

**RUGBY - NEW HVAC UPGRADE VRV SYSTEMS (ZONES NO. 3 -4)**  
**OVERALL ELEC. FLOOR PLAN @ EXIST. UPPER MAIN FLOOR**  
 SCALE: 3/32" = 1'-0"

REVISIONS		NO.	DATE	DESCRIPTION	BY
1	IFOB	DEC. 16, 2019	ISSUED FOR OWNER BIDDING.	JJC	

DESIGNED BY: S.BRAUNBECK & J.CAPITAN  
 DRAWN BY: CAPITAN  
 CHECKED BY: CAPITAN  
 DATE: DECEMBER-16-2019  
 SCALE: AS NOTED  
 JOB NO.: DEI JOB NO. 19005

DESIGN & ENGINEERING  
 ENERGY SYSTEMS  
 INFRASTRUCTURE UTILITIES  
 SYSTEMS ANALYSIS  
 COMMISSIONING REVIEW

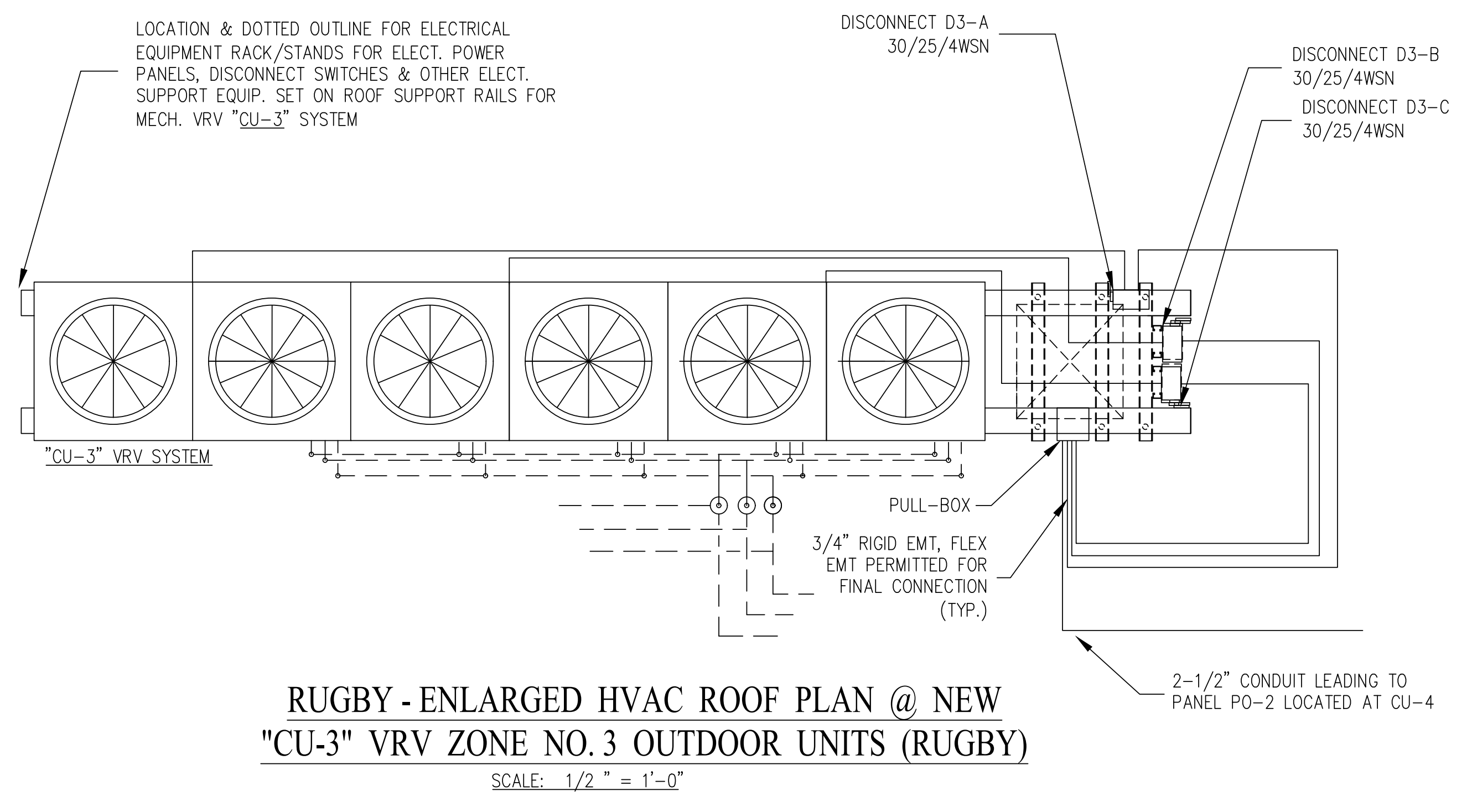
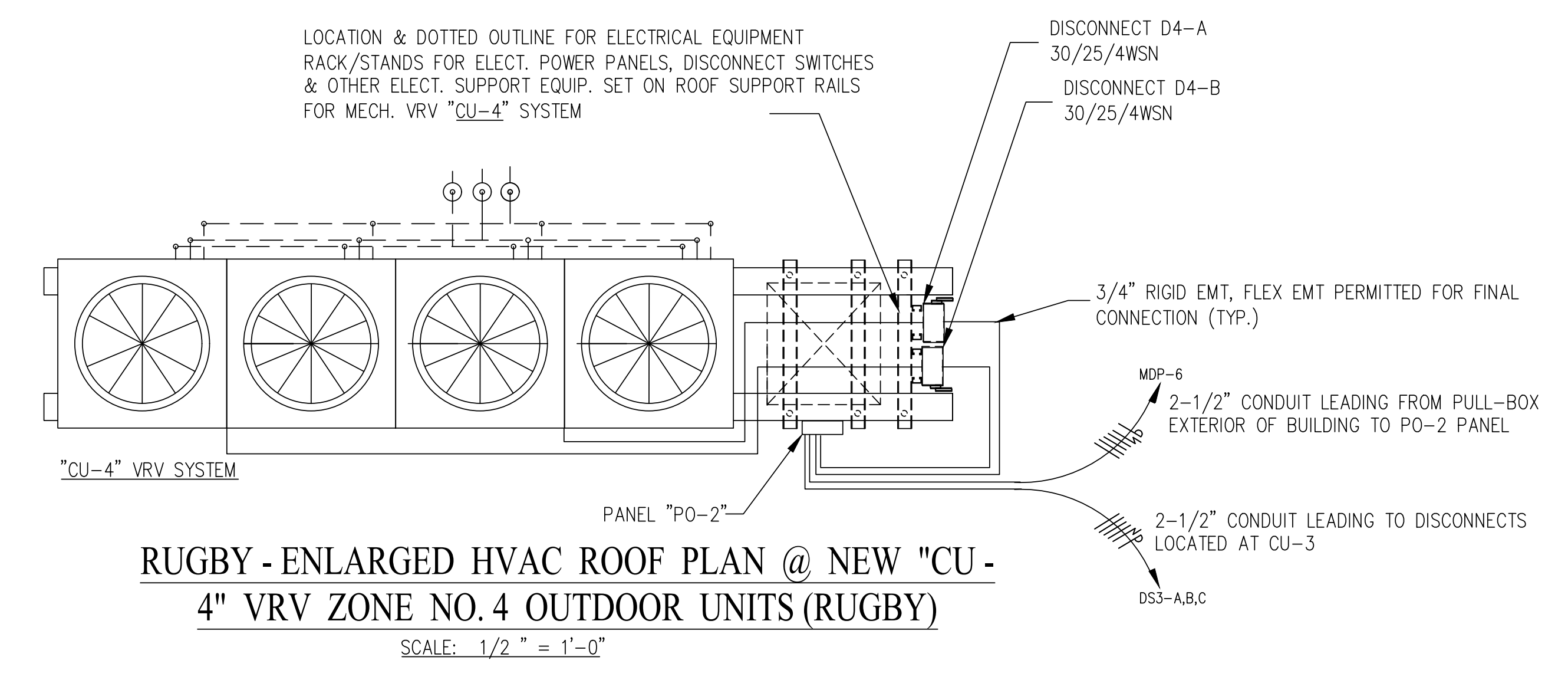
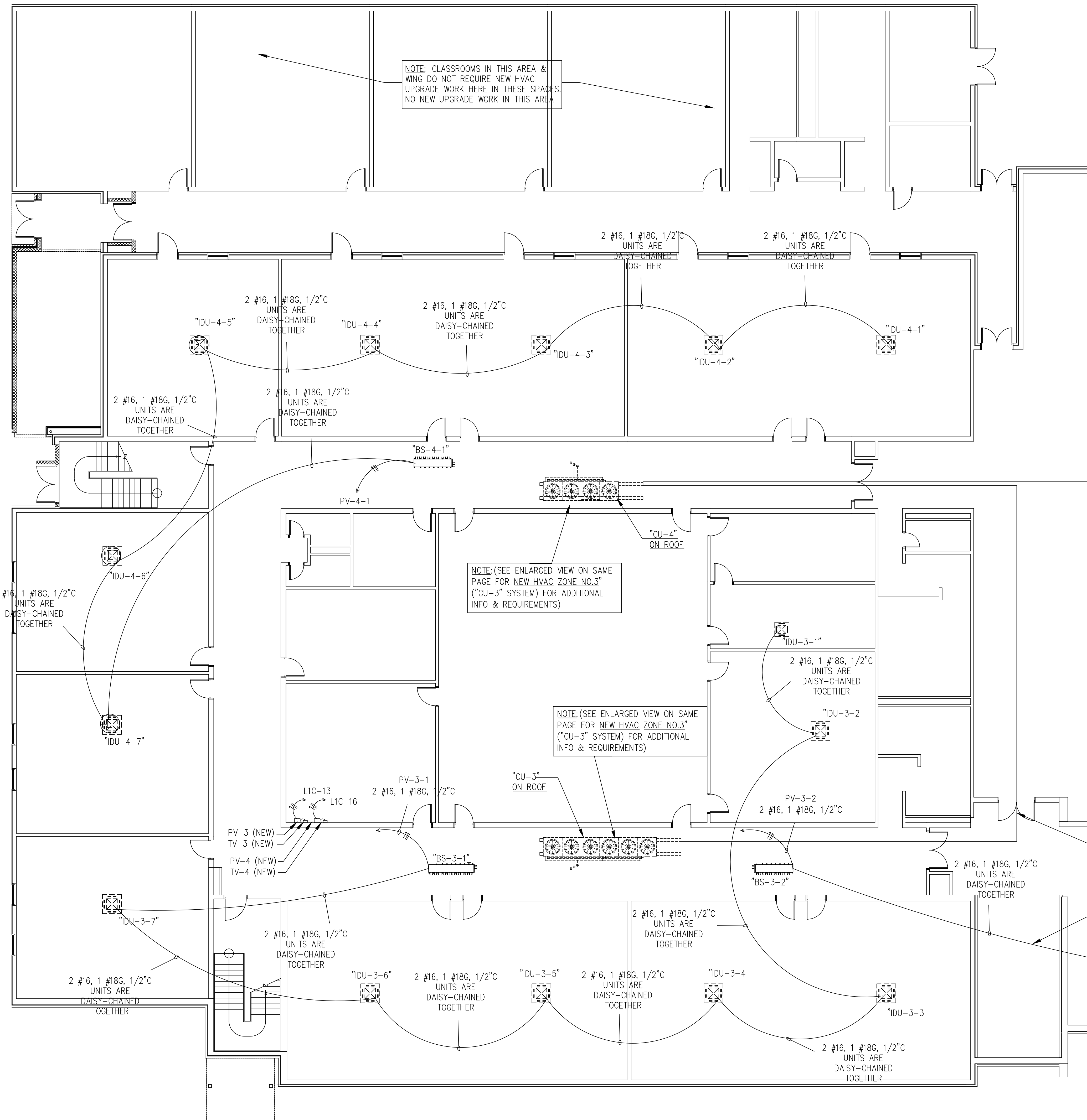
**DELTA**  
 DELTA ENGINEERING, INC. • CONSULTING ENGINEERS  
 315 EAST BROAD STREET, GREENVILLE, SC 29601  
 GREENVILLE, SC TEL. NO. (864) 505-5358  
 3106 RIVERVIEW VIEW, CHARLESTON, SC 29414  
 CHARLESTON, SC TEL. NO. (864) 505-2976  
 Em: jcapitan@gmail.com

THIS DRAWING IS THE PROPERTY AND COPYRIGHT OF DELTA ENGINEERING, INC. AND SHALL NOT BE USED OR COPIED WITHOUT WRITTEN PERMISSION. COPYRIGHT ©

**RUGBY - NEW HVAC UPGRADE SYSTEMS OVERALL ELEC. FLOOR PLAN @ EXIST. UPPER MAIN FLOOR**

PROJECT: **2019 - 2020 HVAC UPGRADES TO FLAT ROCK & RUGBY MIDDLE SCHOOLS**  
 HENDERSON COUNTY PUBLIC SCHOOLS  
 414 - 4TH STREET, HENDERSONVILLE, HENDERSON COUNTY, NORTH CAROLINA 29621

DRAWING: **RG-E1U**  
 (UPPER FLOOR LEVEL)  
 SHEET: 12 OF 17  
 REV. NO.: IFOB



**RUGBY HVAC UPGRADE NEW ELEC. WORK - PART- A FLOOR PLAN @ EXIST. MAIN UPPER FLOOR (VRV ZONES 3 & 4)**  
SCALE: 1/8"=1'-0" (EXIST REFERENCE PARTIAL FLOOR PLAN USED FOR NEW HVAC VRV SYSTEMS INFORMATION)

REVISIONS	
NO.	DESCRIPTION
1	ISSUED FOR OWNER BIDDING.

DESIGNED BY: S.BRAUNBECK & J.CAPITAN  
DRAWN BY: CAPITAN  
CHECKED BY: CAPITAN  
DATE: DECEMBER-16-2019  
SCALE: AS NOTED  
JOB NO.: DEI JOB NO. 19005

DECEMBER 16, 2019

DESIGN & ENGINEERING ENERGY SYSTEMS INFRASTRUCTURE UTILITIES SYSTEMS ANALYSIS COMMISSIONING REVIEW

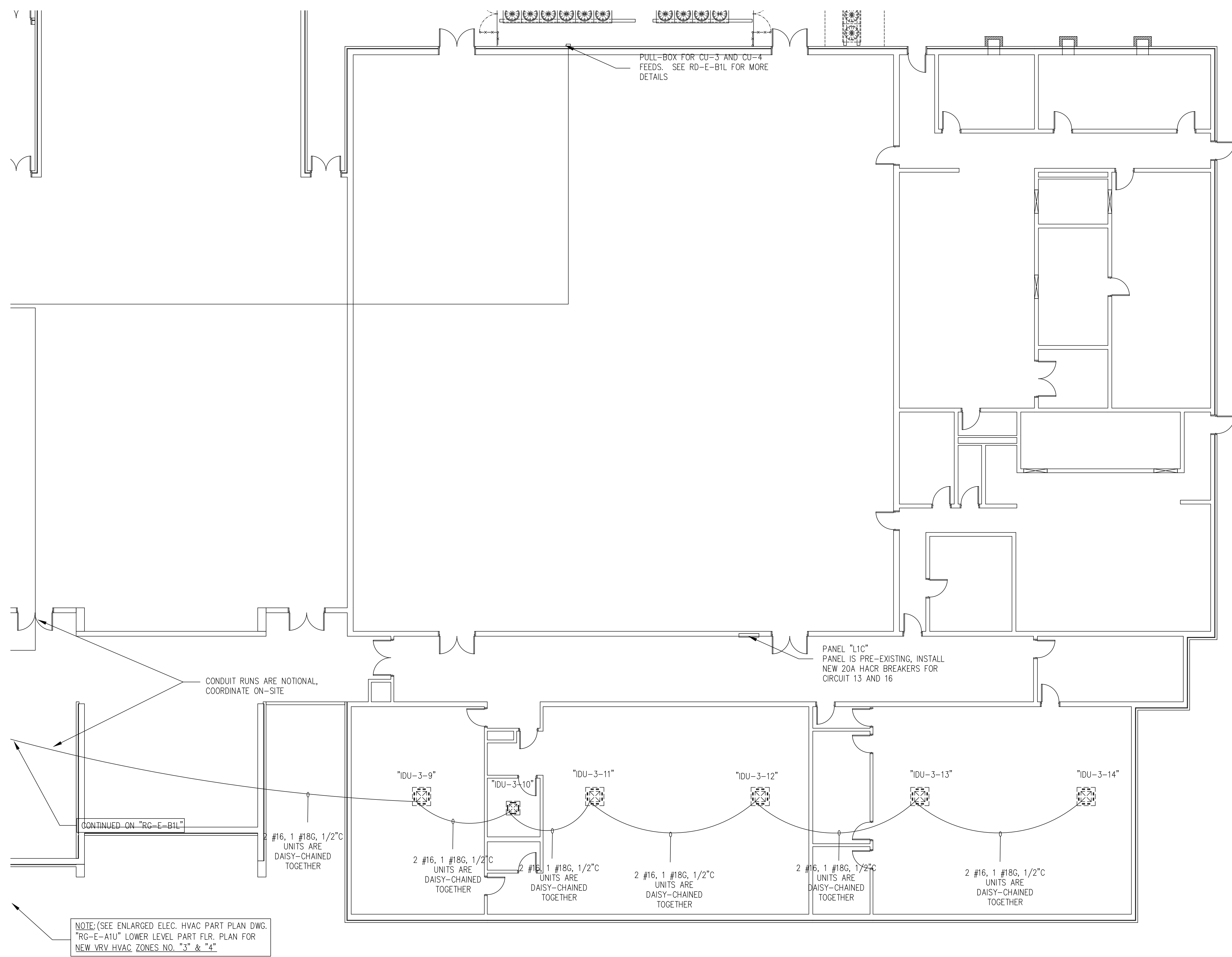
**DELTA**  
DELTA ENGINEERING, INC. o CONSULTING ENGINEERS  
315 EAST BROAD STREET, GREENVILLE, SC 29601  
GREENVILLE, SC TEL. NO. (864) 505-5358  
3106 RIVERVIEW, CHARLESTON, SC 29414  
CHARLESTON, SC TEL. NO. (864) 505-2976  
Em: jcapitan@gmail.com

THIS DRAWING IS THE PROPERTY AND COPYRIGHT OF DELTA ENGINEERING, INC. AND SHALL NOT BE USED OR COPIED WITHOUT WRITTEN PERMISSION. COPYRIGHT ©

**RUGBY HVAC UPGRADE NEW ELEC. WORK PART-A FLOOR PLAN @ EXIST. MAIN UPPER FLOOR (VRV ZONES 3 & 4)**

PROJECT: 2019 - 2020 HVAC UPGRADES TO FLAT ROCK & RUGBY MIDDLE SCHOOLS  
HENDERSON COUNTY PUBLIC SCHOOLS  
414 - 4TH STREET, HENDERSONVILLE, HENDERSON COUNTY, NORTH CAROLINA 29621

DRAWING: **RG-E-A1 UPPER**  
SHEET: 13 OF 17  
REV. NO.: IFOB



**RUGBY HVAC UPGRADE NEW ELEC. WORK - PART-B FLOOR PLAN @ EXIST. MAIN UPPER FLOOR**  
 SCALE: 1/8"=1'-0" (EXIST REFERENCE FLOOR PLAN USED FOR NEW HVAC VRV SYSTEMS INFORMATION ONLY)

NO.		DATE		REVISIONS	
				DESCRIPTION	
IFOB	DEC. 16, 2019	ISSUED FOR OWNER BIDDING.		BY	JJC

DESIGNED BY: S.BRAUNBECK & J.CAPITAN  
 DRAWN BY: CAPITAN  
 CHECKED BY: CAPITAN  
 DATE: DECEMBER-16-2019  
 SCALE: AS NOTED  
 JOB NO.: DEI JOB NO. 19005

PROFESSIONAL SEAL  
 S. BRAUNBECK  
 ENGINEER  
 8096  
 DECEMBER 16, 2019

DESIGN & ENGINEERING  
 ENERGY SYSTEMS  
 INFRASTRUCTURE UTILITIES  
 SYSTEMS ANALYSIS  
 COMMISSIONING REVIEW

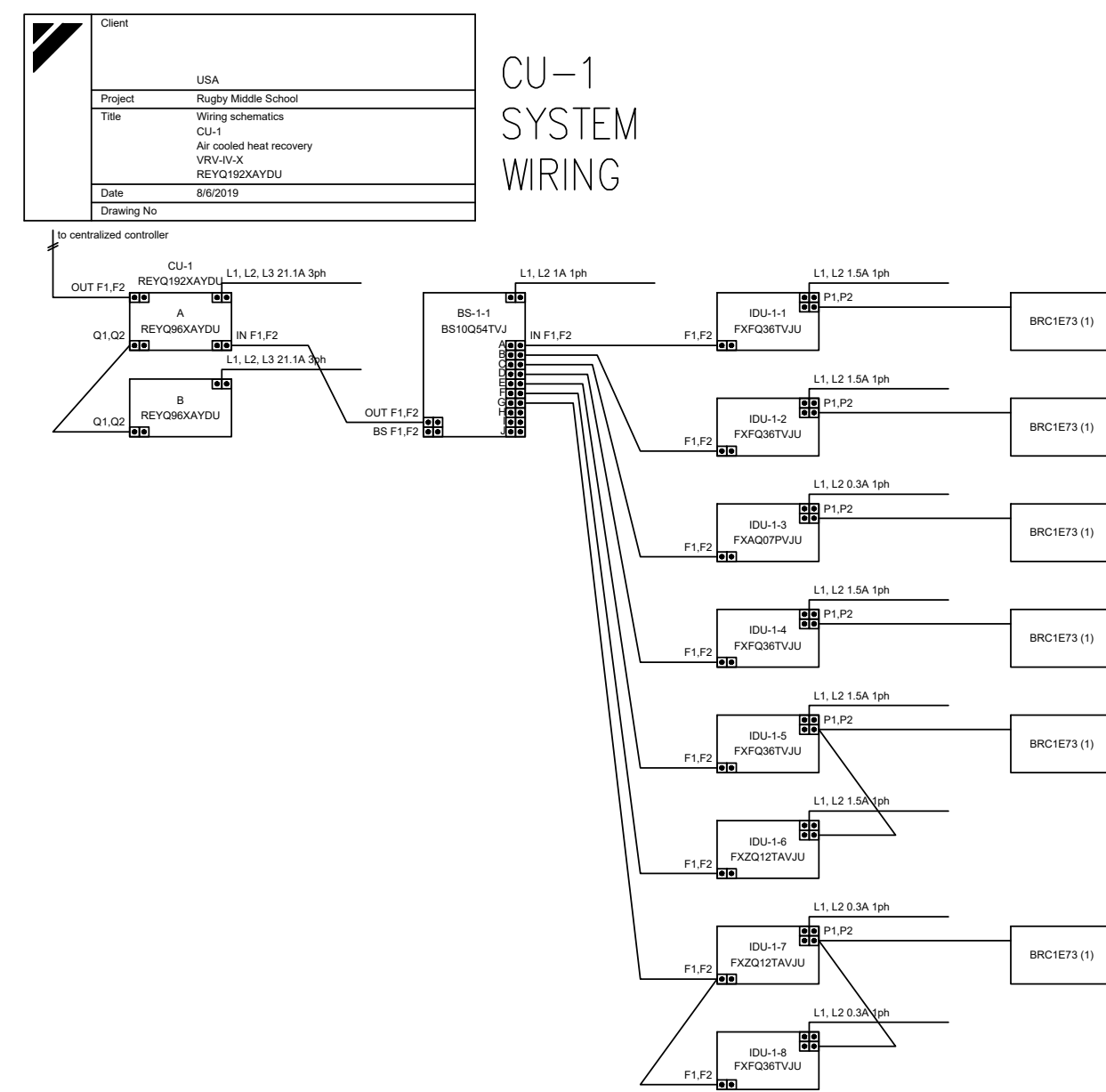
**DELTA**  
 DELTA ENGINEERING, INC. • CONSULTING ENGINEERS  
 315 EAST BROAD STREET, GREENVILLE, SC 29601  
 GREENVILLE, SC TEL. NO. (864) 505-5358  
 3106 RIVERVIEW VIEW, CHARLESTON, SC 29414  
 CHARLESTON, SC TEL. NO. (864) 505-2976  
 Em: jcapitan@gmail.com

THIS DRAWING IS THE PROPERTY AND COPYRIGHT OF DELTA ENGINEERING, INC. AND SHALL NOT BE USED OR COPIED WITHOUT WRITTEN PERMISSION COPYRIGHT ©

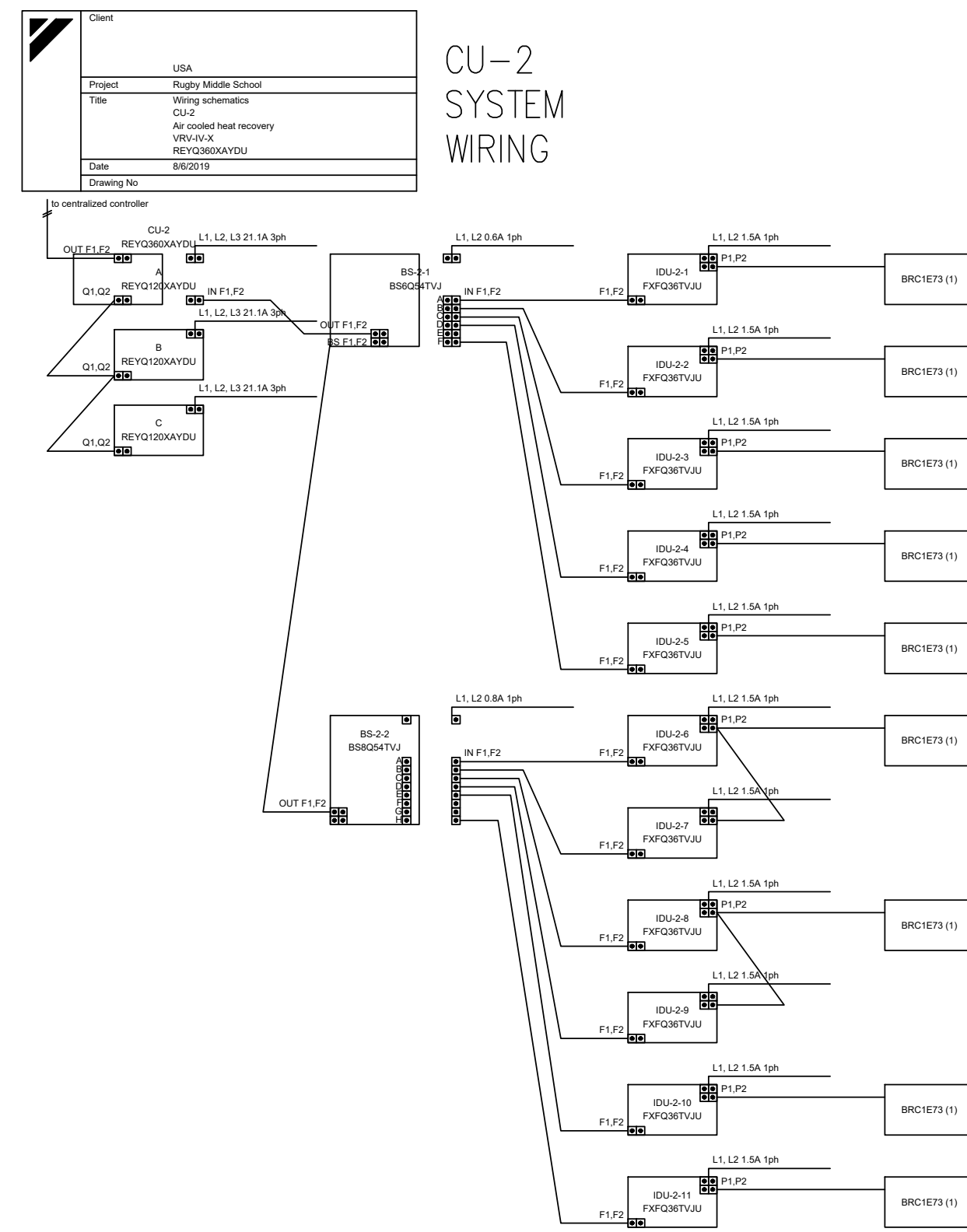
**RUGBY HVAC UPGRADE NEW ELEC. WORK PART-A FLOOR PLAN @ EXIST. MAIN UPPER FLOOR**

PROJECT: 2019 - 2020 HVAC UPGRADES TO FLAT ROCK & RUGBY MIDDLE SCHOOLS  
 HENDERSON COUNTY PUBLIC SCHOOLS  
 414 - 4TH STREET, HENDERSONVILLE, HENDERSON COUNTY, NORTH CAROLINA 29621

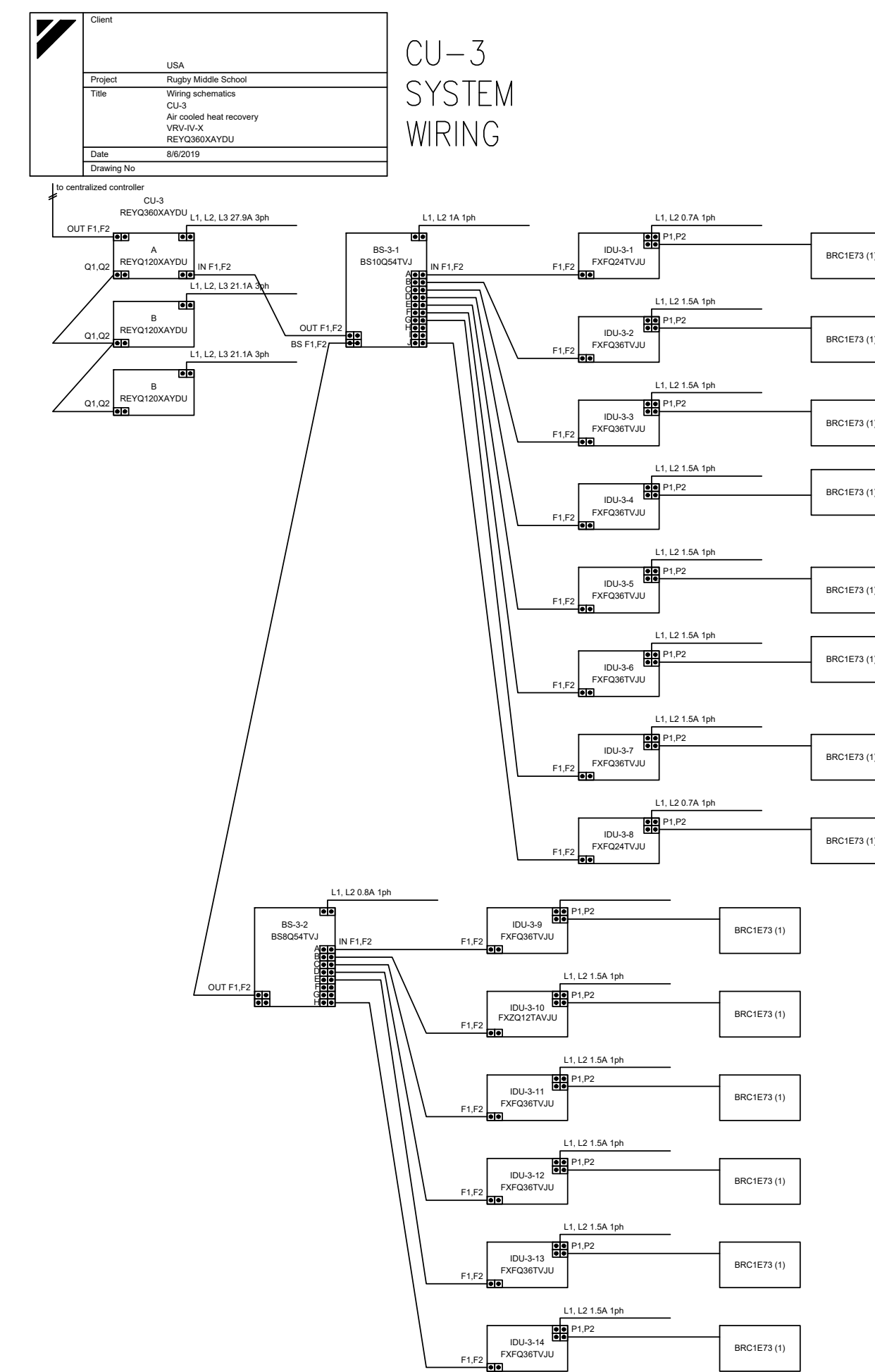
DRAWING: **RG-E-B1 UPPER**  
 SHEET: 14 OF 17  
 REV. NO.: IFOB



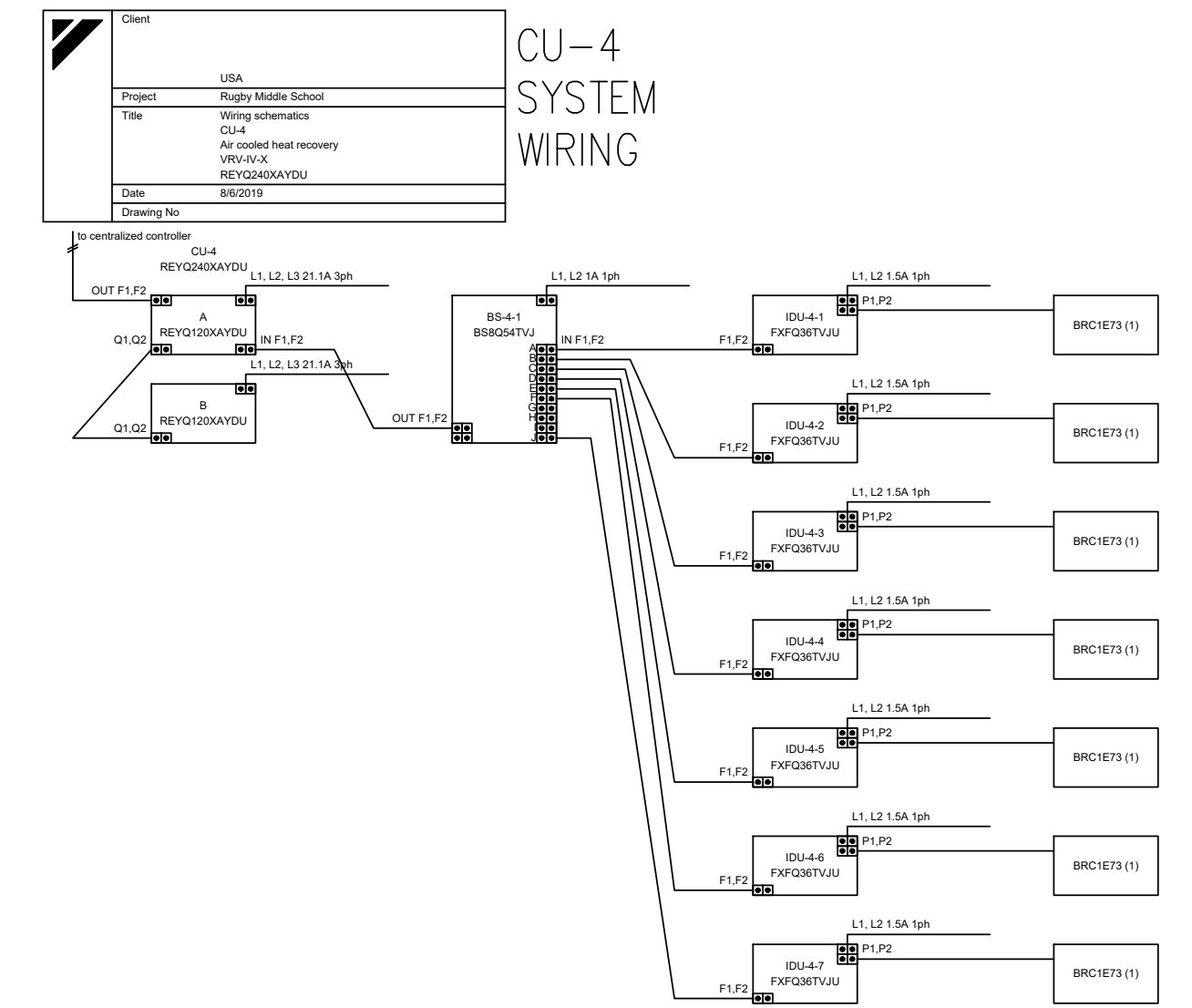
VRV - ZONES NO. 1 - "CU-1" VRV SYSTEM  
WIRING SCHEMATIC DIAGRAMS DETAIL  
NO SCALE



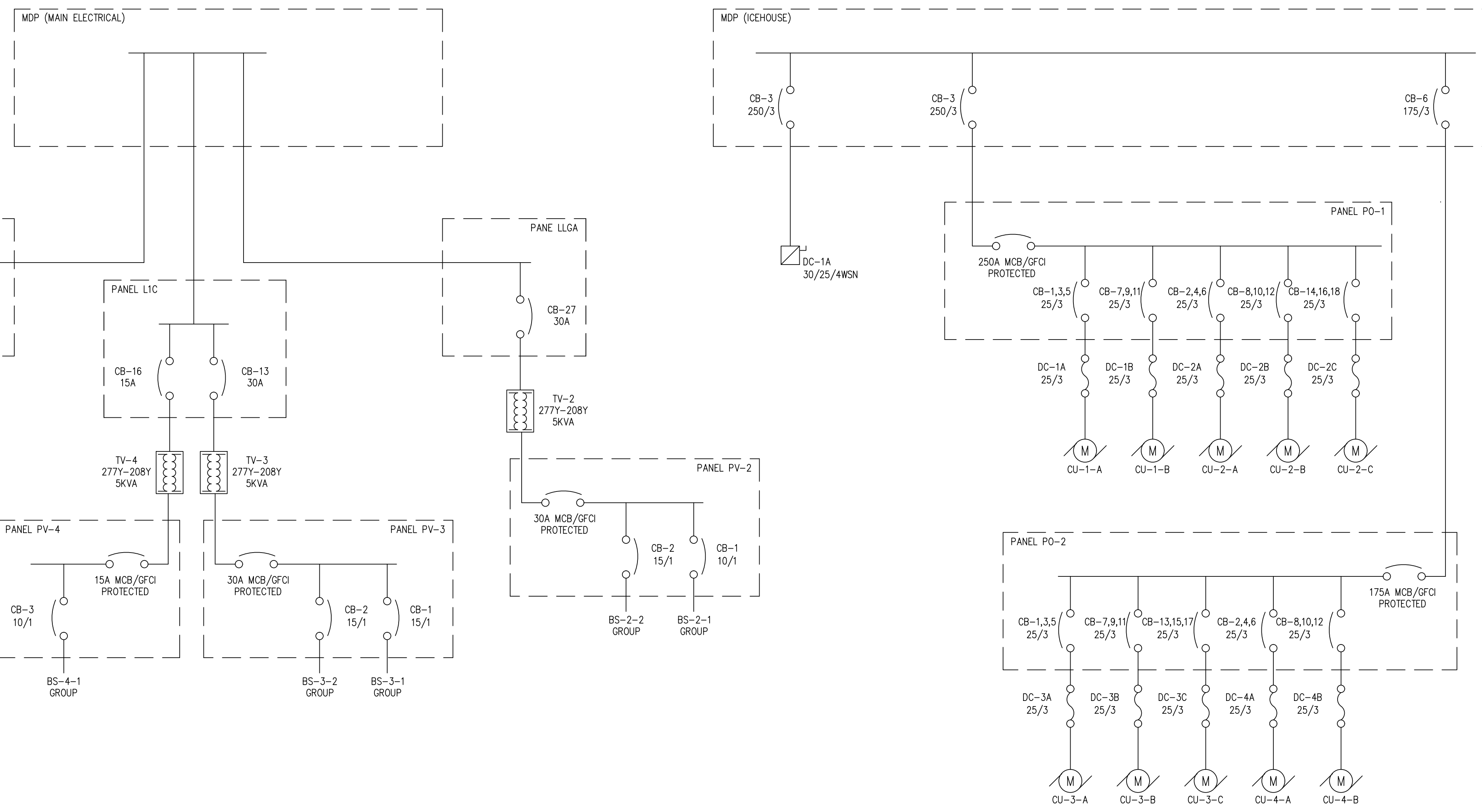
VRV - ZONES NO. 2 - "CU-2" VRV SYSTEM  
WIRING SCHEMATIC DIAGRAM DETAIL  
NO SCALE



VRV - ZONES NO. 3 - "CU-3" VRV SYSTEM  
WIRING SCHEMATIC DIAGRAM DETAIL  
NO SCALE



VRV - ZONES NO. 24 - "CU-4" VRV SYSTEM  
WIRING SCHEMATIC DIAGRAM DETAIL  
NO SCALE



FLAT ROOK - NEW HVAC UPGRADE VRV SYSTEMS (ZONES NO. 1 - 4) OVERALL  
POWER WIRING SCHEMATIC DIAGRAMS DETAILS  
NO SCALE

NO.	DATE	DESCRIPTION
IFOB	DEC. 16, 2019	ISSUED FOR OWNER BIDDING.

NO.	DATE	DESCRIPTION	BY
			JJC

DESIGNED BY: S.BRAUNBECK & J.CAPITAN	PROFESSIONAL SEAL S.BRAUNBECK J.CAPITAN ELECTRICAL ENGINEERS SOUTH CAROLINA NOVEMBER 16, 2019
CHECKED BY: CAPITAN	
DATE: DECEMBER-16-2019	
SCALE: AS NOTED	
JOB NO.: DEI JOB NO. 19005	

DESIGN & ENGINEERING  
ENERGY SYSTEMS  
INFRASTRUCTURE UTILITIES  
SYSTEMS ANALYSIS  
COMMISSIONING REVIEW

**DELTA**  
DELTA ENGINEERING, INC. o CONSULTING ENGINEERS  
315 EAST BROAD STREET, GREENVILLE, SC 29601  
GREENVILLE, SC TEL. NO. (864) 505-5358  
3106 RIVERVIEW VIEW, CHARLESTON, SC 29414  
CHARLESTON, SC TEL. NO. (864) 505-2976  
Em: jcapitan@gmail.com

THIS DRAWING IS THE PROPERTY AND COPYRIGHT OF DELTA ENGINEERING, INC. AND SHALL NOT BE USED OR COPIED WITHOUT WRITTEN PERMISSION. COPYRIGHT ©

**RUGBY - NEW HVAC UPGRADE SYSTEMS WIRING AND ONE-LINE SCHEMATIC DETAILS**

PROJECT:  
**2019 - 2020 HVAC UPGRADES TO FLAT ROCK & RUGBY MIDDLE SCHOOLS**  
HENDERSON COUNTY PUBLIC SCHOOLS  
414 - 4TH STREET, HENDERSONVILLE, HENDERSON COUNTY, NORTH CAROLINA 29621

DRAWING:  
**RG-E-2**  
SHEET: 15 OF 17  
REV. NO.: IFOB

PANEL PV-1		MOUNTING: SURFACE		ENCLOSURE: NEMA 1	
VOLTAGE: 208-1P-4W		FEEDER: LGB-13		MAINS: 15A MBC	
DEVICE	BRANCH CIRCUIT	LOAD (VA)	NO.	VOLT AMPS	DESIGNATION
15	1	1	1	2000	BS-1-1 GROUP
			3	4	
			5	6	
INTEGRATED EQUIPMENT RATING: 10,000 AIC MINIMUM		KVA TOTAL: 2.0		TOTAL KVA: 2.0 TOTAL AMPS: 9.6	

NOTES:  
1. BREAKER IS TO BE HACR TYPE

**PANEL SCHEDULE - PV-1**  
**SERVICES BS-1-1 GROUP**  
NO SCALE

PANEL PV-2		MOUNTING: SURFACE		ENCLOSURE: NEMA 1	
VOLTAGE: 208-1P-4W		FEEDER: LGA-27		MAINS: 30A MBC	
DEVICE	BRANCH CIRCUIT	LOAD (VA)	NO.	VOLT AMPS	DESIGNATION
15	1	1	1	1684	BS-2-1 GROUP
			2	1996	BS-2-2 GROUP
			3	4	
			5	6	
INTEGRATED EQUIPMENT RATING: 10,000 AIC MINIMUM		KVA TOTAL: 3.7		TOTAL KVA: 3.7 TOTAL AMPS: 17.78	

NOTES:  
1. BREAKER IS TO BE HACR TYPE

**PANEL SCHEDULE - PV-2**  
**SERVICES BS-2-1 AND BS-2-2 GROUPS**  
NO SCALE

PANEL PV-3		MOUNTING: SURFACE		ENCLOSURE: NEMA 1	
VOLTAGE: 208-1P-4W		FEEDER: L1C-13		MAINS: 30A MBC	
DEVICE	BRANCH CIRCUIT	LOAD (VA)	NO.	VOLT AMPS	DESIGNATION
15	1	1	1	2255	BS-3-1 GROUP
			2	1996	BS-3-2 GROUP
			3	4	
			5	6	
INTEGRATED EQUIPMENT RATING: 10,000 AIC MINIMUM		KVA TOTAL: 4.2		TOTAL KVA: 4.2 TOTAL AMPS: 20.1	

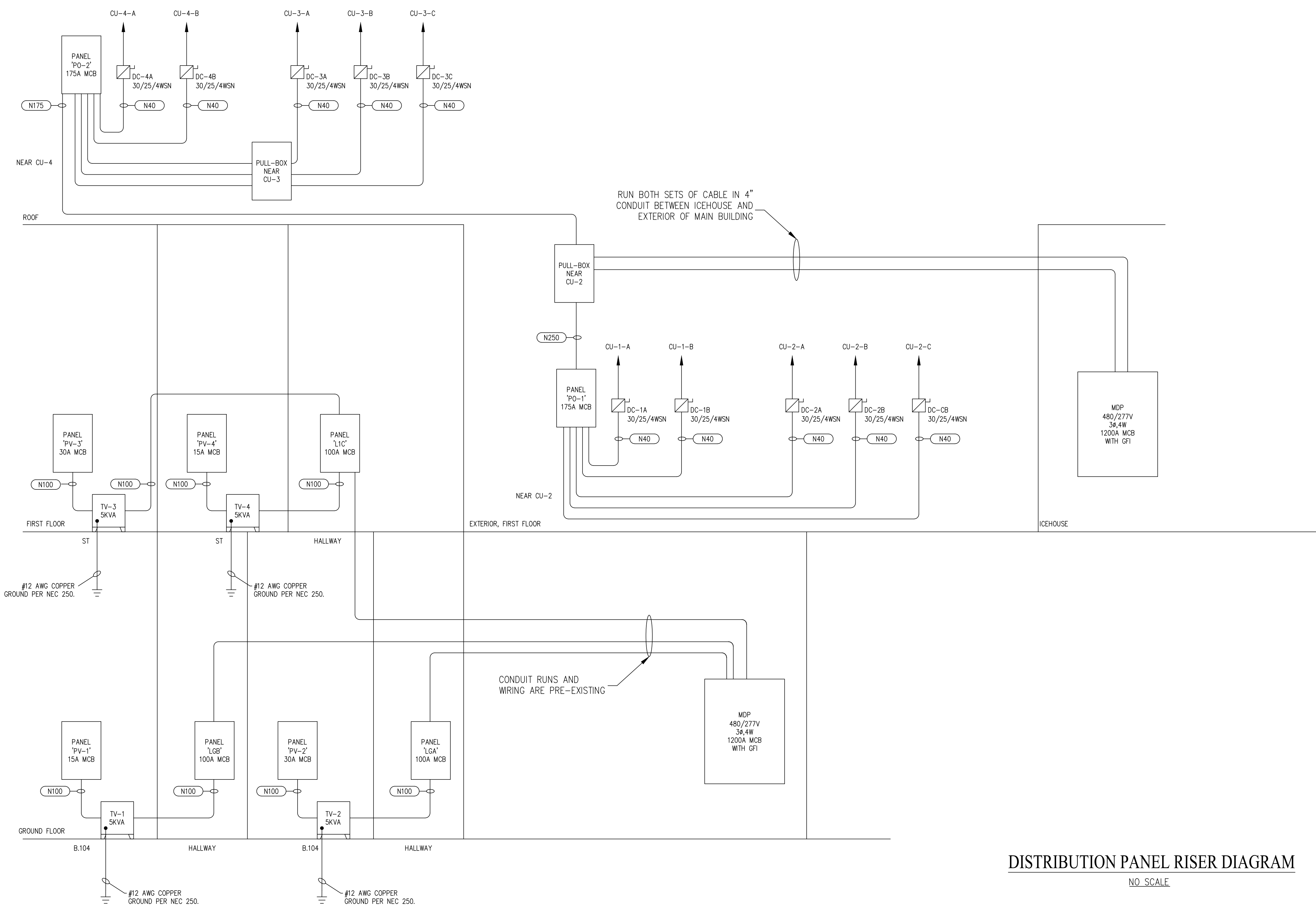
NOTES:  
1. BREAKER IS TO BE HACR TYPE

**PANEL SCHEDULE - PV-3**  
**SERVICES BS-3-1 AND BS-3-2 GROUPS**  
NO SCALE

PANEL PV-4		MOUNTING: SURFACE		ENCLOSURE: NEMA 1	
VOLTAGE: 208-1P-4W		FEEDER: L1C-16		MAINS: 15A MBC	
DEVICE	BRANCH CIRCUIT	LOAD (VA)	NO.	VOLT AMPS	DESIGNATION
15	1	1	1	2000	BS-4-1 GROUP
			2	2	
			3	4	
			5	6	
INTEGRATED EQUIPMENT RATING: 10,000 AIC MINIMUM		KVA TOTAL: 4.7		TOTAL KVA: 3.7 TOTAL AMPS: 17.8	

NOTES:  
1. BREAKER IS TO BE HACR TYPE

**PANEL SCHEDULE - PV-4**  
**SERVICES BS-4-1 GROUP**  
NO SCALE



**DISTRIBUTION PANEL RISER DIAGRAM**  
NO SCALE

CABLE/CONDUIT SCHEDULE	
TAG	WIRE AND CONDUIT
N25	4 #12, 1 #10; 3/4" C
N40	4 #10, 1 #6; 3/4" C
N175	4 #2, 1 #2; 2" C
N250	4 #3/0, 1 #4; 2-1/2" C

PANEL PO-1		MOUNTING: SURFACE		ENCLOSURE: NEMA 4X								
VOLTAGE: 480Y/277V-3P-4W		FEEDER: MDP-3 (ICEHOUSE)		MAINS: 225A MBC								
DEVICE	BRANCH CIRCUIT	DESIGNATION	VOLT AMPS	PHASE LOAD (VOLT-AMPS)		DESIGNATION	NOTES	POLES	TRIP			
				ØA	ØB					ØC		
25	3	1	CU-1-A	6928	1	13856	2	6928	CU-2-A	1	3	25
			CU-1-A	6928	3	13856	4	6928	CU-2-A	1	3	25
			CU-1-A	6928	5	13856	6	6928	CU-2-A	1	3	25
			CU-1-B	6928	7	13856	8	6928	CU-2-B	1	3	25
			CU-1-B	6928	9	13856	10	6928	CU-2-B	1	3	25
			CU-1-B	6928	11	13856	12	6928	CU-2-B	1	3	25
			FUTURE USE	6928	13	13856	14	6928	CU-2-C	1	3	25
			FUTURE USE	6928	15	13856	16	6928	CU-2-C	1	3	25
			FUTURE USE	6928	17	13856	18	6928	CU-2-C	1	3	25
			SPACE	19			20		SPACE			
			SPACE	21			22		SPACE			
			SPACE	23			24		SPACE			
INTEGRATED EQUIPMENT RATING: 10,000 AIC MINIMUM		KVA TOTAL: 41.6		41.6		41.6		TOTAL KVA: 124.7		TOTAL AMPS: 150.0		

NOTES:  
1. BREAKER IS TO BE HACR TYPE

**PANEL SCHEDULE - PO-1**  
**SERVICES CU-1, CU-2, AND FUTURE UNIT**  
NO SCALE

PANEL PO-2		MOUNTING: SURFACE		ENCLOSURE: NEMA 4X								
VOLTAGE: 480Y/277V-3P-4W		FEEDER: MDP-6 (ICEHOUSE)		MAINS: 175A MBC								
DEVICE	BRANCH CIRCUIT	DESIGNATION	VOLT AMPS	PHASE LOAD (VOLT-AMPS)		DESIGNATION	NOTES	POLES	TRIP			
				ØA	ØB					ØC		
25	3	1	CU-3-A	6928	1	13856	2	6928	CU-4-A	1	3	25
			CU-3-A	6928	3	13856	4	6928	CU-4-A	1	3	25
			CU-3-A	6928	5	13856	6	6928	CU-4-A	1	3	25
			CU-3-B	6928	7	13856	8	6928	CU-4-B	1	3	25
			CU-3-B	6928	9	13856	10	6928	CU-4-B	1	3	25
			CU-3-B	6928	11	13856	12	6928	CU-4-B	1	3	25
			CU-3-C	6928	13	6928	14		SPACE			
			CU-3-C	6928	15	6928	16		SPACE			
			CU-3-C	6928	17	6928	18		SPACE			
			SPACE	19			20		SPACE			
			SPACE	21			22		SPACE			
			SPACE	23			24		SPACE			
INTEGRATED EQUIPMENT RATING: 10,000 AIC MINIMUM		KVA TOTAL: 34.6		34.6		34.6		TOTAL KVA: 103.9		TOTAL AMPS: 125.0		

NOTES:  
1. BREAKER IS TO BE HACR TYPE

**PANEL SCHEDULE - PO-2**  
**SERVICES CU-3 AND CU-4**  
NO SCALE

<b>REVISIONS</b> NO. DATE DESCRIPTION BY 1 DEC 16, 2019 ISSUED FOR OWNER BIDDING. JJC		<b>PROFESSIONAL SEAL</b> S. BRAUNBECK & J. CAPITAN ENGINEERS DECEMBER 16, 2019		DESIGNED BY: S. BRAUNBECK & J. CAPITAN DRAWN BY: CAPITAN CHECKED BY: CAPITAN DATE: DECEMBER-16-2019 SCALE: AS NOTED JOB NO.: DEI JOB NO. 19005		<b>DELTA</b> DELTA ENGINEERING, INC. • CONSULTING ENGINEERS 315 EAST BROAD STREET, GREENVILLE, SC 29601 GREENVILLE, SC TEL. NO. (864) 505-5358 3106 RIVERVIEW VIEW, CHARLESTON, SC 29414 CHARLESTON, SC TEL. NO. (864) 505-2976 Em: jecapitan@gmail.com		THIS DRAWING IS THE PROPERTY OF DELTA ENGINEERING, INC. AND SHALL NOT BE USED OR COPIED WITHOUT WRITTEN PERMISSION. COPYRIGHT ©		<b>RUGBY - ELECTRICAL PANEL AND RISER DETAILS</b>		PROJECT: 2019 - 2020 HVAC UPGRADES TO FLAT ROCK & RUGBY MIDDLE SCHOOLS HENDERSON COUNTY PUBLIC SCHOOLS 414 - 4TH STREET, HENDERSONVILLE, HENDERSON COUNTY, NORTH CAROLINA 29621		DRAWING: <b>RG-E-3</b> SHEET: 16 OF 17 REV. NO.: IFOB	
---	--	---	--	---	--	---	--	---	--	---	--	---	--	---	--

LOAD BREAKDOWN										
NAME	LOAD (A)	VOLTAGE (3PH)	VOLTAGE (1PH)	TOTAL LOAD	WATTS	BREAKER (+125%)	TOTAL WATTS	TRANSFORMER (277-208)	BREAKER	WIRING
CU-1-A	21.1	480						N/A	25A	10AWG
CU-1-B	21.1	480							25A	10AWG
BS-1-1	1		208		1996.8		1996.8	5KVA	15A	
IU-1-1	1.5		208							
IU-1-2	1.5		208							
IU-1-3	0.3		208							
IU-1-4	1.5		208	9.6		12.00				
IU-1-5	1.5		208							
IU-1-6	0.4		208							
IU-1-7	0.4		208							
IU-1-8	1.5		208							
CU-2-A	21.1	480							25A	10AWG
CU-2-B	21.1	480							25A	12AWG
CU-2-C	21.1	480							25A	12AWG
BS-2-1	0.6		208		1684.8		1684.8	5KVA	15A	
IU-2-1	1.5		208							
IU-2-2	1.5		208	8.1		10.13				
IU-2-3	1.5		208							
IU-2-4	1.5		208							
IU-2-5	1.5		208							
BS-2-2	0.6		208		1996.8		1996.8	5KVA	15A	
IU-2-6	1.5		208							
IU-2-7	1.5		208							
IU-2-8	1.5		208	9.6		12.00				
IU-2-9	1.5		208							
IU-2-10	1.5		208							
IU-2-11	1.5		208							
CU-3-A	21.1	480							25A	12AWG
CU-3-B	21.1	480							25A	12AWG
CU-3-C	21.1	480							25A	12AWG
BS-3-1	1		208		2225.6		2225.6	5KVA	15A	
IU-3-1	0.7		208							
IU-3-2	1.5		208							
IU-3-3	1.5		208	10.7		13.38				
IU-3-4	1.5		208							
IU-3-5	1.5		208							
IU-3-6	1.5		208							
IU-3-7	1.5		208							
BS-3-2	1		208		1913.6		1913.6	5KVA	15A	
IU-3-8	1.5		208							
IU-3-9	0.7		208							
IU-3-10	1.5		208	9.2		11.50				
IU-3-11	1.5		208							
IU-3-12	1.5		208							
IU-3-13	1.5		208							
CU-4-A	21.1	480							25A	10AWG
CU-4-B	21.1	480							25A	10AWG
BS-4-1	1		208		2392		2392	5KVA	15A	
IU-4-1	1.5		208							
IU-4-2	1.5		208							
IU-4-3	1.5		208	11.5		14.375				
IU-4-4	1.5		208							
IU-4-5	1.5		208							
IU-4-6	1.5		208							
IU-4-7	1.5		208							

TRANSFORMER (277-208) CALCULATIONS					
NAME	GROUP	WATTS	TOTAL WATTS	SIZE (KVA)	FEEDER AMPS (277)
TV-1	BS-1-1	1996.8	1996.8	5	18.05054
TV-2	BS-2-1	1684.8	3681.6	5	18.05054
	BS-2-2	1996.8			
TV-3	BS-3-1	2225.6	4222.4	5	18.05054
	BS-3-2	1996.8			
TV-4	BS-4-1	2392	2392	5	18.05054

PANEL SCHEDULE CALCULATIONS					
NAME	GROUP	CALC LOAD	LOAD + 125%	BREAKER	FEEDER
PV-1	BS-1-1	9.6	12.00	15	LGB-13 (15A REPLACEMENT)
PV-2	BS-2-1	8.1	10.13	15	LGA-27 (30A REPLACEMENT)
	BS-2-2	9.6	12.00	15	
PV-3	BS-3-1	10.7	13.38	15	LIC-13 (30A REPLACEMENT)
	BS-3-2	9.2	11.50	15	
PV-4	BS-4-1	11.5	14.375	15	LIC-16 (15A REPLACEMENT)
PO-1	CU-1-A	PER VENDOR		25	150MCB (FROM MDA-6)
	CU-1-B	PER VENDOR		25	
	CU-2-A	PER VENDOR		25	
	CU-2-B	PER VENDOR		25	
	CU-2-C	PER VENDOR		25	
	FUTURE	PER VENDOR		25	
PO-2	CU-3-A	PER VENDOR		25	150MCB (FROM MDA-2)
	CU-3-B	PER VENDOR		25	
	CU-3-C	PER VENDOR		25	
	CU-4-A	PER VENDOR		25	
	CU-4-B	PER VENDOR		25	

REVISIONS		
NO.	DATE	DESCRIPTION
1	DEC. 16, 2019	ISSUED FOR OWNER BIDDING.

DESIGNED BY: S.BRAUNBECK & J.CAPITAN  
 DRAWN BY: CAPITAN  
 CHECKED BY: CAPITAN  
 DATE: DECEMBER-16-2019  
 SCALE: AS NOTED  
 JOB NO.: DEI JOB NO. 19005

DESIGN & ENGINEERING ENERGY SYSTEMS INFRASTRUCTURE UTILITIES SYSTEMS ANALYSIS COMMISSIONING REVIEW

DELTA ENGINEERING, INC. • CONSULTING ENGINEERS  
 315 EAST BROAD STREET, GREENVILLE, SC 29601  
 GREENVILLE, SC TEL. NO. (864) 505-5358  
 3106 RIVERVIEW VIEW, CHARLESTON, SC 29414  
 CHARLESTON, SC TEL. NO. (864) 505-2976  
 Em: jcapitan@gmail.com

THIS DRAWING IS THE PROPERTY AND COPYRIGHT OF DELTA ENGINEERING, INC. AND SHALL NOT BE USED OR COPIED WITHOUT WRITTEN PERMISSION. COPYRIGHT ©

**RUGBY - NEW HVAC UPGRADE ELECTRICAL LOADS**

PROJECT: 2019 - 2020 HVAC UPGRADES TO FLAT ROCK & RUGBY MIDDLE SCHOOLS

HENDERSON COUNTY PUBLIC SCHOOLS  
 414 - 4TH STREET, HENDERSONVILLE, HENDERSON COUNTY, NORTH CAROLINA 29621

DRAWING: **RG-E-4**

SHEET: 17 OF 17  
 REV. NO.: IFOB