GENERAL NOTES	KEYED NOTES
A. VERIFY EXACT LOCATION OF ALL ELECTRICAL EQUIPMENT WITH OWNER AND ARCHITECT PRIOR TO INSTALLATION. B. VERIFY ALL ELECTRICAL INSTALLATIONS WITH LOCAL CODES AND CITY ORDINANCES PRIOR TO INSTALLATION. C. VERIFY AND COORDINATE EXACT LOCATION OF ALL LIGHT FIXTURE LOCATIONS AND MOUNTING HEIGHTS WITH ARCHITECTURAL REFLECTIVE CEILING PLAN. D. ALL LIGHTING CONTROLS SHOWN FOR GENERAL REFERENCE ONLY. THE ELECTRICAL CONTRACTOR SHALL PROVIDE AND SUBMIT CONTROL DRAWINGS AND MODEL NUMBERS FOR ENGINEERING APPROVAL DURING SUBMITTAL STAGE. E. ANY OUTLET, SWITCH, RECEPTACLE, FIXTURE OR PANEL MAY BE RELOCATED WITHIN A TEN (10) FOOT RADIUS OF THE INDICATED LOCATION WITHOUT ADDITIONAL CHARGE TO OWNER. F. PROVIDE ALL COMPONENTS NECESSARY FOR COMPLETE LIGHT FIXTURE AND LIGHTING CONTROLS. G. PROVIDE CONTROL LIGHTING WITH EMERGENCY LIGHTS WITH AN UN-SWITCHED HOT LEG AND A SWITCHED HOT LEG FOR SUFFICIENT OPERATION.	1. 120/208V, 3Ø PANEL "A".

LIGHTING CONTROLS

ROOMS WITH THESE LIGHTING CONTROL SYMBOLS (REFER TO PLAN FOR EXACT QUANTITIES)	TYPICAL LOCATION (REFER TO PLAN FOR EXACT LOCATIONS)	LIGHTING CONTROL DESCRIPTION	EXAMPLE MODEL #'S
CIRCUIT NUMBER; ON A-# THRU Z-1; ZONE	1. WAITING 100 AND BUSINESS 101 2. CORRIDOR 103 AND HALL 111	1. NLIGHT LIGHTING CONTROLS SYSTEM WITH 2 GRAPHIC WALPODS/KEYPADS AND 4 ZONES. ZONES AND KEYPAD LOCATIONS INDICATED ON PLANS. 2. NLIGHT LIGHTING CONTROLS SYSTEM WITH 2 GRAPHIC WALPODS/KEYPADS AND 2 ZONES. ZONES AND KEYPAD LOCATIONS INDICATED ON PLANS	POWER PACK: NLIGHT NPP16-D-ER KEYPAD: NLIGHT NPOD-GFX-WH
$VD	OFFICE, X-RAY, AND TREATMENT ROOMS	WALL MOUNTED WALL BOX CONTROL WITH 0-10V DIMMING CONTROL AND VACANCY SENSOR	WALL BOX: LUTRON MZ-Z101-V
$O	RESTROOMS	WALL MOUNTED WALL BOX CONTROL WITH OCCUPANCY SENSOR	WALLBOX: LUTRON MS-A102
$	LAB/STERILE AND ELECTRICAL ROOM	STANDARD WALL MOUNT MANUAL SWITCH	REFER TO SPECIFICATIONS

NOTES:
A. COORDINATE WITH LIGHTING CONTROLS MANUFACTURER PRIOR TO ROUGH-IN OF ANY CONDUIT OR WIRING FOR LIGHTING SYSTEM TO VERIFY WIRING REQUIREMENTS WITH LIGHTING CONTROL SYSTEM PROVIDED ON PROJECT.
B. LIGHTING CONTROL SYSTEM TO BE FULLY COMMISSIONED AND PROGRAMMED BY FACTORY TRAINED MANUFACTURERS REPRESENTATIVE. PROVIDE COMPLETE TRAINING TO OWNER.

LIGHT FIXTURE SCHEDULE

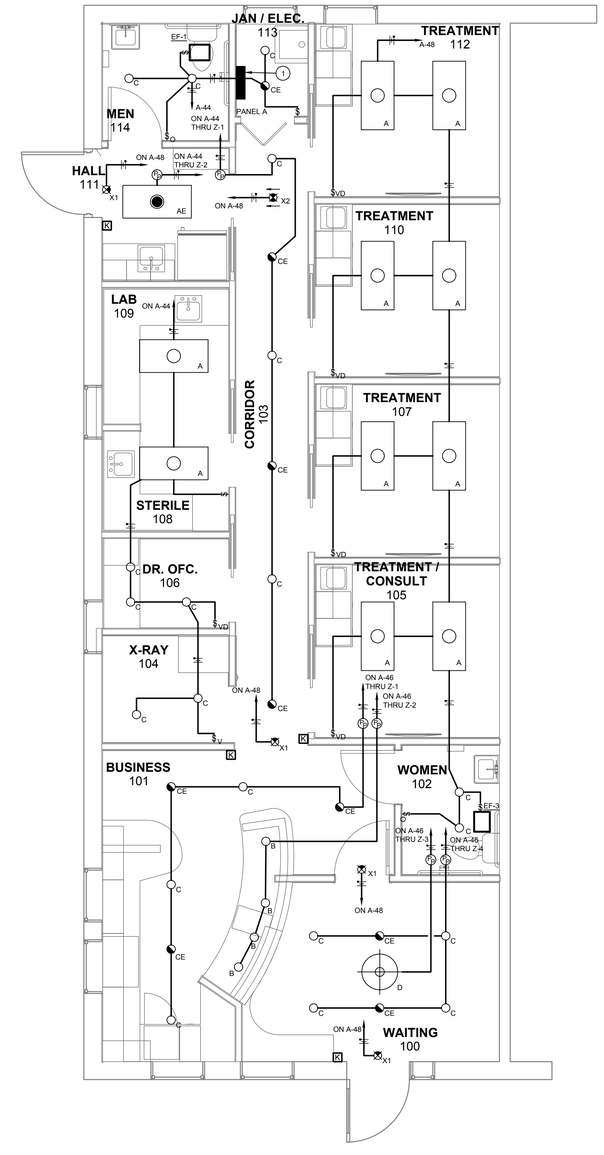
TYPE	VOLTAGE	MOUNTING	MANUFACTURER	MODEL NUMBER	LAMPS	WATTS	NOTES
A	120	RECESSED	METALUX	24GR-LD4-42-F1-UNV-L840-CD1-U	LED (4200 LUMENS)	37	
AE	120	RECESSED	METALUX	24GR-LD4-42-F1-UNV-EL14W-L840-CD1-U	LED (4200 LUMENS)	37	
B	120	PENDANT	SHAPER	461-A-L0/840/UNV/xx/1S	LED (1000 LUMENS)	10	1
C	120	RECESSED	PORTFOLIO	LD6A15D010TE-ERW6A15840-6LW1LI	LED (1500 LUMENS)	22	
CE	120	RECESSED	PORTFOLIO	LD6A15D010TE-EM14-ERW6A15840-6LW1LI	LED (1500 LUMENS)	22	
D	120	PENDANT	CHANDELIER FIXTURE PROVIDED BY OWNER AND INSTALLED BY CONTRACTOR		LED	200 MAX.	
X1	120	SURFACE	SURE-LITES	SLX6 (ONE SIDED)	LED	5	
X2	120	SURFACE	SURE-LITES	SLX6 (DOUBLE SIDED)	LED	5	

LIGHT FIXTURE SCHEDULE GENERAL NOTES:

A. SUBSTITUTIONS REQUIRE 10 DAY PRIOR APPROVAL. WILL INCLUDE FULL CUTSHEETS, PHOTOMETRICS, AND IES FILES FOR CONSIDERATION.

LIGHT FIXTURE SCHEDULE NOTES:

1 VERIFY SUSPENSION HEIGHT AND FINISH COLOR WITH OWNER.



1 FLOOR PLAN - ELECTRICAL - LIGHTING
1/4" = 1'-0"

STATE OF TEXAS
BOBBY D. LITTLE
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LICENSED
PROFESSIONAL ENGINEER
12-23-15

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REVISION

#	Revision Date	Revision Description
1	12/23/2015	Correct Address

TEXAS SLEEP SOLUTIONS
5341 UNIVERSITY
SUITE: 100
McKINNEY, TX 75071
Project number 2015-043
Date 12/21/2015

FLOOR PLAN - ELECTRICAL LIGHTING
Scale: As Indicated

E101

GENERAL NOTES

A. VERIFY EXACT LOCATION OF ALL ELECTRICAL EQUIPMENT WITH OWNER AND ARCHITECT PRIOR TO INSTALLATION.

B. VERIFY ALL ELECTRICAL INSTALLATIONS WITH LOCAL CODES AND CITY ORDINANCES PRIOR TO INSTALLATION.

C. ALL EXHAUST FANS SHALL BE PROVIDED WITH HP RATED SNAP SWITCH FOR DISCONNECTING MEANS, UNLESS NOTED OTHERWISE.

D. THE ELECTRICAL CONTRACTOR SHALL FIELD VERIFY EXACT POWER REQUIREMENTS FOR OWNER FURNISHED EQUIPMENT PRIOR TO ROUGH-IN. TERMINATE AS DIRECTED BY EQUIPMENT NAME PLATES. COORDINATE EXACT LOCATION FOR INSTALLATIONS WITH OWNER PRIOR TO ROUGH-IN.

E. REFER TO MECHANICAL AND PLUMBING PLANS FOR MECHANICAL AND PLUMBING EQUIPMENT AND LOCATIONS. PROVIDE ALL LABOR AND MATERIALS TO FULLY CONNECT ALL MECHANICAL AND PLUMBING EQUIPMENT. REFER TO ELECTRICAL PANEL SCHEDULES FOR CIRCUIT NUMBER AND SIZE.

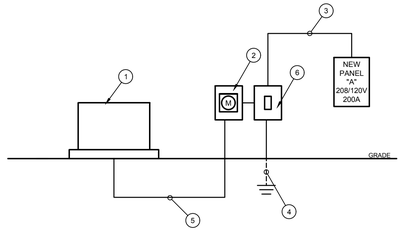
F. ALL RECEPTACLES IN TREATMENT AREAS SHALL BE GFI RATED.

G. ALL RECEPTACLES SERVING PATIENT CARE AREAS SHALL HAVE A REDUNDANT GROUND AS DIRECTED BY NATIONAL ELECTRIC CODE.

H. ALL RECEPTACLES WITHIN 6' OF A SINK SHALL BE GFI.

KEYED NOTES

1. 120/208V, 3Ø PANEL "A".
2. 200A ENCLOSED CIRCUIT BREAKER IN NEMA 3 ENCLOSURE AND METER CAN MOUNTED ON WEST END OF EXISTING BUILDING. VERIFY EXACT LOCATION PRIOR TO BID. REFER TO RISER DIAGRAM.
3. UNDERGROUND SECONDARY FROM EXISTING TRANSFORMER USING EXISTING 2" CONDUIT. REFER TO RISER DIAGRAM.
4. 1" CONDUIT BELOW SLAB TO SERVE FLOOR RECEPTACLE BELOW TREATMENT CHAIRS. VERIFY EXACT LOCATION OF RECEPTACLE WITH OWNER PRIOR TO ROUGH-IN.
5. 1" CONDUIT WITH CONTROL WIRE FROM X-RAY MACHINE J-BOX TO REMOTE SWITCH J-BOX.REFER TO MANUFACTURER RECOMMENDATIONS.
6. INSTALL RECEPTACLE AND DATA OUTLETS WITH MILLWORK. COORDINATE EXACT MOUNTING LOCATION AND HEIGHT WITH OWNER PRIOR TO ROUGH-IN.
7. FIRE ALARM CONTROL PANEL. CONNECT TO ADJACENT TENANT SPACE FIRE ALARM SYSTEM AS REQUIRED FOR A COMPLETE SYSTEM.



ELECTRICAL RISER DIAGRAM
NO SCALE

NOTE: VERIFY ALL SERVICE CONDITIONS WITH POWER CO. PRIOR TO BID AND INCLUDE ALL LABOR AND MATERIALS NECESSARY FOR A COMPLETE AND OPERATIONAL SYSTEM.

RISER DIAGRAM GENERAL NOTES

A. COORDINATE ALL SITE CONDITIONS PRIOR TO BID.

B. COORDINATE ALL ELECTRICAL UTILITY REQUIREMENTS WITH POWER COMPANY PRIOR TO BID.

C. ALL ELECTRICAL ITEMS TO BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND ALL LOCAL ORDINANCES AND CODES.

D. ALL METERING REQUIREMENTS MUST BE COORDINATED WITH POWER COMPANY PRIOR TO BID INCLUDE ALL CT'S, CABINET AND BASES AS DIRECTED BY POWER COMPANY.

RISER DIAGRAM KEYED NOTES

1. EXISTING UTILITY TRANSFORMER.
2. METER BASE INSTALLED BY ELECTRICAL CONTRACTOR AS DIRECTED BY POWER COMPANY.
3. FOUR #3/0 AND #2 GROUND IN 2" CONDUIT. ROUTE ABOVE CEILING OF ADJACENT TENANT SPACE AS DIRECTED BY OWNER.
4. #2 GR. IN 1" CONDUIT.
5. FOUR #3/0 IN EXISTING 2" CONDUIT.
6. 200A/3P ENCLOSED CIRCUIT BREAKER IN NEMA 3 ENCLOSURE (SERVICE ENTRANCE RATED MINIMUM 35 KAIC)

FIRE ALARM SYSTEM

A. FIRE ALARM DEVICES ARE SHOWN FOR GENERAL REFERENCE ONLY AND SHALL NOT BE USED FOR ACTUAL DEVICE LOCATIONS OR COUNTS. THE FIRE ALARM CONTRACTOR SHALL DESIGN AND INSTALL AN ADDRESSABLE FIRE ALARM SYSTEM TO MEET 2012 INTERNATIONAL BUILDING CODE, NFPA72, NFPA101, TAS, ADA AND ALL OTHER APPLICABLE CITY OF MCKINNEY CODES, LAWS AND REGULATIONS. CONTRACTORS SHALL HAVE A NICET LEVEL IV FIRE ALARM DESIGNER ON STAFF. SUBMIT A COPY OF FINAL DESIGN AND INSTALLATION FIRE ALARM DRAWINGS TO THE LOCAL AUTHORITY HAVING JURISDICTION FOR APPROVAL PRIOR TO BEGINNING ANY INSTALLATION.

B. VERIFY EXACT LOCATION OF ALL FIRE ALARM DEVICES AT JOBSITE. COORDINATE PLACEMENT WITH ARCHITECTURAL PRIOR TO INSTALLATION TO AVOID MILLWORK, SHELVING, ARTWORK, ETC.

C. ALL FIRE ALARM WIRING IN WALLS SHALL BE INSTALLED IN 3/4" CONDUIT.

PANEL "A"

MOUNTING SURFACE — **MAINS** 225A **MLO**
208/120 **VOLTS 3 PHASE 4 WIRE + GR.** — **BUS** 225 **AMPS.**
MIN. CKT. BKR. I.C. 14,000 **AMPS.**

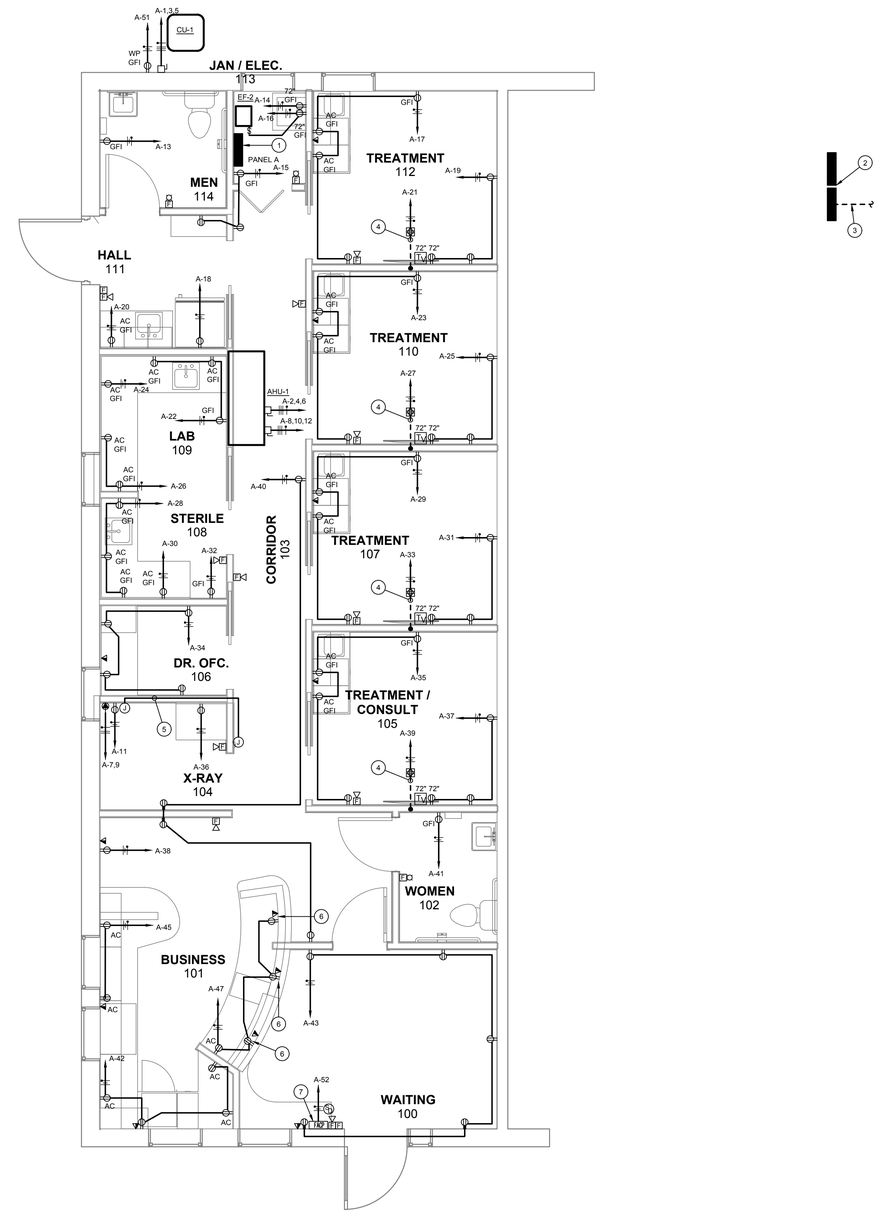
MAXIMUM WIDTH 20"

DESCRIPTION	LOAD / PHASE A	LOAD / PHASE B	LOAD / PHASE C	BKR	CKT NO.	NOTES			CKT NO.	BKR	LOAD / PHASE A	LOAD / PHASE B	LOAD / PHASE C	DESCRIPTION
CU-1	2556			35	1				2	40	4320			AHU-1 (#1)
		2556			3				4			4320		
			2556		5				6				4320	
X-RAY	1040			20	7				8	30	3120			AHU-1 (#2)
		1040			9				10			3120		
X-RAY			1920	20	11				12				3120	
RECEPTACLE	1000			20	13				14	20	1650			WH-1
RECEPTACLE		600		20	15				16	20		500		HWCP/EF-2
RECEPTACLE			800	20	17		1		18	20			1200	FRIDGE
RECEPTACLE	600			20	19				20	20	1200			RECEPTACLE
RECEPTACLE		1000		20	21				22	20		600		RECEPTACLE
RECEPTACLE			800	20	23				24	20			800	RECEPTACLE
RECEPTACLE	600			20	25				26	20	600			RECEPTACLE
RECEPTACLE		1000		20	27				28	20		600		RECEPTACLE
RECEPTACLE			800	20	29				30	20			800	RECEPTACLE
RECEPTACLE	600			20	31				32	20	800			RECEPTACLE
RECEPTACLE		1000		20	33				34	20		800		RECEPTACLE
RECEPTACLE			800	20	35				36	20			600	RECEPTACLE
RECEPTACLE	600			20	37				38	20	1200			COPIER
RECEPTACLE		1000		20	39				40	20		800		RECEPTACLE
RECEPTACLE			1000	20	41				42	20			800	RECEPTACLE
RECEPTACLE	1000			20	43				44	20	600			LIGHTING
RECEPTACLE		800		20	45				46	20		600		LIGHTING
RECEPTACLE			800	20	47				48	20			600	LIGHTING
SPARE				20	49				50	20				SPARE
RECEPTACLE		600		20	51				52	20		400		FACP
SPARE				20	53				54	20				SPARE
SPARE				20	55				56	20				SPARE
SPACE ONLY				20	57				58	20				SPACE ONLY
SPACE ONLY				20	59				60	20				SPACE ONLY
SPACE ONLY				20	61				62	20				SPACE ONLY
SPACE ONLY				20	63				64	20				SPACE ONLY
SPACE ONLY				20	65				66	20				SPACE ONLY
SPACE ONLY				20	67				68	20				SPACE ONLY
SPACE ONLY				20	69				70	20				SPACE ONLY

CONNECTED LOAD: 64,538
PHASE A: 21486 **AMPS** 179
PHASE B: 21336 **AMPS** 178
PHASE C: 21716 **AMPS** 181

DEMAND LOAD: 57,638
PHASE A: 19653 **AMPS** 164
PHASE B: 18603 **AMPS** 155
PAHSE C: 19383 **AMPS** 162

NOTES:
1. PROVIDE WITH GFI CIRCUIT BREAKER.



1 FLOOR PLAN - ELECTRICAL - POWER AND FIRE ALARM
1/4" = 1'-0"

WIRE AND CONDUIT SIZING CHART

BREAKER	15	20	25	30	35	40	45	50	60	70	80	90	100	125	150	175	200	225	400
PHASE	#12	#12	#10	#10	#8	#8	#8	#8	#6	#4	#4	#2	#2	#1	#1/0	#2/0	#3/0	#4/0	#500MCM
NEUTRAL	#12	#12	#10	#10	#8	#8	#8	#8	#6	#4	#4	#2	#2	#1	#1/0	#2/0	#3/0	#4/0	#500MCM
GROUND	#12	#12	#10	#10	#10	#10	#10	#10	#10	#10	#10	#8	#8	#6	#6	#4	#2	#2	#1/0
CONDUIT	1/2"	1/2"	1/2"	1/2"	1"	1"	1"	1"	1"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/2"	2"	2"	2"	2-1/2"	4"

NOTES:
1. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, ALL CONDUCTORS AND CONDUIT SHALL BE SIZED FROM THIS CHART.
2. ALL LIGHTING AND POWER CIRCUITS OVER 75' TO BE #10 THHN.

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12-23-15

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REVISION

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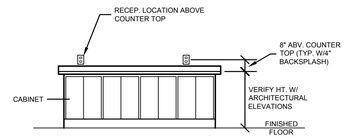
1	12/23/2015	Correct Address

TEXAS SLEEP SOLUTIONS
5341 UNIVERSITY
SUITE: 100
McKINNEY, TX 75071
Project number 2015-043
Date 12/21/2015

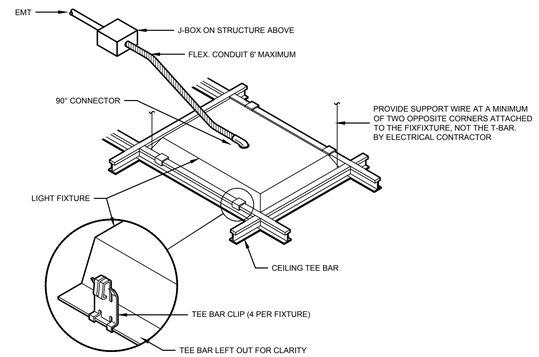
FLOOR PLAN - ELECTRICAL POWER
Scale: As Indicated

E102



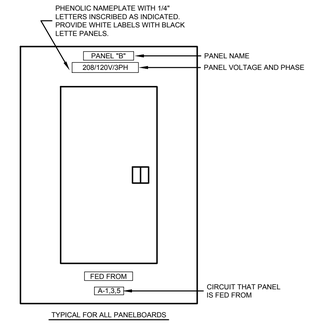
NOTE: VERIFY ALL HEIGHTS WITH ARCHITECT

WIRING DEVICE MOUNTING HEIGHT
NO SCALE



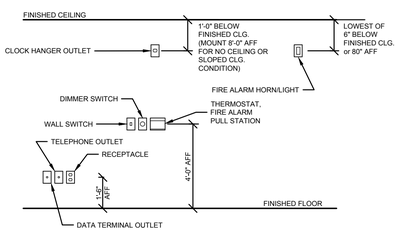
NOTE: TYPICAL FOR ALL LIGHT FIXTURES

LAY-IN LIGHT FIXTURE DETAIL
NO SCALE



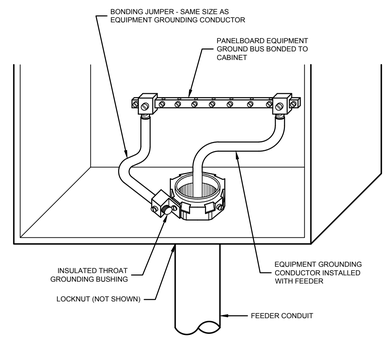
TYPICAL FOR ALL PANELBOARDS

PANEL IDENTIFICATION DETAIL
NO SCALE

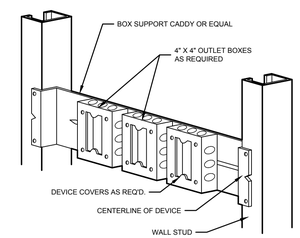


NOTE: VERIFY ALL HEIGHTS WITH ARCHITECT

WIRING DEVICE MOUNTING HEIGHTS - TYPICAL
NO SCALE

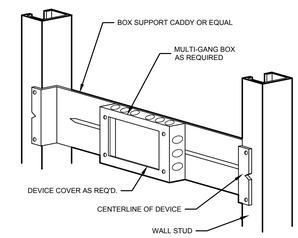


PANELBOARD BONDING DETAIL
NO SCALE



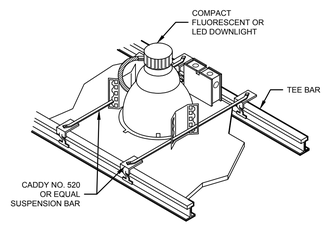
NOTE: TYPICAL FOR ALL OUTLET BOXES

MULTIPLE OUTLET BOX DETAIL
NO SCALE

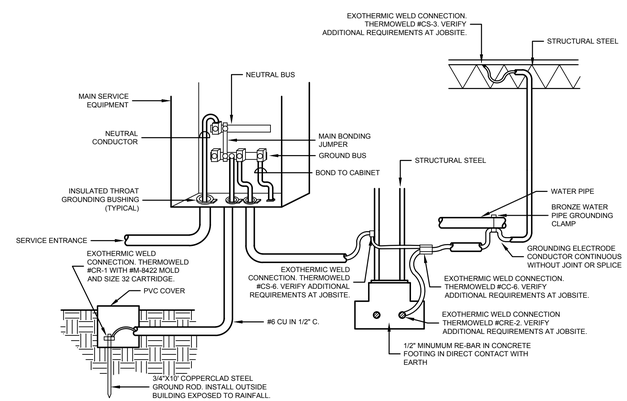


NOTE: TYPICAL FOR ALL OUTLET BOXES

MULTI-GANG OUTLET BOX DETAIL
NO SCALE



DOWNLIGHT DETAIL
NO SCALE



NOTE: INSTALL GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH THE NEC ARTICLE 250. BONDING JUMPERS SHALL BE THE SAME SIZE AS THE GROUNDING CONDUCTORS.

SERVICE GROUNDING DETAIL
NO SCALE

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5341 UNIVERSITY
SUITE: 100
McKINNEY, TX 75071
Project number 2015-043
Date 12/21/2015

ELECTRICAL DETAILS

Scale: As Indicated

E103

ELECTRICAL SPECIFICATIONS

I. GENERAL:
A. The work shall include furnishing and installing all electrical work, including final connections to all devices and placing them in service. All work shall conform to local, state and national codes as interpreted by the authorities having jurisdiction. All materials shall be UL labeled and listed.
B. Comply with requirements of the 2014 National Electrical Code in the construction and installation of all work.
C. All major electrical service equipment specified herein shall be Square D. This includes panelboards, disconnect switches and circuit breakers. Obtain Owner's approval for substitutions.
D. All equipment shall be installed in a location and manner that shall allow for convenient access for maintenance and inspection. Access doors and panels in walls and ceilings shall be provided as required for concealed equipment, controls and boxes.
E. Make all payments for fees, permits and deposits for electrical work. Coordinate with local electrical utility to provide all equipment and pay all costs required to extend underground service from power company facilities to building including meter bases and conduit for meter conductors, CT meter cabinets, and other equipment deemed necessary by the utility company.

II. MATERIALS:
A. CONDUITS:
1. Underground Plastic Conduit: Type 40, Heavy wall, high impact rigid virgin polyvinyl chloride (PVC) conduit and fittings, conforming to NEMA Publications TC2 and TC3 and UL listed for direct burial use: Carlon or equivalent. Type 80 PVC to be used under driveways.
2. Rigid Steel Conduit: Rigid, threaded, thick-walled: galvanized inside and outside or galvanized outside with a protective coating inside: UL listed and labeled according to Standard UL6; conforming to ANSI Standard C80.1; Pittsburg, Republic Steel, Robroy or Allied.
3. Electrical Metallic Tubing (EMT): Steel tubing, galvanized outside and provided with a slick corrosion resistant interior coating; UL listed and labeled according to Standard 797; conforming to ANSI Standard C80.3; Pittsburg, Republic Steel, Robroy or Allied.
4. Liquidtight Flexible Metal Conduit; Spirally wound, galvanized steel strips, as for flexible metal conduit: with polyvinyl chloride Cover extruded over the exterior to make conduit liquidtight; UL listed, Electri-flex type "LA" or equivalent.

B. CONDUIT FITTINGS:
1. Couplings and Terminations for Rigid Steel conduit: Factory made steel threaded couplings; bushing at all boxes and cabinets, with locknuts inside and outside box or cabinet.
2. Couplings and Terminations for Electrical Metallic Tubing: Join lengths of EMT with steel, set screw couplings and connectors.
3. Couplings and Terminations for Flexible Metal Conduit: T&B 440 Series couplings at connections between flexible and rigid conduit; T&B 3110 or 3130 Series nylon insulated throat, steel connectors at box or cabinet terminations.

C. OUTLET BOXES:
1. Sheet Steel Boxes: Sheet steel not lighter than No. 14 gauge, galvanized after fabrication: Raco, Steel City Appleton.
2. Cast Metal Boxes: Cast iron or Cast alloy with threaded hubs: Crouse-Hinds, Appleton or Pyle National.

D. PULL BOXES AND JUNCTION BOXES:
1. Sheet steel, galvanized inside and outside, with galvanized covers.
2. Small boxes: For boxes where the volume required is not over 100 cubic inches, use standard outlet boxes.
3. Larger boxes: For boxes where the volume required is over 100 cubic inches, use cabinets as specified for panelboard cabinets with covers of same gauge as boxes, secured with corrosion resistant bolt or screws.

E. CONDUCTORS (600 VOLTS AND UNDER):
1. Type: Soft drawn, annealed copper, UL listed, rated at 600 volts, Okonite, Triange, Anaconda or Simplex No. 8 and larger shall be stranded: No. 10 and smaller may be solid.
2. Insulation: Branch circuits shall have type THHN insulation. Service feeders shall be type THHN or THWN. Feeder circuits shall be Type THHN.

F. JOINTS AND SPLICES:
1. Stranded Copper Conductors: UL approved solderless bolted pressure connectors or Thomas and Betts Series 54000 compression connectors. All connectors shall be properly sized to match conductor sizes. All compression connectors shall be applied with properly sized dies and tools.
2. Solid Copper Conductors: UL approved solderless bolted pressure connectors: or UL approved electrical spring connectors of "Scotchlok", Ideal or T&B "Piggy" make.

III. COLOR CODING:
1. Phase conductors shall be black, red, and blue for phases A, B, and C respectively in the 208 volt system.
2. Neutral conductors shall be white or gray. Grounding conductors shall be green.
3. Switch legs shall be black with white, red with white or blue with white depending on phase.
4. All wiring No. 8 and larger shall be black and be marked with color banding tape as specified. All phase conductors, neutral and equipment ground conductors shall be marked with colored tape. Apply marking at each termination and every four feet of wiring in raceways.

IV. MATERIALS:
A. WALL SWITCHES:

DEVICE	CATALOG NO.	
1.1 Single pole Wall Switch	Hubbell	1203-I
1.2 Three-way Wall Switch	Hubbell	1203-I

A. RECEPTACLES:
1. Receptacle, 20 Ampere, 125 Volt, 2 Pole, 3 Wire Grounding Duplex: Hubbell No. HBL5362W or HBL5362-I (NEMA 5-20R).
2. Receptacle, 20 Ampere, 125 Volt, 2 Pole, 3 Wire Grounding Duplex with Self-Contained Ground Fault Circuit Interrupter: Hubbell No. GF-20WLA or GF-20ILA.
3. Outdoor Receptacle with Self-Contained Ground Fault Circuit Interrupter: Hubbell No. HBL5362WWR in FS or FD cast box with gasketed lift covers: Hubble HBL5206WO

B. COVERPLATES:
1. Hubbell SS8 line stainless steel wall plates shall be used and shall be galvanized steel plates if surface mounted. All switches controlling motorized equipment shall have engraved nameplates.
2. Provide engraved coverplates as required by Owner.

V. PANELBOARDS:
A. MATERIALS:
1. Panelboard Cabinets: Furnish and install cabinets to serve the various panelboards, of sizes as required to house the panelboards. Cabinets shall be rigidly constructed of sheet steel of gauges conforming to Underwriters' Laboratories Inc. requirements; corners over-lapped or welded; edges turned over to receive trim.
2. Cabinet Fronts: Cut from single sheet of not less than No. 12 gauge cold-rolled sheet steel; fastened in place by adjustable trim clamps which will allow plumbing; same size as the cabinet box if surface mounted; size to overlap the box a minimum of 3/4" on all sides if flush mounted. Provide each door with a substantial flush, cylinder tumbler lock and catch. On doors more than 48" high provide a combination three point catch and lock with T-handle. Provide each lock with two keys, with all locks keyed alike.
3. Finish: All back boxes galvanized; all exposed metal, including fronts, primed and finished in gray lacquer.
4. Where a circuit protective device is scheduled as a "spare", provide the device complete for operation. Where such a device is scheduled as a "space" or "space only", provide proper space and all necessary connectors for future installation of the size of device scheduled. Where a breaker or switch is scheduled to serve a "future" load, provide the device complete for operation.
5. All circuit breakers shall be quick make, quick break, trip free, thermal magnetic, indicating type unless noted otherwise. Branch circuit breakers shall be fully interchangeable without disturbing adjacent units.
6. Connect all circuit interrupting devices with sequence phasing.
7. Provide each panelboard with a neatly typewritten directory of circuits mounted in a cardholder on the inside of the panelboard cabinet. Cover directory with transparent sheet plastic.
8. All panelboards shall be listed by Underwriters' Laboratories Inc.
9. Provide each panelboard with a factory engraved nameplate which shall identify the panelboard name.

B. LIGHTING AND APPLIANCE PANELBOARDS:
1. Panelboards shall have the number and size of bolted-in circuit breakers as scheduled. Panels shall be Square D, type NQOD with bolt-on breakers as required for the interrupting ratings schedules or equivalent.

VI. LIGHTING CONTACTORS:
1. Electrically held with 120 volt coil in NEMA I Enclosure.
2. Allen Bradley, ASCO, Square D.
3. Control for contractor shall be photocell and optionally, remote switch mounted at owner specified location.

VII. INTERIOR LIGHTING FIXTURES:
A. MATERIALS:
1. Provide and install a lighting fixture on each and every lighting outlet shown. Furnish fixtures in accordance with the designations on the drawings and as specified herein. All features specified or scheduled for fixtures shall be provided, even if the catalog number given in the specifications or schedule lacks the required numerals, prefixes or suffixes corresponding to the features called for.
2. All lighting fixtures shall bear the label Underwriters' Laboratories Inc.
3. Provide electronic ballasts and T-8 lamps for all fluorescent fixtures where possible.
4. Fixtures shall comply with ANSI 132.1.

B. BALLASTS:
1. Ballasts shall have a minimum power factor of 85 %%%. harmonic distortion not to exceed 16
2. All ballasts installed in an interior space shall be energy saving. The ballast shall be high power factor, UL labeled, with automatic reset features and "A" sound rating. Ballasts mounted outside shall be rated for full operation at -20 Degrees F.

C. LAMPS:
1. Fully equip each fixture with a full set of new lamps at the completion and acceptance of the work; lamps shall be General Electric, Westing house of Sylvania. Incandescent lamps shall be inside frosted unless specified or recommended otherwise by the fixture manufacturer. Fluorescent lamps shall be 3500 degree k lamps for interior fixtures. Ballasts shall have a minimum power factor of 85. harmonic distortion not to exceed 16

VIII. DISCONNECT SWITCHES:
1. Disconnecting switches shall be manufactured by Square D. Switches shall be heavy duty, enclosed type, rated for 250 volts. Switches used as service switches shall bear a UL service entrance label and nameplate shall so indicate.
2. Fused switches shall have rejection type fuseholders. Fuses for power equipment shall be UL RK-5 dual element, time delay, current limiting, Buss FRN-R/FRS-R equivalent.

IX. EXECUTION:
A. EXCAVATION:
1. Perform all excavation work required in connection with the installation of the work under this Division. After the electrical work has been installed, tested and approved, backfill all sidewalks, streets and other pavement and repairing the openings in them to return to the surface to approximately its original condition.
2. Perform all excavations of every description of whatever substances encountered and to the depths required for installation of the work. During excavation, stack material suitable for backfilling in an orderly manner a sufficient distance from the banks of the trenches to prevent slides or cave-ins. Remove all excavated material not required or suitable for backfill, or waste as directed. Control grading to prevent surface water from flowing into excavations and remove any water accumulating therein by pumping.
3. Use open-cut grading and make trenches of the necessary width for proper installation of the lines with banks as nearly vertical as possible.
4. Grade the bottom of trenches accurately to provide uniform bearing and support for conduit or duct on undisturbed soil at every point along its entire length.

B. BACKFILLING:
1. Carefully backfill trenches with earth, sandy clay, sand and gravel, safe shale or other approved material free from large clods of earth or stone, deposited in thoroughly and carefully rammed 6-inch layers. Do not use blasted rock. Compaction with water will be permissible and will be a requirement when so directed. Re-open any trenches improperly filled or where settlement occurs to the depth required for proper compaction, the refill, mound over and smooth off.
2. Backfill open trenches across roadways or other areas to be paved as specified above except that the entire depth of trench shall be backfilled in 6-inch layers; each layer moistened and compacted to a density of not less than 95 % Standard Proctor in such manner as to permit the rolling and compaction of the filled trench together with the adjoining earth to provide the required bearing value and permit paving of the area immediately after backfilling is completed. Along all other portions of the trenches, grade the ground to a reasonable uniformity and leave the mounding over the trenches in a uniform and neat condition.

C. INSTALLATION OF UNDERGROUND PLASTIC CONDUIT:
1. Plastic conduit approved for direct burial (Schedule 40) may be used in or under slab-on-grade or for underground branch circuits if local codes permit. Minimum size is 3/4 inch.
2. Install exterior conduits 24 inches below finished grade unless noted to the contrary. Assemble and install raceways in accordance with manufacturer's instructions. Make joints with couplings and solvent cement. Fabricate bends of 30 degrees or more with factory-made elbows, or make field bends with proper heating equipment. Bends showing signs of overheating or flattening are unacceptable. Ream ends of all conduit before joining.
3. Snake plastic conduit in trench, from side to side, with a complete cycle every 40 feet to allow for expansion and contraction. Maintain this configuration during backfilling.
4. Where conduit turns up out of earth, or floor slabs, change from plastic to rigid galvanized steel conduit below grade. Do not extend any plastic conduit above grade. Wrap all steel conduits and fittings buried in earth as specified elsewhere herein.

D. INSTALLATION OF UNDERGROUND STEEL CONDUIT:
1. All steel conduit in earth shall be rigid galvanized steel conduit. Wrap such conduit with 3M Company 0.020 inch thick No. 51 "scotchwrap" vinyl plastic tape, half lapped to give a double thickness wrap. Remove all oil, grease and dirt from conduit with a suitable solvent, and clean and dry conduit before wrapping. If conduit is pre-wrapped in the shop and then cut and joined on the job, wrap all joints on the job, overlapping pipe wrapping 3" on both sides of joints

E. INSTALLATION OF BILDING RACEWAYS:
1. All wiring of every description shall be run in conduit or electrical metallic tubing unless noted or specified otherwise. Conduits may be run exposed in machinery and electrical rooms and unfinished areas. All other conduits shall be run concealed unless otherwise noted. All exposed runs shall be installed parallel to the surface of the building in a neat and orderly manner.
2. Types: All conduits installed on roofs shall be rigid galvanized steel conduits. Above grade interior conduits shall be electrical metallic tubing. Conduits installed below grade in slabs or buried in earth shall be PVC or rigid galvanized steel. Ent is not allowed.
3. Connections: Use lengths of flexible metal conduit, not less than 12" long at final connections to all motors, controls and other devices subject to movement because of vibration or mechanical adjustment. Use flexible metal conduit also at connections to recessed lighting fixtures, and elsewhere as required. In damp or wet locations, and where installed outdoors, use liquid flexible metal conduit.
4. Penetrations: Wherever raceways pass through floors, walls, partitions, etc., carefully fill any space between the outside of the raceway and the building material to prevent passage of air, water, smoke, and fumes. Filling material shall be fire resistive and, in general, similar to the basic building materials through which the raceway passes.

F. CONDUIT SUPPORTS:
1. Support Spacing: Use minimum spacing as directed by National Electrical Code, but space hangers more closely where required by conditions.
2. Individual Conduits: Support conduits running vertically or horizontally with galvanized malleable iron one-hole clamps. Carry individual supported horizontally conduits 1-1/4" and larger on Kindorf No. 150 or Steel City No.C-149 hangers. Use no perforated strap iron as hanger material. Where conduits smaller than 1-1/4" are installed above non-removable type ceilings, they may be supported on ceiling runner channels.
3. Multiple Conduits: Where multiple raceways are run horizontally at the same elevations, they may be supported on trapezes formed of sections of Unistrut angle iron or channels suspended on rods or pipes. Size trapeze members including the suspension rods for the number size and loaded weight of the conduits they are to support. Space them as required for the smallest conduit supported.

G. INSTALLATION OF OUTLET BOXES:
1. Usage: provide at each outlet or device of whatever character a metal outlet box in which conduits shall terminate.
2. Boxes Recessed in Construction: Cast metal boxes.
3. For Wall Switches, Receptacles and Communications Use: Use 4"x4" size with proper square cornered tile wall cover, plaster cover, or finishing plate, except where construction will not permit or the device requires a larger box.
4. Boxes for Exposed Work: Cast metal boxes.
5. Boxes for Outdoors: Cast metal boxes with gasketed covers.

H. WIRE PULLING:
1. Wire Pulling: Provide suitable installation equipment for pulling conductors into raceways or conduits. Use ropes of polyethylene, nylon or other suitable material to pull in conductors. Attach pulling lines to conductors by means of woven basket grips or by pulling eyes attached directly to conductors. All conductors to be installed in a single conduit shall be pulled in together.
2. Cable Lubricants: All cable lubricants shall be UL listed, and shall be certified by their manufacturer to be non-injurious to the insulation on which they are used.

I. INSTALLATION OF BUILDING WIRE (600 VOLTS AND UNDER):
1. Feeders: Run all feeders their entire length in continuous pieces without joints or splices, insofar as practical.
2. Sizes: No wire shall be smaller than No. 12 except for signal or control circuits, and except for individual lighting fixture taps as permitted by the National Electrical Code.
3. Identifying Tags: Nonferrous; stamped to clearly identify each circuit. Securely fasten tags to all cables, feeders and power circuits in pull boxes, lighting, power and distribution panelboards, etc..
4. Bundling Conductors; Bundle all conductors in panelboards, cabinets and the like, using marlin twine lacing or nylon straps made for the purpose. Bundle conductors larger than No. 10 in individual circuits. Bundle smaller conductors in larger groups.

J. MOUNTING HEIGHTS:
1. Where mounting heights are indicated on the drawings, the device shall be installed with the centerline of the device at the indicated height.
2. In general, devices which are shown to be installed at counters or other millwork, unless noted. Wall switches shall be installed on the strike side of the door as finally hung.
3. Unless otherwise noted on the drawings, or directed by the Owner, install devices at the following heights.

DEVICE	MOUNTING HEIGHT
Wall Switch	4'-0"
Receptacle	18"
Telephone Outlet	18"

4. Observe all ADA requirements when mounting devices in areas designated as "handicap".

X. SERVICE CONNECTIONS:
1. Coordinate all requirements for the electrical service with utility provider and include all cost associated with the underground electrical service.

XI. LOAD BALANCING:
1. The contractor shall carefully balance his electrical loads between the various phases. When the facilities are under use at their heaviest loading periods, tests shall be run on the "hot" conductors in each feeder to a panel and any unbalance shall be corrected to a point that no conductor's load shall be more than 10% high or low (maximum unbalance of 20%) in amperes

XII. SERVICE AND EQUIPMENT GROUNDING:
1. Provide adequate and permanent service neutral and equipment grounding in accordance with the National Electrical Code, and subject to the following additional requirements.
2. Connect the service ground and equipment ground to a common point within the metallic enclosure containing the main service disconnecting means. From the common point of connection of the service ground and equipment ground, run in conduit a combined service and equipment grounding conductor without joint of splice to the main water service pipe and connect it thereto with an approved bolted pressure clamp. Clean all contact surfaces thoroughly before connection, to assure good metal to metal contact. Bond the conduit to the grounding conductor at each end. Supplement the water pipe ground with an additional electrode which shall be 10' long by 3/4 inch diameter copper clad steel ground rod. Attach the electrode to the water pipe and to the service/equipment grounding conductor.
3. Size grounding conductors in accordance with National Electrical Code Tables 250-94 and 250-95.
4. The building structure steel frame shall be grounded to the building service ground electrode, using the conductor size specified in National Electrical Code Section 250-94 (a).

XIII. GROUNDING RACEWAYS:
1. Assure the electrical continuity at all metallic raceway systems, pulling up all conduits and/or locknuts wrench light. Where the flexible metallic conduit is employed, provide a green-insulated grounding jumper installed in the flexible conduit. Install a separate green-insulated conductor in each nonmetallic conduit.
2. Provide grounding bushings on all service raceways terminating within panelboards, cabinets, and all other enclosures. Provide grounding conductors from such bushings to the frame of the enclosure and to the ground bus or equipment grounding strap. Size grounding conductors in accordance with NEC Table 250-95.

XIV. EQUIPMENT GROUNDING CONDUCTORS:
1. Provide a separate, green-insulated copper grounding conductor, with insulation of the same rating as phase conductors, for each feeder and for each branch circuit indicated. Install the grounding conductor in the same raceway with the related phase and neutral conductors, and connect the grounding conductor to pull boxes at intervals of 100 feet or less, to each raceway. Connect all grounding conductors to bare grounding bars in panelboards, and to ground buses in service equipment to the end that there will be an uninterrupted grounding circuit from the point of a ground fault back to the point of connection of the equipment ground and system neutral. Size all these grounding conductors per NEC Table 250-95.

XV. EQUIPMENT WIRING:
1. Connect complete for operation all items of heating and air conditioning and all other electrical devices furnished by the Owner of under other Divisions of the specifications. Refer to mechanical and plumbing sheets for exact equipment locations and equipment type. Refer to the Owner and to the various Contractors for the work under the other Divisions for the scope of connections to equipment furnished by them and for the exact locations of all items.
2. Where disconnect switches or circuit breakers are not provided integral with control equipment for motors and other electrical appurtenances, provide and install all disconnect switches required by the National Electrical Code and/or as indicated.

XVI. TEMPERATURE CONTROL:
1. Completely connect for operation all items for temperature controls which require electrical connections, furnishing all wiring, conduit and labor. All control wiring, including thermostat wiring, shall be in conduit.

XVII. COMMUNICATION AND COMPUTER CIRCUITS:
1. Provide and install conduit to and from outlet boxes for telephone outlets shown on drawings. Installation of the system will be by others.

XVIII. ELECTRICAL SERVICE:
1. Coordinate all electrical service requirements with utility provider and include all costs associated with underground electrical service in bid.

XIX. LIGHTING CONTROLS:
1. Provide and install a lighting control device for each and every lighting control device shown. Furnish device in accordance with the designations on the drawings and as specified herein. All features specified or noted for lighting control device shall be provided, even if the catalog number given in the specifications or note lacks the required numerals, prefixes or suffixes corresponding to the features called for.

2. The lighting control system shall be field service by manufacturer. Upon completion of the installation, the system shall be completely examined by a factory authorized or trained field service technician(s). This engineering check-out (ECO) shall be performed upon receipt of written notification to manufacturer that all load and control wires have been installed and tested, and all elements of the project are prepared and ready in accordance with supplied Notice to the Contractor instructions. One on-site ECO will be performed unless specifically written and outlined otherwise on the Purchase Order. Upon completion of the ECO, the technician(s) shall demonstrate the operation and maintenance of the system to the owner's representatives.

ELECTRICAL SYMBOL SCHEDULE

A	LIGHT FIXTURE - TYPE NOTED
A1	LIGHT FIXTURE WITH BATTERY BACK-UP - TYPE NOTED
(NL)	LIGHT FIXTURE WIRED TO BE NIGHT LIGHT FOR CONTINUOUS OPERATION
B	DOWN LIGHT FIXTURE - TYPE NOTED
D	WALL MOUNTED LIGHT FIXTURE - TYPE NOTED
X	EXIT SIGN - TYPE NOTED
G	POLE MOUNTED LIGHT FIXTURE - TYPE NOTED
$	SPST WALL SWITCH
$3	THREE WAY SWITCH
$VD	VACANCY SENSOR SWITCH WITH 0-10V DIMMING
	DUPLEX RECEPTACLE - 20A, 125V, 2P, 3W, GROUNDING
	DOUBLE DUPLEX RECEPTACLE - 20A, 125V, 2P, 3W, GROUNDING
42"	DUPLEX RECEPTACLE MOUNTED 42" AFF
AC	ABOVE COUNTER (VERIFY WITH ARCHITECTURAL)
GFI	DUPLEX RECEPTACLE WITH GFI
WP	DUPLEX RECEPTACLE WITH WEATHER-PROOF COVER
	FLOOR MOUNTED DUPLEX RECEPTACLE
	WALL MOUNTED TELEPHONE/DATA OUTLET
	FLOOR MOUNTED TELEPHONE OUTLET
J	JUNCTION BOX
	MOTOR LOCATION
	DISCONNECT SWITCH
	CIRCUIT RUN TO PANELBOARD - NUMBER OF WIRES SHOWN
	DISTRIBUTION PANELBOARD
	SURFACE MOUNTED LIGHTING AND APPLIANCE PANELBOARD
OS	OCCUPANCY SENSOR
	POWER PACK
K	LIGHTING CONTROL SYSTEM KEYPAD
FA	FIRE ALARM CONTROL PANEL
F	MANUAL FIRE ALARM PULL STATION
F	SPEAKER STROBE
F	VISUAL STROBE
S	SMOKE DETECTOR

STATE OF TEXAS
BOBBY D. LITTLE
88896
LICENSED
PROFESSIONAL ENGINEER
12-23-15

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THESE DRAWINGS ARE RELEASED BY THE ENGINEER WHOSE SEAL APPEARS ON THIS DRAWING FOR ONE TIME CONSTRUCTION.

THE ENGINEER MUST BE HIRED ON AN HOURLY BASIS FOR ADDITIONAL SERVICES TO ENSURE QUALITY CONTROL. ADDITIONAL SERVICES SHALL INCLUDE EQUIPMENT SUBMITTAL REVIEW, AN INTERMEDIATE ABOVE CEILING INSPECTION AND AND A FINAL INSPECTION.

IN THE EVENT THAT THIS CONDITION IS NOT MET, THE GENERAL CONTRACTOR ASSUMES ALL RESPONSIBILITY OF QUALITY CONTROL FOR INSTALLATION AND THE ENGINEER IS THEREBY EXPUNGED FROM ANY LIABILITY OR RESPONSIBILITY FOR UPHOLDING THE "STANDARD OF CARE" FOR THE PROJECT.

CRADDOCK ARCHITECTURE

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TEXAS SLEEP SOLUTIONS

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REVISION

#	Revision Date	Revision Description
1	12/23/2015	Correct Address

TEXAS SLEEP SOLUTIONS
5341 UNIVERSITY
SUITE: 100
McKINNEY, TX 75071
Project number 2015-043
Date 12/21/2015

ELECTRICAL SPECIFICATIONS

Scale: As Indicated

E104

MECHANICAL LEGEND

SYMBOL	DESCRIPTION
AHU	AIR HANDLING UNIT
CU	CONDENSING UNIT
EF	EXHAUST FAN
CFM	CUBIC FEET PER MINUTE
RPM	REVOLUTIONS PER MINUTE
BTUH	BRITISH THERMAL UNITS PER HOUR
MBH	BTUH X 1000
SP	STATIC PRESSURE
ESP	EXTERNAL STATIC PRESSURE
HP	HORSEPOWER
EAT	ENTERING AIR TEMPERATURE
LAT	LEAVING AIR TEMPERATURE
DB	DRY BULB TEMPERATURE
WB	WET BULB TEMPERATURE
OA	OUTSIDE AIR
RA	RETURN AIR
SA	SUPPLY AIR
EA	EXHAUST AIR
D	DRAIN
S	REFRIGERANT SUCTION LINE
L	REFRIGERANT LIQUID LINE
	MANUAL BALANCING DAMPER
T	THERMOSTAT
S	REMOTE TEMPERATURE SENSOR
	SUPPLY DIFFUSER WITH PATTERN
	RETURN GRILLE
	EXHAUST REGISTER
	SUPPLY DUCT - CROSS SECTION
	EXHAUST DUCT - CROSS SECTION
	RETURN DUCT - CROSS SECTION
	SLOP IN DIRECTION OF ARROW
	ELBOW TURNED DOWN
	ELBOW TURNED UP

DIFFUSER/GRILLE LABEL

X-# — AIR DISTRIBUTION TYPE
X" — NECK SIZE
— AIRFLOW (CFM)

GENERAL NOTES

A. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR LOCATION OF ALL CEILING MOUNTED AIR DISTRIBUTION DEVICES.

B. LOCATE ALL THERMOSTATS A MINIMUM OF SIX INCHES FROM WALL CORNERS, DOOR FRAMES AND OTHER DEVICES. MOUNT THERMOSTATS AT 48" A.F.F. COORDINATE THE LOCATION OF ALL THERMOSTATS WITH ARCHITECT PRIOR TO INSTALLATION.

C. PROVIDE NEW REFRIGERANT PIPING FROM AIR HANDLING UNIT OVERHEAD AND TURN DOWN IN EXTERIOR WALL AND EXTEND TO CONDENSING UNIT. SUSPEND LINES ABOVE CEILING AS DETAILED. EXTEND LINES TO RESPECTIVE CONDENSING UNIT AND SUPPORT AS DETAILED. SEAL WALL PENETRATION WATER TIGHT. REFER TO CONDENSING UNIT SCHEDULE FOR REFRIGERANT LINE SIZES.

D. PROVIDE CONDENSATE DRAIN LINE FROM AIR HANDLING UNIT AND EXTEND DRAIN LINE TO SPILL TO MOP SINK IN JANITORS CLOSET. PIPE P-TRAP IN CONDENSATE LINES AS DETAILED. ALL CONDENSATE DRAIN LINES SHALL BE TYPE L COPPER WITH SOLDERED JOINTS. SIZE DRAIN LINE ACCORDING TO CONDENSATE TRAP DETAIL.

E. REFER TO AIR HANDLING UNIT MOUNTING DETAILS FOR INSTALLATION OF ALL INDOOR UNITS AND ECONOMIZER.

KEYED NOTES

1. 4" THICK CONCRETE CONDENSING UNIT PAD.
2. OUTSIDE AIR PLENUM ON TOP OF FOUR 12x12 LOUVERS WITH BUG SCREENS INSTALLED ON SOFFIT. STUB O.A. DUCT INTO PLENUM AS SHOWN. PROVIDE TRANSITIONS AS REQUIRED TO FIT IN STRUCTURE. IF REQUIRED, ENCLOSE EXISTING STRUCTURE IN SHEET METAL ENCAPSULATION AS NO STRUCTURE SHALL BE EXPOSED IN PLENUM.
3. RELIEF AIR PLENUM ON TOP OF THREE 12x12 LOUVERS WITH BUG SCREENS INSTALLED ON SOFFIT. STUB RELIEF AIR DUCT INTO PLENUM AS SHOWN. PROVIDE TRANSITIONS AS REQUIRED TO FIT IN STRUCTURE. IF REQUIRED, ENCLOSE EXISTING STRUCTURE IN SHEET METAL ENCAPSULATION AS NO STRUCTURE SHALL BE EXPOSED IN PLENUM.
4. TURN E.A. DUCT DOWN TO 12x12 LOUVER WITH BUG SCREEN IN SOFFIT.
5. TURN OUTSIDE AIR DUCT DOWN TO CONNECT TO ECONOMIZER, REFER TO DETAIL.
6. TURN RELIEF AIR DUCT DOWN TO CONNECT TO RETURN AIR DUCT WITH BAROMETRIC RELIEF DAMPER, REFER TO DETAIL.
7. MOTORIZED ECONOMIZER RETURN AIR DAMPER.

EXHAUST FAN SCHEDULE

MARK	CFM	SP	RPM	WATTS	DRIVE	ELECTRICAL DATA	TYPE	EXAMPLE
EF-1	80	0.3	1100	53	DIRECT	115 V, 1 Ø, 60 Hz	CEILING	GREENHECK SP-A125
EF-2	80	0.3	1100	53	DIRECT	115 V, 1 Ø, 60 Hz	CEILING	GREENHECK SP-A125
EF-3	80	0.3	1100	53	DIRECT	115 V, 1 Ø, 60 Hz	CEILING	GREENHECK SP-A125

NOTES:
1. ALL SELECTIONS BASED ON JOBSITE ELEVATION.
2. PROVIDE ALL FANS WITH FAN MOUNTED SPEED CONTROLLER.

AIR DISTRIBUTION SCHEDULE

MARK	TYPE	LOCATION	FRAME	FINISH	EXAMPLE
S-1	SUPPLY	CEILING	TB	WHITE	TITUS TDC, 24x24
S-2	SUPPLY	CEILING	PF	WHITE	TITUS TDC
R-1	RETURN	CEILING	TB	WHITE	TITUS PAR, 24x24
R-2	RETURN	CEILING	PF	WHITE	TITUS PAR

NOTES:
1. OBD = OPPOSED BLADE DAMPER
2. EXT = EXTRACTOR
3. PF = PLASTER FRAME (FRAME KIT EQUAL TO TITUS RAPID MOUNT)
4. TB = LAY-IN T-BAR
5. VERIFY FRAME TYPE WITH CEILING INSTALLER'S LAYOUT.

AIR HANDLING UNIT SCHEDULE

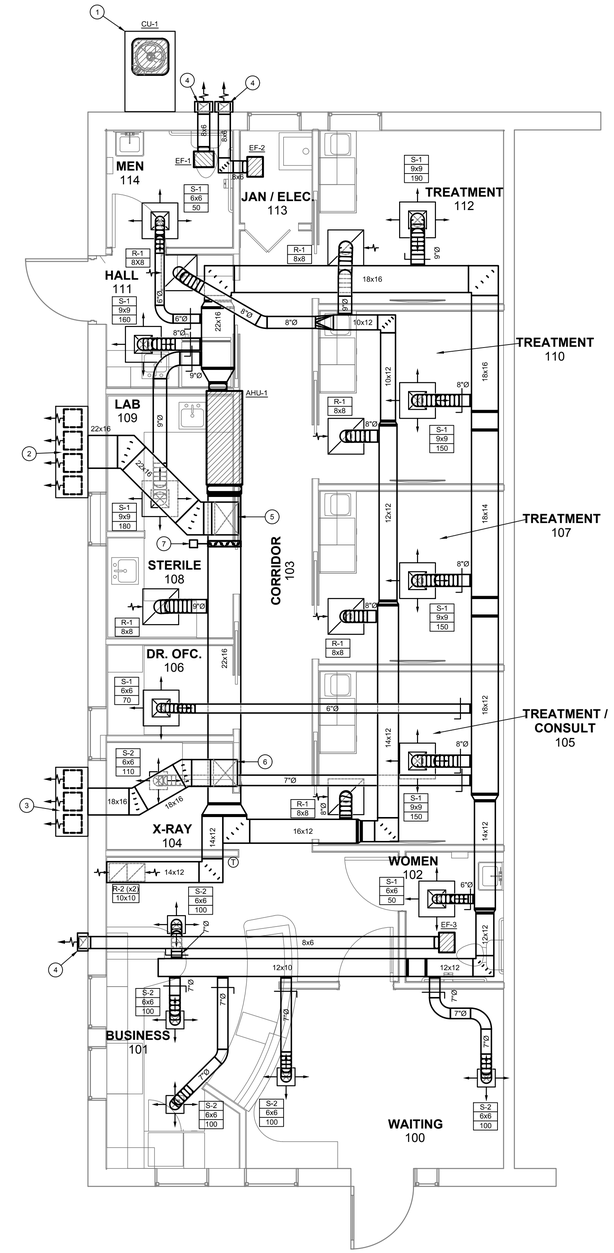
MARK	FAN DATA				COOLING DATA			HEATING DATA		ELECTRICAL DATA	EXAMPLE: LENNOX
	S.A. CFM	O.A. CFM	ESP	HP	SENSIBLE	TOTAL	EAT	KW	STEPS		
AHU-1	1760	320	0.4	1.0	48.5	57.0	80/67	20	2	208 V, 3Ø, 60 Hz	CBX27UH-060

NOTES:
1. ALL SELECTIONS BASED ON JOBSITE ELEVATION.
2. COOLING COIL VELOCITY SHALL BE 500 FPM OR LESS.
3. SENSIBLE AND TOTAL CAPACITIES ARE EXPRESSED IN MBTUH.
4. AMBIENT TEMPERATURE IS 100°F.
5. COOLING EAT IS COIL ENTERING AIR DB/WB TEMPERATURE IN °F.
6. PROVIDE UNIT WITH ENTHALPY ECONOMIZER.

CONDENSING UNIT SCHEDULE

MARK	SERVES	CAPACITY - MBH	SEER	ELECTRICAL DATA	REFRIGERANT LINE SIZES	EXAMPLE: LENNOX
CU-1	AHU-1	57.0	13.0	208 V, 3Ø, 60 Hz	1 1/8" S, 3/8" L	TSA060S4

NOTES:
1. ALL SELECTIONS BASED ON JOBSITE ELEVATION.
2. SELECT UNITS AT 100°F DB AMBIENT TEMPERATURE.



1 FLOOR PLAN - MECHANICAL
1/4" = 1'-0"

FINCHER ENGINEERING, LLC
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STATE OF TEXAS
JUSTIN M. FINCHER
98476
12-23-15

THESE DRAWINGS ARE RELEASED BY THE ENGINEER WHOSE SEAL APPEARS ON THIS DRAWING FOR ONE TIME CONSTRUCTION.

THE ENGINEER MUST BE HIRED ON AN HOURLY BASIS FOR ADDITIONAL SERVICES TO ENSURE QUALITY CONTROL. ADDITIONAL SERVICES SHALL INCLUDE EQUIPMENT SUBMITTAL REVIEW, AN INTERMEDIATE ABOVE CEILING INSPECTION AND AND A FINAL INSPECTION.

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CRADDOCK ARCHITECTURE

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TEXAS SLEEP SOLUTIONS

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REVISION

#	Revision Date	Revision Description
1	12/23/2015	Correct Address

TEXAS SLEEP SOLUTIONS
5341 UNIVERSITY
SUITE: 100
McKINNEY, TX 75071

Project number 2015-043
Date 12/21/2015

FLOOR PLAN - MECHANICAL
Scale: As Indicated

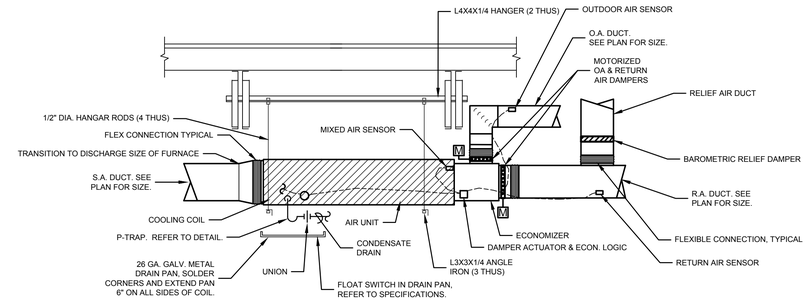
M101

MECHANICAL SPECIFICATIONS

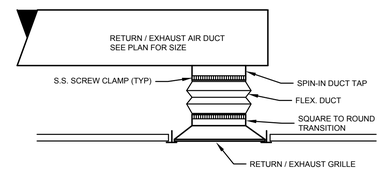
I. GENERAL
A. NOTE:
1. Conform with the applicable provisions of the General Conditions, the Special Conditions and the General Requirements.
B. SUBMITTALS:
1. Submit manufacturer's data and shop drawings on all materials.
C. SCOPE:
1. This section of the specifications pertains to all labor, materials, equipment and service necessary for and incidental to the heating, ventilating and air conditioning system as shown on the drawings and/or as specified herein.
2. All appurtenances and auxiliary equipment necessary to the function of any specified item of equipment shall be furnished with the item of equipment, whether specifically mentioned or not. Each item of equipment shall perform the function for which it is intended, and all work necessary to provide a complete functional system shall be provided.
3. This specification requires that all items of equipment be completely installed, finally connected, tested and placed in service.
4. It shall be the responsibility of the Contractor to verify all requirements of the equipment and the contract and certify with the submittal of the shop drawings that all requirements have been met, including:
a) Space requirements
b) Electrical requirements (voltage, phase, wires - No. and size)
c) Capacities
d) Clearance for maintenance
e) Quality
f) Quantity

II. PRODUCTS
A. MOTORS AND STARTERS:
1. Provide motors and starting equipment for all motor driven equipment. All motors larger than 1/4 HP shall have magnetic starters with a switching device. All single phase motors larger than 1/6 HP shall be capacitor start.
B. SPLIT SYSTEM:
1. Air Handling Unit:
a) Furnish and install where shown on the plans direct expansion fan coils equipped with electric heater either packaged or assembled from separate sections. Unit shall operate properly in vertical upflow position and is to be installed with ductwork. Capacities shall be as scheduled.
b) Unit enclosure shall be insulated and constructed of galvanized steel, bonderized and finished with baked enamel. Large front service access panels shall provide easy access to all components. Reversible filter rack shall have duct connection flanges and be equipped with permanent type filter that slides out for maintenance.
c) Fan shall be forward curved with double inlet, mounted on motor shaft, dynamically and statically balanced. The fan shall deliver scheduled cfm with required external static pressure. The multi-speed fan motor shall be factory lubricated, have internal overload protection and be resiliently mounted. Fan motor assembly shall slide out for service.
d) Cooling coil shall be constructed with aluminum plate fins mechanically bonded to nonferrous tubing with all joints brazed. Coil shall have factory installed; refrigerant metering device; refrigerant line fittings which permit mechanical connections; 2 condensate pans with primary and auxiliary drain connections on each.
e) Electric heater shall be factory installed. Heater models over 10 kw shall have heating elements sequenced on and off in 5 kw increments, and shall be wired for 2 stage operation. All heaters shall be equipped with both thermal and current overload devices, and the required heating and cooling system controls including control circuit 24v transformer.
f) Condensate overflow sensor for horizontal units: This safety option de-energizes the system switch when the auxiliary drain pan is in danger of overflowing with condensate. This condition is indicated when the float switch rises to 50% of its travel, and the normally closed input latches open. The float switch is provided at the auxiliary drain pan.
2. Condensing Unit:
a) Furnish and install an air to air electric condensing unit designed and tested for use with Refrigerant R-410a and contain sufficient charge (R-410a) for complete system. Brass service valves with refrigerant line fittings and service ports shall be located on exterior of unit.
b) Nominal unit electrical characteristics shall be as scheduled.
c) Total cooling capacity shall not be less than scheduled. Unit energy efficiency ratio (SEER) shall be as scheduled or more at ARI conditions.
d) Outdoor coil shall have aluminum plate fins mechanically bonded to copper tubes. Coil shall be protected by vinyl coated grille. Factory installed coil refrigerant metering device shall be mounted on unit liquid service valve. Metering device internal components shall be removable for cleaning or replacement.
e) Outdoor unit fan shall be propeller type, direct driven, and arranged for vertical air discharge. Fan motor shall be factory lubricated, inherently protected and resiliently mounted.
f) Compressor shall be of the welded hermetic type with internal vibration isolation and be covered with a shield to muffle operating sound. Compressor motor shall have both thermal and current sensitive overload device, and start assist device shall be standard on 1 phase units if required. Compressor shall be equipped with a crankcase heater and have internal high pressure protection.
g) Controls shall be factory wired and located in a readily accessible location on unit swing out service door. Controls and protective devices shall include a liquid line low pressure switch, suction line accumulator and pressure relief device. Control wiring terminal board shall be designed to match indoor unit terminal board and accessory thermostat terminals for standardized point to point connection.
h) Accessories shall include hail guard, solid state time guard, service sentry, optimizer control, start capacitor and relay, coupler and liquid line filter dryer. Thermostat shall be a 7-day commercial programmable thermostat equal to Honeywell TB8220.
i) Provide unit with enthalpy economizer. Provide all dampers and controls as required to provide complete and operational system.
C. REFRIGERANT PIPING:
1. Refrigerant piping shall be ASTM B280, Type ACR hard drawn copper tubing assembled with wrought copper fittings. Braze joints with AWS A5.8 BCuP silver/phosphorous/copper alloy. Flood system with nitrogen when brazing.
2. When the refrigerant piping systems have been complete, the Contractor shall thoroughly purge the system with dry nitrogen test for leaks, make the systems tight, evacuate to 7mm Hg and fully charge them with Freon refrigerant. Upon completion of the operating tests, he shall replace any refrigerant lost during the test operations, and upon acceptance shall leave the systems fully charged.
3. The refrigerant suction lines shall be insulated with 1" thick Armstrong "Armaflex" foamed plastic insulation threaded on the piping. Seal vapor tight.
D. FANS:
1. The fans indicated on the drawings shall be provided in accordance with the schedule on the drawings. Fans shall be AMCA rated.
2. Fans shall be furnished with backdraft dampers, starters, disconnect switches, flexible connection and birdscreen.
3. All roof mounted exhaust fans shall be of the power roof ventilator type with fan wheels mounted horizontally. All fan housings shall be corrosion resistant construction. All fans shall be equipped with ball bearings, permanently lubricated. Fans shall be resiliently mounted.
4. Curbs shall be factory fabricated and furnised with the unit.
5. Exhaust fans shall be as manufactured by Cook, Penn Ventilator, or Greenheck.
E. METAL DUCTWORK:
1. Except as otherwise specified herein, in other sections of the specifications, and/or noted on the drawings, low pressure ducts shall be constructed of galvanized steel sheets in accordance with the recommended construction for low pressure ductwork insofar as gauges of metal to be used, bracing of joints and joint construction as established in HVAC DUCT CONSTRUCTION STANDARDS, First Edition, as published by Sheetmetal and Air Conditioning Contractors National Association, Inc. (SMACNA).
2. Unless indicated otherwise, all duct shall be constructed in conformance with 1" w.g. pressure class except duct upstream of terminal devices in variable air volume systems shall be in conformance with 2" w.g. pressure class.
3. Make square elbows where shown or required, with factory-fabricated turning vanes. Make all other changes in direction with rounded elbows having a centerline radius equal to 1-1/2 times the width of the duct in the plane of the bend.
4. Make transformations in duct shape or dimension with gradual slopes on all sides. Make increases in dimensions in the direction of air flow, with a maximum slope of 1" in 7" on any side. Make decreases in dimensions in the direction of air flow preferably with a slope of 1" in 7" on any side, but with a maximum slope of 1" in 4" where conditions necessitate.
5. Ducts shall be routed in conjunction with pipes, electrical conduits, ceiling hangers, etc. so as to avoid interferences insofar as possible. Where duct penetrations are unavoidable, provide streamline shaped sleeves around such material penetrations, made airtight at duct surfaces, except that such sleeves are not required at tie rods. Where obstructions are of a size to exceed 10% of the duct area, the duct shall be transformed to maintain the same duct area.
6. Transverse duct joints 36" and larger shall be made with The Ductmate System or an approved equal. The Ductmate System components shall be of standard catalogue manufacture as supplied by Ductmate Industries, Inc.
7. The installation of The Ductmate System shall be in accordance with the manufacturers printed instruction and installation manuals.
8. The standard Ductmate 35 System joint is the equivalent of a SMACNA "J" connection. The Ductmate 25 System joint is the equivalent of a SMACNA "F" connection. Construction of the duct, such as gauge, reinforcing, etc., shall be as indicated in the addendum to the SMACNA manuals as provided by the manufacturer and as tested by Pittsburgh Testing Laboratory.
F. DUCT WRAP:
1. Insulate the supply, return and fresh air ducts with 2" thick, 3/4 lb. density, Owens-Corning "All Service Wrap" glass fiber flexible insulation having a factory applied FSK\, vapor barrier jacket. This insulation shall be secured, vapor barrier side out, to sheet metal. On horizontal runs, lap top and bottom sheets over edges of side pieces. Butt joints tightly. Ducts handling warm air only need not be vapor sealed. On ducts 24" and wider, install clips on bottom of duct, maximum of 18" O.C., to prevent insulation from sagging
G. DUCT SEALER:
1. All supply air and exhaust air ductwork shall be sealed to provide airtight construction. Metal surfaces to be joined shall be clean, dry and free of dirt or grease. Apply a heavy coat of Kingco Seal-Rite 18-120 to the interior metal surface of the slip joint, then interlock into place metal duct sections. Apply a heavy coat of 18-120 to the exterior metal surface duct joint, making sure any voids are filled to secure a continuous air pressure sealant.
2. Allow sealant to dry a minimum of 48 hours before pressurizing system.
3. Ductmate PROseal or Hardcast will be considered equal.
I. AIR CONTROL DEVICES:
1. Manual dampers shall be installed as required to afford complete control of the air flow in the various duct systems. In rectangular supply ducts, a volume damper shall be installed at each point where a branch is taken off to achieve the final air balance.
2. Volume dampers of the "butterfly" type shall be constructed of 22 gauge galvanized steel riveted or welded to square operating rods. Dampers shall have bearings of brass, bronze or approved plastic in most instances. Volume dampers of the butterfly type shall be used only in cases where neither dimension of the damper exceed 24". The metal used shall match that of duct system containing the damper in each case. Use special metals for damper rods and bearings as required to resist corrosion.
3. In cases where either dimension of the smaller branch duct exceeds 24", volume dampers shall be of the opposed blade type with blades linked together and controlled from a single point. They shall be constructed of No. 16 gauge steel either galvanized or with a baked enamel finish. Dampers shall have brass, bronze or approved plastic sleeve bearings. Blades shall be not more than 12" in width and shall be opposed acting, and those for automatic dampers shall have neoprene blade edges and stainless steel jamb seals. Blades shall be mounted in suitable band or angle iron frames strongly braced to insure rigidity.
4. Each volume damper, unless specified for automatic operation, shall be fitted with an adjusting device having a locking mechanism. Wherever the ducts are rendered inaccessible behind non-removable ceilings or furrings, or other construction that is not easily removable to permit access to the ducts, the dampers shall be equal to Young Regulator Co. No. 1200 right angle worm gear regulator with 301 concealed damper regulator. On exposed or easily accessible ducts the adjusting devices shall be equal to Young No. 1 or No. 900 and shall be fastened to the ducts.
5. Damper rods and operators on insulated ducts shall have extended rods and stand off brackets.
J. FLEXIBLE DUCT:
1. Flexible duct shall be a factory fabricated assembly consisting of an inner sleeve, insulation and an outer moisture barrier. The inner sleeve shall be constructed of a continuous vinyl-coated spring steel wire helix fused to a continuous layer of fiber glass impregnated and coated with vinyl. A I-/4 inch thick insulating blanket of fiber glass wool shall encase the inner sleeve and be sheathed with an outer moisture barrier of a reinforced Mylar or neoprene laminate of low permeability. The flexible duct shall be rated for a maximum working velocity of 6000 FPM and shall be listed by the Underwriters' Laboratories under their UL-181 standards as a Class 1 duct and shall comply with NFPA Standard #90A. The flexible duct shall be Thermaflex M-KE for low pressure application.
2. Flex duct shall not exceed 4'-0" in length or have more than 90 degree of bend. If longer duct is required use round sheetmetal duct with 2" thick duct insulation to make-up the difference in length.
K. FLEXIBLE CONNECTIONS:
1. Provide sound isolating flexible connections between connecting ducts and the inlet and outlet of each fan. These connections shall in each case be long enough to permit a minimum separation of 3" between the duct and the fan or unit housing with at least 1" slack in the flexible material itself.
2. Flexible connectors for indoor application shall be fire resistant, waterproof, and mildew resistant coated neoprene. Flexible connector shall be equal to Ductmate PROFlex Neoprene.
3. Flexible connectors for outdoor application shall be fire resistant, waterproof, mildew resistant, and U.V. resistant hypalon. Flexible connector shall be equal to Ductmate PROFlex Hypalon.
L. AIR DISTRIBUTION DEVICES:
1. Furnish and install all grilles, registers, and diffusers for every purpose. Refer to the tabulation on the drawings for types, sizes and accessories.
2. All grilles, registers, and diffusers located in the ceiling shall be factory finished in OFF-WHITE. Door grilles shall be factory finished in baked enamel medium birch tan. All other grilles and registers shall be factory primed and spray painted 2 coats on the job.
3. All grilles and registers shall be installed with tamperproof screws and shall be secured to the duct with a minimum of four screws.
4. Where perforated supply grilles or diffusers are scheduled, they shall be of the type with adjustable curved blades in the neck of the diffusers. Other types are not acceptable.
5. Where ceiling mounted air distribution devices are shown and require a ceiling radiation damper, the grille or diffuser shall be constructed of steel, aluminum is not acceptable.
6. Air distribution devices as manufactured by Titus, Metal-Aire, or Krueger will be acceptable.
M. FLASHING:
1. Where the contractor installs ducts or piping through the roof, he shall flash and counterflash them into the roof construction to the satisfaction of the Architect. All such flashing shall be constructed of copper bearing galvanized steel sheets.
III. EXECUTION
A. TESTING, ADJUSTING AND BALANCING MECHANICAL SYSTEMS:
1. Upon completion of the installation and start up of the mechanical equipment, check, adjust and balance systemic components to obtain optimum conditions in each conditioned space to the building.
2. Prepare and submit to the Architect complete reports on the balance and operation of the system.
3. Make a total of three inspections within 90 days after occupancy of the building to insure that satisfactory conditions are being maintained throughout and to satisfy any unusual conditions.
4. Make inspections in the building during the opposite season from that in which the initial adjustments were made and at those times make any necessary modifications to the initial adjustments required to produce optimum operation of the systemic components, to produce the proper conditions in each conditioned space.
5. During the balancing, the temperature regulation shall be adjusted for proper relationship between controlling instruments and calibrated by the Contractor.
6. Before final acceptance is made, furnish the following data.
a) A tabulation of the simultaneous temperature of all spaces on each separately controlled zone, together with the outside temperature at time of measurement. Hourly for 8 hours on a typical design day selected by the Architect.
b) A listing of the measured air quantities at each outlet corresponding to the temperature tabulation specified above.
c) Air quantities at each return and exhaust air handling device.
d) A tabulation of full load amp draw for each power consuming device.
7. The above data shall be neatly entered on appropriate forms together with any typed supplements required to completely document all results. Written explanations of any abnormal conditions shall be included. All this shall be assembled into a suitable brochure and a total of 4 copies shall be provided.
B. INSTRUCTIONS:
1. During the test periods instruct the building operating personnel in the operation and maintenance of all equipment.
2. Deliver to the Owner 3 complete instruction manuals covering the maintenance and operation of the system components. Provide complete data on all equipment including for each item a parts list and the name and address of the vendor where replacement parts can be purchased.

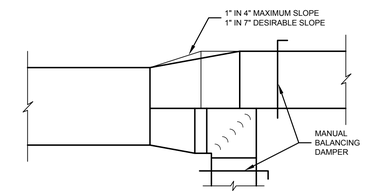
END OF SECTION



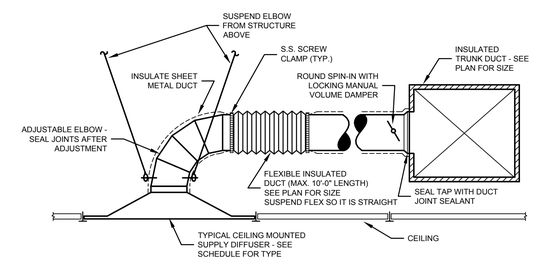
HORIZONTAL AHU MOUNTING DETAIL WITH ECONOMIZER
NO SCALE



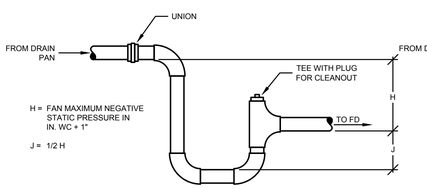
TYPICAL CEILING DIFFUSER CONNECTION DETAIL
NO SCALE
NOTE: CONNECTIONS OF FLEX DUCT INNER CORE SHALL BE MADE WITH S.S. WORM DRIVE CLAMPS. OUTER INSULATION SHALL BE FITTED OVER CORE CONNECTION AND SECURED WITH S.S. CLAMP.



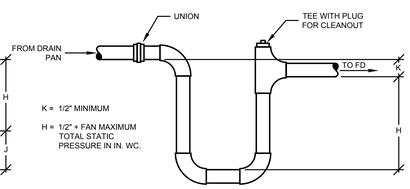
FULL ELBOW TAKE-OFF DETAIL
NO SCALE



SUPPLY AIR DIFFUSER MOUNTING DETAIL
NO SCALE
NOTE: CONNECTIONS OF FLEX DUCT INNER CORE SHALL BE MADE WITH S.S. WORM DRIVE CLAMPS. OUTER INSULATION SHALL BE FITTED OVER CORE CONNECTION AND SECURED WITH S.S. CLAMP.



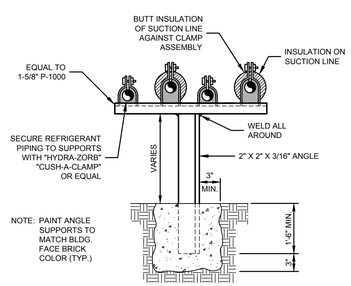
NEGATIVE PRESSURE P-TRAP



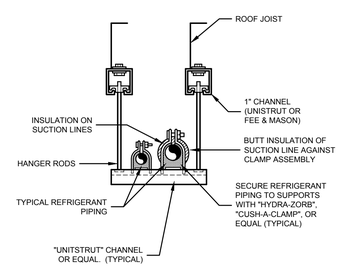
POSITIVE PRESSURE P-TRAP

DRAIN SIZE	HVAC EQUIP. TOTAL CFM
3/4"	0 - 800
1"	801 - 2,000
1-1/4"	2,001 - 12,000
1-1/2"	12,001 - 20,000
2"	20,001 - 68,000

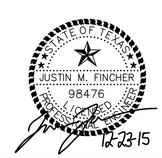
CONDENSATE DRAIN DETAIL
NO SCALE
NOTE: CONDENSATE DRAIN SHALL NOT BE SMALLER THAN UNIT CONNECTION.



EXTERIOR REFRIGERANT PIPE SUPPORT DETAIL
NO SCALE



SUSPENDED REFRIGERANT PIPE SUPPORT AT CEILING
NO SCALE



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CRADDOCK ARCHITECTURE

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750 E. Interstate 30 Ste. 160 Rockwall, TX 75087 214-952-0527

TEXAS SLEEP SOLUTIONS

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REVISION

#	Revision Date	Revision Description
1	12/23/2015	Correct Address

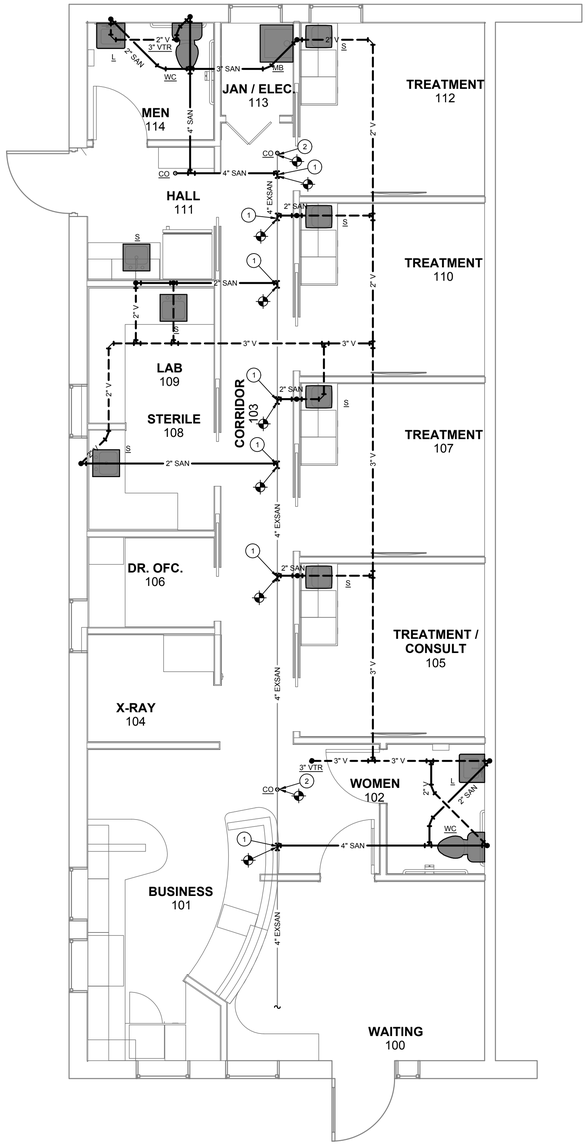
TEXAS SLEEP SOLUTIONS
5341 UNIVERSITY
SUITE: 100
McKINNEY, TX 75071
Project number 2015-043
Date 12/21/2015

MECHANICAL SCHEDULES AND DETAILS
Scale: As Indicated

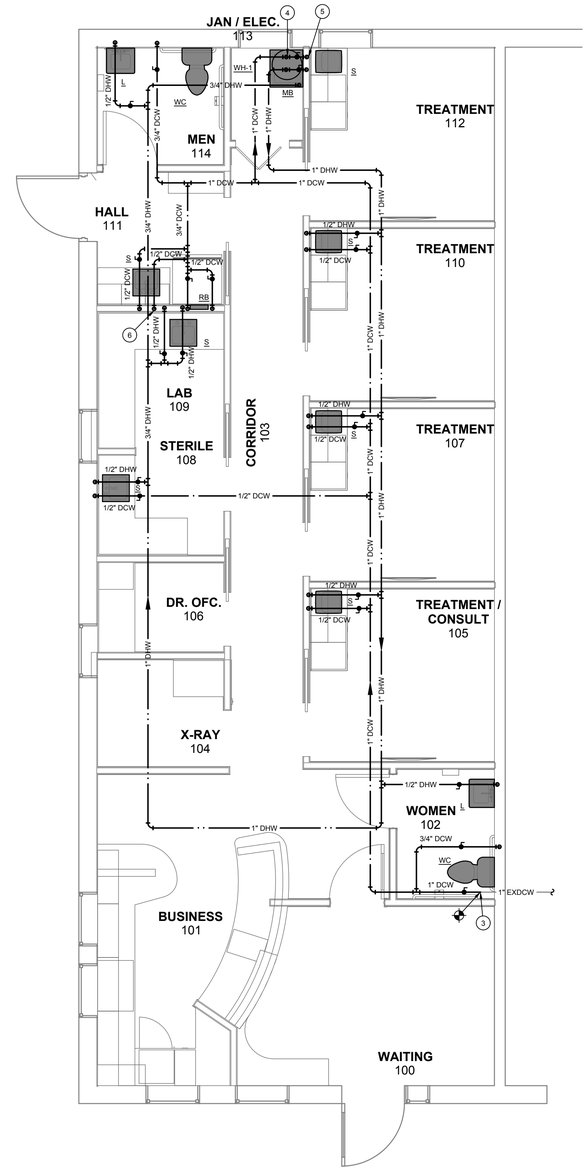
M102

PLUMBING LEGEND

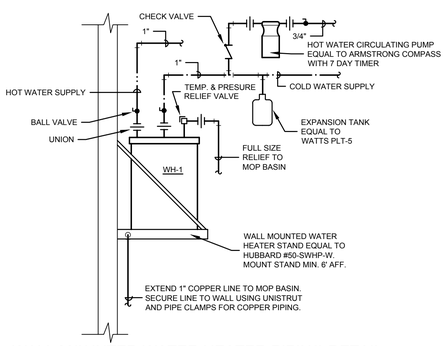
SYMBOL	DESCRIPTION
VTR	VENT THROUGH ROOF
	SANITARY SOIL LINE (SAN)
	SANITARY VENT LINE (V)
	COLD WATER LINE (DCW)
	HOT WATER LINE (DHW)
	HOT WATER RETURN LINE (DHC)
G	GAS LINE (G)
VAC	VACUUM LINE (VAC)
CA	AIR LINE (CA)
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
AD	ACCESS DOOR
SAN	SANITARY SOIL
V	SANITARY VENT
G	NATURAL GAS
DHC	DOMESTIC HOT WATER CIRCULATING
EXDCW	EXISTING DOMESTIC COLD WATER
EXDHW	EXISTING DOMESTIC HOT WATER
EXDHC	EXISTING DOMESTIC HOT WATER CIRCULATING
EXSAN	EXISTING SANITARY SOIL
EXV	EXISTING SANITARY VENT
EXG	EXISTING NATURAL GAS
A.F.F.	ABOVE FINISHED FLOOR
B.F.C.	BELOW FINISHED CEILING
WCO	WALL CLEANOUT
CO	CLEANOUT
DCO	DOUBLE CLEANOUT
	BALL VALVE
	ELBOW TURNED DOWN
	ELBOW TURNED UP
	FLOW IN DIRECTION OF ARROW
WH	WALL HYDRANT
FD	FLOOR DRAIN
	UNION
	VALVE IN BOX
	CHECK VALVE
	GAS COCK
	CONNECT TO EXISTING
GR(___)	GAS REGULATOR FROM 2 lbs. TO OUNCE PRESSURE UNLESS NOTED OTHERWISE (GAS LOAD IN MBTUH)



1 FLOOR PLAN - PLUMBING - SEWER, WASTE, AND VENT
1/4" = 1'-0"



1 FLOOR PLAN - PLUMBING - DOMESTIC WATER
1/4" = 1'-0"



WALL MOUNTED WATER HEATER PIPING DETAIL
NO SCALE

WATER HEATER SCHEDULE

MARK	TANK CAP.	FUEL	INPUT	RECOVERY GPH	ELECTRICAL DATA	EXAMPLE
WH-1	19 GAL.	ELEC.	1650 W	11 GAL.	120 V, 1Ø, 60 HZ	A.O. SMITH EJCS-20
NOTE: RECOVERY BASED ON 90 DEGREE TEMPERATURE RISE.						

GENERAL NOTES

A. VERIFY EXACT LOCATION OF ALL EXISTING UTILITIES AND PIPING AT THE JOBSITE PRIOR TO BID.

B. CONTRACTOR SHALL COORDINATE EXACT LOCATIONS OF ALL VTR's WITH CONDITIONS AT JOBSITE. NO VTR SHALL BE INSTALLED WITH IN 10' OF ANY OUTSIDE AIR INTAKE.

C. MOUNTING HEIGHT OF ALL PLUMBING FIXTURES SHALL BE COORDINATED WITH ARCHITECT PRIOR TO INSTALLATION.

D. REFER TO PLUMBING FIXTURE SCHEDULE FOR RUNOUT LINE SIZES TO INDIVIDUAL FIXTURES WHERE LINE SIZES ARE NOT INDICATED ON FLOOR PLAN.

E. PROVIDE CEILING MOUNTED ACCESS DOORS TO ACCESS ANY VALVES THAT ARE INSTALLED ABOVE INACCESSIBLE CEILINGS.

KEYED NOTES

1. CONNECT NEW 4" SEWER LINE TO EXISTING SEWER LINE. VERIFY EXACT LOCATION AND DEPTH OF EXISTING LINE AT JOBSITE.
2. INSTALL NEW CLEANOUT IN EXISTING SEWER LINE.
3. CONNECT NEW 1" DCW LINE TO EXISTING DCW LINE AT APPROXIMATELY THIS LOCATION. VERIFY EXACT LOCATION AND SIZE OF EXISTING LINE AT JOBSITE.
4. TURN 1" DCW, 1" DHW, AND 3/4" DHC LINES DOWN TO SERVE WATER HEATER, REFER TO DETAIL.
5. TURN 3/4" DCW AND 3/4" DHW LINES DOWN TO SERVE MOP BASIN AND SINK.
6. TURN 1/2" DCW LINE DOWN TO SERVE STONE MODEL GRINDER. PROVIDE BACKFLOW PREVENTER AS REQUIRED. TERMINATE LINE WITH FITTING AND AT EXACT LOCATION DETERMINED BY OWNER.

STATE OF TEXAS
JUSTIN M. FINCHER
98476
LICENSED
12-23-15

FINCHER ENGINEERING, LLC
FINCHER ENGINEERING, LLC
TX FIRM #F-16408
12402 SLIDE ROAD, SUITE 403
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THESE DRAWINGS ARE RELEASED BY THE ENGINEER WHOSE SEAL APPEARS ON THIS DRAWING FOR ONE TIME CONSTRUCTION.

THE ENGINEER MUST BE HIRED ON AN HOURLY BASIS FOR ADDITIONAL SERVICES TO ENSURE QUALITY CONTROL. ADDITIONAL SERVICES SHALL INCLUDE EQUIPMENT SUBMITTAL REVIEW, AN INTERMEDIATE ABOVE CEILING INSPECTION AND AND A FINAL INSPECTION.

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CRADDOCK ARCHITECTURE

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750 E. Interstate 30 Ste. 160 Rockwall, TX 75087 214-952-0527

TEXAS SLEEP SOLUTIONS

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REVISION

#	Revision Date	Revision Description
1	12/23/2015	Correct Address

TEXAS SLEEP SOLUTIONS
5341 UNIVERSITY
SUITE: 100
McKINNEY, TX 75071

Date 12/21/2015

Project number 2015-043

FLOOR PLAN - PLUMBING

Scale: As Indicated

P101

PLUMBING SPECIFICATIONS

I. GENERAL
A. NOTE:
1. Conform with applicable provisions of the General Conditions, Special Conditions, General Requirements, and Supplemental Conditions.
B. SUBMITTALS:
1. Submit manufacturer's data on all materials.
C. SCOPE:
1. This section of the specifications requires the furnishing and installation of all equipment, labor, materials, transportation, tools and appliances and in performing all operations in connection with the installation of the plumbing systems.
D. UTILITY SERVICES:
1. Water Service: Connect to the existing water service line at the site. Refer to the drawings for details. Provide a valve at the connection point.
2. Sanitary Sewer: Extend and connect to the existing sewer at the site as shown on the drawings.
3. It is the responsibility of the Contractor to provide all required components and pay all required fees as required by local utility company to provide Owner with a complete and operational system.

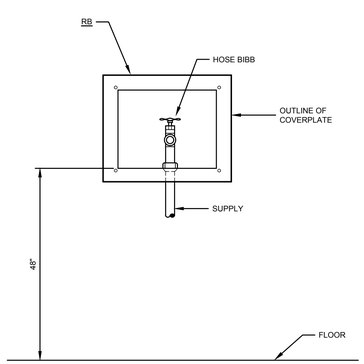
II. PRODUCTS
A. MATERIALS:
1. Sanitary Soil, Waste and Drain Lines: PVC-DWV Plastic pipe and fittings conforming to ASTM D-2665-68, assembled with solvent cement conforming to ASTM D-2564-67.
2. Sanitary Vent Lines: PVC-DWV Plastic pipe and fittings conforming to ASTM D-2665-68, assembled with solvent cement conforming to ASTM D-2564-67.
3. Domestic Water Lines (Hot, Cold and Recirculating): PEX Potable Water Distribution and Water Service Systems:
a) Manufacturer:
(1) Uponor, Inc.
(2) Or approved equivalent; subject to compliance with project and specification requirements.
b) Tubing
(1) Material: Crosslinked polyethylene (PEX) manufactured by PEX-a or Engel method
(2) Type: Wirsbo AQUAPEX
(3) Material Standard: Manufactured in accordance with ASTM F876 and ASTM F877 and tested for compliance by an independent third party agency
(4) Standard grade hydrostatic design and pressure ratings from PPI
(5) Fire-rated assembly listings in accordance with ANSI/UL 263
(a) UL Design No. L557 -- 1-hour wood frame floor/ceiling assemblies
(b) UL Design No. K913 -- 2-hour concrete floor/ceiling assemblies
(c) UL Design No. U372 -- 1-hour wood stud/gypsum wallboard wall assemblies
(d) UL Design No. V444 -- 1-hour steel stud/gypsum wallboard wall assemblies
(6) Minimum Bend Radius (cold bending): No less than six times the outside diameter. Use a bend support as supplied by the PEX tubing manufacturer for tubing with a bend radius less than stated.
(7) Nominal Inside Diameter: Provide tubing with nominal inside diameter, in accordance with ASTM F876 as indicated.
c) Fittings
(1) Material: Fitting assembly is manufactured from material listed in paragraph 5.1 of ASTM F1960.
(2) Material Standard: Comply with ASTM F1960.
(3) Type: PEX-a cold expansion fitting.
(a) Assembly consists of the appropriate ProPEX insert with a corresponding ProPEX Ring.
d) Manifolds
(1) Material
(a) Type L copper body with UNS 3600 series brass ProPEX outlet connections
(b) Engineered Plastic (EP) body with ProPEX outlet connections
(2) Manifold Type
(a) Uponor ProPEX 1" Copper Manifold
(b) Uponor engineered plastic (EP) Manifold
(3) All manifolds manufactured with the appropriate-sized ProPEX fittings on the manifold supply inlets.
e) Accessories
(1) Angle stops and straight stops that are compatible with PEX tubing are supplied by the PEX tubing manufacturer.
(2) Bend supports designed for maintaining tight radius bends are supplied by the PEX tubing manufacturer.
(3) ProPEX expander tool to install the ASTM F1960 compatible fittings are supplied by the PEX tubing manufacturer.
(4) The tubing manufacturer provides clips and/or PEX rails for supporting tubing runs.
(5) All horizontal tubing hangers and riser clamps are epoxy-coated material.
4. Drain Lines: Type L copper with solder joint fittings.
5. Condensate Drain Lines: PVC-DWV Plastic pipe and fittings conforming to ASTM D-2665-68, assembled with solvent cement conforming to ASTM D-2564-67.
6. Interior Cleanouts: Cleanouts shall be provided at the bottom of each stack, at each change in direction, and in each horizontal run at intervals not exceeding 50 feet in all interior soil, waste, and drain lines. Where cleanouts occur in walls of finished areas, they shall be concealed behind chrome plated access covers, such as Wade W-8480-R or provided with other special plugs and covers as required to present a finished appearance. Floor cleanouts in unfinished areas shall be Wade W-6000 with threaded adjustable housing, flanged ferrule with cast iron plug and gasket and secured satin bronze scoriated top. Floor cleanouts in finished tile floors shall be Wade W-6000-TS with square tile top; in carpeted areas Wade W-6000-72 with carpet marker. All cleanouts shall be the same size as the line served up to 4" size and shall be 4" for all larger lines.
7. Exterior Cleanouts: Provide and install cleanouts in exterior sewer lines where shown or as required by ordinance but not greater than 100 ft. apart. Cleanouts shall consist of a concrete encased special fitting with sewer pipes extending therefrom upward, terminating in a concrete slab. A brass countersunk cleanout ferrule shall be set on this slab in such manner as to be flush with finished grade and to provide access, through its cover, to the cleanout. Cleanouts shall be the same size as the sewer, up to 6" in size, and 4" on 6" and larger sizes.
8. Air Chambers: Air chambers of Type L copper, not less than 12" long and no smaller than the supply pipe, shall be provided and installed in each water supply to each and every fixture, outlet, item of equipment, etc. The length and/or the diameter of these air chambers shall be greater where required to eliminate water hammer. PDI shock absorbers may be used if sized in accordance with PDI recommendations.
9. Vacuum Breakers: On each water supply line serving a plumbing fixture, item of equipment, or other device which has a water supply below the rim of the fixture, or which has a threaded or tubing spout, provide and install an approved vacuum breaker. These vacuum breakers shall be designed to prevent any possible backflow through them. Where these are installed in chrome plated lines, they shall be chrome plated to match.
B. VALVES:
1. All valves must be lead-free according to Federal Government S.3874.
2. Swing Check Valves: 2" and smaller, all bronze screwed. 2-1/2" and larger, iron body, flanged, bronze trimmed. Apollo, Crane, Nibco and Milwaukee are acceptable.
3. Ball Valves: Bronze threaded body, chrome plated full port bronze ball, teflon seats and O-rings, bronze shafts, and infinite position handle with memory stops. Valve shall be two piece. Where valves are installed in insulated lines, provide extended stems of adequate length for the handle to clear the insulation and jacket. Apollo, Crane, Nibco and Milwaukee are acceptable.
C. HANGERS AND SUPPORTS:
1. Support all pipes as required by the plumbing code and as required to prevent sagging. PVC lines shall be supported at 4' intervals and other pipes shall be supported on 8' intervals as a minimum. Hangers shall be clevis type with adjusters.
D. ELECTRIC WATER HEATER:
1. Electric water heater shall be a packaged electric water heater with welded steel, glass lined tank, factory insulated and jacketed. Provide with a drain.
2. Heating elements shall be direct immersion elements, Incaloy sheathed.
3. Control shall be automatic. Thermostat shall be immersion type. Thermostat shall operate the magnetic contactors.
4. Master Control Panel: Prewired and factory installed to contain the contactors, wiring and terminals.
5. Provide with magnesium anode.
6. Provide a Watts T & P relief valve piped full size to floor drain.
7. Unit shall be UL listed.
8. Capacity shall be as scheduled on the drawings.

E. PLUMBING FIXTURES:
1. Refer to Plumbing Fixture Schedule on drawings.
2. The plate numbers on the drawings represent fixtures that will be acceptable on the job. Approved equal fixtures of American Standard, Eljer, and Kohler will be acceptable.
3. All exposed trim shall be chrome plated brass. This includes faucets, fittings, stops, risers, strainers, tailpieces, traps, waste, escutcheons, flush valves, brackets, vacuum breakers, goosenecks, hole covers, bolts, nuts and etc.
4. All threaded supply fittings or outlets with tubing nozzles shall have back flow preventers.
5. All fixtures shall have quarter-turn stop valves.
6. Generally all wall hung fixtures shall be provided with chair carriers so that no weight is supported from the wall.
7. All fixtures shall be cleaned before final acceptance.
8. Verify mounting height of each and every fixture before rough-in.
9. Where fixtures mate with walls or floor, the joint shall be grouted with dental plaster, G. E. Silicone or other grout as directed by the Architect.
10. The Contractor shall verify all rough in heights before installation and shall secure a current ruling on heights of handicapped fixtures before rough in to insure that they meet the requirements of the parties having jurisdiction.
11. Controls for water closet flush valves shall be mounted on the wide side of toilet areas.
12. All fixtures shall meet State of Texas water saving performance standards.

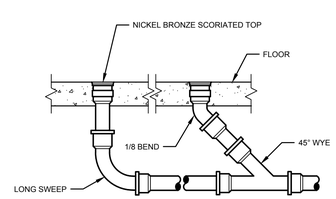
III. EXECUTION
A. INSTALLATION OF PIPING SYSTEMS:
1. Drain lines and Sanitary waste: Grade down toward the sewer connection at a uniform slope of 1/4" per foot to serve individual fixtures or not less than 1/8" per foot to serve multiple stacks or outlets. Slope shall be greater where possible and shall never be less than required to produce a flow velocity of 2 feet per second.
2. Vents: Grade up to the vent through the roof. Terminate not less than 10" above the roof.
3. Water Lines: Grade to established low points and provide valved drains to completely drain the system.
4. Isolation Valves: The water supplies to each group of fixtures shall have an isolating valve in each line serving the riser. Where these valves are not accessible thru removable ceilings or otherwise, provide access doors in the ceiling or chase.
B. INSTALLATION OF PEX PIPING
1. Installation
a) Install Wirsbo AQUAPEX tubing in accordance with the tubing manufacturer's recommendations and as indicated in the installation handbook.
b) Do not install PEX tubing within 6 inches [152 mm] of gas appliance vents or within 12 inches [305 mm] of any recessed light fixtures.
c) Do not solder within 18 inches [457 mm] of PEX tubing in the same waterline. Make sweat connections prior to making PEX connections.
d) Do not expose PEX tubing to direct sunlight for more than 30 days.
e) Ensure no glues, solvents, sealants or chemicals come in contact with the tubing without prior permission from the tubing manufacturer.
f) Use grommets or sleeves at the penetration for PEX tubing passing through metal studs.
g) Protect PEX tubing with sleeves where abrasion may occur.
h) Use strike protectors where PEX tubing penetrates a stud or joist and has the potential for being struck with a screw or nail.
i) Use tubing manufacturer-supplied bend supports where bends are less than six times the outside tubing diameter.
j) Minimum horizontal supports are installed not less than 32 inches between hangers in accordance with model plumbing codes and the installation handbook.
k) PEX riser installations require epoxy-coated riser clamps installed at the base of the ceiling per floor.
l) A mid-story support is required for riser applications.
m) Pressurize Wirsbo AQUAPEX tubing with air in accordance with applicable codes or in the absence of applicable codes to a pressure of 25 psi (173 kPa) above normal working pressure of the system.
n) Comply with safety precautions when pressure testing, including use of compressed air, where applicable. Do not use water to pressurize the system if ambient air temperature has the possibility of dropping below 32°F (0°C).
2. Through-penetration Firestop
a) Ensure compliance of one- and two-hour rated through penetration assemblies in accordance with ASTM E814.
b) A list of firestop manufacturers that list PEX tubing with their firestop systems is available from the PEX tubing manufacturer.
3. Related Products Installation: Refer to other sections listed in Related Sections paragraph herein for related products installation.
C. FABRICATION OF PIPE JOINTS:
1. Solvent Weld Plastic Joints: Solvent welded according to manufacturers instructions.
D. REPAIR OF LEAKS:
1. All leaks in piping systems shall be corrected as follows:
a) Repair leaks in PVC pipe by remaking the joint.
b) Repair leaks in welded joints by removing the defective weld completely through the base metal and grind smooth. Re-weld, accomplishing 100% penetration of the base metal. The repair weld should in no case be less than 4" in length.
E. INSULATION:
1. Any insulation which is not applied in a workmanlike manner will be rejected and replaced. All coverings shall be smooth, flush, dressed to line and tight. Mastic shall be neatly applied and tooled. Architect reserves the right to reject any insulation whose appearance he deems unacceptable.
2. Apply insulation and pipe covering after all work has been tested, found to be tight and accepted as such by the Architect. Thoroughly clean and dry all surface to be covered.
3. Factory-applied vapor-barrier jackets shall be one of the following:
a) An All Service Jacket (ASJ) laminated of flame resistant white kraft paper, glass scrim reinforcement, and kraft paper.
b) Foil Reinforced Kraft (FRK) Jacket laminated of flame resistant 0.001" aluminum foil, glass scrim reinforcement and kraft paper.
4. Insulate valves and fittings with two fiberglass inserts and preformed Manville "Zeston" covers with taped seams.
5. The following describes materials, thicknesses and finishes for insulation and coverings.
6. Domestic Cold Water, Hot Water and Circulating Lines: Insulate with 1" thick Owens-Corning Fiberglas ASJ/SSL-II molded sectional glass fiber pipe covering with an All Service jacket (ASJ). Insulate concealed valves and fittings with preformed "Zeston" PVC covers over fiberglass insulation. Insulate exposed valves and fittings with Hamfab insulation fittings.
F. TESTING:
1. Test all pipes before they are concealed in furrings or chases, insulated, painted, or otherwise covered up or rendered inaccessible. Accomplish testing by sections of lines or systems, as required by conditions during construction. Clean all piping and equipment before testing.
2. Domestic Water Lines Interior: Hydrostatically test for 6 hours at 150 psig. There shall be no leaks whatsoever.
3. Interior Soil, Waste and Vent Lines: Drainage and venting system piping shall be tested with water before the fixtures are installed. Water test shall be applied to the drainage and venting system either in its entirety or in sections. If the entire system is tested, all openings in the pipes shall be tightly closed except the highest opening and the system shall be filled with water to the point of overflow. If the system is tested in sections, each opening except the highest opening of the section under test shall be tightly plugged, and each section shall be filled with water and tested with at least a 10 foot head of water. The water shall be kept in the system, or in the portion under test, for at least 30 minutes before the inspection starts. The system shall then be tight at all joints. Water shall not drop more than 1" in 8 hours.
G. DISINFECTING:
1. After cleaning, flushing and testing, the Contractor shall furnish all labor, equipment and materials necessary for the disinfection of all domestic pipe lines which shall be disinfected by the application of a chlorinating agent. The chlorinating agent may be a liquid chlorine, liquid chlorine gas water mixture, or a calcium hypochlorite solution, which shall be fed into the lines through a suitable solution feed device.
2. The chlorinating agent shall be applied at or near the point from which the line is being filled and through a corporation stop or other approved connection inserted in the horizontal axis of the newly laid pipe. The water being used to fill the line shall be controlled to flow into the section to be disinfected very slowly.
3. The chlorine dose applied to the water entering the lines shall be at least 40 to 60 parts per million. The treated water shall be retained in the pipe lines for a period of not less than 24 hours. At the end of the 24 hour retention period the chlorine residual shall be at least 20 ppm. All treated water shall be thoroughly flushed from the lines until the replacement water in the lines has a chlorine residual of

PLUMBING FIXTURE SCHEDULE

MARK	FIXTURE SPECIFICATION	FIXTURE CONNECTIONS (RUNOUT LINE SIZES) DCW	DHW	SAN	VENT
WATER CLOSETS					
WC	Bowl: Kohler K-3609 or Kohler K-3609-RA water saver, 1.28 GPF, elongated bowl, piston flushing system, handicapped 17" height closet combination with anti-siphon float valve, and flat bolt covers. TAS compliant. Coordinate with Architect for fixtures requiring left or right hand trip levers.	1/2"	___	4"	2"
	Stop & Riser: McGuire BV2166-F-R15, Supply shall include commercial pattern chrome plated Quarter Turn Brass Ball Valve with convertible loose key handle, 15" chrome plated copper riser and Forged Brass Set Screw Flange.				
	Seat: Bemis 1955 SS/CH white solid plastic open front.				
LAVATORIES					
L	Fixture: Kohler K-1997-4 vitreous china 20" x 18" for concealed arms, with 4" drillings. TAS compliant.	1/2"	1/2"	2"	2"
	Supply: T&S Brass B-2711, 4" Centerset Single Lever Faucet with ½" IPS Male Inlet Shanks, Temperature Limit Stop and Ceramic Cartridge. TAS compliant.				
	Tailpiece: McGuire 155WC Cast Brass Chrome Plated Offset Wheelchair Strainer with polished chrome cast brass elbow and 17 gauge 1-1/4" inch seamless brass offset tailpiece.				
	P-trap: McGuire 8872C-F P-trap shall be chrome plated cast brass body with cleanout, with 17 gauge seamless wall bend, slip nuts and Chrome Plated Forged Brass Set Screw Flange.				
	Stops, risers: McGuire BV2165-F Supply kit shall include commercial pattern chrome plated Quarter-Turn Brass Ball Valve with convertible loose key handle, Chrome Plated copper riser and Chrome Plated Forged Brass Set Screw				
	Protective Insulation: Plumberex X4333/X4114, Insulate per ADA 4.19.4 and or IBC all exposed lavatories drain piping, hot/cold stops and supplies. Protectors will consist of molded closed cell PVC, with anti-fungal and anti-microbial properties. To be one piece continuous smooth design.				
	Carrier: Josam 17100 floor mounted Lavatory Carrier with concealed arms, leveling and securing screws, rectangular structural uprights and welded feet				
SINKS					
S	Fixture: Elkay LRAD-1918, 19" x 18" x 6" deep, single compartment, off-center drain, 18 gage type 302 self rimming stainless steel with 3 holes. TAS compliant.	1/2"	1/2"	2"	2"
	Supply: T&S Brass B-2862, 8" Centerset Deck Mounted Faucet with swivel gooseneck, 4" wrist action handles and 2.2GPM aerator. TAS compliant.				
	Strainer: McGuire 1151WC, adjustable brass offset sink strainer with 17 gauge seamless brass waste arm and tailpiece, cast brass slip nuts and heavy cast elbow.				
	P-trap: McGuire 8912C-F P-trap shall be chrome plated cast brass body with cleanout, with 17 gauge seamless wall bend, slip nuts and Chrome Plated Forged Brass Set Screw Flange.				
	Stops, risers: McGuire BV2165-F Supply kit shall include commercial pattern chrome plated Quarter-Turn Brass Ball Valve with convertible loose key handle, Chrome Plated copper riser and Chrome Plated Forged Brass Set Screw Flange.				
	Protective Insulation: Plumberex X4333/X4114, Insulate per ADA 4.19.4 and or IBC all exposed lavatories drain piping, hot/cold stops and supplies. Protectors will consist of molded closed cell PVC, with anti-fungal and anti-microbial properties. To be one piece continuous smooth design.				
MOP BASINS					
MB	Fixture: Stern-Williams SB-1502, 24x24x12 corner precast terrazzo, 3" integral drain body, stainless steel cap & tiling flange on two sides.	3/4"	3/4"	3"	2"
	Supply: T&S Brass B-0665-BSTR, Service Sink Faucet with rough chrome finish, built in stops, vacuum breaker, lever handles, wall brace and ¾" garden hose outlet				
	Accessories: T&S Brass B-0653 & B-0654, Reinforced PVC hose and mop hanger				
SPECIALTIES					
RPZ	Fixture: Watts LF009 lead free reduced pressure zone assembly. Provide with strainer. Provide with quarter turn valves for 1/4"-2" line sizes and NRS gate valves for lines 2-1/2" - 3".	LINE SZE			
	Air Gap: Provide with air gap and extend to spill to nearest floor drain.				
RB	Fixture: Guy Gray SSIB1 stainless steel ice maker box with quarter turn valves.	1/2"	___	___	___



REFRIGERATOR CONNECTION BOX
NO SCALE



INTERIOR CLEANOUT DETAIL
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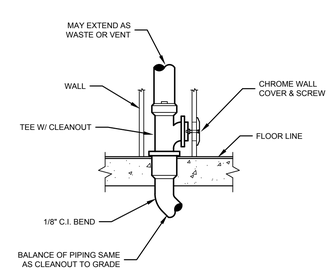

WALL CLEANOUT DETAIL
NO SCALE

FINCHER ENGINEERING, LLC
TX FIRM #F-16408
12402 SLIDE ROAD, SUITE 403
LUBBOCK, TX 79424
PH: 806-701-5109
WWW.FINCHERENG.COM

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CRADDOCK ARCHITECTURE

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TEXAS SLEEP SOLUTIONS

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REVISION

#	Revision Date	Revision Description
1	12/23/2015	Correct Address

TEXAS SLEEP SOLUTIONS
5341 UNIVERSITY
SUITE: 100
McKINNEY, TX 75071
Project number 2015-043
Date 12/21/2015

PLUMBING SCHEDULES AND DETAILS
Scale: As Indicated

P102

COM*check* Software Version 4.0.2.2

Interior Lighting Compliance Certificate

Project Information

Energy Code:	2012 IECC
Project Title:	Texas Sleep Solutions
Project Type:	New Construction

Construction Site:
5431 University
Suite 200
McKinney, TX 75071

Owner/Agent:

Designer/Contractor:
Justin Fincher, P.E.
Fincher Engineering, LLC
12402 Slide Road
Suite 403
Lubbock, TX 79424
806-701-5109
justin@finchereng.com

Additional Efficiency Package

Reduced interior lighting power. Requirements are implicitly enforced within interior lighting allowance calculations.

Allowed Interior Lighting Power

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts (B X C)
1-Health care clinic	1294	0 .87	1126
		Total Allowed Watts =	1126

Proposed Interior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
1-Health care clinic				
LED 1: A: LED Other Fixture Unit 36W:	1	11	37	407
LED 2: B: LED Other Fixture Unit 25W:	1	29	22	638
LED 3: C: LED Other Fixture Unit 6.5W:	1	4	10	40
			Total Proposed Watts =	1085

Interior Lighting PASSES: Design 4% better than code

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2012 IECC requirements in COM*check* Version 4.0.2.2 and to comply with the mandatory requirements listed in the Inspection Checklist.

Justin Fincher, P.E.		12/21/2015
Name - Title	Signature	Date

COM*check* Software Version 4.0.2.2

Mechanical Compliance Certificate

Project Information

Energy Code:	2012 IECC
Project Title:	Texas Sleep Solutions
Location:	McKinney, Texas
Climate Zone:	3a
Project Type:	New Construction

Construction Site:
5431 University
Suite 200
McKinney, TX 75071

Owner/Agent:

Designer/Contractor:
Justin Fincher, P.E.
Fincher Engineering, LLC
12402 Slide Road
Suite 403
Lubbock, TX 79424
806-701-5109
justin@finchereng.com

Additional Efficiency Package

Reduced interior lighting power. Requirements are implicitly enforced within interior lighting allowance calculations.

Mechanical Systems List

Quantity	System Type & Description
1	HVAC System 1 (Single Zone):
	Heating: 1 each - Central Furnace, Electric, Capacity = 68 kBtu/h
	No minimum efficiency requirement applies
	Cooling: 1 each - Split System, Capacity = 57 kBtu/h, Air-Cooled Condenser, Air Economizer
	Proposed Efficiency = 13.00 SEER, Required Efficiency = 13.00 SEER
	Fan System: FAN SYSTEM 1 -- Compliance (Motor nameplate HP method) : Passes
	Fans:
	FAN 1 Supply, Constant Volume, 1790 CFM, 1.0 motor nameplate hp
1	Water Heater 1:
	Electric Storage Water Heater, Capacity: 19 gallons w/ Circulation Pump
	No minimum efficiency requirement applies

Mechanical Compliance Statement

Compliance Statement: The proposed mechanical design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2012 IECC requirements in COM*check* Version 4.0.2.2 and to comply with the mandatory requirements listed in the Inspection Checklist.

Justin Fincher, P.E.		12/21/2015
Name - Title	Signature	Date

COM*check* Software Version 4.0.2.2

Inspection Checklist

Energy Code: 2012 IECC

Requirements: 78.0% were addressed directly in the COM*check* software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR2][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical systems and equipment and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C103.2 [PR3][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the service water heating systems and equipment and document where exceptions to the standard are claimed. Hot water system sized per manufacturer's sizing guide.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C103.2 [PR4][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C406 [PR9][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the additional energy efficiency package options.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Footing / Foundation Inspection	Complies?	Comments/Assumptions
C403.2.4.5 [FO9][3]	Freeze protection and snow/ice melting system sensors for future connection to controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Plumbing Rough-In Inspection	Complies?	Comments/Assumptions
C404.3 [PL5][3]	Temperature controls installed on service water heating systems (110 F for dwelling units and lavatories in public restrooms and 90 F for other occupancies.)	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C404.4 [PL3][1]	Automatic time switches installed to automatically switch off the recirculating hot-water system or heat trace.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.2.3 [ME55][2]	HVAC equipment efficiency verified.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Mechanical Systems list for values.*
C403.2.5.1 [ME59][1]	Demand control ventilation provided for spaces >500 sq.ft. and >25 people/1000 sq.ft. occupant density and served by systems with air side economizer, auto modulating outside air damper control, or design airflow >3,000 cfm.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C403.2.7 [ME60][2]	HVAC ducts and plenums insulated. Where ducts or plenums are installed in or under a slab, verification may need to occur during Foundation Inspection.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.8 [ME61][2]	HVAC piping insulation thickness. Where piping is installed in or under a slab, verification may need to occur during Foundation Inspection.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.8.1 [ME7][3]	Piping Insulation exposed to weather is protected from damage (due to sun, moisture, wind, etc.).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.8 [ME41][3]	Thermally ineffective panel surfaces of sensible heating panels have insulation >= R-3.5.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C403.2.7 [ME10][2]	Ducts and plenums sealed based on static pressure and location.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.7.1.3 [ME11][3]	Ductwork operating >3 in. water column requires air leakage testing.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C403.3.1, C403.3.1.1 [ME62][1]	Air economizers provided where required, meet the requirements for design capacity, control signal, ventilation controls, high-limit shut-off, integrated economizer control, and provide a means to relieve excess outside air during operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.2.1 [ME53][3]	Air outlets and zone terminal devices have means for air balancing.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.4.2 [ME66][2]	VAV fan motors >=7.5 hp to be driven by variable speed drive, have a vane-axial fan with variable pitch blades, or have controls to limit fan motor demand.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C403.4.2 [ME66][2]	VAV fan motors >=7.5 hp to be driven by variable speed drive, have a vane-axial fan with variable pitch blades, or have controls to limit fan motor demand.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.2.6 [ME57][1]	Exhaust air energy recovery on systems meeting Table C403.2.6	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C403.2.11 [ME71][2]	Unenclosed spaces that are heated use only radiant heat.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.2.1 [EL22][2]	Automatic controls to shut off all building lighting installed in all buildings.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.2.1.1 [EL23][2]	Independent lighting controls installed per approved lighting plans and all manual controls readily accessible and visible to occupants.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.2.1.2 [EL15][1]	Lighting controls installed to uniformly reduce the lighting load by at least 50%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.2.2.3 [EL16][2]	Daylight zones provided with individual controls that control the lights independent of general area lighting.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.2.3 [EL17][3]	Sleeping units have at least one master switch at the main entry door that controls wired luminaires and switched receptacles.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.2.2 [EL18][1]	Occupancy sensors installed in required spaces.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.2.2.3 [EL20][1]	Primary sidelighted areas are equipped with required lighting controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.2.3 [EL21][1]	Enclosed spaces with daylight area under skylights and rooftop monitors are equipped with required lighting controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.3 [EL4][1]	Separate lighting control devices for specific uses installed per approved lighting plans.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.3 [EL19][3]	Fluorescent luminaires with odd numbered lamp configurations that are within 10 feet center to center (if recess mounted) or are within 1 foot edge to edge (if pendant or surface mounted) shall be tandem wired.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.4 [EL6][1]	Exit signs do not exceed 5 watts per face.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.2.3 [EL8][1]	Additional interior lighting power allowed for special functions per the approved lighting plans and is automatically controlled and separated from general lighting.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C403.2.4.1 [FI47][3]	Heating and cooling to each zone is controlled by a thermostat control. Minimum one humidity control device per installed humidification/dehumidification system.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.2 [FI38][3]	Thermostatic controls have a 5 °F deadband.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.2 [FI20][3]	Temperature controls have setpoint overlap restrictions.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.3 [FI39][3]	Each zone equipped with setback controls using automatic time clock or programmable control system.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.3 [FI40][3]	Automatic Controls: Setback to 55°F (heat) and 85°F (cool); 7-day clock, 2-hour occupant override, 10-hour backup	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.4.3.3 [FI41][3]	Systems include optimum start controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.5.1 [FI7][3]	Furnished HVAC as-built drawings submitted within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C303.3, C408.2.5.3 [FI8][3]	Furnished O&M manuals for HVAC systems within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.5.3 [FI43][1]	An air and/or hydronic system balancing report is provided for HVAC systems.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.3.2 [FI10][1]	HVAC control systems have been tested to ensure proper operation, calibration and adjustment of controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C404.3 [FI11][3]	Public lavatory faucet water temperature <=110°F.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C404.5 [FI25][2]	All piping in circulating system insulated	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C404.6 [FI12][3]	Controls are installed that limit the operation of a recirculation pump installed to maintain temperature of a storage tank.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.2.2 [FI27][3]	HVAC systems and equipment capacity does not exceed calculated loads.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.5.1 [FI16][3]	Furnished as-built drawings for electric power systems within 30 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C303.3, C408.2.5.2 [FI17][3]	Furnished O&M instructions for systems and equipment to the building owner or designated representative.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C405.5.2 [FI18][1]	Interior installed lamp and fixture lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Interior Lighting fixture schedule for values.*
C408.2.1 [FI28][1]	Commissioning plan developed by registered design professional or approved agency.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.4 [FI29][1]	Preliminary commissioning report completed and certified by registered design professional or approved agency.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.5.4 [FI30][1]	Final commissioning report due to building owner within 90 days of receipt of certificate of occupancy.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.3.1 [FI31][1]	HVAC equipment has been tested to ensure proper operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.2.3.3 [FI32][1]	Economizers have been tested to ensure proper operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.3 [FI33][1]	Lighting systems have been tested to ensure proper calibration, adjustment, programming, and operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C406 [FI34][1]	Efficient HVAC performance, efficient lighting system, or on-site supply of renewable energy consistent with what is shown the approved plans.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

Additional Comments/Assumptions:

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)

1	High Impact (Tier 1)	2	Medium Impact (Tier 2)	3	Low Impact (Tier 3)