

## CONTROLS GENERAL NOTES

- GENERAL NOTES ARE APPLICABLE AS STATED BELOW OR EXCEPT WHERE SPECIFICALLY INDICATED ON THE CONSTRUCTION DOCUMENTS.
2. WORK AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF LATEST EDITION, STANDARDS OF UNIFORM BUILDING CODE, LATEST EDITION AND CODE.
3. FURNISH ELECTRICAL MATERIALS AND CONTROL EQUIPMENT PER THE "NATIONAL ELECTRICAL CODE". ALLOW REQUIRED WORKING SPACE PER THE "NATIONAL ELECTRICAL CODE".
4. ELECTRICAL EQUIPMENT (AC AND DC) SHALL HAVE APPLICABLE U.I. OR ETL LABEL.
5. REFER TO GENERAL CONDITIONS OF THE SPECIFICATIONS FOR RESTRICTIONS ON CONSTRUCTION WORK.
6. VERIFY SITE CONDITIONS AND COORDINATE WITH OTHER WORK. CONFIRM SUBMITTAL REVIEW COMMENTS PRIOR TO PROCEEDING WITH INSTALLATION.
7. PRIOR TO THE START OF WORK, FIELD VERIFY EXACT LOCATIONS OF MECHANICAL AND ELECTRICAL EQUIPMENT, FIELD SENSORS, AND EQUIPMENT REQUIRING INTERFACE WITH CONTROL.
8. SINGLE LINE DIAGRAMS, SCHEMATICS, DETAILS AND CONDUIT PATHS ARE CONCEPTUAL AND ILLUSTRATE THE FUNCTIONAL RELATIONSHIP AMONG SYSTEM COMPONENTS. ACCORDINGLY, APPLICATION ENGINEERING IS REQUIRED TO ACHIEVE THE SPECIFIED REQUIREMENTS.
9. OUTDOOR CONDUIT FITTINGS, CONNECTIONS, JUNCTION BOXES, PANELS AND PULL BOXES ARE TO BE WATERPROOF (NEMA 4). EXTERIOR CONTROL DEVICES AND EQUIPMENT SHALL BE WEATHERPROOF.
10. CONDUIT ROUTINGS ARE SHOWN DIAGRAMMATICALLY. PROVIDE ANY ADDITIONAL CONDUITS AS REQUIRED TO ACCOMMODATE FIELD CONDITIONS.
11. REFER TO DIVISION 26 FOR ELECTRICAL COMPONENT PRODUCT STANDARDS.
12. ELECTRICAL CONTROL GUTTERS TO HAVE SUFFICIENT SPACE TO ACCOMMODATE THE REQUIRED CONDUCTORS WITH 80% FREE VOLUME.
13. PANELS TO HAVE LOCKING DOORS AND BE KEYPAD ALIKE.
14. DEMONSTRATE A COMPLETE AND FULLY OPERATIONAL SYSTEM.
15. COORDINATE SHOP DRAWINGS WITH OTHER TRADES, INDICATING LOCATIONS OF LIGHT FIXTURES, CABLE TRAYS, BEAMS, ELECTRICAL AND DATA CONDUITS, WIRING AND OTHER RELATED ITEMS.
16. COORDINATE INTERPOSING RELAY COIL VOLTAGE AND CONTACTS TO THE APPLICATION.
17. REVIEW SPECIFICATIONS FOR WORK REQUIREMENTS.
18. CONTROLS CONTRACTOR IS TO REVIEW ALL MECHANICAL, ELECTRICAL AND PLUMBING PLANS AND SPECIFICATIONS.
19. CONTROLS CONTRACTOR TO REVIEW ALL EQUIPMENT QUANTITIES WITH MECHANICAL, ELECTRICAL AND PLUMBING PLANS.
20. EMERGENCY POWER TO SERVE CONTROLS ON EQUIPMENT SERVED BY EMERGENCY POWER.
21. ALL INPUTS, OUTPUTS, SET-POINTS AND DEADBANDS SHALL HAVE GRAPHIC INDICATION.
22. ALL EQUIPMENT SHALL HAVE INDEPENDENT EQUIPMENT GRAPHIC PAGES WITH DYNAMIC LINKS.
23. CONTROLS GRAPHICS PACKAGE SHALL INCLUDE FLOORPLANS WITH DYNAMIC GRAPHIC LINKS TO RESPECTIVE EQUIPMENT GRAPHIC PAGES. CONTROLS GRAPHICS PACKAGES SHALL ALSO INCLUDE, BUT NOT BE LIMITED TO, OVERALL SITE PLAN, OVERALL FLOOR PLANS AND ENLARGED FLOOR PLANS WITH DYNAMIC GRAPHIC LINKS.
24. SET-POINTS, RESET SCHEDULES AND DEAD BANDS SHALL BE USER ADJUSTABLE.
25. ALL INPUTS AND OUTPUTS SHALL BE TRENDED. TREND ALL ANALOG INPUTS/OUTPUTS AT 15 MINUTE INTERVALS (Δt). TREND ALL BINARY/DIGITAL INPUTS/OUTPUTS BASED ON CHANGE OF STATE.
26. ALL PROCESS VARIABLES AND EQUIPMENT SHALL HAVE ALARMS AND NOTIFICATION UPON FAILURE OR NON STANDARD OPERATING CONDITIONS.
27. PROVIDE INTERFACE TO AUTOMATIC TRANSFER SWITCH DRY CONTACTS FOR HVAC EQUIPMENT SEQUENCING UPON TRANSFER OF UTILITY POWER TO GENERATOR POWER. REFER TO POWER RISER CONTRACT, SHEET E-003 FOR REQUIRED SEQUENCING.
28. ALL MODULATING CONTROL LOOPS SHALL UTILIZE PID CONTROL LOOPS AND BE TUNED TO PROVIDE STABLE CONTROL OPERATION.

## CONTROLS SCOPE OF WORK MATRIX

WORK SCOPE	DIVISION 23 - MECHANICAL	DIVISION 26	DIVISION 23 - CONTROLS	NOTES/COMMENTS
120VAC/1PH/60- WITH GROUND EMERGENCY POWER TO CONTROLS DEVICES AND CONTROLLERS		POWER TO CONTROLS DEVICES, ENCLOSURES AND DAMPERS. (CONDUIT, WIRE, CIRCUIT BREAKER)	PROVIDE AND MOUNT U.L. APPROVED CONTROLS TRANSFORMERS IN ENCLOSURE WITH CLASS II TRANSFORMERS	CONTROLS CONTRACTOR TO COORDINATE CONTROL VOLTAGES OF DAMPERS AND ACTUATORS. CONTROLS CONTRACTOR TO PROVIDE 120VAC CONDUIT AND WIRE NOT INDICATED ON ELECTRICAL DRAWINGS
120VAC/1PH/60- WITH GROUND POWER (NORMAL OR E. POWER) TO ZONE TERMINAL UNIT CONTROLLERS			PROVIDE CONDUIT AND WIRE TO CONTROL PANELS	MUST INCLUDE GROUND WIRE
120VAC/1PH/60- WITH GROUND EMERGENCY POWER TO BMS CONTROLLERS/ENCLOSURES (FOUS, AHUS, PLANT, TOWER, ETC.) AND FILE SERVER(S) AND WORKSTATIONS		PROVIDE ALL CONDUIT, WIRE, AND CIRCUIT BREAKER	PROVIDE UPS AND CONFIGURATION	
ZONE TERMINAL UNITS	PROVIDE FLOW CROSS, ENCLOSURE, SHIPPING		PROVIDE CONTROLLER SHIPPING TO BOX MANUFACTURER FOR MOUNTING	MOUNTING FEES BY BOX MANUFACTURER
TIER 1 BACNET TCP/IP CABLE			PROVIDE CABLE, CONDUIT, CONNECTORS, TERMINATIONS, ETC.	
FILE SERVERS, WORK-STATIONS, HUBS, PRINTERS, CABLES, UPS			PROVIDE FILE SERVER(S), WORKSTATIONS, HUBS, PRINTERS, MONITORS, CABLES, SOFTWARE INSTALLATION AND CONFIGURATION (APPLICATION SPECIFIC)	MUST CONFORM TO OWNERS IT EQUIPMENT STANDARD
TIER 2 BACNET MSTP CABLE			PROVIDE CABLE, CONDUIT, TERMINATIONS	
PERIPHERAL DEVICES - AS APPLICABLE (SUPPLIED)	FLOW CONTROL DAMPERS  TEMPERATURE CONTROL DAMPERS  AIR HANDLING UNIT BASED AIR FLOW METERS/STATIONS  COMBINATION SMOKE/FIRE DAMPERS WITH OPEN & CLOSED STATUS SWITCHES  DUCT SMOKE DETECTORS  VFD'S	3 PHASE MOTOR STARTERS, DISCONNECTS	AIR HANDLING UNIT BASED AIR FLOW TRANSMITTERS  FLOW CONTROL DAMPER ACTUATORS  TEMPERATURE CONTROL DAMPER ACTUATORS  TEMPERATURE SWITCHES  TEMPERATURE ELEMENTS  TEMPERATURE TRANSMITTERS  PRESSURE TRANSMITTERS  DIFFERENTIAL PRESSURE TRANSMITTERS  MOISTURE SENSORS AND SWITCHES  CURRENT SENSORS AND SWITCHES  PROVIDE: CONDUIT AND WIRE TERMINATIONS FOR FLOW SWITCHES AND DIFFERENTIAL PRESSURE TRANSMITTERS  PROVIDE WIRE TERMINATIONS FOR FIRE LIFE SAFETY SHUTDOWN/INTERLOCK WIRING. COORDINATE WITH FA.	
SYSTEM INTERFACES - AS APPLICABLE (GATEWAYS)	VFD'S (BACNET)	EMERGENCY GENERATOR (BACNET)  SWITCHGEAR (BACNET)	FIRE LIFE SAFETY-GATEWAY  SECURITY SYSTEM - GATEWAY  LIGHTING CONTROLS - GATEWAY	

### CONTROL DIAGRAM LEGEND

<div><div>A1</div><div>A0</div><div>B1</div><div>B0</div></div>	ANALOG INPUT	ANALOG OUTPUT	BINARY/DIGITAL INPUT	BINARY/DIGITAL OUTPUT		AFMS	CV	DM	DPS	DPT	ERU	FS	FZ	HS	NC	NO	SD	SHS	SPS	STS	TS		
																							AIR FLOW MEASURING STATION
																							CONTROL VALVE
																							DAMPER MOTOR
																							DIFFERENTIAL PRESSURE SWITCH
																							DIFFERENTIAL PRESSURE TRANSDUCER
																							ENERGY RECOVERY UNIT
																							FLOW SWITCH
																							FREEZE/STAT
																							HUMIDITY SENSOR
																							NORMALLY CLOSED
																							NORMALLY OPEN
																							SMOKE DETECTOR
																							SPACE HUMIDITY SENSOR
																							STATIC PRESSURE SWITCH
																							SPACE TEMPERATURE SENSOR
																							TEMPERATURE SENSOR

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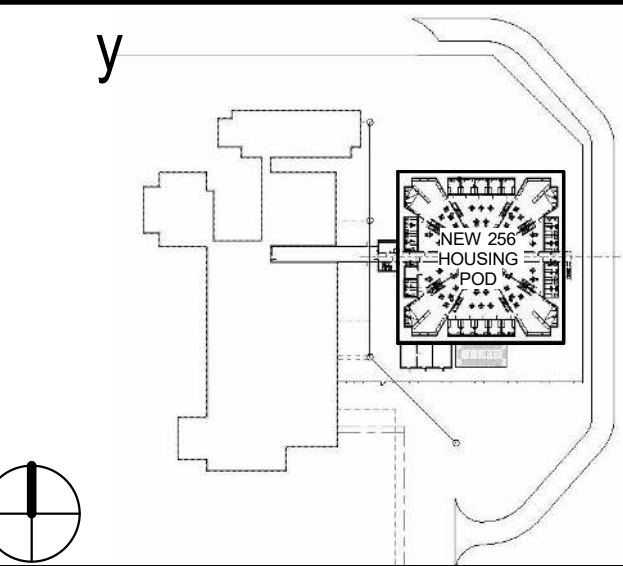
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**THINK. LISTEN. CREATE.**

Professional Seals

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## REVISIONS

DRAWN BY	C FLOEGEL
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CHECKED BY	C FLOEGEL
DATE	JULY 24, 2020

**TITLE**

## HVAC CONTROLS

PROJECT NO.	50101397
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M-601

SHEET NO.

DESTROY AFTER USE