FIRE NOTES

I. PROVIDE ADDRESS LETTERS MIN. 8" HIGH ON FRONT OF TENANT SPACE VISIBLE FROM STREET.

2. PROVIDE A WALL MOUNTED PORTABLE FIRE EXTINGUISHER WITH A MINIMUM RATING OF 2-A: I O-B:C WITHIN 75 FEET FROM ANY POINT IN THE BUILDING, MEASURED ALONG THE PATH OF TRAVEL. SEE EQUIPMENT PLANS A2.0 AND A2.1 FOR LOCATIONS.

3. PROVIDE A WALL MOUNTED TYPE 'K' PORTABLE FIRE EXTINGUISHER WITHIN 30-FT OF COMMERCIAL COOKING EQUIPMENT. THE TYPE 'K' EXTINGUISHER IS IN ADDITION TO THE PORTABLE FIRE EXTINGUISHER WITH A MINIMUM RATING OF 2-A: I O-B:C (SEE NOTE #2). SEE EQUIPMENT PLANS A2.0 AND A2.1 FOR LOCATIONS.

4. COMMERCIAL COOKING APPLIANCES LOCATED BENEATH A TYPE I COMMERCIAL EXHAUST HOOD MUST BE PROTECTED BY AN AUTOMATIC WET-CHEMICAL BASED FIXED FIRE EXTINGUISHING SYSTEM. THE FIRE EXTINGUISHING SYSTEM MUST ALSO PROTECT THE TYPE I EXHAUST HOOD PLENUM SPACE AND THE EXHAUST DUCTWORK. AUTOMATIC FIRE EXTINGUISHING SYSTEM FOR HOOD SHALL BE INTERCONNECTED TO THE FUEL AND/OR CURRENT SUPPLY FOR COOKING. ACTIVATION OF FIRE EXTINGUISHING SYSTEM SHALL SHUT OFF FUEL AND /OR CURRENT SUPPLY TO COOKING EQUIPMENT AND ELECTRIC RECEPTACLES LOCATED UNDER THE HOOD. CONSULT A STATE LICENSED FIRE PROTECTION CONTRACTOR FOR ASSISTANCE WITH THIS ISSUE.

5. THE FOLLOWING SHALL OCCUR WHEN THE HOOD SYSTEM IS ACTIVATED: A) THE HOOD EXHAUST FAN CONTINUES TO RUN (UNLESS THE PRINTED MANUFACTURER INSTALLATION GUIDELINES FOR THE SPECIFIC KITCHEN HOOD SYSTEM REQUIRES EXHAUST FAN SHUTDOWN). B) MAKE-UP AIR MUST SHUT DOWN UPON ACTIVATION OF THE KITCHEN HOOD FIRE SUPRESSION SYSTEM.

7. DUCT DETECTORS ON AIR HANDLERS REQUIRE REMOTE AUDIO/ VISUAL INDICATORS IF THE DETECTORS ARE INSTALLED MORE THAN 10 FEET ABOVE THE FINISHED FLOOR LEVEL OR IF THE DETECTORS ARE INSTALLED ABOVE THE CEILING, UNLESS THE DETECTORS ARE CONNECTED TO A FIRE ALARM SYSTEM AND THE LOCATION OF THE DETECTOR IS CLEARLY

SHOWN AT THE FIRE ALARM PANEL. 8. A SPRINKLER SYSTEM AND FIRE ALARM SYSTEM WILL NOT BE INSTALLED IN THIS BUILDING.

CO2 STORAGE CONTAINER

SIZE OF THE CO2 CONTAINER (CARBONATION FOR SODA MACHINE) DOES NOT EXCEED 100 LBS.

FAST BREAK C-STORE

Chisos St & IH 35 S

San Marcos, TX 78666

NEW CONSTRUCTION FOR CONVENIENCE STORE WITH TWO FUEL ISLANDS

GENERAL NOTES

I. CONTRACTOR SHALL VISIT THE SITE AND VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS THAT AFFECT THE NEW WORK PRIOR TO BIDDING. ANY SITE DISCREPANCIES FOUND DURING CONSTRUCTION SHALL BE REPORTED TO THE OWNER'S REPRESENTATIVE IMMEDIATELY.

2. ALL WORK SHALL BE ACCOMPLISHED IN ACCORDANCE WITH ALL APPLICABLE STATE, LOCAL, AND NATIONAL CODES (CURRENT EDITIONS AS ACCEPTED BY CITY). ALL WORK SHALL COMPLY WITH THE AMERICANS WITH DISABILITIES ACT ("ADA") AND TEXAS ACCESSIBILITY STANDARDS (T.A.S.) AS APPLICABLE.

3. ALL NECESSARY PERMITS, LICENSES, CERTIFICATES, TESTS, ETC., SHALL BE PROCURED AND PAID FOR BY THE CONTRACTOR.

4. SHOULD ANY ERRORS, OMISSIONS, CONFLICTS, OR AMBIGUITIES EXIST IN THE DRAWINGS THE CONTRACTOR SHALL BRING THESE TO THE ATTENTION OF THE ARCHITECT IMMEDIATELY FOR ADJUSTMENT IN WRITING BEFORE SIGNING THE CONTRACT OR PROCEEDING WITH THE WORK. OTHERWISE, HE SHALL, AT HIS OWN EXPENSE, SUPPLY THE PROPER MATERIALS AND LABOR TO MAKE GOOD ANY DAMAGE OR DEFECT CAUSED BY SUCH UNINTENTIONAL ERROR.

5. UPON COMPLETION OF THE WORK, THE CONTRACTOR SHALL CLEAN ALL EQUIPMENT.

G. UPON COMPLETION OF THE WORK, ALL PARTS OF THE INSTALLATION SHALL BE TESTED.

7. COORDINATE WITH LANDLORD'S ROOFING CONTRACTOR FOR FLASHING INSTALLATION AROUND ROOF PENETRATION.

8. ALL EQUIPMENT FURNISHED UNDER THIS CONTRACT SHALL BE NEW UNLESS OTHERWISE NOTED. 9. ENSURE MINIMUM 10-FT HORIZONTAL OR 3-FT VERTICAL CLEARANCE BETWEEN VENTS, OUTLETS, AND FRESH AIR INTAKES.

IO. ALL DIMENSIONS ARE TO FACE OF STUD, GRID CENTERLINE, FACE OF BLOCK OR FACE OF FINISHED COOLER PANEL UNLESS NOTED OTHERWISE. CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO STARTING ANY WORK OR FABRICATION.

II. ALL WOOD TO BE USED FOR BLOCKING AND NAILERS SHALL BE TREATED (WOLMANIZED OR EQUAL).

I 2. GENERAL CONTRACTOR SHALL COORDINATE AND VERIFY ALL PIPE AND CONDUIT LOCATIONS IN CONCRETE SLAB WITH ALL RELATIVE SUBCONTRACTORS.

13. MILLWORK SHALL BE PROVIDED BY CONTRACTOR . VERIFY DESIGN AND SPECIFICATIONS WITH OWNER'S REPRESENTATIVE.

14. WALK-IN COOLER/FREEZER LIGHT FIXTURES FURNISHED AND INSTALLED BY COOLER MANUFACTURER, WIRED BY GENERAL CONTRACTOR'S ELECTRICIAN.

I 5. CONTRACTOR SHALL PROVIDE OWNER WITH PROOF OF INSURANCE MEETING OWNERS REQUIREMENTS PRIOR TO STARTING ANY CONSTRUCTION.

I.G. FIBERGLASS REINFORCED PANELS (FRP) TO BE APPLIED WITH MASTIC TO GYP. BD. INSTALL "J" MOLD AT VERTICAL EXPOSED EDGES.

I.7. STAINLESS STEEL PANELS (S/S) TO BE APPLIED WITH MASTIC TO GYP. BD. INSTALL "J" MOLD AT VERTICAL EXPOSED EDGES.

18. PAINT ALL ELECTRICAL, PLUMBING, IE. EXPOSED ON EXTERIOR WALL SAME COLOR AS EXTERIOR WALL.

19. ALL EXTERIOR OUTLETS, EMERGENCY STOP BUTTONS, CO2 SUPPLY OUTLAST, ¢ HOSE BIBBS SHALL BE RECESSED. MOUNT FLUSH WITH FACE OF WALL.

20. FUEL SYSTEM SHALL BE FURNISHED AND INSTALLED BY OWNER, GENERAL CONTRACTOR SHALL FURNISH ELECTRICAL TO FUEL SYSTEM.



CODES REFERENCED: CONSTRUCTION TYPE: AUTO. SPRINKLER SYSTEM: FIRE ALARM SYSTEM: STORIES & BLDG. HT: BUILDING AREA: OCCUPANCY GROUP: OCCUPANT LOAD

PATH OF TRAVEL.

EXIT SIGN

SHEE

M0.2 M0.3 M2.1

M2.2 M3.1

M4.1

MK1.1 MK1.2 MK1.3

MK1.4

TDLR: TABS2021008181

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BUILDING DESIGN INFORMATION

THE 2021 ICC CODES AND 2020 NATIONAL ELECTRICAL CODE TYPE V-B NO

NO

ONE STORY & 28'-0" HEIGHT 5,990 S.F.

'M' (MERCANTILE) <u>57_</u>PEOPLE

- 51 SALES (OCCUPANT LOAD FACTOR OF 1:60)
- 1 OFFICE (OCCUPANT LOAD FACTOR OF 1:100) 5 KITCHEN/CASHIER (OCCUPANT LOAD FACTOR OF 1:200)

2 EXIT REQUIRED/ 3 EXITS PROVIDED

SYMBOL LEGEND

FE-I PROVIDE A WALL MOUNTED PORTABLE FIRE EXTINGUISHER WITH A MINIMUM RATING OF 2-A: I O-B:C WITHIN 75 FEET FROM ANY POINT IN THE BUILDING, MEASURED ALONG THE

FE-2 PROVIDE A WALL MOUNTED TYPE 'K' PORTABLE FIRE ∇ EXTINGUISHER WITHIN 30-FT OF COMMERCIAL COOKING EQUIPMENT. THE TYPE 'K' EXTINGUISHER IS IN ADDITION TO THE PORTABLE FIRE EXTINGUISHER WITH A MINIMUM RATING OF 2-A:10-B:C.

LIMITED SERVICE CONTRACT:

PLEASE NOTE THAT THESE DRAWINGS WERE PRODUCED UNDER A LIMITED OR PARTIAL SERVICES CONTRACT. NOT ALL DETAILS OR CONSTRUCTION NOTES HAVE BEEN SHOWN, THEREFORE, REQUIRING THE ARCHITECT'S INPUT AND REVIEW DURING CONSTRUCTION.



GENERAL NOTES AND SPECIFICATIONS

I DIVISION I - GENERAL REQUIREMENTS

A. General Conditions;

General Conditions of the Contract for construction A201, latest edition are hereby made a part of these specifications as bound herein and shall apply to all divisions as though copied herein. B. Supplementary Conditions;

- I. No changes in construction methods, materials, details, specifications, general notes, schedules or deletion of any requirement shown on these plans will be acceptable without first obtaining permission from the Architect.
- 2. The contractor shall be responsible for constructing the project in accordance with all provisions of applicable codes and ordinances. Workmanship and materials to be of highest industry standards.
- 3. Any deviation from applicable codes will be the full responsibility of the General Contractor.
- 4. The Contractor shall be responsible for honoring all guarantees and other requirements enumerated in plans, whether or not such responsibility is passed over to the subcontractor or material dealer
- 5. The General Contractor shall store all materials for construction and protect from rain, pilferage and damage. Contractor shall obtain insurance covering same.
- 6. The Contractor must verify all existing conditions, items and notify the Architect of any discrepancies.
- 7. The Contractor is responsible for leading the Job site meetings as well as job meeting notes, etc.

SECTION 01010 - SUMMARY OF WORK

- A. The project consists of new construction for a commercial retail building in San Marcos, Texas.
- B. Fees; The General Contractor shall be responsible for paying for all permits required by the City of San Marcos.
- C. The plans and specifications have been developed with the intent of meeting or exceeding the minimum required standards. Should the plans and specifications disagree with themselves, the greater quality or greater quantity shall be performed or furnished.
- D. Insurance; The General Contractor to confer with Owner to determine the necessity of providing the following;
- I. Workman's Compensation
- 2. Public Liability
- 3. Property Damage 4. Builders Risk
- E. Responsibility for accidents; The Contractor is responsible for all loss due to accidents during construction
- F. The Contractor is responsible for the cleaning of the work and removal of trash from the work area daılv.

SECTION O 1 500 - TEMPORARY FACILITIES AND CONTROLS

A. Provide and pay for all costs for temporary facilities and services required for the proper and expeditious execution of the Contract Work, including job site telephone.

- B. Make all temporary connections to existing utilities in locations acceptable to local authorities having jurisdiction thereof. Pay all costs for temporary electrical, water, and heating.
- C. Provide First Aid and fire protection as required by OSHA.

8 DIVISION 8 - WOOD DOORS

SECTION 08110 - DOOR AND DOOR FRAMES

I.I GENERAL

A. Submit product data sheets for each type of door and frame specified.

- 1.2 PRODUCTS
- A. Manufacturers; Subject to compliance with requirements, provide products by one of the following; I. Curriers Co.
- 2. Republic Builders Products
- 3. Steelcraft
- 4. Pioneer Industries
- 5. Benchmark Commercial Doors
- 6. Amweld Building Products, Inc.
- B. Wood Doors; Provide 1 $\frac{3}{4}$ " thick wood doors
- C. Frames; Provide metal frames for doors that comply with ANSI/SDI 100, fabricate to be rigid, neat appearance from defects, warp or buckle. IN
- 1.3 EXECUTION
- A. General; Install wood doors, frames and accessories according to shop drawings, manufacturer's data and drawings
- B. Placing Frames; Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set.
- I. Install at least three anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb.
- C. Door Installation; Fit doors accurately in frames, with clearances specified in ANSI/SDI 100. D. Prime Coat Touchup; Immediately after erection, sand smooth any damaged areas of prime coat and apply touchup of compatible air-drying primer.

SECTION 08710 - DOOR HARDWARE

- I.I GENERAL
- A. Submit final hardware schedule by "Hardware Sets", to indicate specifically the product to be furnished for each item required on each door. Furnish templates to each fabricator of doors and frames as required for hardware preparation.
- B. On panic exit devices provide UL label indicating "Fire Exit Hardware"
- 1.2 PRODUCTS
- A. Where base materials and quality of finish are not otherwise indicated, provide at least the commercially recognized quality specified in ANSI/BHMA AI 56 series standards applicable to
- each particular type of hardware.
- B. Hardware Schedule; Provide hardware for each door as in the following list of hardware sets; Hardware Set No. 1; A (restroom and kitchen doors)
 - I I /2 Pair Butts Hager 5 knuckle full mortise
 - stainless steel pin; paint hinge to match door Privacy Lockset
 - Door Closer Arrow; S 400 Series
- 1.3 EXECUTION
- A. Hardware mounting locations; as recommended by the Door and Hardware Institute UNO.
- B. Return one month after Owners occupancy and adjust hardware to proper operation and function. Instruct Owner's personnel in proper maintenance and adjustment.

9 DIVISION 9 - FINISHES

SECTION 09111 - METAL STUD FRAMING SYSTEMS

I.I GENERAL; Section includes; formed metal stud framing at interior locations; framing accessories. A. SYSTEM DESCRIPTION

- I. Metal stud framing system for wall infill.
- 2. Maximum allowable deflection $\frac{1}{240}$ span.
- 3. Design systems to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
- 4. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
- B. QUALITY ASSURANCE; Perform work in accordance with GA 203, Metal Framing Manufacturers Association (MFMA) and ASTM C754.

C. QUALIFICATIONS; Installer; Company specializing in performing the work of this section with minimum 5 years documented experience.

1.2PRODUCTS

- A. Stud Framing Members;
- I. Studs; ASTM A525, non-load bearing rolled steel, channel-shaped, punched for utility access, as scheduled on MEP drawings.
- 2. Runners; Of same material and thickness as studs, bent leg retainer notched to receive studs with provisions for crimp locking to stud.
- 3. Furring and Bracing Members; Of same material as studs; thickness to suit purpose.
- 4. Fasteners; GA 203. Self drilling, self tapping screws.
- 5. Tough-Up Primer for Galvanized Surfaces; SSPC Paint 20 Type I Inorganic zinc rich. B. FABRICATION
- I. Fabricate assemblies of framed sections to sizes and profiles required; with framing members fitted, reinforced, and braced to suit design requirements.
- 2. Fit and assemble in largest practical sections for delivery to site, ready for installation.
- C. FINISHES
- I. Studs; Galvanize to G60 coating class.
- 2. Tracks and Headers; Galvanize to G60 coating class. 3. Accessories; Same finish as framing members.
- 1.3 EXECUTION

A. Verify site conditions are ready for work. Verify rough-in utilities are in proper location. B. ERECTION

- I. Align and secure top and bottom runners at 24" o.c.
- 2. Where called for place one bead of acoustic sealant between studs and adjacent vertical surfaces to achieve an air seal.
- 3. For demising walls install a continuous extended leg track at top for $1 \frac{1}{4}$ vertical movement. 4. Fit runners under and above openings; secure intermediate studs to same spacing as wall as
- studs.
- 5. Secure studs to tracks using fastener method. Do not weld.
- 6. Stud splicing not permissible.
- 7. Fabricate corners using a minimum of three studs.
- 8. Double studs at wall openings, door and window joints, not more than 2 inches from each side of openings
- 9. Brace stud framing system rigid.
- 10.Coordinate installation of wood blocks, anchors and wood blocking for electrical, mechanical and signage work to be placed within or behind stud framing.
- I I.Blocking; Secure wood blocking to studs. Secure steel channels to studs. Install blocking or support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, and hardware. 12. Refer to drawings for indication of partitions to extend stud framing through the ceiling to the structure above. Provide extended leg ceiling runners as mentioned in item three above.
- C. ERECTION TOLERANCES
- 1. Maximum variation from true position; $\frac{1}{2}$.
- 2. Maximum variation of any member from plane; $\frac{1}{2}$.

SECTION 09255 - GYPSUM BOARD ASSEMBLIES

I.I GENERAL

A. Sound Transmission Characteristics; For assemblies indicated to have STC ratings, provide materials and construction identical to those of assemblies whose STC ratings were determined per ASTM E 90 and classified per ASTM E 413 by a qualified independent testing agency.

1.2 PRODUCTS

- A. Manufacturers; Subject to compliance with requirements, provide gypsum board and related products by one of the following;
- I. Domtar Gypsum
- 2. Georgia Pacific Corp.
- 3. Gold Bond Building Products Div., National Gypsum Co.
- 4. United States Gypsum Co.
- B. Steel Framing Components for Suspended and Furred Ceilings; Sized per ASTM C 754, unless
- otherwise indicated, and as follows;
- 1. Steel Framing Steel Channels; 0.0598-inch thickness of base metal and 7/16-inch-wide flanges, and as follows;
- a.) Carrying Channels; $1 \frac{1}{2}$ inch deep, 475 lb per 1000 feet (see drawings for alternate method). b.) Furring Channels; $1 \frac{1}{2}$ deep, 475 lb. per 1000 feet (see drawings for alternate method)
- c.) Finish; Rust-inhibitive paint, unless otherwise indicated. 2. Wire hangers and ties; ASTM A 641, soft temper, Class 1 zinc coating.
- 3. Steel Rigid Furring Channels; ASTM C 645.
- 4. Provide soffit control joints at 48" o.c.
- C. Steel Framing for Walls and Partitions; Comply with ASTM C 754 and the following;
- Component Sizes and Spaces; As indicated but not less than that required to comply with ASTM С 754 under the following maximum deflection and lateral loading conditions; Maximum 1/120 at 5 lb. per sq. ft.
- Deflection;
- 2. Protective Coating for Framing Members; Mfg. standard corrosion-resistant coating. D. Gypsum Board; Provide gypsum board of types indicated, in maximum lengths available, to minimize end joints.
- 1. Type; $\frac{1}{2}$ and $\frac{5}{8}$ Georgia Pacific Dens-Glass Gold Fiberglass Impregnated Sheathing
- 2. Soffits; Georgia Pacific Dens-Glass Gold Fiberglass Impregnated Sheathing. E. Gypsum Board Joint Treatment Materials; ASTM C 475 and ASTM C 840, and as follows;
- 1. Joint Tape @ Soffits and Sheathing; Quick-Tape, Inc. 2" minimum 10x10 glass mesh joint tape. Apply $\frac{3}{8}$ " bead of caulk along joints and trowel into entire tape and joint. 2. Tremco Dynamic Sealant.
- F. Miscellaneous Materials; As follows and as recommended by the Gypsum Board Manufacturer. I. Laminating Adhesive as recommended by the Gypsum Board Mfg.
- 2. Corrosion resistant coated steel drill screws of size and type recommended by the board mfg. for fastening cementitious backer units.
- G. Texture; Provide two job samples, 2'x2' for approval.

1.3 EXECUTION

A. Install per manufacturer instructions.

SECTION 09900 - PAINTING

I.I GENERAL

- B. Submittals; Submit the following;
- manufacturer as the finish coats.
- bearing manufacturer's name and label.
- 1.2 PRODUCTS
- types specified
- 1.3 EXECUTION requirements
- preparation and painting.
- Roughen to remove glaze.
- D. Application; Apply paint according to manufacturer's directions.
- materials from site.
- Architect.
- painted surfaces. FERROUS METALS Prime Coat; DTM Acrylic Primer
- GALVANIZED METALS:
- CONCRETE TILT WALLS Prime Coat; Loxan Conditioner
- WOOD, PAINTED; Prime Coat; A-100 Interior Oil Primer
- WOOD, STAINED, INTERIOR;
- CONCRETE, STAINED

A. Paint exposed surfaces whether or not colors are designated in the schedules, except where a surface or material is specifically indicated not to be painted or is to remain natural. Where an item or surface is not specifically mentioned, paint the same as similar adjacent materials or surfaces. If color or finish is not designated, the Architect will select from standard colors or finishes available.

I. Submit two 24"x24" color samples of each type of paint called for on the project.

C. Applicator Qualifications; Engage an experienced applicator who has completed painting system applications similar in material and extend to those indicated for the project.

D. Single-source responsibility; provide primers and undercoat paint produced by the same

E. Field Samples; Provide samples on wall surfaces on site for review and approval. F. Deliver materials to the job site in the manufacturer's original, unopened packages and containers

G. Store materials not in use in tightly covered containers in a well ventilated area. H. Matching a color is not allowed. Use paint mfg. as specified by Owner.

A. Paint Materials; Provide block fillers, primers, finish coat materials and related materials that are compatible with one another and the substrate indicated. B. Material Quality; Provide the manufacturer's best-quality trade paint material of the various coating

A. Examine surfaces and conditions under which painting will be performed for compliance with

Do not begin application until unsatisfactory conditions have been corrected.

B. Preparation; Remove hardware and various accessories, light fixtures and similar items already installed that are not to be painted or provide surface-applied protection prior to surface

C. Cleaning; Clean substrates of substances that could impair the bond of various coatings. Remove oil and grease prior to cleaning. Schedule cleaning and painting so dust and other contaminates from the cleaning process will not fall on wet, newly painted surfaces.

I. Provide barrier coats over incompatible primers or remove and re-prime cementitious materials; prepare cementitious surfaces to be painted. Remove chalk, dust, dirt, grease, efflorescence, oils.

2. Ferrous Materials; Clean ungalvanized ferrous-metal surfaces that have not been shop-coated; remove oil, grease, dirt, or other foreign substrates. Use solvent or mechanical cleaning methods

that comply with recommendations of the Steel Structure Painting Council.

E. Cleanup; At the end of each work day, remove empty cans, rags, rubbish and other discarded paint

F. Protection; Protect work of other trades, whether being painted or not against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable by the

G. Provide 'wet paint' signs to protect newly painted surfaces.

H. At completion of construction activities of other trades, touch-up and restore damaged or defaced

I. Paint all materials on project per below; Paint specified is Sherwin Williams Co.

Finish Two Coats; DTM Acrylic Coating

First; clean with white vinegar and wipe clean with clean cloth. Prime Coat; Galvanized DTM Acrylic Primer Finish 2 Coats; DTM Acrylic Coating

Finish Two Coats; Textured Masonry Topcoat, Coars Texture

Finish Two Coats; Duration Interior Latex Satin Coating

WoodScapes Stain; Semi-Transparent or Solid; Verify with Owner Finish Coat; Another coat of the same.

Verify application procedure with Owner

LIMITED SERVICE CONTRACT:

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SHEET

A0.0





A0.2



ARCHITECTURAL SITE PLAN
SCALE: 1:30

♦ NOTES: SITE

BA

- I. INTEGRAL COLOR ADDITIVE IN CONCRETE AT PATIO AND SIDEWALK SURROUNDING BUILDING.
- 2. ACCESSIBLE ROUTE. MAX. SLOPE 1:20 € MAX. CROSS SLOPE 1:48.
- 3. ACCESSIBLE PARKING SIGN ON POLE.
- 4. ACCESSIBLE PARKING SPACE. MAXIMUM CROSS SLOPE 1:48.
- 5. ACCESSIBLE ACCESS AISLE. MAXIMUM CROSS SLOPE 1:48.
- 6. ACCESSIBLE ROUTE CONTINUES TO FUEL ISLAND.

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SCHEDULE OF ROOM FINISHES

I) PROVIDE FINISH MATERIAL SAMPLES FOR OWNER SELECTION & APPROVAL. 2) SEALER OVER CONCRETE FLOOR TO HAVE SLIP RESISTANT AGGREGATE ADDITIVE. 3) IN OPEN CEILING PAINT ROOF DECK, JOISTS, BEAMS, DECKING, ≰ CONDUIT, ETC.

FINISH SCHEDULE				
ROOM NAME	FLOOR	BASE	WALL	CEILING
SALES	TILE WITH SEALER	4" VINYL BASE	PAINTED GYP. BD.	EXPOSED ROOF DECK, PAINT
KITCHEN	TILE WITH SEALER	TILE BASE	F.R.P., WHITE, ON GREEN BOARD	SUSPENDED VINYL FACED GYP. BD. CLNG. TILE, WHITE COLOR
STORAGE, UTILITY	TILE WITH SEALER	TILE BASE	F.R.P., WHITE, ON GREEN BOARD AT HOOD WALL: S/S PANEL ON GREEN BOARD	SUSPENDED VINYL FACED GYP. BD. CLNG. TILE, WHITE COLOR
WOMEN ¢ MEN	TILE WITH SEALER	TILE BASE	TILE ON CONCRETE BOARD	SUSPENDED VINYL FACED GYP. BD. CLNG. TILE, WHITE COLOR
OFFICE	TILE WITH SEALER	4" VINYL BASE	F.R.P., WHITE, ON GREEN BOARD	SUSPENDED VINYL FACED GYP. BD. CLNG. TILE, WHITE COLOR
COOLER ¢ BEER CAVE	EXPOSED CONCRETE WITH SEALER	N/A	S/S PANEL BY COOLER MANUF.	S/S PANEL BY COOLER MANUF.

ALL DIMENSIONS ARE TO FACE OF STUD, GRID CENTERLINE, FACE OF BLOCK OR FACE OF FINISHED COOLER PANEL UNLESS NOTED OTHERWISE. CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO STARTING ANY WORK OR

ALL WOOD TO BE USED FOR BLOCKING AND NAILERS SHALL BE TREATED

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A1.0

SCALE: NOT TO SCALE

						33	1	ICE CREAM BUNKER	-	_	_
EQU	ЛРГ	MENT LIST				34	1	FOLDING FAUCET	_	_	_
KEY	QTY	ITEM NAME	MODEL	UTILITY	NOTES	35	1		_	_	_
1	2	BUNN COFFEE MAKER	BUNN 38700.0043 AXIOM	120/60/1 13.3A	14	36	1	3-COMPARTMENT SINK W/(2) DRAIN BDS.	ADVANCE TABCO FC-3-2030	_	_
2	1	BUNN CAPPUCCINO MACHINE	BUNN 37000.0000 iMIX-5	120/60/1 15A	14	37	1	PREP SINK W/ (1) DRAIN BD.	REGENCY	_	_
3	1	BUNN FRESH TEA BREWER	BUNN ICE TEA MAKER – 3 GAL.	120/60/1 14.4A	14	38	2	HAND SINK (WALL MOUNTED) - EMPLOYEE	_	_	_
4	4	BUNN TEA DISPENSER	BUNN TD3T-N DISPENSER	-	_	39	1	F REAL SHAKE	F REAL	120/60/1 15A	(2
5	1	DROP COOLER	VOLLRATH FC-4C-02120-R TWO PAN	120/60/1 3.5A	46	40	1	FEDERAL GRAB N GO COOLER	FEDERAL INDUSTRIES SELF SERVE IMSS84	208/60/1 (30A)	(4
6	2	VENDOCO HOT FOOD DISPLAY	VENDOCO HFOD36	208/60/1 12.9A	_	41	1	4 DOOR FREEZER 30-IN DOORS	BEL-4-30SC	(SEE CUT SHEET)	-
7	2	HOT FOOD MERCHANDISER	-	120/60/1 13.9A	-	42	1	9 DR. WALK-IN COOLER	_	_	(1
8	2	SYRUP RACKS	MONIN 4 TIER SYRUP RACK	-	_			LIGHTS AND DOOR/WINDOW HEAT STRIPS		(POWER FROM EVAP.)	
9	3	TV MENU (CEILING MOUNTED)	-	-	-			(2) EVAPORATOR		208/60/1 (20A)	
10	1	HAND SINK (COUNTER MOUNTED)	-	_	-			(1) REMOTE CONDENSER		208/60/3 (20A)	
11	1	ROLLER GRILL	NEMCO 8045W-SLT	120/60/1 15A	-	43	1	BFFR CAVE	_		(
12	1	HOT DOG WARMER	NEMCO 8075-BW	120/60/1 5.4A	4		<u> </u>	LIGHTS AND DOOR/WINDOW HEAT STRIPS		(POWER FROM EVAP)	
13	2	BUBBLERS	CRATHCO D25-3 5 GALLON	120/60/1 6A	-			(2) EVAPORATOR		208/60/1 (20A)	
14	2	BUNN SLUSHI	BUNN 34000.0012 ULTRA	120/60/1 12A	-					208/60/3 (20A)	
15	1	ICEE FBD	24-3100-0012 D	208/60/1 (30A)	248	44	1		_		(
16	2	FOUNTAIN SODA	LANCER WORLDWIDE IBD 44 12LEVSS	115/60/1 2A	248			LIGHTS AND DOOR /WINDOW HEAT STRIPS		(POWER FROM EVAP)	
17	2	SODA BIB RACK	LANCER W. 3X5 12 PUMPS 15 BOXES	_	_					$(1000 \pm 1000 \pm 10000 \pm 10000 \pm 10000 \pm 10000 \pm 10000 \pm 100000 \pm 100000000$	
18	1	ICEE BIB RACK	-	_	-					200/00/1 (20A) 208/60/3 (20A)	
19	2	ICE MAKER (SODA)	CORNELIUS CHUNKLET WCC700	115/60/1 (20A)	-	45	1		_		(
20	1	ICE TROUGH	-	_	_	10	- '			208/60/1 (204)	
21	1	PASTRY CASE (DRY BAKERY)	TRUE TDM-DC-77-GE	115/60/1 7A	-			(1) REMOTE CONDENSER		208/60/3 (204)	
22	1	FRYER	PITCO 65C+S	150,000 BTU	-	46	1		_	SPEC BY FAR	_
23	1	GRIDDLE (36-IN)	TURBO AIR TAMG-36	66,000 BTU	_	47	1			120 000 BTU	
24	1	6 BURNER RANGE W/ OVEN	CPG 351S24N	210,000 BTU	-	48	1			-	
25	1	HEATED HOLDING	AVANTCO A-49F	120/60/1 6.08A	-	Δ <u>τ</u>					
26	1	2 DOOR FREEZER	-	_	-	50	1				
27	1	VEEDER ROOT	_	120/60/1 1.8A	_	51	1			JILO DI LINGINEER	-
28	1	OUTDOOR ICE MERCHANDISER	POLARTEMP - POLAR 1000	115/60/1 14.7A	-	52				_	-
29	3	OPEN SIGN	_	-	-	53				_	-
30	1	HOTWELL	VOLLRATH FC-6IH-05208	208/60/1 16.5A	(4)	54		-	-	-	-
31	1	COLDWELL	VOLLRATH 36442 THREE PAN	120/60/1 4.9A	<u>(4)6</u>	54		-	-	-	
32	1	NACHO/CHIPS	GHFL FOOD SERVICE	_	-	- 55		_		-	

FIXTURE LEGEND

TAG	SYMBOL	DESCRIPTION
A		2x4 LED PRISMATIC LENS
В		PENDANT LED, BOTTOM OF FIXTURE @ 12'-0" UNLESS OTHERWISE NOTED,
С	Ø	RECESSED LED CAN LIGHT
D		RECESSED LED SOFFIT/CANOPY
E	ΗQ	WALL ACCENT FIXTURE - FULL C BOTTOM OF FIXTURE @ 12'-0"
Х		COMBINATION EMERGENCY LIG

REFLECTED CEILING PLAN SCALE: 3/16" = 1'-0"

	(#)	NOTES (R.C.P.) VERIFY FINISH MATERIAL SELECTIONS WITH OWNER.	MÄD
	١.	EXPOSED TO STRUCTURE & ROOF DECK ABOVE. PAINT PER OWNER SELECTION: STRUCTURE. EXPOSED CONDUIT & DUCTS. ETC.	ARCHITECTURE
	2.	NO CEILING ABOVE COOLER/FREEZER BOX; EXPOSED TO ROOF DECK	P.O. BOX 180973 AUSTIN, TEXAS 78718
» Л F F	3	(NO PAINT).	PHONE: 512.296.8406
	J. 4	$2'_{y}A'$ LAY-IN W/ THE CELLING $@$ LO-ET A E E	
	5	$2'x^2' \downarrow AY-IN W/ THE CELLING @ 9-ET A E E$	
	6.	$2^{\prime}x^{2}$ LAY-IN W/ THE CELLING @ 11-FT A F F	
Y LIGHT	7	$2^{\prime}x^{\prime}$ LAY-IN W/ THE CELLING @ 1.2-FT A F F	
CUT OFF	8.	BOTTOM OF FURR-DOWN @ 9-FT A.F.F. AND WALL TERMINATES AT LAY-IN CEILING OR ROOF DECK IN OPEN CEILING CONDITION; DIAGONAL BRACE WALL TO ROOF STRUCTURE.	
GHT ¢ EXIT	9.	BOTTOM OF FURR-DOWN @ 10-FT A.F.F. AND WALL TERMINATES AT LAY-IN CEILING OR ROOF DECK IN OPEN CEILING CONDITION; DIAGONAL BRACE WALL TO ROOF STRUCTURE.	
	10.	BOTTOM OF FURR-DOWN @ 12-FT A.F.F. AND WALL TERMINATES AT LAY-IN CEILING OR ROOF DECK IN OPEN CEILING CONDITION; DIAGONAL BRACE WALL TO ROOF STRUCTURE.	
	11.	WALL ABOVE COOLER; ALIGN WITH EDGE OF COOLER AND TERMINATE AT BOTTOM OF ROOF DECK; DIAGONAL BRACE WALL TO ROOF STRUCTURE.	
	12.	T.V. MENU SUSPENDED FROM CEILING.	
	13.	STAINLESS STEEL PANEL FROM TOP OF HOOD PERIMETER TO BOTTOM OF CEILING.	
	14.	METAL CANOPY W/ METAL PANEL SOFFIT. CANOPY TO BE MAPES OR EQUIVALENT. CONTRACTOR TO PROVIDE CANOPY SUBMITTAL FOR OWNER APPROVAL. https://mapescanopies.com/	
	15.	FLOATING GYP. GD. CEILING @ 12-FT	0RI 0
		E X 12-FT	-ST(35 S 7866
	-2->		r BREAK Chisos St & an Marcos, [*]
		32'-7"	AS' S
			1 1 1

LIMITED SERVICE CONTRACT:

PLEASE NOTE THAT THESE DRAWINGS WERE PRODUCED UNDER A LIMITED OR PARTIAL SERVICES CONTRACT. NOT ALL DETAILS OR CONSTRUCTION NOTES HAVE BEEN SHOWN, THEREFORE, REQUIRING THE ARCHITECT'S INPUT AND REVIEW DURING CONSTRUCTION.

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APRIL 10, 2023

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DATE: April 10, 2023

Reflected Ceiling Plan

SHEET

A3.0

Architect.

PHASE:

JOB NO.: 2130

DRAWN: MP CHECKED: MP

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A4.0

FINISH FLOOR EL. 0'-0"

BRICK ——

T.O. WALL EL. 22'-O" METAL PANEL T.O. ROOF (LOW) EL. 16'-0"

T.O. WALL EL. 22'-0"

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ARCHITECTURE

TOILET ACCESSORY SCHEDULE

REF. NO.	DESCRIPTION	NOTES
T1	36" GRAB BAR	MOUNT 36" A.F.F.
T2	42" GRAB BAR	MOUNT 36" A.F.F.
T3	TOILET TISSUE DISPENSER	TOP MIN. 48" A.F.F. BOTTOM MIN. 15" A.F.F.
T4	AUTOMATIC HAND DRYER	MOUNT CONTROL MAX. 44" A.F. NOT TO EXCEED 4" PROJECTION
<i>T5</i>	MIRROR WITH S.S. CHANNEL FRAME	TOP OF MIRROR 74" MIN. A.F.F. BOTTOM OF MIRROR 40" A.F.F.
<i>T6</i>	SOAP DISPENSER (NOT SHOWN)	MOUNT CONTROL MAX. 44" A.F.

ELEVATION NOTES

1) PROVIDE STAINLESS STEEL FINISH FOR ALL RESTROOM ACCESSORIES UNLESS NOTED OTHERWISE.

2) INSTALL RESTROOM ACCESSORIES W/ SCREWS OR BOLTS EXTENDING AT LEAST 1" INTO SOLID BLOCKING.

3) ALL CONTROL DEVICES FOR LIGHT, POWER, HEAT, ETC. SHALL BE MOUNTED NO HIGHER THAN 48" A.F.F.

4) DIMENSIONS SHOWN ON INTERIOR ELEVATION TAKEN FROM FINISH MATERIAL.

F KEYED NOTES - RESTROOM ELEVATIONS

- 1. TOP OF MIRROR 74" MIN. A.F.F.; BOTTOM OF MIRROR 40" A.F.F.
- 2. ALL RESTROOM WALLS: TILE W/ SEALED GROUT.
- 3. INSULATE LAVATORY DRAIN.

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	DC	OR		FRA	ME		HA	RDW	ARE						REMARKS
No.	TYPE	WIDTH	HEIGHT	MAT'L	PAIR OF HINGES	PRIVACY SET	THRESHOLD 1/2" MAX.	WEATHERSTRIP	STOP	CLOSURE	HSNA / HSNA	KICK PLATE	TRACK	1/3 HP ELECTRIC OPER.	NOTE: 1) ALL GLASS IN 2) S.S. DOORS SHALL BE HARDWA TEMPERED OR ALL LOO SAFETY GLASS.
101	Α	3'-0"	7'-0"	ALUM.	1 1/2"		0	0			0				THUMB TURN INSIDE, LOCATED IN STOREFR
102	В	3'-0"	7'-0"	ALUM.	1 1/2"		Ο	0			Ο				THUMB TURN INSIDE, LOCATED IN STOREFR
103	С	3'-0"	7'-0"	ALUM.	1 1/2"		0	0			0				THUMB TURN INSIDE, LOCATED IN STOREFR
104	D	3'-0"	6'-8"	MTL.	1 1/2"	Ο									
105	D	3'-0"	6'-8"	MTL.	1 1/2"	0									
106	D	3'-0"	6'-8"	MTL.	1 1/2"	Ο									
107	D	3'-0"	6'-8"	MTL.	1 1/2"					0	0				
108	D	3'-0"	6'–8"	MTL.	1 1/2"					0	0				
109	E	3'-0"	6'-8"	MTL.	1 1/2"										LOUVERED WOOD DOOR
110	E	3'-0"	6'-8"	MTL.	1 1/2"										LOUVERED WOOD DOOR
111	F	2'-0"	6'–8"	MTL.	1 1/2"										LOUVERED WOOD DOOR
112	F	2'-0"	6'-8"	MTL.	1 1/2"										LOUVERED WOOD DOOR
113	F	2'-0"	6'-8"	MTL.	1 1/2"										LOUVERED WOOD DOOR
114	F	2'-0"	6'-8"	MTL.	1 1/2"										LOUVERED WOOD DOOR

STOREFRONT INFORMATION

STOREFRONT NOTES:

- FIELD VERIFY DIMENSIONS PRIOR TO STOREFRONT FABRICATION.
- FRAME: ALUMINUM STOREFRONT SYSTEM. GLAZING: SOLARBAN-90:
- 1" TINTED LOW 'E' GLAZING COMPRISED OF 2 LAYERS OF 1/4" GLAZING WITH 1/2" GAP; ALL GLAZING IS TEMPERED.

APRIL 10, 2023

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Architect.

PHASE:

JOB NO.: 2130

DRAWN: MP CHECKED: MP

DATE: April 10, 2023

Door & Window Info.

SHEET

A7.0

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U–VALUE: 0.29 SHGC VALUE: 0.23

STOREFRONT DOOR DESCRIPTIONS: MEDIUM STYLE GLASS DOORS. PUSH/PULL HARDWARE.

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1. STRUCTURAL DEFERRED SUBMITTALS ARE THOSE PORTIONS OF THE DESIGN WHICH REQUIRE STRUCTURAL ENGINEERING THAT ARE NOT SUBMITTED AT THE TIME OF THE APPLICATION BUT ARE TO BE SUBMITTED TO THE BUILDING OFFICIAL AT A LATER DATE. DEFERRED SUBMITTALS SHALL BE SUBMITTED TO AND APPROVED BY THE BUILDING OFFICIAL PRIOR TO INSTALLATION OF ANY SAID

2. COMPLETE STRUCTURAL SHOP DRAWINGS FOR CONSTRUCTION OF EACH BUILDING COMPONENT NOT DESIGNED BY THE STRUCTURAL ENGINEER-OF-RECORD (SER) AND NOT SPECIFIED ON THE PROJECT CONSTRUCTION DOCUMENTS SHALL BE SEALED AND SIGNED BY A SPECIALTY STRUCTURAL ENGINEER (SSE) WHO IS A LICENSED PROFESSIONAL ENGINEER REGISTERED IN THE STATE WHERE THE PROJECT IS BEING CONSTRUCTED WHO IS QUALIFIED TO PERFORM SAID WORK A SEAL BY A LICENSED PROFESSIONAL ENGINEER IS NOT REQUIRED FOR FITHER PRODUCTS WHICH HAVE BEEN TESTED AND CERTIFIED BY AN APPROVED AGENCY SUCH AS THE ICC NOR FOR COMPONENTS WHICH ARE FABRICATED BY A FABRICATOR THAT IS CERTIFIED BY AN APPROVED AGENCY IN WHICH THE AGENCY SPECIFIED THAT SEALING OF THE SHOP DRAWINGS IS NOT REQUIRED (E.G. STEEL JOIST INSTITUTE IN REGARDS TO OPEN WEB STEEL JOISTS) 3. THE SPECIALTY STRUCTURAL ENGINEER (SSE) SHALL SPECIFICALLY INDICATE IN A COVER PAGE AT THE FRONT OF THE SHOP DRAWING THAT THEY ARE THE STRUCTURAL ENGINEER IN RESPONSIBLE CHARGE FOR THE DEFERRED SUBMITTAL AND THAT THEY HAVE REVIEWED THE SHOP DRAWING TO ENSURE COMPLIANCE WITH THEIR DESIGN AND CALCULATIONS.

A. EXTERIOR CLADDING SYSTEMS (NOT REQUIRED IF USING CERTIFIED AND TESTED PRODUCTS/ASSEMBLIES) B. CURTAINWALL, STOREFRONT, WINDOWS (NOT REQUIRED IF USING CERTIFIED AND TESTED PRODUCTS/ASSEMBLIES . SUPPORT TO STRUCTURE FOR: HVLS FANS, OPERABLE PARTITIONS, MEP UTILITIES/EQUIPMENT

. THE CONTRACT STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. METHODS, PROCEDURES AND SEQUENCES OF CONSTRUCTION ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO MAINTAIN AND ENSURE THE INTEGRITY OF THE STRUCTURE AT ALL STAGES OF CONSTRUCTION. 2. THE CONTRACTOR IS RESPONSIBLE FOR QUALITY CONTROL, INCLUDING WORKMANSHIP AND MATERIALS FURNISHED BY SUBCONTRACTORS AND SUPPLIERS

- 3. REFER TO DRAWINGS OTHER THAN STRUCTURAL FOR COMPLETE INFORMATION REGARDING: SLEEVES, CURBS, INSERTS, DEPRESSIONS, OPENINGS, ETC. 4. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO OBTAIN ALL CONTRACT DOCUMENTS AND LATEST REVISIONS/ADDENDA AND TO SUBMIT SUCH DOCUMENTS TO ALL SUBCONTRACTORS AND MATERIAL SUPPLIERS PRIOR TO THE SUBMITTAL OF SHOP DRAWINGS OR MATERIAL PROCUREMENT
- 5. THE USE OR REPRODUCTIONS OF THESE CONTRACT DRAWINGS BY ANY CONTRACTOR OR MATERIAL SUPPLIER IN LIEU OF PREPARATION OF SHOP DRAWINGS SIGNIFIES HIS ACCEPTANCE OF ALL INFORMATION SHOWN HEREON AS CORRECT, AND OBLIGATES HIMSELF TO ANY JOB EXPENSE, REAL OR IMPLIED, DUE TO ANY ERRORS THAT MAY OCCUR HEREON. 6. ALL WORK SHALL CONFORM TO OSHA STANDARDS.
- 7. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL EXCAVATION PROCEDURES INCLUDING LAGGING, SHORING AND PROTECTION OF ADJACENT PROPERTY, STRUCTURES, STREETS AND UTILITIES IN ACCORDANCE WITH ALL CODES AND REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION. 8. THE GENERAL CONTRACTOR SHALL COMPARE THE ARCHITECTURAL AND STRUCTURAL DRAWINGS AND REPORT ANY DISCREPANCIES BETWEEN EACH SET OF DRAWINGS AND WITHIN EACH SET OF DRAWINGS TO THE ARCHITECT AND ENGINEER PRIOR TO THE FABRICATION AND INSTALLATION OF ANY STRUCTURAL MEMBERS. 9. FRAMING LAYOUTS ARE PROVIDED TO REPRESENT DESIGN CONCEPTS AND SYSTEMS CONSTRUCTION. THE CONTRACTOR AND SUBCONTRACTORS ARE RESPONSIBLE FOR MATERIAL QUANTITIES
- 10. WHERE MEMBER LOCATIONS ARE NOT SPECIFICALLY DIMENSIONED, MEMBERS ARE EITHER LOCATED ON COLUMN LINES OR ARE EQUALLY SPACED BETWEEN THE LOCATED MEMBERS. 11. IF CERTAIN FEATURES ARE NOT FULLY SHOWN OR SPECIFIED ON THE DRAWINGS OR IN THE SPECIFICATIONS, THEIR CONSTRUCTION SHALL BE OF THE SAME CHARACTER AS SHOWN OR SPECIFIED
- 12. WHERE CONFLICT EXISTS AMONG THE VARIOUS PARTS OF THE STRUCTURAL CONTRACT DOCUMENTS, STRUCTURAL DRAWINGS, GENERAL NOTES AND SPECIFICATIONS, THE STRUCTURAL REQUIREMENTS, AS INDICATED BY THE ENGINEER, SHALL GOVERN. 13. THE FLOOR DESIGN LIVE LOAD FOR EACH ELEVATED FLOOR STRUCTURE OR PORTION THEREOF THAT EXCEEDS 50 POUNDS PER SQUARE FOOT (PSF) SHALL BE STATED ON DURABLE SIGNS AND
- CONSPICUOUSLY POSTED BY THE OWNER IN THE APPLICABLE AREA(S) OF THE BUILDING. 14. ALL STRUCTURES REQUIRE PERIODIC MAINTENANCE TO EXTEND LIFESPAN AND ENSURE STRUCTURAL INTEGRITY FROM EXPOSURE TO THE ENVIRONMENT. A PLANNED PROGRAM OF MAINTENANCE SHALL BE ESTABLISHED BY THE BUILDING OWNER. THIS PROGRAM SHALL INCLUDE SUCH ITEMS AS, BUT NOT LIMITED TO, PAINTING OF STRUCTURAL STEEL, PROTECTIVE COATING FOR CONCRETE, SEALANTS, CAULKED JOINTS, EXPANSION JOINTS, CONTROL JOINTS, SPALLS AND CRACKS IN CONCRETE, AND PRESSURE WASHING OF EXPOSED STRUCTURAL ELEMENTS EXPOSED TO A SALT ENVIRONMENT OR OTHER HARSH CHEMICALS.
- A. THE ENGINEER SHALL NOT HAVE CONTROL NOR CHARGE OF, AND SHALL NOT BE RESPONSIBLE FOR, CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, OR PROCEDURES, FOR SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK, FOR THE ACTS OR OMISSION OF THE CONTRACTOR, SUBCONTRACTOR, OR ANY OTHER PERSONS PERFORMING ANY OF THE WORK OR FOR THE FAILURE OF ANY OF THEM TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS B. PERIODIC SITE OBSERVATION BY FIELD REPRESENTATIVES OF THE STRUCTURAL ENGINEER IS SOLELY FOR THE PURPOSE OF BECOMING GENERALLY FAMILIAR WITH THE PROGRESS AND QUALITY OF THE WORK COMPLETED AND DETERMINING, IN GENERAL, IF THE WORK OBSERVED IS BEING PERFORMED IN A MANNER INDICATING THAT THE WORK, WHEN FULLY COMPLETED, WILL BE IN ACCORDANCE WITH THE STRUCTURAL CONTRACT DOCUMENTS. THIS LIMITED SITE OBSERVATION SHOULD NOT BE CONSTRUED AS EXHAUSTIVE OR CONTINUOUS TO CHECK THE QUALITY OR QUANTITY OF THE WORK, BUT RATHER PERIODIC IN AN EFFORT TO GUARD THE OWNER AGAINST DEFECTS OR DEFICIENCIES IN THE WORK OF THE CONTRACTOR. 16. WATERPROOFING OF THE BUILDING ENVELOPE IS OF CRITICAL IMPORTANCE TO LONG-TERM STRUCTURAL PERFORMANCE, WATERPROOFING DESIGN SHALL BE THE RESPONSIBILITY OF THE

I. WORK SHALL BE PERFORMED BY A QUALIFIED CONSTRUCTION CONTRACTOR AND SUBCONTRACTOR EXPERIENCED IN THIS TYPE OF WORK. SUCH KNOWLEDGE SHALL INCLUDE MAKING ALLOWANCES FOR PERFORMING WORK OF THIS NATURE FOLLOWING INDUSTRY STANDARDS OF CARE. 2. THE CONSTRUCTION CONTRACTOR AND SUBCONTRACTORS SHALL UNDERSTAND THE NATURE OF DRAWING PRODUCTION AND COORDINATION BETWEEN CONSULTANTS AND SHALL NOT ENTER INTO A CONTRACT BASED ON DRAWINGS THAT ARE BELIEVED TO CONTAIN DISCREPANCIES OR ARE OTHERWISE INCOMPLETE UNLESS PROPER ALLOWANCES HAVE BEEN MADE FOR COST IMPLICATIONS THAT MAY ARISE DUE TO FUTURE DRAWING CHANGES MADE IN PREPARATION OF FINAL CONSTRUCTION DOCUMENTS 3. IN THE COURSE OF PRODUCING AND ISSUING DRAWINGS, VARIOUS STAGES OF COMPLETION ARE DEVELOPED. THE CONSTRUCTION CONTRACTOR AND SUBCONTRACTORS SHALL UNDERSTAND THE PURPOSE AND CONTENT CONTAINED IN PERMIT, PRICING, AND CONSTRUCTION DRAWINGS. COST IMPLICATIONS AND CONTRACTIBILITY ARE THE RESPONSIBILITY OF THE CONSTRUCTION CONTRACTOR AND SUBCONTRACTORS UNLESS PRIOR ARRANGEMENTS HAVE BEEN MADE WITH THE OWNER

1. NO PROVISIONS FOR ANY FUTURE EXPANSION HAVE BEEN MADE IN THE STRUCTURAL DESIGN.

1. ALL REQUESTS FOR SUBSTITUTIONS OF MATERIALS OR DETAILS SHOWN IN THE CONTRACT DOCUMENTS SHALL BE SUBMITTED FOR APPROVAL DURING THE BIDDING PERIOD. ONCE BIDS ARE ACCEPTED, PROPOSED SUBSTITUTIONS WILL BE CONSIDERED ONLY WHEN THEY ARE OFFICIALLY SUBMITTED WITH AN IDENTIFIED SAVINGS TO BE DEDUCTED FROM THE CONTRACT.

A. THE GENERAL CONTRACTOR SHALL PREPARE A DETAILED LIST AND SCHEDULE OF ALL SUBMITTAL ITEMS TO BE SENT TO THE STRUCTURAL ENGINEER PRIOR TO THE START OF ATED AND REVISED AS THE IOB PROGRESSE

A. ALL SUBMITTALS MUST BE REVIEWED AND ELECTRONICALLY STAMPED BY THE GENERAL CONTRACTOR PRIOR TO SUBMITTAL TO THE DESIGN TEAM AS NO EXCEPTIONS. BY SUBMITTING TO THE DESIGN TEAM, THE CONTRACTOR IS AFFIRMING THAT THE WORK, AS THE CONTRACTOR HAS DIVIDED IT AMONG THE TRADES, WILL COMPLY WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS INCLUDING VERIFICATION OF MATERIALS, FIELD MEASUREMENTS, COORDINATION WITH OTHER SUBMITTALS, ETC. B. ANY DEVIATION/CLARIFICATION FROM THE CONSTRUCTION DOCUMENTS IN A SUBMITTAL SHALL BE CLEARLY INDICATED AS A DEVIATION, FOR SPECIFIC REVIEW BY THE DESIGN TEAM. A NON-RESPONSE TO A NOTED DEVIATION/CLARIFICATION DOES NOT INDICATE APPROVAL. IF NOT ADDRESSED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING OF THE

C. ALL SUBMITTALS MUST INCLUDE A TRANSMITTAL SHEET WHICH INDICATES: a. SUBMITTAL NUMBER PER THE FOLLOWING FORMAT: E.G. 03 30 00-01.00 (DIVISION, SUBMITTAL # FOR DIVISION, ISSUE # - THE EXAMPLE INDICATES THE FIRST SUBMITTAL, FIRST ISSUE OF

e. ISSUING PARTY INCLUDING NAME, PHONE NUMBER AND EMAIL D. CONTRACTOR SHALL PROVIDE THE SUBMITTAL IN ELECTRONIC (PDF) FORMAT. SUBMITTALS SHALL NOT BE SCANNED COPIES OF PRINTED DOCUMENT: E. THE OMISSION FROM THE SHOP DRAWINGS OF ANY MATERIALS REQUIRED BY THE CONTRACT DOCUMENTS SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF FURNISHING AND INSTALLING SUCH MATERIALS, REGARDLESS OF WHETHER SHOWN OR COMMENTED IN THE SHOP DRAWING F. THE CONTRACTOR MUST ALLOW A MINIMUM OF 10 BUSINESS DAYS FOR STRUCTURAL REVIEW OF ALL SUBMITTALS. THE CONTRACTOR CAN REQUEST AN EXPEDITED REVIEW AT AN AGREED UPON FEE WITH THE STRUCTURAL ENGINEER AS AN ADDITIONAL SERVICE. G. RESUBMITTALS REQUIRE THE SAME MINIMUM REVIEW TIME AS THE ORIGINAL SUBMITTAL.

H. STRUCTURAL STEEL SUBMITTALS MUST BE ACCOMPANIED BY THE SDS/2, IFC OR TEKLA MODEL OF THE STRUCTURAL STEEL FABRICATION MODEL WHICH WILL BE USED BY THE DESIGN TEAM AS A VISUAL AID TO THE SHOP DRAWINGS. 3. ENGINEER REVIEW STAMP DESIGNATIONS: ALL DESIGNATIONS ARE INDICATIVE OF A REVIEW FOR THE LIMITED PURPOSE OF CHECKING FOR GENERAL CONFORMANCE WITH THE INFORMATION GIVEN AND THE DESIGN CONCEPT EXPRESSED GENERAL IN THE STRUCTURAL CONSTRUCTION DOCUMENTS. REVIEW OF SUCH SUBMITTALS IS NOT FOR THE PURPOSE OF DETERMINING THE ACCURACY AND COMPLETENESS OF OTHER INFORMATION SUCH AS DIMENSIONS, QUANTITIES, AND INSTALLATION OR PERFORMANCE OF EQUIPMENT OR SYSTEMS,

WHICH ARE THE CONTRACTOR'S RESPONSIBILITY. THE ENGINEERS'S REVIEW SHALL NOT CONSTITUTE APPROVAL OF SAFETY PRECAUTIONS OR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES. THE ENGINEERS'S REVIEW OF A SPECIFIC ITEM SHALL NOT INDICATE APPROVAL OF AN ASSEMBLY OF WHICH THE ITEM IS A COMPONENT. a. NO EXCEPTIONS WITH THE STRUCTURAL CONSTRUCTION DOCUMENTS WERE IDENTIFIED IN OUR LIMITED REVIEW FOR GENERAL CONFORMANCE. THIS DOES NOT CONSTITUTE APPROVAL FOR ANY NON-CONFORMING ITEMS THAT WERE NOT IDENTIFIED IN OUR REVIEW. NO "FOR REVIEW" RESUBMITTAL IS REQUIRED.

a. EXCEPTIONS WITH THE STRUCTURAL CONSTRUCTION DOCUMENTS WERE IDENTIFIED IN OUR LIMITED REVIEW FOR GENERAL CONFORMANCE AND NEED TO BE REVISED PRIOR TO SUBMITTING THE "FOR CONSTRUCTION" SUBMITTAL. THIS DOES NOT CONSTITUTE APPROVAL FOR ANY NON-CONFORMING ITEMS THAT WERE NOT IDENTIFIED IN OUR REVIEW.

a. SIGNIFICANT ITEMS WERE FOUND IN CONFLICT WITH THE STRUCTURAL CONSTRUCTION DOCUMENTS. THE SUBMITTAL NEEDS TO BE RESUBMITTED "FOR REVIEW". b. THE CONTRACTOR SHALL DIRECT SPECIFIC ATTENTION, IN WRITING OR ON RESUBMITTED SHOP DRAWINGS, PRODUCT DATA, SAMPLES, OR SIMILAR SUBMITTALS, TO REVISIONS OTHER THAN THOSE REQUESTED BY THE ENGINEER ON PREVIOUS SUBMITTALS. IN THE ABSENCE OF SUCH NOTICE, THE ENGINEER'S APPROVAL OF A RESUBMISSION SHALL NOT APPLY TO

SHALL NOTIFY DUDLEY IN WRITING.

a. THE SUBMITTAL HAS BEEN REVIEWED FOR THE IMPACT TO THE STRUCTURE SHOWN IN THE CONSTRUCTION DOCUMENTS ONLY.

1. CONSTRUCTION OR WORK FOR WHICH A PERMIT IS REQUIRED SHALL BE SUBJECT TO INSPECTION BY THE BUILDING OFFICIAL AND SUCH CONSTRUCTION OR WORK SHALL REMAIN ACCESSIBLE AND EXPOSED FOR INSPECTION PURPOSES UNTIL APPROVED. REQUIRED TESTING INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:

a. FOOTING AND FOUNDATION INSPECTIONS SHALL BE MADE AFTER EXCAVATIONS FOR FOOTINGS ARE COMPLETE AND ANY REQUIRED REINFORCING STEEL IS IN PLACE. FOR CONCRETE FOUNDATIONS, ANY REQUIRED FORMS SHALL BE IN PLACE PRIOR TO INSPECTION. MATERIALS FOR THE FOUNDATION SHALL BE ON THE JOB, EXCEPT WHERE CONCRETE IS READY MIXED IN ACCORDANCE WITH ASTM C94, THE CONCRETE NEED NOT BE ON THE JOB.

a. CONCRETE SLAB AND UNDER-FLOOR INSPECTIONS SHALL BE MADE AFTER IN-SLAB OR UNDER-FLOOR REINFORCING STEEL AND BUILDING SERVICE EQUIPMENT, CONDUIT, PIPING ACCESSORIES AND OTHER ANCILLARY EQUIPMENT ITEMS ARE IN PLACE, BUT BEFORE ANY CONCRETE IS PLACED OR FLOOR SHEATHING INSTALLED, INCLUDING THE SUBFLOOR.

a. FRAMING INSPECTIONS SHALL BE MADE AFTER THE ROOF DECK OR SHEATHING, ALL FRAMING, FIREBLOCKING AND BRACING ARE IN PLACE AND PIPES, CHIMNEYS AND VENTS TO BE CONCEALED ARE COMPLETE AND THE ROUGH ELECTRICAL, PLUMBING, HEATING WIRES, PIPES AND DUCTS ARE APPROVED.

A. PARTIAL PLANS, ELEVATIONS, SECTIONS, DETAIL OR SCHEDULES LABELED WITH "TYPICAL" AT THE BEGINNING OF THEIR TITLE SHALL APPLY TO ALL SITUATIONS OCCURRING ON THE PROJECT THAT ARE THE SAME OR SIMILAR TO THE THOSE SPECIFICALLY SHOWN. THE APPLICABILITY OF THE CONTENT OF THESE VIEWS TO LOCATIONS ON THE PLAN CAN BE DETERMINED FROM THE TITLE OF THE VIEW. SUCH VIEWS SHALL APPLY WHETHER OR NOT THEY ARE KEYED IN AT EACH LOCATION. DECISIONS REGARDING APPLICABILITY OF THESE "TYPICAL" VIEWS SHALL BE DETERMINED BY THE STRUCTURAL ENGINEER.

2. COLOR: THESE DRAWINGS ARE INTENDED TO BE VIEWED IN COLOR. IF THE FOLLOWING COLORS ARE NOT RED GREEN BLUE THEN THIS DRAWING SET IS NOT BEING VIEWED AS INTENDED. 3. SCALE: IF THE FOLLOWING LINE IS NOT EXACTLY 1" LONG, THEN THIS SET HAS BEEN SCALED.

MATERIAL IDENTIFICATION SYMBOLS

UNIVERSAL SYMBOLS

VIEW REFERENCE SYMBOLS

AREA OR ITEM BEING DETAILED CALLOUT (ENLARGED VIEW) SYM

DETAIL NUMBER OR

SHEET NUMBER

LETTER

• TYPICAL CONDITION, SECTION (DETAIL) WILL NOT BE CUT AT EACH CONDITION SIM = SIMILAR CONDITION AT THIS LOCATION IS SIMILAR TO ANOTHER CONDITION OPH = OPPOSITE HAND• THE CONDITION AT THIS LOCATION IS A MIRROR IMAGE TO WHAT IS SEEN IN THE DETAIL, SECTION OR ENLARGED VIEW

SLOPE EDGE

PLAN SYMBOLS

SLOPE TRANSITION INDICATOR

ONE-WAY SLAB OR DECK

SPAN INDICATOR SYMBOL

ХХХ-х 🛩

3,500# -

BELOW 🥿

MECHANICAL UNIT OR OTHER

EQUIPMENT

SYMBOL

SLAB OR

DECK TYPE

(IF PROVIDED)

RAMP SLOPE INDICATOR SYMBOL SLAB OR

SLOPE

REF ARCH

TWO-WAY SLAB SPAN INDICATOR <u>symbol</u>

- ROUGH OUTLINE OF UNIT UNIT NAME (IF PROVIDED)

MAX TOTAL ALLOWABLE WEIGHT OF UNIT OR EQUIPMENT INCLUDING

IF PROVIDED, INDICATES UNIT IS HANGING BELOW FLOOR OR ROOF

WEIGHT OF CURB

ABBREVIATIONS

ROUND, DIAMETER

AND

ADDL

NUMBER

ADDITIONAL

LLH

LLV

LONG

LSH

LSV

LWC

М

MAX

MС

MECH

MEZZ

MFR

ΜН

MIN

MISC

MTL

NF

NIC

NTS

NWC

OC

OD

OPH

OPNG

OPP

OSB

OVS

PAF

PAR

PCC

PCF

PCY

PERP

PL

PLF

PJP

PRELIM

PROP

PSF

PSI

QTY

RAD

REF

REINF

reqd

REV

SCHED

SECT

SHT

SIM

SLBB

SLRS

SOG

SPA

SQ

STD

STIF

SW

TO

TOC

TOM

TOS

TYP

UNO

VERT

WP

WS

WSP

WWR

XS

XXS

WELDED WIRE REINFORCEMENT

DOUBLE EXTRA STRONG (SCH. 80 PIPE)

RIDGE INDICATO

<u>symbol</u>

EXTRA STRONG (SCH. 40 PIPE)

WF (W)

trans

STRUCT

SYMM

SPEC

rtu

GRAVEL	GROUT
STRUCTURAL PRECAST CONCRETE	WOOD
EVATION OF REFER	ENCE OBJECT OR
EFERENCE OBJECT (DCATION	DR
<u>GNATION SYMBOL</u>	
<u>REINFORCI</u> 11	ING STEEL WITH STD 80° HOOK
Ţ	
<u>LINE</u> BREAK MA	<u>RK</u>

.0	IYP	
<u>IBOL</u>		

AESS ARCHITECTURAL EXPOSED STRUCTURAL STEEL ABOVE FINISHED FLOOR **AIR HANDLING UNIT** AHU **AI TERNATE** APPROX APPROXIMATE ARCH ARCHITECTURAL BLDG BUILDING BOTTOM OF BOD BOTTOM OF DECK BOT BOTTOM BRDG BRIDGING BEARING BRG BTWN BETWEEN CAMBER CANTILEVER CANT COLD-FORMED STEEL CFS CAST-IN-PLACE CIP CONSTRUCTION/CONTRACTION (CONTROL) JOINT CJP COMPLETE JOINT PENETRATION CENTERLINE CL CONCRETE MASONRY UNIT CMU COL COLUMN CONC CONCRETE CONN CONNECTION CONSTR CONSTRUCTION CONT CONTINUOUS COORD COORDINATE CTRS CENTERS bar diameter DBA DEFORMED BAR ANCHOR DOUGLAS FIR (WOOD) DIA (Ø) DIAMFTER DIM DIMENSION DWG DRAWING EACH EACH FACE EXPANSION JOINT EL (ELEV ELEVATION EMBED EMBEDMENT, EMBEDDED ENGR ENGINEER FQUAI FQ EQUIP EQUIPMENT EQUIV FQUIVALEN1 EACH WAY EXIST existing FχΡ EXPANSION EXTERIOR FABRICATE 28 DAY CONCRETE STRENGTH 28 DAY MASONRY STRENGTH FLOOR DRAIN FOUNDATION FDN FAR FACE FINISH(ED FLOOR FAR SIDE FOOTING FUTURE FIELD VERIFY YIELD STRENGTH GALV GALVANIZE(D) GEN GENERAL GRADE GR HORIZONTAL REACTION HGR HANGER HORIZ HORIZONTAL HEADED STUD ANCHOR HOLLOW STRUCTURAL SECTION INSIDE DIAMETER INFORMATION INFO INTERIOR JOINT KIPS (1000 LBS) KIPS PER SQUARE FOOT KSF KIPS PER SQUARE INCH POUNDS Ld DEVELOPMENT LENGTH LLBB LONG LEG BACK TO BACK

LONG LEG HORIZONTAL LONG LEG VERTICAL LONGITUDINAL LONG SIDE HORIZONTAL LONG SIDE VERTICAL LIGHTWEIGHT CONCRETE MOMENT MAXIMUM MOMENT CONNECTION MECHANICAL MEZZANINE MANUFACTURER HORIZONTAL MOMENT MINIMUM MISCELLANEOUS METAL NEAR FACE NOT IN CONTRACT NEAR SIDE NOT TO SCALE NORMALWEIGHT CONCRETE ON CENTER OUTSIDE DIAMETER **OPPOSITE HAND** OPENING OPPOSITE ORIENTED STRAND BOARD (WOOD) OVERSIZED HOLE AXIAL LOAD POWDER ACTUATED FASTENER PARALLEL PRECAST CONCRETE POUNDS PER CUBIC FOOT POUNDS PER CUBIC YARD PERPENDICULAR PLATE POUNDS PER LINEAR FOOT PARTIAL JOINT PENETRATION PRELIMINARY PROPERTY POUNDS PER SQUARE FOOT POUNDS PER SQUARE INCH POST-TENSION(ED) QUANTITY VERTICAL SHEAR REACTION radius REFERENCE REINFORCEMENT REQUIRED REVISION ROOF TOP UNIT SLIP CRITICAL SCHEDULE(D) SECTION SHEET SIMILAR SHORT LEG BACK TO BACK SEISMIC LOAD RESISTING SYSTEM SLAB-ON-GRADE Spacing SPECIFICATION SQUARE STANDARD STIFFENER STEEL STRUCTURE, STRUCTURAL SHEAR WALL SYMMETRIC, SYMMETRICAL SOUTHERN YELLOW PIN TORSION TOP OF COLUMN TOP OF TOP OF CONCRETE TOP OF MASONRY TOP OF STEEL, TOP OF SLAB TRANSVERSE TYPICAL UNLESS NOTED OTHERWISE VERTICAL WIDE FLANGE WORK POINT WATERSTOP WOOD STRUCTURAL PANEL WEIGHT

S0.0

B. WET-CURED BY KEEPING THE SURFACE WET AFTER THE CONCRETE HAS SET AND FINISHING IS COMPLETE

. THE CONTRACTOR MUST SUBMIT PLACING DRAWINGS COMPLETE WITH LAYOUT, SYMBOLS AND NOTATION, AND SCHEUDLES WITH THE REINFORCING STEEL SHOP DRAWINGS. IF THE CONTRACTOR ONLY SUBMITS SCHEDULES (BAR LISTS, CUT AND BEND INFORMATION), THE SUBMITTAL WILL NOT BE REVIEWED AND WILL BE RETURNED REVISE AND RESUBMIT. DETAILING OF

CONCRETE REINFORCEMENT BARS AND ACCESSORIES SHALL CONFORM TO THE FOLLOWING: ACI 315 "DETAILS AND DETAILING OF CONCRETE REINFORCEMENT", CRSI "REINFORCING BAR DETAILING", AND CRSI "MANUAL OF STANDARD PRACTICE". ALL REFERENCES SHALL BE THE LATEST EDITION AVAILABLE 2. PLACING DRAWINGS ARE DETAILED WORKING DRAWINGS THAT SHOW THE QUANTITY, SIZE, DIMENSIONS, SPACING, LOCATIONS, AND OTHER INFORMATION REQUIRED FOR REINFORCEMENT FABRICATION AND INSTALLATION, PLACING DRAWINGS SHALL BE USED BY THE IRONWORKERS ON THE PROJET TO PLACE (INSTALL) THE REINFORCING STEEL. A. LAYOUT: THE PLACING DRAWINGS MUST INCLUDE PLANS, DETAILS, ELEVATIONS, GRAPHICS, SCHEDULES, MATERIAL LISTS, AND BENDING DETAILS OF REINFORCEMENT AND

REINFORCEMENT SUPPORTS, AS APPLICABLE TO THIS PROJECT. B. FIELD CONDITIONS, FIELD MEASUREMENTS, LOCATION OF CONSTRUCTION, CONTRACTION (CONTROL), AND EXPANSION JOINTS SHALL BE IMPLEMENTED INTO THE PLACING DRAWINGS. C. THE PLACING DRAWINGS MUST BE PREPARED BASED UPON THE LATEST CONSTRUCTION DOCUMENTS ALONG WITH SHOP DRAWINGS FOR OTHER TRADES THAT EFFECT THE REINFORCEMENT

D. THE PLACING DRAWINGS MUST BE COMPUTER GENERATED.

3. COMPLETE REINFORCING PLACING DRAWINGS PREPARED IN ACCORDANCE WITH ACI 315 SHALL BE REVIEWED BY THE ENGINEER AND AVAILABLE ON THE JOB SITE PRIOR TO & DURING THE PLACING OF CONCRETE. 4. CONCRETE REINFORCEMENT BARS SHALL CONFORM TO ASTM A615, GRADE 60, WITH SUPPLEMENTARY REQUIREMENTS. 5. ALL REINFORCING STEEL SHALL BE SUPPORTED AT DESIGNED DEPTH USING PLASTIC OR METALLIC CHAIRS SPACED AT 48" OC IN ALL DIRECTIONS TO SUPPORT FULL LENGTH OF

REINFORCEMENT. IF ALTERNATE IS TO BE USED, PROPOSED CHAIR IS TO BE SUBMITTED IN WRITING AND APPROVED BY EOR A. PRECAST CONCRETE SUPPORTS (UTILITY BRICKS) MAY ONLY BE USED AT THE BOTTOM OF GRADE BEAMS WITH A DEPTH OF AT LEAST 18" OR WITH WRITTEN PERMISSION FROM THE EOR. WHEN PERMITTED, PRECAST SUPPORTS SHALL HAVE A SURFACE AREA OF NOT LESS THAN 4 IN^2 AND HAVE A COMPRESSIVE STRENGTH EQUAL TO OR GREATER THAN THE CONCRETE

6. END HOOKS, DEVELOPMENT LENGTHS, AND SPLICES SHALL CONFORM TO THE REQUIREMENTS OF ACI 318. 7. REINFORCEMENT MAY BE PLACED IN BUNDLES OF NOT MORE THAN TWO W/ THE CLEAR DISTANCE BETWEEN BUNDLES OF REINFORCEMENT OR TENDONS OF 3 INCHES MINIMUM. CONCRETE

COVER NOT SPECIFICALLY DETAILED ON THE DRAWINGS SHALL BE IN ACCORDANCE WITH ACI 318. 8. COVERAGE: THE FOLLOWING SHALL BE THE MINIMUM REINFORCEMENT CONCRETE COVERAGE (INCLUDING TENDONS):

B. CONCRETE EXPOSED TO EARTH OR WEATHER: a. NO. 6 AND LARGER ..

b. NO. 5 BAR AND SMALLER C. CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND 3/4"

9. UNO, ALL LAP SPLICES OF REINFORCEMENT IN GROUND SUPPORTED ELEMENTS (GRADE BEAMS, FOOTINGS, TURN DOWNS) SHALL BE A MINIMUM OF 48Ø, WHERE Ø = THE DIAMETER OF THE BAR, REINFORCEMENT IN STRUCTURAL SLABS, WALLS OR ELEVATED STRUCTURES SHALL REFER TO THE TYPICAL LAP SPLICE DETAIL 10. HEADED CONCRETE STUD ANCHORS ("HSA") FASTENED TO AN EMBED PLATE SHALL BE NELSON OR KSM HEADED CONCRETE ANCHORS (OR APPROVED ALTERNATIVE). ANCHORS SHALL BE AUTOMATICALLY END WELDED WITH SUITABLE STUD WELDING EQUIPMENT IN THE SHOP OR IN THE FIELD. WELDING SHALL BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE NELSON STUD WELDING COMPANY OR THE KSM WELDING SYSTEMS COMPANY.

REINFORCED CONCRETE - 03 30 00

A. CONCRETE WORK SHALL CONFORM TO THE LATEST ED. OF ACI 301 (SPECIFICATIONS FOR STRUCTURAL CONCRETE) UNO IN THESE CONSTRUCTION DOCUMENTS.

B. POINT OF DELIVERY = AT DISCHARGE FROM THE CONCRETE MIX TRUC (END OF THE CHUTE)

C. POINT OF PLACEMENT = AT THE LOCATION WHERE CONCRETE IS PLACED TO HARDEN. IF PUMPING, THIS WILL BE AT THE END OF THE PUMP HOSE D. WELDING OF REINFORCEMENT IS NOT ALLOW WITHOUT WRITTEN PERMISSION FROM ENGINEER.

A. ALL CONCRETE MIXES SHALL CONFORM TO ACI 301, UNO. MIX DESIGN DATA RESULTS EITHER COMPLYING WITH THE FIELD EXPERIENCE OR TRIAL MIXTURE METHOD PER ACI 301/318 SHALL BE SUBMITTED FOR EACH CONCRETE MIX. PROPORTIONS OF MATERIALS FOR CONCRETE SHALL BE ESTABLISHED TO: a. PROVIDE WORKABILITY AND CONSISTENCY TO PERMIT CONCRETE TO BE WORKED READILY INTO FORMS AND AROUND REINFORCEMENT UNDER CONDITIONS OF PLACEMENT TO BE EMPLOYED, WITHOUT SEGREGATION OR EXCESSIVE BLEEDING.

b. MEET REQUIREMENTS FOR APPLICABLE EXPOSURE REQUIREMENTS. c. MEET OR EXCEED THE REQUIRED F'C d. NOT EXCEED THE MAXIMUM W/C RATIO.

. ADHERE TO THE MINIMUM CEMENTITOUS MATERIAL CONTENT FOR FLOORS (REF ACI 301 TABLE 4.2.2.1). C. THE CONTRACTOR MUST INDICATE THE PLANNED PLACEMENT METHOD FOR EACH CONCRETE MIX.

D. WATER MAY NOT BE ADDED TO THE CONCRETE MIX IN THE FIELD TO ADJUST THE SLUMP (RETEMPERING) WITHOUT THE SPECIAL INSPECTOR BEING PRESENT TO CONFIRM THAT IT DOES NOT EXCEED THE W/C RATIO OR DESIGN SLUMP. THE READY-MIX COMPANY MUST INDICATE THE MAXIMUM WATER WITHHELD AT THE PLANT. IF THE AMOUNT, THE W/C RATIO OR DESIGN SLUMP IS EXCEEDED THEN THE CONCRETE SHALL BE REJECTED.

E. SLUMP TESTS SHALL BE PERFORMED AT THE POINT OF PLACEMENT WITH THE EXCEPTIONS NOTED BELOW:

a. IF THE POINT OF DELIVERY IS THE SAME AS THE POINT OF PLACEMENT (CONCRETE IS PLACED DIRECTLY FROM TRUCK) b. IF THE CONTRACTOR HAS DEVELOPED AN ACCEPTABLE (APPROVED BY SPECIAL INSPECTOR AND EOR) CORRELATION BETWEEN FRESH CONCRETE PROPERTIES AT THE POINT OF DELIVERY AND POINT OF PLACEMEN

F. AIR-ENTRAINED CONCRETE SHALL NOT BE USED IN ANY NORMALWEIGHT CONCRETE FLOOR SLAB THAT IS TO RECEIVE A HARD-TROWELED FINISH. 3. CONCRETE CONSTRUCTION MATERIALS: (FOR ALL MATERIALS APPROVED EQUIVALENTS ARE ACCEPTABLE - IT IS THE CONTRACTORS RESPONSIBILITY TO ESTABLISH THE THAT SUBSITUTE PRODUCT IS EQUAL TO OR BETTER THAN THE SPECIFIED PRODUCT)

a. USE ASTM C150 TYPE I OR TYPE III OR ASTM C595 TYPE IL, EXCEPT WHERE SPECFICALLY INDICATED OTHERWISE IN TABLE BELOW.

a. FLY ASH MAY BE USED TO REPLACE A PORTION OF THE PORTLAND CEMENT, SUBJECT TO THE APPROVAL OF THE ARCHITECT AND STRUCTURAL ENGINEER NOT TO EXCEED THE AMOUNTS LISTED IN THE CONCRETE TABLE. b. USE ASTM C618 CLASS C OR F.

C. NORMAL WEIGHT AGGREGATE: a. USE ASTM C33.

b. MATERIAL CERTIFICATES FROM THE AGGREGATE SUPPLIER MUST BE SUBMITTED WITH THE CONCRETE MIX DESIGN.

c. PEA STONE (PEA GRAVEL) AGGREGATES ARE NOT ACCEPTABLE.

a. COMPLY WITH THE REQUIREMENTS OF ASTM C1602. E. COMPRESSIBLE (JOINT) FILLER AT ISOLATION AND/OR EXPANSION JOINTS

a. MUST ADHERE TO ASTM D1751 ASPHALT-SATURATED CELLULOSIC FIBER F. ADHESIVE ANCHORING SYSTEMS

a. TWO-COMPONENT SYSTEMS THAT ADHERE TO ASTM C881 (HILTI HY-200, SIMPSON SET-XP, POWERS PE 1000+1

A. FOR CORROSION PROTECTION OF REINFORCEMENT IN CONCRETE, MAXIMUM WATER SOLUBLE ION CONCENTRATIONS IN HARDENED CONCRETE AT AGES FROM 28 TO 42 DAYS CONTRIBUTED FROM THE THE INGREDIENTS INCLUDING WATER, AGGREGATES, CEMENTITIOUS MATERIALS, AND ADMIXTURES SHALL NOT EXCEED THE LIMITS INDICATED IN THE TABLE BELOW.

A. CONCRETE SHALL BE PLACED CAREFULLY SO AS NOT TO DEVIATE REINFORCEMENT FROM THE DESIGN LOCATION. B. CONCRETE SHALL BE PROPERLY VIBRATED, ESPECIALLY AROUND POST-TENSIONED ANCHORAGES AND CONGESTED AREAS SUCH AS COLUMN JOINTS.

. PLACEMENT OF CONCRETE SHALL BE COMPLETED WITHIN 90 MINUTES AFTER THE INTRODUCTION OF THE MIXING WATER (BATCH TIME), IN ACCORDANCE WITH ASTM C94. D. TOLERANCES FOR CONCRETE CONSTRUCTION SHALL CONFORM TO THE LATEST ED. OF ACI 117 (SPECIFICATION FOR TOLERANCES FOR CONCRETE CONSTRUCTION AND MATERIALS).

A. THE CONTRACTOR SHALL SUBMIT FORMWORK DRAWINGS, PREPARED UNDER THE SUPERVISION AND SEALED BY THE FORMWORK DESIGN ENGINEER, SHALL BE SUBMITTED FOR OWNER'S RECORD AND SHALL BE REVIEWED BY THE ENGINEER FOR CONFORMANCE TO STRUCTURAL LAYOUT ONLY. SUCH SHOP DRAWINGS SHALL INDICATE ALL DIMENSIONS AND TYPES OF

MATERIALS, SIZES, LENGTHS, CONNECTION DETAILS, DESIGN ALLOWANCE FOR CONSTRUCTION LOADS, ANCHORS, FORM TIES, SHORES, BRACES, CONSTRUCTION JOINTS, REVEALS, CAMBER, OPENINGS FORMWORK COATINGS AND ALL OTHER PERTINENT INFORMATION B. THE MINIMUM COMPRESSIVE STRENGTH OF CONCRETE FOR FORMWORK REMOVAL SHALL BE 75% OF THE SPECIFIED ftc

CONCRETE MIX REQUIREMENTS										
	f'c	EXPOSURE CATEGORY	MAX CL-	MAX FLY ASH	MAX W/CM RATIO	MAX COARSE AGG. SIZE	MIN. AIR CONTENT			
ND ^a	3,500	F0,S0,P(W)0,C1	0.30	20%	0.45	ן"	N/A (3% MAX)			

A. CONCRETE MIXES FOR SLABS SHALL HAVE AN ULTIMATE DRY SHRINKAGE STRAIN LESS THAN 520 MILLIONTHS WHEN PLACED ON A DRY BASE MATERIALS. CONTRACTOR SHALL SUBMIT CERTIFICATION THAT THE PROPOSED B. "P(W)X" REFERS TO PERMEABILITY REQUIREMENTS OF THE CONCRETE. WHEN REFERENCING ACI318-11, CATEGORY SHOULD BE READ AS "PX". WHEN REFERENCING ACI318-14 OR ACI318-19, CATEGORY SHOULD BE READ

C. SLUMP REQUIREMENTS SHALL BE DETERMINED BY THE CONTRACTOR AND CONCRETE PRODUCER BASED UPON HANDLING, PLACING, FINISHING AND CURING CRITERIA FOR CONCRETE CONSTRUCTION. IF THE CONTRACTOR IS NOT ABLE TO DETERMINE SLUMP REQUIREMENTS, THEN IT SHALL BE IN ACCORDANCE WITH ACI 301 (SLUMP = 4" ± 1").

D. UNLESS NOTED OTHERWISE, REMOVAL OF SHORING, BRACING, FORMWORK OR BACKFILLING OF STRUCTURES SHALL NOT OCCUR UNITL THE CONCRETE HAS OBTAINED A MINIMUM OF 75% OF I'C. SHORING, BRACING, OF STRUCTURES SHALL NOT OCCUR UNITL THE CONCRETE HAS OBTAINED A MINIMUM OF 75% OF I'C. SHORING, BRACING, FORMWORK AND BACKFILLING OPERATIONS ARE MEANS AND METHOD OF CONSTRUCTION AND THUS THE CONTRACTOR IS SOLEY RESPONSIBLE FOR THESE OPERATIONS. QUESTIONS ON CAPACITY OF THE STRUCTURE TO SUPPORT TEMPORARY LOADING CONDITIONS SHALL BE ADDRESSED IN WRITING TO THE ENGINEER. IN MANY CASES, THE CONTRACTOR WILL NEED TO CONSULT A SPECIALITY STRUCTURAL ENGINEER TO DESIGN SHORING, BRACING, ETC., TO FACIILATE THEIR SELECTED MEANS AND METHODS OF CONSTRUCTION.

> CASE 1: DEVELOPMENT LENGTHS OF REINFORCEMENT IN TENSION, Ld (IN) CASE 2: DEVELOPMENT LENGTHS OF REINFORCEMENT IN TENSION, Ld (IN) FY = 60,000 PSI FY = 60,000 PSI NORMALWEIGHT CONCRETE, f'c (PSI) NORMALWEIGHT CONCRETE, f'c (PSI) db (IN) f'c = 3,000 f'c = 4,000 f'c = 5,000 f'c = 6,000 f'c = 3,000 f'c = 4,000 f'c = 5,000 f'c = 6,000 bar size BAR SIZE db (IN) 0.375 0.375 17 16 14 13 12 21 18 15 0.5 22 19 0.5 28 25 22 20 0.625 0.625 27 19 31 28 25 24 - 36 0.75 28 0.75 43 33 30 33 25 37 0.875 0.875 48 34 62 54 48 42 44 1.00 47 39 1.00 62 55 50 55 42 #8 #8 1.128 62 1.128 80 70 62 57 54 48 44 90 1.27 60 54 49 #10 1.27 78 70 64 #10 1.41 77 60 1.41 100 78 71 #11 67 55

1. CASE 1 APPLIES TO REINFORCEMENT THAT HAS LESS THAN 12" OF FRESH CONCRETE PLACED BELOW HORIZONTAL REINFORCEMENT. ALL VERTICAL REINFORCEMENT FALLS UNDER 2. CASE 2 APPLIES TO REINFORCEMENT THAT HAS MORE THAN 12" OF FRESH CONCRETE PLACED BELOW HORIZONTAL REINFORCEMENT

3. CLEAR SPACING OF BARS BEING DEVELOPED MUST BE AT LEAST 4. 2db (DIA OF BAR) & CLEAR COVER AT LEAST db, INCREASE DEVELOPMENT LENGTH BY 1.5 IF OTHERWISE

5. FOR EPOXY COATED REINFORCEMENT INCREASE THE LENGTH BY A FACTOR OF 1.2.

⁴CASE 2 Ld[™] CASE 1 Ld

<u>STD 90° HOOK</u>

STRAIGHT BAR

- 4 A .A .A

STD 180° HOOK

RETEMPERING (ADDING WATER TO CONCRETE ON-SITE)

. WATER SHALL NOT BE ADDED TO THE MIX TRUCKS ON THE JOB SITE IN EXCESS OF THE VOLUME OF WATER THAT IS SPECIFICALLY INDICATED TO HAVE BEEN WITHHELD FROM THE READY MIX SUPPLIER

2. PRIOR TO ADDING WATER, THE CONTRACTOR SHALL CONFIRM THAT THE MIX IS NOT ALREADY WITHIN TOLERANCE ON SLUMP. WATER SHALL ONLY BE ADDED IF THE SLUMP IS BELOW TOLERANCE AND THE READY MIX SUPPLIER HAD INDICATED THE VOLUME OF WITHHELD (TRIM) WATER.

CASE 1: CLASS B SPLICE LENGTHS OF REINFORCEMENT IN TENSION, Ld (IN) FY = 60,000 PSI NORMALWEIGHT CONCRETE, f°c (PSI)							CASE 2: CLASS B SPLICE LENGTHS OF REINFORCEMENT IN TENSION, Ld (IN) FY = 60,000 PSI NORMALWEIGHT CONCRETE, f'c (PSI)						
BAR SIZE	db (IN)	f'c = 3,000	f'c = 4,000	f'c = 5,000	f'c = 6,000	BAR SIZE	db (IN)	f'c = 3,000	f'c = 4,000	f'c = 5,000	f'c = 6,000		
#3	0.375	21	18	17	15	#3	0.375	28	24	22	20		
#4	0.5	28	25	22	20	#4	0.5	37	32	29	26		
#5	0.625	36	31	28	30	#5	0.625	46	40	36	33		
#6	0.75	43	37	33	44	#6	0.75	56	48	43	39		
#7	0.875	62	54	48	44	#7	0.875	81	70	63	57		
#8	1.00	71	62	55	50	#8	1.00	93	80	72	65		
#9	1.128	80	70	62	57	#9	1.128	104	90	81	74		
#10	1.27	90	78	70	64	#10	1.27	118	102	91	83		
#11	1.41	100	87	78	71	#11	1.41	131	113	101	92		

1. CASE 1 APPLIES TO REINFORCEMENT THAT HAS LESS THAN 12" OF FRESH CONCRETE PLACED BELOW HORIZONTAL REINFORCEMENT, ALL VERTICAL REINFORCEMENT FALLS UNDER CASE 1 2. CASE 2 APPLIES TO REINFORCEMENT THAT HAS MORE THAN 12" OF FRESH CONCRETE PLACED BELOW HORIZONTAL REINFORCEMENT. 3. CLEAR SPACING OF BARS BEING DEVELOPED MUST BE AT LEAST 2db (DIA OF BAR) & CLEAR COVER AT LEAST db, INCREASE DEVELOPMENT LENGTH BY 1.5 IF OTHERWISE. 4. FOR EPOXY COATED REINFORCEMENT INCREASE THE LENGTH BY A FACTOR OF 1.2. 5. ADJACENT BARS THAT ARE TO BE SPLICED SHALL BE IN CONTACT AND TIED TOGETHER WHERE POSSIBLE, WHERE CONTACT IS NOT POSSIBLE. THE MAXIMUM OFFSET SHALL BE ONE-FIFTH THE REQUIRED LAP SPLICE LENGTH OR 6", WHICHEVER IS LESS.

	stand <i>i</i>	ARD END HOOK DIMENSIC	ons (IN)	
	5	180º H	90°	
RAK 217E	U	A or G	J	A
#3	2 1/4	5	3	
#4	3	6	4	
#5	3 3/4	7	5	
#6	4 1/2	8	6	
#7	5 1/4	10	7	
#8	6	11	8	
#9	9 1/2	15	11 3/4	
#10	10 3/4	17	13 1/4	
#11	12	19	14 3/4	

HOOK BENT INTO THE JOINT.

TENSION DEVELOPMENT LENGTH NOT TO SCALE (© Dudley Engineering LLC)

DEVELOF	Pment lengths of stane FY = 60, Normalweight c	DARD HOOKS IN TENSION, ,000 PSI CONCRETE, f'c (PSI)	.Ldh (IN)	
db (IN)	f'c = 3,000	f'c = 4,000	f'c = 5,000	f'c = 6,000
0.375	9	8	7	6
0.5	11	10	9	8
0.625	14	12	11	10
0.75	17	15	13	12
0.875	20	17	15	14
1.00	22	19	17	16
1.128	25	22	20	18
1.27	28	25	22	20
1.41	31	27	24	22

1. THE HOOK SHALL BE LOCATED WITHIN THE CONFINED CORE OF A COLUMN OR BOUNDARY ELEMENT, WITH THE 2. THE DEVELOPMENT LENGTH SHALL BE MULTIPLIED BY A FACTOR OF 1.2 FOR EPOXY-COATED REINFORCING BARS

DEVELOPMENT LENGTH, Ld IS THE BONDED LENGTH REQUIRED TO ACHIEVE THE DESIGN STRENGTH OF A BAR (TO PRECLUDE THE BAR FROM SLIPPING OUT OF

SAN MARCOS, TX 78666 THEY ARE NOT SUITABLE FOR USE ON OTHER PROJECTS OR IN OTHER LOCATIONS WITHOUT THE APPROVAL AND PARTICIPATION OF THE ENGINEER. REPRODUCTION IS PROHIBITED.

JOB NO.:	23-00012
PHASE:	
DRAWN:	
CHECKED:	
DATE:	4/10/2023

GENERAL NOTES

- 3. DUTIES OF THE SPECIAL INSPECTOR: 4. DUTIES AND RESPONSIBILITIES OF THE CONTRACTOR: THE SPECIAL INSPECTION REQUIREMENTS CONTAINED WITHIN THIS "STATEMENT OF SPECIAL INSPECTIONS".

REQUIRED VERIFICATION AND INSPECTION OF SOILS (TABLE 1705.6) VERIFICATION AND INSPECTION CONTINUOUS PERIODIC REQUIRED VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE YES χ DESIGN BEARING CAPACITY VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED YES Х PROPER MATERIALS PERFORM CLASSIFICATION AND TESTING OF COMPACTED MATERIALS Х YES VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING YES PLACEMENT AND COMPACTION OF COMPACTED FILL PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY THE Х YES SITE HAS BEEN PREPARED PROPERLY

REQUIRED VERIFICATION AND INSPECTION OF GRADING AND DRAINAGE FOR FOUNDATIONS ON EXPANSIVE SOILS CONTINUOUS PERIODIC VERIFICATION AND INSPECTION REQUIRED AFTER BUILDING CONSTRUCTION AND LANDSCAPING HAVE BEEN COMPLETED, FINAL Х YES GRADES SHALL BE VERIFIED TO DOCUMENT REQUIRED DRAINAGE AFTER BUILDING CONSTRUCTION AND LANDSCAPING HAVE BEEN COMPLETED, YES Х DOWNSPOUTS SHALL BE INSPECTED TO CONFIRM CONFORMANCE. GRADES AROUND THE STRUCTURE SHALL BE PERIODICALLY INSPECTED AND ADJUSTED YES Х AS PART OF THE BUILDING'S MAINTENANCE PROGRAM PLUMBING LEAK "HYRDROSTATIC" TEST PERFORMED BY A LICENSED PLUMBER. TEST TO YES Х OCCUR AFTER ROUGH PLUMBING INSTALL WHERE PAVING/FLATWORK ABUT THE FOUNDATION, A MAINTENANCE PROGRAM YES Х SHALL BE ESTABLISHED TO EFFECTIVELY SEAL AND MAINTAIN JOINTS AND PREVENT

SURFACE WATER INFILTRATION.

REQUIRED VERIFICATION AND INSPECTION OF CONCRETE	CONSTRUCTION (TAE	BLE 1705.3)	
VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REQUIRE
INSPECTION OF REINFORCING STEEL, INCLUDING PRESTRESSING TENDONS AND PLACEMENT.	-	Х	YES
INSPECTION OF ANCHORS CAST IN CONCRETE WHERE ALLOWABLE LOADS HAVE BEEN USED OR STRENGTH DESIGN IS USED.	-	Х	YES
INSPECTION OF ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS.	-	Х	YES
VERIFYING USE OF REQUIRED MIX DESIGN		Х	YES
AT THE TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE	X	-	YES
INSPECTION OF CONCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	-	YES
INSPECTION FOR MAINTENANCE OF SPECIFIED CURING TEMPERATURES AND TECHNIQUES	-	Х	YES
INSPECTION OF PRESTRESSED CONCRETE APPLICATION OF PRESTRESSING FORCES	X	-	NO
ERECTION OF PRECAST CONCRETE MEMBERS	-	Х	NO
VERIFICATION OF IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES. BRACING AND/OR FORMS FROM BEAMS, WALLS, STRUCTURAL SLABS, ETC.	-	Х	YES
INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED		Х	YES

STRUCTURAL STATEMENT OF SPECIAL INSPECTIONS & TESTING

 SPECIAL INSPECTIONS AND STRUCTURAL TESTING SHALL BE PROVIDED BY AN INDEPENDENT AGENCY EMPLOYED BY THE OWNER FOR THE ITEMS IDENTIFIED IN THIS SECTION AND IN OTHER AREAS OF THE APPROVED CONSTRUCTION PLANS AND SPECIFICATIONS. (SEE IBC CHAPTER 17).
 THE NAMES AND CREDENTIALS OF THE SPECIAL INSPECTORS TO BE USED SHALL BE SUBMITTED TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSBILE CHARGE AND THE BUILDING OFFICIAL FOR APPROVAL. DUDLEY ENGINEERING CAN BE SOLICITED TO PROVIDE SPECIAL INSPECTIONS. WE RECOMMEND THAT THE PROJECT GEOTECHNICAL ENGINEER BE SOLICITED TO PROVIDE SPECIAL INSPECTIONS FOR THE SOILS AND TESTING FOR THE SOIL AND CONCRETE.

A. THE SPECIAL INSPECTOR SHALL REVIEW ALL WORK LISTED BELOW FOR CONFORMANCE WITH THE APPROVED CONSTRUCTION DRAWINGS, SPECIFICATIONS AND THE IBC.

B. THE SPECIAL INSPECTOR SHALL FURNISH SPECIAL INSPECTION REPORTS TO THE STRUCTURAL EOR, CONTRACTOR, OWNER AND BUILDING OFFICIAL ON A WEEKLY BASIS, OR MORE FREQUENTLY AS REQUIRED BY THE BUILDING OFFICIAL. ALL ITEMS NOT IN COMPLIANCE SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION, AND IF UNCORRECTED, TO THE EOR AND THE BUILDING OFFICIAL.

C. ONCE CORRECTIONS HAVE BEEN MADE BY THE CONTRACTOR, THE SPECIAL INSPECTOR SHALL SUBMIT A FINAL SIGNED REPORT TO THE BUILDING OFFICIAL STATING THAT THE WORK REQUIRING SPECIAL INSPECTION WAS, TO THE SPECIAL INSPECTOR'S KNOWLEDGE, IN CONFORMANCE WITH THE APPROVED CONSTRUCTION PLANS AND SPECIFICATIONS AS WELL AS THE APPLICABLE WORKMANSHIP PROVISIONS OF THE IBC.

A. THE CONTRACTOR SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE OWNER AND THE BUILDING OFFICIAL PRIOR TO THE COMMENCEMENT OF WORK. IN ACCORDANCE WITH IBC 1704.4, THE STATEMENT OF RESPONSIBILITY SHALL CONTAIN ACKNOWLEDGEMENT OF

B. THE CONTRACTOR SHALL NOTIFY THE RESPONSIBLE SPECIAL INSPECTION THAT WORK IS READY FOR INSPECTION AT LEAST ONE WORKING DAY (24 HOURS MINIMUM) BEFORE SUCH INSPECTION IS REQUIRED.

C. ALL WORK REQUIRING SPECIAL INSPECTION SHALL REMAIN ACCESSIBLE AND EXPOSED UNTIL IT HAS BEEN OBSERVED BY THE SPECIAL INSPECTOR. 5. PLEASE SEE THE "SPECIAL INSPECTION SCHEDULE" FOR THE TYPES, EXTENTS AND FREQUENCY OF SPECIFIC ITEMS REQUIRING SPECIAL INSPECTIONS AND STRUCTURAL TESTS AS PART OF THIS PROJECT.

6. REFER TO ARCHITECTURAL AND/OR MEP DRAWINGS FOR ADDITIONAL SPECIAL INSPECTION REQUIRED. DUDLEY ENGINEERING HAS LISTED THE STRUCTURAL SPECIAL INSPECTIONS AND TESTING WITHIN OUR SCOPE ONLY.

WIND-RESISTING COMPONENTS (1705.11.3)

PERIODIC SPECIAL INSPECTION IS REQUIRED FOR FASTENING OF THE FOLLOWING SYSTEMS AND COMPONENTS: 1. ROOF COVERING, ROOF DECK AND ROOF FRAMING CONNECTIONS.

2. EXTERIOR WALL COVERING AND WALL CONNECTIONS TO ROOF AND FLOOR DIAPHRAGMS AND FRAMING

REQUIRED VERIFICATION AND INSPECTION OF STRUCTURAL STEEL CONSTRUCTION (§1705.2.1)

STRUCTURAL STEEL - GENERAL

THE SPECIAL INSPECTOR SHALL INSPECT THE FABRICATED OR ERECTED STEEL FRAME, AS APPROPRIATE, TO VERIFY COMPLIANCE WITH THE DETAIL SHOWN ON THE CONSTRUCTION DOCUMENTS, SUCH AS BRACES, STIFFENERS, MEMBER LOCATIONS AND PROPER APPLICATION OF JOINT DETAILS AT EACH CONNECTION.

STRUCTURAL STEEL - ANCHOR RODS / EMBED PLATES

THE SPECIAL INSPECTOR SHALL BE ON THE PREMISES FOR INSPECTION DURING THE PLACEMENT OF ANCHOR RODS AND OTHER EMBEDMENT SUPPORTING STRUCTURAL STEEL FOR COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS. AS A MINIMUM, THE DIAMETER, GRADE, TYPE AND LENGTH OF THE ANCHOR RODS OR EMBEDDED ITEM, AND THE EXTENT OR DEPTH OF EMBEDMENT INTO THE CONCRETE, SHALL BE VERIFIED PRIOR TO PLACEMENT OF CONCRETE.

STRUCTURAL STEEL - WELDS				
VERIFICATION AND INSPECTION	CON	TINUOUS	PERIODIC	REQUIRED
INSPECTION TASKS PRIOR TO WELDING (AISC 360 TABLE N5.4-1)		1		
WELDING PROCEDURE SPECIFICATION (WPS'S) AVAILABLE		Х	-	YES
MANUFACTURER CERTIFICATIONS FOR WELDING CONSUMABLES AVAILABLE		Х	-	YES
MATERIAL IDENTIFICATION (TYPE / GRADE)		-	Х	YES
WELDER IDENTIFICATION SYSTEM		-	Х	YES
FIT-UP GROOVE WELDS		-	Х	NO
CONFIGURATION AND FINISH OF ACCESS HOLES		-	Х	NO
FIT-UP FILLET WELDS		-	Х	YES
CHECK WELDING EQUIPMENT		-	Х	YES
INSPECTION TASKS DURING WELDING (AISC 360 TABLE N5.4-2)				
USE OF QUALIFIED WELDERS		-	Х	YES
CONTROL AND HANDLING OF WELDING CONSUMABLES		-	Х	YES
NO WELDING OVER CRACKED TACK WELDS		-	Х	YES
ENVIRONMENTAL CONDITIONS (WIND SPEED WITHIN LIMITS, PRECIPITATION AND TEMPERATURE		-	X	YES
WPS FOLLOWED • SETTINGS ON WELDING EQUIPMENT • TRAVEL SPEED • SELECTED WELDING MATERIALS		-	X	YES
SELECTED WELDING MATERIALS SHIELDING GAS TYPE / FLOW RATE PPEHEAT APPLIED				
INTERPASS TEMPERATURE MAINTAINED (MIN/ MAX) PROPER POSITION (F, V, H, OH)				
WELDING TECHNIQUES INTERPASS AND FINAL CLEANING EACH PASS WITHIN PROFILE LIMITATIONS 		-	Х	YES
EACH PASS MEEL QUALITY REQUIREMENTS			Y	YES
		- X	^	YES
		x		YES
CRACK PROHIBITION WELD / BASE-METAL FUSION CRATER CROSS SECTION WELD PROFILES WELD SIZE UNDERCUT POPOLITY				
ARC STRIKES		Х	-	YES
k-AREA		Х	-	YES
BACKING REMOVED AND WELD TABS REMOVED (IF REQUIRED)		Х	-	YES
REPAIR ACTIVITIES		Х	-	YES
DOCUMENT ACCEPTANCE OR REJECTION OF WELDED JOINT MEMBER		Х	-	YES
		Х	-	YES
NON-DESTRUCTIVE TESTING OF WELL	DED JOIN	ITS		
FILLET WELDS:				
MT TEST A MINIMUM OF 10% OF THE LENGTH OF EACH FILLET WELD EXCEEDING 5/16".		-	Х	YES
PERIODIC MT TESTING OF REPRESENTATIVE FILLET WELDS 5/16" AND LESS BUT NEED NOT EXCEED 10% OF ALL SUCH WELDS, EXCEPT AS REQUIRED FOR HIGH REJECTION RATES AS INDICATED IN THE FOLLOWING PARAGRAPH.	5	-	X	YES
INCREASE MT TESTING RATE FOR WELDERS HAVING A HIGH REJECTION RATE AS REQUIRE ENSURE ACCEPTABLE WELDS.	D TO	Х	-	YES
PARTIAL JOINT PENETRATION (PJP) WELDS INCLUDING FLARE BEVEL WELDS				
MT TEST A MINIMUM OF 25% OF THE LENGTH OF EACH PJP WELD EXCEEDING 5/16" EFFEC THROAT.	TIVE	-	Х	YES
PERIODIC MT TESTING OF REPRESENTATIVE PJP WELDS 5/16" AND LESS BUT NEED NOT EXC 10% OF ALL SUCH WELDS, EXCEPT AS REQUIRED FOR HIGH REJECTION RATES AS INDICATE THE FOLLOWING PARAGRAPH.	:EED :D IN	-	Х	YES
INCREASE MT TESTING RATE FOR WELDERS HAVING A HIGH REJECTION RATE AS REQUIRED ENSURE ACCEPTABLE WELDS) TO	Х	-	YES
COMPLETE JOINT PENETRATION (CJP) WELDS				
ALL CJP WELDS EXCEEDING 5/16" THICKNESS SHALL BE 100% UT TESTED PER AWS D1.1 CLA 6 PART F. THE TESTING LABORATORY SHALL REVIEW THE CJP JOINTS TO DETERMINE WHERE GEOMETRY OR ACCESSIBILITY PRECLUDES THE USE OF STANDARD SCANNING PATTERNS PI AWS D1.1 CLAUSE 6 PART F. AT THESE LOCATIONS THE TESTING LABORATORY SHALL DEVELO AND SUBMIT FOR APPROVAL A WRITTEN TESTING PROCEDURE IN ACCORDANCE WITH AW D1.1 ANNEX S.	NUSE ER OP /S	Х	-	YES
PERIODIC MT TESTING OF REPRESENTATIVE CJP WELDS 5/16" AND LESS NOT TO EXCEED 10 OF ALL SUCH WELDS.	0%	-	X	YES
INCREASE MT TESTING RATE FOR WELDERS HAVING A HIGH REJECTION RATE AS REQUIRED ENSURE ACCEPTABLE WELDS.	TO	X	-	YES

STRUCTURAL STEEL HIGH-STRENGTH BOLTS (SNUG-TIGHT) - INSPE	CTION TASKS PRIO	R TO BOLTING	
VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REQUIRED
OCUMENTATION AND ACCEPTANCE OR REJECTION OF BOLTED CONNECTIONS	-	Х	YES

STRUCTURAL STEEL HIGH-STRENGTH BOLTS (SNUG-TIGHT) - INSP	ECTION TASKS DUR	ING BOLTING	
VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	F
DOCUMENTATION OF ACCEPTANCE OR REJECTION OF BOLTED CONNECTIONS.	-	Х	

REQUIRED SPECIAL INSPECTION OF OPEN-WEB JOISTS AND JOIST GIRDERS (IBC TABLE 1705.2.3) INSPECTION FREQUENCY REFERENCED VERIFICATION AND INSPECTION STANDARD CONTINUOUS PERIODIC

. INSTALLATION OF OPEN-WEB STEEL JOISTS AND JOIST GIRDERS			
a. END CONNECTIONS - WELDING OR BOLTED	-	Х	SJI SPECS PER 2207.1
b. BRIDGING - HORIZONTAL OR DIAGONAL			
STANDARD BRIDGING	-	Х	SJI SPECS PER 2207.1
BRIDGING THAT DIFFERS FROM THE SJI SPECIFICATIONS LISTED IN IBC SECTION 2207.1	-	Х	

REQUIRED _____ YES

	IBC REFERENCE	REQUIRED
0	1705.2.3	YES
0	1705.2.3	YES
	1705.2.3	YES

1 ISOMETRIC

PLAN NOTES	PLAN	<u>I LEGEND</u>	SLAB GEOMETRY	PTI PARAMETERS	
VERIFY ALL EDGE OF FOUNDATION DIMENSIONS WITH FINAL ARCHITECTURE FLOOR PLANS.	FOUNDATION PERIMETER		AREA (SF) 6,080	e _m - CENTER	7.0'
VERIFY EXACT DIMENSIONS: SLAB DROFS, SLOPES, EIC. ARE SHOWN AS AN AID TO THE CONTRACTOR ONLY. VERIFY EXACT DIMENSIONS AND LOCATIONS WITH ARCH./OWNER. DIMENSIONS ARE TO CLOE GRADE BEAMS OR EDGE OF SLAB LINEESS NOTED OTHERWISE	SLAB ELEVATION CHANGE		PERIMETER (FT) 337	e _m - EDGE	3.7'
REFER TO MEP DRAWINGS FOR PENETRATIONS AND UNDERGROUND UTILITIES. ALL PENETRATIONS SHALL BE SHOWN IN REBAR PLACEMENT DRAWINGS.	FOOTING OUTLINE		SHAPE FACTOR 19	Y _m - CENTER	1.0"
CONTRACTION (CONTROL) JOINTS (GROOVED OR SAW-CUTS) ARE RECOMMENDED TO REDUCE CRACKS IN SLAB WHICH WILL BE VISIBLE, BUT ARE NOT REQUIRED FOR STRUCTURAL REQUIREMENTS. FOR THE RECOMMENDED MAXIMUM JOINT SPACING, REF DETAIL 5 / S3.0	RECOMMENDED CONTRACTION (CONTROL) JOINT REF <u>5 / \$3.0</u>		AREA AND PERIMETER OF THE SLAB ARE PROVIDED FOR PURPOSES OF	Y _m - EDGE	1.3"
FOR FLATWORK OR PAVEMENT ABUTTING THE BUILDING FOUNDATION, REF DETAIL 13 / \$3.0 CONCRETE IS ASSUMED TO RECEIVE A STEEL TROWEL FINISH UNLESS NOTED OTHERWISE. NOTIFY	GRAVITY COLUMN EMBED PLATE,		CALCULATING THE SHAPE FACTOR FOR THE SLAB ONLY AND SHALL NOT BE LISED FOR ANY OTHER	EFFECTIVE PLASTICITY INDEX	47
ADDITIONAL SHRINKAGE CRACKING MITIGATION METHODS.	REF 5/S4.0		PURPOSE.	ALLOW. BEARING (PSF)	2,000
	EMBED PLATE AT STEEL BRACES, REF 5/S4.0			MIN <u>PERIMETER</u> BEAM EMBEDMENT BELOW <u>FINAL</u> GRADE / FLATWORK	36"
	SLAB DROP, REF PLAN NOTE 1				
	SLAB DROP W. SLOPE, REF PLAN NOTE 1		رب م		
	ADDITIONAL V-BARS AT COLUMNS, REF 9/S3.1 , 6/S3.1				GR. BEAM CAGE
	RE-ENTRANT CORNER BARS REF TYPICAL DETAIL		AM EMBEDMENT BE	SRADE, REF PIII PAR	
	SLOPE IN TOP SURFACE OF SLAB, REF ARCH FOR EXTENTS AND MAGNITUDE				
	EXPOSED CONCRETE LIGHT BROOM FINISH				

STIRRUPS² BEAM ID1 DESCRIPTION WIDTH DEPTH³ BARS BARS (3) - #6 (3) - #6 #3 @ 24" O B1 TYPICAL BEAM VERTICAL MOISTUR B2 #3 @ 24" (BARRIER TD TURNDOWN N/R

. BEAMS ARE TYPE B1 UNO. 2. LOCATE THE FIRST STIRRUP A MAXIMUM OF 3" FROM FACE OF SUPPORT.

3. BEAM DEPTH INDICATED IN THE SCHEDULE IS A STRUCTURAL MINIMUM THAT THE BEAM REINFORCEMENT CAGE MAY BE BASED UPON. REFERENCE GEOTECHNICAL REPORT FOR MINIMUM GRADE BEAM EMBEDMENT BELOW ADJACENT FINAL GRADE OR FLATWORK/PAVEMENT. 4. N/R = NOT REQUIRED

REFERENCE DRAWING(S):

NOTES:

SLAB THICKNESS:

DESIGN METHOD:

VAPOR RETARDER:

SLAB DIMENSIONS SHOWN ARE BASED UPON THE FOLLWING CAD (COMPUTER-AIDED DESIGN) REFERENCE FILE(S), BY OTHERS.

 FILE FORMAT: DWG • FILE NAME: Chisos_Structural dwgs_2.27.23.dwg • DATE OF FILE: 27 FEBUARY, 2023

FILE AUTHOR: MAD ARCHITECTURE

SUBGRADE AND BUILDING PAD NOTES (PER GEOTECHNICAL REPORT): 1. SUBGRADE IMPROVEMENT:

A. REMOVE THE SUBGRADE SOILS TO A DEPTH OF 2 FEET BELOW THE FINISHED GRADE ELEVATION. CHEMICAL OR WATER PRESSURE INJECTION SHOULD BE PERFOMED TO A DEPTH OF 10 FEET BELOW FINISHED GRADE ELEVATION. IN ADDITION, PROVIDE A MINIMUM OF 2 FEET SELECT FILL/FLEX BASE TO TOP OF BUILDING PAD ELEVATION. THE SELECT FILL/FLEX BASE PAD MUST BE OF UNIFORM THICKNESS U.N.O. BY GEOTECHNICAL ENGINEER.

2. SITE PREPARATION:

- A. SOFT SOILS SHOULD BE REMOVED UNTIL FIRM SOIL IS REACHED. THE SOFT SOILS CAN BE AERATED AND PLACED BACK IN SIX-INCH LOOSE LIFTS AND COMPACTED TO 95% AS SPECIFIED BY ASTM D-698. TREE STUMPS, TREE ROOTS, OLD SLABS, OLD FOUNDATIONS AND EXISTING PAVEMENTS SHOULD BE REMOVED FROM THE STRUCTURE AREA. IF THE TREE STUMPS AND ROOTS ARE LEFT IN PLACE, SETTLEMENT AND TERMITE INFESTATION MAY OCCUR, ONCE A ROOT SYSTEM IS REMOVED, A VOID IS CREATED IN THE SUBSOIL. IT IS RECOMMENDED TO FILL THESE VOIDS WITH STRUCTURAL FILL OR CEMENT-STABILIZED SAND AND COMPACT TO 95% AS SPECIFIED BY ASTM D-698. B. ANY LOW-LYING AREAS INCLUDING RAVINES, DITCHES, SWAMPS, ETC. SHOULD BE FILLED WITH STRUCTURAL FILL AND PLACED IN EIGHT-INCH
- LIFTS. EACH LIFT SHOULD BE COMPACTED TO 95% OF THE MAXIMUM DRY DENSITY AS SPECIFIED BY ASTM D-698. C. THE EXPOSED SUBGRADE SHOULD BE SCARIFIED TO A MINIMUM DEPTH OF SIX (6) INCHES FOUNDATION AREAS OR PER SUBGRADE IMPROVEMENT REQUIREMENTS. THE SUBGRADE SHOULD THEN BE COMPACTED TO 95% OF THE MAXIMUM DENSITY AS DETERMINED BY THE STANDARD MOISTURE DENSITY RELATIONSHIP (ASTM D-698). IN THE EVENT THAT THE UPPER SIX (6) INCHES CANNOT BE COMPACTED DUE TO EXCESSIVE MOISTURE, WE RECOMMEND THAT THESE SOILS BE EXCAVATED AND REMOVED OR CHEMICALLY STABILIZED TO PROVIDE A FIRM BASE FOR FILL PLACEMENT. PROOF ROLLING SHOULD BE PERFORMED USING A HEAVY TIRED LOADED TRUCK OR PNEUMATIC RUBBER-TIRED
- WEIGHING 20 TONS. D. THE SELECT FILL SOILS SHALL EXTEND 5 FEET BEYOND THE BUILDING PERIMETER
- E. THE FLOOR SLAB SHOULD BE PLACED AS SOON AS POSSIBLE AFTER THE BUILDING PAD IS PREPARED. IF THE BUILDING PAD IS LEFT EXPOSED TO RAINFALL, PERCHED GROUNDWATER CONDITIONS MAY DEVELOP WHICH WILL UNDERMINE THE INTEGRITY OF THE FLOOR SLAB. ALL TRENCHES (WATER, CABLE, ELECTRICAL) SHOULD BE PROPERLY BACKFILLED AND COMPACTED TO 95% OF THE MAXIMUM DRY DENSITIES. SAND OR PERMEABLE MATERIALS SHOULD NOT BE USED AS BACKFILL. IMPROPERLY BACKFILLED AND IMPROPERLY COMPACTED TRENCH, IF LEFT EXPOSED WILL ALSO BE ANOTHER SOURCE FOR PERCHED GROUNDWATER CONDITIONS. IN GENERAL PERCHED WATER TENDS TO BE TRAPPED WITHIN THE FILL. THE TRAPPED GROUNDWATER TENDS TO SOFTEN THE SUBGRADE. POSITIVE DRAINAGE SHOULD BE MAINTAINED ACROSS THE ENTIRE BUILDING PAD.
- F. A QUALIFIED SOIL TECHNICIAN SHOULD MONITOR ALL EARTHWORK OPERATIONS. FIELD DENSITY TESTS SHOULD BE CONDUCTED ON EACH LIFT USING A NUCLEAR DENSITY GAUGE. THE GAUGE SHOULD BE CALIBRATED EVERY DAY. PRIOR TO FIELD DENSITY TESTS, A 50-POUND SAMPLE FROM THE SUBGRADE SOILS SHOULD BE OBTAINED. A SIMILAR SAMPLE SHOULD BE OBTAINED FROM THE FILL SOILS. A STANDARD MOISTURE DENSITY RELATIONSHIP (ASTM D-698) SHOULD BE PERFORMED ON EACH SAMPLE IN ORDER TO OBTAIN AN OPTIMUM MOISTURE CONTENT AND A MAXIMUM DRY DENSITY. THE FIELD DENSITY TESTS SHOULD BE COMPARED TO THESE RESULTS EVERY TIME THE SOILS ARE TESTED IN THE FIELD. LOW SWELL POTENTIAL STRUCTURAL FILL (SELECT FILL)
- A. LOW SWELL POTENTIAL SELECT FILL SHOULD CONSIST OF COHESIVE SOILS FREE OF ORGANICS OR OTHER DELETERIOUS MATERIALS AND SHOULD HAVE A PLASTICITY INDEX NOT LESS THAN <u>6 OR MORE THAN 16</u>. SANDY CLAYS ARE RECOMMENDED FOR USE. THE LOW SWELL POTENTIAL SELECT FILL SHOULD BE CLEANED AND FREE OF ORGANIC MATTER OR OTHER DELETERIOUS MATERIAL. THE FILL SHOULD BE PLACED IN MAXIMUM 8-INCH LOOSE LIFTS AND COMPACTED TO A MINIMUM OF ______ PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D 698 (STANDARD PROCTOR). THE MOISTURE CONTENT AT THE TIME OF COMPACTION SHOULD BE_07, +37. OF THE OPTIMUM VALUE AS DEFINED BY ASTM D 698. THE REFERENCED MOISTURE CONTENT AND DENSITY SHOULD BE MAINTAINED UNTIL CONSTRUCTION IS COMPLETE. 4. HORIZONTAL MOISTURE BARRIER
- A. WHERE THE PERIMETER OF THE FOUNDATION DOES NOT HAVE LOW PERMEABILITY FLATWORK (SIDEWALK, PAVEMENT, PATIO, ETC.) ABUTTING THE FOUNDATION, A HORIZONTAL MOISTURE BARRIER VIA CLAY CAP AND VAPOR RETARDER MUST BE PROVIDED. a. CLAY CAP: A MINIMUM 5' WIDE LOW PERMEABILITY CLAY "CAP" SHALL BE PLACED ALONG THE EXTERIOR OF THE FOUNDATION TO HELP MINIMIZE MOISTURE INFILTRATION INTO THE SELECT FILL SOIL PADS. THE LOW PERMEABILITY, 1-FOOT THICK CLAY "CAP" SHALL HAVE A MINIMUM PLASTICITY INDEX (PI) OF 30.
- b. VAPOR RETARDER: BELOW THE CLAY CAP, A MIN 10 MIL VAPOR RETARDER MUST BE PROVIDED ON A MINIMUM 5% SLOPE. RETARDER MUST BE SECURED TO THE FOUNDATION. 5. DRAINAGE A. ROOF DRAINAGE SHOULD BE COLLECTED BY A SYSTEM OF GUTTERS AND DOWNSPOUTS AND TRANSMITTED A MINIMUM DISTANCE OF 10'
- AWAY FROM THE FOUNDATION TO AN AREA WITH POSITIVE DRAINAGE AWAY FROM THE FOUNDATION, PREFERABLY TO A PAVED SURFACE WHERE WATER CAN DRAIN RAPIDLY AWAY FROM THE STRUCTURE. SIDEWALKS, PARKING AREAS, BUILDING ACCESS DRIVES, AND THE GENERAL GROUND SURFACE SHOULD BE SLOPED SO THAT WATER WILL DRAIN AWAY FROM THE STRUCTURE. WATER SHOULD NOT BE ALLOWED TO POND NEAR THE BUILDING FOUNDATIONS.
- B. FINAL GRADES SHALL SLOPE A MINIMUM OF 5% (6") FOR THE FIRST 10 FEET AWAY FROM THE FOUNDATION IN ALL DIRECTIONS, WITH THE EXCEPTIONS BELOW. [NOTE: THIS SLOPE SHALL OCCUR IN THE SELECT FILL OR IN-SITU SOIL. MERELY SLOPING TOPSOIL IS NOT SUFFICIENT.] REFER TO CIVIL DRAWINGS FOR ALL DRAINAGE REQUIREMENTS. a. EXCEPTIONS:
- WHERE LOT LINES, WALLS, SLOPES OR OTHER PHYSICAL BARRIERS PROHIBIT 6 INCHES OF FALL WITHIN 10 FEET, A 5% SLOPE SHALL BE PROVIDED TO EITHER DRAINS OR SWALES TO ENSURE DRAINAGE AWAY FROM THE STRUCTURE. 1. SWALES USE FOR THIS PURPOSE SHALL BE SLOPED NOT LESS THAN 2% WHERE LOCATED WITHIN 10' OF THE BUILDING FOUNDATION. IMPERVIOUS SURFACES WITHIN 10 FEET OF THE BUILDING FOUNDATION SHALL BE SLOPED A MINIMUM OF 2% AWAY FROM THE BUII DING.
- 6. LANDSCAPING A. DO NOT USE METAL EDGING OR OTHER DAMMING DEVICES WITHIN FIVE FEET OF THE FOUNDATION. THE ROOTS OF TREES AND LARGE PLANTS REMOVE LARGE QUANTITIES OF WATER FROM THE SOIL. IF THESE TREES AND SHRUBS ARE NEAR THE FOUNDATION AND IF SUFFICIENT WATER IS NOT SUPPLIED. THE SOILS MAY SHRINK IF EXPANSIVE, CAUSING SUBSIDENCE IN THE FOUNDATION. DURING DRY PERIODS, ENOUGH WATER SHOULD BE SUPPLIED TO TREES TO MINIMIZE SHRINKING OF EXPANSIVE SOILS AROUND THEM. MOST OF THE IRRIGATION WATER SHOULD BE APPLIED WELL AWAY FROM THE FOUNDATION TO ATTRACT THE TREE ROOTS IN THAT DIRECTION. WHEN TREES MATURE TO THE POINT OF SHADING THE ENTIRE LOT, REGULAR PRUNING WILL BE NEEDED TO REDUCE THEIR WATER UPTAKE, LANDSCAPING (PLANTS, SHRUBS, FLOWERS, ETC.) SHOULD NOT TRAP WATER AGAINST THE FOUNDATION. PROVIDE A SLOPE IN SOILS BELOW LANDSCAPE BEDDING AND IN THE BEDDING AWAY FROM THE FOUNDATION. ALTERNATIVELY, PROVIDE SWALES AROUND AND THROUGH THE LANDSCAPING TO DRAIN WATER AWAY. PROVIDE UNIFORM GROUND COVER AROUND THE FOUNDATION. THIS WILL HELP KEEP THE MOISTURE EVAPORATION RATE UNIFORM. IN AREAS THAT ARE NOT PLANTED, USE MULCH. EXTEND THE GROUND COVER AT LEAST FIVE FEET FROM THE FOUNDATION. B. ANY/ALL TREES SHALL BE PLANTED AT A MINIMUM DISTANCE EQUIVALENT TO THE HEIGHT OF THE TREE OR THE DRIP LINE PLUS 10 FEET WHICHEVER IS GREATER.
- 7. SOIL MOISTURE A. EXPANSIVE SOILS HEAVE AND SUBSIDE DUE TO CHANGES IN MOISTURE CONTENT. CHANGES IN MOISTURE CONTENT CAN CAUSE VERY LARGE CHANGES IN SOIL VOLUME WHEN GOING FROM A DRY TO A SATURATED CONDITION, AND VICE VERSA, THIS MOVEMENT DOES NOT MEAN THE FOUNDATION IS IMPROPERLY DESIGNED OR THAT IT HAS FAILED. THE FOUNDATION DESIGN ENGINEER CANNOT CONTROL THE MOISTURE CONTENT OF THE SOIL, BUT OFTEN THE OWNER/TENANT CAN. UNIFORMITY IS THE KEY: UNIFORM MOISTURE CONTENT IN THE SOIL, UNIFORMLY MAINTAINED IN ALL AREAS AROUND THE FOUNDATION. IF CHANGES IN MOISTURE CONTENT ARE UNIFORM, THEN MOVEMENT OF THE FOUNDATION WILL BE UNIFORM AND LESS DISTRESS WILL BE CREATED IN THE STRUCTURE. IF CHANGES IN MOISTURE CONTENT ARE NON-UNIFORM, THEN THERE MAY BE DIFFERENTIAL MOVEMENT IN THE FOUNDATION. DIFFERENTIAL MOVEMENT CAN CAUSE GREATER (AND MORE OBVIOUS) DISTRESS IN THE STRUCTURE. LEAKING POOLS, LEAKING PLUMBING LINES, LEAKING DRAINS, DRIPPING FAUCETS, DRIPPING AIR CONDITIONING CONDENSATE LINES, AND MISDIRECTED WATER FROM CLOGGED AND BROKEN GUTTERS AND DOWNSPOUTS CAN CAUSE LOCAL HIGH MOISTURE CONTENTS THAT CAN RESULT IN DIFFERENTIAL MOVEMENT IN AREAS OF EXPANSIVE SOILS. THESE CONDITIONS SHOULD BE REMEDIED AS SOON AS POSSIBLE. TREES IN OR NEAR THE FOOTPRINT OF THE FOUNDATION, EITHER REMOVED OR PLANTED DURING CONSTRUCTION, CAUSE THE MAJORITY OF FOUNDATION PROBLEMS REQUIRING REPAIR IN THIS AREA. TREES REMOVED DURING CONSTRUCTION TEND TO CAUSE HEAVE OF EXPANSIVE SOILS DURING THE FIRST FEW YEARS, WITH INITIAL DISTRESS OFTEN EVIDENT AT THE TIME OF MOVE-IN. TREES PLANTED DURING OR AFTER CONSTRUCTION TEND TO CAUSE SUBSIDENCE OF EXPANSIVE SOILS. HOWEVER, SIGNIFICANT
- SUBSIDENCE DISTRESS WILL USUALLY NOT OCCUR FOR TEN TO TWENTY YEARS AS THE TREES MATURE. 8. CLIMATE A. DURING PERIODS OF DRY WEATHER, THE SOIL AROUND THE FOUNDATION SHOULD BE IRRIGATED IF THE BUILDING IS LOCATED IN AN AREA WHERE EXPANSIVE SOILS ARE KNOWN TO OCCUR. THE MOST COMMONLY USED IRRIGATION SYSTEM IS ABOVEGROUND TIMED SPRINKLERS WITH A MANUAL OVERRIDE SO THEY CAN BE TURNED OFF IN RAINY WEATHER. AN AUTOMATIC BELOWGROUND IRRIGATION SYSTEM THAT SENSES THE MOISTURE CONTENT OF THE SOIL MAY ALSO BE USED. TEND TO KEEP THE IRRIGATION SYSTEM SET ON "MANUAL", AND ONLY USE IT IN DRIER PERIODS WHEN WILTING OF THE LAWN GRASSES AND OTHER VEGETATION OCCURS. THE IRRIGATION SHOULD BE DONE AT LEAST ONE TO TWO FEET AWAY FROM THE FOUNDATION, AND THEN LIGHTLY SO THAT TREE ROOTS ARE NOT ATTRACTED THERE. DO NOT ALLOW SPRINKLERS TO SPRAY WATER AGAINST THE STRUCTURE. IN EXTENDED DRY PERIODS, SHOULD THE SOIL CRACK AND PULL AWAY FROM THE FOUNDATION, DO NOT WATER DIRECTLY INTO THE GAP.
- 9. UTILITIES A. CONNECTIONS FOR UTILITIES (PLUMBING, ELECTRICAL, GAS, ETC.) THAT ARE UNDERNEATH, GO THROUGH OR ARE ATTACHED TO THE FOUNDATION SHALL HAVE BE FLEXIBLE TO ACCOMMODATE FOUNDATION MOVEMENT OF AT LEAST 2". ALL DRAINAGE PIPING, AND GENERAL PLUMBING SYSTEMS ASSOCIATED WITH THE FOUNDATION OR IN PROXIMITY TO THE FOUNDATION SHALL BE LEAK TESTED FOLLOWING INSTALLATION AND ON AN ANNUAL BASIS. 10. ARCHITECTURAL FINISHES
- A. FLOORING FINISHES SHALL BE JOINTED AT CONSTRUCTION, EXPANSION OR CONTROL JOINTS IN THE CONCRETE. B. BRITTLE FLOOR FINISHES SUCH AS CERAMIC, STONE, ETC. FLOORS SHALL HAVE AN UNCOUPLING POLYETHYLENE MEMBRANE BENEATH THE TILE THAT ALLOWS IN-PLANE MOVEMENT. EXAMPLE PRODUCTS: SCHLUTER-DITRA, NUHEAT UNCOUPLING MEMBRANE C. WALL COVERINGS SHALL BE JOINTED ON EACH SIDE OF DOOR AND WINDOW OPENINGS. D. ALL ARCHITECTURAL FINISHES SHALL MIRROR CONTROL, EXPANSION OR CONSTRUCTION JOINTS IN THE FOUNDATION.
- 11. FUTURE STRUCTURES: A. THE OWNER/CONTRACTOR SHALL NOTIFY THE STRUCTURAL ENGINEER IF FUTURE STRUCTURES SUCH AS SWIMMING POOLS, JACUZZI OR ANY OTHER STRUCTURE THAT HAS A FOUNDATION AND IS LOCATED WITHIN 30 FEET FROM THE PRIMARY BUILDING FOUNDATION IS PLANNED AS SUCH STRUCTURES CAN HAVE AN AFFECT ON THE PERFORMANCE OF THE PRIMARY BUILDING FOUNDATION.

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THESE DOCUMENTS HAVE BEEN PREPARED SPECIFICALLY FOR THE FOLLOWING PROJECT

SAN MARCOS C-STORE

CHICOS ST. & IH 35 S SAN MARCOS, TX 78666 THEY ARE NOT SUITABLE FOR USE ON OTHER PROJECTS OR IN OTHER LOCATIONS WITHOUT

THE APPROVAL AND PARTICIPATION OF THE ENGINEER. REPRODUCTION IS PROHIBITED. 23 00012

JOD NO	23-00012
PHASE:	
DRAWN:	
CHECKED:	
DATE:	4/10/2023

FOUNDATION PLAN

<u>ROOF PLAN NOTES</u>	<u>ROOF P</u>	LAN LEGEND	
K (B.O.D) ELEVATIONS ARE SHOWN ON PLAN. CONT. 1/4" BENT PLATE/ANGLE AT ALL ROOF EDGES AND OPENINGS. REFERENCE FOR HORIZONTAL AND VERTICAL LEG DIMENSIONS. DECK EDGE ANGLES/PLATES SHALL BE D SHALL BE SPLICED ONLY AT SUPPORTS. SPLICES SHALL BE BUTT WELDED TO DEVELOP IF THE MEMBER ALL VERIFY ALL PERIMETER EDGE ANGLE/BENT PLATE DIMENSIONS WITH ARCHITECTUAL	SPAN DIRECTION OF DECK (SPAN SHALL ALWAY BE PERPENDICULAR TO THE INTERMEDIATE SUPPORT MEMBERS)	DECK SPAN	. DECK TY 2. GAGE: 3. GALVAN 4. SHOP PR 5. MINIMU A. AT IN
R TO CONSTRUCTION. PERMANENT EXPOSED TO THE EXTERIOR OR IS PERMANENTLY IN UNCONDITIONED SPACE WITH A ZINC-RICH, EXTERIOR GRADE PAINT OR HOT-DIP GALVANIZED (PREFERRED). AWINGS FOR PENETRATIONS NOW SHOWN. ADDITIONAL REINFORCEMENT REQUIRED AT TO	BOTTOM OF STEEL ROOF DECK		B. FASTI C. FASTI AND 5. FASTENE A. AT SL
	STEEL ROOF DECK SLOPE (ARROW INDICATES DOWNWARD DIRECTION)		b. H c. 5 B. AT SII a. #
	STEEL COLUMNS (HSS AND WIDE FLANGE)		 MINIMUI A. ARC B. SCRE END LAP MINIMUI THE ROOC
	STEEL WIDE FLANGE BEAM		U. THE KOC
	STEEL JOIST		
	STEEL BEAM BOTTOM FLANGE BRACE		
	STEEL ANGLE PARAPET BRACE (REF 8 / S4.1)		
	VERTICAL VERTIC VERTIC (ALL REACTIONS FACTORED PER LRFD)	VERTICAL DIAGONAL BRACE REF ELEVATIONS AXIAL (K) MOMENT (K-FT) CAL SHEAR (KIPS) W16x26 VXX MXX AXX MOMENT SHEAR CONNECTION CONNECTION	
	RTU DESIGNATED AREA REF ROOF PLAN NOTE 14 FOR ADDITIONAL LOAD		

NOTES: 1. ALL REACTIONS ARE FACTORED PER LRFD 2. WHERE REACTIONS ARE NOT GIVEN, SEE GENERAL STEEL NOTES FOR DESIGN VALUES

4 TYPICAL EXTERIOR WIDENED GRADE BEAM - BUMP OUT IN SLAB (≤ 14 ") 1 S1.0 NOT TO SCALE

CHECKED: DATE: 4/10/2023

FOUNDATION DETAILS

S3.1

DEANA			
SIZE	LENGTH (L)	BOLTS (N)	REACTION (KIPS)
W8	6	2	16
W10	6	2	16
W12	9	3	36
W14	9	3	38
W16	12	4	57
W18	15	5	76
W21	15	5	76
W24	18	6	95
W27	21	7	111
W30	24	8	131
W33	27	9	149
W36	30	10	167

SLOT HSS BRACE ENDS AS CL COLUMN REQUIRED HSS COLUMN FINISH · GUSSET PLATE, SEE NOTE 3 WORK POINT HSA, SEE NOTE 2

NOTE: 1. SEE BRACED FRAME ELEVATIONS FOR MEMBER SIZES, FORCES, AND SEE DETAIL <u>6/S4.0</u> FOR CONNECTION DESIGN CRITERIA 2. SEE TYPICAL COLUMN EMBED PLATE DETAIL FOR ADDITIONAL INFORMATION. 3. GUSSET PLATE AT CENTER OF COLUMN. SIZE AS REQUIRED TO DEVELOP BRACE FORCE 4. SEE COLUMN SCHEDULE, PLANS, OR DETAILS FOR ELEVATION OF BASE PLATE.

TYPICAL HSS BRACED FRAME CONNECTION AT FOUNDATION 1 S2.0 NOT TO SCALE (© Dudley Engineering LLC)

BRACED FRAME NOTES: 1. CONNECTION DESIGN FORCES. FORCES SHOWN ON THE BRACED FRAME

- ELEVATIONS ARE LOAD AND RESISTANCE FACTOR (LRFD) DESIGN FORCES. DO NOT REDUCE FORCES OR INCREASE LIMIT STRENGTH FOR WIND OR EARTHQUAKE. 2. DEFINITIONS:
- A = BRACE FORCE, TENSION OR COMPRESSION (KIPS) Av = VERTICAL COMPONENT OF BRACE FORCE (KIPS)
- Ah = HORIZONTAL COMPONENT OF BRACE FORCE (KIPS) H = HORIZONTAL TRANSFER FORCE (KIPS). THIS IS THE HORIZONTAL FORCE THAT MUST BE TRANSFERRED THROUGH THE COLUMN. WHERE "H" IS NOT SHOWN ON THE BRACED FRAME ELEVATION, ASSUME "H" IS EQUAL TO ZERO. R = BRACE BEAM REACTION (KIPS). REFER TO BRACED FRAME ELEVATIONS OR PLAN. WHERE "R" IS NOT SHOWN ON THE DRAWINGS, USE SIMPLE BEAM REACTION EQUAL TO ONE-HALF THE UNIFORM LOAD CAPACITY FROM THE "TABLE OF UNIFORM LOAD CONSTANTS," AISC MANUAL, PART 2 FOR GIVEN SHAPE, SPAN, AND GRADE OF STEEL, FOR CHEVRON OR INVERTED V BRACING, THE BEAM SPAN SHALL BE TAKEN AS ONE HALF THE DISTANCE BETWEEN COLUMNS. NOTE THAT FORCES "H" AND "R" ARE NOT THE HORIZONTAL AND VERTICAL COMPONENTS OF THE BRACE FORCE.
- 3. BRACE TENSION MEMBERS. TENSION MEMBERS HAVE BEEN PROPORTIONED ASSUMING 85 PERCENT OF THE GROSS AREA OF THE MEMBER. CONNECTIONS REMOVING MORE THAN 15 PERCENT OF THE GROSS MEMBER AREA AT ANY CROSS SECTION SHALL BE REINFORCED WITH STEEL PLATES. THE REINFORCING PLATES SHALL BE EXTENDED ALONG THE MEMBER LENGTH BEYOND THE END OF
- THE CONNECTION AND WELDED TO THE MAIN MEMBER AS REQUIRED TO DEVELOP THE TENSILE STRENGTH OF THE REINFORCING PLATE. 4. CONNECTION DETAILS. CONNECTION DETAILS ARE SHOWN ON THE DRAWINGS. IT IS THE INTENT OF THE PLANS AND SPECIFICATIONS THAT, UNLESS SPECIFICALLY NOTED OTHERWISE, SHOP CONNECTIONS SHALL BE WELDED OR BOLTED AND THAT FIELD CONNECTIONS SHALL BE BOLTED. THE FABRICATOR SHALL SUBMIT DETAILS OF PROPOSED TYPICAL CONNECTIONS FOR ENGINEER REVIEW PRIOR
- TO PREPARATION OF DETAILED SHOP DRAWINGS. 5. CALCULATIONS. THE FABRICATOR SHALL SUBMIT CONNECTION DESIGN

/ NOT TO SCALE

- CALCULATIONS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE WHERE THE PROJECT IS LOCATED. 6. CONNECTION DESIGN. IN GENERAL FOLLOW THE RECOMMENDATIONS IN THE
- PAPER "BRACING CONNECTIONS FOR HEAVY CONSTRUCTION," AISC JOURNAL, THIRD QUARTER 1984, VOL. 21. CONNECTION DESIGN CALCULATIONS SHALL INCLUDE BUT NOT NECESSARILY BE LIMITED TO THE FOLLOWING CHECKS. 6 TYPICAL BRACED FRAME NOTES

- A. BRACE BEAM TO COLUMN CONNECTION 1. "DOUBLE ANGLE A" TO COLUMN BOLTED CONNECTION. DESIGN BOLTS FOR COMBINED SHEAR "R" AND TENSION "H" INCLUDING THE EFFECTS OF PRYING ACTION CAUSED BY BENDING IN THE OUTSTANDING LEGS OF THE ANGLES.
- 2. "DOUBLE ANGLE A" TO BEAM WEB WELDED CONNECTION. DESIGN THE C-SHAPED "WELD A" FOR THE COMBINED EFFECTS OF SHEAR "R", TENSION "H", AND MOMENT "M = R x E", WHERE "E" IS THE DISTANCE FROM THE END OF THE ANGLE ON THE COLUMN SIDE TO THE CENTROID OF THE C-SHAPED
- 3. DOUBLE ANGLES A". DESIGN DOUBLE ANGLES FOR SHEAR "R" AND TENSION "H".THE ANGLE LEG THICKNESS SHALL BE ADEQUATE FOR BENDING CAUSED BY PRYING ACTION.
- 4. COLUMN FLANGE BENDING. FOR CASES WHERE THE BRACE BEAM FRAMES TO THE COLUMN FLANGE, THE COLUMN FLANGE THICKNESS SHALL BE CHECKED FOR BENDING STRESSES RESULTING FROM PRYING ACTION DUE TO TENSION FORCE "H". REDUCE THE BOLT GAGE. INCREASE BOLT SPACING OR NUMBER OF BOLTS, OR PROVIDE COLUMN FLANGE STIFFENERS IF REQUIRED TO CORRECT COLUMN FLANGE BENDING PROBLEMS.
- 5. BEAM WEB. CHECK BEAM WEB FOR COMBINED SHEAR "R" AND TENSION "H". INCREASE ANGLE LENGTH, ANGLE LEG, AND/OR PROVIDE DOUBLER PLATES IN BEAM WEB IF REQUIRED TO CORRECT BEAM WEB STRENGTH DEFICIENCIES.
- B. GUSSET PLATE TO COLUMN CONNECTION I. "DOUBLE ANGLE B" TO COLUMN BOLTED CONNECTION a. FOR GUSSET PLATE TO COLUMN WEB CONNECTIONS AND GUSSET
- PLATE TO COLUMN FLANGE CONNECTIONS WHERE THE BRACE WORK POINT IS LOCATED AT THE COLUMN FACE, BOLTS SHALL BE DESIGNED FOR SHEAR "PV" WITHOUT REGARD TO ECCENTRICITY. "DOUBLE ANGLES B" SHALL BE CHECKED FOR SHEAR IN GROSS AND NET SECTION. b. FOR GUSSET PLATE TO COLUMN FLANGE CONNECTIONS WHERE THE BRACE WORK POINT IS LOCATED AT THE COLUMN CENTERLINE, BOLTS SHALL BE DESIGNED FOR COMBINED SHEAR "Pv" AND TENSION DUE TO MOMENT "M = Pv x E3" WHERE E3 IS EQUAL TO ONE HALF THE COLUMN
- DEPTH. THE MAGNITUDE OF THE DESIGN BOLT TENSION SHALL CONSIDER THE MAGNIFICATION EFFECT OF PRYING ACTION. "DOUBLE ANGLES B" SHALL BE CHECKED FOR SHEAR IN GROSS AND NET SECTION AS WELL AS MOMENT "M = Pv x (E3 + 1)". ADDITIONALLY, THE ANGLE LEG THICKNESS SHALL BE CHECKED FOR BENDING STRESSES RESULTING

FROM PRYING ACTION.

- JUST PAST THE BEAM FLANGE AND HAVING A LENGTH EQUAL TO THE HORIZONTAL DIMENSION OF THE GUSSET PLATE. THE BEAM WEB HORIZONTAL SHEAR SHALL BE EQUAL TO "Ph x(1-AF/A)" WHERE "AF" IS THE AREA OF ONE BEAM FLANGE AND "A" IS THE TOTAL BEAM CROSS SECTIONAL AREA. INCREASE GUSSET PLATE HORIZONTAL DIMENSION OR PROVIDE DOUBLER PLATES AS REQUIRED TO CORRECT BEAM HORIZONTAL SHEAR PROBLEMS.
- B. CHECK BEAM WEB FOR WEB CRIPPLING AT THE END OF THE GUSSET PLATE. INCREASE GUSSET PLATE HORIZONTAL DIMENSION AND/OR PROVIDE DOUBLER PLATES OR STIFFENER PLATES AS REQUIRED TO CORRECT BEAM WEB CRIPPLING PROBLEMS. GUSSET PLATE AT BRACE/BEAM/COLUMN CONNECTION
- . AT THE CONNECTION TO THE COLUMN, CHECK THE GUSSET PLATE FOR VERTICAL SHEAR "Pv". FOR CASES WHERE THE GUSSET PLATE CONNECTS TO THE COLUMN FLANGE AND THE BRACE WORK POINT IS LOCATED AT THE COLUMN CENTERLINE, ADDITIONALLY CHECK THE GUSSET PLATE FOR MOMENT "M = Pv x E4".
- 2. AT THE BEAM CONNECTION, CHECK THE GUSSET PLATE FOR HORIZONTAL SHEAR "Ph" AND MOMENT "M = Ph x E1". 3. THE GUSSET PLATE THICKNESS SHALL ADDITIONALLY BE CHECKED FOR BOLT BEARING WHERE APPLICABLE, TEAR OUT, AND YIELDING AND/OR BUCKLING AT THE WHITMORE SECTION.
- BEAM WEB a. CHECK BEAM WEB FOR HORIZONTAL SHEAR AT A SECTION LOCATED JUST PAST THE BEAM FLANGE AND HAVING A LENGTH EQUAL TO THE
- HORIZONTAL DIMENSION OF THE GUSSET PLATE "L". THE BEAM WEB HORIZONTAL SHEAR SHALL BE EQUAL TO "(Ph1 + Ph2) x (1 - AF/A)" WHERE "AF" IS THE AREA OF ONE BEAM FLANGE AND "A" IS THE TOTAL BEAM CROSS SECTIONAL AREA. INCREASE GUSSET PLATE HORIZONTAL DIMENSION OR PROVIDE DOUBLER PLATES AS REQUIRED TO CORRECT BEAM HORIZONTAL SHEAR PROBLEM.
- b. CHECK BEAM WEB FOR WEB CRIPPLING AT THE END OF THE GUSSET PLATE. INCREASE GUSSET PLATE HORIZONTAL DIMENSION AND/OR PROVIDE DOUBLER PLATES OR STIFFENER PLATES AS REQUIRED TO CORRECT BEAM WEB CRIPPLING PROBLEMS.
- F. BRACE MEMBER CONNECTION TO GUSSET PLATE 1. PROVIDE WELDED OR BOLTED CONNECTIONS AS INDICATED ON THE DETAILS ON THE DRAWINGS TO DEVELOP BRACE FORCE.
- 2. FOR BOLTED CONNECTIONS REMOVING MORE THAN 15% OF THE BRACE MEMBER SECTION, CHECK BRACE STRENGTH IN THE NET SECTION AND REINFORCE AS REQUIRED. REFER TO NOTE 3 ABOVE.

ARCHITECTUR

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WITH BOLTS

WITHOUT BOLTS

JOIST TYPE	FILLET SIZE (W)	LENGTH (L)	
K-SERIES	1/8"	3"	
LH SERIES, 02-06	3/16"	3"	
LH/DLH SERIES, 07-17	1/4"	3"	
DLH SERIES, 18-25	5/16"	4"	

1. ERECTOR NOTE: WHERE JOISTS ARE FABRICATED TO ALLOW FOR FIELD BOLTING TO THE SUPPORTING STRUCTURE, THE BOLTED CONNECTIONS ARE FOR INITIAL ATTACHMENT ONLY. SNUG-TIGHTENED BOLTS SHALL REMAIN IN THE BEARING SLOTS AFTER FINAL CONNECTION IS MADE VIA WELDING. IF A BOLTED CONNECTION IS NOT USED, OR THE BOLTS ARE REMOVED AFTER ERECTION, JOIST SEATS MUST BE WELDED ALONG THE INSIDE EDGE OF SEAT SLOTS.

TYPICAL JOISTS BEARING AT PERIMETER STEEL BEAM

12 TYPICAL ROOF DECK AT JOISTS PARALLEL TO PERIMETER BEAM 1 S1.1 / NOT TO SCALE (© Dudley Engineering LLC)

TYPICAL STEEL JOIST DETAILS S4.1

ELECTRICAL SCOPE OF WORK

PROVIDE NEW ELECTRICAL SERVICE FOR CONVENIENCE STORE.

PROVIDE POWER FOR NEW ELECTRICAL DEVICES, LIGHTING FIXTURES, AND KITCHEN EQUIPMENT. PROVIDE NEW LIGHTING CONTROLS.

APPLICABLE CODES AND STANDARDS

ALL ELECTRICAL MATERIALS, INSTALLATION, TESTING, CLEANING, SUPPORTS, AND WORKMANSHIP SHALL BE IN STRICT ACCORDANCE WITH THE BELOW LISTED APPLICABLE CODES INCLUDE BUT ARE NOT LIMITED TO:

2015 INTERNATIONAL BUILDING CODE 2020 NATIONAL ELECTRICAL CODE 2015 INTERNATIONAL FIRE CODE 2015 INTERNATIONAL ENERGY CONSERVATION CODE

ELECTRICAL SHEET LIST					
SHEET NUMBER	SHEET NAME				
E0.1	ELECTRICAL LEGENDS				
E0.2	ELECTRICAL NOTES				
E0.3	ELECTRICAL SPECIFICATIONS				
E1.1	ELECTRICAL SITE PLAN				
E2.1	ELECTRICAL POWER PLAN				
E2.2	ELECTRICAL HVAC/PLBG PLAN				
E3.1	ELECTRICAL LIGHTING PLAN				
E4.1	ELECTRICAL ENLARGED PLANS				
E5.1	ELECTRICAL ONE LINE DIAGRAM				
E5.2	ELECTRICAL DETAILS				
E6.1	ELECTRICAL SCHEDULES				

	FIXTURE TAG LEGEND		ELECTRICAL LEGEND
	Δ.a.	ALL SY	MBOLS SHOWN ARE NOT NECESSARILY USED IN THIS PROJECT
	PANEL-##	(E)	EXISTING
	A (UPPER CASE LETTER) - DENOTES FIXTURE TYPE a (LOWER CASE LETTER) - DENOTES SWITCH LEG	(R)	RELOCATED
	PANEL (PANEL NAME) - DENOTES PANEL NAME ## (CIRCUIT NUMBER) - DENOTES CIRCUIT NUMBER	(N)	NEW
	· · · · · · · · · · · · · · · · · · ·	(D)— —	DEMO
L	IGHTING CONTROL TAG LEGEND		NEW OR RELOCATED LIGHT FIXTURE. LETTER INDICATES TYPE. REFER TO LIGHT FIXTURE SCHEDULE FOR MORE INFORMATION.
	A,a A (UPPER CASE LETTER) - DENOTES CONTROL TYPE a (LOWER CASE LETTER) - DENOTES SWITCH LEG		NEW EMERGENCY LIGHT FIXTURE. PROVIDE WITH EMERGENCY POWER SOURCE. REFER TO LIGHT FIXTURE SCHEDULE FOR MORE INFORMATION.
nd I Ulti The	NOTES : -ZONE SWITCHES WITH MULTIPLE DISCTINCT SWITCH LEGS INDICATED E LIGHTING CONTROL TAG VIA MULTIPLE LOWER CASE LETTERS	e	EXIT LIGHT. PROVIDE DIRECTIONAL CHEVRON(S) ARROW(S) AS INDICATED ON PLANS. PROVIDE WITH INTEGRAL BATTERY PACK UNO. CONNECT TO UNSWITCHED POWER LEADS.
EPE	RATED BY COMMAS.	\$ _s	SINGLE POLE SWITCH
		\$м	MANUAL MOTOR STARTER WITH PROPER THERMAL ELEMENT INSTALLED.
	LIGHTING CONTROLS LEGEND	\$мс	SWITCH, THREE-WAY MOMENTARY CONTACT TOGGLE TYPE WITH CENTER NEUTRAL POSITION. SIMILAR TO ASCO # 173A2.
s	WATTSTOPPER WALL SWITCH VACANCY SENSOR. MODEL #DSW-301. VACANCY SENSOR PROVIDES UP TO 600 SQ. FT. OF COVERAGE. PROVIDE APPROPRIATE ACCESSORIES AS NEEDED.	Ф	DUPLEX RECEPTACLE, 20AMP, 125VOLT, 2POLE, 3WIRE, GROUNDING TYPE, NEMA 5-20R UNO.
	WATTSTOPPER WALL SWITCH VACANCY SENSOR WITH DIMMING.	φ	SIMPLEX RECEPTACLE. SIMILAR TO DUPLEX RECEPTACLE
)SD	MODEL #DW-311. OCCUPANCY SENSOR PROVIDES UP TO 600 SQ. FT. OF COVERAGE. PROVIDE APPROPRIATE ACCESSORIES AS NEEDED.		DOUBLE (QUAD) DUPLEX RECEPTACLE WITH COMMON COVER
/	WATTSTOPPER DIGITAL WALL SWITCH. MODEL #LMSW-10#. PROVIDE NUMBER OF ZONES TO MATCH NUMBER OF SPECIFIED SWITCH ZONES. COORDINATE EXACT SPEC WITH OWNER PRIOR TO PURCHASE. PROVIDE APPROPRIATE POWER PACKS AND OTHER WATTSTOPPER ACCESSORIES AS NEEDED	ф 	GROUND FAULT INTERRUPTOR (GFI) DUPLEX RECEPTACLE. SIMILAR TO DUPLEX RECEPTACLE ABOVE.
	WATTSTOPPER DIGITAL WALL SWITCH WITH DIMMING. MODEL	Фwр	WEATHERPROOF (WP) DUPLEX RECEPTACLE. SIMILAR TO DUPLEX RECEPTACLE ABOVE.
VD	NUMBER OF ZONES TO MATCH NUMBER OF SPECIFIED SWITCH ZONES. COORDINATE EXACT SPEC WITH OWNER PRIOR TO PURCHASE. PROVIDE APPROPRIATE POWER PACKS AND OTHER WATTSTOPPER ACCESSORIES AS NEEDED	Щwр	GROUND FAULT INTERRUPTOR (GFI) & WEATHERPROOF (WP) DUPLEX RECEPTACLE. SIMILAR TO DUPLEX RECEPTACLE ABOVE.
	WATTSTOPPER CEILING MOUNTED VACANCY SENSOR. MODEL #LMDC-100. PROVIDES UP TO 2,500 SQ. FT. OF COVERAGE. PROVIDE APPROPRIATE POWER PACKS AND OTHER WATTSTOPPER ACCESSORIES AS NEEDED.	•	ARCHITECT) RECEPTACLE AND COVER PLATE, WITH INTENDED USAGES OF RECEPTACLES ENGRAVED ON COVERPLATE (E.G. "COPIER"). ELECTRICIAN SHALL CONFIRM RECEPTACLE TYPE REQUIRED WITH OWNER/EQPM VENDOR PRIOR TO INSTALL.
	WATTSTOPPER WIDE VIEW VACANCY SENSOR; DESIGNED TO MOUNT IN CORNER. MODEL #LMDX-100. PROVIDES DETECTION UP TO 40 FT. FROM SENSOR. PROVIDE APPROPRIATE POWER PACKS AND OTHER WATTSTOPPER ACCESSORIES AS NEEDED.	Ф	SPLIT-WIRE RECEPTACLE WITH EACH HOT WIRE CONNECTED TO A DOUBLE-POLE CIRCUIT BREAKER. SIMILAR TO DUPLEX RECEPTACLE ABOVE.
]	WATTSTOPER HALLWAY OCCUPANCY SENSOR. MODEL #LMUC-100. PROVIDES DETECTION UP TO 130 FT. FROM SENSOR. PROVIDE APPROPRIATE POWER PACKS AND OTHER WATTSTOPPER ACCESSORIES AS NEEDED	φ	SPECIALTY RECEPTACLE. REFER TO PLANS FOR EXACT NEMA CONFIGURATION OF RECEPTACLE.
)	WATTSTOPPER PHOTOCELL SENSOR. MODEL #LMLS-400. PROVIDES AUTOMATIC DIMMING OF FIXTURES IN DAYLIGHT ZONE INDICATED. PROVIDE APPROPRIATE POWER PACKS AND OTHER IN IGHT	V	WITH BUSHING AND PULL STRING, STUBBED TO ACCESSIBLE CEILING.
٦		\square	POKE-THRU OR RECESSED FLOOR BOX FOR POWER. TYPE SPECIFIED ON PLANS.
 - -	WITHIN ZONE SHALL BE AUTOMATICALLY DIMMED AS DAYLIGHT LEVELS RISE.		POKE-THRU OR RECESSED FLOOR BOX FOR POWER AND DATA. TYPE SPECIFIED ON PLANS.
<u>S:</u>		\square	CEILING MOUNTED DUPLEX RECEPTACLE, 20AMP, 125VOLT, 2POLE, 3WIRE, GROUNDING TYPE, NEMA 5-20R UNO.
	STED BY THE E.C. ALL OCCUPANCY SENSORS SHALL HAVE THE TIME Y SET TO THE MAXIMUM SETTING.	J	JUNCTION BOX.
L C	CCUPANCY SENSORS SHALL PASS NEMA WD7 TESTING. R TO LIGHTING CONTROL SCHEDULE FOR MORE INFORMATION. THE		ELECTRICAL PANEL BOARDS.
ELEC DPEF CONT CABL	TRICAL CONTRACTOR SHALL PROVIDE AND INSTALL A COMPLETE, ATIONAL AND CODE COMPLIANT LIGHTING CONTROL SYSTEM. THE FRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL WIRING, ING, DEVICES, COMPONENTS, ETC. AS REQUIRED BY THE	L	DISCONNECT SWITCH. ALL SWITCHES SHALL BE HEAVY DUTY TYPE (E.G. 30A/3P/600/NF/NEMA 1)
	JFACTURER. REFER TO INSTALLATION MANUALS AND WIRING		CONDUIT RUN CONCEALED IN WALL OR CEILING

- MANUFACTURER. REFER TO INSTALLATION MANUALS AND WIRING DIAGRAMS PROVIDED BY THE MANUFACTURER.
 4. THE BASIS OF DESIGN FOR LIGHTING CONTROLS IS LEGRAND WATTSTOPPER. ANY ADDITIONAL COST INCURRED BY AN APPROVED SUBSTITUTION (INCLUDING ENGINEERING COSTS OF REDESIGN) WILL BE AT CONTRACTOR'S EXPENSE.
- 5. PRODUCTS BY LEVITON, GREENGATE AND/OR NLIGHT THAT ARE EQUIVALENT TO WATTSTOPPER ARE ACCEPTABLE.
- FOR SUBMITTALS: SUBMIT DIMENSIONED DRAWINGS OF LIGHTING CONTROL SYSTEM AND ACCESSORIES INCLUDING, BUT NOT LIMITED TO: RELAY PANELS, SWITCHES, PHOTOCELLS, CONTROLLERS AND OTHER INTERFACES. SHOP DRAWINGS SHALL INDICATE LOCATION OF EACH DEVICE OR AN RFI TO CONFIRM LOCATION. PLANS ARE FLOOR PLAN DIAGRAMS. "CUT SHEET" SUBMITTAL NOT ACCEPTABLE. SUBMIT A ONE-LINE DIAGRAM OF THE SYSTEM CONFIGURATION INDICATING THE TYPE, SIZE AND NUMBER OF CONDUCTORS BETWEEN EACH COMPONENT IF IT DIFFERS FROM THAT ILLUSTRATED IN THE RISER DIAGRAM IN THESE SPECIFICATIONS. SUBMITTALS THAT SHOW TYPICAL RISER DIAGRAMS ARE NOT ACCEPTABLE.

LEGEND NOTES:

1. THE WORD "PROVIDE" AS USED IN THESE DRAWINGS SHALL MEAN "MATERIALS AND LABOR FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR".

— — — CONDUIT RUN CONCEALED IN FLOOR

HOMERUN TO ELECTRICAL PANELBOARDS

- UNDERGROUND CONDUIT

	ELECTRICAL ARREVIATIONS
(D)	DEMO
(E) (N)	EXISTING NEW
(R) (RM)	
(R'D)	
AC	AMPERE FUSE
AFF AHJ	ABOVE FINISHED FLOOR AUTHORITY HAVING JURISDICTION
AIC AMP	AMPERE INTERRUPTING CAPACITY AMPERE
AT ATS	AMPERE TRIP
AWG	AMERICAN WIRE GAUGE
CB	
CFCI	CIRCUIT
CLG CT	CEILING CURRENT TRANSFORMER
CU DISC.	COPPER DISCONNECT
DIST. EA	DISTRIBUTION EACH
E.C.	ELECTRICAL CONTRACTOR
FAAP	FIRE ALARM ANNUNCIATION PANEL
FACP	FULL LOAD AMPS
FTL G.C.	FEED THRU LUGS GENERAL CONTRACTOR
GFI GRD	GROUND FAULT INTERRUPTER GROUND
GRS	GALVANIZED RIGID STEEL
IDF	
JB	JUNCTION BOX
KVA KW	KILO-VOLT-AMPERE KILOWATT
LAN LTS	LOCAL AREA NETWORK LIGHTS
LTG MCB	LIGHTING MAIN CIRCUIT BREAKER
MDF	MAIN DISTRIBUTION FRAME
MTD	MAIN EUGS ONLY MOUNTED
MTG NEC	MOUNTING NATIONAL ELECTRICAL CODE
NEMA NF	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION NON-FUSED
NTS OFCI	NOT TO SCALE OWNER FURNISHED CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED OWNER INSTALLED
OCP	OVERCORRENT PROTECTION
OSC	OCCUPANCY SENSOR OCCUPANCY SENSOR CONTROLS
P PA	POLE PUBLIC ADDRESS
PB PC	PUSH BUTTON PHOTOCELL
PH	PHASE
PS	PHOTOSENSOR
REC	RECEPTACLE
RECP REQ'D	RECEPTACLE REQUIRED
SN SPECS	SOLID NEUTRAL SPECIFICATIONS
SPKR SWBD	SPEAKER SWITCHBOARD
SWGR	SWITCHGEAR
TTB	TELEPHONE TERMINAL BOARD
TVSS TYP.	TRANSIENT VOLTAGE SURGE SUPPRESSOR TYPICAL
UC, U/C U.N.O.	UNDER COUNTER UNLESS NOTED OTHERWISE
V VA	VOLT VOLT-AMPERE
VC	VACANCY CONTROLS
VSD	VARIABLE SPEED DRIVE
W/	WATTOK WIKE WITH
W/O WP	WITHOUT WEATHERPROOF
XFMR XFR	TRANSFORMER TRANSFER

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JOB PHA DRA CHE DAT	Architecture and may not be reproduced in any form without written permission from the Architect. JOB NO.: 2130 PHASE: Project Status DRAWN: Designer CHECKED: Checker DATE: Issue Date ELECTRICAL LEGENDS SHEET SHEET								

INTERNATIONAL ENERGY CONSERVATION CODE

A COMMISSIONING PLAN MUST BE DEVELOPED BY A REGISTERED DESIGN PROFESSIONAL OR APPROVED AGENCY. THE PLAN SHALL INCLUDE THE FOLLOWING ITEMS: A NARRATIVE DESCRIPTION OF THE ACTIVITIES THAT WILL BE ACCOMPLISHED DURING EACH PHASE

- OF COMMISSIONING. A LISTING OF THE SPECIFIC EQUIPMENT, APPLIANCES OR SYSTEMS TO BE TESTED AND A DESCRIPTION OF THE TESTS TO BE PERFORMED.
- FUNCTIONS TO BE TESTED. CONDITIONS UNDER WHICH THE TEST WILL BE PERFORMED.
- MEASURABLE CRITERIA FOR PERFORMANCE

LIGHTING COMMISSIONING NOTES

• LIGHTING SYSTEM COMMISSIONING ACTIVITIES INCLUDE BUT SHALL NOT BE LIMITED TO: - SUBMITTAL REVIEWS

- FIELD OBSERVATION - ENSURE ALL FIXTURES HAVE LAMPS AND ARE OPERATIONAL
- TEST EMERGENCY LIGHTING (INCLUDING EXIT SIGNS)
- ENSURE ALL OCCUPANCY & DAYLIGHT SENSORS HAVE BEEN INSTALLED PER THE MANUFACTURERS INSTRUCTIONS AND ARE OPERATING AS INTENDED. VERIFY STATUS INDICATORS ON DEVICES ARE CORRECT.
- CONFIRM SWITCHES AND DEVICES CONTROL LIGHT FIXTURES AS INDICATED ON THE DRAWINGS
- THE LIST OF COMMISSIONED SYSTEMS INCLUDES, BUT SHALL NOT BE LIMITED TO: - LIGHT FIXTURES
 - EXIT SIGNS
 - EMERGENCY EGRESS LIGHTING - OCCUPANCY SENSORS
 - DAYLIGHT SENSORS - TIME-CLOCK & TIME-SWITCH CONTROLS
 - DIMMER SYSTEMS
- BAS INTERFACE DOCUMENTATION CERTIFYING THE INSTALLED LIGHTING CONTROLS MEET DOCUMENTED PERFORMANCE CRITERIA OF SECTION C405.2 AND TESTING CRITERIA OF SECTION C408.3 OF THE IECC ARE TO BE PROVIDED TO THE BUILDING OWNER WITHIN 90 DAYS OF THE RECEIPT OF THE CERTIFICATE OF OCCUPANCY.

FIRE ALARM SYSTEM

FIRE ALARM SYSTEM DESIGN (DEVICES AND LAYOUT) ARE BY THE FIRE ALARM CONTRACTOR.

FIRE ALARM SYSTEM CONSTRUCTION DOCUMENTS FOR THE SCOPE OF WORK INDICATED IN THIS PROJECT SHALL BE SUBMITTED TO THE CITY OF **SAN MARCOS** FOR APPROVAL PRIOR TO COMMENCING FIRE ALARM WORK AND THE INSTALLATION MUST BE APPROVED BY THE CITY AND LOCAL AUTHORITY HAVING JURISDICTION AFTER COMPLETION.

- 1. AN EXISTING FIRE ALARM SYSTEM IS IN PLACE. REUSE ALL EXISTING DEVICES WHERE PRACTICAL AND PROVIDE NEW DEVICES MATCHING EXISTING DEVICES WHERE NECESSARY, COORDINATE WITH MECHANICAL AND PLUMBING DRAWINGS. COORDINATE DEVICE LOCATIONS WITH ARCHITECTURAL
- DRAWINGS. SUBMIT SHOP DRAWINGS AND SEQUENCE OF OPERATIONS TO ENGINEER FOR REVIEW. 2. THE FIRE ALARM SYSTEM MODIFICATIONS FOR THIS PROJECT SHALL BE DESIGNED BY A LICENSED FIRE ALARM CONTRACTOR AND BE IN ACCORDANCE WITH NFPA 72 & 101 AND CITY BUILDING CODE. CONTRACTOR IS RESPONSIBLE FOR SUBMISSION OF PLANS TO THE CITY FOR APPROVAL AND ALL
- ASSOCIATED FEES. 3. ALL 120V CIRCUITS REQUIRED FOR THE OPERATION OF THE FIRE ALARM SYSTEM SHALL BE NCLUDED. LOCATIONS OF ALL PANELS AND BOOSTERS SHALL BE COORDINATED WITH ARCHITEC CONTRACTOR SHALL TEST THE SYSTEM IN THE PRESENCE OF LOCAL AUTHORITIES AND MAKE ALL REQUIRED MODIFICATIONS AND ADDITIONS TO HIS DESIGN AT NO ADDITIONAL COST.

ELECTRICAL HVAC EQUIPMENT NOTES

- 1. ALL ELECTRICAL SIZING OF HVAC EQUIPMENT INCLUDING OVERCURRENT DEVICES, DISCONNECT SWITCHES, CONDUIT/WIRE, ETC, ARE SELECTED BASED ON EQUIPMENT SHOWN ON MECHANICAL DRAWINGS, E.C. TO FIELD VERIFY EQUIPMENT SUPPLIED BY HVAC TO VERIFY ALL REQUIREMENTS INCLUDING BUT NOT LIMITED TO VOLTAGE, PHASE, MOCP, AND SINGLE POINT CONNECTION REQUIREMENTS. REVISE ELECTRICAL AS REQUIRED AND NOTIFY ELECTRICAL ENGINEER IMMEDIATELY OF ALL NECESSARY CHANGES TO MATCH ACTUAL EQUIPMENT SUPPLIED BY MECHANICAL CONTRACTOR.
- 2. COORDINATE LOCATION OF ALL DISCONNECT SWITCHES, STARTERS, CONTROL STATIONS, ETC CALLED OUT IN THE ELECTRICAL DRAWINGS. E.C. SHALL INSTALL SUCH DEVICES IN COMPLIANCE WITH CODE REQUIRED CLEARANCE REQUIREMENTS. ALL SUCH DEVICES SHALL BE ACCESSIBLE AFTER EQUIPMENT ARE IN PLACE AND SATISFY CODE CLEARANCE REQUIREMENTS. REMOVE AND RE-INSTALL DEVICES THAT ARE INACCESSIBLE OR WITH INADEQUATE CODE CLEARANCE. COORDINATE INSTALLATION WITH MECHANICAL CONTRACTOR
- 3. E.C. TO FIELD VERIFY EXTERNAL STARTER REQUIREMENTS FOR HVAC EQUIPMENT BASED ON ACTUAL EQUIPMENT SUPPLIED. E.C. TO PROVIDE EXTERNAL STARTERS ONLY FOR REQUIRED EQUIPMENT WITHOUT INTERNAL STARTER MEANS.
- 4. FOR OUTDOOR PAD-MOUNTED A/C EQUIPMENT, CONNECT A/C EQUIPMENT TO OUTDOOR NEMA 3R DISCONNECT SWITCHES WITH UNDERGROUND RIGID CONDUIT FEEDER. STUB UP CONDUIT NEAR EQUIPMENT CONNECTION POINT. PROVIDE SEALTITE FROM CONDUIT STUB UP TO EQUIPMENT. MAXIMUM LENGTH OF SEALTITE 5 FEET. SEALTITE LONGER THAN 5 FEET IS NOT ALLOWED.
- 5. E.C. TO COORDINATE EXHAUST FAN CONTROL REQUIREMENTS WITH MECHANICAL DRAWING SCHEDULES. WHERE EXHAUST FANS ARE INDICATED AS INTERLOCKED WITH HVAC EQUIPMENT, E.C. SHALL PROVIDE ALL REQUIRED RELAYS, CONDUIT/CONTROL WIRES, ETC AS REQUIRED FOR A COMPLETE AND OPERATING SYSTEM. COORDINATE INTERLOCK REQUIREMENTS WITH HVAC CONTRACTOR

POWER GENERAL NOTES

- A. REMOVE ALL UNUSED CABLING, WIRE AND CONDUIT IN THIS SPACE. TERMINATE CONDUITS OUTSIDE ELECTRICAL ROOM WITH A JUNCTION BOX. TURN BREAKER OFF AND UPDATE PANEL DIRECTORY TO INDICATE SPARE BREAKER AND DATE OF CHANGE.
- B. COORDINATE LOCATIONS OF ALL DEVICES AND JUNCTION BOXES WITH THE EQUIPMENT INSTALLER. CONTRACTOR SHALL NOT INSTALL MORE THAN THREE CIRCUITS (3 PHASE WIRES, 1 NEUTRAL + 1 GROUND) IN A COMMON CONDUIT. EXCEPT WHERE SPECIFICALLY NOTED AND ALLOWED. WHERE MORE THAN THREE CURRENT CARRYING CONDUCTORS (EXAMPLES: 3 PHASE WIRES + 1 CURRENT CARRYING NEUTRAL CONDUCTOR) ARE INSTALLED IN A COMMON CONDUIT, THE AMPACITY OF ALL CURRENT-CARRYING CONDUCTORS SHALL BE DERATED PER NEC ARTICLE 310.15 (B)(3)(A). PROVIDE COMMON TRIP BREAKERS FOR MULTIWIRE CIRCUITS PER NEC ARTICLE 210.4 (B).

LIGHTING GENERAL NOTES

- A. REFER TO ARCH. REFLECTED CEILING PLANS FOR EXACT LOCATIONS OF ALL FIXTURES B. VERIFY COLOR OF ALL FIXTURES WITH ARCHITECT/OWNER. C. DRAWINGS DO NOT SHOW DETAILS OF FIXTURE MOUNTING. ELECTRICAL CONTRACTOR TO PROVIDE
- ALL NECESSARY AND REQUIRED MOUNTING HARDWARE AND ACCESSORIES AS REQUIRED FOR A COMPLETE AND OPERATING SYSTEM. SLOPED CEILING: PROVIDE SLOPED-CEILING ADAPTORS AS REQUIRED FOR ALL FIXTURES INSTALLED IN SUCH CEILING. D. ALL 2'x4' FIXTURES SUPPORTED BY FRAMING MEMBER BY MECHANICAL MEANS, SUCH AS BOLTS,
- SCREWS, OR RIVETS. CLIPS IDENTIFIED FOR USE WITH THE TYPE OF CEILING FRAMING MEMBER(S) AND FIXTURE(S) SHALL BE PERMITTED. ALL FOUR SIDES OF FIXTURES SHALL BE FASTENED TO CEILING FRAMING MEMBERS. REFERENCE N.E.C. ARTICLE 410-36(B) E. ACCEPTABLE LAMP MANUFACTURERS: MATCH BASE BUILDING STANDARDS. ACCEPTABLE BALLAST
- MANUFACTURERS: MATCH BASE BUILDING STANDARDS. F. ALL LAMPS ARE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR UNLESS SPECIFICALLY NOTED OTHERWISE (THIS APPLIES TO ALL NEW FIXTURES). REPLACE ALL BURNT OUT OR DEFECTIVE LAMPS AND BALLAST WITHIN 6 MONTHS AFTER ACCEPTANCE OF SUBSTANTIAL COMPLETION AT NO ADDITIONAL COST TO THE OWNER (THIS APPLIES TO NEW FIXTURES ONLY, NOT REUSED/EXISTING FIXTURES).
- G. ALL FIXTURES SHALL BE FACTORY PAINTED-AFTER-FABRICATION TYPE. H. IN GENERAL, ALL FIXTURES IN AREAS WITH LAY-IN CEILING ARE CONNECTED USING EMT CONDUIT AND 6-FT (MAXIMUM LENGTH) FIXTURE WHIP. ON PLAN DRAWINGS, FIXTURE CIRCUITING AND CONNECTION ARE SHOWN DIAGRAMMATICALLY WITH ARCS AND CURVES. SUCH DIAGRAMMATIC REPRESENTATION DOES NOT IMPLY OR INDICATE EXCLUSIE USE OF ARMORED OR METAL CLAD CABLE (TYPE BX OR MC). ALL FIXTURE CONNECTION IN AREAS WITH LAY-IN CEILING SHALL BE MADE WITH CONDUIT AND WHIPS.
- ALL LAMPS. DRIVERS AND ELECTRONIC BALLASTS SHALL MATCH BASE BUILDING STANDARD. EXISTING FIXTURES RELOCATED BY ELECTRICAL CONTRACTOR: PROVIDE NEW MOUNTING ACCESSORIES, PLASTIC FRAME, BRACKET, BOXES, ETC... AS REQUIRED FOR A COMPLETE AND OPERATING SYSTEM.
- K. EXISTING FIXTURES RE-USED BY ELECTRICAL CONTRACTOR: EXISTING FIXTURES INDICATED TO BE RE-USED SHALL BE CLEANED AND RE-LAMPED. ELECTRICAL CONTRACTOR TO EXAMINE CONDITION OF EXISTING BALLAST, REPLACE IF NOISY OR DEFECTIVE. ALL BALLAST DATED BEFORE 1976 ARE PRESUMED TO CONATIN PCB AND SHALL BE REMOVED BY THE ELECTRICAL CONTRACTOR. DISPOSE OF SUCH BALLAST IN STRICT COMPLIANCE WITH APPLICABLE FEDERAL AND STATE LAWS AND LOCAL ORDINANCES. FIXTURES NOT INDICATED FOR RE-USE SHALL BE DELIVERED TO A LOCATION TO BE SPECIFIED BY OWNER. DISPOSE OF SUCH FIXTURES IF NOT NEEDED BY OWNER.

SITE PLAN GENERAL NOTES

- A PLAN REPRESENTS ENGINEER'S PROPOSED DESIGN, COORDINATE LOCATION AND INSTALLATION OF ELECTRICAL AND TELECOM SERVICE AND ALL RELATED DEVICES AND EQUIPMENT WITH OWNER AND UTILITY.
- B. UNDERGROUND SITE WORK: CONTRACTOR IS REQUIRED TO USE LINE LOCATOR TO IDENTIFY LOCATION(S) OF ALL EXISTING UTILITY LINES. CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ALL DAMAGES TO ANY EXISTING UTILITY LINES CAUSED BY EXCAVATION AND SUBSEQUENT REPAIR OF UTILITY LINES.
- C. AS-BUILT UNDERGROUND UTILITY DRAWINGS MUST BE PROVIDED SHOWING SPECIFIC LOCATIONS OF ALL UTILITIES BURIED ON THE ENTIRE SITE.

CURRENT CARRYING CONDUCTORS	IN TABLES AS ADJUSTED FOR TEMP IF NECESSARY	OR MORE WIRE IN ONE CONDUIT 60°C WIRE (E.G.: TW)	OR MORE WIRE IN ONE CONDUIT 75°C WIRE (E.G.: THWN)	OR MORE WIRE IN ONE CONDUIT 90°C WIRE (E.G.: THHN)
4 THRU 6	80%	#12	#12	#12
7 THRU 9	70%	#10	#10	#12
10 THRU 20	50%	#8	#8	#10
21 THRU 30	45%	#6	#8	#8
31 THRU 40	40%	#6	#8	#8
41 AND ABOVE	35%	#4	#6	#6

- WITH THE HIGHER RATED CONDUCTORS.
- CONDITION.

- THE SPACE NOTED
- DRAWINGS.
- OR EQUAL.
- BREAKER/ SWITCHES.
- INDOOR/OUTDOOR ELECTRICAL EQUIPMENT APPLY TO ALL CORRIDOR WALLS.

ELECTRICAL GENERAL NOTES

 ALL CIRCUIT NUMBERS SHOWN ARE FOR REFERENCE ONLY. FIELD VERIFY ACTUAL CIRCUIT NUMBERS REQ'D AND ADJUST ACCORDINGLY. PROVIDE TYPE-WRITTEN DIRECTOR(IES) REFLECTING ACTUAL CIRCUIT NUMBERS USED, WITH FIELD REVISED/ RELOCATED CIRCUITS CLEARLY INDICATED. DIRECTOR(IES) SHALL INCLUDE DATE AND PROJECT DESCRIPTION, EXAMPLE : 2006 NEW BLDG. EACH CIRCUIT IS SHOWN WITH AN INDIVIDUAL HOMERUN. E.C. MAY ELECT TO COMBINE TWO OR MORE CIRCUITS IN ONE COMMON CONDUIT AND WITH COMMON NEUTRAL WHERE ALLOWED (CIRCUITS WITH HIGH CONTENT OF HARMONIC CURRENTS MAY NOT USE COMMON NEUTRAL EXAMPLE: CIRCUITS WITH NON-LINEAR ELECTRONIC POWER SUPPLIES SUCH AS COMPUTERS. COPIERS, PRINTERS, ETC). NOTE: AMPACITIES OF CONDUCTORS SHALL BE REDUCED IF MORE THAN THREE CURRENT CARRYING CONDUCTORS ARE INSTALLED IN A RACEWAY. SEE N.E.C. ARTICLE 310.15(B)(2)(A) "ADJUSTMENT FACTORS". CONDUCTORS SHALL BE DERATED IF 4 OR MORE WIRES ARE INSTALLED IN ONE CONDUIT (SEE RELATED NOTE "G3" ON TEMPERATURE LIMITATION OF CONDUCTOR AMPACITY), TYPICAL EXAMPLES FOR 20-AMP CIRCUITS ARE SHOWN BELOW:

• TEMPERATURE LIMITATIONS ON AMPACITY OF CONDUCTOR: THE AMPACITY OF A CONDUCTOR SHALL BE SELECTED BASED ON THE NATIONAL ELECTRICAL CODE ARTICLES 310.15 AND 110.14.(C)(1),(2). THE TEMPERATURE LIMITATIONS NOTED IN 110.14.(C)(1),(2) MAY BE PARAPHRASED AS FOLLOWS : (A) CIRCUITS RATED 100 AMP OR LESS: USE 60-DEGREE C RATED CONDUCTORS ONLY. 75-DEGREE C AND 90-DEGREE C CONDUCTOR MAY BE USED BUT ONLY AT 60-DEGREE C AMPACITY. EXCEPTIONS: HIGHER TEMPERATURE CABLE ARE ALLOWED PROVIDED THE EQUIPMENT IS LISTED AND IDENTIFIED FOR USE WITH THE HIGHER RATED CONDUCTORS. (B) CIRCUITS RATED MORE THAN 100 AMP OR CONDUCTOR LARGER THAN #1 AWG: USE 75-DEGREE C RATED CONDUCTORS ONLY. 90-DEGREE C CONDUCTOR MAY BE USED BUT ONLY AT 75-DEGREE C AMPACITY. EXCEPTIONS: HIGHER TEMPERATURE CABLE ARE ALLOWED PROVIDED THE EQUIPMENT IS LISTED AND IDENTIFIED FOR USE

WIRES OVERSIZED TO ALLEVIATE VOLTAGE DROP: WHERE OVERSIZED WIRES ARE USED TO ALLEVIATE VOLTAGE DROP. CONTRACTOR TO PROVIDE REDUCER LUGS AND/OR J-BOXES AS REQUIRED TO TERMINATE WIRES IN EQUIPMENT.

 ALL CONDUIT AND WIRE MUST BE CONCEALED FROM VIEW. EXPOSED CONDUIT AND WIRE ARE NOT ACCEPTABLE, EXCEPTIONS ARE CENTRAL PLANT, MECHANICAL/ELECTRICAL ROOMS. EXISTING CONSTRUCTION: ALL NEW WIRINGS INSTALLED IN EXISTING WALL/CEILING/MILLWORK SHALL BE CONCEALED, INCLUDING CONCRETE BLOCK WALL. PATCH ANY CUT AREAS TO MATCH EXISTING

 ALL ELECTRICAL AND COMMUNICATION DEVICES (LIGHT SWITCHES, RECEPTACLES, TELEPHONE, DATA ETC.) SHALL BE RECESSED MOUNTED UNLESS NOTED OTHERWISE. FIELD VERIFY RECEPTACLE MOUNTING REQUIREMENTS WITH OWNER/ ARCH., MOUNT ALL DUPLEX RECEPTACLES WITH THE "U" GROUND TERMINAL ON TOP, UNLESS NOTED OTHERWISE OR AS REQUIRED BY OWNER/ARCH. NEUTRAL TERMINAL SHALL BE ON TOP FOR HORIZONTALLY MOUNTED RECEPTACLES. ALL OUTLETS ON DEDICATED CIRCUITS (MARKED "DED" OR "D" ON PLANS) SHALL BE PROPERLY IDENTIFIED BY USING DISTINCTIVE COLOR DEVICES (USE BROWN OR GRAY DEVICES. CONFIRM COLOR REQUIREMENTS WITH ARCHITECT/OWNER .). COVER PLATES SHALL BE MARKED WITH CIRCUIT NUMBER(S) AND LOADS SERVED. EXAMPLE : CKT # LA-1 COPY MACHINE. EQUIPMENT LAYOUT IS BASED ON SQUARE D AND/OR SIEMENS. EQUIPMENT BY OTHER MANUFACTURERS SUCH AS GE MAY HAVE LARGER DIMENSIONS. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO PROVIDE EQUIPMENT WITH SIMILAR DIMENSIONS THAT WOULD FIT IN

 VERIFY LOCATION OF ALL OUTLETS (POWER & COMMUNICATION) WITH OWNER/ARCH PRIOR TO ROUGH-IN, OWNER RESERVES THE RIGHT TO MOVE ANY OUTLETS 5 FEET IN ANY DIRECTION PRIOR TO ROUGH-IN. ALL RECEPTACLES WITHIN 6 FEET OF ANY WET AREA (EXAMPLE : SINK, DISHWASHER, ETC..) SHALL HAVE GROUND FAULT PROTECTION, WHETHER SPECIFICALLY INDICATED OR NOT ON

 MOUNTING HEIGHTS OF ALL OUTLETS (RECEPTACLES, SWITCHES, TELEPHONE, DATA, ETC.) IN AREAS WITH COUNTERTOP SHALL BE VERIFIED WITH ARCH/OWNER. GENERALLY ALL OUTLETS ARE TO BE MOUNTED ABOVE COUNTERTOP EXCEPT OUTLETS FOR DISPOSERS, UNDERCOUNTER DISHWASHER, UNDERCOUNTER REFRIGERATORS ETC. REFER TO ARCH INTERIOR ELEVATIONS. ALL WEATHERPROOF/WET LOCATION AND/OR OUTDOOR RECEPTACLES SHALL HAVE "WEATHERPROOF-IN-USE" COVERS (NEC ARTICLE 406.8(B)). PROVIDE RACO BELL RAYNTITE II COVERS

 ESTIMATED LOADS : INFORMATION AND DATA ON SPECIALTY EQUIPMENT MAY NOT BE AVAILABLE DURING THE DESIGN PROCESS. SOME LOADS ARE NECESSARILY ESTIMATED. SUCH ESTIMATED LOADS ARE INDICATED AS (EST.) ON PLANS, RISER DIAGRAMS AND/OR PANEL SCHEDULES. CONTRACTOR SHALL BID THE PROJECT USING THE ESTIMATED FEEDER/BREAKER/SWITCHES SHOWN ON DRAWINGS. HOWEVER, THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMATION AND VERIFICATION OF ALL SUCH ESTIMATED LOADS WITH THE APPROPRIATE VENDORS/SUPPLIERS. ALL SHOP DRAWINGS SUBMITTED BY THE CONTRACTOR SHALL INCLUDE CERTIFICATION THAT THE CONTRACTOR HAS CONFIRMED/VERIFIED ANY ESTIMATED LOADS SHOWN ON THE DRAWINGS. CONTRACTOR WILL NOT BE DUE ANY ADDITIONAL COMPENSATION FOR HIS FAILURE TO VERIFY THE ESTIMATED LOADS SHOWN ON DRAWINGS, PROVIDE CREDIT TO THE OWNER IF ACTUAL LOADS ARE SMALLER THAN ESTIMATED LOADS, CREDIT SHALL BE GIVEN FOR SIZE REDUCTION ON FEEDER/

 EXAMPLE OF EQUIPMENT LOADS THAT ARE TYPICALLY ESTIMATED : SPECIAL COPY MACHINE, WELDING EQPT OUTLET, ELEVATOR MACHINERY, .

PROVIDE HOUSE KEEPING CONCRETE PAD (MINIMUM 4" HIGH) FOR ALL FLOOR MOUNTED ELECTRICAL EQUIPMENT INCLUDING TRANSFORMERS, SWITCHBOARDS, M.C.C., TRANSFER SWITCHES ETC. PROVIDE ALL REQUIRED AND NECESSARY GALVANIZED UNISTRUT SUPPORT FOR ALL

 FIRE WALL : DO NOT INSTALL RECEPTACLES, TELEPHONE, DATA OUTLETS ETC. BACK-TO-BACK IN FIRE/SMOKE PARTITIONS OR WITHIN THE SAME SPACE ENCLOSED BY TWO ADJACENT STUDS. ALSO

ш R C (\mathbf{O}) 50 20 $\sim \sim$ Š σ Ο Š S Μ Ē an S TECHNOLOGIE 801 TRAVIS, SUITE 2000 HOUSTON, TX 77002 PHONE: 713-237-9800 FAX: 713-237-9801 Texas Registered Engineering Firm F-10573 © 2022 MÄD Architecture All Rights Reserved. The arrangements depicted herein are the sole property of **M**A**D** Architecture and may not be reproduced in any form without written permission from the Architect. JOB NO.: 2130 PHASE: Project Status DRAWN: Designer CHECKED: Checker DATE: Issue Date ELECTRICAL NOTES

ELECTRICAL SPECIFICATIONS

26 05 00 BASIC ELECTRICAL REQUIREMENTS

PERMITS AND CODES: OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND REQUIRED INSPECTIONS. COMPLY WITH ALL NATIONAL, STATE AND MUNICIPAL LAWS, CODES AND ORDINANCES RELATING TO BUILDING AND PUBLIC SAFETY. PROVIDE ANY REQUIRED TEMPORARY POWER AND UTILITIES FOR ALL TRADES AND ALL CONSTRUCTION TRAILERS, PROVIDE TEMPORARY CONSTRUCTION LIGHTING AND POWER ELECTRICAL CONTRACTOR SHALL INCLUDE TEMPORARY ELECTRIC SERVICE: ALL TEMPORARY ELECTRIC SHALL BE IN ACCORDANCE WITH OSHA CONSTRUCTION STANDARDS 29FCR, PART 1926 AND ARTICLE 305 OF THE NATIONAL ELECTRICAL CODE. TEMPORARY LIGHTING AND POWER SHALL BE PROVIDED IN ACCORDANCE WITH OSHA STANDARDS. THE OSHA MINIMUM ILLUMINATION IS 5 FOOTCANDLES IN GENERAL CONSTRUCTION AREAS, AND 10 FC IN MECHANICAL / ELECTRICAL ROOMS AND WORKROOMS. INCLUDED ARE CONNECTIONS TO ALL CONSTRUCTION TRAILERS. THE COST OF THIS WORK IS TO BE INCLUDED IN THE BASE ELECTRICAL BID FOR THE PROJECT. TRENCH SAFETY: SEE SUBCHAPTER C OF CHAPTER 756 OF THE TEXAS HEALTH AND SAFETY CODE FOR REQUIREMENTS APPLICABLE TO TRENCH SAFETY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ASSURE COMPLIANCE WITH APPLICABLE STATE AND FEDERAL LAWS, AND NO PROVISION OF THESE DRAWINGS OR SPECIFICATIONS SHALL BE DEEMED TO EXCUSE COMPLIANCE WITH APPLICABLE STATE AND FEDERAL REQUIREMENTS FOR TRENCH SAFETY.

VISITING THE JOB SITE: VISIT THE SITE OF THE PROPOSED CONSTRUCTION IN ORDER TO FULLY UNDERSTAND THE FACILITIES, DIFFICULTIES AND RESTRICTIONS ATTENDING THE EXECUTION OF THE WORK. NO ADDITIONAL COMPENSATION WILL BE ALLOWED THIS CONTRACTOR FOR WORK OR ITEMS OMITTED FROM HIS ORIGINAL PROPOSAL DUE TO HIS FAILURE TO INFORM HIMSELF REGARDING SUCH MATTERS AFFECTING THE PERFORMANCE OF THE WORK IN THIS CONTRACT OR NECESSARY FOR THE INSTALLATION AND COMPLETION OF THE WORK INCLUDED HEREIN

DRAWINGS: DRAWINGS ARE DIAGRAMMATIC, CONFIRM DIMENSIONS & LOCATIONS IN THE FIELD. IF CONFLICTING DIMENSIONS ARE SHOWN, USE LARGER DIMENSIONS AND VERIFY WITH ARCHITECT. SEE ARCHITECTURAL PLANS AND ELEVATIONS FOR EXACT LOCATION OF FIXTURES AND WALL MOUNTED DEVICES.

MATERIAL: ALL MATERIALS SHALL BE NEW AND U.L. LISTED. MATERIAL INSTALLATION SHALL COMPLY WITH NEC REQUIREMENTS AND PERFORM BY CRAFTSMAN SKILLED IN THIS PARTICULAR WORK.

EQUIPMENT PROTECTION : PROTECT EQUIPMENT AND WORK FROM DAMAGE DURING HANDLING AND INSTALLATION UNTIL COMPLETION OF CONSTRUCTION.

COOPERATION WITH OTHER TRADES: COOPERATION WITH TRADES OF ADJACENT, RELATED OR AFFECTED MATERIALS OR OPERATIONS, AND WITH TRADES PERFORMING CONTINUATIONS OF THIS WORK UNDER SUBSEQUENT CONTRACTS. IS CONSIDERED A PART OF THIS WORK IN ORDER TO EFFECT TIMELY AND ACCURATE PLACING OF WORK AND TO BRING TOGETHER. IN PROPER AND CORRECT SEQUENCE, THE WORK OF SUCH TRADES. PROVIDE OTHER TRADES, AS REQUIRED, ALL NECESSARY TEMPLATES, PATTERNS, SETTING PLANS AND SHOP DETAILS FOR THE PROPER INSTALLATION OF THE WORK AND FOR THE PURPOSE OF COORDINATING ADJACENT WORK. ELECTRICAL POWER CONNECTIONS FOR MECHANICAL AND PLUMBING EQUIPMENT ARE IN THIS DIVISION UNLESS NOTED OTHERWISE. VERIFY CHARACTERISTICS OF ALL EQUIPMENT WITH DIVISION 15 AND OTHER SPECIAL DIVISIONS (ELEVATORS ETC) BEFORE ROUGHING IN THE ELECTRICAL CONNECTIONS AND ENERGIZING THE EQUIPMENT.

MECH/PLUMBING/SPECIAL EQPT ACCESS AND CLEARANCE AREAS: REMOVE ANY IMPROPERLY INSTALLED ELECTRICAL EQPT AND CONDUIT THAT ARE LIMITING PROPER ACCESS FOR EOPT SERVICE AND MAINTENANCE.

ACCESS PANEL: PROVIDE ACCESS PANELS OR DOORS FOR ALL DEVICES REQUIRING ADJUSTMENT. SIMILARLY FOR ALL JUNCTION BOXES, PULL BOXES ETC THAT ARE REQUIRED TO BE ACCESSIBLE PER CODE AND/OR THE LOCAL AUTHORITY HAVING JURISDICTION. APPEARANCE OF ACCESS PANELS/DOORS SHALL BE ACCEPTABLE TO ARCHITECT. PANELS/DOORS SHALL BE DESIGNED FOR THE FIRE RATING OF WALL OR CEILING IN WHICH THEY ARE INSTALLED. ALL ACCESS PANELS SHALL BE LOCKABLE AND SHALL BE KEYED ALIKE (SAME KEYING AS PANELS FROM OTHER DIVISIONS).

PLENUMS : PLENUMS ARE CROWDED AND NOT ALL OBSTACLES ARE INDICATED. ALLOW FOR CONDUIT OFFSETS AND PULL BOXES NOT INDICATED ON DRAWINGS.

PLASTER, GYPSUM BOARD OR OTHER NON-ACCESSIBLE CEILINGS: CONTRACTOR SHALL MINIMIZE CUTTING AND PATCHING BY INSTALLING CONDUIT PRIOR TO CEILING/WALL/PARTITION COVER-UP.

LOSS OR DAMAGE TO EXISTING FACILITIES:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOSS OR DAMAGE TO THE EXISTING FACILITIES CAUSED BY HIM AND HIS WORKMEN, AND SHALL BE RESPONSIBLE FOR REPAIRING OR REPLACING SUCH LOSS OR DAMAGE. THE CONTRACTOR SHALL SEND PROPER NOTICES, MAKE NECESSARY ARRANGEMENTS, AND PERFORM OTHER SERVICES REQUIRED FOR THE CARE, PROTECTION AND IN-SERVICE MAINTENANCE OF ALL ELECTRICAL SERVICES FOR THE <NEW AND EXISTING> FACILITIES. THE CONTRACTOR SHALL ERECT TEMPORARY BARRICADES, WITH NECESSARY SAFETY DEVICES, AS REQUIRED TO PROTECT PERSONNEL AND THE GENERAL PUBLIC FROM INJURY, REMOVING ALL SUCH TEMPORARY PROTECTION UPON COMPLETION OF THE WORK.

THE CONTRACTOR SHALL MODIFY, REMOVE AND/OR REPLACE ALL MATERIALS AND ITEMS SO INDICATED ON THE DRAWINGS OR REQUIRED BY THE INSTALLATION OF NEW FACILITIES. SALVAGE MATERIALS SHALL REMAIN THE PROPERTY OF THE OWNER AND SHALL BE DELIVERED TO SUCH DESTINATION AS DIRECTED BY THE OWNER. DISPOSE OF SALVAGE MATERIAL IF NOT RETAINED BY OWNER WHERE EXISTING CONSTRUCTION IS REMOVED TO PROVIDE WORKING AND EXTENSION ACCESS TO EXISTING UTILITIES. CONTRACTOR SHALL REMOVE CEILING GRID, TILES, DOORS, PIPING, AIR CONDITIONING DUCTWORK AND EQUIPMENT, ETC., TO PROVIDE THIS ACCESS AND SHALL REINSTALL SAME UPON COMPLETION OF WORK IN THE AREAS AFFECTED.

WORK IN OCCUPIED AREAS: WORK IN, ABOVE, BELOW OR NEAR OCCUPIED AREAS SHALL BE AT OWNER 'S CONVENIENCE AND MAY BE DURING EVENINGS OR WEEKENDS. SCHEDULE ALL REQUIRED POWER OUTAGES A MINIMUM OF 7 DAYS IN ADVANCE WITH FACILITY ENGINEER/OWNER. DO NOT TURN OFF ANY POWER SOURCES. ONLY FACILITY ENGINEER/OWNER OR HIS AUTHORIZED REPRESENTATIVE MAY DO SO

ELECTRICAL SERVICE OUTAGE: SERVICE TO THE EXISTING BUILDING SHALL BE MAINTAINED DURING NORMAL WORKING HOURS. ANY SERVICE OUTAGE REQUIRED TO COMPLETE THE WORK SHALL BE THE TIME AND FOR THE LENGTH OF TIME AS DIRECTED BY THE OWNER. ALL PREMIUM TIME SHALL BE INCLUDED IN CONTRACTOR'S BID.

FIRE STOPS AND PENETRATION SEALS: ALL PENETRATIONS THROUGH FIRE RATED FLOORS AND WALLS SHALL BE SEALED WITH 3M FIRE RESISTANT FOAM SEALANT. TO PREVENT THE SPREAD OF SMOKE, FIRE, TOXIC GAS OR WATER THROUGH THE PENETRATION EITHER BEFORE, DURING OR AFTER A FIRE, THE FIRE RATING OF THE PENETRATION SEAL SHALL BE AT LEAST THAT OF THE FLOOR OR WALL INTO WHICH IT IS INSTALLED, SO THAT THE ORIGINAL FIRE RATING OF THE FLOOR OR WALL IS MAINTAINED AS REQUIRED BY ARTICLE 300.21 OF THE NATIONAL ELECTRICAL CODE.

CLEAN UP: A) PROVIDE FOR ISOLATION OF WORK AREAS AND DAILY REMOVAL OF DEBRIS. B) CLEAN ALL EQUIPMENT AND FIXTURE LENSES. C) REPLACE ALL BURNED OUT LAMPS. D) TOUCH UP WITH PAINT WHERE REQUIRED.

SUBMITTAL DATA: SUBMITTALS ARE REQUIRED BUT NOT LIMITED TO THE FOLLOWING EQUIPMENT: LIGHTING FIXTURES; SWITCHGEAR; MCCS; DISTRIBUTION: PANELBOARDS: BRANCH CIRCUIT PANELBOARDS: TRANSFORMERS: SWITCHES ETC: EMERGENCY STANDBY GENERATOR SYSTEM: FIRE ALARM SYSTEM: NURSE CALL: SYSTEM: SECURITY SYSTEM: TELEPHONE SYSTEM: COMMUNICATION SYSTEM: CONDUIT/FITTINGS; WIRES; LIGHTNING PROTECTION SYSTEM

SHOP DRAWINGS: SHOP DRAWINGS AS REQUIRED SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR AT NO ADDITIONAL COST TO THE ARCHITECT. THESE SHOP DRAWINGS SHALL BE PREPARED TO INDICATE INSTALLATION OF MAJOR EQUIPMENT WHERE SPECIAL COORDINATION PROBLEM EXIST

OVERCURRENT & SAFETY DISCONNECT DEVICES FOR HVAC EQPT: OVERCURRENT (OC) & DISCONNECT DEVICES SHOWN ON PLANS ARE BASED ON A SPECIFIC HVAC EQUIPMENT MANUFACTURER. HVAC CONTRACTOR MAY SUBMIT OTHER MANUFACTURERS, DIFFERENT MODELS OR RATINGS. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO COORDINATE OC/DISCONNECT DEVICES WITH THE HVAC CONTRACTOR PRIOR TO SUBMITTING SUCH DEVICES FOR ENGINEER'S REVIEW. ANY DEVIATIONS FROM SIZES SHOWN ON DRAWINGS MUST BE NOTED IN THE SUBMITTALS. THE ELECTRICAL CONTRACTOR MUST CERTIFY THAT HE HAS REVIEWED AND COORDINATED WITH THE HVAC CONTRACTOR AND THAT ALL OC/DISCONNECT DEVICES SUBMITTED MATCH THE HVAC EQPT REQUIREMENTS. SHOP DRAWINGS WITHOUT SUCH CERTIFICATION WILL BE RETURNED TO THE CONTRACTOR. ONLY SUBMITTALS WITH SUCH CERTIFICATION WILL BE REVIEWED.

COMPLETE SYSTEMS: ALL SYSTEMS SHALL BE COMPLETE AND WORKING AT COMPLETION OF CONSTRUCTION.

ASSUMPTIONS, (B) ONE LINE DIAGRAM, (C) STATE CONCLUSIONS AND RECOMMENDATIONS

FINAL INSPECTION & OPERATING TESTS: ALL ELECTRICAL SYSTEMS MUST BE CHECKED FOR PROPER POLARITY AND SEQUENCE, ALL MOTORS MUST BE CHECKED FOR PROPER ROTATION AND ALL EQUIPMENT (INCLUDING HVAC, ELEVATOR AND SPECIAL EQUIPMENT) CHECKED FOR PROPER VOLTAGE AND PHASING REQUIREMENTS. PRIOR TO THE APPLICATION OF ANY POWER, THE CONTRACTOR MUST CERTIFY THAT ALL CONNECTED EQUIPMENT MATCH THE CHARACTERISTICS OF THE SUPPLY CIRCUIT VOLTAGE, PHASING AND FEEDER REQUIREMENTS.

AT THE TIME DESIGNATED BY THE ARCHITECT, THE ENTIRE SYSTEM SHALL BE INSPECTED BY THE ARCHITECT AND THE ENGINEER. THE CONTRACTOR OR HIS REPRESENTATIVE SHALL BE PRESENT AT THIS INSPECTION. AFTER ALL SYSTEMS HAVE BEEN COMPLETED AND PUT INTO OPERATION, SUBJECT EACH SYSTEM TO AN OPERATING TEST. UNDER DESIGN CONDITIONS TO ENSURE PROPER SEQUENCE AND OPERATION THROUGHOUT THE RANGE OF OPERATION, MAKE ADJUSTMENTS AS REQUIRED TO ENSURE PROPER FUNCTIONING OF ALL SYSTEMS. SPECIAL TESTS ON INDIVIDUAL SYSTEMS ARE SPECIFIED UNDER INDIVIDUAL SECTIONS

THE CONTRACTOR SHALL PROVIDE A SET OF AS-BUILT DRAWINGS AND MYLAR REPRODUCIBLES TO THE OWNER/ARCH. AFTER THE INSPECTION, ANY ITEMS WHICH ARE NOTED AS NEEDING TO BE CHANGED OR CORRECTED IN ORDER TO COMPLY WITH THESE SPECIFICATIONS AND THE DRAWINGS SHALL BE ACCOMPLISHED WITHOUT DELAY.

GUARANTEE: GUARANTEE ALL WORK AND MATERIALS FURNISHED UNDER THIS CONTRACT FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE BY THE OWNER AND ARCHITECT. GUARANTEE SHALL INCLUDE: ALL LABOR, PARTS, TRAVEL/SUBSISTENCE, SOFTWARE CHANGES/RE-PROGRAMMING, ETC.

RECORD DRAWINGS: MAINTAIN A CONTINUOUS DAILY RECORD DURING THE COURSE OF CONSTRUCTION OF ALL CHANGES AND DEVIATIONS IN THE WORK FROM THE ACCOMPANYING DRAWINGS. SHOW EXACT DIMENSIONS FOR ALL UNDER-SLAB CONDUIT. UPON COMPLETION OF WORK, PURCHASE A SET OF MYLAR REPRODUCIBLES AND MAKE CORRECTIONS AS REQUIRED TO REFLECT THE ELECTRICAL SYSTEMS AS INSTALLED. SUBMIT THREE PRINTS OF THE TRACINGS FOR APPROVAL. MAKE CORRECTIONS TO TRACINGS AS DIRECTED AND DELIVER MYLAR TRACINGS TO THE OWNER.

26 05 73 SHORT CIRCUIT CALCULATION, PROTECTIVE DEVICE COORDINATION AND ARC FLASH STUDIES PROVIDE SHORT CIRCUIT CALCULATION, PROTECTIVE DEVICE COORDINATION AND ARC FLASH HAZARD STUDIES, STUDIES SHALL ENCOMPASS ELECTRICAL DISTRIBUTION SYSTEM FROM NORMAL POWER SOURCE OR SOURCES TO AND INCLUDING (BRANCH BREAKERS IN EACH PANELBOARD}. PREPARE STUDY PRIOR TO ORDERING DISTRIBUTION EQUIPMENT TO VERIFY EQUIPMENT RATINGS REQUIRED. PERFORM STUDY WITH AID OF COMPUTER SOFTWARE PROGRAMS. REPORT SHALL INCLUDE: (A) CALCULATION METHODS AND

ARC FLASH HAZARD ANALYSIS SHALL NOT BE REQUIRED FOR EQUIPMENT RATED 240 VOLTS OR LESS AND SUPPLIED BY ONE TRANSFORMER RATED LESS THAN 125 KVA. CONTRACTOR SHALL PROVIDE WARNING LABELS ON ELECTRICAL EQUIPMENT INDICATING INCIDENT ENERGY LEVEL. LEVEL OF HAZARD AND THE REQUIRED PERSONAL PROTECTION EQUIPMENT. EQUIPMENT SHALL INCLUDE, BUT NOT LIMITED TO, SWITCHBOARDS, DISTRIBUTION PANELS, MOTOR CONTROL CENTERS, PANELS, CONTACTORS, DISCONNECT SWITCHES AND MOTOR STARTERS.

26 05 33 CONDUIT AND BOXES

CONDUIT: SHALL BE RIGID GALVANIZED STEEL (RGS) OR ELECTRICAL METALLIC TUBING (EMT) AS MANUFACTURED BY ALLIED, TRIANGLE OR WHEATLAND. INDOORS ABOVE GRADE: EMT OR RGS.

OUTDOORS ABOVE GRADE, STUB-UPS, OR ON ROOF: RGS OR IMC

 BELOW GRADE: SCHEDULE 40 OR 80 PVC OR RGS. UNDER SLAB: RGS OR SCHEDULE 80 PVC.

PROVIDE TRANSITION FITTINGS FROM PVC SCH 40 OR 80 TO RGS FOR ALL ABOVE GRADE CONDUIT. ALL UNDERGROUND METALLIC CONDUIT SHALL HAVE 40-MIL THICK EXTERNAL PVC COATING FOR CORROSION PROTECTION. UNDERGROUND CONDUIT MINIMUM SIZE 3/4". MINIMUM 24" BURIAL DEPTH FROM FINISHED GRADE TO TOP OF CONDUIT, PROVIDE DEEPER BURIAL DEPTH IF REQUIRED BY LOCAL CODES. PROVIDE CONCRETE ENCASEMENT FOR ALL INCOMING SERVICE CONDUIT UNLESS SPECIFICALLY NOTED OTHERWISE. PROVIDE RED DETECTABLE WARNING TAPE OVER ENTIRE RUN OF SERVICE AND MAJOR CONDUIT RUNS.

INSTALL GROUND WIRES WHERE SHOWN ON THE DRAWINGS. COMPRESSION OR SET-SCREW TYPE FITTINGS MAY BE USED FOR EMT. MINIMUM CONDUIT SIZE 1/2 INCH. TYPE "MC" METAL CLAD CABLE IS ACCEPTABLE IF APPROVED BY THE LOCAL AUTHORITY. MC CABLE, IF APPROVED, HOWEVER, MAY BE USED ONLY FOR DROPS FROM CEILING PLENUM JUNCTION BOXES TO LIGHT FIXTURES AND RECEPTACLES & LIGHT SWITCHES IN WALLS. MC CABLE MAY BE USED AS FIXTURE WHIPS FROM CEILING PLENUM JUNCTION BOXES TO LIGHT FIXTURES, WHIPS MUST BE 6-FT OR LESS. HOMERUN CIRCUITS TO PANELS SHALL BE IN CONDUIT, MC HOMERUN TO PANELS IS NOT ACCEPTABLE. TYPE "AC" ARMORED CABLE (COMMONLY REFERRED TO AS "BX") IS NOT ACCEPTABLE AND SHALL NOT BE USED. ELECTRICAL NONMETALLIC TUBING (ENT, N.E.C. ARTICLE 362) SHALL NOT BE USED UNLESS SPECIFICALLY APPROVED BY THE ENGINEER. FLEXIBLE CONDUIT SHALL BE UTILIZED AS FINAL CONNECTIONS (3'-5' ONLY) AT THE FOLLOWING EQUIPMENT: MOTORS, LIGHTING FIXTURES, HEATER, POWER SUPPLIES, AND ANY OTHER VIBRATION PRODUCING EQUIPMENT. UTILIZE 1/2" FLEXIBLE METALLIC CONDUIT MINIMUM AND INCLUDE A GREEN GROUND WIRE. USE SEALTITE IN WET LOCATIONS SUCH AS OUTDOOR CONDENSING UNITS, WALK-IN COOLER/ FREEZER, KITCHEN, ROOFTOP HVAC EQPT ETC. CONDUIT SHALL BE SUPPORTED FROM STRUCTURE EVERY 5 FEET AND WITHIN 3 FEET OF ALL BOXES. USE LOCKNUTS INSIDE AND OUT AT BOXES. MAINTAIN MINIMUM 12" SEPARATION FROM ALL HIGH TEMPERATURE PIPES. ALL CONDUIT RUNS SHALL BE INSTALLED EITHER PARALLEL OR PERPENDICULAR TO BUILDING LINES. ROUTE CNDUIT AS DIRECTLY AS POSSIBLE WITH LARGEST RADIUS BENDS POSSIBLE. MAKE BENDS WITH STANDARD ELLS OR BENDS PER NEC. PROVIDE EXPANSIONS FITTINGS IF CONDUIT CROSSES STRUCTURAL EXPANSION JOINT. ALL CONDUIT ON ROOF SHALL BE SUPPORTED BY AN ENGINEERED, PREFABRICATED PORTABLE PIPE SYSTEM SPECIFICALLY DESIGNED TO BE INSTALLED ON THE ROOF WITHOUT ROOF PENETRATIONS, FLASHING OR DAMAGE TO THE ROOF MEMBRANE. PROVIDE PIPE SUPPORT SYSTEM BY ERICO, MODEL "CADDY PYRAMID" OR EQUAL BY COOPER B-LINE. SUPPORT AT INTERVAL NOT TO EXCEED 10' ON CENTER, AND WITHIN 5' OF ANY DEFLECTION OF CONDUIT. CONDUIT ON ROOF SHALL BE SUPPORTED ON 4 "X4" REDWOOD SLEEPER AT 10-FOOT INTERVAL. CLEAN CONDUIT INTERIOR AFTER INSTALLATION; COAT SCRATCHES WITH ZINC PAINT. PROVIDE PULL WIRE IN ALL CONDUIT (POWER, FIRE ALARM, TELEPHONE AND OTHER COMMUNICATION CONDUIT). PULL WIRE ALSO REQUIRED IN ALL SPARE CONDUIT. PROJECT RECORD DOCUMENTS: ACCURATELY RECORD ACTUAL ROUTING OF ALL UNDERSLAB AND UNDERGROUND CONDUITS; INCLUDE DIMENSIONS FROM KEY BUILDING POINTS AND DEPTH OF COVER.

OUTLET BOXES: SHALL BE GALVANIZED STEEL SUITABLE FOR LOCATION. CEILING OUTLET BOXES SHALL BE 4" OCTAGON. WALL OUTLET BOXES SHALL BE PROPER DESIGN TO ACCOMMODATE THE DEVICES REQUIRED - 4 INCH SQUARE WITH RAISED COVER. PROVIDE RACO, STEEL CITY OR APPLETON, ALL J-BOXES / SPLICE BOXES MUST BE ACCESSIBLE

JUNCTION /PULL BOXES: (A) FOR EACH CONDUIT RUN: PROVIDE ONE JUNCTION/PULL BOX FOR EACH EQUIVALENT THREE QUARTER BENDS (270°). (B) UNDERGROUND FEEDERS: MINIMUM ONE PULL BOX FOR EACH 350 FEET OF CONDUIT RUN.

26 05 19 BUILDING WIRE AND CABLE

WIRE: (TRIANGLE, AMERICAN INSULATED CABLE CO., OR CABLEC) ALL WIRING SHALL BE IN CONDUIT (EXCEPT PLENUM RATED LOW VOLTAGE CABLES). ALL WIRES MUST BE 75-DEGREE C RATED OR BETTER, 60-DEGREE C RATED WIRE SHALL NOT BE USED. 90-DEGREE C RATED WIRE MAY BE USED BUT ONLY AT 75-DEGREE C AMPACITY EMERGENCY AND NORMAL CIRCUITS MUST BE INSTALLED IN SEPARATE CONDUIT AND DEVICE BOXES PER N.E.C. ARTICLE 700.9.(B) A.) MINIMUM SIZE #12 EXCEPT CONTROLS MAY BE #14. USE #10 CONDUCTORS FOR 20 AMPERE, 120 VOLT BRANCH CIRCUITS LONGER THAN 100 FEET. USE #10 CONDUCTORS FOR 20 AMPERE, 277 VOLT BRANCH CIRCUITS LONGER THAN 200 FEET.

B.) TYPE THHN/THWN STRANDED COPPER THERMOPLASTIC IN DRY LOCATIONS C.) TYPE THWN IN WET LOCATIONS (OUTDOOR, UNDERGROUND, ON ROOF, ETC...

D.) ALL WIRE SHALL BE 98% CONDUCTIVITY COPPER, 600 VOLT. NO ALUMINUM WIRES.

E.) WIRE #10 AND SMALLER MAY BE SOLID OR STRANDED, #8 OR LARGER SHALL BE STRANDED

F.) COMMUNICATION WIRE (FIRE ALARM, TELEPHONE, HVAC THERMOSTAT, DATA ETC.): PLENUM RATED LOW-SMOKE CABLE MAY BE USED IN LIEU OF WIRE/CONDUIT TYPE INSTALLATION. ALL PLENUM RATED CABLE SHALL BE PROPERLY SUPPORTED BY BRIDAL RINGS, CABLE TIES, CLIPS ETC MADE BY ERICO (CADDY COMMUNICATION FASTENERS) OR EQUAL. DO NOT USE SCRAP WIRE TO WRAP AND SUPPORT COMMUNICATION WIRES. HOMEMADE SUPPORT DEVICES ARE NOT ACCEPTABLE. DO NOT LAY COMMUNICATION CABLE DIRECTLY ON TOP OF CEILING TILES, INSTALL CABLES A MINIMUM OF 12" ABOVE CEILING TILES AND 12" FROM HVAC DUCTWORK. PROVIDE A MINIMUM OF 6" SEPARATION BETWEEN POWER CONDUIT AND COMMUNICATION WIRINGS.

FIELD INSULATION TESTING: INSULATION RESISTANCE OF ALL CONDUCTORS SHALL BE TESTED. EACH CONDUCTOR SHALL HAVE ITS INSULATION RESISTANCE TESTED AFTER THE INSTALLATION IS COMPLETED AND ALL SPLICES, TAPS AND CONNECTIONS ARE MADE EXCEPT CONNECTION TO OR INTO ITS SOURCE AND POINT (OR POINTS) OF TERMINATION. INSULATION RESISTANCE OF CONDUCTORS WHICH ARE TO OPERATE AT 600 VOLTS OR LESS SHALL BE TESTED BY USING A BIDDLE MEGGER OF NOT LESS THAN 1000 VOLTS DC. INSULATION RESISTANCE OF CONDUCTORS RATED AT 600 VOLTS SHALL BE FREE OF SHORTS AND GROUNDS AND HAVE A MINIMUM RESISTANCE PHASE-TO-PHASE AND PHASE-TO-GROUND OF AT LEAST 10 MEGOHMS. CONDUCTORS THAT DO NOT EXCEED INSULATION RESISTANCE VALUES LISTED ABOVE SHALL BE REMOVED AT CONTRACTOR'S EXPENSE AND REPLACED AND TEST REPEATED. THE CONTRACTOR SHALL FURNISH AL INSTRUMENTS AND PERSONNEL REQUIRED FOR TESTS, SHALL TABULATE READINGS OBSERVED, AND SHALL FORWARD COPIES OF THE TEST READINGS TO THE OWNER. THESE TESTS REPORTS SHALL IDENTIFY EACH CONDUCTOR TESTED, DATE AND TIME OF TEST AND WEATHER CONDITIONS. EACH TEST SHALL BE SIGNED BY THE PARTY MAKING THE TEST.

26 27 26 WIRING DEVICES

WIRING DEVICES: FURNISH AND INSTALL WHERE INDICATED ON DRAWINGS. MATCH EXISTING OR BASE BUILDING DEVICES IF APPLICABLE ALL DEVICES SHALL BE LEVITON "DECORA" TYPE (WHITE COLOR, CONFIRM W/ARCHITECT) OR APPROVED EQUAL UNLESS SPECIFIED OTHERWISE BY ARCHITECT. ALL RECEPTACLES SHALL BE FED SPEC TYPE. TOGGLE LIGHT SWITCHES AND COVER PLATES ON EMERGENCY POWER SHALL BE RED COLOR. EMERGENCY POWER OUTLETS AND COVER PLATES TO BE RED. ALL POWER OUTLETS SHALL HAVE CIRCUIT NUMBERS AND PANEL NAME ENGRAVED ON FACEPLATE.

DIMMER SWITCHES: PROVIDE DEDICATED NEUTRAL FOR DIMMER CONTROLLED LIGHTING CIRCUIT. DO NOT SHARE NEUTRAL WITH 2 OR MORE BRANCH CIRCUITS. DO NOT BREAK FINS (HEAT SINKS) ON DIMMER SWITCH. DERATED DIMMER SWITCHES MAY BE USED ONLY WHERE SPECIFICALLY APPROVED BY ENGINEER.

GROUND FAULT CIRCUIT INTERRUPTER (GFCI) RECEPTACLE SHALL COMPLY WITH 2006 UL 943 SAFETY STANDARD. GFCI RECEPTACLE SHALL HAVE INTEGRAL END-OF-LIFE LED INDICATOR LIGHT, AND CONTINUOUS SENSING AND SELF-TESTING EVERY 60 SECONDS, PROVIDE HUBBELL GFR5352 OR APPROVED EQUAL

ISOLATED POWER RECEPTACLES (IF USED) TO BE ORANGE COLOR, WITH CIRCUIT NUMBER AND PANEL NAME ENGRAVED ON FACE PLATE. COVER PLATES: HIGH ABUSE NYLON OR STAINLESS STEEL PER ARCHITECT. PROVIDE CIRCUIT NUMBER LABEL ON ALL DEVICE PLATES. ALL ELECTRICAL BOXES ON OPPOSITE SIDES OF CORRIDOR WALLS AND FIREWALLS MUST BE SEPARATED BY A HORIZONTAL DISTANCE OF NOT LESS THAN 24 INCHES.

TESTING AND CERTIFICATION: CONTRACTOR SHALL DELIVER A WRITTEN REPORT CERTIFYING THAT EVERY RECEPTACLE HAS BEEN TESTED AS FOLLOWS AND FOUND ACCEPTABLE: (A) THE PHYSICAL INTEGRITY OF EACH RECEPTACLE SHALL BE CONFIRMED BY VISUAL INSPECTION. (B) THE CONTINUITY OF THE GROUNDING CIRCUIT IN EACH ELECTRICAL RECEPTACLE SHALL BE VERIFIED. (C) CORRECT POLARITY OF THE HOT AND NEUTRAL CONNECTIONS IN EACH ELECTRICAL RECEPTACLE SHALL BE CONFIRMED. (D) THE RETENTION FORCE OF THE GROUNDING BLADE OF EACH ELECTRICAL RECEPTACLE (EXCEPT LOCKING-TYPE RECEPTACLES) SHALL BE NOT LESS THAN 115 GRAMS (4 OZ.).

26 05 26 GROUNDING AND BONDING

GROUNDING: ALL CONDUIT WORK AND ELECTRICAL EQUIPMENT SHALL BE EFFECTIVELY AND PERMANENTLY GROUNDED IN ACCORDANCE WITH NEC REQUIREMENTS. PROVIDE GREEN EQUIPMENT GROUNDING CONDUCTOR WITH ALL POWER AND RECEPTACLE AND LIGHTING CIRCUITS. GREEN EQUIPMENT GROUNDING CONDUCTOR SHALL BE ROUTED FROM PANEL GROUND BUS TO FINAL DEVICES. GROUNDING ELECTRODES: PROVIDE 3/4" X 10-FT LONG, COPPER-CLAD, STEEL GROUNDING ROD. FOR BELOW-GRADE CONNECTIONS PROVIDE EXOTHERMIC WELDED TYPE: FOR ABOVE GRADE CONNECTIONS PROVIDE MECHANICAL BOLTED-TYPE CONNECTIONS UTILIZING HIGH CONDUCTIVE COPPER ALLOY OR BRONZE LUGS OR CLAMPS. SERVICE GROUND RESISTANCE: MUST BE LESS THAN 25 OHMS. PROVIDE ADDITIONAL GROUND RODS AS REQUIRED TO OBTAIN 25 OHMS OR LESS.

26 05 53 ELECTRICAL IDENTIFICATION

IDENTIFICATION: LABEL ALL JUNCTION AND PULL BOXES WITH PANELS AND CIRCUIT NUMBERS. ALL JUNCTION AND PULL BOXES IN CEILING PLENUM SHALL BE PAINTED YELLOW FOR 480 VOLT HIGH VOLTAGE SYSTEM: BLUE FOR LOW VOLTAGE SYSTEM (240 VOLT AND/OR 208 VOLT). FURNISH MARKERS OR PAINT BAND FOR EACH CONDUIT LONGER THAN 6 FEET, SPACING 20 FEET ON CENTER. COLOR OF PAINT BAND (CONFIRM COLOR MATCHES EXISTING COLOR CODE.) : (A) 480 VOLT SYSTEM - BLACK, (B) 208 VOLT SYSTEM - BLACK W/BLUE STRIPES, (C) FIRE ALARM SYSTEM - RED. (D) TELEPHONE SYSTEM - YELLOW, (E) OTHER SYSTEM - BY SPECIFIC LETTER DESCRIPTION. LABEL ALL HOMERUN AND MAJOR CONDUIT WITH HOME PANELS/SWITCHES ETC. AT EVERY 10-FT. INTERVAL IF ACCESSIBLE AND/OR VISIBLE, EXAMPLE: PANEL "X". SW. "X". COND UNIT XXX. XFMR DISC. SW., X-RAY FEEDER XXX. ETC. MARK ALL BRANCH CONDUIT WITH CIRCUIT NUMBERS AT EACH SURFACE MOUNTED PANEL LOCATION. FOR RECESSED PANELS, MARK BRANCH CONDUIT IN CEILING PLENUM JUST ABOVE PANELS.

COLOR CODE: CONDUCTORS SHALL BE COLOR CODED AS FOLLOWS (FOLLOW LOCAL AHJ OR EXISTING COLOR CODES IF APPLICABLE):

	480Y/277V 3PH/4W	208Y/120V 3PH/4W	240/120V 3PH/4W	120/240V 1PH/3W
PHASE A	BROWN	BLACK	BLACK	BLACK
PHASE B	PURPLE	RED	ORANGE (HIGH LEG)	RED
PHASE C	YELLOW	BLUE	BLUE	BLUE
NEUTRAL	GRAY OR WHITE	WHITE	WHITE	WHITE
GROUND	GREEN	GREEN	GREEN	GREEN

ALL PANELS SHALL BE IDENTIFIED USING NAMEPLATES WITH 4 ROWS OF TEXT (LETTER HEIGHT SHALL BE 1/4" MINIMUM), EXAMPLE: PANEL "XX", SECTION # 1 OF 2-SECT PNL

225 AMPS BUS, 150A MCB, 208Y/120V FED FROM DIST PANEL "XXX". 1ST FLOOR

FEEDER SIZE 4 # 1/0 THWN, 1 # 6 G, 2 1/2"C.

PANEL NAMEPLATES SHALL BE ENGRAVED THREE-LAYER LAMINATED PLASTIC, WHITE LETTERS ON BLACK BACKGROUND FOR NORMAL POWER, RED LETTER/BLACK BACKGROUND FOR EMERGENCY POWER. SECURE NAMEPLATES TO EQUIPMENT USING SCREWS OR RIVETS. IN ADDITION TO THE 4 ROWS OF TEXT, ALL EMERGENCY POWER PANELS SHALL BE IDENTIFIED AS TO THE BRANCHES THEY SERVE. PROVIDE LABELS "EMERGENCY LIFE SAFETY BRANCH". "EMERGENCY CRITICAL BRANCH" AND "EMERGENCY EQUIPMENT BRANCH" FOR ALL EMERGENCY PANELS. USE RED LETTER ON BLACK BACKGROUND FOR ALL EMERGENCY PANELS. LETTER HEIGHT SHALL BE 1/4 " MINIMUM. ALL SWITCHES, STARTERS, COMBINATION STARTERS / DISCONNECTS, TRANSFORMERS, WIREWAYS, COMMUNICATION CABINETS, JUNCTION AND PULL BOXES ETC SHALL BE SIMILARLY IDENTIFIED. PROVIDE LABEL FOR EACH BRANCH CIRCUIT ON DISTRIBUTION PANELS, SWITCHBOARDS AND MCC'S.

208V, 3 PHASE, 3 WIRE FEEDER SIZE 3 # 4/0 THWN, 1 # 4 G, 2 1/2"C. FED FROM DIST PANEL "XXX", 1ST FLOOR

ACCU-1

ALL EMERGENCY PANELS, JUNCTION BOXES WITH EMERGENCY CIRCUITS, ETC. SHALL BE PAINTED RED.

33 71 73 ELECTRICAL SERVICE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR TEMPORARY AND PERMANENT SERVICE. COMPLY WITH ALL SERVICE INSTALLATION STANDARDS OF THE SERVING UTILITY. ELECTRICAL SERVICE CHARACTERISTICS SHALL BE AS SHOWN ON THE ELECTRICAL ONE LINE DIAGRAM. CONTRACTOR SHALL COORDINATE LOCATION OF SERVICE ENTRANCE WITH THE POWER COMPANY. PROVIDE MATERIALS AND EQUIPMENT REQUIRED TO CONNECT THE PROJECT SERVICE TO THE UTILITY SYSTEM. CONTRACTOR SHALL SUBMIT TO THE POWER COMPANY AN APPLICATION FOR SERVICE. CONTRACTOR SHALL SUBMIT SERVICE APPLICATION TO THE POWER COMPANY WITHIN 30 DAYS AFTER AWARD OF PROJECT CONTRACT. CONTRACTOR SHALL SECURE A SERVICE OUTLET AND DATA STATEMENT ("STATEMENT") FROM THE POWER COMPANY. VERIFY THAT THE INFORMATION ON THE STATEMENT IS CORRECT, INCLUDING VOLTAGE, PHASE AND NUMBER OF WIRES, TYPES OF SERVICE, SERVICE FACILITY ARRANGEMENTS, AND LOCATION OF SERVICE OUTLET. PROVIDE A COPY OF THE STATEMENT FOR ENGINEER'S REVIEW. FAILURE TO SUBMIT SERVICE APPLICATION IN A TIMELY MANNER MAY CAUSE PROJECT DELAY AND ADDITIONAL COST. ALL SUCH COST DUE TO CONTRACTOR'S FAILURE TO APPLY AND COORDINATE FOR SERVICE IN A TIMELY MANNER SHALL BE BORNE BY THE CONTRACTOR. CONTRACTOR SHALL COORDINATE AND ASSIST OWNER IF APPLICATION IS REQUIRED TO BE SUBMITTED BY OWNER. OUTAGES: SCHEDULE POWER OUTAGES TO AVOID INTERFERENCE WITH THE OWNER 'S ACTIVITIES. OBTAIN APPROVAL FROM OWNER AT LEAST 30 DAYS PRIOR TO THE REQUESTED OUTAGES. IF REQUIRED BY THE OWNER, PROVIDE A SCHEDULE SHOWING SEQUENCE AND DURATION OF ALL ACTIVITIES DURING THE REQUESTED OUTAGES.

26 24 13 DISTRIBUTION SWITCHBOARDS ALL EQUIPMENT SHALL HAVE COPPER BUSES OR WINDINGS

FRONT, BACK AND SIDES. BUSES: SHALL BE 98% IACS CONDUCTIVITY, TIN- OR SILVER-PLATED COPPER WITH ROUNDED EDGES. DETERMINE CURRENT RATING FOR SECTION BUS AND BRANCH BUS ON THE BASIS OF SERVICE TO ALL DEVICES INCLUDING SPARES AND SPACES FOR FUTURE ADDITION. SIZE SECTION BUS A MINIMUM OF 60 PERCENT OF THE MAIN BUS RATING. IN EACH SWITCHBOARD SECTION INCLUDE AN UNINSULATED NEUTRAL BUS ON INSULATED BUS SUPPORTS SECURED TO THE SECTION FRAME AND BOLT TO NEUTRAL BUS BARS IN ADJACENT SECTIONS, THUS PROVIDING A CONTINUOUS NEUTRAL BUS. IN EACH SWITCHBOARD SECTION INCLUDE AN UNINSULATED COPPER GROUND BUS BAR FOR THE EQUIPMENT. SECURE THE BAR TO THE UNIT FRAME AND BOLT TO THE GROUND BUS BARS IN ADJACENT SECTIONS, THUS PROVIDING A CONTINUOUS EQUIPMENT GROUND BUS. INCLUDE TERMINATIONS AT THE BUS BAR FOR FEEDER AND BRANCH CIRCUIT GROUNDING CONDUCTORS. THE TERMINATIONS MUST BE EXOTHERMICALLY WELDED ON OR BE OF AN APPROVED PRESSURE CONNECTOR TYPE. MAKE AREA OF GROUND BUS NOT LESS THAN 1/4 X 2 SQUARE INCHES. EXTEND ALL BUSES THE ENTIRE LENGTH OF THE SWITCHBOARD. BUSES MUST HAVE THE REQUIRED CAPACITY FOR THEIR TOTAL LENGTH. MAKE PROVISIONS FOR EXTENSIONS FROM EITHER END OF BUSES. MAIN AND BRANCH CIRCUIT PROTECTIVE DEVICES: SEE DRAWINGS FOR SIZE. ALL DEVICES SHALL BE 100% RATED. METERING: EQUIP THE SWITCHBOARD WITH AMMETERS, VOLTMETERS AND DEMAND METERS.

GROUND-FAULT PROTECTION: PROVIDE GROUND FAULT PROTECTION ON CIRCUIT PROTECTIVE DEVICES WHERE INDICATED ON THE DRAWINGS. THE UNIT SHALL INCLUDE COORDINATED CURRENT SENSORS, SOLID STATE RELAY AND MONITOR PANEL OF THE SAME MANUFACTURER. CURRENT SENSORS - PROVIDE GROUND-FAULT PROTECTION AS AN INTEGRAL PART OF THE CIRCUIT PROTECTIVE DEVICE. A RESIDUAL SCHEME SHALL BE USED WHICH INCORPORATES AN ADDITIONAL CURRENT TRANSFORMER WHICH WILL MONITOR THE NEUTRAL.

SUBMITTALS: SUBMIT DIMENSIONED DRAWINGS OF THE SWITCHBOARD, INCLUDING TOP AND BOTTOM VIEWS SHOWING ENTRY AND EXIT SPACE FOR CONDUITS AND BUSWAYS. FRONT AND SIDE ELEVATIONS SHOWING ARRANGEMENT OF ALL DEVICES AND ALSO INCLUDE DIMENSIONAL DATA ON ALL BUSES INCLUDING MATERIAL TYPE AND CAPACITY OF THE BUSES. SUBMIT ONE LINE DIAGRAMS FOR EQUIPMENT BEING PROVIDED. ALSO SUBMIT INFORMATION ON ALL PROTECTIVE DEVICES INCLUDING TYPE RATINGS AND SETTINGS OF ALL TRIPS PROVIDED TO INCLUDE GROUND FAULT RELAY SETTINGS. PROVIDE COORDINATION STUDY OF ALL PROTECTIVE DEVICES. PROVIDE COORDINATION CURVES ON LOG-LOG PAPER FOR THE MAIN PROTECTIVE DEVICE AND FOR THE LARGEST BRANCH CIRCUIT DEVICES. THESE CURVES SHALL ALSO SHOW THE GROUND FAULT PROTECTIVE RELAY.

TESTING: AFTER INSTALLATION AND BEFORE ACCEPTANCE BY THE OWNER, THE CONTRACTOR SHALL PROVIDE THE SERVICES OF AN INDEPENDENT TESTING ORGANIZATION SUCH AS GENERAL ELECTRIC INSTALLATION AND SERVICE ENGINEERING, TESTCO OR WESTINGHOUSE ENGINEERING SERVICES TO PERFORMANCE TEST ALL GROUND FAULT RELAYS IN ACCORDANCE WITH NEC PARAGRAPH 230.95. THIS TEST SHALL INVOLVE PASSING A PRIMARY CURRENT THROUGH THE CURRENT SENSOR WITH A SUITABLE, LOW-VOLTAGE TEST SET AND TIMER, WHICH SHALL ALLOW VERIFICATION THAT THE GROUND FAULT RELAYS TRACK THEIR PUBLISHED CURVES AND THAT THEY ACTUALLY TRIP THE DEVICES ON WHICH THEY ARE APPLIED. THIS TEST SHALL ALSO INCLUDE THE POLARITY OF THE CURRENT SENSORS AND GIVE AN INDICATION OF SATISFACTORY OPERATION OF VOLTMETERS, AMMETERS AND THEIR SELECTOR SWITCHES. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER OF THIS TEST DATE 2 DAYS IN ADVANCE SO THAT TESTS CAN BE PROPERLY WITNESSED.

OWNER.

26 24 16 PANELBOARDS PANELS SHALL BE PAINTED RED WITH RED-LETTER NAME TAGS. THAN 6 1/2 FEET ABOVE THE FLOOR OR WORKING PLATFORM. OWNER

26 28 19 ENCLOSED SAFETY SWITCHES ALL SAFETY SWITCHES SHALL BE HEAVY-DUTY TYPE WITH QUICK-MAKE, QUICK-BREAK CONTACTS AND SUITABLE FOR TERMINATING 75-DEGREE C WIRE, PROVIDE EACH SWITCH WITH A GROUND LUG, PROVIDE A DEFEATABLE, FRONT ACCESSIBLE, COIN-PROOF DOOR INTERLOCK TO PREVENT OPENING THE DOOR WHEN THE SWITCH IS IN THE ON POSITION AND TO PREVENT TURNING THE SWITCH ON WHEN THE DOOR IS OPEN. PROVIDE INCOMING LINE TERMINALS WITH AN INSULATED SHIELD SO THAT NO LIVE PARTS ARE EXPOSED WHEN THE DOOR IS OPEN. PROVIDE EACH SWITCH WITH AN ISOLATED, FULLY RATED NEUTRAL BLOCK WITH PROVISIONS FOR BONDING THE BLOCK TO THE ENCLOSURE. WHERE FUSIBLE SWITCHES ARE SHOWN, PROVIDE SWITCHES WITH REJECTION-TYPE FUSE HOLDERS WHICH ARE SUITABLE FOR USE WITH FUSES. IN GENERAL, MOUNT SWITCHES SO THAT OPERATING HANDLE IS APPROXIMATELY 44 INCHES ABOVE FINISHED FLOOR; WHERE GROUPED, ALIGN TOPS OF SWITCHES. ACCEPTABLE MANUFACTURERS ARE GE, SQUARE D, EATON/CUTLER-HAMMER, AND SIEMENS, MATCH EXISTING WHERE REQUIRED BY OWNER.

26 22 00 DRY TYPE TRANSFORMERS PROVIDE DRY TYPE QUIET TRANSFORMERS (PER ANSI -C89 AND UL 506), SELF-COOLED NEMA CLASS AA, COPPER WIRE WINDINGS. ALUMINUM-WINDING TRANSFORMER IS ACCEPTABLE, PROVIDED THAT SUBSTITUTE ALUMINUM TRANSFORMER IS IN COMPLIANCE WITH NEC CLEARANCE REQUIREMENTS. TRANSFORMERS MUST MEET OR EXCEED NEMA TP-1 ENERGY EFFICIENCY STANDARDS.

FURNISH FULL-LOAD TAPS IN THE PRIMARY WINDINGS AS FOLLOWS: <u>KVA RATING</u> TAPS 3-15 KVA. SINGLE PHASE

25-100 KVA, SINGLE PHASE 30-300 KVA, THREE PHASE

167-250 KVA, SINGLE PHASE 500 KVA, THREE PHASE

9-15 KVA, THREE PHASE

COPIES OF THE RECORD TO THE ARCHITECT/ENGINEER.

RAGE SU	JUND LEVELS	ľ
KVA	<u>DB</u>	
0-9	40	
10-50	45	
51-150	50	
151-300	55	
301-500	60	

PROVIDE A 220C INSULATION SYSTEM FOR A MAXIMUM 115-DEGREE C TEMPERATURE RISE OVER A 40-DEGREE C AMBIENT. SPECIAL TRANSFORMERS: 150-DEGREE C RISE FOR SHIELDED ISOLATION TYPE; 115-DEGREE C RISE FOR K-RATED TRANSFORMERS. MAKE TRANSFORMER CABLE CONNECTIONS WITH COMPRESSION-TYPE LUGS SUITABLE FOR TERMINATIONS OF 75C RATED CONDUCTORS. CONSTRUCT CONCRETE PAD FOR FLOOR-MOUNTED TRANSFORMERS, MAINTAIN A MINIMUM OF 6 INCHES FREE AIR SPACE BETWEEN ENCLOSURE AND WALL. MOUNT TRANSFORMERS ON VIBRATION ISOLATING PADS SUITABLE FOR ISOLATING THE TRANSFORMER NOISE FROM THE BLDG STRUCTURE. PROVIDE DOUBLE OR ADDITIONAL LUGS AS REQUIRED WHERE TWO OR MORE SECONDARY FEEDERS ARE CONNECTED TO TRANSFORMERS. PROVIDE VIBRATION ISOLATORS FOR ALL TRANSFORMERS. ACCEPTABLE MANUFACTURERS ARE GE, SQUARE D, EATON/CUTLER-HAMMER, AND SIEMENS. MATCH EXISTING WHERE REQUIRED BY OWNER

PROVIDE SWITCHBOARD WHICH PERMITS ACCESS TO BUSES AND DEVICES FOR INSTALLATION AND FUTURE MAINTENANCE FROM THE

ACCEPTABLE MANUFACTURERS ARE GE, SQUARE D, EATON/CUTLER-HAMMER, AND SIEMENS. MATCH EXISTING WHERE REQUIRED BY

ALL PANELBOARDS SHALL HAVE COPPER BUSES. LOAD CENTER TYPE PANELBOARDS ARE NOT ACCEPTABLE AND SHALL NOT BE USED. PROVIDE BREAKERS WHICH ARE QUICK-MAKE AND QUICK-BREAK ON BOTH MANUAL AND AUTOMATIC OPERATION. USE A TRIP-FREE BREAKER WHICH IS TRIP INDICATING. INCORPORATE INVERSE TIME CHARACTERISTICS BY BIMETALLIC OVERLOAD ELEMENTS AND INSTANTANEOUS CHARACTERISTICS BY MAGNETIC TRIP. FOR 2-POLE AND 3-POLE BREAKERS, USE THE COMMON-TRIP TYPE SO THAT AN OVERLOAD OR FAULT ON ONE POLE WILL TRIP ALL POLES SIMULTANEOUSLY. HANDLE TIES ARE NOT ACCEPTABLE. ALL BREAKERS SHALL BE BOLT-ON THERMAL MAGNETIC TYPE. STAB-ON BREAKERS ARE NOT ACCEPTABLE. DO NOT USE TANDEM CIRCUIT BREAKERS. ALL CIRCUIT BREAKERS RATED 100 AMP OR LESS SHALL BE SUITABLE FOR TERMINATING 75-DEGREE C WIRE (BREAKERS RATED FOR ONLY 60-DEGREE C WIRE IS NOT ACCEPTABLE. SEE SECTION 16123 - BUILDING WIRE AND CABLE). ALL EQUIPMENT SHALL BE LABELED, PANELBOARDS SHALL BE LABELED BOTH ON THE COVERPLATES AND THE INTERIORS. ALL EMERGENCY

PANELBOARD DIRECTORIES: PROVIDE A STEEL DIRECTORY FRAME MOUNTED INSIDE THE DOOR WITH A HEAT-RESISTANT TRANSPARENT FACE AND A DIRECTORY CARD FOR IDENTIFYING THE LOADS SERVED. IDENTIFY EACH CIRCUIT WITH LOAD AND LOCATIONS (ROOM NAMES AND ROOM NUMBERS) AND INDICATE WITH TYPED DIRECTORIES. (EXAMPLE: 5 DUPLEX RECEPTACLES, OFFICE, RM XXX). INSTALL THE PANELBOARDS SUCH THAT THE CENTER OF THE SWITCH OR CIRCUIT BREAKER IN THE HIGHEST POSITION WILL NOT BE MORE

FOR EACH PANEL: FURNISH & INSTALL ONE SPARE 3/4" CONDUIT FOR EVERY 6 SPARES AND/OR SPACES IN THE PANEL. EACH SPARE CONDUIT SHALL BE INSTALLED WITH PULL STRING STUBBED TO A J-BOX LOCATED IN ACCESSIBLE CEILING/PLENUM SPACE. INSTALL A MINIMUM OF ONE SPARE 3/4" CONDUIT FOR EVERY PANEL SHOWN ON PLANS, EVEN IF THERE ARE NO SPARES/SPACES IN SOME PANELS. ACCEPTABLE MANUFACTURERS ARE GE. SQUARE D. EATON/CUTLER-HAMMER, AND SIEMENS. MATCH EXISTING WHERE REQUIRED BY

(2) 5% TAPS BELOW RATED VOLTAGE (2) 5% TAPS BELOW RATED VOLTAGE

(6) 2.5% TAPS, (4) BELOW & (2) ABOVE RATED VOLTAGE (6) 2.5% TAPS, (4) BELOW & (2) ABOVE RATED VOLTAGE

(4) 2.5% TAPS, (2) BELOW & (2) ABOVE RATED VOLTAGE (4) 2.5% TAPS, (2) BELOW & (2) ABOVE RATED VOLTAGE

SELECT THE APPROPRIATE TAP SETTING ON TRANSFORMER SO THAT THE ACTUAL SECONDARY VOLTAGE IS ±1/2 OF A TAP SPAN AT FULL LOAD. RECORD THE TRANSFORMER SERIAL NUMBER, KVA RATING, SELECTED TAP SETTING AND SECONDARY VOLTAGE READINGS. SUBMIT

AVERAGE SOUND LEVELS MUST NOT EXCEED THE FOLLOWING VALUES:

P.O. BOX 180973 AUSTIN, TEXAS 78718 PHONE: 512.296.8406 X JACKSON D. PYKE 144028 CENSED ... 2023-02-14 R Ω Ω $\sim \sim$ Š ω \mathbf{O} \geq Μ σ TECHNOLOGIE 801 TRAVIS, SUITE 2000 HOUSTON, TX 77002 PHONE: 713-237-9800 FAX: 713-237-9801 Texas Registered Engineering Firm F-10573 © 2022 MaD Architecture All Rights Reserved. The arrangements depicted herein are the sole property of MAD Architecture and may not be reproduced in any form without written permission from the Architect. JOB NO.: 2130 PHASE: Project Status DRAWN: Designer CHECKED: Checker DATE: Issue Date ELECTRICAL SPECIFICATIONS

MAD **KEYED NOTES** ARCHITECTURE 1 PROPOSED ROUTING OF UNDERGROUND SERVICE FEEDERS. COORDINATE EXACT ROUTING WITH THE LOCAL UTILITY COMPANY AND CIVIL ENGINEERING DRAWINGS TO AVOID P.O. BOX 180973 CONFLICTS WITH OTHER UTILITIES. 2 APPROXIMATE LOCATION OF NEW UTILITY POWER COMPANY POLE MOUNTED TRANSFORMER FOR BUILDING ELECTRICAL SERVICE. FIELD VERIFY AND COORDINATE FINAL LOCATION WITH AUSTIN, TEXAS 78718 UTILITY COMPANY/OWNER/ARCHITECT/ALL OTHER PERTINENT CONSTRUCTION PARTIES PHONE: 512.296.8406 PRIOR TO INSTALLATION. 3 PROPOSED ROUTING OF UNDERGROUND CONDUIT FOR TELEPHONE AND CABLE. COORDINATE EXACT ROUTING AND TERMINATION WITH TELEPHONE AND CABLE SERVICE PROVIDERS AND CIVIL ENGINEERING DRAWINGS TO AVOID CONFLICTS WITH OTHER UTILITIES. 4 PROPOSED LOCATION OF PHONE PEDESTAL. PROVIDE (2) 4" CONDUITS WITH PULLSTRING FOR TELEPHONE AND CABLE SERVICE. ONE CONDUIT EACH SERVICE. FIELD VERIFY EXACT CONDUIT SIZES AND QUANTITIES WITH SERVICE PROVIDES; MAY REDUCE TO SMALLER SIZE PER SERVICE PROVIDERS STANDARDS. COORDINATE EXACT POINTS OF TERMINATION WITH LOCAL PHONE COMPANY, CABLE COMPANY, OWNER, AND ALL OTHER NECESSARY ENTITIES BEFORE ROUGH-IN AND INSTALLATION. PROVIDE AS NEEDED FOR A COMPLETE AND OPERATING SYSTEM. 5 PROVIDE NEW METER CAN AND CT CAN AS REQUIRED PER LOCAL UTILITY REQUIREMENTS. PROVIDE NEW SERVICE ENTRANCE RATED DISCONNECT. DISCONNECT TO BE X 400A/3P/600V/N3R/(3)-400AF. JACKSON D. PYKE 6 PROVIDE PHOTOCELL MOUNTED ON ROOF TO PROVIDE DUSK TO DAWN CONTROL FOR 144028 EXTERIOR LIGHTING. COORDINAT EXACT MOUNTING LOCATION IN FIELD WITH OWNER. 7 CONNECT EXTERIOR LIGHTING FIXTURES TO RELAY PANEL FOR TIMECLOCK CONTROL. /CENSE? CONNECT TO PHOTOCELL ON ROOF TO PROVIDE DAWN TO DUSK CONTROLS. 8 PROVIDE 120V POWER AND JBOX TO SERVE VEHICLE FILLING STATION. CONFIRM ELECTRICAL REQUIREMENTS AND LOCATION WITH OWNER IN FIELD. 9 PROVIDE 2 SETS OF 1-1/2" SPARE CONDUIT ROUTED FROM UTILITY ROOM TO PARKING LOT TO SERVE FUTURE EV CAR CHARGERS. CONFIRM STUB-UP LOCATION WITH OWNER AND PROVIDE PULL STRING FOR FUTURE USE.

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1" = 20'-0"

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1 ELECTRICAL POWER PLAN 3/16" = 1'-0"

KEYED NOTES

- 1 PROVIDE 208V/1PH POWER FOR (2) EVAPORATORS FOR WALK-IN COOLER. EVAPORATORS TO PROVIDE POWER FOR WALK-IN LIGHTING AND HEAT STRIPS. COORDINATE EXACT ELECTRICAL REQUIREMENTS AND CONNECTION LOCATIONS WITH VENDOR. SEE SHEET E-202 FOR ELECTRICAL CONNECTIONS FOR REMOTE CONDENSOR. PROVIDE EVAPORATOR WITH A 30A/2P/240V/N1/NF DISCONNECT.
- 2 PROVIDE 208V/1PH POWER FOR (2) EVAPORATORS FOR BEER CAVE. EVAPORATORS TO PROVIDE POWER FOR WALK-IN LIGHTING AND HEAT STRIPS. COORDINATE EXACT ELECTRICAL REQUIREMENTS AND CONNECTION LOCATIONS WITH VENDOR. SEE SHEET E-202 FOR ELECTRICAL CONNECTIONS FOR REMOTE CONDENSOR. PROVIDE EVAPORATOR WITH A 30A/2P/240V/N1/NF DISCONNECT.
- 3 PROVIDE (2) 100A PANELS FOR FUEL CANOPIES AND TANK. PANELS 'LB' AND 'LC; TO BE BUILT OUT BY FUEL SYSTEM INSTALLER.
- 4 PROVIDE 208/3PH POWER FOR REMOTE CONDENSOR FOR THIS COOLER. COORDINATE EXACT ELECTRICAL REQUIREMENTS AND CONDENSOR LOCATION WITH VENDOR IN FIELD. PROVIDE WITH A 30A/3P/240V/N3R/NF DISCONNECT.

SHEET NOTES

- A. ALL EQUIPMENT LABELED WITH TAG <u>KE-XX</u> IS KITCHEN EQUIPMENT. SEE KITCHEN EQUIPMENT SCHEDULE ON SHEET E-611 FOR CIRCUITING AND POWER REQUIREMENTS. a. CONTRACTOR SHALL REVIEW KITCHEN CONSULTANT AND ARCHITECTURAL PLANS PRIOR
- TO PREPARING BID. b. VERIFY ALL KITCHEN ELECTRICAL REQUIREMENTS WITH KITCHEN CONSULTANT PRIOR TO ROUGH-IN AND INSTALLATION.
- c. CONFIRM NEMA PLUG TYPES AND INSTALL ALL EQUIPMENT PER MANUFACTURER'S RECOMMENDATION.
- d. ALL ELECTRICAL CONNECTIONS LOCATED BENEATH GREASE EXHAUST HOOD SHALL BE PROVIDED WITH SHUNT TRIP BREAKER.
- B. ALL RECEPTACLES IN COOKING AREAS OF THE KITCHEN AND SALES AREA SHALL BE PROVIDED WITH GFCI PROTECTION. IF RECEPTACLE IS INACCESSIBLE DUE TO PERMANENTLY INSTALLED EQUIPMENT, PROVIDE CIRCUIT FEEDING THAT RECEPTACLE WITH A GFCI BREAKER. OTHERWISE PROVIDE A GFCI RECEPTACLE.

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EQUIPMENT SCHEDULE													
	LOAD	VOLTS / AMPS /	OCP		DISCONNECT STARTER						ΓER		
EQPM NAME	TYPE	POLES	RATING	CIRCUIT	RATING	POLES	VOLTAGE	NEMA	FUSED	FUSE SIZING	TYPE	NEMA SIZING	NOTES
RTU-1	С	480 V / 15 A / 3P	20 A	HA-8,10,12	30 A	3	600 V	3R	No		TBD BY VENDOR	0	
RTU-2	С	480 V / 34 A / 3P	45 A	HA-9,11,13	60 A	3	600 V	3R	No		TBD BY VENDOR	2	
KEF-1	MT	208 V / 7 A / 3P	15 A	LA-26,28,30	30 A	3	240 V	3R	No		TBD BY VENDOR	0	
EF-1	MT	120 V / 1 A / 1P	15 A	LA-27	30 A	1	240 V	3R	No		TBD BY VENDOR	0	1
MUA CONDENSOR	С	208 V / 22 A / 2P	40 A	LA-29,31	60 A	2	240 V	3R	No		TBD BY VENDOR	1	
MUA FAN	MT	208 V / 4 A / 3P	15 A	LA-32,34,36	30 A	3	240 V	3R	No		TBD BY VENDOR	0	
GWH STARTERS	MT	120 V / 1 A / 1P	15 A	LA-33	30 A	1	240 V	1	No		TBD BY VENDOR	0	1
GWH STARTERS	MI	120 V / 1 A / 1P	15 A	LA-33	30 A	1	240 V	1	No		IBD BY VENDOR	0	

VERIFY ELECTRICAL REQUIREMENTS OF ALL EQUIPMENT WITH MANUFACTURER/VENDOR PRIOR TO ROUGH-IN AND INSTALLATION. INSTALL ALL EQUIPMENT PER MANUFACTURER'S INSTRUCTIONS. COORDINATE FINAL DISCONNECT/STARTER SIZING AND REQUIREMENTS WITH EQUIPMENT VENDOR. COORDINATE MOUNTING LOCATION IN FIELD.

NOTES: 1. IN LIEU OF DISCONNECT SPECIFIED IN SCHEDULE, PROVIDE CIRCUIT WITH MOTOR RATED SWITCH. CONFIRM REQUIREMENTS WITH VENDOR DRAWINGS. MATCH NEMA RATING SHOWN IN SCHEDULE ABOVE.

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	LIGHTING FIXTURE SCHEDULE							
TAG	MANUFACTURER	MODEL NUMBER	DESCRIPTION	MOUNTING	LAMP	WATTAGE	VOLTAGE	NOTES
A	TBD BY ARCH	TBD BY ARCH	2'x4' LINEAR	RECESSED	LED	40 W	277 V	
AE	TBD BY ARCH	TBD BY ARCH	2'x4' LINEAR. EMERGENCY	RECESSED	LED	40 W	277 V	1
В	TBD BY ARCH	TBD BY ARCH	PENDANT FIXTURE	SURFACE	LED	20 W	277 V	
BE	TBD BY ARCH	TBD BY ARCH	PENDANT FIXTURE. EMERGENCY	SURFACE	LED	20 W	277 V	1
С	TBD BY ARCH	TBD BY ARCH	CAN LIGHT	RECESSED	LED	20 W	277 V	
CE	TBD BY ARCH	TBD BY ARCH	CAN LIGHT. EMERGENCY	RECESSED	LED	20 W	277 V	1
D	STONCO	GC20-NW-G1-SM-5-8	CANOPY FIXTURE	RECESSED	LED	19 W	277 V	
DE	STONCO	GC20-NW-G1-SM-5-8	CANOPY FIXTURE. EMERGENCY	RECESSED	LED	19 W	277 V	1
P3	GARDCO	ECF-S-32L-700-NW-G2-AR-3-UNV-XX	POLE FIXTURE	20' POLE	LED	73 W	277 V	
P4	GARDCO	ECF-S-32L-700-NW-G2-AR-4-UNV-XX	POLE FIXTURE	20' POLE	LED	73 W	277 V	
W	STONCO	LPW-16-20-NW-G3-3-UNV-XX	WALL PACK	WALL	LED	22 W	277 V	
X	TBD BY ARCH	TBD BY ARCH	EXIT SIGN, EMERGENCY	CEILING	LED	3 W	277 V	

VERIFY FIXTURE SELECTION WITH ARCHITECT PRIOR TO PURCHASE. COORDINATE ALL COLORS AND FINISHES WITH ARCHITECT. PROVIDE APPROPRIATE DIMMING POWER PACKS AS NEEDED.

NOTES: 1. PROVIDE EMERGENCY FIXTURE WITH 90 MINUTE BATTERY BACKUP

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1 ELECTRICAL LIGHTING PLAN 3/16" = 1'-0"

KEYED NOTES

1 PROVIDE RELAY PANEL TO CONTROL LIGHTING SWITCH ZONES AS SHOWN IN RELAY SCHEDULE ON THIS SHEET. RELAY PANEL TO BE ACUITY TYPE ARP-INTENC08-NLT-8SPR-MVOLT-SC-SM-DTC. COORDINATE FINAL LOCATION AND SCHEDULE WITH OWNER.

LIGHTING CONTROLS SCHEDULE								
			OS C	ONTE	ROLS			
SPACE TYPE	DIMMING	MANNUAL OVERRIDE	AUTOMATIC ON - 100% POWEF	AUTOMATIC ON - 50% POWER	MANUAL ON	TIMECLOCK	LIGHT REDUCTION CONTROLS	NOTES
SALES / CASHIER	No	Yes	No	No	No	Yes	Yes	3
UTILITY	No	Yes	No	No	No	Yes	Yes	2
RESTROOM	No	Yes	Yes	No	No	No	No	1
HALL	No	Yes	No	No	No	Yes	Yes	3
OFFICE	No	Yes	No	No	Yes	No	No	
KITCHEN	No	Yes	No	No	No	No	Yes	2
WALK-IN COOLERS	No	No	No	No	No	No	Yes	5
EXTERIOR	No	No	No	No	No	Yes	No	

IECC. PROVIDE ALL NECESSARY POWER PACKS FOR A COMPLETE AND OPERATING SYSTEM

NOTES:

- 1. RESTROOMS SHALL BE CONTROLLED VIA FULL POWER AUTOMATIC-ON CONTROLS PER THE EXCEPTION TO OCCUPANT SENSOR CONTROL FUNCTION IN SECTION C405.2.1.1 OF THE IECC.
- 2. UTILITY ROOM SHALL BE EXEMPT FROM REQUIRING TIMESWITCH OVERRIDE CONTROLS PER EXCEPTION 2.3 OF SECTION C405.2.2.1 OF THE IECC.
- 3. SALES AREA AND THE HALLWAY SHALL BE PERMITTED TO HAVE A TIME LIMIT GREATER THAN 2 HOURS IF THE OVERRIDE SWITCH PROVIDED IS A CAPTIVE KEY DEVICE PER EXCEPTION 1.1 OF SECION C405.2.2.1 OF THE IECC. OTHERWISE THE OVERRIDE SWITCH SHALL PERMIT THE CONTROLLED LIGHTING TO REMAIN ON FOR NOT MORE THAN 2 HOURS.
- 4. THE KITCHEN AREA SHALL BE EXEMPT FROM REQUIRING TIME-SWITCH CONTROL FUNCTION PER EXCEPTION 3 OF SECTION C405.2.2 OF THE IECC. AUTOMATIC SHUT-OFF OF KITCHEN ENDANGER WOULD ENDANGER OCCUPANT SAFETY.
- 5. WALK-IN COOLERS AND BEER CAVE SHALL BE PROVIDED INTEGRAL LIGHTING CONTROLS PER VENDOR SPECIFICATIONS.

NO YES

1

RELAY SCHEDULE							
	RELAY NUMBER	SWITCH	SWITCH TIMESWITCH				
	1	С	YES				
	2	d	YES				
	3	е	NO	1			
	4	f	NO	1			
	5	a	NO	1			

YES k CORDINATE FINAL SCHEDULE IN FIELD.

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- NOTES:
- 1. CONTRACTOR TO CONFIRM WITH OWNER IF THEY WANT KITCHEN ZONES TO BE PROVIDED WITH TIMECLOCK AUTOMATIC-OFF. TIMECLOCK CONTROL IS OPTIONAL PER IECC REQUIREMENTS.

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	∠ ∠ KCI TECHNOLOGIES 801 TRAVIS, SUITE 2000 HOUSTON, TX 77002 PHONE: 713-237-9800 FAX: 713-237-9801								
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JOB PHA	NO.: SE:	2130 Proj) ect S	tatu	S				
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30A/2P/240V/N1/NF DISCONNECT.

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d.	ALL EI
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n EQPM TAG KE-01 KE-01 KE-02 KE-03 KE-05 KE-06 KE-06 KE-07 KE-07 KE-11 KE-12 KE-13 KE-13 KE-14 KE-14 KE-15 KE-19 KE-19 KE-19 KE-19 KE-21 KE-25 KE-30 KE-31 KE-39 KE-40

KEYED NOTES

1 PROVIDE 208V/1PH POWER FOR EVAPORATOR FOR WALK-IN COOLER. EVAPORATOR TO PROVIDE POWER FOR WALK-IN LIGHTING AND HEAT STRIPS. COORDINATE EXACT ELECTRICAL REQUIREMENTS AND CONNECTION LOCATIONS WITH VENDOR. SEE SHEET E-202 FOR ELECTRICAL CONNECTIONS FOR REMOTE CONDENSOR. PROVIDE EVAPORATOR WITH A

SHEET NOTES

JIPMENT LABELED WITH TAG KE-XX IS KITCHEN EQUIPMENT. SEE KITCHEN EQUIPMENT JLE ON THIS SHEET FOR CIRCUITING AND POWER REQUIREMENTS. TRACTOR SHALL REVIEW KITCHEN CONSULTANT AND ARCHITECTURAL PLANS PRIOR REPARING BID. FY ALL KITCHEN ELECTRICAL REQUIREMENTS WITH KITCHEN CONSULTANT PRIOR TO

GH-IN AND INSTALLATION. FIRM NEMA PLUG TYPES AND INSTALL ALL EQUIPMENT PER MANUFACTURER'S OMMENDATION.

ELECTRICAL CONNECTIONS LOCATED BENEATH GREASE EXHAUST HOOD SHALL BE VIDED WITH SHUNT TRIP BREAKER. EPTACLES IN COOKING AREAS OF THE KITCHEN AND SALES AREA SHALL BE

PROVIDED WITH GFCI PROTECTION. IF RECEPTACLE IS INACCESSIBLE DUE TO PERMANENTLY INSTALLED EQUIPMENT, PROVIDE CIRCUIT FEEDING THAT RECEPTACLE WITH A GFCI BREAKER. OTHERWISE PROVIDE A GFCI RECEPTACLE.

ITCHEN EQUIPMENT SCHEDULE						
EQPM NAME	VOLTS/AMPS/POLES	CIRCUIT				
COFFEE MAKER	120 V / 13 A / 1P	LB-17				
COFFEE MAKER	120 V / 13 A / 1P	LB-13				
CAPPUCCINO MACHINE	120 V / 15 A / 1P	LB-32				
TEA BREWER	120 V / 14 A / 1P	LB-20				
DROP COOLER	120 V / 4 A / 1P	LB-2				
HOT FOOD DISPLAY	208 V / 13 A / 2P	LB-21,23				
HOT FOOD DISPLAY	208 V / 13 A / 2P	LB-16,18				
HOT FOOD MERCHANDISER	120 V / 14 A / 1P	LB-14				
HOT FOOD MERCHANDISER	120 V / 14 A / 1P	LB-19				
ROLLER GRILL	120 V / 15 A / 1P	LB-36				
HOT DOG WARMER	120 V / 5 A / 1P	LB-7				
BUBBLERS	120 V / 6 A / 1P	LB-33				
BUBBLERS	120 V / 6 A / 1P	LB-31				
BUNN SLUSHI	120 V / 12 A / 1P	LB-10				
BUNN SLUSHI	120 V / 12 A / 1P	LB-12				
ICEE FBD	208 V / 15 A / 2P	LB-27,29				
FOUNTAIN SODA	120 V / 2 A / 1P	LB-3				
FOUNTAIN SODA	120 V / 2 A / 1P	LB-5				
ICE MAKER	120 V / 8 A / 1P	LB-11				
ICE MAKER	120 V / 8 A / 1P	LB-8				
PASTRY CASE	120 V / 7 A / 1P	LB-9				
HEATED HOLDING	120 V / 6 A / 1P	LB-35				
HOTWELL	208 V / 17 A / 2P	LB-26,28				
COLDWELL	120 V / 5 A / 1P	LB-6				
F REAL SHAKE	120 V / 15 A / 1P	LB-34				
GRAB N GO COOLER	208 V / 15 A / 2P	LB-22,24				

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35 S 78666 표건 Š S Chisos St San Marcos St S

KCI

TECHNOLOGIES 801 TRAVIS, SUITE 2000 HOUSTON, TX 77002 PHONE: 713-237-9800 FAX: 713-237-9801 Texas Registered Engineering Firm F-10573

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JOB NO.:	2130
PHASE:	Project Status
DRAWN:	Designer
CHECKED:	Checker
DATE:	Issue Date

ELECTRICAL ENLARGED PLANS SHEET

E4

1 ONE-LINE DIAGRAM

FEE #12 #10 #8 #6 #4 #3 #2 #1 #1/0 #2/0 #3/0 #4/0 #250 #300 #350 #400 #500

KEYED NOTES

PROVIDE NEW METER CAN AND CT CAN AS REQUIRED PER LOCAL UTILITY REQUIREMENTS. PROVIDE NEW SERVICE ENTRANCE RATED DISCONNECT. DISCONNECT TO BE 400A/3P/600V/N3R/(3)-400AF.

GENERAL NOTES

- 1. ALL EQUIPMENT IS EXISTING UNLESS NOTED OTHERWISE.
- 2. CONTRACTOR SHALL PROVIDE AN ARC FLASH STUDY FOR ALL NEW ELECTRICAL EQUIPMENT 3. A PERMANENTLY AFFIXED LABEL SHALL BE APPLIED WITH THE FAULT CURRENT AT THE TIME OF INSTALLATION AND CALCULATION PER NEC ARTICLE 110.24A. THE LABEL SHALL BE SIZED TO SATISFY THE REQUIREMENTS OF THE LOCAL JURISDICTION OF WHICH THE PROJECT IS LOCATED AND SHALL BE BLUE LETTERING ON A CONTRASTING BACKGROUND. THIS LABEL SHALL ALSO INCLUDE THE DATE OF THE CALCULATION.

CONDUIT/WIRE NOTES

- 1. CONDUITS PROVIDED SHALL BE DETERMINED ON INSTALLATION LOCATION AS SHOWN BELOW: A. ALL INDOOR CONDUITS SHALL BE EMT TYPICAL UNLESS NOTED OTHERWISE. B. ALL OUTDOOR CONDUITS SHALL BE RIGID GALV STEEL TYPICAL UNLESS NOTED OTHERWISE.
- C. ALL UNDERGROUND CONDUITS SHALL BE PVC SCH 40 TYPICAL UNLESS NOTED OTHERWISE. 2. EACH CIRCUIT IS TO BE ENLOSED IN CONDUIT SIZED PER THE CONDUIT SCHEDULE ON THIS SHEET. A. CONDUIT SIZES SHOWN IN THE CONDUIT SIZE SCHEDULE ARE MINIMUM ALLOWABLE CONDUIT SIZES. OVERSIZED CONDUITS ARE ALLOWABLE WHERE REQUESTED AND APPROVED BY
- OWNER/ENGINEER. B. CONTRACTOR MAY ELECT TO COMBINE TWO OR THREE NON-HARMONICS PRODUCING CIRCUITS IN A COMMON RACEWAY. CONTRACTOR SHALL NOT INSTALL MORE THAN THREE CIRCUITS IN A COMMON CONDUIT, EXCEPT WHERE SPECIFICALLY NOTED AND ALLOWED.
- 3. ALL WIRES SHALL HAVE THHN/THWN INSULATION UNLESS NOTED OTHERWISE. 4. SEE FEEDER AMPACITY SCHEDULE FOR AMPACITY RATINGS OF EACH FEEDER. TEMPERATURE
- RATING IS TO BE DETERMINED BY NEC ARTICLE 110.14(C)(1): A. CIRCUITS RATED 100A OR LESS SHALL HAVE CIRCUITING RATED BASED ON 60°C IN FEEDER AMPACITY SCHEDULE.
- B. CIRCUITS RATED OVER 100A SHALL HAVE CIRCUITING RATED BASED ON 75°C IN FEEDER
- AMPACITY SCHEDULE. 5. FOR EACH 2-POLE OR 3-POLE BRANCH CIRCUIT, NEUTRAL WIRE MAY BE OMITTED IF NOT REQUIRED BY EQUIPMENT.

FEEDER SCHEDULE							
EQPT BUS RATING MAIN RATING WIRE SIZE							
HA	400 A	400 A	3-#600, 1-#600, 1-#3				
LA	400 A	400 A	3-#600, 1-#600, 1-#1/0				
LB	100 A	100 A	3-#1, 1-#1, 1-#8				
LC	100 A	100 A	3-#1, 1-#1, 1-#8				
LD	100 A	100 A	3-#1, 1-#1, 1-#8				

SHORT CIRCUIT RATING SCHEDULE							
EQPT	WIRE LENGTH	CALCULATED SC CURRENT	EQPT A.I.C. RATING				
HA	224' - 11 25/32"	15,127 A	35,000 A				
LA	14' - 10 5/8"	5,632 A	10,000 A				
LB	14' - 1 7/8"	4,813 A	10,000 A				
LC	15' - 11 7/8"	4,715 A	10,000 A				
LD	17' - 9 7/8"	4.668 A	10.000 A				

FEEDER AMPACITY SCHEDULE						
	CU		AL / CU (CLAD AL		
	60°	75°	60°	75°		
#12	20A	25A	15A	20A		
#10	30A	35A	25A	30A		
#8	40A	50A	35A	40A		
#6	55A	65A	40A	50A		
#4	70A	85A	55A	65A		
#3	85A	100A	65A	75A		
#2	95A	115A	75A	90A		
#1	110A	130A	85A	100A		
#1/0	125A	150A	100A	120A		
#2/0	145A	175A	115A	135A		
#3/0	165A	200A	130A	155A		
#4/0	195A	230A	150A	180A		
#250	215A	255A	170A	205A		
#300	240A	285A	195A	230A		
#350	260A	310A	210A	250A		
#400	280A	335A	225A	270A		
#500	320A	380A	260A	310A		
#600	350A	420A	285A	340A		

	CONDUIT SIZE SCHEDULE							
		# OF WIRES						
	2 3 4 5							
	#12	1/2"	1/2"	1/2"	1/2"			
	#10	1/2"	1/2"	1/2"	1/2"			
	#8	1/2"	1/2"	3/4"	3/4"			
	#6	1/2"	3/4"	3/4"	1"			
	#4	3/4"	1"	1"	1-1/4"			
,	#3	1"	1"	1-1/4"	1-1/4"			
	#2	1"	1"	1-1/4"	1-1/4"			
j	#1	1-1/4"	1-1/4"	1-1/4"	1-1/2"			
	#1/0	1-1/4"	1-1/4"	1-1/2"	2"			
5	#2/0	1-1/4"	1-1/2"	2"	2"			
	#3/0	1-1/2"	1-1/2"	2"	2"			
į	#4/0	1-1/2"	2"	2"	2-1/2"			
	#250	2"	2"	2-1/2"	2-1/2"			
	#300	2"	2"	2-1/2"	2-1/2"			
	#350	2"	2-1/2"	2-1/2"	3"			
	#400	2-1/2"	2-1/2"	2-1/2"	3"			
	#500	2-1/2"	2-1/2"	3"	3"			
	#600	2-1/2"	3"	3"	3-1/2"			

KC

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ELECTRICAL ONE LINE DIAGRAM

SHEET

E5

Architect.

JOB NO.: 2130 PHASE: Project Status DRAWN: Designer

CHECKED: Checker DATE: Issue Date

TECHNOLOGIES 801 TRAVIS, SUITE 2000 HOUSTON, TX 77002 PHONE: 713-237-9800 FAX: 713-237-9801 Texas Registered Engineering Firm F-10573

NOTE: WHERE PIPING IS EXPOSED AT FINISHED WALLS, PROVIDE FLUSH MOUNTED SLEEVE AND ESCUTCHEON PLATES. (CONTRACTOR MAY USE FIELD FABRICATED S.S. PLATE)

NOTE: SIMILAR FOR UNINSULATED PIPE AND CONDUIT.

	SERVICE	VOLTAGE: 480Y	277 V, 3 PHA	SE, 4 WIRE		
	OC	CUPANCY: 5,620	SQFT RETAIL	SPACE		
со	NNECTED EQUIPMENT					
HA						
			NEW CC	DNNECTED L	OAD BREAK	OOWN
		CONNECTED LOAD [VA]	DEMAND FACTOR [%]	CALCULATED LOAD [VA]	CALCULATED CURRENT [A]	COMMENTS
1.	Lighting	1834 VA	125.00%	2293 VA	3 A	Cada landa avanad aanna stad landa. Cada landa will ba wa
2.	Outside Lighting	974 VA	125.00%	1218 VA	1 A	Code loads exceed connected loads. Code loads will be us
3.	NEC Lighting Load [220.12]	10678 VA	125.00%	13348 VA	16 A	
4.	Cooling	59888 VA	100.00%	59888 VA	72 A	
5.	Heating	0 VA	0.00%	0 VA	0 A	
6.	Motor	4017 VA	100.00%	4017 VA	5 A	
7.	Largest Motor	0 VA	0.00%	0 VA	0 A	
8.	Receptacle	9804 VA	100.00%	9804 VA	12 A	
9.	Non-Coincidental	0 VA	0.00%	0 VA	0 A	
10.	Misc Non-Continuous	1360 VA	100.00%	1360 VA	2 A	
11.	Misc Continuous	15560 VA	125.00%	19450 VA	23 A	
12.	Kitchen	38730 VA	65.00%	25175 VA	30 A	
			TO	TAL LOAD C	ALCULATION	S
						COMMENTS
	TOTAL C	ONNECTED EXIS	TING LOAD (IF	APPLICABLE):	0 VA	
		TO	TAL CONNECT	ED NEW LOAD:	139900 VA	
		FU ⁻	TURE LOAD (IF	APPLICABLE):	40000 VA	Provision for future loads for gas equipment
			TOTAL I	DEMAND LOAD:	172871 VA	
			TOTAL DEM	AND CURRENT:	208 A	
Not	es:		TOTAL DEM	AND CURRENT:	208 A	

| akers Shall Be Bolt-On 1
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K-IN EVAPORATOR | Type)
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AMPS
[A] | TYPE | E LOAD DESCRIPTION | СКТ
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4.5 | 1_#12 1_#12 1 #12 | 20 1 | 180
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 | | 1
 | 20 | 1-#12, 1-#12, 1-#12 | 3.0 | R | ROOFTOP CONV. RCPT | 2
 |
| DR
<-IN EVAPORATOR
E EVAPORATOR | R
MC | 4.5 | $ -++ \angle -++ \angle -++ \angle $ | 20 1 |
 |
 | 360

 | 360
 |
 | | 1
 | 20 | 1-#12, 1-#12, 1-#12 | 3.0 | R | SALES - 2 DR | 4
 |
| K-IN EVAPORATOR | MC | | 1-#12, 1-#12, 1-#12 | 20 1 |
 |
 |

 |
 | 540
 | 1000 | 1
 | 20 | 1-#12, 1-#12, 1-#12 | 8.3 | MC | 4 DOOR FREEZER, GFI CB | 6
 |
| | | 10.0 | 2-#12, 1-#12, 1-#12 | 20 2 | 1040
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 |
 | | 2
 | 20 | 2-#12, 1-#12, 1-#12 | 10.0 | MC | 9 DR WALK-IN EVAPORATOR | 8
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| E EVAPORATOR | | | | |
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| | MC | 10.0 | 2-#12, 1-#12, 1-#12 | 20 2 |
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 | 1040
 | 1040 | 2
 | 20 | 2-#12. 1-#12. 1-#12 | 10.0 | МС | BEER CAVE EVAPORATOR | 12
 |
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 | 1040
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 |
| K-IN EVAPORATOR | МС | 10.0 | 2-#12, 1-#12, 1-#12 | 20 2 |
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 | 1040
 |
 | | 2
 | 20 | 2-#12, 1-#12, 1-#12 | 10.0 | MC | 7 DR WALK-IN EVAPORATOR | 16
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 | 1040
 | 1040 |
 | | | | | | 18
 |
| ION | R | 10.0 | 1-#12, 1-#12, 1-#12 | 20 1 | 1200
 | 1200
 |

 |
 |
 | | 1
 | 20 | 1-#12. 1-#12. 1-#12 | 10.0 | R | POS STATION | 20
 |
| ION | R | 10.0 | 1-#12, 1-#12, 1-#12 | 20 1 |
 |
 | 1200

 | 1200
 |
 | | 1
 | 20 | 1-#12, 1-#12, 1-#12 | 10.0 | R | POS STATION | 22
 |
| INE, GFI CB | R | 14.7 | 1-#10, 1-#10, 1-#10 | 20 1 |
 |
 |

 |
 | 1764
 | 360 | 1
 | 20 | 1-#12, 1-#12, 1-#12 | 3.0 | MIS | VEEDER ROOT | 24
 |
| DR | R | 6.0 | 1-#12, 1-#12, 1-#12 | 20 1 | 720
 | 793
 |

 |
 |
 | | 3
 | 15 | 3-#12, 1-#12, 1-#14 | 6.6 | МТ | KEF-1 | 26
 |
| | MT | 1.0 | 1-#12, 1-#12, 1-#14 | 15 1 |
 |
 | 120

 | 793
 |
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 | | | | | | 28
 |
| DENSOR | С | 22.3 | 2-#8, 1-#8, 1-#10 | 40 2 |
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 | 456
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 | | 3
 | 15 | 3-#12, 1-#12, 1-#14 | 3.8 | MT | MUA FAN | 32
 |
| RTERS | MT | 1.3 | 1-#12, 1-#12, 1-#14 | 15 1 |
 |
 | 150

 | 456
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 | |
 | | | | | | 34
 |
| STEM | MIS | 4.2 | 1-#12, 1-#12, 1-#14 | 15 1 |
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 |
 | 500
 | 456 |
 | | | | | | 36
 |
| K-IN CONDENSOR | С | 10.0 | 3-#12, 1-#12, 1-#12 | 20 3 | 1201
 | 1201
 |

 |
 |
 | | 3
 | 20 | 3-#12, 1-#12, 1-#12 | 10.0 | С | 9 DR WALK-IN CONDENSOR | 38
 |
| | | | | |
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 | 1201

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 |
| | K; | 110.9 | 3-#1, 1-#1, 1-#8 | 100 3 | 13328
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 |
 |
 | | 3
 | 20 | 3-#12, 1-#12, 1-#12 | 10.0 | С | BEER CAVE CONDENSOR | 44
 |
| | | | | |
 |
 | 13239

 | 1201
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 | | | | | | 46
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 |

 |
 | 13383
 | 1201 |
 | | | | | | 48
 |
| | MIS | 0.0 | 3-#1, 1-#1, 1-#8 | 100 3 | 0
 | 1040
 |

 |
 |
 | | 2
 | 20 | 2-#12, 1-#12, 1-#12 | 10.0 | MC | 8'x8' WALK-IN EVAPORATOR | 50
 |
| | | | | |
 |
 | 0

 | 1040
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 | | | | | | 52
 |
| | | | | |
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 |

 |
 | 0
 | 1201 | 3
 | 20 | 3-#12, 1-#12, 1-#12 | 10.0 | С | 8'x8' WALK-IN CONDENSOR | 54
 |
| | MIS | 0.0 | 3-#1, 1-#1, 1-#8 | 100 3 | 0
 | 1201
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 |
 | 0
 | | 1
 | | | | | Space | 60
 |
| | | | | Load: | 3056
 | 51 VA
 | 2788

 | 31 VA
 | 3008
 | 0 VA |
 | | | | | |
 |
| | | | | Amps: | 25
 | 7 A
 | 23

 | 2 A
 | 253
 | 3 A |
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| | E EVAPORATOR C-IN EVAPORATOR ON ON ON NE, GFI CB DR DENSOR CTERS STEM C-IN CONDENSOR | E EVAPORATOR MC C-IN EVAPORATOR MC ON R ON R ON R ON R NE, GFI CB R DR R DR R DR C RTERS MT STEM MIS C-IN CONDENSOR C K; K; MIS | E EVAPORATOR MC 10.0 C-IN EVAPORATOR MC 10.0 ON R 10.0 ON R 10.0 ON R 10.0 ON R 10.0 ON R 10.0 NE, GFI CB R 14.7 DR R 6.0 MT 1.0 DENSOR C 22.3 CTERS MT 1.3 STEM MIS 4.2 C-IN CONDENSOR C 10.0 GANCONDENSOR C 10.0 MIS 0.0 MIS 0.0 MIS 0.0 < | E EVAPORATOR MC 10.0 2-#12, 1-#12, 1-#12 C-IN EVAPORATOR MC 10.0 2-#12, 1-#12, 1-#12 ON R 10.0 1-#12, 1-#12, 1-#12 ON R 10.0 1-#12, 1-#12, 1-#12 ON R 10.0 1-#12, 1-#12, 1-#12 ON R 10.0 1-#12, 1-#12, 1-#12 ON R 10.0 1-#12, 1-#12, 1-#12 NE, GFI CB R 14.7 1-#10, 1-#10, 1-#10 DR R 6.0 1-#12, 1-#12, 1-#12 MT 1.0 1-#12, 1-#12, 1-#14 DENSOR C 22.3 2-#8, 1-#8, 1-#10 RTERS MT 1.3 1-#12, 1-#12, 1-#14 STEM MIS 4.2 1-#12, 1-#12, 1-#14 CIN CONDENSOR C 10.0 3-#12, 1-#12, 1-#14 CIN CONDENSOR C 10.0 3-#1, 1.41, 1.41, 1.48 | E EVAPORATOR MC 10.0 2-#12, 1-#12, 1-#12 20 2 10 0 0 1 1 1 1 1 1 1 1 0 1 </td <td>E EVAPORATOR MC 10.0 2.#12, 1.#12, 1.#12 20 2 1040 C-IN EVAPORATOR MC 10.0 2.#12, 1.#12, 1.#12 20 2 ON R 10.0 1.#12, 1.#12, 1.#12 20 1 1200 ON R 10.0 1.#12, 1.#12, 1.#12 20 1 1200 ON R 10.0 1.#12, 1.#12, 1.#12 20 1 1200 ON R 10.0 1.#12, 1.#12, 1.#12 20 1 720 DR R 6.0 1.#12, 1.#12, 1.#12 20 1 720 DR R 6.0 1.#12, 1.#12, 1.#14 15 1 DENSOR C 22.3 2.#8, 1.#8, 1.#10 40 2 ETERS MT 1.3 1.#12, 1.#12, 1.#14 15 1 STEM MIS 4.2 1.#12, 1.#12, 1.#14 15 1 GIN CONDENSOR<td>E EVAPORATOR MC 10.0 2-#12, 1-#12, 1-#12 20 2 1040 1040 1040 1040 C-IN EVAPORATOR MC 10.0 2-#12, 1-#12, 1-#12 20 2 2 ON R 10.0 1-#12, 1-#12, 1-#12 20 1 1200 1200 ON R 10.0 1-#12, 1-#12, 1-#12 20 1 1200 1200 ON R 10.0 1-#12, 1-#12, 1-#12 20 1 720 793 NE, GFI CB R 14.7 1-#10, 1+#10, 1+#10 20 1 720 793 DR R 6.0 1-#12, 1-#12, 1-#14 15 1 72 793 DENSOR C 22.3 2-#8, 1+#8, 1+#10 40 2 74 74 STERS MT 1.3 1-#12, 1-#12, 1-#14 15 1 74 74 GON DODENSOR<td>E EVAPORATOR MC 10.0 2#12, 1+#12, 1+#12 20 2 model model 1040 1040 (-IN EVAPORATOR MC 10.0 2.#12, 1.#12, 1.#12 20 2 1040 1040 (-IN EVAPORATOR MC 10.0 2.#12, 1.#12, 1.#12 20 1 1200 1000 ON R 10.0 1.#12, 1.#12, 1.#12 20 1 1200 1200 ON R 10.0 1.#12, 1.#12, 1.#12 20 1 720 793 DR R 6.0 1.#12, 1.#12, 1.#12 20 1 720 793 DENSOR C 22.3 2.#8, 1.#8, 1.#10 40 2 2 2 120 DENSOR C 12.3 1.4#12, 1.#12, 1.#14 15 1 120 CIN CONDENSOR C 10.0 3.#12, 1.#12, 1.#14 15 1 <td< td=""><td>E EVAPORATOR MC 10.0 $2-\#12, 1+\#12, 1+\#12$ 20 2 model <th< td=""><td>E EVAPORATOR MC 10.0 2-#12, 1-#12, 1-#12 20 2 ∞ ∞ ∞ 1040 1040 1040 1040 1040 CIN EVAPORATOR MC 10.0 2-#12, 1-#12, 1-#12 20 2 2 1040 1040 1040 ON R 10.0 1-#12, 1-#12, 1-#12 20 1 1200 1201</td><td>E EVAPORATOR MC 10.0 2-#12, 1-#12, 1-#12 20 2 res res 1040 1045 1045<!--</td--><td>E EVAPORATOR MC 10.0 2.#12, 1.#12, 1.#12 20 2 m m m 1040</td><td>E EVAPORATOR MC 10.0 2#12, 1#12, 1#12 20 2 MC 1040
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Load Classification		Connected Load	Demand Factor	Estimated Demand	Panel	Totals
L	Lighting	0 VA	0.00%	0 VA	Total Conn. Existing Load:	0 VA
OL	Outside Lighting	0 VA	0.00%	0 VA	Total Conn. New Load:	88522 VA
С	Cooling	19051 VA	100.00%	19051 VA	Total Demand Load:	78857 VA
Н	Heating	0 VA	0.00%	0 VA	Total Conn. Current:	246 A
MT	Motor	4017 VA	100.00%	4017 VA	Total Demand Current:	219 A
LMT	Largest Motor	0 VA	0.00%	0 VA		
R	Receptacle	9804 VA	100.00%	9804 VA		
NC	Non-Coincidental	0 VA	0.00%	0 VA		
MIS	Misc Non-Continuous	1360 VA	100.00%	1360 VA		
MC	Misc Continuous	15560 VA	125.00%	19450 VA		
K	Kitchen	38730 VA	65.00%	25175 VA		

New Branch Panel: HA

Distribution System: 480Y/277 Number of Phases: 3 Number of Wires: 4

(All	Branch Breakers Shall Be Bolt-On	Туре)																
CKI	LOAD DESCRIPTION	TYPE LOAD AMPS [A]	WIRE SIZE	TRI PO [A	IP / LE \]	[\	A /A]	۱ ۷]	З [А]	، ۲	C (A]	Т	RIP / DLE [A]	WIRE SIZE	LOAD AMPS [A]	TYPE	LOAD DESCRIPTION	CK
1	ТА	K; 106.5	3-#2/0, 1-#2/0, 1-#4	175	3	30561	1834					1	20	1-#12, 1-#12, 1-#12	6.6	L	INTERIOR LIGHTING	2
3								27881	219			1	20	1-#12, 1-#12, 1-#12	0.8	OL	EXTERIOR LTG	4
5										30080	536	1	20	1-#12, 1-#12, 1-#12	1.9	OL	EXTERIOR LTG	6
7	EXTERIOR LTG	OL 0.8	1-#12, 1-#12, 1-#12	20	1	219	4212					3	20	3-#12, 1-#12, 1-#12	15.2	С	RTU-1	8
9	RTU-2	C 33.9	3-#6, 1-#6, 1-#10	45	3			9400	4212									10
11										9400	4212							12
13						9400						1					Space	14
15	Space				1							1					Space	16
17	Space				1							1					Space	18
19	Space				1							1					Space	20
21	Space				1							1					Space	22
23	Space				1							1					Space	24
25	Space				1							1					Space	26
27	Space				1							1					Space	28
29	Space				1							1					Space	30
				Lo	oad:	4613	30 VA	4170	1 VA	4420)2 VA							
				An	nps:	16	8 A	15	1 A	16	1 A							
Not	es:																	

1. All breakers 100Amp or less shall be rated for 75% 60% wire termination. Breakers rated for only 60% wire termination shall not be used. All breakers greater than 100Amp shall be rated for 75% termination. N.E.C. Article 110.14(C)(1). 2. For 3-pole breaker, provide 3 wires + grd where neutral is not used or req'd. Similarly for 2-pole bkr, provide 2 wires + grd if neut. is not req'd.

oad Classification		Connected Load	Demand Factor	Estimated Demand	Panel T	otals
	Lighting				Total Comp. Existing Load: 0	
-	Lignung	1834 VA	125.00%	2293 VA	Total Conn. Existing Load:) VA
OL	Outside Lighting	974 VA	125.00%	1218 VA	Total Conn. New Load: 1	32031 VA
C	Cooling	59888 VA	100.00%	59888 VA	Total Demand Load: 1	23035 VA
4	Heating	0 VA	0.00%	0 VA	Total Conn. Current: 1	59 A
ИТ	Motor	4017 VA	100.00%	4017 VA	Total Demand Current: 1	48 A
_MT	Largest Motor	0 VA	0.00%	0 VA		
२	Receptacle	9804 VA	100.00%	9804 VA		
NC	Non-Coincidental	0 VA	0.00%	0 VA		
MIS	Misc Non-Continuous	1360 VA	100.00%	1360 VA		
NC	Misc Continuous	15560 VA	125.00%	19450 VA		
<	Kitchen	38730 VA	65.00%	25175 VA		

New Branch Panel: LB
Distribution System: 208Y/120
Number of Phases: 3
Number of Wires: 4

	New Brai	nch	Par	nel: LB								Sys	te	m: N	NORMAL				
		Distrib	ution Sy	/stem: 208Y/120							100	A I	MLO			I	Fed B	y: LA	
		Numb	er of Pl	nases: 3		Neutral Rating: 100% Isolated Ground Bus: NO										s: NO			
		Num	ber of	Wires: 4		Feed-Thru Lugs: NO Mounting: RECE										g: RECESSED			
										Bus	Materia	al: CU/S	N			Enc	losur	e: TYPE 1	
(All	Branch Breakers Shall Be Bolt-On T	ype)																	
СКТ	LOAD DESCRIPTION	TYPE	LOAD	WIRE SIZE	TRI	Ρ/		A		В		С	TF	RIP /	WIRE SIZE	LOAD	Ο ΤΥΡ	E LOAD DESCRIPTION	СКТ
			AMPS		POI	E	_		_		_		P	OLE		AMPS	6		
			[A]		[A]	[V	'A]	[V	/A]	[V	'A]		[A]		[A]			
1	KITCHEN CONV. RCPT	R	1.5	1-#12, 1-#12, 1-#12	20	1	180	420					1	15	1-#12, 1-#12, 1-#14	3.5	K	DROP COOLER	2
3	FOUNTAIN SODA	K	2.0	1-#12, 1-#12, 1-#14	15	1			240	500			1	20	1-#10, 1-#10, 1-#10	4.2	MIS	VEHICLE FILLING STATION	4
5	FOUNTAIN SODA	K	2.0	1-#12, 1-#12, 1-#14	15	1					240	600	1	20	1-#12, 1-#12, 1-#12	5.0	K	COLDWELL	6
7	HOT DOG WARMER	K	5.4	1-#12, 1-#12, 1-#12	20	1	648	1000					1	20	1-#12, 1-#12, 1-#12	8.3	K	ICE MAKER	8
9	PASTRY CASE	K	7.0	1-#12, 1-#12, 1-#12	20	1			840	1440			1	20	1-#12, 1-#12, 1-#12	12.0	K	BUNN SLUSHI	10
11	ICE MAKER	K	8.3	1-#12, 1-#12, 1-#12	20	1					1000	1440	1	20	1-#12, 1-#12, 1-#12	12.0	K	BUNN SLUSHI	12
13	COFFEE MAKER	K	13.3	1-#12, 1-#12, 1-#12	20	1	1600	1668					1	20	1-#12, 1-#12, 1-#12	13.9	K	HOT FOOD MERCHANDISER	14
15	KITCHEN CONV. RCPT	R	1.5	1-#12, 1-#12, 1-#12	20	1			180	1342			2	20	2-#12, 1-#12, 1-#12	12.9	K	HOT FOOD DISPLAY	16
17	COFFEE MAKER	K	13.3	1-#12, 1-#12, 1-#12	20	1					1600	1342							18
19	HOT FOOD MERCHANDISER	K	13.9	1-#12, 1-#12, 1-#12	20	1	1668	1728					1	20	1-#12, 1-#12, 1-#12	14.4	K	TEA BREWER	20
21	HOT FOOD DISPLAY	K	12.9	2-#12, 1-#12, 1-#12	20	2			1342	1560			2	30	2-#10, 1-#10, 1-#10	15.0	K	GRAB N GO COOLER	22
23											1342	1560							24
25	KITCHEN CONV. RCPT	R	1.5	1-#12, 1-#12, 1-#12	20	1	180	1716					2	20	2-#12, 1-#12, 1-#12	16.5	K	HOTWELL	26
27	ICEE FBD	K	15.0	2-#10, 1-#10, 1-#10	30	2			1560	1716									28
29											1560	180	1	20	1-#12, 1-#12, 1-#12	1.5	R	KITCHEN CONV. RCPT	30
31	BUBBLERS	K	6.0	1-#12, 1-#12, 1-#12	20	1	720	1800					1	20	1-#12, 1-#12, 1-#12	15.0	K	CAPPUCCINO MACHINE	32
33	BUBBLERS	K	6.0	1-#12, 1-#12, 1-#12	20	1			720	1800			1	20	1-#12, 1-#12, 1-#12	15.0	K	F REAL SHAKE	34
35	HEATED HOLDING	K	6.0	1-#12, 1-#12, 1-#12	20	1					720	1800	1	20	1-#12, 1-#12, 1-#12	15.0	K	ROLLER GRILL	36
37	Space					1							1					Space	38
39	Space					1							1					Space	40
41	Space					1							1					Space	42
					Lo	ad:	1332	28 VA	1323	39 VA	1338	33 VA							
					Am	ps:	11	1 A	11	0 A	11	2 A							

Notes

1. All breakers 100Amp or less shall be rated for 75% 60% wire termination. Breakers rated for only 60% wire termination shall not be used. All breakers greater than 100Amp shall be rated for 75% termination. N.E.C. Article 110.14(C)(1). 2. For 3-pole breaker, provide 3 wires + grd where neutral is not used or req'd. Similarly for 2-pole bkr, provide 2 wires + grd if neut. is not req'd.

Load Classification		Connected Load	Demand Factor	Estimated Demand	Panel	Totals
L	Lighting	0 VA	0.00%	0 VA	Total Conn. Existing Load:	0 VA
OL	Outside Lighting	0 VA	0.00%	0 VA	Total Conn. New Load:	39950 VA
С	Cooling	0 VA	0.00%	0 VA	Total Demand Load:	26395 VA
Н	Heating	0 VA	0.00%	0 VA	Total Conn. Current:	111 A
MT	Motor	0 VA	0.00%	0 VA	Total Demand Current:	73 A
LMT	Largest Motor	0 VA	0.00%	0 VA		
R	Receptacle	720 VA	100.00%	720 VA		
NC	Non-Coincidental	0 VA	0.00%	0 VA		
MIS	Misc Non-Continuous	500 VA	100.00%	500 VA		
MC	Misc Continuous	0 VA	0.00%	0 VA		
К	Kitchen	38730 VA	65.00%	25175 VA		

System: NORMAL 400 A MLO Fed By: SERVICE Neutral Rating: 100% Isolated Ground Bus: NO Mounting: RECESSED Enclosure: TYPE 1 Feed-Thru Lugs: NO Bus Material: CU/SN

MECHANICAL SCOPE OF WORK

NEW MECHANICAL SYSTEM WITH PACKAGED DX UNITS. GREASE EXHAUST. AND MAKEUP AIR SUPPLY.

APPLICABLE CODES AND STANDARDS

ALL MECHANICAL EQUIPMENT, MATERIALS, INSTALLATION, TESTING, CLEANING, SUPPORTS, AND WORKMANSHIP SHALL BE IN STRICT ACCORDANCE WITH THE BELOW LISTED APPLICABLE CODES INCLUDE BUT ARE NOT LIMITED TO:

CODE INFORMATION

2015 INTERNATIONAL BUILDING CODE (W/ CITY OF SAN MARCOS AMENDMENTS) 2015 INTERNATIONAL MECHANICAL CODE (W/ CITY OF SAN MARCOS AMENDMENTS) 2015 INTERNATIONAL FIRE CODE (W/ CITY OF SAN MARCOS AMENDMENTS) 2015 INTERNATIONAL ENERGY CONSERVATION CODE (W/ CITY OF SAN MARCOS AMENDMENTS)

HVAC DESIGN CRITERIA **INDOOR TEMPERATURE**

75° F COOLING (MINIMUM ALLOWED BY 2015 IECC, SECTION C302.1) 72º F HEATING (MAXIMUM ALLOWED BY 2015 IECC, SECTION C302.1)

HUMIDITY CONTROL: THIS PROJECT HAS NO DIRECT CONTROL OF HUMIDITY

OUTDOOR DESIGN CONDITIONS (SAN MARCOS, TEXAS) PER 2017 ASHRAE FUNDAMENTALS HANDBOOK CHAPTER 14:

- 98.2°F DB, 74.4°F WB SUMMER; 26.7°F DB WINTER • 3005 DEGREE DAYS COOLING; 1634 DEGREE DAYS HEATING
- CLIMATE ZONE 2A

OFFICE SPACES:

SALES:

OUTSIDE AIR REQUIREMENTS: PER ASHRAE 62.1-2013 KITCHEN (COOKING):

7.5 CFM PER PERSON, 0.12 CFM PER SQ.FT. 7.5 CFM PER PERSON, 0.12 CFM PER SQ.FT. 5 CFM PER PERSON, 0.06 CFM PER SQ.FT.

FIRE AND SMOKE DAMPER REQUIREMENTS: 2018 IBC BUILDING IS FULLY SPRINKLERED

	MECHANICAL SHEET LIST
SHEET NUMBER	SHEET NAME
M0.1	MECHANICAL LEGENDS AND NOTES
M0.2	MECHANICAL SPECIFICATIONS
M0.3	MECHANICAL SPECIFICATIONS
M2.1	MECHANICAL PLAN
M2.2	MECHANICAL ROOF PLAN
M3.1	MECHANICAL DETAILS
M4.1	MECHANICAL SCHEDULES
MK1.1	MECHANICAL KITCHEN DRAWINGS
MK1.2	MECHANICAL KITCHEN DRAWINGS
MK1.3	MECHANICAL KITCHEN DRAWINGS
MK1.4	MECHANICAL KITCHEN DRAWINGS

MECHANICAL ABBREVIATIONS

	AMPS
F	ABOVE FINISHED FLOOR
PD	AIR PRESSURE DROP
-U 1P	BRITISH THERMAL UNIT
//S	BUILDING MANAGEMENT SYSTEM
-1vi H	CHILLER
HP	
HWR HWS	CHILLED WATER RETURN
)	CLEAN OUT
OND	CONDENSATE DRAIN
RAC	COMPUTER ROOM AIR CONDITIONING UNIT
Г Ч	
VR	CONDENSING UNIT
VS	CONDENSER WATER SUPPLY
3	DRY BULT TEMPERATURE, "F
DAS	DEDICATED OUTDOOR AIR SYSTEM
κ	DIRECT EXPANSION
N ND	EXHAUST AIR EXHAUST AIR DUCT
AT .	ENTERING AIR TEMPERATURE
RV	EXHAUST FAN ENERGY RECOVERY VENTILATOR
SP	EXTERNAL STATIC PRESSURE
- 'R	EXPANSION TANK EXISTING TO REMAIN
JH	ELECTRIC UNIT HEATER
VT	ENTER WATER TEMPERATURE, °F
N CU	FREE AREA FAN COIL UNIT
)	FIRE DAMPER
A M	FULL LOAD AMPS FEET PER MINUTE
PS	FEET PER SECOND
PTU D	FAN POWERED TERMINAL UNIT
JH	GAS UNIT HEATER
PM	GALLONS PER MINUTE
IWR IWS	HEATING HOT WATER RETORN HEATING HOT WATER SUPPLY
) ,	HORSEPOWER
7	HEAT EXCHANGER HERTZ
WG	INCHES OF WATER COLUMN
V .T	KILOWATT LEAVING AIR TEMPERATURE °E
)	LIQUID PROPANE
, VT	LOUVER LEAVING WATER TEMPERATURE, °F
AU	MAKE-UP AIR
3H DCP	INOUSAND BTU PER HOUR MAXIMUM OVERCURRENT PROTECTION
C.	NORMALLY CLOSED
I.C.	
G.	NATURAL GAS
rs v	
۹ ۹D	OUTSIDE AIR DUCT
ED	
anu Si	POUNDS PER SQUARE INCH
SIA	POUNDS PER SQUARE INCH ABSOLUTE
SIG TAC	POUNDS PER SQUARE INCH GUAGE PACKAGED TERMINAL AIR CONDITIONER
A	RETURN AIR
D סי	RETURN AIR DUCT
3	RETURN GRILLE
4	RELATIVE HUMIDITY
- PM	REVOLUTIONS PER MINUTE
२	RETURN REGISTER
5 FU	REFRIGERANT SUCTION ROOF TOP UNIT
<	REMOVE EXISTING
	SUPPLY AIR
)	SUPPLY DIFFUSER
R P	SUPPLY REGISTER
т [.] /	UNIT VENTILATOR
D	VARIABLE AIR VOLUVIE VARIABLE-FREQUENCY DRIVE
RV	VARIABLE REFRIGERANT VOLUME
/ B	WITH WET BULB TEMPERATURE. °F
PD	WATER PRESSURE DROP
	DEGREES FAHRENHEIT PHASE

	ME	CH	ANIC	AL L	.EGI	END
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	MECHANICAL EQUIPMENT
	PLENUM SLOT DIFFUSER
\square	SUPPLY AIR DEVICE
	RETURN AIR DEVICE
	EXHAUST AIR DEVICE
۲ <u>۲</u>	CONCIAL TAP WITH DAMPER
П 	MOTORIZE DAMPER
- II	MANUAL BALANCING DAMPER
λΥ	RIGID DUCTWORK
+++++++++	FLEX DUCT
T	ZONE THERMOSTAT @ 48" A.F.F.
S	ZONE TEMPERATURE SENSOR
A/###	DIFFUSER TAG / AIR FLOW
<u>FCU-#</u>	EQUIPMENT TAG
$\langle \rangle$	KEY NOTE TAG

MECHANICAL GENERAL NOTES

- A. DRAWINGS ARE DIAGRAMMATIC; CONFIRM DIMENSIONS AND LOCATIONS IN THE FIELD. B. RUNOUTS TO INDIVIDUAL AIR DEVICES ARE SAME SIZE AS AIR DEVICE NECK UNLESS OTHERWISE
- NOTED. C. DUCT SIZES SHOWN ARE FREE AREA.
- D. SEE ARCHITECTURAL REFLECTED CEILING PLANS FOR TYPE OF CEILING AND LOCATION OF CEILING DEVICES. E. SEE ARCH ELEVATIONS FOR LOCATION OF WALL MTD DEVICES.
- F. PLENUMS ARE CROWDED AND NOT ALL OBSTACLES ARE INDICATED. ALLOW FOR ADDITIONAL DUCT OR PIPE OFFSETS OR TRANSITIONS NOT INDICATED ON DRAWINGS. G. SEAL ALL PENETRATIONS OF FLOORS, RATED WALLS, EXTERIOR WALLS
- H. CONTRACTOR SHALL SUBMIT DRAWINGS FOR ALL PERMITS IN A TIMELY MANNER AND PAY ALL PERMIT FEES. I. PROVIDE ANY REQUIRED TEMPORARY UTILITIES.
- J. THE LISTING OF PRODUCT MANUFACTURERS, MATERIALS, AND METHODS ARE THE BASIS OF DESIGN AND ARE INTENDED TO ESTABLISH A STANDARD OF QUALITY. THE ENGINEER SHALLBE THE SOLE JUDGE OF QUALITY AND EQUIVALENCE OF EQUIPMENT. MATERIALS, AND METHODS, WHERE SUBSTITUTED OR ALTERNATIVE EQUIPMENT IS PROPOSED ON THE PROJECT BEFORE BIDDING, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THAT THE EQUIPMENT WILL FIT THE SPACE AVAILABLE, INCLUDING ALL REQUIRED CODE AND MAINTENANCE CLEARANCES, AND TO COORDINATE ALL EQUIPMENT REQUIREMENTS WITH OTHER CONTRACTORS.
- K. PROVIDE BID BREAKDOWN TO ALLOW FOR SELECTION OF EQUIPMENT FROM MULTIPLE MANUFACTURERS, MANUFACTURER'S REPRESENTATIVES AND/OR DISTRIBUTORS. BEING LISTED AS THE ONLY ACCEPTABLE MANUFACTURER FOR ONE LINE OF EQUIPMENT DOES NOT AUTOMATICALLY EXTEND TO ALL EQUIPMENT. BREAK BIDS ALONG RESPECTIVE SPECIFICATION SECTIONS.
- L. INSTALL ALL EQUIPMENT TO PROVIDE CLEARANCE AROUND ALL HVAC EQUIPMENT CONFORMING TO MANUFACTURER'S MINIMUM RECOMMENDED SPACE FOR MAINTENANCE AND/OR AIR FLOW AND SUFFICIENT TO ALLOW INSPECTION, SERVICE, REPAIR, OR REPLACEMENT WITHOUT REMOVING ELEMENTS OF PERMANENT CONSTRUCTION OR DISABLING THE FUNCTION OF FIRE RESISTANCE RATED ASSEMBLIES. M. DO NOT RUN DUCT OR PIPE ABOVE ELECTRICAL PANELS.
- N. ALL WORK IN OR ABOVE OCCUPIED AREAS SHALL BE AT OWNER'S CONVENIENCE AND MAY BE DURING EVENINGS OR WEEKENDS. SCHEDULE ALL SERVICE INTERRUPTIONS IN ADVANCE WITH OWNER
- O. ONLY OWNER'S REPRESENTATIVE MAY SHUT OFF EQUIPMENT OR DISCONNECT UTILITIES. P. BEFORE SUBMITTING A BID, IT WILL BE NECESSARY FOR EACH CONTRACTOR WHOSE WORK IS INVOLVED TO VISIT THE SITE AND ASCERTAIN FOR HIMSELF THE CONDITIONS TO BE MET IN INSTALLING THE WORK AND MAKE PROVISIONS FOR THE CONDITIONS IN HIS FINAL PRICE. FAILURE OF THE CONTRACTOR TO COMPLY WITH THIS REQUIREMENT SHALL NOT BE CONSIDERED JUSTIFICATION FOR THE OMISSION OR FAULTY INSTALLATION OF ANY WORK COVERED BY THE CONTRACT DOCUMENTS. THE BID SHALL INCLUDE ALL THE WORK REQUIRED OR NECESSARY TO COMPLY WITH THE WORK SHOWN ON THE DRAWINGS AND IDENTIFIED IN THE SPECIFICATIONS. NO EXTRAS WILL BE ALLOWED FOR CONDITIONS THA TCOULD BE READILY OBSERVED.
- Q. CONTRACTOR SHALL COORDINATE ALL WORK WITH THE BUILDING ENGINEER. R. ALL OTHER AREAS OF THE FLOOR NOT WITHIN THE SCOPE OF WORK SHALL REMAIN UNCHANGED.
- S. BUILDING IS A CONCRETE STRUCTURE WITH THE 2-HOUR RATING AT THE CONCRETE SLAB. CEILING IS NOT PART OF THE RATED ASSEMBLY. CEILING RADIATION FIRE DAMPERS ARE NOT REQUIRED. T. AIR IS RETURNED TO THE RTU VIA DUCTED RETURN AND RETURN AIR TRANSFER DUCTS.
- CONTRACTOR SHALL VERIFY THAT SUFFICENT RETURN AIR OPENINGS ARE PROVIDED.
- U. COORDINATE FINAL LOCATIONS AND LABELING REQUIREMENT OF THERMOSTATS WITH ARCHITECT AND BUILDING ENGINEER. V. LOCATE VOLUME DAMPERS ABOVE ACCESSIBLE CEILING. EVEN IN AREAS OF ACCESSIBLE CEILINGS,
- POSITION DAMPER HANDLE/OPERATOR ON BOTTOM SIDE OF DUCT OR ON CLEAR SIDE OF DUCT FOR EASE OF ADJUSTMENT. W. CONTRACTOR SHALL MAINTAIN MANUFACTURER CLEARANCES FOR ALL MECHANICAL EQUIPMENT
- AND ENSURE ALL SERVICEABLE COMPONENTS ARE READILY ACCESSIBLE, EVEN IN LAY-IN CEILING AREAS. X. CONTRACTOR SHALL COORDIANTE WITH OTHER TRADES TO ENSURE THAT ALL NEW PLASTIC PIPING
- IN RETURN AIR PLENUMS AND EXPOSED AREAS ARE INSULATED (MORGAN PLENUMWRAP+ OR EQUAL) TO MEET CODE FLAME AND SMOKE REQUIREMENTS.

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SECTION C403 BUILDING MECHANICAL SYSTEMS

C403.2.1 Calculation of heating and cooling loads. Engineer has performed HVAC load calculations using Trace 700

C403.2.2 Equipment sizing.

The output capacity of heating and cooling equipment shall be not greater than the loads calculated in accordance with Section C403.2.1. A single piece of equipment providing both heating and cooling shall satisfy this provision for one function with the capacity for the other function as small as possible, within available equipment options. Exceptions:

- 1. Required standby equipment and systems provided with controls and devices that allow such systems or equipment to operate automatically only when the primary equipment is not operating.
- 2. Multiple units of the same equipment type with combined capacities exceeding the design load and provided with controls that have the capability to sequence the operation of each unit based on load.

C403.2.3 HVAC equipment performance requirements. Equipment shall meet the minimum efficiency requirements of Tables C403.2.3.

C403.2.4 HVAC system controls.

Each heating and cooling system shall be provided with thermostatic controls.

C403.2.4.1 Thermostatic controls. The supply of heating and cooling energy to each zone shall be controlled by individual thermostatic controls capable of responding to temperature within the zone. Where humidification or dehumidification or both is provided, at least one humidity control device shall be provided for each humidity control system.

C403.2.4.1.2 Deadband.

Where used to control both heating and cooling, zone thermostatic controls shall provide a temperature range or deadband of at least 5°F within which the supply of heating and cooling energy to the zone is capable of being shut off or reduced to a minimum.

Exceptions:

Thermostats requiring manual changeover between heating and cooling modes. 2. Occupancies or applications requiring precision in indoor temperature control as approved by the code official.

C403.2.4.1.3 Set point overlap restriction. Where a zone has a separate heating and a separate cooling thermostatic control located within the zone, a limit switch, mechanical stop, or direct digital control systems with software programming shall be provided with the capability to prevent the heating set point from exceeding the cooling set point and to maintain a deadband in accordance with Section C403.2.4.1.2.

C403.2.4.2 Off-hour controls.

Each zone shall be provided with thermostatic setback controls that are controlled by either an automatic time clock or programmable control system. **Exceptions:**

1. Zones that will be operated continuously

2. Zones with a full HVAC load demand not exceeding 6,800 Btu/h and having a readily accessible manual shutoff switch

C403.2.4.2.1 Thermostatic setback capabilities

Thermostatic setback controls shall have the capability to set back or temporarily operate the system to maintain zone temperatures down to 55°F or up to 85°F.

C403.2.4.2.2 Automatic setback and shutdown capabilities. Automatic time clock or programmable controls shall be capable of starting and stopping the system for seven different

daily schedules per week and retaining their programming and time setting during a loss of power for at least 10 hours. Additionally, controls shall have a manual override that allows temporary operation of the system for up to 2 hours; a manually operated timer capable of being adjusted to operate the system for up to 2 hours; or an occupancy sensor.

C403.2.4.2.3 Automatic start capabilities

Automatic start controls shall be provided for each HVAC system. The controls shall be capable of automatically adjusting the daily start time of the HVAC system in order to bring each space to the desired occupied temperature immediately prior to scheduled occupancy.

C403.2.4.3 Shutoff dampers.

Outdoor air intake and exhaust openings and stairway and shaft vents shall be provided with Class I motorized dampers. The dampers shall have an air leakage rate not greater than 4 cfm/ft² of damper surface area at 1.0 inch water gauge and shall be labeled by an approved agency when tested in accordance with AMCA 500D for such purpose.

Outdoor air intake and exhaust dampers shall be installed with automatic controls configured to close when the systems or spaces served are not in use or during unoccupied period warm-up and setback operation, unless the systems served require outdoor or exhaust air in accordance with the International Mechanical Code or the dampers are opened to provide intentional economizer cooling.

Stairway and shaft vent dampers shall be installed with automatic controls configured to open upon the activation of any fire alarm initiating device of the building's fire alarm system or the interruption of power to the damper.

Exception: Gravity (nonmotorized) dampers shall be permitted to be used as follows:

- 1. In buildings less than three stories in height above grade plane.
- In buildings of any height located in Climate Zones 1, 2 or 3. Where the design exhaust capacity is not greater than 300 cfm.

Gravity (nonmotorized) dampers shall have an air leakage rate not greater than 20 cfm/ft² where not less than 24 inches in either dimension and 40 cfm/ft² where less than 24 inches in either dimension. The rate of air leakage shall be determined at 1.0 inch water gauge when tested in accordance with AMCA 500D for such purpose. The dampers shall be labeled by an approved agency.

C403.2.4.7 Economizer fault detection and diagnostics (FDD).

Air-cooled unitary direct-expansion units listed in Tables C403.2.3(1) through C403.2.3(3) and variable refrigerant flow (VRF) units that are equipped with an economizer in accordance with Section C403.3 shall include a fault detection and diagnostics (FDD) system complying with the following:

- 1. The following temperature sensors shall be permanently installed to monitor system operation:
- 1.1. Outside air.
- 1.2. Supply air. 1.3. Return air.
- Temperature sensors shall have an accuracy of ±2°F over the range of 40°F to 80°F.
- Refrigerant pressure sensors, where used, shall have an accuracy of ±3 percent of full scale. The unit controller shall be capable of providing system status by indicating the following:
- 1.1. Free cooling available.
- 1.2. Economizer enabled. 1.3. Compressor enabled.
- 1.4. Heating enabled.
- 1.5. Mixed air low limit cycle active.
- 1.6. The current value of each sensor.
- The unit controller shall be capable of manually initiating each operating mode so that the operation of compressors, economizers, fans and the heating system can be independently tested and verified. 6. The unit shall be capable of reporting faults to a fault management application accessible by day-to-day
- operating or service personnel, or annunciated locally on zone thermostats.
- 7. The FDD system shall be capable of detecting the following faults: 1.1. Air temperature sensor failure/fault.
- 1.2. Not economizing when the unit should be economizing.
- 1.3. Economizing when the unit should not be economizing.
- 1.4. Damper not modulating 1.5. Excess outdoor air.

C403.2.6 Ventilation.

Ventilation, either natural or mechanical, shall be provided in accordance with Chapter 4 of the International Mechanical Code. Where mechanical ventilation is provided, the system shall provide the capability to reduce the outdoor air supply to the minimum required by Chapter 4 of the International Mechanical Code.

Exception: Demand control ventilation is not required for systems and spaces as follows:

- Systems with energy recovery complying with Section C403.2.7. 2. Multiple-zone systems without direct digital control of individual zones communicating with a central control
- 3. Systems with a design outdoor airflow less than 1,200 cfm.
- 4. Spaces where the supply airflow rate minus any makeup or outgoing transfer air requirement is less than 1,200
- 5. Ventilation provided for process loads only.

C403.2.8 Kitchen exhaust systems.

Replacement air introduced directly into the exhaust hood cavity shall not be greater than 10 percent of the hood exhaust airflow rate. Conditioned supply air delivered to any space shall not exceed the greater of the following: The ventilation rate required to meet the space heating or cooling load.

2. The hood exhaust flow minus the available transfer air from adjacent space where available transfer air is considered that portion of outdoor ventilation air not required to satisfy other exhaust needs, such as restrooms, and not required to maintain pressurization of adjacent spaces.

Where total kitchen hood exhaust airflow rate is greater than 5,000 cfm, each hood shall be a factory-built commercial exhaust hood listed by a nationally recognized testing laboratory in compliance with UL 710. Each hood shall have a maximum exhaust rate as specified in Table C403.2.8 and shall comply with one of the following: Not less than 50 percent of all replacement air shall be transfer air that would otherwise be exhausted.

hood or hood section

- Exceptions:
- than 15°F.

C403.2.9.1 Duct construction

C403.2.9.1.1 Low-pressure duct systems. sealed as specified in this section

C403.3.1 Integrated economizer control. Economizer systems shall be integrated with the mechanical cooling system and be capable of providing partial cooling even where additional mechanical cooling is required to provide the remainder of the cooling load. Controls shall not be capable of creating a false load in the mechanical cooling systems by limiting or disabling the economizer or any other means, such as hot gas bypass, except at the lowest stage of mechanical cooling.

Test motors in accordance with NEMA MG 1, including winding resistance, no-load speed and current, locked rotor Units that include an air economizer shall comply with the following: current, insulation high-potential test, and mechanical alignment tests. 1. Unit controls shall have the mechanical cooling capacity control interlocked with the air economizer controls Install securely on firm foundation. Mount ball bearing motors with shaft in any position. Install engraved nameplates. such that the outdoor air damper is at the 100-percent open position when mechanical cooling is on and the Ground and bond motors. outdoor air damper does not begin to close to prevent coil freezing due to minimum compressor run time until Single-Phase Motors: Permanent split-capacitor type, where available; otherwise, use split-phase the leaving air temperature is less than 45°F.

- mechanical cooling capacity.

C403.3.3 Air economizers.

C403.3.3.1 Design capacity

C403.3.3.2 Control signal. controlled by only mixed-air temperature. **Exception:** The use of mixed-air temperature limit control shall be permitted for systems controlled from space temperature (such as single-zone systems).

C403.3.3.3 High-limit shutoff. Air economizers shall be capable of automatically reducing outdoor air intake to the design minimum outdoor air quantity when outdoor air intake will no longer reduce cooling energy usage. High-limit shutoff control types for specific climates shall be chosen from Table C403.3.3.4. High-limit shutoff control settings for these control types shall be those specified in Table C403.3.3.3.

C403.3.3.4 Relief of excess outdoor air.

C403.3.3.5 Economizer dampers.

SECTION C408 SYSTEM COMMISSIONING

C408.1 General. This section covers the commissioning of the building mechanical systems in Section C403 and electrical power and lighting systems in Section C405.

C408.2 Mechanical systems and service water-heating systems commissioning and completion requirements. Prior to the final mechanical and plumbing inspections, the registered design professional or approved agency shall provide evidence of mechanical systems commissioning and completion in accordance with the provisions of this section.

Exceptions: The following systems are exempt: space-heating capacity.

C408.2.2 Systems adjusting and balancing. HVAC systems shall be balanced in accordance with generally accepted engineering standards. Air and water flow rates shall be measured and adjusted to deliver final flow rates within the tolerances provided in the product specifications. Test and balance activities shall include air system and hydronic system balancing.

C408.2.2.1 Air systems balancing.

shall be adjusted to meet design flow conditions

C408.2.3 Functional performance testing.

C408.2.3.1 Equipment.

 Cooling-Water Flow Rate: Plus or minus 10 percent Equipment functional performance testing shall demonstrate the installation and operation of components, systems, and system-to-system interfacing relationships in accordance with approved plans and specifications such that operation, HVAC control systems shall be tested to ensure that control elements are calibrated, adjusted, and in proper working function, and maintenance serviceability for each of the commissioned systems is confirmed. Testing shall include all condition. Submit test documentation. modes and sequence of operation, including under full-load, part-load and the following emergency conditions: All modes as described in the sequence of operation. Redundant or automatic back-up mode.

- 3. Performance of alarms.

supply air economizers

C408.2.3.2 Controls

specifications.

specifications.

2. Demand ventilation systems on not less than 75 percent of the exhaust air that are capable of not less than a 50-percent reduction in exhaust and replacement air system airflow rates, including controls necessary to modulate airflow in response to appliance operation and to maintain full capture and containment of smoke, effluent and combustion products during cooking and idle.

3. Listed energy recovery devices with a sensible heat recovery effectiveness of not less than 40 percent on not less than 50 percent of the total exhaust airflow.

Where a single hood, or hood section, is installed over appliances with different duty ratings, the maximum allowable flow rate for the hood or hood section shall be based on the requirements for the highest appliance duty rating under the

Exception: Where not less than 75 percent of all the replacement air is transfer air that would otherwise be exhausted

C403.2.9 Duct and plenum insulation and sealing.

Supply and return air ducts and plenums shall be insulated with a minimum of R-6 insulation where located in unconditioned spaces and where located outside the building with a minimum of R-8 insulation in Climate Zones 1 through 4 and a minimum of R-12 insulation in Climate Zones 5 through 8. Where located within a building envelope assembly, the duct or plenum shall be separated from the building exterior or unconditioned or exempt spaces by a minimum of R-8 insulation in Climate Zones 1 through 4 and a minimum of R-12 insulation in Climate Zones 5 through 8.

Where located within equipment.

2. Where the design temperature difference between the interior and exterior of the duct or plenum is not greater

3. Ducts, air handlers and filter boxes shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded fabric systems or tapes.

Ductwork shall be constructed and erected in accordance with the International Mechanical Code.

Longitudinal and transverse joints, seams and connections of supply and return ducts operating at a static pressure less than or equal to 2 inches w.g. shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), masticplus-embedded-fabric systems or tapes installed in accordance with the manufacturer's installation instructions. **Exception**: Locking-type longitudinal joints and seams, other than the snap-lock and button-lock types, need not be

2. Direct expansion (DX) units that control 75,000 Btu/h or greater of rated capacity of the capacity of the mechanical cooling directly based on occupied space temperature shall have not fewer than two stages of

3. Other DX units, including those that control space temperature by modulating the airflow to the space, shall be in accordance with Table C403.3.1.

Air economizers shall comply with Sections C403.3.3.1 through C403.3.3.5.

Air economizer systems shall be capable of modulating outdoor air and return air dampers to provide up to 100 percent of the design supply air quantity as outdoor air for cooling.

Economizer dampers shall be capable of being sequenced with the mechanical cooling equipment and shall not be

g excess outdoor air during air economizer operation to prevent overpressurizing the building. The relief air outlet shall be located to avoid recirculation into the building.

Return, exhaust/relief and outdoor air dampers used in economizers shall comply with Section C403.2.4.3.

Construction document notes shall clearly indicate provisions for commissioning and completion requirements in accordance with this section and are permitted to refer to specifications for further requirements. Copies of all documentation shall be given to the owner or owner's authorized agent and made available to the code official upon request in accordance with Sections C408.2.4 and C408.2.5.

1. Mechanical systems and service water heater systems in buildings where the total mechanical equipment capacity is less than 480,000 Btu/h cooling capacity and 600,000 Btu/h combined service water-heating and

2. Systems included in Section C403.3 that serve individual dwelling units and sleeping units.

Each supply air outlet and zone terminal device shall be equipped with means for air balancing in accordance with the requirements of Chapter 6 of the International Mechanical Code. Discharge dampers used for air-system balancing are prohibited on constant-volume fans and variable-volume fans with motors 10 hp and larger. Air systems shall be

balanced in a manner to first minimize throttling losses then, for fans with system power of greater than 1 hp, fan speed

Exception: Fans with fan motors of 1 hp or less are not required to be provided with a means for air balancing.

Functional performance testing specified in Sections C408.2.3.1 through C408.2.3.3 shall be conducted.

4. Mode of operation upon a loss of power and restoration of power.

Exception: Unitary or packaged HVAC equipment listed in Tables C403.2.3(1) through C403.2.3(3) that do not require

HVAC and service water-heating control systems shall be tested to document that control devices, components, equipment and systems are calibrated and adjusted and operate in accordance with approved plans and specifications. Sequences of operation shall be functionally tested to document they operate in accordance with approved plans and

C408.2.3.3 Economizers. Air economizers shall undergo a functional test to determine that they operate in accordance with manufacturer's

HVAC SPECIFICATIONS

23 05 00 BASIC MECHANICAL REQUIREMENTS Warranty: Guarantee labor and materials for 1-year. Warranties begin upon Owner's acceptance of substantial completion of the installation.

Shop drawings: Submit complete information on all equipment, air devices, valves, duct accessories and controls. Submit complete ductwork and piping shop drawings, based on approved equipment and field observation of building conditions. Submit detailed layout of mechanical rooms and yards. Incomplete submittals will be returned to the contractor un-reviewed. No time extensions or cost increases will be allowed for delays caused by return of incomplete submittals

Startup Services: Engage equipment manufacturers in appropriate startup, testing, and training activities when required by individual equipment specifications/warranties. Complete installation and startup checks according to manufacturer's written instructions. Prepare a written startup report that records the results of tests and inspections. **Operations and maintenance instructions:** Provide 3 copies of operation and maintenance manuals to Owner.

Provide within 90 days after the date of system acceptance. These manuals shall be in accordance with industryaccepted standard such as ASHRAE Guideline 1 and shall include, at a minimum, the following: a. Submittal data stating equipment size and selected options for each piece of equipment requiring

- maintenance b. Operation manuals and maintenance manuals for each piece of equipment requiring maintenance, except equipment not furnished as part of the project. Required routine maintenance actions shall
- be clearly identified Names and addresses of at least one service agency.
- d. HVAC controls system maintenance and calibration information, including wiring diagrams, schematics, and control sequence descriptions. Desired or field-determined setpoints shall be permanently recorded on control drawings at control devices or, for digital control systems, in programming comments.
- e. A complete narrative of how each system is intended to operate, including suggested setpoints. Provide instruction on system operation to Owner's representatives.

Record drawings: Within 90 days after the date of system acceptance, provide record drawings in Revit Format (using the same software version the project was designed in), plus full size hard copy. Revit models may be available from Engineer for a fee. Record drawings shall include as a minimum the installed location and performance data on each piece of equipment, air devices, control sensors, control panels, general configuration of duct and pipe distribution system including sizes, and the terminal air or water design flow rates. Coordination: Provide Electrical Contractor with electrical requirements of approved equipment in sufficient time to

order panel boards, disconnects, etc. **Sleeves:** Provide metal sleeves where pipes or control wiring penetrate walls

Condensate control in roof mounted units: route condensate drain to nearest roof drain; or, to interior floor drain. As an alternative, contractor may route condensate drain to a suitable lavatory tailpiece. This alternative must be coordinated with the plumbing contractor, to ensure the proper lavatory tailpiece accessories are provided to accommodate the condensate drain piping connection. In addition, a float switch shall be provided that turns unit off, if standing water is detected in the primary pan.

23 05 13 COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

- start/capacitor run or capacitor start/capacitor run motor. Bearings: Prelubricated anti-friction ball bearings, rated for minimum ABMA 9, L-10 life of 200,000 hours. Internal thermal protection that automatically opens power supply circuit when winding temperature exceeds a safe motor insulation value. Terminal lugs to match branch circuit conductor quantities, sizes and materials
- Three-Phase Motors: NEMA MG 1, Design B, Premium -efficiency squirrel-cage induction motor, with windings to accomplish starting methods and number of speeds indicated. Service Factor: 1.15 unless otherwise indicated on Drawings. Enclosure: Meet conditions of installation unless specific enclosure is specified or indicated. Design for continuous operation in 40 degrees C and 3,300 feet environment, with temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type. Insulation System

23 05 29 HANGERS AND SUPPORTS FOR HVAC PIPING & EQUIPMENT

Pipe, duct and equipment hangers and supports shall be per the local code. Support piping at a minimum every 10' or less for 1" and larger pipe, every 6' on 3/4" or smaller. With copper pipe use copper hangers or tape at contact point. If pipe is insulated, support shall be on exterior of insulation. Provide shield to prevent acute compression of insulation.

Support flex ducts per manufacturer's installation instructions (provide instructions for inspector review). Alternate acceptable flex duct support is 26 gage, 1.5 inch wide galvanized iron straps on 4-foot maximum spacing.

Roof curbs & sleepers (required for all roof mounted equipment):

- · Galvanized steel shell and base, mitered cant and step to match deck insulation thickness, internally reinforced, treated wood nailer, and fully welded for water and air tightness. Roof curbs shall match the roof pitch and provide level surface for equipment; provide with rigid insulation with sealed edges (see internal liner specification 23 31 00), and be compatible with the roof type. Minimum 12 inches around unit from top of finished roof surface to top of wood nailer; maximum difference between surfaces shall be 30 inches. If dimension is larger than 30 inches contact engineer for further instructions. Sleepers shall be provided with Roofscreen Drycap or equal manufacturer and method.
- For mechanical rooftop units used for comfort or process cooling or heating on metal roof deck, mechanical contractor shall use BRD NIC-DS-52-E, BRD Hushcore DS-52, or equal manufacturer and method. Manufacturer shall provide a professional engineer stamped anchoring information for curb and/or bracket to
- conform to above stated wind requirements and local code. Acceptable curb & sleeper manufacturers: Thybar, Vibro-Acoustics, CDI, Kinetics, BRD, & equipment Manufacturer
- Any detail provided by KCI on mechanical sheets is for reference only.

Supports for duct and air devices within rated ceiling or floor assemblies shall be per the UL listing.

23 05 53 IDENTIFICATION FOR HVAC PIPING & EQUIPMENT

- Equipment: Permanent label (stencil, metal tag or engraved plastic) with unit tag or name and area or space served.
- Piping: Provide pipe markers every 20 feet. Identify service and flow direction. Install in clear view and align with axis of piping. Ceiling tacks: Provide ceiling tacks to locate valves or dampers above T-bar type panel ceilings. Locate in
- corner of panel closest to equipment. Color code: equipment: Yellow. Fire dampers/smoke dampers: Red. Valves: Blue.

23 05 93 TESTING, ADJUSTING AND BALANCING (TAB) FOR HVAC

Balance may be by a qualified employee of the mechanical contractor. Technician shall be AABC, NEBB, or TABB certified

Balance in accordance with NEBB Procedural Standards –1999 Procedural Standards for Building Systems, or AABC 2002 Associated Air Balance Council Test and Balance Procedures.

Adjust system to achieve air quantities shown, then adjust volumes to provide constant temperature (±2 °F) throughout the zone. Adjust fan sheaves, when applicable and where available. Calibrate all thermostats. Mark setpoints on all dampers and valves. Return to project at 1 and 3 month intervals after completion to make balance adjustments in response to Owner's perceived comfort.

Submit report (NEBB or AABC format) and include -

- General data: Nameplate data on all equipment. Outside air temp and humidity; cfm each supply, exhaust and return grille and actual room temperatures and humidities vs. setpoints • Fans: Volume and static pressure; fan rpm and amps
- DX packaged units: Supply and ret air temp (DB & WB), volume and static pressure; indoor fan rpm and amps; condensing air temp, unit's amps. Outside air cfm.

Air systems shall be balanced to meet air quantities shown at each air device; and, in a manner to first minimize throttling losses in the effected system. Then, for fans with fan system power greater than 1 HP, fan speed shall be adjusted to meet design flow conditions.

Tolerances

- Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent Air Outlets and Inlets: Plus or minus 10 percent
- Heating-Water Flow Rate: Plus or minus 10 percent

Perform inspections in the presence of construction manager or commissioning authority. Owner, construction manager, or commissioning authority may randomly select measurements, documented in the final report, to be rechecked within 90 days. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day. Recheck and adjust for failed measurements.

No adjustment to existing air handlers and fans serving the area are allowed without Owner's express knowledge and consent

23 07 13 DUCT INSULATION

Flame spread less than 25, smoke developed less than 50 as per ASTM E84, NFPA 255, UL273. Minimum required installed R values for non-residential projects (excluding film resistance) are:

Description: Mineral or glass fibers bonded with a thermosetting resir

seal all joints or breaks with reinforcing mesh imbedded in vapor barrier coating.

Jacket shall comply with ASTM C1136, Type II

Mold Growth per ASTM C1338 - No Growth.

ASTM E96 Water Vapor Permeance: 0.5 perms maximum.

 Comply with ASTM C1139 Type III, ASTM C553 Type II, & ASTM C1290 Type III with factory-applied FSK/FSP X CLAYTON F. CLEMENTS 109793 • 2" Staple flange on longitudinal seam. Adhere to duct with vapor barrier type adhesive. Overlap all joints. Vapor 02/14/2023

P.O. BOX 180973

AUSTIN, TEXAS 78718

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JOB NO.:	2130
PHASE:	IFP
DRAWN:	SA
CHECKED:	DW
DATE:	2023-02-14

ECHANICAL SPECIFICATIONS

MECHANICAL									
ATE:	2023-02-14								
HECKED:	DW								
RAWN:	SA								
IASE:	IFP								

Electric, programmable multistage thermostats, automatic changeover, battery backup. Honeywell TB8220 series or 23 09 93.11 SEQUENCES OF OPERATION

23 09 23 ELECTRIC CONTROLS FOR HVAC

ALL SYSTEMS

condition.

iacket

R value stenciled on outside

GREENGUARD Gold Certified.

Formaldehyde & PBDE Free.

Internal liners- see section 23 31 00.

23 08 00 COMMISSIONING OF HVAC

Density: Minimum 1.0 pcf

A. For systems larger than 2000 CFM: provide ionization-type smoke detector in return (2018 IMC 606.2.1) ductwork to shut unit down upon detection of the presence of products of combustion. Detectors located in return must be located prior to dilution by outside air. If return is not present or used on unit then detector shall be located in supply.

All projects less than 480,000 Btu/h cooling capacity and 600,000 Btu/h combined service water-heating and space-

heating capacity or with systems that serve individual dwelling and sleeping units: Test and balance contractor shall

observe HVAC control systems and document that all control elements are calibrated, adjusted, and in proper working

- B. Dead Bands: Where used to control both heating and cooling, automatic changeover zone thermostatic controls shall be capable of providing a temperature range or dead band of at least 5°F within which the supply of heating and cooling energy to the zone is shut off or reduced to a minimum. Exceptions: Special applications where wide temperature ranges are not acceptable (retirement homes, data processing, museums, and or varied hospital areas) and are approved by the authority having jurisdiction.
- C. Automatic Shutdown. Each HVAC system shall have controls that can start and stop the system under different time schedules for seven different daytypes per week, are capable of retaining programming and time setting during loss of power for a period of at least 10 hours, and include an accessible manual override, or equivalent function, that allows temporary operation of the system for up to two hours.
- D. Setback Controls. Heating systems have the capability to automatically restart and temporarily operate the system to maintain *zone* temperatures above a heating setpoint adjustable down to 55°F or lower. Cooling systems shall have the capability to automatically restart and temporarily operate the system as required to maintain zone temperatures below a cooling setpoint adjustable up to 85°F or higher or to prevent high space humidity levels.
- E. Optimum (Automatic) Start Controls. Individual heating and cooling air distribution systems, served by one or more supply fans, shall have optimum start controls. The control algorithm shall, as a minimum, be a function of the difference between space temperature and occupied setpoint and the amount of time prior to scheduled occupancy
- F. Shutoff Damper Controls. Both outdoor air supply and exhaust systems shall be equipped with motorized dampers that automatically shut when the systems or spaces served are not in use. Ventilation outdoor air dampers shall automatically shut off during preoccupancy building warm-up, cool down, and setback. Exceptions:
- a. Gravity (non-motorized) dampers are acceptable in exhaust systems in ASHRAE 90.1 2007 climate zones 1, 2, 3, such as City of Houston. p. Gravity (non-motorized) dampers are acceptable in systems with a design outdoor air intake or exhaust
- capacity of 300 cfm or less. G. Ventilation Controls for High-Occupancy Areas (DCV). Systems with design outdoor air capacities greater than 1,200 cfm serving areas greater than 500 square feet and having an average design occupancy density
- exceeding 25 people per 1000 ft2 shall automatically reduce outdoor air intake below design rates when spaces are partially occupied, via CO2 monitoring. Exception: Systems with energy recovery H. ASHRAE Guideline 36: Contractor shall follow the latest version of ASHRAE Guideline 36. If no pertinent
- sequence exist for a specific application within Guideline 36, then contractor shall follow the below sequence or contact the engineer for further clarification. I. Adjustments to sequences of operation. Make programming, set point, and other changes to the Sequences of Operation as directed by Engineer as a result of submittal/ shop drawing review, commissioning activities or issues discovered during the warranty period.

Operating Hours A. Occupied Hours

- B. Also known as "normal operation" or "daytime operation". Zone devices shall maintain occupied zone temperature setpoint and humidity. Ventilation and exhaust system shall be energized. System shall default to "occupied mode'
- C. Contractor to verify occupied hours with building owner, tenant, and/or building engineer. Hours could differ from business and office hours.
- D. Unoccupied Hours E. Also known as "nighttime operation". Hours covers zones that are not occupied. Zone devices shall maintain unoccupied zone temperature setpoint and humidity. Ventilation system shall be energized to unoccupied set point which is set to satisfy 2013 ASHRAE 62.1.
- F. Occupied Bypass G. Temporary setting to switch a predetermined "unoccupied" zone to "occupied". Temporary override time period shall be user adjustable. Owner or building engineer shall determine if override option to be available to tenant from space sensor face or through web portal. If provided, override button(s) shall be able to activate and cancel override.

SINGLE ZONE CONSTANT VOLUME A/C PACKAGED OR SPLIT SYSTEM:

- A. Programmable thermostat controls system off/on cycles; multiple cycles per day. When system is on, fan runs continuously.
- B. Zone thermostat cycles compressor(s) and activates indoor fan, during cooling mode. Upon a call for heating, the indoor fan and the heating coil shall be activated to maintain setpoint. C. Zone humidistat cycles hot gas reheat cool. When there is a call for dehumidification but not cooling, unit shall
- stage compressors, fans, cooling coil, and hot gas reheat coil unit setpoint is reached. D. Primary condensate drain switch shall shut unit off and generate alarm when closed. Unit shall not automatically restart unless switch has been manually reset.

23 31 00 HVAC DUCTS

Do not fabricate duct from these drawings, confirm all dimensions and available space in field. Dimensions given on drawings are inside free area, sheet metal is larger on lined duct. Branch takeoffs to have 45 degree entry fitting with volume damper. Elbows to be radius type with minimum centerline radius 1.5 times width or mitered elbows with single thickness turning vanes. Snap-lock is prohibited for medium and high pressure duct classifications.

Sheet metal: Use galvanized sheet metal, conforming to current SMACNA for construction, reinforcing, support and other aspects.

PRESSURE CLASS: Return: -1"

Exhaust: -1" upstream of fan, 1" downstream

DUCT SEALING

- Definitions (per ASHRAE SYSTEMS & EQUIPMENT 2008 TABLE 18-1): • Seal Level A: All transverse joints and longitudinal seams, and all duct wall penetrations
- Seal Level B: All transverse joints and longitudinal seams
- Round or flat oval spiral seams need not be sealed
- Transverse joints include connections (including but not limited to spin-ins, taps, branches, access door frames, duct connections to equipment) Duct wall penetrations include but are not limited to screws, pipe, tubes, rods, wires & non self-sealing fasteners
- Supply and outside air ducts, all locations; return or exhaust ducts, outdoors: Seal Level A.
- Return or exhaust ducts, indoors: Seal Level A • Seal all metal ducts using Hardcast or equal mastic plus fiberglass scrim.

Sealant: Foster 32-19 or Childers CP-146. Do not use oil or solvent base sealants inside buildings. Do not exceed LEED/SCAQMD volatile organic compound limits inside buildings. Tape sealants are not allowed

Externally insulated ducts shall be sealed before being insulated. Sealants of exterior ducts shall form a water and air-tight seal, bond to the metal involved, remain flexible with metal movement and have a service temperature range of –30°F to +175°F. If exposed to direct sunlight, sealant shall be UV and ozone resistant. Foster 32-19 or Childers CP-146.

DUCT LINER / INSULATION SCHEDULE:

- Rectangular supply: Unlined, externally insulated, except that 25 feet closest to fan or air units shall be internally lined
 Round supply: Unlined, externally insulated
- Return duct- Internal liner
- Exhaust- No liner, no insulation; except that exhaust ducts in non-conditioned attics shall be externally insulated
 Outside air Unlined, externally insulated, except that 15 feet closest to a fan shall be internally lined. Ductwork upstream and downstream on humidifier up to the fan shall remain unlined if humidifer (manifold) is present.
 Kitchen or food preparation area supply ducts unlined, externally insulated
- Exhaust/relief upstream of energy recovery ventilator Unlined, uninsulated; except that 15 feet closest to fan shall be internally lined.
- Exhaust/relief downstream of energy recovery ventilator wheel internally lined.
 Outside air to and from energy recovery ventilator: Unlined, externally insulated, except that 15 ft closest to a fan shall be internally lined.

Liner Product (when specified in duct description above):

- Acceptable Manufacturers: Johns Manville Linacoustic; Certainteed Tough Gard or equal,
- Density: 1.5 PCF (pounds per cubic foot)
 Comply with latest version of
- Material
 Thermal ASTM C1071, ASTM C518
- Sound ASTM C1071, ASTM C423, ASTM E795
- Fungi Resistance ASM C1338 & G21
 Fire/Smoke UL 723, ASTM E84, NFPA 259
- Greengaurd certified
- Attachments and adhesives: Foster 85-60, Childers CP-127, or equivalent with 90% coverage and stick clips. Leading edges and transverse joints to be sealed with Foster 81-42W (white), CP-50AMV1 (white), CP-135 (black), or equivalent.
- Liner Thickness: R-values shall meet duct insulation values spec'd in section 23 07 13. In addition to meeting R-values, the following minimum thicknesses shall be maintained for acoustic reasons:
- Supply duct: 1".
- Return ducts: 1/2" except that within 15 feet of fan or air unit use 1".
 Return air sound traps: 1".
- Exposed ductwork shall be internally lined based on liner product and thickness paragraphs above. Coordinate duct finish with architect.

Flex duct

Shall not exceed 5 feet in length, nor be bent more than 90 degrees. Flex duct shall be same size as diffuser neck. Flexmaster 1M, 3M, 5M or equal; CPE or foil/fiberglass/polyester laminate, supported by helically wound spring steel wire; fiberglass insulation; aluminized vapor barrier film. Product shall have listed marks by either ETL, or UL and shall have minimum 25/50 Flame/Smoke ratings. Pressure Rating: 6-inches WG positive; 1-inch WG negative. Vapor barrier Perm rating of 0.10 or less per ASTM E96 procedure A. Insulation: R value to meet that required for ductwork. Inner core shall maintain shape and full free area at 90 degree bends without glues or reinforcement. Secure with Stainlesssteel band with cadmium-plated hex screw to tighten band with a worm-gear action. Acceptable alternative is to use a nylon strap listed and labeled in accordance with standard UL 181B and marked '181B-C'. Contact engineer is planning on using an adhesive plus sheet metal screws.

Grease exhaust duct from cooking hoods

- Liquid tight duct sloped toward hood minimum 1/4 inch per linear foot (1" per foot if horizontal length exceeds 75 ft).
- Minimum 500 fpm velocity; maximum 2500 fpm.
- Confirm location and size of hood connections See Food Service equipment plans.
 Flex duct of any type is prohibited. Elbows shall be sweep when possible. No turning vanes.
- Access cleanouts doors (UL listed or matching duct construction) shall be provided in the following location, and placed in duct side or top (not bottom). If placed on side a minimum of 1.5 inches from the interior bottom of ductwork shall be provided before access opening.
- All Run Types
- changes of direction
- within 18 inches of hood collar when hood has dampers
 within three feet on both sides of inline fans
- Within three feet of wall mounted fans
- Provide platform if access point is not reachable with a 10 foot ladder.
- Horizontal Runs
 When minimum access size stated in this section can not be provided, provide access every 12 feet.
- Vertical Runs
- When personnel entry is not possible every level
- When personnel entry is possible top of riser
 Access Size
- Minimum 20x20 for personnel entry
- Signage
- "ACCESS PANEL- DO NOT OBSTRUCT"
- Field fabricated ducts:
- Liquid tight, welded 16-gage steel or 18 gage stainless. Enclose portion of duct from ceiling penetration to
 or thru roof with 2-hour, UL 1978 classified wrap system 3M FireBarrier Duct Wrap 15A or equal.
 Installation, supports, access panel insulation per manufacturer's instructions. Grease duct enclosure
 systems shall be tested to UL 2221. Enclosures shall be vented to building exterior. Outdoor ducts shall be
 painted for weather protection, unless stainless steel.
- Stamp "Fire-resistiveEnclosure, Do Not Remove" at 24" intervals along entire length of external blanket.
 Stamp or sign "ACCESS PANEL. DO NOT OBSTRUCT" over blanket covering access panel(s).
 Blanket along entire run must be from a single manufacturer & model.
- <u>Factory manufactured ducts:</u>
 UL 1978 tested and listed for use with commercial cooking equipment, per NFPA-96 and applicable Mechanical Code for Type 1 hood. Selkirk Commercial /Industrial Model IPS ZeroClear or approved equal certified for zero clearance to combustible material per UL 2221 with a 2-hour fire rating and 1-hour fire rating per ASTM-E2336. The double wall exhaust system shall have a 304 stainless steel inner liner and an aluminized steel outer jacket. Insulation between the inner liner and outer jacket. Aluminized steel surfaces exposed to the elements shall be protected by primer and corrosion resistant paint suitable for outer jacket
- skin temperatures. Alternatively, an outer jacket of 304 or 316 stainless steel may be used in lieu of painting.
 Design and install to be liquid tight. Inner pipe joints shall be securely connected and sealed with factory supplied bands and appropriate sealant. Provide access for inspection and cleaning of each change of duct direction. Provide drainage of grease residue, allow for the thermal expansion and allow fire suppression equipment to be integrated. Roof penetrations shall be suitable for a noncombustible roof. Install per manufacturer's installation instructions and all applicable codes. Provide all supports, guides, expansion joints, guys & tensioners, thimbles, roof flashings, storm collars, terminations required for a complete system. Maintain hourly ratings with use of factory fire stop at necessary floor/wall penetrations.

Double wall round supply duct:

Equal to Semco; spiral seam outer; perforated inner; insulation between

23 33 00 AIR DUCT ACCESSORIES Provide manual balancing dampers in all supply and exhaust branches. Provide manual balancing dampers in outside air and return ducts to each air unit. Provide manual balancing damper at each motorized duct damper location.

MANUAL VOLUME DAMPERS: per SMACNA HVAC Duct Construction Standards - Metal and Flexible. Single blade dampers for duct sizes up to 6 x 30 inch. Multi-Blade Damper: opposed blade pattern. Assemble center and edge crimped blades in prime coated or galvanized frame channel with suitable hardware. Except in round ductwork 12 inches and smaller, furnish end bearings. Furnish closed end bearings on ducts having pressure classification over 2 inches wg.

Furnish locking, indicating quadrant regulators on single and multi-blade dampers. On insulated ducts mount quadrant regulators on standoff mounting brackets, bases, or adapters to allow full insulation thickness. Where rod lengths exceed 30 inches furnish regulator at both ends.

All balance damper operators shall be accessible via access panel, lay-in ceiling or remote cable operator. All motorized damper operators shall be accessible and shall not block the air stream.

Outdoor air, supply and exhaust air dampers shall have a maximum leakage rate of 4 cfm per square foot at one inch water gauge.

SPLITTER DAMPERS – Material: Same gage as duct to 24 inches size in both dimensions, and two gages heavier for sizes over 24 inches. Blade: sheet metal streamline shape, secured with continuous hinge or rod. Operator: Min. 1/4 inch diameter rod in self aligning, universal joint action, flanged bushing with set screw.

BACKDRAFT DAMPERS: Parallel-action, gravity-balanced, galv. 16 gage thick steel or extruded aluminum blades with felt or flexible vinyl sealed edges. Blades linked together in rattle-free manner with 90-degree stop, steel ball bearings, and plated steel pivot pin. Adjustment device to permit setting for varying differential static pressure.

FLEXIBLE CONNECTIONS: per SMACNA. Fabric crimped into 24 gage galvanized metal edging strip. Fabric: Approx. 3 inches wide. UL listed fire-retardant neoprene coated woven glass fiber fabric conforming to NFPA 90A.

23 37 13 AIR INLETS AND OUTLETS

For air devices located in lay-in ceilings, vendor shall confirm ceiling grid type and size prior to ordering air devices. Acceptable Manufacturers: Titus, Price, MetalAire, Nailor, Kreuger

SIDEWALL AIR DEVICES

Sidewall supply- double deflection, 3/4" spacing, front blades vertical, opposed blade damper Titus 300 R or equal Wall return grille: steel or aluminum, white, 35 deg horizontal louvers on 3/4" spacing. Opposed blade damper. *Titus* 350 RL or equal

23 41 00 HVAC AIR CLEANING DEVICES

Filters shall be 2", 30 percent efficiency as per ASHRAE 52.2 -2017, Maximum initial resistance at 500 fpm = 0.25". AAF 'Perfect Pleat HC M8' or equal. Use standard sizes only.

Provide construction filters for the duration of this project in all air units serving the project area and in air units serving other areas on the same floor.

Replace with new filters after balancing and adjusting is complete. Provide temporary filter media over all return or exhaust grilles in project area, to keep construction dust out of air systems.

23 51 00 CHIMNEYS AND FLUES

Double wall gas vents: Inner pipe of sheet aluminum, and outer pipe of galvanized sheet steel, tested in compliance with UL 441.

Atmospheric Furnace, Unit Heater, Water Heater: Galvanized Type B Atmospheric Boiler Steel Type B

Forced draft equipment: Vent rated for positive pressure

Thimbles or separators to provide required clearance from combustible construction. UL listed roof cap, height above roof and distance from openings, property lines and surfaces per the local code.

For condensing type equipment, provide PVC pipes or other means recommended by vendor. Pipe, fittings, and cements must come from one manufacturer. Piping and components must be clearly stamped for use in gas venting (UL 1738). IPEX 1738 or equal.

For sealed combustion type equipment, provide concentric vents as recommended by vendor.

Flues for forced ventilation appliances shall be UL listed for positive pressure.

23 54 16.13 GAS FURNACES WITH DX COILS

Horizontal or vertical as shown on drawings. AGA certified. Automatic electronic pilot. Route condensate drain (provide 3" deep trap) to floor or hub drain provided by plumber. Install with manufacturer's required clearances to combustibles. Provide overflow pan for attic units, with discharge to drip through soffit. Provide type B flue through roof to Breidert cap. Gas piping is by Plumber.

23 74 16.11 PACKAGED ROOFTOP AIR CONDITIONING UNITS

- Acceptable Manufacturers:
- Five (5) Nominal (AHRI) Refrigeration Tons or less: Trane, Greenheck, Carrier, Daikin, Aaon, or Johnson Controls (aka York & Tempmaster)
- Systems larger than Five (5) Nominal (AHRI) Refrigeration Tons: Aaon, Trane, Daikin (MPS & Rebel line),
 Johnson Controls (also York & Tempmenter: units with IntelliConced). Creathook, or Lenney (units with MS)
- Johnson Controls (aka York & Tempmaster; units with IntelliSpeed), Greenheck, or Lennox (units with MSAV)
 Comply with latest version of UL 1995, ASHRAE 62.1, AHRI 270, & ASHRAE 90.1
 Certified to latest version of AHRI 210/240 or 340/360; When provided with ERV AHRI 1060. This is to ensure
- Certified to latest version of ARR 210/240 of 340/360, when provided with ERV ARR 1060. This is to ensure compliance with United States (U.S.) Department of Energy (D.O.E.) Building Technology Office (B.T.O) minimum energy conservation standards (10 CFR 431.97 or latest).
- Cabinet: Formed and reinforced steel panels. Hinged to allow access to internal parts and components with toolless quarter turn handle(s) and sealed joint sections. Pitched roof panels, electrical and plumbing knockouts (through the base or side) with grommet seals, & lifting lugs. Manufacturer's standard paint with option for Architect to choose paint color. Minimum 2 inch deep stainless drain pan. Factory recommended insulation; double wall or foil faced to prevent erosion to the airstream. Filter rack for 2" or 4" cartridge type (2" and 4" rack for DOAS applications and when scheduled). Single point power with control-circuit transformer, external disconnect and convenience outlet.
- Fan: Factory balanced statically and dynamically. Direct drive fans shall be resiliently mounted in the fan inlet. Belt driven fans shall be installed on an adjustable fan base resiliently mounted in the casing. Supply fan shall have aluminum wheels and galvanized scrolls. Condenser propeller fan shall be mounted on shaft of permanently lubricated motor. Provide VFD or ECM for condenser fans for head pressure control if modulating variable speed compressors are provided.
- Motors: shall comply with section 23 05 13. Large enough to avoid motor operation above 1.0 service factor.
 Coils:
 Refrigerant Coils: Aluminum plate fin and seamless internally-grooved copper tube in steel casing with
- equalizing type vertical distributor. Suction discharge bypass valve for hot gas reheat. Hail guards, when scheduled, on condenser coil sections.
- Electric-Resistance Heating: Resistance wire of 80 percent nickel and 20 percent chromium, supported and insulated by floating ceramic bushings recessed into casing openings, fastened to supporting brackets, and mounted in galvanized-steel frame. Terminate elements in stainless-steel machine-staked terminals secured with stainless-steel hardware. Integral overtemperature and overcurrent protection.
- Refrigerant circuit: Compressor(s) mounted on vibration isolators with internal overcurrent and high temperature
 protection, internal pressure relief, and crankcase heaters. Appropriate expansion valve, refrigerant filter/dryer,
 pressure safety switches, motor thermal overload protection, suction and liquid line service valves, low ambient
 kit, and anti-short cycling and time delay relay. Dual compressors for units greater than 6-tons. Sound
 blanket(s) for modulating compressors.
- Dampers: Motorized with adjustable position(s). Rain hoods and bird screens. Dry bulb economizer, when
- scheduled, shall have low leak, modulating outside air damper and return pressure relief.
 Curb: Factory or third party insulated curb. See specification section 23 05 29 & 23 05 48.
- Controls: Condensate overflow switch, dirty filter switch, and air proving switch. Provide phase monitor for variable speed and/or VFD applications. Provide conduit for control wiring that is ran outdoors and outside unit.
 Basic Standalone: Wall mounted seven day programmable thermostat or sensor. When required for proper operation, wall mounted humidistat or sensor with set point and indication readings. Humidistat and thermostat may be integral device.
- Provide factory supervised startup on jobs that are LEED certified or require commissioning.

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AIR DEVICE SCHEDULE Project: Suds San Marcos C-Store Manufacturer & Model Face Size Neck Size CFM Finish Material Notes Tag Service 6ø 0-190 А 24"x24" 8ø 191-305 White Alum. 1,2,3,4,5,6 Supply Titus OMNI 10ø 306-435 В Return Titus PAR 24"x24" -- --White Alum. 4,5 С Duct-Mtd. Supply Titus 300RL 14"x8" 12"x6" White Alum. 4,5 --0-75 6ø 24"x24" D 4,5,6 Exhaust Titus PAR White Alum. 8ø 75+ Е Captiveaire PSP (or eq.) 24"x24" 12ø 0-500 Silver Alum. 2,3,4,5,6 Kitchen Supply

Notes

. Four way unless shown different. . Provide opposed blade damper at each supply or exhaust unless balancing damper is provided at runout takeoff.

. Factory insulate diffuser backpans.

. Provide plaster frame for hard ceiling applications. Provide balance at face/remote cable-driven dampers for air devices.

. Coordinate finish with architect. 5. Provide Titus FlexRight or equal.

BUILDING PRESSURE SUMMARY Project: Suds San Marcos C-Sto

Project: Suds San	Marcos C-Store			
TAG	OA CFM	EXH CFM	NET CFM	NOTES
MAU-1	2160			
RTU-1	250			
RTU-2	805			
KEF-1		-2700		
EF-1		-450		
BUILDING TOTAL				
(Hoods on)	3215	-3150	65	When hoods are on, building is positive
(Hoods off)	965	-600	365	When hoods are off, building is positive
KITCHEN TOTAL				
(Hoods on)	2385	-2700	-315	When hoods are on, kitchen is positive

FAN SCHEDULE

Project: Suds San Marcos C-S	tore
Tag	EF-1
Site Elevation [ft.]	617
Service	Exhaust
Area Served	RRs & Janitor
Fan Type	Roof-mounted
Airflow [CFM]	450
Ext. Static Pressure ["wc]	0.5
Drive	Direct
Motor Data	1/6 hp
Volts/Ph/Hz	115/1/60
Accessories	
Factory Disconnect	No, Field
Backdraft Damper	Yes
Fan Speed Controller	Integral VFD
Notes	1
Manufacturer or Eq.	Greenheck
Model or Eq.	CUE-095-VG
Notes	

1. Fan shall be controlled by timeclock.

Tag	RTII_1	ρτιι ο
Site Elevation [ft]	617	617
	Constant Volumo	57 \/A\/
Area Served	Kitchon & PPc	Salas Eleor
Discharge Configuration	Down	
	Down	Down
Supply Fan		
Total Airflow [cfm]	1,405	4,355
Outside Air [cfm]	225	740
Ext. Static ["wc]	1	1
	0.35	U.//
Control	Staged	Staged
Cooling Coil - Air Side		
Airflow [cfm]	1405	4,355
Air Ent. Coil, DB/WB [°F]	79.0 / 65.8	78.4 / 65.3
Air Lvg. Coil, DB/WB [°F]	55.2 / 54.2	55.8 / 54.2
Sensible Cooling [Btu/h]	30,900	91,800
Total Cooling [Btu/h]	42,400	125,700
Heating Coil - Air Side		
	10.0	22.0
	10.6	23.0
Stages	1	3
Compressor(s)		
Min. Quantity	1	2
Stages	1	3
Refrigerant	R410A	R410A
Condenser Coil - Air Side		
Cooling Ambient Condition [°F]	108	108
Fan Control	ECM	ECM
Primary Filter		
Type / MERV	Per Manufacturer / 8	Per Manufacturer
Electrical		
Volts/Ph/Hz	460/3/60	460/3/60
MCA / MOCP [A]	19 / 20	42.4 / 45
Unit Data & Accessories		
Min. SEER / EER	20 /	/ 12.4
Alarm(s)	Filton Cond. Fair	
Free promition / Wigh Limit [95]		
Barometric Relief		Voc
Unit Mounted Disconnect	Υρς	Yes
Smoke Detector / Location	Yes / Return	Yes / Return
Single Point Elec. Connection	Yes	Yes
Condensate Pump	No	No
Hail Guards	Yes	Yes
Manufacturer or Eg.	Carrier	Carrier
Madal ar Er		

1. Required Btu/h are net; fan heat has not been subtracted. 2. External static includes ductwork, diffusers, & dirt accumulation on filters

3. Motor(s) shall be premium efficiency.

4. Unit shall conform to ASHRAE 90.1-2013 or local energy code. Most stringent requirements apply.

5. If model number & schedule conflict; most stringent requirements apply.

6. Evaporator shall be provided with internal float switch and shall shut unit off if primary drain becomes restricted.

. The above stated economizer high limit was obtained from 2015 IECC Table C403.3.3.3. Provide fault detection and diagnosis that complies and is declared to Title 24, Part 6 Section 120.29(i). 8. Leaving air during heating shall not exceed 85°F.

9. Provide UV resistant nameplace on exterior of unit and on one interior service panel. Include weight, electrical, and general information on both plates.

10. Coordinate final controls requirements with owner's vendor. 11. All electrical and control components shall be wired into a NEMA 4 panel. Electrical single point connection shall power VFDs, motors, compressors, and other components. Control section shall be powered by seperate 120/1 circuit and power GFI, lights (with switch), and control components wired to a common junction box.

	FC	IR QUEST Aus RE PHONE: (EMAIL: rega	IDNS, CALL tin Office GIDN 47 512) 539-0483 7@captiveaire	. TH 3	ΗE									
HOOL	INF	ORMATION	$V_{\rm J} - JOB \# 5$	838	3393]		1			1			
HDDD ND	TAG	MODEL	MANUFACTURI	ER I	LENGTH	MAX COOKING TEMP	TYPE	APPLIANCE DUTY	DESIGN CFM/FT	TOTAL EXH CFM	WIDTH	LENG	EXHA I HEIGHT	UST F RISER(DIA
1	HD-1	5424 ND-2-PSP-I	- CAPTIVEAIR	E	12′0″	600 DEG	I	HEAVY	225	2700			4″	16″
HOOL	INF	<u>ORMATION</u>	V		FILTER	(S)					LIGHT	2)		
HOOD NO	TAG	Т	YPE	QTY	HEIGHT	LENGTH	EFFI	CIENCY @ 7 1ICRONS	QTY		TYPE		WIF GUA	RE RD L
1	HD-1	SS BAF HAI	FLE WITH NDLES	9	16″	16″		30%	4	L55	SERIES	E26	N	
HOOD	0 <i>0PT</i>	'IONS		•	ΠΡΤΙ								·	·
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HOOD NO	TAG	POS LE	NGTH WIDTH	HEIG	ынт түр	PE WIDTH	H LENG	<u>ISER(S)</u> DIA CFM	SP	-				
1	HD-1	Front :	156″ 16″	6″	r MUA MUA MUA	A 12" A 12" A 12"	28" 28" 28"	720 720 720	0.195″ 0.195″ 0.195″					
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KITCHEN SYSTEM DESIGNED BY OTHERS. DRAWINGS SHOWN FOR REFERENCE PURPOSES ONLY.

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			<u> </u>								DISCHARGE	WEIGHT	SUNES								
			UDEL #		ESP	ENC			PHASE VUL		VELOCITY	(LBS)	SLINES								
1	KEF-1	1 DU180HF	Ā	CAPTIVEAIRE 2700	1.000	1117 DDP,PR	EMIUM 1.5	500 0.9800	0 3 208	3 6.6	624 FPM	187	13.8								
<u>CON</u>	<u>DENSE</u>	<u>R DETAILS</u>						r				·									
FAN UNI ND	TAG	FAN UNIT MODEL	#	CONDENSER TONNAGE VOL	TAGE	PHASE FREQU	ENCY	MCA	RLA	MAX F SIZ	USE MIN WIRE E SIZE	SEER									
2	MUA-1	A2-D.250-20D-MP	งป	1 5 208-	-230 1	PHASE 60 I	HZ 27	7.5 AMPS	22.32 AMPS	40 AN	1PS 8 AWG	15									
MUA	FAN	INFORMATION — JO) B#58383	393																	
FAN UNI ND	TAG	QTY FAN UNIT M	DDEL #	BLOWER HOUSING	MIN I CFM	DESIGN ESP	RPM	MOTOR ENCL	HP BHP	PHASE	VOLT FLA MO		EIGHT LBS) SONES								
2	MUA-1	1 A2-D.250-20	D-MPU	20MF-2-MDD A2-D.250	2000	2160 0.500	1065 DI	DP,PREMIUN	1 1.000 0.641	.0 3	208 3.8 4.8	BA 15A 1	.343 7.7								
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	CODLING HEATING																				
FAN		COIL DESIGN										1									
		TYPE CFM ENTERIN TEM	NG DB ENTE	ERING WB LEAVING DB LEA TEMP TEMP	VING WE TEMP	B ENTERING FLUID TEMP	LEAVII Fluid t	NG FLU EMP	ID FLOW I RATE	PERCENT GLYCOL	TOTAL CAPACITY	SENSIBLE CAPACITY	LATENT CAPACITY	ENTERING DB TEMP	LEA∨ING DB TEMP	ENTERING FLUID TEMP	LEA∨ING FLUID TEMP	FLUID FLOW RATE	PERCENT GLYCOL	STEAM PRESSURE	С
2	MUA-1	DX 2160 97.0	•F	74.0°F 79.6°F	67.7 ° F						48.4 MBH	38.4 MBH	10.0 MBH								
GAS	FIREL	MAKE-UP AIR UN	IIT(S)																		
FAN	ТАС			REQUIRED INPUT GAS		BURNER															
		BTUS BTUS		PRESSURE													ĉ	26_1			
2	MUA-1	107973 99335 4	4*F	7 IN. W.C 14 IN. W.C.	NATUR	AL 92				<u>Fan</u> ŧ	<u> 1 DU180HFA - EXHA</u>	UST FAN (KEF-1)	<u>)</u>								/ //
$F_{\Delta \lambda}$			I		-1]						-			FFAT					
FAN																	OREST				
	TAG	QTY		DESCRIPTION							-		37 3/8″			– DIRECT – ROOF M	DRIVE C⊡NSTRUC ⊡UNTED FANS,	TION (NO BELTS/P	ULLEYS).	26″	
		1 GREASE BOX									+			\neg		- RESTAU	RANT MODEL.				
1	KFF-1	1 HINGE KIT - SHIF	PS LOOSE F	FOR CURB SUPPLIED BY OTH	ERS							/				- UL7057 - VARIAB	AND UL762 AND U LE SPEED CONTRE	LU-S645 L.		A	_
-		1 FAN BASE CERAMI	IC SEAL -	INSTALLED AT PLANT - FOR	GREASE	DUCTS										- INTERNA	AL WIRING.				
		1 2 YEAR PARIS W	ARRANIY					500					—	le la	t t	- THERMA	L OVERLOAD PRO FAT OPERATION 30	FECTION (SINGLE P 10°F (149°C)	'HASE).		
		1 CFM		LK LUW CFM FRUFILE FACKA		LD UN HEATERS	UNDER E.	500							- GREASE	CLASSIFICATION	TESTING.				
		1 INLET PRESSURE	GAUGE, 0-3	35″												- NEMA 3	R SAFETY DISCON	NECT SWITCH.			/
		1 MANIFOLD PRESSU	JRE GAUGE,	-5 TO 15" WC							33 3/4″						TEMPERATURE TE				/
		1 BUTTERFLY MOD	VALVE OPT	TION FOR MOD SIZE 2 (1" MO	d valve	.>)	22 5/8″	WHILE E	EXHAUSTING AIR A	T 300°F (149°C)		۷.	<u> </u>
		1 MOTORIZED BACKD	RAFT DAME	PER FOR A2-D HOUSING - ME	FTS AMC	A CLASS 1A RAT	ING					\searrow \coprod				UNTIL A THERMAL	LL FAN PARTS HA _ EQUILIBRIUM, AN	VE REACHED			
	MUA-I	5 TON SINGLE CI	RCUIT MODU	JLAR PACKAGED COOLING OP	TION FOR	SIZE 2 DF/EH	MUA (2,00	00						7			RATING EFFECTS	TO THE FAN WHICH	4		
		1 TO 3,000 CFM), 20	08V/230V,	1 PHASE, COOLING THERMOS	TAT OR F	ROGRAMMABLE S	TAT REQL	JIRED					$\langle $	GREASE	DRAIN.		CAUSE UNSAFE DP				
			M FOR SIZE									_┌└┌─└╱──				<u>ABNORMA</u> EXHAUST	L FLARE-UP TES				
		₁ SEPARATE 120V V	WIRING PAC	KAGE (REQUIRED AND USED				<u> </u>		- 16, 1/2"			WHILE E	CXHAUSTING BURNI	NG GREASE VAPOR	2					
		VFD> - THREE PH							10 11 2			15 MINUT	TES WITHOUT THE	FAN BECOMING							
		1 2 YEAR PARTS W	AKKANTY													DAMAGED AN UNSA	TO ANY EXTENT	THAT COULD CAUS	E		
FAN	ACCES	<u>SSORIES</u>			7								24								
FAN		EXHAUST	SUPPLY						20			<u>DPTION</u> - GREA	<u>NS</u> ASE_BOX.								
		GREASE GRAVITY WALL CUP DAMPER MOUNT	SIDE DISCHARGE	GRA∨ITY MOTORIZED WALL DAMPER DAMPER MOUN						28,			- HING SUPPLI - FAN AT PLA	JE KIT – SHIPS L IED BY DTHERS, BASE CERAMIC SI ANT – FUR GREAS	LUSE FOR CURB						
1	KEF-1	YES											- v			- 2 YE	EAR PARTS WARRA	NTY.			
2	MUA-1			YES																	

CUH	RB AS	SSEMBLIES			
ND	□N FAN	TAG	WEIGHT	ITEM	SIZE
1	# 1	KEF-1	30 LBS	CURB	26.500"W X 26.500"L X 26.000"H ALDNG LENGTH, RIGH
2	# 2	MUA-1	107 LBS	CURB	31.000"W X 79.000"L X 20.000"H ALONG WIDTH, RIGHT
	# 2			RAIL	6.000"W X 31.000"L X 20.000"H RIGHT.

HT VENTED. INSULATED.

KITCHEN SYSTEM DESIGNED BY OTHERS. DRAWINGS SHOWN FOR REFERENCE PURPOSES ONLY.

KITCHEN SYSTEM DESIGNED BY OTHERS. DRAWINGS SHOWN FOR REFERENCE PURPOSES ONLY.

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---- MIN. 20" -----

16 1/4″

24″ SER∨ICE

145 5/8" ·

CLEARANCE REQ.

7 13/16″ –

<u>CERTIFICATIONS</u> ALL PROFILE PLATE ASSEMBLIES SHALL BE INCLUDED IN THE DF UNIT'S ETL LISTING AND COMPLY WITH COMBINED SAFETY STANDARDS ANSI Z83.4 AND CSA 3.7 (NON-RECIRCULATING DF HEATERS) AND ANSI Z83.18 (RECIRCULATING DF HEATERS). <u>GENERAL CONSTRUCTION</u>: -PROFILE PLATES SHALL BE FORMED FROM G90 GAL∨ANIZED STEEL. -PROFILE PLATES SHALL VARY IN SIZE PER UNIT. -PROFILE PLATES SHALL BE MOUNTED ALONG THE SAME PLANE AS THE DISCHARGE DF THE BURNER. -DESIGN SHALL INCORPORATE PROPERLY TORQUED, PERMANENTLY MOUNTED SPRING HINGES. -SPRING HINGES SHALL BE MADE FROM PLATED STEEL.

APPLICATION: SPRING-LOADED BURNER PROFILE PLATES ARE ENGINEERED TO AUTOMATICALLY REACT TO THE MOMENTUM OF A FRESH AIR STREAM, WITHOUT THE NEED FOR ANY MOTORS OR ACTUATORS TO MECHANICALLY ADJUST THEM. WITH THIS FEATURE, ALL DF UNITS ARE DESIGNED FOR DEMAND CONTROL VENTILATION (DCV) REQUIREMENTS.

DIRECT FIRED PROFILE PLATE SPECIFICATIONS: DESCRIPTION: DIRECT FIRED BURNERS SHALL HAVE PATENTED (US PATENT ND; US6629523B2), SELF-ADJUSTING PROFILE PLATES DESIGNED TO ENSURE PROPER AIR VELOCITY AND PRESSURE DROP ACROSS THE BURNER. PROFILE PLATES SHALL ALLOW BURNERS TO ACHIEVE CLEAN COMBUSTION BY LIMITING BY-PRODUCT LEVELS TO A MAXIMUM OF 5PPM OF CARBON MONOXIDE (CD, AND 0.5PPM OF NITROGEN DIDXIDE (ND2DIRECT FIRED UNITS SHALL BE CONFIGURED WITH THE BLOWER MOUNTED DOWNSTREAM OF THE BURNER. THIS ARRANGEMENT WILL ENSURE A CONSISTENT AIRFLOW, REGARDLESS OF INLET AIR TEMPERATURE.

DIRECT FIRED (DF) PROFILE PLATE ASSEMBLY

										000
			-	_	DUCTWO	RK # I	PARIS	- JUB#5	838	39.
TAG	PART #	CFM	GPM	ZONE	COVEREDBY	SP	WEIGHT	VELOCITY	QTY	DES
P1	DW1645DWASY-2R-S	2700				-0.0613	22.06	1933.73	1	DOL ST4
P2	DW1645DWASY-2R-S	2700				-0.0875	22.06	1933.73	1	DOL STA
P3	DW1647DWLT-2R-S	2700				-0.0229	70.12	1933.73	1	
P4	DW1647DWAJD-2R-S	2700				-0.0191	103.34	1933.73	1	DDU ST4 30,5 CL4
P5 ASSEMBLED W/P6	DW164550DWLTTP-2R-S	2700				-0.022	68.55	1933.73	1	DOL ST4
P6 ASSEMBLED W/P5	DW2616TPDBEX	2700					9.00	1933.73	1	DUC USE DE S
SYSTEM AT P6						-0.8848	0.00			
	3M-2000PLUS						0.80		2	סטם
	DW16DWCLASY-2R-S						7.96		2	DUC - F
TOTAL WEIGHT							312.65			<u> </u>

DOUBLE WALL FACTORY BUILT DUCTWORK

- ALL DUCTWORK IS REQUIRED TO BE INSTALLED WITH THE MAXIMUM SUPPORT SPACING LISTED BELOW.

- FOR A COMPLETE LIST OF APPROVED SUPPORT METHODS, SEE THE ENTIRE INSTALLATION AND OPERATION MANUAL

- DUCTWORK SHALL SLOPE NOT LESS THAN 1/16" PER LINEAR FOOT TOWARDS THE HOOD OR AN APPROVED GREASE COLLECTION RESERVOIR. - WHERE HORIZONTAL DUCTS EXCEED 75 FEET IN LENGTH, THE SLOPE SHALL NOT BE LESS THAN 3/16" PER LINEAR FOOT.

HORIZ	ZONTAL
DUCT DIAMETER	SUPPORT SPACING (FT)
5″	7'
6″	7′
7″	7′
8″	7′
10″	7′
12″	7′
14″	7′
16″	7′
18″	5′
20"	5′
22″	5′
24″	5′
26″	5′
28″	5′
30″	5′
32″	5′
34″	5′
36″	5′

	VERTICAL		
TYPE	WALL SUPPORT (FT)	CURB SUPPORT (F	
2R & 2R HT (5"-16")	20′	24′	
2R (18")	18′	24′	
3R & 3Z (5"-24")	10′	24′	
3Z (26″ -36″)	10′	20′	

DO NOT LEAK TEST USING SMOKE BOMBS CONTAINING CHLORINES/CHLORIDES, CONSULT WITH CAPTIVEAIRE FOR PROPER LEAK TESTING METHODS,

03 DOUBLE WALL

P2-

DUCTWORK #1 FRONT VIEW DUCTWORK #1 SIDE VIEW DUCTWORK #1 TOP VIEW

PLUMBING SCOPE OF WORK

NEW CONSTRUCTION PRIOR TO STARTING PROJECT WITH CIVIL ENGINEER.

APPLICABLE CODES AND STANDARDS

LIMITED TO:

2015 INTERNATIONAL PLUMBING CODE (W/ CITY OF SAN MARCOS AMENDMENTS) 2015 INTERNATIONAL FIRE CODE (W/ CITY OF SAN MARCOS AMENDMENTS)

SHEE
NUMBE
P0.1
P0.2
P2.1
P2.2
P2.3
P2.4
P3.1
P5.1
P5.2
P5.3
P6.1
P6.2
P6.3
P7.1

File N User: Date/]

PROVIDE PLUMBING UTILITES TO THE PLUMBING FIXTURE. COORDINATE SANITARY WASTE, COLD WATER AND NATURAL GAS CONNECTIONS TO THE BUILDING. CONTRACTOR SHALL CONFIRM ALL LOCATIONS

HOT WATER SYSTEM SHALL BE BY TANKLESS WATER HEATERS MOUNTED ABOVE THE MOP SINK.

ALL PLUMBING MATERIALS, INSTALLATION, TESTING, CLEANING, SUPPORTS, AND WORKMANSHIP SHALL BE IN STRICT ACCORDANCE WITH THE BELOW LISTED APPLICABLE CODES INCLUDE BUT ARE NOT

2015 INTERNATIONAL BUILDING CODE (W/ CITY OF SAN MARCOS AMENDMENTS)

2015 INTERNATIONAL FUEL GAS CODE (W/ CITY OF SAN MARCOS AMENDMENTS)

2015 INTERNATIONAL ENERGY CONSERVATION CODE (W/ CITY OF SAN MARCOS AMENDMENTS)

PLUMBING LEGEND						
PIPING	SYSTEMS					
	SAN	SANITARY	WAST	E PIPNG		
	V	SANITARY VENT PIPING				
	CW	COLD WATER PIPING				
	HW	HOT WATE	R PIP	NG		
	HWR	HOT WATE	R RE1	TURN PIPING		
	—-GW	GREASE W	/ASTE	PIPING		
	——G———	NATURAL	GAS P	IPING		
	——A———	COMPRESSED AIR PIPING				
	ST	PRIMARY STORM DRAIN PIPING				
	OD	SECONDARY STORM DRAIN PIPING				
	AW	ACID WASTE PIPING				
	AV	ACID VENT PIPING				
<u>SYMBO</u>	LS					
C-	PIPE DOWN		ъ	BALL VALVE		
0	PIPE UP		M	BUTTERFLY VALVE		
НØ	FCO / COTG		\bowtie	GATE VALVE		
1	END OF LINE CLEANOUT			GLOBE VALVE		
	END CAP		Ĺ	CHECK VALVE		
•			₽	POINT OF DEMOLITION		
\bigcirc	KEYED NOTES					

UNLESS NOTED OTHERWISE, WATER AND VENT PIPING SHOWN ON PLANS ABOVE THE CEILING AND SANITARY DRAIN PIPING IS BELOW THE FLOOR

PLUMBING SHEET LIST

SHEET NAME
PLUMBING LEGENDS AND NOTES
PLUMBING SPECIFICATIONS
PLUMBING UNDERFLOOR PLAN
PLUMBING WASTE & VENT PLAN
PLUMBING DOMESTIC WATER PLAN
PLUMBING ROOF PLAN
PLUMBING NATURAL GAS PLAN
PLUMBING RISER DIAGRAM
PLUBMING RISER DIAGRAM
PLUMBING RISER DIAGRAM
PLUMBING DETAILS
PLUMBING DETAILS
PLUMBING DETAILS
PLUMBING SCHEDULES

	PLUMBING ABBREVIATIONS
A ADA AFF AV AW BFF BOP BT DC CWFU CWS DFU EDF EWH ESP CO DC S GPH B W(140) HWFU HWR E. MS NIC DD S S WH HB HW (140) HWFU HWR E. MS DD S S MIC S MIC MIC MIC MIC MIC MIC MIC MIC MIC MIC	PLUMBING ABBREVIATIONS COMPRESSED AIR AMERICAN WITH DISABILITIES ACT ABOVE FINISHED FLOOR ACID VENT ACID WASTE BELOW FINISHED FLOOR BACKFLOW PREVENTER BOTTOM OF PIPE BATH TUB BOTTOM OF PIPE BATH TUB BOTTOM OF PIPE COLD WATER COLD WATER COLD WATER COLD WATER SUPPLY FIXTURE UNITS COLD WATER SOFTEN DRAINGAGE FIXTURE UNITS DRINKING FOUNTAIN ELECTRIC WATER HEATER ELEVATOR SUMP PUMP FLOOR CLEANOUT FLOOR DRAIN FIRE DEPARTMENT CONNECTION FLOOR SINK NATURAL GAS GALLONS PER MINUTE GREASE WASTE GAS WATER HEATER HOT WATER HOT WATER RETURN INVERT ELEVATION LAVATORY MOP SINK NOT IN CONTRACT VOERFLOUR GAACKFLOW PREVENTER RECIRCULATION DRAIN POUNDS PER SQUARE INCH PRESSURE PRESSURE REDUCING BACKFLOW PREVENTER RECIRCULATION UNT SANITARY WASTE SHOWER SINK SQUARE FOOTAGE PRIMER UNIT THERMOSTATIC MIXING VALVE TYPICAL URINAL SANITARY VENT
NC NCO	WATER CLOSET WALL CLEANOUT
N) E) D)	NEW PIPING SYSTEM EXISTING PIPING SYSTEM DEMO'D PIPING SYSTEM

PLUMBING GENERAL NOTES

A. DRAWINGS ARE DIAGRAMMATIC; CONFIRM DIMENSIONS AND LOCATIONS IN THE FIELD. IF

CONFLICTING DIMENSIONS ARE SHOWN, USE LARGER DIMENSION. B. CONTRACTOR SHALL FIELD VERIFY SIZE. LOCATION. AND CONDITION OF EXISTING PIPING BEFORE PROCEEDING WITH BID AND CONSTRUCTION. ANY REUSED PIPING FOUND TO BE IN POOR CONDITION OR NOT PER CURRENT CODE REQUIREMENTS SHALL BE DOCUMENTED AND THE ENGINEER SHALL BE MADE AWARE OF THIS CONDITION IMMEDIATELY. C. ALL PLUMBING PIPING, EQUIPMENT, AND FIXTURE INSTALLATIONS SHALL BE PERFORMED BY A

LICENSED PLUMBING CONTRACTOR. ALL PLUMBING WORK SHALL BE SUPERVISED BY A LICENSED MASTER PLUMBER. D. GUARANTEE LABOR AND MATERIALS FOR 1-YEAR. WARRANTIES BEGIN UPON OWNER'S ACCEPTANCE

OF SUBSTANTIAL COMPLETION OF THE INSTALLATION. E. ALL EXCEPTIONS OR SUBSTITUTIONS TAKEN TO SPECIFIED MATERIALS, FIXTURES, EQUIPMENT, OR REQUIREMENTS OF THESE DOCUMENTS SHALL BE SUBMITTED TO THE OWNER, ARCHITECT, AND ENGINEER FOR REVIEW PRIOR TO PURCHASE AND INSTALLATION. F. PROVIDE EXPANSION LOOPS IN LONG RUNS OF HOT WATER AND HOT WATER RETURN PIPING AS REQUIRED BY CODE.

G. PROVIDE INSULATION KIT FOR SUPPLIES, DRAIN PIPING AND P-TRAPS FOR ALL HANDICAP ACCESSIBLE LAVATORIES AND SINKS. INSULATION KITS SHALL BE EQUAL TO TRUEBRO 103 (WHITE). WHERE PROTECTIVE SKIRT UNDER FIXTURES IS PROVIDED, INSULATION OF PIPING IS REQUIRED. H. PROVIDE ZURN #Z-1447 OR EQUAL CLEANOUT TEE IN DRAIN LINES FOR ALL COUNTER MOUNTED SINKS AND WALL MOUNTED LAVATORIES.

I. REFER TO PROJECT CONTRACT DOCUMENTATION AND ARCHITECTURAL DRAWINGS FOR ADDITIONAL REQUIREMENTS AND INFORMATION. J. SEE ARCHITECTURAL PLANS AND ELEVATIONS FOR EXACT LOCATION OF FIXTURES AND WALL

MOUNTED DEVICES. K. PLENUMS ARE CROWDED AND NOT ALL OBSTACLES ARE INDICATED. ALLOW FOR ADDITIONAL PIPE

OFFSETS, AS REQUIRED, AND WHEN NOT INDICATED ON DRAWINGS. L. PROPERLY SEAL ALL PENETRATIONS OF FLOORS, EXTERIOR WALLS, AND RATED WALLS.

M. SECURE ALL PERMITS AND PROVIDE ANY REQUIRED TEMPORARY UTILITIES. N. ALL PLUMBING VENTS THRU ROOF SHALL HAVE THE MINIMUM SEPARATION OF TEN (10) FEET FROM HVAC OUTSIDE AIR INLETS, PER THE APPLICABLE CODE; COORDINATE WITH HVAC CONTRACTOR. O. BEFORE SUBMITTING A BID, IT WILL BE NECESSARY FOR EACH CONTRACTOR WHOSE WORK IS INVOLVED TO VISIT THE SITE AND ASCERTAIN FOR HIMSELF THE CONDITIONS TO BE MET IN INSTALLING THE WORK AND MAKE PROVISIONS FOR THE CONDITIONS IN HIS FINAL PRICE. FAILURE OF THE CONTRACTOR TO COMPLY WITH THIS REQUIREMENT SHALL NOT BE CONSIDERED JUSTIFICATION FOR THE OMISSION OR FAULTY INSTALLATION OF ANY WORK COVERED BY THE CONTRACT DOCUMENTS. THE BID SHALL INCLUDE ALL THE WORK REQUIRED OR NECESSARY TO COMPLY WITH THE WORK SHOWN ON THE DRAWINGS AND IDENTIFIED IN THE SPECIFICATIONS. P. PIPING SHALL NOT BE ROUTED OVER ELECTRICAL PANELS OR TRANSFORMERS. Q. PROVIDE WATER HAMMER ARRESTORS FOR ALL NEW QUICK-ACTING VALVES. SIZE IN ACCORDANCE WITH PDI STANDARDS; REFER TO DETAIL AND SIZING CHART.. THE USE OF AIR CHAMBERS SHALL NOT

BE ACCEPTABLE AND ARE NOT ALLOWED. R. BRANCH TAKEOFF: RUNOUT FROM HORIZONTAL PIPING SHALL BE TAKEN OFF OF THE CENTERLINE OF THE MAIN OR BRANCH PIPING AND RISE VERTICALLY OR AT AN ANGLE NOT LESS THAN 45 DEGREES FROM VERTICAL

S. THE GENERAL CONTRACTOR SHALL MAKE AN ALLOWANCE IN HIS PRICE TO PAY ALL GAS COMPANY SETUP FEES ASSOCIATED WITH INSTALLATION OF GAS SERVICE AND METER AT THE BUILDING. T. THE LISTING OF PRODUCT MANUFACTURERS, MATERIALS AND METHODS ARE THE BASIS OF DESIGN AND ARE INTENDED TO ESTABLISH A STANDARD OF QUALITY. THE ENGINEER SHALL BE THE SOLE JUDGE OF QUALITY AND EQUIVALENCE OF EQUIPMENT, MATERIALS AND METHODS. WHERE SUBSTITUTED OR ALTERNATIVE EQUIPMENT IS PROPOSED ON THE PROJECT BEFORE BIDDING, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THAT THE EQUIPMENT WILL FIT THE SPACE AVAILABLE, INCLUDING ALL REQUIRED CODE AND MAINTENANCE CLEARANCES, AND TO COORDINATE ALL EQUIPMENT REQUIREMENTS WITH OTHER CONTRACTORS.

2 0 Q 0<u>0</u> S Ω Ω 3 \mathbf{O} $I \times$ Y Š S -CO CO S Ш hisos: n Mar R m an \mathbf{O} S S _____ $T \subset T$ n C TECHNOLOGIES 801 TRAVIS, SUITE 2000 HOUSTON, TX 77002 PHONE: 713-237-9800 FAX: 713-237-9801 Texas Registered Engineering Firm F-10573 © 2022 MÄD Architecture All Rights Reserved. The arrangements depicted herein are the sole property of MAD Architecture and may not be reproduced in any form without written permission from the Architect. JOB NO.: 2130 PHASE: Project Status DRAWN: JPC CHECKED: CFC DATE: Issue Date PLUMBING LEGENDS AND =NOTES=

P0

PLUMBING SPECIFICATIONS

SECTION 22 00 00 PLUMBING COMMON WORK REQUIREMENTS SUBMITTALS

- A. GENERAL
- SUBMIT PRODUCT DATA SUBMITTALS FOR EQUIPMENT AND MATERIALS SPECIFIED IN THIS 1. SECTION
- THE CONTRACTOR SHALL NOT PERFORM WORK BEFORE REVIEW OF THE SUBMITTALS BY THE SYSTEM START-UP ENGINEER. THE RESPONSIBLE CONTRACTOR MAY BE REQUIRED TO REMOVE, CHANGE, MODIFY AND REPLACE SUCH WORK TO MEET THE CONDITIONS OF THE CONTRACT
- DOCUMENTS WITHOUT ADDITIONAL COMPENSATION. THE PLUMBING CONTRACTOR SHALL PROVIDE MATERIALS AND/OR EQUIPMENT FOR EACH AND EVERY ITEM COVERED WITHIN THE PLUMBING SPECIFICATIONS, DIVISION 22. REFER TO SUB-PARAGRAPHS BELOW FOR ALL RELATED REQUIREMENTS.
- B. PRODUCT DATA SUBMITTALS: PROVIDE A DIGITAL COPY OF PRODUCT DATA FOR PLUMBING FIXTURE, ACCESSORIES, EQUIPMENT AND MATERIALS AS INDICATED ON THE DRAWINGS.
- CLEARLY DELINEATE BETWEEN INFORMATION THAT APPLIES TO THIS PROJECT AND INFORMATION THAT DOES NOT APPLY C. CERTIFICATIONS:
- CERTIFICATION AT CONTRACT CLOSEOUT THAT SPECIFIED PERFORMANCE CRITERIA HAS BEEN MET BY ALL PLUMBING AND FIRE PROTECTION SYSTEMS SPECIFIED IN DIVISION 22 SECTIONS. IN ADDITION, PROVIDE CERTIFICATIONS REQUIRED BY REMAINING DIVISION 22 SECTIONS
- D. OPERATING AND MAINTENANCE MANUALS: FURNISH NOT LESS THAN FIVE (5) OPERATING AND MAINTENANCE MANUALS FOR EACH ITEM OF EQUIPMENT OR SYSTEM BEING FURNISHED.
- MAINTENANCE MANUAL CONTENT SHALL INCLUDE THE FOLLOWING TYPEWRITTEN OR PRINTED INFORMATION FOR EACH ITEM: INSTALLATION INSTRUCTIONS, WIRING AND CONTROL DIAGRAMS, MAINTENANCE INSTRUCTIONS, PROCEDURES AND SCHEDULES, PARTS LIST FOR EACH PIECE OF EQUIPMENT WITH IDENTIFYING DRAWING, NEAREST TWO (2) SERVICING AGENCIES, MATERIAL SAFETY DATA SHEETS, TESTING AND BALANCING REPORTS.

QUALITY ASSURANCE

- A. REFERENCE STANDARDS: APPLICABLE REQUIREMENTS OF STANDARDS AND SPECIFICATIONS REFERENCED IN DIVISION 22 SECTIONS APPLY TO THE WORK.
- B. WORK SHALL COMPLY WITH RECOGNIZED STANDARDS AND CODES, APPLICABLE FEDERAL, STATE AND MUNICIPAL CODES AND REQUIREMENTS, AND SHALL BE SUBJECT TO INSPECTION AND APPROVAL OF AUTHORITIES HAVING JURISDICTION.
- C. IT IS NOT THE INTENT TO SPECIFY MATERIALS, EQUIPMENT OR METHODS OF INSTALLATION THAT MAY BE IN CONFLICT WITH NATIONAL, FEDERAL, STATE, LOCAL OR UTILITY COMPANY CODES, STANDARDS OR POLICIES. WHERE THESE CODES, STANDARDS OR POLICIES REQUIRE A DIFFERENT MATERIAL OR METHOD THEN SPECIFIED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING, AND SHALL PROVIDE THE PROPER MATERIAL AND PERFORM THE WORK, WITHOUT ADDITIONAL COMPENSATION, TO COMPLY WITH THESE CODES, AFTER REVIEW BY THE ENGINEER.

DELIVERY, STORAGE AND HANDLING

- A. DELIVER MATERIALS TO PROJECT SITE IN UNOPENED CONTAINERS BEARING MANUFACTURER'S NAME AND CONTENT IDENTIFICATION. B. STORE MATERIALS AS RECOMMENDED BY THE MANUFACTURER.
- MATERIALS AND EQUIPMENT A. MATERIALS AND EQUIPMENT SHALL BE NEW, CONFORM TO GRADE, QUALITY AND STANDARDS SPECIFIED HEREIN. TYPE, CAPACITY AND APPLICATION SHALL BE SUITABLE AND CAPABLE OF SATISFACTORY OPERATION FOR THE PURPOSE INTENDED. NO MATERIAL SHALL BE INSTALLED FOR A PURPOSE OR IN A MANNER NOT RECOMMENDED BY THE MANUFACTURER OF THE PRODUCT.

EXAMINATION

- A. EXAMINE AREAS IN WHICH WORK IS TO BE PERFORMED. REPORT TO THE CONTRACTOR ALL PREVAILING CONDITIONS THAT WILL ADVERSELY AFFECT SATISFACTORY EXECUTION OF WORK. DO NOT PROCEED WITH WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
- B. STARTING WORK CONSTITUTES ACCEPTANCE OF THE EXISTING CONDITIONS AND THIS CONTRACTOR SHALL THEN AT HIS EXPENSE, BE RESPONSIBLE FOR CORRECTING ALL
- UNSATISFACTORY AND DEFECTIVE WORK ENCOUNTERED. C. CAREFULLY INVESTIGATE STRUCTURE AND FINISH CONDITIONS AFFECTING THE WORK AND ARRANGE WORK SEQUENCE ACCORDINGLY; PROVIDING SUCH ITEMS AS MAY BE REQUIRED TO MEET SUCH CONDITIONS.
- D. IF DIVISION 22 WORK IS INSTALLED BEFORE COORDINATING WITH OTHER TRADES, NECESSARY CHANGES IN THE WORK REQUIRED TO CORRECT THE CONDITION SHALL BE AT THE RESPONSIBLE DIVISION 22 CONTRACTOR'S EXPENSE.

INSTALLATION-GENERAL

- A. LOCATE EQUIPMENT, EQUIPMENT CONTROLS AND OTHER DEVICES, WHICH MUST BE SERVICED, OPERATED OR MAINTAINED IN FULLY ACCESSIBLE LOCATIONS, IF REQUIRED FOR BETTER ACCESSIBILITY, PROVIDE ENGINEER REVIEWED ACCESS PANELS FOR THIS PURPOSE. LOCATE EQUIPMENT REQUIRING PERIODIC MAINTENANCE TO PERMIT REMOVAL WITHOUT DAMAGE TO OTHER WORK. MINOR DEVIATIONS FROM THE CONTRACT DOCUMENTS MAY BE MADE TO ALLOW FOR BETTER ACCESSIBILITY; BUT, CHANGES WHICH MAY INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT PRIOR REVIEW.
- B. PRODUCT INSTALLATION: PRODUCTS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, DETAILS AND INSTRUCTIONS.
- COORDINATE WORK WITH OTHER TRADES TO ELIMINATE ANY POSSIBLE INTERFERENCE BEFORE ANY PIPING, CONDUIT, EQUIPMENT, DEVICES, CONTROLS, SUPPORTS, DUCTWORK AND FIXTURES ARE INSTALLED.
- D. WHERE MULTIPLE ITEMS OF EQUIPMENT, DEVICES, PIPING, CONDUITS, SUPPORTING METAL WORK, HANGERS, PULL BOXES, OUTLETS, DUCTWORK OR CONTROLS ARE SHOWN ON ANY OF THE CONTRACT DOCUMENTS OF THE VARIOUS TRADES IN THE SAME LOCATION, COORDINATE AND ADJUST ITEMS TO FIT WITHIN THE DESIGNATED LOCATION(S). PROVIDE AND INSTALL ALL NECESSARY OFFSETS, BENDS, TURNS, MODIFICATIONS IN PIPING AND DEVICES REQUIRED TO INSTALL THE WORK WITHOUT INTERFERENCE WITH THAT OF OTHER TRADES OR STRUCTURE, WITHOUT ADDITIONAL COST TO THE OWNER.

BUILDING AND SITE SERVICES

A. CONTACT UTILITY COMPANIES AND LOCAL AUTHORITIES TO ARRANGE FOR REQUIRED SEWER, WATER AND GAS SERVICES.

CONTINUITY OF SERVICES

A. CONTRACTOR SHALL NOTIFY BUILDING MANAGEMENT/OWNER IN WRITING FOUR (4) DAYS BEFORE ANY WORK TO BE DONE THAT WILL INTERRUPT SERVICES TO OTHER SPACES B. NO "EXTRA" COMPENSATION SHALL BE PERMITTED DUE TO "OVERTIME" HOURS IMPLICIT IN THE ABOVE REQUIREMENTS.

PASSAGE OF EQUIPMENT

- A. ESTABLISH PASSAGE CLEARANCES REQUIRED TO DELIVER, INSTALL AND ERECT PLUMBING EQUIPMENT. WHEREVER NECESSARY, PROVIDE EQUIPMENT IN SECTIONS OR KNOCKED DOWN IN ORDER TO ALLOW PASSAGE OF EQUIPMENT THROUGH OPENINGS.
- B. WHERE THERE IS NOT SUFFICIENT CLEARANCE FOR PASSAGE OF PLUMBING EQUIPMENT; DELIVER, INSTALL AND PROTECT SUCH EQUIPMENT BEFORE CONFINING WALLS, FLOORS, SLABS AND STEEL WORK ARE ERECTED. SCHEDULE AND COORDINATE WORK WITH OTHER DIVISIONS.
- C. IF STRUCTURES, EQUIPMENT AND SYSTEMS MUST BE ALTERED TO PROVIDE PASSAGE OF EQUIPMENT, THE RESPONSIBLE TRADE CONTRACTOR SHALL RESTORE STRUCTURES. EQUIPMENT AND SYSTEMS TO THEIR ORIGINAL CONDITION WITHOUT ADDITIONAL COMPENSATION.

CUTTING AND PATCHING

- A. THE DIVISION 22 TRADE CONTRACTORS SHALL PROVIDE CUTTING AND PATCHING REQUIRED FOR THE INSTALLATION OF THE WORK OF THIS SECTION.
- B. RETAIN THE ORIGINAL INSTALLER OR FABRICATOR, OR AN EQUALLY RECOGNIZED, EXPERIENCED AND SPECIALIZED FIRM TO CUT AND PATCH EXPOSED WORK. THIS REQUIREMENT MAY BE WAIVED AT THE SOLE DISCRETION OF THE ENGINEER, IF CUTTING AND PATCHING IS MINOR IN SCOPE AND IF CONTRACTOR CAN DEMONSTRATE TO THE SATISFACTION OF THE ENGINEER THAT WORK IS

PAINTING AND FINISHING

A. FOLLOWING ENGINEER'S REVIEW OF REQUIRED CUTTING AND PATCHING, PROVIDE PAINTING AND FINISHING REQUIRED FOR INSTALLATION OF THE WORK OF THIS SECTION. PAINTING AND FINISHING SHALL BE DONE BY THE SAME FIRM THAT PERFORMED THE CUTTING AND PATCHING

BEING PERFORMED BY CRAFTSMEN SKILLED IN THE REQUIRED WORK.

- WORK, OR ANOTHER FIRM ACCEPTABLE TO THE ENGINEER. B. PROVIDE REQUIRED PAINTS, PRIMERS, STAINS, SEALERS, FILLERS, TRIM, CARPET, TILE, WOOD, EPOXY, VINYL OR RUBBER BASES, PANELING AND ADDITIONAL REQUIRED WALL, FLOOR AND CEILING FINISH MATERIALS TO MATCH ADJOINING SPACES AND FINISHES.
- . PROVIDE THE BEST QUALITY PROFESSIONAL/COMMERCIAL GRADE OF EACH TYPE OF COATING OR FINISH. FINISHES SHALL BE INSTALLED IN COMPLIANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS, INCLUDING RECOMMENDED TEMPERATURE AND HUMIDITY CONDITIONS.
- MATCH ORIGINAL FINISH COLORS BY USING THE SAME MANUFACTURER AND COLOR FORMATION FOR THE FINISH TO BE APPLIED. WHEN FINISH MATERIAL, COLOR OR MANUFACTURER IS NO LONGER COMMERCIALLY AVAILABLE, THE CONTRACTOR SHALL SUBMIT SAMPLES OF PROPOSED SUBSTITUTE FINISHES TO THE ENGINEER FOR REVIEW.

CLEANING

OPERATING INSTRUCTIONS

PROJECT CLOSEOUT

- CONTRACT DOCUMENTS
- TREATMENTS
- COMPLETION OF SYSTEM START-UP

- ENGINEER
- SECTIONS.

SECURING EXTERIOR EQUIPMENT

GENERAL REQUIREMENTS FOR VALVES

- SINGLE MANUFACTURER

SERVICE.

- PFRMITTED

BALL VALVES

SWING CHECK VALVES

TYPE 4. MANUFACTURERS:
AI VE INSTALLATION

л.	
	ALLOW SERVIC
В.	LOCATE VALVE
C.	INSTALL VALVE

Ε.	INSTALL SWING
	WITH HINGE PI
	INISTALL CHAIN

GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

А.	IF VALVES WITE
	HIGHER CWP R
Β.	USE GATE VAL\
C.	END CONNECTI
1.	FOR PIPING
2.	FOR PIPING

22 05 29 HANGERS AND SUPPORTS PERFORMANCE REQUIREMENTS

METAL PIPE HANGERS AND SUPPORTS A. PIPE HANGERS AND SUPPORTS

SHALL COM
FABRICATE
GALVANIZE
NON-METAL
PADDED HA
HANGER RC
STEEL
RAPEZE PIPE H

FASTENER SYSTEMS

A. COORDINATE AND COOPERATE WITH OTHER TRADES FOR CLEANING AND REMOVAL OF TRASH AND DEBRIS FROM THE PROJECT ON A PERIODIC BASIS OR AS DIRECTED BY THE ENGINEER. REMOVE TRASH AND DEBRIS IN AREAS OPEN TO THE PUBLIC ON A DAILY BASIS.

A. AFTER COMPLETION OF TESTING IN ACCORDANCE WITH REMAINING DIVISION 22 SECTIONS, START EACH SYSTEM AND MAKE FINAL ADJUSTMENTS FOR PROPER FLOW, TEMPERATURE AND QUIETNESS OF OPERATION.

A. REQUEST A DATE FROM THE OWNER IN WRITING WITH A COPY TO THE ENGINEER, WHEN THE INSTRUCTION PERIOD SHALL BEGIN. TESTING, BALANCING AND ADJUSTING SHALL BE COMPLETE AND ACCEPTABLE TO THE ENGINEER PRIOR TO INSTRUCTION OF THE OWNER'S REPRESENTATIVE. THE OWNER MAY REQUEST INTERIM INSTRUCTION PRIOR TO THE FINAL INSTRUCTION PERIOD IN ORDER TO OPERATE THE SYSTEMS PRIOR TO COMPLETION OF THE PROJECT. THE INTERIM INSTRUCTION PERIOD SHALL BE IN ADDITION TO FINAL INSTRUCTIONS AND NOT REDUCE THE LENGTH OF INSTRUCTION DURING THE FINAL INSTRUCTION PERIOD.

A. SUBMIT NOTIFICATION OF SUBSTANTIAL COMPLETION TO THE ENGINEER FOLLOWING COMPLETION OF THE FOLLOWING TASKS

B. INSTALLATION OF ALL REQUIRED MATERIAL, EQUIPMENT AND SYSTEMS AS DOCUMENTED IN THE

C. COMPLETION OF ALL REQUIRED SYSTEM TESTING AND BALANCING D. COMPLETION OF CUTTING, PATCHING AND FINISHING OF SURFACES REQUIRING SUCH

E. COMPLETION OF CLEANING OF SITE

G. PROVISION OF OPERATING AND MAINTENANCE INSTRUCTIONS

H. SUBMISSION OF ALL REQUIRED CERTIFICATIONS I. SUBMISSION OF PROJECT RECORD DRAWINGS

J. SUBMISSION OF WARRANTY DOCUMENTS FOR COMPLETION OF INITIAL STARTING DATE BY

K. FOLLOWING COMPLETION OF THE ABOVE TASKS, THE TRADE CONTRACTOR SHALL PERFORM CLOSEOUT WORK AND SUBMIT CLOSEOUT DOCUMENTS REQUIRED TO ESTABLISH SUBSTANTIAL COMPLETION, AS DEFINED IN THIS SECTION AND AS DEFINED BY GENERAL ARCHITECTURAL

A. EXTERIOR EQUIPMENT SHALL BE SECURELY FASTENED IN PLACE. SUPPORTS SHALL BE DESIGNED AND CONSTRUCTED TO SUSTAIN VERTICAL AND HORIZONTAL LOADS WITHIN THE STRESS LIMITATIONS AND WIND SPEEDS SPECIFIED IN THE APPLICABLE BUILDING CODE

22 05 23 GENERAL DUTY VALVES FOR PLUMBING PIPING

A. PLUMBING VALVE APPLICATIONS SPECIFIED IN THIS SECTION ARE LIMITED TO NPS 24 (DN 600). MANY VALVES SPECIFIED ARE AVAILABLE IN LARGER SIZES. B. SOURCE LIMITATIONS FOR VALVES: OBTAIN EACH TYPE OF VALVE FROM SINGLE SOURCE FROM

C. IN COMPLIANCE WITH ASME B1.20.1 FOR THREADS FOR THREADED END VALVES, B16.1 FOR FLANGES ON IRON VALVES, B16.10 AND ASME B16.34 FOR FERROUS VALVE DIMENSIONS AND DESIGN CRITERIA, B16.18 FOR SOLDER JOINT, B31.9 FOR BUILDING SERVICES PIPING VALVES. D. NSF COMPLIANCE: NSF 61 ANNEX G AND NSF 372 FOR VALVE MATERIALS FOR POTABLE-WATER

E. BRONZE VALVES SHALL BE MADE WITH DEZINCIFICATION-RESISTANT MATERIALS. BRONZE VALVES MADE WITH COPPER ALLOY (BRASS) CONTAINING MORE THAN 15 PERCENT ZINC ARE NOT

F. VALVE PRESSURE-TEMPERATURE RATINGS: NOT LESS THAN INDICATED AND AS REQUIRED FOR SYSTEM PRESSURES AND TEMPERATURES.

G. VALVE SIZES: SAME AS UPSTREAM PIPING UNLESS OTHERWISE INDICATED. H. VALVE BYPASS AND DRAIN CONNECTIONS: MSS SP-45.

I. VALVES IN INSULATED PIPING PROVIDE 2-INCH STEM EXTENSIONS, PROTECTIVE SLEEVES THAT ALLOW OPERATION OF VALVES WITHOUT BREAKING VAPOR SEALS OR DISTURBING INSULATION, AND FULLY ADJUSTABLE MEMORY STOPS.

A. BRONZE BALL VALVES, TWO-PIECE WITH FULL PORT, BRONZE BODY WITH STAINLESS STEEL TRIM AND BALL, THREADED OR SOLDERED, 600 PSIG CWP RATING, PTFE SEATS. SHALL COMPLY WITH MSS SP-110. VALVES WITH INTEGRAL PRESS-CONNECT ENDS SHALL BE VIEGA ONLY. MANUFACTURERS: APOLLO, NIBCO, MILWAUKEE, WATTS, OR EQUAL

A. BRONZE SWING CHECK VALVE, WITH NONMETALLIC DISC, CLASS 125, HORIZONTAL FLOW, THREADED OR SOLDERED, 200 PSIG CWP RATING, PTFE DISC. SHALL COMPLY WITH MSS SP-80

APOLLO, NIBCO, MILWAUKEE, WATTS, OR EQUAL

VALVE INSTALLATION A. INSTALL VALVES WITH UNIONS OR FLANGES AT EACH PIECE OF EQUIPMENT ARRANGED TO E, MAINTENANCE, AND EQUIPMENT REMOVAL WITHOUT SYSTEM SHUTDOWN. ES FOR EASY ACCESS AND PROVIDE SEPARATE SUPPORT WHERE NECESSARY. ES IN HORIZONTAL PIPING WITH STEM AT OR ABOVE CENTER OF PIPE. D. INSTALL VALVES IN POSITION TO ALLOW FULL STEM MOVEMENT.

G CHECK VALVES FOR PROPER DIRECTION OF FLOW IN HORIZONTAL POSITION N LEVEL F. INSTALL CHAINWHEELS ON OPERATORS FOR GATE VALVES NPS 4 AND LARGER, AND MORE THAN

96 INCHES ABOVE THE FLOOR. EXTEND CHAINS TO 60 INCHES ABOVE FINISHED FLOOR.

ITH SPECIFIED CWP RATINGS ARE UNAVAILABLE, THE SAME TYPES OF VALVES WITH RATINGS MAY BE SUBSTITUTED. VES FOR SHUTOFF SERVICE ONLY.

IONS G/TUBING, NPS 2 AND SMALLER: THREADED OR SOLDERED.

G/TUBING, NPS 2-1/2 AND LARGER: FLANGED.

A. DELEGATED DESIGN: DESIGN TRAPEZE PIPE HANGERS AND EQUIPMENT SUPPORTS, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.

B. STRUCTURAL PERFORMANCE: HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED ACCORDING TO ASCE/SEI 7. DESIGN SUPPORTS FOR MULTIPLE PIPES CAPABLE OF SUPPORTING COMBINED WEIGHT OF

SUPPORTED SYSTEMS, SYSTEM CONTENTS, AND TEST WATER. DESIGN EQUIPMENT SUPPORTS CAPABLE OF SUPPORTING COMBINED OPERATING WEIGHT OF SUPPORTED EQUIPMENT AND CONNECTED SYSTEMS AND COMPONENTS.

CARBON STEEL AND STAINLESS-STEEL PIPE HANGERS AND SUPPORTS SHALL COMPLY WITH MSS SP-58, TYPES 1 THROUGH 58, FACTORY-FABRICATED COMPONENTS. COPPER HANGERS IPLY WITH MSS SP-58, TYPES 1 THROUGH 50, COPPER-COATED-STEEL, FACTORY-COMPONENTS.

D METALLIC COATINGS SHALL BE PRE-GALVANIZED OR HOT DIPPED, LLIC COATINGS SHALL BE PLASTIC COATING, JACKET OR LINER.

ANGERS SHALL HAVE FIBERGLASS OR OTHER PIPE INSULATION PAD OR CUSHION ODS SHALL BE CONTINUOUS-THREAD ROD, NUTS, AND WASHER MADE OF CARBON HANGERS

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

A. POWDER-ACTUATED FASTENERS: THREADED-STEEL STUD, FOR USE IN HARDENED PORTLAND CEMENT CONCRETE WITH PULL-OUT, TENSION, AND SHEAR CAPACITIES APPROPRIATE FOR SUPPORTED LOADS AND BUILDING MATERIALS WHERE USED. B. MECHANICAL-EXPANSION ANCHORS: INSERT-WEDGE-TYPE, ZINC-COATED STEEL ANCHORS, FOR USE IN HARDENED PORTLAND CEMENT CONCRETE; WITH PULL-OUT, TENSION, AND SHEAR CAPACITIES APPROPRIATE FOR SUPPORTED LOADS AND BUILDING MATERIALS WHERE USED.

HANGER AND SUPPORT INSTALLATION

A. METAL PIPE-HANGER INSTALLATION: COMPLY WITH MSS SP-69 AND MSS SP-89. INSTALL HANGERS. DOMESTIC HOT & COLD WATER PIPING-SUPPORTS, CLAMPS, AND ATTACHMENTS AS REQUIRED TO PROPERLY SUPPORTING PIPING SHALL MEET THE REQUIREMENTS OF NSF/ANSI 61 FOR HEALTH EFFECTS IN POTABLE WATER AND FROM THE BUILDING STRUCTURE. NSF/ANSI 372 FOR LEAD FREE REQUIREMENTS IN THE "REDUCTION OF LEAD IN DRINKING WATER ACT".

- B. METAL TRAPEZE PIPE-HANGER INSTALLATION: COMPLY WITH MSS SP-69 AND MSS SP-89. ON FIELD-FABRICATED TRAPEZE PIPE HANGERS.
- BOLTS, RODS, NUTS, WASHERS, AND OTHER ACCESSORIES.
- ARRANGE FOR GROUPING OF PARALLEL RUNS OF HORIZONTAL PIPING, AND SUPPORT TOGETHER A. HARD COPPER TUBE: ASTM B88 TYPE "L" COPPER TUBING WITH ASME B16.22 WROUGHT COPPER AND ASME B16.18 CAST COPPER ALLOY (BRONZE) SOLDER JOINT FITTINGS WITH LEAD FREE SOLDER OR C. INSTALL HANGERS AND SUPPORTS COMPLETE WITH NECESSARY ATTACHMENTS, INSERTS, VIEGA PROPRESS PRESS-CONNECT FITTINGS 1/2" TO 4". WHERE VIEGA PROPRESS FITTINGS ARE USED, INSTALLERS SHALL BE CREDENTIALED BY VIEGA (A FREE SERVICE), THE CONNECTIONS SHALL D. INSTALL HANGERS AND SUPPORTS TO ALLOW CONTROLLED THERMAL AND SEISMIC MOVEMENT BE MARKED FOR FULL INSERTION DEPTH, THE VIEGA TWO-STEP PRESSURE TESTING SHALL BE CONDUCTED TO ENSURE DETECTION OF UNPRESSED FITTINGS AND THERE SHALL BE NO MIXING OF OF PIPING SYSTEMS, TO PERMIT FREEDOM OF MOVEMENT BETWEEN PIPE ANCHORS, AND TO FACILITATE ACTION OF EXPANSION JOINTS, EXPANSION LOOPS, EXPANSION BENDS, AND SIMILAR MANUFACTURERS. PRESS MANUFACTURERS ALL USE VARIOUS TECHNOLOGY AT SOME POINT AND HAVE DIFFERENT INSTRUCTIONS. THE APPROVED MANUFACTURER'S INSTALLATION INSTRUCTIONS INSTALL LATERAL BRACING WITH PIPE HANGERS AND SUPPORTS TO PREVENT SWAYING. SHALL BE STRICTLY ADHERED TO. IF VALVES WITH PRESS-CONNECT ENDS ARE USED, THE VALVES PIPE SLOPES: INSTALL HANGERS AND SUPPORTS TO PROVIDE INDICATED PIPE SLOPES AND TO SHALL BE VIEGA IN ORDER TO ENSURE UNIFORM PRESS TECHNOLOGY THROUGHOUT THE SYSTEM NOT EXCEED MAXIMUM PIPE DEFLECTIONS ALLOWED BY ASME B31.9 FOR BUILDING SERVICES SYSTEM SHALL BE DRAINABLE.
- PIPING
- G. USE HANGERS AND SUPPORTS WITH GALVANIZED METALLIC COATINGS FOR PIPING AND EQUIPMENT THAT WILL NOT HAVE FIELD-APPLIED FINISH.
- H. USE NONMETALLIC COATINGS ON ATTACHMENTS FOR ELECTROLYTIC PROTECTION WHERE ATTACHMENTS ARE IN DIRECT CONTACT WITH COPPER TUBING I. USE CARBON-STEEL PIPE HANGERS AND SUPPORTS AND METAL TRAPEZE PIPE HANGERS AND
- ATTACHMENTS FOR GENERAL SERVICE APPLICATIONS. J. USE STAINLESS-STEEL PIPE HANGERS AND STAINLESS-STEEL ATTACHMENTS FOR HOSTILE ENVIRONMENT APPLICATIONS.
- K. USE COPPER-PLATED PIPE HANGERS AND COPPER ATTACHMENTS FOR COPPER PIPING AND TUBING
- L. USE PADDED HANGERS FOR PIPING THAT IS SUBJECT TO SCRATCHING M. USE THERMAL-HANGER SHIELD INSERTS FOR INSULATED PIPING AND TUBING.
- N. ISOLATE ALL WATER PIPING FROM DIRECT CONTACT WITH STRUCTURAL MEMBERS (STUDS,
- JOISTS, BEAMS, ETC.) TO PREVENT THE TRANSMISSION OF SOUND. O. ISOLATE ALL WATER PIPING FROM DIRECT CONTACT WITH STRUCTURAL MEMBERS (STUDS, JOISTS, BEAMS, ETC.) TO PREVENT THE TRANSMISSION OF SOUND.
- P. NO WOOD SILLS ALLOWED Q. ROOF SUPPORTS COMPATIBLE WITH EXISTING ROOF SYSTEM SHALL BE PORTABLE PIPE
- HANGERS OR APPROVED EQUAL.
- EQUIPMENT SUPPORT A. PROVIDE 4" REINFORCED CONCRETE HOUSEKEEPING PAD WITH CHAMFERED EDGES FOR ALL FLOOR OR GROUND MOUNTED EQUIPMENT. B. FLASH AND SEAL EQUIPMENT, PIPE STACKS, AND ROOF PENETRATIONS.

HANGER SPACING

INTERNATIONAL PLUMBING CODE HANGER SPACING TABLE 308.5 A. COPPER PIPING

- a. 1 ¼" AND SMALLER MAXIMUM HORIZONTAL SPACING OF 6'-0" AND MAXIMUM VERTICAL SPACING OF 10'-0"
- b. 1 1/2" AND LARGER MAXIMUM HORIZONTAL SPACING OF 10'-0" AND MAXIMUM VERTICAL SPACING OF 10'-0" B. CAST IRON PIPING
- a. ALL SIZES MAXIMUM HORIZONTAL SPACING OF 5'-0" UNLESS 10 FEET PIPE IS USED FOR INSTALL AND SPACING MAY BE INCREASE A MAXIMUM HORZINTAL SPACING OF 10'-0" b. MAXIMUM VERTICAL SPACING OF 15'-0"
- C. SCHEDULE 40 PVC PIPE
- a. MAXIMUM HORIZONTAL SPACING OF 4'-0" b. MAXIMUM VERTICAL SPACING OF 10'-0"

22 05 48 VIBRATION ISOLATION

A. INLINE CIRCULATING PUMP: SUSPEND OR SUPPORT WITH RUBBER OR SPRING ISOLATORS.

22 05 53 PLUMBING COMPONENTS IDENTIFICATION EQUIPMENT:

- PERMANENT LABEL (STENCIL, METAL TAG) WITH UNIT TAG OR NAME AND AREA OR SPACE SERVED. A. MATERIAL: ANODIZES ALUMINUM (0.032 INCH THICK), BLACK LETTERS, WHITE BACKGROUND.
- B. LABEL: SIZE SHALL VERY FOR REQUIRE CONTENT, MINIMUM SIZE 2-1/2 X ¾ INCH C. MINIMUM LETTER SIZE: 1/4 INCH (6.4 MM) FOR NAME OF UNITS IF VIEWING DISTANCE IS LESS THAN 24 INCHES, 1/2 INCH FOR VIEWING DISTANCES UP TO 72 INCHES, AND PROPORTIONATELY LARGER LETTERING FOR GREATER VIEWING DISTANCES. INCLUDE SECONDARY LETTERING TWO-THIRDS TO THREE-QUARTERS THE SIZE OF PRINCIPAL LETTERING.
- D. FASTENERS: STAINLESS STEEL RIVETS GENERAL REQUIREMENTS FOR MANUFACTURED PIPE LABELS
- A. PREPRINTED, COLOR-CODED, WITH LETTERING INDICATING SERVICE, AND SHOWING FLOW
- DIRECTION. B. SELF-ADHESIVE PIPE LABELS: PRINTED PLASTIC WITH CONTACT-TYPE, PERMANENT-ADHESIVE BACKING
- C. PIPE LABEL CONTENTS: INCLUDE IDENTIFICATION OF PIPING SERVICE USING SAME DESIGNATIONS OR ABBREVIATIONS AS USED ON DRAWINGS; ALSO INCLUDE PIPE SIZE AND AN ARROW INDICATING FLOW DIRECTION
- 1. LETTERING SIZE: SIZE LETTERS ACCORDING TO ASME A13.1 FOR PIPING, AT LEAST 1/2 INCH FOR VIEWING DISTANCES UP TO 72 INCHES AND PROPORTIONATELY LARGER LETTERING FOR GREATER VIEWING DISTANCES.

VALVE TAGS:

- A. TAGS: STAMPED OR ENGRAVED WITH 1/4 INCH LETTERING FOR PIPING SYSTEM AND 1/2 INCH
- NUMBERS B. MATERIAL: BRASS 0.032 INCH MINIMUM THICKNESS AND HAVING PREDRILLED OR STAMPED HOLES
- FOR ATTACHMENT HARDWARE C. FASTENERS: BRASS WIRE-LINK OR BEADED CHAIN OR S-HOOK

VALVE TAG CHART:

A. FOR EACH PIPING SYSTEM, ON 8-1/2-BY-11-INCH (A4) BOND PAPER. TABULATE VALVE NUMBER, PIPING SYSTEM, SYSTEM ABBREVIATION (AS SHOWN ON VALVE TAG), LOCATION OF VALVE (ROOM OR SPACE), NORMAL-OPERATING POSITION (OPEN, CLOSED, OR MODULATING), AND VARIATIONS FOR IDENTIFICATION. MARK VALVES FOR EMERGENCY SHUTOFF AND SIMILAR SPECIAL USES. 1. VALVE TAG SCHEDULE SHALL BE INCLUDED IN OPERATION AND MAINTENANCE DATA.

22 07 19 PIPING INSULATION

ALL INSULATION MUST HAVE FLAME SPREAD LESS THAN 25 AND SMOKE DEVELOPED LESS THAN 50 AS PER ASTM E84, NFPA 255, AND UL 273. A. PROVIDE GALVANIZED SHEET METAL SHIELDS AT ALL PIPE HANGERS FOR PIPES 11/2" OR LARGER. FOR

- PIPE 4" AND LARGER, PROVIDE HIGH-DENSITY INSULATION (CALCIUM SILICATE) INSERTS AT HANGERS. ALL FIBERGLASS INSULATION SHALL BE 'HEAVY DENSITY'. 1-PIECE MOLDED FIBERGLASS WITH FACOTRY APPLIED TYPE ASM/SSL 'ALL SERVICE' JACKET WITH SELF-SEALING LAP. AVERAGE
- THERMAL CONDUCTIVITY SHALL NOT EXCEED 0.25 BTU-IN PER SQUARE FOOT PER DEGREES FAHRENHEIT PER HOUR AT A MEAN TEMPERATURE OF 100 DEGREES. C. DOMESTIC COLD WATER IN EXTERIOR WALLS, ATTICS SPACE ABOVE BUILDING INSULATION, OR
- OTHER AREAS SUBJECT TO FREEZING 1" FIBERGLASS. D. DOMESTIC HOT WATER (105°F-140°F) -
- FOR PIPE SIZES 1 1/4" OR LESS, PROVIDE 1" FIBERGLASS INSULATION FOR PIPE SIZES 1 1/2" AND LARGER, PROVIDE 1 1/2" FIBERGLASS INSULATION (RE: IECC 2015 – TABLE C403.2.10 MINIMUM PIPE INSULATION THICKNESS)
- INSULATE ALL EXPOSED DRAIN, WATER SUPPLY VALVES AND PIPING BELOW LAVATORIES AND SINKS WITH CLOSED CELL INSULATING KIT AS MANUFACTURED BY TRUEBRO LAVGUARD2 E-Z SERIES OR EQUAL BY MCGUIRE.
- F. FLOOR DRAINS ABOVE GRADE RECEIVING CONDENSATE FROM HVAC UNITS OR ICE MACHINES SHALL BE INSULATED WITH 1" FIBERGLASS A MINIMUM OF 5-FEET DOWNSTREAM OF DRAIN.

22 10 00 PLUMBING PIPING

TESTING: UPON COMPLETION OF CONSTRUCTION, ALL DOMESTIC WATER PIPING SHALL BE THOROUGHLY FLUSHED AND STERILIZED. SUBMIT CERTIFICATES OF TESTING FOR ENGINEER REVIEW

WASTE AND VENT PIPING -

- A. <u>BELOW SLAB</u>: DRAINAGE PIPING BELOW SLAB SHALL BE SCHEDULE 40 PVC WITH DWV FITTINGS AND CLAMPS. TRANSITIONS BETWEEN UNDER SLAB PVC AND ABOVE SLAB CAST IRON SHALL BE AS DETAILED ON PLANS. PIPE / FITTING MFG: CHARLOTTE, TYLER PIPE, OR EQUAL
- B. <u>ABOVE SLAB</u>: ASTM A888 NO-HUB CAST IRON PIPE AND FITTINGS, WITH ASTM C1540 HEAVY DUTY CLAMPS AND ASTM C564 GASKETS; NO-HUB PIPE MFG: CHARLOTTE, TYLER PIPE, OR EQUAL
- NO-HUB CLAMPS MFG: ANACO, MISSION, IDEAL, CLAMP-ALL OR EQUAL

NOTE: PLASTIC PIPING OF ANY TYPE MAY NOT BE USED FOR ANY PLUMBING PIPING SYSTEM WHEN THE PIPING IS ROUTED WITHIN A CEILING PLENUM USED AS A RETURN AIR PLENUM.

NATURAL GAS PIPING -

UNDERGROUND PIPING, OUTSIDE BUILDING:

- PIPING WITHIN BUILDING A. STEEL PIPE: ASTM A53/A53M, BLACK STEEL, SCHEDULE 40, TYPE E OR S, GRADE B.
- 1/2" TO 2"-MALLEABLE IRON THREADED FITTINGS OR VIEGA MEGAPRESSG PRESS-CONNECT FITTINGS.
- 2 1/2" TO 4"-WROUGHT STEEL WELDING FITTINGS OR VIEGA MEGAPRESSG PRESS-CONNECT FITTINGS. MALLEABLE-IRON THREADED FITTINGS: ASME B16.3, CLASS 150, STANDARD PATTERN. 2. WROUGHT-STEEL WELDING FITTINGS: ASTM A234/A234M FOR BUTT WELDING AND SOCKET
- WELDING
- . VIEGA MEGAPRESSG PRESS-CONNECT FITTINGS: ANSI LC4/CSA 6.32 4. THE INSTALLER'S SHALL BE CREDENTIALED BY VIEGA
- HNBR SEALING ELEMENTS.
- 6. ALL CONNECTIONS SHALL BEAR FULL INSERTION MARKS.
- 7. NO MIXING OF MANUFACTURERS. 8. WHEN VALVES WITH PRESS-CONNECT ENDS ARE USED, THEY SHALL BE VIEGA VALVES

PIPING ON ROOF:

A. IF THREADED PIPE AND FITTINGS ARE USED, ALL PIPE SHALL BE CUT AND THREADED AT GRADE LEVEL AND THEN TRANSFERRED TO THE ROOF. IF WELDED CONNECTIONS ARE USED, ALL WELDING OF ROOF PIPE SHALL BE PERFORMED WITH A DOUBLE LAYER OF FIRE CODE GYPSUM BOARD BETWEEN THE WELDING POINT AND THE ROOF MEMBRANE. IF VIEGA MEGAPRESSG FITTINGS ARE USED, THE INSTALLERS SHALL BE CREDENTIALED BY VIEGA (A FREE SERVICE). IF CUTTING PIPE ON A MEMBRANE TYPE ROOF, FOR WELDING OR MEGAPRESS CONNECTIONS, PROTECT THE ROOF SURFACE UNDER THE PIPE CUTTING STAND WITH MASONITE AND USE A DRAIN PAN TO CAPTURE THE SHAVINGS. PROVIDE EXPANSION LOOP IF A BUILDING EXPANSION JOINT IS CROSSED. PROVIDE TREATED WOOD BLOCK PIPE SUPPORTS, SPACED PER CODE REQUIREMENTS TO PREVENT SAGGING, AND ATTACH LOOSE FITTING PIPE CLAMPS TO THE SUPPORT BLOCK. PAINT PIPE WITH INDUSTRY STANDARD YELLOW INDUSTRIAL COATING.

MAKE CONNECTIONS BETWEEN DISSIMILAR PIPING MATERIALS WITH ADAPTORS MANUFACTURED FOR THE APPLICABLE TYPE OF TRANSITION.

PROVIDE ASSE 1079 DIELECTRIC ISOLATION DEVICE (DIELECTRIC UNION OR COUPLING) WHERE COPPER LINES CONNECT TO FERROUS LINES OR EQUIPMENT.

ALL PIPING PENETRATIONS THROUGH FLOORS SHALL BE SEALED WITH UL LISTED FIRESTOF

22 13 23 SANITARY WASTE INTERCEPTORS

A. GREASE WASTE SYSTEM - SHALL HAVE GREASE TRAPS AND SAMPLING WELLS ACCEPTABLE MANUFACTURERS: PARK EQUIPMENT, J.R. SMITH, SHIER OR EQUAL

22 42 00 PLUMBING FIXTURES

- A. REFER TO PLUMBING CONSTRUCTION DRAWINGS FOR 'PLUMBING FIXTURE SCHEDULE.' B. FIXTURES SHALL BE CERTIFIED TO MEET THE WATER SAVING PERFORMANCE STANDARDS OF TEXAS CIVIL STATUTES SECTION 372.002 AND SHALL BE LISTED WITH THE STATE AS COMPLYING WITH SUCH. ALL FIXTURES SHALL COMPLY WITH THE MORE RESTRICTIVE OF ANSI OR THE FOLLOWING (WHEN
- TESTED PER ANSI TESTING PROCEDURES): 1. MAXIMUM FLOW FROM SINK OR LAVATORY FAUCET OR FAUCET AERATOR SHALL BE 2.20
- GALLONS PER MINUTE (GPM) AT A PRESSURE OF 60 PSI;
- MAXIMUM FLOW FROM A SHOWER HEAD SHALL BE 2.75 GPM AT A PRESSURE OF 80 PSI: 3. MAXIMUM VOLUME OF WATER PER FLUSH FROM A URINAL AND ASSOCIATED FLUSH VALVE SHALL NOT EXCEED 0.5 GALLON;
- 4. MAXIMUM VOLUME OF WATER PER FLUSH FROM A TOILET SHALL NOT EXCEED 1.28 GALLONS. C. FIXTURES SHALL COMPLY WITH REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT, PUBLIC LAW 101-336 AND WITH STATE OF TEXAS CIVIL STATUTES ARTICLES 7, 601B.
- 1. FLUSH CONTROLS SHALL BE NO MORE THAN 44" ABOVE FLOOR AND ON THE WIDE SIDE OF STALLS.
- 2. URINAL RIMS SHALL NOT EXCEED 17" ABOVE FINISHED FLOOR; FLUSH CONTROLS SHALL BE NO MORE THAN 44" ABOVE FLOOR.
- 3. EXPOSED HOT WATER AND DRAIN PIPES SHALL BE CONFIGURED TO PROTECT AGAINST CONTACT AND SHALL BE INSULATED WITH PREFABRICATED COVERS BY TRUEBRO OR EQUAL. 4. LAVATORIES SHALL BE MINIMUM 17" FRONT TO BACK AND SHALL ALLOW MINIMUM 27" HIGH KNEE
- CLEARANCE. 5. DRINKING FOUNTAIN SPOUTS SHALL BE NO HIGHER THAN 36"; FLOW SHALL BE PARALLEL TO UNIT FRONT AND ARC AT LEAST 4" HIGH.

PLAN

TRUE

1" = 1'-0"

PLAN

TRUE

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NATURAL GAS PIPING CALCULATION

INLET PRESSURE OF 2 PSI LONGEST MEASURED LENG ADDITIONAL 20% FOR FRICT TOTAL DEVELOPED LENGTH

TOTAL CONNECTED LOAD

GAS PIPING SIZED BASED ON ² 2015 INTERNATIONAL FUEL GA

	PLUMBING GAS EQUIPMENT SCHEDULE								
NAME	EQPT DESCRIPTION	EQPT LOCATION	EQPT MIN. BTUH LOCATION FUEL TYPE INPUT		NATURAL GAS CFH INPUT				
KITCHEN									
EQPT #22	FRYER	KITCHEN	NATURAL GAS	150,000	150				
EQPT #23	GRIDDLE (36 INCH)	KITCHEN	NATURAL GAS	66,000	66				
EQPT # 24	6 BURNER RANGE / OVEN	KITCHEN	NATURAL GAS	210,000	210				
ROOF TOP				426,000	426				
MUA-1	MAKEUP AIR UNIT	ROOF TOP	NATURAL GAS	108,000	108				
STORAGE		1		108,000	108				
GWH-1	TANKLESS WATER HEATER	STORAGE	NATURAL GAS	183,000	183				
GWH-2	TANKLESS WATER HEATER	STORAGE	NATURAL GAS	183,000	183				
GWH-3	TANKLESS WATER HEATER	STORAGE	NATURAL GAS	183,000	183				
				549,000	549				

TOTAL NATURAL GAS DEMAND (CFH) FOR PROJECT

GTH	= 91' - 3"
<u>TION AND FITTING LOSE</u>	= <u>18' - 3"</u>
'H	= 109' - 6"
OF NEW EQUIPMENT	= 867 CFH
ON THE 000 FEET COLUMN	I OF THE
_ GAS CODE - TABLE 402.4	(5)

1,083,000

1,083

6) <u>12" = 1'-0"</u>

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	ER			
ARRESTOR				
WATEF	R HA	MME	ER SCI	HEDULE
PPP INC. MODEL #	PIPE SIZE	SIZE	AIR CHAMBER	FIXTURE UNIT CAPACITY
PPP INC. MODEL # SC-500	PIPE SIZE 1/2"	SIZE A	AIR CHAMBER 60 PSIG	FIXTURE UNIT CAPACITY 1 TO 11
PPP INC. MODEL # SC-500 SC-750	PIPE SIZE 1/2" 3/4""	SIZE A B	AIR CHAMBER 60 PSIG 60 PSIG	FIXTURE UNIT CAPACITY 1 TO 11 12 TO 32
PPP INC. MODEL # SC-500 SC-750 SC-1000	PIPE SIZE 1/2" 3/4""	SIZE A B C	AIR CHAMBER 60 PSIG 60 PSIG 60 PSIG	FIXTURE UNIT CAPACITY 1 TO 11 12 TO 32 33 TO 60
PPP INC. MODEL # SC-500 SC-750 SC-1000 SC-1250	PIPE SIZE 1/2" 3/4"" 1" 1 1/4"	SIZE A B C D	AIR CHAMBER 60 PSIG 60 PSIG 60 PSIG	FIXTURE UNIT CAPACITY 1 TO 11 12 TO 32 33 TO 60 61 TO 113
PPP INC. MODEL # SC-500 SC-750 SC-1000 SC-1250 SC-1500	PIPE SIZE 1/2" 3/4"" 1" 1 1/4" 1 1/2"	SIZE A B C D E	AIR CHAMBER 60 PSIG 60 PSIG 60 PSIG 60 PSIG	FIXTURE UNIT CAPACITY 1 TO 11 12 TO 32 33 TO 60 61 TO 113 114 TO 154

-FLOW DIRECTION

-WATER HAMMER ARRESTOR

UNDERGROUND INSTALLATION OF PLASTIC PIPE PLASTIC PIPE SHOULD ALWAYS BE BURIED IN STRICT ACCORDANCE WITH THE ASTM STANDARD RELEVANT TO THE TYPE OF PLASTIC PIPING SYSTEM BEING INSTALLED. THOSE STANDARD ARE: ASTM D2321 STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF

THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY-FLOW
APPLICATIONS.ASTM D2774STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF
THERMOPLASTIC PRESSURE PIPING.

NOTE: IN ADDITION TO THESE STANDARDS , PIPE SHOULD ALWAYS BE INSTALLED IN ACCORDANCE WITH ALL LOCAL CODE REQUIREMENTS.

- **RECOMMENDATION FOR UNGROUND INSTALLATION OF PLASTIC DRAINAGE PIPE** 1. THE MINIMUM WIDTH OF THE TRENCH SHOULD BE THE PIPE OD (OUTSIDE DIAMETER) PLUS 16 INCHES OR THE PIPE OUTSIDE DIAMETER TIMES 1.25 PLUS 12 INCHES. THIS WILL ALLOW ADEQUATE ROOM FOR JOINING THE PIPE, SNAKING THE PIPE IN THE TRENCH TO ALLOW FOR EXPANSION AND CONTRACTION WHERE APPROPIATE AND SPACE FOR BACKFILLING AND COMPACTION OF BACKFILL. THE SPACE BETWEEN THE PIPE AND TRENCH WALL MUST BE WIDER THAN THE COMPACTION EQUIPMENT USED TO COMPACT BACKFILL.
- PROVIDE A MINIMUM OF 4 INCHES OF FIRM, STABLE AND UNIFORM BEDDING MATERIAL IN THE TRENCH BOTTOM. IF ROCK OR UNYIELDING MATERIAL IS ENCOUNTERED, A MINIMUM OF 6 INCHES OF BEDDING SHALL BE USED. BLOCKING SHOULD NOT BE USED TO CHANGE PIPE GRADE OR TO INTERMITTENTLY SUPPORT PIPE OVER LOW SECTIONS IN THE TRENCH.
- 3. THE PIPE SHOULD BE SURROUNDED WITH AN AGGREGATE MATERIAL WHICH CAN BE EASILY WORKED AROUND THE SIDES OF THE PIPE. BACKFILLING SHOULD BE PERFORMED IN LAYERS OF 6 INCHES WITH EACH LAYER BEING SUFFICIENTLY COMPACTED TO 85% TO 95% COMPACTION.
- 4. A MECHANICAL TAMPER IS RECOMMENDED FOR COMPACTING SAND AND GRAVEL. THESE MATERIALS CONTAIN FINE-GRAINS, SUCH AS SILT AND CLAY. IF A TAMPER IS NOT AVAILABLE, COMPACTING SHOULD BE DONE BY HAND.
- 5. THE TRENCH SHOULD BE COMPLETELY FILLED. THE BACKFILL SHOULD BE PLACED AND SPREAD IN UNIFORM LAYERS TO PREVENT ANY UNFILLED SPACES OR VOIDS. LARGE ROCKS, STONES, FROZEN CLODS OR OTHER LARGE DEBRIS SHOULD BE REMOVED. STONE BACKFILL SHALL PASS THROUGH AN 1-1/2" SIEVE. ROCK SIZE SHOULD BE ABOUT ONE-TENTH OF THE PIPE OUTSIDE DIAMETER. HEAVY TAMPERS OR ROLLING EQUIPMENT SHOULD ONLY BE USED TO CONSOLIDATE THE FINAL BACKFILL.
- 6. TO PREVENT DAMAGE TO THE PIPE AND DISTURBANCE TO PIPE EMBEDMENT, A MINIMUM DEPTH OF BACKFILL ABOVE THE PIPE SHOULD BE MAINTAINED. PIPE SHOULD ALWAYS BE INSTALLED BELOW THE FROST LEVEL. TYPICALLY, IT IS NOT ADVISABLE TO ALLOW VEHICULAR TRAFFIC OR HEAVY CONSTRUCTION EQUIPMENT TO TRAVERSE THE PIPE TRENCH.

UNDERGROUND INSTALLATION OF PLASTIC PIPING

Image: Source of the second		Contact PRO	CLAYTON CLAYTON CLAYTON	OF 7 0F 7 09793 5055 202	MENTS	** /2023
Image: Second system Image: Second system Image: Second			FAULBREAK C-VIORE			San Marcos, IX / 8666
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ARCHITECTUR

3 TMV INSTALLATION NOT TO SCALE

CLG

NOM	IN	
SIZE	(
		1/2"
	3	3/4"
		1"
	1	1/4
	1	1/2

C.I. CASTINGS:

Cast iron rings and grates are manufactured of grey cast iron conforming to ASTM A48 Class 30, Heavy-Duty AASHTO H20/HL93

GREASE INTERCEPTOR SCHDEULE									
MANUFACTURER (OR EQUAL)	MODEL NO. (OR EQUAL)	CAPACITY US GAL.	GREASE CAPACITY (LBS)	EMPTY WEIGHT (LBS)	LENGTH (L)	WIDTH (W)	HEIGHT (H)	INLET (FL1)	OUTLET (FL2)
PARKUSA	GT-500	500	1,200	9,500	7'-10"	4'-4"	4'-6"	3'-3"	3'-0"

	GREASE INTERCEPTOR CALCULATIONS							
		2015 INTERNATIONAL PLUN	IBING CODE					
QTY	MARK	FIXTURE DESCRIPTION	TRAP SIZE	FIXTURE DFU	TOTAL DFU			
2	HS-1	HAND SINKS	2*	1	2			
3	FS-1	3" FLOOR SINKS	3"	5	15			
0		3" FLOOR DRAINS	3"	5	0			
0		4" FLOOR SINKS	4"	6	0			
0		4" FLOOR DRAINS	4"	6	0			
0		MOP SINKS	3"	2	0			
SUB-TOTAL NEW DFU								
		CON	IVERSION OF	DFU TO GPM	8.5			

DRAINAGE FIXTURE UNITS BASED ON TABLE 709.1 & 709.2

SAMPLE WELL SCHEDULE								
MANUFACTURER (OR EQUAL)	MODEL NO. (OR EQUAL)	DIAMETER "D"	IN & OUT PIPE SIZE	WIDTH "W"				
PARKUSA	SWB-154	15"	4"	24"				

Engineering Data

Class I/II concrete with design strength of The grease interceptor is structurally & hydraulically engineered to conform to 4500 PSI at 28 days. Unit is of monolithic UPC/IPC and regional plumbing codes recommended in most cities. Consult with local authorities for specific application requirements.

baffle required, slide-in type is not acceptable) Shop drawings shall include complete structural & bouyancy calculations certified by a licensed professional engineer upon request.

to ASTM A615 on required centers or equal. Consult with Park Equipment Company for exact excavation dimensions & shipping information.

CDEAGE INITEDCEDTOD COUDELII E

	VERIFY PLUMBING		IER / ARCHITECT P	RIOR TO ORDERING OR PURCHASING				
		MANUFACTURER	MODEL #			BING C	ONNEC	TIONS
MARK	DESCRIPTION	(OR EQUAL)	(OR EQUAL)	ACCESSORIES (OR EQUAL)	CW	HW	SAN	VENT
FCO-1	CAST IRON FLOOR CLEANOUT WITH ROUND ADJUSTABLE NICKEL BRONZE TOP AND GASKET SEAL	JAY R. SMITH MFG. CO.	4020S-04				4"	
FD-1	CAST IRON BODY FLOOR DRAIN WITH FLASHING COLLAR AND 6" NICKEL BRONZE ROUND ADJUSTABLE STRAINER HEAD	JAY R. SMITH MFG. CO.	2005A-03-06-NB	SURE SEAL TRAP GUARD #SS3009V			3"	2"
FFD-1	ROUND FLOOR DRAIN WITH FLASHING COLLAR AND NICKEL BRONZE ADJUSTABLE STRAINER HEAD, 4" DIAMETER FUNNEL	JAY R. SMITH MFG. CO.	2005A-02-06	SURE SEAL TRAP GUARD #SS2009V			2"	2"
FS-1	12" x 12" x 8" DEEP STAINLESS STEEL BODY FLOOR SINK WITH 1/2 GRATE COVER, SEDIMENT BUCKET AND TRAP PRIMER CONNECTION. PROVIDE WITH ANCHOR FLANGE AS REQUIRED	JAY R. SMITH MFG. CO.	3001-3-DBS-P050-12	PROVIDE 1/2" TRAP PRIMER LINE			3"	2"
GCO-1	EXTERIOR CLEANOUT, UNFINISHED AREA, ROUND CAST IRON TOP - TRACTOR COVER AND VANDAL PROOF CENTER SECURING SCREW, HEAVY TRAFFIC LOAD	JAY R. SMITH MFG. CO.	4240-04-U				4"	
HB-1	BRONZE NICKEL PLATED QUARTER TURN NON-FREEZE HYDRANT WITH 3/4" HOSE CONNECTION, BACKER PLATE, INTEGRAL VACUUM BREAKER WITH VANDAL RESISTANT CAP AND "T" HANDLE KEY	JAY R. SMITH MFG. CO.	5609QT-04		3/4"			
HB-2	BRONZE NICKEL PLATED QUARTER TURN NON-FREEZE HYDRANT WITH 3/4" HOSE CONNECTION, BACKER PLATE, INTEGRAL VACUUM BREAKER WITH VANDAL RESISTANT CAP AND "T" HANDLE KEY	JAY R. SMITH MFG. CO.	5609QT-04		3/4"			
HS-1	STAINLESS STELL WALL SINK (NSF) THAT INCLUDES FAUCET AND BASKET.	AERO MANUFACTURING	#HSF	McGUIRE P-TRAP AND STOPS. PROVIDE WATTS #LFMMV THERMOSTATIC MIXING VALVE.	1/2"	1/2"	2"	2"
HS-2	SELF-RIMMING SINGLE COMPARTMENT, OFF-CENTERED REAR DRAIN LOCATION, 3 HOLES ON 4" CENTERS, OVERALL SIZE: 17" L x 20" W x 6" DEEP, TYPE 304 18 GAUGE STAINLESS STEEL, BACKLEDGE, SATIN FINISH RIM AND BOWL, FULLY UNDERCOATED TO REDUCE CONDENSATION AND RESONANCE, CRUMB CUP STRAINER.	ELKAY "LUSTERTONE"	LRAD 1720-6-3	ELKAY FAUCET #LK100 (1.5 GPM), STRAINER #LK35, McGUIRE STOPS AND P-TRAP	1/2"	1/2"	2"	2"
L-1	RECTANGULAR UNDER MOUNT SINK WITH GLAZED UNDERSIDE, TAPERED INTERIOR BOWL, FRONT OVERFLOW	SLOAN	SS-3201	AMERICAN STANDARD #7055.105 FAUCET, POWERS TEMPERING VALVE #LFG480, McGUIRE #8902C CHROME PLATED HEAVY CAST BRASS WITH CLEANOUT P-TRAP, McGUIRE #LFH2165LKF 1/2" x 3/8" CHROME PLATED BRASS STOPS WITH BRASS STEMS COMPLING ANSI NSF 61, SEC 9	1/2"	1/2"	2"	2"
MS-1	SQUARE TERRAZZO MOP SINK WITH DROP FRONT AND CONTINUOUS STAINLESS STEEL CAPS ON ALL CURBS	FIAT PRODUCTS	TSB3000	FIAT PRODUCTS #830AA BASIN FITTING, #832AA HOSE & HOSE BRACKET, #833AA SILICONE SEALANT, #MSG2424 WALL GUARDS	1/2"	1/2"	3"	2"
U-1	HIGH EFFICIENCY URINAL TOP SPUD WALL HUNG WITH MANUAL FLUSH VALVE, VITREOUS CHINA, WASHDOWN FLUSH ACTION, EXTENDED SIDES FOR PRIVACY, 3/4" TOP SPUD, A.D.A MOUNTING HEIGHT	SLOAN	SU-1009	SLOAN ROYAL #186-0.5 (0.5 GPF) MANUAL FLUSH VALVE, JAY R. SMITH CARRIER	3/4"		2"	2"
U-2	HIGH EFFICIENCY URINAL TOP SPUD WALL HUNG WITH MANUAL FLUSH VALVE, VITREOUS CHINA, WASHDOWN FLUSH ACTION, EXTENDED SIDES FOR PRIVACY, 3/4" TOP SPUD	SLOAN	SU-1009	SLOAN ROYAL #186-0.5 (0.5 GPF) MANUAL FLUSH VALVE, JAY R. SMITH CARRIER	3/4"		2"	2"
WC-1	HIGH EFFICIENCY WATER CLOSET, FLOOR MOUNTED, VITREOUS CHINA, ELONGATED SYPHON JET FLUSH ACTION BOWL, TOP SPUD FOR USE WITH EXPOSED FLUSH VALVE, PROVIDE DUAL WAX RINGS. A.D.A. MOUNTING HEIGHT.	SLOAN	ST-2029	SLOAN ROYAL #111-1.28 (1.28 GPF) MANUAL FLUSH VALVE, BEMIS #1955SSCT HVY DUTY OPEN FRONT TOILET SEAT	1"		4"	2"
WC-2	HIGH EFFICIENCY WATER CLOSET, FLOOR MOUNTED, VITREOUS CHINA, ELONGATED SYPHON JET FLUSH ACTION BOWL, TOP SPUD FOR USE WITH EXPOSED FLUSH VALVE, PROVIDE DUAL WAX RINGS. STANDARD MOUNTING HEIGHT.	SLOAN	ST-2009-A	SLOAN ROYAL #111-1.28 (1.28 GPF) MANUAL FLUSH VALVE, BEMIS #1955SSCT HVY DUTY OPEN FRONT TOILET SEAT	1"		4"	2"

	GAS WATER HEATER SCHEDULE								
MARK	DESCRIPTION	MANUFACTURER (OR EQUAL)	MODEL (OR EQUAL)	ENTER WATER TEMP.	STORED WATER TEMP.	GAS INPUT (BTU/HR)	ACCESSORIES (OR EQUAL)		
GWH-1	CONDENSING TANKLESS GAS WATER HEATER	Navien	NPE-240A2	65 °F	140 °F	183000	NAVIEN REMOTE CONTROLLER #30022717B; NAVICIRC KIT #30022965A;COMMON VENT COLLAR #30014367B; NAVILINK #PBCM-AS-001; PLUMB EASY VALVE SET #30009323A; PLUMB EASY VALVE SET PIPE COVER #30012581A; READY LINK COMMUNICATION CABLE #GXXX000546		
GWH-2	CONDENSING TANKLESS GAS WATER HEATER	Navien	NPE-240A2	65 °F	140 °F	183000			
GWH-3	CONDENSING TANKLESS GAS WATER HEATER	Navien	NPE-240A2	65 °F	140 °F	183000			
PROVIDE NEU	TRALIZER UNIT #GXXX001324 WHICH WILL SERVE	UP TO 6 UNITS. ROUTE D	ISCHARGE OF UNIT TO F	LOOR SINK O	N OTHER SIDE	E OF THE WAL	L FROM THE WATER HEATERS		

PLUMBING AC	CESSORY	SCHEDULE
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MARK	DESCRIPTION	MANUFACTURER (OR EQUAL)	MODEL # (OR EQUAL)
CM-1	1/2" REDUCE PRESSURE ZONE BACKFLOW PREVENTER	WATTS	LF009-QT
CM-2	1/2" REDUCE PRESSURE ZONE BACKFLOW PREVENTER	WATTS	LF009-QT
CM-3	1/2" REDUCE PRESSURE ZONE BACKFLOW PREVENTER	WATTS	LF009-QT
TB-1	1/2" REDUCE PRESSURE ZONE BACKFLOW PREVENTER	WATTS	LF009-QT
EQ-1	1/2" LEAD FREE IN-LINE DOUBLE CHECK VALVE MEETING ANSI/ASSE STANDARD 1024 FOR NON-HEALTH HAZARD APPLICATIONS. TEMPERATURE RANGE 33°F - 180°F CONTINUOUS @ 175 PSI	WATTS	LF7R
FS-2	1/2" LEAD FREE IN-LINE DOUBLE CHECK VALVE MEETING ANSI/ASSE STANDARD 1024 FOR NON-HEALTH HAZARD APPLICATIONS. TEMPERATURE RANGE 33°F - 180°F CONTINUOUS @ 175 PSI	WATTS	LF7R
FS-1	1/2" LEAD FREE IN-LINE DOUBLE CHECK VALVE MEETING ANSI/ASSE STANDARD 1024 FOR NON-HEALTH HAZARD APPLICATIONS. TEMPERATURE RANGE 33°F - 180°F CONTINUOUS @ 175 PSI	WATTS	LF7R
RS-1	1/2" LEAD FREE IN-LINE DOUBLE CHECK VALVE MEETING ANSI/ASSE STANDARD 1024 FOR NON-HEALTH HAZARD APPLICATIONS. TEMPERATURE RANGE 33°F - 180°F CONTINUOUS @ 175 PSI	WATTS	LF7R

PLUMBING MATERIAL SCHEDULE	
SERVICE PIPE	MATERIALS
DOMESTIC WATER PIPING	ASTM B88 TYPE "L" COPPER
DOMESTIC WATER PIPING (BELOW SLAB)	ASTM B88 TYPE "K" COPPER - JOINT FREE
SANITARY WASTE PIPING	ASTM A888 CAST IRON NO-HUB PIPE W/ ASTM C1540 HEAVY DUTY CLAMPS
SANITARY WASTE PIPING (BELOW SLAB)	ASTM D1785 SCHEDULE 40 PVC W/ DWV FITTINGS CONFORMING WITH D1785 AND D2665
SANITARY VENT PIPING	ASTM A888 CAST IRON NO-HUB PIPE W/ ASTM C1540 HEAVY DUTY CLAMPS
SANITARY VENT PIPING (BELOW SLAB)	ASTM D1785 SCHEDULE 40 PVC W/ DWV FITTINGS CONFORMING WITH D1785 AND D2665
NATURAL GAS PIPING	ASTM A53 BLACK STEEL W/ BLACK 150LB MALLEABLE IRON FITTINGS. PIPING 2" AND LARGER SHALL BE WELDED.
GREASE WASTE PIPING	ASTM A888 CAST IRON NO-HUB PIPE W/ ASTM C1540 HEAVY DUTY CLAMPS
GREASE WASTE PIPING (BELOW SLAB)	ASTM D1785 SCHEDULE 40 PVC W/ DWV FITTINGS CONFORMING WITH D1785 AND D2665

