STEAMBOAT SPRINGS MIDDLE SCHOOL **CAFETERIA ADDITION** 39610 AMETHYST DR STEAMBOAT SPRINGS, CO 80487

DESIGN DEVELOPMENT 02/21/20





	GENE	ERAL NOTES			AB			
GEN	IERAL NOTES:			AFF A APC A	ABOVE FINISHE ACOUSTIC CEIL			
1.	ARCHITECT IF ADDITIONAL INFORMATION IS REQUIRED. ALL DIMENSIONS ARE GIVEN TO FACE OF WALL FRAMING. SEE WALL SECTIONS AND WALL TYPES FOR EXACT CONSTRUCTION							
2.	SEE SHEET A0.03 FOR WALL		DR PLANS	BRG BRD BO BOT BRKR	BEARING BOARD BOTTOM OF BOTTOM BREAKER			
5.	WORK, IN WALLS AND CEILI TO, TOILET AND BATH ACCE ELECTRICAL EQUIPMENT, W COUNTERTOPS, ETC.	NGS. LOCATIONS INCLUDE, E SSORIES, WALL AND CEILING INDOW TREATMENTS, CASE	G MOUNTED WORK,	BTUH BTUH BLDG BUR CLG CL CL C/C	BRITISH THERM BTU PER HOUR BUILDING BUILT UP ROOF CEILING CENTER LINE CENTER TO CEI			
4.	WHERE WALL PARTITIONS A NEW FINISH SURFACES MUS SURFACES ON BOTH SIDES MATERIAL TO MATCH EXIST	ARE A CONTINUTATION OF EX ST BE FLUSH AND CONTINOU . INFILL OPEINGS IN EXISTING ING WALL THICKNESS, TEXT	XISTING ONES, ITS WITH EXISTING G WALLS WITH URE AND FINISH.	CO C CW COL CONC CONT CJ	CLEAN OUT CONDUIT COLD WATER COLUMN CONCRETE CONTINOUS, CO CONTROL JOIN			
5.	REFERENCE S-SERIES DRAV AND COORDINATE.	WINGS FOR STRUCTURAL NO	DTES AND DETAILS	CORR CMP X CFM	CORRUGATGEE CORRUGATED I CROSS CUBIC FEET PE			
6.	EXISTING BUILDING DIMENS EXISTING SURVEY INFORMA PROVIDED BY OWNER. IMMI ARE ENCOUNTERED THAT D ELEVATIONS SHOWN.	GIONS AND ELEVATIONS ARE ATION AND EXISTING AS BUIL EDIATELY NOTIFY ARCHITEC DO NOT AGREE WITH DIMENS	BASED UPON T DOCUMENTS T IF CONDITIONS SIONS AND/OR	D I DTL I DIAG I DIA I DIAPH I DHW I DWG I	DEEP/DEPTH DETAIL DIAGONAL DIAMETER DIAPHRAM DOMESTIC HOT DRAWING			
7.	VERIFY ALL PITCHED FLOOF ARCHITECT. PROVIDE A SLA PITCH LINES ARE NOT SHOV	R AREAS SHOWN WITH PITCH AB DEPRESSION AT ALL FLOO WN ON DRAWINGS.	H LINES WITH THE OR DRAINS WHERE	EA ELEC E EWC E ADA LIFT E EMBED E	EACH ELECTRIC ELECTRIC WATI ELEVATION, ELE EMBEDMENT EMERGENCY			
8.	PRVOIDE 4" RETURN FROM NOT DIMENSIONED.	FACE OF ADJACENT WALL F	OR ANY DOORS	EX I EXIST I EXP I EXP I	EXISTING EXISTING EXPANSION EXTERIOR EXT			
9.	SEE MECHANICAL, PLUBMIN SHOWN ON ARCHITECTURA	IG AND ELECTRICAL DRAWIN L DRAWINGS AND COORDIN	IGS FOR ITEMS NOT ATE.	FD I FE I FEC I	FLOOR DRAIN FIRE EXTINGUIS FIRE EXTENGUI			
10.	ALL INTERIOR WALLS SHALI STEEL STRUCTURE (BEAM) WALL TYPES ON SHEET A0.0	LEXTEND TO UNDERSIDE OF UNLESS NOTED OTHERWISE 03.	ROOF DECK AND SEE PARTITION	FT FG FF FH FLG FLOUR	FEET FIBERGLASS FINISH FLOOR FIRE HYDRANT FLANGE FLOURESCENT			
11.	DATUM 100'-0" INDICATED O EQUALS 6849.23 ON CIVIL SI	N ALL DRAWINGS, OTHER TH ERIES DRAWINGS.	IAN CIVIL SERIES,	FP FTG FS FS FGA GA	FIREPLACE FOOTING FLOOR SINK GAUGE			
12.	ALL STEEL LOCATED BELOV WITH BITUMINOUS DAMPRO	V AND EXPOSED TO GRADE ⁻ OFING.	TO BE COATED	GAL (GALV (GI (G	GALLON GALVANIZED GALVANIZED IR GAS			
13.	CONTRACTOR TO COMPLY INSPECTIONS, 2015 IBC - 170	WITH ALL REQUIREMENTS FO 04.	OR SPECIAL	GND GND GR GYP GWB	GLASS MESH M GROUND GRADE, GRADIN GYPSUM GYPSUM WALL			
				H&V I HDO I HDPE I	HEATING & VEN HIGH DENSITY (HIGH DENSITY F			
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	MA	TERIALS LEGE	ND					
					ALTERNAT 1) REPLAC			
	ALUMINUM				ALTERNAT 1) REPLAC			
	ACT				ALTERNAT 1) PROVID			
	BATT INSULATION							
	BRICK	GYPSUM BOARD	WOOD FINISH					
	CONCRETE	METAL STUD	WOOD ROUGH					
	GRAVEL	ASPHALT	STONE VENEER					
		SYMBOLS			-			
	1 VIEW INAITIE A101 1/8" = 1'-0"	DRAWING TITLE & SCALE	 PARTITION OR WALL TYPE 					
	1 A101 1 EXTERI	OR ELEVATION	DOOR TAG SIZE AS DESIGNATED ON DOOR SCHDULE					
		OR ELEVATION	WINDOW TAG ALL WINDOWS ARE TO BE HINGED PER					
	1 SIM A101 WALL S SECTIO	SECTION & PARTIAL	EXTERIOR ELEVATION DRAWINGS REVISION NUMBER					
	A101 SIM DETAIL	SECTION ?	KEYNOTE TAG					
		NLARGEMFNT +124' - 0"	- ELEVATION					
			- JI UI LLEVATION					
					DA.			
				RENCE	FOR TH			

BBREVIA		NS	PROJECT DIRECTORY				
HED FLOOR EILING TILE _T JRAL)	HORZ HP HW HWC HR	HORIZONTAL HORSE POWER HOT WATER HOT WATER CIRCULATION HOUR	OWNER	STEAMBOAT SPRINGS SCHOOL DISTRICT 325 7TH STREET STEAMBOAT SPRINGS, CO 80487 (970) 871-3188 Pascal Ginesta pginesta@ssk12.org			
, ID	JT KV KVA	INSULATION, INSULATING JOINT KILOVOLT KILOVOLT AMPERE	OWNERS REPRESENTATIVE	DYNAMIC PROGRAM MANAGEMENT Colleen Kaneda (970) 390-0312 colleen.kaneda@dynamicpm.co Todd Raper			
RMAL UNIT JR OFING	MFR MAX MECH MTL MIN	MANHOLE MANUFACTURE(R) MAXIMUM MECHANICAL METAL MINIMUM	ARCHITECT	(970) 986-2274 todd.raper@dynamicpm.co TAB ASSOCIATES, Inc. 56 EDWARDS VILLAGE BLVD SUITE 210 EDWARDS, CO 81632			
CENTER	N NO OC OPP OZ	NORTH NUMBER ON CENTER OPPOSITE OUNCE(S) OUTSIDE DIAMETER		(970) 766-1470 (970) 766-1741 FAX PROJECT ARCHITECT - Greg Macik X107 greg@tabassociates.com PROJECT MANAGER - Warner Hopkins X111 warner@tabassociates.com			
CONTINUE INT ED D METAL PIPE PER MINUTE	OSF PERF PL POLY POLY	OUTSIDE DIAMETER OUTSIDE FACE PERFORATED PLATE POLE POLYETHYLENE POLYETHYLENE POLYETHYLENE	CIVIL ENGINEER	ALPINE ENGINEERING 34510 HIGHWAY 6 EDWARDS, CO 81632 (970) 926-3373 PRINCIPAL - Matt Wadey			
OT WATER	PVC PW PSF PSI PRV PRO PL PLAM	POLYVINYL CHLORIDE POTABLE WATER PRESSURE PER SQUARE FOOT PRESSURE PER SQUARE INCH PRESSURE RELIEVE VALVE PROJECTION PROPERTY LINE PLASTIC LAMINATE	LANDSCAPE ARCHITECT	DHM DESIGN 900 SOUTH BROADWAY SUITE #200 DENVER, CO 80209 (303) 892-5566 PRINCIPAL - Mark Wilcox (DENVER)			
ATER COOLER ELEVATOR	REINF RCP RM	REIFNFORCE(D), (ING) REFLECTED CEILING PLAN ROOM		mwilcox@dhmdesign.com ASSOC PRINCIPAL - Marc Diemer (CARBONDALE) mdiemer@dhmdesign.com			
XTRUDED	SCH SHT SIM SLH SPEC SF STL	SCHEDULE SHEET SIMILAR SPRING LOADED HINGES SPECIFICATION(S) SQUARE FOOT (FEET) STEEL	STRUCTURAL ENGINEER	JIRSA/HEDRICK P.O. BOX 4989 EAGLE, CO 81631 (303) 318-6539 Matt Hood mhood@jirsahedrick.com			
N UISHER GUISHER CABINET R	STIFF STN SD STRUCT SUSP T&G	STIFFENER STONE STORM DRAIN STRUCTURAL SUSPENDED TOUNGE & GROOVE	MECHANICAL/ELECTRICAL/ TECHNOLOGY ENGINEERS	BG WORKS P.O. BOX 9650 AVON, CO 81620 (970) 949-6108 ELECTRICAL - Marc Sacconi masacconi@babuildingworks.com			
NT	TC THK THRU TO TRANSV TS	TEMPERATURE CONTROL THICKNESS THROUGH TOP OF TRANSVERSE TUBE STEEL		MECHANICAL - David Lyle dalyle@bgbuildingworks.com TECHNOLOGY - ERIC ADEN etaden@bgbuildingworks.com			
IRON I MORTAR UNIT(S) DING	TYP UG UNO VB VERT VEST	TYPICAL UNDERGROUND UNLESS NOTED OTHERWISE VAPOR BARRIER VERTICAL VESTIBULE		1100 W. LITTLETON BLVD SUITE 420 LITTLETON, CO 80120 (720) 446-9283 Jeff Kwolkoski jeffk@waveengineering.us			
LL BOARD ENTILATING Y OVERLAY Y POLYETHYLENE	V WC WD WWF W	VOLT WATER CLOSET/WATER COLUMN WOOD WELDED WIRE FABRIC WEST/WATER/WIDE/WIDTH	KITCHEN CONSULTANT	KITCHENTECH (303) 835-2018 Brian Johnson brian@kitchentech.boz			
ΓAL	w/ W/O	WITHOUT	CONTRACTOR	HASELDEN CONSTRUCTION 6950 SOUTH POTOMAC ST CENTENNIAL, CO 80112 (970) 453-3959 PRECONSTRUCTION MANAGER - David Marsh DavidMarsh@haselden.com			

ALTERNATES

GENERAL ALTERNATES LIST:

IATE #1 ARCADE ACEMENT OF BRICK FLOORING

ATE #2 BATHROOMS ACE WALL TILE, FLOOR TILE, REPAINT CMU, NEW PARTITIONS, FITTINGS, VALVES, MIRRORS, AND HAND DRYERS IN SHARED BATHROOMS

IATE #3 /IDE FULL FIRE SUPPRESSION TO BALANCE OF BUILDING NOT CURRENTLY SPRINKLED

ATUM REFERENCE

HIS PROJECT IS THE MAIN FINISH FLOOR LEVEL LL OTHER DRAWINGS EQUALS 6849.23' ON SITE PLAN

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3 LEVEL 1 - EX. FIRE WALL SEPERATION PLAN A0.02 1/32" = 1'-0"



4 LEVEL 1 - FIRE WALL SEPERATION PLAN A0.02 1/32" = 1'-0"

EXISTING BUILDING INFORMATION

BUILDING	OCCUPAN	CY OCCUPANTS	EXISTING AREA	NEW AREA	ALLOWABLE AREA	EXISTING CONST. TYPE	FIRE SUPPRESSION	BUILDING HEIGHT
ADMIN WING ADDITION 2007	В		5,826 SF	-	58,000 SF	TYPE 2B (IIB)	YES	EX
GYM +STAGE WING ORIGINAL BLDG 1980	A1/A3/E		20,674 SF	-	58,000 SF	TYPE 2B (IIB)	YES	EX
CLASSROOM WING 1 ORINGAL BLDG 1980	E		18,148 SF	-	58,000 SF	TYPE 2B (IIB)	YES	EX
CLASSRROM WING 2 ORIGINAL BLDG 1980	E		11,082 SF	-	58,000 SF	TYPE 2B (IIB)	YES	EX
CLASSROOM WING 3 ORIGINAL BLDG 1980	E		11,071 SF	-	58,000 SF	TYPE 2B (IIB)	YES	EX
CLASSROOM WING 4 ADDITION 2003	<u>E</u>		11,208 SF	-	58,000 SF	TYPE 2B (IIB)	YES	EX
NEW CAFETERIA WING EXISTING CAFETORIUM + PROPOSED CAFETERIA ADDED TO CLASSROOM WING 1	A2		4,434 SF	2,608 SF	58,000 SF	TYPE 2B (IIB)	PROPOSED EXISTING CAFETORIUM TO BE SPRINKLED	16'-8" MATCHING ADJACENT
TOTAL OCCUPANTS	NC	ADDITIONAL OCCUPANTS	S					
TOTAL NEW AREA	2,6	08 SF						
TOTAL AREA	85,	<u>051 SF</u>						

NEW CAFETERIA AREA IS AN ACCESSORY USE FOR THE SCHOOL PER 2015 IBC 303.1.3

WORK IN SCIENCE CLASSROOMS DOES NOT IMPACT/CHANGE OCCUPANCY, SQUARE FOOTAGE, CONSTRUCTION TYPE, OR EGRESS







Metal Framed Wall Insulation R-13+R-7.5ci Below Grade Wall R-10c Unheated Slabs R-15 for 24" Below









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Issue Dates: Initial SD - 12/20/19 SD - 01/14/20 DD - 02/21/20 Sheet Title: Code Summary Project No: 1935.03







NEW CONCRETE FOUNDATION WALL



NEW CONCRETE FOUNDATION WALL



											I	DOOR SCHEDULE							
	LO FROM ROOM		WIDTH	HEIGHT	THICKNES	DOOR	DOOR	DOOR	FRAME	FRAME	FRAME	GLASS TYPE	HEAD	JAMB	SILL	FIRE		REMARKS	ABBREVIATION
DOOR NO. A103A	CAFETERIA ADDITION	LOWER LEVEL NORTH ARCADE	6' - 0"	7' - 0"	1 3/4"	6	WD	ST	6	HM	PT						02		MFG MANUFACTU EHM EX HOLLOW
A103B	CAFETERIA ADDITION	LOWER LEVEL NORTH ARCADE	3' - 0"	7' - 0"	1 3/4"	5	WD	ST	3	НМ	PT						03		EWD EX WOOD ESF EX STORE FF
A103C	CAFETERIA ADDITION		6' - 0"	7' - 0"	1 3/4"	6	SF	MFG	5	SF	MFG						AL-01	KEYCARD ACCESS, NO WIRING IN REMOVABLE MULLION	EAL EX ALUMINU
A103D	EX. CAFETORIUM	I CAFETERIA CONVERSION	3' - 0"	7' - 0"	1 3/4"	4	WD	ST	1	НМ	PT						04		HM HOLLOW ME WD WOOD
A105C		EX. CAFETORIUM	12' - 0"	8' - 0"	2 1/8"	9											OH-01	GARAGE DOOR, GLASS, STRAIGHT UP	SF STORE FRO
A105D		EX. CAFETORIUM	14' - 6"	8' - 0"	2 1/8"	9											OH-01	GARAGE DOOR, GLASS, STRAIGHT UP	AL ALUMINUM
A105E		EX. CAFETORIUM	14' - 6"	8' - 0"	2 1/8"	9											OH-01	GARAGE DOOR, GLASS, STRAIGHT UP	EST EX STAIN
A109A	SERVING	CAFETERIA ADDITION	3' - 0"	2' - 6"	2"	8	WD	ST									09		EPT EX PAINT
A111A	INSTRUMENTAL		6' - 2"	6' - 8"	2 1/2"	1	HM	PT	EX	EX	PT						EX-01	REPLACE DOOR, DOOR HARDWARE, AND RETROFIT FOR HINGE LOCKSET	MILL FACTORY
C106A	GREENHOUSE		3' - 0"	7' - 0"	1 3/4"	1	HM	PT	3	HM	PT						01	EXTERIOR KEYED	PT PAINT
C107D	7TH GRADE SCIENCE	7TH GRADE SCIENCE	12' - 0"	8' - 6"	2"		MFR	WB									SL-01	FOLDING PARTITION	ST STAIN TEMP TEMPEREI
C107E			15' - 0"	5' - 6"	2"		MFR	NA									SL-01	ACORDION COUNTERTOP DOOR	EX EXISTING
D103A		GREENHOUSE	3' - 0"	7' - 0"	1 3/4"	1	HM	PT	3	HM	PT						01	EXTERIOR KEYED	SS STAINLES
EA105A	EX. CAFETORIUM	I LOWER LEVEL NORTH ARCADE	6' - 0"	7' - 0"	1 3/4"	6	WD	ST	EX	EX	PT						02		VS VINYL STIC BY MFG
EA105B	EX. CAFETORIUM	I LOWER LEVEL NORTH ARCADE	6' - 0"	7' - 0"	1 3/4"	6	WD	ST	EX	EX	PT						02		
EA111B	INSTRUMENTAL		6' - 0"	8' - 0"	1 3/4"	EX	EX	EX	EX	EX	EX					-	EX-02	SALVAGE BOTH DOOR LEAFS FROM EXISTING (E)107 DOORS	



DOOR TYPE 6

DOOR TYPES 1/2" = 1'-0"

PER SCH





WINDOWS 1/4" = 1'-0"

DOOR TYPE 7

	WINDOW S	SCHEDULE F	RESIDENTIAL	-	
Type Mark	DESCRIPTION	WIDTH	HEIGHT	FINISH	COMMENTS
1		6' - 0"	7' - 0"		
2		7' - 0"	7' - 0"		

INISH

MULLION





TAB Associates The Architectural Balance 0056 Edwards Village Blvd. Suite 210 Edwards, CO 8132 (970) 766-1470 fax: (970) 766-1471 email: tab@vail.net www.tabassociates.com Civil Engineer ALPINE ENGINEERING (970) 926-3373 Structural Engineer (303) 839-1963 Mechanical Engineer BG BUILDINGWORKS (970) 949-6108 Electrical Engineer BG BUILDINGWORKS (970) 949-6108

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	Revisions:									
No	No Description Date									

Issue Dates: Initial SD - 12/20/19 SD - 01/14/20 DD - 02/21/20 Sheet Title: Door and Window Schedules



SYMBOL	GENERAL_LOCATION	MANUFACTURER	PRO
APC-1	CLASSROOMS/CAFETERIA	ARMSTRONG	FINE FISSURED-HIGH ACOUST
APC-2	LEARNING COMMONS CLOUDS	ARMSTRONG	FINE FISSURED-HIGH ACOUST
ACOUSTIC WALL P	ANEL		
AWP-1	CAFTERIA	SOUNDPLY	RF M25
AWP-2	MUSIC	KINETICS	HARD SIDE
ACOUSTICAL SOLU	ITIONS		
ACC-1	ART	ARMSTRONG	TECTUM FINALE
ACC-2	MUSIC	ACOUSTICAL SOLUTIONS	PYRAMID SOUND DIFFUSER
BASE			
B-1	GENERAL WALL BASE	ROPPE	VINYL - TYPE TP - 700 SERIES
CARPET CPT-1	FIELD	TANDUS CENTIVA	APPLAUSE III
-			
CORNER GUARD			
CG-1			
DOORS			
DR-1	INTERIOR DOORS	VT INDUSTRIES	MATCH EX.
FIBRE-REINFORCE			
FRP-1	KITCHEN AND MOP SINKS	MARLITE	STANDARD-PEBBLE SURFACE
GROUT		MADEL	EDOVY
G-2	FOR FLOOR TILE T-2	MAPEI	EPOXY
<u></u>		l.	
LUXURY VINYL TILE			
LVI-I	FIELD	TARKETT	
PAINT			
P-1	FIELD PAINT	SHERWIN WILLIAMS	KWALL PAINT, DISTRICT STAN
P-2 P-3	CLASSROOM ACCENT WALLS	SHERWIN WILLIAMS	IBD IBD
1-0			
PLASTIC LAMINATE	E		
PL-1	CASEWORK - HORIZONTAL SURFACES	WILSONART	PLASTIC LAMINATE
FL-2	CASEWORK - VERTICAL SURFACES	WILSONARI	
SEALED CONCRET	E FLOORING		
SC-1		-	CONCRETE, SEALED
SOLID SURFACE			
SS-1	COUNTERTOPS AND WINDOW SILLS	CORIAN	SOLID SURFACING 13MM
TACKBOARD	GENERAL TACKBOARD	FORBO	
TILING			
T-1			
T-3	KITCHEN WALL TILE	DALTILE	COLOR WHEEL LINEAR
TOILET PARTITION			וססו
IP-1		BOBRICK	
TRANSITIONS			
TR-1	RESTROOM WALL TILE EDGE TRIM	SCHLUTER	DILEX-AHK
TR-2	CARPET TO LVT	JOHNSONITE	СТАХХХ-Н
TR-3	TILE TO LVT	SCHLUTER	RENO-TK
TR-4	CARPET TO CARPET	JOHNSONITE	CTA-XX-N
	-		
WOC-1		TANDUS CENTIVA	ASSERTIVE ACTION 04837
WINDOW SHADE			
WOOD			
WD-1			
VVU-2			

COLOR AND MATERIAL	S SCHEDULE - BASIS OF DESIGN			
DUCT NAME	COLOR / FINISH	SIZE	REMARKS	HEADER
ICS SQUARE LAY-IN - 1714 ICS SQUARE LAY-IN - 1714	WHITE W/ WHITE GRID	24 × 48 ×3/4 24" × 48"×3/4"	CLOUD EDGE - 6" AXIOM	ACOUSTIC PANEL CEILING
	ТРЛ		1	
	TBD			ACOUSTIC WALL PANEL
			1	
	TRD	24748	SEE DRAWINGS	
	WHITE	48X48	SEE DRAWINGS	ACOUSTICAL SOLUTIONS
	I			
		4" H		RASE
		T		DAOL
				1
	QUINCE	6' ROLLS	UNIDIRECTIONAL	CARPET
	SILVER WHITE 0105	WIDTH- 1.5" HEIGHT- 4'-0"	INSTALL AT TOP OF BASE	CORNER GUARD
	MATCH EX.			DOORS
	I			
			1	
				FIBRE-REINFORCED FLASTIC
			1	
	CHARCOAL 47			GROUT
				GRUUI
			1	
		18 x 18		LUXURY VINYL TILE
DARD				PAINT
				PAINT
	BRONZE LEGACY 4656-60			PLASTIC LAMINATE
	BRONZE ELGACT 4000-00			
			1	
		-		SEALED CONCRETE FLOORING
	DEEP ANTHRACITE	13MM		SOLID SURFACE
	2182 - POTATO SKIN	48"X72"	SATIN ANODIZED ALUMINUM TRIM, SEE PLAN FOR SIZE	TACKBOARD
	BEIGE NEII-MATTE	24X24	INSTALL IN ALL RESTROOMS	TILING
	ALLEGRO BEIGE CH21-UNPOLISHED	24X24	INSTALL IN ALL RESTROOMS	TILING
	K175 GLOSS BISCUIT	6X18	INSTALL IN KITCHEN	TILING
	DESERT ZEPHYR 4841-60			TOILET PARTITIONS
	SATIN ANODIZED ALUMINUM	HEIGHT TO MATCH TILE AND SETTING BED		TRANSITIONS
		THICKNESS		
	BLACK 40	INSTALLER TO VERIFY SIZE		TRANSITIONS
	BLACK 40	INSTALLER TO VERIFY SIZE		TRANSITIONS
	CHROMIUM 26201			
			1	
			1	
	WHITE/SAND			WINDOW SHADE
	MATCH EX.	SEE ELEVATION FOR SIZE		WOOD
		SEE ELEVATION FOR SIZE	STAIN. SEE ELEVATION FOR COLOR	















REFER TO CITY OF STEAMBOAT'S STANDARD SPECIFICTIONS FOR WATER AND WASTEWATER UTILITIES



LEGEND

____X____

TREE PROTECTION FENCING

TREES TO BE REMOVED

LIMITS OF REMOVALS

LIMITS OF CONSTRUCTION







SCALE: NTS

LEGEND

• • • • • • . <u>.</u>

SYNTHETIC TURF

LIMITS OF CONSTRUCTION













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LEGEND

- ---- EXISTING CONTOUR
- 01 PROPOSED CONTOUR MINOR

















LANDSCAPE NOTES:

- 1. ALL PLANT MATERIALS SHALL MEET OR EXCEED CURRENT AMERICAN STANDARD FOR NURSERY STOCK ANSI 260.1 AND THE COLORADO NURSERY ACT AND ACCOMPANYING RULES AND REGULATIONS.
- 2. ALL APPROVED WORK WITHIN TREE PROTECTION ZONE/CRITICAL ROOT ZONE MUST BE ACCOMPLISHED WITH HAND TOOLS ONLY.
- 3. CONTRACTOR TO SUBMIT SOD CERTIFICATE TO THE OWNER'S REPRESENTATIVE FOR APPROVAL.
- 4. THE SODDED AREAS SHALL BE PREPARED WITH ORGANIC MATTER AT THE RATE OF 4 CUBIC YARDS PER 1,000 SQUARE FEET. REFER TO SPECIFICATION FOR NATIVE SEED LANDSCAPE AREA AMENDMENTS. THIS PREPARATION SHALL BE THOROUGHLY INCORPORATED INTO THE TOP 6" OF SOIL.
- 5. ALL PLANT MATERIAL ARE TO BE APPROVED BY THE OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
- 6. NO SUBSTANTIAL CHANGE FROM THE APPROVED LANDSCAPE PLAN MAY OCCUR WITHOUT PRIOR REVIEW & APPROVAL BY THE OWNER'S REPRESENTATIVE WHICH MAY REQUIRE ADDITIONAL IRRIGATION TAPS FOR CHANGES DUE TO MORE WATER INTENSIVE LANDSCAPING.
- ALL TREES IN SEEDED OR SODDED AREAS WILL HAVE A MULCH RING WITH NATURAL CEDAR FIBER MULCH AT A 3"-4" DEPTH AND AT LEAST 3'-4' DIAMETER. NO MULCH WILL BE PLACED AGAINST THE TRUNK OF THE TREE.
 ANY TREE SUBSTITUTIONS MUST BE APPROVED BY OWNER'S REPRESENTATIVE PRIOR TO
- ANT TREE SUBSTITUTIONS MOST BE AFFROVED BY OWNER'S REFRESENTATIVE FRIOR TO DELIVERY AND INSTALLATION.
 ALL UTILITY EASEMENT SHALL REMAIN UNOBSTRUCTED AND FULLY ACCESSIBLE ALONG THEIR

ENTIRE LENGTH FOR MAINTENANCE EQUIPMENT ENTRY.

- 10. THE CONTRACTOR SHALL FINE GRADE ALL AREAS TO BE PLANTED. THE CONTRACTOR SHALL REMOVE REQUIRED DEPTH OF SOIL ALONG WALKWAYS TO ACCOMMODATE SOD OR MULCH
- DEPTH. 11. THE CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE AWAY FROM ALL STRUCTURES AND WALKWAYS. HAVE ALL FINE GRADING APPROVED PRIOR TO SEEDING.
- COBBLE SALVAGED FROM ON SITE GRADING OPERATIONS TO BE REVIEWED FOR USE AND PLACEMENT WITHIN LANDSCAPE AREAS AS NOTED ON PLANS.
- 13. ALL SHRUB BEDS TO BE MULCHED WITH 1 ¹/₂" WASHED RIVER ROCK, 3" DEPTH, OVER FILTER FABRIC UNLESS OTHERWISE NOTED. SUBMIT SAMPLE FOR APPROVAL.
- 14. PRIOR TO SODDING, SEEDING, OR PLANTING, CONTRACTOR TO APPLY HERBICIDE TO ELIMINATE ALL WEED GROWTH WITHIN LANDSCAPE AREAS, PER SPECIFICATION.

PLANT LIST

,			
COMMON NAME	BOTANICAL NAME	SIZE	COMMENTS
ORNAMENTAL TREES			
Rocky Mountain Maple	Acer glabrum	6'-8' Ht. Clump form	B&B, specimen quality
Lanceleaf Cottonwood	Populus acuminata	2 1/2" cal	B&B, specimen quality
DECIDUOUS SHRUBS			
Bluemist Spirea	Caryopteris x clandonensis 'Dark Knight'	5 gal.	cont., 5 canes min., 12"-18" ht.
Mountain Snowberry	Symphoricarpos oreophilus	5 gal.	cont., 5 canes min., 18"-24" ht.
Yellow Flowering Currant	Ribes aureum	5 gal.	cont., 5 canes min., 18"-24" ht.
Isanti Dogwood	Cornus sericea 'Isanti'	5 gal.	cont., 5 canes min., 18"-24" ht.
CONIFEROUS/EVERGREEN	SHRUBS		
Compact Oregon Grape Holly	Mahonia repens 'Compacta'	5 gal.	cont., 5 canes min., 18"-24" ht.
Common Juniper	Juniperus communis	5 gal.	cont., 5 canes min., 18"-24" ht.
ORNAMENTAL GRASSES			
Little Bluestem	Schizachvrium Scoparium 'Blaze'	1 gal.	Container, Well established
		- gan	

NATIVE SEED MIX

IRRIGATED NATIVE SEED: FRESH, CLEAN, DRY, NEW CROP SEED COMPLYING WITH THE ASSOCIATION OF OFFICIAL SEED ANALYSTS "RULES FOR TESTING SEEDS" FOR PURITY AND GERMINATION TOLERANCES. REFER TO SPECIFICATIONS FOR APPLICATION RATE.

BLUE GRAMA	25%
BOTTLEBUSH SQUIRRELTAIL	5%
BUFFALOGRASS	25%
GREEN NEEDLEGRASS	5%
PRAIRIE JUNEGRASS	5%
SAND DROPSEED	5%
SIDEOATS GRAMA	20%
WESTERN WHEATGRASS	10%



3 DECIDUOUS TREE PLANTING

NOT TO SCALE

- APPLY SPE DEEP. SEE DEPTH ARC DO NOT BL	CIFIED ROCK SPECIFICATION OUND PLANT E JRY PLANT WI	MULCH 1 1/2' NS. NOTE: MU BASE MAY BE TH MULCH.	'-3" LCH THINNER.
PLANT S			

	= == == == == == == == <u> == </u> == ==
\	-PLANTING PIT TO BE
\backslash	PER SPECIFICATIONS
、 、	AMENDED BACKFILL, RE: SPECIFICATIONS
\	REMOVE PLASTIC POTS PRIOR TO PLANTING

ORNAMENTAL GRASSES & PERENNIALS

NOT TO SCALE













Sheet No:

L5.0

-POST CAP, TYP. -1 5/8" O.D. STEEL GATE FRAMES -1 5/8" O.D. STEEL BRACE RAILS —1 5/8" O.D. STEEL CENTER RAIL, TYP. —8 GA.x2" MESH KNUCKLED T&B, TYP. -2 7/8" O.D. STEEL

SCALE: 1/2" = 1'-0







2 LONG JUMP PIT

NOTES: MANUFACTURER — SPORTSFIELD SPECIALTIES MODEL # — DCHS COLOR — BY OWNER	22'-4 <u>1</u> "
RF: CIVIL FOR CONCRETE PAVING DETAIL	$\left(\begin{array}{cccccccccccccccccccccccccccccccccccc$
CAGE SHOWN FOR REFERENCE ONLY, NIC, BY OTHERS	
CONCRETE PAD	
MAIN NET	
POLES	
	14'-9"
3 SHOT PUT & DISCUS C	CONCRETE PAD

-FLEXEDGE RUBBER LONG JUMP CURB BY: SPORTSEDGE -NATIVE SEED

N.T.S.

1 SITE DETAILS





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L5.1



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\square	

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DAKTR	ONICS	COPYRIGHT 2018 DAKT	RONICS, INC. (USA)		\downarrow
PROJECT:	OUTDOOR LED	SCOREBOAR	DS		
TITLE:	COMPONENT L	OCATION; FB-	-2020-R/A		
DATE:	3 FEB 12	DIM UNITS: INC	HES [MILLIME	TERS]	SHE
SCALE:	1=40	DO NOT S	CALE DRAW	ING	
DESIGN:	DOPPELT	JOB NO.	FUNC - TYPE - SIZE		106
		1			



		HEIGHT ABO	VE GRADE	= 15'				
VELOCITY				DESIGN WIND VELOCITY				
50 MPH	170 MPH	HEIGHT (FT)		115 MPH	130 MPH	150 MPH	170 MPH	
10X30	W10X33	8	COLUMN	W8X31	W10X33	W10X39	W16X36	
.0'X10.0'	3.0'X9.5'		FOOTING	2.0'X9.0'	3.0'X8.5'	3.0'X9.5'	3.0'X10.5'	
12X26*	W14X30*	10	COLUMN	W12X26*	W14X30*	W12X40	W14X48	
.0'X9.5'	3.0'X11.0'		FOOTING	3.0'X8.5'	3.0'X9.5'	3.0'X11.0'	3.0'X12.0'	
12X30*	W14X34*	12	COLUMN	W14X30*	W16X36*	W14X43*	W21X48*	
.0'X11.0'	3.0'X12.0'		FOOTING	3.0'X9.5'	3.0'X11.0'	3.0'X12.0'	3.0'X13.0'	
14X34*	W16X40*	14	COLUMN	W16X36*	W16X40*	W14X48*	W18X55*	
.0'X12.0'	3.0'X13.0'		FOOTING	3.0'X10.0'	3.0'X11.0'	3.0'X13.0'	3.0'X15.0'	
16X40*	W21X44*	16	COLUMN	W12X40*	W14X48*	W18X55*	W21X62*	
.0'X12.0'	3.0'X14.0'		FOOTING	3.0'X11.0'	3.0'X12.0'	3.0'X14.0'	3.0'X16.0'	
21X44*	W21X48*	18	COLUMN	W14X43*	W21X48*	W18X60*	W21X68*	
.0'X14.0'	3.0'X16.0'		FOOTING	3.0'X12.0'	3.0'X13.0'	3.0'X15.0'	3.0'X18.0'	

HEIGHT ABOVE GRADE = 15'				
		DESIGN WIND VELOCITY		
HEIGHT (FT)		115 MPH	140 MPH	
8	COLUMN FOOTING	W8X35 2.0'X11.0'	W16X36* 3.0'X11.0'	
10	COLUMN FOOTING	W14X34* 3.0'X10.0'	W14X43* 3.0'X12.0'	
12	COLUMN FOOTING	W14X38* 3.0'X11.0'	W14X48* 3.0'X13.0'	
14	COLUMN FOOTING	W14X43* 3.0'X12.0'	W18X55* 3.0'X14.0'	
16	COLUMN FOOTING	W14X48* 3.0'X13.0'	W21X62* 3.0'X16.0'	
18	COLUMN FOOTING	W18X55* 3.0'X14.0'	W16X67* 3.0'X17.0'	

	DA BI	THE CONCEPTS EXF THIS DRAWING ARE DO NOT REPRODUCI	PRESSED ANI CONFIDENTIA E BY ANY M CONSENT	D DI AL A IEAN OF			
	DO NOT	SCALE D	RAWIN	5	COPYRIGHT	2011 DAKTR	
	PROJ:OUTDOOR	SCORE	BOA	RD INSTALL	_ATION		
	TITLE: 18' WIDTH	ARD INSTAL	LATION SPE	ECS			
:	DESIGN: RSCHWAR	DESIGN: RSCHWAR			VAR	DATE: 2	27
P	SCALE: 1/16"=1'						
:	SHEET	REV	J	OB NO:	FUNC-TYPE-SIZE	1 /	1 [
г		02	P16	647	E-10-A		













POINT OF CONNECTION - TIE INTO EXISTING SYSTEM PEAK FLOW REQUIREMENT: 70 GPM. REQUIRED STATIC PRESSURE: 80 PSI

CONTRACTOR TO LOCATE EXISTING 2" TAP AND BACKFLOW PREVENTER. TIE ONTO EXISTING IRRIGATION SYSTEM AND EXTEND PVC MAINLINE AS SHOWN. EXTEND ONE PE89 SHIELDED CABLE FROM FLOW SENSOR TO DATA RETRIEVAL UNIT LOCATED IN ASSOCIATED CONTROLLER. EXTEND 4 UFUL14# WIRE (TWO ORANGE AND TWO BLUE) AND CONNECT 2 OF THE WIRES FROM THE MASTER VALVE TO THE DATA RETRIEVAL BOARD IN ASSOCIATED CONTROLLER. SEE DETAIL SHEET FOR REQUIRED PIPE LENGTHS UPSTREAM AND DOWNSTREAM OF FLOW SENSING UNIT. WORK SHALL CONFORM TO LOCAL CODE. FEES AND PERMITS ASSOCIATED WITH WORK ARE TO BE OBTAINED AND PAID FOR BY CONTRACTOR.

-CONTROLLER LOCATION "A"

PEDESTAL MOUNT ONE CONTROLLER (REFER TO SCHEDULE FOR MODEL & STATION COUNT), REMOTE READY, AT INDICATED LOCATION, 120 VOLT POWER IS AVAILABLE WITHIN 40 LF. OF CONTROLLER LOCATION FROM BUILDING, BY OTHERS RE=(tbd). ETHERNET CABLING WILL BE REQUIRED TO BE INSTALLED TO CONTROLLER LOCATION, TO BE COORDINATED. ELECTRICAL METER, WIRE/CONDUIT, STEP-DOWN TRANSFORMER (IF REQUIRED) AND POWER CONNECTION TO CONTROLLER IS BY CONTRACTOR WITH WORK CONFORMING TO LOCAL CODES. EXTEND PE89 SHIELDED CABLE FROM THE FLOW SENSOR AND 4 #14 UFUL WIRES (TWO BLUE AND TWO ORANGE) FROM MASTER VALVE TO ASSOCIATED CONTROLLER. CONNECT WIRES TO THE APPROPRIATE SENSOR INPUT PORTS. FEES AND PERMITS ASSOCIATED WITH WORK ARE TO BE OBTAINED AND PAID BY CONTRACTOR. FINAL CONTROLLER LOCATION SHALL BE APPROVED BY CONSULTANT PRIOR TO INSTALLATION. MOUNT ONE WEATHER SENSOR ON BUILDING WHERE THERE IS 20FT. OF CLEARANCE FROM ANY OVERHANG OR OBSTRUCTING FEATURE. INSTALL WEATHER SENSOR RECEIVER IN CONTROLLER ENCLOSURE. FINAL WEATHER SENSOR LOCATION SHALL BE APPROVED BY CONSULTANT PRIOR TO INSTALLATION.



 $\underbrace{1}_{1^{\circ}} \underbrace{1^{\circ}}_{1^{\circ}} \underbrace{1^{\circ}}_{1^{\circ}} = 40^{\circ} - 0^{\circ}} \underbrace{1^{\circ}}_{1^{\circ}} = 40^{\circ} - 0^{\circ}}$







IRRIGATION SCHEDULE					
SYMBOL	MANUFACTURER	MODEL NO.	DESCRIPTION	DETAIL NO.	
	RAIN BIRD	1806-SAM-PRS WITH HE-VAN SERIES NOZZLE & 1800-NPCAP	POPUP SPRAY HEAD	1	
♦⊒�∎	RAIN BIRD	1812 SAM PRS WITH HE-VAN SERIES NOZZLE	HI-POP SPRAY HEAD	2	
● ^{#6} 🙀 💣 🗣	HUNTER	1-20-06-55 WITH # NOZZLE	GEAR DRIVEN ROTOR	З	
	HUNTER	I-20-12-PL WITH # NOZZLE	HI-POP GEAR DRIVEN ROTOR	4	
• ^{#6} * 6 * 6	HUNTER	1-25-06-55-R WITH # NOZZLE	GEAR DRIVEN ROTOR	з	
•	RAIN BIRD	PESB-PRS-D W/DECODER	ELECTRIC CONTROL VALVE	6 \$ 7	
V	RAIN BIRD	44-LRC	QUICK COUPLING VALVE	5	
Ø	RAIN BIRD	I-Q -TWO WIRE CONTROLLER	ELECTRIC CONTROLLER	18 \$ 19	
Ŕ	RAIN BIRD	WR2-RFC	WEATHER SENSOR DEVICE	20	
	FEBCO	825YA	RP BACKFLOW PREVENTER	23	
N/5	STRONG BOX	SBBC-(15/30)AL	BACKFLOW PREVENTER ENCLOSURE	24	
N/5	OLDCASTLE / CARSON	REFER TO SPECIFICATIONS AND DETAILS	VALVE BOXES	N/S	
N/5	N/S MATCO 201X		MANUAL DRAIN VALVE	٩	
M	LINE SIZE - 21/2" AND SMALLER		GATE VALVE	10	
M		LINE SIZE - 3" AND LARGER	GATE VALVE	11	
۲	RAIN BIRD PESB-PRS-D		MASTER CONTROL VALVE	22	
FS	FS RAIN BIRD F5-200-P		FLOW SENSOR	21	
N/5	N/5		THRUST BLOCKS	13	
		CLASS 200 BE - 21/2" & SMALLER	PVC MAINLINE	12	
		CLASS 200 RT - 3" & LARGER	PVC MAINLINE	12	
		#100 NSF	POLY LATERAL	12	
		CLA55 160	PVC SLEEVING	14	
~~~~	TORO	BLUE STRIPE	POLY DRIP TUBING $-\frac{3}{4}$ " MIN. WIDTH	17	
Ð	RAIN BIRD	XCZ-015-PRF OR XCZ-100-PRF W/ DECODER	DRIP VALVE ASSEMBLY	15 <b># 7</b>	
₽			DRIP LINE BLOW-OUT STUB	16	
N/5	RAIN BIRD	XERI-BUG	DRIP EMITTERS	17	
N/5	RAIN BIRD	FD-TURF	VALVE DECODER	٦	
N/5	RAIN BIRD	SD-210	SENSOR DECODER	21 \$ 22	
	PAIGE	P7072D (FOR RAINBIRD, BASELINE)	2-WIRE DECODER CABLE	N/5	
@^	RAIN BIRD	LSP1TURF	SURGE PROTECTION	8	
M			WATER METER	N/S	
CONTROLLER & STATION NO.					

### **IRRIGATION DEVELOPMENT DESIGN NOTES**

- 1. THE IRRIGATION SYSTEM SHALL BE DESIGNED TO PROVIDE PEAK SEASON IRRIGATION WITHIN AN SIX NIGHT, SIX HOUR PER NIGHT WATERING PERIOD. IRRIGATION SHALL OCCUR BETWEEN THE HOURS OF 11:00 PM AND 4:00 AM*** .
- 2. THE MAINLINE SYSTEM WILL BE DESIGNED SUCH THAT VELOCITIES WITHIN THE MAINLINE PIPING DO NOT EXCEED FIVE FEET PER SECOND.
- 3. THE MAXIMUM FLOW RATE REQUIRED FOR THE SITE, AS NOTED ON FOC NOTES. THE STATIC PRESSURE AVAILABLE AT THE SITE IS 80 PSI MIN.
- 4. IRRIGATION DESIGN APPROACH 4.1. TURF AREAS
- 4.1.1. SMALL AREAS (25 FEET WIDE OR LESS) SHALL BE IRRIGATED WITH FIXED NOZZLE POP-UP SPRAY HEADS WITH MATCHED PRECIPITATION NOZZLES. NOZZLES SHALL BE SIZES TO PROVIDE HEAD TO HEAD COVERAGE. 4.1.2. LARGE TURF AREAS (WIDER THAN 25 FEET) SHALL BE IRRIGATED WITH GEAR DRIVEN
- ROTOR HEADS WITH A MINIMUM PRECIPITATION RATE OF .45" PER HOUR FOR A FULL CIRCLE HEAD. 4.2. SHRUB BED AREAS - BED AREAS WITH PLANT MATERIAL ONE GALLON IN SIZE OR
- LARGER SHALL BE DRIP IRRIGATED. 4.3. PERENNIAL AND ANNUAL BED AREAS - PERENNIAL AND ANNUAL BED AREAS SHALL BE SPRAY IRRIGATED WITH 12" POP-UP SPRAY HEADS WITH A MAXIMUM SPACING OF 10' O.C. OR IN AREAS ARE LESS THAN 10 FT. WIDE SHALL BE IRRIGATED WITH SUBSURFACE IRRIGATION.
- 5. THE IRRIGATION INFORMATION SHOWN ON THESE PLANS IS CONCEPTUAL.
- 6. IRRIGATION SYSTEM SHALL BE FULLY AUTOMATIC AND INCLUDE A WEATHER SENSING DEVICE.

2.23" PER WEEK PEAK SEASON BLUEGRASS TURF ORNAMENTAL PLANTINGS 0.89" PER WEEK PEAK SEASON 0.74" PER WEEK PEAK SEASON (TWO SEASONS) NATIVE SEED MIXES

- SHOWN.
- WIRE SLEEVE.

### SLEEVED P

COM

### **IRRIGATION CONSTRUCTION NOTES**

1. DRAWINGS AND BASE INFORMATION - ALL BASE AND PLANTING INFORMATION HAVE BEEN PROVIDED BY DHM DESIGN. THE CONTRACTOR IS RESPONSIBLE TO NOTIFY HYDROSYSTEMS*KDI OF ANY DISCREPANCIES BETWEEN THE UTILITY OR PLANTING PLANS AND THE IRRIGATION PLAN. IF CONTRACTOR FAILS TO NOTIFY HYDROSYSTEMS*KDI AND MAKES CHANGES TO THE IRRIGATION SYSTEM DESIGN, HE ASSUMES ALL COSTS AND LIABILITIES ASSOCIATED WITH THOSE FIELD CHANGES. REFER TO SPECIFICATIONS FOR ADDITIONAL PROJECT REQUIREMENTS.

2. SYSTEM PRESSURE - HYDROSYSTEMS*KDI HAS CONTACTED THE LOCAL WATER DISTRICT THAT SERVES THIS SITE AND THEY HAVE BEEN TOLD THAT THE STATIC WATER PRESSURE IN THIS AREA SHOULD BE 80 PSI. THE CONTRACTOR IS RESPONSIBLE TO FIELD VERIFY PRESSURE PRIOR TO COMMENCING ANY CONSTRUCTION AND NOTIFY HYDROSYSTEMS*KDI OF ANY VARIANCE FROM THE STATED PRESSURE IMMEDIATELY. WRITTEN DOCUMENTATION OF PRESSURE TEST AND RESULTS SHALL BE PROVIDED TO HYDROSYSTEMS*KDI AT CONSTRUCTION ONSET. IF CONTRACTOR FAILS TO FIELD VERIFY PRESSURE AND/OR NOTIFY HYDROSYSTEMS*KDI OR ANY VARIATIONS FROM THIS PRESSURE. THEN HE ASSUMES ALL CONSTRUCTION AND ENGINEERING COSTS ASSOCIATED WITH SYSTEM MODIFICATIONS REQUIRED TO ACCOMMODATE ACTUAL SITE PRESSURE. THIS SYSTEM HAS BEEN DESIGNED FOR A REQUIRED STATIC PRESSURE OF 80 PSI MINIMUM.

3. IRRIGATION SYSTEM OPERATION INTENT - THIS IRRIGATION SYSTEM HAS BEEN DESIGNED TO IRRIGATE THE ESTABLISHED LANDSCAPE WITHIN A SIX NIGHT PER WEEK, SIX HOUR PER NIGHT WATERING WINDOW. ESTABLISHMENT WATERING WILL REQUIRE UP TO TWICE AS MUCH IRRIGATION FOR A FOUR TO SIX WEEK PERIOD. THE DESIGN IS BASED ON THE FOLLOWING PROJECTED WEEKLY APPLICATION RATES AFTER ESTABLISHMENT. THESE FIGURES ARE BASED ON A 30-YEAR AVERAGE WEATHER DATA AND WILL NEED TO BE ADJUSTED DUE TO SEASONAL CHANGES AND WEATHER CONDITIONS ABOVE AND BELOW THE AVERAGE VALUES UTILIZED.

NOTE: IT IS THE INTENT OF THIS DESIGN THAT NATIVE AREAS WOULD ONLY BE IRRIGATED FOR ESTABLISHMENT. SYSTEM WILL REMAIN FOR USE DURING YEARS WITH LESS THAN NORMAL RAINFALL.

4. EQUIPMENT INSTALLATION - IT IS THE INTENT OF THIS DESIGN THAT ALL IRRIGATION EQUIPMENT BE INSTALLED WITHIN PROPERTY LIMITS AND WITHIN LANDSCAPED AREAS. ANY EQUIPMENT OTHER THAN VALVE BOXES OR SLEEVING THAT CONTAINS PIPE OR WIRES SHOWN OUTSIDE OF THESE LIMITS IS SHOWN IN THAT LOCATION FOR GRAPHICAL CLARITY ONLY. ALL VALVE BOXES SHALL BE INSTALLED A MINIMUM OF 2'-O" FROM EDGE OF ANY PAVED SURFACES UNLESS SPECIFICALLY INDICATED ON PLANS, BOXES INSTALLED IN OPEN TURF AREAS SHALL BE KEPT TO EDGES AND STAKED FOR REVIEW IF ALONG HIGH TRAFFIC AREAS. ALL VALVE BOXES SHALL BE PLACED A MINIMUM OF 3'-O" FROM THE CENTERLINE OF ANY DRAINAGE SWALE. ALL VALVE BOXES WITHIN PAVEMENT SHALL BE TIER 15 RATED BOXES FOR HEAVY DUTY NON-DELIBERATE TRAFFIC. BOX LID COLOR SHALL MATCH ADJACENT MATERIALS, I.E. GREEN IN TURF, TAN IN WOOD MULCH, GRAY IN STONE MULCH, PURPLE FOR RECLAIMED WATER SYSTEMS (IF REQUIRED). REFER TO LANDSCAPE PLANS FOR MATERIAL COLORS AND TYPES. ALL BOXES SHALL BE INSTALLED TO BE FLUSH WITH GRADE AND IN AN ORDERLY MANNER.

5. MANUAL DRAIN VALVES - CONTRACTOR TO INSTALL ONE MANUAL DRAIN VALVE ON PRESSURE SUPPLY LINE DIRECTLY DOWNSTREAM OF BACKFLOW PREVENTER AND AT ALL LOW POINTS AND DEAD ENDS OF PRESSURE SUPPLY PIPING TO INSURE COMPLETE DRAINAGE OF SYSTEM. CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THESE LOCATIONS IN-FIELD AND INSTALLATION LOCATIONS SHALL BE NOTED ON AS-BUILTS.

6. POP-UP SPRAY NOZZLES - CONTRACTOR TO INSTALL PLASTIC NOZZLES ON ALL POP-UP SPRAY HEADS. INSTALL 15 SERIES NOZZLES ON ALL HEADS SPACED AT 12' TO 14'. INSTALL 12 SERIES NOZZLES ON ALL HEADS SPACED 10' TO 11'. INSTALL 10 SERIES NOZZLES ON ALL HEADS SPACED AT 8' TO 9'. INSTALL 8 SERIES NOZZLES ON ALL HEADS SPACED AT 6' TO 7'. INSTALL 5' NOZZLES ON ALL HEADS SPACED AT 5'. INSTALL SIDE STRIP NOZZLES ON ALL HEADS WITH AN "S" DESIGNATION AND RIGHT AND LEFT CORNER STRIP NOZZLES ON ALL HEADS WITH AN "L" OR "R" DESIGNATION. VARIABLE ARC NOZZLES SHOULD BE UTILIZED ADJACENT TO CURVILINEAR SHRUB BEDS OR FOR ANY ANGLES THAT ARE NOT A STANDARD NOZZLE ANGLE. WHERE INDICATED, INSTALL LOW FLOW SQ SERIES SQUARE NOZZLES AT SPACING

7. DRIP IRRIGATION - REFER TO IRRIGATION DETAIL SHEET FOR DRIP EMITTER QUANTITIES AND PLACEMENT.

8. UNLABELED PIPING - ALL UNLABELED LATERAL PIPING SHALL BE 1" MINIMUM UNLESS OTHERWISE NOTED.

9. SLEEVING - ALL SLEEVING UNDER PAVED SURFACES SHOWN ON PLANS IS BY CONTRACTOR UNLESS OTHERWISE NOTED. SLEEVING SHALL BE INSTALLED IN THE SIZES AND QUANTITIES SHOWN ON PLANS OR BASED ON THE SCHEDULE BELOW. WHERE SLEEVES ARE SHOWN, BUT NOT LABELED, FOLLOW THE SCHEDULE BELOW. ALL MAINLINE, CONTROL WIRES AND DRIP LINES UNDER PAVED SURFACES ARE TO BE INSTALLED IN SLEEVING. ALL MAINLINE SLEEVE LOCATIONS TO INCLUDE A SEPARATE

PE SIZE/WIRE QUANTITY	REQUIRED SLEEVE SIZE & (QUANTITY
1 ¹ / ₄ " PIPING	2" PVC (1)
2" PIPING	4" PVC (1)
- 3" PIPING	6" PVC (1)
IPING	8" PVC (1)
IMUNICATION CABLE (2-W	IRE) 3" PVC (1)

10. 2-WIRE SYSTEM NOTES - CONTRACTOR SHALL INSTALL ALL TWO-WIRE COMPONENTS PER MANUFACTURES RECOMMENDATIONS AND STANDARDS. 10.1. CONTRACTOR SHALL USE ONLY MANUFACTURED 2-WIRE DECODER CABLE (SEE SCHEDULE FOR SPECIFIC 2-WIRE CABLE).

10.2. USE DIFFERENT COLOR 2-WIRE DECODER CABLE FOR EACH CONTROLLER (BLUE FOR A AND BLACK FOR B).

10.3. ONLY USE SINGLE STATION DECODERS (SEE SCHEDULE FOR SPECIFIC MODEL). 10.4. ONLY USE SENSOR DECODER FOR FLOW SENSOR (SEE SCHEDULE FOR SPECIFIC MODEL) IF INDICATED ON PLANS.

10.5. LOOP 5' OF 2-WIRE DECODER CABLE INTO ALL VALVE BOXES (WITH DECODERS AND SPLICES) FOR MAINTENANCE.

10.6. USE ONLY 3M DBR-6 WATERPROOF CONNECTORS ON ALL WIRE SPLICES AND ALL WIRE SPLICES ARE TO BE MADE WITHIN A VALVE BOX WITH CONTROL VALVES OR A SEPARATE 10" ROUND VALVE BOX FOR WIRE SPLICES. 10.7. INSTALL SURGE PROTECTOR RODS OR PLATES 8 LF. FROM VALVES, DECODERS, AND COMMUNICATION WIRE.

10.8. GROUND ALL DECODERS AND DECODER WIRE A MINIMUM OF EVERY 500 OF WIRE OR EVERY 8TH DECODER AND AT ALL ENDS OF 2-WIRE DECODER CABLE RUN. 10.9. LOOP EXTRA 10' OF 2-WIRE DECODER CABLE INTO A VALVE BOX AT PHASING LINES FOR FUTURE CONNECTION (IF INDICATED ON PLANS).

11. ADJUSTMENT - CONTRACTOR SHALL FINE TUNE/ADJUST THE IRRIGATION SYSTEM TO REDUCE/AVOID OVERSPRAY ONTO HARD SURFACES BY ADJUSTING NOZZLE DIRECTION AND NOZZLE RADIUS.

12. PLANS AND SPECIFICATIONS - CONTRACTOR RESPONSIBLE TO ENSURE WORK CONFORMS TO PLANS AND SPECIFICATIONS. AT ONSET OF CONSTRUCTION, VERIFY PLANS ARE CURRENT. WHERE REQUIRED BY CITY, CONTRACTOR SHALL CONSTRUCT ONLY OFF CITY STAMPED PLANS. REVISIONS TO CITY STAMPED PLANS SHALL CONFORM TO CITY FIELD CHANGE PROCEDURES AND DOCUMENTATION.

13. EXISTING IRRIGATION DAMAGE - CONTRACTOR SHALL REPAIR OR REPLACE ANY EXISTING IRRIGATION SYSTEMS DAMAGED DURING NEW INSTALLATION, REPAIR OR REPLACEMENT SHALL BE DETERMINED BY OWNER OR OWNER'S REPRESENTATIVE AND PAID FOR BY THE LANDSCAPE CONTRACTOR.

14. EXISTING IRRIGATION COORDINATION - EXISTING IRRIGATION SYSTEM SHALL NOT BE TURNED OFF FOR MORE THAN 24 HOURS MAXIMUM. CONTRACTOR SHALL COORDINATE TURN OFF OF SYSTEM WITH OWNER OR MAINTENANCE STAFF 72 HOURS PRIOR TO ANY NEW CONSTRUCTION.

15. SIMULTANEOUS ZONE OPERATION - THIS IRRIGATION SYSTEM HAS BEEN DESIGNED TO OPERATE MULTIPLE ZONES SIMULTANEOUSLY BASED ON INDIVIDUAL ZONE FLOW. THE DESIGN IS INTENDED TO OPERATE MULTIPLE VALVES, UP TO THE MAXIMUM FLOW IN THE POINT OF CONNECTION NOTE. REFER TO CONTROLLER SPECIFICATION FOR MAXIMUM SIMULTANEOUS VALVE COUNT.







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PLANTING BACKFILL MATERIAL POLY DRIP TUBING PLANT ROOTBALL EMITTER - STAKE TO EDGE OF ROOTBALL EMITTER MICRO-TUBING - 60 MAXIMUM LENGTH PLAN

PLANT SIZE	EMITTER FLOW RATE	EMITTER BE
1 - 2 GALLON MATERIAL	0.5 GPH	
5 GALLON MATERIAL	0.5 GPH	
11/2" CALIPER TREE	1.0 GPH	
2" CALIPER TREE	1.0 GPH	
21/2" CALIPER TREE	1.0 GPH	
3" CALIPER TREE	1.0 GPH	
31/2" CALIPER TREE	1.0 GPH	
4" CALIPER TREE	1.0 GPH	
6 FT. CONIFEROUS TREE	1.0 GPH	1
8 FT. CONIFEROUS TREE	1.0 GPH	
10 FT. CONIFEROUS TREE	1.0 GPH	
12 FT. CONIFEROUS TREE	1.0 GPH	

### DRIP EMITTER

**BELOW GRADE** 

3/4" - 2" SYSTEMS WITH PVC CONNECTION



NOTE: MOUNT RAIN SENSOR RECEIVER PER CONTROLLER DETAIL.

### WEATHER SENSOR **EAVE MOUNTED - Wireless**

ENCLOSURE MODEL BFP MODEL/SIZE FEBCO 825Y 3/4" # 1" SBBC-30AL SBBC-45AL FEBCO 825Y 11/2" # 2" SBBC-15AL FEBCO 825YA ¾" & 1" SBBC-30AL FEBCO 825YA 1½" # 2" ×_____ . . . . . - STRONGBOX ENCLOSURE CONCRETE PAD NOTES: PAD PENETRATIONS FOR BACKFLOW PREVENTER RISERS TO BE 1" LARGER THAN RISER DIAMETER. • TOP SURFACE OF CONCRETE PAD SHALL BE 1" ABOVE FINISH . INSTALL ENCLOSURE ANCHORS AS PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE OWNER WITH KEYED PADLOCK FOR ENCLOSURE. BACKFLOW ENCLOSURE STRONGBOX - 3/4" - 2" SYSTEMS







**TWO WIRE SYSTEM** 













<u>OVERALL EXISTING PLAN</u> A2.00 1/16" = 1'-0"







D269



### NOTES: **GENERAL DEMOLITION NOTES:** DEMOLITION GENERAL NOTES APPLY TO ALL DEMOLITION SHEETS. COORDINATE DEMOLITION AND PHASING EFFORTS WITH ARCHITECT AND OWNER'S REPRESENTATIVES. EVERY EFFORT SHALL BE MADE TO MINIMIZE DISRUPTION OF OWNER'S OPERATIONS AND TO PROVIDE BUILDING USER'S SAFETY. EXCESSIVE NOISE AND VIBRATION SHALL BE PRE-APPROVED AND COORDINATED WITH OWNER'S REPRESENTATION. COORDINATE DEMOLITION WITH OWNER'S REPRESENTATIVE AND ASBESTOS ABATEMENT. PRIMARY ASBESTOS ABATEMENT DEMOLITION WILL INCLUDE BUT IS NOT LIMITED TO THE REMOVAL OF CEILINGS, LIGHTING, CASEWORK, DOORS, WALL FINISHES, INTERIOR WALL FRAMING, ASBESTOS FLOOR TILE AND MASTIC REMOVAL. COORDINATE DISRUPTION OF UTILITY SERVICES WITH OWNER AND AS SATISFIED. VERIFY EXISTING CONDITIONS, DIMENSIONS, AND ELEVATIONS AND NOTIFY ARCHITECT OF DISCREPANCIES. . ITEMS NOT SHOWN DASHED ARE TO REMAIN. ALL DASHED ITEMS REPRESENT ITEMS TO BE REMOVED. COORDINATE REMOVAL WITH NEW ITEMS SHOWN IN DRAWINGS. REMOVE EXISTING WALLS, DOORS, MILLWORK, PLUMBING FIXTURES, CEILINGS, SOFFITS, MARKERBOARDS, ETC. IN THEIR ENTIRETY AND AS REQUIRED TO EXECUTE DEMOLITION AND CONSTRUCTION WORK AS DESCRIBED ON THE DRAWINGS. THE OWNER SHALL RESERVE THE RIGHT TO SALVAGE ANY MATERIALS. . PROVIDE PROTECTIONS FOR EXISTING BUILDING MATERIALS AND EQUIPMENT FROM DAMAGE DUE TO DEMOLITION OR CONSTRUCTION-RELATED INCIDENT PREFORMED UNDER THIS CONTRACT. 10. REFER TO MEP AND STRUCTURAL DRAWINGS FOR ADDITIONAL ITEMS TO BE REMOVED, CAPPED OR ALTERED. 11. IF NEW CONSTRUCTION IS SHOWN ON OTHER DRAWINGS IT IS ASSUMED DEMOLITION IS REQUIRED IF EXISTING WALLS, FINISHES AND ETC. ARE CURRENTLY PRESENT. 12. CONTRACTOR TO COORDINATE REMOVAL OF EXISTING ITEMS WITH INSTALLATIONS OF NEW ITEMS. 13. COORDINATE NEW STRUCTURAL ITEMS WITH REMOVAL OF EXISTING ITEMS. REFER TO STRUCTURAL PLANS FOR ADDITIONAL STRUCTURAL WORK TO EXISTING STRUCTURE. 14. IT IS ASSUMED ITEMS NOT TAGGED AS REMOVED OR SALVAGED WILL BE REMOVED IF ATTACHED TO WALL, CABINET, OR OTHER ITEMS. THIS INCLUDES ITEMS ON WALLS, CEILINGS AND FLOORS. 15. ALL PLUMBING SHOWN AS DASHED AND NOT SPECIFICALLY NOTED WILL BE REMOVED. ALL PLUMBING NEEDS TO BE MODIFIED TO MATCH NEW LAYOUT. REFER TO PLUMBING PLANS FOR EXTENT OF WORK. 16. DRAWINGS ATTEMPT TO SHOW EXISTING CONDITIONS. BUT, ALL EXISTING CONDITIONS MAY NOT BE SHOWN OR VISIBLE ON SITE. CARE MUST BE TAKEN TO ABANDON, TURNOFF OR OTHERWISE SECURE EXISTING ELEMENTS THAT NEED TO BE REMOVED WITH REMOVED STRUCTURE. WHEN CONFLICTS ARE FOUND CONTACT ARCHITECT FOR DIRECTION. 7. REFER TO DEMO REFLECTED CEILING PLANS FOR ADDITIONAL WORK 18. ALL HARDWARE TO BE SALVAGED FOR OWNER OR REUSE FOR NEW CONSTRUCTIONS. 19. SALVAGE AND STORE ALL EXISTING FURNISHINGS AND EQUIPMENT IN EXISTING SPACES NOTED FOR RENOVATION. 20. NOT ALL ITEMS TAGGED FOR CLARITY. ASSUME REMOVE IF DASHED. **DEMOLITION DEFINITIONS:** REMOVE: DETACH ITEMS FROM EXISTING CONSTRUCTION AND LEGALLY DISPOSE OF THEM OFF SITE, UNLESS OTHERWISE INDICATED TO BE REMOVED AND SALVAGED OR REMOVED AND REINSTALLED. SALVAGE: DETACH ITEMS FROM EXISTING CONDITIONS AND RETURN TO OWNER READY FOR REUSE. REMOVE AND REINSTALL: DETACH ITEMS FROM EXISTING CONDITIONS, PREPARE THEM FOR REUSE, TEMPORARY STORE AS REQUIRED AND REINSTALL THEM AS INDICATED. EXISTING: EXISTING ITEMS OF CONSTRUCTION THAT ARE NOT TO BE REMOVED AND THAT ARE NOT OTHERWISE INDICATED TO BE REMOVED, SALVAGED, OR REMOVED AND REINSTALLED. DRAWINGS ATTEMPT TO SHOW EXISTING CONDITIONS. BUT, ALL EXISTING CONDITIONS MAY NOT BE SHOWN OR VISIBLE ON SITE. CARE MUST BE TAKEN TO ABANDON, TURNOFF OR OTHERWISE SECURE EXISTING ELEMENTS THAT NEED TO BE REMOVED WITH REMOVED STRUCTURE. DEMOLITION LEGEND EXISTING CONSTRUCTION TO REMAIN Keynote Legend Key Value REMOVE EXISTING WALL REMOVE EXISTING WINDOW REMOVE EXISTING DOOR AND DOOR D203 FRAME EXISTING STRUCTURE TO REMAIN, REF D208 STRUCTURE DWGS EXISTING WALL TO REMAIN EXISTING DOOR TO REMAIN D210 D212 REMOVE EXISTING CASEWORK D213 EXISTING CASEWORK TO REMAIN D214 REMOVE FLOOR RISERS D217 REF KITCHEN DWGS AND OWNER FOR RFUSE EXISTING STAGE TO REMAIN D22 D223 EXISTING CLIMBING WALL TO REMAIN SALVAGE SIGN FOR RELOCATION REMOVE PORTION OF EXISTING WALL FOR NEW DOOR REMOVE EXISTING LOCKERS D229 D230 EXISTING FLOOR TO REMAIN D239 REMOVE EXISTING TROPHY CASE REMOVE DOOR AND DOOR HARDWARE, D246 EXISTING FRAME TO REMAIN REMOVE FLOORING, PREP FLOOR FOR D264 D268 FLOOR PLANS EXISTING ELECTRICAL, GUTTER, AND D269 DOWNSPOUT TO REMAIN SALVAGE EXISTING CABINETS FOR REINSTALLATION IN THE SAME D274 FOOTPRINT LOCATION ON THE NEW FLOOR ELEVATION D275 OPENING AND WITHIN NEW FURRING WALL SALVAGE TRACK AND FIELD RECORDS D298 FOR REINSTALLATION BY SCHOOL,





D299







- OWNER AND AS SATISFIED.
- DRAWINGS.
- ANY MATERIALS.
- CURRENTLY PRESENT.

- ADDITIONAL WORK
- RENOVATION.
- REMOVE IF DASHED.

- THEM AS INDICATED.

		C	EMOLITION LEGEN
		E	XISTING CONSTRU
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			Keynote Lege
	Key Value		Key
	D201		REMOVE EXISTING
	D209		EXISTING WALL TO
	D212		REMOVE EXISTING
	D213		EXISTING CASEWO
	D219		REMOVE EXISTING PANELS, CABINETS

1219	PANELS, CABINET
225	REMOVE PORTION FOR NEW DOOR
264	REMOVE FLOORIN NEW FLOORING R
288	REMOVE EXISITNO





# Ê F G _____ _ _ _ _ _ _ _ _ _ _ _ _ _ DRAWINGS. DRAWINGS. ALTERED. _____ _ _ _ _ _ _ _ _ _ _____ _____ _____ WORK. RENOVATION. _____ _____ _____

Key Value	Ke
D208	EXISTING STRUCT STRUCTURE DWG
D209	EXISTING WALL TO
D249	EXISTING GUTTER HEAT TAPE TO RE
D258	EXISTING WALL FF AND ROOF DECKI
D280	EXISTING PARAPE
D289	REMOVE EXISTING







EXISTING CONSTRUCTION TO BE REMOVED

Keynote Text EXISTING WALL FRAMING BETWEEN BEAM



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Revisions: Description Da

Issue Dates: Initial SD - 12/20/19 SD - 01/14/20 DD - 02/21/20

Sheet Title: Demo Exterior Elevations







- NEW WORK AS SCHEDULED.
- EXISTING.
- 6. DO NOT SCALE DRAWINGS.
- INDICATED.

	Keynote Leger
Key Value	Keyr
A210	INSTALL NEW DRYV EXISTING COLUMN
A211	NEW WINDOW SOLI
A214	INSTALL NEW SECT REF DOOR SCHEDU
A216	INFILL WALL WHERE AND DOORS ARE TO WALL TAG
A220	EXISTING WALL TO
A223	INSTALL NEW LVT F
A224	INSTALL NEW EPOX
A225	LAMINATED CUSTO WALL ON 20' WALL S
A226	INSTALL DRYWALL COLUMN LAMINANT PROTECTION BOAR
A230	NEW CEILING MOUN ELECTRICAL POWE RETRACTABLE COR DRAWINGS
A233	INSTALL NEW SEMI EXTINGUISHER CAE 75' APART, FULLY R GYM
A241	PATCH/INSTALL NEV WHERE RISERS/CAU REMOVED
A245	REPAIR/REPLACE E OPEN
A246	NO WORK IN AREA
A250	REINSTALL SALVAG
A255	NEW STAIRS TO BE GUARDRAILS AND H
A264	INSTALL NEW CARP
A266	FLUSH OUT FLOOR ADJACENT SPACES
A269	EXISTING CABINETS
A284	INSTALL NEW SEAT CURB, STAIN CONC
A288	INSTALL NEW BASE
A295	NEW DOOR IN EXIS







### 1 7th GRADE SCIENCE ROOMS





2 8TH GRADE SCIENCE ROOMS

### ν ) W ┶┹╈┽ 00 000 . _ _ _ _ _ _ _ _ -HOOD LOCATION ╶╓┑╞╧╦╣╴ _ ____ _ ___ _ ___ 8TH GRADE SCIENCE D101 EQ EQ STRUCTURE OF GREENHOUSE -TO BE INVESTIGATED AND RECCOMENDATIONS GIVEN A8.01 _____ _ ____ RES GREENHOUSE I ene I D103 ° ( A8.01 8TH GRADE SCIENCE D104 SCOPE OF WORK 1) DEMO AND REPLACE ALL CASEWORK, COUNTERTOPS, AND SINKS, DRYWALL PATCH AND PAINT AS NEEDED 2) DEMO AND REPLACE FLOORING W/ LVT 3) NEW BIOSAFETY OR VENTED CABINETS 4) NEW VENT HOODS -HOOD LOCATION _ ____ _ _ ___ __ __ _ _ _ _ _ _ _ _ _ _ $\searrow$

### NOTES:

### FLOOR PLAN GENERAL NOTES: 1. PATCH EXISTING CONSTRUCTION SCHEDULED TO REMAIN. REPAIRED SURFACES TO BE FLUSH WITH

- ADJACENT FINISH SURFACES. TO SAME QUALITY AS NEW CONSTRUCTION PRIOR TO INSTALLING NEW FINISHES. REFER TO THE FINISH MANUFACTURER'S GUIDELINES FOR INSTALLATION. 2. PATCH EXISTING FIRE-RATED WALLS, FLOOR
- CEILINGS, ETC. SO AS TO MAINTAIN THE FIRE-RADIATING. ADD FIRE-SMOKE DAMPERS WHERE NEW DUCTS CROSS. ADD FIRE STOP AT ALL
- 3. PATCH WALLS AT REMOVED RECEPTACLE OPENINGS SO AS TO RECEIVE SUBSEQUENT WORK.
- NEW WORK AS SCHEDULED. 5. COORDINATE ALL FLOOR CORE DRILLING WITH
- EXISTING. 6. DO NOT SCALE DRAWINGS.
- 7. IN ROOMS WITH FLOOR DRAINS, SLOPE CONCRETE SURFACE WITHIN 18" RADIUS AT 1/4" PER FOOT TOWARD FLOOR DRAIN, UNLESS OTHERWISE INDICATED.
- 8. ALL SPOT ELEVATIONS SHOWN ON THE FLOOR PLANS OUTSIDE THE BUILDING RELATE TO USGS ELEVATIONS. ALL SPOT ELEVATIONS INSIDE THE BUILDING REFER TO BUILDING REFERENCE ELEVATIONS. NOTIFY ARCHITECT IMMEDIATELY SHOULD CONDITIONS BE FOUND CONTRADICTORY TO THESE DRAWINGS.
- 9. ALL ANGLES SHOWN ON THE FLOOR PLANS ARE 90 DEGREES UNLESS OTHERWISE NOTED.
- 10. ALL DIMENSIONS ARE TO GRID LINE, FACE OF CONCRETE OR MASONRY, OR FACE OF GYPSUM BOARD, UNLESS OTHERWISE NOTED.
- 11. ALL FLOOR PLAN DIMENSIONS TO MASONRY ARE NOMINAL DIMENSIONS, UNLESS NOTED AS ACTUAL
- 12. "TB" NEW CORK TACKBOARDS OR "MB" NEW MARKERBOARDS
- 13. PROVIDE EXIT DOOR NUMBERS PER DOOR SIGNAGE SHEET AT ALL EXIT DOORS.

### Key Value A201 INSTALL NEW CASEWORK WITH A208 INTERIOR ELEVATIONS INSTALL NEW TACKBOARDS WITH A218 AND SEE PLANS FOR SIZES EXISTING WALL TO REMAIN A220 A229 NEW FLAME/CHEM STORAGE CABINET 34Wx34Dx65T A253 SCOPE OF WORK A262 NEW EPOXY COUNTERTOPS WITH INTEGRAL EPOXY SINKS EXISTING CABINETS TO REMAIN A269 A283

KEYNOTE PLAN













### NOTES:

		ROOF FINISH LEGEND R-1 90 MIL BLACK EPDM
		METAL FLASHING PAINTED TO
F	G	NOTES
		1. HATCHED AREAS INDICAT ROOF & CRICKETS, RE: ST
		2. ALL DRAINS TO RECEIVE H ENTIRE LENGTH, RE: DIAG
		ELECTRICAL PLANS
	<u> </u>	ROOF PLAN GENERAL NOTES
		1. ALL EXISTING ROOFING IN I REMOVED AND REPLACED
	l	MIL EPDM ON 1/2" PROTECT CONTINIUOUS INSULATION.
 		2. REFER TO MECHANICAL AN FOR ADDITIONAL SCOPE.
		EXTERIOR MATERIAL
		EX-1 EXISTING BRICK
 	+	X-1 NEW BRICK TO MATC X-2 NEW STUCCO TO MA
		ER-1 EXISTING EPDM
		R-1 NEW ACOUSTICAL, 90 REINFORCED EPDM F
		LAYER OF DENSDECI ON ONE LAYER OF DE ON TOP OF MTL BOO
		Key Value
		A235 INSTALL NEW RG ROOFING TO GC
		PARAPET 6" MIN CAP
 		MEP DWGS A274 INSTALL NEW PA
		A281 INSTALL NEW 90 ROOF WITH TAP
		A316 LAMBS TOUNGE SCUPPER, REF I
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### KEYNOTE PLAN



MATCH EXISTING

E OVERBUILT TRUCTURAL HEAT TAPE FOR GRAM ON

DEMO AREAS TO BE WITH FULLY ADHERED 90 TION BOARD ON R-30 MIN

ID ELECTRICAL DRAWINGS

### LEGEND:

H EXISTING TCH EXISTING

00 MIL FULLY ADHERED ROOF ON SINGLE CK ON RIGID INSULATION DENSDECK INSTALLED F DECK

egend Keynote Text ROOF CURB, EPDM O UP, OVER, AND DOWN N, INSTALL NEW PARAPET

IN WITH HEAT TRACE, REF RAPET 0 MIL REINFORCED EPDM PERED R-35 MIN RIGID

E ROOF DRAIN AND DETAIL 2/A5.42







AREA A FINISH PLAN

NOTES: SYMBOL LEGEND ROOM # WALL BASE FLOOR SEE ENLARGED FLOOR PLANS AND INTERIOR ELEVATIONS FOR EXTENT OF WALL TILE ON WET WALLS ONLY. FLOOR MATERIAL LEGEND LVT  $\square \land \land \land$ CARPET WALK-OFF CARPET







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0 0 ch S Steamboat Springs Middle 39610 Amethyst Dr Steamboat Springs, C0 80487 Revisions: Description Issue Dates: Initial SD - 12/20/19 SD - 01/14/20 DD - 02/21/20 Sheet Title: Floor Finish Plans Project No: 1935.03 Sheet No: A2.05





### NOTES:

- **EXTERIOR ELEVATION GENERAL NOTES:** 1. EXTERIOR FINISHES INDICATED ON ELEVATIONS SEE "EXTERIOR MATERIAL LEGEND" FOR MATERIALS.
- 2. REFERENCE ROOF PLAN FOR LOCATIONS OF ROOF COMPONENETS NOT INDICATED ON EXTERIOR ELEVATIONS.
- 3. REFER TO MEP AND STRUCTURAL DRAWINGS FOR ANY ADDITIONAL WORK.
- WORK WILL BE REPAINTED. THIS INCLUDES BUT IS NOT LIMITED TO: DOORS, DOOR FRAMES, WINDOW FRAMES, AND HEADERS, CEILINGS, HANDRAILS, EXPOSED MECHANICAL, CMU ACCENTS, SOFFITS, STRUCTURAL BEAMS, AND ETC.
- 5. PROVIDE ALLOWANCE TO SEAL AND CAULK VARIOUS WALL PENERTRATIONS AND HOLES AROUND EXTERIOR PERIMETER OF BUIDLING, SIMILAR AREAS SUCH AS HOSE BIBS, PIPES, ETC.
- 6. PROVIDE ALLOWANCE TO REVIEW ALL EXPOSED ELECTRICAL CONDUIT TO DETERMINE FEASIBILITY TO REMOVE OR RELOCATE. INCLUDE IN ALLOWANCE LABOR AND MATERIALS TO REMOVE OR RELOCATE.
- 7. SEE CIVIL PLANS FOR NOTE TO RESEAL ALL HORIZONTAL CONCRETE AND ASPHALT JOINTS AT BUILDING.
- 8. WHEN A PORTION OF A WALL IS PAINTED ASSUME THE ENTIRE WALL IS PAINTED TO INSIDE OR OUTSIDE CORNERS.
- 9. DO NOT SCALE DRAWINGS. 10. ALL ANGLES SHOWN ON THE FLOOR PLANS ARE 90 DEGREES UNLESS NOTED OTHERWISE.

### EXTERIOR MATERIAL LEGEND:

- EX-1 EXISTING BRICK X-1 NEW BRICK TO MATCH EXISTING X-2 NEW STUCCO TO MATCH EXISTING ER-1 EXISTING EPDM
- R-1 NEW ACOUSTICAL, 90 MIL FULLY ADHERED REINFORCED EPDM ROOF ON SINGLE LAYER OF DENSDECK ON RIGID INSULATION ON ONE LAYER OF DENSDECK INSTALLED ON TOP OF MTL ROOF DECK

Keynote Legend		
Key Value	Keynote Text	
A304	REINSTALL SALVAGED EXTERIOR LIGHT CENTERED ABOVE DOOR BELOW	
A316	LAMBS TOUNGE ROOF DRAIN AND SCUPPER, REF DETAIL 2/A5.42	
A325	INSTALL SALVAGED ELECTRIC SIGN	
EX-1	EXISTING BRICK	
X-1	NEW BRICK TO MATCH EXISTING	
X-2	NEW STUCCO WITH INTERGRAL COLOR FINISH COAT	

4. ASSUME ALL PAINTED SURFACES IN AREA OF






CAFETERIA ADDITION SECTION

## NOTES:

## EXTERIOR MATERIAL LEGEND:

EX-1	EXISTING BRICK
X-1	NEW BRICK TO MATCH
X-2	NEW STUCCO TO MAT
ER-1	EXISTING EPDM
R-1	NEW ACOUSTICAL, 90 N REINFORCED EPDM RC LAYER OF DENSDECK

	Keynote Legend
Key Value	Keynote Text
A220	EXISTING WALL TO REMAIN
A235	INSTALL NEW ROOF CURB, EPDM ROOFING TO GO UP, OVER, AND DOWN PARAPET 6" MIN, INSTALL NEW PARAPET CAP
A274	INSTALL NEW PARAPET
A280	EXISTING ROOF TO REMAIN
A281	INSTALL NEW 90 MIL REINFORCED EPDM ROOF WITH TAPERED R-35 MIN RIGID INSULATION
A326	NEW DOOR IN EXISTING FRAME GLAZING TO HAVE BLINDS
A401	DRYWALL WRAP STEEL BEAM
A402	STEEL BEAM, REF STRUCTURAL DRAWINGS
A613	NEW 2X4 SUSPENDED ACOUSTIC CEILING TILE CLOUD

AREA <u>A RCP</u> 100' - 0"

•	
)	

CH EXISTING ATCH EXISTING

NEW ACOUSTICAL, 90 MIL FULLY ADHERED REINFORCED EPDM ROOF ON SINGLE LAYER OF DENSDECK ON RIGID INSULATION ON ONE LAYER OF DENSDECK INSTALLED ON TOP OF MTL ROOF DECK



Issue Dates: Initial SD - 12/20/19 SD - 01/14/20 DD - 02/21/20 Sheet Title: Building Sections





# 1 CONCRETE BASE DETAIL - GRADE



# 2 CONCRETE BASE DETAIL - CONC WALKWAY



# 6 JAMB @ TRASH ENCL GATE



## 3 CMU WALL CAP

—HEAVY DUTY BALL BEARING EXT. HINGE WELDED TO POST & FRAME (4) TOTAL PER GATE -4"x4"x1/4" STL TUBE POST EMBEDED IN CONC. FOOTING









## <u>MARKERBOARD ATTACHMENT</u> A5.20 3" = 1'-0"

2 MBD / TBD / TV ELEVATION (A5.20) 1/4" = 1'-0"







INTERIOR ROOM ID TAG: 4" x 4" x 0.125" TO BE MOUNTED AND CENTERED ON DOOR FRAME

EXIT DOOR NUMBERS-INTERIOR: X" (AS REQ.) x 0.125" TO BE MOUNTED AND CENTERED ON DOOR FRAME

EXIT DOOR NUMERS-EXTERIOR: 4" VINYL LETTERS ADHERED TO METAL DOOR OR GLASS PANEL, CENTERED 13" FROM TOP OF DOOR TO BOTTOM OF NUMBER. ONE EXTERIOR DOOR ID PANEL PER POINT OF ENTRY



Seal





# 1 GRAB BAR ATTACHMENT DETAIL1 A5.30 3" = 1'-0"







# 2 GRAB BAR ATTACHMENT DETAIL A5.30 3" = 1'-0"





4 RESTROOM WALL BASE DETAIL A5.30 3" = 1'-0"

-SCHEDULED TILE SCHEDULED TILE COVE -SCHLUTER - DILEX AHK



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Seal



Sheet No:

A5.30





# PER 3/A5.40





## <u>SCUPPER DETAIL - STUCCO</u> A5.40 3" = 1'-0"



## INTERIOR



INTERIOR







## EXTERIOR





# 5 TYP INTERIOR DOOR HEAD/ JAMB DETAIL A5.60 3" = 1'-0"



<u>TYP INTERIOR DOOR HEAD/ JAMB DETAIL -</u> 13 DUPLICATE A5.60 3" = 1'-0"





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-GYPSUM WALLBOARD, REF FINISH SCHED -FRAMED WALL, REF FRAMING PLAN FOR WALL TYPES -HEADER, REF STRUCT DWGS -SEALANT, BOTH SIDES -HOLLOW METAL WINDOW FRAME

6" = 1'-0"

~~~~

 $/ \land \rangle$

AXO







4" VYCOR PLUS STRIP ON -

HEAD NAILING FIN

VYCOR PLUS CORNER STRIP TO SEAL GAP BETWEEN NAILING FINS

HEAD NAILING FIN



METAL FLASHING

HEADER, JAMB AND

STOOL TRIM

INTERIOR









INTERIOR





6 A5.70 3" = 1'-0"

EXTERIOR

-SOLID SURFACE SILL,

—STOREFRONT WINDOW, REF WDW TYPES

-BLOCKING AS REQUIRED

CHAMFERED OVER SILL

REF WDW TRIM TYPES

—1/4" SAWCUT DRIP

WEATHER BARRIER

ELEVS FOR LOCATIONS

EDGE

AROUND ENTIRE OPENING

-SEALANT AND BACKER ROD

-CONT INSULATION WITH CONT

-EXT STUCCO FINISH, REF EXT

-BATT INSULATION, REF WALL TYPES

-GYP WALLBOARD, REF FINISH SCHED

-BACKER ROD AND SEALANT, BOTH SIDES

-CONT FLEXIBLE FLASHING WRAPPED

-PRECAST WINDOW SILL WITH CHAMFER,

—MTL FLASHING WITH DRIP EDGE,

REF FINISH SCHED

INTERIOR



4 TYP WINDOW HEAD AT STUCCO A5.70 3" = 1'-0"

SLOPE

EXTERIOR

7 SF WINDOW HEAD AT BRICK ON MTL A5.70 3" = 1'-0"

REF EXT ELEVS AND WALL TYPES







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1935.03

Sheet No:

A5.70







WALK-IN INTERIOR

FREEZER WALL BY MFG



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Seal



A5.90











NOTES:

- . REFER TO FIRE PROTECTION DRAWINGS FOR LOCATIONS OF FIRE SPRINKLER HEADS. CENTER FIRE SPRINKLER HEADS BOTH DIRECTIONS IN CEILING
- 2. SUBMIT LAYOUT OF ALL GYPSUM BOARD CEILING CONTROL JOINTS FORE REVIEW.
- 3. ALL CEILINGS SHALL BE AS NOTED ON PLANS.
- MOUNTING LOCATIONS OF ITEMS WHERE NO CEILINGS IS REQUIRED OR INDICATED.
- . LIGHTS, DIFFUSERS, EXIT SIGNS, SMOKE DETECTORS, AND FIRE ALARMS SPEAKERS/STROBES SHALL BE CENTERED IN THE CEILING TILES IN WHICH THEY OCCUR, UNLESS NOTED OTHERWISE.
- 6. CENTER ALL CEILING GRIDS IN EACH ROOM OR SPACE UNLESS OTHERWISE INDICATED WITH A GRID ORIGIN OR DIMENSION.
- . REFER TO ELECTRICAL AND MECHANICAL DRAWINGS FOR NEW LIGHTS AND REGISTERS.

Keynote Legend Keynote Text NEW CEILING MOUNTED DROP DOWN ELECTRICAL POWER OUTLET ON RETRACTABLE CORD, REF ELEC DRAWINGS EX 2X4 ACT CEILING TO REMAIN EX CEILING TO REMAIN NEW KITCHEN HOOD REF KITCHEN AND MECHANICAL DRAWINGS











2 C107 7TH GRADE SCIENCE NORTH A8.01 1/4" = 1'-0"



| 6 | 2104 7TH GRADE SCIENCE NO | <u>RTH</u> |
|-------|---------------------------|------------|
| A8.01 | 1/4" = 1'-0" | |



10 D101 8TH GRADE SCIENCE SOUTH A8.01 1/4" = 1'-0"

2 A2.08

2

NOTES:

3 C107 7TH GRADE SCIENCE SOUTH

| | | | | | ADD/ALT | : RE | PLA
SIM | CE I
TO | UPP
8TH | ER CA
SCIE | ETS
RO(| WIT
DM | Η | | | |
|--|--------|---------------|--|--|---------|------|------------|------------|------------|---------------|-------------|------------|---|--|--|--|
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<u>C104 7TH SCIENCE SOUTH</u> A8.01 1/4" = 1'-0"

| Tage | |
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| | |
| | |
| | |

11 D104 8TH GRADE SCIENCE NORTH A8.01 1/4" = 1'-0"

| 3. ALL DIMENSIONS ARE TO FACE MASONRY, OR FACE OF GYPSI OTHERWISE NOTED. 4. EQUIPMENT (SHOWN DASHED COORDINATION ONLY. REFER DRAWINGS OR SPECIFICATION 5. REFER TO SHEET A0.10 FOR THEIGHTS. 5. REFER TO SHEET A0.10 FOR THEIGHTS. Keynote Leger Key Value Keynote Leger A208 INSTALL NEW CASE UPPER/LOWER CAE INTERIOR ELEVATION A215 INSTALL NEW SOUN WALL SYSTEM A218 INSTALL NEW TACK PROJECTABLE/MAGON TEACHING WALL AND SEE PLANS FO A262 NEW EPOXY COUNT | ۷. | MANUFACT | URER |
|---|-----------------|-----------------------------------|--|
| 4. EQUIPMENT (SHOWN DASHED COORDINATION ONLY. REFER DRAWINGS OR SPECIFICATION 5. REFER TO SHEET A0.10 FOR THEIGHTS. 5. REFER TO SHEET A0.10 FOR THEIGHTS. Keynote Leger Key Value Keynote Leger A208 INSTALL NEW CASE INTERIOR ELEVATION A215 INSTALL NEW SOUN WALL SYSTEM A218 INSTALL NEW TACK PROJECTABLE/MAG ON TEACHING WALL AND SEE PLANS FO A262 | 3. | ALL DIMEN
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OR FACE OF GYPSI
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Coordina
Drawings | T (SHOWN DASHED)
TION ONLY. REFER
OR SPECIFICATION |
| Key Value Keynote Leger Key Value Keynote A208 INSTALL NEW CASE UPPER/LOWER CAE INTERIOR ELEVATIO A215 INSTALL NEW SOUN WALL SYSTEM A218 A218 INSTALL NEW TACK PROJECTABLE/MAG ON TEACHING WALL AND SEE PLANS FO A262 NEW EPOXY COUNT INTEGRAL EPOXY S | 5. | REFER TO
HEIGHTS. | SHEET A0.10 FOR T |
| Key ValueKeynote LegerKey ValueKeynoteA208INSTALL NEW CASE
UPPER/LOWER CAE
INTERIOR ELEVATIONA215INSTALL NEW SOUN
WALL SYSTEMA218INSTALL NEW TACK
PROJECTABLE/MAG
ON TEACHING WALL
AND SEE PLANS FOA262NEW EPOXY COUNT
INTEGRAL EPOXY S | | | |
| Key ValueKeyrA208INSTALL NEW CASE
UPPER/LOWER CAE
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ON TEACHING WALL
AND SEE PLANS FOA262NEW EPOXY COUNT
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| A208INSTALL NEW CASE
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| A215 INSTALL NEW SOUN
WALL SYSTEM
A218 INSTALL NEW TACK
PROJECTABLE/MAG
ON TEACHING WALL
AND SEE PLANS FO
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INTEGRAL EPOXY S | A20 | 08 | INSTALL NEW CASE |
| A218 INSTALL NEW TACK
PROJECTABLE/MAG
ON TEACHING WALL
AND SEE PLANS FO
A262 NEW EPOXY COUNT
INTEGRAL EPOXY S | | | INTERIOR ELEVATION |
| A262 NEW EPOXY COUNT
INTEGRAL EPOXY S | A2 <sup>-</sup> | 15 | INTERIOR ELEVATION
INSTALL NEW SOUN
WALL SYSTEM |
| | A2 <sup>-</sup> | 15
18 | INTERIOR ELEVATION
INSTALL NEW SOUN
WALL SYSTEM
INSTALL NEW TACK
PROJECTABLE/MAG
ON TEACHING WALL
AND SEE PLANS FO |

INTERIOR ELEVATION NOTES:

1. DO NOT SCALE DRAWINGS.



Project No: 1935.03 Sheet No: A8.01







| STAN | DARD ABBREVIATIONS |
|--------------|---|
| AB | |
| ADDL | ADDITIONAL |
| AFF
ALT | ALTERNATE |
| APA | AMERICAN PLYWOOD ASSOCIATION |
| ARCH | ARCHITECT / ARCHITECTURAL |
| B | BOTTOM |
| BETW | BETWEEN |
| BF | BOTTOM OF FOOTING |
| BL | BRICK LEDGE |
| BLDG | BUILDING |
| BLKG | BLOCKING |
| BRG | BEARING
BOTTOM OF WALL |
| CFS/CFMF | COLD FORMED STEEL/COLD FORMED METAL FRAMING |
| CJ | CONTROL JOINT, CONSTRUCTION JOINT |
| CLR | CLEAR |
| CMU
CONC | CONCRETE MASONRY UNIT |
| CONST | CONSTRUCTION |
| CONT | CONTINUOUS |
| DAS | DEFORMED ANCHOR STUD |
| DL | DEAD LOAD |
| DN | DOWN |
| DT | DRAG TRUSS |
| DWG | DRAWING |
| EA | EACH |
| EF | EACH FACE |
| EJ | EXPANSION JOINT |
| EL
FL FV | ELEVATION |
| EQ | EQUAL
EACH WAY |
| EXP | EXPANSION |
| (E) | EXISTING |
| FDN | FLOOR DRAIN
FINISHED FLOOR |
| FF | FOUNDATION |
| FTG | FOOTING |
| FV | FIELD VERIFY |
| GALV | GALVANIZED |
| GC | GENERAL CONTRACTOR |
| GET | GABLE END TRUSS |
| GL | GLULAM BEAM OR COLUMN |
| GT | GIRDER TRUSS |
| HAS | HEADED ANCHOR STUD |
| HORIZ | HORIZONTAL |
| HSS | HOLLOW STRUCTURAL SECTION |
| HT | HIP TRUSS |
| IF | INSIDE FACE |
| k | KIPS |
| LLBB | LONG LEG BACK-TO-BACK |
| LLH | LONG LEG HORIZONTAL |
| LLV | LONG LEG VERTICAL |
| LVL | LAMINATED VENEER LUMBER |
| MATL | MATERIAL |
| MAX | MAXIMUM |
| MECH | MECHANICAL |
| MFR | MANUFACTURER |
| MIN | MINIMUM |
| MISC | MISCELLANEOUS |
| MTL | METAL |
| NIC | NOT IN CONTRACT |
| NTS | NOT TO SCALE |
| OC | ON-CENTER |
| OH | OPPOSITE HAND |
| OPNG | OPENING |
| PAF | POWDER ACTUATED FASTENER |
| PC | PRECAST
PRE-ENGINEERED WOOD ROOF TRUSS |
| PJP | PARTIAL JOINT PENETRATION |
| PLWD | PLYWOOD |
| R | RADIUS |
| REINF | REINFORCING |
| REQU | ROUGH OPENING |
| SCHED
SHT | SHEET |
| SHTG | SHEATHING |
| SIM | SIMILAR |
| SL | STONE LEDGE |
| SLBB | SHORT LEGS BACK-TO-BACK |
| SOG | SLAB-ON-GRADE |
| SP | SPACE(S) |
| SPECS | SPECIFICATIONS |
| STD | STANDARD |
| STFR | STIFFENER |
| STL | STRUCTURAL |
| SYM | SYMMETRICAL |
| TC | TOP OF CONRETE |
| ТЕ | TOP OF FOOTING |
| ТНК | THICKNESS |
| TL | TOP OF LEDGE |
| TM | TOP OF MASONRY |
| TP | TOP OF PLATE |
| TS | TOP OF STEFI |
| TW | TOP OF WALL |
| TYP | |
| VERT | VINLESS INUTED UTHERWISE
VERTICAL |
| VI | VALLEY IRUSS |
| W/ | WITH |
| WD | WOOD |
| WP | WORK POINT |
| WT | WEIGHT |
| WWR | WELDED WIRE REINFORCEMENT |
| # | POUNDS |

DEFERRED SUBMITTALS

THE DESIGN OF THE FOLLOWING BUILDING COMPONENTS SHALL BE TREATED AS DEFERRED SUBMITTALS, ALL ASSOCIATED DRAWINGS AND CALCULATIONS SHALL BE STAMPED AND SIGNED BY THE ENGINEER RESPONSIBLE FOR THEIR PREPARATION. AFTER REVIEW, THE ENGINEER-OF-RECORD SHALL FORWARD THE DEFERRED SUBMITTAL DOCUMENTS TO THE BUILDING DEPARTMENT. DEFERRED SUBMITTAL ITEMS SHALL NOT BE INSTALLED UNTIL THEIR DESIGN AND SUBMITTAL DOCUMENTS HAVE BEEN APPROVED BY THE BUILDING OFFICIAL:

- STEEL BAR JOISTS. COLD FORMED METAL FRAMING.
- CURTAIN WALL SYSTEMS

| 1. | All work shall
County Amer | conform to the minimum | m standards | of the Intern | ational Build | ing C |
|---------------------------------|---|--|--|---|---|--|
| 2. | Design Loads
Dead Loa | s
ads
i superimposed dead loa | ad | 20 | nsf | |
| | Mecl | nanical equipment | au | acti | ual weight | |
| | Roof Sho
Snov | ow Load
v Criteria:
Pg = 90 psf, Pf = 65 psf | , Ce = 1.0, C | t = 1.0, Is = | 1.0 | |
| | Occupan | cy Category | | II | | |
| | Wind Cri
115 | teria:
mph (3 second gust, Ult | imate) 90 m | ph (Nominal) |), Exposure (| С |
| | Build
Inter | ing Category = Enclose
nal Pressure Coefficient | d
t = ± 0.18 | | | |
| | | COMPONENTS | S AND CLAD | DING WIND
Effectiv | PRESSUR | ES <sup>1,2</sup> |
| | | Zones <sup>3</sup> | 10 sf | 20 sf | 50 sf | 10 |
| | | Zone 1 - Roof Interior
Zone 2 - Roof Edge | 53.9 (32.3) | 48.2 (28.9) | 40.6 (24.4) | 29.4
34.8 |
| | | Zone 3 - Roof Corner | 81.1 (48.7) | 67.2 (40.3) | 48.7 (29.2) | 34.8 |
| | | Zone 5 - Wall Corner | 43.1 (25.8) | 40.1 (24.1) | 36.3 (21.8) | 33.3 |
| | | Parapet | 108 (65) | 100 (60) | 91 (55) | 83 |
| | | Pressures sh
ultimate with s Refer to detai
structures, et
applicable con Refer to Figure
description of | own are dete
service level
ils for wind lo
c. Roof overl
mponent and
re 30.4-1 thre
each zone. | ermined using
pressures s
bading on mis
hangs shall b
I cladding loa
bugh 30.6-1 | g ASCE 7-10
hown in pare
scellaneous
be designed
ads per Figur
in ASCE 7-1 | 0 and
enthe
roofto
for
re 30
0 for |
| Sei | smic Criteria
Site
Seisi
R = , | Class (C,D), Design Ca
mic Force Resisting Sys
Fa = , Fv = , Ss = , S1 | tegory (B,C,I
stem =
= , SDS = , ; | D), <equival
SD1 = , Cs =</equival
 | ent Lateral F
= , le = , V = | orce
kips |
| 3.
⊿ | The frost dep | oth is XX inches. All four | ndations shal | l be deeper t | than this. | wina |
| 5. | brought t
Contractor m | o the attention of the Ar
ust check all dimension | chitect/Engir
s, framing co | neer before p
onditions, an | proceeding w
d site conditi | ith ar |
| 6. | Architect
A detail, sect
but is to | /Engineer shall be notifi
ion, elevation, etc. refer
be used at all like and si | ed immediate
ence may be
imilar constru | ely of any dis
indicated or
uction condit | screpancies on a
nly once on a
ions | or po
a stru |
| 7. | No modificati
also appl | on shall be made to any
ies to any openings for | / structural m
plumbing, el | nember witho
ectrical and r | out the appro
mechanical t | val o
rades |
| 8. | Stability of th
structural frai
inspected as | e structural frame during
me is not complete until
required by the building | g constructio
all connectio
official and a | n is the resp
ons to lateral
accepted by | onsibility of t
force resisti
the SER. Th | he G:
ng el
his in |
| | such as meta
like. All conc | al deck, plywood and gy
rete elements must hav | psum board
ve reached th | sheathing, m | netal straps,
strength. Te | conc |
| 9. | Design, mate
may be cons | uction should be provide
erials, equipment, and pl
idered for use, provided | ed by the Ge
roducts othe
prior approv | neral Contra
r than those
/al is obtaine | ctor and the
described be
d for the Ow | ir Sui
elow (
ner,) |
| 10. | applicable go
Nothing conta | verning code authority.
ained within the contract | t documents | shall relieve | the general | contr |
| | or: a. the response b. dealing w c. safety of d. superinter | onsibility to determine ar
<i>v</i> ith matters of safety of
property
ending of the work | ny aspect of
personnel | how the work | k is to be per | rform |
| 11. | e. construct
The Contract | tion means and method
or shall be responsible i | s
for all excava | ation procedu | ures and pro | tectic |
| 12. | The Contract | or shall coordinate, rev
tural walls, slabs, beam | iew and subi | nit shop dra
ns. A single | wings that id
drawing of e | entify
each |
| | identifying loc
weeks prior t | cations and sizes of all s
o placing concrete in the | sleeves and b
ese structura | olockouts sha
I elements. | all be submit
Penetrations | tted for
s not |
| 13. | Shop drawing
prior to fabric | gs and calculations when
ation or construction of | re applicable
all structural | shall be sub
items includ | mitted to the
ing the follow | e Arc
wing: |
| | reinforcemen
engineered w | t, embedded steel items
lood and pre-engineered
department by the cont | s, structural s
d cold-forme
tractor for rec | steel, metal o
d steel. App
cord only Al | decking, she
roved shop (
llow 2 weeks | ar sti
drawi
for r |
| 14. | Special inspective documents, so the Architect/
the work was | cetion, in accordance will
shall be performed by a
'Engineer and the Buildi
performed in conforma | th the Interna
qualified insp
ng Departme
ince with the | ational Buildir
pector from a
ent at the cor
approved pla | ng Code or a
an approved
npletion of e
ans and spec | ager
ager
ach t |
| 15. | schedules for
Do not place
adequately s | r specific requirements.
backfill against baseme
hored. Forces due to by | ent walls until | basement a | nd first floors | s are
uded |
| 16. | walls.
All mechanic | al and electrical equipm | ent purchase | es shall be co | pordinated w | vith th |
| 17. | General Con
shall be brou
The structura | tractor. This includes eq
ght to the architect's and
Il drawings have been c | uipment size
d engineer's
ompleted us | e, weight, op
attention prio
ing the availa | enings, requi
or to equipmo
able informat | ired s
ent p
tion re |
| | contractor to
before proce | field verify the existing of the second tender of tender o | conditions ar | id notify the a | architect and | l engi |
| 18. | The general changes. The | contractor shall submit a
e request shall include a | any substituti
Ill informatior | on request to
required for | o the archite
r the enginee | ct an
er to f |
| 19. | Any item that
general contr | ie any required compens
is listed as a discrepan
actor throughout the pro | ຣaແon tor the
icy by the ind
oject. the loo | evaluation.
lependent te
shall include | sting agency
e the discrep | / shal
ancv |
| | and descripti
address each | on of discrepancy. The
discrepancy and keep | general cont
a record of t | ractor shall o
he required | contact the encorrections, | ngine
The I |
| 20. | addressed ar
For any item | ne engineer cannot be r
nd resolved.
that requires a change | eleased until | due to contr | actor error o | uiscre
or def |
| | contractor sh
the architect | all submit plans, details
and engineer prior to co | , and calcula
mpletion of t | tions for the he work. So | proposed scorection | olution |
| 21. | jurisdiction.
The contractor
carrying capa | on to be stamped and si
or shall not stockpile an
acity, cause damage, or | gned by a pr
y building ma
create exce | ofessional en
aterials or eq
ssive deflect | ngineer who
uipment in a
ion to any st | is reę
man
ructu |
| | shall contact
building mate | tne engineer for evaluat
rial stockpiles prior to p | tion of locatic
lacement of | ons where it i
these items | may be nece
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GENERAL NOTES

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Force Procedure>

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- with any work so involved. tions before starting work. or possible deficiencies. a structural construction drawing,
- oval of the Architect/Engineer. This f the General Contractor. The ting elements have been made,
- This includes all diaphragm elements , concrete topping, tie rods and the emporary bracing of the structure ir Sub-Contractors as necessary. elow or indicated on the drawings wner, Architect/Engineer, and the
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- dentify all penetrations for all trades each portion of the structure tted for review and approval four s not shown on the approved shop
- e Architect/Engineer for approval wing: concrete and masonry near stud layout, stairs, predrawings shall be submitted to the for review of shop drawings. as required by the construction
- agency. Reports shall be issued to each type of work stating whether ecifications. See inspection rs are in place or wall has been
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- with the structural drawings by the ired support, etc. Any discrepancies ent purchase. ation regarding existing conditions.
- the responsibility of the general engineer of any discrepancies ect and engineer prior to making any
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- or deficiency in construction, the olution. These shall be reviewed by ions may require submitted o is registered in the project
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- ned in accordance with the Soils Report as ils Report is hereby made a part of these ninimums on of foundation bearing strata shall be ctions shall be performed prior to placement of
- rom any source prior to pouring concrete.
- wind or seismic forces is 3000 psf. ed with on site soils: 40 psf/ft 50 psf/ft

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CONCRETE:

1. Concrete work shall conform to all requirements of the International Building Code and ACI 318, Building Code Requirements for Structural Concrete, latest approved editions. 2. Design mixes shall provide concrete with the following properties as indicated on drawings and schedules:

| | CONCRETE MIX MATRIX | | | | | | | | | | | |
|-------------|---|--------------------------------------|----------------------|--------------------|------------------------------|----------------|-----------------------------|------------------------|--|--|--|--|
| Міх
Туре | Intended Use of Concrete | Compressive
Strength
(28 days) | Max.
W/C
Ratio | Max. Agg.
Size² | Slump
Limits <sup>3</sup> | Cement
Type | Air
Content <sup>1</sup> | Required
Admixtures | | | | |
| A | Foundation walls, grade beams & footings | 4500 psi | 0.53 | 1" | 3-5" | 1 / 11 | 4%-7% | AEA <sup>1</sup> | | | | |
| В | Interior slab-on-
grade | 3000 psi | 0.53 | 3/4" | 3-5" | 1 / 11 | | | | | | |
| С | Exterior slab-on-grade and
parking slab-on-grade | 4500 psi | 0.45 | 3/4" | 3-5" | 1/11 | 4%-7% | AEA <sup>1</sup> | | | | |
| D | Other concrete | 3000 psi | 0.50 | 3/4" | 3-5" | 1 / 11 | 4%-7% | AEA <sup>1</sup> | | | | |

Footnotes:

- 1. Air entraining admixture Normal weight aggregate unless noted otherwise
- 3. Range indicates minimum and maximum limits 4. High range water reducer
- Calcium nitrite corrosion inhibitor
- 3. Use accelerating admixtures in cold weather only when approved by Architect/Engineer. Use of admixtures will not relax cold weather placement requirements. Do not use calcium chloride. Use set retarding admixtures during hot weather only when approved by Architect/Engineer. 4. Prepare concrete mix designs for each type and strength of concrete, using either laboratory trial batch or field
- experience methods as specified in ACI 301. If trial batch method is used, use an independent testing facility acceptable to Engineer for preparing and reporting of proposed mix designs. 5. Submit written reports to Engineer of each proposed mix design at least 15 days prior to start of work. Do not begin concrete production until Engineer has reviewed mix designs.
- 6. Portland Cement shall conform to ASTM C150, Type I / II < Type V>. Aggregate for normal weight concrete shall conform to all requirements and tests of ASTM C33. Aggregate for lightweight concrete shall conform to all requirements and tests of ASTM C330. Concrete mixing operations, etc., shall conform to ASTM C94 and ACI 304.
- 7. Clear concrete coverage for reinforcing bars shall be as follows unless noted otherwise: Concrete exposed to earth without forms.... Concrete poured in forms but exposed to earth or weather: 1 1/2" #5 bars or smaller. Bars larger than #5.... Concrete not exposed to earth or weather:
- Slabs, walls and joists. Beams and column bars... 1 1/2' (principal reinf., ties and stirrups) 8. All top reinforcing shall terminate with standard hooks at ends of slabs, construction joints, beams, walls, and
- foundations unless noted otherwise.
- 9. Non-shrink grout shall conform to ASTM C1107. 10. Water-reducing admixtures shall conform to ASTM C494, and be used in strict accordance with the manufacturer's recommendations. An air-entraining agent conforming to the ASTM C260 shall be used in all concrete mixes for
- work which is exposed to weather. 11. Cracking of concrete slabs due to shrinkage is expected. The general contractor shall anticipate repairing cracks in all slabs but particularly at the parking levels. Rout and seal all cracks 0.01 inch wide and greater as described in the
- specifications. 12. Embedded conduits, pipes, and sleeves in concrete: a. Any and all conduits, pipes, and sleeves embedded in structural concrete shall be shown in plan or thoroughly described in writing and provided to the Structural Engineer for written approval a minimum of four weeks prior
- to installation b. All embedded items shall be located as to not impair the strength of the construction of the concrete member. c. Contractor shall coordinate the installation of all embedded items and penetrations. Cost of additional reinforcement or where conduit is to be provided with Schedule 40 uncoated or galvanized steel pipe (ASTM 53) shall be borne by the contractor.
- d. All embedded items shall conform to the following, unless otherwise directed by the Structural Engineer or shown on the structural drawings: Elevated concrete slabs: A. Conduits shall not be embedded in any slabs less than 7" thick or any slabs on metal deck.
 - B. For other conditions, proposed conduits less than or equal to 1 1/2" outside diameter shall conform to the following: a. No embedment shall disrupt the placement of the reinforcing steel or PT tendons, where applicable.
 - b. The conduit shall be placed within the middle third of the slab thickness. c. Parallel runs of conduits shall have a clear spacing of three times their outside diameter. No more than eight parallel conduit runs shall occur in a single bay. Conduit runs parallel to structural beams or walls shall be a minimum of 3'-0" away from the face of the member.
 - d. Conduits shall be installed without excess length and may only cross adjacent conduit one time within the middle third of the slab. e. Conduits shall not be placed through a column or within 3'-0" of a column face and shall not run
 - through a stud rail. C. Conduits with an outside diameter greater than 1 1/2" are not permitted in the slab unless specifically approved by the Structural Engineer
- D. Sleeves of any size and vertical conduit penetrations of the slab are not permitted within 6'-0" of a column face unless specifically approved by the Structural Engineer. 2. Concrete slabs on grade:
- A. Horizontal conduit shall not be embedded within a slab on grade. 3. Concrete columns:
- A. Conduits shall not penetrate or be embedded in columns unless specifically approved by the Structural Engineer. 4. Concrete walls:
- A. Conduits shall not be embedded horizontally in any wall, length wise.
- B. Conduits shall not be embedded vertically in any wall less than 8" thick. C. For other conditions, proposed conduits less than or equal to 1 1/2" outside diameter shall conform to
- the following: a. No embedment shall disrupt the placement of the reinforcing steel. b. The conduit shall be placed between vertical reinforcement layers. The conduit shall be placed in the middle third of the wall for single layer vertical reinforcement.
- 5. Concrete beams: A. Conduits shall not be embedded vertically or horizontally, length wise, in any beam. B. All horizontal, width wise, sleeves in beams shall be installed with Schedule 40 uncoated or galvanized
- steel pipe (ASTM 53) sleeve and are at the discretion of the structural engineer. 13. All blockouts in foundation walls and footings must be approved by the Structural Engineer prior to construction. 14. All concrete shall be consolidated by vibration, spading, rodding, or forking so that concrete is thoroughly worked
- around the reinforcement and embedded items and into corners of forms without segregation of materials. 15. Provide 3/4" chamfers at all exposed corners. 16. Provide 2- #5 bars (1 each face) with 2'-0" projection around all openings greater than 10" in any dimension in
- concrete slabs and walls, unless noted otherwise. 17. Provide 2- #5 bars at all reentrant and opening corners.
- 18. Control joints in concrete
- a. Control joints shall be provided at 30'-0" OC maximum in concrete walls. Provide joint sealant for walls exposed to earth or weather b. Control joints shall be provided in all slabs-on-grade at a maximum spacing of 10'-0" OC for 4" slabs and 12'-0" OC for 5" slabs, unless noted otherwise. Joints shall be 1/8" wide x (thickness/4)" deep continuous sawed joint or pre-molded joint. Joints shall be provided at all column centerlines, corners and ends of walls, re-entrant corners and any other areas with high crack potential. Proposed joint locations shall be submitted to the
- architect for approval prior to completion of work. 19. Slabs, walls, footings and beams shall not have joints in a horizontal plane. Any stop in concrete work must be made at quarter point of span with vertical bulkheads and horizontal keys, unless otherwise shown. All construction joints shall be as detailed or as approved by the Engineer 20. Refer to Architectural drawings for reveals, areas of textured concrete or special finishes, items required to be cast
- into the concrete, curbs and slab depressions. 21. Concrete tolerances shall be as specified in ACI 117 and as follows: Tops of walls and columns... -3/4", +0" 1/4" in 10 feet. 1" maximum total Plumbness.
- ..1/2" in 20 feet, 1" maximum total Plan alignment.. Cross-sectional dimension.. -1/4", +1/2" Size and location of sleeves and blockouts.. ..+1/4"
- ..1/4" in 10 feet, 3/4" maximum total Slab and beam soffits ... 21. The Contractor shall design all forms and supporting shores in conformance with ACI 347. Design shall include rate and method of placing concrete and construction loads, including vertical, horizontal, and impact loads. Forms shall
- be substantial and sufficiently tight to prevent leakage of mortar and properly braced or tied to maintain position and 22. Forms shall be removed in such a manner as not to impair safety and serviceability of the structure. All concrete to be exposed by form removal shall have sufficient strength not to be damaged thereby. Reshore until 28 days after placement, and for full duration where construction loads exceed specified service loads. Reshoring shall conform to ACI 347.

the plans.



- complete all diaphragm connections
- shear of plf.

reinforcing is provided. Code D1.1. shall perform all welding

Structural Concrete.

otherwise.





REINFORCING STEEL

1. Reinforcing steel shall conform to ASTM A615, Grade 60. Reinforcing to be welded or field bent shall be ASTM A706, Grade 60. < Epoxy-coated reinforcing steel shall conform to ASTM A775 and shall be coated prior to fabrication.> Welded wire reinforcement (WWR) shall conform to ASTM A185, Fy=65 ksi. WWR must lap one full mesh plus 2" at side and end laps, but not less than 6" and shall be wired together. WWR shall be placed in the center of slabs-on-grade or in the center of the concrete thickness above the deck for slabs on form deck . Studrail shear reinforcing shall be made of Low Carbon Steel, C1015 in accordance with ASTM A108 with a minimum vield of 50.000 psi and a minimum tensile strength of 60.000 psi and a maximum 20% elongation in 2" as manufactured by Decon or Suncoast. The complete and finished studrail shall be ICBO evaluated and all welding must take place in an ICC approved and audited facility.

4. Welding of reinforcing steel shall conform to AWS D1.4, using proper low hydrogen electrodes. All bars to be welded shall conform to ASTM A706. . <All bars in concrete shall be lapped a minimum of 36 bar diameters (2'-0" min.) at all splices.> <OR> <All bars in concrete shall be lapped in accordance with the "Concrete Reinforcing Tension Lap Splice Length (Class B)" schedule provided in these drawings unless specifically noted otherwise.>

6. Dowels for walls and columns shall be the same size and spacing as the wall/column reinforcing, unless noted . All reinforcing bar bends shall be made cold with a bar bender at the ACI 318 specified minimum radius. Extend and anchor all horizontal bars at corners and intersections to fully develop the bar.

. Detail bars in accordance with the latest editions of the ACI Detailing Manual and ACI Building Code Requirements for 10. Provide all accessories necessary to support reinforcing at positions shown on the plan. 11. Continuous bars in walls, beams and grade beams shall be spliced as follows:

a. Top bars - at midspan Bottom bars - over supports

12. All stirrups shall have a minimum of 2- #4 horizontal reinforcing bars provided as spacers when no other horizontal

STRUCTURAL STEEL:

1. All fabrication and erection shall conform to the latest edition of the AISC Manual of Steel Construction. 2. A Certified Welder approved by the authority having jurisdiction in accordance with AWS, Structural Welding

- . Wide flange shapes shall be ASTM A572, Grade 50, ASTM A36 / A572-50, or ASTM A992. 4. Round hollow structural sections shall be ASTM A500 Grade B (42 ksi). 5. Square and rectangular hollow structural sections (HSS) shall be ASTM A500 Grade B (46 ksi).
- . Miscellaneous structural steel such as plates, angles and channels shall conform to multigrade steel (50 8. All welding electrodes shall conform to ASTM E70XX. The minimum fillet weld size shall be 3/16".
- 9. Headed anchor studs shall conform to ASTM A108 (60 ksi). 10. Anchor rods and unfinished rods shall conform to ASTM F1554, Grade 36. 11. Bolted connections are to be of high-strength ASTM A325-N bolts, unless noted otherwise. A minimum of
- two bolts is required for all beam connections. Minimum required connection capacity is 12 kips LRFD
- 12. High-strength bolts shall conform to the provisions of the "Specification for Structural Joints Using ASTM A325 or A490 Bolts", latest edition, as approved by the Research Council on Riveted and Bolted Structural
- 13. For slip-critical bolted assemblies the assembly surface, including those adjacent to the washer, shall be free of mill scale, oil, paint or other coatings. 14. All high-strength bolts in bearing type connections shall be snug tight. The snug tight condition is defined as the tightness that exists when all plies in a joint are in firm contact. A few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench may attain this. All high-strength bolts shown on the drawings as slip critical or subject to tension loads shall be tightened to a bolt tension not less than that given in Table 8.1 for the RCSC Specification for Structural Joints using ASTM A325 or A490 bolts. Tightening shall be done by the turn-of-nut method, by a direct tension indicator, or by properly calibrated
- wrenches. Provide hardened washers under the nut or bolt head, whichever is the element turned in tightening. Bolts not indicated as slip critical shall not be pre-tensioned. 15. Shop drawings for all structural steel indicated on the structural drawings shall be submitted for review to the Structural Engineer prior to fabrication.
- 16. All structural steel exposed to weather shall be hot-dip galvanized, unless noted otherwise. 17. All structural steel shall be shop coated with an approved rust inhibitive primer. Do not prime beams that are o receive ineproving. See specifications for additional gaivanizing information 18. No holes other than those specifically detailed shall be allowed through structural steel members. No cutting or burning of structural steel shall be permitted without written consent from the Architect/Engineer. 19. All welding of reinforcing steel bars to structural steel members will require continuous inspection by a
- 20. All members are to be erected with natural mill camber or induced camber up, unless noted otherwise on
- 21. Steel joists shall be designed, fabricated and erected in accordance with Steel Joist Institute (SJI) Specification. Where steel joists bear on structural steel framing the joist nearest each column on each side of the beam shall be bolted to the beam. Joist bridging shall conform to SJI specifications unless otherwise shown on plans. Joist supplier shall verify that the metal deck, joists, and joist girders meet any size, spacing, support, and/or bridging restrictions imposed by Underwriters Laboratories designated floor or roof
- 22. Joist Supplier shall submit calculations for all non-uniformly loaded joists. 23. Install all required bridging and miscellaneous steel prior to installing deck.
- 24. Connections shall be as shown in schedules and sections in the drawings. Any changes to the connections proposed by the contractor shall be submitted with the structural steel shop drawings. This connection submittal shall include calculations stamped and signed by the contractor's engineer. 25. (For composite steel beam floors only). Screed concrete topping to a constant thickness over the beams.
- 26. Architecturally Exposed Structural Steel (AESS):
- a. Structural steel noted as AESS on the structural drawings shall conform to project specifications for detailing, fabrication, and erection of AESS b. All AESS shall be free of mill marks, have welds ground smooth, and piece marks covered. The
- surface preparation of AESS shall conform to SSPC-SP 3 power tool cleaning. c. All exposed field welds shall be continuous and ground smooth with any field welding aids removed. a. Miscellaneous structural steel includes any steel that is not specifically included in the framing of the building superstructure. Superstructure steel may include beams, columns, trusses, girders, joists,
- b. The structural steel supplier shall supply all necessary steel items, whether indicated on the drawings or not, that fulfill the structural design and architectural design intent for the structure. These items may include edge angles, closure angles, deck support, miscellaneous plates, etc. c. Openings in roof or floor decks with concrete may be as shown on structural, architectural, or MEP drawings. If openings are not dimensioned on structural plans, refer to architectural or MEP drawings. Unless noted otherwise, openings in decks 24"x24" or less shall be reinforced with 1- #5 in concrete above flutes on all four sides of opening. Reinforcement shall extend 2'-0" minimum beyond edge of opening or have a standard hook. All openings shall have 2'-0" minimum clear between them. For any opening that does not meet this requirement, refer to plans and details for required reinforcing. d. Openings in metal roof deck without concrete may be as shown on structural, architectural, or MEP

METAL DECKING:

- 1. All metal decking shall conform to ASTM 1008 or ASTM A653 and have minimum yield strength of 33 ksi. All composite deck and any deck permanently exposed to weather or moisture shall be galvanized. The galvanized coating shall conform to ASTM A653, G60 or G90.
- 2. Minimum deck gages are shown on plans and are based on 3-span, unshored conditions. Heavier deck gage may be required for conditions other than these, depending on manufacturer's layout.

drawings. If openings are not dimensioned on structural plans, refer to architectural or MEP drawings.

- Deck welding shall be in accordance with AWS D1.3, "Structural Welding Code-Sheet Steel". 4. Contractor shall provide closure plates, flashing and all miscellaneous light gage metal shapes necessary to complete the work. Deck supplier shall provide closures to match adjacent deck gage as required to
- Minimum bearing of decking on supports shall be 1 1/2". 6. Sheets shall be attached to all supporting steel members by welding as indicated on the drawing and in
- accordance with manufacturer's recommendations. 7. See plans for deck type, gage and fastening. Steel deck shall be fastened to develop a minimum diaphragm
- 8. Do not suspend hangers for conduit, sprinklers, light fixtures, etc. from the metal decking. 9. Metal decking shall be continuous on main roof below all overframed areas.

COLD-FORMED STEEL FRAMING:

- 1. All metallic coated metal studs 16 gage and heavier shall be formed from steel that corresponds to the minimum requirements of ASTM A1003, Grade 50 Type H. All metallic coated 16 gage tracks and heavier shall be formed from steel that corresponds to the requirements of ASTM A570 or A611, Grade 33.
- 2. All metallic coated 18 gage studs and lighter, all painted track, bridging, end closures and accessories shall be formed from steel that corresponds to the requirements of ASTM A1003, Grade 33, Type H. All galvanized metal studs 16 gage and heavier shall be formed from steel that corresponds to the minimum
- requirements of ASTM A653, Grade 50. All galvanized 16 gage and heavier tracks shall be formed from steel that corresponds to the requirements of ASTM A653, Grade 33. 4. All galvanized 18 gage studs and lighter, all painted track, bridging, end closures, and accessories shall be formed from steel that corresponds to the requirements of ASTM A653, Grade 33.
- 5. All painted material and accessories shall be primed with rust inhibitive paint meeting the performance requirements of TT-P-626C.
- 6. Provide bridging as required by the manufacturer's recommendations. 7. Splices in metal studs, joists, and headers will not be permitted.
- 8. All corners shall be framed with a minimum of 3 studs of the same gage as wall studs, unless noted otherwise
- 9. Multiple studs shall be secured together with either #10 screws at 18" OC staggered or 11/2" of weld at each flange @18"OC
- 10. Load bearing studs shall be square cut and bear on both upper and lower tracks. Maximum allowable gap is
- 11. No holes shall be cut in structural studs, joist or headers without written approval from structural engineer. 12. Web stiffeners shall be constructed of unpunched studs or track, gage to match stud below, unless noted otherwise. No holes are allowed in web stiffeners.
- 13. Holes in studs are not allowed within 12" of the top or bottom of the stud. 14. Do not bend or cut flanges of studs, joist or headers. Any damaged members shall be replaced. 15. The joist web shall be located directly above the stud web unless noted otherwise.
- 16. Bracing straps shall be flat with no bows or splices. They shall be attached to all intermediate studs with 3-# 10 screws. 17. Coordinate joist locations with plumbing and mechanical penetrations. Provide additional joists as required to
- maintain joist spacing. 18. Minimum effective section properties of metal studs shall be as shown in the current Steel Stud Manufacturer's Association (SSMA) Publication: Fy=50 ksi for 16 gage and heavier section, Fy=33 ksi for 18 gage and lighter sections.
- 19. Metal stud contractor shall submit structural calculations and drawings for all framing members and connections to the Engineer prior to fabrication.

CONCRETE UNIT MASONRY:

- 1. Fabrication and placement of all Concrete Masonry Units and reinforcing shall be in accordance with ACI 530 and ACI 530.1 unless noted otherwise. All masonry shall develop a minimum compressive strength, f'm of 1750 psi at 28 days.
- Concrete block shall be hollow, load-bearing concrete masonry units conforming to ASTM C90 lightweight units, unless noted otherwise. 4. All masonry shall be reinforced grouted masonry. Grout solid all cells specified on plans. As a minimum,
- grout all cells which contain rebar, bolts, etc. Grout solid all cells below grade. Grouting shall be stopped 1 1/2" below top of course so as to form a key at the pour joint. 5. Mortar shall conform to ASTM C270 Type S with a minimum compressive strength of 1800 psi at 28 days for exterior walls and interior bearing walls, Type M for foundation walls or walls exposed to earth, and Type O or Type S for interior non-bearing walls.
- 6. Grout shall be self-consolidating and conform to ASTM C476 with a minimum compressive strength of 2000 psi at 28 days. Grout strength test shall be as set forth in ASTM C1019.
- 8. Aggregates for mortar and grout shall be natural sand and rock conforming to ASTM C144 (mortar) and C404 (grout).
- . Cement shall be Portland Cement conforming to ASTM C150, Type I or II, low alkali. 10. All reinforcement, bolts, etc. shall have minimum grout coverage of 3/4". Reinforcing shall be centered in
- the cell unless noted otherwise. Reinforcing steel shall be secured in place and inspected prior to grouting. 11. Unless otherwise noted, place continuous bond beam at top of all walls, at suspended floors and at roofs. Reinforce bond beam with 2- #5 bars. At floor and roof levels, bond beam reinforcing shall be continuous through control joints. Elsewhere, bond beam reinforcing shall be discontinuous at control joints. Hook reinforcing at end of wall and make continuous around corners. Step bond beam as required to align with floors and roofs. I an bond beam 4'-0" at vertical steps
- 12. Unless otherwise noted, CMU wall reinforcing shall be as follows: a. All walls shall be reinforced with #5 @48" OC vertical maximum
- b. Provide 1- #5 around openings greater than 12" in any dimension and each side of control joints. Extend reinforcing 2'-0" past edge of opening. c. Provide 2- #5 vertical at all wall ends
- d. Provide 3- #5 vertical at all wall corners
- e. Horizontal joint reinforcing in all masonry walls shall be 9 gage minimum ladder type spaced @16" OC. Joint reinforcing shall be lapped 8" keeping cell clear of crossing wires. 13. Unless noted otherwise, place continuous bond beam at tops of walls, at suspended floors and roofs, and top course of parapets.
- 14. See the architectural drawings for finish surface, height of units, laying pattern and joint types. Unless specifically shown otherwise, all concrete block shall be laid in running bond. 15. Cleanouts shall be provided for all grout pours over 5 feet in height. All grout pours greater than 12" require internal mechanical vibration and reconsolidation. Grout pours 12" or less shall be mechanically
- vibrated or puddled. 16. High lift grouted construction may be used in conformance with IBC requirements. 17. Continuous special inspection shall be provided during preparation and taking of any required prisms or test specimens, at the start of laying of masonry units, after the placement of reinforcement, grout space
- prior to each grouting operation, and during all grouting operations. 18. Concrete block shall have attained full design compressive strength prior to placement. Date of manufacture shall be stapled to pallets.
- 19. Concrete block shall be dry at time of placement. Wet or frozen masonry units shall not be placed. 20. Provide 1" soft joint between CMU partitions and all vertical concrete surfaces. See architectural drawings for caulking and fire safing requirements of soft joints. 21. Anchored Brick/Stone Veneer:
- Unless noted otherwise, brick and/or stone veneer shall be anchored as follows: a. Anchors for veneer shall be two-piece, adjustable anchors with minimum W1.7 wire size. Anchors shall be submitted to architect for approval prior to installation.
- b. Anchor spacing 1. Maximum spacing shall be 24" OC vertical and 16" OC horizontal
- 2. For seismic design categories D, E and F, maximum spacing shall be 16" OC vertical and 16" OC horizontal. See general section for seismic design category. c. Backing of brick/stone veneer shall be spaced @16" OC maximum. Cold-formed steel backing shall be 18 ga minimum and galvanized. All backing shall be fastened to structural framing with
- minimum #10 screws. d. Loose lintels shall be as specified in the Loose Lintel Schedule. All lintels and relief angles shall be galvanized. Provide a 3/8" minimum gap between bottom of relief angle and top of veneer







JOIST POCKET AT PARTITION WALL

1 PARTITION WALL BRACING BETWEEN STEEL BEAMS

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

PARTITION WALL BRACING AT METAL DECK - $\underbrace{3}_{3/4" = 1^{\circ}-0"}^{\text{ELEVATION}}$

4 STEEL BEAM POCKET AT PARTITION WALL

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. LRFD CAPACITIES ARE BASED ON THE AISC MANUAL FOR STEEL CONSTRUCTION - THIRTEENTH EDITION FOR STRENGTH (LRFD) LOADS.

Fy OF BEAMS AND GIRDERS = 50 ksi. FV OF CONNECTION PLATES = 36 ksi.

GIRDER WEB THICKNESS MUST BE > BEAM WEB THICKNESS. INTERPOLATION BETWEEN WEB THICKNESSES GIVEN IS NOT PERMITTED.

1 1/2" COPE DEPTH. BEAMS MAY BE SKEWED UP TO 30° FROM PERPENDICULAR WITH NO REDUCTION IN CAPACITY OR INCREASE IN WELD SIZE.

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O' - 0 1/2"
O' - 0 0 O' - 0 O' | VGTH
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L5X3 1/2X3/8
"#"-A325-N BC
SHORT SLOT | W/
DLTS IN HC
TED HOLE |
| #"- 3/4"Ø
A325-N
BOLTS | BEAM SIZES | MIN BEAM
WEB
THICKNESS | MAX CC
LENG |
| 2 | W12's | 0.200 | 6" |
| 3 | W14's, W16's, W18's | 0.230 | 6" |
| 4 | W18's, W21's, W24's, C18's | 0.300 | 6" |
| 5 | W21's, W24's, W27's, W30's | 0.350 | 10" |
| 6 | W24's, W27's, W30's, W33's,
W36's | 0.395 | 10" |
| 7 | W27's, W30's, W33's, W36's,
W40's | 0.460 | 10" |
| 8 | W30's, W33's, W36's, W40's | 0.470 | 10" |
| 9 | W33's, W36's, W40's | 0.550 | 10" |
| 10 | W36's, W40's | 0.600 | 10" |
| 11 | W40's | 0.630 | 10" |
| NOTES:
1. LRFI
2. Fy O | D CAPACITIES ARE BASED ON THE AISC
F BEAMS AND GIRDERS = 50 ksi. | MANUAL FOR ST | TEEL CONS |

STRUCTION - THIRTEENTH EDITION FOR STRENGTH (LRFD) LOADS.

Fy OF CONNECTION ANGLES = 36 ksi. GIRDER WEB THICKNESS MUST BE > BEAM WEB THICKNESS.

INTERPOLATION BETWEEN WEB THICKNESSES GIVEN IS NOT PERMITTED.

1/2" \_\_\_\_COPE LENGTH ∕0' - 1 1/4" MIN À L5X3 1/2X3/8 W/ $\overset{}\prec$ short slotted holes "#"- 3/4"Ø MIN BEAM 3" COPE 4" COPE BEAM SIZES A325-N WEB CAPACITY BOLTS THICKNESS (KIPS) W8's, MC10's, MC12's 0.170 12 0.190 11 W10's, C10's W12×14, W12×16 0.200 23 W12×19 AND HEAVIER, C12's, C15's, 0.230 23 W14's, W16's, W18's 0.250 38 W16's, W18's, W21's, W24's, C18's W18's, W21's, W24's, W27's, W30's 0.300 54 W21's, W24's, W27's, W30's, W33's, 0.350 71 W36's W24's, W27's, W30's, W33's, 0.395 W36's 0.460 W27's, W30's, W33's, W36's, W40's 0.550 W30's, W33's, W36's, W40's 0.600 10 W33's, W36's, W40's -0.630 W36's, W40's

LRFD CAPACITIES ARE BASED ON THE AISC MANUAL FOR STEEL CONSTRUCTION - THIRTEENTH EDITION FOR STRENGTH (LRFD) LOADS. Fy OF BEAMS AND GIRDERS = 50 ksi. Fy OF CONNECTION ANGLES = 36 ksi.

GIRDER WEB THICKNESS MUST BE > BEAM WEB THICKNESS. INTERPOLATION BETWEEN WEB THICKNESSES GIVEN IS NOT PERMITTED.

Fy OF CONNECTION ANGLES = 36 ksi. GIRDER WEB, COLUMN WEB OR FLANGE THICKNESS MUST BE > BEAM WEB THICKNESS.

INTERPOLATION BETWEEN WEB THICKNESSES GIVEN IS NOT PERMITTED.

Fy OF BEAMS AND GIRDERS = 50 ksi. Fy OF CONNECTION ANGLES = 36 ksi.

GIRDER WEB, COLUMN WEB OR FLANGE THICKNESS MUST BE > BEAM WEB THICKNESS. . INTERPOLATION BETWEEN WEB THICKNESSES GIVEN IS NOT PERMITTED.

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| | | ,, | 0056 Edwards Village
Suite 210
Edwards, CO 813 | Blvd. |
| VIDE FLANGE C
COLUMN THICKI |)R TUBE
NESS > 1/4" | | (970) 766-147
fax: (970) 766-147 | 70 |
| 6" COPE | 8" COPE | | email: tab@vail.ne
www.tabassociates.
<u>Civil Engineer</u> | com |
| (KIPS) | (KIPS) | | Structural Enginee | r |
| 14 | 11 | | | <u>1</u> |
| | 23 | | Mechanical Engined | <u>er</u> |
| 44 | 33 | | Electrical Engineer | <u>r</u> |
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Sheet Title: Steel Connection Schedules

TAB

Associates The Architectural Balance 0056 Edwards Village Blvd. Suite 210 Edwards, CO 8132 (970) 766-1470 fax: (970) 766-1471 email: tab@vail.net www.tabassociates.com Civil Engineer

Structural Engineer

Mechanical Engineer

Electrical Engineer

| Revisions: | | | |
|------------|-------------|------|--|
| No | Description | Date | |
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Issue Dates: DD - 02/21/20 Sheet Title: Steel Bar Joist Roof Typical Details

CENTER SPLICE OVER STUD PACK BAR JOIST — \_\_\_\_

DISTRIBUTION HEADER SPLICE

NOTES: 1. DISTRIBUTION HEADER SHALL BE 10'-0" MIN LENGTH UNLESS WALL IS < 10'-0" LONG. 2. DISTRIBUTION HEADER SPLICE SHALL OCCUR ≥ 16" PAST OPENINGS. 3. NO HOLES CAN BE CUT IN DISTRIBUTION HEADER. PLUMBING,

ELECTRICAL, ETC. MUST BE RUN IN NON-BEARING WALLS. 4. DOUBLE STUDS ARE REQUIRED AT ALL DISTRIBUTION HEADER SPLICES.

- STEEL BEAM / 2- 0.157"Ø PAF @16" OC TSN VERTICLIP SL TSN - VERTICLAP SL EA SIDE AT JAMB PACK THE SCREWS SHALL BE - INSTALLED IN THE CENTER OF THE LONG SLOTTED HOLE

9 MULTIPLE STUDS

AL600 EA SIDE AT OPENINGS <u>></u> 6'-0"

- 0.157"Ø PAF @16" OC

TAB Associates The Architectural Balanc 0056 Edwards Village Blvd. Suite 210 Edwards, CO 8132 (970) 766-1470 fax: (970) 766-1471 email: tab@vail.net www.tabassociates.com Civil Engineer Structural Engineer Mechanical Engineer

Electrical Engineer

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| Revisions: | | | |
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Issue Dates: DD - 02/21/20 Sheet Title: Typical CFS Details Project No: 20191103

Sheet No:

S1.5

REQUIRED THIRD PARTY SPECIAL INSPECTIONS AND TESTS OF **CONCRETE CONSTRUCTION - 2015 IBC**

| TYPE |
|--|
| Inspect reinforcment, including prestressing tendons, and verify placement. |
| Reinforcing bar welding: |
| a. Verify weldability of reinforcing bars other than ASTM A706. |
| b. Inspect single-pass fillet welds, maximum 5/16"; and |
| c. Inspect all other welds. |
| Inspect anchors cast in concrete. |
| Inspect anchors post-installed in hardened concrete membe |
| a. Adhesive anchors installed in horizontally or upwardly
inclined orientatations to resist sustained tension loads |
| Mechanical anchors and adhesive anchors not defined
4.a. |
| Verifying use of required design mix. |
| Prior to concrete placement, fabricate specimens for strengt tests, perform slump and air content tests, and determine the temperature of the concrete. |
| Inspect concrete and shotcrete placement for proper
application techniques. |
| Verify maintenance of specified curing temperature and techniques. |
| Inspect prestressed concrete for: |
| a. Application of prestressing forces; and |
| b. Grouting of bonded prestressing tendons. |
|). Inspect erection of precast concrete members. |
| Verify in-situ concrete strength, prior to stressing of
tendons in post-tensioned concrete and prior to removal of
shores and forms from beams and structural slabs. |
| 2. Inspect formwork for shape, location and dimensions of the concrete member being formed. |
| |
| |

| | | OPEN-WEB STE |
|-------|------------------------------------|---|
| | | TYPE |
| Insta | allatio | on of open-web steel joists and joist girders. |
| a. | Enc | connections - welding or bolted. |
| b. | Bridging - horizontal or diagonal. | |
| | 1. | Standard bridging. |
| | 2. | Bridging that differs from the SJI specifications listed in section 2207.1. |
| | | |

| | CONTINUOUS | PERIODIC SPECIAL | REFERENCED | IBC | |
|--------|--------------------|------------------|---|-----------------------------------|--|
| | SPECIAL INSPECTION | INSPECTION | STANDARD | REFERENCE | |
| | - | Х | ACI 318: Ch. 20, 25.2, 25.3, 26.6.1-26.6.3 | 1908.4 | |
| | - | - | AWS D1.4
ACI 318: 26.6.4 | - | |
| | - | x | AWS D1.4
ACI 318: 26.6.4 | - | |
| | - | x | AWS D1.4
ACI 318: 26.6.4 | - | |
| | Х | - | AWS D1.4
ACI 318: 26.6.4 | - | |
| | - | Х | ACI 318: 17.8.2 | - | |
| s. | - | - | | - | |
| | Х | - | ACI 318: 17.8.2.4 | - | |
| in | - | Х | ACI 318: 17.8.2 | - | |
| | - | X | ACI 318: Ch. 19, 26.4.3, 26.4.4 | 1904.1, 1904.2,
1908.2, 1908.3 | |
| ו
פ | Х | - | ASTM C 172
ASTM C 31
ACI 318: 26.4, 26.12 | 1908.10 | |
| | Х | - | ACI 318: 26.5 | 1908.6, 1908.7, 1908.8 | |
| | - | Х | ACI 318: 26.5.3-26.5.5 | 1908.9 | |
| | - | - | | - | |
| | Х | - | ACI 318: 26.10 | - | |
| | Х | - | ACI 318: 26.10 | - | |
| | - | X | ACI 318: Ch. 26.8 | - | |
| | - | x | ACI 318: 26.11.2 | - | |
| | - | X | ACI 318: 26.11.1.2 (b) | - | |

HIRD PARTY SPECIAL INSPECTIONS OF EL INISTS AND INIST CIRDERS - 2015 IRC

| L JUISTS AND JUIST GIRDERS - 2013 IDC | | | | |
|---------------------------------------|--------------------|--|--|--|
| CONTINUOUS | PERIODIC | REFERENCED | | |
| SPECIAL INSPECTION | SPECIAL INSPECTION | STANDARD | | |
| - | - | | | |
| - | Х | SJI specifications listed in Section 2207.1. | | |
| - | - | | | |
| - | Х | SJI specifications listed in Section 2207.1. | | |
| - | Х | | | |

THIRD PARTY LEVEL B QUALITY ASSURANCE EOD MACONDY CONCEPTION 2015 IDC

| | FUR MASUNRY | CONSTRUC | ノ I U N - Z | 112 IBC | |
|----|--|------------|-------------|---|---|
| | | FREQUENCY | | REFERENCE F | OR CRITERIA |
| | INSPECTION TASK | CONTINUOUS | PERIODIC | TMS 402 | TMS 602 |
| 1. | Verify compliance with the approved submittals | - | Х | - | Art. 1.5 |
| 2. | As masonry construction begins, verify that the following are in compliance: | | | | |
| | a. Proportions of site-prepared mortar | - | - | Х | Art. 2.1, 2.6 A |
| | b. Construction of mortar joints | - | Х | - | Art. 3.3 B |
| | c. Grade and size of prestressing tendons and anchorages. | - | Х | - | Art. 2.4 B,
2.4 H |
| | d. Location of reinforcement, connectors, and prestressing tendons and anchorages. | - | Х | - | Art. 3.4, 3.6 A |
| | e. Prestressing technique | - | Х | - | Art. 3.6 B |
| | f. Properties of thin-bed mortar for AAC masonry | х | Х | - | Art. 2.1 C |
| 3. | Prior to grouting, verify that the following are in compliance: | | | | |
| | a. Grout space | - | Х | - | Art. 3.2 D,
3.2F |
| | Grade, type, and size of reinforcement and anchor bolts,
and prestressing tendons and anchorages | - | Х | Sec. 6.1 | Art. 2.4, 3.4 |
| | c. Placement of reinforcement, connectors, and
prestressing tendons and anchorages | - | Х | Sec. 6.1, 6.2.1,
6.2.6, 6.2.7 | Art. 3.2 E, 3.4
3.6 A |
| | Proportions of site-prepared grout and prestressing grout
for bonded tendons | - | Х | - | Art. 2.6 B,
2.4 G.1.b |
| | e. Construction of mortar joints | - | Х | - | Art. 3.3 B |
| 4. | Verify during construction: | | | | |
| | a. Size and location of structural elements | - | Х | - | Art. 3.3 F |
| | Type, size, and location of anchors, including other
details of anchorage of masonry to structural members,
frames, or other construction. | - | Х | Sec. 1.2.1(e),
6.1.4.3, 6.2.1 | - |
| | c. Welding of reinforcement | x | - | Sec. 8.1.6.7.2,
9.3.3.4(c), 11.3.3.4 (b) | - |
| | Preparation, construction, and protection of masonry
during cold weather (temperature below 40°F (4.4°C))
or hot weather (temperature above 90°F (32.2°C)) | - | Х | - | Art. 1.8 C,
1.8 D |
| | e. Application and measurement of prestressing force | х | - | - | Art. 3.6 B |
| | f. Placement of grout and prestressing grout for bonded tendons is in compliance | x | - | - | Art. 3.5,
3.6 C |
| | g. Placement of AAC masonry units and construction of
thin-bed mortar joints | x | Х | - | Art. 3.3 B.9,
3.3 F.1.b |
| 5. | Observe preparation of grout specimens, mortar specimens, and / or prisms | - | х | - | Art. 1.4 B.2.a.3,
1.4 B.2.b.3,
1.4 B.2.c.3,
1.4 B.3 14 B.4 |

| REQUIRED THIRD PARTY SPECIAL INSPECTIONS AND TESTS | | | | | |
|--|---|------------------|---|--|--|
| | OF S | SOILS - 2015 IBC | | | |
| | TYPE CONTINUOUS PERIODIC
SPECIAL INSPECTION SPECIAL INSPECTION | | | | |
| 1. | Verify materials below shallow foundations are adequate to
achieve the design bearing capacity. | - | Х | | |
| 2. | Verify excavations are extended to proper depth and have reached proper material. | - | Х | | |
| 3. | Perform classification and testing of compacted fill materials. | - | Х | | |
| 4. | Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill. | Х | - | | |
| 5. | Prior to placement of compacted fill, inspect subgrade and verify that site has been prepared properly. | - | Х | | |

REQUIRED THIRD PARTY VERIFICATION AND INSPECTIONS FOR **COLD-FORMED STEEL CONSTRUCTION - 2015 IBC** VERIFICATION AND INSPECTION CONTINUOUS 1. Pre-fabricated cold-formed steel structural elements and assemblies. a. size, spacing b. connections and welds -2. Site built assemblies a. grade, size, spacing b. connections and welds c. blocking -3. Diaphragms a. member size at panel edges b. fastener diameter and length -

STATEMENT OF SPECIAL INSPECTIONS - 2015 IBC

-

SPECIAL INSPECTIONS AND STRUCTURAL TESTING SHALL BE PROVIDED BY A THIRD PARTY AGENCY EMPLOYED BY THE OWNER. SPECIAL INSPECTIONS AND TESTING SHALL BE PROVIDED AS REQUIRED IN CHAPTER 17 OF THE IBC AND BY THE ENGINEER OF RECORD. REQUIREMENTS ARE NOTED IN CHARTS PROVIDED ON THE CONSTRUCTION DOCUMENTS, AS WELL AS IN THE SPECIFICATIONS. THE NAMES AND CREDENTIALS OF THE SPECIAL INSPECTORS TO BE USED SHALL BE SUBMITTED TO THE BUILDING OFFICIAL. A. ALL SPECIAL INSPECTORS SHALL BE QUALIFIED TO INSPECT MATERIALS BASED ON CERTIFICATION, TRANING OR EXPERIENCE AS REQUIRED, AND MUST MEET SPECIFICATION STANDARDS. SPECIAL INSPECTOR DUTIES: A. SPECIAL INSPECTOR SHALL REVIEW ALL WORK REQUIRED ON THE CONSTRUCTION DOCUMENTS AND SPECIFICATIONS. B. SPECIAL INSPECTOR SHALL FURNISH SPECIAL INSPECTION REPORTS TO THE ENGINEER OF RECORD, ARCHITECT, CONTRACTOR, OWNER, AND BUILDING OFFICIAL ON A WEEKLY BASIS OR MORE FREQUENTLY. ALL ITEMS NOT IN COMPLIANCE SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR

c. fastener spacing

- CORRECTION. IF UNCORRECTED, THEY SHALL BE REPORTED TO THE EOR. SPECIAL INSPECTOR SHALL KEEP A LOG OF ALL NON-COMPLIANCE ITEMS, INCLUDING THOSE NOTED ON STRUCTURAL OBSERVATION REPORTS. D. SPECIAL INSPECTOR SHALL REINSPECT ALL NON-COMPLIANCE ITEMS UPON REPAIR BY THE CONTRACTOR TO MEET THE CONSTRUCTION DOCUMENTS OR REPAIR BASED ON ENGINEER OF RECORD DIRECTIVES. E. SPECIAL INSPECTOR SHALL SUBMIT A FINAL REPORT.
- F. SPECIAL INSPECTOR SHALL FURNISH A FINAL LETTER TO THE EOR AT THE COMPLETION OF THE PROJECT STATING THAT ALL INSPECTIONS HAVE BEEN COMPLETED AND ALL DISCREPANCIES HAVE BEEN RESOLVED. CONTRACTOR DUTIES:
- A. CONTRACTOR SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE OWNER AND BUILDING OFFICIAL PRIOR TO THE COMMENCEMENT OF WORK. THE STATEMENT SHALL CONTAIN ACKNOWLEDGEMENT OF THE SPECIAL INSPECTION REQUIREMENTS ON THE CONSTRUCTION DOCUMENTS AND SPECIFICATIONS.
- IS REQUIRED. C. ALL WORK, INCLUDING REPAIRS, SHALL REMAIN ACCESSIBLE AND EXPOSED UNTIL IT HAS BEEN OBSERVED BY THE SPECIAL INSPECTOR.
- D. CONTRACTOR SHALL PROVIDE CURRENT DRAWINGS AND SPECIFICATIONS TO THE SPECIAL INSPECTOR. THIS INCLUDES ALL STRUCTURAL OBSERVATIONS, REPORTS, AND REPAIR DOCUMENTATION.
- E. ALL REPAIRS SHALL BE INSPECTED AT THE COST OF THE CONTRACTOR. NON-COMPLIANCE ITEMS SHALL BE RESOLVED IN A TIMELY MANNER.

| PERIODIC | REFERENCED
STANDARD | IBC
REFERENCE |
|----------|------------------------|---|
| | | |
| Х | - | Sec. 1704.2.5.1,
1705.11.2., 1705.12.3 |
| Х | | |
| | | |
| Х | _ | Sec. 1705.11.2,
1705.12.3 |
| Х | | |
| Х | | |
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| Х | | Sec. 1705 11 2 |
| Х | - | 1705.12.3 |
| Х | | |

B. CONTRACTOR SHALL NOTIFY THE RESPONSIBLE SPECIAL INSPECTOR THAT WORK IS READY FOR INSPECTION A MINIMUM OF 24 HOURS BEFORE SUCH INSPECTION

REQUIRED THIRD PARTY VERIFICATION AND INSPECT FOR STEEL CONSTRUCTION - 2015 IBC

| | CONTINUOUS | PERIODIC | |
|---|---------------------|-------------------|-----|
| INSPECTIO | N TASKS PRIOR TO W | ELDING | |
| Welder qualification records and continuity records | <u>-</u> | x | |
| WPS available | X | - | |
| Manufacturer certifications for welding consumables available | X | - | |
| Material identification (type/grade) | _ | X | |
| Welder identification system <sup>[1]</sup> | | X | |
| Fit-up of aroove welds (including joint geometry) | | x | |
| Fit-up of CIP groove welds of HSS T- Y- and K-joints without backing | | | |
| (including joint geometry) | - | Х | |
| Configuration and finish of access holes | - | Χ | |
| Fit-up of fillet welds | - | X | |
| INSPECTIO | N TASKS DURING WE | LDING | |
| Control and handling of welding consumables | - | Х | |
| No welding over cracked tack welds | - | Х | |
| Environmental conditions | - | Х | |
| WPS followed | - | Х | |
| Welding techniques | - | Х | |
| Placement and installation of steel headed stud anchors | Х | - | |
| INSPECTIO | ON TASKS AFTER WEI | DING | |
| Welds cleaned | - | Х | |
| Size, length and location of welds | Х | - | |
| Welds meet visual acceptance criteria | Х | - | |
| Arc strikes | Х | - | |
| k-area <sup>[2]</sup> | Х | - | |
| Weld access holes in rolled heavy shapes and built-up heavy shapes [3] | Х | - | |
| Backing removed and weld tabs removed (if required) | Х | - | |
| Repair activities | Х | - | |
| Document acceptance or rejection of welded joint or member | Х | - | |
| No prohibited welds have been added without the approval of the EOR | - | Х | |
| INSPECT | ION TASKS PRIOR TO | BOLTING | |
| Manufacturer's certifications available for fastener materials | Х | - | |
| Fasteners marked in accordance with ASTM requirements | - | Х | |
| Correct fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane) | _ | Х | |
| Correct bolting procedure selected for joint detail | _ | X | |
| Connecting elements including the appropriate faving surface condition | | | |
| and hole preparation, if specified, meet applicable requirements | - | Χ | |
| Pre-installation verification testing by installation personnel observed
and documented for fastener assemblies and methods used | - | Х | |
| Protected storage provided for bolts, nuts, washers and other fastener components | - | Х | |
| INSPEC | FION TASKS DURING E | BOLTING | |
| Fastener assemblies placed in all holes and washers and nuts are positioned as required | - | х | |
| Joint brought to the snug-tight condition prior to the pretensioning operation | - | Х | |
| Fastener component not turned by the wrench prevented from rotating | | X | |
| Fasteners are pretensioned in accordance with the RCSC Specification, | | | |
| progressing systematically from the most rigid point toward the free edges | - | Х | |
| INSPEC | TION TASKS AFTER B | OLTING | |
| Document acceptance or rejection of bolted connections | X | - | |
| INSPECTION OF STEEL FRA | ME, DECK AND JOINT | DETAILS FOR COMPL | _IA |
| Placement and installation of steel deck | - | X | |
| Details such as bracing and stiffening | - | X | |
| Member locations | - | Х | |
| Application of joint details at each connection | - | х | |

NOTES: 1. THE FABRICATOR OR ERECTOR, AS APPLICABLE, SHALL MAINTAIN A SYSTEM BY WHICH A WELDER WHO HAS WELDED A JOINT OR MEMBER (STAMPS, IF USED, SHALL BE THE LOW-STRESS TYPE.

2. WHEN WELDING OF DOUBLER PLATES, CONTINUITY PLATES OR STIFFENERS HAS BEEN PERFORMED IN THE k-AREA, VISUALLY INSPECT THE CRACKS WITHIN 3" OF THE WELD. 3. AFTER ROLLED HEAVY SHAPES (PER AISC 360 SECTION A3.1c) AND BUILT-UP HEAVY SHAPES (PER AISC 360 SECTION A3.1d) ARE WELDED, VI

WELD ACCESS HOLES FOR CRACKS.

| CTION | |
|--|--|
| REFERENCED | |
| STANDARD | |
| | |
| | TAB |
| | The Architectural B
0056 Edwards Village B |
| AISC 360 TABLE N5.4-1 | Edwards, CO 8132
(970) 766-147
fax: (970) 766-1471 |
| AISC 360 TABLE N5.4-1 | www.tabassociates.c |
| | Structural Engineer |
| AISC 300 TABLE NS.4-1 | Mechanical Engineer |
| AISC 360 TABLE N5.4-2 | |
| AISC 360 TABLE N5.4-2 | Seal |
| AISC 360 TABLE N5.4-2 | |
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| AISC 360 TABLE N5.4-3 | |
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S1.6

(16) (15)\_\_\_\_\_ (14) (13) (12)ALL EXISTING COLUMNS TO REMAIN ~DO NOT DAMAGE (11)(10)\_\_\_\_\_ (9) (8.7) 8

MAIN LEVEL DEMO PLAN

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| 13 |
 |
| (12) |
 |
| (11) | |
| 10 | |
| 9 | |
| 8.7 | |
| 8 | |

1 ROOF DEMO PLAN

A

| | SPREAD | D FOOT | ING SCHED | ULE |
|------|---------|---------|-----------|-------------|
| TYPE | WIDTH | LENGTH | THICKNESS | REINFORCING |
| F3 | 3' - 0" | 3' - 0" | 1' - 0" | |
| F4 | 4' - 0" | 4' - 0" | 1' - 0" | |
| F5 | 5' - 0" | 5' - 0" | 1' - 0" | |

KEYNOTES

| | Revisions: | |
|----|-------------|------|
| No | Description | Date |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| KEYNOTES | | | | | |
|--|--------------|--------------------------|------------|---------------------|---|
| INDICATES CHANGE IN ELEVATION.
STEEL BEAM DESIGNATIONS:
W10x12[12]c=1/2"(100'-0")
BEAM SIZE[No. HEADED ANCHOR STUDS] c
ELEVATION) SEE SHEET S
STUD LAYOUT. | 0.2
5.2 | | | | |
| INDICATES BRACE FRAMING.
JOIST DESIGN FOR 27psf DEAD LOAD AND 3
WEIGHT OF MECHANICAL UNITS WHERE AF
SHOWN ON PLAN. (###/###) = TOTAL LOAD
WITH ADDITIONAL UNIFORM LOADS DUE TO
S### FOR SPECIAL JOIST WITH ADDITIONAL | 5.9
5.11 | J | | H | G |
| LOADING. DESIGN ROOF JOIST FOR A NET
JOIST BRIDGING PER SJI SPECIFICATIONS
1 1/2" TYPE "B"x22GA METAL ROOF DECK, 3
DECK TO DEVELOP A DIAPHRAGM SHEAR (| 5.14
5.16 | | | | |
| | | | | | 5 |
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| | | | | | |

c=CAMBER(TOP OF STEEL S### FOR HEADED ANCHOR

D 30psf LIVE LOAD PLUS APPLICABLE SPACING AS AD plf/LIVE LOAD plf ON JOIST TO DRIFTING. SEE SHEET NAL NON-UNIFORM DRIFT ET UPLIFT OF 5psf. IS BY JOIST SUPPLIER. , 3 SPAN MINIMUM. ATTACH R CAPACITY OF 300plf.

TAB Associates The Architectural Balance 0056 Edwards Village Blvd. Suite 210 Edwards, CO 8132 (970) 766-1470 fax: (970) 766-1471 email: tab@vail.net www.tabassociates.com Civil Engineer

Structural Engineer

Mechanical Engineer

Electrical Engineer

Issue Dates: DD - 02/21/20 Sheet Title: Roof Framing Plan Project No: 20191103 Sheet No: S2.12

 (\mathbf{V}) (\mathbf{U}) 13 \_\_\_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ W12X26 (10)-(9)

2 SCIENCE CLASSROOM FRAMING

KEYNOTES

\_\_\_\_\_

Associates The Architectural Balance 0056 Edwards Village Blvd. Suite 210 Edwards, CO 8132 (970) 766-1470 fax: (970) 766-1471 email: tab@vail.net www.tabassociates.com Civil Engineer

Structural Engineer

Mechanical Engineer

Electrical Engineer

Seal

BOXED NOTES INDICATE A TYPICAL CONDITION EXISTS UNLESS NOTED OTHERWISE

| | | | <u>M</u> | ECHAN | IICAL SYSTEMS LEGE | ND | | | |
|--|---|--|---|---------------------|--|--------------------|---|------------------------|---|
| DEVICE | D | UCTWORK LEG | END | EQU | IPMENT ABBREVIATIONS | | ABBREVIATIONS | Р | IPING DESIGNATIONS |
| ATION KEY | | DESCRIPTION | RECTANGULAR | AHU | | | | | |
| TYPE OF AIR DEVICE | $\frac{3D}{PLAN}$ | DUCT RISER | | B | BOILER (HOT WATER) | AFF | ABOVE FINISHED GRADE | — CS—
— CR— | CONDENSER RETURN |
| # = AIR QUANTITY
(CEM) | | | | BB
BT | BASE BOARD
BUFFER TANK | AUTO
ABV | AUTOMATIC ABOVE | — CHS — | CHILLED WATER SUPPLY |
| CA = COMB. AIR
OSA = OUTSIDE AIR | | DUCT DROP | | CC | | BCS | BUILDING CONTROL SYSTEM | — CHS— | |
| RET = RETURN
EXH = EXHAUST
XFR = TRANSFER | | 90° ELBOW DN.
(NEGATIVE PRESSURE)
90° ELBOW DN | | CH
CP OR P
CT | CHILLER
CIRC PUMP
COOLING TOWER | BLDG
BFG | BUILDING
BELOW FINISHED GRADE | | CLOSED CONDENSER SUPPLY CLOSED CONDENSER RETURN |
| SIZE (INCHES) OR MINIMUM
FREE AREA REQUIRED IN
SQUARE FEET | | (POSITIVE PRESSURE) | | | CABINET UNIT HEATER
CONSTANT VOLUME BOX | BOP
B/N | BOTTOM OF PIPE FROM FINISHED FLOOR
BETWEEN | — FCS — | FLOOR COOLING SUPPLY |
| | | (NEGATIVE PRESSURE) | | | | | | | |
| | | 90° ELBOW UP
(POSITIVE PRESSURE) | | EBH | ELECTRIC BASEBOARD HEATER | | COMBUSTION AIR
CONTROLS CONTRACTOR | — GLS — | GEVCOL FEED
GEOTHERMAL (OR GROUND) LOOP SUPPLY |
| INDICATES AIR INLET DEVICE | | SIZE OR SHAPE TRANSITIO | | ECU
EF | EVAPORATIVE COOLING UNIT
EXHAUST FAN | CFM
CIP | CUBIC FEET PER MINUTE (AIR FLOW RATE)
CAST IN PLACE | <u> </u> | GEOTHERMAL (OR GROUND) LOOP RETURN |
| MODULE SIZE REGISTERS, | | ROUND FLEXIBLE DUCT
CONNECTION | | ERU | ENERGY RECOVERY UNIT | | CEILING (OR COOLING) | — HWS— | HEATING WATER SUPPLY |
| MODULE SIZE. | | 90° RADIUS ELBOW | | EWH | ELECTRIC WATER HEATER | | CONDENSATE | -HWS(LT)- | HEATING WATER SUPPLY (LOW TEMP) |
| | | 90° MITERED ELBOW | | F
FC | FURNACE
FAN COIL | CONN
CONTR'R | CONNECT (OR CONNECTION)
CONTRACTOR | -HWR(LT)-
-HWS(HT)- | HEATING WATER RETURN (LOW TEMP)
HEATING WATER SUPPLY (HIGH TEMP) |
| IATION KEY | | W/ TURNING VANES | | FP
GF | FAN POWERED BOX | | CLEANOUT
CLEANOUT TO GRADE | -HWR(HT)- | HEATING WATER RETURN (HIGH TEMP) |
| | | 90° STRAIGHT TEE | | <u>H</u> | HUMIDIFIER | | DOMESTIC COLD WATER | -HWR(HP)- | HEATING WATER RETURN (HEAT PUMP) |
| | | 90° CONICAL TEE | | HC
HP | HEATING COIL
HEAT PUMP | – <u>DN</u>
(E) | DOWN
EXISTING | — RFS — | RADIANT FLOOR SUPPLY |
| LED WATER
IESTIC WATER | | 45° BRANCH | | HX | HEAT EXCHANGER | EA
EAT | EXHAUST AIR
ENTERING AIR TEMPERATURE | — RFR — | RADIANT FLOOR RETURN |
| TING WATER
IPING
ITE AND/OR VENT | | 45° CONICAL BRANCH | | MAU | MAKE-UP AIR UNIT | EC | ELECTRICAL CONTRACTOR | — SHWS— | SOLAR HEATING WATER SUPPLY |
| IG RISER (MISC TYPES)
RM DRAIN
SECONDARY STORM DRAIN | | COMBINATION FIRE AND | | | MOTOR CONTROL CENTER
MIXING VALVE | EWT | EXHAUST
ENTERING WATER TEMPERATURE | — SHWR— | SOLAR HEATING WATER RETURN |
| | | SMOKE DAMPER | | P
RF | PUMP (SEE PIPING LEGEND FOR DETAILS)
RETURN (OR RELIEF) AIR FAN | FA
FACP | FREE AREA FIRE ALARM CONTROL PANEL | — SMS — | SNOWMELT SUPPLY
SNOWMELT RETURN |
| EXHAUST AIR
OUTSIDE AIR
JRN AIR | | FIRE DAMPER | | RZ | RADIANT ZONE | FBO | FURNISHED BY OWNER | | |
| PLY AIR | | SMOKE DAMPER | | SA
SB | SNOWMELT AREA
SUMP BASIN | FCO
FCT | FLOOR CLEANOUT
FOR CONTINUATION | STEAM & CO | NDENSATE PIPING
HIGH PRESURE STEAM |
| | | MANUAL BALANCING DAMF | | SF
ST | SUPPLY FAN
STORAGE TANK | FFI
FSD | FOR FURTHER INFORMATION COMBINATION FIRE/SMOKE DAMPER | — HPR —
— LPS — | HIGH PRESURE CONDENSATE RETURN |
| MBER | | MOTORIZED DAMPER | | TMV | | GC | | | LOW PRESURE CONDENSATE RETURN |
| | | BACKDRAFT DAMPER | | VR | VARIABLE VOLUME BOX W/ REHEAT | GPM | GROUND HEAT EXCHANGER
GALLONS PER MINUTE (WATER FLOW RATE) | — MPS —
— MPR — | MEDIUM PRESURE STEAM
MEDIUM PRESURE CONDENSATE RETURN |
| NCE SAMPLE | | | | VV
WH | VARIABLE VOLUME BOX
WATER HEATER | HP
HW | HORSE POWER DOMESTIC HOT WATER | PC | PUMPED CONDENSATE |
| | | D = DROP R=RISE | | | | HWC | HOT WATER RECIRCULATION | | IPING |
| | - { 14ø } | DUCT SIZE TAG:
FIRST NUMBER = PLAN WIE | DTH 14x12 - | | PIPING SYMBOLS | | LEAVING AIR TEMPERATURE | G
MG | MEDIUM PRESSURE GAS |
| R CONTINUATION | | | | <u>د</u>
م | 90° ELBOW DN
90° ELBOW UP | LF
LWT | LINEAR FOOT LEAVING WATER TEMPERATURE | — PG—
— LPG— | PROPANE GAS
LIQUID PROPANE GAS |
| JMBER
G NUMBER OR | | | | | TEE DOWN | MC
MFR | MECHANICAL CONTRACTOR | — PD— | PROPANE DRAIN |
| A LETTER | | | | | BUTTERFLY VALVE | | MOTOR OPERATED DAMPER | | |
| TO: | | | | | SHUT OFF (BALL, GATE, BUTTERFLY) GLOBE VALVE | - (N)
NC | NEW
NORMALLY CLOSED | — FOS—
— FOR— | FUEL OIL SUPPLY FUEL OIL RETURN |
| | | | | | | | NATIONAL ELECTRIC CODE | | FUEL OIL VENT |
| DTES | FIXTUR | E CONNECTION | SCHEDULE | | BALL VALVE | | NORMALLY OPEN | — FOF— | FUEL OIL FILL |
| VIATIONS, AND DESIGNATIONS
RE NOT NECESSARILY USED ON | WATER CLOSET (FLUSH | I VALVE) WC - | V CW WASTE VENT 1" 4" 2" | | FLOW BALANCING VALVE | | OPPOSED BLADE VOLUME DAMPER | — RS— | REFRIGERANT SUCTION |
| NSISTS OF DATA GENERATED, | WATER CLOSET (FLUSH
URINAL (BLOWOUT) | ITANK) WC -
UR - | 1/2" 4" 2" 1" 2" 1-1/2" | € | PLUG VALVE IN RISER GATE OR GLOBE VALVE IN RISER | OC
OSA | ON CENTER
OUTSIDE AIR | <u> </u> | REFRIGERANT LIQUID |
| ENTIONS OCCURRING IN THIS
CESSARILY DEFINED ON THESE
THE ENGINEER IN THE EVENT | URINAL (WASHDOWN)
URINAL (WATERLESS) | UR - | · 3/4" 2" 1-1/2"
- 2" 1-1/2" | | DRAIN VALVE W/ HOSE END
TEMPERATURE CONTROL VALVE (2-WAY) | RA
REQ'D | RETURN AIR
REQUIRED | — CW— | DOMESTIC COLD WATER (CW)
DOMESTIC HOT WATER (HW) |
| TION INTERPRETATION IS | | LAV 1/2 | 2" 1/2" 1-1/2" 1-1/2" | | TEMPERATURE CONTROL VALVE (3-WAY) | RE: | REFER TO: | -HWC- | HOT WATER RECIRCULATION (HWC) |
| | SERVICE SINK | SS 1/. | 2" 1/2" 1-1/2" 1-1/2"
2" 1/2" 3" 2" | | SOLENOID VALVE | SA | SUPPLY AIR | <u> </u> | |
| | MOP SERVICE BASIN
DRINKING FOUNTAIN/WA | MSB 3/-
ATER COOLER DF - | 4" 3/4" 3" 2" - 1/2" 1-1/2" 1-1/2" | | VENTURI/FLOW INDICATOR PUMP & EQUIPMENT CONNECTOR | SF
SP | SQUARE FOOT (FEET)
STATIC PRESSURE | <u> </u> | FIRE LINE |
| | KITCHEN SINK W/ OR W/ | /O DISPOSAL KS 1/ | 2" 1/2" 2" 1-1/2" 4" 3/4" 2" 1-1/2" | | | | STAINLESS STEEL | — AW— | ACID WASTE |
| | SHOWER/BATHTUB | SH/TUB 3/- | 4" 3/4" 2" 1-1/2" 4" 3/4" 2" 1-1/2" | | PIPE ANCHOR | TYP | | GW | GREASE WASTE |
| | CLOTHES WASHER OUT | LET BOX CW 1/2 | 4" 3/4" 2" 1-1/2" 2" 1/2" 2" 1-1/2" | | PIPE EXPANSION JOINT FLEXIBLE CONNECTOR | | VENT THROUGH ROOF | — GV—
— PW— | PUMPED WASTE |
| | DISH MACHINE ROUGH-I
DISHWASHER ROUGH-IN | IN DM 3/-
N DW 1/- | 4" 3/4" 2" 1-1/2" 2" - 2" 1-1/2" | | SAFETY RELIEF VALVE AIR VENT | W/
W/O | WITH WITHOUT | | WASTE VENT |
| | BAR SINK | BS 1/ | 2" 1/2" 1-1/2" 1-1/2" | | PRESSURE - TEMP. TAP | WCO | WALL CLEANOUT | <u> </u> | |
| | REFRIG/ICE MAKER BOX | K FRIG - | 1/2" | IŤ | | | IRANSFER | <u> </u> | STORM DRAIN |
| | FLOOR DRAIN
TRENCH DRAIN | FD -
TD - | - <u>2"</u> <u>1-1/2"</u>
- <u>3</u> " <u>2</u> " | <u>୍</u> ୱ
୍ର | THERMOMETER
VACUUM BREAKER | - | PLAN SYMBOLS | — ST(OF)— | STORM DRAIN OVERFLOW |
| | WORK SINK
HOSE BIB | WS 3/- | 4" 3/4" 2" 1-1/2"
3/4" | | HORIZONTAL CLEANOUT | | CONTROL PANEL/RADIANT MANIFOLD | <u>— CA</u> | COMPRESSED AIR |
| | NOTES: | | | | FLOOR DRAIN | | CARBON MONOXIDE SENSOR | MA | MEDICAL AIR |
| | 1. SIZES SHOWN ARE
SIZES MAY BE INDI | MINIMUM PIPE SIZES TO A S
CATED ON PLANS WHERE RE | INGLE FIXTURE. LARGER
EQUIRED. | | ROOF DRAIN | | REMOTE TEMPERATURE SENSOR | — 02—
— VAC— | VACUUM |
| | MINIMUM DOMESTI RE: MANUFACTURE | IC PIPE SIZE TO 2 OR MORE F
ER'S INSTALLATION INSTRUC | IXTURES IS 3/4".
TIONS FOR INDIRECT | | STRAINER W/ BLOW-OFF VALVE
SHOCK ABSORBER | - H
- SP | HUMIDISTAT DUCT STATIC PRESSURE SENSOR | <u> </u> | CARBON DIOXIDE
NITROUS OXIDE |
| | WASTE SIZES.
4. WASTE AND VENT | SIZES SHOWN ABOVE APPI Y | TO INDIVIDUAL VENTING | ES≈
T | FLOW SWITCH | | ROOM PRESSURE SENSOR | — N2 — | NITROGEN |
| | ONLY. WHERE ALL
OMITTED OR SIZES
WASTE STACK VEN | OWED, INDIVIDUAL VENT CON
S MAY VARY WHEN CIRCUIT V | NECTIONS MAY BE
ENTS, COMMON VENTS,
MATION DRAIN AND VENT | | HOSE BIBB or WALL HYDRANT | | PLUMBING RISER | — WAGD— | WASTE ANESTHETIC GAS DISPOSAL |
| | SYSTEMS ARE USE
REQUIRED TO USE | ED. PRIOR APPROVAL FROM
THESE ALTERNATIVE VENTI | THE ENGINEER IS
NG METHODS. | Ø | STEAM TRAP:
FT-FLOAT & THERMOSTATIC
TD-THERMODYNAMIC | | HEATING WATER RISER | | |
| | 5. PROVIDE TRAP PRI
LOCATED IN FOOD | IMER FOR ALL FLOOR DRAINS
SERVICE AREAS. | S AND FLOOR SINKS NOT | | | | HVAC RISER | | |
| | 6. MINIMUM SIZE FOR | R WASTE AND VENT PIPING B | ENEATH SLAB IS 2". | | STEAM TRAP TEST CHAMBER | | SECTION CUT LETTER/SHEET SHOWN ON | | |
| | ALL FIX TURES LIST 8. REFER TO APPLIAN | NCE SCHEDULES (BY OTHERS | S) FOR ADDITIONAL | | I EMPERATURE CONTROLLER OR SENSOR |
⊗ | POINT OF DISCONNECTION
POINT OF NEW CONNECTION | PI | ROJECT ALTITUDE |
| | PLUMBING FIXTURI
MAKERS, AND GAR | E CONNECTIONS SUCH AS IN
RBAGE DISPOSALS. | STA-HOTS, COFFEE | | | | ACCESS PANEL SNOWMELT MANIFOLD | | 6733' ABOVE SEA LEVEL |
| | 9. PROVIDE ICE MAKE
REFRIGERATOR LC | ER BOX ROUGH IN W/ 1/2"CW
DCATIONS. | CONNECTION FOR ALL | | | | • | | |
| | 10. DESIGNER TO CON
ETC. WITH ACTUAL | NFIRM FLOW RATE OF FLOOR
_ SIZE REQUIRED. | DRAINS, FLOOR SINKS, | | | | | | |

MECHANICAL SHEET INDEX

| | | | | ISS | SUE LO | DG |
|---|---|-------------------|---|-----|--------|----|
| | | % DD - 02.21.2020 | | | | |
| # | TITLE | 00 | | | | |
| M0.0 | MECH COVER SHEET | √ | | | | |
| M0.1 | MECHANICAL SCHEDULES | 1 | | | | |
| M0.2 | MECHANICAL SPECS | | | | | |
| M0.3 | MECHANICAL SPECS | √ | | | | |
| M0.4 | MECHANICAL SPECS | √ | | | | |
| | 1 | | | | | 1 |
| M1.0 | MECHANICAL SITE PLAN | | | | | |
| | | • | • | | | |
| MD2.1 | FIRST LEVEL AREA A DEMO MECH PLAN | | | | | |
| MD2.2 | 6TH GRADE SCIENCE ROOMS DEMO MECH PLAN | | | | | |
| MD2.3 | ROOF AREA A DEMO MECH PLAN | \checkmark | | | | |
| | | | | | | |
| M2.1 | FIRST LEVEL AREA A MECH PLAN | \checkmark | | | | |
| M2.2 | SCIENCE CLASSROOMS MECH PLANS | \checkmark | | | | |
| M2.3 | 6TH GRADE SCIENCE ROOMS MECH PLANS | | | | | |
| M2.4 | ROOF AREA A MECHANICAL PLAN | \checkmark | | | | |
| | | | | | | |
| MPD2.1 | FIRST LEVEL AREA A DEMO PLUMBING PLAN | \checkmark | | | | |
| MPD2.2 | 6TH GRADE SCIENCE ROOMS DEMO PLUMBING
PLAN | \checkmark | | | | |
| | | 1 | | | | |
| MP2.1 | FIRST LEVEL AREA A PLUMBING PLAN | | | | | |
| MP2.2 | SCIENCE CLASSROOMS PLUMBING PLANS | | | | | |
| MP2.3 | 6TH GRADE SCIENCE ROOMS PLUMBING PLANS | | | | | |
| MP2.4 | ROOF AREA A PLUMBING PLAN | | | | | |
| | T | | | | | |
| M3.1 | MECHANICAL DIAGRAMS | √ | | | | |
| M3.2 | MECHANICAL DIAGRAMS | \checkmark | | | | |
| ISSUE LOO
'√' ISSUE
'' NOT F
'*' ISSUE | G KEY:
ED AS PART OF SET
PART OF SET
ED FOR INFORMATION ONLY | | | | | |

REMODEL/RENOVATION NOTE:

CONTRACTOR MUST KEEP IN MIND THAT THIS IS A REMODEL PROJECT. READ GENERAL NOTES CAREFULLY. CONTRACTORS MUST COORDINATE NEW AND EXISTING CONDITIONS FOR INSTALLATION OF THE WORK. CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY OF FIELD CONDITIONS DISCOVERED DURING DEMOLITION THAT VARY FROM THOSE INDICATED HEREIN.

M0.0

| NOTES: | | | | | | | | | | | | | | |
|---------------|----------------------------------|--------------------------|-----------------|-----------|-----------|-------------|---------|------|------|----|-------|------|---|--|
| A. HEATING CO | DIL CAPACITY SIZED AT A MIN | IIMUM FOR MORNING WARM | JP. COIL TO TAP | KE HEATIN | IG CFM FF | ROM 70 TO S | 90 °F. | | | | | | | |
| B. SEE HEAT W | HEEL SCHEDULE FOR INFOR | RMATION ON INTEGRAL HEAT | WHEEL. | | | | | | | | | | | |
| | | SUPPLY FAN | | | | | | | | | | | | |
| | | | MIN. | | | ESP @ | ESP @ | | | | | | E | |
| | | | OUTSIDE | | MIN. | SL (IN | ALT (IN | | | | | MIN. | | |
| MARK | SERVICE | TYPE | AIR (CFM) | CFM | CFM | WC) | WC) | RPM | BHP | HP | CFM | CFM | | |
| (E) RTU-1 | CAFETERIA/ CAFTORIUM/
STORAGE | - | 5700 | 10500 | 5700 | 0.00 | 1.70 | 1750 | 6.72 | 10 | 10500 | 5700 | | |

| | EN | ERGY RE | COVER | WHEEL | SCHEDU | JLE (INTE | GRAL TO | DRTU-1) | |
|-----------|-------------------------------------|------------|------------|------------|-------------|---------------|------------|-----------|------------|
| | | | | HEAT | RECOVERY WH | IEEL DESIGN C | ONDITIONS | | |
| | | OUTDO | OR AIR | INDOC | OR AIR | SUPPI | LY LAT | FROST (| CONTROL |
| | | DB/WB (°F) | DB/WB (°F) | DB/WB (°F) | DB/WB (°F) | DB/WB (°F) | DB/WB (°F) | THRESHOLD | PREVENTION |
| MARK | SERVICE | (SUM) | (WINT) | (SUM) | (WINT) | (SUM) | (WINT) | (OA °F) | METHOD |
| (E) RTU-1 | CAFETERIA/
CAFTORIUM/
STORAGE | | | | | | | | |

HYDRONIC VAV AIR HANDLING UNIT SCHEDULE W/ ENERGY RECOVERY

| | | | | | | | | | | | | G. REFER | TO CONTROL DI | AGRAMS FOR AD | DITIONAL INF | -ORMATION. | | | | | |
|-------------------|----------------------|---------------------|----------------|--------------------|----------------|---------------|-------------------|----------------------|------------------|----------------|---------------|----------------------------|------------------|-------------------------------|-----------------------|-----------------------------------|-----------------------------|---------------|----------------------------------|---------------------------|-----------------------|
| | BAF | | EAT DI | LAT
B/WB SENS | | AL EWT | LWT | MAX W
PD (F | TR
T EAT DB | LAT DB S | ENSIBLE | EATING | N | IAX WTR
PD (FT | | | ELECT | | | OPER.
WEIGHT | MANUFACTURER 8 |
| 2M BHF
50 1.67 | P HP I
7 2 | - | 77.0 | (°F) MB
55.0 17 | H MB | H (°F)
45 | (°F) GPN
55 36 | / HEAL
12.50 | D) (°F)
35 | (°F)
90 | MBH 1
365 | LWI (°F) LWI (°
150 120 | -) GPM | HEAD) FII
4.00 | _IER V0 | OLTAGE
480 | PHASE
3 | FLA
19.0 | MCA N
22.0 | 10CP (LBS)
30.0 5,295 | AAON RN |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | TER | MINAL E | 30X WI | H REH | EAT SCH | EDULE | | | | | | | | |
| TES: | | | | | | | | | | | | | | | | | | | | | |
| | D AND DISCHARGE | SOUND LEVELS | S SHALL NOT EX | CEED NC 35 AT | 1.5" INLET ST | ATIC PRESSURE | E WHEN TESTED | D PER ARI ST | ANDARD 885-9 | 8. | | | | | | | | | | | |
| NATER P | PRESSURE DROP O | F REHEAT COIL | S SHALL NOT EX | XCEED 5 FT. PR | DVIDE REHEA | T COILS SEPAR | ATE FROM BOX | ES IF REQUIF | RED TO MEET V | WATER PRESSI | IRE DROP RE | QUIREMENTS. | | | | | | | | | |
| | | | MAX. | MIN. | MAX. | MIN. INLET | | | HEA | ATING COIL (H | YDRONIC) | | | | | | | | | | |
| MARK | SERVICE | INLET DIA.
(IN.) | COOLING
CFM | COOLING
CFM | HEATING
CFM | (IN. W.C.) | EAT DB
(°F) | LAT DB
(°F) | SENSIBLE
MBH | EWI
(°F) LW | T (°F) GPN | MAX. WATEH
1 P.D. (FT.) | P.D. (IN. WC) | MANUFAC
MODE | URER &
EL # | CONTROL
TYPE | AC | CCESSOR | IES | REMAI | RKS |
| VAV-01 | CAFETORIUM | 12 | 2000 | - | - | 1.0 | 55 | 80 | 43 | 140 | 120 4.8 | 3.00 | 0.40 | TITUS, PRICE, I
KREUGER. E | METALAIRE,
NVIRTEC | DDC | THERMOS | STAT AND CO | D2 SENSOR | - | |
| VAV-02 | CAFETORIUM/ST
AGE | 22 | 3000 | - | - | 1.0 | 55 | 80 | 64 | 140 | 120 6.7 | 3.00 | 0.40 | TITUS, PRICE, I
KREUGER, E | METALAIRE,
NVIRTEC | DDC | THERMOS | STAT AND CO | D2 SENSOR | - | |
| VAV-03 | CAFETERIA | 22 | 4600 | - | - | 1.0 | 55 | 80 | 98 | 140 | 120 10.2 | 3.00 | 0.40 | TITUS, PRICE, I
KREUGER, E | METALAIRE,
NVIRTEC | DDC | THERMOS | STAT AND CO | D2 SENSOR | - | |
| VAV-04 | KITCHEN | 10 | 900 | - | - | 1.0 | 55 | 80 | 19 | 140 | 120 2.0 | 3.00 | 0.30 | TITUS, PRICE, I
KREUGER, E | METALAIRE,
NVIRTEC | DDC | THERMOS | STAT AND CO | D2 SENSOR | - | |
| | | | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | A: PROVIDE D | | E FANS WITH F | | TROL. | | | | | | | | | | |
| | | | | | | | B: NO EQUIPM | MENT SHALL | BE SELECTED | ABOVE 90% OF | MOTOR NAM | EPLATE RATING. | | | | | | | | | |
| | | | | | | | C: PROVIDE F | | | L DAMPER. | | FAN | | | MOTOR | | | | | | |
| | | | | | | | | | | | | ES | P | | | | - | | | | |
| | | | | | | | MARK | SERVIO | CE TYP | E CFM | SONES | @ SL (IN
WC) | @ ALT (IN
WC) | MHP | VOLT | PHASE | MANUF | ACTURER | & MODEL # | ACCESSORIE | S REMARKS |
| | | | | | | | KEF-1 | TYPE II D
HOOD | ISH UPBLA | ST 1500 | - | 0.60 | 0.40 | 1/4 | 120 | 1 | GR | REENHECK C | UBE-141 | INTEGRAL BACKDR | AFT - |
| | | | | | | | KEF-2 | TYPE II KITO
HOOD | CHEN UPBLA | ST 600 | - | 0.60 | 0.30 | 1/8 | 120 | 1 | GR | REENHECK CI | UE-095-D | INTEGRAL BACKDR
DAMPER | AFT - |
| | | | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | MARK | TYPE | AD/ | A FINI | SH | MODEL # | MO | DEL # | | | ACCESSOR | RIES | | RI | EMARKS |
| | | | | | | | P1 | FLOOR S | INK N/A | ACID RES | ISTANT
RON | ZURN Z1902 | | - | | | - | | | | - |
| | | | | | | | P2
P3 | ROOF DR
SCIENC | AIN N/A
E N/A | RES | N | - | CHICAG | -
D #930-VPH | PROVIDE VAC | CUUM BREAKER, | -
UNDER COUNT | TER PROTEC | TION, QUARTER | TURN INSTALL PER | -
R MANUFACTUERR'S |
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ATION TANK, MO | ISTALL REG | UIREMENTS |
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| | | | | | | | | | | | | | | | , | | MA | ANUFACTU | JRER* & | | |
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| NOTES: | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A: RADIA
B: TOTAL | | ESSURE D | DROP OF TAB | AND REHEAT (| | L NOT EXCEED | 0.5" INLET ST | ATIC PRE | -550RE W | HEN IESIEL | PER ARI S | ANDARD 885- | 98. | | | | | | | | | | | | | |
| C: WATE | R PRES | SURE DRC | OP OF REHEAT | COILS SHALL | NOT EXC | EED 5 FT. PRO | VIDE REHEA | T COILS | SEPARATE | E FROM BOXE | ES IF REQUI | RED TO MEET | WATER PR | ESSURE DRO | OP REG | QUIREMENTS. | | | | | | | | | | |
| | | | | MA | AX. | MIN. | MAX. | MIN. | INLET | | | HE | ATING CO | IL (HYDRON | IIC) | | I | | | | | | | | | |
| MAR | ek 📗 | SERVIC | | DIA. COO | LING C
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W C) | EAT DB | LAT DB
(°F) | SENSIBLE
MBH | EWT
(°F) | IWT (°F) | GPM | | MAX. AIR | C) MANU | JFACTURER & | & CONTR | ROL | ACCESSORI | -8 | | REMAR | R |
| VAV-0 | 01 | CAFETORI | UM 12 | 20 | 000 | - | - | (| 1.0 | 55 | 80 | 43 | 140 | 120 | 4.8 | 3.00 | 0.40 | TITUS, P | RICE, METALAIR | RE, DDC | -
THER | MOSTAT AND CO | 2 SENSOR | | - | |
| VAV-0 | 02 0 | | JM/ST 22 | 30 | 000 | - | - | | 1.0 | 55 | 80 | 64 | 140 | 120 | 6.7 | 3.00 | 0.40 | TITUS, P | RICE, METALAIR | RE, DDC | THER | MOSTAT AND CO | 2 SENSOR | | - | |
| VAV-0 | 03 | CAFETER | RIA 22 | 46 | 00 | - | - | | 1.0 | 55 | 80 | 98 | 140 | 120 | 10.2 | 3.00 | 0.40 | TITUS, P | GER, ENVIRTEC
PRICE, METALAIR | RE, DDC | THER | MOSTAT AND CO | 2 SENSOR | | - | |
| VAV-0 | 04 | KITCHEN | N 10 | 90 | 00 | - | - | | 1.0 | 55 | 80 | 19 | 140 | 120 | 2.0 | 3.00 | 0.30 | TITUS, P | RICE, METALAIR | RE, DDC | THER | MOSTAT AND CO | 2 SENSOR | | - | |
| | | | | | | | | | | | | | | | | | | | | · | | | | | | |
| | | | | | | | | | - | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | ٢ | NOTES: | | | | | | | | | | | | | | | | |
| | | | | | | | | | A | : PROVIDE D | IRECT DRIV | E FANS WITH I | AN SPEED | CONTROL. | | | | | | | | | | | | |
| | | | | | | | | | E | | | | | % OF MOTOF | R NAME | EPLATE RATING. | | | | | | | | | | |
| | | | | | | | | | | | | | | | | FAN | | | MOTOF | २ | | | | | | |
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| | | | | | | | | | | MARK | SERVI | | PE | CFM SC | NES | @ SL (IN
WC) | @ ALT (IN
WC) | MHP | VOLT | PHASE | MAN | IUFACTURER | & MODEL # | ¢ AC | CESSORIES | S REMARKS |
| | | | | | | | | | - | KEF-1 | TYPE II D | ISH UPBL | AST | 1500 | - | 0.60 | 0.40 | 1/4 | 120 | 1 | | GREENHECK CU | IBE-141 | INTEG | | AFT - |
| | | | | | | | | | - | KEF-2 | TYPE II KIT | CHEN UPBL | AST | 600 | - | 0.60 | 0.30 | 1/8 | 120 | 1 | | GREENHECK CU | E-095-D | INTEG | GRAL BACKDRA | AFT - |
| | | | | | | | | | L | | HUUL | | | | | | | | | | | | | | DAINIYEK | |
| | | | | | | | | | Г | | | | | | | | | | | · · - - · · · - | | | | | | |
| | | | | | | | | | | | | | | | | PL | UMBIN | G FIXTL | JRE SC | HEDULE | : | | | | | |
| | | | | | | | | | F | | | | • | | MAN | IUFACTURER* & | FAUCE | | & | | 400500 | | | | ~~ | |
| | | | | | | | | | ⊢ | P1 | FLOOR S | : AD
INK N/# | A ACI | CRESISTANT | | ZURN Z1902 | N | 10DEL #
- | | | AUCESS | OKIES | | | RE | - |
| | | | | | | | | | | P2 | BOOE DE | | A (| AST IRON | | | | _ | | | | | | | | |
| | | | | | | | | | - | P3 | SCIENC | E N/A | A | RESIN | | | CHIC | AGO #930-VPH | | E VACUUM BREAK | ER, UNDER CO | | ION, QUARTE | | | MANUFACTUERR'S |
| | | | | | | | | | L | | CLASSRU | | | | | | | | POINT OF | USE STRIEM UNDE | ER COUNTER A | CID NEUTRALIZA | FION TANK, M | ODEL LB2. | REQU | JIREMENTS |
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | GRI | LLE. RF | GISTER | . DIFFI | JSER & | LOUV | ER SC | CHEDU | ILE |
| | | | | | | | | | | | | | | | | | | | , | | -, | | | | | |
| | | | | | | | | | | | | | | | | | MA | RK | USE P | ATTERN | FINISH | MODEL | # | ACCESS | SORIES | REMARKS |
| | | | | | | | | | | | | | | | | | () | E) V | ARIES | - | - | - | | - | E | XISTING DIFFUSER T
REMAIN |
| | | | | | | | | | | | | | | | | | | A LAY-I | N CEILING | 4-WAY | WHITE | TITUS TDC- | -AA | - | | - |

| | | | | | | G. REFE | R TO CONTRO | L DIAGRAMS F | OR ADDITION | AL INFORMATIC | N. | | | | | | | |
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H EV | VT (°F) LWT (| °F) GPM | MAX WTR
PD (FT
HEAD) | FILTER | VOLTAGE | PHA | ASE | FLA | MCA | MOCP | OPER.
WEIGHT
(LBS) | MAN | JFACTURER
MODEL # |
| 55 36 | 12.50 | 35 | 90 | 365 | ; | 150 120 | 26 | 4.00 | 0 | 480 | 3 | 3 | 19.0 | 22.0 | 30.0 | 5,295 | | AAON RN |
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3. | VITH | REHE | EAT SCI | HEDULE | <u> </u> | | | | | | | | | | |
| | S IF REQUIRED 1 | TO MEET W | ATER PR | ESSURE D | | | | | | | | | | | | | | |
| | | HEA | TING CO | L (HYDRO | DNIC) | | | | | | | | | | | | | |
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(°F) | LAT DB SE
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MBH | EWT
(°F) | LWT (°F |) GPM | MAX. WATE
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/C) | JFACTURER
MODEL # | CONT | ROL | ACCESSORIES | | | | REMA | | |
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64 | 140 | 120 | 6.7 | 3.00 | 0.40 | TITUS, F | IGER, ENVIRTE
PRICE, METALA | IRE, DD | | THERMO | STAT AND C | O2 SENSOR | | | - | |
| 55 | 80 | 98 | 140 | 120 | 10.2 | 3.00 | 0.40 | TITUS, F | PRICE, METALA | IRE, DD | ; | THERMO | STAT AND C | O2 SENSOR | 2 | | - | |
| 55 | 80 | 19 | 140 | 120 | 2.0 | 3.00 | 0.30 | TITUS, F | PRICE, METALA | IRE, DD
C | ; | THERMOSTAT AND CO2 SENSOR | | | - | | | |
| PROVIDE D | IRECT DRIVE FAN
IENT SHALL BE S
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SELECTED A
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| KEF-2 | HOOD
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| | | | | I | | | | | | | | | | | | | | |
| | | | | | | P | | G FIXTI | JRE SC | CHEDULI | = | | | | | | | |
| MARK | | ADA | | | MANU | JFACTURER*
MODEL # | & FAUCE | T TRIM MFR*
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| P1
 | ROOF DRAIN | N/A | C | AST IRON | | - | | - | | | | - | | | | | | |
| P3 | SCIENCE
CLASSROOM | N/A | | RESIN | | | СНІС | CAGO #930-VPH | PROVI
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REMAIN |

| WT
°F) GP
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| WT
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(LBS) | MANUFACTURE
MODEL # |
| | 12.50 | 35 | 90 | 365 | 15 | 50 120 | 26 | 4.00 | 0 | 480 | | 3 | 19.0 | 22.0 | 30.0 | 5,295 | AAON RN |
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(°F) | LWT (°F) | GPM | MAX. WATER
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MODEL # | & CONT | ROL
PE | ACCESSORIES | | | REMARKS | | |
| 55
55 | 80 | 64 | 140 | 120 | 6.7 | 3.00 | 0.40 | | GER, ENVIRTED | RE, DD
C | | THERMO | | | | | - |
| 55 | 80 | 98 | 140 | 120 | 10.2 | 3.00 | 0.40 | TITUS, P | PRICE, METALAI | RE, DD | | THERMO | STAT AND C | 02 SENSOR | | | |
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TITUS, P | GER, ENVIRTEC
PRICE, METALAII | RE, DD | C | THERMOSTAT AND CO2 SENSOR | | | | | | | | | |
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MENT SHALL BE S
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H INTEGRAL I | N SPEED (
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6 OF MOTO | R NAMEPL | ATE RATING. | | | ΜΟΤΟΙ | D | | | | | | | |
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| MARK | SERVICE | TYPE | C | FM S | ONES | @ SL (IN
WC) | @ ALT (IN
WC) | MHP | VOLT | PHAS | E | MANUF | ACTURE | R & MODE | L# | ACCESSOR | RIES REMARKS |
| KEF-1 | TYPE II DISH
HOOD | UPBLAST | - 1 | 1500 | - | 0.60 | 0.40 | 1/4 | 120 | 1 | | GF | | CUBE-141 | IN | TEGRAL BACK
DAMPER | DRAFT - |
| KEF-2 | HOOD | UPBLAS | | 600 | - | 0.60 | 0.30 | 1/8 | 120 | 1 | | GR | | UE-095-D | IIN | DAMPER | DRAFI - |
| | | | | | | PI | | | IRE SC | | = | | | | | | |
| | | | | | MANUF | ACTURER* & | FAUCE | TRIM MFR* | & | | | | | | | | |
| MARK
P1 | TYPE
FLOOR SINK | ADA
N/A | F
ACID | -INISH
RESISTANT | M
ZU | ODEL # | N | IODEL # | | | ACC | CESSOR | RIES | | | | REMARKS |
| P2 | ROOF DRAIN | N/A | CA | AST IRON | | - | | - | | | | - | | | | | - |
| P3 | SCIENCE
CLASSROOM | N/A | | RESIN | | | CHIC | AGO #930-VPH | PROVIE
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2. | PER MANUFACTUERR'S
REQUIREMENTS |
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MODE | URER* & | | SCHEL | REMARKS |

OTES:

FOR MECHANICAL EQUIPMENT SHED UNDER THIS CONTRACT DE AND WIRED BY EC. VFD'S AS PART OF THE EQUIPMENT E SHALL BE FURNISHED BY T IN PLACE AND WIRED BY

IENT REQUIRED UNDER THIS CESSARILY SPECIFIED ON SHEETS. PLAN & DIAGRAM PROJECT MANUAL CONTAIN IFICATIONS AS WELL.

04 & 2007) UIPMENT THAT IS NOT E U.S. NATIONAL APPLIANCE RVATION ACT (NAECA) OF RY A PERMANENT LABEL HE MANUFACTURER STATING MENT COMPLIES WITH THE OF STANDARD 90.1.

EQUIPMENT SUBJECT TO THE AE 62.1 AND SHALL COMPLY CTION REQ'MTS THEREIN.

FIES, CHARACTERISTICS, AND FEATURES REQUIRED ARE DICATED IN THE EQUIPMENT PLANS AND SPECIFICATIONS . REQ'MTS.

RACTERISTICS, AND EATURES OF THE PMENT ARE HEREBY NTO THE PROJECT EQUIVALENT PRODUCTS ID CONSTRUCTION MEET OR EXCEED THAT OF UIPMENT WHETHER

IENT AVAILABLE FROM LISTED ANUFACTURERS LISTED IS QUIVALENT TO THE BASIS OF ENT SPECIFIED. CONTRACTOR Y RESPONSIBLE FOR ANY ANT CHANGES TO OTHER SPATIAL REQ'MTS FOR IER THAN SCHEDULED.

RERS REPRESENTATIVES O UNDERSTAND THE CONTROL COORDINATE WITH TCC TO Y FUNCTIONING SYSTEM AS HE CONTROL DIAGRAMS.

Issue Dates: DD SET 2-21-2020 Sheet Title: MECHANICAL SCHEDULES

SECTION [15010][22/230010]--MECHANICAL GENERAL PROVISIONS

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. Consult them for further ructions and be governed by the requirements thereunde
- B. Related Work is specified elsewhere in Divisions 21, 22, 25, 26, 27, and 28, and when issued by the Owner, is hereby incorporated.
- 1.2 PROVISIONS
- A. Work performed under this division of the specifications shall conform to the requirements of Division 1, and the mechanical drawings and all items hereinafter specified.
- 1. Prior to any work being performed under this division, examine architectural, structural, food service, civil, electrical, specialty systems, and interior design drawings and specifications. any discrepancies occur between them and the mechanical drawings and specifications, report discrepancies to the Architect in writing and obtain written instructions for the work.
- 2. Mechanical drawings are diagrammatic, but shall be followed as closely as actual construction of the building will permit. All changes from drawings necessary to make the mechanical work conform to the building as constructed shall be made without additional cost to the Owner. 3. Coordinate the mechanical work with the General Contractor and be responsible to him for satisfactory progress of the work. Coordinate mechanical work with all other trades on the project without additional cost to the Owne
- 4. All work and materials covered by drawings and specifications shall be subject to review at any time by representatives of the Architect and Owner. If the Architect or Owner's agent finds any materials or installation that does not conform to these drawings and specifications. Contractor shall remove the material from the premises and correct the installation to the satisfaction of the agent.
- 5. In acceptance or rejection of installed mechanical systems, no allowance will be made for lack of skill on the part of the installers.
- 1.3 GENERAL
- A. Do not scale drawings. Verify dimensions in field prior to commencement of work. Refer to architectural drawings for all dimensions. B. All subcontractors shall be licensed, experienced, and thoroughly knowledgeable in their respective areas of the construction industry and shall perform in a responsible manner with
- established construction sequence, shall recognize the priority of the construction documents, and shall inform the prime contractor of potential problems when the construction documents are unclear or inconsistent. Work shall be performed in a workman-like manner to the satisfaction of the Architect, Owner, and Engineer. C. Subcontractors shall be responsible to notify the prime contractor of discrepancies or conflicts in the construction documents found during bidding and/or prior to performing the work.
- D. Work Included
- 1. Furnish all labor, materials, equipment and related items, and perform all operations required to complete work within the intent of the Drawings and Specifications, whether or not specifically mentioned, and to deliver complete and fully operational HVAC systems subject to the conditions of the Contract. For this reason, the Contractor shall visit the premises and site before submitting their bid and familiarize themselves with the areas in which work is to be done.
- 2. Provide HVAC, plumbing, and electrical details not mentioned or shown which are necessary for the successful operation of all systems. Clean, sterilize, flush and fill all systems per requirements to make them operational; including labor and materials for final fill of water, refrigerant, oils, grease, gases, antifreeze and brine.
- 3. Set all sleeves and cut and patch all miscellaneous holes necessary for the convenient, orderly and proper installation of the work. Required holes through masonry and concrete construction with an area less than thirty five (35) square inches (20 inch diameter and less) shall be considered miscellaneous holes
- 4. Any work installed without regard to the work of other crafts which must, in the opinion of the Owner or Architect/Engineer, be moved to permit the installation of other work, shall be moved and replaced as a part of this work at no additional charge.
- 5. Rough-in for and connect, as shown on the drawings, all equipment furnished by the 6. Prove satisfactory operation of all equipment and controls to the Owner, Architect, and/or Engineer upon request.
- E. Work Not Include
- 1. Certain labor and materials may be furnished and/or installed under other divisions of these specifications. Coordinate with other trades and arrange the work to make the parts fit together. The following items are to be accomplished under other divisions of these specifications. a. Temporary Heat: See "Temporary Heat" Paragraph in this Specification Section and Division 01.
- b. Roof Curbs: See "Roof Curbs" Paragraph in this Specification Section.
- c. Concrete: See "Concrete" Paragraph in this Specification Section.
- d. Electrical Equipment and Wiring: See "Electrical Equipment and Wiring for Mechanical Division" Paragraph in this Specification Section.
- e. Temporary Water and Toilet: See Division 01.
- F. Equipment Furnished by Owner
- 1. The Owner will award contracts, which will commence concurrently with this contract. Specifically this work will include: 2. Equipment Installation: Refer to appropriate drawings for equipment furnished by the Owner
- 3. Rough-in service pipes to locations as required by architectural and mechanical drawings and equipment shop drawings. Provide service values on all pipes except waste and vent pipes,
- plug or cap these. Final connections to equipment shall be made by Contractor. 4. Rough-in service pipes to locations as required by architectural and mechanical drawings and equipment shop drawings. Provide service valves on all pipes except waste and vent pipes,
- plug or cap these. Final connections to equipment shall be made by Contractor. 5. Refer to food service drawings for exact locations and additional mechanical requirements. Provide dual temperature hot water, cold water, steam, ductwork, gas, power, interlocks, controls, etc. as required by the food service equipment supplier
- 1.4 QUALITY ASSURANCE

A. Qualifications of Contractor: All materials and equipment shall be new and all work shall be executed with the maximum speed consistent with current accepted trade practices. Furnish materials and equipment promptly after authorization to proceed, and proceed with work in progress with the other contractors on the project. Perform all work included in the contract in a manner that will not cause interferences or delays to, or interfere with, the progress of other contractors.

- B. At all times when work is not in progress, keep all open ends of pipe, ductwork, fittings, equipment and fixtures securely closed and protected. C. All welding shall comply with the requirements and recommendations of the American Welding Society and all applicable codes.
- Weld metal shall not project creating an obstruction
- 2. Chip or grind out all weld metal before re-welding.
- 3. Caulking / preening of welds is not allowed.
- 4. Welder shall be certified to work on service/utility type indicated.
- 1.5 EXAMINATION OF PREMISES/SITE
- A. Install work in locations shown on Drawings, unless prevented by Project conditions.
- B. Prior to submitting a bid, visit the site of job and ascertain all conditions affecting the proposed installation and adjust all work accordingly. Make provisions for these costs. C. Coordinate the work with that of all other trades. Where conflicts of work occur and departure from the indicated arrangements are necessary, consult with other Contractors involved; come to agreement as to changed locations and elevations, etc., and obtain written acceptance from the Architect of proposed changes before proceeding with work
- 1.6 CODES AND REFERENCED STANDARDS
- A. Comply with specified Codes and Standards. If conflict exists between Codes or Standards and drawings, project specifications manual or addenda requirements, the most stringent requirement shall apply.
- B. Conform to the installation rules and regulations of the standards listed including all subsequently published amendments thereto issued prior to the date of the bidding documents. C. Conform to the requirements of all local, state and federal agencies which have authority over the project. Include all items of labor and material required to meet such requirements
- regardless of the failure to specify in the project manual or indicated on the drawings each individual item.
- D. All equipment, apparatus and systems shall be rated, tested, fabricated and installed with the applicable industry standards.
- E. The contractor shall verify with the architect if modification of his/her work is required for compliance. F. The applicable portions of the following standards form a part of this project manual to the same force and effect as if repeated herein.
- 1. American National Standards Institute (ANSI)
- International Mechanical Code (IMC)
- International Plumbing Code (IPC)
- 4. American National Standards Institute (ANSI) 5. American Gas Association, Inc. (AGA)
- 6. American Society for Testing Materials (ASTM)
- 7. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
- 8. American Society of Mechanical Engineers (ASME)
- 9. American Water Works Association (AWWA)
- 10. National Electrical Code (NEC)
- 11. National Electric Manufacturers Association (NEMA) 12. National Fire Protection Association (NFPA)
- 13. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)
- 14. Underwriters Laboratories, Inc. (UL)
- 15. Environmental Protection Agency (EPA)
- 16. Associate Air Balance Council (AABC)
- 17. Air Diffusion Council (ADC)
- 18. Air Moving and Control Association (AMCA) 19. Occupational Safety and Health Administration (OSHA)
- 20. Gas Vent Institute, Edition 10-A (GVI)
- G. Conform to the International Building, Fire, and Mechanical Codes, [2009][2012][2015] edition.
- H. Conform to the International Energy Conservation Code, [2006][2009][2012][2015] edition.
- I. Conform to applicable sections of NFPA 13 and NFPA 24. J. Conform to the National Electrical Code, [2011][2014][2017] Edition.
- K. Conform to the requirements of the Americans with Disabilities Acts (ADA) and American National Standards Institute (ANSI) Standard 117
- L. Conform to Colorado Department of Public Health and Environment "Rules and Regulations Governing the Health and Sanitation of Child Care Facilities"
- M. Conform to Colorado Department of Public Health and Environment "Retail Food Establishment Rules and Regulations"
- N. Conform to Colorado Department of Public Health and Environment, Health Facilities and Emergency Medical Services Division, "Standards for Hospitals and Health Facilities".
- Conform to Colorado Department of Public Health and Environment "Rules and Regulations Governing Schools" P. Conform to requirements of the American Institute of Architects (AIA) "Guidelines for Design and Construction of Hospital and Healthcare Facilities 2006 Edition; Facility Guidelines Institute
- (FGI) "Guidelines for Design and Construction of Healthcare Facilities", 2010 Edition; and the Joint Commission for Accreditation of Healthcare Organizations (JCAHO).
- Q. All work shall be furnished and installed in complete accordance with Code seismic requirements.
- R. In case of difference between these specifications, codes, laws, industry standards, and/or utility company regulations the most stringent requirement shall govern.
- 1.7 LEED® REOUIREMENT

information.

- A. Contractor is required to actively participate in the achievement of LEED (Leadership in Energy + Environmental Design) certification and is expected to become familiar with the general requirements and procedures for compliance with certain USGBC LEED pre-requisites and credits as related to the scope of work. LEED submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated LEED requirements Provide all work, documentation and necessary information required by specific pre-requisites and/or credits. Refer to Section 018113, Sustainable Design Requirements for additional
- 1.8 IECC COMMISSIONING REQUIREMENTS
- A. Contractor is required to actively participate in the IECC Commissioning Process with the Commissioning Authority (CxA). Commissioned systems includ & HVAC Systems,] [Domestic Hot Water Heating Systems,] [and Exterior Lighting Control Systems] Commissioning process requirements include:
- 1. Integrating commissioning process activities provided by the CxA into the construction schedule.
- 2. Attending a construction phase control coordination meeting
- 3. Review, accept, and complete Prefunctional checklists checklists provided by the CxA. Submit notifications of readiness upon completion of checklists. 4. Review, accept, and participate in system Functional Performance test procedures provided and witnessed by the CxA.
- 5. Evaluate performance deficiencies identified in test reports and equipment installations. Recommend corrective action, and cooperate with the CxA for resolution of items.
- 6. Certify the work is complete and systems are operational according to the Contract Documents including calibration of instruments and controls.
- 1.9 EXAMINATION OF BIDDING DOCUMENTS
- A. Each bidder shall examine the bidding documents carefully, and not later than seven days prior to the date of receipt of bids, shall make written request to the Architect for interpretation of correction of any discrepancies, ambiguity, inconsistency, or error therein which he may discover. Any interpretation or correction will be issued as an addendum by the Architect. Only a written interpretation or correction by addendum shall be binding. No bidder shall rely upon interpretations or corrections given by any other method. If discrepancies, ambiguity inconsistency. or error are not covered by addendum or written directive, Contractor shall include in their bid, labor materials and methods of construction resulting in higher cost. After award of contract, no allowance or extra compensation will be made on behalf of the Contractor due to his failure to make the written requests as described above.
- B. In order to become familiar with the scope of the work involved, visit the existing site, before submitting bid, and carefully examine the existing conditions in order to have full knowledge and understanding of the conditions and restrictions affecting the performance of the work required. Include in bid all work which is reasonably inferred by the contract drawings and specifications, whether specifically shown or not, as a result of existing conditions, construction, irregularities and interferences which may affect work and is necessary for fully functioning system. No
- additional compensations will be considered for misunderstanding the conditions to be met. C. The person submitting the request will be responsible for its prompt delivery. Failure to so request clarification of any inadequacy, omission, or conflict will not relieve the Contractor of responsibility. The signing of the Contract will be considered as implicitly denoting that the Contractor has a thorough comprehension of full intent and scope of the working drawings and specifications.
- 1.10 STANDARD FOR MATERIALS
- A. All materials shall conform to current applicable industry standards. Workmanship and neat appearance shall be as important as the electrical and mechanical operation. Defective or damaged materials shall be replaced or repaired, prior to final acceptance, in a manner acceptable to the Architect or Owner at no additional cost to the Owner.
- B. All electrical materials shall be acceptable for installation only if labeled or listed by a nationally recognized testing laboratory and if accepted by local authorities
- 1.11 BIDS AND SUBSTITUTIONS
- A. Materials, equipment or services listed by several identifying names are intended to be bidder's choice, and any of the listed names may be bid without soliciting prior acceptance. In all cases where more than one name is given in the specifications, the first named manufacturer's material, equipment or services shall be the basis of design which has been contemplated in coordination and production of the Contract Documents. Where equipment schedules are provided in the drawings, the manufacturer and model number listed in the schedule shall be considered the basis of design. Any changes, including spatial requirements, and costs required to accommodate materials or equipment other than the basis of design shall be the responsibility of the Contractor bidding other than basis of design equipment.
- B. If the Contractor wishes to submit a substitute to the named manufacturer(s) for any equipment, they shall submit in writing on Architect's Substitution Request form, prior to bid, stating the

and bear all costs to replace the substitute item(s). 1.12 BID ALTERNATE(S) B. Alternate(s) for Materials and Equipment

D. Performance Specification of Products:

Acceptance

- 3. The Contractor shall submit the bid alternates at the time the base bids are due. 1.13 PERMITS, FEES AND NOTICES
- A. Apply for and pay for all permits, fees, licenses and inspections for this Division of work.

1.14 PLANS AND SPECIFICATIONS

the agent

B. Shop Drawings

shall pay any costs involved.

e. Lighting devices

f. Telecom / Security

a. Recessed light fixtures

d. Domestic water piping

approved by the Engineer.

1.16 EXISTING UTILITIES

e. Sprinkler piping

f. Electrical condui

b. Ductwork

C. Coordination Drawings

1.15 SUBMITTALS

A. General

manufacturer's name, model number, and detailed product data. In all cases, if the substitute manufacturer is used, the Contractor shall bear all additional costs including, but not limited to, responsibility of coordination with all other trades, any changes incurred in plumbing, electrical, mechanical, general, etc., which result from equipment or material substitution. Where materials or equipment are specified by name, the proposed material or equipment must be identical to the specified material or equipment in all characteristics of quality, function and serviceability, regardless of application in the Project and, in addition, when the Architect deems that aesthetic significance is important, the equal material or equipment must be identical in all characteristics of visual appearance, design, color and texture. Work performed or constructed with unapproved materials/equipment is at Contractor's risk, and any required correction of Work incorporating materials/equipment shall be at Contractor's sole cost and expense

1. Where any product is specified only by requirement to meet an industry standard or regulating body standard such as UL, AGA, AWWA, ANSI, etc. and the item proposed carries approval of that body, no prior acceptance by the Architect / Engineer is needed. 2. When any product or service is specified by requirement to meet a performance standard or is specified by a generic specification, (no manufacturers name listed) no prior acceptance by the Architect / Engineer is needed except as specifically called for in these specifications.

Approval by the Architect / Engineer of equipment other than the specified does not relieve Contractor of this Responsibility to: 1. Provide necessary additional items so that selected or substituted item operates equivalent to the basis of design and properly fits in the available space allocated for the basis of design. 2. Coordinate clearance and other interface requirements with mechanical and other work/disciplines.

3. Provide all features which are standard on the basis of design plus any specified options.

4. Be responsible for assuring that piping, conduit, duct, flue, and other service locations for general equivalents or substitutions do not cause access, service, or operational difficulties any greater that would be encountered with the base design

1. In all instances, Contractor shall assume full responsibility for proof of equality of the stature to the equipment hereinafter specified. All data and information necessary for proof of equality, function and space requirements shall be prepared and accompany the submittal of the Substitution Request to the Architect / Engineer. 2. Specified material and equipment shall be considered the basis of design, and while not specifically mentioned, characteristics such as material types, gauges, weights, appearance and space requirements of the basis of design materials and equipment must be met by any proposed substitutions. 3. Action for substitutions specified herein will be given only after the receipt of formal Substitution Request accompanied by complete data showing performance over entire range, physical dimensions and material construction all specifically marked for the individual item in accordance with requirements for Submittals of Product Data. 4. Where the substitution requires any changes in piping, electrical wiring, clear space for service requirement, venting, ducting, submit Coordination Drawings with the Substitution Request indicating changes required and conclusively coordinating changes required for the HVAC Division as well as changes required for all other Divisions. Contractor submitting the Substitution

a. Be responsible to coordinate all Divisions and make all changes required to accommodate the Substitution. b. Pay for all changes required of both the HVAC Division and all other Divisions to accommodate the Substitution.

5. Approval of the Substitution Request by the Architect / Engineer does not relieve the Contractor of the above responsibilities. See General Conditions for method of notification of G. In the event the substituted material or equipment does not perform to meet the design intent, fit or meet quality standards, the Contractor shall provide the specified material or equipment

A. Refer to Division 01 for items requiring alternate pricing within the contract documents.

1. Equipment and material bid alternate(s) shall be proposed as additive or deductive alternate(s) to specified items by submitting it as a separate line item from the base bid on the Bidder's 2. Such bid alternate proposals shall not be substituted or included in the base bid. Bid alternate proposal(s) must be accompanied by full descriptive data on the proposed equipmer together with a statement of the cost to be added or deducted for each item. The bid alternate shall include all materials. equipment, labor, electrical connections, coordination with all other trades, etc. for a complete and operational system

1. Do not include the cost of any "Plant Investment Fee" or "System Development Charge" for sewer and/or water charged by the City. This will be arranged for and paid for by the Owner. 2. Do not include the cost of any "Gas Application Fee" charged by the Utility Company. This will be arranged and paid for by the Owner B. Notify proper authorities when work is ready for inspections required by applicable codes, rules and regulations, allowing sufficient time for inspections to be made without hindering progress of the work. Furnish to the Owner copies of inspection certificates of acceptance.

A. The intention of the plans and specifications is to provide all piping, fixtures, and equipment. Contractor shall furnish all material and equipment and shall perform all labor to achieve this intent, whether or not such material or equipment is indicated herein. Wherever the term "provide" is used, it shall mean "furnish and instal All plans and specifications including architectural, interiors, site, structural, electrical, plumbing and HVAC plans shall be examined by Contractor prior to submission of quotations to determine systems interface and conditions which could cause interference or deviations in equipment locations and routing. Errors or discrepancies on plans or in specifications shall be reported to the Architect/Engineer in writing and written instructions obtained for the discrepancy prior to submittal of bid to the Owner.

shall be met by each Contractor without extra cost to the Owner. Routing of piping and location of equipment and other devices are shown on plans in a diagrammatic manner for general guidance. Plans shall not be scaled for dimensions. Take all dimensions from Architectural drawings, certified equipment drawings, and from the structure itself before fabricating any work. This Contractor shall coordinate his work with other

All changes from the plans necessary to make the work conform to buildings as constructed and to fit work of other trades, or to conform to rules of all governing authorities and regulations,

Contractors and shall provide necessary deviations in routing as far as 10 feet from those shown to provide systems as specified or implied, without interference and pursuant to these

requirements at no additional cost to the Owner, Architect, or Engineer. Manufacturer's drawings and instructions shall be followed in all cases where the makers of devices and equipment furnish directions covering point not shown on the drawings or described in the specifications. Install all equipment in accordance with manufacturer's recommendations, unless approval is given in writing by the Engineer for deviation. F. Layout and installation of HVAC work shall be coordinated with the overall construction schedule of various trades to prevent delay in completion of the project. Complete drawings and specifications for the entire job shall be maintained and updated at the job site. Coordinate the HVAC work with and be responsible to the General Contractor for satisfactory progress of the work. Coordinate HVAC work with all other trades on the project without additional cost to the Owner. G. Priority of interpretation of discrepancies in Contract Documents shall be complimentary from specifications to drawings. Where discrepancies occur between various specifications, drawings and specifications or codes and standards, the most demanding requirement shall take precedence, except where written interpretation from the Architect/Engineer indicates otherwise. H. All work and materials covered by drawings and specifications shall be subject to review at any time by representatives of the Architect and Owner. If the Architect or Owner's agent finds any

I. In acceptance or rejection of installed mechanical systems, no allowance will be made for lack of skill on the part of the installers

1. Submit under provisions of Division 01 and the requirements below.

specifications shall control and shall be followed.

2. Submit all mechanical division shop drawing and product data at one time. Partial submittals will be rejected 3. The purpose of shop drawing submittals by the Contractor is to demonstrate to the Architect / Engineer that the Contractor understands the design concept. Contract shall demonstrate their understanding by indicating which equipment and material they intend to furnish and install, and shall detail the fabrication and installation methods they intends to use. Contractor further agrees that if deviations, discrepancies, or conflicts between shop drawing submittals and contract documents are discovered either prior to or after shop drawings and

4. Shop drawing submittals shall state capacities, sizes, etc., of all equipment and shall be certified and include computer based project specific selections where applicable. Clearly mark each shop drawing, catalog cut and/or specification sheet to indicate those products and features which are intended to be furnished. Specifically indicate any deviations from the design

intent. Engineer reserves the right to require correction at no cost to Owner for deviations not specifically indicated in the submittals. Review and approval of shop drawings shall not relieve the Contractor from the responsibility of furnishing equipment and materials of proper dimension, size, quantity, guality and all performance characteristics to efficiently perform the requirements and intent of the contract documents. Submittal shall be bound and indexed in a neat and orderly manner.

5. Review of Submittals is rendered as a service only and shall not be considered as a guarantee of measurements or of building conditions; nor shall it be construed as relieving the Contractor of basic responsibilities under their Contract. Architect / Engineer will check submittals only for conformance with the design concept of the project. Review shall not be construed as: Permitting any departure from the contract requirements.

b. Relieving the Contractor of the responsibility for any error in details, dimensions or otherwise that may exist in the Shop Drawings.

c. Contractor agrees that shop drawing submittals processed by the Architect / Engineer are not change orders

 Submittal Schedule: Generate a Schedule of anticipated initial submittals for this Division and provide to General Contractor. Include in schedule specified duration times for review. submittal revision, resubmittal, and subsequent review as indicated in Division 01. Structure submittal schedule to allow for construction and delivery long lead and critical path items based on the overall project construction schedule. Place orders for all equipment in time to prevent any delay in construction schedule or completion of project. If any materials or equipment are not ordered in time, additional charges made by equipment manufacturers to complete their equipment in time to meet construction schedule, together with any specia handling charges, shall be borne by the Contractor.

1. Proposed Product List: At the onset of Project's submittal phase, this Contractor shall submit a complete list of all material and equipment they propose to use in the installation. This list shall include all products specified in this Division and indicate manufacturer, catalog numbers and other identifying information. Architect / Engineer reserves the right to not review individual Product Data and Shop Drawing submittals until the Proposed Product List has been submitted and reviewed. 2. After review of the Proposed Product List by the Architect / Engineer, the Contractor shall submit Product Data and Shop Drawings including descriptive literature of the equipment to be provided under this contract. Drawings shall state capacities, sizes, etc., of all equipment and shall be certified.

3. The shop drawings shall be reviewed by the Contractor and stamped and signed certifying they have reviewed and found them to be 100% complete and accurate, prior to submission. Mark project name and location on each shop drawing, catalog cut and/or specification sheet along with Contractors signed stamp. Architect / Engineer reserves the right to reject shop drawings submitted without project name, location or stamp of Contractor's review. 4. Clearly mark each shop drawing, catalog cut and/or specification sheet to indicate those products and features which are intended to be furnished. Use highlights, arrows, underlines,

circles and strikethroughs to identify exact features, options, capacities, characteristics and dimensions of equipment to be provided. Strike through information that does not apply to the intended product, options not intended to be included, and any manufacturer's disclaimers such as "Dimensions Subject to Change Without Notice." Options not specifically struck will be understood to be included. Architect / Engineer reserves the right to reject shop drawings not adequately marked in the above manner 5. Review and approval of shop drawings shall not relieve the Contractor from the responsibility of furnishing equipment and materials of proper dimension, size, quantity, quality and all performance characteristics to efficiently perform the requirements and intent of the contract documents. Review and approval does not relieve the Contractor from responsibility for errors on the shop drawings. If the shop drawings deviate from the contract documents, Contractor shall advise the Architect / Engineer of such deviations in writing accompanying the

shop drawings submittal, including the reasons for the deviations. Coordinate all required changes with the other trades affected. If the changes are occasioned by the Contractor, they

1. This Contractor shall provide the support role in development of a combined set of coordination electronic drawing(s) to conclusively coordinate spatial arrangements of their materials and equipment with all other trades, and to define sequencing and coordination of installations for efficient flow of the Work. Coordination drawings shall be minimum scale of 1/4" = 1/0" along with a detailed 3-D model showing locations, dimensions and height of installation of all major pieces of equipment, ductwork and piping provided under their respective contracts.

Drawings shall include the following: a. Bottom of duct height and size

b. Piping elevations and size c. Power and Data Conduit elevations and size

d. Hanger support locations (Ductwork / Piping / Conduit / Cable Tray)

g. Fire Protection mains/branch lines/head placement with elevations and size h. Building structure background

i. Proposed locations for access panels (Ductwork/Piping/Conduit/Cable Trav)

j. Indicate the locations of all equipment and materials, including clearances required for servicing and maintaining equipment. k. Indicate movement and positioning of large equipment into the building during construction. 2. Order of space preference throughout the building shall be:

c. Soil, Waste, vent and storm piping

g. Exception: Plumbing lines below or behind plumbing fixtures shall have precedence over all other work. Electrical conduit above or below switchgear, panel boards and control panels shall have precedence over all other work. Do not install any fluid conveying piping over electrical or elevator equipment . Prepare and submit the coordination drawings including detailed three dimensional model for review. By approving and submitting Shop Drawings, Product Data, Samples and similar

submittals, the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. 4. The Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittals has been

5. Where Contractor has failed to provide proper space for equipment and required clearances (as required by local AHJ, as related to code requirements, as noted or shown on plans or as noted on submittals) Contractor shall relocate the equipment as directed by Engineer. Contractor shall be held responsible for any and all changes resulting from such relocations and shall be held responsible for any and all changes resulting from such relocations and shall bear any and all increase costs to Contractor as well as costs to other trades in making said revisions.

Architect / Engineer's Review of Submittals: 1. The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect / Engineer's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect / Engineer in writing of such deviation at the time of submittal and the Architect / Engineer has given written approval of the specific deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings Product Data, Samples or similar submittals

by the Architect / Engineer's approval thereof 2. Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. The purpose of their submittal is to demonstrate for those portions of the Work for which submittals are required the way the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents.

3. The Architect / Engineer will review and either: take no exception to the submittal or take other appropriate action upon contractor's submittals such as Shop Drawings. Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect / Engineer's action will be taken with such reasonable promptness as to cause no delay in the Work of the Contractor or in the activities of the other Contractors, the Owner, General Contractor, or the Construction Manager, while allowing sufficient time in the Architect / Engineer's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation of performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect / Engineer's review of the Contractor's submittals shall not relieve the Contractor of the obligations per the Contract Documents.

A. The plans indicate the location, type and sizes of various utilities within the site where known. These utilities are indicated as accurately as possible. If utilities are encountered during construction, which are not shown on the drawings, ask for instructions from the Architect. Any relocation or remodeling required will then be directed by change order. Assume all responsibility for protection of all utilities, shown or not, and repair any damage caused by this construction at no extra charge to the Owner. Investigate with proper authorities for all existing water taps, etc. and make arrangements to pay for all removal charges in original bid.

Subcontractor shall verify existence and exact location(s) of all utility services, piping, and raceway systems and coordinate, as required, in their respective area of the construction by notifying the prime contractor of variations or conflicts. Subcontractor shall obtain and verify exact utility company drawings and requirements. Owners of all underground utilities shall be notified prior to excavation so that they can locate and mark underground utilities.

1.17 EXISTING CONDITIONS

- Existing systems and conditions shown on drawings for existing buildings are to be noted for guidance only. The Mechanical Contractor shall field check all existing conditions prior to bidding and is to include in his bid an allowance for removal and/or relocation of existing ductwork, piping, fixtures, or other equipment. The Mechanical Contractor shall adapt new and existing mechanical system (ductwork, piping, controls, diffusers, etc.) to all other work as required to maintain/restore the continuity of systems or to make new work meet existing conditions whether indicated or not.
- B. In as much as design for remodel and/or rehabilitation requires that certain assumptions be made regarding [existing] conditions, and because some of these assumptions cannot be verified without destroying otherwise adequate or serviceable portions of the building, the Engineer cannot assure the Owner or the contractor that the professional consulting services herein encompass all contingencies. Field coordination during construction is imperative. Make reasonable allowances for unseen conditions. Existing ductwork, equipment, piping, etc. which are shown as demolished and not indicated for reuse shall become the property of the Contractor. However, fixtures, mechanical equipment
- such as pumps, fans, fire protection equipment, etc. being removed shall become the property of the Owner unless noted otherwise. D. System outages shall be permitted only at times approved by Owner-in writing. Work which could result in an accidental outage shall be performed with the Owner's maintenance personnel
- advised of such work.
- E. The [existing] building will be occupied by the Owner during construction. Continued operation of the facility shall not be hindered by this work. Account for all additional costs which may be incurred due to the difficulty of working over and around employees, furniture, equipment, etc.; and due to the hours of the day in which an area may be accessible when compiling his bid. F. Service shall be maintained to existing areas during construction.
- 1.18 MECHANICAL INSTALLATIONS
- structure, beams, columns and/or existing equipment
- B. Verify all dimensions by field measurements.
- C. Arrange for chases, slots, and openings in other building components to allow for mechanical installations. D. All [existing] support rods and straps currently supporting ducts, pipes, air tubing, electrical conduit, etc. that are removed to allow for room to install [new] equipment shall be relocated and reinstalled, or replaced if damaged
- E. All "capped" sanitary and vent lines shall be reconnected or re-routed as necessary to prevent "dead-ends" in the piping. All piping shall drain to active sanitary waste lines and all branches with traps shall be adequately vented.
- F. [Cap all demolished and abandoned duct take-offs at trunk duct.]
- G. Coordinate the installation of required supporting devices and sleeves to be set in poured in place concrete and other structural components, as they are constructed. H. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing-in the building.
- I. Coordinate the cutting and patching of building components to accommodate the installation of mechanical equipment and materials.
- required clearances as specified in codes and regulations.
- inaccessible when building is complete. "Exposed" is intended to be within equipment rooms, unfinished areas, above "push up" ceilings, accessible pipe and duct tunnels. L. The term "furnish" means supply and deliver to Project, unless otherwise defined in greater detail. The term "install" is used to describe operations at Project, from inspecting and unloading,
- to completion in place, ready for intended use. The term "provide" means furnish and install, complete and ready for intended use, unless otherwise defined in greater detail.
- 1.19 USE OF THE ARCHITECT'S AND/OR ENGINEER'S DRAWINGS A. The Contractor shall obtain, at the Contractor's expense, from the Architect or Engineer a set of AutoCAD or compatible format architectural and engineering drawings on electronic media where desired by the Contractor and/or required by the Specifications for use in preparing the shop drawings, coordination drawings, and record drawings. The Contractor shall provide to the Architect and Engineer a written release of liability acceptable to the Architect and Engineer prior to receiving the electronic media.
- PART 2 -PRODUCTS
- 2.1 MATERIALS AND EQUIPMENT
- A. Use only new materials, of the best quality of their respective kinds. B. All materials, in general, shall be Underwriter's Laboratories listed and labeled.
- 2.2 EQUIPMENT MANUFACTURFR
- A. Equipment in the following categories shall be of one manufacturer or available through one manufacturer for each category to facilitate ease of maintenance for the Owner. 1. Access Doors
- 2. Motors (open drip-proof squirrel cage) 3. HVAC Fixture Trim
- 4. Pressure Gauges
- 5. Starters, including Variable Frequency Drives 6. Strainers
- 7. Temperature Controls
- 8. Thermometers 9. Valves
- PART 3 EXECUTION
- 3.1 ENGINEERING BY CONTRACTOR
- A. The construction of this building requires the contractor to design several systems or subsystems. All such design shall be the completed responsibility of the contractor. The following are hereby delegated to the contractor to design, detail, and submit with seal of Registered Professional Engineer for review by Architect / Engineer. 1. Fire sprinkler.
- 2. Equipment supports, not fully detailed in the drawings.
- 3. Pipe hangers and anchors not specified in these documents, or catalogued by the manufacturer.
- 5. Refrigeration systems.
- Seismic restraints
- 3.2 SAFETY AND MAINTENANCE OF WORK AREAS
- A. The Engineer has no contractual responsibility in connection with job site safety measures or precautions as related to means, methods, techniques, sequences or procedures. Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours. The Architect/Engineer's observations of the Contractor's performance are not intended to include review of the adequacy of the Contractor's safety measures in, on, or near the construction site. Contractor shall be responsible for providing all such safety measures and shall consult with the Local, State or Federal Safety Inspector for
- interpretation whenever in doubt as to whether safe conditions do or do not exist; or whether he is or is not in compliance with Safety Regulations. B. During the project, this Contractor shall maintain his work area in an organized manner, shall not allow debris to accumulate, and shall store equipment, tools and supplies in a manner which shall not cause interference with the activities of others engaged on the project
- HANDLING AND STORAGE OF MATERIALS AND EOUIPMENT
- Provide for proper storage of all materials and equipment and assume responsibility for losses due to any cause. All storage shall be within the contact limit lines of the building site. Cover and store all equipment and materials out of elements; any rusted or weather damaged item shall not be used. B. It is recognized that space at the project for storage of materials and products is limited. Coordinate the deliveries of HVAC systems materials and products with the scheduling and sequencing of the work so that storage requirements at the project are minimized. In general, do not deliver individual items of equipment to the project substantially ahead of the time of installation.
- All materials shall be covered prior to installation and protected until final acceptance. 3.4 COORDINATION AND INSTALLATION OF THE WORK:
- A COORDINATION AMONGST TRADES
- 1. This Contractor shall provide a qualified person during the construction phase of the shop drawing development that has the skills to convert the diagrammatic project drawings into composite assembly drawings in the CAD format determined by the Mechanical Contractor, for integration of systems into the combined master per floor coordination documents being assembled by the Mechanical Contractor. These coordination / fabrication drawings will conform to the performance criteria identified in the project documents and will fit into the 3 imensional allotted space for all systems. Where the piping dimensions, sizes and general arrangements of elements will require to be adjusted due to coordination of new or existing building structure, Architect's reflected ceiling plan and other trade's materials and or equipment space needs, qualified person will provide proposed recommendations of sizes, eleval changes, offsets, etc. for inclusion in a combined drawing(s) for the coordination meetings that will be reviewed by the Architect, Engineer, Owner and other trades to provide an overall acceptance of coordination per floor.
- 2. The layout shown on the drawings is necessarily diagrammatic but shall be followed as closely as other work will permit. Changes from these drawings required to make this work conform to the building construction shall be made only with prior written approval of the Architect/Engineer. All proposed changes shall be shown on shop drawings. All measurements shall be verified by actual observation and all work shall fit in place meeting the approval of the Architect/Engineer
- 3. Provide openings required in new and existing construction that may be necessary. All patching and repairing shall be done by workmen competent in the trade required, at the expense of this Contractor. Arrange work so that minimum cutting will be required. All rubbish and excess materials involved in such cutting shall be promptly removed from the site and disposed of Cutting through the floor or roof systems or load bearing walls shall be done only with the prior written approval of the Architect/Engineer so as to avoid damaging the structural system.
- SEQUENCING, SCHEDULING Confer with the other contractors regarding the location and size of pipes, equipment, ducts, openings and special architectural treatments in order that there may be no interferences between the installation or the progress of the work of any contractor on the project.
- 2. In the case of interconnection of the work of two or more contractors, verify at the site or on shop drawings all dimensions relating to such work. All errors due to the failure to so verify any such dimensions shall be promptly rectified Access panels, in walls or ceilings, required (i.e., automatic or manual damper, fire or smoke damper, coil or control instrument mounted in a duct or pipe) shall be provided by the respective contractor and installed by workman competent in the trade required at the expense of this Contractor. Access panels are not required in areas where the ceiling system is lay-in
- tile: however, sufficient space must be available in and through the ceiling system to allow maintenance and adjustment of dampers, and cleaning of coils as necessary, or a suitable access panel shall be provided for that purpose. Access panels shall be approximately 24 inches by 24 inches wherever possible and shall be provided with flush trim and an allen-key operated camlock fastener. Submit manufacturer's product data to Architect for approval. 4. Items of equipment may be specified singularily; however, provide and install the number of items of equipment as required for a complete system.
- 5. Provide excavating, pumping, backfilling and compacting required, as shown on the drawings. 6. Equipment and devices which have factory prime coat or final surface finish shall be replaced, repaired or refinished if defective or damaged during installation.
- 7. Arrange all work so a minimum period of interruption or outages will occur in the temporary or permanent transfer of services as required for all electrical revisions. Not less than two (2) weeks notification to the Using Agency/Owner shall be required before approval will be granted for any disruption of services. The outage request shall include the extent of the work to be done, length of outage time required and the time at which the outage is to begin. No allowance will be made for extra payment as a result of scheduling "overtime" work necessary to
- perform before or after normal or regular working hours to accomplish the work intended. 8. Submit a "Sequence of Work Schedule" in respect to all temporary and permanent utility and service cutovers after final determination. This schedule shall be submitted for approval to the Architect/Engineer. The submittal shall designate priority order, service or utility affected, date of cutover, and time of day to start and finish. C. MANUFACTURER'S INSTRUCTIONS
- 1. Except where more stringent requirements are indicated, comply with the product manufacturer's instructions and recommendations. 2. Consult with manufacturer's technical representatives, who are recognized as technical experts, for specific instructions on special project conditions
- 3. All items which are a source of noise generation and/or mechanical vibration shall be installed with proper attenuation provisions including absorbers, isolators, or mufflers as required to prevent objectionable noises and vibration
- 4. If a conflict exists, notify the Architect/Engineer in writing and obtain instruction before proceeding with the work in question. D. HOISTING AND MOVEMENT OF EQUIPMENT
- 1. This Contractor shall be responsible for hoisting of all materials and equipment furnished or installed under this Section of the Specifications, in accordance with all city, state and federal
- 2. Wherever possible, arrange for the movement and positioning of equipment so that enclosing partitions, walls and roofs will not be delayed or need to be removed. 3. Otherwise, advise Contractor of opening requirements to be maintained for the subsequent entry of equipment.

avoid overloading the roof deck.

Install piping and equipment

b. Aligned with other work.

a. 70" headroom in storage spaces.

3. Do not obstruct windows, doors or other openings.

a. Plaster finish walls and ceilings: Recessed style.

b. Acoustical tile ceilings: Recessed type.

c. Drywall walls and ceilings: Flush panel.

b. 8'6" headroom in other spaces

ACCESS AND ACCESS DOORS

a. Straight and true.

Architectural Divisions of these Specifications.

d. Concealed, where possible, in occupied spaces.

2. Concrete pads shall be minimum 4 inch high and anchored to the floor with dowels.

e. Out-of-the-way with maximum passageway and headroom remaining in each space.

2. Provide shop drawings to the Architect and Engineer showing locations of all access panels.

2. Except as otherwise indicated, arrange mechanical services and overhead equipment with a minimum of:

4. Give the right-of way to piping systems required to slope for drainage (over other service lines and ductwork).

Conceal all piping in finished areas of the building except where otherwise noted on the drawings.

Furnish and install all traps, air vents, sanitary vents, etc., as required to affect these offsets, transitions and changes in direction.

5. Offsets, transitions and changes in direction in pipes and ducts shall be made as required to maintain proper head room and pitch of sloping pipes whether or not indicated on the drawings.

Install all work to permit removal (without damage to other parts) of coils beat exchanger hundles boiler tubes fan shafts and wheels filters belt guards sheaves and drives and all

3. Furnish access doors of type suitable to Architect and provide to General Contractor to construct into the building. Access doors should be provided in all locations where access is

4. Provide painted, steel (unless noted otherwise) access doors with key lock suitable for the surface in which they are installed and satisfactory to the Architect

other parts which might require periodic replacement or maintenance. Arrange pipes, ducts, and equipment to permit ready access to valves, traps, starters, motors, control components

and to clear the openings of doors and of access panels. Furnish access panels for all mechanical equipment and valves requiring access in concealed locations for installation by contractor.

CONCRETE

F. CLEARANCES

A. Coordinate mechanical equipment and materials installation with other building components, including but not limited to offsetting pipework, ductwork, etc. as necessary to accommodate

J. Where mounting heights are not detailed or dimensioned, install mechanical services and overhead equipment to provide the maximum headroom possible, and in accordance with minimum K. The word "concealed" as used in this specification refers to such spaces as pipe and duct chases, pipe and duct trenches, above plastered ceilings, in walls and buried where pipe and/or duct is

4. Coordinate the movement of heavy items with shoring and bracing so that the building structure will not be overloaded during the movement and installation.

5. Where mechanical products to be installed on the existing roof are too heavy to be hand-carried, do not transport across the existing roof deck; position by crane or other device so as to

1. All poured in place concrete required for equipment furnished under this Division shall be furnished & installed by this Division in accordance with requirements specified under the

d. Remodel Applications: Flanged flush panel

e. Corrosive environments, including but not limited to, restrooms, locker rooms, pool equipment rooms, and natatoriums: Panel and frame shall be aluminum or stainless steel. All associated hardware and fasteners shall be stainless steel

f. Panels in fire and/or smoke rated assemblies shall be listed for the application and carry the appropriate rating for the assembly in which they are installed.

- 3.5 PROTECTION OF WORK AND PROPERTY
- A. Where there are existing facilities, be responsible for the protection thereof, whether or not such facility is to be removed or relocated. Moving or removing any facility must be done so as not to cause interruption of the work of Owner's operation. B. Close all pipe openings with caps or plugs during installation. Cover all fixtures and equipment and protect against injury. At the final completion, clean all work and deliver in an unblemished
- condition, or refinish and repaint at the discretion of the Architect. C. Any equipment, duct or piping systems found to have been damaged or contaminated above "MILL" or "SHOP" conditions shall be replaced or cleaned to the Architect / Engineer's satisfaction.
- Initial fill of traps: Provide initial water seal fill for all waste p-traps, condensate traps, or similar traps. 3.6 PROTECTION OF POTABLE WATER SYSTEMS
- A. All temporary water connections shall be made with an approved back flow preventer.
- B. All hose bibbs shall have, as a minimum, a vacuum breaker to prevent back flow. C. Direct connections to hydronic systems shall only be made through a reduced pressure back flow preventer.
- 3.7 TEMPORARY HEAT, VENTILATION, AND AIR-CONDITIONING
- A. Temporary heat, ventilation, and air-conditioning (HVAC), if required for the construction activities, shall be furnished by the General Contractor. Use of the permanent HVAC system shall not be allowed without written authorization from the Engineer. In the event the permanent HVAC systems are desired to be used prior to substantial completion and final cleaning, the General Contractor shall meet all requirements of the Engineer's written authorization and shall pay all utility costs for operation of the HVAC systems until acceptance by the Owner.
- 3.8 ELECTRICAL EQUIPMENT AND WIRING FOR HVAC DIVISION A. Unless otherwise indicated, all motors and controls shall be furnished, set in place and wired in accordance with the ME Equipment Wiring and Connection Matrix. (MD is Mechanical (HVAC) Division - ED is Electrical Division). Refer to Mechanical Legend and General Notes Sheet for the Wiring and Connection matrix. The Wiring and Connection Matrix does not attempt to include all components; therefore, all items necessary for a complete system shall be included in the base contract.

3.9 REMODELING PROVISIONS

- A. Existing systems and conditions shown on the drawings are provided for guidance only. The Mechanical Contractor shall field check all existing conditions prior to bidding and shall include in his bid an allowance for the removal and relocation of existing conduits, wires, devices, fixtures, or other equipment as indicated on the plans or as required to coordinate and adapt new and existing electrical systems to all other work required for this project.
- Remodel Work Cutting and Patching: The Contractor shall perform cutting, channeling, chasing, drilling, etc., as required to install or remove mechanical equipment in areas of remodeling. This work shall be performed so as to minimize damage to portions of wall finishes, surfaces, plastering, or the structure which are to be reused, resurfaced, plastered or painted under another division of these specifications.
- Carefully coordinate with the required remodeling work, cutting and patching etc., performed by the other trades. Remove or relocate existing mechanical components and other equipment as
- D. All outages on portions of existing mechanical systems shall be minimized and shall be at a time and of duration as accepted by the Owner
- 3.10 MECHANICAL DEMOLITION
- A. Examination
- 1. Verity field measurements are as shown on drawings. 2. Verify that abandoned systems and equipment serve only abandoned facilities.
- 3. Demolition drawings are based on casual field observation and existing record documents. Report discrepancies to Architect before disturbing existing installation. Beginning of demolition means installer accepts existing conditions
- B. Preparation
- 1. Disconnect mechanical systems in walls, floors, and ceilings scheduled for removal.
- 2. Coordinate outages with Architect/Owner. 3. Provide temporary connections to maintain existing systems in service during construction.
- C. Demolition and Extension of Existing Mechanical Work
- 1. Demolish and extend existing mechanical work under provisions of Division 1, Division 2, and this section.
- 2. Remove, relocate, and extend existing installations to accommodate new construction. Remove abandoned piping to source of supply.
- 4. Remove exposed abandoned piping or ductwork, including abandoned piping or ductwork above accessible ceiling finishes.
- Disconnect and remove abandoned equipment
- 6. Disconnect and remove mechanical devices and equipment serving utilization equipment that has been removed. 7. Repair adjacent construction and finishes damaged during demolition and extension work.
- 8. Maintain access to existing mechanical installations, which remain active. Modify installation or provide access panel as appropriate.
- 9. Extend existing installations using materials and methods compatible with existing mechanical installation, or as specified in individual section.
- D. Cleaning and Repair
- Clean and repair existing materials and equipment, which remain or are to be reused. E. Installation
- 1. Install relocated materials and equipment under the provisions of Division 1
- 3.11 IDENTIFICATION
- A. Label all piping and equipment. Provide full band or strip type markers and flow arrows on piping. Provide engraved plastic valve tags with valve number and attach with standard chain or s-hooks. Provide engraved plastic sign on or near specified equipment.
- 3.12 FLUSHING, CLEANING & STERILIZING
- A. Intent: It is the intent of this specification to require that all work, including the inside of equipment, be left in a clean condition with all dust, grease, and construction debris removed. 1. Piping and connection equipment to be left free of sediments, core sand, grease, etc.
- 2. Clean all exposed surfaces of piping, ducts and hangers, etc., sufficiently to receive paint. Vacuum ducts as required for debris removal. 3. Air systems shall not be operated without filters. Replace the filters or clean permanent type filters just prior to substantial completion. All air systems shall be furnished with one additional set of filters for owner replacement.
- 4. Remove and clean all screens, interceptors, strainers, etc., in piping systems just prior to substantial completion
- 5. Clean and wipe dry all plumbing fixtures, exposed valves, faucets, and piping, etc. that are exposed just prior to substantial completion. Clean all equipment and fixtures per manufacturer's specifications to avoid scratching finished surfaces. Leave all plumbing fixtures ready to use 6. Clean interior and exterior of all air handling equipment of all construction debris. Clean exterior of all exposed ductwork just prior to substantial completion.
- 7. Thoroughly clean all equipment room floors after completion of equipment, pipe and duct cleaning. A condition of final acceptance will be the cleanliness of all exposed systems, equipment, and equipment rooms.
- Before final connections are made in the piping systems, blow out all piping with air and then wash out with cleaning compounds. Then flush the system to remove of all foreign materials. Furnish all temporary connections, valves, etc, required for this purpose. Clean the boiler and chiller by the same procedure
- C. After flushing, sterilize the domestic water system in accordance with Domestic Water Piping section.
- 3.13 TESTING
- A. Test all low pressure steam, condensate, heating water, snowmelt, condenser water, and chilled water piping at 150 psig hydrostatic pressure before connecting to unit.
- B. Test all high pressure steam and condensate, radiant panel (embedded in concrete) and anti-freeze piping at 200 psig hydro static pressure.
- C. Test all air, oil and gas piping under 60 psig air pressure. D. Test all refrigeration piping under 150 psig pressure using oil pumped, dry nitrogen and tapping of joints if there is any loss of pressure, soap each joint to find leaks. Charge with 10 psig refrigerant and test with halide torch or electronic leak detector. Evacuate using vacuum pump to 500 microns and purge twice with oil pumped, dry nitrogen.
- E. Test all high velocity ductwork from supply fan to boxes before ducts are concealed and before boxes are connected. All openings shall be capped off and partial sections of the duct to be tested using a fan capable of building 8" S.P. Use U-gauge manometer to test S.P. Repair all audible and visible leaks using smoke in ducts.
- F. All tests must be done to the satisfaction of the local authorities having jurisdiction, before covering.
- G. All hydrostatic tests to be held for a minimum of six hours without loss of pressure. Air tests to be held for a minimum of two hours without loss of pressure.
- H. Furnish all instruments required for testing
- 3.14 EQUIPMENT START UP AND PLACING IN OPERATION
- A. Clean all ducts, pipes, equipment, controls etc., of plaster and other foreign debris B. Before final acceptance, clean or replace all strainers, oil or grease all bearings and clean out all drains. Clean and recoat all permanent filters, replace throwaway type filters with new filters.
- The systems shall be put into operation.
- The Contractor shall verify that all controls are set to meet operating conditions specified. Example: Boiler operating and limit controls set where specified.
- . The contractor shall verify that all pieces of equipment are operable and that all sequences of control are being met.
- 3. The contractor to adjust settings through 1st year as required by MECHANICAL ENGINEER
- D. All packaged HVAC equipment shall be started by the manufacturer or under the manufacturer's supervision. Start-up data shall be recorded in logs. Copies of start-up logs shall be forwarded to the Engineer and included in Operation and Maintenance manuals.
- 3.15 BALANCING

3.16 CLEANING

apparatus

- A. The balancing of the system shall be part of this contract, include in bid the cost of balancing and adjusting. The balancing and balance report shall be in acceptance with Associated Air Balance Council (AABC) requirements or National Environmental Balancing Bureau (NEBB) requirements
- At the completion of the installation, the mechanical systems shall be adjusted and balanced by an independent balancing firm specializing in this work, accepted by the Engineer before Provide such items as thermometer wells, pressure test cocks, access doors, etc., as required to allow tests and adjustments to be made.
- Submit a written balance report by a NEBB or AABC certified balancing contractor. Balancing procedures shall be in accordance with NEBB or AABC guidelines for proportional balance. Submit eport on standard NEBB forms or submit forms for review prior to balancing. Measurements shall include all motor amperage and voltage readings; motor and fan RPMs; static pressure at inlet and outlet of all packaged equipment, fans, coils, and filters; pitot tube measurement of supply, exhaust, return, and outside air main ducts, at minimum outside air, and 100% (economizer) outside air; velocity distribution across the face of filters; air inlet and outlets; water flow at all flow measurement stations; inlet and outlet pressure at pumps with flow calculated from the pump curve; water flow, temperature drop, and pressure drop at all coils.
- Provide belts and sheaves as required for drive changes to adjust fan speed

other protective devices, temporary work, and surplus materials

Adjust flows to within 10% of required quantity. Where room air pressure relationship are required to be maintained as shown by a differential of supply and exhaust/return or by note. adjust supply to within 10% and then adjust exhaust/return to provide the indicated room pressure. If actual quantity is less than 90%, investigate cause, attempt to rectify and notify Engineer. Submittal of balance report with less than required flows without explanation is cause for rejection of report.

B. Leave mechanical rooms and similar unfinished spaces "Broom Clean." Dust equipment, ducts, pipes, and other mechanical and electrical work in mechanical rooms and similar unfinished

D. Upon completion of the work, put systems into service maintaining responsibility for the equipment during all testing operations including the lubricating and turning on and off of such

Upon completion of the contract all remaining materials and rubbish shall be removed from the building and premises and the work areas shall be left clean and free from stains, mortar, paint

paces. Remove construction dirt and debris from interior of equipment, panels, disconnects, ductwork, etc. thoroughly in accordance with manufacturer's instructions

A. Immediately prior to inspection for Substantial Completion, remove any remaining waste materials and rubbish from mechanical and electrical rooms. Remove protective coating, barriers and

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| Revisions: | | | | | | | | | |
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MARCH, 2018

1.1 CLOSEOUT SUBMITTALS A. OPERATION AND MAINTENANCE INSTRUCTIONS

- 1. Books of Operating and Maintenance Manuals shall be delivered to the Owner's authorized representative within 90 days of substantial completion and the Owner instructed as to their use and the equipment involved 2. Thirty (30) days Prior to Substantial Completion, submit operating and maintenance manuals for equipment to Engineer for approval. Assemble manuals into white, 3-ring binders. Insert
- laminated cover sheets, identifying each binder on the front and spine with all necessary information so that all volumes appear uniform and orderly (i.e. Project Name, Owner Project Number, Contractor/Architect/Engineer Information, Volume Number, General Contents Description such as Mechanical, Electrical, etc.) 3. Provide comprehensive table of contents indicating the contents of all volumes in each set. Organize and tab documents in an orderly sequence, based on the table of contents of the
- project manual. Within each section, organize alphabetically by system or subsystem. Include a section in the directory for each of the following: list of documents, list of systems, and list of equipment
- 4. Include copy of each submittal, including Architect / Engineer's review comments, and subsequent resubmittals for record purposes, indicating the actual product installed. Include
- significant changes in the product delivered to project site and changes in manufacturer's written instructions for installation. 5. Provide organized warranty section in the lead binder (Contractor's option to provide separate binder.) Organize warranty documents into an orderly sequence in separate binder, based on the table of contents of the project manual. A copy of each warranty shall also be provided in the respective equipment section.
- 6. Provide organized equipment failure emergency section in the lead binder (Contractor's option to provide separate binder.) Organize into separate sections for each type of emergency and include all necessary steps for safe equipment shut-down and containment. Also, include all necessary contractor and vendor contact information including 24-hour call numbers. 7. Provide comprehensive contact list in the lead binder including contractor and subcontractor's names, addresses, telephone and contact person for Owner's use.
- 8. Include equipment start up logs for all equipment required to be checked out and intitally started under manufacturer's supervision.
- 9. Provide manufacturer's complete data sheets including assembly drawings, spare parts lists, wiring diagrams, mechanical diagrams, installation diagrams, and instructions. Identify
- equipment in manual and cross-reference by including serial number of actual components. 10. In addition to Manufacturer's maintenance documentation, provide separate schedules for preventative and routine maintenance and service with standard time allotment. Include service
- and lubrication requirements and list of required lubricants for equipment, application methods and frequencies. 11. Provide Preventative Maintenance (PM) schedule for checking all items such as belt drives, safety controls, motor running load amps, oil, refrigerant and grease charges. Include cleaning
- schedule of all strainers, traps, coils, tubes, etc 12. Include record of spare parts provided including signature of Owner's representative showing acceptance of parts. Provide list of additional items recommended to be stocked as spare
- parts, with parts identified and cross-referenced to manufacturer's maintenance documentation and including local sources of maintenance materials and related services. 13. Provide test reports from manufacturer start-up indicating systems to be operating properly, including TAB reports, thermographics surveys, etc.
- 14. Provide HVAC control system information including recommended sensor calibration schedule, wiring diagrams and system schematics, narrative for how each system is to operate including 15. Provide electronic copy of final operation and maintenance manuals in full color pdf format on CD/DVD. All files shall clearly indicate specific information related to actual products
- installed. File structure and naming shall be "user-friendly" and organized in a manner similar to the hard copy binders such that it may be intuitively navigated by users. 16. Approval will not be given for final payment until the tests, balancing and operating instruction portions have been completed.
- B. RECORD/AS-BUILT DRAWINGS
- 1. During the process of the work, maintain an accurate record of the installation of the mechanical systems.
- 2. Within 90 days of substantial completion, Contractor shall furnish a complete set of record drawings in reproducible form, and Contractor shall indicate thereon all as-built changes and such additional details necessary or appropriate to provide a complete reference document. If variations and details cannot be shown clearly on Contract Documents, the Contractor shall prepare supplemental drawings adequate to impart the information. These additional drawings shall also be in reproducible form. The foregoing drawings collectively shall constitute the "As-Built" drawings for the Work.
- 3. All indications on "As-Built" drawings shall be executed in a legible manner at Contractor's cost, using methods and legend presentations compatible with the overall scheme of the record Drawings with respect to scale, drawing sheet sizes and sequential indexing. All changes shall be marked clearly in red and clouded.
- 4. Engineer shall review Contractor's "As-Built" drawings and notify Contractor of observed discrepancies or deviations. Contractor shall promptly correct and resubmit revised drawings for Engineer review. Completed "As-Built" drawings shall be delivered to Owner through Architect.
- DEMONSTRATION AND TRAINING 1. Refer to Division 01 for additional requirements regarding Demonstration, Training, and O&M Manuals submittals.
- 2. Prepare and submit operating instructions, as required by Specification Sections, and instruct Owner's personnel in use and maintenance of operating equipment. Explain use operation of
- each system to the Owner's designated representative(s). Explain use of the O&M manuals in operating and maintaining the systems 3. After installation is complete, schedule to meet and instruct Owner's designated personnel in use, operation, care, and cleaning of equipment. Demonstrate that each system operates properly. Instructions shall be given only by qualified personnel, thoroughly familiar with use and maintenance of equipment. Systems shall be complete, operable, and ready for
- continuous operation prior to acceptance by the Owner. 4. Notify the Engineer in writing a minimum of 72 hours in advance of any scheduled Owner equipment training. Following all training, provide record of Owner training including the type of
- training, who conducted the training, and list of attendees. Include copy in each set of O&M manuals 5. Owner training sessions shall be video recorded to DVD media. DVD's shall be clearly labeled indicating content of equipment covered by training, and copies provided as follows: one (1) copy to the Owner, one (1) copy to the Engineer, and one (1) copy shall be included in each set of O&M manuals.
- D. WARRANTY 1. Guarantee all work including labor, material and equipment for this project for a period of one year from date of acceptance by Using Agency/Owner. Repair or replace any work found defective without cost to the Owner during the warranty period.
- 2. All materials and equipment shall be new unless otherwise specified. 3. Guarantee all workmanship, materials and equipment and replace any found defective without cost to the Owner, for one year after final acceptance, as defined in General Conditions.

4. Each warranty for longer than the one year described above (that comes with equipment used on the job) shall be passed on to the owner with dates of start and end of the warranty. END OF SECTIONINSULATIONMAY, 2013 15100 - 1 NOVEMBER, 2017

SECTION [15100][22/230100]--BASIC MATERIAL AND METHOD

- PART 1 GENERAL
- 1.1 RELATED DOCUMENTS
- A. The General Conditions, Special Conditions and Contract Documents are a part of these specifications. Consult them for further instructions and be governed by the requirements thereunder. 1.2 STANDARDS FOR MATERIALS
- A. All materials shall conform to current applicable industry standards. Workmanship and neat appearance shall be as important as the electrical and mechanical operation. Defective or damaged naterials shall be replaced or repaired, prior to final acceptance, in a manner acceptable to the Architect or Owner at no additional cost to the Owner.
- B. All equipment shall have housings suitable for the location installed.
- C. Provide products and materials that are new, clean, free of defects, and free of damage and corrosion, unless specifically directed to reuse any existing materials.
- PART 2 PRODUCTS
- 2.1 MOTORS
- A. Furnish ball bearing, squirrel cage, open dripproof, normal starting torque motor of the horsepower and current characteristics specified with thermal overload protection and dustproof and leak proof bearing rings and constructed for use at the altitude where the work is to be located. Motors guaranteed to operate continuously at full load with temperature rise in any part not to exceed NEMA Standards. Motors shall be commercially, dynamically balanced and tested at the factory before shipment and selected for quiet operation. Provide motors for V-belt drives with a cast iron and steel base, with slide rail and adjustable screw device and belt guard. Line up motors and drives and place motors and equipment on foundations ready for operation B. Motors rated 1 horsepower or greater shall be Department of Energy (DOE) approved "premium efficient", meeting the requirements of EP Act 92, and shall meet NEMA 12-6C full load
- efficiencies. Where not commercially available, power factors shall be capacitor corrected by equipment manufacturer to at least 90 percent under rated load condition
- 2.2 STARTERS
- A. Provide starters of current and capacity ratings to serve the motor intended. All three phase starters to have over current protection on all three legs. On three phase starters furnish a Phase Monitor Control Relay, Time Mark B258B, or A258B, three-phase monitor control relay to open on phase reversal, phase failure or phase under voltage. Phase monitor control relay shall be mounted and wired in the starter enclosure by this contractor. Furnish switches and green running pilot light in starter cover. If pilot lights are specified on control panel, individual starter lights will not be required.
- B. Provide integral transformer and 120-volt control circuit on all starters, which are furnished with control circuits.
- C. Size thermal overload relays for approximately 115% of full load motor current. Switch and fuse units will not be acceptable unless specifically indicated.
- D. All motors 10 horsepower or greater shall be equipped with reduced voltage starters.
- 2.3 BELT DRIVES
- A. Provide belt drives with cast iron sheaves, either companion driven sheaves (except for two groove) or fixed pitch sheaves. If fixed pitch sheaves are used, the MECHANICAL ENGINEER reserves the right to direct speed changes be made, if in his opinion, these are warranted after final balancing. Fixed pitch sheaves shall be bushed type. Provide two groove adjustable drive sheaves with a key for holding pitch adjustment. Use standard FHP, A, B, C and D Sections. FHP belt drives may be used for motors less than three horsepower.
- 2.4 ACCESS DOORS
- A. Provide painted, steel access doors with key lock suitable for the surface in which they are installed and satisfactory to the Architect. Recessed style to accept plaster finish, recessed type to accept acoustical tile, flush panel for drywall or flanged flushed panel for remodeling. In installed in fire rated surface, access door to carry proper rating. 2.5 ALTITUDE RATINGS
- A. Except as otherwise noted, all equipment capacities, air qualities, etc., are adjusted ratings for the elevation of this project as noted on drawings. Manufacturer's ratings shall be adjusted to provide net ratings shown.
- 2.6 FLEXIBLE PIPE CONNECTIONS
- A. For steel piping, construct with stainless steel inner hose and braided exterior sleeve.
- B. For copper piping, construct with bronze inner hose and braided exterior sleeve.
- C. Use connectors suitable for minimum 125 psi WSP and 450° and 200 psi WOG and 250°F.
- D. Construct spool pieces to exact size for insertion of flexible connection.
- 2.7 FIRE STOPPING MATERIA
- A. Penetrations through rated walls and floors shall be sealed with a material capable of preventing the passage of flames and hot gasses when subjected to the requirements of the test standard specific for fire stops ASTM-E-814. B. Acceptable materials include: DOW corning RTV fire stop foam for bare pipe, metal conduit, and electrical cable; 3M Fire Dam 150 caulk for bare pipe, metal conduit, and building construction
- gaps; 3M CP-25 caulk and FS-195 intumescent strips for insulated pipes, plastic pipe or conduit, and electrical cable. Submit UL listed application data for each type of penetration encountered
- 2.8 HEAT TRACE A. Manufacturers:
- 1. Raychem Model: XL-Trace for freeze protection applied between pipe and insulation.
- 2. Raychem Model: Ice stop for freeze protection applied inside storm drain leaders and down spouts.
- Other acceptable manufacturer:
- a. Thermon. b. Hevi-Duty/Nelson.
- B. Features:
- Self regulating at all points along its length.
- 2. 90% power reduction from 40°F pipe temperature to 150°F pipe temperature.
- 3. No overheating if crossed.
- 4. Provide outer jacket and braided copper shield for use inside roof drain leaders or on piping without a ground path.
- C. Accessories:
- 1. Provide tee, splice, and end seal kits as required by the manufacturer. D. Provide ambient sensing thermostat in a NEMA 4x enclosure with three (3) contacts rated at 22 amps each.
- PART 3 EXECUTION
- 3.1 FREEZE PROTECTION
- A. Proximity of any equipment component or fluid piping to potential damage from freezing sources shall be avoided wherever possible. Drawings are diagrammatic. Make location adjustments, add insulation and/or control devices and/or heat sources as necessary to prevent or minimize freeze damage potential. The Architect/Engineer will neither guarantee nor be responsible for any consequences of freezing
- 3.2 VIBRATION ISOLATION A. Equipment
- 1. Erect all floor mounted equipment on 4" high concrete pads over the complete floor area of the equipment.
- 2. Where inertia bases are indicated, pour these bases within structural channel frames having mountings attached to the inside perimeter and furnished with supplementary spring units. Furnish bases with an 18 gauge sheet metal bottom welded in place to retain the concrete. Anchor bolts and reinforcing bars are to be set in the field, #5 reinforcing bars top and bottom, 12" o.c. both ways. Provide one #5 bar at corners, top and bottom, 2' x 2' long. The mounting housing shall have concrete anchors and form enclosures for the spring elements. No damping material shall be used between the inner and outer housing on mountings and mountings shall have a combination lifting and leveling adjustment and 1/4" thick neoprene
- 3. Mount base mounted pumps and compressors (including temperature control compressors) on inertia base with a weight equal to not less than 1-1/2 times the combined weight of the pump and motor. Each inertia base for horizontally split case pumps shall include supports for base elbows at the suction and discharge connections. Where the concrete is 'T' shaped, or other than rectangular, mounting shall be self contained concrete inserts with flush openings on the side of the foundation for spring adjustment or removal.
- 4. Mount supply and return centrifugal fans, cabinet fans and air handling units (where called for on plans) on inertia base with a weight equal to not less than 1-1/2 times the combined weight of the fan and motor. Where centrifugal fan is used, mount fan and motor on common steel base.
- 5. Support each air or refrigeration compressor, (including temperature control compressor) base mounted pump, factory assembled air handing unit and fan by Mason Industries or equivalent spring type vibration isolators.
- 6. All mountings used out of doors shall be hot dipped galvanized.
- 7. Equipment with operating weight different than the installed weight, such as chillers and cooling towers and equipment exposed to wind, such as roof fans, cooling towers, etc., shall be mounted on spring mountings as directed in Mason Engineering Spec. B, but a housing shall be provided that includes vertical limit stops to prevent spring extension when weight is removed. Limit stops shall be out of contract during normal operation.
- B. Piping
- 1. Chillers, Condensers, Towers and Compressors a. Isolate all refrigerant piping from the structure throughout by double deflection spring and neoprene hangers with 1" deflection. Hang piping so that it does not touch any part of the structure. Connect pipes to compressor or condensing unit with convoluted bellows braided metallic flexible pipe connectors b. Isolate all condenser water piping, connected to condenser on any packaged chiller with a reciprocating compressor, from the structure throughout the equipment room by double
- deflection spring and neoprene hangers with 1" deflection. Hang piping so that it does not touch any part of the structure. Connect pipes to condenser and to cooling tower with Teflon flexible equipment connectors. c. Isolate all chilled water piping, connected to evaporator on packaged chiller with reciprocating compressor, from the structure throughout the equipment room by double deflection spring and neoprene hangers with 1" deflection. Hang piping so that it does not touch any part of the structure. Connect pipes to evaporator with Teflon flexible equipment
- 2. Base Mounted Pumps and Air Compressors (including temperature control compressors). Connect piping to air compressors with convoluted bellows, braided metal flexible pipe connectors. Isolate air piping from the structure for the first six hangers by double deflection spring and neoprene hangers with 1" deflection. Hang piping so that it does not touch any part of the structure. Connect piping to base mounted pumps with Teflon flexible equipment connectors.

resistant vapor barrier jacket. High density inserts are not required in plumbing walls behind plumbing fixtures. saddle, similar to Grinnel No. 185-186 or 360<sup>o</sup> zinc plated steel shield for insulation thickness specified. Trapeze Hangers

Flexible Connections

3.3 PIPE HANGERS

Individual Hangers

A. General

systems shall be fire rated.

- support five times the weight of thrust applied without failure.
- straps at each support.
- 5. All steam and high temperature hot water pipe shall have pipe covering protection saddle and shall be supported on Unistrut P-2474-3, pipe rollers or equivalent at each support. 3.4 CONTROL VALVE PIPING
- automatic valve shall be a minimum of the pipe size marked on the drawings.
- 3.5 PUMP CONNECTIONS pipe size noted on the drawings.
- 3.6 ACCESS DOORS
- D. Submit shop drawing indicating the locations of all access doors.
- 3.7 WELDING
- 3.8 PIPE DEPTHS

3.9 PIPE AND PIPE FITTINGS

3.12 FLEXIBLE CONNECTIONS

ROOF FLASHING

3.14 CLEANING

Installation shall be watertight.

also to specification Section 01710

and equipment rooms.

joints where required

3.16 SLEEVES, CUTTING, PATCHING

concrete curb around duct.

3.17 FOUNDATIONS AND SUPPORTS

B. Coordinate required annular space with size of pipe and sleeve.

3.18 FIRE STOPPING

3.19 HEAT TRACE

END OF SECTION

PART 1 - GENERAL

PART 2 -

1.1 RELATED DOCUMENTS

2.1 ACCEPTABLE MANUFACTURERS

MECHANICAL ENGINEER.

2.2 ACCEPTABLE PRODUCTS

PART 3 - EXECUTION

3.1 INDOOR PIPING INSULATION

Do not spiral wrap on pipe.

2. Make one wrap at valves.

Pipe sizes less than 2": 5 w/ft

3.10 DUCTS

3. Domestic Hot and Cold Water, Heating Water and Waste Piping

a. Domestic hot and cold water piping one inch diameter and smaller shall be isolated with the Acousto-Plumb System of orange and blue pipe isolators, holders, and guide, as manufactured by LSP/Specialty Products Company, Tel (800) 854-3215.

c. Do not allow the piping, pipe connectors, pipe hangers or valve to directly touch the structure, studs, gypsum board, or other pipes.

d. Copper waste piping must be completely wrapped with Lowry's acoustical pipe wrap. The wrap is manufactured by Harry A. Lowry. Tel. (818) 768-4661.

b. Isolate waste piping and domestic hot and cold water piping larger than one inch in diameter with Trisolator system of pipe isolators as manufactured by Elmdor/Stoneman, Tel. (818)

1. Where ductwork or piping is connected to fans, air handling units, pumps, or other equipment that may transmit vibration along the piping or ductwork, connect by means of a flexible connection constructed of fire resistant canvas, flex piping, or other approved method. Connections shall be suitable for pressures developed at the point of installation. Flexible material shall be waterproof for weather exposed ductwork, shall show no visible strain during operating conditions, and shall comply with code requirements. Flex connections for range exhaust

1. Provide pipe supports for vertical lines at each floor. Provide pipe hangers to support the systems without sagging, including hangers at each offset or change in direction, at ends of branches over five feet in length and at the following maximum spacing:

Pipe SizeHanger SpacingHanger Rod Diameter(Minimum)a. 3/4" and smaller6 ft.3/8"b. 1"8 ft.3/8"c. 1-1/4" through 2"10 ft.3/8"d. 2-1/2" through 3"10 ft.1/2"e. 4" through 5"10 ft.1/2"A.

1. Individual hangers for non-insulated copper piping and insulated copper heating piping and insulated domestic hot water and circulating water piping shall be copper plated, adjustable swivel ring hangers similar to Auto Grip 500, Kin-Line felt lined 440-F or Michigan Hanger Company Series 102 with polyvinyl coating, with insulation over hangers. 2. Individual hangers for insulated cold piping (steel or copper) shall be zinc plated, adjustable swivel ring hangers similar to Auto Grip Figure 800, Kin Line 400 Series, Michigan Series 103 Hangers shall support pipe with hangers over the insulation. The system shall be complete with Auto Grip or Michigan Zinc plated steel shield, Pipe Shields or Kin-Line 460 zinc plated steel shield. Provide insulation insert of high density polyethylene foam, calcium silicate, high density glass fiber or expanded perlite divided in longitudinal half sections and covered with fire

3. Individual hangers for all insulated or non-insulated steel piping (except steam and high temperature hot water) shall be zinc plated, adjustable swivel ring hangers similar to Auto Grip Figure 400, Kin-Line 400 Series, Michigan Series 100. Hangers shall support pipe with insulation over hangers. 4. Individual hangers for steam and high temperature water piping (250°F and above) shall be adjustable swivel pipe rolls, similar to Grinnel No. 171, 181 or 174 with pipe covering protection

1. Parallel runs of piping may be supported on trapeze hangers. Trapeze shall be Unistrut P-1000-3 or Kin Line 211, 371 or 372 equivalent by Elcen or Kindorff. System shall be selected to

2. All non-insulated steel pipe and insulated steel heating water pipe shall have standard pipe straps at each support. 3. All non-insulated copper pipe, insulated copper domestic hot and re-circulating water piping and insulated copper heating piping shall rest on neoprene sleeves and have standard pipe

4. All cold insulated pipe (steel or copper) shall rest on Fee and Mason Figure 81 or equivalent by unistruit, or Kin-Line, galvanized steel insulation shield or 300 galvanized steel shield. Provide insulation insert of high density polyethylene foam, calcium silicate, high density fiber glass or expanded perlite divided in longitudinal half sections and covered with fire resistan vapor barrier jacket. Provide pipe strap over insulation at each support. High density inserts are not required in plumbing walls behind plumbing fixtures.

A. If the control valve size is smaller than the pipe size marked on the drawing, the reduction in size pertains to the valve only. Ball valves, globe valves, and strainers on either side of the

A. Where the suction or discharge of any pump unit is smaller than the pipe size noted on the drawings, all strainers, valves, flexible connections, expansion joints, etc., shall be a minimum of the

A. Furnish an access door for each pipe chase for each floor. This includes both toilet plumbing chases and pipe riser chases. Access doors assembly to be minimum size of 16" x 16". B. Also, furnish access doors in all non-removable ceilings and in partitions and walls where necessary to maintain access to plumbing cleanouts, shock absorbers, fire dampers, manual dampers, valves and other mechanical devices requiring access. Size these as required for access. C. Provide all access doors to the General Contractor for him to construct into the building.

A. Provide all welding in accordance with the welding procedures of the National Certified Pipe Welding Bureau or other approved procedure conforming to the requirements of the ASME Boiler and Pressure Vessel Code, or the ASA Code for Pressure Piping. Only welders who have been fully qualified under the specified procedure shall be employed.

A. Interior pipe below slabs shall be a minimum of 4 inches below slab and shall not be in contact with concrete at any point. Minimum exterior cover over water piping, unless otherwise shown or required by code, shall be 8 feet above the top of the pipe. Area drains shall have maximum cover possible consistent with finished landscape and acceptable flow lines. Gas piping shall have minimum of 3 foot cover with warning tape 12" above pipe. Sanitary waste and storm drain lines shall have 3 foot cover minimum.

A. Full-length pipe in longest lengths possible shall be used. All threads shall be right hand, pipe standard, clean cut, full depth and tapering. Install piping so as to permit complete draining. Provide drains at all low points. All interior soil, waste and condensate lines shall have uniform pitch in the direction of flow of not less than 1/4 inch per foot unless otherwise noted. Ream out all pipe ends, turn on ends and rattle before installing.

A. Construct straight and smooth with neatly finished joints, airtight and free from vibration. Internal ends of slip joints shall be made in the direction of flow. Changes in duct dimensions and shape shall be gradual and uniform. Curved elbows, unless otherwise noted, to have centerline radius of at least 1-1/2 times the duct width. Air turns shall be installed in all abrupt elbows and shall be arranged to permit air to make turns without appreciable turbulence and to remain quiet when the system is in operation. Construction of ducts shall be per the details and recommendations of the latest edition of the ASHRAE handbook and U.M.C. The most stringent requirement governs in conflicts. "Duct mate" joint method may be utilized provided all portions of seam/joint materials are provided by "duct mate" and installed in strict compliance with manufacturer's standards.

3.11 FIRE DAMPERS AND FIRE/SMOKE DAMPER A. Install as required by NFPA pamphlet No. 90A, the Uniform Building Code, Uniform Mechanical Code and as required by local codes. Provide a duct access door to each fire damper and service

access when architecture is restrictive. Furnish UL 555S labeled fire and fire/smoke dampers. Refer to architectural drawings for fire resistive ratings of walls, floors, ceilings, etc.

A. Where ductwork or piping is connected to fans, air handling units, pumps, or other equipment that may transmit vibration along the piping or ductwork, connect by means of a flexible connection constructed of fire resistant canvas, flex piping, or other approved method. Connections shall be suitable for pressures developed at the point of installation. Flexible material shall be waterproof for weather exposed ductwork, shall show no visible strain during operating conditions, and shall comply with code requirements. Flex connections for range exhaust systems

Ducts, piping, and conduits penetrating through roof shall have roof flashing compatible with the roofing system. See architectural drawings. In the absence of any other requirements, provide sheet lead type flashing for plumbing vents in built-up roofs, tall cone with EPDM boot for pipe and conduit in single ply membrane roofs, and curbed roof penetrations in all types of roof.

A. Intent: It is the intent of this specification to require that all work, including the inside of equipment, be left in a clean condition with all dust, grease, and construction debris removed. Refe

Piping and connected equipment to be left free of sediments, core sand, grease, etc. C. Clean all exposed surfaces of piping, ducts and hangers, etc., sufficiently to receive paint. Vacuum ducts as required for debris removal.

D. Air systems shall not be operated without filters. Replace the filters or clean permanent type filters just prior to substantial completion. All air systems with disposable filters shall be

ished with one additional set of boxed filters for owner replacement E. Remove and clean all screens, interceptors, strainers, etc., in piping systems just prior to substantial completion.

F. Clean and wipe dry all plumbing fixtures, exposed valves, faucets, and piping, etc. that are exposed just prior to substantial completion. Clean all equipment and fixtures per manufacturer's specifications to avoid scratching finished surfaces. Leave all plumbing fixtures ready to use.

Clean interior and exterior of all air handling equipment of all construction debris. Clean exterior of all exposed ductwork just prior to substantial completion. H. Thoroughly clean all equipment room floors after completion of equipment, pipe and duct cleaning. A condition of final acceptance will be the cleanliness of all exposed systems, equipment,

3.15 EXPANSION COMPENSATION AND SEISMIC PROTECTION

 Examine piping layout and provide anchors or expansion joints required to adequately protect system. B. Install flexible pipe connectors on pipes connected to equipment supported by vibration isolation.

C. Accomplish structural work and provide equipment required to control expansion and contraction of piping, loops, pipe offsets, and swing joints, and provide corrugated bellows type expansion

D. Provide seismic bracing as required by code for all ducts, piping and equipment

A. Major openings in the structure for mechanical work may be shown on the structural drawings: these will be done under the Architectural Division of these Specifications. It is the Contractor's possibility to set necessary sleeves and boxes for pipe and ducts (not shown on the structural drawings) before erection of structure. This Contractor is responsible for the correct size and location of all openings including coordination with the other trades. All sleeves shall be large enough to allow for continuous insulation to pass through the sleeve. B. In mechanical equipment room floors, all pipe sleeves to the Schedule 40 pipe and shall extend 1" above finished floor. In mechanical equipment room floors, all ducts shall have a 4" high

Caulk all pipes and ducts leaving equipment rooms between sleeve and duct or pipe, 1" deep on each side of wall, floor, or roof. Caulk bare pipes and ducts with lead wool. Caulk insulated

pipes with 1- or 2-part polysulphide caulking compound. D. In the same manner as described in Paragraph C above, caulk all other pipes and ducts throughout the building which penetrate walls and floors and roofs this includes pipe and ducts to rooftop

E. All pipes which may be in view shall be finished with chrome floor, wall and ceiling plates, except in equipment rooms.

A. Furnish and install as indicated on the plans and/or as may be necessary for the proper installation of all equipment furnished under this Division, all foundations, bases and supports. Contractor shall be responsible for their correct location and sizes to fit all equipment. Shim and grout between the equipment and its base to align and level. Bolt equipment inertia bases, vibration isolators, and supports to prevent relative movement.

B. Furnish all hangers, anchors, sway bracing, guides, etc., for the various piping and duct systems as required for their proper installation.

A. Install firestopping materials in accordance with their UL and ASTM tested methods.

C. Requirements for specific systems: 1. Cold piping: Includes chilled water, domestic water, storm water and refrigerant: Insulation and vapor barrier shall be continued through wall and firestopping for "insulated piping" shall

2. Hot piping to 250°F includes domestic hot water, steam to 15 psig and heating hot water: The Contractor has the option of continuing the insulation through the penetration and providing irestopping for "insulated piping", or stopping the insulation on either side of the penetration and using firestopping for uninsulated piping" 3. High temperature piping, over 250°F or over 15 psig steam: Contractor shall stop insulation and provide firestopping for "high temperature piping".

A. Heat trace cable shall be installed by a licensed electrician B. Apply the heat trace cable on the pipe after pressure testing.

3. Secure to pipe with methods approved by manufacturer. Apply "Electrically Traced" signs on resistance 20 mega ohms.

D. Test with a 1000 VDC megger minimum resistance 20 mega ohms E. Heat trace shall be sized as follows, based on -20°F ambient, to maintain 40°F pipe temperature:

2. Pipe sizes equal to or greater than 2": 8 w/ft

PART 1 - SECTION [15250][22/230250]--MECHANICAL INSULATION

A. The General Conditions, Special Conditions and Contract Documents are a part of these Specifications. Consult them for further instructions and be governed by the requirements thereunder.

A. Owens Corning, Johns Manville, Armstrong, Keene, and Knauf insulation will be considered equal names to the insulation specified and will be acceptable without prior approval by the

A. This specification allows several methods of insulating valves, fittings, etc., but it is the contractor's and the manufacturer's responsibility to assure themselves that the code authorities will

approve any product to be installed on the project

A. Insulate all [new] heating water, steam and condensate piping, chilled water, refrigerant, [condenser water,] domestic water, domestic hot water, domestic hot water recirculation, and [horizontal] storm and overflow piping with UL approved, white, all service, mineral fiber, snap-on, pipe insulation. Insulate fittings with mineral fiber blanket insulation and pre-molded PVC covers. All materials shall have a smoke developed rating of 50 or less and a flame spread rating of 25 or less. Provide calcium silicate thermal insert at hangers and supports. Insulation shall pass uninterrupted through hangers. Vapor barriers shall be continuous, and sealed with "non-breathing" vapor barrier mastic on piping operating at temperatures below ambient. All raw edges of insulation shall be neatly trimmed and sealed with mastic Insulation thickness below based on insulation conductivity value not exceeding 0.27 Btu\*in/(hr\*ft^2r°F):

1. Heating water (less than 200°F) - NPS 1.25 and less, 1.5" thick; NPS 1.5 and greater, 2" thick. Runouts within 4 feet of terminal and 1" pipe diameter or less, 1" thick.

- 2. Domestic hot water (DHW140°F and less) and domestic hot water recirculation NPS 1.25 and less, 1" thick; NPS 1.5 and greater, 1.5" thick; non-recirculated DHW run-outs within 8 feet of
- 3. Domestic cold water: all pipe sizes 1/2" thick. 4. [Horizontal] storm and overflow piping [and vertical piping within ten equivalent feet of exterior wall and roof penetrations]: all sizes - 1/2" thick.
- 3.2 OUTDOOR PIPING INSULATION
- A. Insulate all new heating water and refrigerant piping UL approved, white, all service, cellular glass [or polyisocyanurate], pre-molded, snap-on, pipe insulation. Insulate fittings with pre-molded insulating fittings. Vapor barriers shall be continuous, and sealed with "non-breathing" vapor barrier mastic on piping operating at temperatures below ambient. All raw edges shall be neatly trimmed and sealed with mastic. Provide stainless steel [or aluminum] jacket [with z-shaped locking seam]. B. Below grade piping systems shall be insulated with pre-molded polyisocyanurate and jacketed with watertight HPDE system listed for direct bury. Insulation thicknesses as follows are based on insulation conductivity not exceeding 0.27 Btu\*in/(hr\*ft^2\*°F):
- 1. Heating water (less than 200°F) NPS 1.25 and less, 2" thick; NPS 1.5 and greater, 3" thick. Runouts within 4 feet of terminal and 1" pipe diameter or less, 1" thick. END OF SECTION
- SECTION [15300][210300]--DESIGN/BUILD FIRE PROTECTION SYSTEMS

PART 1 - GENERAL

- 1.1 PROJECT INCLUDES A. The fire protection system shall be installed under the design/build concept. The system shall be complete and include any and all appurtenances and be fully coordinated with all other building systems. Include five sets of full design calculations with five sets of shop drawings prepared, reviewed, and sealed by a registered Professional Engineer or State of Colorado Class III Technician. Do the work in accordance with the NFPA [13] 13D[13R] recommendations and comply with the recommendations of Insurance Services Offices of Colorado. B. Secure all necessary permits and approvals from the Authority Having Jurisdiction (AHJ).
- RELATED DOCUMENTS
- The General Conditions, Special Conditions and Contract Documents are a part of these Specifications. Consult them for further instruction and be governed by the requirements thereunder GENERAL A. The fire sprinkler contractor shall serve as the Engineer of record for all work performed under this division. If required by the authority having jurisdiction, (AHJ) Submit complete fire sprinkler system shop drawings and hydraulic calculations, generated by contractor. Shop drawings shall be a minimum 1/8" scale, and shall show device and appliance locations, building background information, room occupancy descriptions, door swings, fire ratings and fire protection system layout and details. Shop drawings and hydraulic calculations shall be sealed by a professional Engineer [or Nicet III licensed technician] registered in the state of [Colorado]. Submit shop drawings and hydraulic calculations to the building and fire departments[as a deferred submittal] and obtain their approval before submission to the architect.
- 1.4 COVERAGE
- A. Provide wet pipe fire protection system(s) for the entire facility. Complete drawings, specifications, and details shall be submitted by the fire sprinkler design-build contractor. B. Provide dry pipe fire protection system(s) or anti-freeze fire protection system(s) for those areas subject to freezing, as determined by local jurisdiction. Areas included but not limited to: garage entrances, outside air intake louvers, emergency generator rooms or rooms with similar ventilation requirements; attic space, exterior eaves, etc.
- Confirm hazard classifications with the authority having jurisdiction.
- D. Refer to mechanical plans for fire sprinkler riser locations and on-site fire mains. Field verify piping mains to be utilized for project. REGULATORY REQUIREMENTS
- A. Hydraulic calculations, product data, and shop drawings shall bear the stamp of approval of the authority having jurisdiction. 1.6 SUBMITTALS
- A. Submit shop drawings and product data under provisions of Division 1.
- B. Indicate hydraulic calculations, detailed pipe layout, hangers and supports, pipe materials used, jointing methods, floor and wall penetration seals, valve data and ratings, components and accessories. Coordinate piping layout with all other trades, ceiling heights and maintenance access for all mechanical and electrical equipment.
- C. Submit shop drawings, product data and hydraulic calculations to authority having jurisdiction for approval. Submit proof of approval to Architect/Engineer PART 2 - PRODUCTS
- 2.1 PIPING MATERIALS
- A. Pipe, Fittings and Hangers
- 1. Piping materials shall be listed in NFPA Pamphlet No. 13 and designed for 175 psi working pressure, conforming to ASTM specifications and to have the manufacturer's name or brand, along with the applicable ASTM standard, marked on each length of pipe. AHJ to have final approval of piping and fitting material. 2. All piping shall be supported by means of hangers tested and listed as approved by UL and/or FM.
- 2.2 VALVES
- A. Gate Valves: U.L. approved. Up to 2 inch; screwed, bronze body, solid wedge, O.S. & Y. 175 psi non-shock C.W. service 2-1/2 inch and larger; flanged, iron body, bronze mounted, double disc, O.S.& Y. 175 psi non-shock C.W. B. Butterfly Valves: U.L. approved. Iron body, 175 psi rated, lug type, with position indicator and padlocking device.
- Check Valves: U.L. approved. Iron body, bronze trim, horizontal swing check with renewable bronze seat and rings, 175 psi non-shock C.W. service, up to 2 inch screwed, 2-1/2 inch and larger
- D. Globe Valves: U.L. approved. Bronze screwed, Class 125, 200 lb. W.O.G.
- SPRINKLER HEADS
- A. Suspended Ceiling Type: [Recessed[Flush] Concealed] pendant type with [white] chrome plated] finish, with matching escutcheon. B. Exposed Area Type: Standard upright type with prass[chrome] finish
- C. Sidewall Type: [Chrome plated White] finish with matching escutcheon
- D. Fusible Link: Temperature rated for specific area hazard.
- E. Guards: Finish matching sprinkler head. Provide escutcheons for all heads located in areas with finished ceilings.

PART 3 - EXECUTION

3.1 SERVICE

- A. Furnish water service from the main to a flange inside the building wall. Connect to flange and provide completed systems throughout the building B. All valves to be provided with cast iron valve box, extension top and cover marked with letter "W". C. Piping outside the building shall have not less than four feet six inches of cover from finished grade. Surround pipe with 4" of clean sand. D. Provide backflow preventer assembly at fire entry piping assembly
- INSTALLATION GENERAL A. Locate outside alarm on building wall. Obtain approval of location from Architect and Authority.
- B. Place pipe runs to minimize obstruction to other work
- C. Place piping in concealed spaces above finished ceilings.
- INSTALLATION SPRINKLER HEADS
- A. Coordinate sprinkler head layout with Architect prior to submission of drawings and hydraulic calculations. Obtain from Architect prior to beginning work.
- 3.4 CLEANING
- A. Flush entire piping system of foreign matter. 3.5 SYSTEM TESTS

Hvdrostatically test entire system.

3.9 ZONE SPRINKLER CONTROL ASSEMBLY

contents of the approval manual.

3.12 HYDRAULIC CALCULATIONS

SECTION [15400][220400]--PLUMBING

DOMESTIC WATER PIPING MATERIALS

A. The sprinkler system is based on the following criteria:

1. Light Hazard occupancy with quick response head for all dwelling units.

1. Computer printout sheets or hand calculation sheets with all calculations.

2. Light Hazard occupancy for public, common and office areas.

3. Ordinary Hazard Group I for the parking garage and retail areas.

3.10 SPRINKLER SYSTEM

3.11 INSTRUCTION

END OF SECTION

PART 1 - GENERAL

PART 2 - PRODUCT

A. Piping Outside Building

B. Piping Inside Building

A. Pipe

use 1100<sup>0</sup> solder.

C. Valves and Specialty Schedule

NPS 6 and smaller.

2.3 GAS PIPING MATERIALS

PART 3 - EXECUTION

3.1 PREPARATION

A. Pipe

1.1 RELATED DOCUMENTS

B. Test shall be witnessed by Authority Having Jurisdiction.

- 3.6 PIPE SUPPORTS A. All piping shall be supported by means of hangers tested and listed as approved by UL and/or FM. Sizing, spacing, and installation shall be in accordance with National Fire Protection Association Standard No. 13, "Sprinkler Systems," except as otherwise shown on Drawings or specified herein.
- 3.7 ALARMS
- A. Provide fire entry station consisting of O.S. & Y. gate valve check valve and U.L. approved flow switch and outside weatherproof electric alarms consisting of audible horn and visual light
- B. Alarms shall be connected to every fire sprinkler system[except for 13D systems served from domestic water.] 3.8 DRAWOFFS AND DRAINS

4. Ordinary Hazard Group II for trash rooms, boiler rooms, pool equipment rooms and other similar spaces.

2. Cross reference points of calculations both on the drawings and in the calculations by symbol or number.

9. Press Temp Taps: Universal Controls Corporation #45-PT-N or Sisco BNO-500, 1/2" NPT, Nordel Core.

2.2 SOIL, WASTE, VENT AND STORM DRAIN MATERIALS (to 5 ft. outside building)

- A. Install all sprinkler branches and piping to drain to the main line on supply riser with 2" discharge pipe running to outside. Test line to drain by gravity to prevent freezing.
- Provide and install control assembly for each sprinkler zone. Control assembly shall include shut off valve pressure regulating valve set at 175 psi where pressure exceeds 175 psj, water flow indicator, [pressure relief valve set at 175 psi], test valve, drain valve, sight glass, and orificed union[size of orifice to be the same as sprinkler head orifice].
- A. When required approvals of this work have been obtained, and at time designated by the Owner, demonstrate to the Owner's personnel the operation and maintenance and demonstrate the
- A. The Fire Protection Contractor shall prepare hydraulic calculations for the design of the system and submit for approval. Submittals shall include but not be limited to:
- 1. All pipe outside the building to the service termination inside the building, 4" and larger; class 250, cement lined, cast iron, or ductile iron of manufacturer's recommended thickness class, mechanical joint or push on joint. 3" and smaller; Type "K", hard drawn copper using hard solder having a minimum melting point of 1100F
- 1. Piping from the service termination throughout the rest of the building, for buried lines; Type "K", hard drawn copper, wrought copper fittings and hard solder having a minimum melting point of 1100°F: for non-buried lines, Type "L", hard drawn copper, wrought copper fittings and no lead 95-5 solder. Where copper tube is joined to brass, steel or other dissimilar metal,
- 1. Ball Valves: Bronze, Class 125, 200 psi W.O.G. screwed, or iron body, brass trim, class 125, 200 psi W.O.G. flanged.

A. The General Conditions, Special Conditions and Contract Documents are a part of these Specifications. Consult them for further instructions and be governed by the requirements thereunder

DWV patterns and to fit Schedule 40 pipe. Assembled with ASTM F 656 adhesive primer and ASTM D 2564 solvent cement. Minimum working pressure rating shall be 150 psi at 73 deg F for

- 2. Globe Valves: Bronze, class 150, 300 psi W.O.G. screwed, or iron body, brass trim, class 125, 200 psi W.O.G. flanged. 3. Check Valves: Bronze, Class 125, 200 psi W.O.G. screwed, or iron body, brass trim, class 125, 200 psi W.O.G. flanged.
- 4. Balancing Valves 125 psi w.p. For 250 degree Fahrenheit service tight shutoff, Tour and Anderson STA, Armstrong CBV, Gerand, or Flowset, B&G circuit setter.
- 5. Pressure Gauges: 4-1/2" dial, bronze bourdon tube. Pressure ranges as required. Brass level handled cock and pigtail. U.S. Gauge Figure 5801, Trerice 600, Danton 101 or equivalent. 6. Thermometers: Multi angle with separable socket, red reading mercury, U.S. Gauge MN-9. Trerice B X 9. Duro 9 EZ or equivalent
- 7. Dielectric Unions: Provide dielectric pipe unions at all connections where ferrous material is connected to non-ferrous material.
- 8. Strainers: 250 lb. semi steel or case iron "Y" type flanged with brass screen, or 250 lb. semi steel "Y" screwed with Monel screer
- . Waste and vent lines buried below ground to a distance of 5 ft. from the building; coated, standard weight, cast iron soil pipe and fittings, Class 50 ductile iron pipe and fittings or hubless, cast iron soil pipe with cast iron couplings approved for below grade installation. Or : Schedule 40 solid core PVC pipe according to ASTM D 2665 drain, waste and vent and PVC socket fittings according to ASTM D 2665 and ASTM D 3311 DWV patterns and to fit Schedule 40 pipe. Assembled with ASTM F 656 adhesive primer and ASTM D 2564 solvent cement.
- 2. Waste and Storm lines above ground; standard weight, cast iron soil pipe and fittings, or hubless, cast iron soil pipe and fittings 3. Pressurized Waste: Schedule 40 solid core PVC pipe for pressure applications according to ASTM D 2665 and ASTM D 1785 and PVC socket fittings according to ASTM D 2665 and ASTM D 3311
- 4. Vent piping above ground; standard weight, cast iron soil pipe and fittings, or standard weight, galvanized steel pipe with 150 lb. galvanized malleable iron fittings. Or [designer note: if no
- plenum is present, PVC can be used as vent piping; otherwise, remove the following:]: Schedule 40 solid core PVC pipe according to ASTM D 2665 drain, waste and vent and PVC socket fittings according to ASTM D 2665 and ASTM D 3311 DWV patterns and to fit Schedule 40 pipe. Assembled with ASTM F 656 adhesive primer and ASTM D 2564 solvent cement.
- 1. Schedule 40 black steel pipe, 150 lb. Malleable iron screwed fittings on above ground pipe, welded fittings with all piping coated and wrapped on buried pipe.
- 1. Non-lubricated ball style valve with resilient seats, and adjustable gland packing nut, AGA and UL listed for natural gas service.

- Ream pipe and tube ends. Remove burrs. B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.
- 3.2 INSTALLATION
- Route piping in orderly manner and maintain gradient. C. Install piping to conserve building space and not interfere with use of space.
- Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. F. Provide clearance for installation of insulation and access to valves and fittings.

A. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

- G. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Architect.
- H. Slope water piping and arrange to drain at low points.
- I. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding. J. Prepare pipe, fittings, supports, and accessories not prefinished, ready for finish painting. Refer to Division 9.
- K. Excavate in accordance with Division 2 for work of this Section.
- L. Backfill in accordance with Division 2 for work of this Section
- M. Install valves with stems upright or horizontal, not inverted. 3.3 WATER PIPING
- A. Water Service
- 1. Furnish water service from the main or fire main. Provide local utility District approved meter, valves and bypass installation in accordance with the governing body's regulations. 2. All pipe outside the building: 4 inch and larger; Class 250, cement lined, cast iron or ductile iron of manufacturer's recommended thickness class mechanical joint or push-on joint, 3 inch and smaller Type "K" copper with wrought copper fittings and hard solder with a minimum melting point of 1100degree F
- 3. Provide piping outside the building with not less than four feet six inches of cover from finished grade. Surround pipe with 4" of clean sand. B. Inside Building
- 1. Terminate domestic service inside building wall or above floor slab. Piping to be continued under this section.
- 2. Insulate all buried pipe within the building as per Insulation Section of these Specifications and surround with 4" or clean sand.
- 3.4 SOIL, WASTE, VENT & STORM DRAIN (serving inside bldg. and to 5 ft. outside bldg.) A. General
- 1. Main lines and branches serving the building; provide a uniform fall of not less than: one inch in 4 feet for pipe sizes 2.5" or less, one inch in eight feet for pipe sizes 3" to 6", and one inch in 16 feet for pipe sizes 8" or larger. 2. Cast-Iron horizontal lines suspended from structure; provide hangers at five feet intervals or wherever necessary to insure proper grading. PVC horizontal lines suspended from structure;
- provide hangers at four feet intervals or wherever necessary to insure proper grading. 3. Vertical lines; anchor at each floor level.
- 4. Fixtures; vent in accordance with sound plumbing practice and applicable codes.
- B. Cleanouts . Install full size brass cleanout plugs wherever pipes change direction or otherwise require cleanouts for proper cleaning of entire drainage systems. All wall cleanouts shall be located#[-6"
- above floors in (commercial) areas] and [1'-6" (residential) areas]. Provide cleanouts for the drainage system at every 100 feet; except where a change in pipe direction greater than 45 degrees occurs, install a cleanout at the change of direction. If multiple changes in direction greater than 45 degrees occur within 40 feet of the initial change in direction, the installed cleanout shall serve as the cleanout for the multiple changes in direction within the 40 feet. Cleanouts shall have brass plugs with chrome plated cover plates for walls, scoriated brass cover for floor, flush with floor or wall. Avoid locating floor and wall cleanouts in visible living and sleeping areas. 3.5 FIXTURES AND EQUIPMENT
- A. Fixtures
- 1. Install all fixtures and/or rough in according to the fixture schedule.
- 2. All fixtures shall be secured to walls, floors or countertops in accordance with manufacturer's roughing in and setting requirements to form a rigid installation.
- 3. All pipe at all the fixtures, which may be exposed to view, shall be brass chrome finish, finished with chrome escutcheons where they project from walls and floors. 4. All floor drains, floor sinks, trough drains, sand oil separators, and elevator sump hub receptors connected to the sewer system shall be equipped with trap primers. Provide trap primers with backflow preventers and connect to the nearest cold water piping adjacent to a flushing fixture. Provide electronic trap primers for any areas where the nearest adjacent flushing fixtures are not within a reasonable distance or structural obstructions prevent gravity sloping of trap primer lines. Added cost of electric power for electronic trap primers shall be borne
- by plumbing contractor. Install all trap primer valves and associated systems in accordance with manufacturer's recommendations 5. Stop valves shall be furnished and installed at all fixtures, for all equipment and at rough in locations.
- 6. Vacuum breakers shall be provided at all outlets with hose connections.
- 7. All exposed domestic hot water, domestic cold water, and waste at handicapped accessible fixtures shall be insulated with Truebro "Lav Guard" or equivalent.
- 8. Provide shock arresters at all domestic hot and cold water branches serving fixtures and equipment with quick closing valves. Such fixtures and equipment includes flush valve water closets, dishwashers, ice machines, and clothes washers. Shock arresters shall be constructed with a piston in a sealed copper tube chamber, and approved for installation within walls without access panels. Sioux chief or equivalent. Bellows type not acceptable. B. Valving
- 1. Provide valves on all water and gas piping lines before they leave the basement, crawl space or trench. Install shut off valves and access panels for all plumbing groups of more than 4
- C. Hose Bibbs 1. Provide and install hose bibb in each equipment room where there is a cold water line present.
- D. Sump Pumps
- 1. Provide flange and clamping ring on sumps to clamp in membrane where water-proof membrane occurs. 3.6 FLASHINGS
- A. Flash each vent and stack through roof in accordance with the roofing manufacturer's recommendation
- B. Flash roof drains in accordance with roofing manufacturer's recommendations. Clamp flashing into roof with roofing.
- END OF SECTION
- SECTION [15600][230600]--HEAT GENERATION, REFRIGERATION, AND LIQUID HEAT TRANSFER PART 1 - GENERAL
- 1.1 RELATED DOCUMENTS
- A. The General Conditions, Special Conditions and Contract Documents are a part of these Specifications. Consult them for further instructions and be governed by the requirements thereunder.

2.2 VALVE AND SPECIALTY SCHEDULE

A. Low Temperature (249<sup>9</sup>F and less)

Valve MB12 or equivalent

B. Copper, Low Pressure (124 psi and less)

valve, Milwaukee BB1-100, Hoffman, Sarco or equivale

Designer Note: Note that 50 psi should be the safety valve maximum setting.

2. Globe Valves: Class 150, 300 lb. W.O.G. bronze, solder ends.

3. Check Valves: Class 125, 200 lb. W.O.G. bronze, solder ends.

Milwaukee BB1-350, Hoffman, Sarco or equivalent

equivalent

- PART 2 -PRODUCT 2.1 PIPING MATERIALS
- A. Hydronic piping
- 1. Above grade, up through 2-1/2": schedule 40 steel pipe with malleable iron threaded fittings, or Type "L" copper tube with wrought copper fittings and 95-5 no lead solder.
- 2. Above grade, 3" and larger: Schedule 40 steel pipe with cast iron or steel welding fittings 3. Below grade, up through 1-1/4": Type "K" soft annealed copper tube, single length to avoid fittings, (wrought copper fittings where unavoidable) and 1100 degree Farenheight solder insulate with 1" thick closed cell elastomeric insulation. All buried pipe shall be surrounded with 4" of clean sand.
- 4. Below grade, 1-1/2" and larger: jacketed, pre-insulated piping, with fluid carrier pipe equal to above specification. Rovanco, Ricwell/Perma-pipe or equivalent. B. Drain and receptor piping for combustion condensate--not buried--type: schedule 40 solid-wall PVC, PVC fittings, and [low-voc] PVC cement; buried--type: schedule 80 solid-wall PVC, PVC
- fittings, and [low-voc] PVC cement. All buried pipe shall be surrounded with 4" of clean sand. Provide neutralization systems as recommended by combustion appliance manufacturer. C. Drain pan piping: Not buried: Type "M" copper, wrought copper fittings, and 95-5 solder; Buried: Type "L" copper wrought copper fittings, and 95-5 solder. All buried pipe shall be surrounded
- D. Refrigeration piping--Type "L", ACR grade copper, cleaned, dehydrated, and capped at the factory. Use wrought copper fittings and hard solder having a minimum melting point of 1100 degree F for buried lines, 95-5 solder for non-buried lines. Valves and specialties shall be standard brass or bronze valves for refrigeration service. Buried pipe shall be surrounded by 4" clean sand. E. Snowmelt/Radiant Floor Tubing
- 1. All tubing to be cross-linked polyethylene (PEX) with an oxygen diffusion barrier. Tubing to be rated for continuous operation of 100 psig and a temperature suitable for the specific application. Factory manifolds shall be equipped with loop valves and zone valves per controls requirements. Systems shall be capable of withstanding temperatures 180 degree f to 230 degree f for limited periods of time. Install piping and manifold in accordance with the manufacturer's recommendations.

2. Butterfly Valves: 150 psi W.P. for 250<sup>o</sup>F service, positive tight shut off for flow in either direction. Provide level handle for services through 6", totally enclosed gear actuator 8" and larger.

Full lug iron body to permit retention of valve to one flange only. Rigid back field replaceable resilient seat and bronze or welded nickel edge disc. Extended neck to allow for 2" of

3. Plug Valves: 176 lb. W.O.G., 150 psi W.P. for 250 F service. Eccentric, positive tight shut off valve with permanently lubricated stem-bearing surfaces in upper and lower journals.

sizes 10" and larger. Gears to have adjustable position stop. 1/2" through 4"; DeZurik Figure #435. 5" and larger; DeZurik Figure #118, Homestead Industries Series 1500 series or

5. Check Valves: Class 125, 200 lb. W.O.G. bronze screwed, or iron flanged or 125 psi W.P. iron noiseless check valve for pump discharges, "Muessco" 101-AP, "Miller Streamflow" 153, Gulf

7. Balancing Shut Off Valve: 125 psi W.P. for 250<sup>o</sup> service, tight shut off brass valve, internal mechanism which can be set at balancing position, Illinois Dual Purpose Balancing/Shut Off

9. Traps: All traps to be F and T traps for pressures up to 50 psig, sized with pressure drop not to exceed \_\_\_\_\_ psi when passing capacity called for on drawings. Illinois, Hoffman, Sarco or

12. Pressure Gauges: 4-1/2" dial, bronze bourdon tube. Pressure ranges as required. Brass lever handled cock and pigtail. U.S. Gauge figure 5801, Trerice 600, Danton 101 or equivalent.

4. Balancing Valves: 125 psi W.P. for 250<sup>o</sup> service, tight shut off brass valve with internal mechanism which can be set at balancing position, Illinois Dual Purpose Balancing/Shut Off Valve,

5. Flo-Control Valves, Radiator Valves, Pressure Gauges, Pressure Temperature Taps, Thermometers. Same as specified for steel suitable for use in copper pipe.

insulation when used in insulated lines. Centerline Series LT, Crane #14N, Demco NE, DeZurik 632 L, ITT Grinnell Series 8000, Keystone 228, Stockham LD-311-B33-B Hammond 382 Series or

Provide adjustable position stop for all valves used in balancing service. Level actuated on sizes 5"-8" where pressures do not exceed 100 psi. Gear actuated on higher pressures and on all

- 2. Snowmelt piping shall be placed on 9 inch centers. Tube diameter, nominal 5/8".
- 3. Wirsbo hePEX or approved equivalent 4. Radiant floor piping shall be spaced on 9 inch centers. Wirsbo hePEX or approved equivalent.

1. Gate Valves: Class 125, 200 lb. W.O.G. bronze screwed, or iron body, bronze mounted, flanged.

4. Globe Valves: Class 150, 300 lb. W.O.G. bronze screwed, or Class 125, 200 lb. W.O.G. iron flanged.

13. Press.-Temp. Taps: Universal Controls Corp. #45-PT-N, Sisco ENO-500, 1/2" NPT, Nordel core or equivalent.

1. Gate Valves Low Temperature (249°F and less): Class 125, 200 lb. W.O.G. bronze, solder ends.

8. Radiator Valves: Straight, corner or angle pattern as required, bakelite handle, Illinois Series 65. Hoffman, Sarco, or equivalent.

14. Thermometers: Multi-angle with separable socket, red reading mercury. U.S. Gauge MN-9, Trerice B x 9, Duro 9 EZ or equivalent.

11. Strainers: 250 lb. semi-steel or cast iron "Y" type screwed with Monel screen or flanged with brass screen (for steam or water as required).

6. Flo-Control Valve: Bell & Gossett Flo-Control, Taco Flo-Chek or Hoffman Flo-Control Valve.

10. Unions: 300 lb. W.O.G. malleable iron screwed or 125 lb. cast iron flanged union

NOVEMBER, 2017

PART 3 - EXECUTION

- 1.1 PIPEWORK A. Grade and valves all heating, snowmelt, condenser, and chilled water piping systems with 3/4" hose and end valves to permit complete drainage of the system. All high points in equipment
- rooms shall be vented with automatic air vents piped to convenient drain. All high points in system outside of equipment rooms to be vented with combination automatic/manual air vents to relieve air in the system.
- B. Provide expansion joints or loops on all chilled, snowmelt and heating water piping runs in excess of 50 feet and in accordance with the manufacturer's recommendations. C. Fill beating water system with [30%] propylene glycol/water solution and provide freeze protection down to [10F]; fill snowmelt system with [50%] propylene glycol/water solution and provide freeze protection down to [-20F]. Solution shall be preblended of industrially inhibited propylene glycol and deionized water. Automotive grade antifreeze is not acceptable. The solution shall contain a fluorescent pink dye to facilitate easy leak detection. Approved coolant manufactures are Interstate Chemical Co (NFP 30%), Dow Chemical Co (Dowfrost HD 30%), or approved equal.
- D. All buried pipe to be insulated as per Insulation Section of these Specifications. All buried pipe shall be surrounded by 4" clean sand.
- E. Valve off each individual piece of radiation or equipment with valve for shut off service on supply, valve for shutoff and balancing service on return.
- F. Route piping in orderly manner, plumb and parallel to building structure, and maintain gradient. G. Install piping to conserve building space, and not interfere with use of space and other work.
- H. Group piping whenever practical at common elevations.
- I. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- J. Provide clearance for installation of insulation, and access to valves and fittings.
- K. Slope piping and arrange systems to drain at low points. Use eccentric reducers to maintain top of pipe level. L. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- M. Install valves with stems upright or horizontal, not inverted.
- 1.2 SNOWMELT PANELS
- A. Connections between the main and snowmelt manifold box shall have swing joints before turning up into box and arranged in a manner to allow for expansion. B. Panels embedded in concrete shall be graded level and laid in a manner that will allow concrete to envelope the pipe.
- C. Panels embedded in sand beneath pavers shall be graded level and laid in a manner that will allow concrete to envelope the pipe.
- 1.3 RADIANT PANEL (PANELS EMBEDDED IN CONCRETE).
- A. Connections between the main and radiant panel manifold box shall have swing joints before turning up into box and arranged in a manner to allow for expansion. B. Panel shall be graded level and laid in a manner that will allow concrete to envelope the pipe.
- 1.4 VALVING OF BRANCHES
- A. Valve all lines, except drain pipes, before they leave the basement, crawl space or trench.
- 1.5 ALITOMATIC COLD WATER FILL ASSEMBLY
- A. Provide a pressure reducing valve, reduced pressure double check back flow preventer, test cocks, strainer, vacuum breaker, and valved by-pass. 1.6 MANUAL AIR VENTS
- A. Provide short vertical sections of 2" diameter pipe to form air chamber, with 1/8" brass needle valve at top of chamber.
- 1.7 PUMPS
- A. Install pumps in accordance with manufacturer's instructions.
- B. Provide access space around pumps for service. Provide no less than minimum as recommended by manufacturer.
- C. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of idpoint of published maximum efficiency curve
- D. Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump such that no weight is carried on pump casings. For base mounted pumps, provide supports under elbows on pump suction and discharge line sizes 4 inches and over.
- E. Provide line sized shut-off valve on pump suction, and line sized non-slam soft seat check valve shutoffs and balancing valve on pump discharge.
- F. Provide air cock and drain connection on horizontal pump casings.
- G. Provide drains for bases, piped to and discharging into floor drains.
- H. Lubricate pumps before start-up.
- I. Install base mounted pumps on concrete base, with anchor bolts, set and level, and grout in place.
- 1.8 BOILERS A. Provide field representative for starting unit and training operator.
- B. Provide combustion test for each boiler and submit report. Test shall include boiler firing rate, overfire draft, gas flow rate, heat input, burner manifold gas pressure, percent carbon monoxide (CO), percent oxygen (OX), percent excess air, flue gas temperature at outlet, ambient temperature, net stack temperature, percent stack loss, percent combustion efficiency, and heat
- 1.9 CHILLERS
- A. Align chiller package on steel or concrete foundations.
- B. Arrange piping for easy dismantling to permit tube cleaning
- C. Supply service of factory trained representative for a period of one day to supervise testing, dehydration and charging of machine, start-up, and instruction on operation and maintenance to D. Supply initial charge of refrigerant and oil.
- E. Demonstrate system operation and verify specified performance.
- END OF SECTION
- NOVEMBER, 2017
- SECTION [15800][230800]--AIR DISTRIBUTION
- PART 1 GENERAL
- 1.1 RELATED DOCUMENTS A. The General Conditions, Special Conditions and Contract Documents are a part of these Specifications. Consult them for further instructions and be governed by the requirements thereunder.
- 1.2 DEFINITIONS
- A. Duct Sizes: Outside sheetmetal dimensions. Sheetmetal dimensions shown on drawings account for duct liner.
- B. Low Pressure: Two classifications
- 1. Up to ½" water gauge (WG) positive or negative static pressure and velocities less than 2,000 fpm to be SMACNA Duct Pressure Class 1/2" w.g.
- 2. Over ½" up to 2" WG positive or negative static pressure and velocities less than 2,000 fpm to be SMACNA Duct Pressure Class 2" w.g.
- C. High Pressure:
- 1. Over 2" WG up to 4" WG positive or negative static pressure.
- PART 2 PRODUCTS 2.1 MATERIALS
- A. Ductwork Materials
- 1. All ductwork to be galvanized steel except as otherwise called for. G60 galvanized sheet steel; lock forming quality; constructed to the latest edition of SMACNA "HVAC Duct Construction Standards"; +/- 1" WC pressure classification, seal class "C"; with galvanized steel fasteners, anchors, angles, straps, etc.
- 2. Seal all seams (longitudinal and transverse) airtight with united McGill "Uni-Grip" UL listed, water based, non-hardening, elastic sealant or equivalent. Tape not allowed. 3. Round duct shall be spiral seam, galvanized steel. Die stamped or 5 core elbows. "Snap-Lock", longitudinal seam duct, or adjustable fittings are acceptable on individual grille/diffuser
- 4. All laundry exhaust ducts, exhaust ducts serving restrooms/bathrooms, and dishwasher hood exhaust ducts to be watertight construction. Laundry exhaust ducts routed through unheated spaces shall be insulated. 5. Exhaust ducts from range hoods exposed to view; stainless steel with ground and polished welded joints. Concealed ductwork; 14 gauge black steel with angle joints, welded, watertight
- construction up to the roof. Ducts above the roof; 18 gauge galvanized steel, watertight construction. Provide back draft dampers in all exhaust ducts or at exhaust fans. 6. Exterior ductwork: Provide exterior ductwork to these specifications where exposed to weather a. Ductwork Support Materials: Except as otherwise indicated, provide galvanized steel fasteners, anchors, rods, straps, trim, and angles for support of ductwork. Provide equipment
- support rail type or equivalent roof system compatible weatherproof interface at all roof supports. b. Duct Seal System: Equivalent to United McGill "Uni-Weather" UL listed outdoor sealant. Fire rating: UL listed. Contractor may propose alternate sealing systems. "Ductmate" and similar flanged joining systems are acceptable if an additional bead or silicone based outdoor sealant is applied all around each joint, and the top flange is protected by a sheet metal
- c. Construct and seal ducts to three inch static pressure standards. d. Do not line exterior duct. Insulate supply and return duct with two layers of1-1/2 inch thick, min. R-12 closed cell elastomeric insulation. Stagger seams and joints. Provide full adhesive coat on duct surface and between insulation layers. Coat finished surface with white protective coating as recommended by the insulation manufacturer. Install 18 Ga. galvanized, pitched, sheet metal cap secured to duct and supports over top of insulation for positive drainage off horizontal surface.
- B. Return Air Plenum:
- 1. The HVAC system will use the space above the ceiling on each floor as a return air plenum. Conform to the requirements of NFPA and local code requirements for all material installed in the return air plenum. Provide a complete return air path between all return air devices (grilles etc.) and their respective HVAC unit. Maximum velocity of return air in plenum shall
- generally not exceed 250 feet per minute, nor exceed 750 feet per minute at any cross-section of the return air path.
- 2.2 LOW PRESSURE DUCTWORK (1/2 and 2 inch Classification)
- A. Fabricate and support in accordance with SMACNA Duct Construction Standards and ASHRAE handbooks, except as indicated. Provide duct material, gages, reinforcing, and sealing for ½" and 2" operating pressures. B. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except
- by written permission.
- C. Construct Ts, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, providea[r foil] turning vanes. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fiber insulation.
- D. Increase duct sizes gradually, not exceeding 19 divergence wherever possible. Divergence upstream of equipment shall not exceed 30; convergence downstream shall not exceed 49.
- E. Provide easements where low pressure ductwork conflicts with piping and structure. Where easements exceed 10 percent duct area, split into two ducts maintaining original duct area. F. Connect flexible ducts to metal ducts with draw bands and sheet metal screws.
- G. Use crimp joints with or without bead for joining round duct sizes 8" and smaller with crimp in direction of air flow. Use mechanical joints for exposed round duct joints.
- H. Use double nuts and lock washers on threaded rod supports
- 2.3 BACKDRAFT DAMPERS A. PROVIDE COUNTER WEIGHT TYPE BACKDRAFT DAMPERS IN ALL DUCTS OPENING TO THE OUTSIDE RUSKIN MODEL CBS-7 OR APPROVED EQUAL.
- 2.4 VOLUME CONTROL DAMPERS
- A. GALVANIZED SHEET METAL WITH VENTFABRICS, INC., VENTLOCK OR EQUAL OPERATING HARDWARE. FOR ACCESSIBLE DAMPERS, PROVIDE NO. 620, 635 OR 637 DIAL REGULATORS, NO. 635 OR 637 SQUARE END BEARING, AND NO. 635 SPRING END BEARING, AS APPLICABLE. FOR INACCESSIBLE DAMPERS, PROVIDE NO. 666 CONCEALED DAMPER REGULATOR, WITH PAINTED COVER (COLOR BY
- ARCHITECT) AND BEARINGS AS ABOVE. FOR MEDIUM PRESSURE DUCTS, PROVIDE NO. 635 HIVEL DIAL REGULATOR AND NO. 609 HIVEL END BEARING FOR ACCESSIBLE DAMPERS.
- Retain "Manufacturers" Subparagraph and list of manufacturers below to require products from manufacturers listed or a comparable product from other manufacturers. 2.5 FIRE DAMPERS
- A. 1-1/2 hr. or 3 hr. fire rating or as required to protect rating shown on Architectural floor plan with sleeve where construction fire rating requires. Meeting NFPA 90 A requirements, provide a UL listedshutter, curtain type blades, and replaceable fusible link. Use type "B" dampers at all locations where space permits or type "C" dampers for round or oval ducts. Use type "A" dampers only where space will not allow type "B".
- 2.6 FIRE/SMOKE DAMPER
- A. RUSKIN, AIR BALANCE, INC. OR EQUAL, UL LABELED AND IN CONFORMANCE WITH NFPA 90A. ALL DAMPERS TO BE OUT OF AIRSTREAM, TYPE B OR C RATED FOR A MINIMUM OF 1-1/2 HOURS (2 HOURS WHERE NOTED), UL LABEL AND AS APPROVED BY LOCAL AUTHORITIES. MOUNT DAMPERS WITHIN 16-GAGE SLEEVES HELD IN PLACE WITH RETAINING ANGLES. COORDINATE LOCATION OF ACCESS PANELS TO PERMIT EASY ACCESS TO FUSIBLE LINK.
- 2.7 FLEXIBLE DUCT CONNECTIONS
- A. Fabricate in accordance with SMACNA Duct Construction Standards, and as indicated.
- B. UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 36 oz per sq. yd, approximately 6 inches wide, crimped into metal edging strip. 2.8 TURNING VANES
- A. SMACNA SMALL DOUBLE VANE, PLATE NO. 22B OR EQUAL, WITH AIRFOIL BLADES FOR DUCTS 36" OR LESS IN WIDTH; SMACNA FIG. 3.23 FOR DUCTS GREATER THAN 36" WIDE. FOR MEDIUM
- PRESSURE DUCTS: SMACNA FIG. 3-23
- 2.9 DUCT ACCESS DOORS
- A. Fabricate in accordance with SMACNA Duct Construction Standards and as indicated. B. Coordinate locations with Architect prior to fabrication.
- C. Fabricate rigid and close-fitting doors of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum one inch thick insulation with sheet
- D. REINFORCED, GALVANIZED SHEET METAL WITH AIRTIGHT GASKETS RATED FOR PRESSURES AND SERVICE INTENDED. MILCOR OR EQUAL. PROVIDE HINGES AND VENTFABRICS, INC. VENTLOCK LATCHES.
- E. DUCT ACCESS PANELS FOR HAND ENTRY ONLY: NO. 90 SASH TYPE LATCH. MINIMUM SIZE: 18" X 18".
- F. DUCT AND PLENUM ACCESS DOORS FOR BODY ENTRY: NO. 310 LATCH, OPERABLE FROM BOTH SIDES OF DOOR. MINIMUM SIZE: 18" X 18". G. Access doors with sheet metal screw fasteners are not acceptable.
- 2.10 LOW VELOCITY FLEXIBLE DUCTS
- A. Flexible ductwork shall have an outer jacket of fire retardant polyethylene vapor barrier material, uniform layer of fiberglass insulation, high-strength galvanized steel helix encapsulated in reinforced "rip stop" aluminum laminate interior core, UL listed and labeled, class 1 air duct. Working pressure rating: positive 6", negative 4". Flexmaster Type 5 or equivalent. Submit samples to determine equivalence
- 2.11 TWIST-IN FITTING FOR ROUND DUCT CONNECTION
- A. Factory fabricated galvanized for insulated ducts, steel adaptor plate on glass fiber ducts. Butterfly damper with quadrant operator and lock nut on all applications except VAV systems upstream of VAV box
- 2.12 VOLUME EXTRACTORS (ALL RECTANGULAR TAKEOFFS) A. Steel or aluminum construction with vanes on 2 inch centers, gauge operated. Manual operator attached to branch duct. Carnes 1250, Titus AG-225, T & B VLR, Anemostat DT2M, Krueger EX-88A, Agitair, Branchtrol S-2, J & J EX 9, Metalaire EX-1 or equivalent.
- 2.13 INSULATION A. Type A: Flexible glass fiber - all interior ducts shall be insulated on the outside with flexible glass fiber blanket. Microlite Type 100 - 2 inches thick Fiber Glass Duct Wrap Insulation per ASTM C 553 Type I or approved equal with a minimum installed R-Value of 6 for interior ductwork. The FSK facing should have a permeance of .02 or less. Refer to schedule in Part 3.

A. Mineral-Fiber Board: 4 inches thick and 3-lb/cu. ft. nominal density. 3.8 FLEXIBLE DUCTS 3.9 DUCT SYSTEM ADJUSTING AND CLEANING A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment which may be harmed luctwork for cleaning purposes END OF SECTION

PART 1 - GENERAL

1.2 SUMMARY

1.3 DEFINITIONS

1.4 SUBMITTALS

1.5 OUALITY ASSURANCE

intended use.

1.6 COORDINATION

PART 2 - PRODUCTS

2.1 MANUFACTURERS

2.2 ELECTRONIC SENSORS

B. RTDs and Transmitters:

C. Humidity Sensors:

1.1 RELATED DOCUMENTS

B. I/O: Input/output.

F. PC: Personal computer.

3.6 ACCESS DOORS

3.7 DUCT INSULATION

D. Liner Application

F. Insulation Schedule

without twisting or distortion.

B. Type B: Flexible glass fiber; All sheet metal shall be lined with Factory edge coated Johns Manville Permacote II or approved equal. The liner shall meet ASTM C-1071 and NFPA 90A and 90B with an Air Stream Acrylic Coating, which contains an immobilized, EPA Registered, anti-microbial agent as tested in accordance with ASTM G-21 and G-22. The liner shall have an R-Value of 6 and a NRC of .70 [tested in accordance to ASTM C 423 "Type A Mounting"]. Maximum velocity - 6000 fpm. Adhesive shall conform to ASTM C 916, with liner adhered to the Duct with 90 percent minimum coverage. Pin placement per manufacturer's data sheet Johns Manville AHS-197]. Shop or field cuts shall be liberally coated with Johns Manville Super Seal Edge Treatment or approved equal. Note: when velocity exceeds 4000 fpm, use metal nosing on every leading edge. Refer to schedule in Part 3.

Type C: All exterior ducts shall be insulated with mineral or glass fibers bonded with a thermosetting resin. Johns Manville or equivalent, 4" thick complying with ASTM C 553, Type II and ASTM C 1290. The minimum installed insulation R-value for exterior ductwork shall be 12. Refer to schedule in Part 3. D. INSULATION CONDUCTIVITY VALUE shall NOT EXCEED 0.27 BTU\*IN/(HR\*FT^2\*°F)

E. Adhesives: Waterproof fire-retardant type.

F. Joint Tape: Glass fiber cloth, open mesh. G. Tie Wire: Annealed steel, 16 gage.

H. Any of the following manufacturers may be used in the base bid: 1. Ultralite Number 200

2. Pittsburgh Plate Glass "Textrafine"

Owens Corning "Aeroflex"

3.1 ACCESSORIES INSTALLATION

Certainteed

PART 3 - EXECUTION

A. Install accessories in accordance with manufacturer's instructions

breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.

B. Provide balancing dampers on all branch take-offs from the main and where indicated. C. Provide fire dampers and fire/smoke dampers at locations indicated, and where ducts and outlets pass through fire rated components. Install with required perimeter mounting angles, sleeves,

D. Demonstrate re-setting of fire and fire/smoke dampers to authorities having jurisdiction and Owner's representative.

E. Provide backdraft dampers on exhaust fans and/or exhaust ducts at outside wall penetrations and where indicated. F. Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.

G. Provide duct access doors for inspection and cleaning before and after automatic dampers at fire dampers, and elsewhere as indicated. Provide minimum 8" x 8" size for hand access, 18" x 18" size for shoulder access, and as indicated.

H. Provide duct test holes where indicated and required for testing and balancing purposes.

3.2 GRILLE, REGISTER, DIFFUSER AND LOUVER INSTALLATION A. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.

B. Install diffusers to ductwork with air tight connection C. Paint ductwork visible behind air outlets and inlets matte black.

3.3 DUCTWORK INSTALLATION

A. Provide ¼" galvanized mesh screen on all combustion air ducts or openings, and all open end return and exhaust ducts.

B. Duct sizes shown on the drawings are outside (sheet metal) duct dimensions. Ductwork shall be furnished and installed in accordance with SMACNA Low Pressure (STD) Duct Construction itandards and High Pressure (STV) Duct Construction Standards Manual. C. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with

D. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

E. Slope underground ducts to plenums or low pumpout points at 1:500. F. Connect terminal units to ducts with one foot maximum length of flexible duct. Do not use flexible duct to change direction.

spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.

G. Connect diffusers to low pressure ducts with 5 feet maximum length of flexible duct. Hold in place with strap or clamp.

H. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system. I. When low pressure supply air ducts are not located in the conditioned room itself, these ducts shall be sealed as per SMACNA Class B Standards. This Standard includes the sealing of all transverse joint and fitting connections and snap lock seams. Not more than one unsealed longitudinal seam on the perimeter shall be allowed. All ductwork shall be sealed by using mastic or mastic-plus type. The sealer shall be non-toxic, non-combustible and non-flammable and have approved fire rating for sealing ducts in plenums as required by appropriate authority having

J. Do not install takeoffs on elbows or other points of the system where air velocity is not uniform. K. Suspend ducts from structure with proper hangers at horizontalintervals, at each floor and wherever necessary, all as required by SMACNA. Make all duct connections to motor driven equipment with flexible connections, unless specifically indicated otherwise on the plans. Install turning vanes in all 90° square elbows, whether shown on Plans or not. Install manual splitter dampers and/or opposed blade dampers in all velocity duct division and splits where shown. Splitter dampers shall have push rod and external locking device. Install adjustable volume extractors in low velocity duct takeoffs with linkage for external operator.

L. Make all duct offsets with 15 degree transitions. Sharper transitions can be made only when space does not allow 15 degree offsets, 30 degree offsets minimum. M. Make all radius elbows with radius of one and one half times the diameter or width of duct and an inside throat radius of one times the diameter or width.

N. Make all ducts on indoor cooling towers and ducts exposed to weather; watertight by welding all joints and connections or by using duct sealants recommended by the manufacturer. 3.4 DUCTWORK APPLICATION SCHEDULE

A. Low pressure supply, return, relief, and general exhaust ducts to be steel. B. Kitchen hood exhaust to be steel or stainless steel, depending on application.

3.5 FIRE AND FIRE/SMOKE DAMPERS

A. Install fire dampers with code approval sleeves in all duct openings where shown on drawings. Installed in accordance with the U.L. requirement with access door in duct. Use frame CR for all round ducts. Use frame B for rectangular and square ducts.

A. Provide sheet metal access of the size as noted or as required for proper access to the equipment. Access doors shall occur on each side of each coil and filter bank, inlet to each fan and wherever else shown. Construct these doors of No. 22 gauge galvanized metal. Provide doors with a flat iron or angle iron stiffening frame and so constructed that they can be operated

B. Provide duct opening at each door with a continuous reinforcing galvanized bar with a sponge rubber gasket to make the door airtight. Provide doors with not less than two galvanized iron hinges and latches sized to suite door size, each hinge having a bronze pin. Construct all parts of doors of galvanized iron and make airtight. Doors shall be double thickness with 1" insulation between sheet metal walls when located in insulation duct. Access doors shall open against air pressure.

A. Install materials in accordance with manufacturer's instructions. B. Provide insulation with vapor barrier.

C. Exterior Insulation Application: 1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.

2. Install without sag or underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive. Stop and point insulation around access doors and damper operators to allow operation without distributing wrapping.

1. Adhere insulation with adhesive for 100 percent coverage. Secure insulation with mechanical fasteners on 15" centers maximum on top and side of ductwork with dimension exceeding 20" Seal and smooth joints. Do not use nail-type fasteners. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.

2. Ductwork dimensions indicated are net outside dimensions required for air flow. Ductwork sizes to allow for insulation thickness. E. Continue insulation with vapor barrier through penetrations.

1. Supply-air duct and plenum insulation shall be one of the following:

A. Mineral-Fiber Blanket: 1-1/2 inches thick and 0.75-lb/cu. ft. nominal density. B. Duct Liner: 1 inch thick and 0.75-lb/cu. ft. nominal density. 2. Return-air duct and plenum insulation and exhaust ducts within 10ft of the exterior shall be one of the following: A. Mineral-Fiber Blanket: 1-1/2 inches thick and 0.75-lb/cu. ft. nominal density. B. Duct Liner: 1 inch thick and 0.75-lb/cu. ft. nominal density. 3. Outdoor-air duct and plenum insulation shall be one of the following:

A. Mineral-Fiber Board: 2 inches thick and 3-lb/cu. ft. nominal density. B. Duct Liner: 1 inch thick and 0.75-lb/cu. ft. nominal density.

4. Exterior supply-, return-, and outdoor-air duct insulation shall be one of the following:

A. Attach all flexible ducts inner to duct connectors, diffuser necks, or ductwork with stainless steel worm driven clamp. Tape outer vapor barrier securely over clamp with vapor barrier tape. All flexible ducts shall not exceed eight feet in length

by excessive dirt with temporary filters, or bypass during cleaning. B. Clean duct systems with high power vacuum machines. Protect equipment which may be harmed by excessive dirt with filters, or bypass during cleaning. Provide adequate access into

SECTION 15900 - HVAC INSTRUMENTATION AND CONTROLS

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

A. This Section includes control equipment for HVAC systems and components, including control components for terminal heating and cooling units not supplied with factory-wired controls.

A. DDC: Direct digital control.

C. BACnet: A control network protocol system allowing for interoperable controllers to communicate, share information, and perform global control strategies

D. LonWorks: A control network technology platform for designing and implementing interoperable control devices and networks. E. MS/TP: Master slave/token passing.

G. PID: Proportional plus integral plus derivative. H. RTD: Resistance temperature detector

WEB SERVER: A PC, Server, or Control Panel that when connected to an Ethernet Network with Internet access allows remote users to graphically interface with the control system without the need for proprietary software loaded on their PC.

A. Drawings: Submit shop drawings of equipment, control panels and wiring diagrams to the Consulting Mechanical Engineer for review.

A. Installer Qualifications: Automatic control system manufacturer's authorized representative who is trained and approved for installation of system components required for this Project. B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for

A. Coordinate location of thermostats, humidistats, and other exposed control sensors with plans and room details before installation. Comply with local building codes and ADA requirements for thermostat and humidistat height above finished floor

1. Mount all stats at 48" AFF In "accessible" areas, 46" AFF In other areas, unless noted otherwise. Coordinate location with wall finish, and to avoid casework, furniture, door swings, heat sources, and exterior walls. Notify Engineer of any conflicts prior to beginning thermostat installation.

B. Coordinate supply of conditioned electrical branch circuits for controllers, control panels, and web server equipment

C. Coordinate equipment with Division 26 Section "Electrical Power Monitoring and Control" to achieve compatibility of communication interfaces. D. Coordinate equipment with Division 26 Section "Motor-Control Centers" to achieve compatibility with motor starters and annunciation devices.

A. Acceptable manufacturers are: Johnson Control Company, Anderson, Trane, Honeywell, Alerton or Barber Colman. Others must be accepted by the Consulting Mechanical Engineer before bidding. It is recognized that packaged equipment comes with other names on controls and that some functions are accomplished with other named components. This specification does not intend to prohibit this practice.

A. Description: Vibration and corrosion resistant; for wall, immersion, or duct mounting as required. 1. Accuracy: Plus or minus 0.5 deg F at calibration point.

2. Wire: Twisted, shielded-pair cable. 3. Outside-Air Sensors: Watertight inlet fitting, shielded from direct sunlight. 4. Room Security Sensors: Stainless-steel cover plate with insulated back and security screws.

1. Accuracy: Plus or minus 2 percent at calibration point. 2. Wire: Twisted, shielded-pair cable.

3. Outside-Air Sensors: Watertight inlet fitting, shielded from direct sunlight. 4. Room Security Sensors: Stainless-steel cover plate with insulated back and security screws. 1. Accuracy: 2 percent full range with linear output.

2. Room Sensor Range: 20 to 80 percent relative humidity. 3. Duct Sensor: 0 to 100 percent relative humidity range with element guard and mounting plate.

4. Outside-Air Sensor: 0 to 100 percent relative humidity range with mounting enclosure,.

D. Pressure Transmitters/Transducers: 1. Static-Pressure Transmitter: Nondirectional sensor with suitable range for expected input, and temperature compensated.

a. Accuracy: 2 percent of full scale with repeatability of 0.5 percent. b. Output: 0 to 10 volts or 4 to 20 mA.

c. Building Static-Pressure Range: 0- to 0.25-inch wg dip switch selectable

d. Duct Static-Pressure Range: 0- to 5-inch wg dip switch selectable

2. Water Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum150-psig (1034-kPa) operating pressure; linear output 0 to 10 volts or 4 to 20 mA. 3. Water Differential-Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum 150-psig (1034-kPa) operating pressure and tested to 300-psig (2070-kPa);

linear output 0 to 10 volts or 4 to 20 mA.

4. Differential-Pressure Switch (Air or Water): Snap acting, with pilot-duty rating and with suitable scale range and differential. 5. Pressure Transmitters: Direct acting for gas, liquid, or steam service; range suitable for system; linear output 0 to 10 volts or 4 to 20 mA.

2.3 STATUS SENSORS

A. Status Inputs for Fans: Self-powered, solid-state current switch with adjustable trip current, selected to match current and system output requirements. B. Status Inputs for Pumps: Self-powered, solid-state current switch with adjustable trip current, selected to match current and system output requirements.

C. Status Inputs for Electric Motors: Comply with ISA 50.00.01, current-sensing fixed- or split-core transformers with self-powered transmitter, adjustable and suitable for 175 percent of rated motor current. D. Electronic Valve/Damper Position Indicator: Visual scale indicating percent of travel and 2- to 10-V dc, feedback signal.

2.4 ACTUATORS A. Electric Motors: Size to operate with sufficient reserve power to provide smooth modulating action or two-position action.

B. Electronic Actuators: Direct-coupled type designed for minimum 60,000 full-stroke cycles at rated torque. 1. Valves: Size for torque required for valve close off at maximum pump differential pressure.

2. Dampers: Size for running torque calculated as follows:

a. Parallel-Blade Damper with Edge Seals: 7 inch-lb/sq. ft. (86.8 kg-cm/sq. m) of damper. b. Opposed-Blade Damper with Edge Seals: 5 inch-lb/sq. ft. (62 kg-cm/sq. m) of damper.

c. Parallel-Blade Damper without Edge Seals: 4 inch-lb/sq. ft (49.6 kg-cm/sq. m) of damper.

d. Opposed-Blade Damper without Edge Seals: 3 inch-lb/sq. ft. (37.2 kg-cm/sq. m) of damper.

f. Dampers with 3- to 4-Inch wg (750 to 1000 Pa) of Pressure Drop or Face Velocities of 2500 to 3000 fpm (13 to 15 m/s): Increase running torque by 2.0.

3. Coupling: V-bolt and V-shaped, toothed cradle.

4. Overload Protection: Electronic overload or digital rotation-sensing circuitry.

5. Fail-Safe Operation: Mechanical, spring-return mechanism. Provide external, manual gear release on nonspring-return actuators. 6. Power Requirements (Two-Position Spring Return): 24V ac.

7. Power Requirements (Modulating): Maximum 10 VA at 24-V ac or 8 W at 24-V dc.

8. Proportional Signal: 0- to 10-V dc or 4 to 20 mA,

2.5 CONTROL VALVES

A. Control Valves: Factory fabricated, of type, body material, and pressure class based on maximum pressure and temperature rating of piping system, unless otherwise indicated.

2.6 CONTROL CABLE A. Electronic and fiber-optic cables for control wiring are specified in Division 26 Section "Voice and Data Communication Cabling."

PART 3 - EXECUTION 3.1 INSTALLATION

3.3 DEMONSTRATION

END OF SECTION

"Demonstration and Training."

A. Install software in control units and operator workstation(s). Implement all features of programs to specified requirements and as appropriate to sequence of operation.

B. Connect and configure equipment and software to achieve sequence of operation specified. C. Install labels and nameplates to identify control components according to Division 22/23 Section "Mechanical Identification."

D. Install hydronic instrument wells, valves, and other accessories according to Division 22/23 Section "Hydronic Piping."

E. Install refrigerant instrument wells, valves, and other accessories according to Division 22/23 Section "Refrigerant Piping." F. Install duct volume-control dampers according to Division 22/23 Sections specifying air ducts.

G. Install electronic and fiber-optic cables according to Division 26 Section "Voice and Data Communication Cabling." 3.2 ELECTRICAL WIRING AND CONNECTION INSTALLATION

A. Install raceways, boxes, and cabinets according to Division 26 Section "Raceways and Boxes."

3. Install concealed non-plenum rated cable in raceway.

B. Install building wire and cable according to Division 26 Section "Conductors and Cables."

C. Install signal and communication cable according to Division 26 Section "Voice and Data Communication Cabling." 1. Conceal cable, except in mechanical rooms and areas where other conduit and piping are exposed. 2. Install exposed cable in raceway.

e. Dampers with 2- to 3-Inch wg (500 to 750 Pa) of Pressure Drop or Face Velocities of 1000 to 2500 fpm (5 to 13 m/s): Increase running torque by 1.5.

Bundle and harness multiconductor instrument cable in place of single cables where several cables follow a common path 5. Fasten flexible conductors, bridging cabinets and doors, along hinge side; protect against abrasion. Tie and support conductors. 6. Number-code or color-code conductors for future identification and service of control system, except local individual room control cables 7. Install wire and cable with sufficient slack and flexible connections to allow for vibration of piping and equipment D. Connect manual-reset limit controls independent of manual-control switch positions. Automatic duct heater resets may be connected in interlock circuit of power controllers.

E. Connect hand-off-auto selector switches to override automatic interlock controls when switch is in hand position A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain HVAC instrumentation and controls. Refer to Division 1 Section

B. From 30 days of substantial completion, turn over 1 set of the following documents to owner's agent and one set to specifying engineer: 1. Point Trends of all zone temperatures vs. setpoints sampled hourly for all scheduled hours of occupancy for first 30 days of operation from substantial completion. 2. Point Trends of central hot water supply temperature vs. setpoint vs. outside air temperature sampled hourly for the first 30 days of operation from substantial completion.

3. Point Trends of central chilled water supply temperature vs. setpoint vs outside air temperature sampled hourly for the first 30 days of operation from substantial completion. 4. Point Trends of all air handling unit supply temperatures vs. setpoint sampled hourly for all scheduled hours of occupancy from substantial completion.

\_\_\_\_

EXISTING AREA SERVED: (272 BTU/SF) 3500 SF – SIDEWALK PROPOSED NEW SNOWMELT AREA: ADD 2600 SF – SIDEWALK/ASPHALT NEW TOTAL = 6100 SF (174 BTU/SF)

<u>(E) PUMP</u>

\_\_\_\_\_GPM, \_\_\_\_FT

EXISTING SNOWMELT AREA (3500 SF)

MECHANICAL SITE PLAN SCALE: 1" = 20'-0"

1 FIRST LEVEL AREA A DEMO MECHANICAL PLAN SCALE: 1/8" = 1'-0"

DEMOLITION NOTES: 1. ADDITIONAL STORM, HYDRONIC, DOMESTIC, WASTE AND VENT PIPING MAY BE ROUTED IN SPACE THAT IS NOT REPRESENTED, BUT IS TO REMAIN. OTHER SYSTEMS MAY EXIST WITHIN THE SPACE THAT ARE NOT REPRESENTED ON THESE DRAWINGS; MODIFICATIONS TO THESE SYSTEMS ARE NOT ANTICIPATED.

- BELOW.
- USED FOR LATER CONNECTION. 8. SEAL ALL OPEN DUCTS DURING CONSTRUCTION TO MITIGATE DUST AND DEBRIS FROM SYSTEM. CAP DUCTWORK IN
- RECONNECTED. WATER PIPING.
- WHAT IS FOUND IN THE FIELD.
- DEMO NOTES

SHEET WAS OBTAINED, IN PART, FROM HISTORIC DESIGN DRAWINGS. ONLY ACCESSIBLE FOR VISUAL CONFIRMATION DURING DESIGN PROCESS.

3. PROVIDE PRELIMINARY TESTING OF EXISTING HYDRONIC SYSTEMS. MEASURE CURRENT FLUID FLOW RATE THROUGH ALL EXISTING COILS, RADIANT, AND SNOWMELT ZONES FOR THE CURRENTLY INSTALLED SYSTEMS. SUBMIT REPORT OF MEASURED VALUES TO ENGINEER FOR REVIEW AND CONFIRMATION OF SYSTEM DESIGN ASSUMPTIONS PRIOR TO

4. PROVIDE PRELIMINARY TESTING OF EXISTING HVAC DUCTWORK SYSTEMS. MEASURE CURRENT AIR FLOW RATES AT ALL EXISTING SUPPLY, RETURN, AND EXHAUST REGISTERS. MEASURE TOTAL AIR FLOWS AT MAIN DUCT BRANCHES AND ALL FAN SYSTEMS. SUBMIT REPORT OF MEASURED VALUES TO ENGINEER FOR REVIEW AND CONFIRMATION OF SYSTEM DESIGN ASSUMPTIONS PRIOR TO DEMOLITION. 5. (E) WASTE SYSTEM SERVING SPACE IS LOCATED IN THE CEILING OF THE SPACE

6. REMOVE ALL MECHANICAL ITEMS INDICATED. 7. TEMPORARILY SEAL OR CAP PIPING TO BE RE-

LOCATIONS THAT ARE NOT BEING

9. REMOVE ALL DEMOLISHED COLD WATER, HOT WATER AND HOT WATER RECIRCULATION PIPING BACK TO BRANCH FROM MAIN TO ELIMINATE ALL DEAD ENDS IN DOMESTIC

10. NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES OF INFORMATION REPRESENTED IN THE DOCUMENTS VERSUS 11. COORDINATE PATCHING AND REPAIRS OF WALLS, CEILINGS AND FLOORS WITH ARCHITECT.

12. PATCH STRUCTURAL OPENINGS IN FLOORS, WALLS AND ROOFS THAT WERE PREVIOUSLY OCCUPIED BY SYSTEMS AND EQUIPMENT DEMOLISHED UNDER THIS CONTRACT IN ACCORDANCE WITH STRUCTURAL ENGINEER'S REQUIREMENTS.

Project No: 10183.00

Sheet No:

MD2.1

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- SYSTEMS ARE NOT ANTICIPATED. 2. FIELD VERIFY ALL COMPONENTS PRIOR TO DEMOLITION. THE INFORMATION ON THIS PORTIONS OF THE SYSTEMS WERE DURING DESIGN PROCESS.
- DEMOLITION.
 - 5. (E) WASTE SYSTEM SERVING SPACE IS LOCATED IN THE CEILING OF THE SPACE BELOW.
 - USED FOR LATER CONNECTION.
 - LOCATIONS THAT ARE NOT BEING RECONNECTED. WATER PIPING.
 - 10. NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES OF INFORMATION WHAT IS FOUND IN THE FIELD.
 - ARCHITECT.
 - DEMO NOTES

DEMOLITION NOTES:

1. ADDITIONAL STORM, HYDRONIC, DOMESTIC, WASTE AND VENT PIPING MAY BE ROUTED IN SPACE THAT IS NOT REPRESENTED, BUT IS TO REMAIN. OTHER SYSTEMS MAY EXIST WITHIN THE SPACE THAT ARE NOT REPRESENTED ON THESE DRAWINGS; MODIFICATIONS TO THESE

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(16)-(15)-(14.7) (14)-(10)— (8.8) 8.6 (8.2) (8)-(7.4) **A**)

1 FIRST LEVEL AREA A MECHANICAL PLAN SCALE: 1/8" = 1'-0"

DEMOLITION.

- 5. (E) WASTE SYSTEM SERVING SPACE IS LOCATED IN THE CEILING OF THE SPACE BELOW.
- USED FOR LATER CONNECTION. 8. SEAL ALL OPEN DUCTS DURING CONSTRUCTION TO MITIGATE DUST AND DEBRIS FROM SYSTEM. CAP DUCTWORK IN
- RECONNECTED. WATER PIPING.
- 10. NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES OF INFORMATION WHAT IS FOUND IN THE FIELD.

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ACCESSIBLE FOR VISUAL CONFIRMATION

HYDRONIC SYSTEMS. MEASURE CURRENT FLUID FLOW RATE THROUGH ALL EXISTING COILS, RADIANT, AND SNOWMELT ZONES FOR THE CURRENTLY INSTALLED SYSTEMS. SUBMIT REPORT OF MEASURED VALUES TO ENGINEER FOR REVIEW AND CONFIRMATION OF SYSTEM DESIGN ASSUMPTIONS PRIOR TO

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DEMO NOTES

Project No: 10183.00

Sheet No:

M2.1

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FLAG NOTES:

ENVIRONMENTAL EXH TERMINATIONS AND OPENINGS INTO BUILDING.

Project No: 10183.00

Sheet No:

M2.2






ROOMS MECH PLANS

































ASSE 1070 LISTED, AT EACH PUBLIC MATCH HW PIPE SIZE. 8. ROOF OVERFLOW DRAINAGE STRATEGY TO BE DETERMINED OR VIA ARCHITECTURAL SCUPPERS U.N.O. 9. TERMINATE PLUMBING VENTS NOT LESS THAN 12" ABOVE ROOF. 10. DO NOT ROUTE PIPING OVER ELECTRICAL ROOMS OR ELECTRICAL PANELS; MAINTAIN N.E.C. CLEARANCES. COORDINATE ROUTINGS WITH DIV. 16 CONTRACTOR. HEIGHT IN GARAGE AND INFORM THE THAT MAY NOT MEET 8'-6" PRIOR TO HEIGHT MUST BE MAINTAINED IN ACCESSIBLE VEHICLE AREAS. 12. PROVIDE FLEXIBLE PIPE CONNECTIONS TO ALL MOTORIZED EQUIPMENT. 13. ROUTE DOMESTIC HOT WATER RECIRC TO WITHIN 10 FEET OF ALL HOT WATER FIXTURES. CONNECT WITHIN 2 FEET OF PUBLIC LAVATORY FAUCETS. 14. VERIFY ALL EQUIPMENT ACCESS PANELS WITH MANUFACTURER AND ARCHITECT. 16. PEX PIPING SHALL NOT BE ALLOWED TO PENETRATE FIRE BARRIERS WHERE FIRE CAULKING IS REQUIRED. CEILINGS. ELECTRICAL. 19. ACCESS PANELS SHALL BE 24x24, U.N.O. APPARATUS THAT THEY SERVE.

20. SEAL ALL PIPING PENETRATIONS THROUGH ACOUSTIC PARTITIONS. SERVICE ESTABLISHMENTS.

FLAG NOTES:



INSTALLATION.



1. RE: \_/M\_ SERIES FOR MECHANICAL DIAGRAMS. 2. REFER TO THE PLUMBING FIXTURE CONNECTION SCHEDULE FOR PIPE SIZES TO INDIVIDUAL FIXTURES.

3. NOT ALL REQUIRED CLEANOUTS ARE NECESSARILY SHOWN ON THESE PLANS. PROVIDE CLEANOUTS ON WASTE, VENT AND STORM PIPING AS REQUIRED BY CODE AND FOR REASONABLE MAINTENANCE BASED ON ACTUAL FIELD INSTALLATION. COORDINATE LOCATIONS WITH ARCHITECT/ENGINEER. 4. COORDINATE ROUTING OF CONDENSATE DRAIN LINES WITH ARCHITECT PRIOR TO

5. PIPING ON EXTERIOR WALLS OR PRE-CAST CONCRETE WALLS TO BE ROUTED IN FRAMED WALL ON INTERIOR SIDE OF INSULATION. 6. ST AND ST(OF) PIPING 3", U.N.O.

7. INSTALL THERMOSTATIC MIXING VALVES, HANDWASHING LAVATORY/SINK. SIZE TO

11. CONTRACTOR TO MAINTAIN 8'-6" CLEAR HEAD ENGINEER AND ARCHITECT OF ANY AREAS INSTALLATION, MINIMUM 8'-2" CLEAR HEAD

15. PROTECT PIPING ROUTED ALONG COLUMNS, WALLS, ETC. FROM DAMAGE AS NECESSARY WITH CAGES. COORDINATE WITH ARCHITECT.

17. ALL VALVES SHALL BE INSTALLED ABOVE DROP-IN CEILINGS IN ACCESSIBLE LOCATIONS, OR WITH ACCESS PANELS IN HARD-LID

18. ALL PIPING SHALL BE ROUTED AS HIGH AS POSSIBLE IN THE CEILING SPACE. UTILIZE JOIST SPACE WHEN POSSIBLE, ESPECIALLY WHERE CROSSING OTHER PIPES, DUCTS, AND

LOCATIONS SHOWN ARE APPROXIMATE, EXACT LOCATIONS SHALL BE COORDINATED WITH THE ARCHITECTS DRAWINGS AND WITH THE LOCATIONS OF THE EQUIPMENT OR

21. EXPOSED SOIL OR WASTE PIPING SHALL NOT BE INSTALLED ABOVE ANY WORKING, STORAGE, OR EATING SURFACES IN FOOD













INSTALLATION. 5. PIPING ON EXTERIOR WALLS OR PRE-CAST CONCRETE WALLS TO BE ROUTED IN FRAMED WALL ON INTERIOR SIDE OF INSULATION.

6. ST AND ST(OF) PIPING 3", U.N.O. 7. INSTALL THERMOSTATIC MIXING VALVES, ASSE 1070 LISTED, AT EACH PUBLIC HANDWASHING LAVATORY/SINK. SIZE TO MATCH HW PIPE SIZE.

8. ROOF OVERFLOW DRAINAGE STRATEGY TO BE DETERMINED OR VIA ARCHITECTURAL SCUPPERS U.N.O.

9. TERMINATE PLUMBING VENTS NOT LESS THAN 12" ABOVE ROOF. 10. DO NOT ROUTE PIPING OVER ELECTRICAL ROOMS OR ELECTRICAL PANELS; MAINTAIN

HEIGHT MUST BE MAINTAINED IN ACCESSIBLE VEHICLE AREAS. 12. PROVIDE FLEXIBLE PIPE CONNECTIONS TO ALL MOTORIZED EQUIPMENT. 13. ROUTE DOMESTIC HOT WATER RECIRC TO

PUBLIC LAVATORY FAUCETS.

WITH MANUFACTURER AND ARCHITECT. 15. PROTECT PIPING ROUTED ALONG COLUMNS, WALLS, ETC. FROM DAMAGE AS NECESSARY WITH CAGES. COORDINATE WITH ARCHITECT. 16. PEX PIPING SHALL NOT BE ALLOWED TO PENETRATE FIRE BARRIERS WHERE FIRE

CAULKING IS REQUIRED.

CEILINGS. ELECTRICAL.

APPARATUS THAT THEY SERVE. ACOUSTIC PARTITIONS.





1. RE: \_/M\_ SERIES FOR MECHANICAL DIAGRAMS. CONNECTION SCHEDULE FOR PIPE SIZES TO

3. NOT ALL REQUIRED CLEANOUTS ARE NECESSARILY SHOWN ON THESE PLANS. PROVIDE CLEANOUTS ON WASTE, VENT AND STORM PIPING AS REQUIRED BY CODE AND FOR REASONABLE MAINTENANCE BASED ON ACTUAL FIELD INSTALLATION. COORDINATE LOCATIONS WITH ARCHITECT/ENGINEER.

N.E.C. CLEARANCES. COORDINATE ROUTINGS WITH DIV. 16 CONTRACTOR. 11. CONTRACTOR TO MAINTAIN 8'-6" CLEAR HEAD HEIGHT IN GARAGE AND INFORM THE ENGINEER AND ARCHITECT OF ANY AREAS THAT MAY NOT MEET 8'-6" PRIOR TO INSTALLATION, MINIMUM 8'-2" CLEAR HEAD

WITHIN 10 FEET OF ALL HOT WATER FIXTURES. CONNECT WITHIN 2 FEET OF 14. VERIFY ALL EQUIPMENT ACCESS PANELS

17. ALL VALVES SHALL BE INSTALLED ABOVE DROP-IN CEILINGS IN ACCESSIBLE LOCATIONS, OR WITH ACCESS PANELS IN HARD-LID

18. ALL PIPING SHALL BE ROUTED AS HIGH AS POSSIBLE IN THE CEILING SPACE. UTILIZE JOIST SPACE WHEN POSSIBLE, ESPECIALLY WHERE CROSSING OTHER PIPES, DUCTS, AND

19. ACCESS PANELS SHALL BE 24x24, U.N.O. LOCATIONS SHOWN ARE APPROXIMATE, EXACT LOCATIONS SHALL BE COORDINATED WITH THE ARCHITECTS DRAWINGS AND WITH THE LOCATIONS OF THE EQUIPMENT OR

20. SEAL ALL PIPING PENETRATIONS THROUGH 21. EXPOSED SOIL OR WASTE PIPING SHALL NOT BE INSTALLED ABOVE ANY WORKING, STORAGE, OR EATING SURFACES IN FOOD SERVICE ESTABLISHMENTS.

FLAG NOTES:



















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| | POINT DESCRIPTION- | GRAPHIC SCREEN | ANIMATED POINT ON GRAPHIC | TEMPERATURE | PRESSURE | RELATIVE HUMIDITY
CO2 - OUTSIDE AIR REFERENCE | AFMS - OSA | AFMS - SA | GPM | PERCENI | E | DDC (4-20 ma, 0-10 vdc) | | | STATUS | STATUS ON/OFF | STATIS OPENICI SD | TIMED OVERRIDE | HEAT/COOL | ALARM | STOP/START | OPEN/CLOSED | LOCK OUT | HIGH/LOW SPEED | FLOATING CONTROL | OCCUPIED/UNOCC | FAULT RESET | HEAT/COOL | HIGH UR LUW VALUE | STATUS DIFF FROM CMD | FREEZESTAT | ALARM | TREND VALUE | TREND STATUS | | COTATIONALLY SEQUNCE | CRIIICAL VALVE REAEI | PERIODIC HEAT TREATMENT |
| | EXHAUST AIR DAMPER | X | | | | | | | | | | Х | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | EXHASUT FAN SPEED | X | | | | | | | | | | Х | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | EXHAUST FAN ENABLE/DISABLE | X | | | | | | | | | | | | | | | | | | | | |) | (| | | | | | | | | | | | | | |
| | EXHAUST FAN STATUS | X | Χ | | | | | | | | | | | | X | | | | | | | | | | | | | | | X | (| | | | | | | |
| | EXHAUST FAN ALARM | X | | | | | | | | | | | | | | | | | | Х | | | | | | | | | | | | X | | | | | | |
| | MIXING DAMPER POSITION | X | | | | | | | | | | Х | | | | | | | | | | | | | | | | | | | | | Π | | | | | |
| | MIXED AIR TEMPERATURE | X | | Х | | | | \square | | | | | | | | | | | | | | | | | | | |) | () | x | | | X | | | | | T |
| | FILTER DIFFERENTIAL PRESSURE | X | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | X | X | | | | | |
| 2 | CO2 - OUTDOOR REFERENCE | X | | | | Х | | \square | | | | | | | | | | | | | | | | | | | | | | | | | Π | | | | | |
| 5 | HEATING CONTROL VALVE | X | | | | | | \square | | | | Х | | | | | | | | | | | | | | | | | | | | | Π | | | | | |
| 4 | SUPPLY FAN SPEED | X | | | | | | | | | | Х | | | | | | | | | | | | | | | | | | | | | Π | | | | | |
| 5 | SUPPLY FAN ENABLE/DISABLE | X | | | | | | \square | | | | | | | | | | | | | | |) | (| | | | | | | | | Π | | | | | T |
| 2 | SUPPLY FAN STATUS | X | Х | | | | | | | | | | | | X | | | | | | | | | | | | | | | X | (| | | | | | | |
| | SUPPLY FAN ALARM | X | | | | | | | | | | | | | | | | | | х | | | | | | | | | T | - | | X | Π | | | | T | T |
| Ľ | DUCT STATIC HIGH LIMIT | x | | | | | | \square | | | | | | | | | | | | х | | | | | | | | + | T | + | 1 | X | Π | \square | + | | + | T |
| Ľ | DISCHARGE AIR TEMPERATURE | X | | x | | | | \square | | | | | | | | | | | | | | | | | | | |) | K) | x | 1 | 1 | x | \square | | | | T |
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| È | DUCT STATIC PRESSURE | X | | | x | | | \square | | | | | | | | | | | | | | | | | | | | + | T | + | 1 | \top | X | \square | + | | + | + |
| | COOLING DISCHARGE SETPOINT | x | | | | | | \square | | | | Х | | | | | | | | | | | | | | | | | T | + | 1 | 1 | Ħ | \square | + | | + | T |
| | COOLING ENABLE/DISABLE | X | | | | | | \square | | | | | | | | | | | | | | |) | (| | | | + | T | + | 1 | \uparrow | \square | \square | + | | + | + |
| | RTU STATUS | X | X | | | | | Ħ | | | | | | | x | | | | | | | | | | 1 | | | + | + | X | đ | 1 | Ħ | | + | | + | + |
| | SMOKE DETECTOR | x | | | | | | Ħ | | | | | | | | | | | | х | | | | | 1 | | | + | + | + | + | x | H | | + | | + | 1 |
| | RETURN AIR TEMPERATURE | x | | x | | | | Ħ | | | | | | | | | | | | | | | | | | | |) | K) | x | + | + | x | | + | | + | + |
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| | SPACE PRESSURE | X | | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | X | | | | | |
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◀ KITCHEN EXHAUST CONTROL DIAGRAM SCALE: NONE

SEQUENCE OF CONTROL: MULTIZONE VAV RTU W/ REHEAT ZONES

DESCRIPTION - THE SYSTEM CONSISTS OF AN EXISTING SINGLE-ZONE ROOF TOP AIR HANDLING UNIT COMPLETE WITH MIXING BOX AND ENERGY RECOVERY SECTION, AIR BI ENDER, FILTER SECTION, HOT WATER COIL, CHILLED WATER COIL, SUPPLY FAN WITH VFD AND RELIEF FAN WITH VAV. THE EXISTING UNIT IS BEING CONVERTED TO A MULTIZONE ROOFTOP UNIT THROUGH THE ADDITION OF DOWNSTREAM VAV TERMINAL BOXES WITH HYDRONIC REHEAT COIL. VAV BOXES, DAMPERS, CONTROL VALVES, AND THEIR ACTUATORS, AS WELL AS ALL OTHER CONTROLS REQUIRED SHALL BE NEW EQUIPMENT FURNISHED AND INSTALLED BY THE TEMPERATURE CONTROLS CONTRACTOR.

SCHEDULING - THE AIR HANDLING UNIT SHALL BE SCHEDULED IN EITHER OCCUPIED OR UNOCCUPIED MODE BASED ON FEEDBACK STATUS FROM THE RESPECTIVE TERMINAL BOX ZONES SERVED BY THE AHU. WHEN ALL RESPECTIVE ZONES SERVED ARE IN UNOCCUPIED MODE, THE AHU OPERATIONAL MODE SHALL BE UNOCCUPIED. WHEN ANY OF THE RESPECTIVE ZONES ARE IN OCCUPIED MODE, THE AHU OPERATIONAL MODE SHALL BE OCCUPIED. WHEN IN OCCUPIED MODE, SUPPLY FAN SHALL OPERATE AND CONTROLLED DEVICES SHALL POSITION WITH RESPECT TO THEIR PI CONTROL LOOP. WHEN IN UNOCCUPIED MODE, FAN SHALL SHUT OFF RETURN DAMPER FULL OPEN, OUTSIDE AIR DAMPERS CLOSED, HOT WATER VALVE 10% OPEN TO COIL, AND DX SYSTEMS DISABLED. MORNING WARM-UP: SHALL BE SCHEDULED TO OCCUR

PRIOR TO OCCUPANCY. PROVIDE ADJUSTABLE DURATION TO PERMIT BLDG. OPERATOR TO TUNE TIME PERIOD REQUIRED TO FULLY EXECUTE WARM-UP EXERCISE PRIOR TO OCCUPANCY, DURING MORNING WARM-UP. FIRST ALL VAV BOXES SHALL OPEN UP TO 100% OF BALANCED MAXIMUM COOLING CEM, AFTER A 3 MINUTE DELAY (USER ADJUSTABLE) THE SUPPLY FAN SHALL START AND THE VFD SHALL MODULATE TO MAINTAIN THE MAXIMUM DUCT STATIC PRESSURE SETPOINT (AS DETERMINED BY BALANCE CONTRACTOR) PLUS 0.10" WC. AHU SHALL SUPPLY 85°F DAT. OSA & EXH DAMPERS SHALL BE CLOSED, RA DAMPER SHALL BE OPEN. RETURN FAN SHALL TRACK SUPPLY FAN SPEED (OR SHALL BE OFF, IF EXHAUST FAN CONFIGURATION). AS THE ZONES REACH OCCUPIED SETPOINT, THE AHU HEATING COIL CONTROL VALVE SHALL CLOSE AND THE AHU FAN SPEED SHALL MODULATE TO MAINTAIN DUCT STATIC PRESSURE SETPOINT BASED ON RESET SCHEDULE BELOW.

MORNING COOL-DOWN: SHALL BE BASED UPON TREND DATA COLLECTED OVER THE PREVIOUS 7 DAYS (ADJ) TO DETERMINE WHETHER OR NOT MORNING COOL-DOWN IS WARRANTED. MORNING COOL DOWN SHALL BE DEEMED WARRANTED IF:

DEMAND FOR COOLING OCCURRED ON THE MAJORITY OF THE DAYS IN PREVIOUS PERIOD POLLED. 2. -OR- DAILY MAXIMUM OUTSIDE AIR TEMPERATURE EXCEEDED SPACE TEMPERATURE SETPOINT FOR A MAJORITY OF THE DAYS THE IN PREVIOUS PERIOD POLLED.

WHEN DEEMED WARRANTED, MORNING COOLDOWN SHALL BE EXECUTED IN LIEU OF MORNING WARM-UP ROUTINE. THE NIGHT VENT COOLING ROUTINE SHALL BE SCHEDULED TO OCCUR PRIOR TO OCCUPANCY. PROVIDE ADJUSTABLE DURATION TO PERMIT BLDG. OPERATOR TO TUNE TIME PERIOD REQUIRED TO FULLY EXECUTE COOL-DOWN EXERCISE PRIOR TO OCCUPANCY, DURING MORNING COOL-DOWN, FIRST ALL VAV BOXES SHALL OPEN TO 100% OF BALANCED MAXIMUM CFM, AFTER A 3 MINUTE DELAY. FANS SHALL START AND MODULATE TO MAINTAIN MAINTAIN THE MAXIMUM DUCT STATIC PRESSURE SETPOINT (AS DETERMINED BY BALANCE

CONTRACTOR) PLUS 0.10" WC. DURING NIGHT VENT COOLING, AHU SHALL MODULATE MIXING BOX POSITION TO ACHIEVE COOLING DISCHARGE AIR TEMPERATURE SETPOINT (IE 48°F TO 58°F). TARGET SPACE SETPOINT FOR THE RESPECTIVE SHALL BE THE BOTTOM OF THE HEATING/COOLING DEADBAND (IE 68°F). AS ZONES REACH THEIR RESPECTIVE MORNING COOLDOWN SETPOINTS (IE 60°F TO 68°F) THEIR RESPECTIVE VAV DAMPERS SHALL CYCLE TO FULLY CLOSED.

MIXED AIR CONTROL: MIXING BOX CONTROL IS CONTROLLED BY MULTIPLE CONTROL LOOPS- BCS SHALL HIGH SELECT CONTROL POSITION AMONGST THE FOLLOWING LOOPS:

OCCUPIED/UNOCCUPIED: DAMPER CLOSED DURING UNOCCUPIED AND OPEN TO MINIMUM POSITION DURING OCCUPIED. MINIMUM OUTSIDE AIR POSITIONS SHALL NOT BE LESS THAN 30% OSA DURING OCCUPIED PERIODS.

MIXED AIR TEMPERATURE CONTROL LOOP: WHEN OUTSIDE AIR TEMPERATURE FALLS BELOW DISCHARGE AIR SETPOINT BY 1 DEGREE, MIXING DAMPERS SHALL MODULATE TO MAINTAIN DISCHARGE AIR TEMPERATURE AT SETPOINT.

ECONOMIZER CONTROL LOOP: OPEN OUTSIDE AIR DAMPER, CLOSE RETURN AIR DAMPER, AND OPEN RELIEF DAMPER (WHERE APPLICABLE), DURING ECONOMIZER MODE. COOLING IS VIA ECONOMIZER MODE ONLY, DISABLE ECONOMIZER COOLING WHEN OUTSIDE AIR TEMPERATURES ARE GREATER THAN INDOOR SPACE TEMPERATURE SETPOINT.

DISCHARGE AIR TEMPERATURE (DAT) CONTROL: DAT SETPOINT SHALL BE BASED ON O.S.A. TEMP RESET SCHEDULE BELOW.

OSA BASED DAT RESET 70 65 60 55 40 45 50 5**6**0 65 RETURN AIR TEMP (°F)

MODULATE MIXING BOX POSITION TO MAINTAIN DAT AT SETPOINT DURING ECONOMIZER COOLING. IF THE OSA DAMPERS ARE AT MINIMUM POSITION AND THE MIXED AIR TEMPERATURE IS BELOW DAT SETPOINT, MODULATE HEATING WATER VALVE TO MAINTAIN DAT AT SETPOINT. IF OSA TEMP IS GREATER THAN DAT SETPOINT, MODULATE MIXING DAMPERS TO MINIMUM POSITION. ENABLE COOLING SYSTEM (RTU-1 ONLY) AS REQUIRED TO MAINTAIN DAT AT SETPOINT.

SUPPLY FAN CONTROL: THE SUPPLY FAN VFD SHALL BE MODULATED BASED ON DUCT STATIC PRESSURE FEEDBACK TO MAINTAIN DUCT STATIC PRESSURE AT SETPOINT. EMPLOY CRITICAL

VALVE RESET LOGIC TO MAINTAIN THE MOST OPEN PRIMARY AIR VALVE IN THE SYSTEM AT 90% OR GREATER. POLL ALL VALVE POSITIONS TO DETERMINE MOST OPEN (CRITICAL) VALVE. RESET STATIC PRESSURE SETPOINT PER THE SCHEDULE BELOW. CRITICAL VALVE RESET

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CRITICAL VALVE POSITION (% OF FULL OPEN)

DURINGEBAUANEONIGIGTARREE OF ONOURT EREALINGUNEESES SHALL BE PROGRAMMED TO REMAIN OPEN UNDER SATISFIED CONDITIONS TO ALLOW FOR A MINIMUM FAN FLOW RATE WITHOUT OVER-PRESSURIZING THE SUPPLY

RETURN FAN CONTROL: SPEED SHALL TRACK SUPPLY FAN SPEED AT SETTING DETERMINED BY TAB EXERCISES DURING CLOSEOUT. TRACKING SETTING (IE 80% OF SUPPLY FAN SPEED) SHALL BE ADJUSTABLE VIA THE OPERATOR INTERFACE.

RELIEF SYSTEMS CONTROL: THE EXHAUST DAMPER SHALL BE CONTROLLED BASED ON SPACE PRESSURE REFERENCED AGAINST OUTSIDE AIR PRESSURE. VALUES INDICATED BELOW ARE DIFFERENTIAL PRESSURES BETWEEN THE TWO MEASUREMENTS. CONTROL LOOPS MANAGING THE EXHAUST DAMPER POSITION SHALL BE I FTHARGIC IN ORDER TO AVOID "HUNTING" OF THE SYSTEM DUE TO EXTERIOR DOOR USAGE. UPON A RISE IN SPACE PRESSURE TO +0.02"WC. OPEN THE EXHAUST DAMPER TO MINIMUM POSITION (10%). VARY POSITION O EXHAUST DAMPER FROM MINIMUM TO FULL OPEN AS BUILDING SPACE PRESSURE RISES FROM +0.02"WC TO +0.08" WC.

FEATURES DISCHARGE AIR TEMPERATURE SHALL BE TRENDED HOURLY. 2. GENERATE AN ALARM SHOULD DISCHARGE AIR

- TEMPERATURE STRAY FROM DISCHARGE AIR TEMPERATURE SETPOINT BY 5 DEG OR MORE. GENERATE FILTER CHANGE ALARM SHOULD FILTER DIFFERENTIAL PRESSURE EXCEED FILTER CHANGE
- SETPOINT (ADJUSTABLE AT THE OPERATOR INTERFACE). GENERATE AN ALARM SHOULD ANY FAN STATUS NOT MATCH FAN COMMAND
- GENERATE AN ALARM AND OPEN HEATING VALVE TO 100% SHOULD FREEZE STAT TRIP AND DAMPERS SHALL GO TO UNOCCUPIED MODE POSITION.
- GENERATE AN ALARM SHOULD SMOKE DETECTOR TRIP AND SHUT UNIT DOWN. VALVES AND DAMPERS
- SHALL GO TO UNOCCUPIED MODE. DISABLE SUPPLY FAN AND GENERATE ALARM SHOULD DUCT HIGH STATIC PRESSURE SWITCH TRIP HOURLY TREND ITEMS INDICATED IN THE POINTS
- LIST TO BE TRENDED. STORE DATA FOR 1 YEAR PRIOR TO PURGING.
- GENERATE ALARMS AS INDICATED IN THE POINTS LIST AND IN THE SEQUENCE OF CONTROL ABOVE.









- 1. CONTROLS CONTRACTOR TO COVER ALL COSTS OF ELECTRICAL POWER REQUIREMENTS, IF ANY, AND LINE VOLTAGE WIRING, IF ANY, BY LICENSED ELECTRICIAN.
- 2. SEQUENCES OF OPERATION DEFINED HEREIN DESCRIBE GENERAL INTENT AND DO NOT INCLUDE ALL NECESSARY PROCEDURES/STEPS REQUIRED. ANTICIPATE FINE TUNING OF SEQUENCES (INCLUDING, BUT NOT LIMITED TO, SETPOINT ADJUSTMENTS, DEADBAND REFINEMENT, RESET CURVES ENDPOINTS, TIME DELAYS. OFFSETS. AND ACTUAL SEQUENCING OF EQUIPMENT). MAY BE REQUIRED AND SHALL BE PERFORMED AS REQUIRED DURING FUNCTIONAL PERFORMANCE TESTING OF THE SYSTEMS. CONTROLS CONTRACTOR SHALL BE RESPONSIBLE TO MAKE ANY AND ALL FINE TUNING ADJUSTMENTS TO PROVIDE A COMPLETE AND OPERABLE SYSTEM.
- 3. CONTROLS SHALL BE FIELD INSTALLED. CONTROLS CONTRACTOR SHALL BE RESPONSIBLE FOR WIRING AND INSTALLING ALL DEVICES REQUIRED FOR A FULLY FUNCTIONAL CONTROL SYSTEM FOR THIS PROJECT, REGARDLESS OF VOLTAGE. IF THE CONTRACTOR CANNOT SELF-PERFORM WORK REQUIRING LINE VOLTAGE THEN THE CONTRACTOR SHALL COORDINATE WITH AND COMPENSATE THE ELECTRICAL CONTRACTOR AS REQUIRED. CONTROLS CONTRACTOR SHALL COORDINATE WITH EQUIPMENT SUPPLIERS TO ENSURE THAT ALL DEVICES ARE COMPATIBLE WITH THE EXISTING CONTROLS SYSTEM AND EXISTING MECHANICAL EQUIPMENT.
- 4. ALL CONTROL WIRING TO BE INSTALLED IN PLENUM RATED CONDUIT.

- 5. NO NETWORKED CONTROL POINTS ARE ALLOWED. ALL SENSORS TO BE HARDWIRED DIRECTLY TO CONTROLLING MODULE.
- 6. DESCRIPTION THE BUILDING CONTROL SYSTEM (BCS) SHALL CONSIST OF AN ASHRAE STANDARD 135 COMPLIANT (BACNET COMPATIBLE) DEVICES AND PROTOCOL FOR CONTROL OF HVAC & PLUMBING SYSTEMS MAJOR COMPONENTS, INCLUDING BOILERS, PUMPS, RTU'S, VAV BOXES, FAN POWERED BOXES, VFDS, WATER HEATERS, AND COMPUTER ROOM COOLING SYSTEMS SHALL BE PROVIDED BY MANUFACTURER WITH BACNET COMPATIBLE CONTROLLERS WITH ALL AVAILABLE INFORMATION WITHIN COMMUNICATED TO
- AND GRAPHICALLY REPRESENTED IN THE BCS. 7. REMOTE ACCESS - PROVIDE REMOTE ACCESS VIA WEB BASED INTERFACE (WEB ACCESS ITSELF IS NOT PART OF THIS CONTRACT).
- 8. BUILDING OCCUPANCY IN ADDITION TO THE OCCUPANCY SCHEDULING FEATURES AVAILABLE THROUGH THE BCS SOFTWARE, PROVIDE MANUAL CONTROLLABILITY OF OCCUPANCY STATUS. MANUAL CONTROL OF OCCUPANCY STATUS SHALL BE ADJUSTABLE THROUGH THE OPERATOR INTERFACE. MANUAL OCCUPANCY OVERRIDE DURATION SHALL BE ADJUSTABLE.
- 9. GRAPHICS ALL BCS POINTS SHALL BE REPRESENTED BY GRAPHIC DISPLAY ON 12. VARIABLE FREQUENCY DRIVES (VFDS) TO BE PROVIDED WITH BACNET THE WEB BASED INTERFACE. ITEMS SUCH AS PUMPS, FANS, CONTROL VALVES. COMPATIBLE INTERFACE TO MONITOR CURRENT VFD STATUS AND OPERATING AND DAMPER MOTORS SHALL BE REPRESENTED BY GRAPHIC DISPLAYS GRAPHICAL FLOOR PLANS SHALL INDICATE ANIMATED ZONE DESIGNATIONS AS

- BELOW SETPOINT.
- DOUBLE-CLICKING THE ASSOCIATED FLOOR PLAN GRAPHIC ADDITIONAL THE SAME MANNER. 11. LOCATIONS SHOWN ON DRAWINGS ARE APPROXIMATE LOCATIONS ONLY.
- PRIOR TO ROUTING CONDUIT AND PULLING WIRE.

SEQUENCE OF CONTROL:

DESCRIPTION - THE NEW SYSTEMS CONSIST OF A PRESSURE INDEPENDENT VARIABLE AIR VOLUME BOX COMPLETE WITH MOTORIZED DAMPER, HOT WATER REHEAT COIL, FLOATING POINT OR PROPORTIONAL CONTROL VALVE, AND AIR FLOW PRESSURE TRANSDUCER.

SCHEDULING - OCCUPIED/UNOCUPIED SCHEDULING APPLIES TO THESE SYSTEMS. SCHEDULES TO BE DETERMINED BY OWNER AND SHALL BE AVAILABLE THROUGH THE OPERATOR WORKSTATION INTERFACE.

- SCHEDULING CONTROLS SPACE SETPOINT TEMPERATURE. DURING OCCUPIED MODE, TERMINAL UNIT SHALL MAINTAIN SPACE TEMPERATURE AT SETPOINT DICTATED BY SPACE MOUNTED THERMOSTAT (LE 68-72°E HEATING, 76-80°F COOLING). DURING UNOCCUPIED MODE, TERMINAL UNIT SHALL MAINTAIN SPACE TEMPERATURE AT SETBACK TEMPERATURE SETPOINT (I.E. 60°F HEATING, N/A COOLING)
- OCCUPIED/UNOCCUPIED SCHEDULING ALSO CONTROLS VENTILATION. WHEN SCHEDULED IN THE OCCUPIED MODE, TERMINAL UNIT SHALL PROVIDE MINIMUM VENTILATION CFM CALCULATED BY THE DEMAND CONTROL VENTILATION PROGRAM. WHEN SCHEDULED IN THE UNOCCUPIED MODE, DAMPER SHALL BE SHUT. TERMINAL BOX SHALL BE PERMITTED TO OPEN AS REQUIRED ON DEMAND FOR HEATING ONLY, DURING UNOCCUPIED PERIODS.
- TIMED OVERRIDE SHOULD THE TIMED OVERRIDE BE SWITCHED TO OCCUPIED DURING UNOCCUPIED MODE, OCCUPIED MODE OPERATION SHALL APPLY FOR THE TIMED OCCUPANCY DURATION.

CONTROL - THE AIRFLOW PRESSURE TRANSDUCER SHALL INDICATE TO THE UNIT MOUNTED DDC CONTROLLER MEASURED AIRFLOW. THE DDC CONTROLLER SHALL MODULATE THE VAV BOX DAMPER TO MAINTAIN AIRFLOW AT SETPOINT. AIRFLOW SETPOINT AND REHEAT VALVE SHALL BE MODULATED BASED ON SPACE TEMPERATURE DEVIATION FROM SETPOINT PER THE SAMPLE RESET SCHEDULES BELOW INDICATING DEADBAND, HEATING AND COOLING RAMP-UP RANGES, AND MINIMUM AIRFLOWS.

- NOTES THE ADJACENT GRAPHICS ARE PROVIDED FOR REFERENCE ONLY. EACH TERMINAL BOX IS UNIQUE AND MAY HAVE REQ'MTS THAT VARY FROM THOSE DEPICTED ABOVE 3. INCLUDE LOGIC TO OPERATE REHEAT VALVE TO MAINTAIN DISCHARGE AIR TEMPERATURE AT SETPOINT (I.E. 85°F MAX AT -2°F AND GREATER
- DEVIATION FROM SETPOINT) 4. REFER TO EQUIPMENT SCHEDULES FOR INITIAL AIR DELIVERY (CFM) SETTINGS.
- THE SPACE MOUNTED TEMPERATURE SENSOR SHALL INCORPORATE A WARMER/COOLER ADJUSTMENT ALLOWING ZONE OCCUPANTS TO BIAS THE SPACE TEMPERATURE SETPOINT BY A FIXED AMOUNT IN EITHER DIRECTION.
- FEATURES 1. COOPERATION WITH NIGHT VENT COOLING, MORNING WARMUP, AND
- DCV LOGIC WHERE SPECIFIED IN RESPECTIVE AHU SEQUENCES. SPACE TEMPERATURE SHALL BE TRENDED HOURLY.
- GENERATE AN ALARM SHOULD DISCHARGE AIR TEMPERATURE STRAY FROM DISCHARGE AIR TEMPERATURE SETPOINT BY 5 DEG OR MORE. 4. HOURLY TREND ITEMS INDICATED IN THE POINTS LIST TO BE TRENDED.
- STORE DATA FOR 1 YEAR PRIOR TO PURGING.

➔ VAV w/ REHEAT CONTROL DIAGRAM

| | - | |
|--|---|-------|
| OUTPUT ALARMS PROGRAMS | S | |
| LOCK OUT
ENABLE/DISABLE
HIGHLOW SPEED
FLOATING CONTROL
FLOATING CONTROL
HIGH OR LOW VALUE
OUT OF RANGE
STATUS DIFF. FROM CMD
STATUS DIFF. FROM CMD
TREND VALUE
TREND VALUE
TREND STATUS
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ROTATIONALLY SEQUNCE | | NOTES |
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SVSTEM FEATURE

- SEQUENCE OF CONTROL DESCRIPTION - THE NEW SYSTEMS CONSIST OF A PRESSURE INDEPENDENT VARIABLE AIR VOLUME BOX COMPLETE WITH MOTORIZED DAMPER, HOT WATER REHEAT COIL, FLOATING POINT OR PROPORTIONAL CONTROL VALVE,
- AND AIR FLOW PRESSURE TRANSDUCER. SCHEDULING - OCCUPIED/UNOCUPIED SCHEDULING APPLIES TO THESE SYSTEMS, SCHEDULES TO BE DETERMINED BY OWNER AND SHALL BE
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- DURING UNOCCUPIED PERIODS. TIMED OVERRIDE - SHOULD THE TIMED OVERRIDE BE SWITCHED TO OCCUPIED DURING UNOCCUPIED MODE, OCCUPIED MODE OPERATION SHALL APPLY FOR THE TIMED OCCUPANCY DURATION.
- KITCHEN HOOD VENTILATION MODE. WHEN KITCHEN EXHAUST HOOD IS ACTIVATED, VAV WILL BE OVERRIDDEN TO OCCUPIED MODE AND MAX DESIGN CFM. WHEN KITCHEN EXHAUST IS OFF, VAV WILL RETURN TO NORMAL OPERATION.

CONTROL - THE AIRFLOW PRESSURE TRANSDUCER SHALL INDICATE TO THE UNIT MOUNTED DDC CONTROLLER MEASURED AIRFLOW. THE DDC CONTROLLER SHALL MODULATE THE VAV BOX DAMPER TO MAINTAIN AIRFLOW AT SETPOINT. AIRFLOW SETPOINT AND REHEAT VALVE SHALL BE MODULATED BASED ON SPACE TEMPERATURE DEVIATION FROM SETPOINT PER THE SAMPLE RESET SCHEDULES BELOW INDICATING DEADBAND, HEATING AND COOLING RAMP-UP RANGES, AND MINIMUM AIRFLOWS.

WHEN KITCHEN VENTILATION MODE IS ACTIVATED, THE DDC CONTROLLER SHALL DRIVE THE AIRFLOW TO CONSTANT VOLUME AT MAXIMUM CFM, AND MODULATE THE REHEAT VALVE TO MAINTAIN SPACE TEMPERATURE SETPOINT

- THE ADJACENT GRAPHICS ARE PROVIDED FOR REFERENCE ONLY. EACH TERMINAL BOX IS UNIQUE AND MAY HAVE REQ'MTS THAT VARY FROM THOSE DEPICTED ABOVE. 3. INCLUDE LOGIC TO OPERATE REHEAT VALVE TO MAINTAIN DISCHARGE
- AIR TEMPERATURE AT SETPOINT (I.E. 85°F MAX AT -2°F AND GREATER DEVIATION FROM SETPOINT) 4. REFER TO EQUIPMENT SCHEDULES FOR INITIAL AIR DELIVERY (CFM) SETTINGS.

THE SPACE MOUNTED TEMPERATURE SENSOR SHALL INCORPORATE A WARMER/COOLER ADJUSTMENT ALLOWING ZONE OCCUPANTS TO BIAS THE SPACE TEMPERATURE SETPOINT BY A FIXED AMOUNT IN EITHER DIRECTION. FEATURES

- COOPERATION WITH NIGHT VENT COOLING, MORNING WARMUP, AND DCV LOGIC WHERE SPECIFIED IN RESPECTIVE AHU SEQUENCES. SPACE TEMPERATURE SHALL BE TRENDED HOURLY.
- GENERATE AN ALARM SHOULD DISCHARGE AIR TEMPERATURE STRAY FROM DISCHARGE AIR TEMPERATURE SETPOINT BY 5 DEG OR MORE. 4. HOURLY TREND ITEMS INDICATED IN THE POINTS LIST TO BE TRENDED. STORE DATA FOR 1 YEAR PRIOR TO PURGING.

3 KITCHEN AND CAFETERIA SPACE VAV

CONTROLS GENERAL NOTES:

WELL AS THEIR SPACE TEMPERATURE SETPOINT, SPACE TEMPERATURE, AND MODE OF OPERATION "HEATING." "COOLING" OR "INACTIVE". BACKGROUND COLOR OF ZONES SHALL BE CHANGED AS FOLLOWS: GREEN - SPACE TEMPERATURE WITHIN 3°F OF SETPOINT: RED - SPACE TEMPERATURE GREATER THAN 3°F ABOVE SETPOINT; BLUE -SPACE TEMPERATURE LOWER THAN 3°F

10. GRAPHICAL FLOOR PLANS SHALL ALSO INDICATE CENTRALIZED PLANT EQUIPMENT. VAV'S. AHU'S. RTU'S. AND DISTRIBUTED IT ROOM COOLING SYSTEM BY LOCATION. ANIMATED GRAPHICS ARE NOT REQUIRED ON THE GRAPHICAL FLOOR PLAN SCREEN, ADDITIONAL INFORMATION FOR THE EQUIPMENT INDICATED ON THE GRAPHICAL FLOOR PLANS SHALL BE EASILY ACCESSED BY

INFORMATION FOR THE CENTRAL PLANT AS A WHOLE SHALL BE ACCESSIBLE IN

INDICATE EXACT LOCATION OF ALL DEVICES IN THE FIELD WITH CLEARLY MARKED IDENTIFIERS AND OBTAIN ARCHITECT'S AND ENGINEER'S APPROVAL

CONDITIONS THROUGH ITS COMMUNICATION PORT.

DESTINATION DETERMINED BY THE OWNER: SPACE TEMPERATURE LOW LIMIT; IT (MDF & IDFS) ROOM TEMPERATURE HIGH LIMIT; GENERALIZED EQUIPMENT FAILURE ALARM (FOR EQUIPMENT SUCH AS PUMPS, WATER HEATERS, RTU'S, ERVS, VFDS, ETC) 14. ADJUSTABILITY - WITH THE EXCEPTION OF DESIGN TEMPERATURES, ALL

13. ALARMS - PROVIDE THE FOLLOWING SPECIFIC DIAL-OUT ALARMS TO

SETPOINTS, TIME DELAYS, DURATIONS, RESET SCHEDULES, AND OTHER CONTROL VARIABLES SHALL BE ADJUSTABLE. VARIABLES REQUIRED FOR CONTROLS IMPLEMENTATION THAT ARE NOT DEFINED IN THE SEQUENCES OF CONTROL SHALL BE DEFINED BY CONTROLS CONTRACTOR IN THEIR SHOP DRAWING SUBMITTAL. CONTRACTOR'S SUGGESTED ADJUSTMENTS TO VARIABLES DEFINED IN THE SEQUENCES OF CONTROL, IF ANY, SHALL BE SUBMITTED IN THE CONTROLS DRAWINGS.

15. RESET CURVE GRAPHICS - CERTAIN CONTROLS SEQUENCES IN THIS DRAWING SET CONTAIN RESET CURVES DESCRIPTIONS THAT ARE PROVIDED GRAPHICALLY. THOUGH THESE CURVES REPRESENT PROPORTIONAL CONTROL ONLY IN THE SIMPLEST INTERPRETATION, THE CONTROLS SYSTEM INTENT IS TO UTILIZE PROPORTIONAL-INTEGRAL (PI) AND/OR PROPORTIONAL-INTEGRAL-DERIVATIVE (PID) LOOPS TO PERMIT TUNING OF CONTROLS SYSTEMS RESPONSE, LIMIT OVERSHOOT/UNDERSHOOT, AND IMPROVE SYSTEM STABILITY. RESET CURVE GRAPHICS ARE PROVIDED AS SUGGESTED STARTING POINTS FOR THE PROPORTIONAL COMPONENT ONLY; ALL ENDPOINTS, OFFSETS, SLOPES, ETC ARE FLEXIBLE.

THROUGH THE COURSE OF THE PROJECT. A COMPREHENSIVE RECORD OF MECHANICAL EQUIPMENT AND CONTROLS RELATED ADDENDA (ASI'S, RFI'S, AND CCD'S), ADJUSTMENTS TO SETPOINTS DEFINED HEREIN, INITIAL SETPOINTS NOT DEFINED HEREIN. ANY SUGGESTIONS FOR ADJUSTMENTS AND/OR MODIFICATION TO THE APPROVED CONTROL SHOP DRAWINGS THAT ARISE DURING THE COURSE OF CONSTRUCTION, STARTUP, AND COMMISSIONING SHALL BE REVIEWED BY THE ENGINEER. APPROVED CHANGES SHALL BE RECORDED ON THE CONTROLS SHOP DRAWINGS BEING USED AS CONTROLS RECORD DRAWINGS. ALL SUCH CHANGES SHALL BE UPDATED ELECTRONICALLY AND SUBMITTED TO THE OWNER DURING PROJECT CLOSEOUT

16. CONTROLS RECORD DRAWINGS REQUIRED - CONTRACTOR SHALL MAINTAIN,

- 17. TRENDING TREND HOURLY WITH MINIMUM ONE YEAR STORAGE THE FOLLOWING:SPACE TEMPERATURE FOR EACH ZONE: CO2 LEVEL FOR EACH ZONE EQUIPPED WITH DEMAND CONTROL VENTILATION; ADDITIONAL 15% STORAGE AVAILABILITY FOR OTHER POINTS THAT MAY REQUIRE FUTURE TRENDING FOR TROUBLE SHOOTING, COMMISSIONING, ETC.
- 18. POINTS LISTS CONTROLS DRAWING SUBMITTAL SHALL PROVIDE COMPLETE POINTS LISTS AND NAME/ADDRESS OF EACH POINT OCCURRENCE WITHIN THE PROJECT.
- 19. SPARE CAPACITY PROVIDE SYSTEM ARCHITECTURE/INFRASTRUCTURE WITH MINIMUM 10% SPARE CAPACITY FOR FUTURE ADDITIONAL POINTS EVENLY DISTRIBUTED ACROSS THE FACILITY.



| | TERMINAL CONTROL |
|---|--|
| | HEATING CFM = VENT CFM |
| - 100
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-
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- 0 W W XI
- 0 W W XI
- 0 E K CE W I
- 0 E K CE
- 0 - | REHEAT VALVE
AIR DELIVERY
-5 4 3 2 -1 0 1 2 3 4
ROOM TEMPERATURE DEVIATION FROM SETPOINT (°F) |
| | HEATING CFM > MIN CFM |
| 100 - | |
| 5 | |
| л <sup>80-</sup> | REHEAT VALVE |
| XAN 90- | |
| ЧЦ - | |
| L 40- | |
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2-21-2020 Sheet Title: MECHANICAL DIAGRAMS

Issue Dates DD SET

| | Revisions: | |
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| No | Description | Date |
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| | RECESSED FIXTURE |
|--|---|
| \bigcirc \bigcirc | RECESSED WALL WASHER |
| $\Box\!$ | RECESSED ADJUSTABLE ACCENT |
| $\square \rightarrow \bigcirc \rightarrow$ | RECESSED INGRADE UPLIGHT |
| | SURFACED MOUNTED LINEAR TROFFER |
| | RECESSED LINEAR TROFFER |
| | RECESSED LINEAR WALL WASH/GRAZE |
| | RECESSED INGRADE LINEAR UPLIGHT |
| | RECESSED INGRADE LINEAR WALL WASH/GRAZE |
| ••• | LINEAR PENDANT MOUNTED LIGHT |
| | |
| | SURFACE MOUNTED LED PANEL |
| | SURFACE MOUNTED LIGHT |
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 | RECESSED STEP LIGHT |
| | MONO-POINT LIGHTING FIXTURE |
| € | MONO-POINT STAKE MOUNT ACCENT |
| $\overline{\otimes}$ | TABLE LAMP |
| $\overline{\otimes}$ | FLOOR LAMP |
| $\overline{\mathbf{\otimes}}$ | CEILING MOUNTED EXIT SIGN W/ FACES & ARROWS AS SHOWN |
| HØ | WALL MOUNTED EXIT SIGN W/ FACES & ARROWS AS SHOWN |
| H | WALL MOUNTED COMBO EXIT SIGN / EGRESS LIGHT |
| <₽ | EMERGENCY LIGHTS |
| | EXTERIOR POLE MOUNTED LIGHT |
| | EXTERIOR POST (BOLLARD) MOUNTED LIGHT |
| | FIXTURE WITH EMERGENCY BACKUP OR ON EM CIRCUIT |
| | LIGHTING CONTROL SYMBOLS |
| \$ | WALL MOUNTED SWITCH |
| \$ <sup>3</sup> | THREE-WAY SWITCH |
| \$4 | FOUR-WAY SWITCH |
| \$ <sup>J</sup> | DOOR JAMB SWITCH |
| \$ <sup>K</sup> | KEY SWITCH |
| \$ <sup>D</sup> | DIMMER SWITCH |
| K <u>∕</u> xxx | WALL MOUNTED DEVICE |
| RA | ROOM CONTROLLER |
| RL | PLUG LOAD CONTROLLER |
| 0 | OCCUPANCY/VACANCY PROGRAMMED SENSOR - CEILING MOUNTED |
| (*) | DAYLIGHT PHOTO SENSOR |
| | LIGHTING DRAWING SYMBOLS |
| | ALIGNMENT LINE |
| | – – – – – CENTER LINE DESIGNATION |
| | |

| <u>EL</u> | ECTRICAL SYSTEMS LEGEND | | NOTE:
ALL SYMBOLS SHOWN ON LEGEND
ARE NOT NECESSARILY USED. |
|--------------------------------|---|---------------|---|
| | POWER SYMBOLS | | ABBREVIATIONS |
| <u> </u> | SINGLE RECEPTACLE | AFC | ABOVE FINISHED CEILING |
| | DUPLEX RECEPTACLE | AFF | ABOVE FINISHED FLOOR |
| | DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER | AFG | ABOVE FINISHED GRADE |
| | | AHJ | AUTHORITY HAVING JURISDICTION |
| | | | |
| | | | |
| | | AWG | |
| <u>L</u> | | BEG | |
| | | BMS | |
| ₽ | | | CONDUIT |
| <u> </u> | FLUSH FLOOR MOUNTED DUPLEX RECEPTACLE AND TELECOM | CATV | COMMUNITY (CABLE) ANTENNA TELEVISION SYSTEM |
| | WALL MOUNTED SPECIAL OUTLET AS NOTED | CCTV | CLOSED CIRCUIT TELEVISION |
| $\overline{\diamond}$ | SPECIAL OUTLET AS NOTED | СКТ | CIRCUIT |
| | JUNCTION BOX | CPU | CENTRAL PROCESSING UNIT |
| | WALL MOUNTED JUNCTION BOX | СТ | CURRENT TRANSFORMER |
| J | FLOOR MOUNTED JUNCTION BOX | DISP | GARBAGE DISPOSAL |
| $\langle \overline{-} \rangle$ | MECHANICAL EQUIPMENT POWER CONNECTION | DW | DISHWASHER |
| TS | TIMER SWITCH | (E) | EXISTING |
| C | FUSED DISCONNECT | EM | EMERGENCY |
| | NON FUSED DISCONNECT | EWC | ELECTRIC WATER COOLER |
| | MOTOR STARTER | FA | FIRE ALARM |
| СВ | | FACP | FIRE ALARM CONTROL PANEL |
| <u>PB</u> | PULL BOX | FBO | FURNISHED BY OTHERS |
| | | | |
| | | | |
|
 | | | |
| | | | |
| | CONTACTOR | | |
| | ELECTRIC MOTOR | IG | ISOLATED GROUND |
|)
一
石 | METER | IR | INFRARED |
| 0 | THERMOSTAT | LAN | LOCAL AREA NETWORK |
| ATS | AUTOMATIC TRANSFER SWITCH | MDF | MAIN DISTRIBUTION FRAME |
| | CIRCUIT HOMERUN | (N) | NEW |
| | CONDUIT RUN | NIC | NOT IN CONTRACT |
| | CONDUIT RUN BELOW GRADE | NL | NIGHT LIGHT |
| 0 | CONDUIT UP | NTS | NOT TO SCALE |
| -• | CONDUIT DOWN | 00 | ON CENTER |
| \$ | SWITCH | PA | PUBLIC ADDRESS |
| \$' | THERMAL OVERLOAD SWITCH | REF | REFRIGERATOR |
| \$ <sup>v</sup> | | | |
| \$'` | KEY SWIICH | | |
| | ONE-LINE DIAGRAM SYMBOLS | | |
| | DISCONNECT SWITCH | | UNLESS NOTED OTHERWISE |
| | FUSE | $\frac{1}{V}$ | VOLT |
| | CIRCUIT BREAKER | W | WATT |
| | CURRENT TRANSFORMER | WAN | WIDE AREA NETWORK |
| 36 | POTENTIAL TRANSFORMER | WAP | WIRELESS ACCESS POINT |
| M | METER | WLAN | WIRELESS LOCAL AREA NETWORK |
| $\overline{\mathbb{O}}$ | VOLT-METER | WP | WEATHERPROOF |
| _ Ã | AMP-METER | XP | EXPLOSIONPROOF |
| SPD | SURGE PROTECTION DEVICE | +18" | MOUNTING HEIGHT TO CENTERLINE OF DEVICE ABOVE FINISH |
| ø | SELECTOR SWITCH | | FLOUR (VERIFY W/ ARCH ELEVATIONS) |
| | GROUND FAULT PROTECTION | | |
| <u></u> | SHUNT TRIP | NOTES | |
| | NORMALLY OPEN CONTACT | <u></u> . | |
| //́— | NORMALLY CLOSED CONTACT | - LIGHT L | INEWEIGHT INDICATES EXISTING. |
| | | - HATCHE | ED AREAS INDICATE DEMOLITION. |
| | | - 'C' ADJA | |
| <u>_</u> | | WOUNT | Ψ |
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| | MECHANICAL EQUIPMEN |
|------------|---|
| | |
| | ITEM |
| 1 | EQUIPMENT MOTORS AND THERMAL OVERLOADS, RESISTANCE HEATERS. |
| 2 | VFD'S, MOTOR CONTROLLERS; MAGNETIC STARTERS, REDUCED VOLTAGE STARTERS |
| 3 | DISCONNECT SWITCHES (FUSED OR NON-FUSED), HP RATED SWITCHES, THERMAL OV MANUAL OPERATING SWITCHES. |
| 4 | PUSHBUTTON STATIONS, PILOT LIGHTS, MULTI-SPEED SWITCHES, FLOAT SWITCHES, T
TIMECLOCKS, CONTROL TRANSFORMERS, CONTROL PANELS, MOTOR VALVES, DAMPE
EP AND PE SWITCHES AND INTERLOCKS. |
| 5 | 120 VOLT POWER FOR BAS PANELS, FIRE PROTECTION AND BOILER CONTROLS. |
| 6 | FIRE/SMOKE DAMPERS AND ELEVATOR VENT DAMPERS. |
| MD | = MECHANICAL DIVISION |
| ED | = ELECTRICAL DIVISION |
| <u>NO</u> | T <u>ES:</u> |
| (a) | IF FURNISHED AS PART OF FACTORY-WIRED EQUIPMENT, THEN WIRING AND COM |
| (b) | IF ANY OF THESE DEVICES CARRY THE FULL LOAD CURRENT TO ANY MOTOR THE
FURNISHED BY MD AND WIRED BY ED SHALL BE LOCATED AT THE DEVICE BEING
CONTRACTORS WITH NO CHANGE IN THE CONTRACT PRICE. |
| (c) | WIRING FROM ALARM CONTACTS TO ALARM SYSTEM BY ED; ALL CONTROL FUNC |
| GEI
COI | NERAL NOTES: THE ABOVE LIST DOES NOT ATTEMPT TO INCLUDE ALL COMPONENTS
NTRACT. |

ENT WIRING AND CONNECTIONS

| | FURNISHED
UNDER | SET IN PLACE
OR MTD. UNDER | WIRED/
CONNECTED
UNDER |
|---|--------------------|-------------------------------|------------------------------|
| | MD | MD | ED |
| S AND OVERLOAD RELAYS. | MD | ED(a) | ED |
| VERLOAD SWITCHES AND FUSES AND | ED(a) | ED(a) | ED |
| THERMOSTATS, CONTROL RELAYS,
PER ACTUATORS, SOLENOID VALVES, | MD | MD | MD(b) |
| | ED | ED | ED |
| | MD | MD | ED(c) |
| | | | |
| | | | |

ONNECTIONS ONLY BY ED

THEY SHALL BE CONNECTED BY ED. CONTROL DEVICES CARRYING FULL LOAD CURRENT NG CONTROLLED, UNLESS SHOWN ON DRAWINGS OR MUTUAL AGREEMENT IS MADE BETWEEN THE

ICTION WIRING BY MD. DUCT DETECTORS FURNISHED BY ED, SET IN PLACE BY MD.

ITS. ALL ITEMS NECESSARY FOR A COMPLETE SYSTEM SHALL BE INCLUDED IN THE BASE

| | ELECTRICA | | ET IN | DEX | | | | | | |
|--|--|---|--|---|--|---|---|---|--|-----------------------|
| #
E0.0
E0.1
E0.2
E0.3
ED2.1
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E2.1
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E2.11 | TITLE ELEC COVER SHEET ELECTRICAL SCHEDULES ELECTRICAL SCHEDULES ELECTRICAL SCHEDULES ELECTRICAL SCHEDULES ELECTRICAL SPECS FIRST LEVEL AREA A DEMO ELEC PLAN 6TH GRADE SCIENCE ROOMS DEMO ELECTRICAL PLAN FIRST LEVEL AREA A DEMO LIGHTING PLAN FIRST LEVEL AREA A ELEC PLAN SCIENCE CLASSROOMS ELEC PLANS 6TH GRADE SCIENCE ROOMS ELEC PLAN FIRST LEVEL AREA A LIGHTING PLAN | | | | LUG | | | TASSO
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| E2.11 | ELECTRICAL DIAGRAMS | | | | | | | fax: (97
email: t
www.taba | 70) 766-1471
ab@vail.net
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COOF | OT SCALE DRAWINGS. VERIFY DIMENSIONS ON ARCH
K. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC. SIZES
RE POSSIBLE, BUT MAY BE DISTORTED FOR CLARITY OF
APPROVED BY THE ARCHITECT. IT IS NOT WITHIN TH
BOXES AND OBSTRUCTIONS. IT SHALL BE THE RESPONS
STRUCTURE, PRESERVE HEADROOM AND KEEP OPEN
TING CONDITIONS WERE TAKEN FROM ORIGINAL DRAV
DITIONS. FIELD VERIFY ALL EXISTING CONDITIONS PR
DEMOLITION WITH ALL OTHER DISCIPLINES AND EXIST
EM OUTAGES SHALL BE PERMITTED ONLY AT TIMES A
DENTAL OUTAGE (BEYOND BRANCH CIRCUITS) SHALL
JCH WORK.
TICE SHALL BE MAINTAINED TO EXISTING AREAS DURING
RATORS, CABLES, OUTLETS, ETC. AS REQUIRED TO IN
PMENT SHALL BE SUBJECT TO OWNER APPROVAL.
EW ARCHITECTURAL, MECHANICAL AND OTHER DRAW
RDINATE WITH ALL TRADES AND ELECTRICAL REFERE | ITECTURAL D
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ON THE DRAW
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DF OUTLETS AND
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BETW | TION AND MOUNTING HEIGHT OF ALL LIGHT FIXTURES
FY REQUIREMENTS OF ALL MECHANICAL EQUIPMENT | S AND DEVICE
WITH SHOP D | S WITH ARC | BMITTALS. NO | r to rough-in
Dtify engineef | I.
R OF ANY CO | NFLICTS | | | |
| 7. WORI | K SHALL BE PERFORMED IN A WORKMANLIKE MANNER | R TO THE SAT | ISFACTION (| OF THE ARCH | IITECT. | | | | | |
| 8. WORI
ORDII | K, MATERIALS, AND EQUIPMENT SHALL CONFORM TO NANCES. | THE LATEST I | EDITIONS OF | F LOCAL, STA | TE, AND NATION | NAL CODES A | ND | | | |
| 9. SECU
THE A | IRE AND PAY FOR ALL PERMITS AND FEES NECESSAR
ARCHITECT A COPY OF INSPECTION REPORTS AND AF | Y FOR EXECU
PROVAL CER | TION AND C | OMPLETION | OF ELECTRICAL
AND STATE INSP | WORK. FUR
PECTIONS. | NISH TO | | | |
| 10. PROV
SUBM | /IDE 1/4" SCALE LAYOUT DRAWINGS OF ROOMS WITH
IITTAL. LAYOUTS SHALL SHOW LOCATIONS OF AND S | ELECTRICAL S
HALL BE COO | SWITCHBOA
RDINATED V | RDS AND TRA | ANSFORMERS W
NICAL EQUIPMEI | /ITH SHOP DI
NT. ALL EQU | RAWING
IPMENT | 0 | | |
| SHAL
11. CONT | L BE DRAWN TO SCALE.
'RACTOR'S FAILURE TO ORDER OR RELEASE ORDER I | OR MATERIA | LS AND/OR I | | VILL NOT BE AC | CEPTED AS A | Ą | 0 | | |
| 12. VERIF
TREN
PULLI
PERC
DRAV
ELEC
CONS
ANY S | SON TO SUBSTITUTE ALTERNATE MATERIALS, EQUIPM
FY EXACT LOCATIONS OF EXISTING AND NEW UNDERG
ICHING. PROVIDE NECESSARY TRENCHING, BACKFILL
BOXES, TRANSFORMER PADS, SAWCUTTING AND PAT
ENT COMPACTION AND PATCH TO MATCH EXISTING.
VINGS AND REQUIREMENTS. ELECTRICAL CONTRACT
TRICAL UTILITY COMPANY WITH-IN 10 DAYS OF AWAR
STRUCTION SCHEDULING AND INSTALLATION OF THE I
SCHEDULING CONFLICTS. | ENT, OR INST
GROUND UTILI
, EXCAVATION
CHING, CONC
CONTRACTOI
OR IS TO SUB
D OF CONTRA
JTILITY TRAN | ALLATION M
ITIES, PIPINO
N, SUPPORT
RETE/PAVIN
R SHALL OB'
MIT A COMP
ACT. COORE
SFORMER W | E THODS.
S AND RACEV
S, SERVICE F
IG, ETC. REQ
TAIN AND VEI
LETE CONST
DINATE TIMEL
/ITH THE UTIL | VAY SYSTEMS P
EEDERS (COND
UIRED. BACKFII
RIFY EXACT UTII
RUCTION DRAW
INE OF THEIR R
ITY COMPANY. | PRIOR TO
OUIT AND/OR Y
L TRENCHES
LITY COMPAN
ING SET TO
EVIEW, APPF
NOTIFY OW | WIRE),
S TO 90
NY
THE
ROVAL,
NER OF | le Sch | ive | 487 |
| 13. EXIST
THE E
ALLO
INDIC
WORI | TING SYSTEMS AND CONDITIONS SHOWN ON DRAWING
ELECTRICAL CONTRACTOR TO FIELD CHECK ALL EXIS
WANCE FOR REMOVAL AND/OR RELOCATION OF EXIS
FATED ON THE PLANS OR AS REQUIRED TO COORDINA
K AS REQUIRED. | gs for exist
Ting conditi
Ting condui
Ting and adaf | TING BUILDIN
ONS PRIOR
TS, WIRES, I
PT NEW AND | IGS ARE TO E
TO BIDDING /
DEVICES, FIX
EXISTING EL | BE NOTED "FOR
AND TO INCLUDI
TURES, OR OTH
ECTRICAL SYST | Guidance C
E in his bid A
Er Equipme
Tem to all C | DNLY".
AN
NT AS
DTHER | idd | | 080 |
| ALL P
SMOR
THAT 15. EXPO
DO NO | ENETRATIONS THROUGH FIRE RATED WALLS, FLOOR
(E AND FIRE THROUGH THEM. THE FIRE RATING OF TH
OF THE FLOOR OR WALL. REFER TO SPECIFICATIONS
(SED CONDUIT SHALL BE INSTALLED IN STRAIGHT LINI
OT LOOP EXCESS FLEXIBLE CONDUIT IN CEILING SPACE | S OR PARTITI
HE PENETRAT
S FOR ADDITIC
ES, PARALLEL
CE. | ONS SHALL
ION SEAL SH
DNAL INFORI
WITH OR A | BE SEALED T
HALL AT A MII
MATION.
T RIGHT ANG | O PREVENT THI
NIMUM BE THE S
LES TO THE BUI | E SPREAD OF
SAME RATING | =
B AS
CTURE. | No. | lyst | gs, C |
| 16. PROV
VOLT | /IDE A SEPARATE CODE SIZED GREEN EQUIPMENT GF
AGE CIRCUITS. FOR ALL 20A CIRCUITS, EQUIPMENT (| OUND CONDU
ROUND CONI | JCTOR IN AL | L CONDUITS
E SHALL MAT | AND RACEWAY | S CONTAININ
DUCTOR SIZ | IG LINE
E. FOR | D
D | t | in |
| CIRCU
17. PROV | UITS UPSIZED FOR VOLTAGE DROP INCREASE EQUIPN | IENT GROUNE | DING CONDU
RAL AND ELI | ICTOR SIZE F
ECTRICAL DE | PER CODE.
MOLITION DRAV | VINGS FOR | | Ĕ | D | br |
| LOCA
WORI | TION AND EXTENT OF DEMOLITION REQUIRED. CONT
K INVOLVED. | RACTOR SHA | LL VISIT SITI | E PRIOR TO E | BID TO DETERMI | NE EXTENT (| DF | | F | it S |
| 18. PROV
LIGHT
REMO | /IDE ALL NECESSARY DEMOLITION TO REMOVE EXIST
FS, FIRE ALARMS DEVICES, ETC. COMPLETE WITH AS
DVE THE ABOVE, OUTLET SHALL BE ABANDONED, WIR | NG UNUSED (
SOCIATED CIF
E REMOVED, 1 | CONDUIT, W
RCUITING TC
AND BLANK | IRE, CABLE, J
SOURCE. W
COVER PLAT | I-BOXES, RECEF
/HERE IT IS NOT
ES PROVIDED. | PTACLES, SW
FEASIBLE TO | VITCHES,
O | | | 09 |
| 19. THE (
THE F
FINIS | CONTRACTOR SHALL DO ALL CUTTING AND PATCHING
PROPER INSTALLATION OF THE ELECTRICAL WORK. A
H AS, AND SHALL ACCURATELY MATCH ALL SURROUN | OF THE EXIS
LL PATCHING
DING WORK. | TING CONST
SHALL BE O | FRUCTION WO | ORK WHICH MAY
MATERIALS, WC | / BE REQUIRI
)RKMANSHIP | ED FOR
AND | L
C | 10 | amb |
| 20. ALL (I
REQU | E) EQUIPMENT, LAMPS, BALLASTS, ETC. BEING REMO
IIREMENTS. | /ED SHALL BE | DISCARDE | D IN ACCORD | ANCE WITH APP | PLICABLE EPA | A | D a | Ö | tea |
| 21. EXIST
THOS
22. VERIF
CENT
VARIA
INACO | TING LIGHT FIXTURES, ELECTRICAL EQUIPMENT, ETC.
E ITEMS BEING RELOCATED.
FY LOCATIONS FOR ALL ELECTRICAL EQUIPMENT WIT
ERING OUTLETS AND LOCATING BOXES AND OUTLET
ATIONS IN FIREPROOFING AND PLASTERING, WINDOW
CURACY RESULTING FROM FAILURE TO DO SO WITHO | BEING REMO
H ARCHITECT
S, ALLOW FOF
AND DOOR T
UT EXPENSE | VED SHALL
URAL DRAW
R OVERHEAL
RIM, PANELI
TO OWNER. | BE RETURNE
INGS FOR IN
D PIPES, DUC
NG, HUNG CI | D TO THE OWN
TERIOR DETAILS
TS AND MECHAI
EILING AND LIKE | ER, EXCEPT
S AND FINISH
NICAL EQUIP
S, AND CORRE | FOR
. IN
MENT,
ECT ANY | mbo | တိုက် | S |
| 23. INSTA
TO TH | ALL ALL MATERIALS IN ACCORDANCE WITH THE MANU
HE ARCHITECT/ENGINEER'S ATTENTION PRIOR TO INS | FACTURER'S
TALLATION. | RECOMMEN | DATIONS. AN | NY DEVIATIONS | SHALL BE BR | OUGHT | | | |
| 24. FINAL
AND I | CONNECTIONS TO EQUIPMENT SHALL BE IN ACCORE
NSTRUCTIONS. IT SHALL BE THE CONTRACTOR'S RES | ANCE WITH M
SPONSIBILITY | IANUFACTU
TO PROVID | RER'S APPRO
E MATERIALS | VED WIRING DI | AGRAMS, DE
NT COMPATIE | TAILS,
BLE | ļ | | |
| 25. CONT | RACTOR SHALL BE RESPONSIBLE FOR REPLACING EV | | HICH IS DAM | | | IELD WIRING | | 5 | | |
| 26. UPON
SWIT
EQUII | I COMPLETION OF ALL ELECTRICAL WORK, ELECTRICA
CHES, LIGHTS, MOTORS, AND ANY OTHER ELECTRICA
PMENT AND THAT PART OF THE SYSTEM SHALL THEN
DDITIONAL COST TO THE OWNER | AL CONTRACT
L ITEMS SHAL
BE RETESTEI | OR SHALL A
L BE IMMED
D. ALL SUCH | ADJUST AND "
NATELY REPA
REPLACEME | TEST ALL CIRCU
VIRED OR REPLA
ENT OR REPAIR | IITS, OUTLET
ACED WITH A
SHALL BE DC | S,
LL NEW
DNE AT | | | |
| 27. AFTE
SITE. | R COMPLETION OF WORK UNDER THIS SECTION, CLE | AN-UP ALL RE | SULTANT DE | EBRIS FROM | THIS WORK AND | REMOVE FR | ROM THE | | | |
| 28. ALL E | ELECTRICAL SYSTEMS COMPONENTS SHALL BE LISTER | O OR LABELEI |) by U.L. Or | OTHER REC | OGNIZED TESTI | NG FACILITY. | | | | |
| 29. WIRIN
DUPL
30. ALL V
INSUL
SHOV
AND 9 | NG DEVICES SHALL BE SPECIFICATION GRADE AND RA
EX RECEPTACLES. THE COLOR OF THE DEVICES AND
VIRING SHALL BE INSTALLED IN LISTED METALLIC RAC
LATED THROAT TYPE. MINIMUM RACEWAY SIZE IS 3/4
VN ON ONE-LINE. BRANCH CIRCUITS 25A AND LARGER
SMALLER MAY BE GROUPED INTO RACEWAYS AS TO P | COVER PLAT
COVER PLAT
EWAYS, UNLE
ALL FEEDER
SHALL BE IN
NOT EXCEED | NPERES FOR
ESS SHALL B
RS SHALL BE
STALLED IN
CURRENT | CLIGHT SWIT
E AS DIRECT
OTHERWISE.
INSTALLED
INDIVIDUAL F
CARRYING 7 | CHES, AND 20 A
ED BY ARCHITE
CONNECTORS
IN RACEWAY CO
ACEWAYS. BRA
5-DEGREE CONT | MPERES FOF
CT.
SHALL BE
ONFIGURATIC
NCH CIRCUIT | ×
 | Rev
No Descrip | ptions: | Date |
| CURF
31. ALL E
PULL
ORIG | RENT-CARRYING 90-DEGREE CONDUCTORS, IN A SING
MPTY RACEWAY SYSTEMS SHALL HAVE A 200LB NYLO
AND TERMINATION POINTS, USING PERMANENT META
INATION, AND TERMINATION POINTS OF EACH INDIVID | LE RACEWAY
ON PULL STRI
ALLIC TAGS. 1
UAL CONDUIT | NG OR EQUA | AD CABLE IS
AL, AND SHAL
NDICATE INTI | L BE IDENTIFIEI | D AT ALL JUN
CONDUIT, | ICTION, | | | |
| 32. WIRE
WIRE
CELS | SHALL BE COPPER, 75 DEGREE CELSIUS RATED FOR
SHALL BE COPPER, MINIMUM 90 DEGREE CELSIUS RA
IUS AMBIENT. CONDUCTOR AMPACITY SHALL BE DER | GENERAL US
TED. SIZES IN
ATED FOR HIG | e. Wiring \
Ndicated Ai
Gher Ambie | WITHIN 3 INCI
RE FOR INST/
INT INSTALLA | HES OF FLUORE
ALLATION IN A M
TIONS. | SCENT BALL
AXIMUM 30 E | ASTS
DEGREE | | | |
| 33. PROV
PROJ | | EXISTING AND | | | | | DF | lssue
DD | e Dates:
SET | |
| 34. PANE
SHAL | L DIRECTORIES SHALL BE REMOVABLE. ROOM NAME
L BE TYPED AND INSTALLED UNDER CLEAR PLASTIC (| S AND NUMBE
COVERS. | TING 55 | | | | | 2-21 | 1-2020 | |
| 35. FINAL
FITTI | LUDINIECTIONS TO MOTORS, TRANSFORMERS, AND (
NGS. DO NOT SECURE CONDUITS, DISCONNECTS, OR | DEVICES TO | | OR MECHAN | BE SEAL TITE FL | LEX AND APP | KUVED | | | |
| აס. REFE
ELEC | R TO FOOD SERVICE DRAWINGS FOR ADDITIONAL RO
TRICAL CONTRACTOR SHALL COORDINATE ALL FOOD | UGH-IN REQU
SERVICE ROU | UGH-IN WITH | | WITHIN THIS | SERIES. | K. | Shee | et Title: | |
| 37. ALL R
LABE
ON DI | LEVIOTE POWER SUPPLIES FOR LIGHTING SHALL BE L
L POWER SUPPLY WITH CIRCUIT, LOAD SERVED, AND
RAWINGS, LOCATE REMOTE EQUIPMENT ON WALL AR | CATED WHE
ROOM WHER
EA ABOVE DO | RE ACCESS
E LOAD IS S
ORWAYS FO | IBLE AND CO
ERVED. WHE
OR CONSISTE | INCEALED FROM
ERE APPLICABLE
ENCY IN FACILIT | E AND/OR INE
Y MANAGEMI | VV.
DICATED
ENT. | ELEC | | 'ER |
| 38. GUAF
FOR A | RANTEE THE INSTALLATION AGAINST DEFECTS IN MAT
A PERIOD OF ONE YEAR AFTER OWNER'S ACCEPTANC
ER. | ERIALS AND V
E. DEFECTS | VORKMANS
SHALL BE P | HIP WHICH M
ROMPTLY RE | AY OCCUR UND | ER NORMAL
UT COST TO | USAGE
THE | 31 | | |
| 39. SYST | EMS SHALL BE COMPLETE, OPERABLE, AND READY F
DRS. ETC. SHALL BE CONNECTED AND OPERAPLE | OR CONTINUC | US OPERAT | ION. LIGHTS | , SWITCHES, RE | CEPTACLES | , | | | |
| | , L. J. J. MILL DE COMMENTED AND OFERADLE. | | | | | | | | | |
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| LUMINAIRE SCHEDULE | | WIRI | NG SCHEDULE - COPPER | R | | | | ME | CHANIC | CAL EQU | IPMENT SCł | HEDULE | | |
|---|-------------------|-------------------------------------|---|--------------------------------------|--------|-----------------------|---------------------------|------------|------------|-------------|-----------------------|----------|-------------------|-------|
| GENERAL NOTES: | AMPS | (2WG) | (3WG) | (4WG) | | | | | | | | | CIRCUIT | |
| BOF = BOTTOM OF FIXTURE, RFD = RECESSED FIXTURE DEPTH, OFD = OVERALL FIXTURE DEPTH, OFH = OVERALL FIXTURE HEIGHT, TOP = TOP OF POLE, AFF = ABOVE FINISHED FLOOR. | | 1Ø, 2 WIRE, GROUND | 1Ø, 3 WIRE, GROUND OR 3Ø, 3 WIRE, GROUND | 3Ø, 4 WIRE, GROUND | | EL | ECTRICAL IN | NFORMATION | 1 | | | | INFORMATION | |
| A. THE LUMINAIRE SCHEDULE CAN NOT BE USED INDEPENDENTLY OF THE DRAWINGS AND SPECIFICATIONS TO OBTAIN LUMINAIRE COSTS. THE INDIVIDUAL ESTABLISHING LUMINAIRE COSTS SHALL NOT QUOTE PRICING WITHOUT FIRST SEEING APPLICABLE ELECTRICAL DRAWINGS AND ELECTRICAL DIVISIO
SPECIFICATIONS. THE CONTRACTOR IS REPONSIBLE FOR PROVIDING NECESSARY DRAWINGS AND SPECIFICATIONS TO THE INDIVIDUAL QUOTING LUMINAIRE PRICING. | N 20 | (2#12 & 1#12 G) 3/4"C | (3#12 & 1#12 G) 3/4"C | (4#12 & 1#12 G) 3/4"C | | VOLTAGE P | OLE
S HP | FLA MC | A MOCP | STARTER | DISCONNECT | FEEDER | PANE
L CIRCUIT | 1 |
| B. REFER TO DRAWINGS FOR FIXTURES REQUIRING EMERGENCY BATTERY BACKUP OPTION (SHOWN BY HATCH IN/OVER SYMBOL). MINIMUM LIGHT OUTPUT FOR EM BALLAST SHALL BE 600 LUMENS. BATTERY SHALL OPERATE FOR A MINIMUM OF 90 MINUTES. | | (2#10 & 1#10 G) 3/4°C | (3#10 & 1#10 G) 3/4°C | (4#10 & 1#10 G) 3/4°C | KEF 1 | 120 V | 1 3/4 | 13.8 - | 20A | | 1P MOTOR RATED SWITCH | 20(2WG) | | |
| C. INTERRUPT POWER SUPPLY TO DEMONSTRATE PROPER OPERATION OF ALL EMERGENCY LIGHTING PRIOR TO JOB COMPLETION. | 40 | (2#8 & 1#10 G) 3/4"C | (3#8 & 1#10 G) 3/4"C | (4#8 & 1#10 G) 3/4"C | KEF 2 | 120 V | 1 1/4 | 5.8 - | 20A | · | 1P MOTOR RATED SWITCH | 20(2WG) | | |
| D. MINIMUM CRI FOR FRONT OF HOUSE LIGHT FIXTURES SHALL BE 80. | 50 | (2#6 & 1#10 G) 3/4"C | (3#6 & 1#10 G) 3/4"C | (4#6 & 1#10 G) 1"C | VAV 01 | 120 V | 1 -
1 - | | 20A | - | | 20(2WG) | | |
| E. ALL FINISHES TO BE REVIEWED AND VERIFIED BY ARCHITECT PRIOR TO PURCHASE. | 60 | (2#4 & 1#10 G) 3/4"C | (3#4 & 1#10 G) 1"C | (4#4 & 1#10 G) 1 1/4"C | VAV 02 | 120 V | 1 - | | 20A | - | TOS | 20(2WG) | | |
| F. PROVIDE ALL PARTS, PIECES, AND COMPONENTS NECESSARY FOR A COMPLETE AND FUNCTIONAL SYSTEM. ELECTRICAL CONTRACTOR TO CONFIRM ALL MOUNTING ACCESSORIES PRIOR TO ORDER. | 70 | | | | VAV 04 | 120 V | 1 - | | 20A | | TOS | 20(2WG) | | |
| G. CONFIRM DIMMING PROTOCOL WITH FINAL CONTROLS SPECIFICATIONS AND SHOP DRAWINGS. ALL FRONT OF HOUSE LIGHT FIXTURES TO BE PROVIDED WITH 1% MINIMUM DIMMING RANGE. ELECTRICAL CONTRACTOR TO VERIFY PRIOR TO ORDER. | 70 | (2#4 & 1#8 G) 3/4"C | (3#4 & 1#8 G) 1"C | (4#4 & 1#8 G) 1 1/4"C | _ | | | | | | | | | |
| H. ELECTRICAL CONTRACTOR TO COORDINATE ALL ACCESS PANELS, DRIVER LOCATIONS, AND TRANSFORMER LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION. | 80 | (2#3 & 1#8 G) 1"C | (3#3 & 1#8 G) 1"C | (4#3 & 1#8 G) 1 1/4"C | | | | | | | | | | |
| I. ELECTRICAL CONTRACTOR TO CONFIRM FIXTURE COMPATIBLITY WITH CEILING TYPE AND CEILING THICKNESS PRIOR TO FINAL FIXTURE ORDER. | 90 | (2#2 & 1#8 G) 1"C | (3#2 & 1#8 G) 1 1/4"C | (4#2 & 1#8 G) 1 1/4"C | | | | | N I | ICHEN EU | UIPMENT SCH | DULE | | |
| J. FOR ALL LINEAR FIXTURES, ELECTRICAL CONTRACTOR TO VERIFY EXACT FIXTURE LENGTHS PER FIELD MEASUREMENTS OR MILLWORK SHOP DRAWINGS, AS APPLICABLE. | 100 | (2#3 & 1#8 G) 1"C | (3#3 & 1#8 G) 1 1//"C | (<i>1</i> #3 & 1#8 C) 1 1//"C | | | | VOLT / H | | | CONNECTION | | | |
| K. ELECTRICAL CONTRACTOR TO VERIFY FEED AND LENGTH OF LEAD WIRES REQUIRED AND REVISE AS NECESSARY. | | (2#3 & 1#0 G) 1 C | (5#5 & 1#6 G) 1 1/4 C | (4#3 & 1#0 G) 1 1/4 C | | | RIPTION | PHASE W | ATTS AMPS | HARDWIRED F | RECEPTACLE DISCONNEC | T HEIGHT | | RCUIT |
| L. PROVIDE EXIT SIGN MOUNTING, FACES AND CHEVRONS PER PLANS. | CONDUCTOR SIZES A | ARE BASED ON 60° TERMINATIONS LESS | THAN 100A AND 75° TERMINATIONS GREATER THAN OR EQUA | AL TO 100A, NEC TABLE 310.12(B)(16). | K | | | 208/1 2 | | Y | | 10" | 00/01/00 | |
| M.FOR ALL DECORATIVE LIGHTING, REFER TO INTERIOR DESIGN DOCUMENTATION FOR FIXTURE MOUNTING HEIGHT. | CONDUIT SIZES ARE | BASED ON NEC TABLE 4 (EMT) AND TABL | E 5 (THHN INSULATION). | | | | FUSAL | 200/1 2 | 11F 9 | ^ | | 12 | 20(300G) | |
| SPECIFIC NOTES: | | | | | | | DISH MACHINE | 208/3 | 40 | x | | 24" | 40(3)M(C) | |
| 1. [MOUNT PER PLANS. PENDANT MOUNT AS REQUIRED BELOW DUCTWORK FOR MAXIMIMUM ILLUMINATION OF ROOM SURFACES.] | | | | | | | | 200/0 | | | | | 40(3003) | |
| 2. REMOTE DRIVER/TRANSFORMER REQUIRED. DRIVER/TRANSFORMER TO BE LOCATED IN ACCESSIBLE, VENTILATED LOCATION. | | | | | K-8 | BOOSTI | ER HEATER | 208/3 7 | 000 | X | | 12" | 20(3WG) | |
| 3. SEE PLANS FOR CIRCUITING AND [EMERGENCY INVERTER] INFORMATION. | | | | | | | | | | | | | 20(0110) | |
| 4. COORDINATE AIMING IN FIELD WITH [ARCHITECT AND/OR LIGHTING DESIGNER]. | | | | | K-2 | 4 EXHAUST | HOOD TYPE 2 | 120/1 | 15 | x | | CLG | 20(2WG) | |
| 5. [ELECTRICAL CONTRACTOR TO REVIEW FIXTURE WEIGHT AND PROVIDE J-BOX SUITABLE FOR FIXTURE GREATER THAN 50LBS, AS REQUIRED.] | | | | | | | | | | | | | | |
| 6. [NO MORE THAN 30 TRACK HEADS MAY BE MOUNTED PER TRACK PER CIRCUIT.] | | | | | K-2 | 6 10 PAN | STEAMER | 120/1 | 5 | X | | 24" | 20(2WG) | |
| TYPE DESCRIPTION MOUNTING OTY TYPE LUMENS CRI CCT WATTS DIMMING VOLTAGE MANUEACTURER CATALOG NUMPER SPECIFIC | | | | | K_2 | 7 DOUBLI | E STACKED | 120/1 | 20 | | | 2/" | 20(2)M(C) | |
| TTPE DESCRIPTION WOUNTING QT1 TTPE LOWENS CRI CCI WATTS DIMINING VOLTAGE WANDFACTORER CATALOG NOWDER NOTES R1 2'v/ RECESSED VOLUMETRIC TROFFER CASKETED RECESSED 1 LED 6218 lm 80 3500 49 0 277 LITHONIA 2GTL-4'-60L-G710L R35 - | | | | | 17-2 | CONVEC | CTION OVEN | 120/1 | 20 | | -201 | | 20(2003) | |
| R1E 2'x4' RECESSED VOLUMETRIC TROFFER, GASKETED RECESSED 1 LED 6218 lm 80 3500 49 0 277 LITHONIA 261L-4-60L-6210-LP835 - | | | | | К-3 | | D CABINET | 120/1 | 20 | x | | 24" | 20(2)()(C) | |
| R2 2X4 RECESSED VOLUMETRIC TROFFER, GRID RECESSED 1 LED 1200 lm 82 3500 100 0 277 LITHONIA 2BLT4 120L ADSM EZ1 LP835 - | | | | | | | | | | | | | 20(200) | |
| R2E 2X4 RECESSED VOLUMETRIC TROFFER, GRID RECESSED 1 LED 12000 lm 82 3500 100 0 277 LITHONIA 2BLT4 120L ADSM EZ1 LP835 - D2 01/01 DEGE000ED VOLUMETRIC TROFFER, GRID RECESSED 1 LED 12000 lm 82 3500 100 0 277 LITHONIA 2BLT4 120L ADSM EZ1 LP835 - | | | | | К-3 | 3 HEA <sup>-</sup> | T LAMPS | 120/1 | 7 | x | | CLG | 20(2WG) | |
| R3 2X2 RECESSED VOLUMETRIC TROFFED, GRID RECESSED 1 LED 3332 Im 80 3500 27 0 277 LITHONIA 2BL12 33LADSM E2T LP835 - | | | | | | | | | | | | | () | |
| X1 THERMOPLASTIC EXIT SIGN, BATTERY POWERED WITH
NICKLE CADMIUM BATTERY, WHITE FINISH WITH SURFACE 1 LED 0 1 NA 277 LITHONIA LQM S W 3 G 120/277 EL N - | | | | | K-4 | 1 ICE MACH | IINE WITH BIN | 120/1 | 20 | | 5-20R | 60" | 20(2WG) | |
| GREEN LETTERS G < | | | | | K-4 | 3 WALK I | N COOLER | 120/1 | 10 | X | | CLG | 20(2WG) | |
| | | | | | К-4 | 4 WALK IN CO | OLER EVAP COI | L 120/1 | 3 | x | | CLG | 20(2WG) | |
| | | | | | К-4 | 5 WALK I
CON | N COOLER
DENSER | 208/3 | 7 | x | | | 20(3WG) | |
| | | | | | K-4 | 7 GLASS D
INTEGRAL | OORS WITH
LED LIGHTING | 120/1 | 3 | x | | CLG | 20(2WG) | |
| | | | | | GENE | RAL NOTES: | | | I | | I | | | |

| | | SHTING CONTROL DE | /ICES | |
|---|--|---|--|-------|
| TYPE | DESCRIPTION | PROGRAMMING REQUIREMENTS | COMMENTS | NOTES |
| | | STAND ALONE SWITCH DEVICES | | |
| \$ | LINE VOLTAGE TOGGLE SWITCH, SINGLE
POLE | MANUAL ON, MANUAL OFF | | |
| | | AUTOMATIC STAND ALONE CONTROL DEV | ICES | |
| SO1 | CEILING MOUNTED, DUAL TECH
OCCUPANCY SENSOR | AUTOMATIC ON, AUTOMATIC OFF AFTER 15
MINUTES OF UNOCCUPIED SPACE. LOCAL
ON/OFF OVERRIDE BUTTON (SEE DEVICES
BELOW) | EC SHALL COORDINATE MOUNTING SUCH
THAT SENSOR IS NOT WITHIN 6' OF AIR
RETURN SYSTEMS. MANUAL ON SWITCHES TO
BE LOW VOLATE AND COMPATIBLE WITH
CEILING SENSOR. | 1 |
| SK1 | KEYED LOW VOLTAGE PUSH BUTTON
WALL STATION, TWO BUTTON | KEYED. MANUAL ON OPERATION WHEN KEY
ENGAGED, AUTOMATIC OFF VIA ROOM
SENSOR (SEE ADDITIONAL DEVICES ABOVE) | | |
| | | ROOM CONTROLLER SYSTEMS | · · · · · | |
| RO1 | ROOM CONTROLLER CEILING MOUNTED
OCCUPANCY SENSOR, DUAL TECH, LOW
VOLTAGE | MANUAL ON VIA LOCAL PUSH BUTTON, OFF
AFTER 15 MINUTES OF UNOCCUPIED SPACE | EC SHALL COORDINATE MOUNTING SUCH
THAT SENSOR IS NOT WITHIN 6' OF AIR
RETURN SYSTEMS | 1 |
| RP1 | ROOM CONTROLLER CLOSED LOOP
DAYLIGHT SENSOR | LIGHT-LEVEL MONITORING RANGE: 10 TO 100
FC WITH AN ADJUSTMENT TO TURN-ON AND
TURN-OFF LIGHTS AT FOOTCANDLE LEVELS
WITHIN THAT RANGE.
TIME DELAY: FIFTEEN SECOND MINIMUM, TO
PREVENT FALSE OPERATION. MAINTAIN 30 FC
AT WORKING SURFACE. PHOTOCELL MUST
DIM LIGHTS CONTINUOUSLY TO AT LEAST 15%
MINIMUM | AND A DIRECTIONAL LENS IN FRONT OF THE
PHOTOCELL TO PREVENT FIXED LIGHT
SOURCES FROM CAUSING UNINTENTIONAL
SHUT-OFF. SENSOR SHALL NOT BE LOCATED
IN CLOSE PROXIMITY TO INDIRECT LIGHTING
OR WHERE SUBJECT TO VEILING
REFLECTIONS FROM GLASS OR WATER
SURFACES | 1 |
| RK1 | ROOM CONTROLLER, TWO ZONE, MANUAL
LOW VOLTAGE PUSH BUTTON KEYPAD
WITH RAISE LOWER | MANUAL ON. SHALL BE COMPATIBLE FOR 1%
SMOOTH DIMMING UNLESS OTHERWISE
NOTED, 0-10V DIMMING | | |
| RA | ROOM CONTROLLER DEVICE | | PROVIDE QUANTITIES AS REQUIRED PER
MANUFACTURER. | |
| ERAL NOTES
APPROVE
UTRON
WATTSTOPP
SENSOR SWI
LEVITON
NLIGHT
RESTRON
EATON
ALL MANI
ONTROLS ANI
THE LEVEL
FINAL OC
AWINGS. LO
NUFACTURE
PRESENTAT
SIGN INTENT | 2:
ED STANDALONE LIGHTING CONTROLS TO BE
ER
TCH
JALLY DIMMED LIGHTING LOADS SHALL BE C.
D LIGHT FIXTURES SHALL BE COORDINATED
NOTED ON THE LIGHTING FIXTURE SCHEDUL
CUPANCY AND DAYLIGHT SENSOR LOCATION
CATIONS INDICATED IN THERE DRAWING SH,
ER. IF OPERATION OF SENSOR DOES NOT ME
IVE SHALL PROVIDE FIELD RECTIFICATION SI
T.
C.
E. FINISHES TO BE REVIEWED AND APPROV | PROVIDED BY ONE OF THE FOLLOWING PRE-AI
APABLE OF DIMMING LIGHTS TO OFF SETTING. I
BY THE EC TO ENSURE THAT LIGHTING IS ABLE
E.
NS SHALL BE PROVIDED BY MANUFACTURER AN
ALL BE REVIEWED AND ALTERED AS NECESSAR
ET THE INTENT OUTLINED IN THESE DOCUMENT
ERVICES AS NECESSARY IN ORDER TO RECONF
ED BY ARCHITECT AND/OR INTERIOR DESIGNER | PPROVED MANUFACTURERS.
DIMMING COMPATIBLITY BETWEEN THE
TO DIM, WITH NO VISIBLE FLICKER,
ND LOCATED PER APPROVED SHOP
Y FOR CORRECT OPERATION BY
'S, THE MANUFACTURER
IGURE SYSTEM TO MEET THE | |
| ALL DEVI
REFER TO
PROVIDE
PLANS W | CE FINISHES TO BE REVIEWED AND APPROV
D DRAWINGS FOR SWITCH TYPE QUANTITIES
POWER PACKS AND ROOM CONTROLLERS A
VITHIN DRAWINGS ARE PROVIDED TO COMMI | ED DT ARCHITECT AND/OR INTERIOR DESIGNER
AND LOCATIONS.
S NECESSARY
INICATE DESIGN INTENT SYSTEM SHALL BE WIF | RED AND PROGRAMMED ACCORDING TO | |

APPROVED SHOP DRAWINGS

H. SHOP DRAWINGS SHALL BE SUBMITTED TO AND REVIEWED BY BG BUILDINGWORKS PRIOR TO PURCHASE CONGREGATE ADJACENT DEVICES UNDER A SINGLE FACEPLATE. ACCOUNT FOR WATTAGE RESTRICTIONS WHERE REQUIRED

ALL CALIBRATION DEVICES SHALL BE READILY ACCESSIBLE K. LIGHT LEVEL SETTINGS/PROGRAMMING SHALL BE REVIEWED AND ADJUSTED WITH OWNER SUPERVISION IN FIELD AFTER INSTALLATION AND PRIOR TO COMMISSIONING AS REQUIRED THIRD PARTY COMMISSIONING SHALL BE PROVIDED AS REQUIRED BY THE IECC.

<u>(E)GEN</u> 125 kW

M. REFER TO LOW VOLTAGE DEVICE SCHEDULE FOR INITIAL PROGRAM SETTINGS AND SCENE SELECTION N. ALL AUTOMATIC SENSING DEVICES SHALL BE SELF LEARNING TO MITIGATE NUISANCE TRIPPING

PROVIDE CLEANING AND MAINTAINENCE OVERRIDES PER THE REQUIREMENTS OF IECC. PROVIDE TWO HOUR OVERRIDE FOR KEYPAD DEVICES

 SPECIFIC NOTES:

 1.
 MOUNT PER MANUFACTURER RECOMMENDATIONS TO ENSURE PROPER PERFORMANCE.



1 ELECTRICAL ONE-LINE DIAGRAM SCALE: NONE

A. FIELD VERIFY ALL EQUIPMENT POWER AND CONNECTION REQUIREMENTS WITH KITCHEN CONTRACTOR AND MANUFACTURER'S INFORMATION. B. HARD WIRED EQUIPMENT CONNECTIONS SHALL BE SEALTIGHT.

C. E.C. SHALL COORDINATE ALL CONNECTION POINT LOCATIONS AND RECEPTACLE CONFIGURATIONS WITH THE KITCHEN CONSULTANT. VERIFY EQUIPMENT DISCONNECT REQUIREMENTS PRIOR TO INSTALLATION. D. ANY EQUIPMENT UNDER HOOD TIES INTO FIRE SUPPRESSION SYSTEM. PROVIDE SHUNT TRIP CIRCUIT BREAKER TO TURN EQUIPMENT OFF WHEN FIRE SUPPRESSION SYSTEM IS

ACTIVATED. E. PROVIDE ALL EQUIPMENT DISCONNECTS IN KITCHEN WITH NEMA 3R RATING. F. COORDINATE CONTROLS WITH KITCHEN EQUIPMENT VENDOR.

SPECIFIC NOTES: (1) WALK IN COOLER CONDESER LOCATED ON ROOF. COORDINATE EXACT LOCATION WITH KITCHEN CONSULTANT.

| | | | | | | TRANSFORM | ER SCHEDULE | | | | | |
|-----------|-------------|--------------|--------------------------|----------------|------------------|--------------------------------|-------------------------------------|------------------|--------|------------|-------|---|
| | | PRIMARY (48 | 0V, 3Ø, 3W) | | | SECONDARY (208V, 3Ø, 4) | N) | GROUNDING | DI | MENSIONS (| IN.) | Γ |
| SIZE | | 0000 | | FI A | 0000 | FEE | DER | ELECTRODE | | | DEDTU | ŀ |
| | FLA | UCPD | FEEDER | FLA | | COPPER | ALUMINUM | CONDUCTOR | HEIGHT | | DEPTH | |
| 15 | 18 | 25A3P | 30(3WG) | 42 | 60A3P | (4#4 & 1#8G) 1-1/4"C | (4#4 & 1#6 G) 1-+1/4"C | 1-#8 | 27 | 20.5 | 17.25 | |
| GENERAL I | NOTES: | | | | | | | | · | | | _ |
| А. | PRIMARY OV | ERCURRENT PR | ROTECTION PER N.E.C. TAE | BLE 450.3(B). | | | | | | | | |
| В. | SECONDARY | OVERCURREN | T PROTECTION PER N.E.C. | TABLE 450.3(E | 3). | | | | | | | |
| C. | BONDING AN | ID GROUNDING | CONDUCTOR PER N.E.C. T | ABLE 250.66. | | | | | | | | |
| D. | GROUNDING | ELECTRODE CO | ONDUCTORS ARE SIZED B | ASED ON COPI | PER CONDUCTOR | S. | | | | | | |
| E. | SEE PLANS F | OR INCREASED | CONDUCTOR SIZES DUE | TO VOLTAGE [| DROP. | | | | | | | |
| F. | CONDUIT SIZ | ES ARE BASED | ON NEC TABLE 4 (EMT) AN | ID TABLE 5 (TH | IHN INSULATION). | | | | | | | |
| G. | DIMENSIONS | AND WEIGHT F | OR 15KVA TRANSFORMER | S AND LARGE | R ARE BASED ON | SQUARE D 2016 DOE ENERGY EFFIC | ENT TYPE, 150 DEGREE C RISE, WITH C | COPPER WINDINGS. | | | | |



















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PART 1 - GENERAL

DIVISION 26 - ELECTRICAL SPECIFICATIONS

SECTION 26 00 10 - GENERAL PROVISIONS

1.01 PROJECT DESCRIPTION

- A. This project is a remodel of existing restrooms in an existing school building. The project is approximately 1,400 square feet located at 325 7 <sup>th</sup> Street in Steamboat Springs, Colorado.
- 1.02 PROVISIONS A. Work performed under this division of the specifications shall conform to the requirements of Division 1, and the electrical drawings and all items hereinafter specified.
- 1. The drawings and specifications for the electrical work are intended to describe a complete electrical system; omission of minor items obviously necessary to accomplish the above intent shall not relieve the Contractor from providing same.
- 2. Prior to any work being performed under this division examine architectural, structural, and mechanical drawings and specifications and if any discrepancies occur between them and the electrical drawings and specifications, report same to the Architect in writing and obtain written instructions for the work. 3. Electrical drawings are diagrammatic but shall be followed as closely as actual construction of the building will permit. All changes from drawings necessary to make
- the electrical work conform to the building as constructed shall be made without cost to the Owner. 4. Coordinate the electrical work with the General Contractor and be responsible to him for satisfactory progress of same. Coordinate electrical work with all other trades
- on the project without cost to the Owner.
- 5. Do not scale drawings. Verify dimensions on architectural drawings and in field prior to commencement of work. 6. All work and materials covered by drawings and specifications shall be subject to review at any time by representatives of the Architect and Owner. If the Architect or Owner's agent finds any material or installation that does not conform to these drawings and specifications, Contractor shall remove the material from the premises and correct the installation to the satisfaction of the agent. 7. In acceptance or rejection of installed electrical systems, no allowance will be made for lack of skill on the part of the installers.

1.03 WORK INCLUDED

- A. The electrical system required for this work to include, but is not necessarily limited to: . Complete feeder system to branch circuit panels 2. Complete branch circuit wiring for lighting, motors, receptacles, junction boxes, and similar uses.
- 3. Lighting fixtures, wall switches, receptacles and similar items.

1.04 CODES AND STANDARDS A. The applicable and enforced editions of the following Codes and published standards (including supplements and official interpretations) are minimum requirements: 1. NFPA 70 - National Electrical Code (NEC).

- 2. NFPA 72 National Fire Alarm Code. 3. NFPA 101 - Life Safety Code.
- 4. NFPA 110 Emergency Power Systems 5. Conform to all applicable State and Local Codes.
- 6. American National Standards Institute (ANSI). 7. National Electrical Safety Code (NESC).
- 8. Americans with Disabilities Acts (ADA) and American National Standards Institute (ANSI) 117 9. National Electrical Manufacturer's Association (NEMA).
- 10. Underwriter's Laboratories (UL). 11. Insulated Cable Engineers Association (ICEA).
- International Building Code. International Mechanical Code
- 14. International Fire Code. 15. Institute of Electrical and Electronic Engineers (IEEE).
- B. Comply with requirements of Underwriters Laboratories for all items installed for which U.L. standards have been established. C. The drawings and specifications take precedence when they are more stringent than codes, statutes, or ordinances in effect. Applicable codes, ordinances, standards and statutes take precedence when they are more stringent or conflict with the drawings and specifications.

1.05 EXAMINATION OF BIDDING DOCUMENTS

- A. Each bidder shall examine the bidding documents carefully, and not later than seven days prior to the date of receipt of bids, shall make written request to the Architect for interpretation or correction of any discrepancies, ambiguities, inconsistencies, or errors therein which he may discover. The Architect will issue any interpretation or correction as an Addendum. Only a written interpretation or correction by addendum shall be binding. No bidder shall rely upon interpretations or corrections given by any other method. If discrepancies, ambiguities, inconsistencies, or errors are not covered by addendum or written directive, Contractor shall include in his bid, labor, materials and methods of construction resulting in higher cost. After award of contract, no allowance or extra compensation will be made on behalf of the Contractor due to his failure to make the written requests as described above.
- B. Failure to request clarification during the bid phase of any inadequacy, omission, or conflict will not relieve the Contractor of their responsibilities. The signing of the contract will be considered as implicitly denoting that the Contractor has a thorough comprehension of the full intent and scope of the working drawings and specifications.
- 1.06 EXAMINATION OF PREMISES A. Visit site prior to bid and verify that conditions are as indicated. Contractor shall include in his bid costs required to make his work meet existing conditions.
- 1.07 EXISTING CONDITIONS

A. Existing systems and conditions shown on drawings for existing buildings are to be noted "for guidance only". The Electrical Contractor shall field check all existing conditions prior to bidding and is to include in his bid an allowance for extension, removal and/or relocation of existing conduits, wires, devices, fixtures, or other equipment

- as indicated on the plans or as required to coordinate and adapt new and existing electrical system to all other work. B. Where the reuse of existing conduits, wires, devices, etc. is permissible, make certain that the wiring for same is continuous from outlet to outlet and that such circuit or systems shall pass through no outlet or junction boxes which may be rendered inaccessible by the structural changes to be made to the building. Existing conduits, wire, devices, etc. which are not indicated for reuse shall become the property of this Contractor however lighting fixtures, panel fused switches, circuit breakers, fire alarm
- equipment, etc. shall become the property of the Owner. C. System outages shall be permitted only at times approved by Owner in writing. Work which could result in an accidental outage (beyond branch circuits) shall be performed
- with the Owner's maintenance personnel advised of such work. D. Service shall be maintained to existing areas during construction. Contractor shall provide portable generators, cables, outlets, etc. as required to maintain continuity of service. Placement of such portable equipment shall be subject to Owner approval. Generator system shall be complete and operable and shall include required
- accessories, fuel tanks, piping, muffler, block heater, battery charger, etc. E. Immediately after award of contract, verify available physical space and ampacity of existing panelboards, switchboards, distribution boards, motor control centers, etc., and
- provide written documentation of findings to the Architect/Engineer. Documentation shall include a minimum 24-hour recording ampere reading on all existing switchgear being utilized for this project.

F. Provide new updated panelboard directories for existing and new circuits being utilized for completion of project.

- 1.08 PERMITS FEES & NOTICES A. Obtain and pay for all necessary permits, inspections and certificates that may be necessary for the full completion of the work. Furnish the Architect with a certificate of final inspection and approval from the AHJ over the electrical insta
- B. Notify proper authorities when work is ready for inspections required by applicable codes, rules and regulations, allowing sufficient time for inspections to be made without hindering progress of the work. Furnish to the Owner copies of inspection certificates of acceptance.

1.09 TESTS

A. Upon completion of all work and adjustment of all equipment, provide complete operational tests of all electrical equipment provided under this division.

1 10 WARRANTY

A. Guarantee that all work governed by this division shall be free of defects in workmanship, materials and parts for a period of one (1) year after written acceptance. Promptly repair, revise, and replace defects as directed with no additional cost to the Owner (lamps and fuses are exempt).

1.11 RECORD DRAWINGS

- A. During the progress of the work, maintain an accurate record of the installation of the electrical system. Upon completion of the electrical installation, transfer all record data to prints of the original drawings. Drawings shall include all addendum items, change orders, alternates, reroutings, etc. As a condition of acceptance of the project, deliver to the Architect one copy of the record drawings.
- 1.12 PROTECTION
- A. Of People: Arrange barriers, signs, etc. as required to minimize the hazard of people. Comply with applicable safety and health regulations. Coordinate as necessary with the Owner and the General Contractor B. Of Work: Take all measures necessary to protect the work both before and after installation, to assure that it will be in clean, undamaged, unblemished condition when turned over to the Owner. Repair/replace work damaged during construction

PART 2 - PRODUCTS

- 2.01 STANDARD FOR MATERIALS A All electrical material shall be new and of the quality and type specified
- B. Manufacturer and catalog number shown in these specifications or on drawings are intended as a guide to quality. Equivalent materials and equipment of other manufacturers will be considered provided such substitutions are requested in accordance with the provisions of paragraph 2.03 and shall include all information necessary to support the claim of equivalenc C. No extension of completion date shall be allowed for time lost in consideration, shipping, or installation of approved substitutions. Review of substitutions signifies general

equality of materials and equipment only. This review does not relieve the Contractor of responsibility for proper operation of the system, compliance with specifications and necessary changes due to dimensional differences or space requirements.

2.02 SHOP DRAWINGS

A. Shop drawings required for this project are as follows 1. Lighting fixtures

- 2. Panelboards 3. Fire alarm and detection system 4. Disconnects
- B. Present shop drawing submittal data at one time, in electronic PDF format, indexed in a neat and orderly manner. Partial submittals will not be accepted. Provide four sets of submittal data, unless noted otherwise in Division
- C. Place orders for all equipment in time to prevent any delay in construction schedule or completion of project. If any materials or equipment are not ordered in time, additional charges made by equipment manufacturers to complete their equipment in time to meet construction schedule, together with any special handling charges, shall
- be borne by the Contractor. D. Shop drawings: Contractor agrees that shop drawing submittals processed by the engineer are not change orders; that the purpose of shop drawing submittals by the Contractor is to demonstrate to the engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment
- and material he intends to provide and by detailing the fabrication and installation methods he intends to use. Contractor further agrees that if deviations, discrepancies, or conflicts between shop drawing submittals and contract documents in the form of design drawings and specifications are discovered either prior to or after shop drawing submittals are processed by the engineer, the design drawings and specifications shall control and shall be followed.

2.03 BID ALTERNATE(S) A. Refer to Division 1 for additional information.

- B. Alternate(s) for Material and Equipment 1. Equipment and material bid alternate(s) shall be proposed as additive or deductive alternate(s) to specified items by submitting it as a separate line item from the base bid on the Bidder's letterhead.
- 2. Such bid alternate proposals shall not be substituted or included in the base bid. Bid alternate proposal(s) must be accompanied by full descriptive data on the proposed equipment, together with a statement of the cost to be added or deducted for each item. The bid alternate shall include all materials, equipment, labor,
- connections, coordination with all other trades, etc. for a complete and operational system. 3. The Contractor shall submit the bid alternates at the time the base bids are due.

2.04 PRODUCT HANDLING A. Use all means necessary to protect electrical system materials before, during and after installation and to protect the installed work and materials of all other trades.

B. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect at no additional cost to the Owner. C. Upon completion of all installations, lamping and testing, thoroughly inspect all exposed portions of the electrical installation and completely remove all exposed labels, soil, markings, and foreign materials.

PART 3 - EXECUTION

- 3.01 WORKMANSHIP AND COMPLETION OF INSTALLATION A. Contractor's personnel and subcontractors selected to perform the work shall be well versed and skilled in the trades involved.
- B. Coordinate electrical equipment and materials installation with other building components. C. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring
- positioning prior to closing-in the building D. Any changes or deviations from the drawings and specifications must be accepted in writing by the Architect/Engineer. All errors in installation shall be corrected at the

expense of the Contractor. All specialties shall be installed as detailed on the drawings. Where detail or specific installation requirements are not provided, manufacturer's recommendations shall be followed

- E. Upon completion of work, all equipment and materials shall be installed complete, thoroughly checked, correctly adjusted, and left ready for intended use or operation. All work shall be thoroughly cleaned and all residue shall be removed from surfaces. Exterior surfaces of all material and equipment shall be delivered in a perfect, unblemished condition
- F. Contractor shall provide a complete installation, including all required labor, material, cartage, insurance, permits, and taxes.

3.02 PROGRESS OF WORK

A. Order the progress of electrical work to conform to the progress of the work of the other trades. Complete the entire installation as soon as the condition of the building will permit. Any cost resulting from defective or ill-timed work performed under this Section shall be borne by this Contractor.

3.03 CUTTING AND PATCHING A. Provide all cutting, trenching, backfilling, patching and refinishing or resurfacing required for electrical work in a manner meeting the approval of the Engineer and at no

- additional cost to the Owner B. All openings made in fire-rated walls, floors, or ceilings shall be patched and made tight in a manner to conform to the fire rating for the surface penetrated.
- 3.04 DELIVERY AND STORAGE OF MATERIALS A. Arrange and be held responsible for delivery and safe storage of materials and equipment for electrical installation.
- B. Carefully check materials furnished to this Contractor for installation, and provide receipt acknowledging acceptance of delivery and condition of the materials received. hereafter, assume full responsibility for its safekeeping until the final installation has been reviewed and accepted.

3.05 PROTECTION OF WORK AND PROPERTY

A. Where there are existing facilities, be responsible for the protection thereof, whether or not such facility is to be removed or relocated. Moving or removing any facility must e done so as not to cause interruption of the work of Owner's operation. B. Close all conduit openings with caps or plugs during installation. Cover all fixtures and equipment and protect against injury. At the final completion, clean all work and deliver in an unblemished condition, or refinish and repaint at the discretion of the Architect. C. Any equipment or conduit systems found to have been damaged or contaminated above "MILL" or "SHOP" conditions shall be replaced or cleaned to the Engineer's

satisfaction 3.06 FINAL ACCEPTANCE

- A. Final acceptance by the Owner will not occur until all operating instructions are received and Owner's personnel have been thoroughly indoctrinated in the maintenance and operation of all equipment. B. Deliver three (3) complete operating manuals and parts lists to the Owner (or his designated representative) at the time of the above required indoctrination. Fully explain the contents of the manuals as part of required indoctrination and instruct the Owner's personnel in the correct procedure in obtaining service, both during and after the guarantee period. The operating manual and parts lists shall give complete information as to whom the Owner shall contact for service and parts including the address and phone number. Furnish evidence that an authorized service organization regularly carries a complete stock of repair parts for these items (or systems), and that the
- organization is available for service. Service shall be furnished within twenty four (24) hours after requested. C. Clean up: Remove all materials, scrap, etc., relative to the electrical installation and leave the premises and all equipment, lamps, fixtures, etc. in a clean, orderly condition. Any costs to the Owner for clean up of the site will be charged against the Contractor.
- D. Acceptance Demonstration: Upon completion of the work, at a time to be designated by the Architect, the Contractor shall demonstrate for the Owner the operation of the entire installation, including all systems provided under this contract
- E. Operating and Acceptance Tests: Provide all labor, instruments, and equipment for the performance of tests as specified. Submit three (3) copies of a typewritten test report for the Architect for his approval. 1 Record the full load current in each phase or line at the main service entrance and for each feeder leaving the main distribution panelboard. Readings shall be taken
- with the maximum installed load connected and in operation. 2. Perform a careful inspection of the main switchboard bus structure and cable connections to verify that all connections are mechanically and electrically tight. 3. Measure the resistance to around for the service ground, which shall not exceed ten (10) ohms under normal soil moisture conditions. If required, install additional ground provisions in a manner accepted by the Engineer at no additional cost to the Owner.

A. General: Provide the following services and materials to assist the Owner in operation and maintenance.

- 2. For all branch circuit panelboard directories, provide neatly typed, removable cards and protective plastic faces. Spare circuit breakers shall be identified as such.
- stainless steel device plates and circuit number.
- 3.08 CONSTRUCTION LIGHTING AND POWER
- with all applicable laws and regulations. permanent project metered service solely for construction use.

3.09 REMODELING PROVISIONS

3.07 IDENTIFICATION

- required to coordinate and adapt new and existing electrical systems to all other work required for this project.
- modifications to assure that circuits, or system, shall not pass through outlets or junction boxes which may be rendered inaccessible by changes to be made to the building.
- plastered or painted under another division of these specifications.

devices, fixtures and other equipment as necessary.

- 3.10 ELECTRICAL DEMOLITION A. Examination
- 1. Verity field measurements and circuiting arrangements are as shown on drawings 2. Verify that abandoned wiring and equipment serve only abandoned facilities.
- 4. Beginning of demolition means installer accepts existing conditions. B. Preparation 1. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.
- 2. Coordination outages with Architect/Owner 3. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations
- of demolition. C. Demolition and Extension of Existing Electrical Work
- 1. Demolish and extend existing electrical work under provisions of Division 1, Division 2, and this section. Remove, relocate, and extend existing installations to accommodate new construction. 3. Remove abandoned wiring to source of supply.

lamps, non-operational ballasts, and broken electrical parts.

moisture, PVC-coated flex (Liquidtight) shall be used.

2. Use set-screw or compression fittings for all EMT conduit.

1. Use solvent welded fittings for all PVC conduit.

3. Use threaded fittings for all rigid conduit.

C. Switches shall be 120/277V, 20A, rocker type.

G.E., Siemens, Square D, Cutler-Hammer.

and listed and labeled for use in "wet locations" in damp spaces.

before making up joints. Follow compound manufacturer's instructions.

E. Route dedicated neutral conductors on line and load side of dimmers per manufacturer's instructions

and substantial base to which all electrical equipment is attached.

B. Bolt-free standing equipment to 4" high concrete housekeeping pads

derated for higher ambient installation

abandoned outlets, which are not removed.

SECTION 26 10 00 - BASIC MATERIALS AND METHODS

D. Cleaning and Repair

END OF SECTION 26 00 10

PART 2 - PRODUCTS

2.01 RACEWAYS AND FITTINGS

B. Fittings:

2.02 WIRE AND CABLE

2.03 WIRE CONNECTIONS

2.04 SURFACE RACEWAYS

2.05 OUTLET BOXES

acceptable

2.07 DISCONNECTS

PART 3 - EXECUTION

3.02 WIRE INSTALLATION

3.03 WIRING DEVICE INSTALLATION

3.05 EQUIPMENT CONNECTIONS

END OF SECTION 26 10 00

ductwork or mechanical equipment

Submit elementary control diagrams.

cover plates.

3.04 DEVICES

A. Branch circuit conductors shall be as follows:

3.01 CONDUIT INSTALLATION

2.06 DEVICES

PART 1 - GENERAL (Not Used)

E. Installation

ELECTRICAL SPECIFICATIONS:

B. Directory Cards, Nameplates and Labels: No temporary markings, which are visible on equipment, shall remain after the project is complete. Repaint trims, housing, etc., where such markings cannot be readily removed. Defaced finishes must be refinished. All engraved metal or plastic nameplates shall be white letters on a black or gray background. Raised letter type tape shall not be used. No abbreviations in labeling will be permitted without special approval. All panelboards shall be labeled as designated on the electrical drawings. Thoroughly clean surface to which pressure sensitive type labels are applied to assure adherence of label. Directory cards. nameplates, and labels shall indicate the general area and type of electrical load served by each circuit. Provide the following types of labels at these locations. 1. On each separate mounted disconnect and starter for a motor or fixed appliance, indicate motor or appliance designation, voltage, and phase. (Motor or appliance designations shall be as given on the Mechanical or Architectural plans.) Use three-sixteenth inch (3/16") minimum height letters.

3. For all device plates for switches used to control exhaust fans or other equipment, provide one-eighth inch (1/8") minimum height black filled, engraved letters on 4. For all receptacle device plates, provide one-eighth inch (1/8") minimum height letters on white (normal power) and red (emergency power) nameplates indicating panel

A. Provide all temporary facilities required to supply construction power and light. Install and maintain facilities in a manner that will protect the public and workmen. Comply B. The General Contractor shall pay for all power and light used by him and his subcontractors where construction power is separately metered, or is taken from the

- A. Existing systems and conditions shown on the drawings are provided for guidance only. The Electrical Contractor shall field check all existing conditions prior to bidding and shall include in his bid an allowance for the removal and relocation of existing conduits, wires, devices, fixtures, or other equipment as indicated on the plans or as B. Where the reuse of existing conduits, outlets, junction boxes, etc., is permissible, make certain that the wiring form them is continuous from outlet to outlet. Provide
- Existing conduits, wire, devices, fixtures, etc., which shall be removed shall become the property of this Contractor unless otherwise noted. C. Connect new work to existing in a manner that will assure proper raceway grounding throughout in conformance with the National Electrical Code. D. Remodel Work Cutting and Patching: The Contractor shall perform cutting, channeling, chasing, drilling, etc., as required to install or remove electrical equipment in areas of remodeling. This work shall be performed so as to minimize damage to portions of wall finishes, surfaces, plastering, or the structure which are to be reused, resurfaced, E. Carefully coordinate with the required remodeling work, cutting and patching etc., performed by the other trades. Remove or relocate existing electrical conduits, wires,
- F. All outages on portions of existing electrical systems shall be minimized and shall be at a time and of duration as accepted by the Owner.

3. Demolition drawings are based on casual field observation and existing record documents. Report discrepancies to Architect before disturbing existing installation.

4. Fire protection, fire alarm, and detection systems shall be maintained and capable of proper operation during construction. The local Fire Marshall shall be notified before construction starts, when scheduled interruptions are expected and after construction is complete. Protect and support life safety systems routed through areas

4. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

5. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for

6. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.

8. Repair adjacent construction and finishes damaged during demolition and extension work. 9. Maintain access to existing electrical installations, which remain active. Modify installation or provide access panel as appropriate.

10. Extend existing installations using materials and methods compatible with existing electrical installation, or as specified in individual section. 1. Clean and repair existing materials and equipment, which remain or are to be reused.

2. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

3. Luminaries: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace

1. Install relocated materials and equipment under the provisions of Division 1.

1. Conduits installed underground or in grade slabs shall be Schedule 40 PVC with ground wire.

2. Conduits subject to mechanical damage or where otherwise required by code shall be galvanized rigid heavy wall conduit; all other conduit may be electric metallic . Flexible metallic conduit shall be used where vibration or other reasons do not allow solid connections to motors, equipment, etc. Flex may also be used to fish in existing walls or where required to connection in millwork. The use of flex shall be held to a minimum. Where flexible metallic conduit is used in areas subject to 4. Where approved by applicable codes, type "ENT" non-metallic conduit may be used for branch circuits.

5. Where approved by applicable codes, type "MC" aluminum metal clad cable may be used for feeders and branch circuits.

A. Voltage range 0 to 24: High conductivity copper, thermo-plastic insulation, 300 volt rating.

3. Voltage range 24 to 600: High conductivity copper, moisture-resistant thermo-plastic insulation, 600 volt 75°C rating for general use. For HID fixtures and wiring within 3 inches of fluorescent ballasts, wire shall be copper, minimum 90°C rated. Sizes indicated are for installation in a maximum 30°C ambient. Conductor ampacity shall be C. Conductors used specifically for equipment or service ground may be bare or have insulation to match circuit/feeder conductors.

A. All electrical connections shall be electrically and mechanically secure, using the following methods: 1. Wire size #8 and smaller--pressure type connectors (scotch-lok) or equivalent.

2. Wire size #6 and larger--mechanical or compression lugs. Burndy, T & B. Ilsco or equivalent B. Wire termination provisions for panelboards, circuit breakers, safety switches, and all other electrical apparatus shall be listed as suitable for 75°C.

A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturers standard enamel finish in color selected by Architect. B. Manufacturer shall be Thomas& Betts Corporation, Walker systems, Inc. (The Wiremold Company), or approved equal.

A. Outlet boxes shall be: one piece steel, galvanized, Steel City Electric, Appleton Electric, Raco or approved equivalent. Where NMC or ENT is used, plastic boxes are

A. Wiring devices shall be specification grade and rated at 20 amperes for light switches and 20 amperes for duplex receptacles. Switches, receptacles, and other devices

shall be Leviton Decora style, or Pass Seymour, Cooper, or Hubbell equivalent. Color shall be ivory unless noted otherwise by Architect B. GFCI receptacles shall be straight blade feed through type with indicator light that is lighted when device is tripped.

D. Wall plates shall be smooth, high-impact thermoplastic material for finished spaces. Galvanized steel for unfinished spaces. Cast aluminum with spring-loaded lift cover

E. Wet locations weatherproof cover plates shall be NEMA250, complying with type 3R weather resistant in-use rating die-cast aluminum with lockable cover.

A. Safety switches shall be heavy-duty, quick-make, quick-break with cover interlock, fusible or non-fusible, and grounding lugs in enclosure to suit locations and requirements.

A. All wiring shall be installed in listed raceways. Raceways in slab-on-grade or below grade shall be schedule 40 PVC. Transitions from below to above grade shall be with rigid steel elbows with P.V.C. Jacket or approved equal protection. EMT fittings shall be malleable iron or steel. Connectors shall be insulated throat type. B. Make conduit bends with standard conduit elbows or conduit bent to not less than the same radius. All bends shall be free from dents or flattening. C. All fittings in wet places, locations exposed to weather, or buried in masonry, concrete or fill, shall be water-tight. Apply listed compound to threads of raceway and fittings D. At locations subject to moisture or vibration, use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

E. Cap conduit ends to prevent entrance of foreign materials during construction.

F. Run concealed conduits in a direct line. Run exposed conduits parallel to, or at right angles with, lines of the building. Install all conduits at least 6" away from flues, steam and hot water pipes. Install horizontal raceway runs above water and steam piping. G. Seal all conduit penetrations of fire rated walls, floor, or ceilings with U.L. listed "Dow Corning" #2000 or #2001 fire stop sealant or equivalent. H. All empty raceway systems shall have a polypropylene pullwire or equal, and shall be identified at all junction, pull and termination points using permanent metallic tags.

Tag shall indicate intended use of conduit, origination, and termination points of each individual conduit. I. Non-metallic and flexible metal conduits shall have a code-sized copper grounding conductor. Increase conduit size as required. J. Conduits penetrating through roof shall have roof flashing with caulk type counter flashing sleeve. Installation shall be watertight.

K. Where panels are installed flush with walls, empty conduits shall be extended from the panel to an accessible space above or below. A minimum of one 3/4"c shall be installed for every three single pole spare circuit breakers or spaces, or fraction thereof, but not less than two conduits.

1. For general applications through size #8: THWN 75 <sup>o</sup>C wire and full size ground, or type THHN 90 <sup>o</sup>C. 2. Branch circuit conductors through size #10 to be solid, #8 and larger stranded.

3. Unless indicated on the drawings, (the minimum) wire used for branch circuits shall be #12 THWN protected by 20 ampere circuit breakers. 4. Branch circuits for receptacles shall be on 20 amp, single pole circuit breakers with #12 conductors. No more than eight (8) duplex receptacles shall be on any one branch circuit. Circuits serving bathroom GFCI receptacles may serve lighting but shall not serve any other receptacles. 5. Lighting branch circuit shall not be loaded to more than 70% of breaker rating, in effect, 14 amps per circuit. B. The drawings indicate the general direction of routes of branch circuit home runs. Continue all such home runs to panels as though the routes were completely indicated.

1. Conductors shall be continuous from outlet box to outlet box, or junction box, with no splices except in such boxes. 2. Do not install wire in conduits until after plastering or drywall is completed and all moisture has been removed from conduits.

A. Review architectural and mechanical drawings before installing outlets. Changing of outlets to conform to these drawings and any other slight change in mounting height or location of outlets required shall be considered as a part of this contract. Use outlet boxes of sufficient size and shape to best suit the particular location and to contain the enclosed wire and connections without crowding. Size all boxes per N.E.C. Article 370. B. Switch and receptacle outlet boxes shall be standard boxes with cover plates. Where more than one switch or device is located at one point, use gang boxes and gang C. Receptacles in wet locations shall be installed with a binged outlet cover/enclosure marked "suitable for wet locations while in use" and "UL listed". There must be a gasket between the enclosure and the mounting surface, and between and hinged cover and mounting plate/base to assure proper seal. Taymac; specification grade or equivalen D. Flush mount lighting switches 4'0" centerline above finished floor unless otherwise indicated. Flush mount wall type receptacles and other wall mounted wiring devices and outlets 18 inches centerline above finished floor unless otherwise indicated.

F. Set metal floor boxes level. Trim after installation to fit flush with finished floor surfaces. G Set non-metallic floor boxes level Trim after installation to fit flush with finished floor surfaces H. Identify panelboard and circuit number on receptacles with durable wire markers and tags inside outlet boxes

A. Support all panels, junction boxes and other electrical devices in a manner as required by the N.E.C. Use extra bracing, supports, etc. as necessary to provide a proper

A. Final connections to motors, transformers and other vibrating equipment shall be with seal tite flex and approved fittings. Do not secure conduits, disconnects, or devices to B. Final connections to equipment shall be in accordance with manufacturer's approved wiring diagrams, details, and instructions. It shall be the Contractor's responsibility to provide materials and equipment compatible with equipment actually supplied. C. Electrical Contractor shall provide controls, interlocks, accessories, etc. in motor control starters as required by the temperature control Contractor. Starters shall contain 120V control transformer, pilot light, and pushbuttons or selector switch as required, in addition to other items (auxiliary contacts, door switches, relays, etc.) required.

SECTION 26 40 00 - ELECTRICAL SERVICE AND DISTRIBUTION

PART 1 - GENERAL 1.01 ELECTRICAL SERVICE CHARACTERISTICS (NOT USED)

PART 2 - PRODUCTS

2.01 BRANCH CIRCUIT PANELS

A. Bolt on circuit breaker type with hinged door, indoor circuit directory. Circuit breakers to meet the non-interchangeability requirements of the N.E.C. where applicable; all breakers 20 ampere single pole unless otherwise noted; all multiple units common trip. Mains with lugs or main circuit breakers as shown on the panelboard schedules. All panels to have neutral and ground bus. General Electric, ITE, Square D, Cutler-Hammer equivalent B. Molded case circuit breakers with series-connected rating to meet available fault currents. GFCI circuit breakers shall be single or two pole configurations with 5 mA trip sensitivity. AFCI circuit breakers shall be single pole configuration that provides protection from an arcing fault by de-energizing the circuit when the fault is detected. Shunt trip circuit breaker energized from a separate 120V circuit set to trip at 75 % of rated voltage.

PART 3 - EXECUTION 3 01 MOUNTING

A. Install distribution equipment in accordance with manufacturer's recommendation, and as shown on the drawings. B. Install wall-mounted equipment 5' 0" centerline above finished floor unless otherwise indicated C. Install top of panelboards 6'6" above finished floor unless otherwise noted on the drawings. Mount plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish

- D. Stub four 1-inch empty conduits from panel boards into accessible ceiling space or below slab not on grade.
- 3.02 IDENTIFICATION A. Identify panelboard name, voltage and ampacity with engraved machine printed nameplate on panelboard mounted with corrosion resistant screws. B. Create a typewritten directory schedule indicating installed circuit loads mounted to inside door cover in removable transparent pocket.
- 3.03 COMPATIBILITY A. The Contractor is responsible for all coordination with the utility company for this project, to insure the installation of electrical services shall be compatible with the entire project, and to insure that electrical service is installed at a time as to provide necessary electrical power as required to the completed project. Single phase equipment on a three phase distribution system shall be connected to insure as near a balanced system load as possible.

END OF SECTION 26 40 00

SECTION 26 50 00 - LIGHTING & LIGHTING CONTROLS

PART 1 - GENERAL

1.01 PROVISIONS

- A. Provide all interior and exterior lighting fixtures as shown on the plans and hereinafter specified. All items shall be provided to make a complete and operable lighting system, including lamps, ballasts, poles, hangers, painting, plaster frames, etc. B. Fixtures shall be as shown in the fixture schedule. Catalog numbers shown are the latest available at the time of design. If discrepancies occur between description and
- catalog number, description will take precedence. C. Verify trim, finish and general description of all lighting fixtures through shop drawing approval prior to placing order for fixtures. Modify catalog numbers accordingly.

PART 2 - PRODUCTS

2.01 EMERGENCY OR NIGHT LIGHTING A. Fixtures indicated as being on emergency shall be provided with self-contained battery powered inverter unit for direct mounting in fixture. Provide unit with fully automatic

two rate charger, nickel cadmium battery, AC "on" pilot light, and test switch. Design and wire unit to automatically transfer to battery supply on loss of normal AC power and to operate 32 watt T8 fluorescent lamp with minimum output of 600 lumens for minimum 1-1/2 hours.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install lighting fixtures straight and true with reference to adjacent walls, and securely fasten to and support by structural members of the building. Refer to architectural or interior reflected ceiling plans and elevations for exact location of fixtures. B. Recessed light fixtures installed in gyp. board or plaster ceilings shall have plaster frames installed prior to ceiling material. C. Multi-ballasted fluorescent fixtures shall be dual switched unless noted otherwise.
- Clip fixture to grid on two sides with factory-furnished clips. Final connection to fixture shall be made with a flexible U.L. approved assembly. END OF SECTION 26 50 00

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- D. Fixtures recessed in "t-bar" ceiling shall be supported independently of ceiling system, with four #12 hanger wires up to structure. Secure hanger wires to corners of fixture.









- DEMO NOTES
- 2 DISCONNECT AND REMOVE ALL EXISTING ELECTRICAL FIXTURES AND EQUIPMENT.

SAME LOCATION AT 18" AFF.





NOTES:

REMAIN IN ORDER TO KEEP SYSTEMS OUTSIDE OF THE AREA OF DEMOLITION IN OPERABLE CONDITION. CONTRACTOR SHALL PROVIDE APPROPRIATE PROTECTION AND EXERCISE CARE WHEN PERFROMING

3. ALL SYSTEMS LOCATED OUTSIDE THE AREA

5. ELECTRICAL CONTRACTOR SHALL REMOVE ALL DEMOLISHED ITEMS FROM SITE UNLESS OWNER WISHES TO RETAIN. ITEMS REMOVED FROM SITE SHALL BE DISPOSED OF IN A

SCOPE IN THIS OCCUPIED SPACE. ELECTRICAL CONTRACTOR SHALL PROVIDE A REASONABLE ALLOWANCE TO INCLUDE THE REMOVAL OF ITEMS NOT INDICATED ON THE ELECTRICAL DEMOLITION PLAN.

1 DISCONNECT AND REMOVE ALL EXISTING ELECTRICAL FIXTURES AND EQUIPMENT IN EXISTING INSTRUMENTAL SPACE.

3 DISCONNECT AND REMOVE RECEPTACLE. STORE AND PROTECT TO BE RELOCATED IN





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- DEMO NOTES

NOTES:

SCOPE OF WORK; THE CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY IN FIELD PRIOR

REMAIN IN ORDER TO KEEP SYSTEMS OUTSIDE OF THE AREA OF DEMOLITION IN OPERABLE CONDITION. CONTRACTOR SHALL PROVIDE APPROPRIATE PROTECTION AND EXERCISE CARE WHEN PERFROMING

3. ALL SYSTEMS LOCATED OUTSIDE THE AREA

5. ELECTRICAL CONTRACTOR SHALL REMOVE ALL DEMOLISHED ITEMS FROM SITE UNLESS OWNER WISHES TO RETAIN. ITEMS REMOVED FROM SITE SHALL BE DISPOSED OF IN A

6. EVERY ATTEMPT WAS MADE TO LOCATE ALL ITEMS TO BE INCLUDED IN THE DEMOLITION ELECTRICAL CONTRACTOR SHALL PROVIDE A REASONABLE ALLOWANCE TO INCLUDE THE REMOVAL OF ITEMS NOT INDICATED ON THE ELECTRICAL DEMOLITION PLAN.

2 SALVAGE EXISTING PLUGMOLD ROUTED ALONG THIS WALL FOR REUSE. 3 ALL EXISTING ELECTRICAL FIXTURES AND





Sheet No:

ED2.2













NOTES: 1. DEMOLITION PLAN INDICATES A DESIRED SCOPE OF WORK; THE CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY IN FIELD PRIOR 2. CONDITIONS MAY EXIST WHERE (E) CABLING AND/OR EQUIPMENT IS INSTALLED WITHIN AN AREA OF DEMOLITION THAT IS INTENDED TO REMAIN IN ORDER TO KEEP SYSTEMS OUTSIDE OF THE AREA OF DEMOLITION IN OPERABLE CONDITION. CONTRACTOR SHALL PROVIDE APPROPRIATE PROTECTION AND EXERCISE CARE WHEN PERFROMING DEMOLITION AROUND SUCH CABLING AND TAB 3. ALL SYSTEMS LOCATED OUTSIDE THE AREA OF DEMOLITION ARE INTENDED TO REMAIN Associates 4. FOR ALL ITEMS TO BE DEMOLISHED REMOVE CIRCUIT BACK TO POINT OF CONNECTION. MAKE BRANCH CIRCUIT WITH REMAINING The Architectural Balance 0056 Edwards Village Blvd. Suite 210 Edwards, CO 8132 5. ELECTRICAL CONTRACTOR SHALL REMOVE (970) 766-1470 ALL DEMOLISHED ITEMS FROM SITE UNLESS OWNER WISHES TO RETAIN. ITEMS REMOVED fax: (970) 766-1471 email: tab@vail.net www.tabassociates.com FROM SITE SHALL BE DISPOSED OF IN A 6. EVERY ATTEMPT WAS MADE TO LOCATE ALL ITEMS TO BE INCLUDED IN THE DEMOLITION ELECTRICAL CONTRACTOR SHALL PROVIDE A REASONABLE ALLOWANCE TO INCLUDE THE REMOVAL OF ITEMS NOT INDICATED ON THE ELECTRICAL DEMOLITION PLAN. DEMO NOTES 1 DISCONNECT AND REMOVE ALL EXISTING LIGHTING FIXTURES AND CONTROLS WITHIN SHADED REGION. 0 0 C S 1 CO 80487 Steamboat Springs Middle 39610 Amethyst Driv Steamboat Springs, C0 8048 Description Issue Dates: DD SET 2-21-2020 Sheet Title: FIRST LEVEL AREA A DEMO LIGHTING PLAN KEY PLAN Project No: 10183.00

Sheet No:

ED2.11







- ROUGH-IN.





COORDINATE ALL RECEPTACLE MOUNTING LOCATIONS WITH FIXTURES, APPLIANCES, FURNITURE, CABINETRY, AND OTHER EQUIPMENT PRIOR TO ROUGH-IN. 2. REFER TO MECHANICAL EQUIPMENT SCHEDULE FOR CIRCUIT, DISCONNECT, AND CONDUCTORS FOR MECHANICAL EQUIPMENT. 3. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR FIELD COORDINATING THE LOCATION OF ELECTRICAL EQUIPMENT, JUNCTION BOXES, DISCONNECTS, ETC. EC SHALL BE TAB RESPONSIBLE FOR COORDINATION AND THE ROUTING OF FEEDERS, AND BRANCH Associates 4. COORDINATE POWER CONNECTIONS FOR OWNER PROVIDED EQUIPMENT AND APPLIANCES, AND ALL OTHER EQUIPMENT PROVIDED BY OTHER DIVISIONS WITH SUBMITTAL DATA CUT SHEETS, WIRING The Architectural Balance 0056 Edwards Village Blvd. Suite 210 Edwards, CO 8132 DIAGRAMS, AND MANUFACTURER'S WRITTEN (970) 766-1470 INSTALLATION INSTRUCTIONS. FIELD fax: (970) 766-1471 email: tab@vail.net www.tabassociates.com COORDINATE FINAL LOCATIONS OF EQUIPMENT AND POWER CONNECTIONS WITH GENERAL CONTRACTOR AND OTHER DIVISIONS/CONTRACTORS PRIOR TO ROUGH-**#** FLAG NOTES: 1 PROVIDE 3#12, 1#12 G, 3/4"C TO NEW OVERHEAD GARAGE DOORS. 2 NEW LOCATION, AT 18" AFF, FOR STORED RECEPTACLE. 3 PROVIDE SIMPLEX RECEPTACLE FOR HUBBELL #ACA12345-DR20 PULL-DOWN RECEPTACLE OR EQUIVALENT. COORDINATE EXACT LOCATION OF RECEPTACLE WITH ARCHITECT PRIOR TO 0 0 ch S (1) 00 Middle 80 Ο C $(\mathbf{0})$ prings Amethy Spring at imboat S 39610 S σ Ste Issue Dates: DD SET 2-21-2020 Sheet Title: FIRST LEVEL AREA A ELEC PLAN KEY PLAN Project No: 10183.00 BG BUILDINGWORKS systemsfulfilled 303.278.3820 www.bgbuildingworks.com Project No. 10183.00 Copyright 2020 ALBUQUERQUE | AVON | DENVER | FORT COLLINS Sheet No: E2.1





NOTES: 1. REFER TO ARCHITECTURAL PLANS AND INTERIOR ELEVATIONS FOR FINAL RECEPTACLE AND DEVICE PLACEMENT. COORDINATE ALL RECEPTACLE MOUNTING LOCATIONS WITH FIXTURES, APPLIANCES, FURNITURE, CABINETRY, AND OTHER EQUIPMENT PRIOR TO ROUGH-IN. 2. REFER TO MECHANICAL EQUIPMENT SCHEDULE FOR CIRCUIT, DISCONNECT, AND CONDUCTORS FOR MECHANICAL EQUIPMENT. 3. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR FIELD COORDINATING THE LOCATION OF ELECTRICAL EQUIPMENT, JUNCTION BOXES, DISCONNECTS, ETC. EC SHALL BE TAB RESPONSIBLE FOR COORDINATION AND THE ROUTING OF FEEDERS, AND BRANCH Associates 4. COORDINATE POWER CONNECTIONS FOR OWNER PROVIDED EQUIPMENT AND APPLIANCES, AND ALL OTHER EQUIPMENT PROVIDED BY OTHER DIVISIONS WITH SUBMITTAL DATA CUT SHEETS, WIRING The Architectural Balance 0056 Edwards Village Blvd. Suite 210 Edwards, CO 8132 DIAGRAMS, AND MANUFACTURER'S WRITTEN (970) 766-1470 INSTALLATION INSTRUCTIONS. FIELD fax: (970) 766-1471 email: tab@vail.net www.tabassociates.com COORDINATE FINAL LOCATIONS OF EQUIPMENT AND POWER CONNECTIONS WITH GENERAL CONTRACTOR AND OTHER DIVISIONS/CONTRACTORS PRIOR TO ROUGH-# FLAG NOTES: 1 PROVIDE SIMPLEX RECEPTACLE FOR HUBBELL #ACA12345-DR20 PULL-DOWN RECEPTACLE OR EQUIVALENT. COORDINATE EXACT LOCATION OF RECEPTACLE WITH ARCHITECT PRIOR TO ROUGH-IN. 2 PROVIDE ELECTRICAL CIRCUIT FOR NEW FUME HOOD. 3 PROVIDE ADD ALTERNATE PRICE TO PROVIDE EMERGENCY SHUT-OFF FOR ALL RECEPTACLES IN CLASSROOM. REPLACE EXISTING CIRCUIT BREAKERS SERVING EXISTING RECEPTACLES IN CLASSROOM WITH SHUNT TRIP TYPE CIRCUIT BREAKERS. ADD ALTERNATE PRICE TO INCLUDE ALL COMPONENTS TO PROVIDE AN OPERABLE EM SHUTOFF SYSTEM. 4 PROVIDE NEW LEGRAND #X20GB618 PLUGMOLD OR EQUIVALENT. REUSE EXISTING ELECTRICAL CIRCUIT SERVING DEMO'D PLUGMOLD. 0 C S Steamboat Springs Middle S 39610 Amethyst Drive Steamboat Springs, CO 80487 Description lssue Dates: DD SET 2-21-2020 Sheet Title: SCIENCE CLASSROOMS ELEC PLANS



Project No: 10183.00

Sheet No:

E2.2







E2.3

- ROUGH-IN.
- # FLAG NOTES:

- 1 PROVIDE SIMPLEX RECEPTACLE FOR HUBBELL #ACA12345-DR20 PULL-DOWN RECEPTACLE OR
- EQUIVALENT. COORDINATE EXACT LOCATION OF RECEPTACLE WITH ARCHITECT PRIOR TO

- MEZZANINE.
- 2 DISCONNECT EXISTING LIGHTING . CIRCUIT TO PANEL 'EL' LOCATED IN ELECTRICAL ROOM

- CIRCUITS.

NOTES:

1. REFER TO ARCHITECTURAL PLANS AND INTERIOR ELEVATIONS FOR FINAL RECEPTACLE AND DEVICE PLACEMENT. COORDINATE ALL RECEPTACLE MOUNTING LOCATIONS WITH FIXTURES, APPLIANCES, FURNITURE, CABINETRY, AND OTHER EQUIPMENT PRIOR TO ROUGH-IN.

2. REFER TO MECHANICAL EQUIPMENT SCHEDULE FOR CIRCUIT, DISCONNECT, AND CONDUCTORS FOR MECHANICAL EQUIPMENT. 3. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR FIELD COORDINATING THE LOCATION OF ELECTRICAL EQUIPMENT, JUNCTION BOXES, DISCONNECTS, ETC. EC SHALL BE RESPONSIBLE FOR COORDINATION AND THE ROUTING OF FEEDERS, AND BRANCH

4. COORDINATE POWER CONNECTIONS FOR OWNER PROVIDED EQUIPMENT AND APPLIANCES, AND ALL OTHER EQUIPMENT PROVIDED BY OTHER DIVISIONS WITH SUBMITTAL DATA CUT SHEETS, WIRING DIAGRAMS, AND MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS. FIELD COORDINATE FINAL LOCATIONS OF EQUIPMENT AND POWER CONNECTIONS WITH GENERAL CONTRACTOR AND OTHER DIVISIONS/CONTRACTORS PRIOR TO ROUGH-

3 NEW 30A, 3P, NF DISCONNECT ON PRIMARY SIDE OF TRANSFORMER.

4 MOUNT TRANSFORMER HIGH ON WALL.









- ADDITIONAL INFORMATION.
- CONTROL.





NOTES: 1. EXIT SIGNS SHALL BE CIRCUITED TO THE EMERGENCY BRANCH CIRCUIT SERVING THE EMERGENCY LIGHTING IN THE SAME SPACE. 2. SPACES WITH NORMAL AND EMERGENCY LIGHTING SHALL HAVE AN AUTOMATIC LOAD CONTROL RELAY. EMERGENCY LIGHTING IS TO BE CONTROLLED WITH THE NORMAL CONDITIONS. EMERGENCY LIGHTING TO AUTOMATICALLY RETURN TO FULL-BRIGHT IN





2 EXTERIOR LIGHTING TO BE TIED INTO EXISTING BUILDING PHOTOCELL AND TIMECLOCK



| | Revisions: | | | | | | | | | |
|----|-------------|------|--|--|--|--|--|--|--|--|
| No | Description | Date | | | | | | | | |
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| END | | NOTE:
ALL SYMBOLS SHOWN ON LEGEND
ARE NOT NECESSARILY USED. |
|--------------|---|---|
| | | GENERAL SYMBOLS |
| | | JUNCTION BOX |
| | | WALL MOUNTED JUNCTION BOX
FLOOR MOUNTED JUNCTION BOX |
| | | |
| |
 | CONDULL RUN BELOW GRADE |
| | | |
| | — CT12/4 — | CABLE RUNWAY
CABLETRAY (PREMISES; NUMBER INDICATES WIDTH/DFPTH) |
| | | GROUNDING BUSBAR (TGB/TMGB) |
| KS | | DEMARCATION POINT WALL-MOUNT CABINET |
| KS | | EQUIPMENT RACK |
| | | WALL-MOUNTED EQUIPMENT RACK |
| | | AUDIOVISUAL SYMBOLS |
| VITH LUGS | T | TELEVISION OUTLET - WALL MOUNTED |
| ES | | |
| IBOLS | - <u>□</u> V
 | DIGITAL SIGNAGE |
| | | |
| | | AUDIOVISUAL OUTLET - CEILING MOUNTED |
| | | LOUDSPEAKER - CEILING MOUNTED |
| | <u>врк О</u> | LOUDSPEAKER - WALL MOUNTED |
| | | |
| | M | MICROPHONE OUTLET - CEILING MOUNTED
MICROPHONE OUTLET - FLOORBOX |
| | | POINT SOURCE LOUDSPEAKER |
| | | PROJECTION SCREEN, TV, OR OTHER DISPLAY EQPT |
| | | SPEAKER ZONE HOMERUN |
| | | |
| | | |
| BOLS | | REMOTE ANNUNCIATOR PANEL |
| | | |
| | | MONITORED RELAY |
| | | |
| | | CARBON MONOXIDE DETECTOR |
| | | |
| · | | DUCT DETECTOR |
| | н | |
| | $\frac{BB}{CO}$ | SMOKE DETECTOR SOUND BARRIER
SMOKE DETECTOR W/ CARBON MONOXIDE |
| | | BEAM TYPE SMOKE DETECTOR TRANSMITTER |
| ET | RBD
F | BEAM TYPE SMOKE DETECTOR RECEIVER
FIRE ALARM PULL STATION |
| OWERED) | | FIRE ALARM CHIME |
| | | FIRE ALARM CHIME/STOBE |
| | | FIRE ALARM STROBE |
| | | |
| | $-\frac{(F)}{(F)}$ | FIRE ALARM SPEAKER
FIRE ALARM COMBO SPEAKER/STROBE |
| | | FIREMAN'S PHONE JACK |
| | FF | SPRINKLER SYSTEM FLOW SWITCH |
| VITCHES | FSD | FIRE/SMOKE DAMPER |
| | | LOW TEMPERATURE SENSOR |
| | | NURSECALL SYMBOLS |
| | | NORMAL CALL DOME LIGHT - WALL MOUNT |
| | | NORMAL CALL DOME LIGHT - SINGLE LED - WALL MOUNT |
| | | NORMAL CALL DOME LIGHT - WALL MOUNT |
| | | NORMAL CALL DOME LIGHT - SINGLE LED - CEILING MOUNT |
| | $ \frac{\langle z \rangle}{\langle J \rangle} $ | NURSE GALL ZONE LIGHT - CEILING MOUNT
DOMELESS CONTROLLER - ABOVE MOUNT |
| | | NURSE CALL MASTER STATION |
| | | NURSE CALL TERMINAL CABINET CODEBLUE EMERGENCY STATION |
| | | TOILET EMERGENCY STATION w/ PULL CORD |
| | | STAFF EMERGENCY STATION |
| | | DOUBLE PATIENT STATION |
| | | STAFF PRESENCE PAD |
| | <u>- ७२</u>
- िन | DUTY STATION |
| | (B)H | PATIENT BED HANDHELD CONTROL |
| | | |
|] [| DEVIC | E COORDINATION NOTE: |
| N | | SHALL NOT SCALE THESE DRAWINGS TO DETERMINE LOCATIONS
HOWN. IF EXACT DIMENSIONS ARE NECESSARY TO BE ADHERED |
| | TO, DIMENSIO | NS ARE INDICATED WITH CONSTRUCTION DOCUMENTS. |
| · | IT IS THE CON | I RACTOR'S RESPONSIBILITY TO REFER TO THE ARCHITECTURAL
VATIONS, DETAILS AND REFLECTED CEILING PLANS TO DETERMINE
IONS OF COMPONENTS, IT IS THE CONTRACTOR'S RESPONSIBILITY |
| | TO REFER TO | THE ARCHITECTURAL INTERIOR. |
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| | | |
| (
(| | $H_{I} \rightarrow H_{A} \rightarrow \frac{\text{NOTES:}}{1 \text{ IF MOUNTING HEIGHT OF}}$ |
| | 9'-0" CEILING | $H_{\text{I}} = H_{\text{I}} = H_{\text{I}} = H_{\text{I}}$ |
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C | ALL-MTD SUPERCEDE LOCATIONS
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| 24- | | |
| * * | | AGE DEVICES |
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TECHNOLOGY SHEET INDEX

| | | | | 100 | |
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| T0.1 | TECHNOLOGY SCHEDULES | | | | |
| T0.2 | TECHNOLOGY SPECS - DIV 27 | | | | |
| T0.3 | TECHNOLOGY SPECS - DIV 28 | √ | | | |
| | | | | | |
| TD2.1 | FIRST LEVEL AREA A DEMO TECH PLAN | | | | |
| TD2.2 | 6TH GRADE SCIENCE ROOMS DEMO TECH PLAN | \checkmark | | | |
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| ISSUE LOG | B KEY: | | | | |

NOT PART OF SET ISSUED FOR INFORMATION ONLY

GENERAL NOTES:

- [THESE DRAWINGS ACCOMPANY THE PUBLISHED CONSTRUCTION DOCUMENT SPECIFICATION BOOK (PROJECT MANUAL)]. DO NOT SCALE DRAWINGS. VERIFY DIMENSIONS ON ARCHITECTURAL DRAWINGS AND IN FIELD PRIOR TO COMMENCEMENT OF WORK
- WORK ASSOCIATED WITH TECHNOLOGY SYSTEMS REQUIRES CAREFUL, DETAILED COORDINATION, BOTH PREPARTORY AND ON-SITE, BETWEEN THE GENERAL CONTRACTOR, ELECTRICAL CONTRACTOR, AND THE TECHNOLOGY SYSTEMS CONTRACTOR(S). LACK OF PLANNING, COORDINATION, OR SKILL ON PART OF ANY PARTY ASSOCIATED WITH THE SCOPE OF WORK INDICATED WILL NOT BE ACCEPTED AS REASON FOR INSTALLATION THAT DOES NOT MEET SPECIFICATIONS OR INDUSTRY STANDARDS. VISIT SITE PRIOR TO BID AND VERIFY THAT CONDITIONS ARE AS INDICATED. CONTRACTOR SHALL INCLUDE IN HIS BID COSTS
- REQUIRED TO MAKE HIS WORK MEET EXISTING CONDITIONS. IF WORK ON LIVE NETWORKS OR SYSTEMS IS TO BE DONE, SYSTEM DOWNTIME SHALL BE PERMITTED ONLY AT TIMES APPROVED BY OWNER – IN WRITING. WORK WHICH COULD RESULT IN AN ACCIDENTAL OUTAGE SHALL BE PERFORMED WITH THE OWNER'S
- IT/IS STAFF AND/OR MAINTENANCE PERSONNEL ADVISED AND AWARE OF SUCH WORK.] [COMMUNICATIONS SERVICES SHALL BE MAINTAINED TO EXISTING AREAS DURING CONSTRUCTION IF SUCH AREAS ARE TO REMAIN
- LIVE. CONTRACTOR SHALL PROVIDE NECESSARY MEANS AND PROTECTION TO ENSURE UPTIME.] REVIEW ENTIRE CONTRACT DOCUMENT PACKAGE (INCLUDING ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND OTHER DRAWINGS AND SPECIFICATIONS) PRIOR TO BID.
- WORK SHALL BE PERFORMED IN A WORKMANLIKE MANNER TO THE SATISFACTION OF THE ARCHITECT AND ENGINEER. WORK, MATERIALS, AND EQUIPMENT SHALL CONFORM TO THE LATEST EDITIONS OF LOCAL AND STATE ADOPTED CODES AND ORDINANCES. 2014 EDITION OF NFPA 70 - NATIONAL ELECTRICAL CODE SHALL BE MET AT A MINIMUM. APPLICABLE VOLUMES OF NFPA (NFPA 72, NFPA 75, NFPA 76, NFPA 99, NFPA 101, ETC.) SHALL BE ADHERED TO AT A MINIMUM.
- WORK, MATERIALS, AND EQUIPMENT SHALL CONFORM TO THE LATEST APPLICABLE STANDARDS AND RECOMMENDATIONS AS PUBLISHED BY AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI), TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA), ELECTRONIC INDUSTRIES ALLIANCE (EIA), INSULATED CABLE ENGINEERS ASSOCIATION (ICEA), INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE), SECURITY INDUSTRY ASSOCIATION (SIA), BUILDING INDUSTRY CONSULTING SERVICES INTERNATIONAL (BICSI), AND INFOCOMM INTERNATIONAL.
- PROVIDE WITH SHOP DRAWING SUBMITTAL, 1/4" SCALE LAYOUT DRAWINGS OF ROOMS WITH COMMUNICATIONS, AUDIOVISUAL, AND SECURITY DISTRIBUTION OR HEAD-END EQUIPMENT. LAYOUTS SHALL SHOW LOCATIONS OF, AND SHALL BE COORDINATED WITH ELECTRICAL AND MECHANICAL EQUIPMENT. ALL EQUIPMENT SHALL BE DRAWN TO SCALE. CONTRACTOR'S FAILURE TO ORDER OR RELEASE ORDER FOR MATERIALS AND/OR EQUIPMENT WILL NOT BE ACCEPTED AS A
- REASON TO SUBSTITUTE ALTERNATE MATERIALS, EQUIPMENT, OR INSTALLATION METHODS. VERIFY EXACT LOCATIONS OF EXISTING AND NEW UNDERGROUND UTILITIES, PIPING, AND RACEWAY SYSTEMS PRIOR TO TRENCHING. PROVIDE NECESSARY TRENCHING, BACKFILL, EXCAVATION, SUPPORTS, BACKBONES/SERVICE ENTRANCES (CONDUIT AND/OR CABLING) PULLBOXES HANDHOLES MANHOLES PEDESTALS SAWCUTTING AND PATCHING CONCRETE/PAVING ETC. REQUIRED. BACKFILL TRENCHES TO 90 PERCENT COMPACTION AND PATCH TO MATCH EXISTING. CONTRACTOR SHALL OBTAIN AND VERIFY EXACT SERVICE PROVIDER DRAWINGS AND REQUIREMENTS. CONTRACTOR IS TO SUBMIT A COMPLETE CONSTRUCTION DRAWING SET TO THE SERVICE PROVIDERS WITHIN 10 DAYS OF AWARD OF CONTRACT. COORDINATE TIMELINE OF THEIR REVIEW, APPROVAL, CONSTRUCTION SCHEDULING AND INSTALLATION OF THE PEDESTALS OR PROVIDER-OWNED MANHOLES WITH THE SERVICE PROVIDER. NOTIFY OWNER OF ANY SCHEDULING CONFLICTS.
- IFIELD-VERIFY EXISTING INFRASTRUCTURE TO BE RECONNECTED TO NEW OR EXISTING DISTRIBUTION (PATCHPANELS, WIRING BLOCKS, ETC.). PROVIDE ADDITIONAL MATERIAL AS NECESSARY TO COMPLETE.]
- [EXISTING SYSTEMS AND CONDITIONS SHOWN ON DRAWINGS FOR EXISTING BUILDINGS ARE TO BE NOTED "FOR GUIDANCE ONLY." CONTRACTOR SHALL FIELD CHECK ALL EXISTING CONDITIONS PRIOR TO BIDDING. CONTRACTOR SHALL INCLUDE IN THEIR BID AN ALLOWANCE FOR REMOVAL AND/OR RELOCATION OF EXISTING CONDUITS, CABLES, DEVICES, FIXTURES, OR OTHER EQUIPMENT AS INDICATED ON THE PLANS OR AS REQUIRED TO COORDINATE AND ADAPT NEW AND EXISTING TECHNOLOGY SYSTEMS TO ALL OTHER WORK AS REQUIRED.]
- [PROVIDE TECHNOLOGY SYSTEMS DEMOLITION REQUIRED. REFER TO ARCHITECTURAL, TECHNOLOGY SYSTEMS AND ELECTRICAL DEMOLITION DRAWINGS FOR LOCATION AND EXTENT OF DEMOLITION REQUIRED. CONTRACTOR SHALL VISIT SITE PRIOR TO BID TO DETERMINE EXTENT OF WORK INVOLVED. PROVIDE LABOR AND MATERIALS REQUIRED TO MAINTAIN AND/OR RESTORE CONTINUITY OF SERVICE TO EXISTING DEVICES.]
- [PROVIDE ALL NECESSARY DEMOLITION TO REMOVE EXISTING UNUSED CONDUIT, CABLE, J-BOXES, OUTLETS, DEVICES, AND THE LIKE, COMPLETE WITH ASSOCIATED CABLING TO DISTRIBUTION LOCATION. WHERE IT IS NOT FEASIBLE TO REMOVE THE ABOVE, OUTLET SHALL BE ABANDONED, CABLE REMOVED, AND BLANK COVER PLATES PROVIDED.] [ALL (E) EQUIPMENT BEING REMOVED SHALL BE [DISCARDED] [RECYCLED] IN ACCORDANCE WITH APPLICABLE EPA AND LOCAL
- REQUIREMENTS.1 [EXISTING LIGHT FIXTURES, ELECTRICAL EQUIPMENT, ETC. BEING REMOVED SHALL BE RETURNED TO THE OWNER, EXCEPT FOR THOSE ITEMS BEING RELOCATED.]
- VERIFY EXACT LOCATION OF EQUIPMENT TO BE FURNISHED BY OTHERS PRIOR TO ROUGH-IN.
- INSTALL ALL MATERIALS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. ANY DEVIATIONS SHALL BE BROUGHT TO THE ARCHITECT/ENGINEER'S ATTENTION PRIOR TO INSTALLATION.
- FINAL CONNECTIONS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH MANUFACTURER'S APPROVED WIRING DIAGRAMS, DETAILS, AND INSTRUCTIONS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE MATERIALS AND EQUIPMENT COMPATIBLE WITH EQUIPMENT ACTUALLY SUPPLIED.
- CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING EQUIPMENT WHICH IS DAMAGED DUE TO INCORRECT FIELD WIRING PROVIDED UNDER THIS SECTION OR FACTORY WIRING IN EQUIPMENT PROVIDED UNDER THIS SECTION. [WHERE THE RE-USE OF EXISTING EQUIPMENT, CONDUITS, CABLES, AND DEVICES IS PERMISSIBLE, MAKE CERTAIN THAT THESE COMPONENTS COMPRISE A COMPLETE AND OPERABLE SYSTEM. PROVIDE ADDITIONAL MATERIAL AS NECESSARY TO (RE)
- ESTABLISH OPERATION.1 [WHERE EXISTING PATHWAYS (CONDUIT AND BOXES) ARE TO BE REUSED, ENSURE CABLING PASSES THROUGH NO OUTLET OR JUNCTION BOX WHICH MAY BE RENDERED INACCESSIBLE BY THE ARCHITECTURAL OR STRUCTURAL CHANGES TO BE MADE TO THE BUILDING.1
- [EXISTING CONDUITS, CABLE, AND DEVICES WHICH ARE NOT INDICATED FOR REUSE SHALL BECOME THE PROPERTY OF CONTRACTOR. EQUIPMENT AND DISTRIBUTION EQUIPMENT (PATCHPANELS, WIRING BLOCKS, ETC.) SHALL BE RETURNED TO THE OWNER UNLESS OTHERWISE EXPLICITLY STATED BY OWNER IN WRITING.]
- ALL SYSTEMS COMPONENTS SHALL BE LISTED OR LABELED BY U.L. OR OTHER RECOGNIZED TESTING FACILITY. SYSTEMS SHALL BE TESTED AND VERIFIED UPON COMPLETION OF INSTALLATION. SYSTEMS THAT DO NOT PASS INDUSTRY STANDARD TESTS SHALL BE CORRECTED AT NO ADDITIONAL COST TO OWNER.
- GUARANTEE THE INSTALLATION AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP WHICH MAY OCCUR UNDER NORMAL USAGE FOR A PERIOD OF ONE YEAR AFTER OWNER'S ACCEPTANCE. DEFECTS SHALL BE PROMPTLY REMEDIED WITHOUT COST TO THE PROVIDE SOLUTION-BASED EXTENDED WARRANTIES FOR STRUCTURED CABLING SYSTEMS. PROVIDE ALL NECESSARY
- DOCUMENTATION TO OWNER PRIOR TURNOVER. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF AS-BUILT RECORD DRAWINGS ON-SITE WHICH SHALL BE AVAILABLE FOR REVIEW DURING ENGINEER'S SITE OBSERVATIONS. UPON COMPLETION, PROVIDE OFFICIAL SET OF RECORD DRAWINGS TO ARCHITECT, IN FORMAT AS REQUESTED BY OWNER. DRAWINGS SHALL INCLUDE ALL ADDENDUM ITEMS, CHANGE ORDERS, FIELD
- ALTERATIONS, REROUTINGS, ETC CONDUITS FOR TECHNOLOGY SYSTEMS LARGER THAN TRADE SIZE 1 (1") SHALL HAVE LONG-RADIUS SWEEPS AT ALL CHANGES IN DIRECTION. LONG-RADIUS SWEEPS SHALL BE MINIMUM 12X CONDUIT DIAMETER.
- OUTLET BOXES SHALL BE MINIMUM 4-11/16"x4-11/16"x2-1/2", METALLIC OR NONMETALLIC AS PROJECT REQUIREMENTS DICTATE.
- FLEXIBLE METAL CONDUIT SHALL NOT BE USED AS CABLE PATHWAY. ONLY SMOOTH-WALLED METALLIC CONDUIT OR TUBING MAY BE USED. ALTERNATELY, PLASTIC-TYPE (ENT AND/OR PVC) TUBING MAY BE USED. ALL METALLIC SUPPORT COMPONENTS (CONDUITS, SLEEVES, PATHWAYS, CABLETRAY, J-HOOKS OR OTHER SUPPORT, RACKS, CABINETS, ETC.) SHALL BE BONDED WITH NO SMALLER THAN #6AWG INSULATED (GREEN) COPPER BONDING CONDUCTORS. ALL
- COMPONENTS SHALL BE BONDED TO TELECOMMUNICATIONS GROUNDING BUS. REFERENCE DRAWINGS AND ANSI J-STD-607-A STANDARD ALL EMPTY RACEWAY SYSTEMS SHALL HAVE A NYLON PULLTAPE INSTALLED. PULLTAPE SHALL HAVE PHYSICAL LENGTH MARKINGS AND BE RATED FOR 200-LB STRENGTH. EMPTY PATHWAYS SHALL BE IDENTIFIED AS SUCH AT ALL JUNCTION BOXES. PULLBOXES. AND OUTLET/DEVICE BOXES, USING PERMANENT LABELING. LABELING TAG SHALL INDICATE INTENDED USE OF
- CONDUIT, LOCATION OF PATHWAY ORIGINATION, AND LOCATION OF TERMINATION OF EACH INDIVIDUAL CONDUIT. ALL CABLING SHALL BE INDEPENDENTLY SUPPORTED FROM STRUCTURAL ELEMENTS. CABLING IS NOT ALLOWED TO COME IN CONTACT WITH PIPING, ELECTRICAL CIRCUITS/CONDUITS, LIGHTING FIXTURES, DUCTWORK, OR ANY OTHER INSTALLED SYSTEM. CABLING SHALL NOT USE STRUCTURAL MEMBERS ALONE AS SUPPORT; APPROPRIATE J-HOOKS, BRIDLE RINGS, OR SIMILAR SHALL BE USED. CABLING SHALL BE INSTALLED WITH SUPPORTS NO GREATER THAN 5'-0" SPACING.
- ALL EQUIPMENT SHALL BE INDEPENDENTLY SUPPORTED FROM STRUCTURAL ELEMENTS. PROVIDE PULLBOXES ALONG CONDUIT RUNS AT 100 FEET INTERVALS OR EVERY 180-DEGREES OF BENDS, OR BOTH.
- CONDUITS MAY NOT CHANGE DIRECTION MORE THAN 90 DEGREES AT ANY SINGLE BEND.

SYSTEM.1

CONDULETTE FITTINGS MAY NOT BE USED TO CHANGE PATHWAY DIRECTION AT ANY TIME. FIRE ALARM SYSTEM IS A DESIGN/BUILD SYSTEM THAT SHALL BE IN ACCORDANCE WITH ALL APPLICABLE CODES AND AUTHORITIES HAVING JURISDICTION (AHJ). INFORMATION CONTAINED HEREIN IS PROVIDED TO INDICATE A SYSTEM INTENT AND GENERAL PERFORMANCE REQUIREMENTS. DEVICE LOCATONS SHOWN ARE FOR BASIC QUANTITY COORDINATION FOR BIDDING PURPOSES AND GENERAL INTER-TRADE COORDINATION. FINAL SYSTEM SHOP DRAWINGS (SUBMITTED TO THE AHJ FOR APPROVAL) SHALL BE PREPARED AND STAMPED BY EITHER A LICENSED FIRE PROTECTION PROFESSIONAL ENGINEER (PE) IN THE STATE OF JURISDICTION, OR FIRE ALARM SYSTEM DESIGNER/CONTRACTOR WITH NICET LEVEL III (OR ABOVE) CERTIFICATION. DESIGN/BUILD CONTRACTOR SHALL, UPON REVIEW OF THE DOCUMENTS, PROVIDE ALLOWANCE FOR ADDITIONAL COMPONENTS (DEVICES, CABLING, ETC.) REQUIRED BEYOND INDICATED SCOPE IN THESE DRAWINGS TO PROVIDE A COMPLETE AND OPERABLE







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Revisions Description

> Issue Dates: DD SET 2-21-2020

Sheet Title: **TECH COVER** SHEET



| TECHNOLOGY SY | STEMS | RESPO | NSIBILITY | <u>Y MATRIX</u> | | |
|---|-------------------------------------|----------------------------------|--------------------------------------|-----------------------------|--|--|
| | EN | ΓΙΤΥ | NOTES | | | |
| | | | APPLY TO
ALL | | | |
| COMPONENT | FURNISH | INSTALL | ENTITIES | SPECIFIC NOTES | | |
| COMMON WORK | | | | | | |
| CABLE PATHWAY FIRE STOPPING DEVICE | E | E | 1 | | | |
| FIRE RATED FLOOR PENETRATION ASSEMBLY | E | E | 1 | | | |
| HANGER SUPPORTS FOR CABLE SUPPORTS | Т | Т | 2 | | | |
| MISCELLANEOUS FIRE STOPPING MATERIAL | GC | GC | 1, 5 | | | |
| PENETRATION
STRAPS / SLINGS | GC
T | GC | 1, 5 | | | |
| WIDE BASE CABLE SUPPORTS (J-HOOKS, | T | T | 2 | | | |
| ARLINGTON LOOPS)
FLECTRICAL FOR COMMUNICATIONS | | | | | | |
| BACKBOXES | E | E | 1 | | | |
| CONDUIT, FITTINGS, PULL STRINGS | E
F | E | 1 1 3 | | | |
| BONDING BUSBAR | E | E | - | | | |
| BONDING RISER CONDUCTORS
HANGERS AND SUPPORTS FOR CABLE TRAY | E | E | - | | | |
| INNERDUCTS (FABRIC) | E | E | 1 | | | |
| | E | E | 1 | | | |
| PULL BOXES | E | E | 1 | | | |
| SURFACE RACEWAY | E | E | 3 | | | |
| TELECOMMUNICATIONS (STRUCTURED CABLING SYS | TEM) | | · · · | | | |
| BACKBOARDS | GC
T | GC | - (| COORDINATE WITH EC AND TC | | |
| CABLE MANAGEMENT | т | T | - | | | |
| | Т т | T | - | | | |
| EQUIPMENT FRAMES AND ACCESSORIES | T | Т | - | | | |
| EQUIPMENT RACKS AND ACCESSORIES | Т | Т | - | | | |
| HORIZONTAL CABLING | T | T | - | | | |
| | Т | T | - | | | |
| OUTSIDE PLANT BACKBONE CABLING | <u> </u> | T | - | | | |
| | Т | T | - | | | |
| POWER DISTRIBUTION UNITS (PDU) | T | T | - | | | |
| SPLICE ENCLOSURES | T | T | - | | | |
| BONDING | Ι | I | - | | | |
| | Т | Т | - | | | |
| SWITCHES | 0 | 0 | - | | | |
| SERVERS | 0 | 0 | - | | | |
| COPPER PATCH CORDS - WORKSTATIONS / ROOMS | T | T | - | | | |
| | 0 | 0 | - | | | |
| END-USER EQUIPMENT - WIRELESS ACCESS POINTS | AND SYSTEM | 0 | - | | | |
| WIFI SYSTM | 0 | 0 | - | | | |
| WIRELESS SURVEY | 0 | 0 | - | | | |
| END-USER EQUIPMENT - SERVICES | 0 | 0 | | | | |
| DATA | 0 | 0 | - | | | |
| LEGEND | | | | | | |
| GC = GENERAL CONTRACTOR | | | | | | |
| T = TELECOMMUNICATIONS CONTRACTOR | | | | | | |
| E = ELECTRICAL CONTRACTOR $O = OWNER$ | | | | | | |
| GENERAL NOTES: | | | | | | |
| A. SOME COMPONENTS AND ASSOCIATED FURNIS | H AND INSTALL F | RESPONSIBILITIES | S MAY NOT BE INDI | CATED ON THIS MATRIX. | | |
| CONTRACTOR IS RESPONSIBLE FOR FINA DETE
RESPONSIBILITIES REQUIRED FOR PROVISION | ERMINATION OF A | LL COMPONENTS | S AND ASSOCIATED
TEMS READY FOR (| FURNISH AND INSTALL | | |
| DETERMINATION IN SUCH SHALL OCCUR PRIOR | TO BID. | | | | | |
| B. CABLING FOR COMPONENTS SHALL BE PROVID | ED BY ENTITY IN:
FOUIREMENTS (IN | | DNENT UNLESS OT | TERWISE INDICATED. | | |
| ROUGH-IN. | | JULUDING OLEEV | | | | |
| MATRIX NOTES: | | | | | | |
| A. EACH RESPECTIVE TRADE SHALL COORDINATE | | | | PRIOR TO ROUGH IN. | | |
| B. EACH TRADE SHALL COORDINATE PROVISION O
TELECOMMUNICATIONS CONTRACTOR SHALL F | PROVIDE THIS COMPON | | SS DETERMINED OT | HERWISE IN CONJUNCTION | | |
| WITH TELECOMMUNICATIONS CONTRACTOR. | | | | | | |
| D. FURNISHING CONTRACTOR TO PROVIDE ROUG | H IN DIMENSIONS | 6 / TEMPLATE AND | D DESIRED LOCATIO | ON FOR TABLE TOP INTERFACE. | | |
| INSTALLING CONTRACTOR SHALL CUT-OUT SUI
WITH DESIRED LOCATION PRIOR TO PERFORM | RFACE OF TABLE | , IDENTIFYING AN | ID COORDINATING | ANY POTENTIAL CONFLICTS | | |
| E. EACH TRADE SHALL COORDINATE PROVISION (| OF THIS COMPON | ENT WITH GENER | RAL CONTRACTOR. | GENERAL CONTRACTOR | | |
| SHALL PROVIDE THIS COMPONENT UNLESS DE | IERMINED OTHE | RWISE IN CONJU | NCTION WITH GENE | RAL CONTRACTOR. | | |
| G. THE FURNISHING CONTRACTOR SHALL PROVID | E ALL SYSTEM RI | EQUIREMENTS F | OR A FULLY FUNCT | IONAL AND OPERATING | | |
| SYSTEM READY FOR THE OWNERS USE. REQU
CABLING, PROGRAMING, INSTALLATION AND CO | IREMENTS SHALL
DORDINATION UN | INCLUDE BUT NO
LESS NOTED OTH | OT BE LIMITED TO S
HERWISE. | SYSTEM COMPONENTS, | | |
| H. THE TELECOM CONTRACTOR SHALL PROVIDE T
SECURITY CONTRACTOR TO TERMINATE. | THE ACCESS CON | ITROL CABLING A | ND SHALL LEAVE I | T UNTERMINATED FOR THE | | |





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| SECTION 270010 - COMMUNICATIONS GENERAL PROVISIONS | SECTION 27 05 26 - GROUNDING AND BONDING F |
|---|---|
| PART 1 - GENERAL
1.1 DESCRIPTION | PART 1 - GENERAL
1.1 SUMMARY |
| | A. SECTION INCLUDES: |
| WORK SHALL CONSIST OF FURNISHING ALL LABOR, EQUIPMENT, SUPPLIES AND MATERIALS, UNLESS OTHERWISE SPECIFIED,
NECESSARY FOR THE INSTALLATION OF COMPLETE COMMUNICATIONS SYSTEMS AS REQUIRED BY THE SPECIFICATIONS AND AS | GROUNDING CONDUCTORS. GROUNDING CONNECTORS. |
| SHOWN ON THE DRAWINGS, SUBJECT TO THE TERMS AND CONDITIONS OF THE CONTRACT. | 3. GROUNDING BUSBARS. |
| A. THE TECHNOLOGY SYSTEMS DRAWINGS, AND ALL ITEMS HEREINAFTER SPECIFIED. | 2.1 CONDUCTORS |
| 1 TECHNOLOGY SYSTEMS DRAWINGS ARE DIAGRAMMATIC BUT SHALL BE FOULOWED AS CLOSELY AS ACTUAL CONSTRUCTION OF THE | A. MANUFACTURERS: SUBJECT TO COMPLIAN
1 HARGER LIGHTNING AND GROUNDING |
| BUILDING WILL PERMIT. ALL CHANGES FROM DRAWINGS NECESSARY TO MAKE THE WORK CONFORM TO THE BUILDING AS | 2. PANDUIT CORP. |
| 2. COORDINATE THE COMMUNICATIONS WORK WITH THE GENERAL CONTRACTOR AND/OR THE ELECTRICAL CONTRACTOR AND BE | 3. SOUTHWIRE.
B. COMPLY WITH UL 486A-486B. |
| RESPONSIBLE TO THEM FOR SATISFACTORY PROGRESS OF THE SAME. COORDINATE COMMUNICATIONS WORK WITH ALL OTHER
TRADES ON THE PROJECT WITHOUT ADDITIONAL COST TO THE OWNER | C. INSULATED CONDUCTORS: STRANDED COL |
| 3. ALL WORK AND MATERIALS COVERED BY DRAWINGS AND SPECIFICATIONS SHALL BE SUBJECT TO REVIEW AT ANY TIME BY | 1. GROUND WIRE FOR CUSTOM-LENGTH E |
| REPRESENTATIVES OF THE OWNER. IF THE OWNER'S AGENT FINDS ANY MATERIALS OR INSTALLATION THAT DOES NOT CONFORM T
THESE DRAWINGS AND SPECIFICATIONS, CONTRACTOR SHALL REMOVE THE MATERIAL FROM THE PREMISES AND CORRECT THE | D 2. CABLE TRAY EQUIPMENT GROUNDING V
D. CABLE TRAY GROUNDING JUMPER: |
| INSTALLATION TO THE SATISFACTION OF THE AGENT. | 1. NOT SMALLER THAN NO. 6 AWG AND NO |
| A. THE LATEST EDITIONS OF THE FOLLOWING STANDARDS (INCLUDING SUPPLEMENTS AND OFFICIAL INTERPRETATIONS) ARE MINIMUM | FERRULE. ATTACH WITH GROUNDING S |
| REQUIREMENTS:
1. NFPA 70 - NATIONAL ELECTRICAL CODE (NEC) | E. BARE COPPER CONDUCTORS: |
| 2. NFPA 72 - NATIONAL FIRE ALARM CODE | 1. SOLID CONDUCTORS: ASTM B 3. |
| NFPA 101 - LIFE SAFETY CODE ALL APPLICABLE STATE AND LOCAL CODES | 2. STRANDED CONDUCTORS: ASTM B 8.
3. TINNED CONDUCTORS: ASTM B 33. |
| 5. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
6. NATIONAL ELECTRICAL SAFETY CODE (NESC) | 4. BONDING CABLE: 28 KCMILS (14.2 sq. mi
5. BONDING CONDUCTOR: NO. 4 OB NO. 6 |
| 7. AMERICANS WITH DISABILITIES ACTS (ADA) AND AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) 117 | 6. BONDING JUMPER: TINNED-COPPER TA |
| 8. NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)
9. UNDERWRITER'S LABORATORIES (UL) | mm) WIDE AND 1/16 INCH (1.6 mm) THICK
2.2 CONNECTORS |
| 10. INSULATED CABLE ENGINEERS ASSOCIATION (ICEA) | A. MANUFACTURERS: SUBJECT TO COMPLIAN |
| 12. INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS (IEEE) | 2. CHATSWORTH PRODUCTS, INC. |
| 13. BUILDING INDUSTRY CONSULTING SERVICES INTERNATIONAL (BICSI) PUBLICATIONS
14. TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA) STANDARDS AND PUBLICATIONS | HARGER LIGHTNING AND GROUNDING. PANDUIT CORP |
| B. THE DRAWINGS AND SPECIFICATIONS TAKE PRECEDENCE WHEN THEY ARE MORE STRINGENT THAN CODES, STATUTES, OR ORDINANCE | S |
| IN EFFECT. APPLICABLE CODES, ORDINANCES, STANDARDS AND STATUTES TAKE PRECEDENCE WHEN THEY ARE MORE STRINGENT OR
CONFLICT WITH THE DRAWINGS AND SPECIFICATIONS. | B. COMPRESSION WIRE CONNECTORS: CRIMI
COMPRESSED AROUND THE CONDUCTOR. |
| 1.4 SPECIAL REQUIREMENTS
A DEEINITIONS: "DROVIDE" SHALL MEAN "EUDNISH AND INSTALL". "EUDNISH" MEANS TO SUDDLY ALL MATERIALS LABOR, EQUIDMENT | |
| TESTING APPARATUS, CONTROLS, TESTS, ACCESSORIES AND ALL OTHER ITEMS CUSTOMARILY REQUIRED FOR THE PROPER AND | BRONZE U-BOLT GROUNDING CLAMPS, AND |
| COMPLETE APPLICATION. "INSTALL" MEANS TO JOIN, UNIT, FASTEN, LINK, ATTACH, SET UP OR OTHERWISE CONNECT TOGETHER BEFOR
TESTING AND TURNING OVER TO OWNER. COMPLETE AND READY FOR REGULAR OPERATION. THE WORDS "ACCEPT" OR "ACCEPTABLE" | E D. BUSBAR CONNECTORS: CAST SILICON BRO
LONG BARREL AND TWO HOLES SPACED O |
| DENOTE ONLY THAT THE EQUIPMENT ITEMS ARE IN GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT. | |
| DRAWINGS: 1. THE DRAWINGS INDICATE THE GENERAL ARRANGEMENT AND LOCATION OF OUTLETS, DEVICES, MAIN/INTERMEDIATE DISTRIBUTION | A. MANUFACTURERS: SUBJECT TO COMPLIAN |
| FRAMES, MAJOR PATHWAYS, AND OTHER WORK. INFORMATION SHOWN ON THE DRAWINGS IS SCHEMATIC. DRAWINGS AND
SPECIFICATIONS ARE COMPLEMENTARY TO EACH OTHER. WHAT IS CALLED FOR BY ONE SHALL BE AS BINDING AS IF CALLED FOR BY | 1. CHATSWORTH PRODUCTS, INC. |
| BOTH. DATA PRESENTED ON THESE DRAWINGS IS ACCURATE AS PLANNING CAN BE DETERMINED, BUT ACCURACY IS NOT | 3. PANDUIT CORP. |
| GUARANTEED AND FIELD VERIFICATION OF ALL DIMENSIONS, LOCATIONS, LEVELS, ETC., TO SUIT FIELD CONDITIONS IS DIRECTED.
1.5 TESTS | B. PBB: 1/4 BY 4 INCHES (6.3 by 100 mm) IN CR
C. SBB: 1/4 BY 2 INCHES (6.3 by 50 mm) IN CR |
| A. UPON COMPLETION OF ALL WORK AND ADJUSTMENT OF ALL EQUIPMENT, PROVIDE COMPLETE OPERATIONAL TESTS OF ALL | PART 3 - EXECUTION |
| 1.6 WARRANTY | A. BONDING SHALL INCLUDE THE AC UTILITY F |
| A. GUARANTEE THAT ALL WORK GOVERNED BY THIS DIVISION SHALL BE FREE OF DEFECTS IN WORKMANSHIP, MATERIALS AND PARTS FOR
MINIMUM PERIOD OF ONE (1) YEAR AFTER WRITTEN ACCEPTANCE. PROMPTLY REPAIR, REVISE, AND REPLACE DEFECTS AS DIRECTED W | A ELECTRODE SYSTEM. THE BONDING OF TH
ITH TWO OTHERS. |
| NO ADDITIONAL COST TO THE OWNER. | B. COMPLY WITH LISTD 607 A |
| MANUFACTURERS SUCH THAT EXTENDED WARRANTIES, AT A MINIMUM PERIOD OF FIFTEEN (15) YEARS AFTER INSTALLATION, AVAILABLE | E 3.2 APPLICATION |
| FOR COMPLETE SYSTEMS ARE PROVIDED.
1.7 SUBMITTALS | A. CONDUCTORS: INSTALL SOLID CONDUCTO
UNI ESS OTHERWISE INDICATED |
| | 1. THE BONDING CONDUCTORS BETWEEN |
| PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED. SHOP DRAWINGS: FOR COMMUNICATIONS SYSTEMS. INCLUDE PLANS, ELEVATIONS, SECTIONS, DETAILS, AND ATTACHMENTS TO | 2. THE BONDING CONDUCTORS BETWEEN |
| OTHER WORK.
B. INFORMATIONAL SUBMITTALS: | NO. 6 AWG. |
| 1. QUALIFICATION DATA: FOR INSTALLER, INSTALLATION SUPERVISOR, AND FIELD INSPECTOR. | B. THE TBC BETWEEN THE PBB AND THE AC S |
| C. PRESENT SHOP DRAWING SUBMITTAL DATA AT ONE TIME, IN PDF FORMAT, INDEXED IN A NEAT AND ORDERLY MANNER. PARTIAL
SUBMITTALS WILL NOT BE ACCEPTED. DO NOT BEGIN WORK UNTIL (1) COPY IS RETURNED. | 3.4 GROUNDING BUSBARS
A. INDICATE LOCATIONS OF GROUNDING BUS |
| 1.8 RECORD DRAWINGS | mm) MINIMUM FROM WALL, 12 INCHES (300 |
| ORIGINAL DRAWINGS. USE A COLOR WHICH CONTRASTS WITH THE PRINTS. THIS SHALL BE A SEPARATE SET OF DRAWINGS, NOT USED | 3.5 CONNECTIONS |
| FOR CONSTRUCTION PURPOSES, AND SHALL BE KEPT UP TO DATE AS THE JOB PROGRESSES AND SHALL BE MADE AVAILABLE FOR
INSPECTION BY THE ENGINEER AT ALL TIMES. THESE UPDATED PROGRESS DRAWINGS SHALL BE USED TO PRODUCE THE FINAL RECOR | A. BOND METALLIC EQUIPMENT IN A TELECOM
EQUIPMENT GROUNDING CONDUCTORS NO |
| DRAWINGS THAT SHALL BE IN AUTOCAD ELECTRONIC FORMAT MEDIA UPON PROJECT COMPLETION. | B. STACKING OF CONDUCTORS UNDER A SINC |
| B. OPON COMPLETION OF THE CONTRACT, BOTH SETS (ELECTRONIC AND HARD COPY DRAWINGS) OF RECORD DRAWINGS SHALL BE
DELIVERED TO THE ENGINEER. | D. TELECOMMUNICATIONS ENCLOSURES AND |
| C. THE CONTRACTOR SHALL MARK ALL RECORD DRAWINGS ON THE FRONT LOWER RIGHT HAND CORNER WITH A STAMP IMPRESSION THAT
READS 'RECORD DRAWINGS' OR SIMILAR | TELECOMMUNICATIONS BONDING AND GRO |
| 1.9 PROJECT/SITE CONDITIONS | BONDING CONDUCTORS. |
| A. INSTALL WORK IN LOCATIONS SHOWN ON DRAWINGS, UNLESS PREVENTED BY PROJECT CONDITIONS. B. PRIOR TO SUBMITTING A BID, VISIT THE SITE OF JOB AND ASCERTAIN ALL CONDITIONS AFFECTING THE PROPOSED INSTALLATION AND | E. STRUCTURAL STEEL: WHERE THE STRUCT
SPACE, BOND EACH SBB AND PBB TO THE |
| ADJUST ALL WORK ACCORDINGLY. MAKE PROVISIONS FOR THESE COSTS. | END OF SECTION 27 05 26 |
| 2.1 STANDARD FOR MATERIALS | PART 1 - GENERAL |
| A. ALL MATERIALS SHALL CONFORM TO CURRENT APPLICABLE INDUSTRY STANDARDS. WORKMANSHIP AND NEAT APPEARANCE SHALL BE
IMPORTANT AS THE SYSTEM OPERATION. DEFECTIVE OR DAMAGED MATERIALS SHALL BE REPLACED OR REPAIRED. PRIOR TO FINAL | AS 1.1 SUMMARY
A. SECTION INCLUDES: |
| ACCEPTANCE, IN A MANNER ACCEPTABLE TO THE ENGINEER OR OWNER AT NO ADDITIONAL COST TO THE OWNER. | 1. TELECOMMUNICATIONS MOUNTING ELE |
| D. ALL WATERIALS SHALL DE AUGEFTADLE FOR INSTALLATION UNLY IF LADELED OR LISTED BY A NATIONALLY RECOGNIZED TESTING
LABORATORY AND IF ACCEPTED BY LOCAL AUTHORITIES. | 2. BAUNDUARDS.
3. TELECOMMUNICATIONS EQUIPMENT RA |
| C. ALL MATERIALS SHALL BE ACCEPTABLE FOR INSTALLATION ONLY IF IN COMPLIANCE WITH REQUIREMENTS SET FORTH IN THIS
SPECIFICATION. | 4. CABLE RUNWAY.
5. 1.2. ACTION SUBMITTALS |
| 2.2 BID ALTERNATE(S) | A. PRODUCT DATA: FOR EACH TYPE OF PROD |
| A. REFER TO ALL CONTRACT DOCUMENTS FOR ADDITIONAL INFORMATION.
B. ALTERNATE(S) FOR MATERIAL AND EQUIPMENT | PART 2 - PRODUCTS
2.1 BACKBOARDS |
| 1. THE CONTRACTOR SHALL SUBMIT THE BID ALTERNATES AT THE TIME THE BASE BIDS ARE DUE. | A. BACKBOARDS: PLYWOOD, FIRE-RETARDAN
BACKING DANIELS SPECIFIED IN SECTION OF |
| 3.1 WORKMANSHIP AND COMPLETION OF INSTALLATION | 2.2 EQUIPMENT FRAMES |
| A. CONTRACTOR'S PERSONNEL AND SUBCONTRACTORS SELECTED TO PERFORM THE WORK SHALL BE WELL VERSED AND SKILLED IN THE
TRADES INVOLVED. | A. MANUFACTURERS: SUBJECT TO COMPLIAN
1. CHATSWORTH PRODUCTS INC |
| B. COORDINATE EQUIPMENT AND MATERIALS INSTALLATION WITH OTHER BUILDING COMPONENTS. | 2. COOPER / B-LINE. |
| C. SEQUENCE, COORDINATE, AND INTEGRATE INSTALLATIONS OF MATERIALS AND EQUIPMENT FOR EFFICIENT FLOW OF THE WORK. GIVE
PARTICULAR ATTENTION TO LARGE EQUIPMENT REQUIRING SPECIFIC POSITIONING. | 3. GREAT LAKES CASE & CABINET.
4. MIDDLE ATLANTIC PRODUCTS, INC. |
| D. CONTRACTOR SHALL PROVIDE A COMPLETE INSTALLATION, INCLUDING ALL REQUIRED LABOR, MATERIAL, CARTAGE, INSURANCE, PERMI
AND TAXES. | TS, 5. LEGRAND / ORTRONICS, INC.
B. GENERAL FRAMF/RACK REQUIREMENTS |
| | 1. DISTRIBUTION FRAMES: FREESTANDING |
| A. WHENE THERE ARE EARLING FARILITED, DE REOFRINGIELE FOR THE ERVIEWIUN THEREOF, WHETHER OK NUT SUCH FARILITY IS TO BE | |

- REMOVED OR RELOCATED. MOVING OR REMOVING ANY FACILITY MUST BE DONE SO AS NOT TO CAUSE INTERRUPTION OF THE WORK OF OWNER'S OPERATION. B. CLOSE ALL CONDUIT OPENINGS WITH CAPS OR PLUGS DURING INSTALLATION. COVER ALL FIXTURES AND EQUIPMENT AND PROTECT
- AGAINST INJURY. AT THE FINAL COMPLETION, CLEAN ALL WORK AND DELIVER IN AN UNBLEMISHED CONDITION, OR REFINISH AND REPAINT AT THE DISCRETION OF THE OWNER. 3.3 FINAL ACCEPTANCE A. FINAL ACCEPTANCE BY THE OWNER WILL NOT OCCUR UNTIL ALL OPERATING INSTRUCTIONS ARE RECEIVED, ALL NECESSARY TESTS HAVE
- BEEN DEMONSTRATED AS "PASS", AND OWNER'S PERSONNEL HAVE BEEN THOROUGHLY INDOCTRINATED IN THE MAINTENANCE AND OPERATION OF ALL EQUIPMENT. B. OPERATING MANUAL, PARTS LISTS, AND INDOCTRINATION OF OPERATING AND MAINTENANCE PERSONNEL: FURNISH THE SERVICES OF A QUALIFIED REPRESENTATIVE OF THE SUPPLIER FOR EACH ITEM OR SYSTEM ITEMIZED BELOW WHO SHALL INSTRUCT SPECIFIC PERSONNEL, AS DESIGNATED BY THE OWNER, IN THE OPERATION AND MAINTENANCE OF THAT ITEM OR SYSTEM.
- C. INSTRUCTION SHALL BE MADE WHEN THE PARTICULAR SYSTEM IS COMPLETE AND SHALL BE OF THE NUMBER OF HOURS AND AT THE TIME REQUESTED BY THE OWNER. A REPRESENTATIVE OF THE ELECTRICAL CONTRACTOR SHALL BE PRESENT FOR ALL DEMONSTRATIONS. D. END OF SECTION 270010

DIVISION 27 SPECIFICATIONS:

GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

NG CONDUCTORS. IG CONNECTORS.

RERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:

ONDUCTORS: STRANDED COPPER WIRE, GREEN OR GREEN WITH YELLOW STRIPE INSULATION, INSULATED FOR 600 V, AND /ITH UL 83. WIRE FOR CUSTOM-LENGTH EQUIPMENT GROUND JUMPERS SHALL BE NO. 6 AWG, 19-STRAND, UL-LISTED, TYPE THHN WIRE.

AY EQUIPMENT GROUNDING WIRE: NO. 6 AWG. GROUNDING JUMPER: LER THAN NO. 6 AWG AND NOT LONGER THAN 12 INCHES (300 mm). IF JUMPER IS A WIRE, IT SHALL HAVE A CRIMPED IG LUG WITH TWO HOLES AND LONG BARREL FOR TWO CRIMPS. IF JUMPER IS A FLEXIBLE BRAID, IT SHALL HAVE A ONE-HOLE

ATTACH WITH GROUNDING SCREW OR CONNECTOR PROVIDED BY CABLE TRAY MANUFACTURER. R CONDUCTORS:

CABLE: 28 KCMILS (14.2 sq. mm), 14 STRANDS OF NO. 17 AWG CONDUCTOR, AND 1/4 INCH (6.3 mm) IN DIAMETER. CONDUCTOR: NO. 4 OR NO. 6 AWG, STRANDED CONDUCTOR. JUMPER: TINNED-COPPER TAPE, BRAIDED CONDUCTORS TERMINATED WITH TWO-HOLE COPPER FERRULES; 1-5/8 INCHES (41 AND 1/16 INCH (1.6 mm) THICK.

RERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: PART OF HUBBELL ELECTRICAL SYSTEMS.

ORTH PRODUCTS, INC. IGHTNING AND GROUNDING.

N WIRE CONNECTORS: CRIMP-AND-COMPRESS CONNECTORS THAT BOND TO THE CONDUCTOR WHEN THE CONNECTOR IS D AROUND THE CONDUCTOR. COMPLY WITH UL 467. PLATED TINNED COPPER, C AND H SHAPED.

RENCE GRID CONNECTORS: COMBINATION OF COMPRESSION WIRE CONNECTORS, ACCESS FLOOR GROUNDING CLAMPS, LT GROUNDING CLAMPS, AND COPPER SPLIT-BOLT CONNECTORS, DESIGNED FOR THE PURPOSE. NECTORS: CAST SILICON BRONZE, SOLDERLESS COMPRESSION EXOTHERMIC-TYPE, MECHANICAL CONNECTOR; WITH A L AND TWO HOLES SPACED ON 5/8- OR 1-INCH (15.8- or 25.4-mm) CENTERS FOR A TWO-BOLT CONNECTION TO THE BUSBAR.

RERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:

RTH PRODUCTS, INC. IGHTNING AND GROUNDING.

INCHES (6.3 by 100 mm) IN CROSS SECTION, LENGTH AS INDICATED ON DRAWINGS. 2 INCHES (6.3 by 50 mm) IN CROSS SECTION, LENGTH AS INDICATED ON DRAWINGS.

ALL INCLUDE THE AC UTILITY POWER SERVICE ENTRANCE, THE COMMUNICATIONS CABLE ENTRANCE, AND THE GROUNDING SYSTEM. THE BONDING OF THESE ELEMENTS SHALL FORM A LOOP SO THAT EACH ELEMENT IS CONNECTED TO AT LEAST H NECA 1.

H J-STD-607-A.

INSTALL SOLID CONDUCTOR FOR NO. 8 AWG AND SMALLER AND STRANDED CONDUCTORS FOR NO. 6 AWG AND LARGER RWISE INDICATED DING CONDUCTORS BETWEEN THE SBB AND STRUCTURAL STEEL OF STEEL-FRAME BUILDINGS SHALL NOT BE SMALLER THAN DING CONDUCTORS BETWEEN THE PBB AND STRUCTURAL STEEL OF STEEL-FRAME BUILDINGS SHALL NOT BE SMALLER THAN

ELECTRODE SYSTEM WEEN THE PBB AND THE AC SERVICE EQUIPMENT GROUND SHALL NOT BE SMALLER THAN NO. 2/0 AWG. CATIONS OF GROUNDING BUSBARS ON DRAWINGS. INSTALL BUSBARS HORIZONTALLY, ON INSULATED SPACERS 2 INCHES (50

I FROM WALL, 12 INCHES (300 mm) ABOVE FINISHED FLOOR UNLESS OTHERWISE INDICATED. LIC EQUIPMENT IN A TELECOMMUNICATIONS EQUIPMENT ROOM TO THE GROUNDING BUSBAR IN THAT ROOM, USING ROUNDING CONDUCTORS NOT SMALLER THAN NO. 6 AWG.

CONDUCTORS UNDER A SINGLE BOLT IS NOT PERMITTED WHEN CONNECTING TO BUSBARS. TECTOR: BOND TO THE PBB WITH INSULATED BONDING CONDUCTOR.

IICATIONS ENCLOSURES AND EQUIPMENT RACKS: BOND METALLIC COMPONENTS OF ENCLOSURES TO THE CATIONS BONDING AND GROUNDING SYSTEM. INSTALL VERTICALLY MOUNTED RACK GROUNDING BUSBAR UNLESS THE AND RACK ARE MANUFACTURED WITH THE BUSBAR. BOND THE EQUIPMENT GROUNDING BUSBAR TO THE SBB NO. 2 AWG IDUCTORS. STEEL: WHERE THE STRUCTURAL STEEL OF A STEEL FRAME BUILDING IS READILY ACCESSIBLE WITHIN THE ROOM OR EACH SBB AND PBB TO THE VERTICAL STEEL OF THE BUILDING FRAME.

COMMUNICATIONS EQUIPMENT ROOM FITTINGS

UDES. MUNICATIONS MOUNTING ELEMENTS.

MUNICATIONS EQUIPMENT RACKS AND CABINETS.

ON SUBMITTALS TA: FOR EACH TYPE OF PRODUCT.

: PLYWOOD, FIRE-RETARDANT TREATED, 3/4 BY 48 BY 96 INCHES, AC-GRADE. COMPLY WITH REQUIREMENTS FOR PLYWOOD IELS SPECIFIED IN SECTION 061000 - ROUGH CARPENTRY.

RERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING OR EQUAL:

2.3 CABLE RUNWAY

COMPARABLE. D. CABLE RUNWAY:

ION FRAMES: FREESTANDING AND/OR WALL-MOUNTING, MODULAR STEEL UNITS DESIGNED FOR TELECOMMUNICATIONS SUPPORT AND COORDINATED WITH DIMENSIONS OF UNITS TO BE SUPPORTED. 2. MODULE DIMENSION: WIDTH COMPATIBLE WITH EIA 310-D STANDARD, 19-INCH PANEL MOUNTING.

3. FINISH: MANUFACTURER'S STANDARD, BAKED-POLYESTER POWDER COAT, BLACK FINISH.

C. BASIS OF DESIGN PRODUCT: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY CHATSWORTH PRODUCTS, INC, OR

1. 3/8 INCHES BY 1-1/2 INCHES BY 0.065" THICK RECTANGULAR STEEL TUBING. 2. CROSS-MEMBERS AT 12" RUNG SPACING.

3. 12 INCHES WIDE BY 10'-0" SEGMENTS, FIELD-MODIFIED TO FIT FIELD CONDITIONS. 4. BLACK POWDER-COATED FINISH.

- C. RUNWAY ACCESSORIES: 1. CABLE RUNWAY RADIUS DROP AT ALL VERTICAL CABLE MANAGERS. 2. BUTT-SPLICE KITS AT ALL ON-AXIS CONNECTIONS OF RUNWAY. 3. JUNCTION SPLICE KITS AT PERPENDICULAR CONNECTIONS OF RUNWAY. 4. CORNER BRACKETS AT PERPENDICULAR CONNECTIONS OF RUNWAY. 5. CABLE RUNWAY ELEVATION KIT (3") AT ALL RACKS, FRAMES AND CABINETS. 6. STEEL TRIANGULAR SUPPORT BRACKET AT 5'-0" ON CENTER FOR WALL-MOUNTED RUNWAY.
- 8. FOOT KIT AT VERTICAL RUNWAY CONNECTION TO FLOOR.
- 9. VERTICAL WALL BRACKETS FOR VERTICAL RUNWAY. 10. RUNWAY SUPPORT BRACKETS FOR SUSPENDED RUNWAY 11. PROTECTIVE END CAPS FOR ALL EXPOSED RUNWAY ENDS.
- 12. ALL ACCESSORIES WITH FINISH OPTIONS SHALL BE BLACK POWDER-COATED FINISH. 2.4 POWER STRIPS A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: 1. CHATSWORTH PRODUCTS, INC.
- 2. SERVER TECHNOLOGIES. 3. GEIST.
- B. VERTICAL POWER STRIPS: COMPLY WITH UL 1363. 1. VERTICAL RACK MOUNTING.
- 2. 20A, 120V INPUT. 3. 24, 20A, 120V, NEMA 5-20R RECEPTACLES.
- C. HORIZONTAL POWER STRIPS: COMPLY WITH UL 1363. 1. HORIZONTAL RACK MOUNTING.
- 2. 20A, 120V INPUT. 3. 6, 20A, 120V, NEMA 5-20R RECEPTACLES.
- 4. LED INDICATOR LIGHTS FOR POWER AND PROTECTION STATUS. 2.5 POWER DISTRIBUTION UNITS (PDUS)
 - 1. CHATSWORTH PRODUCTS, INC. 2. SERVER TECHNOLOGIES.
- 3. GEIST. B. POWER DISTRIBUTION UNITS:
- APPLICATION. 2. VERTICAL RACK MOUNTING.
- 3. 30A, 120/208V INPUT. 4. 24. 20-A. 120VAC, NEMA 5-20 RECEPTACLES.
- 5 I FD INDICATOR LIGHTS FOR POWER AND PROTECTION STATUS 6. LED INDICATOR LIGHTS FOR REVERSE POLARITY AND OPEN OUTLET GROUND.
- 7. 3X 20A MAGNETIC CIRCUIT BREAKER. 8. CORD-CONNECTED WITH 10-FOOT LINE CORD WITH NEMA L21-30P LOCKING PLUG.
- 9. IN-LINE AMMETER WITH REALTIME DISPLAY OF ELECTRICAL CONSUMPTION PER PHASE. 10. ETHERNET CONNECTION FOR MONITORING
- 11. PROVIDE ACCESSORY TEMPERATURE AND HUMIDITY SENSOR (ONE PER EQUIPMENT ROOM). 12. INTEGRAL SURGE PROTECTION. 13. PROTECTION MODES SHALL BE LINE-NEUTRAL, LINE-GROUND, NEUTRAL-GROUND.
- 14. PEAK IMPULSE SURGE CURRENT RATING: 13KA MINIMUM. 15. UL 1449 CLAMPING VOLTAGE FOR ALL THREE MODES SHALL BE NOT MORE THAN 330V. 2.7 LABELING
- USED BY LABEL PRINTERS. PART 3 - EXECUTION
- 3.1 INSTALLATION
- TELECOMMUNICATIONS ROOMS. B. BUNDLE, LACE, AND TRAIN CONDUCTORS AND CABLES TO TERMINAL POINTS WITHOUT EXCEEDING MANUFACTURER'S LIMITATIONS ON
- BENDING RADII. INSTALL LACING BARS AND DISTRIBUTION SPOOLS FOR CABLE MANAGEMENT.
- STAFF. COORDINATE SERVICE ENTRANCE ARRANGEMENT WITH OWNER'S PREFERRED LOCAL EXCHANGE CARRIER. D. COORDINATE LOCATION OF POWER RACEWAYS AND RECEPTACLES WITH LOCATIONS OF COMMUNICATIONS EQUIPMENT REQUIRING
- ELECTRICAL POWER TO OPERATE. 3.2 BACKBOARDS
- A. INSTALL BACKBOARDS VERTICALLY, BOTTOM AT +6"AFF. BUTT BACKBOARD SHEETS TOGETHER TIGHTLY. B. INSTALL BACKBOARDS WITH 'A' GRADE SIDE OF PLYWOOD FACING INTO ROOM.
- 3.3 RACKS, CABINETS AND FRAMES A. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. 3.4 FIRESTOPPING
- A. COMPLY WITH REQUIREMENTS IN SECTION 078413 PENETRATION FIRESTOPPING. B. COMPLY WITH TIA-569-B, ANNEX A, "FIRESTOPPING".
- . COMPLY WITH BICSI TDMM, "FIRESTOPPING SYSTEMS" ARTICLE. END OF SECTION 271100
- SECTION 27 13 00 COMMUNICATIONS BACKBONE CABLING PART 1 - GENERAL
- 1.1 SUMMARY A. SECTION INCLUDES:
- UTP CABLE. 50/125 -MICROMETER, OPTICAL FIBER CABLING. 3. CABLE CONNECTING HARDWARE, PATCH PANELS, AND CROSS-CONNECTS.
- 4. CABLING IDENTIFICATION PRODUCTS. PART 2 - PRODUCTS 2.1 UTP CABLE
- B. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: 1. BERK-TEK; A NEXANS COMPANY. 2. COMMSCOPE, INC.
- 3. SUPERIOR ESSEX INC. 4. SYSTIMAX SOLUTIONS; A COMMSCOPE INC. BRAND.
- 5. DESCRIPTION: 100-OHM, 4-PAIR UTP, COVERED WITH A YELLOW THERMOPLASTIC JACKET. 1. COMPLY WITH ICEA S-90-661 FOR MECHANICAL PROPERTIES.
- 2. COMPLY WITH TIA/EIA-568-B.1 FOR PERFORMANCE SPECIFICATIONS. 3. COMPLY WITH TIA/EIA-568-B.2, CATEGORY 6.
- THE FOLLOWING TYPES a. COMMUNICATIONS, PLENUM RATED: TYPE CMP, COMPLYING WITH NFPA 262. 2.2 UTP CABLE HARDWARE
- A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: 1. HUBBELL PREMISE WIRING. 2. LEVITON VOICE & DATA DIVISION. 3. NORDEX/CDT: A SUBSIDIARY OF CABLE DESIGN TECHNOLOGIES.
- 4. SIEMON CO. (THE). B. CONNECTING BLOCKS: 110-STYLE IDC FOR CATEGORY 6. PROVIDE BLOCKS FOR THE NUMBER OF CABLES TERMINATED ON THE BLOCK,
- PLUS 25 PERCENT SPARE. INTEGRAL WITH CONNECTOR BODIES, INCLUDING PLUGS AND JACKS WHERE INDICATED. CROSS-CONNECT: MODULAR ARRAY OF CONNECTING BLOCKS ARRANGED TO TERMINATE BUILDING CABLES AND PERMIT
- INTERCONNECTION BETWEEN CABLES. D. PATCH PANEL: MODULAR PANELS HOUSING MULTIPLE-NUMBERED JACK UNITS WITH IDC-TYPE CONNECTORS AT EACH JACK FOR
- PERMANENT TERMINATION OF PAIR GROUPS OF INSTALLED CABLES. 1. NUMBER OF JACKS PER FIELD: ONE FOR EACH FOUR-PAIR UTP CABLE INDICATED.
- TERMINALS 2. PATCH CORDS: OWNER PROVIDED.

7. WALL ANGLE SUPPORT KIT AT PERPENDICULAR CONNECTIONS BETWEEN WALL AND RUNWAY.

A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:

1. LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND

A. COMPLY WITH TIA-606-B AND UL 969 FOR A SYSTEM OF LABELING MATERIALS, INCLUDING LABEL STOCKS, LAMINATING ADHESIVES, AND INKS

A. COMPLY WITH BICSI TDMM FOR LAYOUT AND INSTALLATION OF ENTRANCE FACILITIES, COMMUNICATIONS EQUIPMENT ROOMS AND

C. COORDINATE LAYOUT AND INSTALLATION OF COMMUNICATIONS EQUIPMENT WITH OWNER'S TELECOMMUNICATIONS AND NETWORKING

4. LISTED AND LABELED BY AN NRTL ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION AS COMPLYING WITH UL 444 AND NFPA 70 FOR

2.3 OPTICAL FIBER CABLE A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: 3. BERK-TEK; A NEXANS COMPANY.

- 4 COMMSCOPE INC. 5. CORNING CABLE SYSTEMS.
- 6. SYSTIMAX SOLUTIONS; A COMMSCOPE INC. BRAND. 7 BELDEN
- B. DESCRIPTION: MULTIMODE, 50/125 -MICROMETER, NONCONDUCTIVE, TIGHT BUFFER, OPTICAL FIBER CABLE. 1. COMPLY WITH ICEA S-83-596 FOR MECHANICAL PROPERTIES.
- 2. COMPLY WITH TIA/EIA-568-B.3 FOR PERFORMANCE SPECIFICATIONS. 3. COMPLY WITH TIA/EIA-492AAAA-B FOR DETAILED SPECIFICATIONS.
- 4. LISTED AND LABELED BY AN NRTL ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION AS COMPLYING WITH UL 444, UL 1651, AND NFPA 70 FOR THE FOLLOWING TYPES: a. PLENUM RATED, NONCONDUCTIVE: TYPE OFNP, COMPLYING WITH NFPA 262.
- 5. MAXIMUM ATTENUATION: 3.50 DB/KM AT 850 NM; 1.5 DB/KM AT 1300 NM. 6. MINIMUM MODAL BANDWIDTH: 160 MHZ-KM AT 850 NM; 500 MHZ-KM AT 1300 NM.
- C. JACKET . JACKET COLOR: YELLOW FOR 50/125-MICROMETER CABLE.
- 2.4 OPTICAL FIBER CABLE HARDWARE A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: 1. BERK-TEK; A NEXANS COMPANY.
- 2. CORNING CABLE SYSTEMS. 3. HUBBELL PREMISE WIRING.
- 4. SIEMON CO. (THE). B. CROSS-CONNECTS AND PATCH PANELS: MODULAR PANELS HOUSING MULTIPLE-NUMBERED, DUPLEX CABLE CONNECTORS. C. PATCH CORDS: FACTORY-MADE, DUAL-FIBER CABLES IN 36-INCH (900-mm) LENGTHS. D. CABLE CONNECTING HARDWARE:
- 1. QUICK-CONNECT, SIMPLEX AND DUPLEX, TYPE LC CONNECTORS. INSERTION LOSS NOT MORE THAN 0.75 DB.
- PART 3 EXECUTION 3.1 WIRING METHODS

A. WIRING METHOD: INSTALL CABLES IN RACEWAYS AND CABLE TRAYS EXCEPT WITHIN CONSOLES, CABINETS, DESKS, AND COUNTERS AND EXCEPT IN ACCESSIBLE CEILING SPACES, IN ATTICS, AND IN GYPSUM BOARD PARTITIONS WHERE UNENCLOSED WIRING METHOD MAY BE USED. CONCEAL RACEWAY AND CABLES EXCEPT IN UNFINISHED SPACES. 1. INSTALL PLENUM CABLE IN ENVIRONMENTAL AIR SPACES, INCLUDING PLENUM CEILINGS. END OF SECTION 27 13 00

SECTION 271500 - COMMUNICATIONS HORIZONTAL CABLING PART 1 - GENERAL

1.1 SUMMARY A. SECTION INCLUDES:

> 1. UTP CABLING. CABLE CONNECTING HARDWARE, PATCH PANELS, AND CROSS-CONNECTS.

- TELECOMMUNICATIONS OUTLET/CONNECTORS. 4. CABLING SYSTEM IDENTIFICATION PRODUCTS. PART 2 - PRODUCTS
- 2.1 UTP CABLE A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: 1. BELDEN INC 2. BERK-TEK; A NEXANS COMPANY.
- 3. COMMSCOPE, INC. 4. HITACHI CABLE AMERICA INC.
- B. DESCRIPTION: 100-OHM, FOUR-PAIR UTP COVERED WITH A BLUE THERMOPLASTIC JACKET. . COMPLY WITH ICEA S-90-661 FOR MECHANICAL PROPERTIES.
- 2. COMPLY WITH TIA/EIA-568-B.1 FOR PERFORMANCE SPECIFICATIONS. 3. COMPLY WITH TIA/EIA-568-B.2, CATEGORY 6.
- 4. LISTED AND LABELED BY AN NRTL ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION AS COMPLYING WITH UL 444 AND NFPA 70 FOR THE FOLLOWING TYPES:
- a. COMMUNICATIONS, PLENUM RATED: TYPE CMP, COMPLYING WITH UL 1666. 2.2 UTP CABLE HARDWARE A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
- 1. BELDEN INC. 2. COMMSCOPE, INC.
- 3. HUBBELL PREMISE WIRING 4. LEVITON COMMERCIAL NETWORKS DIVISION. B. CONNECTING BLOCKS: 110-STYLE IDC FOR CATEGORY 6. PROVIDE BLOCKS FOR THE NUMBER OF CABLES TERMINATED ON THE BLOCK,
- PLUS 25 PERCENT SPARE. INTEGRAL WITH CONNECTOR BODIES, INCLUDING PLUGS AND JACKS WHERE INDICATED. C. CROSS-CONNECT: MODULAR ARRAY OF CONNECTING BLOCKS ARRANGED TO TERMINATE BUILDING CABLES AND PERMIT
- INTERCONNECTION BETWEEN CABLES. D. PATCH PANEL: MODULAR PANELS HOUSING MULTIPLE-NUMBERED JACK UNITS WITH IDC-TYPE CONNECTORS AT EACH JACK FOR PERMANENT TERMINATION OF PAIR GROUPS OF INSTALLED CABLES.
- E. JACKS AND JACK ASSEMBLIES: MODULAR, COLOR-CODED, EIGHT-POSITION MODULAR RECEPTACLE UNITS WITH INTEGRAL IDC-TYPE FRMINALS F. PATCH CORDS: FACTORY-MADE, FOUR-PAIR CABLES IN 36-INCH (900 MM) LENGTHS; TERMINATED WITH EIGHT-POSITION MODULAR PLUG
- AT EACH END. 2.3 TELECOMMUNICATIONS OUTLET/CONNECTORS A. WORKSTATION OUTLETS: TWO-PORT-CONNECTOR ASSEMBLIES MOUNTED IN SINGLE FACEPLATE. 1. PLASTIC FACEPLATE: HIGH-IMPACT PLASTIC. FOR USE WITH SNAP-IN JACKS ACCOMMODATING ANY COMBINATION OF UTP, OPTICAL
- FIBER, AND COAXIAL WORK AREA CORDS. a. FLUSH MOUNTING JACKS, POSITIONING THE CORD AT A 45-DEGREE ANGLE 3. LEGEND: SNAP-IN, CLEAR-LABEL COVERS AND MACHINE-PRINTED PAPER INSERTS.
- PART 3 EXECUTION 3.1 WIRING METHODS
- A. INSTALL CABLES IN PATHWAYS AND CABLE TRAYS EXCEPT WITHIN CONSOLES, CABINETS, DESKS, AND COUNTERS. CONCEAL PATHWAYS AND CABLES EXCEPT IN UNFINISHED SPACES. B. CONCEAL CONDUCTORS AND CABLES IN ACCESSIBLE CEILINGS, WALLS, AND FLOORS WHERE POSSIBLE. C. WIRING WITHIN ENCLOSURES:
- 1. BUNDLE, LACE, AND TRAIN CONDUCTORS TO TERMINAL POINTS WITH NO EXCESS AND WITHOUT EXCEEDING MANUFACTURER'S LIMITATIONS ON BENDING RADII.
- 2. INSTALL LACING BARS AND DISTRIBUTION SPOOLS. 3. INSTALL CONDUCTORS PARALLEL WITH OR AT RIGHT ANGLES TO SIDES AND BACK OF ENCLOSURE. 3.2 INSTALLATION OF CABLES
- A. COMPLY WITH NECA 1. B. GENERAL REQUIREMENTS FOR CABLING:
- 1. COMPLY WITH TIA/EIA-568-B.1. 2. COMPLY WITH BICSI ITSIM, CH. 6, "CABLE TERMINATION PRACTICES."
- C. UTP CABLE INSTALLATION: 1. COMPLY WITH TIA/FIA-568-B.2.

END OF SECTION 271500

- 2. DO NOT UNTWIST UTP CABLES MORE THAN 1/2 INCH (12 MM) FROM THE POINT OF TERMINATION TO MAINTAIN CABLE GEOMETRY. D. GROUP CONNECTING HARDWARE FOR CABLES INTO SEPARATE LOGICAL FIELDS. E. SEPARATION FROM EMI SOURCES:
- 1. COMPLY WITH BICSI TDMM AND TIA-569-B FOR SEPARATING UNSHIELDED COPPER VOICE AND DATA COMMUNICATION CABLE FROM POTENTIAL EMI SOURCES. INCLUDING ELECTRICAL POWER LINES AND EQUIPMENT. 3.3 FIRESTOPPING A. COMPLY WITH TIA-569-B, ANNEX A, "FIRESTOPPING."
- B. COMPLY WITH BICSI TDMM, "FIRESTOPPING SYSTEMS" ARTICLE. 3.4 FIELD QUALITY CONTROL
- A. PERFORM THE FOLLOWING TESTS AND INSPECTIONS. B. END-TO-END CABLING WILL BE CONSIDERED DEFECTIVE IF IT DOES NOT PASS TESTS AND INSPECTIONS. C. PREPARE TEST AND INSPECTION REPORTS.



E. JACKS AND JACK ASSEMBLIES: MODULAR, COLOR-CODED, EIGHT-POSITION MODULAR RECEPTACLE UNITS WITH INTEGRAL IDC-TYPE





SECTION 28 00 10 - ELECTRONIC SAFETY AND SECURITY GENERAL PROVISIONS

PART 1 - GENERAL 1.1 RELATED DOCUMENTS

- A. THE GENERAL CONDITIONS, SPECIAL CONDITIONS, AND CONTRACT DOCUMENTS ARE PART OF THESE SPECIFICATIONS. CONSULT THEM FURTHER FOR INSTRUCTIONS AND BE GOVERNED BY THE REQUIREMENTS CONTAINED THERE UNDER.
- 1.2 DESCRIPTION A. WORK INCLUDED
- 1. WORK SHALL CONSIST OF FURNISHING ALL LABOR, EQUIPMENT, SUPPLIES AND MATERIALS, UNLESS OTHERWISE SPECIFIED, NECESSARY FOR THE INSTALLATION OF COMPLETE ELECTRONIC SAFETY AND SECURITY (CCTV/ACCESS CONTROL) SYSTEMS AS REQUIRED BY THE SPECIFICATIONS AND AS SHOWN ON THE DRAWINGS, SUBJECT TO THE TERMS AND CONDITIONS OF THE CONTRACT. THE WORK SHALL ALSO INCLUDE THE COMPLETION OF THOSE DETAILS OF WORK NOT MENTIONED OR SHOWN WHICH ARE NECESSARY FOR THE SUCCESSFUL OPERATION OF ALL ELECTRONIC SAFETY AND SECURITY SYSTEMS.
- 1.3 PROVISIONS
- A. WORK PERFORMED UNDER THIS DIVISION OF THE SPECIFICATIONS SHALL CONFORM TO THE REQUIREMENTS OF DIVISION 1, THE TECHNOLOGY SYSTEMS DRAWINGS, AND ALL ITEMS HEREINAFTER SPECIFIED. 1. PRIOR TO ANY WORK BEING PERFORMED UNDER THIS DIVISION, EXAMINE THE FOLLOWING DRAWINGS AND SPECIFICATIONS: a. ARCHITECTURAL
- b. STRUCTURAL c. FOOD SERVICE
- d. CIVIL e. MECHANICAI
- f. ELECTRICAL a. INTERIOR DESIGN
- 2. IF ANY DISCREPANCIES OCCUR BETWEEN OTHER DRAWINGS AND SPECIFICATIONS AND THE TECHNOLOGY SYSTEMS DRAWINGS AND SPECIFICATIONS, REPORT DISCREPANCIES TO THE ARCHITECT IN WRITING AND OBTAIN WRITTEN INSTRUCTIONS FOR THE WORK. 3. TECHNOLOGY SYSTEMS DRAWINGS ARE DIAGRAMMATIC BUT SHALL BE FOLLOWED AS CLOSELY AS ACTUAL CONSTRUCTION OF THE
- BUILDING WILL PERMIT. ALL CHANGES FROM DRAWINGS NECESSARY TO MAKE THE WORK CONFORM TO THE BUILDING AS CONSTRUCTED SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER. 4. COORDINATE THE WORK WITH THE GENERAL CONTRACTOR AND/OR THE ELECTRICAL CONTRACTOR AND BE RESPONSIBLE TO THEM
- FOR SATISFACTORY PROGRESS OF THE SAME. COORDINATE WORK WITH ALL OTHER TRADES ON THE PROJECT WITHOUT ADDITIONAL COST TO THE OWNER. 5. ALL WORK AND MATERIALS COVERED BY DRAWINGS AND SPECIFICATIONS SHALL BE SUBJECT TO REVIEW AT ANY TIME BY
- REPRESENTATIVES OF THE ARCHITECT AND OWNER. IF THE ARCHITECT OR OWNER'S AGENT FINDS ANY MATERIALS OR INSTALLATION THAT DOES NOT CONFORM TO THESE DRAWINGS AND SPECIFICATIONS, CONTRACTOR SHALL REMOVE THE MATERIAL FROM THE PREMISES AND CORRECT THE INSTALLATION TO THE SATISFACTION OF THE AGENT. 6. IN ACCEPTANCE OR REJECTION OF INSTALLED SYSTEMS, NO ALLOWANCE WILL BE MADE FOR LACK OF SKILL ON THE PART OF THE
- INSTALLERS. 1.4 CODES AND STANDARDS A. THE LATEST EDITIONS OF THE FOLLOWING STANDARDS (INCLUDING SUPPLEMENTS AND OFFICIAL INTERPRETATIONS) ARE MINIMUM
- REQUIREMENTS: 1. NFPA 70 - NATIONAL ELECTRICAL CODE (NEC)
- 2. NFPA 72 NATIONAL FIRE ALARM CODE 3. NFPA 101 - LIFE SAFETY CODE
- 4. ALL APPLICABLE STATE AND LOCAL CODES 5. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) 6. NATIONAL ELECTRICAL SAFETY CODE (NESC)
- 7. AMERICANS WITH DISABILITIES ACTS (ADA) AND AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) 117 8. NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)
- 9. UNDERWRITER'S LABORATORIES (UL) 10. INSULATED CABLE ENGINEERS ASSOCIATION (ICEA)
- 11. INTERNATIONAL BUILDING CODE 12. INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS (IEEE)
- 13. BUILDING INDUSTRY CONSULTING SERVICES INTERNATIONAL (BICSI) PUBLICATIONS 14. TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA) STANDARDS AND PUBLICATIONS
- 15. SECURITY INDUSTRY ASSOCIATION (SIA) STANDARDS AND PUBLICATIONS. THE DRAWINGS AND SPECIFICATIONS TAKE PRECEDENCE WHEN THEY ARE MORE STRINGENT THAN CODES, STATUTES, OR ORDINANCES IN EFFECT. APPLICABLE CODES, ORDINANCES, STANDARDS AND STATUTES TAKE PRECEDENCE WHEN THEY ARE MORE STRINGENT OR CONFLICT WITH THE DRAWINGS AND SPECIFICATIONS.
- **1.5 SPECIAL REQUIREMENTS** A. DEFINITIONS: "PROVIDE" SHALL MEAN "FURNISH AND INSTALL". "FURNISH" MEANS TO SUPPLY ALL MATERIALS, LABOR, EQUIPMENT,
- TESTING APPARATUS, CONTROLS, TESTS, ACCESSORIES AND ALL OTHER ITEMS CUSTOMARILY REQUIRED FOR THE PROPER AND COMPLETE APPLICATION. "INSTALL" MEANS TO JOIN, UNIT, FASTEN, LINK, ATTACH, SET UP OR OTHERWISE CONNECT TOGETHER BEFORE TESTING AND TURNING OVER TO OWNER, COMPLETE AND READY FOR REGULAR OPERATION. 1.6 EXAMINATION OF BIDDING DOCUMENTS
- A. EACH BIDDER SHALL EXAMINE THE BIDDING DOCUMENTS CAREFULLY, AND NOT LATER THAN SEVEN DAYS PRIOR TO THE DATE OF RECEIPT OF BIDS. SHALL MAKE WRITTEN REQUEST TO THE ENGINEER FOR INTERPRETATION OR CORRECTION OF ANY DISCREPANCIES. AMBIGUITY. INCONSISTENCY, OR ERROR THEREIN WHICH HE MAY DISCOVER. ANY INTERPRETATION OR CORRECTION WILL BE ISSUED AS AN ADDENDUM BY THE ARCHITECT.
- 1.10 WARRANTY A. GUARANTEE THAT ALL WORK GOVERNED BY THIS DIVISION SHALL BE FREE OF DEFECTS IN WORKMANSHIP, MATERIALS AND PARTS FOR A MINIMUM PERIOD OF ONE (1) YEAR AFTER WRITTEN ACCEPTANCE. PROMPTLY REPAIR, REVISE, AND REPLACE DEFECTS AS DIRECTED WITH NO ADDITIONAL COST TO THE OWNER.
- 1.11 SUBMITTALS A. ACTION SUBMITTALS:
- . PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED. 2. SHOP DRAWINGS: FOR ELECTRONIC SAFETY AND SECURITY SYSTEMS. INCLUDE PLANS, ELEVATIONS, SECTIONS, DETAILS, AND ATTACHMENTS TO OTHER WORK. B. INFORMATIONAL SUBMITTALS:
- . QUALIFICATION DATA: FOR INSTALLER, INSTALLATION SUPERVISOR, AND FIELD INSPECTOR.
- D. PRESENT PRODUCT DATA SUBMITTAL INFORMATION AT ONE TIME, IN ELECTRONIC (PDF) FORMAT OR HARDCOPY FORMAT, INDEXED IN A NEAT AND ORDERLY MANNER. SUBMITTALS MUST CLEARLY INDICATE PRODUCTS AND MATERIALS INTENDED TO BE USED ON THIS PROJECT, INCLUDING PART NUMBERS AND APPLICABLE OPTIONS. PARTIAL SUBMITTALS WILL NOT BE ACCEPTED. DO NOT BEGIN WORK UNTIL SUBMITTAL REVIEW IS RETURNED. E. SUBMIT SHOP DRAWINGS, LAYOUTS, MANUFACTURER'S DATA, WIRING DIAGRAMS AND MATERIAL SCHEDULES THAT MAY BE REQUESTED
- BY THE ARCHITECT FOR HIS REVIEW. THE REVIEW BY THE ARCHITECT WILL NOT CONSTITUTE CONCURRENCE WITH ANY DEVIATION FROM THE PLANS AND SPECIFICATIONS UNLESS SUCH DEVIATIONS ARE SPECIFICALLY IDENTIFIED BY THE METHOD DESCRIBED BELOW, NOR SHALL IT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR ERRORS OR OMISSIONS IN THE SUBMITTED DATA 1.12 RECORD DRAWINGS
- A. MAINTAIN A CURRENT SET OF ELECTRONIC SAFETY AND SECURITY DRAWINGS AT THE SITE. NEATLY MARK ALL CHANGES AND DEVIATIONS FROM THE ORIGINAL DRAWINGS. USE A COLOR WHICH CONTRASTS WITH THE PRINTS. THIS SHALL BE A SEPARATE SET OF DRAWINGS, NOT USED FOR CONSTRUCTION PURPOSES, AND SHALL BE KEPT UP TO DATE AS THE JOB PROGRESSES AND SHALL BE MADE AVAILABLE FOR INSPECTION BY THE ARCHITECT AND ENGINEER AT ALL TIMES. THESE UPDATED PROGRESS DRAWINGS SHALL BE USED TO PRODUCE THE FINAL RECORD DRAWINGS THAT SHALL BE IN AUTOCAD ELECTRONIC FORMAT MEDIA UPON PROJECT COMPLETION. B. UPON COMPLETION OF THE CONTRACT, BOTH SETS (ELECTRONIC AND HARD COPY DRAWINGS) OF RECORD DRAWINGS SHALL BE DELIVERED TO THE ARCHITECT.
- 1.13 PROJECT/SITE CONDITIONS A INSTALL WORK IN LOCATIONS SHOWN ON DRAWINGS, UNLESS PREVENTED BY PROJECT CONDITIONS B. PRIOR TO SUBMITTING A BID, VISIT THE SITE OF JOB AND ASCERTAIN ALL CONDITIONS AFFECTING THE PROPOSED INSTALLATION AND
- ADJUST ALL WORK ACCORDINGLY. MAKE PROVISIONS FOR THESE COSTS. C. ALL OUTAGES OF PRE-ESTABLISHED SERVICE SHALL BE SCHEDULED WITH THE OWNER AND SERVICE PROVIDER FIVE (5) DAYS IN ADVANCE OF PROPOSED OUTAGE. INCLUDE AN OVERTIME ALLOWANCE IN THE BID FOR THE PERFORMANCE OF ALL WORK REQUIRING OUTAGES AT SUCH TIME AS IT IS APPROVED BY THE OWNER. OUTAGES SHALL BE AT A TIME AND OF SUCH DURATION AS ACCEPTED BY THE OWNER.
- PART 2 PRODUCTS 2.1 STANDARD FOR MATERIALS
- A. ALL MATERIALS SHALL CONFORM TO CURRENT APPLICABLE INDUSTRY STANDARDS. WORKMANSHIP AND NEAT APPEARANCE SHALL BE AS IMPORTANT AS THE SYSTEM OPERATION. DEFECTIVE OR DAMAGED MATERIALS SHALL BE REPLACED OR REPAIRED, PRIOR TO FINAL ACCEPTANCE, IN A MANNER ACCEPTABLE TO THE ARCHITECT, ENGINEER OR OWNER AT NO ADDITIONAL COST TO THE OWNER. B. ALL MATERIALS SHALL BE ACCEPTABLE FOR INSTALLATION ONLY IF LABELED OR LISTED BY A NATIONALLY RECOGNIZED TESTING
- LABORATORY AND IF ACCEPTED BY LOCAL AUTHORITIES. C. ALL MATERIALS SHALL BE ACCEPTABLE FOR INSTALLATION ONLY IF IN COMPLIANCE WITH REQUIREMENTS SET FORTH IN THIS SPECIFICATION.
- 2.2 BID ALTERNATE(S) A. ALTERNATE(S) FOR MATERIAL AND FOUIPMENT
- 1. EQUIPMENT AND MATERIAL BID ALTERNATE(S) SHALL BE PROPOSED AS ADDITIVE OR DEDUCTIVE ALTERNATE(S) TO SPECIFIED ITEMS BY SUBMITTING IT AS A SEPARATE LINE ITEM FROM THE BASE BID ON THE BIDDER'S LETTERHEAD. 2. THE CONTRACTOR SHALL SUBMIT THE BID ALTERNATES AT THE TIME THE BASE BIDS ARE DUE.
- 2.3 SUBSTITUTIONS (CONTRACTOR AND/OR OWNER INITIATED) A. PERFORMANCE SPECIFICATION: WHEN ANY ITEM IS SPECIFIED BY REQUIREMENT TO MEET A PERFORMANCE, INDUSTRY OR REGULATING BODY STANDARD OR IS SPECIFIED GENERICALLY (NO MANUFACTURER'S NAME LISTED), NO PRIOR REVIEW BY THE ENGINEER IS NEEDED UNLESS SPECIFICALLY CALLED FOR IN THESE SPECIFICATIONS.

PART 3 - EXECUTION 3.1 WORKMANSHIP AND COMPLETION OF INSTALLATION

- A. CONTRACTOR'S PERSONNEL AND SUBCONTRACTORS SELECTED TO PERFORM THE WORK SHALL BE WELL VERSED AND SKILLED IN THE TRADES INVOLVED. B. COORDINATE EQUIPMENT AND MATERIALS INSTALLATION WITH OTHER BUILDING COMPONENTS. 2. SEQUENCE, COORDINATE, AND INTEGRATE INSTALLATIONS OF MATERIALS AND EQUIPMENT FOR EFFICIENT FLOW OF THE WORK. GIVE PARTICULAR ATTENTION TO LARGE EQUIPMENT REQUIRING SPECIFIC POSITIONING.
- D. ANY CHANGES OR DEVIATIONS FROM THE DRAWINGS AND SPECIFICATIONS MUST BE ACCEPTED IN WRITING BY THE ARCHITECT/ENGINEER. ALL ERRORS IN INSTALLATION SHALL BE CORRECTED AT THE EXPENSE OF THE CONTRACTOR. ALL SPECIALTIES SHALL BE INSTALLED AS DETAILED ON THE DRAWINGS. WHERE DETAIL OR SPECIFIC INSTALLATION REQUIREMENTS ARE NOT PROVIDED, MANUFACTURER'S RECOMMENDATIONS SHALL BE FOLLOWED.

TRADES INVOLVED. B. COORDINATE EQUIPMENT AND MATERIALS INSTALLATION WITH OTHER BUILDING COMPONENTS.

PART 3 - EXECUTION

- UNBLEMISHED CONDITION AND TAXES.
- 3.3 TRENCHING AND BACKFILLING OF THE NATIONAL ELECTRICAL CODE.
- 3.4 CHASES, OPENINGS, CUTTING, AND PATCHING THE FIRE RATING FOR THE SURFACE PENETRATED
- MANNER MEETING THE APPROVAL OF THE ENGINEER AND AT NO ADDITIONAL COST TO THE OWNER. 3.5 DELIVERY AND STORAGE OF MATERIALS
- C. CAREFULLY MARK AND STORE ALL MATERIALS. D. DELIVER MATERIALS TO THE JOB SITE IN STAGES OF THE WORK THAT WILL EXPEDITE THE WORK AS A WHOLE. 3.6 PROTECTION OF WORK AND PROPERTY
- OWNER'S OPERATION.
- AT THE DISCRETION OF THE ARCHITECT 3.7 FINAL ACCEPTANCE
- **OPERATION OF ALL EQUIPMENT**
- AUTHORIZED SERVICE ORGANIZATION REGULARLY CARRIES A COMPLETE STOCK OF REPAIR PARTS FOR THESE ITEMS (OR SYSTEMS), AND REQUESTED.
- UP OF THE SITE WILL BE CHARGED AGAINST THE CONTRACTOR. 3.8 REMODELING PROVISIONS
- PROJECT.

- NFCFSSAR'
- A. EXAMINATION
- B. PREPARATION 2. COORDINATE OUTAGES WITH ARCHITECT/OWNER.
- MINIMIZE OUTAGE DURATION.

- ACCESS PANEL AS APPROPRIATE.
- INDIVIDUAL SECTION. D. CLEANING AND REPAIR
- E. INSTALLATION
- 3.10 OWNER PROVIDED FOUIPMENT
- FINISHED BUILDING CONDITIONS. END OF SECTION 280010
- SECTION 28 13 00 ACCESS CONTROL PART 1 - GENERAL A. SECTION INCLUDES:
- 2. SECURITY ACCESS CONTROLLERS CONNECTED TO HIGH-SPEED ELECTRONIC-DATA TRANSMISSION NETWORK. PART 2 - PRODUCTS 2.1 MANUFACTURERS
- 1. OPEN OPTIONS.

DIVISION 28 SPECIFICATIONS:

3.1 WORKMANSHIP AND COMPLETION OF INSTALLATION A. CONTRACTOR'S PERSONNEL AND SUBCONTRACTORS SELECTED TO PERFORM THE WORK SHALL BE WELL VERSED AND SKILLED IN THE

C. SEQUENCE, COORDINATE, AND INTEGRATE INSTALLATIONS OF MATERIALS AND EQUIPMENT FOR EFFICIENT FLOW OF THE WORK. GIVE PARTICULAR ATTENTION TO LARGE EQUIPMENT REQUIRING SPECIFIC POSITIONING. D. ANY CHANGES OR DEVIATIONS FROM THE DRAWINGS AND SPECIFICATIONS MUST BE ACCEPTED IN WRITING BY THE

ARCHITECT/ENGINEER. ALL ERRORS IN INSTALLATION SHALL BE CORRECTED AT THE EXPENSE OF THE CONTRACTOR. ALL SPECIALTIES SHALL BE INSTALLED AS DETAILED ON THE DRAWINGS. WHERE DETAIL OR SPECIFIC INSTALLATION REQUIREMENTS ARE NOT PROVIDED, MANUFACTURER'S RECOMMENDATIONS SHALL BE FOLLOWED. E. UPON COMPLETION OF WORK, ALL EQUIPMENT AND MATERIALS SHALL BE INSTALLED COMPLETE, THOROUGHLY CHECKED, CORRECTLY ADJUSTED, AND LEFT READY FOR INTENDED USE OR OPERATION. ALL WORK SHALL BE THOROUGHLY CLEANED AND ALL RESIDUE SHALL BE REMOVED FROM SURFACES. EXTERIOR SURFACES OF ALL MATERIAL AND EQUIPMENT SHALL BE DELIVERED IN A PERFECT, F. CONTRACTOR SHALL PROVIDE A COMPLETE INSTALLATION, INCLUDING ALL REQUIRED LABOR, MATERIAL, CARTAGE, INSURANCE, PERMITS,

A. PERFORM ALL TRENCHING AND BACKFILLING REQUIRED BY WORK PERFORMED UNDER THIS SECTION IN ACCORDANCE WITH THE EXCAVATING AND GRADING SPECIFICATIONS AS HEREIN SPECIFIED. THIS WORK SHALL COMPLY WITH THE REQUIREMENTS OF TABLE 300-5

A. ALL OPENINGS MADE IN FIRE-RATED WALLS, FLOORS, OR CEILINGS SHALL BE PATCHED AND MADE TIGHT IN A MANNER TO CONFORM TO B. ALL PENETRATIONS REQUIRED THROUGH EXISTING CONCRETE CONSTRUCTION SHALL BE CORE DRILLED AT MINIMUM SIZE REQUIRED. PRECAUTIONS SHALL BE TAKEN WHEN DRILLING TO PREVENT DAMAGE TO STRUCTURAL CONCRETE. CONTRACTOR SHALL OBTAIN PERMISSION FROM THE ARCHITECT BEFORE PROCEEDING WITH DRILLING. C. PROVIDE ALL CUTTING, TRENCHING, BACKFILLING, PATCHING AND REFINISHING OR RESURFACING REQUIRED FOR ELECTRICAL WORK IN A

A. ARRANGE AND BE HELD RESPONSIBLE FOR DELIVERY AND SAFE STORAGE OF MATERIALS AND EQUIPMENT FOR INSTALLATION.

B. STORE MATERIALS AND EQUIPMENT FOR EASY INSPECTION AND CHECKING.

A. WHERE THERE ARE EXISTING FACILITIES, BE RESPONSIBLE FOR THE PROTECTION THEREOF, WHETHER OR NOT SUCH FACILITY IS TO BE REMOVED OR RELOCATED. MOVING OR REMOVING ANY FACILITY MUST BE DONE SO AS NOT TO CAUSE INTERRUPTION OF THE WORK OF B. CLOSE ALL CONDUIT OPENINGS WITH CAPS OR PLUGS DURING INSTALLATION. COVER ALL FIXTURES AND EQUIPMENT AND PROTECT AGAINST INJURY. AT THE FINAL COMPLETION, CLEAN ALL WORK AND DELIVER IN AN UNBLEMISHED CONDITION, OR REFINISH AND REPAINT

A. FINAL ACCEPTANCE BY THE OWNER WILL NOT OCCUR UNTIL ALL OPERATING INSTRUCTIONS ARE RECEIVED, ALL NECESSARY TESTS HAVE BEEN DEMONSTRATED AS "PASS", AND OWNER'S PERSONNEL HAVE BEEN THOROUGHLY INDOCTRINATED IN THE MAINTENANCE AND B. OPERATING MANUAL, PARTS LISTS, AND INDOCTRINATION OF OPERATING AND MAINTENANCE PERSONNEL: FURNISH THE SERVICES OF A QUALIFIED REPRESENTATIVE OF THE SUPPLIER FOR EACH ITEM OR SYSTEM ITEMIZED BELOW WHO SHALL INSTRUCT SPECIFIC PERSONNEL, AS DESIGNATED BY THE OWNER, IN THE OPERATION AND MAINTENANCE OF THAT ITEM OR SYSTEM. C. INSTRUCTION SHALL BE MADE WHEN THE PARTICULAR SYSTEM IS COMPLETE AND SHALL BE OF THE NUMBER OF HOURS AND AT THE TIME REQUESTED BY THE OWNER. A REPRESENTATIVE OF THE ELECTRICAL CONTRACTOR SHALL BE PRESENT FOR ALL DEMONSTRATIONS. D. DELIVER THREE (3) COMPLETE OPERATING MANUALS AND PARTS LISTS TO THE OWNER (OR HIS DESIGNATED REPRESENTATIVE) AT THE TIME OF THE ABOVE REQUIRED INDOCTRINATION. FULLY EXPLAIN THE CONTENTS OF THE MANUALS AS PART OF REQUIRED INDOCTRINATION AND INSTRUCT THE OWNER'S PERSONNEL IN THE CORRECT PROCEDURE IN OBTAINING SERVICE, BOTH DURING AND AFTER THE GUARANTEE PERIOD. THE OPERATING MANUAL AND PARTS LISTS SHALL GIVE COMPLETE INFORMATION AS TO WHOM THE OWNER SHALL CONTACT FOR SERVICE AND PARTS, INCLUDING THE ADDRESS AND PHONE NUMBER. FURNISH EVIDENCE THAT AN

THAT THE ORGANIZATION IS AVAILABLE FOR SERVICE. SERVICE SHALL BE FURNISHED WITHIN TWENTY FOUR (24) HOURS AFTER E. CLEAN UP: REMOVE ALL MATERIALS, SCRAP, ETC., RELATIVE TO THE ELECTRONIC SAFETY AND SECURITY INSTALLATION AND LEAVE THE PREMISES AND ALL EQUIPMENT, OUTLETS, PATCHPANELS, ETC. IN A CLEAN, ORDERLY CONDITION. ANY COSTS TO THE OWNER FOR CLEAN

A. EXISTING SYSTEMS AND CONDITIONS SHOWN ON THE DRAWINGS ARE PROVIDED FOR GUIDANCE ONLY. THE SECURITY CONTRACTOR SHALL FIELD CHECK ALL EXISTING CONDITIONS PRIOR TO BIDDING AND SHALL INCLUDE IN HIS BID AN ALLOWANCE FOR THE REMOVAL AND RELOCATION OF EXISTING CONDUITS, CABLES, DEVICES, OR OTHER EQUIPMENT AS INDICATED ON THE PLANS OR AS REQUIRED TO COORDINATE AND ADAPT NEW AND EXISTING ELECTRONIC SAFETY AND SECURITY SYSTEMS TO ALL OTHER WORK REQUIRED FOR THIS B. WHERE THE REUSE OF EXISTING CONDUITS, OUTLETS, JUNCTION BOXES, ETC., IS PERMISSIBLE, MAKE CERTAIN THAT THE CABLING IS CONTINUOUS FROM DISTRIBUTION POINT TO OUTLET. PROVIDE MODIFICATIONS TO ASSURE THAT SYSTEM SHALL NOT PASS THROUGH OUTLETS OR JUNCTION BOXES WHICH MAY BE RENDERED INACCESSIBLE BY CHANGES TO BE MADE TO THE BUILDING. EXISTING CONDUITS, CABLE, DEVICES, ETC., WHICH SHALL BE REMOVED SHALL BECOME THE PROPERTY OF THIS CONTRACTOR UNLESS OTHERWISE

C. CONNECT NEW WORK TO EXISTING IN A MANNER THAT WILL ASSURE PROPER GROUNDING AND BONDING TECHNIQUES THROUGHOUT IN CONFORMANCE WITH THE NATIONAL ELECTRICAL CODE, BICSI STANDARDS, AND ANSI J-STD-607. D. REMODEL WORK CUTTING AND PATCHING: THE CONTRACTOR SHALL PERFORM CUTTING, CHANNELING, CHASING, DRILLING, ETC., AS REQUIRED TO INSTALL OR REMOVE ELECTRONIC SAFETY AND SECURITY EQUIPMENT IN AREAS OF REMODELING. THIS WORK SHALL BE PERFORMED SO AS TO MINIMIZE DAMAGE TO PORTIONS OF WALL FINISHES, SURFACES, PLASTERING, OR THE STRUCTURE WHICH ARE T BE REUSED, RESURFACED, PLASTERED OR PAINTED UNDER ANOTHER DIVISION OF THESE SPECIFICATIONS. E. CAREFULLY COORDINATE WITH THE REQUIRED REMODELING WORK, CUTTING AND PATCHING ETC., PERFORMED BY THE OTHER TRADES. REMOVE OR RELOCATE EXISTING ELECTRONIC SAFETY AND SECURITY CONDUITS, CABLES, DEVICES, AND OTHER EQUIPMENT AS F. ALL OUTAGES ON PORTIONS OF EXISTING ELECTRONIC SAFETY AND SECURITY SYSTEMS SHALL BE MINIMIZED AND SHALL BE AT A TIME

AND OF DURATION AS ACCEPTED BY THE OWNER. 3.9 ELECTRONIC SAFETY AND SECURITY SYSTEMS DEMOLITION

1. VERIFY FIELD MEASUREMENTS AND CABLING ARRANGEMENTS ARE AS SHOWN ON DRAWINGS. VERIFY THAT ABANDONED CABLING AND EQUIPMENT SERVE ONLY ABANDONED FACILITIES.

3. DEMOLITION DRAWINGS ARE BASED ON CASUAL FIELD OBSERVATION AND EXISTING RECORD DOCUMENTS. REPORT DISCREPANCIES TO ARCHITECT BEFORE DISTURBING EXISTING INSTALLATION. 4. BEGINNING OF DEMOLITION MEANS INSTALLER ACCEPTS EXISTING CONDITIONS.

1. DISCONNECT SYSTEMS IN WALLS, FLOORS, AND CEILINGS SCHEDULED FOR REMOVAL.

3. PROVIDE TEMPORARY CABLING AND CONNECTIONS TO MAINTAIN EXISTING SYSTEMS IN SERVICE DURING CONSTRUCTION. 4. EXISTING TELEPHONE SYSTEM: MAINTAIN EXISTING SYSTEM IN SERVICE. DISABLE SYSTEM ONLY TO MAKE SWITCHOVERS AND CONNECTIONS. NOTIFY OWNER/ARCHITECT IN WRITING AT LEAST 24 HOURS BEFORE PARTIALLY OR COMPLETELY DISABLING SYSTEM.

C. DEMOLITION AND EXTENSION OF EXISTING WORK 1. DEMOLISH AND EXTEND EXISTING SYSTEMS INFRASTRUCTURE UNDER PROVISIONS OF DIVISION 1, DIVISION 2, AND THIS SECTION. REMOVE, RELOCATE, AND EXTEND EXISTING INSTALLATIONS TO ACCOMMODATE NEW CONSTRUCTION.

. REMOVE ABANDONED CABLING TO SOURCE OF SUPPLY. 4. REMOVE EXPOSED ABANDONED CONDUIT, INCLUDING ABANDONED CONDUIT ABOVE ACCESSIBLE CEILING FINISHES. CUT CONDUIT FLUSH WITH WALLS AND FLOORS, AND PATCH SURFACES. 5. DISCONNECT ABANDONED OUTLETS AND REMOVE DEVICES. REMOVE ABANDONED OUTLETS IF CONDUIT SERVICING THEM IS

ABANDONED AND REMOVED. PROVIDE BLANK COVER FOR ABANDONED OUTLETS, WHICH ARE NOT REMOVED. 6. DISCONNECT AND REMOVE ABANDONED DISTRIBUTION EQUIPMENT 7. REPAIR ADJACENT CONSTRUCTION AND FINISHES DAMAGED DURING DEMOLITION AND EXTENSION WORK. 8. MAINTAIN ACCESS TO EXISTING COMMUNCIATIONS INSTALLATIONS WHICH REMAIN ACTIVE. MODIFY INSTALLATION OR PROVIDE

9. EXTEND EXISTING INSTALLATIONS USING MATERIALS AND METHODS COMPATIBLE WITH EXISTING INSTALLATION, OR AS SPECIFIED IN

CLEAN AND REPAIR EXISTING MATERIALS AND EQUIPMENT, WHICH REMAIN OR ARE TO BE REUSED. 2. CROSS-CONNECTS: CLEAN EXPOSED SURFACES AND CHECK TIGHTNESS OF CONNECTIONS. REPLACE DAMAGED DEVICES. 1. INSTALL RELOCATED MATERIALS AND EQUIPMENT UNDER THE PROVISIONS OF DIVISION 1.

A. PROVIDE REQUIRED CONNECTIONS TO OWNER-FURNISHED EQUIPMENT

B. INSPECT OWNER FURNISHED EQUIPMENT FOR DAMAGE, DEFECTS, MISSING COMPONENTS, ETC. REPORT DEFICIENCIES TO THE OWNER IMMEDIATELY. DO NOT INSTALL OR CONNECT DEFICIENT EQUIPMENT. C. PROVIDE SUPPORTS, FASTENINGS, AND AUXILIARY HARDWARE NECESSARY FOR A COMPLETE INSTALLATION IN ACCORDANCE WITH THE

1. SECURITY ACCESS OPERATING SYSTEM AND APPLICATION SOFTWARE.

A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY THE FOLLOWING:

- 2.2 OPERATION A. SECURITY ACCESS SYSTEM SHALL USE A SINGLE DATABASE FOR ACCESS-CONTROL AND CREDENTIAL-CREATION FUNCTIONS. B. FIELD EQUIPMENT SHALL INCLUDE CONTROLLERS. SENSORS, AND CONTROLS. 1. CONTROLLERS SHALL SERVE AS AN INTERFACE BETWEEN THE CENTRAL STATION AND SENSORS AND CONTROLS. 2. DATA EXCHANGE BETWEEN THE CENTRAL STATION AND THE CONTROLLERS SHALL INCLUDE DOWN-LINE TRANSMISSION OF COMMANDS, SOFTWARE, AND DATABASES TO CONTROLLERS. 3. THE UP-LINE DATA EXCHANGE FROM THE CONTROLLER TO THE CENTRAL STATION SHALL INCLUDE STATUS DATA SUCH AS INTRUSION ALARMS, STATUS REPORTS, AND ENTRY-CONTROL RECORDS. 4. CONTROLLERS ARE CLASSIFIED AS ALARM-ANNUNCIATION OR ENTRY-CONTROL TYPE. C. DOOR HARDWARE INTERFACE: 1. ELECTRICAL CHARACTERISTICS OF CONTROLLERS SHALL MATCH THE SIGNAL AND POWER REQUIREMENTS OF DOOR HARDWARE. 2.3 APPLICATION SOFTWARE A. PROVIDE PROFESSIONAL / ENTERPRISE ACCESS CONTROL MANAGEMENT SOFTWARE BY HARDWARE MANUFACTURER. B. PC-TO-CONTROLLER COMMUNICATIONS: 1. CENTRAL-STATION OR WORKSTATION COMMUNICATIONS SHALL USE THE FOLLOWING: a. TCP/IP LAN INTERFACE. 2.4 CONTROLLERS A. CONTROLLERS: INTELLIGENT PERIPHERAL CONTROL UNIT, COMPLYING WITH UL 294, THAT STORES TIME, DATE, VALID CODES, ACCESS LEVELS, AND SIMILAR DATA DOWNLOADED FROM THE CENTRAL STATION OR WORKSTATION FOR CONTROLLING ITS OPERATION. B. BATTERY BACKUP: SEALED, LEAD ACID; SIZED TO PROVIDE RUN TIME DURING A POWER OUTAGE OF 90 MINUTES, COMPLYING WITH UL 924. C. ENTRY-CONTROL CONTROLLER: 1. FUNCTION: PROVIDE LOCAL ENTRY-CONTROL FUNCTIONS INCLUDING ONE- AND TWO-WAY COMMUNICATIONS WITH ACCESS-CONTROL DEVICES SUCH AS CARD READERS, KEYPADS, BIOMETRIC PERSONNEL IDENTITY-VERIFICATION DEVICES, DOOR STRIKES, MAGNETIC LATCHES, GATE AND DOOR OPERATORS, AND EXIT PUSH BUTTONS. a. OPERATE AS A STAND-ALONE PORTAL CONTROLLER USING THE DOWNLOADED DATABASE DURING PERIODS OF COMMUNICATION
 - LOSS BETWEEN THE CONTROLLER AND THE FIELD-DEVICE NETWORK. b. ACCEPT INFORMATION GENERATED BY THE ENTRY-CONTROL DEVICES; AUTOMATICALLY PROCESS THIS INFORMATION TO DETERMINE VALID IDENTIFICATION OF THE INDIVIDUAL PRESENT AT THE PORTAL: 1) ON AUTHENTICATION OF THE CREDENTIALS OR INFORMATION PRESENTED, CHECK PRIVILEGES OF THE IDENTIFIED INDIVIDUAL, ALLOWING ONLY THOSE ACTIONS GRANTED AS PRIVILEGES. 2) PRIVILEGES SHALL INCLUDE, BUT ARE NOT LIMITED TO, TIME OF DAY CONTROL, DAY OF WEEK CONTROL, GROUP CONTROL, AND
 - VISITOR ESCORT CONTROL. MAINTAIN A DATE-, TIME-, AND LOCATION-STAMPED RECORD OF EACH TRANSACTION. A TRANSACTION IS DEFINED AS ANY SUCCESSFUL OR UNSUCCESSFUL ATTEMPT TO GAIN ACCESS THROUGH A CONTROLLED PORTAL BY THE PRESENTATION OF CREDENTIALS OR OTHER IDENTIFYING INFORMATION.
- INPUTS: a. DATA FROM ENTRY-CONTROL DEVICES; USE THIS INPUT TO CHANGE MODES BETWEEN ACCESS AND SECURE. b. DATABASE DOWNLOADS AND UPDATES FROM THE CENTRAL STATION THAT INCLUDE ENROLLMENT AND PRIVILEGE INFORMATION. 3. OUTPUTS: a. INDICATE SUCCESS OR FAILURE OF ATTEMPTS TO USE ENTRY-CONTROL DEVICES AND MAKE COMPARISONS OF PRESENTED
- INFORMATION WITH STORED IDENTIFICATION INFORMATION b. GRANT OR DENY ENTRY BY SENDING CONTROL SIGNALS TO PORTAL-CONTROL DEVICES AND MASK INTRUSION-ALARM ANNUNCIATION FROM SENSORS STIMULATED BY AUTHORIZED ENTRIES. c. MAINTAIN A DATE-, TIME-, AND LOCATION-STAMPED RECORD OF EACH TRANSACTION AND TRANSMIT TRANSACTION RECORDS TO THE CENTRAL STATION.
- d. DOOR PROP ALARM: IF A PORTAL IS HELD OPEN FOR LONGER THAN TIME LISTED IN A SCHEDULE, ALARM SOUNDS. 4. WITH POWER SUPPLIES SUFFICIENT TO POWER AT VOLTAGE AND FREQUENCY REQUIRED FOR FIELD DEVICES AND PORTAL-CONTROL DEVICES
- 5. CONTROLLER POWER: NFPA 70, CLASS II POWER-SUPPLY TRANSFORMER, WITH 12- OR 24-V AC SECONDARY, BACKUP BATTERY AND CHARGER a. BACKUP BATTERY: PREMIUM, VALVE -REGULATED, RECOMBINANT-SEALED, LEAD-CALCIUM BATTERY; SPILL PROOF; WITH A FULL ONE-YEAR WARRANTY AND A PRO RATA 19 -YEAR WARRANTY. WITH SINGLE-STAGE, CONSTANT-VOLTAGE-CURRENT, LIMITED BATTERY CHARGER, COMPLY WITH BATTERY MANUFACTURER'S WRITTEN INSTRUCTIONS FOR BATTERY TERMINAL VOLTAGE AND
- CHARGING CURRENT RECOMMENDATIONS FOR MAXIMUM BATTERY LIFE. b. BACKUP POWER-SUPPLY CAPACITY: 90 MINUTES OF BATTERY SUPPLY. SUBMIT BATTERY AND CHARGER CALCULATIONS. c. POWER MONITORING: PROVIDE MANUAL, DYNAMIC BATTERY-LOAD TEST, INITIATED AND MONITORED AT THE CONTROL CENTER; WITH AUTOMATIC DISCONNECTION OF THE CONTROLLER WHEN BATTERY VOLTAGE DROPS BELOW CONTROLLER LIMITS. REPORT BY USING LOCAL CONTROLLER-MOUNTED DIGITAL DISPLAYS AND BY COMMUNICATING STATUS TO CENTRAL STATION. INDICATE NORMAL POWER ON AND BATTERY CHARGER ON TRICKLE CHARGE. INDICATE AND REPORT THE FOLLOWING: 1) TROUBLE ALARM: NORMAL POWER-OFF LOAD ASSUMED BY BATTERY.
- 2) TROUBLE ALARM: LOW BATTERY. 3) ALARM: POWER OFF 2.5 CARD READERS, CREDENTIAL CARDS, AND KEYPADS
- A. CARD-READER POWER: POWERED FROM ITS ASSOCIATED CONTROLLER, INCLUDING ITS STANDBY POWER SOURCE, AND SHALL NOT DISSIPATE MORE THAN 5 W. 2.6 DOOR HARDWARE INTERFACE
- A. EXIT DEVICE WITH ALARM: OPERATION OF THE EXIT DEVICE SHALL GENERATE AN ALARM AND ANNUNCIATE A LOCAL ALARM. B. EXIT ALARM: OPERATION OF A MONITORED DOOR SHALL GENERATE AN ALARM. C. ELECTRIC DOOR STRIKES: USE END-OF-LINE RESISTORS TO PROVIDE POWER-LINE SUPERVISION. SIGNAL SWITCHES SHALL TRANSMIT DATA TO CONTROLLER TO INDICATE WHEN THE BOLT IS NOT ENGAGED AND THE STRIKE MECHANISM IS UNLOCKED, AND THEY SHALL
- REPORT A FORCED ENTRY. POWER AND SIGNAL SHALL BE FROM THE CONTROLLER. 2.7 CABLES A. GENERAL CABLE REQUIREMENTS: COMPLY WITH REQUIREMENTS IN SECTION 28 05 13 "CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY" AND AS RECOMMENDED BY SYSTEM MANUFACTURER FOR INTEGRATION REQUIREMENT. B. MULTICONDUCTOR, PLENUM-TYPE, READER AND WIEGAND KEYPAD CABLES: 1. SIX CONDUCTORS, NO. 20 AWG, STRANDED (7X28) TINNED COPPER CONDUCTORS. FLUORINATED-ETHYLENE-PROPYLENE INSULATION.
- OVERALL ALUMINUM FOIL/POLYESTER-TAPE SHIELD WITH 100 PERCENT SHIELD COVERAGE PLUS TINNED COPPER BRAID SHIELD WITH 85 PERCENT SHIELD COVERAGE, AND FLUORINATED-ETHYLENE-PROPYLENE JACKET. 2 NEPA 70 TYPE CMP 3. FLAME RESISTANCE: NFPA 262 FLAME TEST.
- C. PAIRED, PLENUM-TYPE, LOCK CABLES: 1. ONE PAIR, TWISTED, NO. 18 AWG, STRANDED (19X30) TINNED COPPER CONDUCTORS, FLUORINATED-ETHYLENE-PROPYLENE INSULATION, UNSHIELDED, AND PLASTIC JACKET. 2. NFPA 70. TYPE CMP. 3. FLAME RESISTANCE: NFPA 262 FLAME TEST.
- D. PAIRED, PLENUM-TYPE, INPUT CABLES: 1. ONE PAIR, TWISTED, NO. 22 AWG, STRANDED (7X30) TINNED COPPER CONDUCTORS, FLUORINATED-ETHYLENE-PROPYLENE INSULATION, ALUMINUM-FOIL/POLYESTER-TAPE SHIELD (FOIL SIDE OUT), WITH NO. 22 AWG DRAIN WIRE, 100 PERCENT SHIELD COVERAGE, AND PLASTIC JACKET. 2. NFPA 70, TYPE CMP.
- 3. FLAME RESISTANCE: NFPA 262 FLAME TEST. PART 3 - EXECUTION
- 3.1 PREPARATION A. OBTAIN DETAILED PROJECT PLANNING FORMS FROM MANUFACTURER OF ACCESS-CONTROL SYSTEM: DEVELOP CUSTOM FORMS TO SUIT PROJECT. FILL IN ALL DATA AVAILABLE FROM PROJECT PLANS AND SPECIFICATIONS AND PUBLISH AS PROJECT PLANNING DOCUMENTS
- FOR REVIEW AND APPROVAL. B. IN MEETINGS WITH ARCHITECT AND OWNER, PRESENT PROJECT PLANNING DOCUMENTS AND REVIEW, ADJUST, AND PREPARE FINAL SETUP DOCUMENTS. USE FINAL DOCUMENTS TO SET UP SYSTEM SOFTWARE.
- 3.2 OWNER PROVIDED FOUIPMENT A. PROVIDE REQUIRED COMMUNICATIONS CONNECTIONS TO OWNER-FURNISHED EQUIPMENT. B. INSPECT OWNER FURNISHED EQUIPMENT FOR DAMAGE, DEFECTS, MISSING COMPONENTS, ETC. REPORT DEFICIENCIES TO THE OWNER
- IMMEDIATELY. DO NOT INSTALL OR CONNECT DEFICIENT EQUIPMENT 3.3 CABLING A. INSTALL CABLES AND WIRING ACCORDING TO REQUIREMENTS IN SECTION 28 05 13 "CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY
- AND SECURITY." B. INSTALL END-OF-LINE RESISTORS AT THE FIELD DEVICE LOCATION AND NOT AT THE CONTROLLER OR PANEL LOCATION.
- 3.4 CABLE APPLICATION A. CABLE APPLICATION REQUIREMENTS ARE MINIMUM REQUIREMENTS AND SHALL BE EXCEEDED IF RECOMMENDED OR REQUIRED BY MANUFACTURER OF SYSTEM HARDWARE.
- B. TIA 485-A CABLING: INSTALL AT A MAXIMUM DISTANCE OF 4000 FT. (1220 m). C. CARD READERS AND KEYPADS: 1. INSTALL NUMBER OF CONDUCTOR PAIRS RECOMMENDED BY MANUFACTURER FOR THE FUNCTIONS SPECIFIED. 2. UNLESS MANUFACTURER RECOMMENDS LARGER CONDUCTORS, INSTALL NO. 22 AWG WIRE IF MAXIMUM DISTANCE FROM CONTROLLER
- TO THE READER IS 250 FT. (75 m), AND INSTALL NO. 20 AWG WIRE IF MAXIMUM DISTANCE IS 500 FT. (150 m). 3. FOR GREATER DISTANCES, INSTALL "EXTENDER" OR "REPEATER" MODULES RECOMMENDED BY MANUFACTURER OF THE CONTROLLER. 4. INSTALL MINIMUM NO. 18 AWG SHIELDED CABLE TO READERS AND KEYPADS THAT DRAW 50 MA OR MORE. D. INSTALL MINIMUM NO. 16 AWG CABLE FROM CONTROLLER TO ELECTRICALLY POWERED LOCKS. DO NOT EXCEED 250 FT. (75 m).
- E. INSTALL CARD READERS, KEYPADS, PUSH BUTTONS, OR BIOMETRIC READERS. 3.5 SYSTEM SOFTWARE AND HARDWARE
- A. INSTALL AND TEST SOFTWARE AND HARDWARE AND PERFORM DATABASES TESTS FOR THE COMPLETE AND PROPER OPERATION OF SYSTEMS INVOLVED. ASSIGN SOFTWARE LICENSE TO OWNER. 3.6 DEMONSTRATION
- A. TRAIN OWNER'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN SECURITY ACCESS SYSTEM. END OF SECTION 28 13 00

SECTION 28 23 00 - VIDEO SURVEILLANCE PART 1 -

1.1 SUMMARY A. SECTION INCLUDES

1. VIDEO SURVEILLANCE SYSTEM CONSISTING OF CAMERAS, DIGITAL VIDEO RECORDER, DATA TRANSMISSION WIRING, AND A CONTROL STATION WITH ITS ASSOCIATED EQUIPMENT PART 2 - PRODUCTS

2.1 IP CAMERAS A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY THE FOLLOWING:

1 VERKADA B. FIXED DOME COLOR CAMERA: ASSEMBLED AND TESTED AS A MANUFACTURED UNIT, CONTAINING CAMERA HOUSING, DOME AND VARIABLE ZOOM LENS. 1. COMPLY WITH UL 639. 2. IP-BASED CAMERA TYPE (TCP/IP SUPPORTED PROTOCOL).

3. BASIC CAMERA POWER SERVED VIA POE. 4. VIDEO COMPRESSION: H.264 OR MOTION JPEG, SIMULTANEOUS AND SELECTABLE.

5. FRAME RATE: UP TO 30 FRAMES PER SECOND. 6. HORIZONTAL RESOLUTION: NOT LESS THAN 720 LINES. 7. WITH AGC, MANUALLY SELECTABLE ON OR OFF.

8. SENSITIVITY: CAMERA SHALL PROVIDE USABLE IMAGES IN LOW-LIGHT CONDITIONS, DELIVERING AN IMAGE AT A SCENE ILLUMINATION OF: COLOR 0.1 LUX AT F1 2 / B&W 0 02 LUX AT F1 2 9. MANUALLY SELECTABLE MODES FOR BACKLIGHT COMPENSATION OR NORMAL LIGHTING. 10. WHITE BALANCE: AUTO-TRACING WHITE BALANCE, WITH MANUALLY SETTABLE FIXED BALANCE OPTION.

11. MOTION DETECTOR: BUILT-IN DIGITAL. 2.2 POWER SUPPLIES

A. LOW VOLTAGE POE INJECTOR SUPPLYING MAXIMUM 15.4W AT OUTPUT. PROVIDED BY MID-SPAN INJECTORS OR POE NETWORK SWITCH. 2.4 IP VIDEO SYSTEMS A. DESCRIPTION: 1. SYSTEM SHALL PROVIDE HIGH-QUALITY DELIVERY AND PROCESSING OF IP-BASED VIDEO, AUDIO, AND CONTROL DATA USING STANDARD

ETHERNET-BASED NETWORKS. 2. SYSTEM SHALL HAVE SEAMLESS INTEGRATION OF ALL VIDEO SURVEILLANCE AND CONTROL FUNCTIONS. 3. GRAPHICAL USER INTERFACE SOFTWARE SHALL MANAGE ALL IP-BASED VIDEO MATRIX SWITCHING AND CAMERA CONTROL FUNCTIONS, TWO-WAY AUDIO COMMUNICATION, ALARM MONITORING AND CONTROL, AND RECORDING AND ARCHIVE/RETRIEVAL MANAGEMENT. IP SYSTEM SHALL ALSO BE CAPABLE OF INTEGRATING INTO LARGER SYSTEM ENVIRONMENTS.

4. SYSTEM DESIGN SHALL INCLUDE ALL NECESSARY COMPRESSION SOFTWARE FOR HIGH-PERFORMANCE, DUAL-STREAM, MPEG-2/MPEG-4 VIDEO. UNIT SHALL PROVIDE CONNECTIONS FOR ALL VIDEO CAMERAS, CAMERA PTZ CONTROL DATA, BIDIRECTIONAL AUDIO, DISCREET SENSOR INPUTS, AND CONTROL SYSTEM OUTPUTS. 5. ALL CAMERA SIGNALS SHALL BE COMPRESSED, ENCODED, AND DELIVERED ONTO THE NETWORK FOR PROCESSING AND CONTROL BY THE IP VIDEO-MANAGEMENT SOFTWARE.

6. CAMERA SYSTEM UNITS SHALL BE RUGGEDLY BUILT AND DESIGNED FOR EXTREME ADVERSE ENVIRONMENTS, COMPLYING WITH NEMA TYPE ENVIRONMENTAL STANDARDS. PART 3 - EXECUTION 3.1 WIRING

A. WIRING METHOD: INSTALL CABLES IN RACEWAYS UNLESS OTHERWISE INDICATED. B. WIRING WITHIN ENCLOSURES: BUNDLE, LACE, AND TRAIN CONDUCTORS TO TERMINAL POINTS WITH NO EXCESS AND WITHOUT EXCEEDING MANUFACTURER'S LIMITATIONS ON BENDING RADII. PROVIDE AND USE LACING BARS AND DISTRIBUTION SPOOLS.

C. GROUNDING: PROVIDE INDEPENDENT-SIGNAL CIRCUIT GROUNDING RECOMMENDED IN WRITING BY MANUFACTURER. 3.2 VIDEO SURVEILLANCE SYSTEM INSTALLATION

A. INSTALL CAMERAS AND INFRARED ILLUMINATORS LEVEL AND PLUMB. B. INSTALL CAMERAS WITH 84-INCH- (2134-mm-) MINIMUM CLEAR SPACE BELOW CAMERAS AND THEIR MOUNTINGS. CHANGE TYPE OF MOUNTING TO ACHIEVE REQUIRED CLEARANCE C. INSTALL POWER SUPPLIES AND OTHER AUXILIARY COMPONENTS AT CONTROL STATIONS UNLESS OTHERWISE INDICATED.

3.3 FIELD QUALITY CONTROL A. PERFORM TESTS AND INSPECTIONS.

B TESTS AND INSPECTIONS<sup>1</sup> 1. INSPECTION: VERIFY THAT UNITS AND CONTROLS ARE PROPERLY INSTALLED, CONNECTED, AND LABELED, AND THAT INTERCONNECTING WIRES AND TERMINALS ARE IDENTIFIED. 2. TEST SCHEDULE: SCHEDULE TESTS AFTER PRETESTING HAS BEEN SUCCESSFULLY COMPLETED AND SYSTEM HAS BEEN IN NORMAL FUNCTIONAL OPERATION FOR AT LEAST 14 DAYS. PROVIDE A MINIMUM OF 10 DAYS' NOTICE OF TEST SCHEDULE. 3. OPERATIONAL TESTS: PERFORM OPERATIONAL SYSTEM TESTS TO VERIFY THAT SYSTEM COMPLIES WITH SPECIFICATIONS. INCLUDE ALL MODES OF SYSTEM OPERATION TEST FOUIPMENT FOR PROPER OPERATION IN ALL FUNCTIONAL MODES C. VIDEO SURVEILLANCE SYSTEM WILL BE CONSIDERED DEFECTIVE IF IT DOES NOT PASS TESTS AND INSPECTIONS.

D. PREPARE TEST AND INSPECTION REPORTS. 3.4 ADJUSTING

A. OCCUPANCY ADJUSTMENTS: WHEN REQUESTED WITHIN 12 MONTHS OF DATE OF SUBSTANTIAL COMPLETION, PROVIDE ON-SITE ASSISTANCE IN ADJUSTING SYSTEM TO SUIT ACTUAL OCCUPIED CONDITIONS. PROVIDE UP TO TWO VISITS TO PROJECT DURING OTHER-THAN-NORMAL OCCUPANCY HOURS FOR THIS PURPOSE. TASKS SHALL INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING: 1. CHECK CABLE CONNECTIONS. 2. CHECK PROPER OPERATION OF CAMERAS AND LENSES. VERIFY OPERATION OF AUTO-IRIS LENSES AND ADJUST BACK-FOCUS AS NEEDED.

3. ADJUST ALL PRESET POSITIONS; CONSULT OWNER'S PERSONNEL. 4. RECOMMEND CHANGES TO CAMERAS, LENSES, AND ASSOCIATED EQUIPMENT TO IMPROVE OWNER'S USE OF VIDEO SURVEILLANCE SYSTEM. PROVIDE A WRITTEN REPORT OF ADJUSTMENTS AND RECOMMENDATIONS. 3.5 CLEANING

A. CLEAN INSTALLED ITEMS USING METHODS AND MATERIALS RECOMMENDED IN WRITING BY MANUFACTURER. B. CLEAN VIDEO-SURVEILLANCE-SYSTEM COMPONENTS, INCLUDING CAMERA-HOUSING WINDOWS, LENSES, AND MONITOR SCREENS. 3.6 DEMONSTRATION

A. TRAIN OWNER'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN VIDEO-SURVEILLANCE EQUIPMENT END OF SECTION 28 23 00





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1 FIRST LEVEL AREA A DEMO TECHNOLOGY PLAN SCALE: 1/8" = 1'-0"



1. INFORMATION REGARDING EXISTING DEVICE PRIOR TO START OF WORK. 2. ALL SYSTEMS LOCATED OUTSIDE THE AREA OPERABLE. 3. CONTRACTOR SHALL COORDINATE WITH WHITEBOARDS, ETC.

DEMO NOTES

- 2 GENERAL DEMOLITION AREA. REMOVE COMMUICATIONS AND LOW VOLTAGE OUTLETS AND EQUIPMENT.





NOTES:

LOCATIONS AND CABLE ROUTING IS NOT AVAILABLE. DEMOLITION PLAN INDICATES A DESIRED SCOPE OF WORK; THE CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY IN FIELD

OF DEMOLITION ARE INTENDED TO REMAIN

OWNER AND ENSURE ALL EQUIPMENT TO BE RETAINED BY OWNER HAS BEEN REMOVED PRIOR TO DEMOLITION WORK, INCLUDING COMPUTER EQUIPMENT, WIRELESS CLOCKS, PROJECTION SCREENS, INTERACTIVE

1 (E) ACCESS CONTROLLED ENTRANCE. REMOVE CÁRD READER AND ELECTRIFIED DOOR HARDWARE FOR POSSIBLE RE-USE. IF DOOR CONTROLLER AND PSU ARE LOCATED AT DOOR, REMOVE AND PRESERVE FOR REUSE.





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NOTES: 1. INFORMATION REGARDING EXISTING DEVICE LOCATIONS AND CABLE ROUTING IS NOT AVAILABLE. DEMOLITION PLAN INDICATES A DESIRED SCOPE OF WORK; THE CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY IN FIELD PRIOR TO START OF WORK. 2. ALL SYSTEMS LOCATED OUTSIDE THE AREA OF DEMOLITION ARE INTENDED TO REMAIN OPERABLE. 3. CONTRACTOR SHALL COORDINATE WITH OWNER AND ENSURE ALL EQUIPMENT TO BE RETAINED BY OWNER HAS BEEN REMOVED <u>PRIOR TO DEMOLITION WORK</u>, INCLUDING COMPUTER EQUIPMENT, WIRELESS CLOCKS, PROJECTION SCREENS, INTERACTIVE WHITEBOARDS, ETC.

DEMO NOTES



1 DEMO EXISTING COMMUNICATIONS OUTLET. BACK PULL CABLING TO ABOVE CEILING FOR POSSIBLE OUTLET RELOCATION.







NOTES:

- 2. ALL LOW VOLTAGE CONDUIT STUBBED OUT ABOVE FINISHED CEILINGS SHALL HAVE LONG RADIUS SWEEPS. 3. CABLE TIES SHALL BE RELEASABLE AND COMPOSED OF HOOK AND LOOP, RUBBER OR
- NOT BE USED. 4. CABLING SHALL BE ROUTED VIA CONDUIT FROM OUTLET BOX TO ABOVE ACCESSIBLE CEILING.
- 5. HOMERUN CABLING TO SERVING
- ON RACK MOUNTED PATCH PANELS. 7. PROVIDE EXPANSION CAPABILITY IN CONDUIT
- SHALL MEET BICSI STANDARDS.
- 10. LIGHT LINEWEIGHT INDICATES OFCI EQUIPMENT.

FLAG NOTES:





1. PROVIDE CONDUIT SLEEVES THROUGH WALLS TO FACILITATE CABLING. PROVIDE FIRESTOPPING AS REQUIRED.

SOFT POLYMER. ZIP-TIES OR EQUAL SHALL

DISTRIBUTION FRAME. USE J-HOOKS FOR PATHWAYS ABOVE ACCESSIBLE CEILING. 6. CABLING SHALL NOT RUN UNSUPPORTED FOR LENGTHS GREATER THAN 5'-0". ALL VOICE/DATA CABLING SHALL BE TERMINATED

CROSSING BUILIDNG EXPANSION JOINTS. RE: ARCHITECTRUAL DRAWINGS FOR LOCATIONS. 8. ALL INFRASTRUCTURE SUPPORTING VOICE/DATA STRUCTURED CABLING SYSTEMS (RACKING, GROUNDING, PATHWAYS, ETC.)

9. CONTRACTOR TO PROVIDE BLOCKING AT PROJECTOR AND DISPLAY LOCATIONS TO SUPPORT 100LBS.



| | Revisions: | | | | | | | | |
|----|-------------|------|--|--|--|--|--|--|--|
| No | Description | Date | | | | | | | |
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T2.1



| NETWORK SWITCH | 4 | | | - CAT
PAT |
|--------------------------------|----|------|-------|--------------|
| -
OFE
POE NETWORK SWITCH | | | - • 1 | |
| | 1 | CAT6 | E ; | |
| | 2 | CAT6 | E | |
| | 3— | CAT6 | E + | |
| | 4 | CAT6 | | |
| | 5— | CAT6 | E | |
| | 6 | CAT6 | E | |

LOCATE IN NEAREST IDF SERVING PRE-K CLASSROOMS.



COMMUNICATIONS RISER DIAGRAM SCALE: NONE



2 COMMUNICATIONS PATHWAYS AND SPACES SCALE: NONE

ACCESS CONTROL PANEL --ENCLOSURE W/ INTEGRAL POWER SUPPLY.



3 ELECTRONIC SECURITY FUNCTIONAL SCALE: NONE

POWER SUPPLY

OPEN OPTIONS 250W / 24V

POWER SUPPLY

/----(E) RJ45 UTP PATCH PANEL, RACK MOUNT. PROVIDE NEW AS REQUIRED.

 \longrightarrow CAT6 \longrightarrow \longrightarrow NEW DATA OUTLETS, TYPICAL.

-MAIN ER/MDF.



NOTES:

| 1. | LIGHT LINEWEIGHT INDICATES EXISTING OR OWNER
PROVIDED EQUIPMENT. |
|----|---|
| 2. | FIELD-COORDINATE EXACT LOCATION OF ALL PANELS
AND HARDWARE WITH OWNER. |
| 3. | PROVIDE ALL NECESSARY ACCESSORIES AND
APPURTENANCES TO COMPRISE A COMPLETE AND
OPERABLE SYSTEM. |
| 4. | INCREASE WIRE GAUGE FOR LOCK CIRCUITS LONGER THAN 300 FEET. |
| 5. | REFERENCE PROJECT MANUAL / SPECIFICATION FOR
CABLING REQUIREMENTS. |
| | |

LINETYPE LEGEND:

| 6/22(S) | SECURITY - CARD READER |
|---------------------|--------------------------------------|
| | SECURITY - ELECTRIC DOOR
HARDWARE |
| | SECURITY - DOOR CONTACT |
| - — — -RS485— — — — | CONTROL (SERIAL) |
| CAT6 | CATEGORY 6 - 4PR UTP |
| | |















| SCHEDULE | | | | | |
|------------------------------------|---|--|--|--|--|
| NOTES | PROVIDED
BY | | | | |
| LINDER SHELE | KEC | | | | |
| CASTERS | KEC | | | | |
| | EXISTING | | | | |
| | | | | | |
| | KEC | | | | |
| | NEC | | | | |
| | | | | | |
| | | | | | |
| | KEC | | | | |
| OVERFLOWS AND LEVER DRAINS | KEC | | | | |
| STAINLESS STEEL | KEC | | | | |
| | KEC | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| STAINLESS STEEL | KEC | | | | |
| UNDER SHELF | KEC | | | | |
| STAINLESS STEEL | KEC | | | | |
| SSSD STATES, NO COOKING WILL OCCUR | KEC | | | | |
| STAINLESS STEEL | KEC | | | | |
| | KEC | | | | |
| CASTERS | KEC | | | | |
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| | | | | | |
| | EXISTING | | | | |
| STAINLESS STEEL TOP AND BASE | KEC | | | | |
| | KEC | | | | |
| METRO MAX I | KEC | | | | |
| | GC | | | | |
| | GC | | | | |
| METRO MAX I | KEC | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| 300 LBS / 24 HOURS | KEC. | | | | |
| | | | | | |
| INTEGRAL FLOOR W/RAMP | | | | | |
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| | SCHEDULE NOTES UNDER SHELF CASTERS CASTERS STAINLESS STEEL METRO MAX I OVERFLOWS AND LEVER DRAINS STAINLESS STEEL OVERFLOWS AND LEVER DRAINS STAINLESS STEEL OVERFLOW AND LEVER DRAINS STAINLESS STEEL OVERFLOW AND LEVER DRAINS STAINLESS STEEL OVERFLOW AND LEVER DRAIN CASTERS STAINLESS STEEL SSD STATES, NO COOKING WILL OCCUR STAINLESS STEEL SSSD STATES, NO COOKING WILL OCCUR STAINLESS STEEL STAINLESS STEEL SSSD STATES, NO COOKING WILL OCCUR STAINLESS STEEL STAINLESS STEEL STAINLESS STEEL STAINLESS STEEL STAINLESS STEEL STAINLESS STEEL TOP AND BASE METRO MAX I METRO MAX I STAINLESS STEEL TOP AND BASE METRO MAX I STAINLESS STEEL TOP AND BASE REMOTE, ON BUILDING ROOF | | | | |





KITCHEN PLUMBING - MECHANICAL



| EQUIPMENT | | | PLUMBING SCHEDULE | | | | | | | | EDULE |
|-----------|----------|---------------------------------|-------------------|--------------|---------------|-------------------|-----------------|---------------|----------|----------|---------------------------------------|
| TEM # | QTY. | DESCRIPTION | AFF | HOT
WATER | COLD
WATER | INDIRECT
WASTE | DIRECT
WASTE | FLOOR
SINK | GAS | BTU | NOTES |
| 1 | 1 | TRAY RETURN TABLE | - | | | | | | | | |
| 2 | 1 | POS / CASHIER CART, MOBILE | - | | | | | | | | |
| 3 | 1 | DISH TABLE, SOILED | OOF | | | 2 | | 3 | | | EXTEND INDIRECT DRAIN TO FLOOR SINK |
| 4 | 1 | PRE RINSE SPRAYER | 15 | 1/2 | 1/2 | | | | | | |
| 5 | 1 | DISPOSAL, 2 HP | 12 | | | | 2 | | | | TAP WATER SUPPLY FROM ITEM #4 |
| 6 | NIC | DISH MACHINE, HIGH TEMP | OOF | | | 2 | | 3 | | | EXTEND INDIRECT DRAIN TO FLOOR SINK |
| 7 | 1 | CONDENSATE HOOD | - | | | | | | | | |
| 8 | 1 | BOOSTER HEATER | 12 | 3/4 | | | | | | | EXTEND BOOSTER OUTPUT TO DISH MACHINE |
| 9 | NIC | SPARE NUMBER | - | | | | | | | | |
| 10 | NIC | SPARE NUMBER | - | | | | | | | | |
| 11 | 1 | | - I | | | | | | | | |
| 12 | 2 | WALL SHELVES | | | | | | | | | |
| 13 | 2 | | | | | | | | <u> </u> | <u> </u> | |
| 1/ | 2 | | | 1/2 | 1/2 | | 2 | | | | |
| 14 | <u>∠</u> | | | 1/2 | 1/2 | 0 | <u> </u> | 2 | | | |
| 10 | 1 | | 15 | 1/2 | 1/2 | 2 | | 3 | | <u> </u> | EATEND INDIRECT DRAIN TO FLOOR SINK |
| 10 | | | - | 4/0 | 4/0 | 0 | | | | | |
| 17 | 1 | | 15 | 1/2 | 1/2 | 2 | | 3 | | | |
| 18 | NIC | SPARE NUMBER | - | | | | | | | | |
| 19 | NIC | SPARE NUMBER | - | | | | | | | | |
| 20 | NIC | SPARE NUMBER | - | | | | | | | | |
| 21 | 2 | WALL SHELVES | - | | | | | | | | |
| 22 | 1 | WORK TABLE | - | | | | | | | | |
| 23 | 2 | WALL SHELVES | - | | | | | | | | |
| 24 | 1 | EXHAUST HOOD, TYPE 2 | - | | | | | | | | |
| 25 | 1 LOT | WALL FLASHING BELOW HOOD | - | | | | | | | | |
| 26 | 1 | STEAMER, 10 PAN | 24 | | 1/2 | 2 | | 3 | 3/4 | 105K | FLEX GAS LINE BY KEC |
| 27 | 1 | CONVECTION OVEN, DOUBLE STACKED | 24-48 | | | | | | 3/4 | 75K ea | FLEX GAS LINE BY KEC |
| 28 | NIC | SPARE NUMBER | - | | | | | | | | |
| 29 | NIC | SPARE NUMBER | - | | | | | | | | |
| 30 | NIC | SPARE NUMBER | - | | | | | | | | |
| 31 | NIC | CABINET, HEATED | - | | | | | | | | |
| 32 | 1 | SERVING LINE, W/ BASE CABINET | - | | | | | | | | |
| 33 | 7 | HEATLAMPS | - | | | | | | | | |
| 34 | 1 | CLEANING SUPPLIES STORAGE | | | | | | | | | |
| 35 | NIC | MOP SINK | STND | 1/2 | 1/2 | | 2 | | <u> </u> | <u> </u> | |
| 36 | NIC | | STND | 1/2 | 1/2 | | | | | | |
| 37 | 1110 | | | 1/2 | 1/2 | | | | | | |
| 30 | | | <u> </u> | | | | | | <u> </u> | | |
| 30 | | | | | | | | | <u> </u> | <u> </u> | |
| 40 | | | | | | | | | | | |
| 40 | | | - | | 4/0 | 0 | | 2 | | | |
| 41 | | | 60 | | 1/2 | 2 | | 3 | | | |
| 42 | NIC | | - | 4/0 | | | | | | | |
| 43 | 1 | | OOF | 1/2 | | 1 | | 2 | ļ | ļ | |
| 44 | 1 | WALK IN COOLER EVAP COIL | - | | | | | | | | |
| 45 | 1 | WALK IN COOLER CONDENSER | - | | | | | | | | |
| 46 | 1 | WALK IN COOLER SHELVING | - | | | | | | | | |
| | 4 | GLASS DOORS W/ LED LIGHTING | - | | | | | | | | |
| 47 | | 1751.00 | | | | | 1 | | | | |

| | | | EX⊦ | IAUST | | HO | OD | S | CHEDULE |
|--------|------------------------------|---|-----|----------------------|-------------------|------------------|-----------------|-------------------------|--|
| ITEM # | EM # HOOD SIZE:
L x W x D | | CFM | EXHAUST
COLLAR(S) | COLLAR
OPENING | S.P. /
COLLAR | GLOBE
LIGHTS | LIGHT / FAN
SWITCHES | NOTES |
| 7 | 42x 42 x 24 | 2 | 600 | 1 | 6 x 6 | 0.50" | NA | NA | CONNECT FAN CONTROL RELAY TO DISH MACHINE |
| | | | | | | | | | TRIGGER, ADD DELAY CIRCUIT IF DESIRED |
| 24 | | | | | | | | | SEE CAPTIVE AIRE DRAWINGS |
| END OF | ITEMS | | | | | | | | THE HOOD RECOMMENDATION IS BASED ON INFO |
| | | | | | | | | | SUPPLIED TO KITCHEN TECH BY SSSD. STATING |
| | | | | | | | | | THERE WOULD BE NO COOKING OCCURRING IN THE |
| | | | | | | | | | KITCHEN, ONLY REHEATING OF PREVIOUSLY COOKED |
| | | | | | | | | ITEMS. | |
| | | | | | 1 | | | I | |



| | | EQUIPMENT | 1 | ELEC | CTR | | | SCHEDULE | | |
|-------|-------|---------------------------------|-------|------|-----|-------|----|----------------------------------|--|--|
| TEM # | QTY. | DESCRIPTION | AFF | VOLT | AMP | PHASE | КW | NOTES | | |
| 1 | 1 | TRAY RETURN TABLE | - | | | | | | | |
| 2 | 1 | POS / CASHIER CART, MOBILE | - | | | | | | | |
| 3 | 1 | DISH TABLE, SOILED | - | | | | | | | |
| 4 | 1 | PRE RINSE SPRAYER | - | | | | | | | |
| 5 | 1 | DISPOSAL, 2 HP | 12 | 208 | 9 | 1 | | | | |
| 6 | NIC | DISH MACHINE, HIGH TEMP | 24 | 208 | 40 | 3 | | | | |
| 7 | 1 | CONDENSATE HOOD | - | | | | | | | |
| 8 | 1 | BOOSTER HEATER | 12 | 208 | | 3 | 7 | | | |
| 9 | NIC | SPARE NUMBER | - | | | | | | | |
| 10 | NIC | SPARE NUMBER | - | | | | | | | |
| 11 | 1 | DISH TABLE, CLEAN | - | | | | | | | |
| 12 | 2 | WALL SHELVES | - | | | | | | | |
| 13 | 2 | CLEAN UTENSIL STORAGE | - | | | | | | | |
| 14 | 2 | HAND SINK W/ SPLASH GUARDS | - | | | | | | | |
| 15 | 1 | SINK, 3 COMPARTMENT, CORNER | - | | | | | | | |
| 16 | 2 | WALL SHELVES | - | | | | | | | |
| 17 | 1 | SINK, VEG PREP | - | | | | | | | |
| 18 | NIC | SPARE NUMBER | - | | | | | | | |
| 19 | NIC | SPARE NUMBER | - | | | | | | | |
| 20 | NIC | SPARE NUMBER | - | | | | | | | |
| 21 | 2 | WALL SHELVES | - | | | | | | | |
| 22 | 1 | WORK TABLE | 48 | 115 | 20 | 1 | | UTILITY OUTLET | | |
| 23 | 2 | WALL SHELVES | - | | | | | | | |
| 24 | 1 | EXHAUST HOOD, TYPE 2 | 000 | 115 | 15 | 1 | | HOOD LIGHTS AND CONTROLS ONLY | | |
| 25 | 1 LOT | WALL FLASHING BELOW HOOD | - | | | | | | | |
| 26 | 1 | STEAMER, 10 PAN | 24 | 115 | 5 | 1 | | DIRECT CONNECT, NO GFCI | | |
| 27 | 1 | CONVECTION OVEN, DOUBLE STACKED | 24-48 | 115 | 20 | 1 | | UNIT SUPPLIED WITH CORD AND PLUG | | |
| 28 | NIC | SPARE NUMBER | - | | | | | | | |
| 29 | NIC | SPARE NUMBER | - | | | | | | | |
| 30 | NIC | SPARE NUMBER | - | | | | | | | |
| 31 | NIC | CABINET, HEATED | 24 | 115 | 20 | 1 | | UNIT SUPPLIED WITH CORD AND PLUG | | |
| 32 | 1 | SERVING LINE, W/ BASE CABINET | 24 | 115 | 20 | 1 | | UTILITY OUTLET | | |
| 33 | 7 | HEAT LAMPS | 000 | 115 | 7 | 1 | | | | |
| 34 | 1 | CLEANING SUPPLIES STORAGE | - | | | | | | | |
| 35 | NIC | MOP SINK | - | | | | | | | |
| 36 | NIC | HOSE BIB FOR CHEM DISPENSER | - | | | | | | | |
| 37 | 4 | DRY STORAGE SHELVING | - | | | | | | | |
| 38 | NIC | SPARE NUMBER | - | | | | | | | |
| 39 | NIC | SPARE NUMBER | - | | | | | | | |
| 40 | NIC | SPARE NUMBER | - | | | | | | | |
| 41 | 1 | ICE MACHINE W/ BIN | 60 | 115 | 20 | 1 | | | | |
| 42 | NIC | EMPLOYEE LOCKERS | - | | | | | | | |
| 43 | 1 | WALK IN COOLER | 000 | 115 | 10 | 1 | | LIGHTS ONLY | | |
| 44 | 1 | WALK IN COOLER EVAP COIL | 000 | 115 | 3 | 1 | | | | |
| 45 | 1 | WALK IN COOLER CONDENSER | ROOF | 208 | 12 | 3 | | | | |
| 46 | 1 | WALK IN COOLER SHELVING | - | | | | | | | |
| 47 | 4 | GLASS DOORS W/ LED LIGHTING | 000 | 115 | 3 | 1 | | | | |
| | OF | ITEMS | Ī | | | | | | | |



| <u>H001</u> | <u> INF</u> | <u>ORMATION</u> | <u> </u> | <u>4213</u> | <u>819</u> | | | | | | | | |
|---|---|---|---|--|---|---|--|--|--|---|--|-------------------|------------|
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DUTY | | DESIC
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| 1 | | 5424
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Deg | | I | N | /A | 150 | | 1500 | | |
| <u>H001</u> | O INF | ORMATION | - | FILTE | R(S) | | | | | | | LIGH | T(S) |
| HOOD
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| ROD AND NUTS TO
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| OOD STYLE | 450
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DEGREES | 5 700
DEGREES | | | | | | | | | 5 4" | |
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150 | ft. cfm/ft.
200 | cfm/ft.
250 | - | | | | | | | | | |
| WITH END
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| <u>5% reduction)</u>
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_SND-2 | 228 | 294 | | | | | | | | | | | |
| SLAND
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GENERAL NOTES

form a System Design Verification (SDV) once all equipment has had a complete start up per the Operation Ily, the SDV will be performed after all inspections are complete.

that are discovered during the SDV will be brought to the ctor and corresponding trades on site. These issues ded to the appropriate sales office. If CAS Service has to field issue, the general contractor will be notified and turn trip be required due to any field related discrepancy that cannot be resolved during the SDV, there will

will address any discrepancy that is the fault of the manufacturer. Should a return trip be required, the iate sales office will be notified. There will be no additional charges for manufacturer discrepancies.

| | | | | | | | | | | | | | - | | |
|----------------|-------|-------|--------|-----------------|------|------|---------|----------------|--------------|-------|----------|----------|--------|------------|--|
| EXHAUST PLENUM | | | | | | | | | HOOD CONFIG. | | SWITCHES | | | | |
| | | | | RISER | (S) | | | HOOD | | | | | | | |
| | WIDTH | LENG. | HEIGHT | DIA. | CFM | VEL. | S.P. | CONSTRUCTION | END | ROW | QUANTITY | LOCATION | | | |
| | | | 4" | 12" | 1500 | 1910 | -0.249" | 430 SS
100% | ALONE | ALONE | 1 FAN | | | | |
| - | | | | · · · · · | | · | | | | | | |] | | |
| LIGHT(S) | | | | | | | | | | | | | | | |
| TYPE | | ۲PE G | | WIRE LOCATION S | | | FI | RE SYSTEM | 1 | EL | ECTRICAL | SWITCHES | SVSTEM | | |
| | | | | | | SIZE | TYPE | \$ | SIZE | | NODEL # | QUANTITY | PIPING | WGHT | |
| Recessed | | | NO | | | | | | | | | | NO | 325
LBS | |



<u>PLAN\_VIEW — Hood\_#1</u> 10'0.00" LONG\_5424VHB—G—ND

EXHAUST RISER -HANGING ANGLE -

IT IS THE RESPONSIBILITY OF THE ARCHITECT/OWNER TO ENSURE THAT THE HOOD CLEARANCE FROM LIMITED-COMBUSTIBLE -AND COMBUSTIBLE MATERIALS IS IN COMPLIANCE WITH LOCAL CODE REQUIREMENTS.



<u>SECTION VIEW – MODEL 5424VHB-G-ND</u> <u>HOOD – #1</u>



SHEET NO.

1

While every effort is made to ensure accurate utility information, at no time will Kitchen Tech be responsible for equipment manufacturer changes to utility service requirements. All drain and condensate lines shall be copper, no plastic drain lines will be accepted. approval. Utensil / equipment storage and lav: HVAC:

GENERAL NOTES

Certain items are listed in the Itemized Equipment Specification as supplied by KEC and installed by G.C. Failure to observe / include these specifications in the G.C. bid does NOT obsolve the G.C. of responsibility to fulfill / perform to these specifications. Not all portions of the following information apply to all projects. Please request clarification, if questions arise.

It shall be the responsibility of the G.C. and all trades to inspect the job site, review and familiarize themselves with the relevant kitchen equipment drawings, health department requirements, schematics, cut sheets, specification documents, contract documents, etc. The submission of proposals by the G.C. and subcontractors will be construed as evidence that they have familiarized themselves with the kitchen project in total. Claims made subsequent to the proposals for additional materials and labor because of difficulties encountered, will not be recognized if they could have been foreseen had proper examination been made. The KEC food service drawings are provided for reference and are the opinion of Kitchen Tech only. All items are to be verified with the Architect, Interior Designers,

Engineers and or Ownership as required. At no time are the KEC Food Service drawings to be used for construction purposes or referenced as construction documents. PLUMBING:

All utility points shown on these drawing shall be roughed in at the designated location and shall be concealed behind / inside the walls. All drain lines to be run 6" AFF with no open Uni-strut, supports, wire ties, etc. Flex gas disconnect and restraint cables supplied by the KEC are installed by G.C. Hand sinks supplied by the KEC are installed by G.C. The G.C. is responsible to flush / sanitize all debris/metal filings from the water supply lines prior to installation of faucets, pot/kettle fillers, hand sinks, etc. All damage due to foreign material entering fixture seats and washers is the responsibility of the G.C. G.C. and or plumbing contractor shall provide all required back flow prevention devices as required by code and health dept. All floor sinks must be located as to allow access for cleaning / clean out and ½ exposure of floor sink from equipment edge, without causing a trip hazard. All floor sink grates are to be flush with the finished floor. All floor sinks should be 12"x12"x8" porcelain or stainless steel, to allow for proper capture of large quantities of discharge water from dish machines and 3 compartment sinks. All hand sinks should be located as not to interfere with adjacent equipment placement. Some municipalities now require solids interceptors to be installed downstream of garbage disposal units. This interceptor shall be specified by the mechanical engineers, furnished and installed by the mechanical contractor. Relocation of hand sinks due to improper placement is the responsibility of the plumbing contractor. It is the responsibility of the plumbing engineer(s) to determine size and location of the grease interceptor and which kitchen drains, hand sinks, floor sinks, etc., must drain to it as per code. It is the responsibility of the plumbing contractor and or engineer(s) to obtain Health Department approval for existing floor drains, floor sinks, etc, which they intend to reuse and may not comply with current codes. The KEC supplies only items called out in the equipment purchase contract. Commercial dish machines require a 140 degree hot water supply. It is the responsibility of the plumbing engineer to ensure 140 degree water is available to the dish machine when activated. The KEC does not supply plumbing parts, fittings, brackets, mounts, ecsuctions, sleeves, supplies, etc. unless specified. When the KEC supplies a range mounted salamander broiler, the plumber is responsible to hard pipe both gas supplies to a common connection point, with individual gas regulators run to each unit. In this installation configuration, only one flex gas line is needed. All gas fired equipment will require the manufacturers supplied gas regulator, to be installed by the GC. GC to supply any alternate, high pressure, and gas regulators required to make the equipment operational. Alternate regulator installation may void manufactures warranty, please consult with the manufacturer for specific details. All gas lines are to be run concealed inside walls w/ stub out for connection to equipment. Commercial food service equipment manufacturers reserve the right to make periodic changes to their products, regarding gas volume and pressure requirements, without changing their specification sheets and without notifying the food service consultant or the end user.

ELECTRICAL:

All utility points shown on these drawing shall be roughed in at the designated location and electrical runs shall be concealed behind / inside the walls. All above and below ceiling electrical must be complete prior to equipment installation. This includes but is not limited to pulling of wire, outlet installation and trimming of outlets. Direct connect wire must be pulled to the i-box and ready for connection to equipment. All locations and cabling requirements for Point of Sale, telephone service, CAT-5e, etc, is the responsibility of the electrical engineer / contractor to coordinate with with the operator / owner. The KEC does not supply any electrical parts or supplies. GFCI's are required as per code. It is the responsibility of the electrical engineer and or electrical contractor to coordinate the specific electrical requirements of all owner supplied equipment and or existing equipment. Commercial foodservice equipment manufacturers reserve the right to make periodic changes to their products, regarding voltage and amperage requirements, without changing their specification sheets and without notifying the foodservice consultant or the end user. While every effort is made to ensure accurate utility information, at no time will Kitchen Tech be responsible for equipment manufacturer changes to utility service requirements. All cord reels shall be Hubbell model number HLBC25163C, unless unacceptable due to code. GC shall submit alternate cord reels for review and

WALK IN COOLER / FREEZER:

The walk in cooler and freezer is supplied with temperature monitoring system, adjacent to the entry door. This system may be connected to the building monitoring system in the event of temperature rise inside the cooler / freezer. Interconnection of the supplied monitoring system and any related items or equipment to make it operational, is the responsibility of the GC. Refrigerant leak detection and or alarm equipment as required be code, is the responsibility of the GC. All mechanical, electrical or plumbing connections are the responsibility of the GC. The only items which will be provided by the KEC are specifically called out in the contract documents and or equipment specification.

GARAGE DOORS / LARGE COILING DOORS:

Any doors which open from a cafeteria or eating area to the exterior of the building (outside) may require an air curtain, in order to meet health dept. requirements. This should be coordinated with mechanical and health dept. requirements.

ELECTRICAL CONTROL PANEL When the Electrical Control Panel (ECP) is not provided by the KEC, the GC shall provide the ECP. Please refer to the project specification documents pertaining to the

exhaust hood and ECP. The ECP controls exhaust fans, MUA, electrical below the hood, etc, in the event the fire suppression system is triggered. No electrical disconnects, relays, shunt trip breakers, etc, supplied by the KEC or fire suppression contractor. The coordinated function and wiring of the ECP is the responsibility of the electrical engineer, electrical contractor and GC. The fire suppression control cabinet is not the ECP and is not a suitable enclosure for the ECP. This system must be operational for final Building / Fire Dept. inspection, prior to final health department inspection. It is recommended that the electrical engineer complete a schematic showing the interconnect system as part of the electrical engineering drawings.

FIRE SUPPRESSION SYSTEM:

When the KEC supplies the fire suppression system it will include the fire suppression control cabinet w/ dry contactors (microswitches), piping of the exhaust hood w/ nozzles and chrome sleeves, plenum piping, manual gas valve, manual pull station adjacent to kitchen exit as per code, one K class fire extinguisher and one final inspection. Installer shall provide written plans detailing the location of the control cabinet and pull station locations. This inspection will be conducted after the ECP interconnection system is fully operational. The GC is responsible to provide any additional electrical contactors as needed for additional connections. The conduit and j-box for the manual pull station shall be supplied by GC and location coordinated with the fire suppression installer. The manual gas valve will be supplied to the plumber during construction for installation in the gas supply line prior to the equipment. This valve shall be installed above ceiling (with suitable inspection access panels), within 10' of the exhaust hood and in a place easily accessible for regulatory inspections.

CONDENSATE HOOD:

When a condensate hood is specified for the project, the exhaust fan shall be controlled by either a manual wall mounted switch or by the dish machine operation via internal electrical contacts provided by the dish machine manufacturer. If a "delayed fan off" function is desired, the electrical engineer shall specify the correct delay device for the project.

LIGHTING IN KITCHEN AREA: Health department Foot Candle (F.C.) lighting requirements are as follows:

Kitchen and Bar areas: Min. of 50 F. C. at work surface or at 36" AFF.

Min. of 30 F.C.

Walk in cooler / freezer: Min. of 30 F.C.

KITCHEN FINISHES: (recommended) Wall below exhaust hood: Shall be finished with 20 gauge stainless steel wall paneling, extending from the top of the tile or floor finish; to behind the exhaust hood. SS

wall paneling shall extend 18" to the left and 18" to the right of the exhaust hood and shall extend from the top of the finished floor to the ceiling. Walls: FRP (fiberglass reinforced plastic) panels installed from floor to ceiling are recommended, in a light color or white which will easily show dirt or soil. Walls consisting of finished drywall with a painted surface (epoxy or otherwise) are not recommended due ease of damage from long term cleaning, scrubbing or chipping of wall surface.

Ceilings: White, vinyl coating gypsum panels are recommenced above all foodservice and bar areas. Floors: Quarry tile (non slip, sealed and sealed grout) is recommended. Epoxy flooring below heat generating equipment (ovens, ranges, steamers, etc.) is NOT RECOMMENDED. Heat in these areas can exceed 200 degrees Fahrenheit and exceed the auto-ignition levels of the epoxy flooring. Any variation from these recommendations may require samples be submitted to the health department for approval. It is the responsibility of the general contractor and or architect to supply the KEC with alternate samples for submittal.

All hanging of hoods, ductwork runs, welding, fire wrap, etc, must be complete prior to equipment installation. When the KEC's contract includes supplying the exhaust hoods and or condensate hoods, it does NOT include installation, hanging, fans, switches, controls, ductwork, welding, roof penetrations, fire wrap, Electrical Control Panel, shunt trip breakers, interlock, or other items to make those systems operational; unless specifically called out in the KEC contract documents.

WALL SHELVES AND WALL MOUNTED EQUIPMENT Unless detailed / noted otherwise, all wall mounted equipment / shelving will be mounted directly to the wall studs and does not require internal wall backing. Heavy gauge metal wall studs will be required to ensure proper load handling.

KITCHEN EQUIPMENT INSTALLATION:

Installation is defined as equipment delivery to job site, assemble / setup, move in to place and make ready for final connection by the G.C. It does not include any type of mechanical, electrical, plumbing work or instruction how to perform. Prior to the kitchen equipment installation all construction, mechanical, electrical, plumbing and HVAC must be 100% complete, other than equipment needing only final

connection. Ceiling tiles and light fixtures installed with all above ceiling work/inspections complete. Walls to be completely finished as per architectural specifications (epoxy or FRP paneling), see finishes section for wall below exhaust hood. Floor to be set, sealed, cured and ready for heavy use. All floor sink covers/grates shall be in place prior to equipment being set in place to avoid an unsafe work environment. Health Department construction inspection has been completed. Under the above stated conditions the install process will take approximately 10-15 working days to complete prior to final health department inspection. Weekend, holiday and or after hours work is not included unless specifically called out in the installation contract. Significant delays should be anticipated/scheduled when the above noted conditions are not complete at the time of KEC installation.

The G.C. shall provide a dumpster suitable for all trash removal generated by the kitchen equipment installation process. All exterior paving and concrete work providing access to the kitchen area must be complete, prior to equipment installation or G.C. shall provide alternate unimpeded access. The G.C. shall provide finished floor/carpet protection to facilitate moving heavy kitchen equipment from the nearest street level entrance to the kitchen area. GC shall provide clear, unobstructed ingress and egress from the kitchen area. In the event the kitchen is located above or below street level and the elevators / lifts are not yet operational or certified for use, the GC shall provide at their cost, all lifts, attended elevator access, additional manpower, etc. to facilitate movement of the kitchen equipment from street level to the kitchen location. Stairs are not considered acceptable ingress and egress from the kitchen area.

USED OR OWNER SUPPLIED EQUIPMENT: When the owner supplies any new or used equipment outside the KEC equipment purchase contract and or the commercial kitchen is being remodeled where existing

equipment will be reused in the new design, the owner is fully responsible for disconnecting, moving, storage, staging, delivery, repair, modification, cleaning, refurbishment, installation, final connection, start up, calibration, health department and regulatory compliance of those items, unless specifically called out in the equipment purchase contract. It is the responsibility of the electrical engineer and or electrical contractor to coordinate the specific electrical requirements of all owner supplied equipment and or existing equipment.

All dimensions referenced or shown are measured from finished surfaces.

All kitchen equipment is strictly prohibited from being used as a work surface by any and all trades. Failure to observe this restriction will result in all damages being charged back to the respective subcontractor / trade. All equipment will be set in place once as per kitchen design schematic for connection by the respective trades. Equipment which is moved for any reason must be returned to its original location.

COMPLIANCE TO NOTES: The KEC equipment contract and all notes contained herein supersede any and all verbal conversation with the KEC regarding responsibility to perform work or supply

any part or item. Any issues which contradict these notes are to be submitted in writing to the architect, KEC and owner for review. An approval or denial will be supplied in writing to the GC or the respective trade making the request. At no time will any on site request of the KEC be construed as an obligation on the part of the KEC. Requests made of the KEC which are outside the scope of the KEC contract will not be accepted as cause for work delays. All trades are responsible for taking whatever steps are necessary to complete their scope of work in a timely manner.

WARRANTY:

All warranties are provided and serviced by the respective manufacturers and or warranty repair service agents. This information can be found in the Operation & Maintenance documents provided by the KEC. Projects in outlying, rural or in areas outside the service agents service area, should be aware that most warranties will NOT cover additional fees for travel outside their standard service area. The end user / customer will be fully responsible for any and all "out of area" travel expenses. It is recommended the end user / customer ask about additional travel fees not covered by the factory warranty, BEFORE engaging a service agent .







