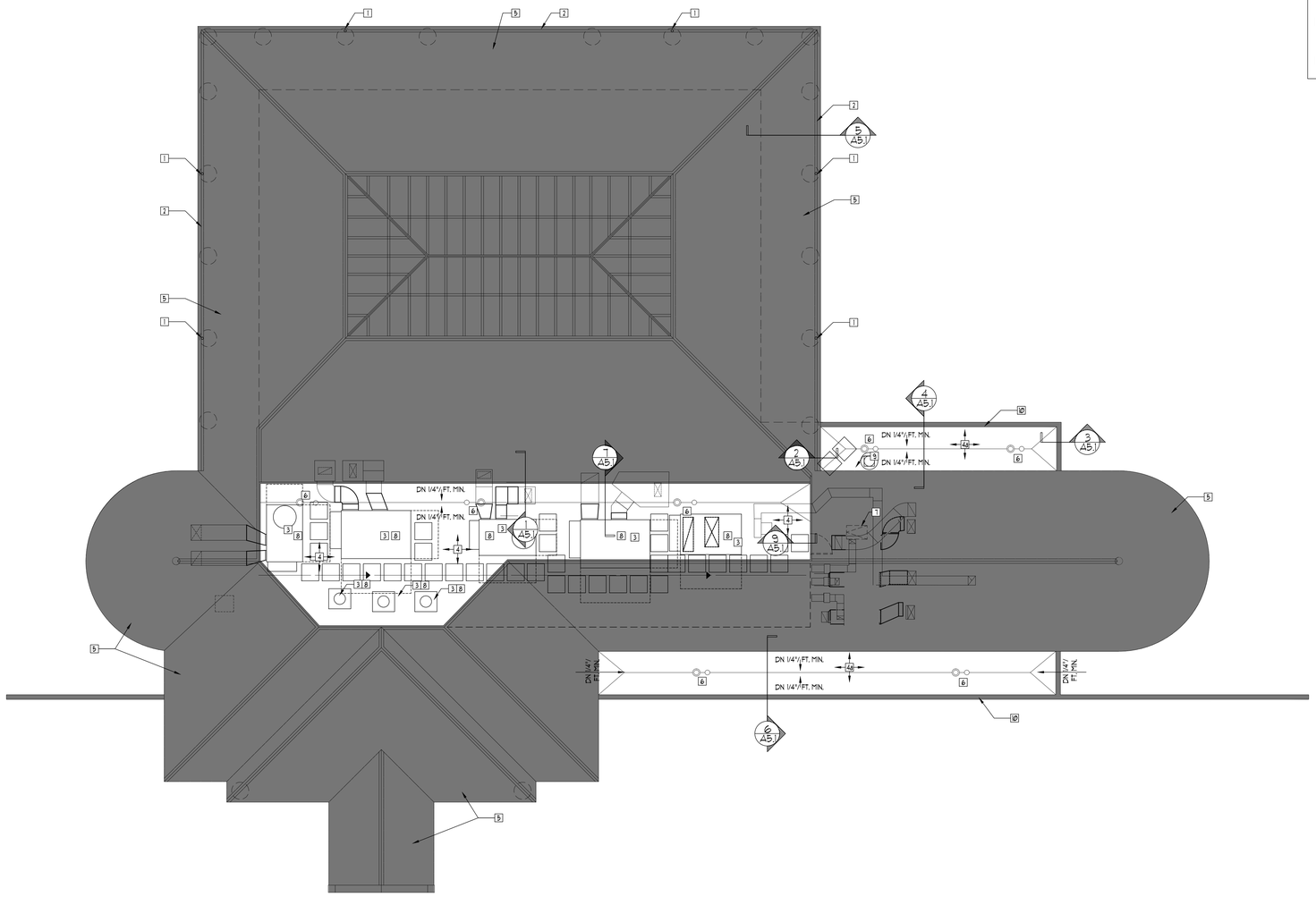
SHADED AREAS ARE NOT IN SCOPE OF WORK.

EXISTING WALL TO REMAIN

REMOVE EXISTING WALL

KEY NOTES: [X]

1. EXISTING DOWNSPOUT EMBEDDED IN EXISTING COLUMN. REMOVE DRAIN RING. PROVIDE NEW SLOTTED DRAIN COVER.
2. EXISTING GUTTER. INSTALL NEW EPDM LINER
3. NEW MECHANICAL EQUIPMENT ON EXISTING CURB. SEE MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
4. NEW ROOFING AND INSULATION OVER EXISTING CONCRETE SUBSTRATE. MAINTAIN A MIN. OF 1/4" SLOPE/ FT. TOWARDS THE VALLEY. R 30 ROOF INSULATION SHALL BE MAINTAINED IN NEW ROOF ASSEMBLY.
4A. NEW ROOFING AND INSULATION OVER EXISTING PLYWOOD SUBSTRATE. INSPECT CONDITION OF EXISTING SUBSTRATE. REPLACE AS NECESSARY. MAINTAIN A MIN. OF 1/4" SLOPE/ FT. TOWARDS THE VALLEY. R 30 ROOF INSULATION SHALL BE MAINTAINED IN NEW ROOF ASSEMBLY.
5. EXISTING STANDING SEAM METAL ROOF
6. EXISTING ROOF DRAIN & OVERFLOW DRAIN. REINSTALL DRAIN COVERS AFTER THE INSTALLATION OF NEW ROOFING. SEE DETAIL 2/A5.1
7. EXISTING ATTIC ACCESS.
8. EXTEND NEW ROOFING MEMBRANE OVER THE EXISTING EQUIPMENT CURB TO MAINTAIN THE INTEGRITY OF THE ENTIRE ROOFING SYSTEM PRIOR TO INSTALLING THE NEW EQUIPMENT. TYPICAL AT ALL EXISTING CURBS.
9. REINSTALL EXHAUST VENT AFTER THE NEW ROOFING IS INSTALLED. EXTEND NEW ROOFING MEMBRANE/ FLASHING TO THE UNDERSIDE OF OF THE CAP FLANGE. SEAL AS REQUIRED. TYPICAL AT ALL EXHAUST VENTS (3 SUCH CONDITIONS)
10. NEW METAL COPING ON EXISTING PARAPET WALL, TYPICAL THROUGHOUT. SEE 6/A5.1



1 A1.2 ROOF PLAN
SCALE: 1/8"=1'-0"

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CLIFFORD E. HURDLE
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REGISTERED ARCHITECT

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DESIGNED BY:
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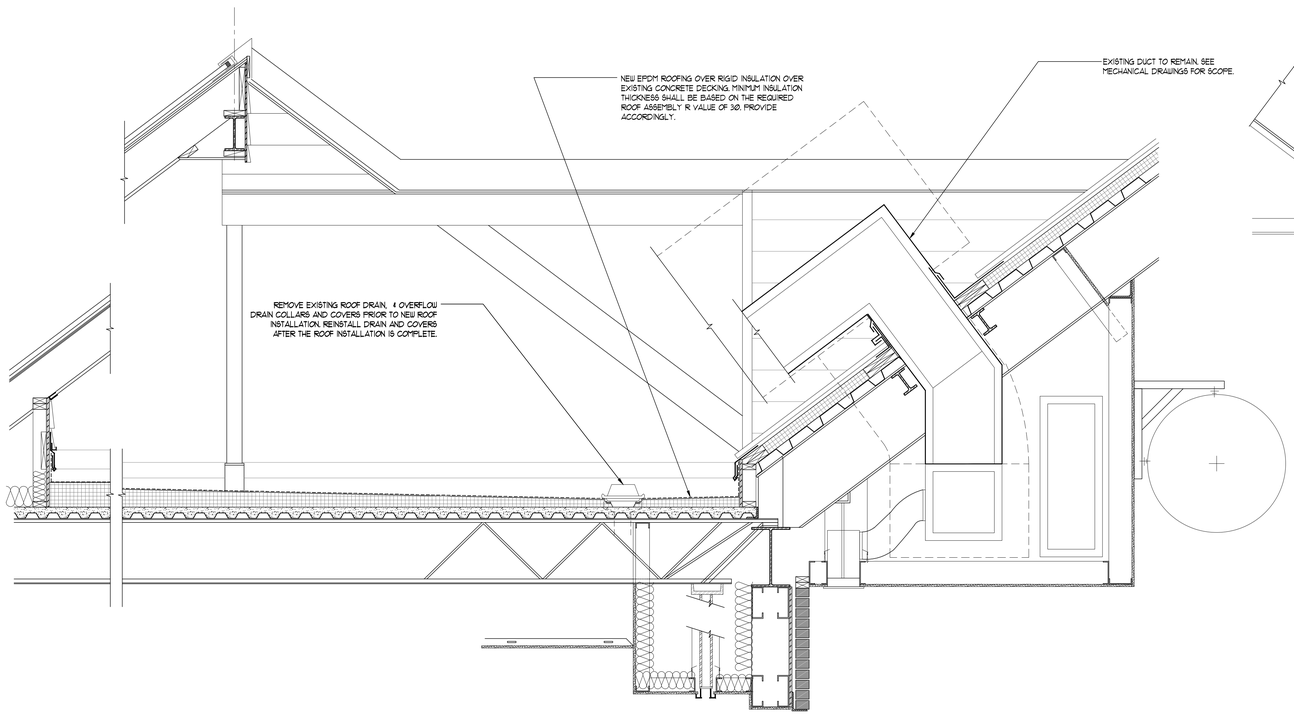
ATRIUM BUILDING ROOF REPLACEMENT
MEADOWLARK GARDENS, FAIRFAX, VA

PROJECT NUMBER: 20105 SCALE: AS SHOWN

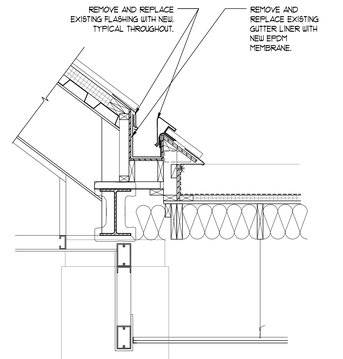
ROOF PLAN

A1.2

PLOTTED DATE:



1 A5.1 WALL SECTION
SCALE: 3/4"=1'-0"



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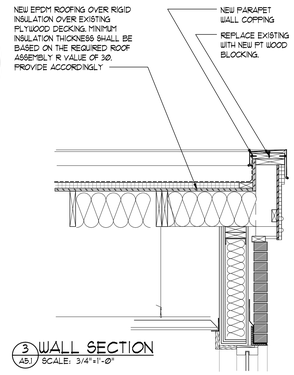

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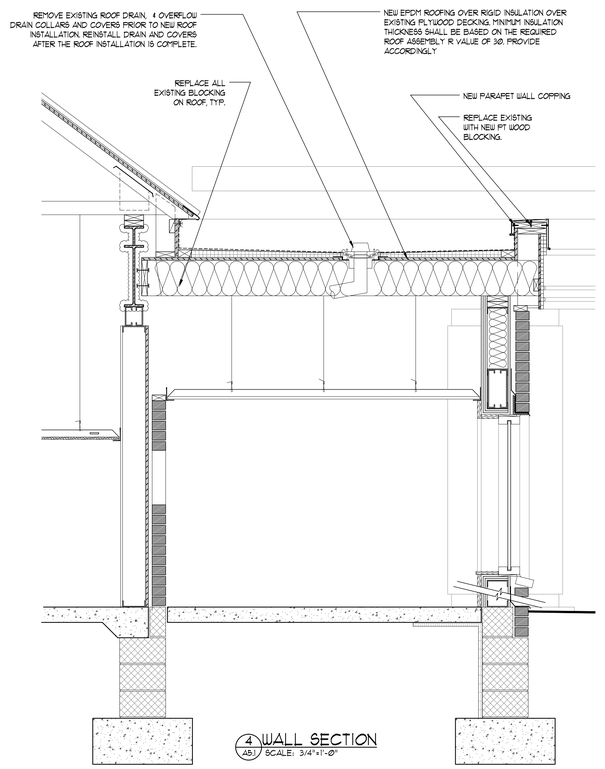

4 A5.1 WALL SECTION
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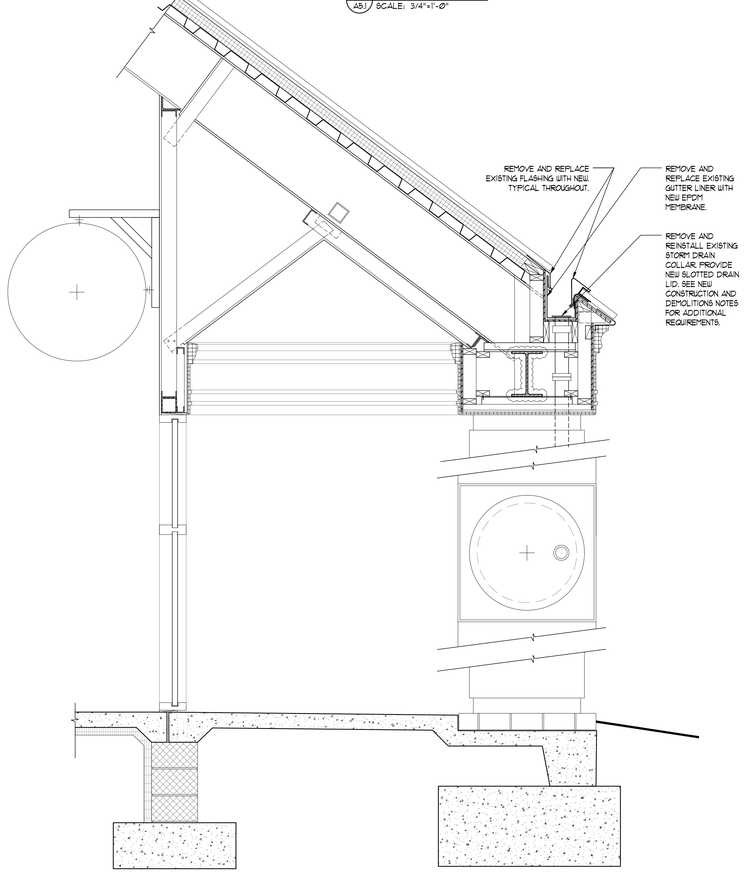

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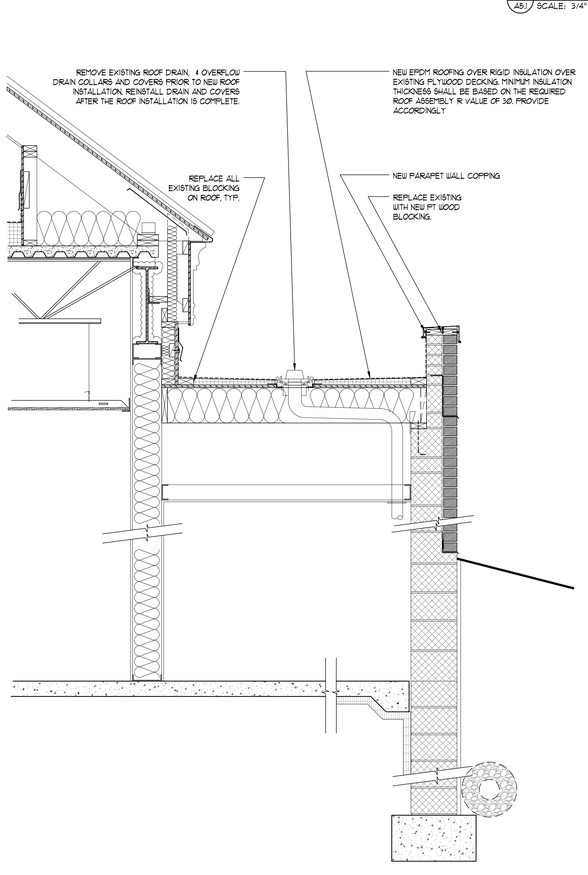
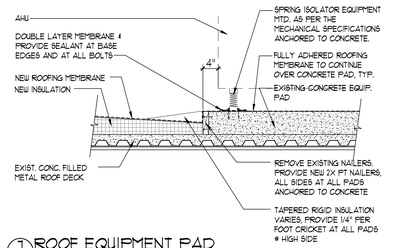
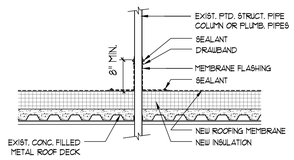


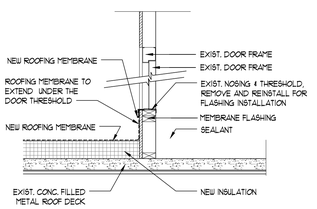
6 A5.1 WALL SECTION
SCALE: 3/4"=1'-0"



7 A5.1 ROOF EQUIPMENT PAD
SCALE: 3/4"=1'-0"



8 A5.1 PIPE PENETRATION DETAIL
SCALE: 3/4"=1'-0"



9 A5.1 FLASHING DETAIL AT DOOR
SCALE: 3/4"=1'-0"

PLOTTED DATE:

ZHA ARCHITECTS
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REVISION	DATE	DESCRIPTION
	07/09/2021	BID + PERMIT SUBMISSION
	07/23/2021	90% DESIGN DOCUMENT SUBMISSION

DESIGNED BY:
DRAWN BY:
CHECKED BY:
APPROVED BY:

ATRIUM BUILDING ROOF REPLACEMENT
MEADOWLARK GARDENS, FAIRFAX, VA

PROJECT NUMBER: 20105
SCALE: AS SHOWN

SECTIONS & DETAILS

A5.1

PROJECT

MEADOWLARK BOTANICAL GARDENS ATRIUM
HVAC ROOFTOP EQUIPMENT REPLACEMENT

PROJECT SITE

MEADOWLARK BOTANICAL GARDENS ATRIUM
9750 Meadowlark Gardens Court
Vienna, VA 22182

VOLUME 1 OF 1

ISSUED FOR: BID & PERMIT SUBMISSION
ISSUE DATE: FEBRUARY 04, 2021

MECHANICAL SHEET LIST	
SHEET NUMBER	SHEET TITLE
M000	MECHANICAL COVER SHEET
M001	MECHANICAL LEGENDS
M002	MECHANICAL LEGENDS
M003	MECHANICAL SPECIFICATIONS
M004	MECHANICAL SPECIFICATIONS
M201	MECHANICAL PLANS
M501	MECHANICAL DETAILS & SCHEDULES
M601	MECHANICAL CONTROLS
M602	MECHANICAL CONTROLS
E001	ELECTRICAL COVER SHEET
E002	ELECTRICAL SPECIFICATIONS
E201	ELECTRICAL PLANS
E500	ELECTRICAL SCHEDULES AND POWER RISER DIAGRAM

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NOVA Parks
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Meadowlark Botanical Gardens Atrium, HVAC Rooftop Equipment Replacement

Meadowlark Botanical Gardens Atrium
9750 Meadowlark Gardens Court
Vienna, VA 22182

Job Number:	N1413.00
Drawn by:	CP
Checked by:	KS
Date:	
Revised:	
BID & PERMIT SUBMISSION	02/04/2021
Scale:	N/A
Drawing Title	PROJECT COVER SHEET

COMMONWEALTH OF VIRGINIA
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2/8/2021

M000

GENERIC HVAC ABBREVIATIONS

(REFER TO CONTROLS LEGEND ABBREVIATIONS FOR ADDITIONAL NOMENCLATURE)

°F	DEGREES FAHRENHEIT
°C	DEGREES CELSIUS
Ø	DIAMETER
AD	ACCESS DOOR
ADA	AMERICANS WITH DISABILITIES ACT
ADJ	ADJUSTABLE
ADDL	ADDITIONAL
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
ALT	ALTERNATE
AP	ACCESS PANEL
ARCH	ARCHITECT
ATC	AUTOMATIC TEMPERATURE CONTROL
ATV	ATMOSPHERIC VENT
AVG	AVERAGE
BHP	BRAKE HORSEPOWER
BLDG	BUILDING
BOP	BOTTOM OF PIPE
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
CL	CENTERLINE
CLG	CEILING
CO	CLEAN-OUT
COL	COLUMN
COMP	COMPRESSOR
CONN	CONNECTION
CONTR	CONTRACTOR
CORR	CORRIDOR
CUF	CUBIC FEET
D	DRAIN
DB	DRY BULB TEMPERATURE
DDC	DIRECT DIGITAL CONTROL
DIA	DIAMETER
DIM	DIMENSION
DN	DOWN
DWG	DRAWING
EA	EACH
EFF	EFFICIENCY
ELEC	ELECTRICAL
ELEV	ELEVATION
EMER	EMERGENCY
ENT	ENTERING
EQUIP	EQUIPMENT
EXH	EXHAUST
EXP	EXPANSION
FCV	FLOW CONTROL VALVE
FG	FIBERGLASS
FLEX	FLEXIBLE
FLR	FLOOR
FLRDR	FLOOR DRAIN
FP	FIRE PROTECTION
FPM	FEET PER MINUTE
FT	FEET
FT/SEC	FEET PER SECOND
FURN	FURNISHED
G	GAS
GA	GAUGE
GAL	GALLONS
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GND	GROUND
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GRD	GRADE (GROUND LEVEL)
GWB	GYPSUM WALL BOARD
H	HEIGHT
HCPD	HANDICAPPED
HD	HEAD
HP	HORSEPOWER
HR	HOUR
HZ	HERTZ
HX	HEAT EXCHANGER
ID	INSIDE DIAMETER
IN	INCHES
INSUL	INSULATION
KW	KILOWATT
KVA	KILOVOLT AMPERE
L	LENGTH
LB	POUND
LF	LINEAR FEET
LVG	LEAVING

M	ONE THOUSAND
MAX	MAXIMUM
MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
MCA	MINIMUM CIRCUIT AMPS
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MFR	MANUFACTURER
MIN	MINIMUM
MOCP	MAXIMUM OVER CURRENT PROTECTION
MTD	MOUNTED
N/A	NOT APPLICABLE
NC	NORMALLY CLOSED
NC	NOISE CRITERIA
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NO.	NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
OB	OCTAVE BAND
OC	ON CENTER
OD	OUTSIDE DIAMETER
ODP	OPEN DRIP PROOF
OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED OWNER INSTALLED
OV	OUTLET VELOCITY
PCF	POUNDS PER CUBIC FOOT
PD	PRESSURE DROP
PH	PHASE
PLBG	PLUMBING
POS	PROVIDED BY OTHER SECTION(S)
PRESS	PRESSURE
PRIM	PRIMARY
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSID	POUNDS PER SQUARE INCH DIFFERENTIAL
PSIG	POUNDS PER SQUARE INCH GAUGE
PVC	POLYVINYL CHLORIDE
REP	REPRESENTATIVE
RET	RETURN
REQD	REQUIRED
REQS	REQUIREMENTS
RH	RELATIVE HUMIDITY
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
SCCR	SHORT CIRCUIT CURRENT RATING
SCH	SCHEDULE
SOV	SOLENOID OPERATED VALVE
SPECS	SPECIFICATIONS
SQ	SQUARE
SQFT	SQUARE FEET
SS	STAINLESS STEEL
STD	STANDARD
STDBY	STANDBY
STL	STEEL
SUCT	SUCTION
SUP	SUPPLY
TA	THROW-AWAY
TAV	THERMOSTATIC AIR VENT
TEFC	TOTALLY ENCLOSED FAN COOLED
TEL	TELEPHONE
TEMP	TEMPERATURE
TOD	TOP OF DUCT
TOP	TOP OF PIPE
TYP	TYPICAL
UH	UNIT HEATER
V	VENT
VEL	VELOCITY
VERT	VERTICAL
VFC	VARIABLE FREQUENCY CONTROLLER
VTR	VENT THROUGH ROOF
W	WIDTH
W/	WITH
W/O	WITHOUT
WB	WET BULB TEMPERATURE
WF	WIDE FLANGE
WG	WATER GAUGE
WRT	WITH RESPECT TO
X	EXISTING EQUIPMENT TO BE REMOVED
XM	EXISTING EQUIPMENT TO REMAIN
XN	NEW LOCATION OF RELOCATED EQUIPMENT
XR	EXISTING EQUIPMENT TO BE RELOCATED

HYDRONIC SYSTEM SPECIFIC ABBREVIATIONS

ACV	AUTOMATIC CONTROL VALVE
AAV	AUTOMATIC AIR VENT
DOV	DRAIN OFF VALVE
MAV	MANUAL AIR VENT
OS&Y	OUTSIDE STEM AND YOKE
NG	NATURAL GAS
P	PUMP
REFG	REFRIGERANT PIPING
TDH	TOTAL DYNAMIC HEAD

AIR SYSTEM SPECIFIC ABBREVIATIONS

AC	AIR CONDITIONING
ACCU	AIR COOLED CONDENSING UNIT
ACD	AUTOMATIC CONTROL DAMPER
ACU	AIR CONDITIONING UNIT
AF	AIR FOIL
AHU	AIR HANDLING UNIT
ALD	ACOUSTICALLY LINED DUCTWORK
BDD	BACKDRAFT DAMPER
BI	BACKWARD INCLINED
BOD	BOTTOM OF DUCT
CC	COOLING COIL
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
CG	CEILING GRILLE
DIFF	DIFFUSER
DWDI	DOUBLE WIDTH DOUBLE INLET
DWSI	DOUBLE WIDTH SINGLE INLET
DX	DIRECT EXPANSION
EAT	ENTERING AIR TEMPERATURE
EF	EXHAUST FAN
EG	EXHAUST GRILLE
EHC	ELECTRICAL HEATING COIL
ER	EXHAUST REGISTER
ERHC	ELECTRIC REHEAT COIL
ESP	EXTERNAL STATIC PRESSURE
F	FAN
F&B	FACE AND BYPASS
FB	FAN BOX
FC	FORWARD CURVED
FA	FREE AREA
FD	FIRE DAMPER (W/ ACCESS DOOR)
FLTR	FILTER
FPI	FINS PER INCH
HC	HEATING COIL
HPU	HEAT PUMP UNIT
KEF	KITCHEN EXHAUST FAN
LAT	LEAVING AIR TEMPERATURE
LUVR	LOUVER

OA	OUTSIDE AIR
OAF	OUTSIDE AIR FAN
OAI	OUTSIDE AIR INTAKE
OBD	OPPOSED BLADE DAMPER
OED	OPEN END DUCT
PHC	PREHEAT COIL
RA	RETURN AIR
RF	RETURN FAN
RG	RETURN GRILLE
RHC	REHEAT COIL
RL	REFRIGERANT LIQUID
RLF	RELIEF
RR	RETURN REGISTER
RS	REFRIGERANT SUCTION
RTU	ROOF TOP UNIT
SA	SUPPLY AIR
SATT	SOUND ATTENUATOR
SCR	SCREEN
SD	SMOKE DAMPER
SDET	SMOKE DETECTOR
SEF	SMOKE EXHAUST FAN
SF	SUPPLY FAN
SFD	COMBINATION AUTOMATIC SMOKE/FIRE DAMPER
–	WITH ACCESS DOOR
SG	SUPPLY GRILLE
SM	SHEETMETAL
SP	STATIC PRESSURE
SR	SUPPLY REGISTER
SWDI	SINGLE WIDTH DOUBLE INLET
SWSI	SINGLE WIDTH SINGLE INLET
TE	TOILET EXHAUST
TF	TRANSFER FAN
TG	TRANSFER GRILLE
TR	TRANSFER
TSP	TOTAL STATIC PRESSURE
UC	UNDERCUT DOOR
VD	VOLUME DAMPER
WMS	WIRE MESH SCREEN

HVAC GENERAL NOTES

GENERAL:

1. HVAC GENERAL NOTES, SYMBOLS LIST AND DETAILS ARE APPLICABLE TO ALL "M" SERIES DRAWINGS.
2. DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO INDICATE CAPACITY, SIZE, APPROXIMATE LOCATION AND GENERAL ARRANGEMENT. DETERMINE EXACT LOCATION OF SYSTEMS AND COMPONENTS IN FIELD.
3. DRAWINGS CANNOT BE FULLY AND CORRECTLY INTERPRETED WITHOUT REFERENCE TO LEGENDS, DETAILS, SCHEDULES AND SPECIFICATIONS. IT IS THE INTENT OF THE DRAWINGS TO SHOW THE INSTALLATION, AS DETAILED BY THE TYPICAL ARRANGEMENTS. ITEMS SHOWN ONCE ON FLOOR PLANS, ELEVATIONS, DETAILS OR DIAGRAMS MAY NOT BE REPEATED IN FULL FOR OTHER TYPICAL INSTANCES.
4. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
5. PROVIDE INFORMATION AND HARDWARE TO COORDINATE CONCRETE PADS AND STEEL PLATFORMS REQUIRED FOR MECHANICAL WORK.
6. COORDINATE ROOF AND WALL PENETRATIONS WITH WORK OF OTHER SECTIONS AND WITH FLASHING REQUIREMENTS.
7. RUN DUCTS AND PIPING CONCEALED, UNLESS SPECIFIED OTHERWISE.
8. INSTALL SENSORS (TEMPERATURE, HUMIDITY, CO2, THERMOSTATS) AT LOCATIONS SHOWN ON PLANS. MOUNTING HEIGHT AFF SHALL COMPLY WITH ADA AND SHALL BE MOUNTED LEVEL WITH ADJACENT SWITCHES (E.G. LIGHT SWITCHES).
9. COORDINATE WORK OF THIS SECTION WITH THAT OF OTHER SECTIONS. ALL WORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN PIPING AND DUCTS AND TRANSITIONS AROUND OBSTRUCTIONS SHALL BE PROVIDED AT NO ADDITIONAL COST.
10. ELEMENTS OF THE WORK SHALL BE INSTALLED IN A MANNER SUCH THAT AT SUBSTANTIAL COMPLETION THE FOLLOWING ITEMS, NEW OR EXISTING SHALL BE "FULLY AND REASONABLY ACCESSIBLE": HVAC CONTROL BOXES, JUNCTION BOXES, VALVES (OF EVERY SHAPE, SORT AND FUNCTION), DDC CONTROL BOXES, ELECTRICAL PANELS, FILTERS, BELTS, DISCONNECT SWITCHES, AND MAINTENANCE ACCESS ELEMENTS INCLUDING PULL SPACE.
    a. "FULLY AND REASONABLY ACCESSIBLE" SHALL BE DEFINED AS: NATIONAL ELECTRIC CODE REQUIRED CLEARANCE FOR POWERED EQUIPMENT AND CAPABLE OF BEING ACCESSED FOR SERVICE, REPAIR OR REPLACEMENT BY AN AVERAGE SIZED INDIVIDUAL (ON A LADDER IF NECESSARY) AND CAPABLE OF BEING SERVICED OR REMOVED WITHOUT REMOVING OR MODIFYING OR DISTORTING OTHER COMPONENTS OF THE WORK. THE DESIGN INTENT PROVIDES A MINIMUM 2' x 2' x 2' ZONE FOR MAINTENANCE. INCREASE WHERE REQUIRED BY MANUFACTURER INSTALLATION INSTRUCTIONS.
    b. CONFLICT WITH MEETING THESE REQUIREMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE IN A TIMELY MANNER AND SHALL BE CORRECTED AT NO ADDITIONAL COST.
11. SUPPORT ALL EQUIPMENT, PIPING AND DUCTWORK FROM BUILDING STRUCTURE. PROVIDE VIBRATION ISOLATION. FOR ROTATING EQUIPMENT, DUCTWORK AND PIPING IN ACCORDANCE WITH THE SPECIFICATIONS. PROVIDE TO THE CONSTRUCTION MANAGER OR GENERAL CONTRACTOR A LIST OF ALL WEIGHTS AND METHODS OF SUPPORT FOR COORDINATION. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
12. ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH NATIONAL ELECTRIC CODE AND DIVISION 26.
13. ALL MATERIAL AND EQUIPMENT SHALL BE NEW.

AIR SYSTEM SPECIFIC NOTES:

1. VERIFY ALL EQUIPMENT CONNECTIONS WITH MANUFACTURER CERTIFIED DRAWINGS. VERIFY AND PROVIDE DUCT TRANSITIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DIMENSIONS BEFORE FABRICATION.
2. SHEETMETAL FITTINGS SHOWN ARE TO BE PROVIDED. NO SUBSTITUTES SHALL BE ALLOWED WITHOUT PRIOR CONSENT FROM ARCHITECT/ENGINEER.
3. REFER TO SPECIFICATIONS FOR DUCTWORK CONSTRUCTION CLASSES, SEAL, AND LEAKAGE CLASSES.
4. SMOKE DETECTORS SHALL BE FURNISHED AND WIRED TO THE FIRE ALARM SYSTEM BY DIVISION 28. DIVISION 23 SHALL MOUNT THE DETECTORS IN DUCTWORK, WHERE REQUIRED BY CODE AND DIVISION 23, DIVISION 23 SHALL WIRE THE DETECTORS TO THE BAS SYSTEM AND FAN STARTERS FOR SHUTDOWN.
5. PROVIDE FLEXIBLE CONNECTIONS ON ALL DUCTS CONNECTING TO FANS AND AIR HANDLING UNITS UNLESS INTERNALLY ISOLATED. ALL DUCTS TO BE GROUNDED ACROSS FLEXIBLE CONNECTION WITH FLEXIBLE COPPER GROUNDING STRAPS.
6. INSULATE DUCTWORK: PERFORM TESTS BEFORE INSULATING.
7. MANUAL DAMPERS ARE NOT SHOWN ON THE DRAWINGS IN ORDER FOR DRAWING CLARITY. PROVIDE MANUAL ADJUSTABLE DAMPERS ON EACH LOW PRESSURE SUPPLY RETURN AND EXHAUST DUCT TAKE OFF, AND AT EACH TAKE OFF TO REGISTERS, GRILLES AND DIFFUSERS.

PIPING SPECIFIC NOTES:

1. VERIFY ALL EQUIPMENT CONNECTIONS WITH MANUFACTURER CERTIFIED DRAWINGS. VERIFY AND PROVIDE FITTINGS TO TRANSITION TO FURNISHED EQUIPMENT CONNECTION SIZES. FIELD VERIFY AND COORDINATE ALL DIMENSIONS BEFORE FABRICATION.
2. ALL CONDENSATE DRAIN LINES SHALL BE PIPED FULL SIZE OF THE UNIT DRAIN OUTLET, WITH "P" TRAP, CONNECTED TO BUILDING DRAINAGE SYSTEMS. SIZE DEPTH OF TRAP FOR ASSOCIATED AIR PRESSURE DIFFERENTIAL. REFER TO DETAIL ON DRAWINGS.
3. PERFORM TEST BEFORE INSULATING PIPING.
4. PROVIDE HANGERS, CLAMPS, OFFSETS, EXPANSION JOINTS, ANCHORS AND GUIDES TO PREVENT STRESS ON PIPING.
5. PROVIDE VENTS AT HIGH POINTS IN PIPING SYSTEMS AND DRAIN VALVES AT LOW POINTS.

NATURAL GAS SPECIFIC NOTES:

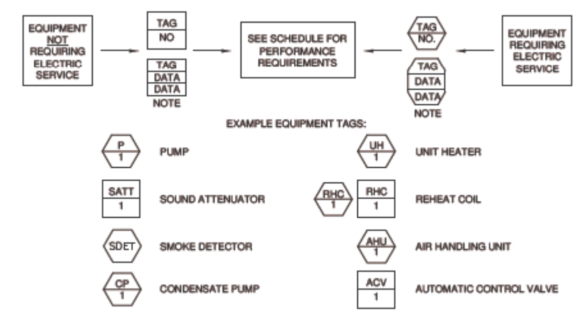
1. CONTRACTORS WORK SHALL COMMENCE ON THE HOUSE SIDE OF THE EXISTING UTILITY CO. METER & REGULATOR.
2. A SUITABLE DRIP OF CONDENSATE POCKET SHALL BE INSTALLED AT THE BOTTOM OF ALL GAS RISERS.
3. ALL GAS PIPING TO COMPLY WITH LOCAL AND STATE CODES.
4. GAS PIPING AND SAFETY DEVICES SHALL CONFORM TO THE REQUIREMENTS OF NFPA 54 AND SHALL BE SUBJECT TO THE INSPECTION AND APPROVAL OF THE STATE REGULATORY BOARD.
5. GAS PIPING SHALL BE TESTED ACCORDING TO THE STATE FUEL GAS CODE AND NATIONAL CODE PROVISIONS OF THE LOCAL PLUMBING INSPECTOR. IF INSPECTION OF THE TEST SHOWS DEFECTS, SUCH DEFECTIVE WORK AND MATERIAL SHALL BE REPLACED AND INSPECTION AND TEST SHALL BE REDONE.

RENOVATION DEMOLITION NOTES

DEMOLITION NOTES

1. SITE VISIT: BEFORE SUBMITTING BID, VISIT AND CAREFULLY EXAMINE SITE TO IDENTIFY EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT WORK OF THIS SECTION. NO EXTRA PAYMENT WILL BE ALLOWED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY WITH SITE CONDITIONS THAT ARE VISIBLE OR READILY CONSTRUED BY EXPERIENCED OBSERVER. SITE VISIT IS PARTICULARLY IMPORTANT BECAUSE THIS IS RENOVATION WORK.
2. EXISTING CONDITIONS AND PREPARATORY WORK: BEFORE STARTING WORK IN A PARTICULAR AREA OF THE PROJECT, VISIT SITE AND EXAMINE CONDITIONS UNDER WHICH WORK MUST BE PERFORMED INCLUDING PREPARATORY WORK DONE UNDER OTHER SECTIONS OR CONTRACTS BY OWNER. REPORT CONDITIONS THAT MIGHT AFFECT WORK ADVERSELY IN WRITING TO ARCHITECT AND OWNER. DO NOT PROCEED WITH WORK UNTIL DEFECTS HAVE BEEN CORRECTED AND CONDITIONS ARE SATISFACTORY. COMMENCEMENT OF WORK SHALL BE CONSTRUED AS COMPLETE ACCEPTANCE OF EXISTING CONDITIONS AND PREPARATORY WORK.
3. DEMOLITION SHALL BE COORDINATED WITH OWNER, ARCHITECT, GENERAL CONTRACTOR, CONSTRUCTION MANAGER AND ENGINEER.
4. PROVIDE MECHANICAL DEMOLITION TERMINATION; CUT, VALVE AND CAP. DROP MECHANICAL DISTRIBUTION TO FLOOR. REMOVAL OF SYSTEM EQUIPMENT SHALL BE BY THE HVAC CONTRACTOR.
5. PROVIDE 2 WEEKS NOTICE TO OWNER OPERATIONS FOR SHUT DOWN OF ANY SERVICES AND/OR SYSTEMS.
6. REFER TO ALL DRAWINGS FOR GENERAL DESCRIPTION OF AREAS REQUIRING DEMOLITION.
7. REFER TO CONSTRUCTION MANAGER INSTRUCTIONS FOR ALL EXISTING EQUIPMENT AND MATERIALS THAT SHALL REMAIN THE PROPERTY OF THE OWNER.
8. ITEMS OF VALUE WHICH ARE NOT DIRECTED TO BE RETURNED TO THE OWNER, SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM SITE AND LEGALLY DISPOSED OF. STORAGE OR SALE OF ITEMS ON THE PROJECT SITE IS PROHIBITED.
9. PROTECTION: ENSURE THE SAFE PASSAGE OF PERSONS IN AND AROUND THE BUILDING DURING DEMOLITION. PREVENT INJURY TO PERSONS AND DAMAGE TO PROPERTY. PROVIDE ADEQUATE SHORING AND BRACING TO PREVENT COLLAPSE. IMMEDIATELY REPAIR DAMAGED PROPERTY TO THE CONDITION BEFORE BEING DAMAGED. TAKE EFFECTIVE MEASURES TO PREVENT WINDBLOWN DUST.
10. UTILITIES: MAINTAIN ALL UTILITIES EXCEPT THOSE REQUIRING REMOVAL OR RELOCATION. KEEP UTILITIES IN SERVICE AND PROTECT FROM DAMAGE. DO NOT INTERRUPT UTILITIES SERVING OCCUPIED AREAS WITHOUT FIRST OBTAINING PERMISSION FROM THE CLINET IN WRITING. PROVIDE TEMPORARY SERVICES.
11. DRAWINGS ARE DIAGRAMMATIC ONLY AND REFLECT OVERALL SYSTEM REMOVAL. NOT EVERY ITEM OR COMPONENT OF A SYSTEM IS SHOWN.
12. PROVIDE SHUT DOWN OF SERVICES (FANS, PUMPS, AHUS, ETC.) AND TRACING OF ALL RISERS WITHIN BASE BID.

EQUIPMENT TAG SYMBOLS & ABBREVIATIONS



NOVA PARKS

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Meadowlark Botanical Gardens Atrium, HVAC Rooftop Equipment Replacement

Meadowlark Botanical Gardens Atrium
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Job Number: N1413.00
Drawn by: CP
Checked by: KS
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BID & PERMIT SUBMISSION 02/04/2021

Scale: N/A
Drawing Title
MECHANICAL LEGENDS

COMMONWEALTH OF VIRGINIA
KENNETH M. SCHRAM
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2/5/2021

M001

FLOW DIAGRAM EQUIPMENT SYMBOLS

- FILTER BANK
- HEATING COIL
- PREHEAT COIL
- REHEAT COIL
- COOLING COIL
- VARIABLE FREQUENCY DRIVE (VFD)
- PUMP
- CENTRIFUGAL FAN WITH INLET GUIDE VANES
- CENTRIFUGAL FAN
- TUBEAXIAL OR VANEAXIAL FAN
- INLINE CENTRIFUGAL FAN
- UPBLAST PROPELLAR FAN
- UPBLAST CENTRIFUGAL FAN
- ROOF FAN
- OPPOSED BLADE DAMPER W/ TWO POSITION ACTUATOR
- OPPOSED BLADE DAMPER W/ MODULATING ACTUATOR
- PARALLEL BLADE DAMPER W/ TWO POSITION ACTUATOR
- PARALLEL BLADE DAMPER W/ MODULATING ACTUATOR
- BACKDRAFT DAMPER

CALL OUT SYMBOLS

- CONNECT NEW TO EXISTING
- POINT OF DISCONNECT
- SECTION DESIGNATION / SHEET NUMBER (1 / H3.1)
- DETAIL DESIGNATION / SHEET NUMBER (1 / H3.1)
- REVISION NUMBER (1)
- TEMPERATURE SENSOR OR THERMOSTAT
- CO2 SENSOR
- HUMIDITY SENSOR
- EQUIPMENT ACCESS ZONE
- TEXT INDICATES DRAWING TO REFERENCE FOR CONTINUATION
- SYMBOL DESIGNATES ASSOCIATED SYSTEM OR SERVICE (CHW, HW, S15, LPS, LPR)
- DIFFUSER, GRILLE, REGISTER LETTER DESIGNATOR (SEE SCHEDULE FOR ATD TYPE)
- DESIGN CFM
- A(200) (200) ALTERNATE CFM LOCATION

REFER TO CONTROLS LEGEND SHEET FOR SYMBOLS USED ON FLOOR PLANS TO INDICATE LOCATION OF TEMPERATURE SENSORS/THERMOSTATS, HUMIDITY SENSORS, PRESSURE SENSORS AND GAS SENSORS (E.G. CARBON DIOXIDE)

PIPING LEGEND

- GATE VALVE
- BALL VALVE
- BALL VALVE WITH MEMORY STOP (BALANCING VALVE)
- BALL VALVE WITH HOSE BIBB, CAP & CHAIN (DRAIN VALVES)
- BUTTERFLY VALVE
- BUTTERFLY VALVE WITH MEMORY STOP (BALANCING VALVE)
- GLOBE VALVE
- PLUG VALVE
- PRESSURE REDUCING VALVE
- CHECK VALVE
- STRAINER W/BALL VALVE, HOSE BIBB & CAP (GATE VALVE FOR STEAM)
- FLOAT OPERATED VALVE
- STRAINER, DUPLEX
- ANGLE VALVE (SECTION VIEW)
- ANGLE VALVE (PLAN VIEW)
- STRAINER, BASKET TYPE W/DRAIN VALVE, HOSE BIBB & CAP
- SOLENOID VALVE
- AUTOMATIC CONTROL VALVE, MODULATING ACTUATOR
- AUTOMATIC CONTROL VALVE, TWO POSITION ACTUATOR
- THREE WAY AUTOMATIC CONTROL VALVE, MODULATING ACTUATOR
- THREE WAY AUTOMATIC CONTROL VALVE, TWO POSITION ACTUATOR
- AUTOMATIC FLOW CONTROL VALVE (PRESSURE INDEPENDENT)
- COMBINATION FLOWMETER/SHUT OFF/BALANCING VALVE (CIRCUIT SETTER)
- FLOW SWITCH
- SAFTEY RELIEF VALVE
- UNION OR FLANGE (AS INDICATED BY PIPE SIZE - SEE SPEC.)
- BLIND FLANGE
- END CAP
- PRESSURE GAUGE WITH GAUGE CLOCK
- THERMOMETER
- VACUUM BREAKER (VB)
- PRESSURE/TEMPERATURE WELL (PT)
- AUTOMATIC AIR VENT WITH ISOLATION VALVE (OR AAV)
- MANUAL AIR VENT (MAV)
- REDUCER (ECCENTRIC-FLAT ON BOTTOM OR FLAT ON TOP)
- REDUCER (CONCENTRIC)
- FLEXIBLE CONNECTION
- RISE (SINGLE LINE - PLAN VIEW)
- DROP (SINGLE LINE - PLAN VIEW)
- TOP TAKEOFF
- BOTTOM TAKEOFF
- PIPE BREAK (SINGLE LINE)
- DIRT LEG
- CLEAN-OUT FOR CONDENSATE DRAIN (CO)
- DIRECTION OF FLOW IN PIPE
- PITCH PIPE UP IN DIRECTION OF FLOW (UP)
- PITCH PIPE DOWN IN DIRECTION OF FLOW (DN)
- NEW WORK
- NEW SUPPLY LINES
- NEW RETURN LINES
- EXISTING PIPING TO REMAIN
- DEMO/EXISTING TO BE REMOVED
- FUTURE

DUCTWORK

SINGLE LINE | DOUBLE LINE | SINGLE LINE | DOUBLE LINE

- NEW DUCT LINETYPE
- ROUND SUPPLY DUCT UP
- SUPPLY DUCT UP
- ROUND SUPPLY DUCT DN
- SUPPLY DUCT DOWN
- STANDARD RADIUS ELBOW (R = W) SUPPLY/RETURN EXHAUST
- BULLHEAD SPLIT SUPPLY — GOOD FOR TAKEOFF TO RING DUCT
- TAKEOFF TO DIFF/GRILLE W/BRANCH TAKE-OFF VOLUME DAMPER — HARD ELBOW
- CEILING DUCT MTD DIFF/GRILLE W/BRANCH TAKE-OFF VOLUME DAMPER
- ACOUSTICALLY LINED DUCT
- EXISTING DUCT TO REMAIN
- EXISTING DUCT TO BE REMOVED
- OPEN END DUCT W/VD & 1/2"x1/2" WMS
- EXISTING DUCT LINETYPE
- ROUND RETURN OR EXHAUST DUCT UP
- RETURN/EXHAUST DUCT UP
- RETURN/EXHAUST DUCT DOWN
- ROUND RETURN OR EXHAUST DUCT DN
- HORIZONTAL OFFSET SUPPLY/RETURN /EXHAUST
- RISE OR DROP SUPPLY/RETURN/ EXHAUST (RISE/DROP)
- 90° TAKE-OFF W/BRANCH TAKE-OFF VOLUME DAMPER (VD IN LOW PRESSURE SYSTEMS ONLY) — RING DUCT
- BULLHEAD CONVERGE RETURN/EXHAUST W/BRANCH TAKE-OFF VOLUME DAMPER
- SIDEWALL DUCT MTD REGISTER/GRILLE W/BRANCH TAKE-OFF VOLUME DAMPER
- SUPPLY SIDEWALL LINEAR DIFFUSER (W/ 1" INTERNALLY LINED SM PLENUM) BRANCH CONN W/VD FOR EVERY 4' OF LINEAR
- SUPPLY CEILING LINEAR DIFFUSER (W/ 1" INTERNALLY LINED SM PLENUM) BRANCH CONN W/VD FOR EVERY 4' OF LINEAR — BOOT BY LD MFR
- FLEXIBLE DUCT

- VD — MANUAL VOLUME DAMPER
- FD — SELF-CLOSING FIRE DAMPER W/ACCESS DOOR
- ACD — AUTOMATIC CONTROL DAMPER W/ACCESS DOOR
- SD — AUTOMATIC SMOKE DAMPER W/ACCESS DOOR
- FSD — COMBINATION FIRE/SMOKE DAMPER W/ACCESS DOOR
- BDD — BACKDRAFT DAMPER
- STANDARD 4-WAY BLOW SUPPLY DIFFUSER
- BLANKED FOR 3-WAY BLOW SUPPLY DIFFUSER
- (OR) BLANKED FOR 2-WAY BLOW SUPPLY DIFFUSER
- BLANKED FOR 1-WAY BLOW SUPPLY DIFFUSER
- (OR) ROOF EXHAUST FAN SHOWN ON ROOF
- (OR) ROOF EXHAUST FAN SHOWN ON FLOOR PLAN
- UC 1/2" — UNDERCUT DOOR
- LVDR 1.5 SF — LOUVERED DOOR
- RETURN OR EXHAUST AIR FLOW
- SUPPLY AIR FLOW

NOVA PARKS

NOVA Parks
5400 Ox Road
Fairfax Station, VA 22039

Meadowlark Botanical Gardens Atrium, HVAC Rooftop Equipment Replacement

Meadowlark Botanical Gardens Atrium
9750 Meadowlark Gardens Court
Vienna, VA 22182

VANDERWEIL
R.G. Vanderweil Engineers, LLP
66 Canal Center Plaza, Suite 200
Alexandria, VA 22314
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Date:
Revised:
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Scale: N/A
Drawing Title

MECHANICAL LEGENDS

COMMONWEALTH OF VIRGINIA
KENNETH M. SCHRAM
Lic. No. 023977
PROFESSIONAL ENGINEER

M002

GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. THIS SPECIFICATION SHALL APPLY TO ALL MECHANICAL, ELECTRICAL, PLUMBING WORK ON THIS PROJECT.

B. PERFORM WORK AND PROVIDE MATERIAL AND EQUIPMENT AS SHOWN ON THE DRAWINGS, AS SPECIFIED AND IN ACCORDANCE WITH THIS SECTION. COMPLETELY COORDINATE WORK OF THIS DIVISION WITH WORK OF OTHERS AND PROVIDE A COMPLETE AND FULLY FUNCTIONAL INSTALLATION.

C. DRAWINGS AND SPECIFICATIONS FORM COMPLIMENTARY REQUIREMENTS. PROVIDE WORK SPECIFIED AND NOT SHOWN, WORK SHOWN AND NOT SPECIFIED AS THOUGH EXPLICITLY REQUIRED BY BOTH BEFORE STARTING WORK IN A PARTICULAR AREA OF THE PROJECT, VISIT THE LOCATION AND EXAMINE CONDITIONS UNDER WHICH WORK MUST BE PERFORMED INCLUDING PREPARATORY WORK DONE UNDER OTHER SECTIONS OR OTHER CONTRACTS OR BY THE OWNER. REVIEW GEOMETRICAL CONSTRAINTS, SUCH AS CEILING HEIGHTS, TO ENSURE CONSTRUCTABILITY AND ACCESS FOR MAINTENANCE. REPORT CONDITIONS THAT MIGHT ADVERSELY AFFECT WORK IN WRITING TO THE ENGINEER. DO NOT PROCEED WITH WORK UNTIL DEFECTS HAVE BEEN CORRECTED AND CONDITIONS ARE SATISFACTORY. COMMENCEMENT OF WORK SHALL BE CONSTRUED AS COMPLETE ACCEPTANCE OF EXISTING CONDITIONS AND PREPARATORY WORK.

1. 2 PROJECT DESCRIPTION

A. THIS PROJECT AIMS TO REPLACE FIVE (5) PACKAGED ROOFTOP UNITS AND THREE (3) SPLIT SYSTEM HEAT PUMPS IN CONJUNCTION WITH THE REPLACEMENT OF THE ROOFING MEMBRANE AND ASSOCIATED ROOFING ELEMENTS. WORK IS DIVIDED INTO BASE BID AND A BID ALTERNATE AS DESIGNATED ON THE DRAWINGS AND AS OUTLINED BELOW.

B. BASE BID: BASE BID WORK INCLUDES MECHANICAL AND ELECTRICAL WORK RELATED TO THE FOLLOWING. COORDINATE PROCUREMENT, STORAGE, AND INSTALLATION OF EQUIPMENT AND MATERIALS WITH ROOF REPLACEMENT SCHEDULE TO MINIMIZE CONSTRUCTION DOWN TIME SUCH THAT NEW EQUIPMENT INSTALLATION BEGINS THE DAY AFTER ROOFING IS COMPLETE IN THE IMMEDIATE AREA OF EACH PIECE OF EQUIPMENT:

1. COMPLETELY REMOVE AND REPLACE AHU-1, -2, -3, -4A, -4B, -4C, 5, 6 , ASSOCIATED DUCTWORK & PIPING, AND ASSOCIATED CONTROLS AS INDICATED ON THE DRAWINGS AND IN CONJUNCTION WITH THE REPLACEMENT OF THE ROOFING MEMBRANE AND ASSOCIATED ROOFING ELEMENTS AS INDICATED ON THE ARCHITECTURAL DRAWINGS.
2. REMOVE, STORE, AND REINSTALL EXISTING FANS AS INDICATED ON THE DRAWINGS AND IN CONJUNCTION WITH THE REPLACEMENT OF THE ROOFING MEMBRANE AND ASSOCIATED ROOFING ELEMENTS AS INDICATED ON THE ARCHITECTURAL DRAWINGS.

C. BID ALTERNATE: BID ALTERNATE WORK SPLITS THE BASE BID WORK INTO PHASES AS DESCRIBED BELOW. COORDINATE PROCUREMENT, STORAGE, AND INSTALLATION OF EQUIPMENT AND MATERIALS WITH ROOF REPLACEMENT SCHEDULE TO MINIMIZE CONSTRUCTION DOWN TIME BETWEEN PHASES SUCH THAT NEW EQUIPMENT INSTALLATION BEGINS THE DAY AFTER ROOFING IS COMPLETE IN THE IMMEDIATE AREA OF EACH PIECE OF EQUIPMENT:

1. PHASE 1: COMPLETELY REMOVE AND REPLACE AHU-4A & AHU-6, DUCTWORK & PIPING, AND CONTROLS AS INDICATED ON THE DRAWINGS AND IN CONJUNCTION WITH THE REPLACEMENT OF THE ROOFING MEMBRANE AND ASSOCIATED ROOFING ELEMENTS AS INDICATED ON THE ARCHITECTURAL DRAWINGS.
2. PHASE 2: COMPLETELY REMOVE AND REPLACE AHU-4C & AHU-4B, DUCTWORK & PIPING, AND CONTROLS AS INDICATED ON THE DRAWINGS AND IN CONJUNCTION WITH THE REPLACEMENT OF THE ROOFING MEMBRANE AND ASSOCIATED ROOFING ELEMENTS AS INDICATED ON THE ARCHITECTURAL DRAWINGS.
3. PHASE 3: COMPLETELY REMOVE AND REPLACE AHU-5, DUCTWORK & PIPING, AND CONTROLS AS INDICATED ON THE DRAWINGS AND IN CONJUNCTION WITH THE REPLACEMENT OF THE ROOFING MEMBRANE AND ASSOCIATED ROOFING ELEMENTS AS INDICATED ON THE ARCHITECTURAL DRAWINGS. REMOVE, STORE, AND REINSTALL KEF-1 AS INDICATED ON THE DRAWINGS AND IN CONJUNCTION WITH THE REPLACEMENT OF THE ROOFING MEMBRANE AND ASSOCIATED ROOFING ELEMENTS AS INDICATED ON THE ARCHITECTURAL DRAWINGS.
4. PHASE 4: COMPLETELY REMOVE AND REPLACE AHU-1, -2, -3, ASSOCIATED CONDENSING UNITS, DUCTWORK & PIPING, AND CONTROLS AS INDICATED ON THE DRAWINGS AND IN CONJUNCTION WITH THE REPLACEMENT OF THE ROOFING MEMBRANE AND ASSOCIATED ROOFING ELEMENTS AS INDICATED ON THE ARCHITECTURAL DRAWINGS. REMOVE, STORE, AND REINSTALL TEF-1 AS INDICATED ON THE DRAWINGS AND IN CONJUNCTION WITH THE REPLACEMENT OF THE ROOFING MEMBRANE AND ASSOCIATED ROOFING ELEMENTS AS INDICATED ON THE ARCHITECTURAL DRAWINGS.
5. PHASE 5: REMOVE, STORE, AND REINSTALL KEF-2 AS INDICATED ON THE DRAWINGS AND IN CONJUNCTION WITH THE REPLACEMENT OF THE ROOFING MEMBRANE AND ASSOCIATED ROOFING ELEMENTS AS INDICATED ON THE ARCHITECTURAL DRAWINGS

1.3 CODES, STANDARDS, AUTHORITIES AND PERMITS

C. PERFORM WORK IN ACCORDANCE WITH RULES, REGULATIONS, STANDARDS, CODES, ORDINANCES, AND LAWS OF LOCAL, STATE, AND FEDERAL GOVERNMENTS, AND OTHER AUTHORITIES THAT HAVE LEGAL JURISDICTION OVER THE SITE.

D. PRIOR TO COMMENCEMENT OF WORK, NOTIFY STATE AND APPLICABLE AUTHORITIES AND SUBMIT ALL OF THE APPLICABLE NOTIFICATIONS FOR CONSTRUCTION, OPERATION AND/OR DEMOLITION.

E. MATERIALS AND EQUIPMENT SHALL BE MANUFACTURED, INSTALLED AND TESTED AS SPECIFIED IN LATEST EDITIONS OF APPLICABLE PUBLICATIONS, STANDARDS, RULINGS AND DETERMINATIONS OF:

1. LOCAL AND STATE BUILDING, PLUMBING, MECHANICAL, ELECTRICAL, FIRE AND HEALTH DEPARTMENT CODES
2. AMERICAN GAS ASSOCIATION (AGA)
3. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
4. AMERICAN INSURANCE ASSOCIATION (AIA) (FORMERLY NATIONAL BOARD OF FIRE UNDERWRITERS)
5. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
6. UNDERWRITERS LABORATORIES (UL)
7. FACTORY MUTUAL ASSOCIATION (FM)
8. OWNER'S INSURANCE UNDERWRITER
9. SHEET METAL & AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)

D. MATERIAL AND EQUIPMENT SHALL BE LISTED BY UNDERWRITERS' LABORATORIES (UL), AND APPROVED BY ASME, ANSI, ASTM, AND AGA FOR INTENDED SERVICE.

E. WHEN REQUIREMENTS CITED IN THIS SPECIFICATION CONFLICT WITH EACH OTHER OR WITH CONTRACT DOCUMENTS, MOST STRINGENT SHALL GOVERN WORK.

F. SECURE AND PAY FOR ALL PERMITS AND INSPECTIONS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION. SECURE TRADE PERMITS PRIOR TO BEGINNING WORK.

1.4 GUARANTEE

A. GUARANTEE THE WORK OF THIS SECTION IN WRITING FOR ONE YEAR FOLLOWING THE DATE OF SUBSTANTIAL COMPLETION. IF THE EQUIPMENT IS USED FOR VENTILATION, TEMPORARY HEAT, OR OTHER USE PRIOR TO INITIAL BENEFICIAL OCCUPANCY BY THE OWNER, THE BID PRICE SHALL INCLUDE AN EXTENDED PERIOD OF WARRANTY COVERING THE ONE-YEAR OF BENEFICIAL OCCUPANCY BY THE OWNER. THE GUARANTEE SHALL REPAIR OR REPLACE DEFECTIVE MATERIALS, EQUIPMENT, WORKMANSHIP AND INSTALLATION THAT DEVELOP WITHIN THIS PERIOD, PROMPTLY AND TO ARCHITECT'S SATISFACTION AND CORRECT DAMAGE CAUSED IN MAKING NECESSARY REPAIRS AND REPLACEMENTS UNDER GUARANTEE WITHIN CONTRACT PRICE.

1.5 COORDINATION DRAWINGS

A. A SINGLE SET OF COORDINATION DRAWINGS SHALL BE MUTUALLY PREPARED BY ALL MECHANICAL AND ELECTRICAL TRADES. THE INITIATION OF THESE DRAWINGS BEGINS WITH THE SHEET METAL SUBCONTRACTOR.

B. THE SHEET METAL SUBCONTRACTOR SHALL PREPARE A COMPLETE SET OF ELECTRONIC DRAWINGS IN APPROVED VERSIONS OF AUTOCAD, REVIT, OR APPROVED ALTERNATIVE, AT SCALE NOT LESS THAN 3/8" EQUALS 1'-0" SHOWING: STRUCTURE, RATED PARTITIONS, CEILING TYPE AND OTHER INFORMATION AS NEEDED FOR COORDINATION. ALL TRADES SHALL ELECTRONICALLY ADD THEIR SYSTEMS TO THE ELECTRONIC FORMATTED DRAWINGS, EACH TRADE IN A DIFFERENT COLOR, SHOWING REQUIRED OFFSETS AND DIMENSIONS TO AVOID INTERFERENCES. THESE ELECTRONIC FILES WILL BE CONSIDERED THE PROJECT COORDINATION DRAWINGS.

C. WHERE CONFLICTS OCCUR WITH PLACEMENT OF MATERIALS OF VARIOUS TRADES, THE SHEET METAL SUBCONTRACTOR WILL BE RESPONSIBLE TO COORDINATE THE AVAILABLE SPACE TO ACCOMMODATE ALL TRADES.

D. SHEET METAL FABRICATION SHALL NOT START UNTIL COPIES OF COMPLETED COORDINATION DRAWINGS ARE RECEIVED BY THE ARCHITECT AND HAVE BEEN REVIEWED.

E. REVIEW BY ENGINEER OF COORDINATION DRAWINGS IS LIMITED TO CONFIRMING THAT REQUIREMENTS FOR COORDINATION AND PREPARATION OF PLANS HAVE BEEN COMPLIED WITH BY THE CONSTRUCTION MANAGER OR GENERAL CONTRACTOR AND SHALL NOT DIMINISH RESPONSIBILITY UNDER THIS CONTRACT FOR FINAL COORDINATION OF INSTALLATION AND MAINTENANCE CLEARANCES OF ALL SYSTEMS AND EQUIPMENT WITH ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL AND OTHER RELATED WORK.

1.6 SHOP DRAWING SUBMITTALS

A. SUBMITTAL COVER SHEET:

1. SHOP DRAWING SUBMITTAL FOR EACH PRODUCT SHALL INCLUDE A COPY OF THE FOLLOWING COVER SHEET COMPLETELY FILLED OUT. INCOMPLETE OR INCORRECT COVER SHEET SUBMITTAL SHALL CONSTITUTE REASON FOR REJECTION
2. PROVIDE SEPARATE COVER SHEET (BELOW) FOR EACH PRODUCT, RATHER THAN ONE COVER SHEET FOR MULTIPLE PRODUCTS, WHETHER OR NOT SUPPLIED BY ONE MANUFACTURER OR VENDOR.

SHOP DRAWING COVER SHEET			
PROJECT:		CONTRACTOR:	
DIVISION NO.:		SECTION NO.:	
DESCRIPTION:			
CONTRACT DRAWING REFERENCE NO:			
EQUIPMENT TAG:			
SUBMISSION (CIRCLE ONE): FIRST, SECOND, THIRD, FOURTH			
DATE:			
INFORMATION AND CHECKLIST			
1.	Contractor's Log #ID		
2.	Name, address, and phone number of supplier.		
3.	Are all specified or scheduled items included and exactly match scheduled/specified items?	Yes No	
4.	Is this item a substitution?	Yes No	
5.	Are deviations clearly identified?	Yes No	
6.	Does equipment fit space shown on construction documents, coordination drawings, and actual field conditions?	Yes No	
7.	Has support, erection, weights, and installation been coordinated with all trades?	Yes No	
8.	Does the proposed installation void warranties and/or violate UL or code requirements?	Yes No	
9.	Does this material/equipment add expense to any other trade or project costs?	Yes No	
10.	Does equipment require interface with other trades? List divisions and specifics requiring coordination?	Yes No	
11.	Is control interface coordinated?	Yes No	
12	List electrical characteristics (V/Ph/A)		

B. SUBMITTAL PROCEDURES, CONTENTS, AND FORMAT

1. CONSTRUCTION MANAGER OR GENERAL CONTRACTOR SHALL FIRST REVIEW SUBMITTAL PACKAGES FOR COMPLIANCE WITH CONTRACT DOCUMENTS. UPON REVIEW BY THE G.C. THE SUBMITTALS WILL THEN BE SUBMITTED FOR REVIEW BY ARCHITECT. REVIEW BY CONSTRUCTION MANAGER OR CONTRACTOR IS INTENDED TO ENSURE THAT THE SUBMITTALS INCLUDE THE FOREGOING COVER SHEET, ARE IN THE CORRECT ELECTRONIC FORMAT AS SPECIFIED BELOW, AND THAT THE DEVICES/EQUIPMENT/ITEMS FIT INTO THE SPACE PROVIDED. ALSO, THAT THE SUBMITTAL CONTAINS ADEQUATE INFORMATION TO VERIFY SPECIFICATION REQUIREMENTS AS WELL AS THE PERFORMANCE AND DIMENSIONAL REQUIREMENTS SHOWN ON THE DRAWINGS. IF A SHOP DRAWING IS RETURNED WITH A SUBMITTAL STATUS OF "REJECTED" OR "REVISE AND RESUBMIT", IT INDICATES THE SHOP DRAWING WAS NOT ADEQUATELY REVIEWED BY THE CONTRACTOR. SUBSEQUENT RE-SUBMITTALS SHALL BE COMPLETE AND SHALL INCLUDE A COVER LETTER SUMMARIZING THE CORRECTIONS MADE IN RESPONSE TO THE REVIEW COMMENTS.
2. SUBMITTALS WILL BE PROVIDED TO ENGINEER IN ELECTRONIC (PDF) FORMAT. A SINGLE PDF FILE SHALL BE SUBMITTED FOR EACH RESPECTIVE SUBMITTAL. THE PDF FILE WILL BE FORMATTED IN THE FOLLOWING WAY:

   a. SUBMITTALS WILL BE 'EMAILED' TO THE MECHANICAL/ELECTRICAL TEAM VIA THE FOLLOWING EMAIL ADDRESS(ES):

   DL-ALE-SHOPDRAWINGS@VANDERWEIL.COM

3. SUBMITTAL CONTENTS

   a. ELECTRONIC SUBMITTALS SHALL BE COMPREHENSIVE AND FULLY SELF CONTAINED AND SHALL NOT CONTAIN LINKS TO ASSOCIATED WEBSITES.

   b. SUBMITTALS SHALL INCLUDE ALL CATALOG DATA AND PHYSICAL AND PERFORMANCE CHARACTERISTICS AND PLANS AND DIAGRAMS AS NECESSARY TO CONFIRM COMPLIANCE WITH PLANS AND SPECIFICATIONS.

   c. SUBMITTALS SHALL CONTAIN ONLY INFORMATION RELEVANT TO THE PARTICULAR EQUIPMENT OR MATERIALS TO BE FURNISHED. CLEARLY INDICATE THE PIECE OF EQUIPMENT OR MATERIAL BEING PROVIDED. DO NOT SUBMIT GENERIC CATALOG CUTS WHICH DESCRIBE SEVERAL DIFFERENT ITEMS IN ADDITION TO THOSE SPECIFIC ITEMS BEING PROVIDED.

4. SHOP DRAWINGS SHOWING MANUFACTURER'S PRODUCT DATA SHALL CONTAIN DETAILED DIMENSIONAL DRAWINGS, ACCURATE AND COMPLETE DESCRIPTION OF MATERIALS OF CONSTRUCTION, MANUFACTURER'S PUBLISHED PERFORMANCE CHARACTERISTICS AND CAPACITY RATINGS (PERFORMANCE DATA, ALONE, IS NOT ACCEPTABLE), ELECTRICAL REQUIREMENTS AND WIRING DIAGRAMS. DRAWINGS SHALL CLEARLY INDICATE LOCATION (TERMINAL BLOCK OR WIRE NUMBER), VOLTAGE AND FUNCTION FOR ALL FIELD TERMINATIONS, AND OTHER INFORMATION NECESSARY TO DEMONSTRATE COMPLIANCE WITH ALL REQUIREMENTS OF CONTRACT DOCUMENTS.

D. ACCEPTABLE MANUFACTURERS: SUBSTITUTION OF PRODUCTS OTHER THAN THOSE OF THE ACCEPTABLE MANUFACTURERS SPECIFIED HEREING SHALL NOT BE MADE. ONLY THE SPECIFIED ITEMS, OR COMPARABLE PRODUCTS BY ONE OF THE OTHER NAMED ALTERNATIVE MANUFACTURERS SHALL BE SUBMITTED. OTHER MANUFACTURERS AND PRODUCTS WILL NOT BE USED.

E. DEVIATIONS

1. PROPOSED DEVIATIONS FROM CONTRACT DOCUMENTS SHALL BE REQUESTED INDIVIDUALLY IN WRITING WHETHER DEVIATIONS RESULT FROM FIELD CONDITIONS, STANDARD SHOP PRACTICE, OR OTHER CAUSE. SUBMIT LETTER WITH TRANSMITTAL OF SHOP DRAWINGS WHICH FLAGS THE DEVIATION TO THE ATTENTION OF THE ARCHITECT.
2. WITHOUT LETTERS FLAGGING THE DEVIATION TO THE ARCHITECT, IT IS POSSIBLE THAT THE ARCHITECT MAY NOT NOTICE SUCH DEVIATION OR MAY NOT REALIZE ITS RAMIFICATIONS. THEREFORE, IF SUCH LETTERS ARE NOT SUBMITTED TO THE ENGINEER, THE CONTRACTOR SHALL HOLD THE ENGINEER AND HIS CONSULTANTS HARMLESS FOR ANY AND ALL ADVERSE CONSEQUENCES RESULTING FROM THE DEVIATIONS BEING IMPLEMENTED. THIS SHALL APPLY REGARDLESS OF WHETHER THE ENGINEER HAS REVIEWED OR APPROVED SHOP DRAWINGS CONTAINING THE DEVIATION, AND WILL BE STRICTLY ENFORCED.
3. APPROVAL OF PROPOSED DEVIATIONS, IF ANY, WILL BE MADE AT DISCRETION OF ARCHITECT.

F. SUBMITTAL STATUS: SUBMITTALS WILL BE RETURNED MARKED/NOTED AS ILLUSTRATED BELOW:

"REVIEWED": REVIEWED AND FOUND GENERALLY ACCEPTABLE. MINOR DEVIATIONS NOTED. NO FURTHER SUBMITTAL IS REQUIRED IF NOTED DEVIATIONS ARE COMPLIED WITH/ CORRECTED.

"REVISE AND RESUBMIT": SUBMITTAL CONTAINS DEVIATIONS WHICH SHALL BE CORRECTED AND CONFIRMED BY A NEW SUBMITTAL.

"REJECTED": SUBMITTAL IS INCORRECT TO SUCH AN EXTENT THAT MATERIAL IS UNACCEPTABLE, OR IS INCOMPLETE TO SUCH AN EXTENT THAT A COMPLETE REVIEW CANNOT BE MADE. RESUBMIT IN ACCORDANCE WITH REQUIREMENTS OF THE CONTRACT DOCUMENTS.

"NO ACTION": SUBMITTAL NOT REVIEWED.

G. RESPONSIBILITY: INTENT OF ENGINEER'S SUBMITTAL REVIEW IS TO CHECK FOR CAPACITY, RATING, AND CERTAIN CONSTRUCTION FEATURES. CONTRACTOR SHALL ENSURE THAT WORK MEETS REQUIREMENTS OF CONTRACT DOCUMENTS REGARDING INFORMATION THAT PERTAINS TO FABRICATION PROCESSES OR MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES OF CONSTRUCTION; AND FOR COORDINATION OF WORK OF THIS AND OTHER SECTIONS. WORK SHALL COMPLY WITH SUBMITTALS MARKED "REVIEWED" TO EXTENT THAT THEY AGREE WITH CONTRACT DOCUMENTS. SUBMITTAL REVIEW SHALL NOT DIMINISH RESPONSIBILITY UNDER THIS CONTRACT FOR DIMENSIONAL COORDINATION, QUANTITIES, INSTALLATION, WIRING, SUPPORTS AND ACCESS FOR SERVICE, NOR SHOP DRAWING ERRORS OR DEVIATIONS FROM REQUIREMENTS OF CONTRACT DOCUMENTS. NOTING OF SOME ERRORS WHILE OVERLOOKING OTHERS WILL NOT EXCUSE PROCEEDING IN ERROR. CONTRACT DOCUMENTS REQUIREMENTS ARE NOT LIMITED, WAIVED NOR SUPERSEDED BY REVIEW.

H. SCHEDULE: INCORPORATE SHOP DRAWING REVIEW PERIOD INTO CONSTRUCTION SCHEDULE SO THAT WORK IS NOT DELAYED. CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR DELAYS CAUSED BY NOT INCORPORATING THE FOLLOWING SHOP DRAWING REVIEW TIME REQUIREMENTS INTO HIS PROJECT SCHEDULE. WORKING DAYS LISTED REFERENCE THE TIME IN THE ENGINEER'S OFFICE. IT DOES NOT INCLUDE TRANSMITTAL OR REVIEW TIME OF OTHERS. ALLOW AT LEAST 10 WORKING DAYS, EXCLUSIVE OF TRANSMITTAL TIME, FOR REVIEW EACH TIME SHOP DRAWING IS SUBMITTED OR RESUBMITTED WITH THE EXCEPTION THAT 14 WORKING DAYS, EXCLUSIVE OF TRANSMITTAL TIME, ARE REQUIRED FOR THE FOLLOWING:

1. HVAC TEMPERATURE CONTROL SUBMITTAL.
2. COORDINATION DRAWINGS.
3. IF MORE THAN FIVE SHOP DRAWINGS OF A SINGLE TRADE ARE RECEIVED IN ONE CALENDAR WEEK.

1.7 RECORD DRAWINGS (AS-BUILTS)

A. AS WORK PROGRESSES AND FOR DURATION OF CONTRACT, MAINTAIN COMPLETE AND SEPARATE SET OF PRINTS OF CONTRACT DRAWINGS AT JOB SITE AT ALL TIMES. RECORD WORK COMPLETED AND ALL CHANGES FROM ORIGINAL CONTRACT DRAWINGS. SUCH CHANGES SHALL INCLUDE, BUT NOT BE LIMITED TO, THOSE RESULTING FROM RFI'S, FIELD CONDITIONS, AND MODIFICATIONS AND ADDITIONS. INCLUDE ACTUAL LOCATION OF EXISTING UTILITIES IF THEY DIFFER FROM DESIGN DOCUMENTS. AT COMPLETION OF PROJECT CONTRACTOR SHALL INCORPORATE ALL CHANGES INTO RECORD AS-BUILT DRAWINGS IN ELECTRONIC FORMAT AND SUBMIT FOR REVIEW AND APPROVAL.

B. AT COMPLETION OF WORK, PREPARE A COMPLETE SET OF RECORD DRAWINGS IN ELECTRONIC FORMAT. DELIVER TO THE ARCHITECT FOR APPROVAL.

C. AFTER APPROVAL, DELIVER THE FOLLOWING:

1. ORIGINAL (NOT SCANNED) ELECTRONIC VERSION OF DRAWINGS IN APPROVED FORMAT, NOTATED AS "RECORD DRAWINGS," AND CONFORMED TO INCORPORATE ALL CHANGES TO THE ORIGINAL DESIGN NOTED ABOVE, THE CHANGES SHALL BE CLOUDED AND APPROPRIATELY IDENTIFIED. DELIVER ONE COPY EACH TO THE GENERAL CONTRACTOR, OWNER, ARCHITECT, AND ENGINEER.

1.8 BULLETINS, MANUALS, AND OPERATING INSTRUCTIONS - ELECTRONIC FORMAT

PROVIDE ELECTRONICALLY FORMATTED (SEARCHABLE PDF) FILES OF MANUFACTURER'S OPERATING AND MAINTENANCE INSTRUCTIONS FOR EACH PIECE OF EQUIPMENT AND SYSTEM. COMPILE RESPECTIVE WORK OF EACH DISCIPLINE INTO A SINGLE FILE FOR EACH DISCIPLINE. ALL NAME TAG INFORMATION SUCH AS MAKE, TYPE, SIZE, CAPACITY, SERIAL NUMBER, ETC. SHALL BE INCLUDED AS PART OF THE MANUAL. PROVIDE, WITHIN THE ELECTRONIC FILE, TABLE OF CONTENTS/INDEX LISTING.

1.9 SPECIAL RESPONSIBILITIES

A. COOPERATE AND COORDINATE WITH WORK OF OTHER SECTIONS IN EXECUTING WORK OF THIS SECTION.

1. PERFORM WORK SO THAT PROGRESS OF ENTIRE PROJECT INCLUDING WORK OF OTHER SECTIONS SHALL NOT BE INTERFERED WITH OR DELAYED.
2. PROVIDE INFORMATION AS REQUESTED ON ITEMS FURNISHED UNDER ONE SECTION WHICH SHALL BE INSTALLED UNDER OTHER SECTIONS.
3. FOR EQUIPMENT PROVIDED UNDER ANY DIVISION OR SECTION WHICH HAS CONNECTION MADE UNDER THE MECHANICAL OR ELECTRICAL SECTIONS, OBTAIN DETAILED INSTALLATION AND HOOKUP INFORMATION FROM THE EQUIPMENT MANUFACTURERS.
4. OBTAIN FINAL ROUGHING DIMENSIONS OR OTHER INFORMATION AS NEEDED FOR COMPLETE INSTALLATION OF ITEMS FURNISHED UNDER OTHER SECTIONS OR BY OWNER.
5. KEEP FULLY INFORMED AS TO SHAPE, SIZE AND POSITION OF OPENINGS REQUIRED FOR MATERIAL OR EQUIPMENT TO BE PROVIDED UNDER ALL SECTIONS. GIVE FULL INFORMATION SO THAT OPENINGS REQUIRED BY WORK OF THIS SECTION MAY BE COORDINATED WITH OTHER WORK AND OTHER OPENINGS AND MAY BE PROVIDED FOR IN ADVANCE. IN CASE OF FAILURE TO PROVIDE SUFFICIENT INFORMATION IN PROPER TIME, PROVIDE CUTTING AND PATCHING OR HAVE SAME DONE, AT OWN EXPENSE AND TO FULL SATISFACTION OF ARCHITECT.
6. NOTIFY ENGINEER OF LOCATION AND EXTENT OF EXISTING PIPING, CONDUIT, DUCTWORK AND EQUIPMENT THAT INTERFERES WITH NEW CONSTRUCTION. IN COORDINATION WITH AND WITH APPROVAL OF ENGINEER, RELOCATE PIPING, DUCTWORK AND EQUIPMENT TO PERMIT NEW WORK TO BE PROVIDED. REMOVE NON-FUNCTIONING AND ABANDONED PIPING, DUCTWORK AND EQUIPMENT. DISPOSE OF OR STORE ITEMS.

B. BUILDING EXPANSION JOINTS AND FIREWALLS

1. DUCTWORK, CONDUIT, CABLE TRAY, PIPING, AND OTHER HORIZONTAL DISTRIBUTION SYSTEMS SHALL BE PROVIDED WITH APPROVED EXPANSION PROVISIONS WHEN PASSING BY BUILDING EXPANSION JOINTS. PROVIDE COPPER GROUND JUMPER ACROSS EXPANSION JOINTS FOR ELECTRICAL COMPONENTS. SYSTEMS SHALL BE RUN THROUGH RATED WALLS, PARTITIONS, AND FLOORS VIA APPROVED FIREPROOFED SLEEVES.

C. INSTALLATION SHALL PROVIDE ACCESS TO SYSTEMS

1. INSTALLATION SHALL ALLOW CLEARANCES FOR EASY ACCESS TO SYSTEMS FOR ROUTINE MAINTENANCE, FOR REPAIRS, AND FOR INSTALLING NEW CABLE IN CONDUIT AND CABLE TRAYS.

D. PROTECTION OF WORK

1. EACH CONTRACTOR SHALL BE RESPONSIBLE FOR WORK AND EQUIPMENT UNTIL FINALLY INSPECTED, TESTED, AND ACCEPTED. CAREFULLY STORE MATERIALS AND EQUIPMENT THAT IS NOT IMMEDIATELY INSTALLED AFTER DELIVERY TO SITE. CLOSE OPEN ENDS OF WORK WITH TEMPORARY COVERS OR PLUG DURING CONSTRUCTION TO PREVENT ENTRY OF OBSTRUCTING MATERIAL. COVER WORK SUBJECT TO FALLING DEBRIS WITH TEMPORARY COVERS.
2. PROVIDE ALL MATERIALS, EQUIPMENT AND LABOR TO PROVIDE ADEQUATE PROTECTION OF ALL EQUIPMENT DURING THE COURSE OF CONSTRUCTION. THIS INCLUDES PROTECTION FROM MOISTURE AND FOREIGN MATERIAL. AT COMPLETION, ALL WORK MUST BE TURNED OVER TO OWNER CLEAN AND IN NEW CONDITION.
3. PROTECT THE WORK AND MATERIAL OF OTHER TRADES THAT MIGHT BE DAMAGED BY WORK OR WORKMEN AND MAKE GOOD ALL DAMAGE THUS CAUSED.

E. FIREPROOFING: PATCHING AND REPAIRING OF FIREPROOFING DUE TO CUTTING OR DAMAGING TO FIREPROOFING DURING COURSE OF WORK SPECIFIED UNDER THIS SECTION SHALL BE PERFORMED BY INSTALLER OF FIREPROOFING AND PAID FOR BY TRADE RESPONSIBLE FOR DAMAGE AND SHALL NOT CONSTITUTE GROUNDS FOR AN EXTRA TO OWNER.

1.10 CONTINUITY OF SERVICES

A. DO NOT INTERRUPT EXISTING SERVICES WITHOUT OWNER'S WRITTEN APPROVAL.

B. SCHEDULE INTERRUPTIONS IN ADVANCE, ACCORDING TO OWNER'S INSTRUCTIONS. SUBMIT, IN WRITING, WITH REQUEST FOR INTERRUPTION, METHODS PROPOSED TO MINIMIZE LENGTH OF INTERRUPTION.

C. INTERRUPTIONS SHALL BE SCHEDULED AT TIMES OF DAY AND WORK SO THAT THEY HAVE MINIMAL IMPACT ON OWNER'S OPERATIONS.

D. SUBCONTRACTOR SHALL COORDINATE SHUTDOWNS OF EXISTING SYSTEMS.

E. INCLUDE PREMIUM TIME WORK ASSOCIATED WITH INTERRUPTIONS OF SERVICES AND/OR SHUTDOWNS TO AVOID DISRUPTION TO OWNER'S OPERATIONS.

1.11 PROJECT PUNCH LIST PROCEDURE:

A. WHEN THE CONTRACT WORK IS SUBSTANTIALLY COMPLETE, EACH TRADE CONTRACTOR SHALL PHYSICALLY WALK DOWN THE INSTALLATION AND PREPARE A PUNCH LIST CONTAINING AN ITEMIZATION OF WORK REMAINING FOR 100% COMPLETION. THE PUNCH LIST SHALL BE SUBMITTED TO THE ENGINEER AS A PREREQUISITE TO THE ENGINEER'S OWN PUNCH LIST, WHICH WILL THEN BE DEVELOPED TO COMPLEMENT THAT OF THE TRADE CONTRACTOR.

B. IF, WHEN THE ENGINEER ARRIVES AT THE SITE CERTAIN AREAS ARE NOT COMPLETE AND READY FOR PUNCH OUT, THE ENGINEER WILL NOT REVIEW THESE AREAS. WHEN A SECOND NOTIFICATION IS ISSUED INDICATING THE INSTALLATION IS COMPLETED AND THE CONTRACTOR HAS PUNCHED AND CORRECTED THESE AREAS, THE ENGINEER WILL THEN RE-VISIT THE SITE FOR FINAL OBSERVATIONS AND PUNCH LIST

1.12 PROJECT CLOSE-OUT PROCEDURE:

A. REVIEW REQUIREMENTS OF EACH SECTION OF THE SPECIFICATIONS AND SUBMIT FOR APPROVAL TO ARCHITECT THE SIGN-OFF FORMS THAT SHALL BECOME THE PROJECT CLOSE-OUT CHECKLIST. THESE, AT A MINIMUM, SHALL INCLUDE THE FOLLOWING INFORMATION SHOWN IN ATTACHED PROJECT CLOSEOUT CHECKLIST EXAMPLE. THE ARCHITECT AND/OR OWNER MAY INCORPORATE ADDITIONAL SPECIFIC ITEMS TO THE FOLLOWING CHECKLIST WHICH SHALL BECOME PART OF THE PROJECT REQUIREMENTS.

1.13 COMMISSIONING:

A. ALL PORTIONS OF THIS SECTION ARE SUBJECT TO THE COMMISSIONING PROCESS. COMMISSIONING IS A FORMAL PROCESS TO THOROUGHLY DOCUMENT THE INSTALLATION AND VERIFY THE OPERATION OF BUILDING SYSTEMS. REFER TO GENERAL COMMISSIONING REQUIREMENTS 23.08.00.

NOVA PARKS

NOVA Parks
5400 Ox Road
Fairfax Station, VA 22039

Meadowlark Botanical Gardens Atrium, HVAC Rooftop Equipment Replacement

Meadowlark Botanical Gardens Atrium
9750 Meadowlark Gardens Court
Vienna, VA 22182

VANDERWEIL
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Job Number: N1413.00
Drawn by: CP
Checked by: KS
Date:
Revised:
BID & PERMIT SUBMISSION 02/04/2021

Scale: N/A
Drawing Title
MECHANICAL SPECIFICATIONS

COMMONWEALTH OF VIRGINIA
KENNETH M. SCHRAM
Lic. No. 023977
PROFESSIONAL ENGINEER
2/5/2021

M003

23 00 00 - GENERAL

23 00 00 - GENERAL

A. THIS PROJECT INVOLVES CONSTRUCTION INSIDE AN EXISTING STRUCTURE. CONTRACTORS, BY SUBMITTING A BID, ARE DEEMED TO BE COMPLETELY FAMILIAR WITH THE EXISTING CONDITION OF THE BUILDING AS IT INFLUENCES THE WORK DESCRIBED. POTENTIAL PROBLEM AREAS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY.

B. ANY DEMOLITION SHALL BE COORDINATED WITH OWNER, ARCHITECT, G.C. , AND ENGINEER.

C. REVIEW THE ARCHITECTURAL & ELECTRICAL DRAWINGS FOR NOTES, DIMENSIONS, ETC., AND COORDINATE WITH OTHER TRADES INVOLVED. THE WORK REQUIREMENTS DESCRIBED WITHIN DIVISION 20 SPECIFICATION SECTION "COMMON MECHANICAL / ELECTRICAL REQUIREMENTS" FORM COMPLIMENTARY REQUIREMENTS TO THE SCOPE OF WORK CONTAINED WITHIN DIVISION 23.

D. WORK SHALL CONFORM TO THE CURRENT EDITIONS OF THE FOLLOWING:

1. SHEET METAL SMACNA STANDARDS (2005 - 3RD EDITION)
2. INTERNATIONAL MECHANICAL CODE (IMC-2015)
3. INTERNATIONAL ENERGY CONSERVATION CODE (IECC-2015)
4. INTERNATIONAL EXISTING BUILDING CODE (2015)
5. ALL OTHER APPLICABLE STATE AND LOCAL CODES AND ORDINANCES

E. WORK SHALL ALSO CONFORM TO BASE BUILDING SPECIFICATIONS AND STANDARDS.

F. SHUTDOWN OF EXISTING SYSTEMS FOR CONNECTION OF NEW WORK SHALL BE COORDINATED IN ADVANCE WITH THE CONSTRUCTION MANAGER AND BUILDING OWNER.

G. ALL MATERIALS AND EQUIPMENT SHALL BE UNUSED AND OF NEW MANUFACTURE, EXCEPT FOR EXISTING COMPONENTS INDICATED TO REMAIN AND BE REUSED. INSPECT EXISTING EQUIPMENT AND MATERIALS PRIOR TO BIDDING TO VERIFY CONDITION.

H. INSTALL THERMOSTATS AT MOUNTING HEIGHTS ABOVE FINISHED FLOOR IN ACCORDANCE WITH "ADA" REQUIREMENTS, OR AS DIRECTED OTHERWISE BYENGINEER.

I. CONTRACTORS SHALL VERIFY, LAYOUT AND BE RESPONSIBLE FOR ALL MEASUREMENTS OF ALL EXISTING CONDITIONS BEFORE COMMENCING WORK AND SHALL NOTIFY ENGINEER IF A CONDITION EXISTS THAT PREVENTS THE CONTRACTOR FROM ACCOMPLISHING THE INTENT OF THE DRAWINGS.

J. GIVE NOTICES, FILE PLANS, OBTAIN AND PAY FOR ALL PERMITS, PAY FEES AND BACK CHARGES, AND OBTAIN NECESSARY APPROVALS REQUIRED FOR THE WORK.

K. THOUGH SOME OFFSETS & TRANSITIONS ARE SHOWN IN PIPING & SHEET METAL TO HELP INDICATE THE PHYSICAL RELATIONSHIP BETWEEN THEM, IT IS NOT THE INTENT OF THE DRAWINGS TO SHOW ALL PIPING & SHEET METAL OFFSETS & TRANSITIONS REQUIRED. THE CONTRACTOR SHALL FULLY COORDINATE THE MECHANICAL WORK WITHIN ITSELF & WITH THE WORK OF ALL TRADES TO PROVIDE COMPLETE & OPERABLE SYSTEMS WITHOUT INTERFERENCES.

L. EXISTING SYSTEMS AND EQUIPMENT

1. EXISTING TO BE REUSED/RELOCATED EQUIPMENT: REPORT ANY EXISTING EQUIPMENT DEFICIENCIES TO THE OWNER AND THE ENGINEER.

2. CONNECT WORK TO VARIOUS EXISTING SYSTEMS AS INDICATED ON THE DRAWINGS. WORK SHALL BE COMPATIBLE WITH THE EXISTING SYSTEM CONDITIONS. ALL WORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED AS WELL AS WITH EXISTING SYSTEMS, THE STRUCTURE, AND OTHER OBSTRUCTIONS.

O. PRE-DEMO TESTING

1. PRIOR TO ANY DEMOLITION OR NEW WORK, TESTING AND BALANCING CONTRACTOR SHALL TAKE AIRFLOW AND STATIC PRESSURE READINGS AT ALL LOCATIONS WHERE NEW SYSTEMS ARE TO CONNECT TO EXISTING, AND ELSEWHERE AS NOTED ON PLANS. SUBMIT TO ARCHITECT AND ENGINEER PRIOR TO STARTING NEW WORK.

P. SUBMITTALS

1. SUBMIT FOR REVIEW, ELECTRONIC SHOP DRAWINGS IN SEARCHABLE PDF FORMAT FOR THE FOLLOWING.

a. SUBMITTAL DATA FOR ALL MATERIAL AND EQUIPMENT. CLEARLY IDENTIFY DEVIATIONS OF THE SUBMITTED PRODUCTS FROM THE DESIGN.

b. DUCTWORK SHOP DRAWINGS AND DETAILS. THE ROUTING OF DUCTWORK ON THE DESIGN DRAWINGS IS SHOWN DIAGRAMMATICALLY AND APPROXIMATELY. THE CONTRACTOR SHALL DETERMINE EXACT ROUTING AND LOCATIONS, PROVIDING PROPER CLEARANCES, MAKING PROVISIONS FOR MAINTENANCE ACCESS, AND COORDINATING WITH EXISTING AND NEW COMPONENTS OF OTHER TRADES, THE STRUCTURE, AND OTHER OBSTRUCTIONS. THE DUCTWORK SHOP DRAWING SUBMITTAL SHALL BE BASED ON THIS COORDINATION EFFORT AND SHALL SHOW ALL AIR DISTRIBUTION COMPONENTS. DUCTWORK AND COMPONENTS SHALL BE DRAWN TO SCALE, AND DUCT SIZES SHALL BE INDICATED.

c. PIPING SHOP DRAWINGS SHOWING LAYOUT, COMPONENTS, AND DETAILS.

d. CONTROLS SHOP DRAWINGS, INCLUDING EQUIPMENT AND SYSTEM CONTROL SCHEMATICS, SEQUENCES OF OPERATIONS, LOGIC DIAGRAMS AND SYSTEM COMPONENTS INCLUDING DETAILS. SUBMIT A POINT BY POINT STATEMENT OF COMPLIANCE WITH THE SPECIFICATIONS, SEQUENCE OF OPERATIONS AND DRAWING P&ID'S. THIS STATEMENT SHALL CONSIST OF A LIST OF ALL NUMBERED PARAGRAPHS. WHERE THE SYSTEM COMPLIES FULLY, SUCH SHALL BE INDICATED BY PLACING THE WORD "COMPLY" OPPOSITE THE PARAGRAPH NUMBER. WHERE THE SYSTEM DOES NOT COMPLY OR ACCOMPLISHES THE STATED FUNCTION IN A MANNER DIFFERENT FROM THAT DESCRIBED, A FULL DESCRIPTION OF THE DEVIATION SHALL BE PROVIDED.

2. SCHEDULE AT LEAST TEN WORKING DAYS EXCLUSIVE OF TRANSMITTAL TIME, FOR SUBMITTAL REVIEW.

Q. AS-BUILT DRAWINGS

1. MAINTAIN ONE SET OF PRINTS ON THE SITE AND NOTE ALL CHANGES OR DEVIATIONS FROM THE ORIGINAL DESIGN THEREON. AT THE COMPLETION OF THE PROJECT, INCORPORATE ALL CHANGES INTO RECORD AS-BUILT DRAWINGS IN ELECTRONIC FORMAT AND SUBMIT FOR APPROVAL.

R. OPERATING AND MAINTENANCE INSTRUCTIONS

1. PROVIDE THREE SETS OF MANUFACTURERS OPERATING AND MAINTENANCE INSTRUCTIONS FOR EACH PIECE OF EQUIPMENT AND SYSTEM. COMPILE INTO THREE HARD COVER THREE RING BINDERS WITH INDEX PAGE AND INDEXING TABS. ALL NAME TAG INFORMATION SUCH AS MAKE, TYPE, SIZE, CAPACITY, SERIAL NUMBER, ETC. SHALL BE INCLUDED AS PART OF THE MANUAL.

S. WARRANTY

1. WARRANT WORK OF THIS SECTION IN WRITING FOR ONE YEAR FROM DATE OF OWNERS ACCEPTANCE OF SUBSTANTIAL COMPLETION. REPAIR OR REPLACE DEFECTIVE MATERIALS, EQUIPMENT, WORKMANSHIP AND INSTALLATION THAT DEVELOP WITHIN THIS PERIOD, PROMPTLY AND TO OWNER'S SATISFACTION AND CORRECT DAMAGE CAUSED IN MAKING NECESSARY REPAIRS AND REPLACEMENTS UNDER WARRANTY WITHIN CONTRACT PRICE.

T. CLEANING

1. ALL WORK AREAS SHALL BE LEFT AS CLEAN AS NEW. CLEAN INTERNALS OF ALL DUCTWORK AND AIR HANDLING UNITS AND REPLACE FILTERS AFTERWARDS.

2. DUCTWORK: DUCTS SHALL BE THOROUGHLY CLEANED SO THAT NO DIRT OR DUST SHALL BE DISCHARGED FROM DIFFUSERS, REGISTERS, OR GRILLES, WHEN SYSTEM IS OPERATED.

3. PIPING: AFTER CONDENSATE PIPING HAS BEEN PRESSURE TESTED AND APPROVED FOR TIGHTNESS, CLEAN AND FLUSH PIPING.

4. EQUIPMENT: AFTER COMPLETION OF PROJECT, CLEAN THE EXTERIOR SURFACE OF EQUIPMENT INCLUDED IN THIS SECTION, INCLUDING REMOVAL OF CONCRETE RESIDUE.

5. WORK AREA: AFTER COMPLETION OF PROJECT, REMOVE ALL CONSTRUCTION DEBRIS, TEMPORARY FACILITIES AND EQUIPMENT FROM WORK AREA. CLEAN WORK AREA TO PERMIT OCCUPATION.

23 05 00 - COMMON WORK RESULTS

23 05 05 - DEMOLITION

A. REFER TO DRAWINGS FOR GENERAL DESCRIPTION OF AREAS REQUIRING DEMOLITION.

B. REFER TO GENERAL CONTRACTOR'S/CONSTRUCTION MANAGER'S INSTRUCTIONS FOR EXISTING EQUIPMENT AND MATERIALS THAT SHALL REMAIN THE PROPERTY OF THE OWNER.

C. WHERE IT IS NOTED THAT ITEMS OF VALUE ARE NOT TO BE RETURNED TO THE OWNER, THE ITEMS SHALL BECOME THE PROPERTY OF THE CONTRACTOR. STORAGE OR SALE OF ITEMS ON THE PROJECT SITE IS PROHIBITED. ITEMS SHALL BE REMOVED FROM SITE AND LEGALLY DISPOSED OF.

D. PROTECTION: ENSURE THE SAFE PASSAGE OF PERSONS IN AND AROUND THE BUILDING/SITE DURING DEMOLITION. PREVENT INJURY TO PERSONS AND DAMAGE TO PROPERTY. PROVIDE ADEQUATE SHORING AND BRACING TO PREVENT COLLAPSE. IMMEDIATELY REPAIR DAMAGE TO THE CONDITION BEFORE BEING DAMAGED TO THE SATISFACTION OF THE ARCHITECT AND OWNER. TAKE EFFECTIVE MEASURES TO PREVENT WINDBLOWN DUST.

E. UTILITIES: MAINTAIN UTILITIES EXCEPT THOSE REQUIRING REMOVAL OR RELOCATION. KEEP UTILITIES IN SERVICE AND PROTECT FROM DAMAGE. DO NOT INTERRUPT UTILITIES SERVING IN-USE AREAS WITHOUT FIRST OBTAINING PERMISSION FROM THE UTILITY COMPANY AND THE OWNER. PROVIDE TEMPORARY SERVICES AS REQUIRED.

F. DISCONNECT, DEMOLISH, AND REMOVE HVAC SYSTEMS, EQUIPMENT, AND COMPONENTS INDICATED TO BE REMOVED.PIPING TO BE REMOVED: REMOVE PORTION OF PIPING INDICATED TO BE REMOVED AND CAP REMAINING PIPING WITH SAME OR COMPATIBLE PIPING MATERIAL.

1. PIPING TO BE ABANDONED IN PLACE: DRAIN PIPING AND CAP PIPING WITH SAME OR COMPATIBLE PIPING MATERIAL.

2. DUCTS TO BE REMOVED: REMOVE PORTION OF DUCTS INDICATED TO BE REMOVED AND CAP REMAINING DUCTS WITH SAME OR COMPATIBLE DUCTWORK MATERIAL.

3. DUCTS TO BE ABANDONED IN PLACE: CAP DUCTS WITH SAME OR COMPATIBLE DUCTWORK MATERIAL.

4. EQUIPMENT TO BE REMOVED: DISCONNECT AND CAP SERVICES AND REMOVE EQUIPMENT.

5. EQUIPMENT TO BE REMOVED AND REINSTALLED: DISCONNECT AND CAP SERVICES AND REMOVE, CLEAN, AND STORE EQUIPMENT; WHEN APPROPRIATE, REINSTALL, RECONNECT, AND MAKE EQUIPMENT OPERATIONAL.

6. EQUIPMENT TO BE REMOVED AND SALVAGED: DISCONNECT AND CAP SERVICES AND REMOVE EQUIPMENT AND DELIVER TO OWNER.

G. IF PIPE, INSULATION, OR EQUIPMENT TO REMAIN IS DAMAGED IN APPEARANCE OR IS UNSERVICEABLE, REMOVE DAMAGED OR UNSERVICEABLE PORTIONS AND REPLACE WITH NEW PRODUCTS OF EQUAL CAPACITY AND QUALITY.

23 05 13 - MOTORS, STARTERS AND WIRING

A. PROVIDE MOTORS AND CONTROLS, AND FURNISH STARTERS FOR HVAC EQUIPMENT, EXCEPT UNITS SERVED BY MCC PROVIDED UNDER ELECTRICAL SECTION. PROVIDE CONTROL AND OTHER RELATED WIRING INCLUDING INTERLOCKS. ALL MOTORS SHALL TO BE PREMIUM EFFICIENCY. ALL THREE PHASE MOTORS SHALL BE RATED FOR INVERTER DUTY SERVICE.

B. STARTERS THAT REQUIRE INTERLOCKS OR REMOTE CONTROL SHALL BE MAGNETIC WITH HAND-OFF-AUTOMATIC SWITCH (FAST-SLOW-OFF-AUTO FOR TWO SPEED MOTORS) IN COVER. STARTERS SHALL BE BY SINGLE MANUFACTURER: CUTLER-HAMMER, CLARK, ARROW HART OR SQUARE D.

23 05 17 - SLEEVES AND PENETRATIONS

A. GENERAL REQUIREMENTS

1. LAY OUT PENETRATION AND SLEEVE OPENINGS IN ADVANCE. PROVIDE CORE DRILLING OF EXISTING CONSTRUCTION WHERE REQUIRED. SUBMIT PROPOSED LOCATIONS FOR REVIEW PRIOR TO CORE DRILLING.

2. MAINTAIN FIRE RATING OF WALLS, PARTITIONS, CEILINGS, AND FLOORS AT PENETRATIONS. SEAL PENETRATIONS WITH APPROVED FIRESTOP MATERIALS.

3. SLEEVES FOR INSULATED PIPE AND DUCT IN NON-FIRE RATED CONSTRUCTION SHALL ACCOMMODATE CONTINUOUS INSULATION WITHOUT COMPRESSION.

B. PIPE SLEEVES:

1. PROVIDE HOT-DIPPED GALVANIZED SCHEDULE 40 STEEL PIPE SLEEVES FOR PIPES PASSING THROUGH CONCRETE AND MASONRY WALLS AND CONCRETE FLOOR AND ROOF SLABS.

2. PROVIDE 26 GAUGE GALVANIZED STEEL SLEEVES THROUGH PARTITIONS AND NON-FIRE-RATED CONSTRUCTION.

3. PROVIDE MECHANICAL SLEEVE SEALS CONSISTING OF INTERLOCKING MODULES AT EXTERIOR PIPE PENETRATIONS.

4. PROVIDE ADJUSTABLE ESCUTCHEONS ON EXPOSED PIPING THAT PASSES THROUGH FINISHED FLOORS, WALLS AND CEILINGS. ESCUTCHEONS SHALL BE CHROMIUM-PLATED CAST BRASS, SIZED TO COVER SLEEVE OPENING AND TO ACCOMMODATE PIPE AND INSULATION.

23 05 29 - HANGERS AND SUPPORTS

A. PROVIDE PIPE STANDS, SUPPORTS, HANGERS AND OTHER SUPPORTING APPLIANCES AS NECESSARY TO SUPPORT WORK REQUIRED BY CONTRACT DOCUMENTS. SPACING OF HANGERS SHALL BE INSTALLED IN ACCORDANCE WITH APPLICABLE BUILDING AND MECHANICAL CODES. STRUCTURAL STEEL SUPPORTS, HANGERS, ETC. SHALL BE ANGLE IRON, STEEL CHANNEL OR STEEL ROD USED WITH APPROVED CLAMPS, INSERTS, ETC. ALL SUPPORTS, HANGERS, BRACKETS, ETC., SHALL BE AS APPROVED BY THE ENGINEER.

B. ALL HANGERS SHALL BE GALVANIZED.

C. ATTACH HANGERS AND SUPPORTS DIRECTLY ONTO THE STRUCTURE BY FIRST REMOVING EXISTING FIRE PROOFING AND AFTER SECURING THE ATTACHMENT, REPAIRING THE FIRE PROOFING TO ITS ORIGINAL CONDITION, CONTINUOUSLY OVER THE ATTACHMENT.

D. FOR EXPANSION BOLTS/SHIELDS USE RED HEAD, HILTI OR WEJ-IT SELF DRILLING OR STEEL SHIELD, LOAD RATED. DO NOT USE DRILLED ANCHORS IN POST TENSION SLABS WITHOUT APPROVAL OF OWNER. DO NOT CUT REINFORCING STEEL WITH DRILLED INSERTS.

E. SUPPORT ALL GALVANIZED DUCTWORK WITH GALVANIZED HANGERS AND MOUNTS AS REQUIRED BY SMACNA (8 FT SPACING). DO NOT SUPPORT RISERS FROM SLEEVES IN SLABS.

23 05 48 - VIBRATION AND SEISMIC CONTROLS FOR HVAC

A. PROVIDE VIBRATION ISOLATION FOR EACH PIECE OF ROTATING OR RECIPROCATING HVAC EQUIPMENT SHOWN ON THE DRAWINGS. ALL ISOLATION COMPONENTS SHALL BE SUPPLIED BY A SINGLE MANUFACTURER - MASON INDUSTRIES, KINETICS OR AMBER BOOTH. TYPES OF ISOLATORS, REQUIRED DEFLECTIONS, AND INSTALLATION PRACTICES SHALL BE IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE VIBRATION ISOLATION MANUFACTURER.

23 05 53 - PIPE AND DUCT IDENTIFICATION

A. DUCTWORK SHALL BE STENCILED AT EACH JUNCTION OR BRANCH TAKEOFF, AT LEAST ONCE IN EACH ROOM, AND AT INTERVALS NOT LONGER THAN 20 FT. STENCIL SHALL CLEARLY IDENTIFY DUCT SERVICE (S FOR SUPPLY, R FOR RETURN, X FOR EXHAUST), AREA SERVED BY BRANCH, AND ARROW INDICATING DIRECTION OF FLOW.

B. PROVIDE COLOR-CODED PIPE IDENTIFICATION MARKERS ON PIPING INSTALLED UNDER THIS SECTION. PIPE MARKERS SHALL BE SNAP-ON LAMINATED PLASTIC PROTECTED BY CLEAR ACRYLIC COATING. PIPE MARKERS SHALL BE APPLIED AFTER ARCHITECTURAL PAINTING WHERE SUCH IS REQUIRED.

C. PROVIDE ARROW MARKER WITH EACH PIPE CONTENT MARKER TO INDICATE DIRECTION OF FLOW. IF FLOW CAN BE IN EITHER DIRECTION, USE DOUBLE-HEADED ARROW MARKER.

D. MACHINERY SUCH AS RTU'S, FANS, ETC., SHALL BE STENCILED WITH EQUIPMENT NAME CORRESPONDING TO DRAWING SCHEDULE NUMBERS. STENCIL SHALL BE AT LEAST 6" HIGH FOR LARGE EQUIPMENT, 2" HIGH FOR SMALL EQUIPMENT. EQUIPMENT TAGS SHALL HAVE BLACK CHARACTERS ON WHITE FACE.

23 05 93 - TESTING ADJUSTING AND BALANCING

A. PROVIDE QUALIFIED PERSONNEL, EQUIPMENT, APPARATUS AND SERVICES FOR START-UP, TESTING AND BALANCING OF MECHANICAL SYSTEMS, TO PERFORMANCE DATA SHOWN IN SCHEDULES, AS SPECIFIED, AND AS REQUIRED BY CODES, STANDARDS, REGULATIONS AND AUTHORITIES HAVING JURISDICTION INCLUDING CITY INSPECTORS, OWNERS AND ARCHITECT.

B. START UP ALL SYSTEMS, PRESSURE TEST DUCTWORK AND PIPING, AND BALANCE SYSTEMS INCLUDING, BUT NOT LIMITED TO, ALL NEW AHUS WITHIN THE AREA OF WORK TO PERFORMANCE DATA SHOWN ON PLANS, SCHEDULES, AND AS SPECIFIED.

C. DO NOT COVER OR CONCEAL WORK BEFORE TESTING AND INSPECTION AND OBTAINING APPROVAL.

D. LEAKS, DAMAGE AND DEFECTS DISCOVERED OR RESULTING FROM STARTUP, TESTING, AND BALANCING SHALL BE REPAIRED OR REPLACED TO LIKE-NEW CONDITION WITH ACCEPTABLE MATERIALS. TEST SHALL BE CONTINUED UNTIL SYSTEM OPERATES WITHOUT ADJUSTMENT OR REPAIR.

E. REPORT ON REPORTING FORMS, SUBMITTED TO ENGINEER FOR APPROVAL IN ADVANCE.

F. SUBMIT PROCEDURES, RECORDING FORMS, AND TEST EQUIPMENT FOR REVIEW PRIOR TO BALANCING, AS DESCRIBED IN SPECIFICATIONS. SUBMIT ELECTRONIC COPY OF TESTING AND BALANCING REPORTS TO ENGINEER FOR APPROVAL.

G. THIS CONTRACTOR SHALL FURNISH ALL TEST MEDIUMS AND DISPOSE OF ALL TEST MEDIUMS AT AN APPROVED OFF-SITE LOCATION AFTER TESTING IS COMPLETE.

H. NOTE REQUIREMENT ABOVE FOR CFM AND STATIC PRESSURE READINGS PRIOR TO DEMOLITION.

23 07 00 - HVAC INSULATION

23 07 13 - HVAC INSULATION (EXTERNAL)

A. GENERAL REQUIREMENTS

1. INSULATION SHALL BE CERTAIN-TEED, KNAUF, MANVILLE, OR OWENS CORNING. MATERIALS SHALL MEET REQUIREMENTS OF ADHESIVE AND SEALANT COUNCIL STANDARDS AND SMACNA. INSTALL INSULATION, MASTICS, ADHESIVES, COATINGS, COVERS, WEATHER-PROTECTION AND OTHER WORK IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. ASTM E-84 FIRE HAZARD RATINGS SHALL BE 25 FLAME SPREAD, 50 SMOKE DEVELOPED.

2. INSULATION AND VAPOR BARRIER SHALL BE CONTINUOUS AROUND ENTIRE PERIMETER OF DUCTS. DUCTS SUPPORTED BY METAL STRAPS SHALL HAVE INSULATION ENCOMPASSING STRAPS, WHERE STRAPS PENETRATE AT TOP OF DUCT TIGHTLY SEAL AROUND STRAP WITH INSULATING TAPE. DUCTS SUPPORTED BY TRAPEZE TYPE HANGERS UNDER DUCTS SHALL HAVE 6 LB. DENSITY RIGID INSULATION PROVIDED BETWEEN DUCT AND HANGER, INSULATION SHALL BE SAME THICKNESS AND VAPOR BARRIER AS SPECIFIED FOR SPECIFIC DUCT TYPE. RIGID INSULATION SECTION SHALL BE FULL WIDTH OF DUCT AND MINIMUM 12" LONG. TAPE AND SEAL ALL SEAMS WHERE RIGID INSULATION MEETS OTHER INSULATION.

3. ACOUSTICALLY LINED DUCTWORK SHALL NOT BE INSULATED EXTERNALLY, EXCEPT AS NOTED OTHERWISE.

4. FITTINGS, VALVES AND FLANGES SHALL BE INSULATED WITH SAME MATERIAL AND TO SAME THICKNESS AS ADJOINING PIPE INSULATION, WITH PRESENT SECTIONS.

5. FOR STRAINERS AND OTHER VALVES OR FITTINGS WHICH NEED MAINTENANCE, PROVIDE PREFORMED REMOVABLE INSULATION SECTION.

B. PRODUCTS AND APPLICATIONS

1. INDOOR DUCT INSULATION SHALL BE MINERAL FIBER BLANKET DUCT INSULATION WITH FACTORY APPLIED FSK JACKET. PROVIDE MINIMUM OF R-6 (AS INSTALLED) INSULATION FOR SUPPLY AND FRESH AIR DUCTS WHEN LOCATED WITHIN CONCEALED SPACES INSIDE THE BUILDING ENVELOPE. ACCEPTABLE MANUFACTURERS: CERTAIN-TEED, KNAUF, MANVILLE, OR OWENS CORNING.

2. OUTDOOR DUCT INSULATION SHALL BE RIGID MINERAL FIBER BOARD DUCT INSULATION WITH FACTORY APPLIED FSK JACKET. PROVIDE MINIMUM OF R-8 (AS INSTALLED) INSULATION FOR SUPPLY, RETURN, EXHAUST AND FRESH AIR DUCTS WHEN LOCATED OUTSIDE THE BUILDING ENVELOPE. ACCEPTABLE MANUFACTURERS: CERTAIN-TEED, KNAUF, MANVILLE, OR OWENS CORNING.

3. REFRIGERANT LINE AND CONDENSATE DRAIN LINE INSULATION SHALL BE 3/4 INCH THICK FLEXIBLE ELASTOMERIC. ACCEPTABLE MANUFACTURERS: ARMACELL OR K-FLEX.

C. OUTDOOR JACKET

1. PROVIDE OUTDOOR DUCTWORK WITH WEATHER-PROOF LAMINATE JACKETING SYSTEM, 3M VENTURECLAD OR APPROVED EQUAL.

2. PROVIDE OUTDOOR PIPING WITH WATERPROOF 0.016" THICK ALUMINUM JACKET WITH 2" TRANSVERSE AND LONGITUDINAL LAPPED SEAMS ORIENTED TO SHED WATER.

23 08 00 - CX

23 08 00 - COMMISSIONING OF HVAC

A. SCOPE OF HVAC TESTING SHALL INCLUDE ENTIRE HVAC INSTALLATION, FROM CENTRAL EQUIPMENT FOR HEAT GENERATION AND REFRIGERATION THROUGH DISTRIBUTION SYSTEMS TO EACH CONDITIONED SPACE. TESTING SHALL INCLUDE MEASURING CAPACITIES AND EFFECTIVENESS OF OPERATIONAL AND CONTROL FUNCTIONS.

B. TEST ALL OPERATING MODES, INTERLOCKS, CONTROL RESPONSES, AND RESPONSES TO ABNORMAL OR EMERGENCY CONDITIONS, AND VERIFY PROPER RESPONSE OF BUILDING AUTOMATION SYSTEM CONTROLLERS AND SENSORS.

C. THE CXA ALONG WITH THE HVAC CONTRACTOR, TESTING AND BALANCING CONTRACTOR, AND CONTROLS CONTRACTOR SHALL PREPARE DETAILED TESTING PLANS, PROCEDURES, AND CHECKLISTS FOR HVAC SYSTEMS, SUBSYSTEMS, AND EQUIPMENT.

D. PERFORM COMMISSIONING TESTS AT THE DIRECTION OF THE CXA. PROVIDE TECHNICIANS, INSTRUMENTATION, AND TOOLS REQUIRED TO PERFORM COMMISSIONING TESTS. PROVIDE INFORMATION REQUESTED BY THE CXA FOR FINAL COMMISSIONING DOCUMENTATION.

23 09 00 - INSTRUMENTATION AND CONTROLS

23 09 00 - INSTRUMENTATION AND CONTROLS

A. PROVIDE COMPLETE SYSTEM OF AUTOMATIC TEMPERATURE CONTROLS (ATC). CONTROL SYSTEM SHALL BE CAPABLE OF PERFORMING ALL SEQUENCES OF OPERATION SHOWN ON THE DRAWINGS OR DESCRIBED IN THESE SPECIFICATIONS. INDIVIDUAL CONTROL COMPONENTS MAY NOT BE SHOWN ON CONTRACT DOCUMENTS, BUT THE CONTRACTOR SHALL SUPPLY ALL COMPONENTS, AND CONTROL WIRING NECESSARY FOR A COMPLETE OPERABLE SYSTEM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SYSTEM COMPONENTS, WHETHER THE ELECTRICAL OR OTHER WORK IS SUBCONTRACTED OR NOT.

B. PROVIDE TRACER CONCIERGE CONTROLS SYSTEM THAT CONSISTS OF THE FOLLOWING:

1. SINGLE USER INTERFACE AND TOUCH-SCREEN DISPLAY WITH STANDARD SCREENS THAT CAN BE CHANGED TO REFLECT BUILDING SPECIFICS.

2. BUILT-IN FUNCTIONS SUCH AS OVERRIDES, TEMPERATURE SETPOINT CHANGES, DAILY MONITORING AND A SCHEDULER.

3. WEB-ENABLED CAPABILITY FOR REMOTE ACCESS WHICH ENABLES OFFSITE SYSTEM ADJUSTMENTS AND DIAGNOSTICS.

4. EASY INTEGRATION OF EXISTING AND FUTURE DEVICES.

5. AIR-FI: WIRELESS COMMUNICATION UTILIZING BACNET PROTOCOL BETWEEN CONTROL DEVICES SUCH AS SENSORS, PACKAGED EQUIPMENT CONTROLLERS, AND BUILDING AUTOMATION CONTROLLERS.

C. ALL SAFETY SWITCHES AND CUT OUTS SHALL BE FIELD CALIBRATED AND SET PRIOR TO START-UP EQUIPMENT.

D. ALL CONTROL WIRING SHALL COMPLY WITH THE REQUIREMENTS OF THE ELECTRICAL SPECIFICATIONS.

E. SUBMIT TO ENGINEER A POINT-TO-POINT WIRING DIAGRAM SHOWING MANUFACTURERS AND MODEL NUMBERS OF ALL CONTROL COMPONENTS. INCLUDE WRITTEN DESCRIPTION OF SYSTEM OPERATION.

F. WIRING BETWEEN FIRE ALARM SYSTEM AND TEMPERATURE CONTROL SYSTEM, EXCEPT FOR DUCT MOUNTED SMOKE DETECTORS, SHALL BE BY MECHANICAL CONTRACTOR.

G. ROOM THERMOSTAT SENSORS AND TRANSMITTERS IN PUBLIC AREAS SHALL HAVE METAL COVER WITH TAMPER PROOF SCREWS AND CONCEALED ADJUSTMENT. THERMOSTATS FOR PRIVATE OFFICES SHALL HAVE EXPOSED DIAL OR OTHER ADJUSTMENT CAPABILITY FOR SETPOINT ADJUSTMENT. HEATING/COOLING THERMOSTATS SHALL HAVE AN ADJUSTABLE DEADBAND.

H. LOCAL CONTROLLERS, RELAYS, SWITCHES, AND OTHER CONTROL COMPONENTS SHALL BE MOUNTED ON ENCLOSED CONTROL PANELS WITH HINGE-LOCK DOOR MOUNTED NEXT TO SYSTEM CONTROLLED. TEMPERATURE SETTINGS, ADJUSTMENTS AND CALIBRATIONS SHALL BE MADE AT SYSTEM CONTROL PANEL. PANEL SHALL HAVE CANOPY LIGHT AND ON-OFF SWITCH.

23 20 00 - HVAC PIPING

23 21 00 - HYDRONIC PIPING

A. GENERAL REQUIREMENTS

1. PIPE MATERIALS AND FITTING MATERIALS SHALL BE AS INDICATED IN SCHEDULE OF PIPE AND FITTING MATERIALS. PROVIDE DIELECTRIC FITTINGS TO CONNECT DIFFERENT PIPING MATERIALS.

B. SCHEDULE OF PIPE AND FITTING MATERIALS

1. CONDENSATE DRAIN: 125 PSI WORKING PRESSURE. TYPE L COPPER WITH SOLDERED COPPER JOINTS.

C. VALVES AND STRAINERS

1. VALVES SHALL HAVE NAME OF MANUFACTURER AND GUARANTEED WORKING PRESSURE CAST OR STAMPED ON BODIES. VALVES OF SIMILAR TYPE SHALL BE BY A SINGLE MANUFACTURER. VALVES SHALL BE AS MANUFACTURED BY APOLLO, CRANE, HAMMOND, JENKINS, STOCKHOLM OR MILWAUKEE.

23 30 00 - HVAC AIR DISTRIBUTION

23 31 00 - HVAC DUCTS

A. GENERAL REQUIREMENTS

1. FOR GALVANIZED DUCTWORK, SEAL AIR DUCT JOINTS AND JOINTS BETWEEN FITTINGS AND DUCTS WITH HARDCAST SEALANT OR APPROVED EQUAL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

2. DUCTWORK SHALL BE FREE FROM VIBRATION UNDER ALL CONDITIONS OF OPERATION..

3. PATCH AND SEAL ALL EXISTING OPENINGS IN DUCTWORK NOT UTILIZED FOR NEW LAYOUT.

4. WHEN SECTION OF DUCTWORK IS NOT LABELED FOR SIZE, THE LARGER SIZE INDICATED ON THE CONNECTED DUCT SHALL PREVAIL.

5. ELBOWS AND BENDS FOR RECTANGULAR DUCTS SHALL HAVE CENTER LINE RADIUS OF 1.5 TIMES DUCT WIDTH WHEREVER POSSIBLE. WHERE CENTERLINE RADIUS IS LESS THAN 1.5 TIMES DUCT WITH, ELBOWS SHALL BE RADIUS THROAT WITH RADIUS HEEL AND FULL-LENGTH SPLITTER VANES.

6. NO PIPE, CONDUIT, HANGER, ARCHITECTURAL ELEMENT NOR STRUCTURAL MEMBER SHALL PASS THROUGH DUCT WITHOUT ARCHITECT'S AND/OR ENGINEER'S WRITTEN APPROVAL.

B. SHEETMETAL DUCTWORK

1. SHEET METAL DUCTS SHALL BE CONSTRUCTED OF HOT DIPPED G90 GALVANIZED SHEET METAL UNLESS OTHERWISE SPECIFIED. MATERIAL, CONSTRUCTION AND INSTALLATION SHALL MEET REQUIREMENTS OF MOST RECENT EDITIONS OF SMACNA STANDARDS (EXCEPT FOR MORE STRINGENT REQUIREMENTS SPECIFIED OR SHOWN ON DRAWINGS). ALL MEDIUM PRESSURE DUCTWORK BETWEEN MAIN SYSTEM FAN AND AIR TERMINAL DEVICE SHALL BE MINIMUM 4"(wg) PRESSURE CLASS, SEAL CLASS A, LEAKAGE CLASS 6.

23 33 00 - AIR DUCT ACCESSORIES

A. FLEXIBLE CONNECTIONS

1. MAKE ALL CONNECTIONS BETWEEN AIR HANDLING UNITS AND DUCTWORK WITH FLEXIBLE CONNECTIONS. FOR INDOOR APPLICATIONS, FLEXIBLE CONNECTIONS SHALL BE NEOPRENE-COATED FIBROUS GLASS FIRE RETARDANT FABRIC, BY VENTFABRICS, OR DURODYNE. FOR OUTDOOR APPLICATIONS, FLEXIBLE CONNECTIONS SHALL BE DUPONT HYPALON-COATED FIBROUS GLASS FIRE-, WEATHER-, AND UV-RESISTANT BY VENTFABRICS OR DURODYNE.

23 70 00 - CENTRAL HVAC EQUIPMENT

23 70 00 - CENTRAL HVAC EQUIPMENT

A. PACKAGED OUTDOOR ROOFTOP UNIT

1. PROVIDE PACKAGED DX ROOFTOP UNIT BY CARRIER, TRANE, YORK, OR MCQUAY. UNIT SHALL HAVE DX COOLING, GAS HEATING AND MICROPROCESSOR BASED DISCHARGE AIR. PROVIDE ALL NECESSARY SAFETY CONTROLS FOR FURNACE. PROVIDE MINIMUM OF FOUR STAGES OF CAPACITY CONTROL. REFRIGERANT SHALL BE R-41OA.

23 80 00 - DECENTRALIZED HVAC EQUIPMENT

23 80 00 - DECENTRALIZED UNITARY HVAC EQUIPMENT

A. SPLIT SYSTEM HEAT PUMPS

1. PROVIDE COMPLETE DX SYSTEM OF TYPES, SIZES, AND CAPACITIES SHOWN ON SCHEDULES. SYSTEM SHALL CONSIST OF MATCHING AIR COOLED CONDENSING UNITS, COMPRESSORS, PIPING, CONTROLS, WIRING, AND OTHER ACCESSORIES AND APPURTENANCES NECESSARY TO PROVIDE FULLY AUTOMATICALLY FUNCTIONING SYSTEM. ACCEPTABLE MANUFACTURERS: TRANE, CARRIER, YORK OR DAIKIN.

2. DX AIR CONDITIONING SYSTEM SHALL BE CAPABLE OF STARTING AND OPERATING DOWN TO 0°F AMBIENT. LOW AMBIENT OPERATION SHALL BE ACCOMPLISHED BY VARYING THE SPEED OF CONDENSER FAN BASED ON SENSING OF HEAD PRESSURE IN REFRIGERANT LIQUID LINE, BY MODULATING DAMPER IN CONDENSER FAN DISCHARGE BASED ON REFRIGERANT HEAD PRESSURE SENSING, OR BY FLOODING THE CONDENSER COIL WITH LIQUID REFRIGERANT TO MAINTAIN THE DESIRED CONDENSER PRESSURE. PROVIDE TIME DELAY RELAY FOR TIMED BYPASS OF THE LOW PRESSURE SWITCH OR OTHER MEANS TO START CONDENSING UNIT AT 0°F WITHOUT NUISANCE SAFETY TRIP UNITS. WHEN SPECIFIED, HOT GAS BYPASS IS TO BE PRE-PIPED INTEGRAL TO THE UNIT.

3. PROVIDE REFRIGERANT PIPING BETWEEN AIR-COOLED CONDENSING UNIT AND INDOOR UNIT. PROVIDE ALL NECESSARY AUXILIARIES AND APPURTENANCES. REFRIGERANT PIPING SHALL BE ACR COPPER TUBING WITH WROUGHT COPPER FITTINGS AND BRAZED JOINTS. REFRIGERANTS SHALL BE R-410A.

3. PROVIDE THERMOSTATS AND ALL NECESSARY OPERATING CONTROLS. PROVIDE MICROPROSESSOR CONTROL COMPATIBLE WITH BAS, UNIT MOUNTED DISCONNECT, VIBRATION ISOLATION. ACCEPTABLE MANUFACTURERS: CARRIER, MCQUAY, CLIMATE MASTER, OR TRANE.

4. ALL CEILING RECESSED HEAT PUMPS SHALL BE PROVIDED WITH MANUFACTURERS AUXILIARY DRAIN PAN WITH A MOISTURE SENSOR. UPON INDICATION OF WATER PRESENCE IN THE AUXILIARY DRAIN PAN THE HEAT PUMP SHALL BE DE-ENERGIZED AND AN ALARM SHALL BE ISSUED TO THE BAS.

NOVA PARKS

NOVA Parks
5400 Ox Road
Fairfax Station, VA 22039

Meadowlark Botanical Gardens Atrium,
HVAC Rooftop Equipment Replacement

Meadowlark Botanical
Gardens Atrium
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Revised:		
	BID & PERMIT SUBMISSION	02/04/2021
Scale:	N/A	

Drawing Title

MECHANICAL
SPECIFICATIONS

KENNETH M. SCHRAM
Lic. No. 023977
2/5/2021

M004

Friday, February 05, 2021 CLARK, ANDREW
H:\N1413.00\HVAC\N1413\M004.DWG

PRE-DEMO TAB NOTES

1. PRIOR TO START OF ANY CONSTRUCTION OR DEMOLITION, PERFORM TAB REPORT AT THE MARKED LOCATIONS.

DENOTES LOCATION OF PRE-DEMO TAB READING - PRESSURE AND AIRFLOW (TYP.)

GENERAL NOTES

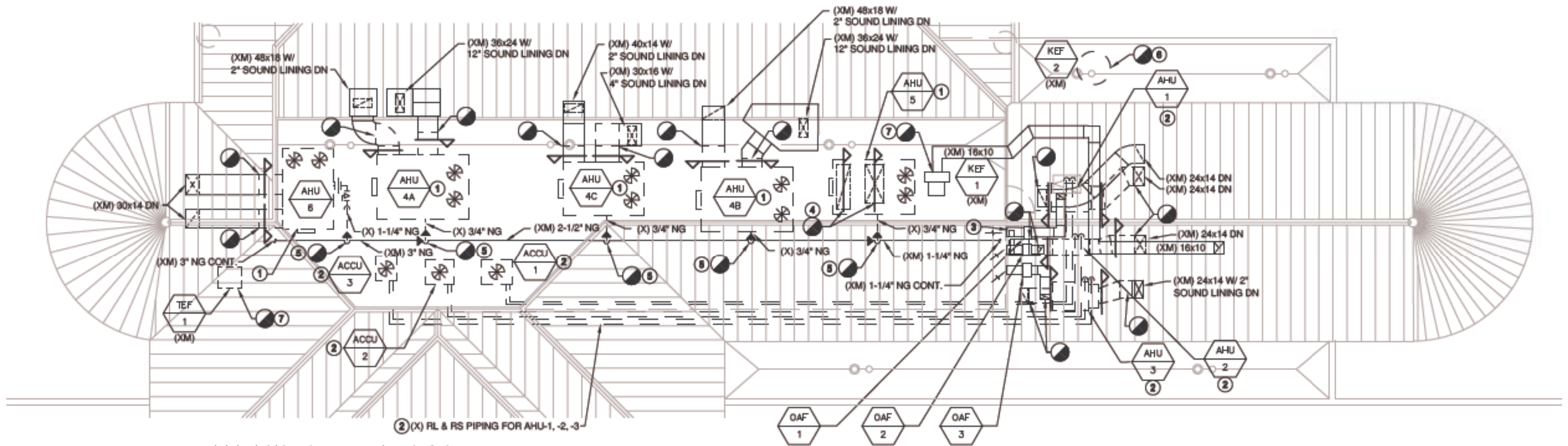
1. COORDINATE ALL REFRIGERANT PIPE ROUTING W/ EXISTING EQUIPMENT, DUCTWORK, AND PIPING.
2. COORDINATE NEW DUCTWORK TRANSITIONS W/ EXISTING SITE CONDITIONS AND NEW AHU DUCTWORK CONNECTIONS.
3. VERIFY EXISTING SMOKE DETECTOR CONNECTIONS W/ EXISTING AHUS & CONTROL SYSTEM. COORDINATE AND RE-ESTABLISH EXISTING SMOKE DETECTOR HARDWIRED CONNECTIONS TO NEW AHUS & NEW CONTROL SYSTEM FOR SHUTDOWN SEQUENCE UPON DETECTION OF SMOKE IN THE EXISTING DUCTWORK.

DEMOLITION PLAN KEYED NOTES (#)

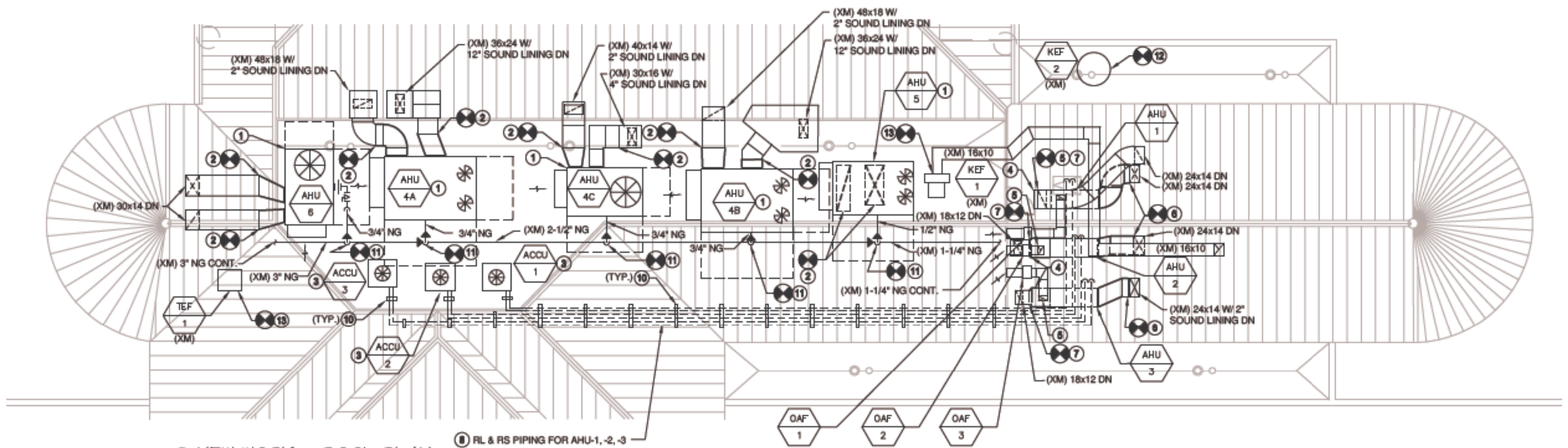
1. DEMOLISH AHU AND ALL ASSOCIATED CONTROL WIRING & THERMOSTATS. DISCONNECT DUCTWORK AS INDICATED AND CAP. DISCONNECT AND REMOVE NG PIPING BACK TO ISOLATION VALVE AND CAP. EXISTING MOUNTING PAD/ROOF CURB SHALL REMAIN IN PLACE.
2. DEMOLISH SPLIT-SYSTEM HEAT PUMP AND ALL ASSOCIATED CONTROL WIRING & THERMOSTATS. REMOVE INDOOR UNIT, OUTDOOR UNIT, AND ALL ASSOCIATED REFRIGERANT PIPING. DISCONNECT DUCTWORK AS INDICATED AND CAP.
3. DEMOLISH EXISTING CONTROL PANELS AND ALL ASSOCIATED CONTROL WIRING/CONDUIT.
4. REMOVE SUPPLY AND RETURN AIR DUCTWORK DN INTO FIRST FLOOR CEILING PLENUM & CAP.
5. REMOVE NG PIPING BACK TO MAIN AND CAP.
6. REMOVE FAN FROM EXISTING ROOF CURB. STORE, CLEAN, AND PROTECT DURING CONSTRUCTION OF NEW ROOF.
7. DISCONNECT FAN FROM EXISTING DUCTWORK. STORE, CLEAN, AND PROTECT DURING CONTRUCTION OF NEW ROOF.

NEW WORK PLANS KEYED NOTES (#)

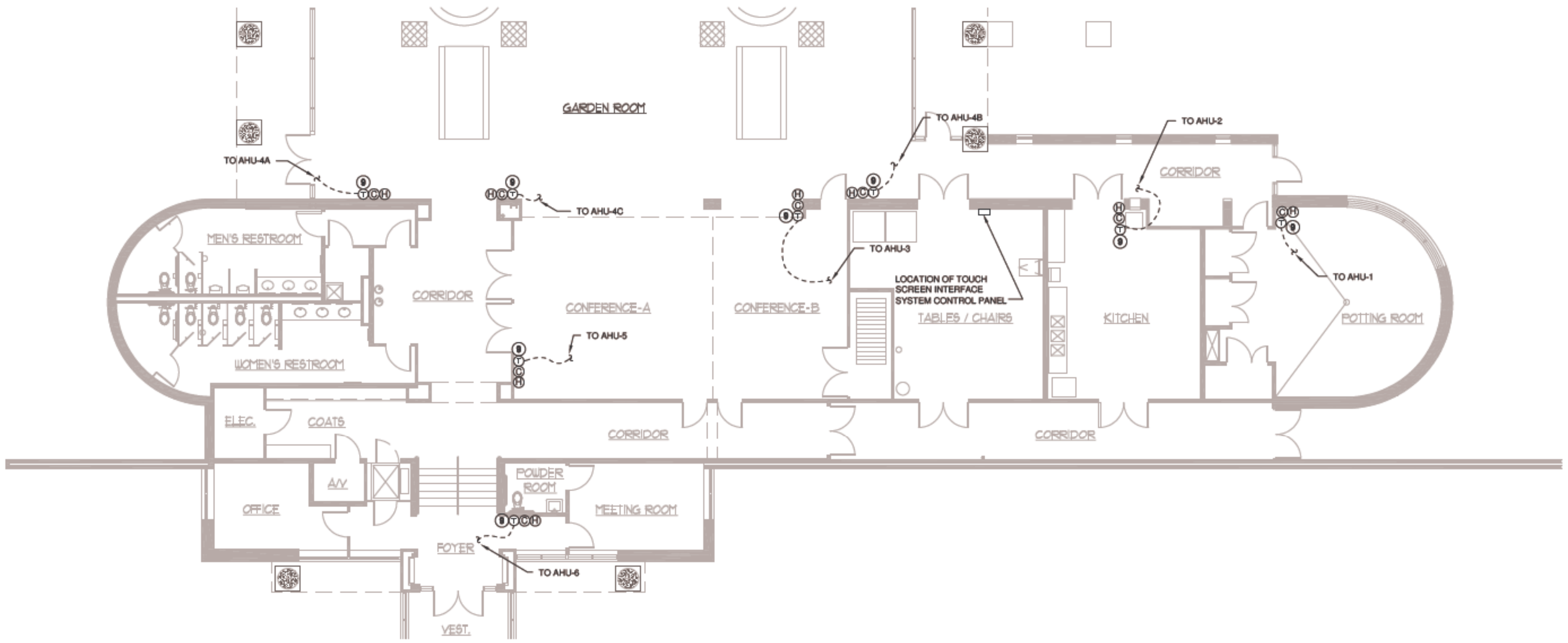
1. INSTALL NEW AHU ON EXISTING MOUNTING PAD/CURB. PROVIDE VIBRATION ISOLATION FOR UNITS MOUNTED ON EXISTING PADS.
2. CONNECT EXISTING DUCTWORK TO NEW AHU. NEW DUCTWORK SHALL MATCH CONSTRUCTION OF EXISTING DUCTWORK. PROVIDE FLEXIBLE CONNECTION TO AHU.
3. INSTALL NEW CONDENSING UNIT ON EXISTING MOUNTING PAD. EXTEND EXISTING PAD AS REQUIRED.
4. PROVIDE 1" SOUND LINED PLENUM. PLENUM SHALL BE HEIGHT AND WIDTH OF UNIT RETURN AIR INLET AND MINIMUM 18" LONG.
5. CONNECT OUTDOOR AIR DUCT TO NEW RETURN AIR PLENUM.
6. CONNECT EXISTING DUCTWORK TO NEW AIR HANDLING UNIT SUPPLY AIR DISCHARGE. PROVIDE DUCTWORK EQUAL TO THE HEIGHT AND WIDTH OF THE SUPPLY AIR DISCHARGE OPENING. PROVIDE TRANSITIONS AS REQUIRED TO CONNECT INTO EXISTING DUCTWORK.
7. CONNECT EXISTING RETURN AIR DUCTWORK TO NEW AHU RETURN AIR PLENUM. PROVIDE TRANSITION AS REQUIRED.
8. SIZE RL & RS PIPING PER MANUFACTURERS REQUIREMENTS.
9. PROVIDE NEW WIRELESS COMBINATION TEMPERATURE/HUMIDITY/CO2 SENSOR. MATCH EXISTING HEIGHT AFF OF EXISTING SENSORS.
10. PROVIDE DURA BLOCK (OR EQUAL) ON ROOF TO SUPPORT REFRIGERANT PIPING. SECURE WITH UNISTRUT PIPE CLAMPS W/ INSULATION COUPLINGS TO PROVIDE CONTINOUS INSULATION SET EVERY 5'-0".
11. EXTEND NEW NG PIPING TO AHU. NEW PIPING SHALL MATCH EXISTING PIPE MATERIAL AND TYPE. PROVIDE ISOLATION VALVE MATCHING EXISTING ISOLATION VALVE TYPE. PROVIDE DRIP LEG AT FINAL CONNECTION TO AHU.
12. REINSTALL FAN ON EXISTING ROOF CURB.
13. REINSTALL FAN ON EXISTING PAD. PROVIDE CONNECTIONS INTO EXISTING DUCTWORK.



1 DEMOLITION - ROOF PLAN
SCALE: 1/8"=1'-0"

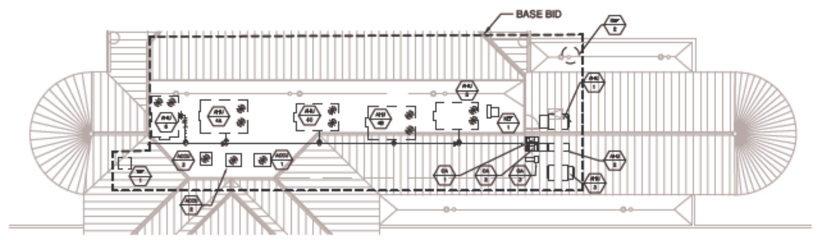


2 NEW WORK - ROOF PLAN
SCALE: 1/8"=1'-0"



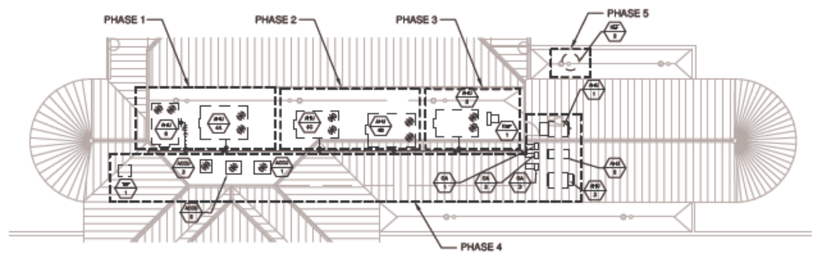
3 NEW WORK - 1ST FLOOR PLAN
SCALE: 1/8"=1'-0"

NOTE: REFER TO GENERAL REQUIREMENTS, SECTION 1.2 ON SHEET M003 FOR BASE BID SCOPE OF WORK



4 BASE BID PHASE - ROOF PLAN
SCALE: 1/16"=1'-0"

NOTE: REFER TO GENERAL REQUIREMENTS, SECTION 1.2 ON SHEET M003 FOR BID ALTERNATE SCOPE OF WORK



5 ALTERNATE BID PHASED - ROOF PLAN
SCALE: 1/16"=1'-0"

PROJECT NORTH

SCALE: 1/8"=1'-0"

NOVA PARKS

NOVA Parks
5400 Ox Road
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Meadowlark Botanical Gardens Atrium, HVAC Rooftop Equipment Replacement

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Date:	
Revised:	
BID & PERMIT SUBMISSION	02/04/2021
Scale:	SEE PLANS

Drawing Title
MECHANICAL PLANS

COMMONWEALTH OF VIRGINIA
KENNETH M. SCHRAM
Lic. No. 023977
PROFESSIONAL ENGINEER
2/5/2021

M201

PACKAGED DX ROOFTOP AIR HANDLING UNIT

UNIT NO.	SERVICE	LOCATION	MIN. O.A. CONDITIONS CFM	MIN. O.A. DB (°F)	MIN. O.A. WB (°F)	BLDG R.A. CONDITIONS DB (°F)	BLDG R.A. WB (°F)	SUPPLY FAN TOTAL CFM	STATIC PRESS (IN.W.G.) TOTAL W/ DIRTYFILTER	STATIC PRESS EXTERNAL TO UNIT	RPM	MAX BHP	MOTOR H.P.	UNIT COOLING CAPACITY TOTAL MBH	MIN. SENS. MBH	MAX FACE VELOC. (FPM)	UNIT L.A.T DB(°F)	UNIT L.A.T WB(°F)	AIR-COOLED CONDENSING UNIT COMPRESSOR(S) TYPE	COMPRESSOR(S) NO.	KW (TOT. INPUT)	D.B. TEMP. (°F)	CONDENSER FAN(S) NO.	CONDENSER FAN(S) HP EA.	INDIRECT GAS-FIRED HEATER DATA INPUT MBH	OUTPUT MBH	AIR SIDE EAT(°F)	AIR SIDE LAT(°F)	GAS PRESS (IN.W.G.)	ELECT. SERVICE VOLTS	M.C.A.	PHASE	HZ	MOCP	MANUFACTURER MODEL NUMBER (AS STANDARD)	REMARKS (SEE FILTER SCHEDULE FOR FILTER DATA)
AHU-4A	GARDEN RM 121	ROOF	1700	95	78	73	60.9	6000	1.520	1.0	808	6.23	7.5	279.8	217.0	500	57.3	55.1	SCROLL	3	21.03	95	2	1.0	350	280	62.4	91.2	2.5/14.0	460	58	3	60	70	TRANE YHH300	NOTES: 1-12
AHU-4B	GARDEN RM 121	ROOF	1700	95	78	73	60.9	6000	1.520	1.0	808	6.23	7.5	279.8	217.0	500	57.3	55.1	SCROLL	3	21.03	95	2	1.0	350	280	62.4	91.2	2.5/14.0	460	58	3	60	70	TRANE YHH300	NOTES: 1-12
AHU-4C	GARDEN RM 121	ROOF	800	95	78	73	60.9	4200	1.842	1.0	1500	2.30	2.75	111.3	92.0	500	58.7	58.3	SCROLL	2	7.80	95	1	0.75	200	160	62.3	97.8	4.5/14.0	460	22	3	60	25	TRANE YHC120	NOTES: 2-12
AHU-5	CONFERENCE A	ROOF	700	95	78	73	60.9	4200	1.432	0.9	821	2.31	3.0	137.7	105.5	500	55.8	53.7	SCROLL	2	10.25	95	2	0.5	250	200	60.7	107.8	2.5/14.0	460	29	3	60	40	TRANE YSD150	NOTES: 2-12
AHU-6	OFFICE/FOYER	ROOF	400	95	78	73	60.9	3500	1.722	0.9	1310	1.58	2.75	108.0	85.9	500	54.5	53.0	SCROLL	2	7.77	95	1	0.75	200	160	66.8	108.9	4.5/14.0	460	22	3	60	25	TRANE YHC120	NOTES: 2-12

* MAXIMUM TEMPERATURE OF AIR LEAVING UNIT, NOT COIL (MUST INCLUDE HEAT FROM FAN MOTORS.)

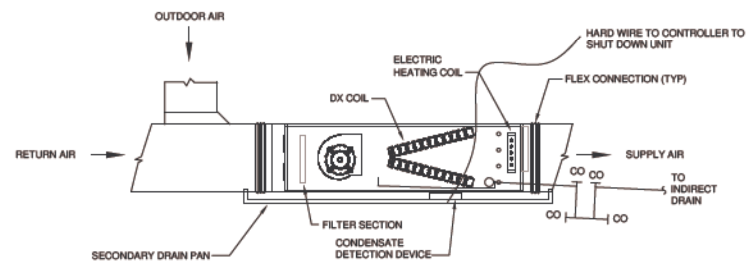
NOTES:
1. PROVIDE MODULATING GAS HEAT
2. "TOTAL STATIC PRESSURE WITH DIRTY FILTER" ASSUMES 0.5" IN. WG ADDITIONAL STATIC PRESSURE DUE TO DIRTY FILTER
3. PROVIDE W/ 2" MERV 8 FILTERS
4. PROVIDE CONTROLS FOR 100% ECONOMIZER MODE W/ COMPARATIVE ENTHALPY OPTION
5. PROVIDE AIR-FI WIRELESS COMMUNICATION INTERFACE
6. PROVIDE WIRELESS ZONE TEMPERATURE/HUMIDITY/CO2 SENSOR
7. HOT GAS REHEAT
8. HINGED ACCESS DOORS
9. CONSTANT VOLUME UNIT
10. STAINLESS STEEL DRAIN PAN
11. BAROMETRIC RELIEF
12. DEMAND CONTROL VENTILATION

AIR-TO-AIR HEAT PUMP

UNIT NUMBER	INDOOR UNIT SERVICE	LOCATION	COOLING DATA TOTAL MBH	SENSIBLE MBH	R.A. COND. DB(°F)	R.A. COND. WB(°F)	OUTDOOR TEMP. DB(°F)	HEATING DATA MBH	INDOOR TEMP. DB(°F)	OUTDOOR TEMP. DB(°F)	FAN DATA CFM	RPM	EXT.SP (IN.WG)	DRIVE	MOTOR HP	SUPPL. ELECTRIC HEATING KW	ELEC.SERVICE VOLTS	PH	HZ	MANUFACTURER MODEL NUMBER (AS STANDARD)	OUTDOOR UNIT UNIT NUMBER	LOCATION	COMPRESSOR R.L.A.	CONDENSER FANS QTY	CONDENSER FANS HP EA	ELEC. SERVICE VOLTS	PH	HZ	MANUFACTURER MODEL NUMBER (AS STANDARD)	REMARKS
AHU-1	POTTING ROOM	ATTIC	55.8	45.8	73	60.9	95	36.0	73	17	1975	ECM	0.8	DIRECT	1.0	14.4	208	1	60	TRANE TAM8A	ACCU-1	ROOF	28.8	1	0.25	460	3	60	TRANE 4TWR7	NOTES: 1-5
AHU-2	KITCHEN	ATTIC	44.5	36.7	73	60.9	95	28.8	73	17	1600	ECM	0.7	DIRECT	0.75	8.8	208	1	60	TRANE TAM8A	ACCU-2	ROOF	18.8	1	0.20	460	3	60	TRANE 4TWR5	NOTES: 1-5
AHU-3	CONF B/STORAGE	ATTIC	47.3	38.7	73	60.9	95	28.8	73	17	1800	ECM	0.8	DIRECT	0.75	18.0	208	1	60	TRANE TAM8A	ACCU-3	ROOF	18.8	1	0.20	460	3	60	TRANE 4TWR5	NOTES: 1-5

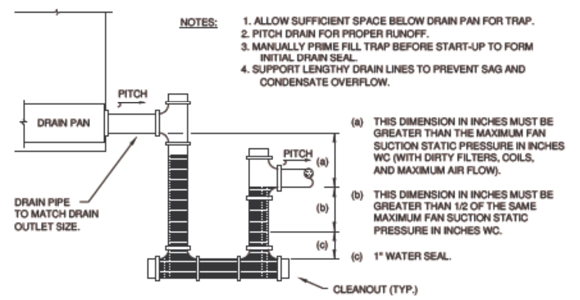
NOTES:

1. PROVIDE W/ 1" MERV 8 FILTERS
2. PROVIDE AIR-FI WIRELESS COMMUNICATION INTERFACE (UC400 PROGRAMMABLE CONTROLLER)
3. PROVIDE WIRELESS ZONE TEMPERATURE/HUMIDITY/CO2 SENSOR
4. ECM FAN
5. AUXILIARY DRAIN PAN W/ UL508 MOISTURE DETECTION DEVICE



NOTES:
1. GALVANIZED SECONDARY DRAIN PAN SHALL BE MIN. 1 1/2" DEPTH AND 3" LARGER THAN COOLING COIL (PAN PROVIDED BY MECHANICAL CONTRACTOR).
2. PAN SHALL BE EQUIPPED WITH A WATER-LEVEL DETECTION DEVICE THAT WILL SHUT OFF THE EQUIPMENT SERVED PRIOR TO OVERFLOW OF THE PAN (DETECTOR BY ATC CONTRACTOR).
3. TERMINAL CONTROLLER MANUFACTURER SHALL PROVIDE 24VOLT RELAY AND TRANSFORMER.
4. INSULATE ALL PIPING COMPONENTS INCLUDING CONTROL VALVE, STRAINERS, VALVES, ETC.
5. CONTROLS CONTRACTOR SHALL PROVIDE MODULATING DAMPER LINKAGE ACTUATOR FOR ALL UNITS WITH CO2 MONITORING AND OUTSIDE AIR RESET.
6. SHEET METAL DISCHARGE PLENUM PROVIDED BY MECHANICAL CONTRACTOR

5 HORIZONTAL HEAT PUMP INDOOR UNIT DETAIL
SCALE: NTS



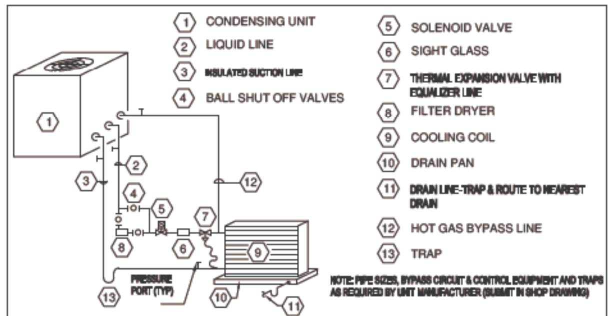
NOTES:
1. ALLOW SUFFICIENT SPACE BELOW DRAIN PAN FOR TRAP.
2. PITCH DRAIN FOR PROPER RUNOFF.
3. MANUALLY PRIME FILL TRAP BEFORE START-UP TO FORM INITIAL DRAIN SEAL.
4. SUPPORT LENGTHY DRAIN LINES TO PREVENT SAG AND CONDENSATE OVERFLOW.

(a) THIS DIMENSION IN INCHES MUST BE GREATER THAN THE MAXIMUM FAN SUCTION STATIC PRESSURE IN INCHES WC (WITH DIRTY FILTERS, COILS, AND MAXIMUM AIR FLOW).

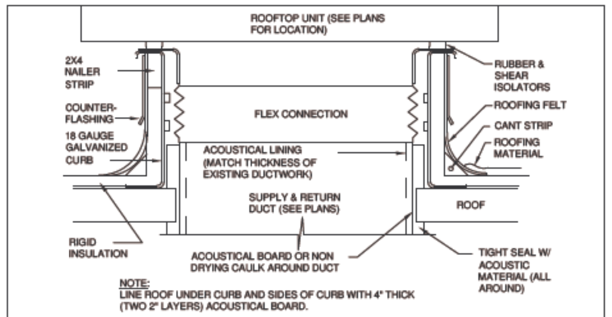
(b) THIS DIMENSION IN INCHES MUST BE GREATER THAN 1/2 OF THE SAME MAXIMUM FAN SUCTION STATIC PRESSURE IN INCHES WC.

(c) 1" WATER SEAL.

4 DRAW THROUGH UNIT CONDENSATE TRAP
SCALE: N.T.S. H03-10

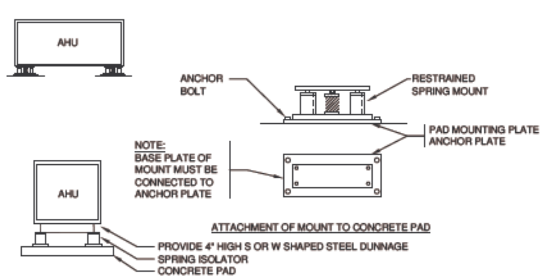


3 REFRIGERANT PIPING COMPONENT DIAGRAM
SCALE: NTS H08-04



NOTE:
LINE ROOF UNDER CURB AND SIDES OF CURB WITH 4" THICK (TWO 2" LAYERS) ACOUSTICAL BOARD.

2 ROOFTOP UNIT MOUNTING W/CURB
SCALE: NTS H01-07



1 AIR HANDLING UNIT SUPPORTED WITH RESTRAINED SPRING MOUNTS
SCALE: NTS H16-13

NOVA PARKS

NOVA Parks
5400 Ox Road
Fairfax Station, VA 22039

Meadowlark Botanical Gardens Atrium, HVAC Rooftop Equipment Replacement

Meadowlark Botanical Gardens Atrium
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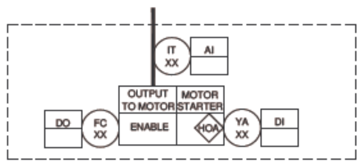
Drawing Title
MECHANICAL SCHEDULES & DETAILS

COMMONWEALTH OF VIRGINIA
KENNETH M. SCHRAM
Lic. No. 023977
PROFESSIONAL ENGINEER
2/5/2021

M501

TYPICAL VARIABLE FREQUENCY CONTROLLER AND MOTOR STARTER CONTROL POINTS

MOTOR STARTER



MS — SYMBOL USED TO REPRESENT MOTOR STARTER

SENSOR LEGEND

REFER TO PLANS FOR SPACE TEMPERATURE, HUMIDITY, PRESSURE AND CARBON DIOXIDE SENSORS/TRANSMITTERS INDICATED BY THE FOLLOWING SYMBOLS:

- TEMPERATURE SENSOR/TRANSMITTER = Ⓣ
- HUMIDITY SENSOR/TRANSMITTER = Ⓗ
- PRESSURE SENSOR/TRANSMITTER = Ⓟ
- EQUIPMENT ALARM CABLE LOCATION = Ⓐ (1 CABLE WITH 8 CONDUCTORS)
- CARBON DIOXIDE SENSOR = Ⓒ
- AIRFLOW DIRECTION INDICATOR = (ADI)
- ALARM STROBE/HORN =

HVAC DDC SYSTEM GENERAL REQUIREMENTS

1. THE DESIGN INTENT IS FOR THE DIRECT DIGITAL CONTROLS (DDC) SYSTEM TO MONITOR PRESSURES, TEMPERATURES AND FLOWS AND TO CONTROL THE VARIOUS COMPONENTS OF THE HVAC SYSTEM INCLUDING BUT NOT LIMITED TO CHILLERS, VALVES, VARIABLE FREQUENCY CONTROLLERS (VFCS), AIR HANDLING UNITS (AHUS), PUMPS, ETC.... MONITORED DATA WILL BE USED TO ENERGIZE OR DE-ENERGIZE EQUIPMENT IN ACCORDANCE WITH THE SEQUENCES OUTLINED.
2. SEQUENCES OUTLINED (UNLESS OTHERWISE SPECIFIED) SHALL BE PERFORMED BY NETWORK CONTROLLERS, PROGRAMMABLE APPLICATION CONTROLLERS AND APPLICATION SPECIFIC CONTROLLERS CONNECTED TO A CENTRAL DDC SYSTEM. SYSTEM ARCHITECTURE SHALL BE BASED ON A PEER-TO-PEER DISTRIBUTED CONTROL SYSTEM NETWORK. SYSTEM SHALL INTEGRATE OPEN COMMUNICATION PROTOCOL CONTROLLERS. ALL CONTROLLERS SHALL BE CAPABLE OF INDEPENDENT OPERATION REGARDLESS OF THE STATUS OF THE DDC SYSTEM WORKSTATION.
3. ALL HVAC EQUIPMENT SHALL BE STARTED/ENABLED AND STOPPED/DISABLED THROUGH THE DDC SYSTEM.
4. AFTER INITIAL STARTUP DDC SYSTEM SHALL AUTOMATICALLY CONTROL OPERATING MODE FOR ALL EQUIPMENT VIA PROGRAMMABLE SCHEDULES INDICATED IN INDIVIDUAL ZONE OR EQUIPMENT SEQUENCES.
5. DDC SYSTEM CONTRACTOR SHALL BE FULLY RESPONSIBLE TO PROVIDE EQUIPMENT AND PROGRAMMING NEEDED TO PERFORM ALL SEQUENCES. WHERE PACKAGED EQUIPMENT IS USED, DDC SYSTEM CONTRACTOR SHALL COORDINATE WITH THE PACKAGED EQUIPMENT CONTROL PANEL FEATURES. DDC SYSTEM CONTRACTOR MAY USE PACKAGED EQUIPMENT CONTROLLER FUNCTIONS WHERE AVAILABLE TO PERFORM SEQUENCES SUBJECT TO FULL COMPLIANCE WITH ALL SEQUENCES AND ALARM MONITORING INDICATED ON THE DRAWINGS. COMMUNICATIONS INTERFACE INCLUDING SOFTWARE BETWEEN THE DDC SYSTEM AND EACH EQUIPMENT MANUFACTURER SUPPLIED CONTROL PANEL SHALL BE PROVIDED BY THE DDC SYSTEM CONTRACTOR. DDC SYSTEM SHALL BE CAPABLE OF READING AND DISPLAYING ALL DATA (INPUT AND OUTPUT) USED BY THE EQUIPMENT MANUFACTURER CONTROL PANEL. SOFTWARE INTERFACE SHALL BE THROUGH LONMARK OR BACNET COMPLIANT OPEN PROTOCOL. PACKAGED EQUIPMENT MIGHT INCLUDE BUT IS NOT LIMITED TO:
   a. CHILLERS
   b. BOILERS
   c. VRF SYSTEMS
   d. DX SPLIT SYSTEMS
   e. PACKAGED AIR HANDLING UNITS
6. ADDRESS IDENTIFIERS FOR ALL POINTS AND VARIABLES SHALL BE COORDINATED WITH EXISTING CONTROLS AND SHALL BE APPROVED BY THE FACILTY OWNER.
7. ABILITY TO REVIEW ALL MEASURED DATA, CONTROL SETPOINTS AND FUNCTIONS SHALL BE PROVIDED AT DDC SYSTEM WORKSTATION AND ON LAPTOP SERVICE TOOL.
8. DDC SYSTEM CONTRACTOR SHALL PROVIDE ALL POWER WIRING AND CONNECTIONS REQUIRED TO OPERATE THE DDC SYSTEM AND ALL CONTROL COMPONENTS AND SHALL COMPLY WITH REQUIREMENTS OF DIVISION 26 SECTIONS. ELECTRICAL CIRCUITS FOR ALL CONTROLS SHALL BE DEDICATED ONLY TO THE DDC SYSTEM AND COMPONENTS. ALL WIRING FROM AND INCLUDING DEDICATED CIRCUIT BREAKERS TO THE POINT OF USE SHALL BE PROVIDED BY THIS SECTION.
   a. WHERE REQUIRED BY SPECIFICATIONS OR OTHERWISE, CONTROL SYSTEM INCLUDING HEAD END WORKSTATION SHALL BE PROVIDED WITH STANDBY POWER TO PERFORM SEQUENCES OUTLINED.
   b. CONTROL PANELS, WORK STATIONS AND HOST COMPUTERS SHALL BE WIRED TO STANDBY POWER WHEN OPERATION OF EQUIPMENT BEING CONTROLLED IS CONNECTED TO STANDBY POWER.
   c. DDC SYSTEM SHALL MONITOR GENERATOR SWITCHGEAR TO OBTAIN STATUS OF NORMAL (STREET) POWER. INPUT SHALL BE PROVIDED INDEPENDENTLY TO AT LEAST TWO NETWORK CONTROLLERS.
9. SAFETIES SHALL BE HARDWIRED TO THE CONTROLLED DEVICE UNLESS NOTED OTHERWISE.
10. INDICATED VALUES OF ALL PARAMETERS IN THE SEQUENCES (TEMPERATURES, PRESSURES, FLOW RATES, PERCENTAGES, LIMITS, DEADBANDS, ETC.) ARE NOMINAL VALUES ONLY AND SHALL BE MANUALLY ADJUSTABLE FROM THE DDC SYSTEM. SETPOINTS AND STATUS SHALL BE ADJUSTABLE GLOBALLY AS WELL AS ON AN INDIVIDUAL COMPONENT BASIS. ALL SETPOINTS, DELAYS AND OTHER PARAMETERS SHALL BE ADJUSTABLE BY THE OPERATOR THROUGH THE DDC SYSTEM WORKSTATION AND THROUGH LAPTOP SERVICE TOOL CONNECTED TO CONTROLLERS WITHOUT ANY HARDWARE OR SOFTWARE REVISIONS.
11. PROVIDE ADEQUATE DAMPING OF ALL MODULATING CONTROL LOOPS TO PREVENT HUNTING. ALL CONTROL LOOPS SHALL BE TUNED TO PROVIDE FOR STABLE OPERATION OF THE CONTROL DEVICE. LOOP TUNING MAY BE REQUIRED MULTIPLE TIMES TO STABILIZE MULTIPLE CONTROL SCENARIOS.
12. ALL EQUIPMENT CONTROLLED BY THE DDC SYSTEM SHALL BE CAPABLE OF MANUAL OPERATION THROUGH HAND-OFF-AUTOMATIC (HOA) SWITCHES LOCATED IN THE MOTOR STARTERS OR VARIABLE FREQUENCY CONTROLLERS. DDC SYSTEM SHALL INCLUDE OPTION TO MANUALLY OVERRIDE EACH AUTOMATED SEQUENCE VIA INPUT TO THE DDC SYSTEM.
13. PROVIDE MENU DRIVEN CAPABILITY TO OVERRIDE AUTOMATED START/STOP OR OPERATING MODES FOR EACH PIECE OF EQUIPMENT (INCLUDING PUMPS, AIR HANDLING UNITS, VV BOXES, ETC.) AT CONTROLLERS. IF A SEQUENCE IS DISABLED BY MANUAL INPUT AND THE DDC SYSTEM ATTEMPTS AN AUTOMATED CHANGE IN OPERATING MODE, AN ALARM SHALL BE INITIATED AT THE DDC SYSTEM STATING THAT THE SYSTEM WAS UNABLE TO CHANGE THE MODE DUE TO USER INPUT. WHERE APPLICABLE A MANUAL INPUT COMMAND WILL THEN BE REQUIRED FROM THE USER INSTRUCTING THE DDC SYSTEM TO START THE NEXT SEQUENTIAL PIECE OF EQUIPMENT.
14. ALL SAFETIES AND ALARMS SHALL REMAIN ACTIVE WHEN OPERATING IN MANUAL OVERRIDE MODES.
15. WHEN A UNIT IS OFF-LINE VIA THE BAS START/STOP, THE H-O-A SWITCH, THE SERVICE DISCONNECT, OR ANY OF THE SAFETIES, COMPONENTS SHALL GO TO THEIR FAIL-SAFE POSITIONS. UNLESS INDICATED OTHERWISE IN THE SEQUENCES, THE FAIL-SAFE POSITIONS ARE: ALL THE DAMPERS SHALL BE CLOSED. THE VARIABLE FREQUENCY CONTROLLERS SHALL BE OFF. THE CHILLED WATER TEMPERATURE CONTROL VALVE SHALL BE CLOSED. THE HOT WATER TEMPERATURE CONTROL VALVE SHALL BE OPEN.
16. IN THE EVENT OF A POWER OUTAGE OR UNPLANNED LOSS OF CONTROLS OR UNPLANNED EQUIPMENT SHUTDOWN, EQUIPMENT SHALL GO TO IT'S FAIL SAFE SETTINGS. IF EQUIPMENT IS DEACTIVATED DUE TO NORMAL OCCUPANCY CYCLE OR OCCUPANCY CONTROLS, FAIL SAFE SETTINGS ARE NOT REQUIRED UNLESS SEQUENCE SPECIFIES OTHERWISE.
17. WHENEVER AN ALARM IS INITIATED, THE DDC SYSTEM SHALL RETAIN IN MEMORY THE READING AND SETPOINT OF EACH ASSOCIATED DEVICE TO HELP THE OPERATOR IN ISOLATING THE CAUSE OF THE ALARM.
18. DDC SYSTEM SHALL HAVE THE ABILITY TO TEMPORARILY DISABLE ALARMS RELATED TO A PIECE OF EQUIPMENT TAKEN OFFLINE FOR MAINTENANCE.
19. IF ANY CONTROLLER OR EQUIPMENT MANUFACTURER'S CONTROL PANEL LOSES COMMUNICATION WITH THE DDC SYSTEM NETWORK, AN ALARM SHALL BE INITIATED AT THE DDC SYSTEM INDICATING THE LOCATION OF THE FAULT.
20. ALL CONTROL SYSTEM SENSORS SHALL HAVE HIGH AND LOW LIMIT SOFTWARE ALARMS TO INDICATE FAULTS. ALL ALARMS SHALL INITIATE AUDIBLE AND VISUAL ALARM AT THE DDC SYSTEM WORKSTATION AND AT THE WORKSTATION ALARM PRINTER. ALARM SHALL INDICATE TIME, DATE, SPECIFIC CONTROL POINT AND NATURE OF THE ALARM.
21. COORDINATE ALL SENSOR INSTALLATION LOCATIONS AND SUBMIT PROPOSED POSITIONS ON APPLICABLE PIPING AND DUCTWORK COORDINATION SUBMITTALS. COORDINATE AND ENSURE MANUFACTURER RECOMMENDED UPSTREAM AND DOWNSTREAM PIPE OR DUCT DIAMETERS ARE PROVIDED. SPECIAL ATTENTION IN THIS REGARD IS REQUIRED FOR FLOW MEASURING DEVICES.
22. WHERE CURRENT TRANSMITTERS ARE USED TO DETERMINE FAN OR EQUIPMENT STATUS, A BELT-OFF TEST SHALL BE PERFORMED TO DETERMINE CURRENT LOW POINT TO VERIFY STATUS.
23. ALL WALL MOUNTED TEMPERATURE OR HUMIDITY TRANSMITTERS SHALL HAVE ALL PENETRATIONS SEALED.
24. ALL CONTROL DEVICES SHALL BE INSTALLED IN SUCH A WAY TO BE ACCESSIBLE FOR MAINTENANCE AND REPAIR.
25. ALL COMMON INFORMATION (E.G. OUTSIDE AIR TEMPERATURE AND HUMIDITY) SHALL BE MEASURED IN AT LEAST (2) LOCATIONS AND COMMUNICATED TO INDEPENDENT NETWORK LEVEL CONTROLLERS.
26. SMOKE DETECTORS SHALL BE FURNISHED AND WIRED TO THE FIRE ALARM SYSTEM BY DIVISION 28. DIVISION 23 SHALL MOUNT THE DETECTORS IN DUCTWORK, WHERE REQUIRED BY CODE AND DIVISION 23, DIVISION 23 SHALL WIRE THE DETECTORS TO THE DDC SYSTEM AND FAN STARTERS FOR SHUTDOWN.
27. SMOKE DAMPERS SHALL BE UL555S LISTED. FIRE DAMPERS SHALL BE UL555 LISTED. PROVIDE FIRE DAMPERS, SMOKE DAMPERS AND FIRE/SMOKE DAMPERS AND ASSOCIATED ACCESS PANELS IN COMPLIANCE WITH APPLICABLE BUILDING AND MECHANICAL CODES AND NFPA 90A. ACCESS DOOR DIMENSIONS SHALL MEET REQUIREMENTS OF NFPA 90A AND NFPA 80.
28. AS A MINIMUM, ONE PROGRAMMABLE APPLICATION CONTROLLER SHALL BE PROVIDED FOR EACH AIR HANDLING UNIT.

DDC SYSTEM INSTRUMENT LEGEND

	FIRST LETTER(S)		SUCCEEDING LETTERS		
	PROCESS OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER FLAME		USERS CHOICE(*)	USERS CHOICE(*)	USERS CHOICE(*)
C	USERS CHOICE(*)			CONTROL	
D	DEWPOINT	DIFFERENTIAL		DAMPER	
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW OR FUME HOOD FACE VELOCITY	RATIO			
G	GAS		GLASS	GATE	
H	HAND (MANUAL)				HIGH
I	CURRENT		INDICATE		
J	POWER	SCAN			
K	TIME OR SCHEDULE	RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOISTURE	MOMENTARY			
N	USERS CHOICE(*)		USERS CHOICE(*)	USERS CHOICE(*)	USERS CHOICE(*)
O	USERS CHOICE(*)		ORIFICE, RESTRICTION		
P	PRESSURE (OR VACUUM)		POINT (TEST CONNECTION)		
Q	QUANTITY OR EVENT(*)	INTEGRATE	INTEGRATE		
R	RADIATION		RECORD OR PRINT		
S	SPEED OR FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE(*)		MULTIFUNCTION(*)	MULTIFUNCTION(*)	MULTIFUNCTION(*)
V	VIBRATION, MECH ANALYSIS			VALVE	
W	WEIGHT OR FORCE		WELL		
X	SMOKE		UNCLASSIFIED(*)	TRANSFORMER	UNCLASSIFIED(*)
Y	EVENT (STATUS)			RELAY OR COMPUTE(*)	
Z	POSITION, DIMENSION			DRIVER, ACTUATOR OR UNCLASSIFIED FINAL CONTROL ELEMENT	

(*) WHEN USED, EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL. SEE ABBREVIATIONS AND LETTER SYMBOLS. EXAMPLE: PT=PRESSURE TRANSMITTER, HS=HAND SWITCH

GENERAL INSTRUMENT/FUNCTION SYMBOLS

CONTROL DEVICE OR INSTRUMENT TAG

- XXX — SYMBOL MODIFIER OR SETPOINT
- XX — DEVICE OR SENSOR TAG ID
- ## — WHEN IDENTICAL, MULTIPLE INSTRUMENTS EXIST WITHIN A LOOP, THEY ARE INDIVIDUALLY, SEQUENTIALLY NUMBERED HERE.

DDC SYSTEM INPUT/OUTPUT IDENTIFIER

XY
X = ANALOG(A) OR DIGITAL(D)
Y = OUTPUT(O) OR INPUT(I)

MODIFIER SYMBOLS AND DESCRIPTIONS SHOWN BELOW

OC	OPEN/CLOSE
OO	ON/OFF
SS	START/STOP
AUTO	AUTO
PAL	PRESSURE ALARM LOW LIMIT
PAH	PRESSURE ALARM HIGH LIMIT
TSL	TEMPERATURE ALARM LOW LIMIT
TSH	TEMPERATURE ALARM HIGH LIMIT
MAL	MOISTURE ALARM LOW LIMIT
MAH	MOISTURE ALARM HIGH LIMIT
R	MANUAL RESET

SAMPLE DEVICE TAGS

- XS (R) — DUCT SMOKE DETECTOR WITH AUXILIARY CONTACTS AND MANUAL RESET
- MT (MAH, MAL) — HIGH & LOW MOISTURE "OUT OF RANGE" LIMITS FOR FAULTY SENSOR ALARM
- XX XX — PILOT LIGHT

NOTES:

INSTRUMENTATION IDENTIFICATION TAGS SHOWN ON THE ENCLOSED CONTROL DRAWINGS ARE INTENDED TO BE SPECIFIC FOR EACH SEQUENCE. NO ATTEMPT HAS BEEN MADE TO COORDINATE SEQUENTIAL TAGS IN ALL SEQUENCES AS THIS EFFORT WOULD NOT AID IN THE UNDERSTANDING OF THE DESIGN INTENT. THEREFORE THERE MAY BE INSTRUMENTS ON THE CONTROL DRAWINGS WHICH APPEAR TO HAVE THE SAME IDENTIFICATION NUMBER.

PROVIDE AND COORDINATE A COMPLETE LIST OF INSTRUMENTATION, THE ASSOCIATED IDENTIFICATION TAGS AND A CROSS REFERENCE TO BE USED IN THE DDC SYSTEM PROGRAM CODE.

LINETYPE LEGEND

- PROCESS LINE
- INSTRUMENT LINE

EQUIPMENT SYMBOLS

SYMBOL	DESCRIPTION
	CENTRIFUGAL FAN
	TUBULAR CENTRIFUGAL OR VANEAXIAL FAN
	PLUG FAN
	PROP FAN
C/C, H/C, RH/C, PH/C	COIL: CC - COOLING COIL, HC - HEATING COIL, RHC- REHEAT COIL, PHC- PREHEAT COIL
	FILTER
MS	MOTOR STARTER
VFC	VARIABLE FREQUENCY CONTROLLER
ECM	ELECTRONICALLY COMMUTATED MOTOR SPEED CONTROLLER

SYMBOL	DESCRIPTION
	MODULATING ACTUATOR WITHOUT INTEGRAL PILOT POSITIONER
	MODULATING ACTUATOR WITHOUT PILOT POSITIONER - FAILS OPEN
	MODULATING ACTUATOR WITHOUT PILOT POSITIONER - FAILS CLOSED
	TWO POSITION ACTUATOR, FAILS OPEN
	TWO POSITION ACTUATOR, FAILS CLOSED
HOA	HAND-OFF-AUTOMATIC CONTROL STATION REFER TO DIVISION 16 DWGS
	TWO WAY VALVE ASSOCIATED WITH ACTUATOR - SEE DRAWINGS & SPECS FOR VALVE TYPE
	THREE WAY VALVE ASSOCIATED WITH ACTUATOR - SEE DRAWINGS & SPECS FOR VALVE TYPE
	OPPOSED BLADE DAMPER ASSOCIATED WITH ACTUATOR
	PARALLEL BLADE DAMPER ASSOCIATED WITH ACTUATOR

NOVA Parks
5400 Ox Road
Fairfax Station, VA 22039

Meadowlark Botanical Gardens Atrium, HVAC Rooftop Equipment Replacement

Meadowlark Botanical Gardens Atrium
9750 Meadowlark Gardens Court
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Scale:	N/A
Drawing Title	MECHANICAL CONTROLS

COMMONWEALTH OF VIRGINIA
KENNETH M. SCHRAM
Lic. No. 023977
PROFESSIONAL ENGINEER
2/5/2021

M601

AIR HANDLING UNITS

A. FAN CONTROL

1. FAN SHALL CONTINUOUSLY OPERATE IN ALL MODES OF OPERATION WHEN THE UNIT IS ENERGIZED. FAN SHALL PROVIDE CONTINUOUS CONSTANT VOLUME OF AIR.

B. ON-OFF CONTROL

1. AIR HANDLING UNITS SHALL BE AUTOMATICALLY STARTED AND STOPPED BY THE BUILDING SYSTEM CONTROL PANEL.

C. NORMAL MODE OPERATION - COOLING

1. A SPACE MOUNTED SENSOR SERVING THE RESPECTIVE AIR HANDLING UNIT SHALL SENSE THE SPACE TEMPERATURE AND SEND A SIGNAL TO THE BUILDING SYSTEM CONTROL PANEL. CONTROL PANEL SHALL ENERGIZE THE COMPRESSORS AND CONDENSER FANS AS REQUIRED TO MAINTAIN SPACE TEMPERATURE SET POINT. HEATING SYSTEM SHALL BE DE-ENERGIZED WHEN IN COOLING MODE. COOLING SYSTEM SHALL BE DE-ENERGIZED WHEN SUPPLY FAN IS OFF.

2. CO2 SENSOR SERVING THE RESPECTIVE AIR HANDLING UNIT SHALL SENSE THE AMOUNT OF CARBON DIOXIDE IN THE ZONE AND SEND A SIGNAL TO THE CONTROL SYSTEM PANEL. WHEN THE MEASURED CO2 VALUE IS ABOVE 1000PPM (ADJ) FOR MORE THAN 5 MINUTES, THE CONTROL SYSTEM PANEL SHALL MODULATE THE OUTSIDE AIR DAMPER TOWARDS ITS MAXIMUM POSITION EQUAL TO THE AHU'S SCHEDULED OUTSIDE AIR VALUE. THE CONTROL SYSTEM PANEL SHALL MODULATE THE RETURN AIR DAMPER ACCORDINGLY TO PROVIDE THE SCHEDULE AMOUNT OF SUPPLY AIR FOR THE AHU. WHEN THE MEASURED CO2 VALUE IS LESS THAN 800PPM (ADJ) FOR MORE THAN 5 MINUTES, THE CONTROL SYSTEM PANEL SHALL MODULATE THE OUTSIDE AIR DAMPER TOWARDS ITS MINIMUM POSITION EQUAL TO 30% OF THE AHU'S SCHEDULED OUTSIDE AIR VALUE.

D. NORMAL MODE OPERATION - HEATING

1. A SPACE MOUNTED SENSOR SERVING THE RESPECTIVE AIR HANDLING UNIT SHALL SENSE THE SPACE TEMPERATURE AND SEND A SIGNAL TO THE BUILDING SYSTEM CONTROL SYSTEM PANEL. CONTROL PANEL SHALL ENERGIZE THE GAS HEATING SYSTEM, HEAT PUMP SYSTEM, OR ELECTRIC HEATING COIL AND FANS AS REQUIRED TO MAINTAIN SPACE TEMPERATURE SET POINT. COOLING SYSTEM SHALL BE DE-ENERGIZED WHEN UNIT IS IN HEATING MODE. HEATING SYSTEM AND COILS SHALL BE INTERLOCKED SUCH THAT THE SYSTEM IS DE-ENERGIZED WHEN SUPPLY FAN IS OFF OR WHEN THERE IS A LACK OF AIRFLOW ACROSS THE COIL. FOR UNITS WITH HEAT PUMP CAPABILITIES, HEAT PUMP HEATING SHALL BE INITIAL STAGE. IF HEAT PUMP HEATING CAPABILITIES CANNOT MAINTAIN SPACE TEMPERATURE, ELECTRIC HEATING COIL SHALL BE ADDITIONAL STAGES.

2. CO2 SENSOR SERVING THE RESPECTIVE AIR HANDLING UNIT SHALL SENSE THE AMOUNT OF CARBON DIOXIDE IN THE ZONE AND SEND A SIGNAL TO THE CONTROL SYSTEM PANEL. WHEN THE MEASURED CO2 VALUE IS ABOVE 1000PPM (ADJ) FOR MORE THAN 5 MINUTES, THE CONTROL SYSTEM PANEL SHALL MODULATE THE OUTSIDE AIR DAMPER TOWARDS ITS MAXIMUM POSITION EQUAL TO THE AHU'S SCHEDULED OUTSIDE AIR VALUE. THE CONTROL SYSTEM PANEL SHALL MODULATE THE RETURN AIR DAMPER ACCORDINGLY TO PROVIDE THE SCHEDULE AMOUNT OF SUPPLY AIR FOR THE AHU. WHEN THE MEASURED CO2 VALUE IS LESS THAN 800PPM (ADJ) FOR MORE THAN 5 MINUTES, THE CONTROL SYSTEM PANEL SHALL MODULATE THE OUTSIDE AIR DAMPER TOWARDS ITS MINIMUM POSITION EQUAL TO 30% OF THE AHU'S SCHEDULED OUTSIDE AIR VALUE.

E. UNOCCUPIED/OFF-HOUR OPERATION MODE

1. A SIGNAL FROM A SPACE SENSOR SHALL OVERRIDE THE BUILDING SYSTEM CONTROL PANEL. THE CONTROL SYSTEM SHALL ENERGIZE THE ASSOCIATED UNIT TO OPERATE IN THE NORMAL MODE (HEATING) WHEN THE SPACE TEMPERATURE FALLS BELOW THE OFF-HOUR LOW LIMIT TEMPERATURE SET POINT AND THE NORMAL MODE (COOLING) IF SPACE TEMPERATURE RISES ABOVE OFF-HOUR HIGH LIMIT TEMPERATURE SET POINT. OUTSIDE AIR DAMPERS SHALL REMAIN COMPLETELY CLOSED IN ALL UNOCCUPIED MODE OPERATION. OFF-HOUR LOW LIMIT SET POINTS: WHEN THE SPACE TEMPERATURE FALLS BELOW 60F (FIELD ADJUSTABLE), THE RESPECTIVE UNIT HEATING SYSTEM SHALL ENERGIZE. WHEN THE SPACE TEMPERATURE RISES ABOVE 65F (FIELD ADJUSTABLE), THE UNIT SHALL DE-ENERGIZE. WHEN THE SPACE TEMPERATURE RISES ABOVE 85F (FIELD ADJUSTABLE), THE RESPECTIVE UNIT COOLING SYSTEM SHALL ENERGIZE. WHEN SPACE TEMPERATURE FALLS BELOW 80F (FIELD ADJUSTABLE), THE UNIT SHALL DE-ENERGIZE.

F. ECONOMIZER OPERATION (UNITS WITH ECONOMIZER DAMPERS)

1. THE MINIMUM SET POINT TO 100% OUTSIDE AIR ECONOMIZER CONTROL SHALL CONSIST OF OUTSIDE AIR DAMPERS, RETURN AIR DAMPERS, EXHAUST/RELIEF AIR DAMPERS, ADJUSTABLE POTENTIOMETERS, MODULATING DAMPER ACTUATORS, AND ADJUSTABLE ENTHALPY SENSOR(S) MOUNTED IN THE RETURN AND OUTSIDE AIR STREAM(S). THE ADJUSTABLE POTENTIOMETERS SHALL CONTROL THE MINIMUM OUTSIDE AIR DAMPER POSITION AND MAXIMUM RELIEF AIR DAMPER POSITION. OUTSIDE AIR ENTHALPY SHALL BE DETERMINED BY AN ENTHALPY SENSOR LOCATED IN THE OUTSIDE AIR STREAM. THE CONTROLS SHALL COMPARE THE OUTSIDE AIR ENTHALPY TO THE RETURN AIR ENTHALPY; DETERMINE THE AIR STREAM THAT IS MOST ENERGY EFFICIENT FOR THE HEATING OR COOLING DEMAND OF THE AIR HANDLING SYSTEM; AND REPOSITION AND MODULATE THE SYSTEM OF DAMPERS TO ACHIEVE THIS FUNCTION. THE OUTSIDE AIR STREAM SHALL NOT BE SELECTED IF THE RESULTING SPACE RELATIVE HUMIDITY WILL EXCEED 50%. OUTSIDE AIR DAMPERS SHALL FAIL IN THE 100% CLOSED POSITION. THE MECHANICAL REFRIGERATION SYSTEMS SHALL BE DE-ENERGIZED AND LOCKED OUT BELOW 50F AMBIENT (FIELD ADJUSTABLE).

2. THE UNIT CONTROLLER SHALL INCLUDE AN ECONOMIZER MODE OVERRIDE FUNCTION. THIS FEATURE SHALL ALLOW THE OPERATOR TO MANUALLY OVERRIDE THE ECONOMIZER SYSTEM OR THE BUILDING SYSTEM CONTROL PANEL AT A HIGH LIMIT ENTHALPY SET POINT. IN THIS OVERRIDE MODE THE OUTSIDE AIR DAMPERS, RELIEF AIR DAMPERS AND RETURN AIR DAMPERS SHALL RESET TO PROVIDE THE MINIMUM SCHEDULED OUTSIDE AIR QUANTITY.

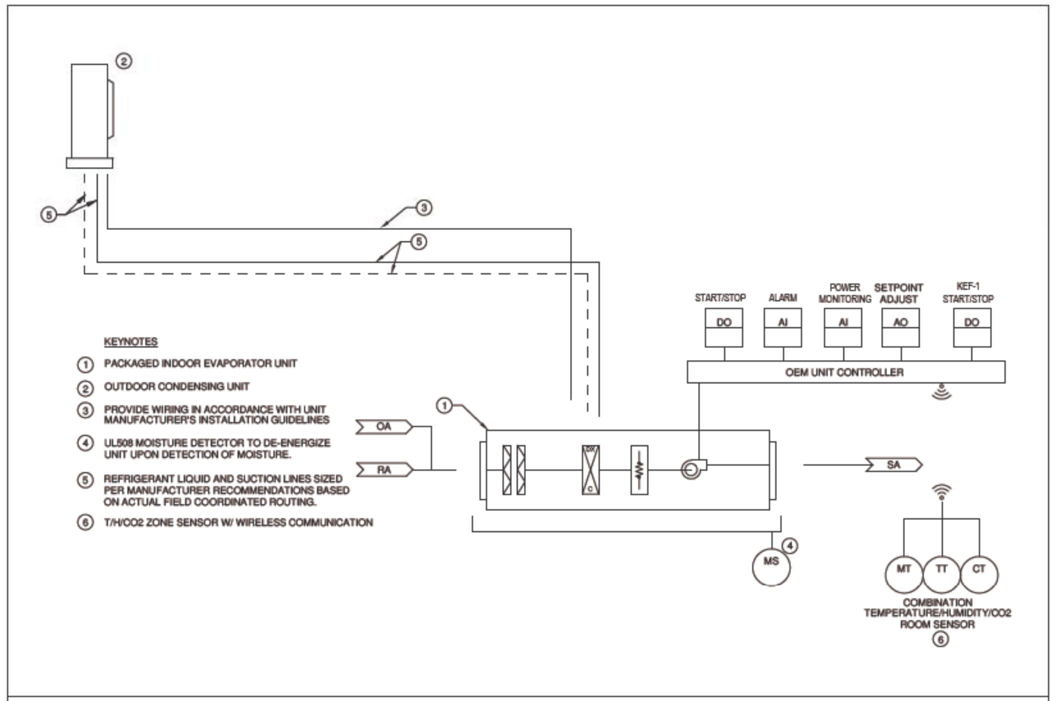
G. ALL TEMPERATURE AND ENTHALPY SET POINTS SHALL BE FIELD ADJUSTABLE.

AHU & EF INTERLOCKS

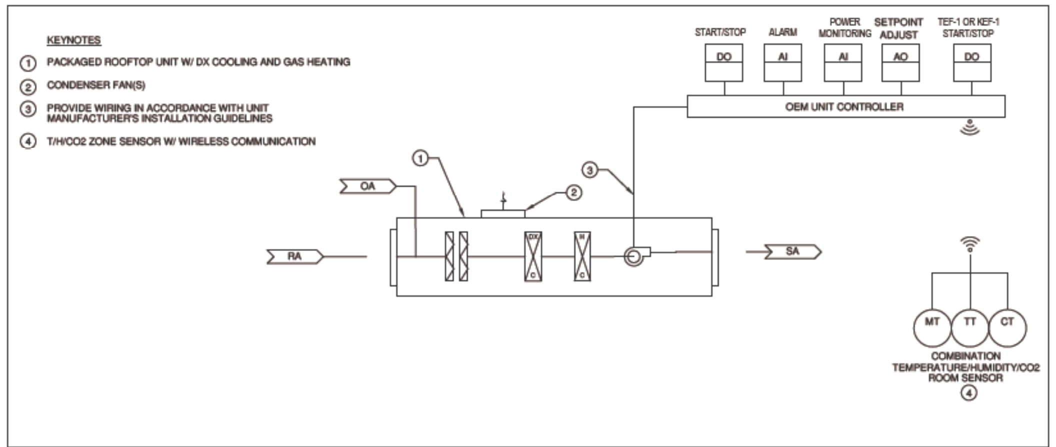
A. THE FOLLOWING UNITS AND FANS SHALL BE INTERLOCKED SUCH THAT ONE DOES NOT OPERATE WITHOUT THE OTHER OPERATING IN ORDER TO MAINTAIN SYSTEM AND BUILDING AIR BALANCE. THE BUILDING ENERGY MANAGEMENT CONTROL PANEL SHALL INCLUDE ON/OFF CONTROL CAPABILITIES FOR TEF-1 AND KEF-1

1. TEF-1 SHALL BE INTERLOCKED WITH THE OPERATION OF AHU-4B AND AHU-6.

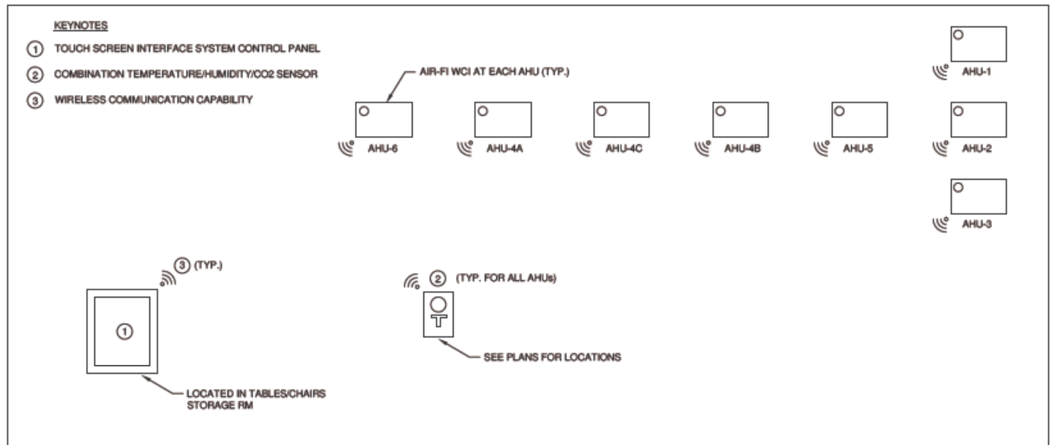
2. KEF-1 SHALL BE INTERLOCKED WITH THE OPERATION OF AHU-4A AND AHU-2.



TYPICAL HEAT PUMP CONTROL DIAGRAM



TYPICAL PACKAGED AIR HANDLING UNIT CONTROL DIAGRAM



BUILDING AUTOMATION SYSTEM ARCHITECTURE DIAGRAM

NOVA PARKS

NOVA Parks
5400 Ox Road
Fairfax Station, VA 22039

Meadowlark Botanical Gardens Atrium, HVAC Rooftop Equipment Replacement

Meadowlark Botanical Gardens Atrium
9750 Meadowlark Gardens Court
Vienna, VA 22182

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Job Number:	N1413.00
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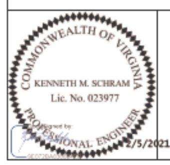
Scale:	N/A
Drawing Title	MECHANICAL CONTROLS



M602

Friday, February 05, 2021 CLARK, ANDREW

EXISTING CONDITION NOTES

1. SITE VISIT: THIS PROJECT INVOLVES CONSTRUCTION INSIDE AN EXISTING STRUCTURE. BEFORE SUBMITTING BID, VISIT AND CAREFULLY EXAMINE SITE TO IDENTIFY EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT WORK OF THIS SECTION. NO EXTRA PAYMENT WILL BE ALLOWED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY WITH SITE CONDITIONS THAT ARE VISIBLE OR READILY CONSTRUED BY EXPERIENCED OBSERVER. SITE VISIT IS PARTICULARLY IMPORTANT BECAUSE THIS IS RENOVATION WORK.
2. PREPARATORY WORK: BEFORE STARTING WORK IN A PARTICULAR AREA OF THE PROJECT, VISIT SITE AND EXAMINE CONDITIONS UNDER WHICH WORK MUST BE PERFORMED INCLUDING PREPARATORY WORK DONE UNDER OTHER SECTIONS OR CONTRACTS BY OWNER. REPORT CONDITIONS THAT MIGHT AFFECT WORK ADVERSELY IN WRITING TO ARCHITECT AND OWNER. DO NOT PROCEED WITH WORK UNTIL DEFECTS HAVE BEEN CORRECTED AND CONDITIONS ARE SATISFACTORY. COMMENCEMENT OF WORK SHALL BE CONSTRUED AS COMPLETE ACCEPTANCE OF EXISTING CONDITIONS AND PREPARATORY WORK.
3. PHASING: WORK SHALL COMPLY WITH THE PHASING REQUIREMENTS OF THE PROJECT AND BE COORDINATED WITH THE OWNER AND ENGINEER.
4. PROVIDE 2 WEEKS NOTICE TO OWNER FOR SHUT DOWN OF ANY SERVICES AND/OR SYSTEMS.
5. REFER TO ENGINEER INSTRUCTIONS FOR ALL EXISTING EQUIPMENT AND MATERIALS THAT SHALL REMAIN THE PROPERTY OF THE OWNER. ITEMS OF VALUE WHICH ARE NOT DIRECTED TO BE RETURNED TO THE OWNER, SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM SITE AND LEGALLY DISPOSED OF. STORAGE OR SALE OF ITEMS ON THE PROJECT SITE IS PROHIBITED.
6. PROTECTION: ENSURE THE SAFE PASSAGE OF PERSONS IN AND AROUND THE BUILDING DURING DEMOLITION. PREVENT INJURY TO PERSONS AND DAMAGE TO PROPERTY. PROVIDE ADEQUATE SHORING AND BRACING TO PREVENT COLLAPSE. IMMEDIATELY REPAIR DAMAGED PROPERTY TO THE CONDITION BEFORE BEING DAMAGED. TAKE EFFECTIVE MEASURES TO PREVENT WINDBLOWN DUST.
7. UTILITIES: MAINTAIN ALL UTILITIES EXCEPT THOSE REQUIRING REMOVAL OR RELOCATION. KEEP UTILITIES IN SERVICE AND PROTECT FROM DAMAGE. DO NOT INTERRUPT UTILITIES SERVING OCCUPIED AREAS WITHOUT FIRST OBTAINING PERMISSION FROM THE OWNER IN WRITING. PROVIDE TEMPORARY SERVICES AS REQUIRED.
8. DEMOLITION WORK MUST FOLLOW THE CONSTRUCTION PHASING SEQUENCE AND MUST BE COORDINATED WITH THE GENERAL AND MECHANICAL DRAWINGS AND CONTRACTORS.
9. MAINTAIN AND RESTORE, IF INTERRUPTED BY REMOVALS OR IN PATH OF NEW CONSTRUCTION, ALL CIRCUITS, CONDUITS AND FEEDERS PASSING THROUGH AND SERVING UNDISTURBED AREAS (SHOWN OR NOT SHOWN). VERIFY CIRCUITS, DEVICES, AND EQUIPMENT SCHEDULED FOR REMOVAL TO ASSURE THAT THEIR REMOVAL WILL NOT ADVERSELY AFFECT ADJACENT AREAS NOT BEING RENOVATED.
10. ELECTRICAL SUBCONTRACTOR SHALL MAINTAIN POWER TO ALL CIRCUITS ADJACENT TO THE CONSTRUCTION AREA. THIS SHALL INCLUDE ANY CIRCUITS PASSING THROUGH THE CONSTRUCTION AREA OR CIRCUITS BEING POWERED FROM POWER PANELS OR BUS DUCTS WITHIN THE CONSTRUCTION AREA. EXTEND AND RELOCATE THESE CIRCUITS AS REQUIRED TO MAINTAIN SERVICE AND TO AVOID INTERFERENCE WITH THE NEW WORK. SUBCONTRACTOR SHALL NOTIFY REPRESENTATIVE FROM CONSTRUCTION MANAGER SHALL IT BE NECESSARY TO INTERRUPT POWER TO AREAS ADJACENT TO THIS CONSTRUCTION AREA.
11. ELECTRICAL SUBCONTRACTOR SHALL VERIFY ALL LIGHTING CIRCUITS WITHIN THE CONSTRUCTION AREA BEFORE DISCONNECTING POWER. CONTRACTOR SHALL PROVIDE NECESSARY WIRING TO MAINTAIN LIGHTING IN AREAS ADJACENT TO THIS CONSTRUCTION AREA WHICH WOULD BE AFFECTED BY THIS DEMOLITION WORK.
12. IN ANY AREA REQUIRING THE PERFORMANCE OF ANY TRADE'S WORK, THIS CONTRACTOR SHALL CAREFULLY REMOVE AND STORE ANY OR ALL ELECTRICAL ITEMS IN PATH OF WORK, REINSTALLING AND RECONNECTING SAME AS REQUIRED, AFTER COMPLETION OF OTHER TRADE'S WORK IN THAT AREA, IN ACCORDANCE WITH THE PLANS AND/OR AS DIRECTED.
13. EXISTING FIRE ALARM DEVICES SHALL BE PROTECTED FROM DAMAGE DURING CONSTRUCTION. THE FIRE ALARM SYSTEM SHALL BE MAINTAINED AND OPERATIONAL DURING CONSTRUCTION.

NEW WORK NOTES

1. ALL EQUIPMENT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, RECTILINEAR TO BUILDING STRUCTURE.
2. EXACT LOCATION OF MECHANICAL EQUIPMENT THAT REQUIRES ELECTRICAL IS SHOWN ON THE MECHANICAL DRAWINGS.
3. CONTRACTOR SHALL REVIEW ALL TRADES' CONTRACT DOCUMENTS TO DETERMINE SPECIFIC MOUNTING LOCATIONS FOR ELECTRICAL EQUIPMENT. COORDINATE EXACT MOUNTING LOCATIONS WITH THE ARCHITECT.
4. ELEMENTS OF THE ELECTRICAL WORK SHALL BE INSTALLED SUCH THAT AT COMPLETION THE ELEMENT SHALL BE FULLY ACCESSIBLE, INCLUDING OPEN-IN, FULL SWING ACCESS DOOR. ELEMENTS OF THE ELECTRICAL WORK INCLUDE, BUT ARE NOT LIMITED TO PANELS, SWITCHBOARDS, MOTOR CONTROLS, TRANSFORMER, DISCONNECTS, JUNCTION BOXES, AND ALL MAINTENANCE ACCESS POINTS INCLUDING CABLE PULL SPACE. FULLY ACCESSIBLE SHALL BE DEFINED AS; CAPABLE OF BEING ACCESSED FOR SERVICE, REPAIR OR REPLACEMENT BY AN INDIVIDUAL, ON A LADDER IF NECESSARY, AND CAPABLE OF BEING SERVICED OR REMOVED WITHOUT REMOVING, MODIFYING OR DISTORTING OTHER COMPONENTS OF THE WORK OF OTHER TRADES. CONFLICTS WITH MEETING THIS REQUIREMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE IN A TIMELY MANNER.
5. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL INCIDENTAL ACCESSORIES NECESSARY TO MAKE ELECTRICAL WORK COMPLETE AND READY FOR OPERATION.
6. ALL CABLE AND CONDUIT SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE, INDEPENDENT OF OTHER SYSTEMS INCLUDING PLUMBING PIPING, HVAC DUCTWORK, DROP CEILING SUPPORTS, ETC.
7. THE CONTRACTOR SHALL COORDINATE ALL MANUFACTURER'S SHOP DRAWINGS FOR EXACT LOCATION AND ROUGHIN IN DIMENSIONS OF ALL EQUIPMENT AND SHALL MAKE ALL FINAL CONNECTIONS AS REQUIRED.
8. FLEXIBLE METAL CONDUIT WITH PVC COATING SHALL BE USED FOR CONNECTIONS TO MOTORS AND EQUIPMENT. LIQUID TIGHT FLEXIBLE CONDUIT FOR EXTERIOR LOCATIONS.
9. ELECTRICAL CONDUIT AND CABLE SHALL NOT BE INSTALLED ON FOREIGN SYSTEMS (I.E. DUCTWORK, PIPING CEILING GRID, ETC) AND SHALL BE INDEPENDENTLY SUPPORTED FROM THE STRUCTURE USING LISTED COMPONENTS. LOW VOLTAGE WIRING (COMMUNICATIONS, AUDIO-VIDEO, ETC) SHALL NOT BE INSTALLED ON FOREIGN SYSTEMS (I.E. DUCTWORK, PIPING CEILING GRID, ETC) AND SHALL BE INDEPENDENTLY SUPPORTED FROM THE STRUCTURE USING LISTED COMPONENTS.
10. ALL ELECTRICAL EQUIPMENT INSTALLED SHALL BE NEW AND UL LISTED.

GENERAL NOTES

1. ALL CONDUIT / CABLE / WIRING ROUTING SHALL BE COORDINATED WITH EXISTING STRUCTURE AND SHALL BE APPROVED BYOWNER PRIOR TO ANY ROUGH-IN AND INSTALLATION.
2. ALL EQUIPMENT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, RECTILINEAR TO BUILDING STRUCTURE.
3. ALL COMPONENTS SHOWN ON THE RISER DIAGRAMS, BUT NOT ON THE PLAN OR VICE VERSA, SHALL BE INCLUDED AS IF SHOWN ON BOTH.
4. EXACT LOCATION OF MECHANICAL EQUIPMENT THAT REQUIRES ELECTRICAL CONNECTION IS SHOWN ON THE MECHANICAL DRAWINGS.
5. ALL RACEWAYS CROSSING BUILDING EXPANSION JOINTS SHALL BE EQUIPPED WITH EXPANSION FITTINGS.
6. CONDUIT HOMERUNS SHOWN ON THE DRAWING WITH MORE THAN 3 CURRENT CARRYING CONDUCTORS ARE SHOWN DIAGRAMATICALLY. THIS CONTRACTOR SHALL NOT INSTALL MORE THAN 3 CURRENT CARRYING CONDUCTORS IN A RACEWAY UNLESS INSTALLATION COMPLIES WITH ARTICLE 310 OF THE NATIONAL ELECTRIC CODE, NOTES TO AMPACITY TABLES REGARDING CONDUCTOR ADJUSTMENT FACTORS.
7. CONTRACTOR SHALL REVIEW ALL TRADES' CONTRACT DOCUMENTS TO DETERMINE SPECIFIC MOUNTING LOCATIONS FOR ELECTRICAL EQUIPMENT.
8. ELEMENTS OF THE ELECTRICAL WORK SHALL BE INSTALLED SUCH THAT AT COMPLETION THE ELEMENT SHALL BE "FULLY AND REASONABLY ACCESSIBLE". ELEMENTS OF THE ELECTRICAL WORK INCLUDE, BUT ARE NOT LIMITED TO PANELS, MOTOR CONTROLS, TRANSFORMER, DISCONNECTS, JUNCTION BOXES, AND ALL MAINTENANCE ACCESS POINTS INCLUDING CABLE PULL SPACE. "FULLY AND REASONABLE ACCESSIBLE" SHALL BE DEFINED AS; CAPABLE OF BEING ACCESSED FOR SERVICE, REPAIR OR REPLACEMENT BY AN AVERAGE SIZE INDIVIDUAL, ON A LADDER IF NECESSARY, AND CAPABLE OF BEING SERVICED OR REMOVED WITHOUT REMOVING, MODIFYING OR DISTORTING OTHER COMPONENTS OF THE WORK OF OTHER TRADES. CONFLICTS WITH MEETING THIS REQUIREMENT SHALL BE BROUGHT TO THE ATTENTION OF THE OWNERS REPRESENTATIVE IN A TIMELY MANNER.
9. EACH LIGHTING AND RECEPTACLE BRANCH CIRCUIT SHALL INCLUDE A SEPARATE NEUTRAL CONDUCTOR FOR EACH AND EVERY CIRCUIT, UNLESS SPECIFICALLY NOTED OTHERWISE.
10. COORDINATE FLOOR PENETRATIONS WITH WORK OF OTHER SECTIONS AND REVIEW ALL PENETRATIONS WITH OWNER PRIOR TO ANY WORK.

WIRING DEVICES LEGEND

2	125 VOLT, 2 POLE, 3 WIRE, 20 AMP., DUPLEX RECEPTACLE. "2" - DENOTES CIRCUIT NUMBER.
	125 VOLT, 2 POLE, 3 WIRE, 20 AMP., DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER OR HIGHER THAN STANDARD RECEPTACLE MOUNTING HEIGHT.
	125 VOLT, 2 POLE, 3 WIRE, 20 AMP. DOUBLE DUPLEX RECEPTACLE.
WP	125 VOLT, 2 POLE, 3 WIRE, 20 AMP., DUPLEX RECEPTACLE EQUIPPED WITH INTEGRAL GROUND FAULT INTERRUPTER AND MOUNTED IN CAST OUTLET BOX WITH WEATHERPROOF COVER.

NOTES:

1. ALL RECEPTACLES SHALL BE INSTALLED WITH GROUND PRONG IN THE UP POSITION.
2. ALL RECEPTACLES SHALL BE SIDE WIRED.
3. ALL RECEPTACLES AND SWITCH COVER PLATES SHALL BE STAINLESS STEEL TYPE.
4. ALL EMERGENCY RECEPTACLES SHALL BE RED IN COLOR.

CIRCUITRY AND FEEDERS LEGEND

PS218-1	HOMERUN TO PANEL "PS218", CIRCUIT #1. EACH BRANCH CIRCUIT SHALL HAVE A DEDICATED NEUTRAL CONDUCTOR UNLESS OTHERWISE NOTED. PROVIDE UNSHARED GROUNDING CONDUCTORS FOR EACH CIRCUIT IN ACCORDANCE WITH SPECIFICATIONS AND N.E.C. UNLESS OTHERWISE NOTED. MINIMUM SIZE CONDUIT SHALL BE 3/4" UNLESS OTHERWISE NOTED. SEE NOTE #1 BELOW.
PS218-1,2	MULTIPLE HOMERUNS TO PANEL "PS218", CIRCUIT #1 AND #2. PROVIDE DEDICATED NEUTRAL AND GROUND FOR EACH CIRCUIT NUMBER SHOWN UNLESS OTHERWISE NOTED. SEE NOTE #1 BELOW.
PS218-1,3,5	HOMERUN TO PANEL "PS218", CIRCUIT #1,3,5 VIA 3-POLE CIRCUIT BREAKER. SEE NOTE #1 BELOW.
	CIRCUITRY TURNING UP
	CIRCUITRY TURNING DOWN

NOTES:

1. REFER TO PANEL SCHEDULES FOR BREAKER SIZE OF EACH CIRCUIT HOMERUN.

EQUIPMENT LEGEND

	208Y/120 VOLT, 3Φ, 4 WIRE PANEL
	480Y/277 VOLT, 3Φ, 4 WIRE PANEL
T3*	DRY TYPE TRANSFORMER. "T3" DENOTES TRANSFORMER TYPE. REFER TO THE "DRY TYPE TRANSFORMER SCHEDULE" FOR FURTHER INFORMATION. ASTERISK DENOTES TRAPEZE MOUNTED TRANSFORMER.
5, L, MD, MG	MOTOR. NUMERAL INDICATES HORSEPOWER RATING. "L" INDICATES LOUVER MOTOR, "MD" INDICATES MOTORIZED OVERHEAD DOOR, "MG" INDICATES MOTORIZED GATE.
VFD	VARIABLE FREQUENCY DRIVE
	DISCONNECT SWITCH (UNFUSED)
	DISCONNECT SWITCH (FUSED)
P	MANUAL MOTOR STARTER COMPLETE WITH THERMAL OVERLOAD PROTECTION. "P" DENOTES EQUIPPED WITH PILOT LIGHT, PROVIDED BY ELECTRICAL CONTRACTOR.
	DENOTES FLEXIBLE LIQUID TIGHT CONNECTION AND CONDUCTORS BY THE ELECTRICAL CONTRACTOR TO EQUIPMENT BY OTHERS.
J	JUNCTION AND/OR PULL BOX IN CEILING
J	JUNCTION AND/OR PULL BOX
J BAS EHD ESD EWC OPS OVP SEC	"BAS" - DENOTES CONNECTION TO BAS PANELS. "EHD" - DENOTES CONNECTION TO ELECTRIC HAND/HAIR DRYER. "ESD" - DENOTES CONNECTION TO ELECTRIC SOAP DISPENSER. "EWC" - DENOTES CONNECTION TO ELECTRIC WATER COOLER. PROVIDE GFCI PROTECTION; HUBBELL "GFBF20ILA" OR EQUAL. "OPS" - DENOTES CONNECTION TO OPERABLE PROJECTOR SCREEN MOTOR. "OVP" - DENOTES TO CONNECT TO OVERHEAD VIDEO PROJECTOR. "SEC" - DENOTES TO CONNECT TO SECURITY PANELS. "FH" - DENOTES CONNECTION TO FUME HOOD
E	EMERGENCY POWER OFF (EPO) BUTTON
XX / X MS217-2	PLUMBING AND MECHANICAL EQUIPMENT DESIGNATION. REFER TO ELECTRICAL/MECHANICAL SCHEDULE. DESIGNATION "MS217-2" DENOTES BRANCH CIRCUIT DESIGNATION FOR EQUIPMENT.
1 / E5-1	PART PLAN REFERENCE TAG. THE TOP LETTER OR NUMBER IS THE PART PLAN REFERENCE AND THE LOWER REFERENCE INDICATES THE DRAWING THE PART PLAN IS LOCATED.

EXISTING EQUIPMENT ABBREVIATIONS

XM	EXISTING EQUIPMENT TO REMAIN
XN	RELOCATED EQUIPMENT AT NEW LOCATION
XR	EXISTING EQUIPMENT TO BE REMOVED WITH ALL ASSOCIATED WIRING AND APPURTENANCES BACK TO SOURCE
XRE	EXISTING EQUIPMENT TO BE REMOVED AND RELOCATED. PROVIDE WIRING / CABLING, AND CONDUIT TO NEW LOCATION. MATCH EXISTING SIZE AND TYPE.

GENERAL ABBREVIATIONS

A	AMPERES	LTG	LIGHTING
ADA	AMERICANS WITH DISABILITIES ACT	LFMC	LIQUIDTIGHT FLEXIBLE METAL CONDUIT
AFF	ABOVE FINISH FLOOR		
AFG	ABOVE FINISH GRADE	MC	METAL CLAD CABLE
AHJ	AUTHORITY HAVING JURISDICTION	MCB	MAIN CIRCUIT BREAKER
AHU	AIR HANDLING UNIT	MCC	MOTOR CONTROL CENTER
AIC	AMPERE INTERRUPTING CAPACITY	MCP	MOTOR CIRCUIT PROTECTOR
AL	ALUMINUM	MISC	MISCELLANEOUS
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE	MLO	MAIN LUGS ONLY
		NC	NORMALLY CLOSED
ARCH	ARCHITECT	NEC	NATIONAL ELECTRIC CODE
ATS	AUTOMATIC TRANSFER SWITCH	NEMA	NATIONAL ELECTRICAL MANUFACTURES ASSOCIATION
ATC	AUTOMATIC TEMPERATURE CONTROL		
AVC	AUDIO VISUAL CONTRACTOR	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
AWG	AMERICAN WIRE GAUGE		
BFG	BELOW FINISH GRADE	N.I.C.	NOT IN CONTRACT
BLDG	BUILDING	NO	NORMALLY OPEN OR NUMBER
C	CONDUIT	NTS	NOT TO SCALE
CAT	CATALOG	P	POLE
CB	CIRCUIT BREAKER	PB	PUSHBUTTON
CBM	CERTIFIED BALLAST MANUFACTURERS	PNL	PANEL
CKT	CIRCUIT	POS	PROVIDED UNDER OTHER SECTIONS
CL	CENTERLINE	PT	POTENTIAL TRANSFORMER
CLF	CURRENT LIMITING FUSE	PVC	POLYVINYL CHLORIDE
COL	COLUMN	PWR	POWER
CPT	CONTROL POWER TRANSFORMER	QTY	QUANTITY
CT	CURRENT TRANSFORMER	REQ'D	REQUIRED
CU	COPPER	RMC	RIGID METAL CONDUIT
CUH	CABINET UNIT HEATER	RMS	ROOT MEAN SQUARED
DDL	DIRECT DIGITAL CONTROL	RNMC	RIGID NON-METALLIC CONDUIT
DWG	DRAWING	RTU	ROOF TOP UNIT
EC	ELECTRICAL CONTRACTOR	SP	SPARE
EF	EXHAUST FAN	SW	SWITCH
EM	EMERGENCY	SYM	SYMMETRICAL
EMT	ELECTRICAL METALLIC TUBING	TEL	TELEPHONE
EPO	EMERGENCY POWER OFF	TMCB	THERMAL MAGNETIC CIRCUIT BREAKER
EWC	ELECTRIC WATER COOLER		
F	FUSE	UG	UNDERGROUND OR UNDERGRADE
FA	FIRE ALARM	UL	UNDERWRITERS LABORATORIES
FCU	FAN COIL UNIT	U.O.N.	UNLESS OTHERWISE NOTED
FLA	FULL LOAD AMPERES	UH	UNIT HEATER
FMC	FLEXIBLE METAL CONDUIT	UPS	UNINTERRUPTABLE POWER SUPPLY
FT	FEET	V	VOLT
GFI	GROUND FAULT INTERRUPTER	VI	VACUUM INTERRUPTER
GND,G	GROUND OR GROUNDING	W	WIRE
GRMC	GALVANIZED RIGID METALLIC CONDUIT	WH	WATER HEATER
HOA	HAND, OFF, AUTOMATIC SWITCH	WP	WEATHERPROOF
HPF	HIGH POWER FACTOR	XFMR	TRANSFORMER
IG	ISOLATED GROUND	△	DELTA
IEEE	INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS	Y	WYE
		Φ	PHASE
IMC	INTERMEDIATE METAL CONDUIT		
INT	INTERLOCK		
kcmil	THOUSAND CIRCULAR MILS		
kVA	KILOVOLT AMPERES		
kW	KILOWATTS		

NOVA PARKS

NOVA Parks
5400 Ox Road
Fairfax Station, VA 22039

Meadowlark Botanical Gardens Atrium, HVAC Rooftop Equipment Replacement

Meadowlark Botanical Gardens Atrium
9750 Meadowlark Gardens Court
Vienna, VA 22182

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Drawing Title

ELECTRICAL
COVER
SHEET

COMMONWEALTH OF VIRGINIA
CHIRAG M. AMIN
Lic. No. 0402061339
PROFESSIONAL ENGINEER
2/5/2021

E001

E L E C T R I C A L   S P E C I F I C A T I O N S

PART 1 - GENERAL

1.1 REFERENCES

A. Conditions of the Contract, General Requirements, apply to work of this Section. Electrical Contractor shall be licensed in the State or District where the work is performed. Licensed Electrical Journeyman to be on site at all times and to provide direct supervision of apprentice electricians.

B. Examine Drawings and other Sections of Specifications for requirements that affect work of this section.

C. As used in this Section, "provide" means "furnish and install" and "POS" means Provided Under Other Sections." "Furnish" means "to purchase and deliver to the project site complete with every necessary appurtenance and support," and "Install" means "to unload" at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project."The word "Provide" is implied in all statements.

D. Perform work and provide material and equipment as shown on Drawings and as specified or indicated in this Section of the Specifications. Completely coordinate work of this Section with work of other trades and provide a complete and fully functional installation. Drawings and Specifications form complimentary requirements; provide work specified & not shown, and work shown and not specified as though explicitly required by both. Although work is not specifically shown or specified, provide supplementary or miscellaneous items, appurtenances, devices and materials obviously necessary for a sound, secure and complete installation. Remove all debris caused by contractors work.

E. Perform work strictly as required by rules, regulations, standards, codes, ordinances, and laws of local, state, and Federal governments, and other authorities that have lawful jurisdiction.

F. Give notices, file plans, obtain permits and licenses (if required), pay fees and backcharges and obtain necessary approvals from authorities that have jurisdiction.

G. Work shall include, but shall not be limited to, the following:
   1. Conduit and raceways
   2. Branch circuit wiring
   3. Wiring devices and plates
   4. Disconnect Switches
   5. Relocation of existing electrical components that interfere with new construction with removal and disposal of obsolete components
   6. Nameplates, labels and tags
   7. Testing

H. Remove, extend, alter and reconnect existing conduits as directed by Owner's Project Representative. Reconnect existing conduit that is cut and disconnected to accommodate work. Pull in new wires between nearest accessible outlets intended for reuse. Provide new conduit where wire cannot be pulled in existing. Connect new and existing work to function as complete, continuously grounded system. Remove conduit and equipment not intended for reuse and store where directed. Use conduit exposed by Work of this Contract in conjunction with nearest outlet intended for reuse as directed.

I. For purpose of this project. Occupying tenant shall be referred to from this point forward as "OWNER".

1.2 CONTRACT DOCUMENTS

A. Work to be performed under this Section is shown primarily on the Electrical Drawings.

B. Listing of Drawings does not limit responsibility of determining full extent of work required by Contract Documents. Refer to Electrical and other Drawings and other Sections that indicate types of construction in which work shall be installed and work of other trades with which work of this Section must be coordinated.

C. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item, in the drawings or specifications or both, carries with it the instruction to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.

D. Items referred to in singular number in Contract Documents shall be provided in quantities necessary to complete work.

E. Drawings are diagrammatic. They are not intended to specify or to show every offsets, fittings, and components. The purpose of the drawings is to indicate a systems concept, the main components of the systems, & the approximate geometrical relationships. Based on the systems concept, the main components, and the approximate geometrical relationships, the contractor shall provide all other components and materials necessary to make the systems fully complete and operational.

1.3 DISCREPANCIES IN DOCUMENTS

A. Address questions regarding drawings to Engineer in writing before award of contract. After award follow Project Manager's RFI and CA procedures.

1.4 SITE VISIT

A. Before submitting bid, visit and carefully examine site to identify existing conditions and difficulties that will affect work of this Section. No extra payment will be allowed for additional work caused by unfamiliarity with site conditions that are visible or readily construed by experienced observer.

1.5 CODES, STANDARDS, AUTHORITIES, & PERMITS

A. Perform work in strict accordance with NEC 2014 standards; the rules, regulations, standards, codes, ordinances, and laws of local, state, and Federal governments, and other authorities having legal jurisdiction over the site.

B. Material and equipment shall be new and listed by Underwriters' Laboratories (UL).

1.6 GUARANTEE & 24 HOUR SERVICE

A. Guarantee Work in writing for one year from date of final acceptance. Repair or replace defective materials or installation at no cost to Owner. Correct damage caused in making necessary repairs and replacements under guarantee at no cost to Owner.

B. Submit guarantee to Owner's Project Representative before final payment.

C. All permits are the responsibility of the contractor.

1.7 RECORD DRAWINGS

A. Maintain record drawings on site. Record set must be complete and current and available for inspection when requisitions for payment are submitted.

1.8 SUBMITTALS

A. Submit shop drawings and product data. Check, stamp and mark with project name submittals before transmitting to Owner. Indicate deviations from contract documents.

B. Schedule at least ten working days, exclusive of transmittal time, for submittal review.

C. Material and equipment requiring Shop Drawing and Product Data submittal shall include, but shall not be limited to:
   1. Wiring devices and faceplates
   2. Enclosed Safety / Disconnect Switches
   3. Conductors
   4. Raceway and boxes
   5. Cabling

PART 2 - PRODUCTS

ALL PRODUCTS SHALL BE NEW UNLESS AGREED TO IN WRITING BY THE OWNER'S PROJECT REPRESENTATIVE.

A. Unless otherwise noted, all electrical distribution equipment shall be provided by the following manufacturers: Eaton Cutler Hammer.

2.1 RACEWAYS

A. Electrical metallic tubing (EMT), min. 3/4-inch, ANSI C80.3 galvanized steel.

B. Flexible metal conduit (FMC), min 3/4", galvanized steel, UL1. Liquid tight flexible metal conduit (LFMC) in wet locations.

C. Rigid galvanized steel conduit (RGS), min. 3/4", ANSI C80.1.

D. Steel connectors and couplings with insulated throats; manufactured elbows; locknuts; and plastic or bakelite bushings at terminations. Couplings and connectors shall be gland and ring compression or stainless steel multiple point locking or steel concrete-tight set screw. Compression couplings & connectors shall form positive ground. Set-screw connectors and couplings shall have wall thickness equal to conduit, case-hardened, hex-head screws and separate ground wire. Bushings for rigid steel and connectors for EMT shall have insulating inserts that meet requirements of UL 514 flame test.

2.2 OUTLET BOXES

A. For concealed work shall be at least 4" square or octagonal, galvanized pressed steel with plaster rings as required. For exposed conduit work shall be cast aluminum alloy with cast aluminum alloy covers.

B. Fitted with galvanized steel plaster covers of required depth to finish flush with finished wall or ceiling.

C. Switch boxes, receptacle boxes and other outlet boxes shall be standard 4" square with plaster rings or gang cover as required.

D. Provide only enough conduit openings to accommodate conduits at individual location. Each box shall be large enough to accommodate number and sizes of conduits, wires and splices to meet NEC requirements, but shall be at least size shown or specified. Necessary volume shall be obtained by using boxes of proper dimensions.

2.3 JUNCTION BOXES & PULL BOXES

A. Provide code gauge galvanized steel junction and pull boxes for conduit 1-1/4" trade size and larger, where indicated and as necessary to facilitate installation, of required dimensions, with accessible, removable screw-on covers. Provide junction and pull boxes in special sizes and shapes determined in field where necessary.

B. Covers shall be accessible. Do not install junction boxes above ceiling except where ceiling is removable or where access panel is provided.

C. Sheet metal pull boxes shall be supported adequately to maintain shape. Larger boxes shall have structural steel bracing welded into rigid assembly formed adequately to maintain alignment in shipment and installation. Secure covers with corrosion-resistant screws or bolts.

2.4 CONDUCTORS (600 V INSULATION)

A. Provide single-conductor, annealed copper wire and cable with insulation rated 600 V, of sizes specified and scheduled on Drawings, for secondary service, feeders, branch and system wiring. Wire insulated for 300 V may be used where voltage is less than 100 V, if isolated from higher voltages. Wire sizes shown and specified are American Wire Gauge for copper.

B. 'NM' or 'NMC' will not be accepted.

C. Wire #10 and larger shall be stranded; #12 and smaller shall be solid. Wire and cable shall have THWN-THHN or XHHW insulation, 75°C.

D. Wiring within light fixtures and other high-temperature equipment shall have 150°C insulation as required by NEC.

E. Splices and Terminations
   1. Make splices in branch circuit wiring with UL-listed, solderless connectors rated 600 V, of sizes and types required by manufacturer's recommendations with temperature ratings equal to those of wires. Splice connectors shall be screw-on. Insulate splices with integral covers or with plastic or rubber friction tape to preserve characteristics of wire and cable insulation.
   2. Provide standard bolt-on lugs with hex screws to attach copper wire and cable to panelboards and electrical equipment.
   3. Ampacity of splices and connectors shall be equal to those of associated wires and cables.

2.5 COLOR CODING

A. Color code secondary service, feeders and branch circuit conductors as follows: 208Y/120V white (neutral), black, red, blue. Provide with solid green grounding conductor. 480Y/277V gray (neutral), brown, orange, yellow. Provide with solid green grounding conductor.

B. Branch circuit conductors #12 and #10 shall have solid color compound, solid color coating. Neutrals and equipment grounds shall have solid compound or solid color coating (white, gray and green), except where colored stripes are required. Conductors #8 and larger with stripes, bands or hash marks shall have background color other than white, green and gray.

2.6 WIRE PULLING EQUIPMENT

A. Provide polyethylene ropes for pulling wire.

B. Provide fish wires for telephone and other empty conduit systems required, without splices and with ample exposed lengths at each end.

2.7 WIRING DEVICES

A. Provide wiring devices by single manufacturer. Device colors shall be white unless otherwise noted. Manufactures: Hubbell, Leviton, and Pass and Seymour.

B. Toggle Switches:
   1. Single-pole shall be 20A., 120-277 V AC. Ivory yoke color.

C. Receptacles:
   1. Duplex shall be NEMA 5-20R, 125 V, 20 A, 2-pole, 3 W, grounding.
   2. Ground fault circuit interrupt outlets shall be similar to the duplex outlets with solid state ground fault sensing and circuit interrupter, class a group, per UL 943 with 5 mA trip level.
   3. Single twist lock receptacles shall have ratings as indicated on drawings. Black in color.

2.8 WIRING DEVICE PLATES

A. Provide stainless steel device faceplates.

B. Device plates shall be by manufacturer of wiring devices.

C. Outlets shall be flush to surface and labeled with circuit number and panel name in black text on transparent adhesive label.

2.09 CIRCUIT BREAKERS

A. Protective devices shall be molded case circuit breakers providing complete circuit overcurrent protection by having inverse time and instantaneous tripping characteristics, and have an AIC rating specified in the "panel schedule".

B. Bolted panelboard breakers only. Each single pole, double pole and three phase breakers shall have a single handle operator - no pin tied handles.

C. Each distribution panelboard shall have Arc Flash Protection warning labels.

D. Circuit breakers shall be operated by a toggle-type handle and shall have a quick-make, quick-break over-center switching mechanism that is mechanically trip free.

E. Automatic tripping of the breaker shall be clearly indicated by the handle position.

F. Provide HACR rated circuit breakers for motor circuit protection.

2.10 ENCLOSED SAFETY / DISCONNECT SWITCHES

Fusible switch assemblies:
   A. Description: nema ks 1, type hd, enclosed load interrupter knife switch. handle lockable in off position.
   B. Fuse clips: Designed to accommodate Nema fu1, class r fuses.

Nonfusible switch assemblies
   A. Description: Nema ks 1, type hd enclosed load interrupter knife switch. Handle lockable in off position.

Manual Motor Starter Switch (MMS)
   A. Description: Fractional Horsepower Manual Non-reversing Controller: "Quick-make, quick-break" toggle action with markings to show whether unit is off, on, or tripped.
   B. Overload Relays: Inverse-time current characteristics; NEMA ICS 2, Class 10 tripping characteristics; heaters matched to nameplate full-load current of actual protected motor; external reset push button; bimetallic type.

Enclosures
   A. Fabrication: Nema KS 1. Interior dry locations: Type 1.

PART 3 - EXECUTION

3.1 MATERIALS & WORKMANSHIP

A. Work shall be executed in workmanlike manner (in accordance with NEC, NECA, and NEIS standards) and shall present neat, rectilinear and mechanical appearance when completed. Maintain maximum headroom at all times. Do not run pipes and ducts exposed unless shown exposed on drawings. Material and equipment shall be new and installed according to manufacturer's recommended best practice so that completed installation shall operate safely and efficiently.

3.2 CONTINUITY OF SERVICES

A. Do not interrupt existing services without Owner's Project Representative's approvals.

3.3 TESTING, INSPECTION, & CLEANING

A. Test wiring and connections for continuity and grounds before devices are connected; demonstrate insulation resistance by megger test as required. Insulation resistance between conductors and grounds for secondary distributions systems shall meet NEC requirements. NETA standard by qualified technicians.

B. Test lighting fixtures with specified lamps in place for 10 hours; check fixtures in sections. Do not operate lamps other than for testing before final inspection by University Project Representative. Replace lamps that fail within 90 days after acceptance by University Project Representative within Contract Price.

C. Failure or defects in workmanship or materials revealed by tests or inspection shall be corrected promptly and retested. Replace defective material.

D. Clean panels and other equipment. Panelboard interiors shall be cleaned and vacuumed. Equipment with damage to painted finish shall be repaired to University Project Representative's satisfaction.

E. Equipment
   1. After completion of project, clean the exterior surface of equipment included in this section, including concrete residue.

F. Electrical and mechanical closets shall be cleaned and vacuumed.

3.4 NAMEPLATES

A. Provide nameplates in or on panelboards, disconnects, junction boxes and cabinets, and for special purpose switches or other controls furnished or installed under this section. Nameplates shall designate equipment controlled with panel and circuit designation.

B. Nameplates shall be laminated black bakelite with 1/4" high white recessed letters. Nameplates shall be securely attached to the equipment with galvanized screws. Adhesives or cements shall not be used.

3.5 WIRING METHODS

A. Install wire in approved raceways as specified and as approved by authorities that have jurisdiction. Surface metal raceways shall not be used unless explicitly specified and shown on Drawings. Do not use surface raceways on floor.

B. Wire from point of service connection to receptacles, lighting fixtures, devices, equipment, outlets for future extension, and other electrical apparatus as shown on Drawings. Provide slack wire for connections. Tape ends of wires and provide blank covers for outlet boxes designated for future use. Wire from source to first device shall be #10 AWG minimum.

C. Follow circuit numbers shown on Drawings to connect circuits to panelboards. Wiring devices shown with a homerun indicate dedicated branch circuits. Multi-wire branch circuits shall not be installed.

D. Electrical metallic tubing may be used generally, if approved by local codes, for lighting fixture and receptacle circuits, telephone, inter-communications, signal and instrumentation circuits, & for control circuits. EMT may be used generally, if approved normal traffic level and where not subject to accidental damage or abuse. by authorities, in masonry walls, above hung ceilings, in equipment rooms, in mechanical and electrical chases and closets, in exposed locations along ceilings or walls above.

E. Install connectors and couplings as recommended by manufacturers. Compression fittings shall not be used with RGS.

F. Provide flexible conduits for connections to electrical equipment and to equipment furnished by the Mechanical or Plumbing trades that are subject to movement, vibration or misalignment; where available space dictates; and where noise transmission must be eliminated or reduced.

G. Run concealed conduit in as direct lines as possible with minimum number of bends of longest possible radius. Run exposed conduit and EMT parallel to or at right angles to building lines. Ends shall be free from dents or flattening.

H. Conduit and EMT runs shall be mechanically and electrically continuous from service entrance to outlets. Conduit shall enter and be secured to cabinet, junction box, pull box or outlet box with locknut outside and bushing inside, or with liquid-tight, threaded, self-locking, cold-weld wedge adapter. Provide additional wrench-tighten locknut for EMT or flexible conduit where circuit voltage exceeds 250 V. Locknuts and bushings or self-locking adapters will not be required where conduits are screwed into tapped connections. Vertical conduit runs that terminate in bottoms of wall boxes or cabinets shall be protected from entrance of foreign material before installation of conductors.

I. Size conduit and flexible metallic conduit as required by NEC except as specified or shown on drawings otherwise.

J. Check raceway sizes to determine that green equipment ground conductor fits in same raceway with phase and neutral conductors to meet NEC percentage of fill requirements. Increase duct, conduit, tubing and raceway sizes shown or specified as required to accommodate conductors.

K. Unless specified or shown otherwise, conduit may be run exposed on unfinished walls and ceilings and in unfinished penthouses, attics and roof spaces. Provide stand-off clips in wet locations, machinery rooms and exterior masonry walls.

L. Install conduit systems complete before drawing in conductors. Blow through and swab after plaster is finished and dry, and before conductors are installed.

M. Attach pull ropes to conductors with basket-weave grips on pulling eyes. Pull cables that share conduit at same time.

N. Provide inserts, hangers, anchors and steel supports as necessary.

3.6 GROUNDING & BONDING

A. Per code: provide jumpers or bonding conductors where raceway is electrically discontinuous. Provide copper ground conductor minimum #12 AWG in all 120 volt branch circuits. Each branch circuit to have a separate ground conductor. Grounds shall be continuous from source to equipment.

B. Maximum point to point resistance to ground shall not exceed 0.5 ohms.

C. Provide equipment grounding system per NEC.

3.7 VOLTAGE CHECK:

A. At completion of job and after full building occupancy. Check voltage at several points of utilization on the system which has been installed under this contract. During the test, energize all loads installed.

3.8 PANELBOARDS:

A. Revise all existing panelboard directories with new type written index showing circuit changes under this contract, including updating of existing circuits not being changed. Place directory in clear plastic sleeve and positively attach to the inside of the panelboard door.

B. Provide terminal strips in existing panels to accommodate the increase in neutral and ground wires.

C. Provide new circuit breakers of manufacturer, type, and short circuit rating to match existing where required to supplement existing quantity. Provide "HACR" rated circuit breakers for HVAC equipment installed in ceiling plenums.

3.09 FIRE PROOFING:

A. Maintain the integrity of new and existing fire and smoke walls and barriers. Use fire barrier caulk 3M Company or approved equal.

3.10 CODES AND STANDARDS

A. Provide all material and work in accordance with the applicable codes of the jurisdiction, which includes but not limited to:
   1. NFPA 70, 72, 101
   2. IBC, ADA
   3. IECC 2015 / ASHRAE 90.1 2013
   4. VIRGINIA STATE AND LOCAL CODES
   5. FAIRFAX COUNTY CODES AND STANDARDS
   6. NEMA, NECA, ANSI
   7. BICSI, TIZ/EIA
   8. IEEE

NOVA PARKS

NOVA Parks
5400 Ox Road
Fairfax Station, VA 22039

Meadowlark Botanical Gardens Atrium, HVAC Rooftop Equipment Replacement

**Meadowlark Botanical Gardens Atrium
9750 Meadowlark Gardens Court
Vienna, VA 22182**

VANDERWEIL
R.G. Vanderweil Engineers, LLP
66 Canal Center Plaza, Suite 200
Alexandria, VA 22314
703.683.9700 TEL
703.683.2480 FAX
vanderweil.com

Job Number: N1413.00	
Drawn by: VV	
Checked by: CA	
Date:	
Revised:	
BID & PERMIT SUBMISSION	02/04/2021
Scale: NONE	

Drawing Title

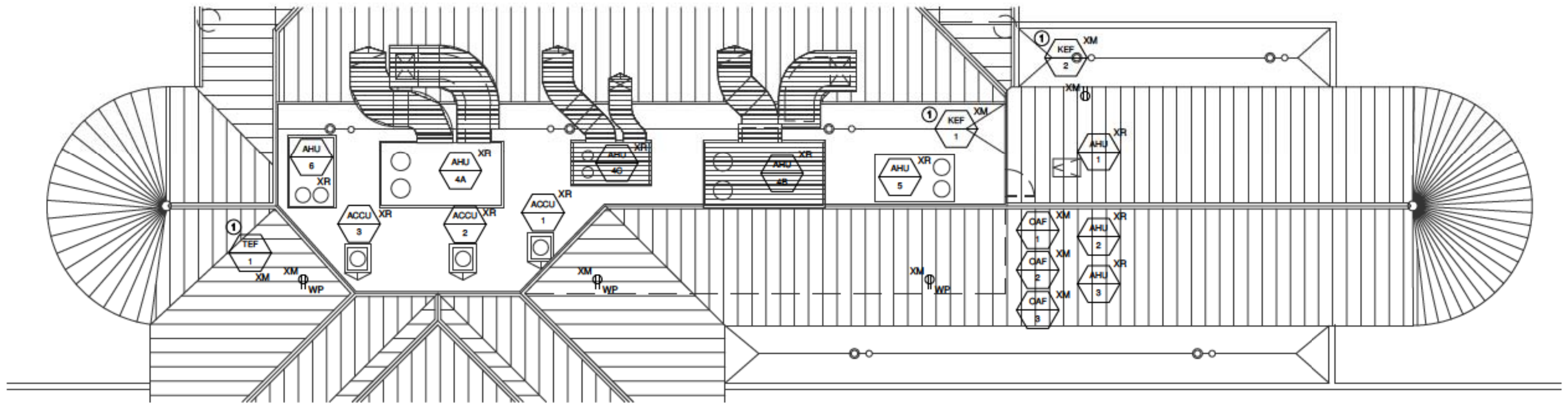
ELECTRICAL SPECIFICATIONS

COMMONWEALTH OF VIRGINIA
CHIRAG M. AMIN
Lic. No. 0402061339
PROFESSIONAL ENGINEER

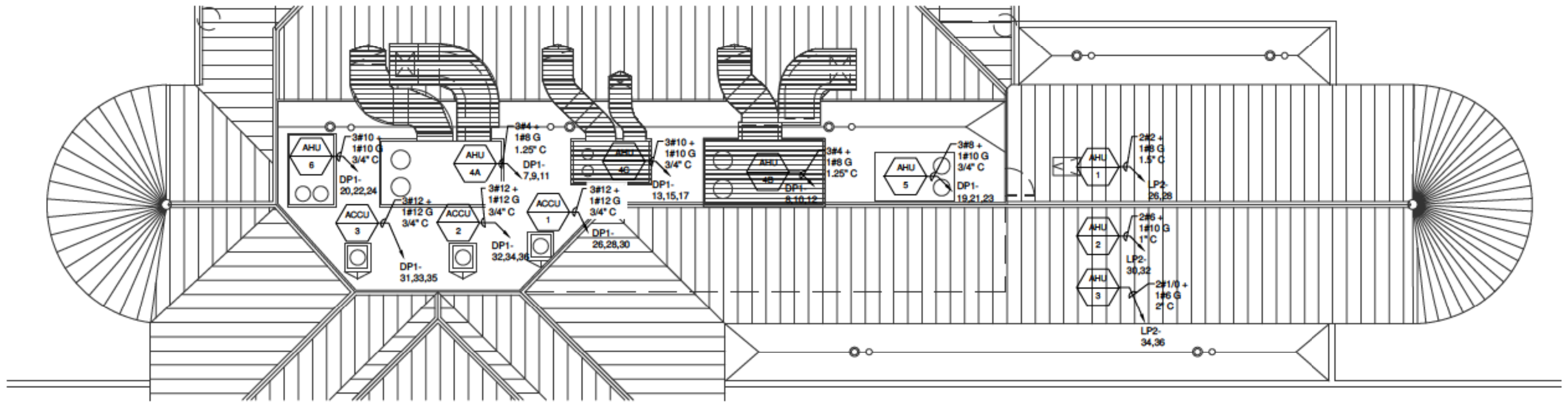
DocuSigned by:
Chirag Amin

2/5/2021

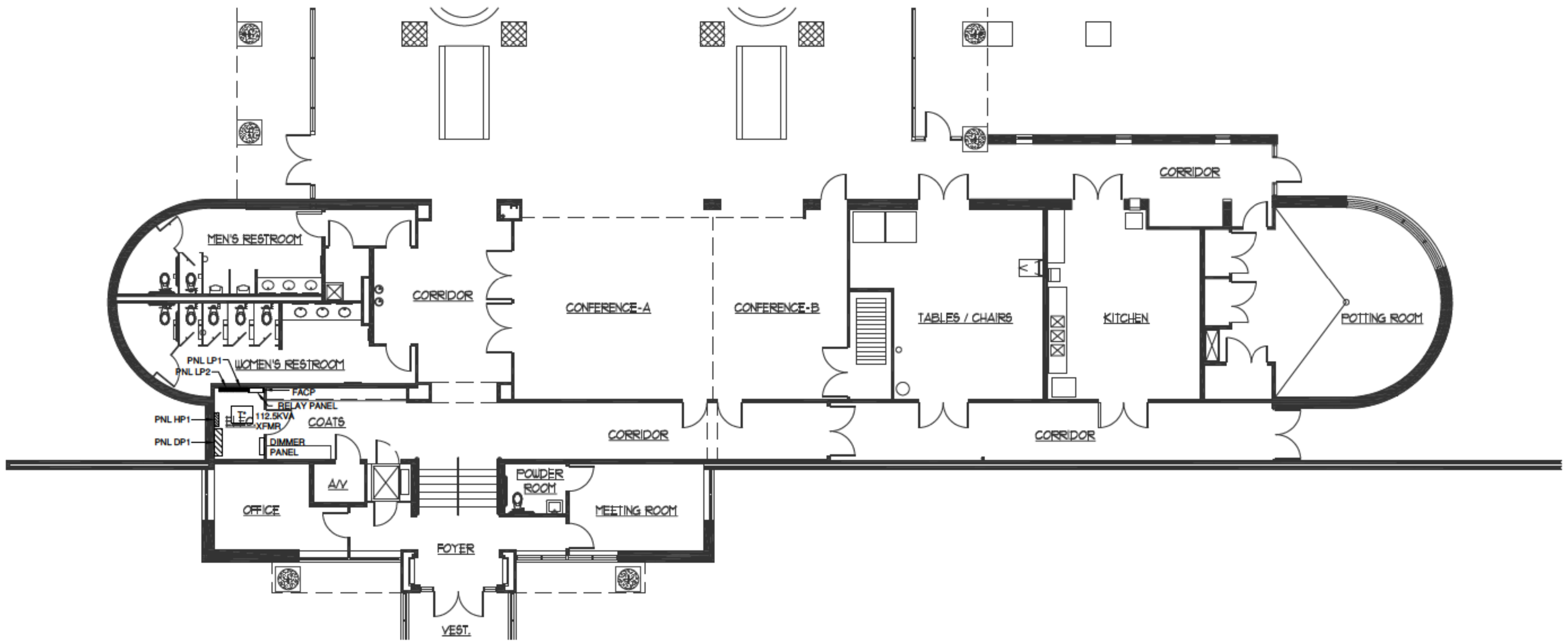
E002



1 E201 EXISTING CONDITIONS AND DEMOLITION - ROOF PLAN
SCALE: 1/8"=1'-0"



2 E201 NEW WORK - ROOF PLAN
SCALE: 1/8"=1'-0"



3 E201 NEW WORK - 1ST FLOOR PLAN
SCALE: 1/8"=1'-0"

GENERAL NOTES

A. NEW CONDUIT ROUTES SHALL MATCH EXISTING CONDUIT THAT WAS REMOVED, AND UTILIZE EXISTING STRUCTURAL CHANNEL. PROVIDE ADDITIONAL NEW STRUCTURAL CHANNEL AS NEEDED ON ROOF TO RUN ALL REQUIRED POWER AND CONTROL WIRING.

B. REFER TO ELECTRICAL MECHANICAL SCHEDULE ON DRAWING E500 FOR THE ELECTRICAL SCOPE OF WORK FOR NEW MECHANICAL EQUIPMENT SHOWN HERE.

DEMOLITION PLAN KEYED NOTES (#)

1. EXISTING TO REMAIN FAN AND THEIR ELECTRICAL WIRING CONNECTIONS / DEVICES SHALL BE TEMPORARILY REMOVED, STORED, CLEANED, PROTECTED, AND RE-INSTALLED MATCHING EXISTING CONDITIONS; AFTER THE ROOFING IS REPLACED UNDER A SEPARATE CONTRACT. COORDINATE PHASING WITH OWNER AND ROOFING CONTRACTOR.

BASE BID VERSUS ALTERNATE BID

BASE BID: ALL NEW WORK AND TEMPORARY REMOVAL/REINSTALLATION OF EXISTING TO REMAIN FANS DONE IN 1 PHASE.

ALTERNATE BID: NEW WORK AND TEMPORARY REMOVAL/REINSTALLATION OF EXISTING TO REMAIN FANS DONE IN 5 PHASES.

1. AHU-6, AHU-4A.
2. AHU-4C, AHU-4B.
3. AHU-5, KEF-1.
4. TEF-1, ACCU-1, ACCU-2, ACCU-3, AHU-1, AHU-2, AHU-3.
5. KEF-2

REFER TO GENERAL REQUIREMENTS, SECTION 1.2 ON SHEET M003 FOR BASE BID / ALTERNATE BID SCOPES OF WORK.

PROJECT NORTH

SCALE: 1/8"=1'-0"
0 2' 4' 8' 16'

NOVA PARKS

NOVA Parks
5400 Ox Road
Fairfax Station, VA 22039

Meadowlark Botanical Gardens Atrium, HVAC Rooftop Equipment Replacement

Meadowlark Botanical Gardens Atrium
9750 Meadowlark Gardens Court
Vienna, VA 22182

VANDERWEIL
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703.683.2480 FAX
vanderweil.com

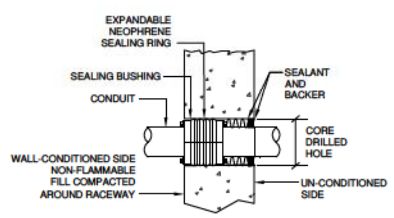
Job Number:	N1413.00
Drawn by:	VV
Checked by:	CA
Date:	
Revised:	
BID & PERMIT SUBMISSION	02/04/2021
Scale:	SEE PLANS

Drawing Title

ELECTRICAL PLANS

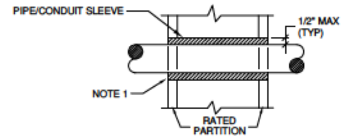
COMMONWEALTH OF VIRGINIA
CHIRAG M. AMIN
Lic. No. 0402061339
PROFESSIONAL ENGINEER
2/5/2021

E201



1 CONDUIT SEALANT PENETRATION

SCALE: NONE

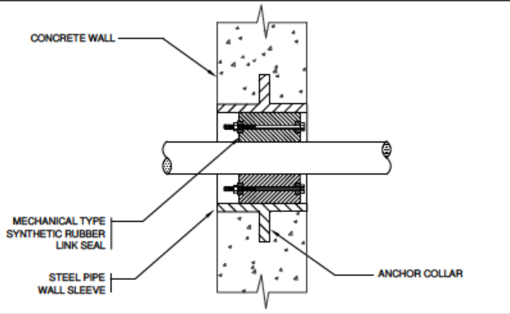


NOTES:

1. AT FIRE RATED PARTITIONS, PROTECT PENETRATIONS AS PART OF AN APPROVED FIRE STOP SYSTEM (INSTALLED AS TESTED IN ACCORDANCE WITH ASTM E 814 OR UL 1479, WITH A MIN POSITIVE PRESSURE DIFFERENTIAL OF 0.01 IN. W.G.) AND IN COMPLIANCE WITH VBC SECTION 714.
2. SEAL AND FILL FUTURE SLEEVE PENETRATIONS THROUGH FIRE RATED ASSEMBLIES W/ FIRE RATED FIRE STOP AS PART OF AN APPROVED FIRE STOP SYSTEM (INSTALLED AS TESTED IN ACCORDANCE WITH ASTM E 814 OR UL 1479, WITH A MIN POSITIVE PRESSURE DIFFERENTIAL OF 0.01 IN. W.G.) AND IN COMPLIANCE WITH VBC SECTION 714.
3. PIPE/CONDUIT PENETRATIONS THROUGH CORRIDOR WALLS ABOVE THE CEILING ARE TO BE FIRE STOPPED AROUND THE PENETRATION.
4. REFER TO THE A01 SERIES ARCHITECTURAL DRAWINGS FOR NRTL LISTED DETAILS.

2 PIPE AND CONDUIT PENETRATIONS THRU FIRE RATED PARTITIONS

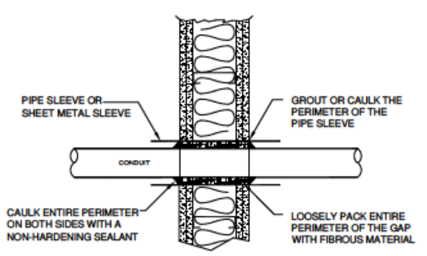
SCALE: NONE



3 WATERTIGHT SLEEVE

SCALE: NONE

BOR_4.75x8.DWG



NOTES

1. DETAIL APPLIES TO CONDUIT OR MC PENETRATIONS THROUGH ANY PARTITIONS.

4 PENETRATIONS IN GWB PARTITIONS

SCALE: NONE

ELECTRICAL MECHANICAL SCHEDULE

TAG NAME	TAG #	DESCRIPTION	PHYSICAL LOCATION	LOAD HP	LOAD kW	LOAD FLA	VOLTS	Ø	STARTER TYPE	STARTER BY DIV.	STARTER LOCATION	LOCAL DISCONNECT TYPE	LOCAL DISCONNECT BY DIV.	LOCAL DISCONNECT LOCATION	KEY NOTE
AHU	1	AIR HANDLING UNIT	ATTIC	1	14.4	69.2	208	1	CP	23	-	DS	26	AT UNIT	1,3
ACCU	1	CONDENSING UNIT	ROOF	-	-	7.4	480	3	-	23	-	DS	26	ON WALL BEHIND UNIT	2
AHU	2	AIR HANDLING UNIT	ATTIC	3/4	5.77	27.7	208	1	CP	23	-	DS	26	AT UNIT	1,3
ACCU	2	CONDENSING UNIT	ROOF	-	-	4.8	480	3	-	23	-	DS	26	ON WALL BEHIND UNIT	2
AHU	3	AIR HANDLING UNIT	ATTIC	3/4	18	86.5	208	1	CP	23	-	DS	26	AT UNIT	1,3
ACCU	3	CONDENSING UNIT	ROOF	-	-	4.8	480	3	-	23	-	DS	26	ON WALL BEHIND UNIT	2
AHU	4A	AIR HANDLING UNIT	ROOF	-	-	44.8	480	3	CSD	26	ON UNIT	-	26	INTEGRAL TO CSD	1,2,3
AHU	4B	AIR HANDLING UNIT	ROOF	-	-	44.8	480	3	CSD	26	ON UNIT	-	26	INTEGRAL TO CSD	1,2,3
AHU	4C	AIR HANDLING UNIT	ROOF	-	-	17.6	480	3	CSD	26	ON UNIT	-	26	INTEGRAL TO CSD	1,2,3
AHU	5	AIR HANDLING UNIT	ROOF	-	-	23.2	480	3	CSD	26	ON UNIT	-	26	INTEGRAL TO CSD	1,2,3
AHU	6	AIR HANDLING UNIT	ROOF	-	-	17.6	480	3	CSD	26	ON UNIT	-	26	INTEGRAL TO CSD	1,2,3

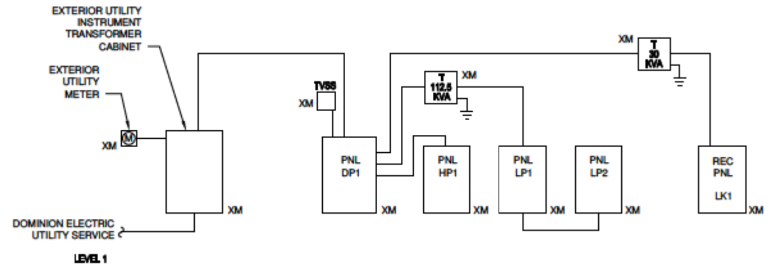
NOTES:
1) SINGLE POINT CONNECTION
2) WEATHERPROOF NEMA 3R STARTER / LOCAL DISCONNECT
3) LOCATE NEW STARTER/LOCAL DISCONNECT IN SAME LOCATION AS EXISTING STARTER/LOCAL DISCONNECT IS REMOVED FROM.

MECHANICAL EQUIPMENT SCHEDULE DEVICE LEGEND

ABBREVIATION	DESCRIPTION
CP	CONTROL PANEL: EQUIPMENT HAVING A CONTROL PANEL SHALL BE FURNISHED AND INSTALLED BY DIVISION 22 OR 23 AND WIRED BY DIVISION 26.
CP-EC	CONTROL PANEL: EC MOTOR CONTROL EQUIPMENT HAVING A CONTROL PANEL SHALL BE FURNISHED AND INSTALLED BY DIVISION 22 OR 23 AND WIRED BY DIVISION 26.
CSD	COMBINATION MOTOR CIRCUIT PROTECTOR & STARTER: EQUIPMENT REQUIRING A STARTER SHALL BE FURNISHED WITH A COMBINATION STARTER/MOTOR CIRCUIT PROTECTOR BY DIVISION 26. THE ELECTRICAL CONTRACTOR SHALL INSTALL AND WIRE THE COMBINATION STARTER/MOTOR CIRCUIT PROTECTOR.
DS	DISCONNECT SWITCH: UNLESS OTHERWISE INDICATED, ALL DISCONNECT SWITCHES ARE PROVIDED BY DIVISION 26.
FDS	FUSED DISCONNECT SWITCH: UNLESS OTHERWISE INDICATED, ALL FUSED DISCONNECT SWITCHES ARE PROVIDED BY DIVISION 26.
JB	JUNCTION BOX: UNLESS OTHERWISE INDICATED, JUNCTION BOX PROVIDED AND INSTALLED BY DIVISION 26.
MMS	MANUAL MOTOR STARTER: THERMAL OVERLOAD PROVIDED AND INSTALLED BY DIVISION 26.
VFD	VARIABLE FREQUENCY DRIVE: UNLESS OTHERWISE INDICATED, VARIABLE FREQUENCY DRIVES FURNISHED BY DIV. 23 (REFER TO HVAC DRAWINGS FOR SPECIFICATION) AND INSTALLED BY DIV. 26. REFER TO DIV. 23 DRAWINGS AND SPECIFICATIONS FOR QUANTITY OF VFD'S REQUIRED FOR EACH EQUIPMENT/APPLICATION. COORDINATE LOCATIONS OF VFD WITH MECHANICAL CONTRACTOR AND FIELD CONDITIONS. EQUIPMENT WITH VFD NOT WITHIN SIGHT OF THE ASSOCIATED EQUIPMENT SHALL BE PROVIDED WITH A LOCAL DISCONNECT. DISCONNECT SWITCHES LOCATED AT MOTORS, SERVED BY A VFD, SHALL HAVE ELECTRICAL INTERLOCK KIT FOR INTERFERENCE TO VFD SHUTDOWN. A PIVOT ARM OPERATES FROM THE SWITCH MECHANISM, BREAKING THE CONTROL CIRCUIT BEFORE THE MAIN SWITCH BLADES BREAK. PROVIDE, IN ADDITION TO THE MOTOR FEED, 2#12 IN A 3#4" CONDUIT FROM THE DISCONNECT TO THE VFD.
VFD*	VARIABLE FREQUENCY DRIVE: VFD'S SHOWN IN THIS SCHEDULE DENOTED WITH " * " INDICATES VFD PROVIDED WITH EQUIPMENT. ELECTRICAL CONTRACTOR SHALL PROVIDE FUSED DISCONNECT SWITCH WITH PIVOT ARM CONTACTS AT EQUIPMENT EXTERIOR. THE PIVOT ARM OPERATES FROM THE SWITCH MECHANISM, BREAKING THE CONTROL CIRCUIT BEFORE THE MAIN SWITCH BLADES BREAK. PROVIDE, IN ADDITION TO THE MOTOR FEED, 2#12 IN A 3#4" CONDUIT FROM THE DISCONNECT TO THE VFD.

ELECTRICAL SHEET NOTES - MECHANICAL EQUIPMENT SCHEDULE

1	REFER TO THE MECHANICAL, PLUMBING AND FIRE PROTECTION DRAWINGS AND SPECIFICATIONS FOR THE LOCATIONS OF ALL EQUIPMENT REQUIRING AN ELECTRICAL CONNECTION. PROVIDE FLEXIBLE CONNECTIONS TO ASSOCIATED EQUIPMENT.
2	LOCATE DISCONNECT SWITCHES, COMBINATION CONTROLLERS AND VFD'S AS CLOSE AS PRACTICABLE TO EQUIPMENT SERVED, AND IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. CONTROL EQUIPMENT NOT WITHIN SITE OF THE MOTOR SHALL BE PROVIDED WITH A LOCAL FUSED DISCONNECT WITH ENCLOSURE PROPERLY RATED FOR THE APPLICATION. ELECTRICAL EQUIPMENT SHALL BE RATED FOR THE MAXIMUM AVAILABLE FAULT CURRENT, AND SHALL BE RATED IN HORSEPOWER TO MEET THE REQUIREMENTS OF THE EQUIPMENT SERVED.
3	PROVIDE NAMEPLATE FOR EACH CONTROLLER AND/OR DISCONNECT MOUNTED ON FRONT OF UNIT ENCLOSURE. NAMEPLATE SHALL INDICATE EQUIPMENT NAME (I.E. AHU-4), CONTROLLER DESIGNATION (I.E. VFD, STARTER, ETC.), EQUIPMENT ELECTRICAL CHARACTERISTICS (I.E. VOLTAGE, PHASE, HP), SOURCE FED FROM (I.E. FROM PANEL MPD) AND LOCATION OF SOURCE (I.E. LOCATED IN ELECTRICAL ROOM 142).



ELECTRICAL POWER RISER DIAGRAM

NO SCALE

NOTE:

THIS PROJECT CONSISTS OF DIRECT ONE-TO-ONE REPLACEMENTS OF THE MECHANICAL EQUIPMENT SHOWN. ELECTRICAL DEMAND LOAD ON THE EXISTING ADEQUATE SERVICE IS ANTICIPATED TO DECREASE SLIGHTLY DUE TO THE INCREASED EFFICIENCY OF THE MODERN MECHANICAL EQUIPMENT.

EXISTING PANEL

PANEL: DP1

AMP: 600 VOLT: 277/480

PHASE: 3 4 WIRE + GND

MOUNTING: SURFACE MAIN: 600 MCB AIC: 50K AMPS RMS SYM

NOTES	Branch Circuit Load Description	KVA Load A	KVA Load B	KVA Load C	Trip Poles	Ckt. No.	Phase	Ckt. No.	Trip Poles	KVA Load A	KVA Load B	KVA Load C	Branch Circuit Load Description	NOTES
	EXISTING 112.5 KVA TRANS	32.20			175/3	1	A	2	225/3	14.60			EXISTING PANEL HP1	
	*		36.70		*	3	B	4	*		10.60		*	
	*			34.40	*	5	C	6	*			10.60	*	
1	**NEW AHU-4A**	12.41			70/3	7	A	8	70/3	12.41			**NEW AHU-4B**	1
	*		12.41		*	9	B	10	*		12.41		*	
	*			12.41	*	11	C	12	*			12.41	*	
1	**NEW AHU-4C**	4.88			25/3	13	A	14	50/3	4.70			EXISTING 30 KVA TRANSFORM	
	*		4.88		*	15	B	16	*		4.80		*	
	*			4.88	*	17	C	18	*			5.20	*	
1	**NEW AHU-5**	6.40			40/3	19	A	20	25/3	4.88			**NEW AHU-6**	1
	*		6.40		*	21	B	22	*		4.88		*	
	*			6.40	*	23	C	24	*			4.88	*	
	TVSS	0.00			15/3	25	A	26	20/3	2.00			**NEW ACCU-1**	1
	*		0.00		*	27	B	28	*		2.00		*	
	*			0.00	*	29	C	30	*			2.00	*	
1	**NEW ACCU-3**	1.33			20/3	31	A	32	20/3	1.33			**NEW ACCU-2**	1
	*		1.33		*	33	B	34	*		1.33		*	
	*			1.33	*	35	C	36	*			1.33	*	
	EXISTING ACTIVE CIRCUIT	5.00			/3	37	A	38	/3	5.00			EXISTING ACTIVE CIRCUIT	
	*		5.00		*	39	B	40	*		5.00		*	
	*			5.00	*	41	C	42	*			5.00	*	
		62.22	66.72	64.42	<<	PHASE SUB-TOTALS			>>	44.92	41.02	41.42		

PHASE A 107.14 kVA

PHASE B 107.74 kVA

PHASE C 105.84 kVA

320.72 kVA TOTAL CONNECTED LOAD

PROVIDE THE FOLLOWING:

NOTES:

1) REMOVE EXISTING CIRCUIT BREAKER AND PROVIDE NEW GENERAL ELECTRIC CIRCUIT BREAKER AS SHOWN WHICH SHALL MATCH TYPE AND SHORT CIRCUIT RATING OF EXISTING DEVICES.

PANELBOARD SCHEDULE GENERAL NOTES

1. BRANCH CIRCUIT LOAD DESCRIPTIONS IN DARK, BOLD TEXT ARE NEW CIRCUITS. REMOVE EXISTING CIRCUIT BREAKERS IN THESE POLE SPACES AND PROVIDE NEW CIRCUIT BREAKERS AS SHOWN. NEW BREAKERS SHALL MATCH MANUFACTURER, TYPE AND SHORT CIRCUIT RATING OF EXISTING DEVICES. PROVIDE NEW WIRING / CABLING PER FLOOR PLAN DRAWINGS.

EXISTING PANEL

PANEL: LP1

AMP: 400 VOLT: 120/208

PHASE: 3 4 WIRE + GND

MOUNTING: SURFACE MAIN: 400 MCB AIC: 10K AMPS RMS SYM

Branch Circuit Load Description	KVA Load A	KVA Load B	KVA Load C	Trip Poles	Ckt. No.	Phase	Ckt. No.	Trip Poles	KVA Load A	KVA Load B	KVA Load C	Branch Circuit Load Description
EXISTING WELL RECEP	0.18			20/1	1	A	2	20/1	0.18			EXIST GARDEN FLR RECEP
EXISTING WELL RECEP		0.36		20/1	3	B	4	20/1		0.18		EXIST GARDEN FLR RECEP
EXIST CONF FLR RECEP			0.18	20/1	5	C	6	20/1			0.18	EXIST GARDEN FLR RECEP
EXIST CONF FLR RECEP	0.18			20/1	7	A	8	20/1	0.18			EXIST GARDEN FLR RECEP
EXIST CONF FLR RECEP		0.18		20/1	9	B	10	20/1		0.18		EXIST GARDEN FLR RECEP
EXISTING EXTERIOR REC			0.72	20/1	11	C	12	20/1			0.18	EXIST GARDEN FLR RECEP
EXISTING DRINK FOUNTAIN	0.54			20/1	13	A	14	20/1	0.18			EXIST GARDEN FLR RECEP
EXISTING RESTRM RECEP		0.54		20/1	15	B	16	20/1		0.18		EXIST GARDEN FLR RECEP
EXISTING CONF RECEPT			0.72	20/1	17	C	18	20/1			0.54	EXIST POTTING RM REC
EXISTING CONF RECEPT	0.72			20/1	19	A	20	20/1	0.72			EXISTING A/V RECEP
EXISTING STOR RECEPT		0.36		20/1	21	B	22	20/1		0.90		EXISTING OFFICE RECEP
EXISTING EXTERIOR REC			0.54	20/1	23	C	24	20/1			0.90	EXISTING MTG RM REC
EXISTING EXTERIOR REC	0.54			20/1	25	A	26	20/1	1.08			EXISTING CORR RECEP
EXISTING EXTERIOR REC		0.54		20/1	27	B	28	20/1		0.90		EXISTING CORR RECEP
EXISTING EXTERIOR REC			0.36	20/1	29	C	30	20/1			0.84	EXISTING HYDRAULIC LIFT
EXISTING EXTERIOR REC	0.36			20/1	31	A	32	20/1	0.18			EXISTING TREE WELL REC
EXISTING EXTERIOR REC		0.36		20/1	33	B	34	20/1		0.18		EXISTING TREE WELL REC
EXISTING FACP			0.18	20/1	35	C	36	20/1			0.18	EXISTING TREE WELL REC
EXISTING WATER FEATURE	1.20			30/2	37	A	38	20/1	0.18			EXIST IRRIGATION CONTROLL
*		1.20		*	39	B	40	20/1		0.36		EXIST ELEC CLOSET REC
EXISTING SPARE			0.00	20/1	41	C	42	20/1			0.36	EXIST TEL RECEP
	3.72	3.54	2.70	<<	PHASE SUB-TOTALS			>>	2.70	2.88	3.18	

PHASE A 6.42 kVA

PHASE B 6.42 kVA

PHASE C 5.88 kVA

18.72 kVA TOTAL CONNECTED LOAD

15.65 kVA TOTAL DEMAND LOAD

PROVIDE THE FOLLOWING:

EXISTING PANEL

PANEL: LP2

AMP: 400 VOLT: 120/208

PHASE: 3 4 WIRE + GND

MOUNTING: SURFACE MAIN: MLO AIC: 10K AMPS RMS SYM

Branch Circuit Load Description	KVA Load A	KVA Load B	KVA Load C	Trip Poles	Ckt. No.	Phase	Ckt. No.	Trip Poles	KVA Load A	KVA Load B	KVA Load C	Branch Circuit Load Description	NOTES
EXIST EXTERIOR LTS	0.30			20/1	1	A	2	20/1	0.00			EXISTING SPARE	
EXIST EXTERIOR LTS		0.30		20/1	3	B	4	20/1		0.00		EXISTING SPARE	
EXIST EXTERIOR LTS			1.50	20/1	5	C	6	20/1			0.00	EXISTING SPARE	
EXIST EXTERIOR LTS	0.20			20/1	7	A	8	20/1	0.00			EXISTING SPARE	
EXIST EXTERIOR LTS		0.60		20/1	9	B	10	20/1		0.00		EXISTING SPARE	
EXIST EXTERIOR LTS			0.40	20/1	11	C	12	20/1			0.24	EXIST FIRE PNL 8E1	
EXIST EXTERIOR LTS	0.80			20/1	13	A	14	20/1	0.00			EXIST ATC/EMCS	
EXIST EXTERIOR LTS		0.60		20/1	15	B	16	30/2		1.20		EXIST WATER FEATURE	
EXISTING CONF RM LTS			1.50	20/1	17	C	18	*			1.20	*	
EXISTING CONF RM LTS	1.80			20/1	19	A	20	20/1	0.00			EXISTING SPARE	
EXIST POWDER RM LTS		0.04		20/1	21	B	22	20/1		1.50		EXIST BASEBOARD HEAT	
EXIST RAFTER RECEP			0.54	20/1	23	C	24	20/1			1.50	EXIST BASEBOARD HEAT	
EXIST RAFTER RECEP	0.54			20/1	25	A	26	100/2	7.20			**NEW AHU-1**	
EXISTING ROOF RECEP		0.54		20/1	27	B	28	*		7.20		*	
EXISTING TEF-1			1.10	20/1	29	C	30	50/2			2.90	**NEW AHU-2**	
EXISTING KEF-1	1.10			20/1	31	A	32	*	2.90			*	
EXISTING OAF (1,2,3)		0.74		20/1	33	B	34	125/2		9.00		**NEW AHU-3**	1
EXISTING SHED RECEP			0.18	20/1	35	C	36	*			9.00	*	
EXISTING SHED RECEP	0.18			20/1	37	A	38	80/3	8.10			EXIST DIMMER PANEL	
EXISTING SHED LIGHT		0.18		20/1	39	B	40	*		8.10		*	
EXISTING SPARE			0.00	20/1	41	C	42	*			8.10	*	
	4.92	3.00	5.22	<<	PHASE SUB-TOTALS			>>	18.20	27.00	22.94		

PHASE A 23.12 kVA

PHASE B 30.00 kVA

PHASE C 28.16 kVA

81.28 kVA TOTAL CONNECTED LOAD

73.64 kVA TOTAL DEMAND LOAD

PROVIDE THE FOLLOWING:

NOTES:

1) REMOVE EXISTING CIRCUIT BREAKER AND PROVIDE NEW GENERAL ELECTRIC CIRCUIT BREAKER AS SHOWN WHICH SHALL MATCH TYPE AND SHORT CIRCUIT RATING OF EXISTING DEVICES.

NOVA PARKS

NOVA Parks
5400 Ox Road
Fairfax Station, VA 22039

Meadowlark Botanical Gardens Atrium, HVAC Rooftop Equipment Replacement

Meadowlark Botanical Gardens Atrium
9750 Meadowlark Gardens Court
Vienna, VA 22182

VANDERWEIL
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Job Number: N1413.00

Drawn by: VV

Checked by: CA

Date:

Revised:

BID & PERMIT SUBMISSION 02/04/2021

Scale: NOT TO SCALE

Drawing Title

ELECTRICAL SCHEDULES AND POWER RISER DIAGRAM

COMMONWEALTH OF VIRGINIA
CHIRAG M. AMIN
Lic. No. 0402061339
PROFESSIONAL ENGINEER
2/5/2021

E500