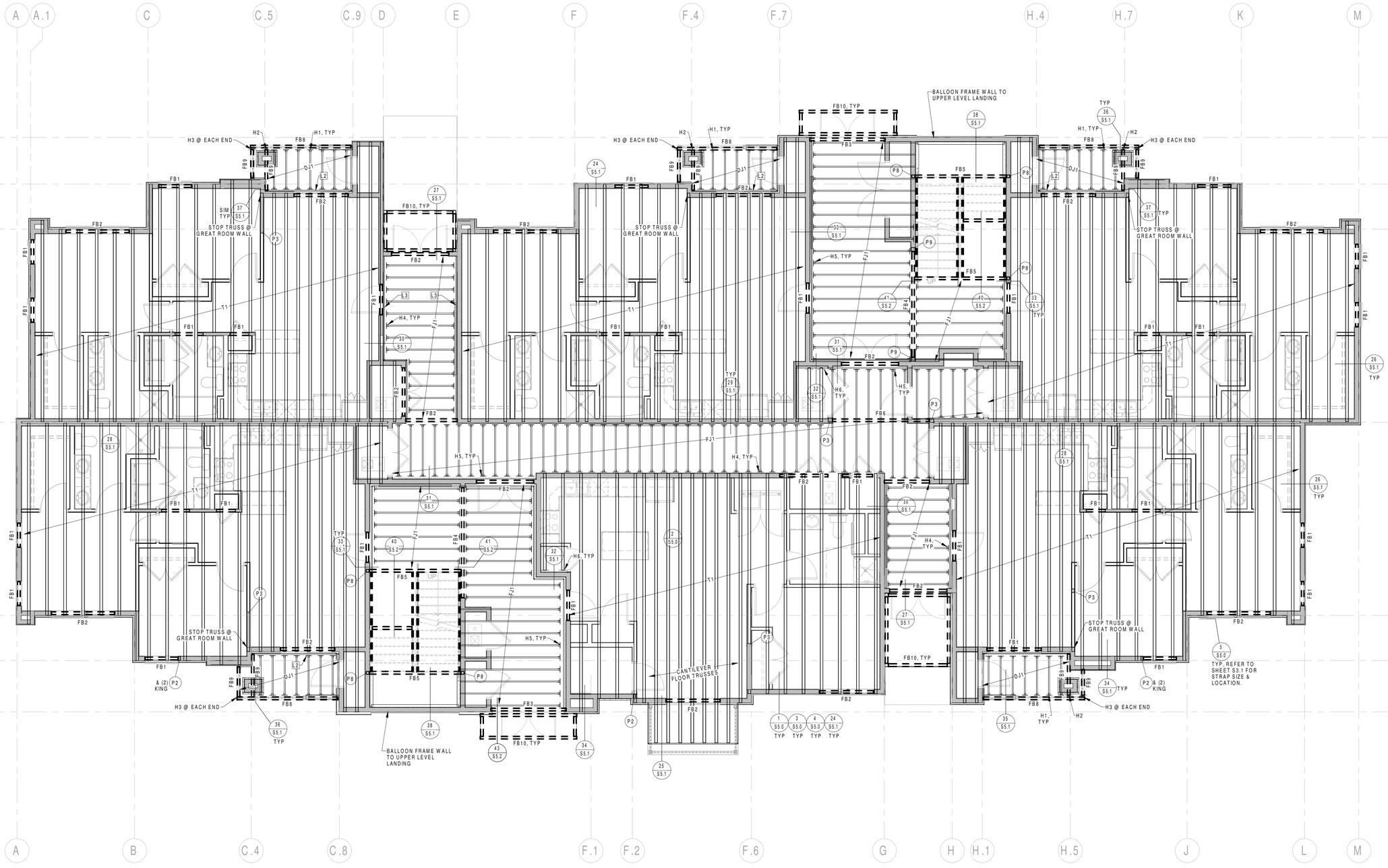


LEVEL 2 FRAMING PLAN

SCALE: 3/16" = 1'-0"

NOTE:
REFER TO SHEET S6.0
FOR STRUCTURAL
NOTES & SCHEDULES

REVISIONS

DRAWN BY
Author

LEI
- A Utah Corporation -
ENGINEERS
SURVEYORS
PLANNERS
3302 N. Main Street
Spanish Fork, UT 84660
Phone: 801.798.0555
Fax: 801.798.9393
office@lei-eng.com
www.lei-eng.com

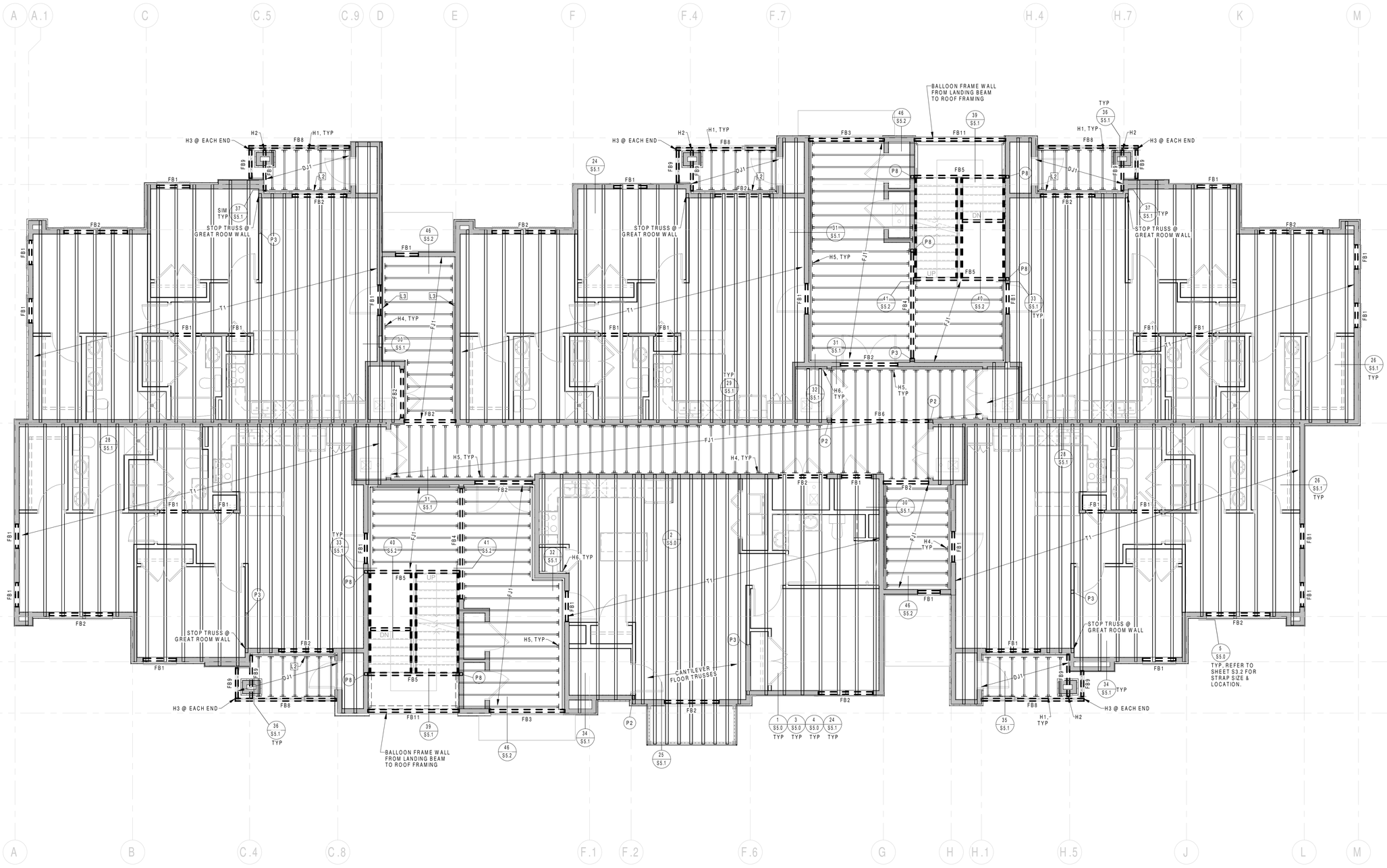
HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRISARCHITECTURE.COM

30th STREET APARTMENTS

LEVEL 2 FRAMING PLAN

Issue Date

S4.0



LEVEL 3 FRAMING PLAN

SCALE: 3/16" = 1'-0"

NOTE:
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FOR STRUCTURAL
NOTES & SCHEDULES

REVISIONS

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Author

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- A Utah Corporation -
ENGINEERS
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PLANNERS
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Phone: 801.798.0555
Fax: 801.798.9393
office@lei-eng.com
www.lei-eng.com

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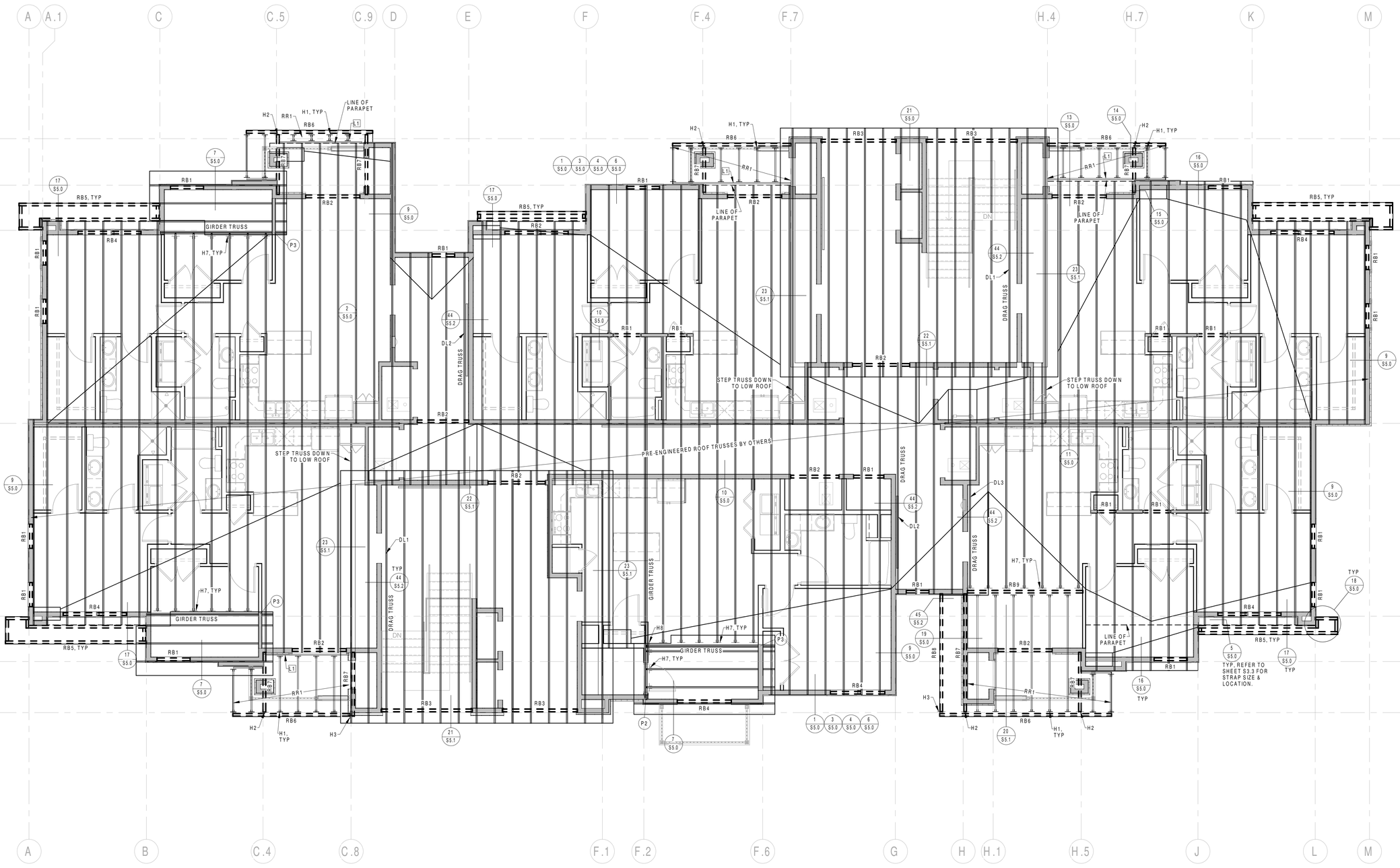
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRISARCHITECTURE.COM

30th STREET APARTMENTS

LEVEL 3 FRAMING PLAN

Issue Date

S4.1



ROOF FRAMING PLAN

SCALE: 3/16" = 1'-0"

NOTE:
REFER TO SHEET S6.0
FOR STRUCTURAL
NOTES & SCHEDULES

JOSHUA K.S. ANDERSON
No. 4939007-2203
PROFESSIONAL STRUCTURAL ENGINEER
STATE OF UTAH
09-20-19

REVISIONS

DRAWN BY
Author

LEI
- A Utah Corporation -
ENGINEERS
SURVEYORS
PLANNERS
3302 N. Main Street
Spanish Fork, UT 84660
Phone: 801.798.0555
Fax: 801.798.9393
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www.lei-eng.com

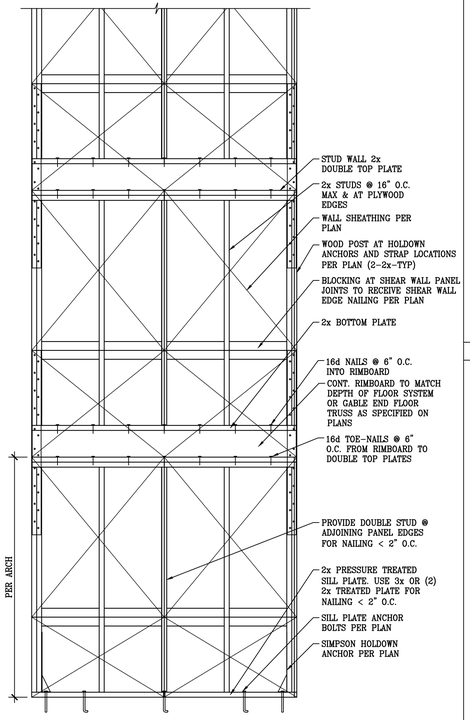
HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS

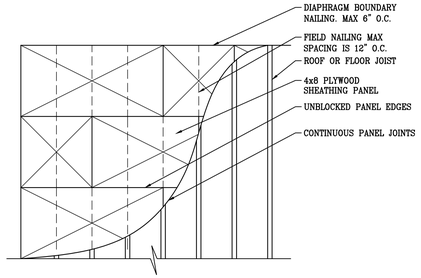
ROOF FRAMING PLAN

Issue Date

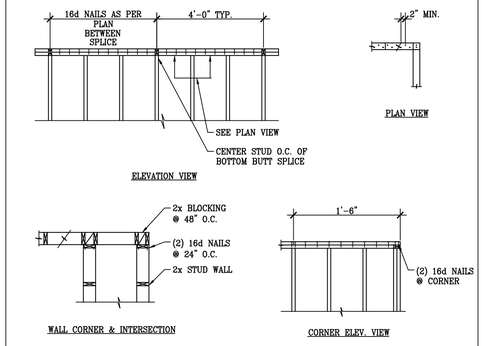
S4.2



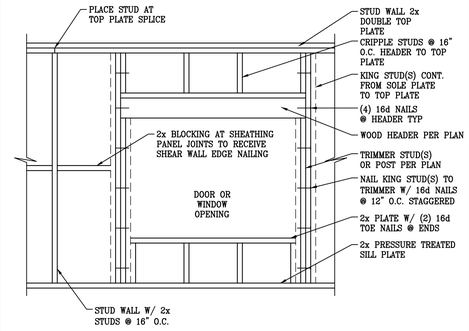
1 TYPICAL SHEAR WALL & FRAMING CONNECTIONS



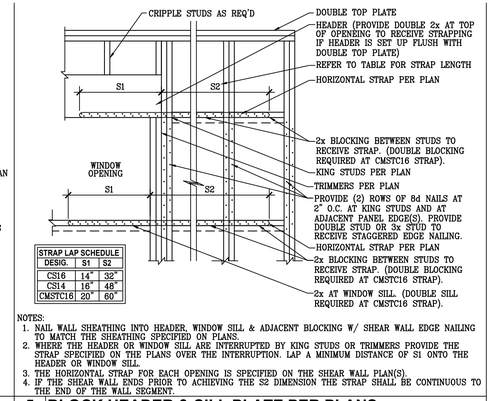
2 TYPICAL UNBLOCKED HORIZONTAL DIAPHRAGM



3 TYPICAL STUD WALL TOP PLATE SPLICE CONNECTION



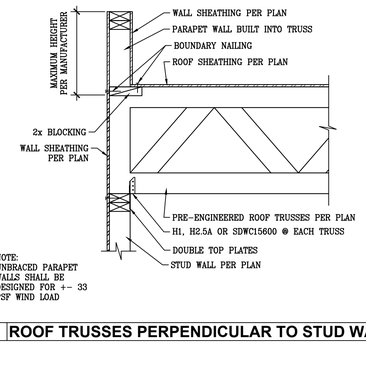
4 TYPICAL WALL FRAMING



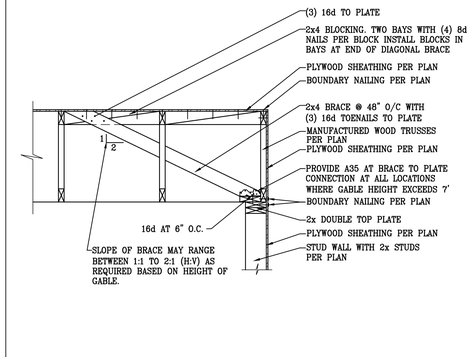
STRAP LAP SCHEDULE		
DESIG.	S1	S2
CS16	14"	32"
CS14	16"	48"
CMSTC16	20"	60"

NOTES:
1. NAIL WALL SHEATHING INTO HEADER, WINDOW SILL & ADJACENT BLOCKING W/ SHEAR WALL EDGE NAILING TO MATCH THE SHEATHING SPECIFIED ON PLANS.
2. WHERE THE HEADER OR WINDOW SILL ARE INTERRUPTED BY KING STUDS OR TRIMMERS PROVIDE THE STRAP SPECIFIED ON THE PLANS OVER THE INTERRUPTION. LAP A MINIMUM DISTANCE OF S1 ONTO THE HEADER OR WINDOW SILL.
3. THE HORIZONTAL STRAP FOR EACH OPENING IS SPECIFIED ON THE SHEAR WALL PLAN(S).
4. IF THE SHEAR WALL ENDS PRIOR TO ACHIEVING THE S2 DIMENSION THE STRAP SHALL BE CONTINUOUS TO THE END OF THE WALL SEGMENT.

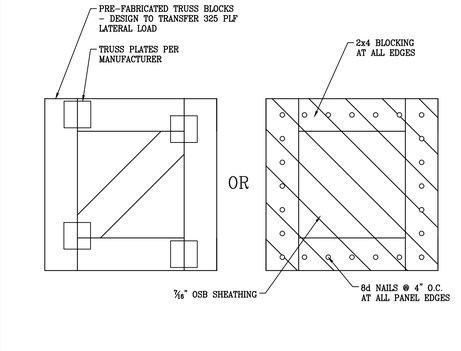
5 BLOCK HEADER & SILL PLATE PER PLANS



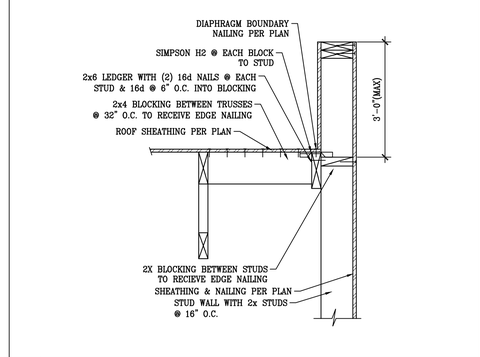
6 ROOF TRUSSES PERPENDICULAR TO STUD WALL



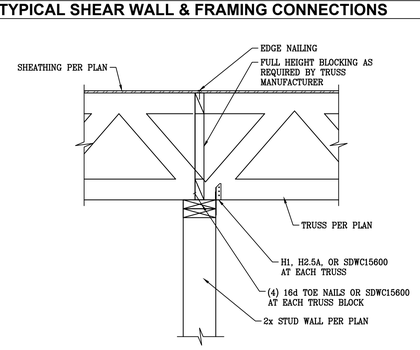
7 GABLE END TRUSS TO STUD WALL CONN.



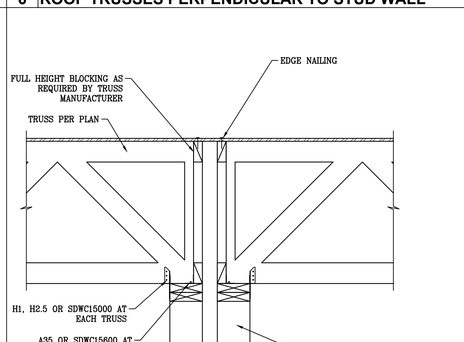
8 TRUSS BLOCKING



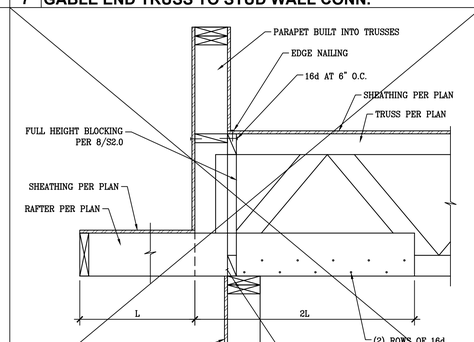
9 PARAPET WALL WITH PARALLEL TRUSS DETAIL



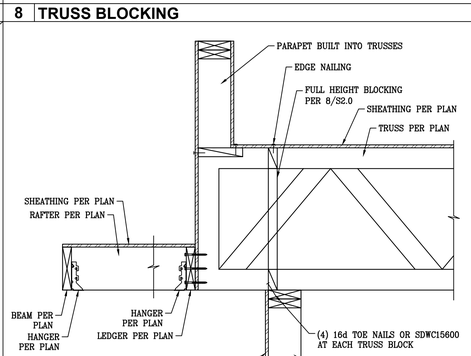
10 ROOF TRUSS TO INTERIOR BEARING WALL.



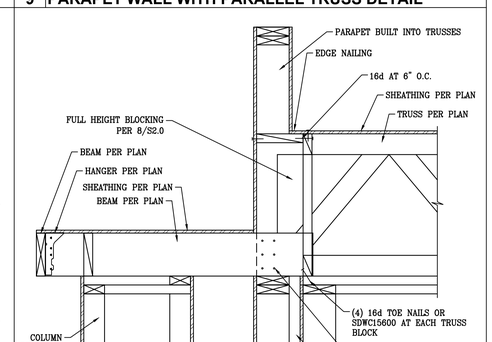
11 ROOF TRUSS TO COMMON SHEAR WALL



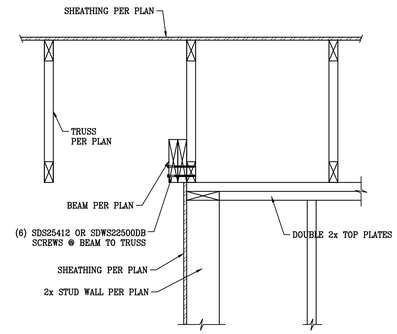
12 NOT USED



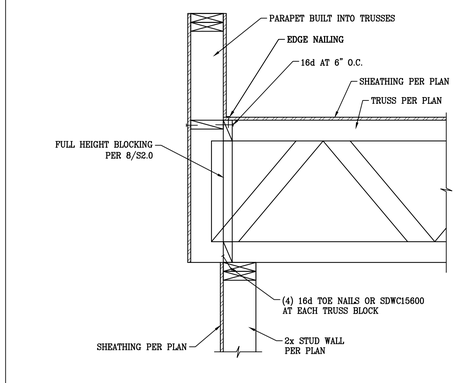
13 RAFTERS AT CANTILEVERED ROOF TRUSS



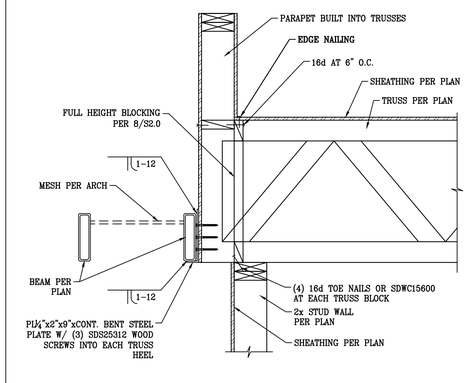
14 BEAM TO CANTILEVER TRUSS



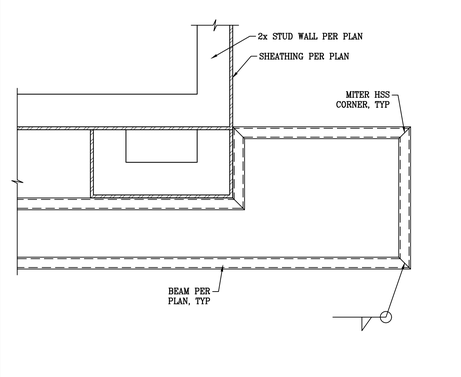
15 BEAM TO CANTILEVER TRUSS



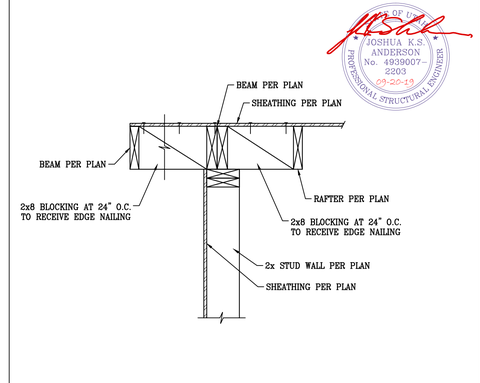
16 TRUSS TO WALL



17 STEEL TRELLIS TO TRUSS



18 PLAN VIEW TRELLIS CONNECTION



19 BEAM OVER STUD WALL

REVISIONS
DRAWN BY -

LEI
A Utah Corporation
ENGINEERS
SURVEYORS
PLANNERS
3302 N. Main Street
Spanish Fork, UT 84660
Phone: 801.798.0555
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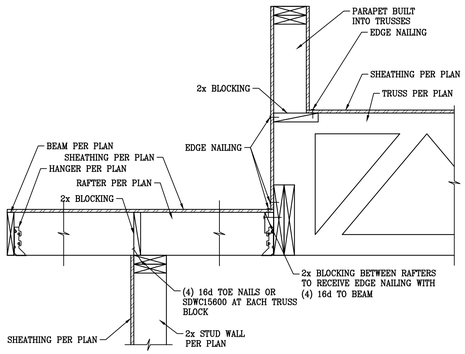
A NEW BUILDING FOR
30th STREET APARTMENTS
STRUCTURAL DETAILS

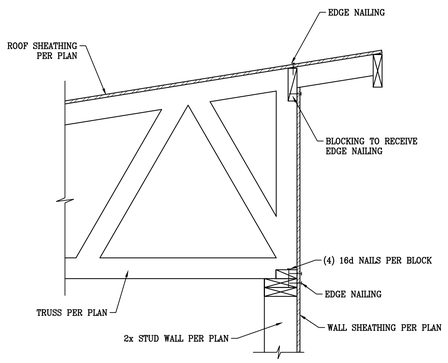
08/30/2019
OGDEN, UTAH

S5.0

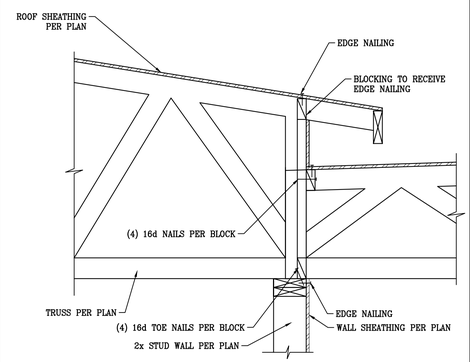
PLOT DATE: 9/20/2019 T:\Structural\2019 Structural Jobs\2019-2522_Ogden - 30th Street Apartments\CAD\STRUC\Ogden - 30th Street Apartments_Details.dwg



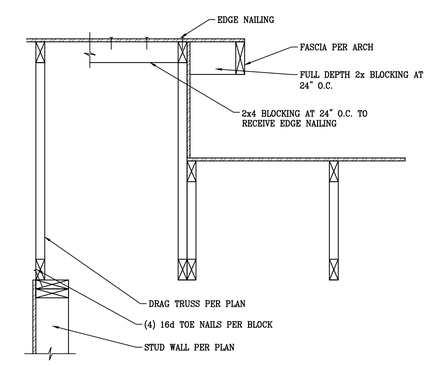
20 CANTILEVER RAFTER TO BEAM



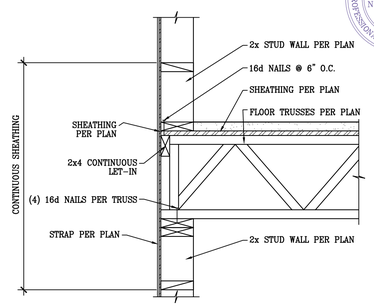
21 TRUSS TO WALL



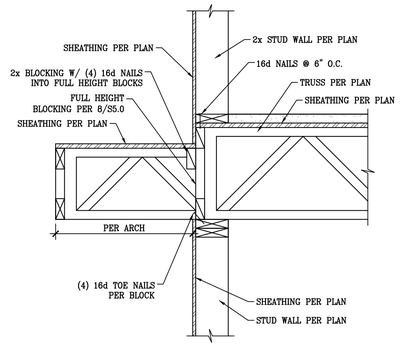
22 TRUSS TO SHARED WALL



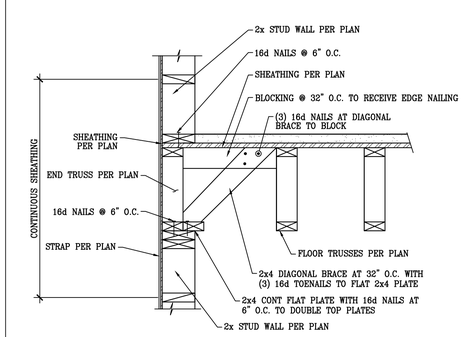
23 TRUSSES AT ROOF STEP WITH DRAG



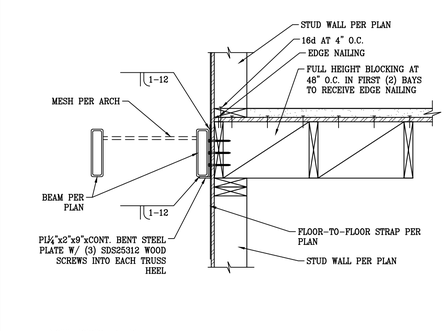
24 FLOOR TRUSSES PERPENDICULAR TO EXT WALL, TYP



25 CANTILEVER TRUSS AT BALCONY

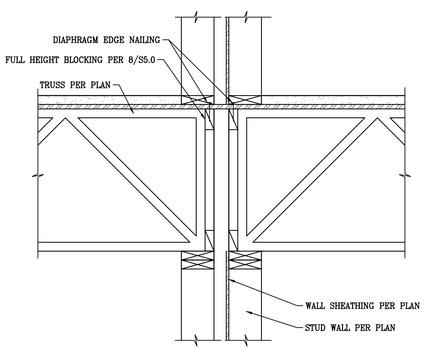


26 FLOOR TRUSSES PARALLEL TO EXT WALL, TYP

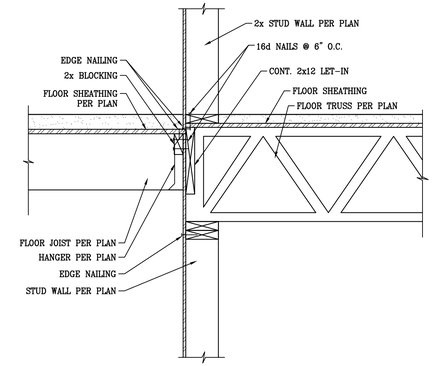


NOTE: JOISTS MAY BE 90° TO THAT SHOWN

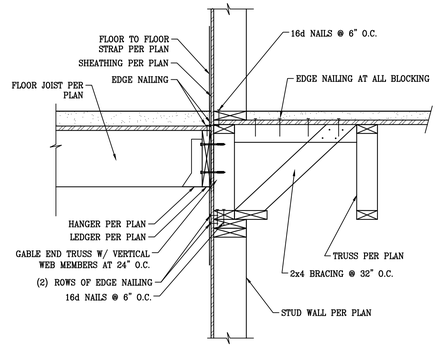
27 TYPICAL EXTERIOR BEARING WALL



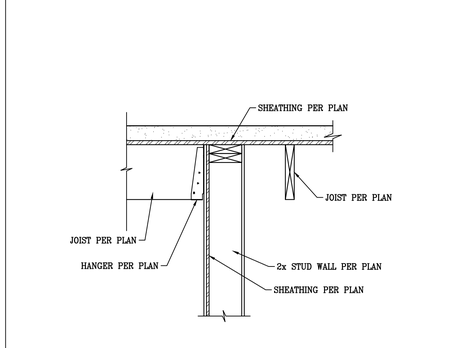
28 FLOOR TRUSS TO COMMON SHEAR WALL, TYP



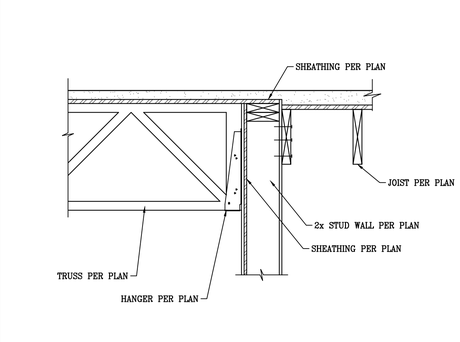
29 JOIST TRANSITION



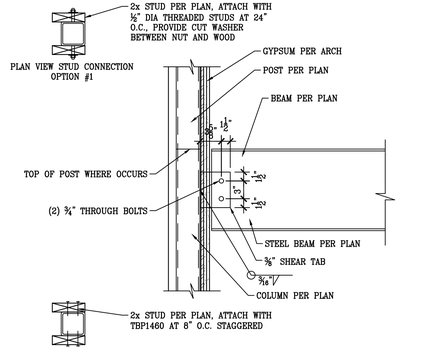
30 FRAMING TRANSITION



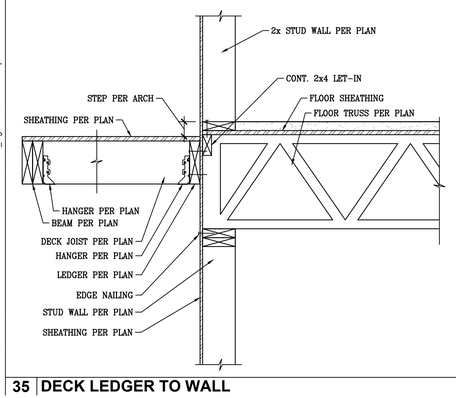
31 FRAMING TRANSITION



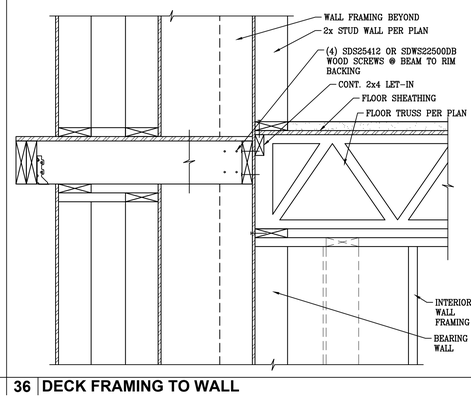
32 FRAMING TRANSITION



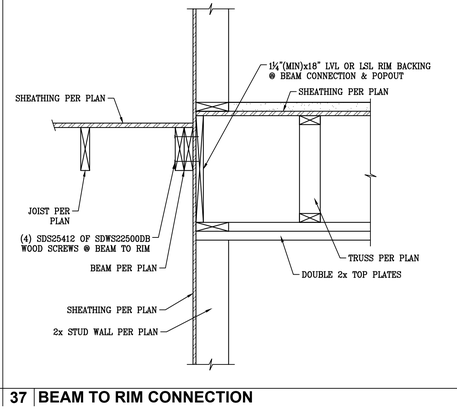
34 POPOUT WALL AT FLOOR FRAMING



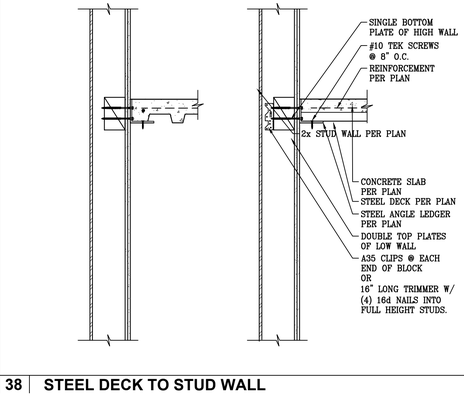
35 DECK LEDGER TO WALL



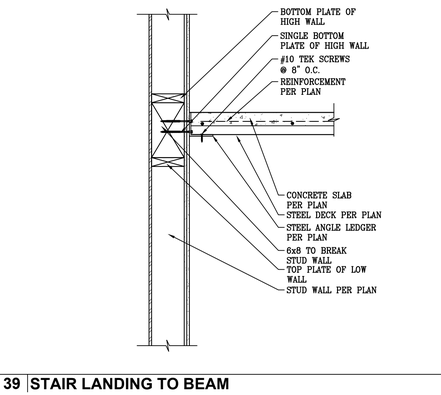
36 DECK FRAMING TO WALL



37 BEAM TO RIM CONNECTION



38 STEEL DECK TO STUD WALL



39 STAIR LANDING TO BEAM

JOSHUA K.S. ANDERSON
No. 4939007-2203
09-20-19
PROFESSIONAL STRUCTURAL ENGINEER
STATE OF UTAH

REVISIONS
△ --

DRAWN BY
-

LEI
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ENGINEERS
SURVEYORS
PLANNERS
3302 N. Main Street
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Phone: 801.798.0555
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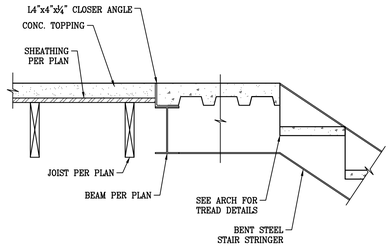
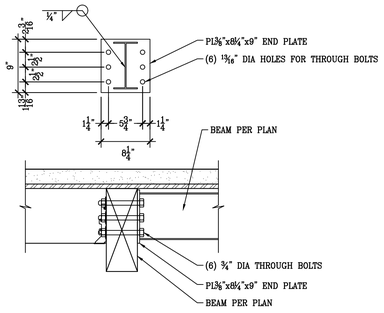
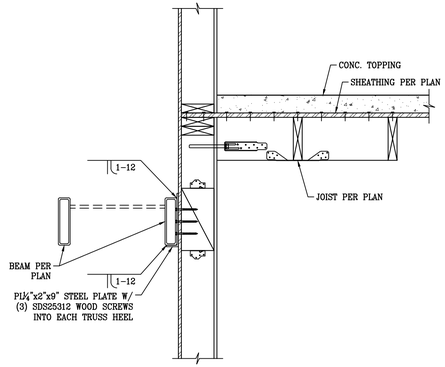


40 STAIR STRINGER TO STEEL BEAM

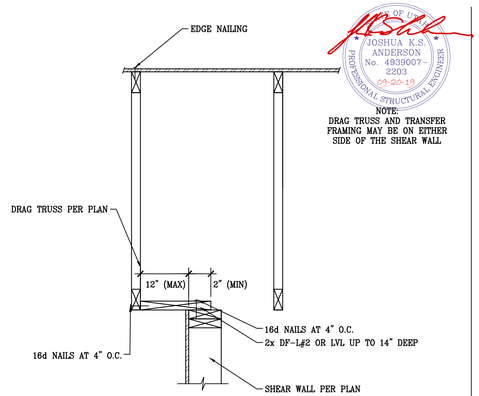


41 STEEL BEAM TO WOOD BEAM

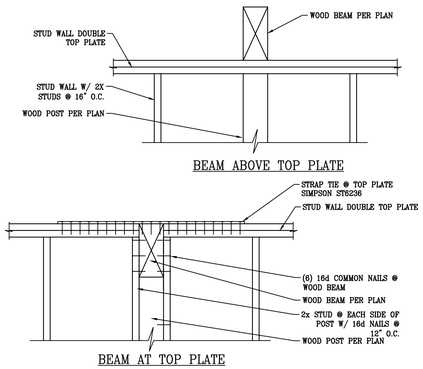
42 NOT USED



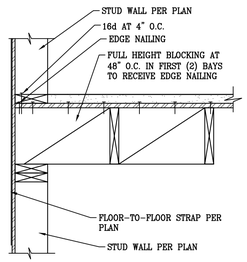
43 ROOF CANOPY TO STUD WALL



44 DRAG TRUSS OFFSET FROM SHEAR WALL



45 WOOD BEAM PERPENDICULAR TO STUD WALL CONN.



NOTE: JOISTS MAY BE 90° TO THAT SHOWN

46 TYPICAL EXTERIOR BEARING WALL

47 NOT USED

48 NOT USED

49 NOT USED

50 NOT USED

51 NOT USED

52 NOT USED

53 NOT USED

54 NOT USED

55 NOT USED

56 NOT USED

57 NOT USED

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59 NOT USED

PLOT DATE: 9/20/2019 T:\Structural\2019 Structural Jobs\2019-2522_Ogden - 30th Street Apartments\CAD\STRUC\Ogden - 30th Street Apartments_Details.dwg

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LEI
A Utah Corporation
ENGINEERS
SURVEYORS
PLANNERS
3302 N. Main Street
Spanish Fork, UT 84660
Phone: 801.798.0555
Fax: 801.798.9393
office@lei-eng.com
www.lei-eng.com

HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRIS-ARCHITECTURE.COM

A NEW BUILDING FOR
30th STREET APARTMENTS
STRUCTURAL DETAILS

08/30/2019
OGDEN, UTAH

S5.2

FTG FOOTING SCHEDULE

DESIG.	LENGTH	WIDTH	DEPTH	LENGTHWISE REINFORCEMENT				CROSSWISE REINFORCEMENT				CAPACITY	NOTE
				QTY.	SIZE	LENGTH	SPACING	QTY.	SIZE	LENGTH	SPACING		
FT1	CONT.	24"	10"	3	#4	CONT.	EQ.	-	-	-	-	5000 PLF	
FT2A	CONT.	24"	10"	3	#4	CONT.	EQ.	-	-	-	-	5000 PLF	SEE DETAIL 19/SD.1
FT2B	CONT.	24"	10"	6	#4	CONT.	EQ.	-	-	-	-	5000 PLF	3 AT TOP, 3 AT BOTTOM
FT3	24"	24"	10"	3	#4	18"	EQ.	3	#4	18"	EQ.	10000 LBS	
FT4	30"	30"	10"	3	#4	24"	EQ.	3	#4	24"	EQ.	15625 LBS	
FT5	36"	36"	10"	4	#4	30"	EQ.	4	#4	30"	EQ.	22500 LBS	
FT6	42"	42"	10"	4	#4	36"	EQ.	4	#4	36"	EQ.	30625 LBS	
FT7	54"	48"	10"	5	#4	42"	EQ.	5	#4	42"	EQ.	39375LBS	

NOTES:
1. f'c=2,500 PSI, fy=60,000 PSI. NO SPECIAL INSPECTION REQUIRED.
2. FOOTINGS SHALL BEAR ON SUITALBE UNDISTURBED NATIVE SOILS OR STRUCTURAL COMPACTED FILL (95% COMPACTION), SPECIFIED AND TESTED BY A REGISTERED GEOTECHNICAL ENGINEER.
3. ALL FOOTINGS SHALL BEAR BELOW THE FROST LINE OF THE LOCALITY. (30" U.N.O.) PROVIDE 12" DIAMETER SONO-TUBE AT EXTERIOR SPOT FOOTINGS PER DETAIL 20/SD.1.
4. PROVIDE J-BARS TO MATCH VERTICAL FOUNDATION WALL REINFORCEMENT WITH 24" MINIMUM LAP SPLICE INTO FOUNDATION WALL.
5. CENTER FOOTING UNDER FOUNDATION WALL U.N.O.

FOUNDATION WALL SCHEDULE

SIZE	REINFORCEMENT
3' FOUNDATION WALL	#4 BARS @ 24" O.C. VERTICAL, (3) #4 BARS HORIZONTAL

NOTES:
1. USE ⅝" DIAMETER x 7" EMBEDMENT ANCHOR BOLTS @ 32" O.C. W/ 3"x3"x¼" (0.229") PLATE WASHERS AT ALL EXTERIOR AND SHEAR WALLS U.N.O. (EDGE OF PLATE WASHER TO BE LOCATED WITHIN ½" OF SHEATHED EDGE OF SILL PLATE)
2. f'c=3,000 PSI, fy=60,000 PSI. NO SPECIAL INSPECTION REQUIRED.
3. PLACE (1) #4 BAR BELOW AND ON EACH SIDE OF EACH OPENING AND (2) #4 BARS ABOVE EACH OPENING. BARS SHALL BE PLACED WITHIN 2" OF THE OPENINGS AND EXTEND 24" BEYOND THE EDGE OF THE OPENING. VERTICAL BARS MAY TERMINATE 3" FROM THE TOP OF THE CONCRETE. OPENING REINFORCEMENT IS IN ADDITION TO STANDARD WALL REINFORCEMENT.
4. TOP AND BOTTOM BARS SHALL BE WITHIN 4" OF THE TOP AND BOTTOM OF THE WALL.
5. PLACE REINFORCEMENT IN THE CENTER OF THE WALL U.N.O.

#/V SHEAR WALL SCHEDULE[1,3,4]

DESIG.	MATERIAL	8d NAILS		½" 16 GAGE STAPLES		CAPACITY		NOTE
		EDGE	FIELD	EDGE	FIELD	WIND	SEISMIC	
1	7/16" OSB OR CDX PLYWOOD	6"	12"	3½"	12"	360	260	2,5
2	7/16" OSB OR CDX PLYWOOD	4"	12"	2" [6]	12"	530	350	2,5
3	7/16" OSB OR CDX PLYWOOD	3"	12"	-	-	685	490	2,5,6
4	7/16" OSB OR CDX PLYWOOD	2"	12"	-	-	895	640	2,5,6
5	½" SHEET ROCK OR BETTER	6"	12"	-	-	90	90	7
6	½" SHEET ROCK	4"	12"	-	-	155	155	7

NOTES:
1. WALL STUDS ARE TO BE SPACED AT 16" O.C. U.N.O.
2. SHEATH ABOVE AND BELOW OPENINGS IN PERFORATED SHEAR WALLS AS PER THE ADJACENT SHEAR WALL DESIGNATION ON EACH SIDE OF THE OPENING.
3. USE (2) KING STUDS AT EACH END OF SHEAR PANELS (SHEAR WALL CHORDS) U.N.O.
4. ALL PANEL EDGES SHALL BE BLOCKED WITH 2x OR WIDER FRAMING WITH EDGE NAILING AT ALL SUPPORTS AND PANEL EDGES U.N.O.
5. WHERE PANELS ARE APPLIED ON BOTH FACES OF A WALL AND NAIL SPACING IS LESS THAN 6" O.C. ON EITHER SIDE, PANEL JOINTS SHALL BE OFFSET TO FALL ON DIFFERENT FRAMING MEMBERS.
6. FRAMING AT ADJOINING PANEL EDGES AND SILL PLATES SHALL BE 3x OR WIDER FOR EDGE NAILING 3" O.C. OR LESS. NAILS AT ADJOINING PANEL EDGES AND INTO SILL PLATES SHALL BE STAGGERED. (DOUBLE 2x FRAMING STITCH-NAILED WITH STAGGERED 16d NAILS WITH SPACING EQUAL TO THE SHEAR WALL EDGE NAILING IS AN ADEQUATE SUBSTITUTE FOR 3x FRAMING.)
7. FASTENERS FOR SHEET ROCK SHEARWALLS SHALL BE NO. 6 TYPE S OR W DRYWALL SCREWS 1⅝" LONG IN LIEU OF 8d NAILS.

HOLDOWN SCHEDULE

SYMBOL	HOLDOWN/STRAP
—○	MST37 STRAP SEE DETAIL 26/S5.1
—□	MST48 STRAP SEE DETAIL 26/S5.1
—◁	CS16x48" LONG STRAP SEE DETAIL 26/S5.1
—●	HDU5-SDS2.5 HOLDOWN SEE DETAIL 6/S2.0
—◀	HDU8-SDS2.5 HOLDOWN SEE DETAIL6/S2.0
—■	STHD10 HOLDOWN SEE DETAIL 7/S2.0
—▼	HDU8-SDS2.5 HOLDOWN W/ SB⅞x24 ANCHOR BOLT SEE DETAIL 12/S2.0

BEAM SCHEDULE

DESIG.	QTY.	SIZE	TYPE	2x6 TRIMMERS	2x6 KING STUDS
RB1	2	2x6	DF-L#2	(1)	(1)
RB2	2	1¾"x7¼"	MICROLLAM	(1)	(2)
RB3	2	1¾"x7¼"	MICROLLAM	(1)	(2)
RB4	3	1¾"x7¼"	MICROLLAM	(1)	(2)
RB5	1	HSS8x2x¼	HOLLOW SHAPE	SEE PLANS	
RB6	1	1¾"x7¼"	MICROLLAM	N/A	N/A
RB7	2	1¾"x7¼"	MICROLLAM	(2)	(2)
RB8	1	1¾"x7¼"	MICROLLAM	(2)	N/A
RB9	1	1¾"x7¼"	MICROLLAM	(2)	(2)

BEAM SCHEDULE

DESIG.	QTY.	SIZE	TYPE	2x6 TRIMMERS	2x6 KING STUDS
FB1	2	2x6	DF-L#2	(2)	(1)
FB2	2	1¾"x7¼"	MICROLLAM	(2)	(2)
FB3	3	2x10	DF-L#2	(2)	(2)
FB4	3	1¾"x14"	MICROLLAM	SEE PLANS	
FB5	1	W 8x10	A992-50 STEEL	SEE PLANS	
FB6	2	1¾"x11⅞"	MICROLLAM	SEE PLANS	
FB7		NOT USED			
FB8	2	1¾"x7¼"	MICROLLAM	(2)	N/A
FB9	2	1¾"x7¼"	MICROLLAM	(2)	N/A
FB10	1	HSS8x2x¼	HOLLOW SHAPE	SEE PLANS	
FB11	1	6x10	DF-L#2	SEE PLANS	

FRAMING NOTES

1. PLANS ARE NOT COMPLETE WITHOUT THE STRUCTURAL CALCULATIONS.
2. REFER TO THE STRUCTURAL CALCULATIONS FOR THE GENERAL STRUCTURAL NOTES.
3. ROOF SHEATHING SHALL BE APA RATED 7/16" OSB OR CDX PLYWOOD WITH 8d NAILS AT 6" O.C. EDGE, 12" O.C. FIELD.
4. FLOOR SHEATHING SHALL BE APA RATED ¾" T&G WITH 10d NAILS OR SIMPSON WSNTL2LS #8 WOOD SCREWS AT 6" O.C. EDGE, 12" O.C. FIELD.
5. EXTERIOR STUD WALLS SHALL BE 2x6 @ 16" O.C U.N.O.
6. USE (8) 16d NAILS BETWEEN TOP PLATE SPLICE POINTS ON ALL EXTERIOR AND SHEAR WALLS. PROVIDE A 4'-0" MINIMUM LAP SPLICE.
7. INSTALL ALL SIMPSON HARDWARE PER MANUFACTURER'S SPECIFICATIONS.
8. HOLDOWNS SHALL BE INSTALLED ON (2) FULL HEIGHT KING STUDS (MINIMUM).
9. FLOOR JOISTS SHALL BE 11⅞" TJI/210 AT 16" O.C. U.N.O.
10. ROOF RAFTERS SHALL BE 2x6 DF-L#2 AT 24" O.C. U.N.O.
11. PROVIDE 2x SQUASH BLOCKING AT FLOOR FRAMING TO MATCH DIMENSIONS OF POST ABOVE.
12. ALL DETAILS SHALL APPLY IN ALL SIMILAR SITUATIONS.
13. ALL LUMBER NOT PERMANENTLY PROTECTED FROM THE ELEMENTS SHALL BE PRESERVATIVE TREATED OR OF A DECAY RESISTANT SPECIES. CONTACT LEI ENGINEERS AND SURVEYORS, INC. IF A DIFFERENT SPECIES IS TO BE USED.

P# POST SCHEDULE

DESIG.	POST SIZE
P1	(1) 2x
P2	(2) 2x
P3	(3) 2x
P4	(4) 2x
P5	(5) 2x
P6	4x4
P7	6x6
P8	HSS4x4x¼ A500GR.B-46 STEEL
P9	5 ⅛"x5 ⅛" PARALLAM POST

NOTES:
1. POSTS INDICATE NUMBER OF TRIMMER STUDS WHEN SPECIFIED AT HEADERS. ALL OTHER POST DESIGNATIONS REFER TO FULL HEIGHT KING STUDS U.N.O.
2. INSTALL (1) TRIMMER AND (1) KING STUD EACH SIDE OF EACH OPENING U.N.O.
3. INSTALL (2) TRIMMER STUDS AT EACH SIDE OF OPENINGS GREATER THAN 6'-0" WIDE U.N.O.
4. INSTALL (2) KING STUDS EACH SIDE OF OPENINGS GREATER THAN 8'-0" WIDE U.N.O.
5. 2x BUILT-UP POSTS SHALL BE THE SAME WIDTH OF THE WALL IN WHICH THEY ARE FRAMED U.N.O.
6. NAIL EACH PLY OF 2x BUILT-UP POSTS W/ 16d NAILS @ 6" O.C. STAGGERED U.N.O.
7. POSTS THAT ARE NOT FRAMED WITHIN A STUD WALL SHALL BE BRACED WITH BC OR AC POST CAP AND PB OR ABA POST BASE U.N.O.

RAFTER SCHEDULE

DESIG.	RAFTER SIZE
RR1	2x10 DF-L#2 @ 24" O.C.

JOIST SCHEDULE

DESIG.	JOIST SIZE
FJ1	2x10 DF-L#2 @ 16" O.C.
DJ1	2x8 DF-L#2 @ 16" O.C.
T1	PRE-ENGINEERED WOOD FLOOR TRUSSES BY OTHERS

LEDGER SCHEDULE

DESIG.	JOIST SIZE
L1	2x10 DF-L#2 LEDGER W/ (3) SDWS22600 WOOD SCREWS AT EACH TRUSS
L2	2x8 DF-L#2 LEDGER W/ (3) SDWS22600 WOOD SCREWS AT EACH TRUSS
L3	2x8 DF-L#2 LEDGER W/

HANGER SCHEDULE

DESIG.	HANGER
H1	LUS26
H2	HHUS48 UPSIDE DOWN
H3	LS90
H4	LUS28
H5	DU210
H6	DHU3.56/18
H7	HUS26
H8	HGUS26-2

DRAG LOAD SCHEDULE

DESIG.	LATERAL DRAG LOAD
DL1	3200 LBS
DL2	6760 LBS
DL3	1600 LBS

STATE OF UTAH
JOSHUA K.S. ANDERSON
No. 4939007-2203
09-20-19
PROFESSIONAL STRUCTURAL ENGINEER

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LEI
A Utah Corporation
ENGINEERS
SURVEYORS
PLANNERS
3302 N. Main Street
Spanish Fork, UT 84660
Phone: 801.798.0555
Fax: 801.798.9393
office@lei-eng.com
www.lei-eng.com

HARRIS ARCHITECTURE
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S6.0

MECHANICAL SYMBOLS

NOTES:
1. ALL SYMBOLS MAY NOT BE USED.
2. DOTTED SYMBOLS INDICATE EXISTING EQUIPMENT, ETC

SYMBOL	EXPLANATION
Ø	ROUND MEASUREMENT
	RETURN AIR
	SUPPLY AIR
	EXHAUST AIR
	EXHAUST FAN
T X-X	THERMOSTAT
S X-X	SENSOR
BD	BALANCING DAMPER
MD	MOTORIZED DAMPER
X / #	MECHANICAL EQUIPMENT SYMBOL
#	KEYED NOTE REFERENCE
NECK / CFM OR SIZE / CFM TAG	NECK: NECK AND BRANCH DUCT SIZE. CFM: CFM OF DIFFUSER, GRILLE OR HOOD. TAG: DIFFUSER OR GRILLE CALL-OUT.
TRANS X"Ø / X	TRANSFER GRILLE SIZE. TRANSFER GRILLE BALANCED TO CFM.
	SUPPLY AIR DUCTWORK
	RETURN AIR DUCTWORK
	EXHAUST AIR DUCTWORK
OA	OUTSIDE AIR DUCTWORK

SITE CONDITIONS

SITE CONDITIONS:	
CITY:	OGDEN, UTAH
ELEVATION:	4,300'
OUTDOOR CONDITIONS:	
WINTER:	HTG: 1° F
SUMMER:	CLG: 94° F
INDOOR CONDITIONS	
WINTER:	HTG: 75° F
SUMMER:	CLG: 72° F

IF TEMPERATURES SHOWN DO NOT MATCH CONDITIONS DESIRED FOR THIS PROJECT CONTACT THE ENGINEER OF RECORD.

SEISMIC SUPPORT NOTES:

BRACING FOR SUSPENDED DUCTWORK, ETC

1. PER ASCE STANDARD 7-10 SEISMIC SUPPORTS ARE NOT REQUIRED FOR EITHER OF THE FOLLOWING CONDITIONS:
   A. HVAC DUCTS ARE SUSPENDED WITH HANGERS 12" OR LESS IN LENGTH.
   B. HVAC DUCTS HAVE A CROSS-SECTIONAL AREA OF LESS THAN 6 SQUARE FEET.
2. IF INSTANCES OCCUR WHERE HVAC DUCT IS SUSPENDED WITH HANGERS GREATER THAN 12" IN LENGTH AND HVAC DUCT HAS A CROSS-SECTIONAL AREA GREATER THAN 6 SQUARE FEET SYSTEM CONNECTORS AND COMPONENTS SHALL BE COMPATIBLE AND DESIGNED FOR THE APPLICATION THAT THEY ARE USED FOR. SHALL HAVE A MINIMUM OF TWO TRANSVERSE BRACES PER STRAIGHT DUCT RUN WITH A MAXIMUM DISTANCE OF 30' BETWEEN TRANSVERSE BRACES. SHALL HAVE A MINIMUM OF ONE LONGITUDINAL BRACE PER STRAIGHT DUCT RUN WITH A MAXIMUM DISTANCE OF 40' BETWEEN LONGITUDINAL BRACES. BRACING SHALL ONLY OCCUR AT OR NEAR AREAS WHERE SUFFICIENT DUCT STIFFNESS IS PRESENT (AT OR NEAR JOINT CONNECTIONS).
3. FOR SEISMIC BRACING OF MECHANICAL EQUIPMENT AN INDEPENDENT SEISMIC AND VIBRATION CONTROL SUBCONTRACTOR WITH EXPERIENCE, COMPUTING CAPABILITIES, AND MANUFACTURED PRODUCTS SHALL BE FURNISHED BY MECHANICAL CONTRACTOR. INDEPENDENT SEISMIC CONSULTANT SHALL PROVIDE REQUIRED COMPUTATIONS, SHOP DRAWINGS, AND MANUFACTURED PRODUCTS TO MEET THE MINIMUM REQUIREMENTS OF ASCE 7-10 AND INTERNATIONAL BUILDING CODES (LATEST ADOPTED EDITION) FOR THE RESPECTIVE SEISMIC DESIGN FOR SEISMIC ZONE WITH IMPORTANCE FACTOR 1.5. SEISMIC SUBCONTRACTOR SHALL EXERCISE THE QUALITY CONTROL FOR THIS WORK AND SHALL NOT BE LIMITED TO INSTRUCTIONS DIRECTED TO THE MECHANICAL CONTRACTOR. THE SEISMIC SUBCONTRACTOR SHALL CERTIFY IN WRITING THAT THEY HAVE INSPECTED THE INSTALLATION AND THAT ALL ISOLATION ANCHORS AND SEISMIC RESTRAINT MATERIALS ARE INSTALLED CORRECTLY AND FUNCTIONING PROPERLY. CERTIFICATION SHALL BE PROVIDED AFTER ALL CORRECTIVE WORK HAS BEEN COMPLETED.

COMMISSIONING NOTES:

MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE ALL DOCUMENTATION TO THE OWNER AS PER THE LISTED 2018 IECC CODE REFERENCES BELOW:

C408.2.1 A COMMISSIONING PLAN SHALL BE DEVELOPED BY A REGISTERED DESIGN PROFESSIONAL OR APPROVED AGENCY AND SHALL INCLUDE THE FOLLOWING ITEMS:
1. A NARRATIVE DESCRIPTION OF THE ACTIVITIES THAT WILL BE ACCOMPLISHED DURING EACH PHASE OF COMMISSIONING, INCLUDING THE PERSONNEL INTENDED TO ACCOMPLISH EACH OF THE ACTIVITIES.
2. A LISTING OF THE SPECIFIC EQUIPMENT, APPLIANCES OR SYSTEMS TO BE TESTED AND A DESCRIPTION OF THE TESTS TO BE PERFORMED.
3. FUNCTIONS TO BE TESTED, INCLUDING, BUT NOT LIMITED TO CALIBRATIONS AND ECONOMIZER CONTROLS.
4. CONDITIONS UNDER WHICH THE TESTS WILL BE PERFORMED. AT A MINIMUM, TESTING SHALL AFFIRM WINTER AND SUMMER DESIGN CONDITIONS AND FULL OUTSIDE AIR CONDITIONS.
5. MEASURABLE CRITERIA FOR PERFORMANCE.

C408.2.4 PRELIMINARY COMMISSIONING REPORT. A PRELIMINARY REPORT OF COMMISSIONING TEST PROCEDURES AND RESULTS SHALL BE COMPLETED AND CERTIFIED BY THE REGISTERED DESIGN PROFESSIONAL OR APPROVED AGENCY AND PROVIDED TO THE BUILDING OWNER. THE REPORT SHALL BE IDENTIFIED AS "PRELIMINARY COMMISSIONING REPORT" AND SHALL IDENTIFY:
1. ITEMIZATION OF DEFICIENCIES FOUND DURING TESTING REQUIRED BY THIS SECTION THAT HAVE NOT BEEN CORRECTED AT THE TIME OF REPORT PREPARATION.
2. DEFERRED TESTS THAT CANNOT BE PERFORMED AT THE TIME OF REPORT PREPARATION BECAUSE OF CLIMATIC CONDITIONS.
3. CLIMATIC CONDITIONS FOR PERFORMANCE OF THE DEFERRED TESTS.

C408.2.4.1 ACCEPTANCE OF REPORT. BUILDINGS, OR PORTIONS THEREOF, SHALL NOT PASS THE FINAL MECHANICAL INSPECTION UNTIL SUCH TIME AS THE CODE OFFICIAL HAS RECEIVED A LETTER OF TRANSMITTAL FROM THE BUILDING OWNER ACKNOWLEDGING THAT THE BUILDING OWNER HAS RECEIVED THE PRELIMINARY COMMISSIONING REPORT.

C408.2.4.2 THE CODE OFFICIAL SHALL BE PERMITTED TO REQUIRE THAT A COPY OF THE PRELIMINARY COMMISSIONING REPORT BE MADE AVAILABLE FOR REVIEW BY THE CODE OFFICIAL.

408.2.5 DOCUMENTATION REQUIREMENTS. THE CONSTRUCTION DOCUMENTS SHALL SPECIFY THAT THE DOCUMENTS DESCRIBED IN THIS SECTION BE PROVIDED TO THE BUILDING OWNER WITHIN 90 DAYS OF THE RECEIPT OF THE CERTIFICATE OF OCCUPANCY.

WHICH SHALL INCLUDE DRAWINGS, MANUALS, SYSTEM BALANCING REPORT, AND FINAL COMMISSIONING REPORT.

GENERAL MECHANICAL NOTES:

1. MECHANICAL CONTRACTOR TO PROVIDE AND INSTALL A 7-DAY PROGRAMMABLE THERMOSTAT FOR EACH FURNACE AND HEAT PUMP IN COMMON AREAS. VERIFY THERMOSTAT LOCATION WITH OWNER REPRESENTATIVE IN FIELD. PROVIDE AND INSTALL HEAVY DUTY VANDAL RESISTANT COVER IN COMMON AREAS.
2. MECHANICAL CONTRACTOR TO PROVIDE AND INSTALL A HONEYWELL T9 WIFI SMART THERMOSTAT FOR EACH FURNACE IN UNITS. VERIFY THERMOSTAT LOCATION WITH OWNER REPRESENTATIVE IN FIELD.
3. COORDINATE EXACT LOCATION OF ALL MECHANICAL UNITS WITH GENERAL CONTRACTOR. VERIFY IN FIELD.
4. PROVIDE AND INSTALL ALL NECESSARY COMPONENTS FOR FURNACE/CONDENSING UNIT SYSTEMS. (IE REFRIGERANT LINES, COMBUSTION AIR PIPING, EXHAUST PIPING, CONCENTRIC TERMINATION KIT). ALL PER MANUFACTURERS RECOMMENDATIONS.
5. PROVIDE AND INSTALL MAKE-UP AIR FOR LAUNDRY CLOSETS AS REQUIRED AS PER 2018 IMC 504.6. MAKE-UP AIR CAN BE PROVIDED FROM INTERIOR SPACES VIA DUCTING OR LOUVERS IN DOORS OR WALLS. (OPENING WITH 100 SQUARE INCHES MIN.).
6. SIZING FOR EQUIPMENT COMBUSTION AIR AND VENT PIPING DETERMINED USING MANUFACTURERS SPECIFICATIONS, ACTUAL LENGTH AND CONFIGURATION INFORMATION FROM FIELD.
7. MECHANICAL CONTRACTOR TO PROVIDE DOCUMENTATION OF REQUIRED MANUFACTURER START-UP FOR EQUIPMENT INCLUDING MANUFACTURER, MODEL NUMBER, SERIAL NUMBER, COOLING CAPACITY, GAS HEATING INPUT, ALL ENTERING AND LEAVING TEMPERATURES, CONNECTED CIRCUIT VOLTAGE, AND VERIFICATION OF PROPER FUNCTION OF THERMOSTAT. CONTRACTOR SHALL PROVIDE MANUALS FOR EQUIPMENT AND NAME OF SERVICE AGENCY.
8. MECHANICAL CONTRACTOR TO PROVIDE AND INSTALL SINGLE THICKNESS TURNING VANES AT EACH 90 DEGREE SQUARE DUCT ELBOW.
9. MECHANICAL CONTRACTOR TO PROVIDE AND INSTALL TRANSFER AIR GRILLES FOR ALL LIVING SPACES (BEDROOMS, LIVING ROOMS, ETC.) AT THE CFM NOTED WITHIN THE SPACE. SEE THE PLANS AND DETAILS FOR ADDITIONAL INFORMATION. COORDINATE LOCATIONS WITH STRUCTURE AND OWNERS REPRESENTATIVE. TRANSFER SHALL INCLUDE BUT NOT LIMITED TO TWO TRANSFER GRILLES, DUCTING, AND SOUND INSULATION.
10. USING CFM NOTED ON PLANS INSTALL GRILLES AND DIFFUSERS WITH MAXIMUM NOISE CRITERIA (NC) OF 25 FOR ALL PUBLIC/COMMON AREAS AND AN NC OF 30 FOR RESIDENTIAL SPACES.
11. DUCTWORK SIZING, ROUTING, AND LOCATION TO BE FIELD VERIFIED AND APPROVED FOR ANY CHANGES TO THE DUCT SIZING AND/OR ROUTING PRIOR TO DUCT FABRICATION AND INSTALLATION. DUCTWORK FABRICATED PRIOR TO FIELD VERIFICATION AND APPROVALS THAT NEEDS TO BE ALTERED WILL BE ALTERED AS NEEDED BY THE CONTRACTOR WITH NO ADDITIONAL COST TO THE OWNER.

GENERAL MECHANICAL NOTES:

12. ALL RETURN AIR & SUPPLY AIR DUCTWORK IN UNCONDITIONED SPACES SHALL BE INSULATED PER APPLICABLE CODES.
13. ALL EQUIPMENT SHALL HAVE A FLEXIBLE CONNECTION FOR THE RETURN AIR & SUPPLY AIR DUCTWORK.
14. BALANCE ALL SYSTEMS IN COMMON AREAS TO CFM NOTED AT EACH DIFFUSER AND GRILLE BY AN INDEPENDENT BALANCING CONTRACTOR.
15. ALL GAS FIRED EQUIPMENT WILL BE TESTED BY CERTIFIED GAS INSTALLERS AND HAVE GREEN STICKERS STATING COMPLIANCE WITH ALL REQUIRED LOCAL AND 2018 IFGC REQUIREMENTS.
16. HEATING LOADS COMPLETED USING CHVAC OR OTHER APPROVED CALCULATION METHODS.
17. THE MAXIMUM LENGTH OF A CLOTHES DRYER EXHAUST DUCT SHALL NOT EXCEED 35 FEET FROM THE DRYER LOCATION TO THE OUTLET TERMINAL. THE MAXIMUM LENGTH OF THE DUCT SHALL BE REDUCED 2-1/2 FEET FOR EACH 45° BEND AND 5 FEET FOR EACH 90° BEND. THE MAXIMUM LENGTH OF THE EXHAUST DUCT DOES NOT INCLUDE THE TRANSITION DUCT. 2018 IMC 504.8.4.
18. CEILING SPACE AVAILABLE TO MECHANICAL DUCTING AND EQUIPMENT IS LIMITED FOR THIS PROJECT. SEE ARCHITECTURAL CROSS SECTIONS FOR ANTICIPATED AVAILABLE SPACE. SEE ARCHITECTURAL AND STRUCTURAL PLANS FOR LOCATIONS OF STRUCTURAL BEAMS THAT MIGHT CONFLICT WITH THE SHOWN DUCT SIZING. DUCT DIMENSIONS REFLECT THE ANTICIPATED SPACE AVAILABLE BETWEEN THE BOTTOM OF TRUSS AND CEILING FRAMING. DUCTING IN CONFLICT AREAS WILL REQUIRE AN IN FIELD ADJUSTMENT. ONLY ADJUST SHOWN DUCT SIZES IN AREAS THAT CONFLICTS OCCUR. RE-SIZE SHOWN DUCT SIZES IN CONFLICT AREAS ACCORDING TO SHOWN CFM VALUES AND USE A .08 FRICTION LOSS.
19. REFRIGERANT PIPING INSULATION.
   19.1. INSULATE ALL REFRIGERANT SUCTION PIPING WITH 1/2" THICK FLEXIBLE FOAMED PLASTIC CLOSED CELL PIPE INSULATION.
   19.2. INSULATION SHALL HAVE A "K" FACTOR OF NOT MORE THAN .26 AT 70°F AND A WATER VAPOR TRANSMISSION RATE OF 0.1 PERM-INCH OR LESS IN CONFORMANCE WITH ASTM C-177 & ASTM C-355 WATER METHOD.
   19.3. WHEN INSULATION IS EXPOSED TO SUNLIGHT WRAP WITH POLYTAPE WITH ONE THIRD OVERLAP.
   19.4. INSTALL INSULATION BY SLITTING TUBULAR SECTIONS AND APPLYING OVER PIPING.
   19.5. PAINT ALL INSULATION AND/OR TAPE EXPOSED TO THE EXTERIOR WITH ULTRAVIOLET RESISTING PAINT.

DESIGN CONTACTS

MECHANICAL ENGINEER:	MARK MAKIN (mark.makin@royaleng.com)
MECHANICAL PROJECT MANAGER:	CHRIS FALSLEV (chris.falslev@royaleng.com)
MECHANICAL DESIGNER:	ROGER FULLERTON (roger.fullerton@royaleng.com)

SHEET INDEX

REGISTERED PROFESSIONAL ENGINEER
4858829
MARK L. MAKIN
9/20/19
STATE OF UTAH

ROYAL ENGINEERING
ELECTRICAL | MECHANICAL
1837 S. EAST BAY BLVD. PROVO, UTAH 84606
PHONE: 801.375.2228 FAX: 801.375.2676

 JOB# J19141.00 DATE PLOTTED: 09/20/2019

REVISIONS

DRAWN BY
RDF

HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS
GENERAL MECHANICAL NOTES, SYMBOLS, AND SHEET INDEX

09/20/2019

M0.1

MECHANICAL KEYED NOTES:

10. PROVIDE AND INSTALL WALL HEATER IN PRV/FIRE RISER ROOM. VERIFY FINAL LOCATION WITH OWNER REPRESENTATIVE. COORDINATE FINAL LOCATIONS WITH PLUMBING CONTRACTOR TO AVOID INSTALLATION CONFLICTS.

MECHANICAL KEYED NOTES:

6. RA DUCT SIZE IS SHOWN. IT IS PROPOSED THAT FURNACE BE MOUNTED ON A RETURN PEDESTAL WITH SIDEWALL RETURN GRILLE. PROVIDE AND INSTALL INSULATION ON RA DUCTING TO ALLEVIATE FAN NOISE. INSTALL RA GRILLE SIZED TO ALLOW SHOWN CFM WITH AN NC NO GREATER THAN 25. COORDINATE FINAL LOCATION WITH OWNER REPRESENTATIVE. SEE MECHANICAL DETAILS.
7. PROPOSED FURNACE LOCATION. SEE MECHANICAL PERFORMANCE NOTES, SCHEDULES AND DETAILS. MAKE ALL CONNECTIONS TO COMPLETE SYSTEM. COORDINATE FINAL LOCATION WITH OWNER REPRESENTATIVE.
8. PROPOSED LOCATION OF FURNACE SUPPLY DUCT. SEE CONTINUATION ON UPPER FLOOR MECHANICAL PLANS. COORDINATE FINAL LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE. SEE MECHANICAL DETAILS.
9. PROPOSED LOCATION OF OUTSIDE AIR DUCTING AND INTAKE. PROVIDE AND INSTALL APPROVED GRILLE, COORDINATE FINAL LOCATION GRILLE/INTAKE WITH OWNER REPRESENTATIVE. PROVIDE AND INSTALL MOTORIZED DAMPER WITH GASKET/SEAL.COORDINATE COLOR WITH OWNER REPRESENTATIVE. SEE OUTSIDE AIR SCHEDULE FOR CFM VALUES AND MECHANICAL DETAILS. DUCT SHALL BE 26 GAUGE OR HEAVIER, LESS THAN 100 SQUARE INCHES, AND CONTINUOUS FROM EQUIPMENT TO EXTERIOR.

MECHANICAL KEYED NOTES:

1. MECHANICAL CONTRACTOR TO PROVIDE AND INSTALL A 7-DAY PROGRAMMABLE THERMOSTAT 48" ABOVE FINISHED FLOOR LEVEL. COORDINATE THERMOSTAT LOCATION WITH OWNER REPRESENTATIVE IN FIELD. PROVIDE AND INSTALL A HEAVY DUTY VANDAL RESISTANT COVER IN PUBLIC AREAS.
2. PROPOSED LOCATION OF WALL MOUNTED HEAT PUMP. SEE MECHANICAL PERFORMANCE NOTES, SCHEDULES AND DETAILS. MAKE ALL CONNECTIONS TO COMPLETE SYSTEM. COORDINATE FINAL LOCATION WITH OWNER REPRESENTATIVE.
3. SEE INDIVIDUAL UNITS ENLARGED MECHANICAL PLANS FOR MORE DETAIL AND INFORMATION.
4. PROPOSED LOCATION OF FURNACE CONCENTRIC VENT PIPING. ROOF VENTING IS DESIRED. INSTALL VENTING PER MANUFACTURERS INSTALLATION INSTRUCTIONS. SEE MECHANICAL DETAILS.
5. PROPOSED LOCATION OF REFRIGERANT LINES TO CONDENSERS/OUTDOOR UNITS. COORDINATE FINAL LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE. SEE MECHANICAL DETAILS.

LEVEL 1 MECHANICAL PLAN

SCALE: 3/16" = 1'-0"

REGISTERED PROFESSIONAL ENGINEER
4858829
MARK L. MAKIN
9/20/19
STATE OF UTAH

ROYAL ENGINEERING
ELECTRICAL MECHANICAL
1837 S. EAST BAY BLVD.
PROVO, UTAH 84606
PHONE: 801.375.2228
FAX: 801.375.2676

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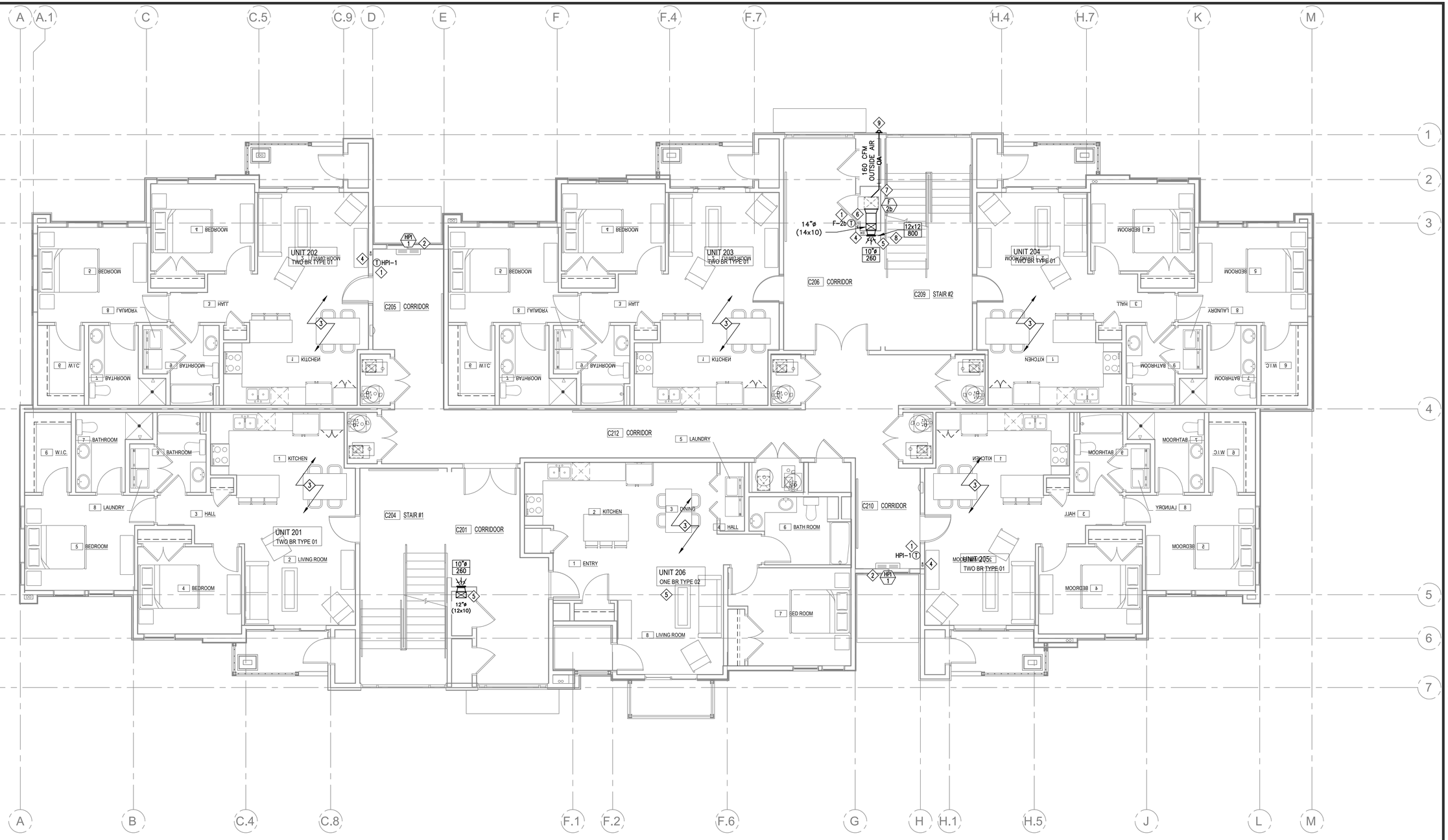
30th STREET APARTMENTS

LEVEL 1 MECHANICAL PLAN

09/20/2019

M1.1



MECHANICAL KEYED NOTES:

6. PROPOSED LOCATION OF FURNACE CONCENTRIC VENT PIPING. ROOF VENTING IS DESIRED. INSTALL VENTING PER MANUFACTURERS INSTALLATION INSTRUCTIONS. SEE MECHANICAL DETAILS.

7. PROPOSED FURNACE LOCATION. SEE MECHANICAL PERFORMANCE NOTES, SCHEDULES AND DETAILS. MAKE ALL CONNECTIONS TO COMPLETE SYSTEM. COORDINATE FINAL LOCATION WITH OWNER REPRESENTATIVE.

8. RA DUCT SIZE IS SHOWN. IT IS PROPOSED THAT FURNACE BE MOUNTED ON A RETURN PEDESTAL WITH SIDEWALL RETURN GRILLE. PROVIDE AND INSTALL INSULATION ON RA DUCTING TO ALLEVIATE FAN NOISE. INSTALL RA GRILLE SIZED TO ALLOW SHOWN CFM WITH AN NC NO GREATER THAN 25. COORDINATE FINAL LOCATION WITH OWNER REPRESENTATIVE. SEE MECHANICAL DETAILS.

9. PROPOSED LOCATION OF OUTSIDE AIR DUCTING AND INTAKE. PROVIDE AND INSTALL APPROVED GRILLE, COORDINATE FINAL LOCATION GRILLE/INTAKE WITH OWNER REPRESENTATIVE. PROVIDE AND INSTALL MOTORIZED DAMPER WITH GASKET/SEAL.COORDINATE COLOR WITH OWNER REPRESENTATIVE. SEE OUTSIDE AIR SCHEDULE FOR CFM VALUES AND MECHANICAL DETAILS. DUCT SHALL BE 26 GAUGE OR HEAVIER, LESS THAN 100 SQUARE INCHES, AND CONTINUOUS FROM EQUIPMENT TO EXTERIOR.

MECHANICAL KEYED NOTES:

1. MECHANICAL CONTRACTOR TO PROVIDE AND INSTALL A 7-DAY PROGRAMMABLE THERMOSTAT 48" ABOVE FINISHED FLOOR LEVEL. COORDINATE THERMOSTAT LOCATION WITH OWNER REPRESENTATIVE IN FIELD. PROVIDE AND INSTALL A HEAVY DUTY VANDAL RESISTANT COVER IN PUBLIC AREAS.

2. PROPOSED LOCATION OF WALL MOUNTED HEAT PUMP. SEE MECHANICAL PERFORMANCE NOTES, SCHEDULES AND DETAILS. MAKE ALL CONNECTIONS TO COMPLETE SYSTEM. COORDINATE FINAL LOCATION WITH OWNER REPRESENTATIVE.

3. SEE INDIVIDUAL UNITS ENLARGED MECHANICAL PLANS FOR MORE DETAIL AND INFORMATION.

4. PROPOSED LOCATION OF REFRIGERANT LINES TO CONDENSERS/OUTDOOR UNITS. COORDINATE FINAL LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE. SEE MECHANICAL DETAILS.

5. PROPOSED LOCATION OF FURNACE SUPPLY DUCT. SEE CONTINUATION ON UPPER AND LOWER FLOOR MECHANICAL PLANS. COORDINATE FINAL LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE. SEE MECHANICAL DETAILS.

LEVEL 2 MECHANICAL PLAN

SCALE: 3/16" = 1'-0"

PROFESSIONAL ENGINEER — MARK L MAKIN — 9/20/19 — STATE OF UTAH

ROYAL ENGINEERING

ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228

MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

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3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6393 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS

LEVEL 2 MECHANICAL PLAN

09/20/2019

M1.2

LEVEL 3 MECHANICAL PLAN

SCALE: 3/16" = 1'–0"

MECHANICAL KEYED NOTES:

1. MECHANICAL CONTRACTOR TO PROVIDE AND INSTALL A 7–DAY PROGRAMMABLE THERMOSTAT 48" ABOVE FINISHED FLOOR LEVEL. COORDINATE THERMOSTAT LOCATION WITH OWNER REPRESENTATIVE IN FIELD. PROVIDE AND INSTALL A HEAVY DUTY VANDAL RESISTANT COVER IN PUBLIC AREAS.
2. PROPOSED LOCATION OF WALL MOUNTED HEAT PUMP. SEE MECHANICAL PERFORMANCE NOTES, SCHEDULES AND DETAILS. MAKE ALL CONNECTIONS TO COMPLETE SYSTEM. COORDINATE FINAL LOCATION WITH OWNER REPRESENTATIVE.
3. SEE INDIVIDUAL UNITS ENLARGED MECHANICAL PLANS FOR MORE DETAIL AND INFORMATION.
4. PROPOSED LOCATION OF REFRIGERANT LINES TO CONDENSERS/OUTDOOR UNITS. COORDINATE FINAL LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE. SEE MECHANICAL DETAILS.
5. PROPOSED LOCATION OF FURNACE SUPPLY DUCT. SEE CONTINUATION ON LOWER FLOOR MECHANICAL PLANS. COORDINATE FINAL LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE. SEE MECHANICAL DETAILS.

REGISTERED PROFESSIONAL ENGINEER
4858829
MARK L. MAKIN
9/20/19
STATE OF UTAH

ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

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LEVEL 3 MECHANICAL PLAN

09/20/2019

M1.3

ROOF MECHANICAL PLAN
SCALE: 3/16" = 1'-0"

MECHANICAL KEYED NOTES:

1. RECOMMENDED LOCATION OF CONDENSING/OUTDOOR UNITS SERVING UNITS AND COMMON AREAS. COORDINATE FINAL LOCATION WITH STRUCTURAL ENGINEER AND OWNER REPRESENTATIVE. PROVIDE AND INSTALL LINE SETS AND GOOSE NECK TRANSITION. SEAL ALL EXTERIOR CONNECTIONS WATER TIGHT AND/OR AS DIRECTED BY OWNER REPRESENTATIVE. SEE MECHANICAL SCHEDULES AND DETAILS.
2. RECOMMENDED LOCATION OF HEAT PUMP SERVING WALL MOUNTED UNITS IN COMMON SPACES. COORDINATE FINAL LOCATION WITH STRUCTURAL ENGINEER AND OWNER REPRESENTATIVE. PROVIDE AND INSTALL LINE SETS AND GOOSE NECK TRANSITION. SEAL ALL EXTERIOR CONNECTIONS WATER TIGHT AND/OR AS DIRECTED BY OWNER REPRESENTATIVE. SEE MECHANICAL SCHEDULES AND DETAILS.

REGISTERED PROFESSIONAL ENGINEER 4858829 MARK L. MAKIN 9/20/19 STATE OF UTAH

ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

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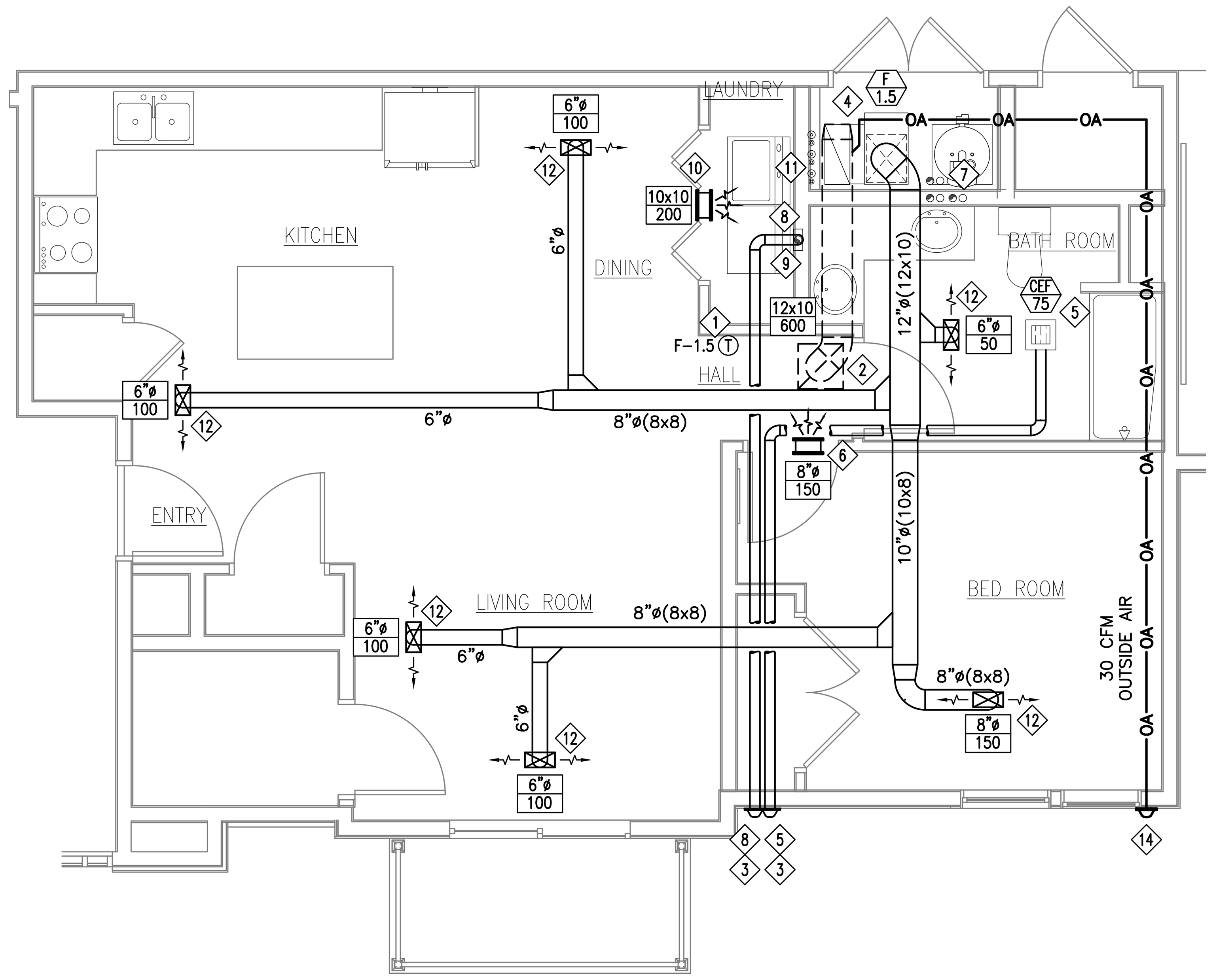
30th STREET APARTMENTS

ROOF MECHANICAL PLAN

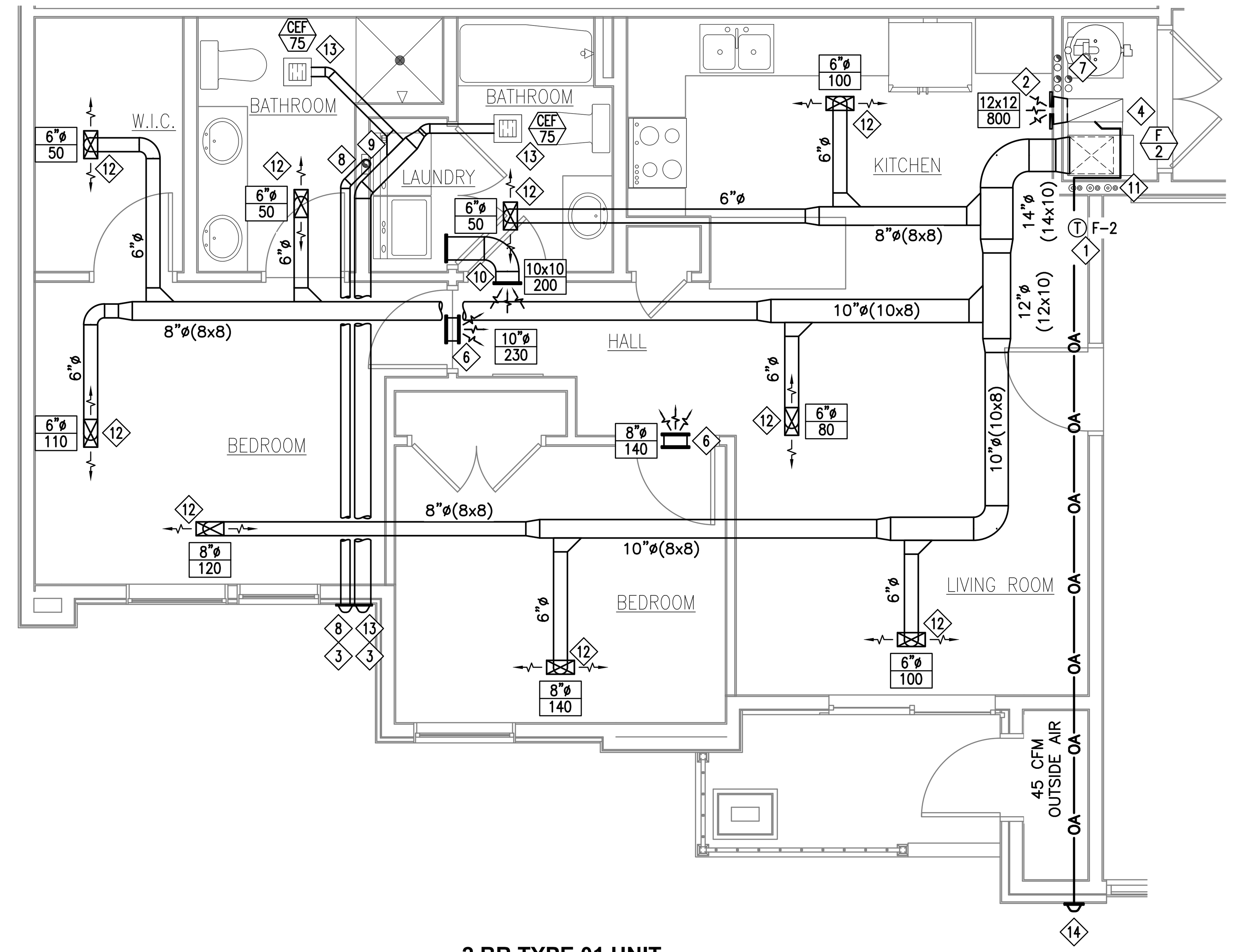
09/20/2019

M1.4



1 BR TYPE 02 UNIT

1 BR ADA TYPE A SIMILAR



2 BR TYPE 01 UNIT

ENLARGED TYPICAL UNITS MECHANICAL PLANS

SCALE: 1/4"=1'0"

MECHANICAL KEYED NOTES:

1. MECHANICAL CONTRACTOR TO PROVIDE AND INSTALL A 7-DAY PROGRAMMABLE WIFI-ENABLED HONEYWELL THERMOSTAT 48" ABOVE FINISHED FLOOR LEVEL. COORDINATE THERMOSTAT LOCATION WITH OWNER'S REPRESENTATIVE IN FIELD.
2. RA DUCT SIZE IS SHOWN. PROVIDE AND INSTALL INSULATION ON RA DUCTING TO ALLEVIATE FAN NOISE. INSTALL RA GRILLE SIZED TO ALLOW SHOWN CFM WITH AN NC NO GREATER THAN 30. COORDINATE FINAL LOCATION WITH OWNER REPRESENTATIVE.
3. MECHANICAL CONTRACTOR TO PROVIDE AND INSTALL BACKDRAFT DAMPERS AT ALL EXTERIOR PENETRATIONS OF THE THERMAL ENVELOPE FOR ALL EXHAUST AND FAN OUTLETS/TERMINATIONS.
4. PROPOSED FURNACE LOCATION. SEE MECHANICAL PERFORMANCE NOTES, SCHEDULES AND DETAILS. MAKE ALL CONNECTIONS TO COMPLETE SYSTEM. COORDINATE FINAL LOCATION WITH OWNER REPRESENTATIVE.
5. PROVIDE AND INSTALL 4"ø EXHAUST DUCT TO APPROVED EXHAUST VENT TERMINATION AT LOCATION APPROVED BY OWNER REPRESENTATIVE. ACTUAL DUCT SIZE SHALL BE DETERMINED BY EXHAUST FAN OUTLET. TERMINATION LOCATION MUST BE A MINIMUM OF 3 FEET FROM ANY OPERABLE OPENING INTO THE BUILDING. FIELD ADJUSTMENT TO LOCATION MAY BE REQUIRED IF TERMINATION LOCATION SHOWN WILL NOT MEET THE 3 FOOT CLEARANCE REQUIREMENT. PAINT WALL GRILLE/TERMINATION(S) SAME COLOR AS SURROUNDING WALL/SURFACE. COORDINATE COLOR WITH OWNER REPRESENTATIVE. SEE MECHANICAL PERFORMANCE NOTES AND DETAILS.
6. PROVIDE AND INSTALL TRANSFER GRILLE AND WALL SLEEVE. COORDINATE LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE. SEE MECHANICAL DETAILS. SIZE GRILLES WITH CFM SHOWN WITH AN NC NO GREATER THAN 30.
7. PROPOSED LOCATION OF FURNACE CONCENTRIC VENT PIPING. ROOF VENTING IS DESIRED. INSTALL VENTING PER MANUFACTURERS INSTALLATION INSTRUCTIONS. SEE MECHANICAL DETAILS.
8. PROVIDE AND INSTALL DRYER VENT BOX WITH 4"ø DUCTING TO OWNER REPRESENTATIVE APPROVED EXHAUST TERMINATION. VENT SHALL BE CONSTRUCTED OF METAL WITH A SMOOTH INTERIOR FINISH. SUGGESTED LOCATION IS SHOWN. PROVIDE AND INSTALL FIRE RATED BOX OR PROVIDE FIRE RATED ASSEMBLY WHEN INSTALLED WITHIN FIRE RATED WALL. TERMINATION SHALL BE 3 FEET FROM ANY OPERABLE OPENING INTO THE STRUCTURE. SEE TERMINATION LOCATION DETAIL. IF SHOWN LOCATION CANNOT MEET CLEARANCE CRITERIA AN ALTERNATE LOCATION WILL BE REQUIRED. IF LOCATION CANNOT MEET MINIMUM EQUIVALENT VENT LENGTH, PROVIDE AND INSTALL BOOSTER FAN. SEE MECHANICAL NOTES AND DETAILS. COORDINATE LOCATION WITH OWNER REPRESENTATIVE.
9. PROVIDE AND INSTALL SIGN AT DRYER DUCT WALL OPENING INDICATING THE TOTAL LENGTH OF THE CONCEALED DUCT.
10. PROVIDE AND INSTALL DRYER MAKE UP GRILLES AND SLEEVE WHERE A CLOSET IS DESIGNED FOR THE INSTALLATION OF A CLOTHES DRYER. AN OPENING HAVING AN AREA OF NOT LESS THAN 100 SQUARE INCHES SHALL BE PROVIDED IN THE CLOSET ENCLOSURE (IMC 504.5). SIDEWALL GRILLES ARE SHOWN. PROVIDE AND INSTALL CEILING GRILLES WITH APPROPRIATE DUCTING IF INSTALLATION OF SIDEWALL GRILLES IS NOT FEASIBLE.
11. PROPOSED LOCATION OF REFRIGERANT LINES TO CONDENSERS. COORDINATE FINAL LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE. SEE MECHANICAL DETAILS.
12. TYPICAL CEILING DIFFUSER. COORDINATE WITH OWNER FOR APPROVED MODELS/MANUFACTURERS. RECOMMENDED DUCT SIZE IS SHOWN. COORDINATE FINAL LOCATION WITH BEARING WALLS/STRUCTURE AND OWNER REPRESENTATIVE. PROVIDE AND INSTALL FIRE DAMPER WHERE DUCTING PENETRATES FIRE RATED ASSEMBLY.
13. PROVIDE AND INSTALL 4"ø EXHAUST DUCT. COMPLETE CONNECTION TO COMMON 7" EXHAUST DUCT. EXTEND EXHAUST DUCT TO APPROVED EXHAUST VENT TERMINATION AT LOCATION APPROVED BY OWNER REPRESENTATIVE. ACTUAL DUCT SIZE SHALL BE DETERMINED BY EXHAUST FAN OUTLET. TERMINATION LOCATION MUST BE A MINIMUM OF 3 FEET FROM ANY OPERABLE OPENING INTO THE BUILDING. FIELD ADJUSTMENT TO LOCATION MAY BE REQUIRED IF TERMINATION LOCATION SHOWN WILL NOT MEET THE 3 FOOT CLEARANCE REQUIREMENT. PAINT WALL GRILLE/TERMINATION(S) SAME COLOR AS SURROUNDING WALL/SURFACE. COORDINATE COLOR WITH OWNER REPRESENTATIVE. SEE MECHANICAL PERFORMANCE NOTES AND DETAILS. PROVIDE AND INSTALL FIRE DAMPER WHERE EXHAUST FAN PENETRATES FIRE RATED ASSEMBLY.
14. SUGGESTED LOCATION OF OUTSIDE AIR DUCTING AND INTAKE WITH APPROVED GRILLE, COORDINATE FINAL LOCATION GRILLE/INTAKE WITH OWNER REPRESENTATIVE. PAINT EXTERIOR GRILLE/INTAKE SAME COLOR AS SURROUNDING WALL. COORDINATE COLOR WITH OWNER REPRESENTATIVE. SEE MECHANICAL DETAILS, NOTES AND OUTSIDE AIR SCHEDULE.

ROYAL ENGINEERING
ELECTRICAL
MECHANICAL
1837 S. EAST BAY BLVD.
PROVO, UTAH 84606
PHONE: 801.375.2228
FAX: 801.375.2676

REVISIONS

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HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS

ENLARGED UNITS TYPICAL MECHANICAL PLANS

09/20/2019

M4.1

OUTSIDE AIR BALANCING SCHEDULE

MARK	BALANCE TO CFM	MINIMUM DUCT SIZE	VENTILATION RATES PER 2015 IMC 403.3 AND EQUATION 4–1. ($V_{bz} = R_p P_z + R_a A_z$)	
			REMARKS	LOCATION
F 2a	150	8"ø	SEE OUTSIDE AIR DUCT DETAIL	NORTH STAIRWELL
F 2b	160	8"ø	SEE OUTSIDE AIR DUCT DETAIL	SOUTH STAIRWELL

FURNACE 95.5% AFUE (1-STAGE, SPLIT SYSTEM)

FURNACE												CONDENSING UNIT										REMARKS
MARK	DESIGN GUIDE	NOMINAL COOLING SUPPLY CFM	ESP (IN)	COOLING EAT DB/WB (°F)	COOLING LAT DB/WB (°F)	COOLING COIL CAPACITY (TONS)	HEATING INPUT CAPACITY (BTU/hr)	HEATING EAT/LAT DB (°F)	ELECTRICAL VOLT/PH/HZ	ELECTRICAL UNIT MCA	ELECTRICAL UNIT MOCP	MARK	DESIGN GUIDE	MINIMUM NOMINAL SIZE (TONS)	ELECTRICAL VOLT/PH/HZ	ELECTRICAL UNIT FLA	ELECTRICAL UNIT MOCP	SEER	REFRIGERANT	MAX OPERATING WEIGHT		
F 1.5	YORK TG9E SERIES	600	0.5	80/62	55.6/52.4	1.5	40,000	65/95	120/1/60	8	15	CU 1.5	YORK CZF SERIES	1.5	240/1/60	11.8	20	15	R410	--	1 2 3 4 5 6 8	UNITS
F 2	YORK TG9E SERIES	800	0.5	80/62	55.9/52.6	2	60,000	65/95	120/1/60	10	15	CU 2	YORK CZF SERIES	2	240/1/60	17.3	30	15	R410	159	1 2 3 4 5 6 8	UNITS
F 2	YORK TG9E SERIES	800	0.5	80/62	55.9/52.6	2	60,000	65/95	120/1/60	10	15	CU 2	YORK CZF SERIES	2	240/1/60	17.3	30	15	R410	159	1 2 3 4 5 7 8	STAIRWELLS

1. SITE CONDITIONS ARE 94/60° DB/WB SUMMER, 1°F DB WINTER, AND AN ELEVATION OF 4,300 FEET ABOVE SEA LEVEL.
2. APPROVED MANUFACTURERS: CARRIER, LENNOX, TRANE, YORK. (SUBJECT TO DOCUMENT CONFORMANCE).
3. WITH CONCENTRIC VENT KIT.
4. MATCH COOLING COIL WITH CONDENSING UNIT. SHALL BE COMPATIBLE WITH FURNACE. FURNACE SHALL BE DESIGNED FOR MULTI–POSITION INSTALLATION. COORDINATE COIL WITH FURNACE ORIENTATION.
5. 1 STAGE OF HEATING.
6. PROVIDE AND INSTALL HONEYWELL T9 WIFI SMART THERMOSTAT.
7. PROVIDE AND INSTALL 7–DAY PROGRAMMABLE THEROMOSTAT. PROVIDE AND INSTALL HEAVY DUTY VANDAL RESISTANT COVER IN PUBLIC AREAS.
8. PROVIDE AND INSTALL FILTER SECTION.

CEILING EXHAUST FAN SCHEDULE

MARK	NOMINAL CFM	TOTAL STATIC PRESSURE IN. W.C.	ELECTRICAL RATED LOAD WATTS	ELECTRICAL VOLTS	ELECTRICAL HERTZ	ELECTRICAL PHASE	SOUND RATING SONES	SELECTION BASED ON GREENHECK MODEL	REMARKS
CEF 75	75	0.25	100	115	60	1	0.6	SP–B110	2 1 3

1. APPROVED MANUFACTURERS: BROAN, FANTECH, ACME, CARNES, PENN, COOK, BREIDERT, COOLAIR, CAPTIVE AIRE, S&P, GREENHECK, TWIN CITY FAN, DELTA BREEZ, AIR KING. (SUBJECT TO PROJECT DOCUMENT CONFORMANCE)
2. CONTROL BY ELECTRICAL CONTRACTOR WITH SEPARATE CONTROL SWITCH.
3. EXHAUST FAN SHALL HAVE INTEGRAL BACKDRAFT DAMPER.

AIR CONDITIONING UNIT SCHEDULE - INDOOR SECTION

MARK	DESCRIPTION	SUPPLY CFM	RATED CAPACITY BTU/H	ELECTRICAL	NOTES
HPI 1	AIR CONDITIONING UNIT	380	12,000	INDOOR UNIT IS POWERED THROUGH THE OUTDOOR UNIT.	DESIGN GUIDE: MITSUBISHI ELECTRIC MSZ–SERIES 1 3 5 2 4 6

1. FACTORY THERMOSTAT CONTROLS.
2. PROVIDE ALL REQUIRED MOUNTING HARDWARE.
3. PROVIDE CONDENSATE PIPING TO NEAREST PLUMBING DRAIN. COORDINATE LOCATION WITH PLUMBING CONTRACTOR.
4. WALL MOUNTED HEATING AND COOLING UNIT.
5. ELECTRICAL CONTRACTOR SHALL PROVIDE CONNECTION BETWEEN INDOOR AND OUTDOOR UNIT.
6. APPROVED MANUFACTURERS: DAIKIN, MITSUBISHI, FRIEDRICH, FUJITSU, SANYO. (SUBJECT TO PROJECT DOCUMENT CONFORMANCE)

AIR COOLED CONDENSING UNIT SCHEDULE - OUTSIDE

MARK	RATED CAPACITY (BTU/H)	ELECTRICAL VOLTAGE	ELECTRICAL UNIT MCA	ELECTRICAL UNIT MOCP	NOTES
HPO 3	36,000	240V 1–PHASE	30	40	DESIGN GUIDE: MITSUBISHI ELECTRIC MXZ–SERIES 1 3 5 2 4 6

1. LOW AMBIENT OPERATION TO 0°F MINIMUM.
2. MAKE PROVISIONS FOR YEAR ROUND OPERATION.
3. 17 SEER MINIMUM EFFICIENCY.
4. APPROVED MANUFACTURERS: DAIKIN, MITSUBISHI, FRIEDRICH, FUJITSU, SANYO. (SUBJECT TO PROJECT DOCUMENT CONFORMANCE)
5. ROOF MOUNTED MULTI–SPLIT OUTDOOR UNIT.
6. PROVIDE BRANCH CONTROLLER.

ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

 JOB# J19141.00 DATE PLOTTED: 09/20/2019

REVISIONS

DRAWN BY
RDF

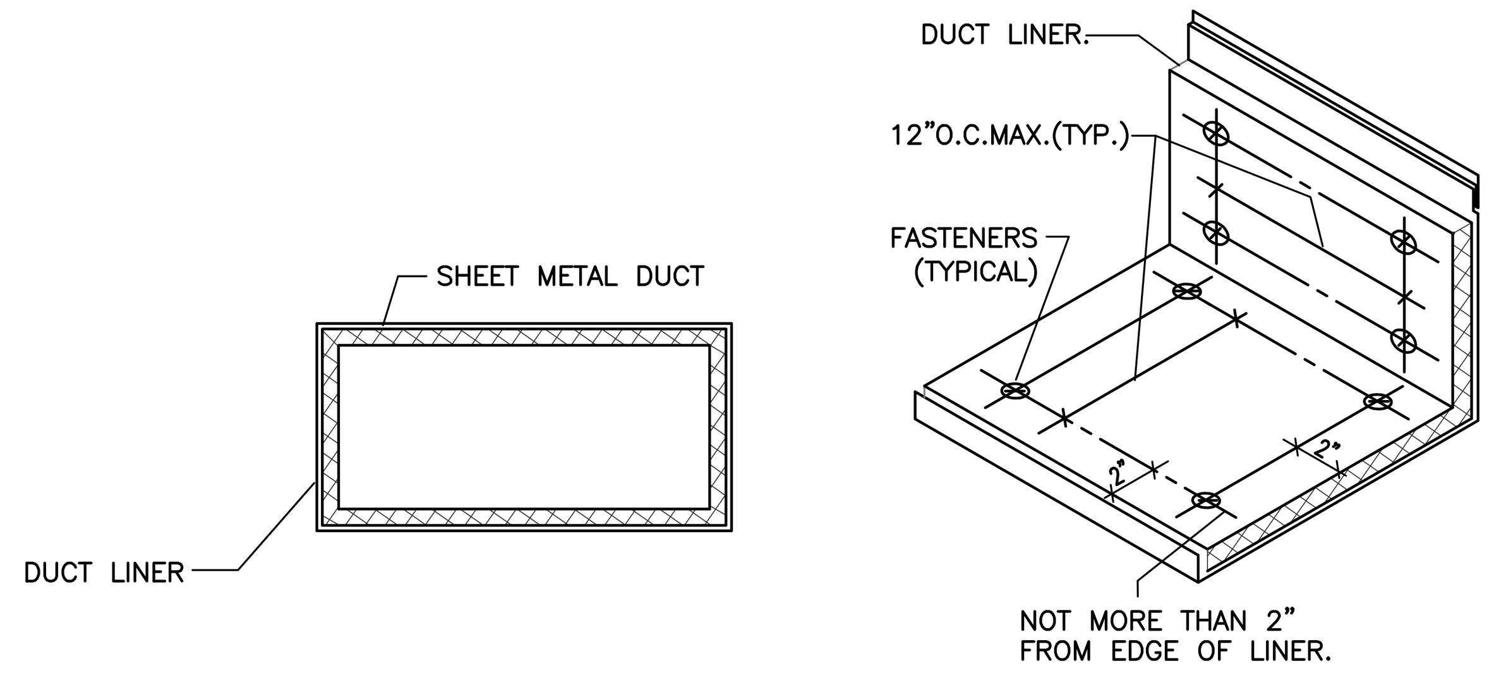
HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS
MECHANICAL SCHEDULES

09/20/2019

M6.1

NOTE:
ALL TRANSVERSE AND LONGITUDINAL EDGES OF LINER TO BE COATED WITH ADHESIVE.



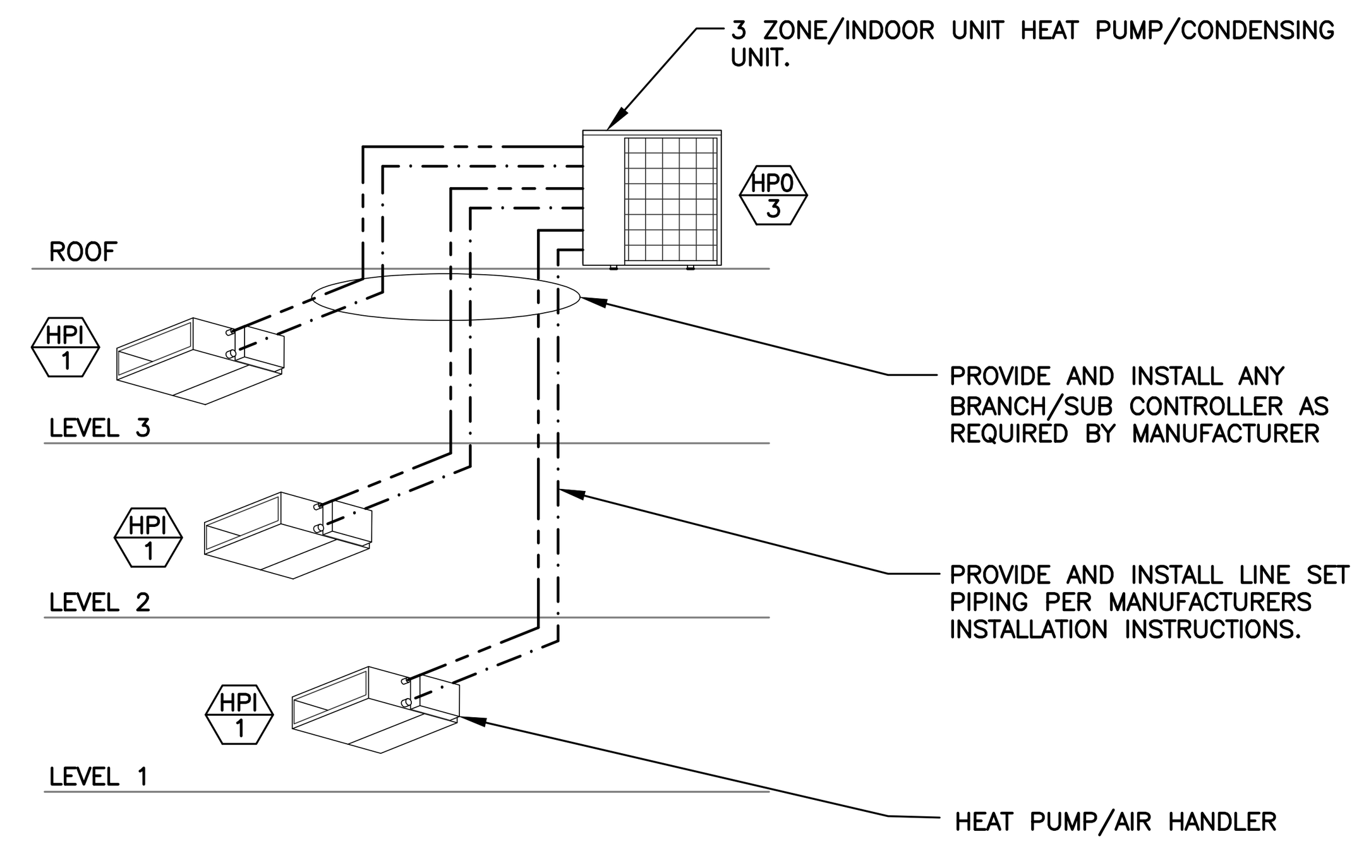
MINIMUM DUCT INSULATION R-VALUES FOR UNCONDITIONED SPACES PER 2018 IECC C403.11.1
SUPPLY = R6
RETURN = R6

MINIMUM DUCT INSULATION R-VALUES WHEN LOCATED OUTSIDE THE BUILDING PER 2018 IECC C403.11.1
SUPPLY = R8 (ZONE 1-4) R12 (ZONE 5-8)
RETURN = R8 (ZONE 1-4) R12 (ZONE 5-8)

NOTE:
THERMAL AND SOUND INSULATION AND COVERINGS, LININGS AND ADHESIVES (WHEN USED) INSTALLED IN CONCEALED AND EXPOSED SPACES SHALL MEET THE REQUIREMENTS OF ASTM E 84. FLAME SPREAD INDEX THAT IS NOT MORE THAN 25 AND A SMOKE-DEVELOPED INDEX OF NOT MORE THAN 50 WHEN TESTED IN ACCORDANCE WITH ASTM E 84.

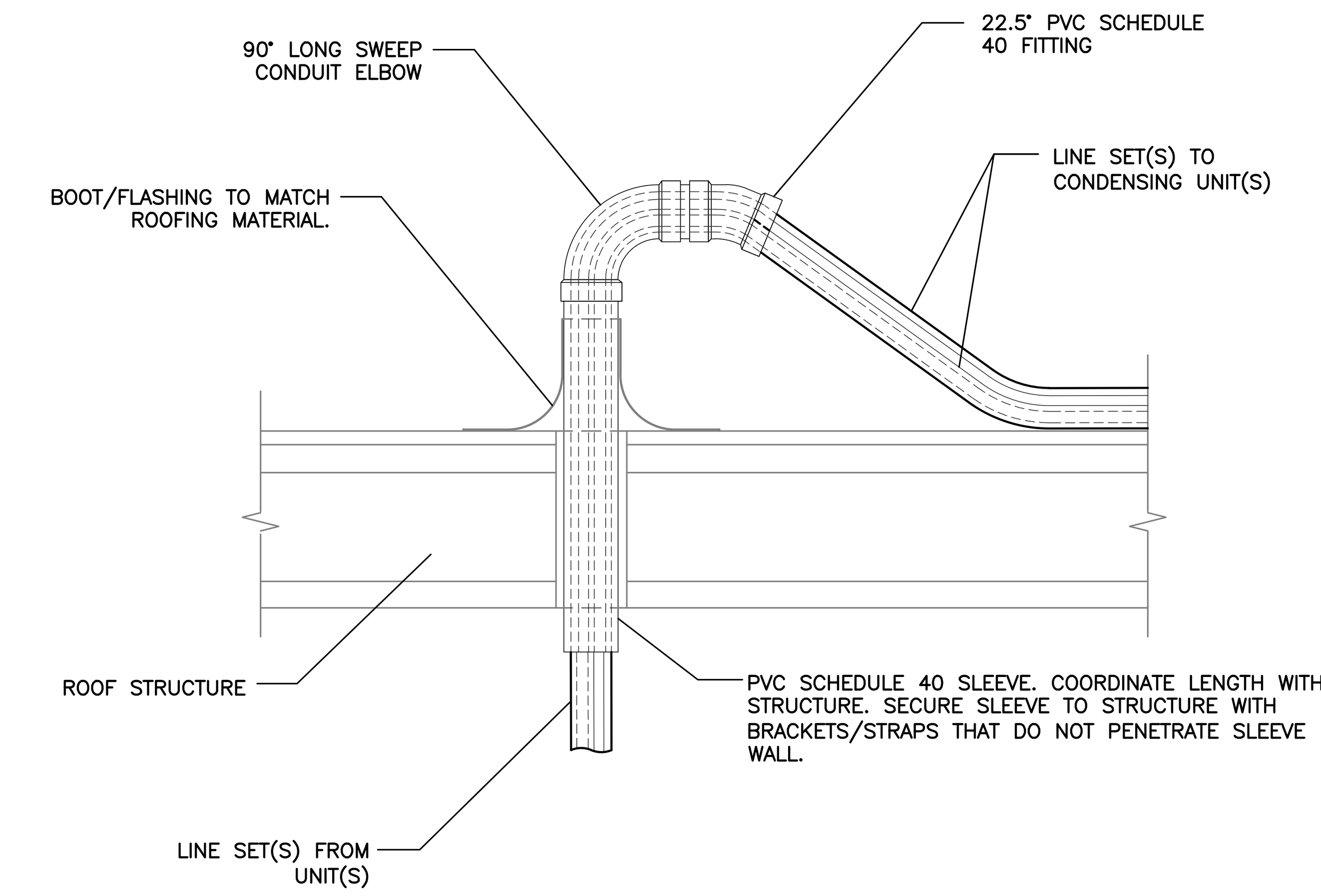
DUCT LINER DETAIL

SCALE: NONE



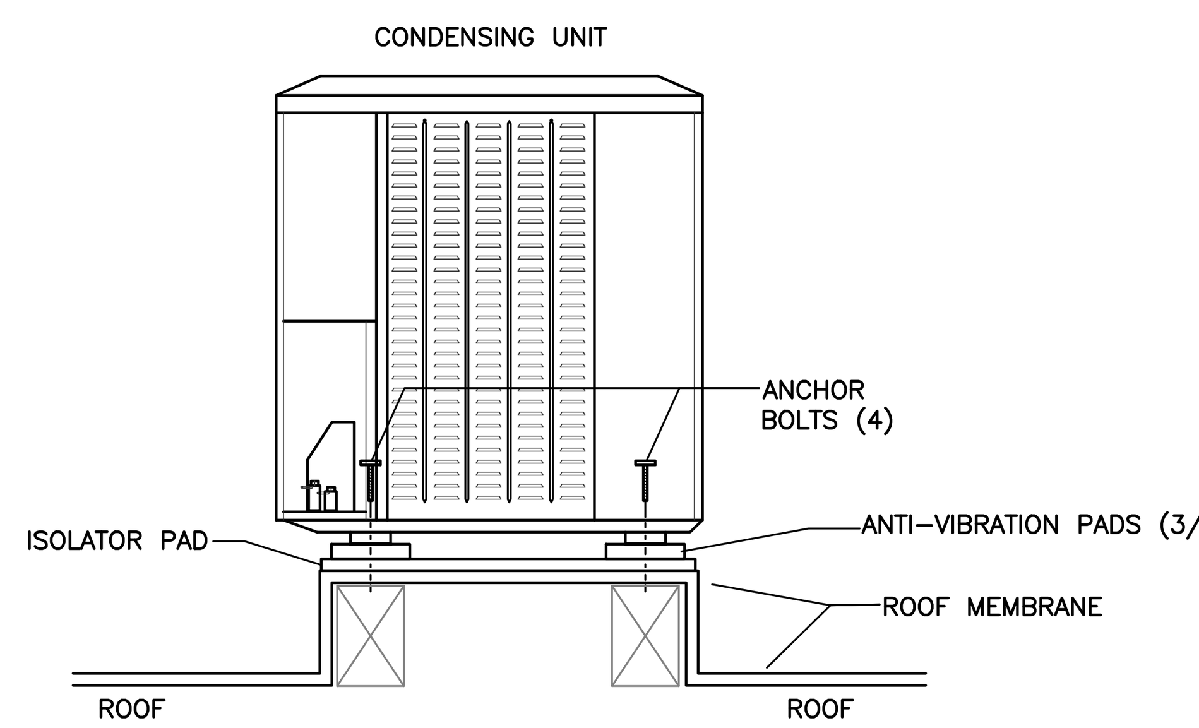
HEAT PUMP ZONING DIAGRAM (3 INDOOR UNITS)

SCALE: NONE



TYPICAL LINE SET GOOSE NECK ROOF DETAIL

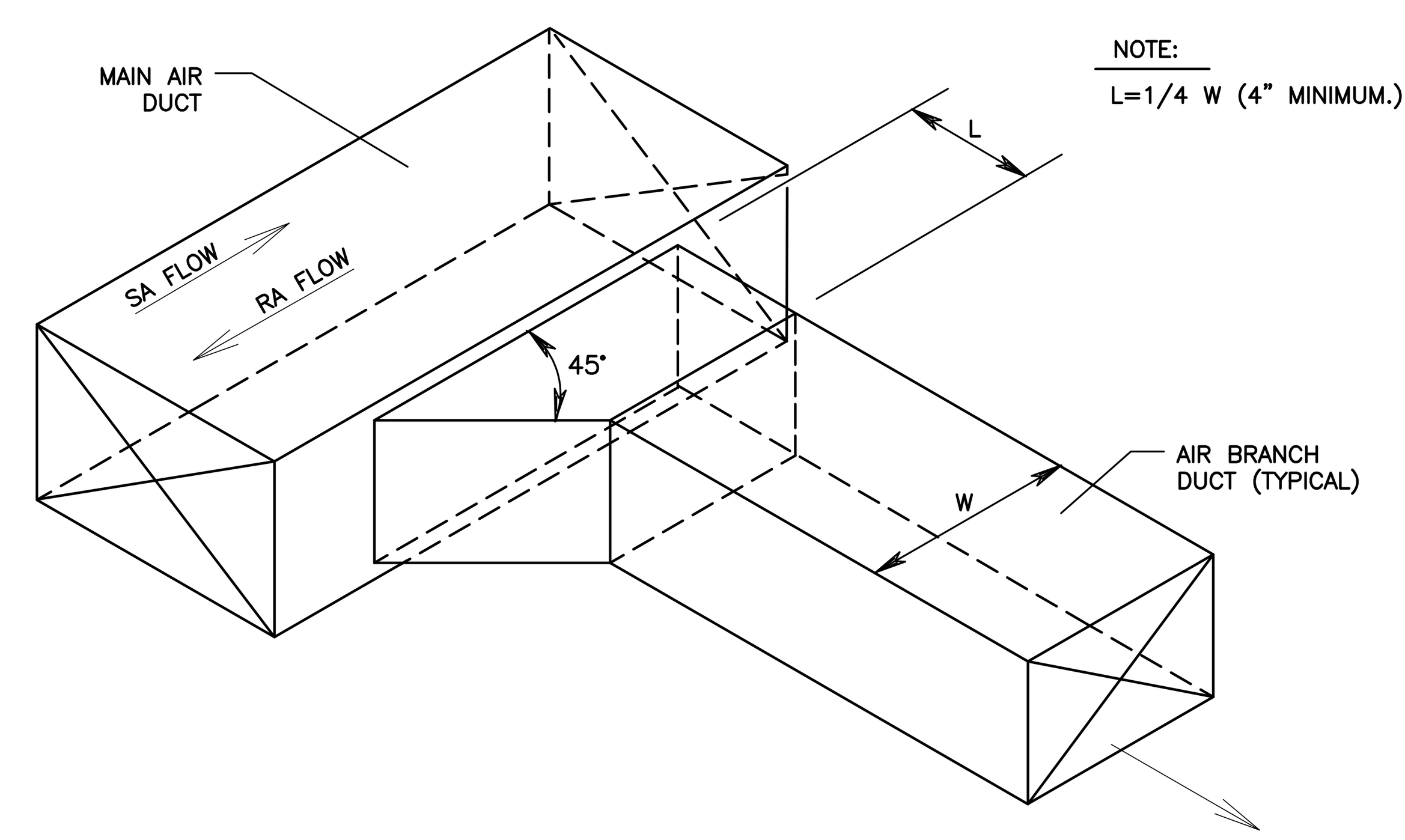
SCALE: NONE



NOTES:
1. INSTALL UNIT LEVEL OR, IF ON A SLOPE, MAINTAIN SLOPE TOLERANCE OF 2 DEGREES (OR 2 INCHES PER 5 FEET).
2. ELEVATED PORTION OF ROOF SHALL BE PROVIDED BY OTHERS (A MINIMUM OF 4 INCHES ABOVE THE SURFACE OF
3. THE ROOF). MOUNT CONDENSING UNIT TO ELEVATED AREA WITH FOUR ANCHOR BOLTS. SEAL ALL PENETRATIONS INTO ROOF MEMBRANE.
4. PROTECT ROOF SURFACE TO AVOID EXPOSURE OF ROOF SURFACE TO CONDENSING UNIT REFRIGERANT AND OIL DURING INSTALLATION.
5. FOLLOW ALL MANUFACTURER RECOMMENDATIONS.
6. VERIFY CURB LOCATION(S) WITH STRUCTURAL AND ARCHITECTURAL PLANS.
7. ANTI-VIBRATION PAD DESIGN STANDARD: DIVERSITECH ISO-CUBE ISO-18.

TYPICAL CONDENSING UNIT ROOF SUPPORT DETAIL

SCALE: NONE



BRANCH DUCT TAKE-OFF

SCALE: NONE

DIMENSION OF LONGEST SIDE, INCHES	SHEET METAL GAGE (ALL FOUR SIDES)	TRANSVERSE REINFORCING (1)					
		MINIMUM REINFORCING ANGLE SIZE AND MAXIMUM LONGITUDINAL SPACING BETWEEN TRANSVERSE JOINTS &/OR INTERMEDIATE REINFORCING	AT JOINTS				
			MIN. H. IN.	DRIVE SLIP / PLAIN S SLIP	HEMMED S SLIP	ALTER'NT BAR SLIP	REINFORCED BAR SLIP
				RECOMMENDED GAUGE	RECOMMENDED GAUGE	RECOMMENDED GAUGE	RECOMMENDED GAUGE
UP THRU 12	26	NONE REQUIRED	1	26	26	24	24
13 – 18	24	NONE REQUIRED	1	24	24	24	24
19 – 30	24	1"X1"X1/8" @ 60 IN	1	24	24	24	24
31 – 36	22	1"X1"X1/8" @ 60 IN	1	–	–	22	22

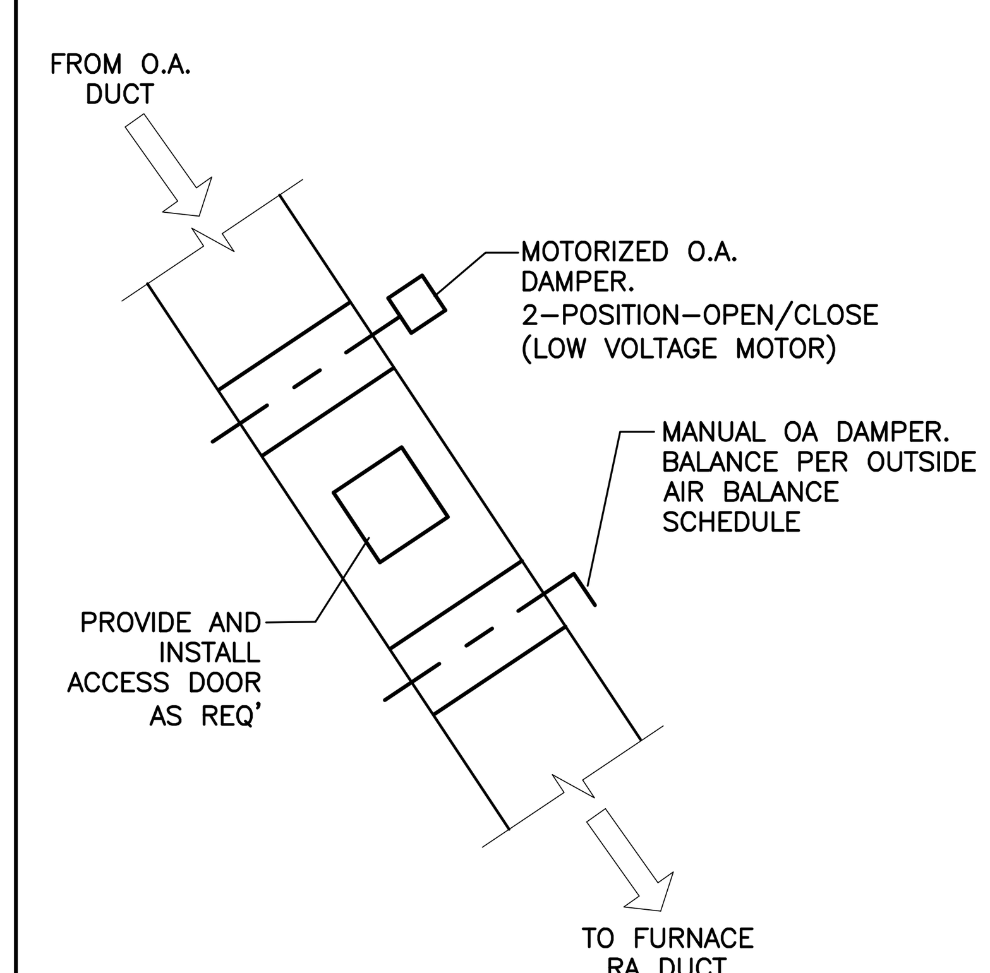
(1) TRANSVERSE REINFORCING SIZE IS DETERMINED BY DIMENSION OF SIDE TO WHICH ANGLE IS APPLIED.

(2) LONGITUDINAL JOINTS TO BE PITTSBURG OR SNAP LOCK TYPE.

(3) ALL DUCTING TO BE CONSTRUCTED TO SMACNA INSTALLATION STANDARDS AND SPECIFICATIONS.

DUCT CONSTRUCTION DETAIL

SCALE: NONE



CONTROL SEQUENCES

1. MOTORIZED OUTSIDE AIR DAMPER SHALL OPEN DURING OCCUPIED MODE AND SHALL REMAIN CLOSED DURING UNOCCUPIED MODE.
2. DURING A CALL FOR HEAT, IN BOTH OCCUPIED AND UNOCCUPIED MODES, THE FURNACE HEATING SYSTEM SHALL CYCLE ON AND OPERATE UNTIL THE PROGRAMMED SET-POINT IS REACHED.
3. DURING A CALL FOR COOLING, IN BOTH OCCUPIED AND UNOCCUPIED MODES, THE FURNACE AND CONDENSING UNITS SHALL CYCLE ON IN COOLING MODE AND OPERATE UNTIL THE PROGRAMMED SET-POINT IS REACHED.
4. UNLESS OTHERWISE SPECIFIED, EACH HVAC SYSTEM SHALL BE CONTROLLED BY A 7-DAY PROGRAMMABLE THERMOSTAT. THERMOSTAT SHALL HAVE OCCUPIED AND UNOCCUPIED MODES. THERMOSTAT SHALL MEET CURRENT REQUIREMENTS OF THE INTERNATIONAL ENERGY CONSERVATION CODE.
5. MECHANICAL CONTRACTOR SHALL PROVIDE AND INSTALL ALL LOW VOLTAGE WIRING, LOW VOLTAGE MOTORIZED ACTUATORS FOR DAMPER CONTROL, AND ANY OTHER NEEDED COMPONENTS FOR A FULLY OPERATIONAL SYSTEM.

TYPICAL OUTSIDE AIR DUCT DETAIL (RESIDENTIAL)

SCALE: NONE

REVISIONS

DRAWN BY
RDF

HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS

MECHANICAL DETAILS

09/20/2019

ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

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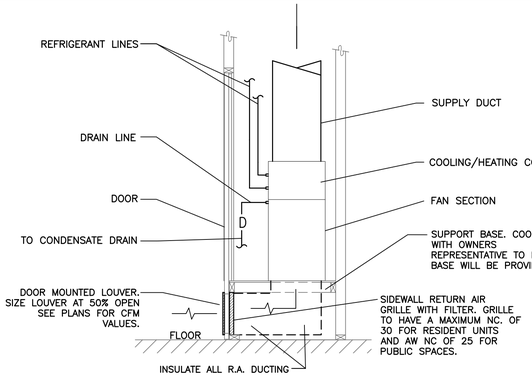
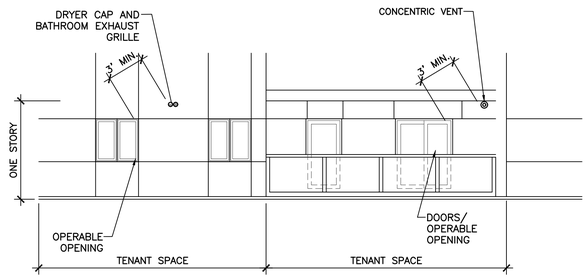
REGISTERED PROFESSIONAL ENGINEER
MARK L. MAKIN
9/20/19
STATE OF UTAH



NOTE:
PROVIDE AND INSTALL NEUTRALIZING DEVICE WHERE CONDENSATE WILL CAUSE DAMAGE TO THE DRAINAGE PIPING. SHALL BE PER 2018 IPC SECTION 803.

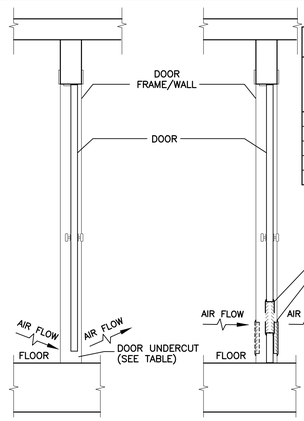
FURNACE W/ SIDEWALL R. A. GRILLE & SUPPORT PLATFORM

SCALE: NONE



TYPICAL EXHAUST TERMINATION LOCATIONS DETAIL

SCALE: NONE



MINIMUM DOOR CUT HEIGHT FOR RETURN AIR

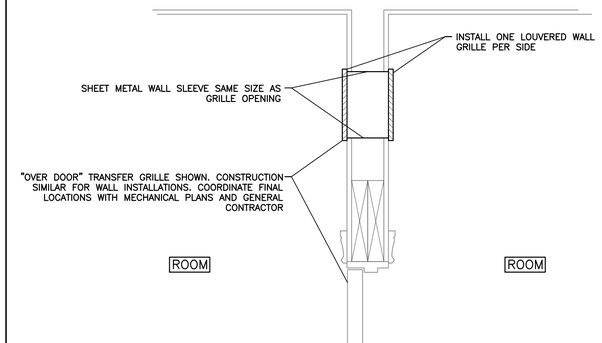
CFM UNDER DOOR	DOOR WIDTH (INCHES)						
	24	30	36	42	48	54	60
	CLEARANCE (INCHES) TO FLOOR TO TOP OF CARPET						
40	.75	0.6	0.48	0.4	0.38	0.34	0.3
50	1.0	0.8	0.65	0.55	0.5	0.45	0.4
100	2.0	1.6	1.3	1.1	1.0	0.9	0.8
200			2.7	2.3	2.0	1.8	1.6
300							2.4

PROVIDE AND INSTALL RA/TRANSFER DOOR GRILLES OR WALL MOUNTED GRILLE(S) SIZED TO ALLOW CFM VALUES SHOWN ON PLANS WITH AN NC (NOISE CRITERIA/COEFICENT) NO GREATER THAN STATED ON PLANS. REFER TO SELECTED GRILLE MANUFACTURERS PERFORMANCE INFORMATION FOR SIZING. COORDINATE FINAL GRILLE LAYOUT WITH STRUCTURE AND OWNER REPRESENTATIVE.

NOTES:
1. GENERAL CONTRACTOR SHALL ENSURE THAT ALL GRILLES ARE PAINTED TO MATCH THE ADJACENT SURFACES, OR COLOR AS APPROVED BY OWNER REPRESENTATIVE.
2. MECHANICAL CONTRACTOR TO PROVIDE ALL GRILLES (SCHEDULED FOR PAINTING) PRIMED FROM FACTORY.
3. VERIFY MODEL AND STYLE WITH OWNER REPRESENTATIVE.
4. FINAL PAINTING REQUIRED TO BE COMPUTED IN FIELD.

UNDERCUT DOOR OR TRANSFER GRILLE DETAILS

SCALE: NONE

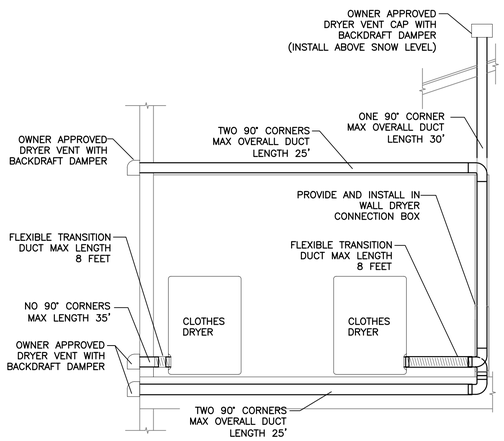


NOTES:
1. GENERAL CONTRACTOR SHALL ENSURE THAT ALL GRILLES AND REGISTERS ARE PAINTED TO MATCH THE ADJACENT SURFACES OR COLOR AS APPROVED BY OWNER REPRESENTATIVE.
2. MECHANICAL CONTRACTOR TO PROVIDE ALL GRILLES (SCHEDULED FOR PAINTING) PRIMED FROM FACTORY.
3. VERIFY MODEL AND STYLE WITH GENERAL CONTRACTOR.
4. FINAL PAINTING TO BE DONE IN FIELD.

"OVER DOOR" TRANSFER GRILLE DETAIL

SCALE: NONE

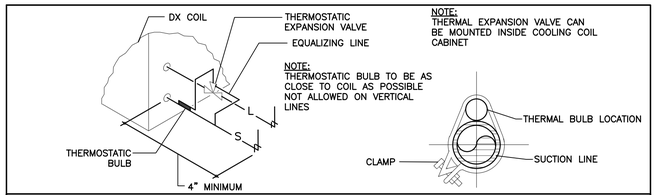
NOTE:
WHERE A CLOSET IS DESIGNED FOR THE INSTALLATION OF A CLOTHES DRYER, AN OPENING HAVING AN AREA OF NOT LESS THAN 100 SQUARE INCHES SHALL BE PROVIDED IN THE CLOSET ENCLOSURE IMC 2018, 504.5. PROVIDE AND INSTALL 10"X10" DUCT WITH 14"X10" OR 12"X12" GRILLES.



NOTES:
1. DUCTS SHALL BE CONSTRUCTED OF METAL, AND SHALL HAVE A SMOOTH INTERIOR FINISH
2. MINIMUM DUCT SIZE SHALL BE 4". ACTUAL SIZE PER MANUFACTURERS RECOMMENDATION.
3. THE MAXIUM LENGTH OF A CLOTHES DRYER EXHAUST DUCT SHALL NOT EXCEED 35 FEET FROM THE DRYER LOCATION TO THE OUTLET TERMINAL. THE MAXIMUM LENGTH OF THE DUCT SHALL BE REDUCED 2-1/2 FEET FOR EACH 45° BEND AND 5 FEET FOR EACH 90° BEND. THE MAXIMUM LENGTH OF THE EXHAUST DUCT DOES NOT INCLUDE THE TRANSITION DUCT. IMC 2018, 504.6.3. PROVIDE AND INSTALL DRYER BOOSTER FAN WHERE CLOTHES DRYER EXHAUST EXCEEDS THDES SPECIFICATIONS.
4. CONCEALED DRYER EXHAUST WITHIN BUILDING CONSTRUCTION SHALL HAVE PERMANENT LABEL OR TAG LISTING EQUIVALENT LENGTH. MOUNT WITHIN 6 FEET OF EXHAUST DUCT CONNECTION. IMC 2018, 504.6.5.

TYPICAL CLOTHES DRYER EXHAUST ROUTING DIAGRAM

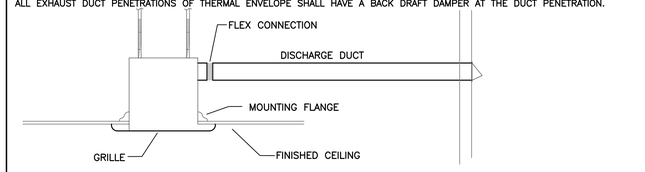
SCALE: NONE



TYPICAL REFRIGERANT COIL CONNECTION DETAIL

SCALE: NONE

NOTE:
ALL EXHAUST DUCT PENETRATIONS OF THERMAL ENVELOPE SHALL HAVE A BACK DRAFT DAMPER AT THE DUCT PENETRATION.



TYPICAL CEILING MOUNTED EXHAUST FAN

SCALE: NONE

REVISIONS

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RDF

HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6393 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS

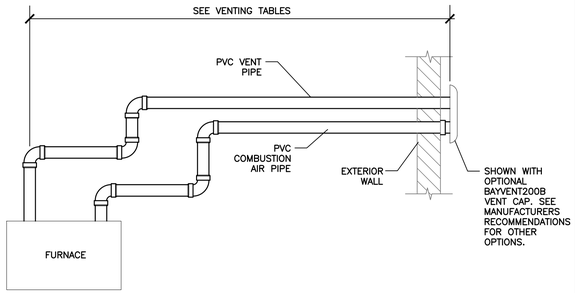
MECHANICAL DETAILS

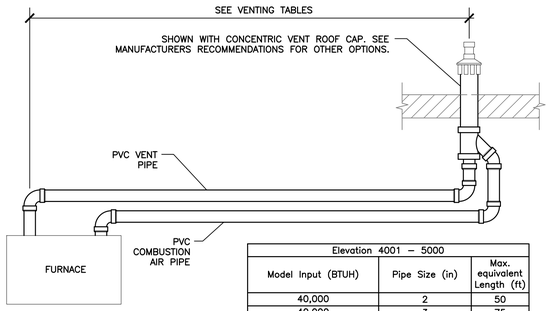
09/20/2019

M6.3

ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2226
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

REGISTERED PROFESSIONAL ENGINEER
MARK L MAKIN
9/20/19
STATE OF UTAH





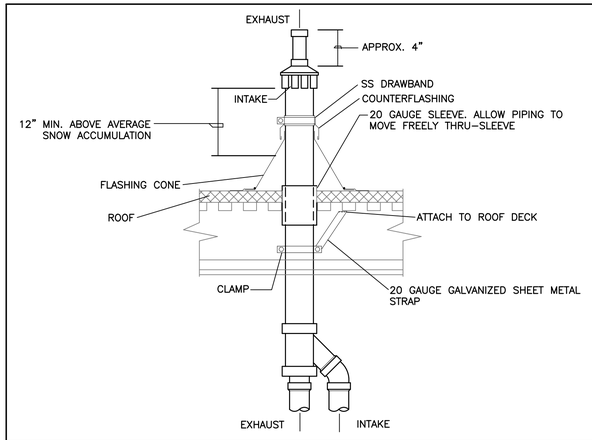
Elevation 4001 – 5000		
Model Input (BTUH)	Pipe Size (in)	Max. equivalent Length (ft)
40,000	2	50
40,000	3	75
40,000	4	140
60,000	2	50
60,000	3	75
60,000	4	140
80,000	2	50
80,000	3	75
80,000	4	140
100,000	2	15
100,000	3	75
100,000	4	140
120,000	3	75
120,000	4	140
130,000	3	70
130,000	4	140

NOTE:
YORK 95% EFFICIENT FURNACE VENTING TABLES ARE SHOWN. IF DIFFERENT MANUFACTURER IS SELECTED, USE RELATING MODEL/MAKE VENTING PIPE SIZE AND LENGTH RECOMMENDATIONS.

Equivalent Length – Fittings			
2" 90 Long Radius Elbow	5 feet of 2" pipe	2" 90 Standard Elbow	7 feet of 2" pipe
2" 45 Long Radius Elbow	2–1/2 feet of 2" pipe	2" 45 Standard Elbow	3–1/2 feet of 2" pipe
3" 90 Long Radius Elbow	5 feet of 3" pipe	3" 90 Standard Elbow	7 feet of 3" pipe
3" 45 Long Radius Elbow	2–1/2 feet of 3" pipe	3" 45 Standard Elbow	3–1/2 feet of 3" pipe
4" 90 Long Radius Elbow	5 feet of 4" pipe	4" 90 Standard Elbow	5 feet of 4" pipe
4" 45 Long Radius Elbow	2–1/2 feet of 4" pipe	4" 45 Standard Elbow	2–1/2 feet of 4" pipe

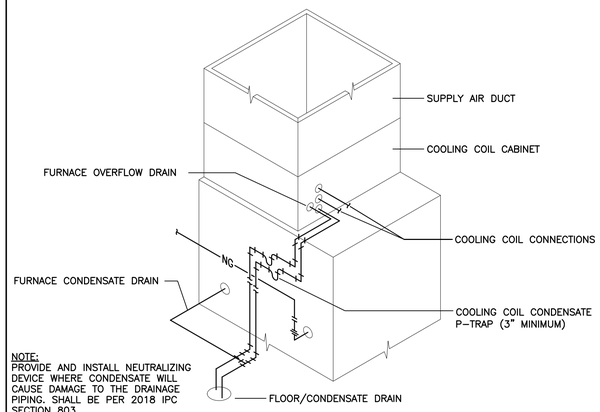
DIRECT VENT APPLIANCE VENTING DETAILS

SCALE: NONE



TYPICAL CONCENTRIC FLAT ROOF TERMINATION DETAIL

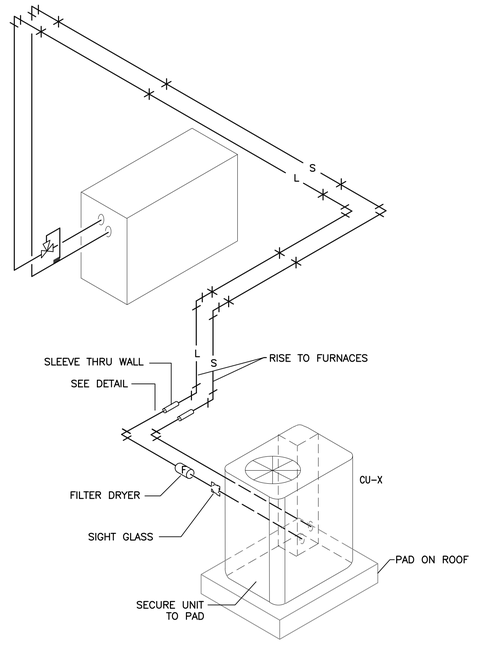
SCALE: NONE



NOTE:
PROVIDE AND INSTALL NEUTRALIZING DEVICE WHERE CONDENSATE WILL CAUSE DAMAGE TO THE DRAINAGE PIPING. SHALL BE PER 2018 IPC SECTION 803.

CONDENSATE DRAIN TRAP DETAIL

SCALE: NONE



TYPICAL REFRIGERANT SCHEMATIC (CU ON ROOF)

SCALE: NONE

REVISIONS

DRAWN BY
RDF

HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6393 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS

MECHANICAL DETAILS

09/20/2019

M6.4

ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

SECTION 23 Mechanical – GENERAL PROVISIONS
Not all specification items are used in every project.

PART 1 – GENERAL

– **Scope:**

A. Provisions of this section apply to all work specified in all sections under Division 23.

B. In addition, work in Division 23 is governed by the provisions of the Bidding Requirements, Contract Forms, General Conditions and all sections under Division 1, General Requirements.

C. Contractor is responsible for results deviating from the plans.

– **Examination of Premises:** Visit the site, verify all measurements and job conditions, and pay all costs necessary to perform the work. Coordinate division of fee responsibilities with the General Contractor.

– **The Mechanical Contractor** shall be licensed and hold a current contracting license that has been valid for a minimum of two years as a Mechanical Contractor in the State where the project is located.

– **The Mechanical Contractor** shall have a minimum of five years experience installing commercial cooling and heating systems similar to those described in these specifications and provide a list of previous projects, including name of project and contact person names and phone numbers as a separate document in addition to the mechanical bid submitted if required by the General Contractor.

– **The Mechanical Contractor** shall be able to bond work he is bidding to perform and shall provide a written statement from the bonding agency proposed to be used for this project as a separate document in addition to the mechanical bid submitted if required by the General Contractor. The bonding agency shall be one having a Best's insurance rating of A or A+.

– **Regulations, Permits, Fees, Charges, Inspections:**

A. Regulations: Comply with all applicable codes, rules and regulations. All materials and work must comply with local construction, mechanical, plumbing, electrical and fire codes. As a minimum, comply with the following: IBC, IMC, UPC, NEC, NFPA codes and all City codes.
B. In addition to the requirements of all governing codes, ordinances and agencies, conform to the requirements of the following codes and standards.
1. 2018 International Mechanical Code
2. 2018 International Building Code
3. 2018 International Energy Code
4. 2018 International Plumbing Code
5. 2018 International Energy Code
6. 2018 International Fuel Gas Code
7. ASHRAE 90.1 – 2016
***Current codes adopted by the respective jurisdiction will supercede this list of codes.

C. Fees and Permits: Pay all connection, installation, use, development, etc., fees and/or charges. Obtain and pay for all required permits and licenses. Coordinate division of fee responsibilities with the General Contractor.

D. Inspections: All work must be inspected and approved by local authorities. Prior to final approval, furnish the Architect with certificates of inspections and approvals by the local authorities in accordance with Division 1.

1. Preheat and interpass temperature shall be determined by temperature indicating crayons, contact pyrometers or other equally suitable means.

D. Postweld Heat Treatment: Postweld heat treatment for pressure components shall be as specified in Table 131 of ANSI B31.1.

– **Drawings and Specifications:**

A. Refer to Division 1 for information on submittals and shop drawings.

B. If a conflict exists between the drawings and specifications, promptly notify the Architect and Engineer.

– **Record Drawings:** Provide record drawings for all work under sections in Division 22 & 23. See Division 1 for detailed requirements covering preparation of record drawings.

– **Work and Materials:** Unless otherwise specified, all materials must be new and of the quality specified. The workmanship shall be of a quality that is acceptable to the Architect and is equal to the standards of the trades. Contractor must staff the project with sufficient skilled workmen, including a fully qualified construction Superintendent, to complete the work in the time allotted. The Superintendent must be qualified to supervise all of the work in his work category.

Approvals of Materials and Equipment: Refer to Division 1 for description of material and equipment for prior approvals and substitutions. Must be received by Engineer 10 days prior to due date/bid opening.

– **Maintenance Manual:**

A. Prior to completion of the project, compile a complete equipment and maintenance manual for all equipment supplied under sections of Division 23, as described in Division 1.

B. Manuals shall be bound in a three–ring binder. A preliminary submittal of the manual shall be made to the Architect 90 days after receiving approved submittals. Final submittal of the manual shall be made four weeks prior to substantial completion of the project.

– **Equipment Purchases:** Arrange for purchase and delivery of all materials and equipment within 15 days after approval of submittals. Coordinate with General Contractor.

– **Cooperative Work:**

A. Correct without charge any work requiring alteration due to lack of proper supervision or failure to make proper provision in time. Correct without charge any damage to adjacent work caused by the alteration. See Division 1 for additional requirements.

B. Cooperative Work Includes:

1. General supervision and responsibility for proper location, rough–in and size of work related to Division 22 & 23 but provided under other divisions of these specifications.

2. Installation of sleeves, inserts and anchors bolts for work under sections in Division 23.

3. Electrical work as specified herein. Refer to Division 26 for requirements.

– **Construction Facilities:**

A. General: Under this division of the specifications execute all work in a manner to provide safe and lawful ingress and egress to the Owner's establishment and such facilities shall be kept clear of materials or equipment as directed by the Architect. Refer to Division 1 for additional requirements.

B. Furnish and maintain from the beginning to the completion of all work all lawful and necessary guards, railings, fences, canopies, lights, and warning signs. Take all necessary precautions required by city and state laws to avoid injury or damage to any and all persons and property.

– **Guarantee:** Guarantee all material, equipment, and workmanship for all sections under Division 23 in writing to be free from defects of material and workmanship for one year from date of final acceptance as outlined in Division 1. Replace without charge any material or equipment proving defective during this period. The guarantee shall include performance of the equipment under all conditions of load, installing any additional items of control and/or protective devices as required and the replacing of any refrigerant lost.

– **Mechanical Wiring:**

A. Provide all temperature control wiring, all interlock wiring, and equipment control wiring for the equipment that is to be provided under this Division unless specifically shown on electrical drawings.

B. All wiring shall be not less than No. 14 insulated, color coded wire in electrical metallic tubing. Installation shall comply with Division 26.

C. Before ordering motors, equipment, etc., verify the available voltage and phase with the electrical trades.

– **Electrical Work:**

A. Electrical wiring, including power wiring and control wiring (except as otherwise specified under Automatic Temperature Controls), all raceways, wiring, outlet and junction boxes, and labor for installation of the wiring and equipment shall be included in Electrical Division 26 of the specifications.

B. All starters in motor control centers are to be furnished and installed under the Electrical Division of the specifications.

C. Under the Automatic Temperature Control section of these specifications, furnish and install all wiring, conduit, electric automatic temperature control devices, thermostats, relays, pneumatic electric switches, automatic control switches and pilot lights. See the Automatic Temperature Control Section, for additional detailed information.

D. All loose starters and control devices for equipment furnished under Division 23 (except as otherwise specified under Automatic Temperature Control Section) are to be furnished under that particular section of Division 23 and installed under the electrical division.

E. Contractor shall be responsible for the checking and testing of all controls and the interlocks for a complete and satisfactory operating system.

F. Before ordering any motors and equipment. Verify the available voltage and phase for all motors with the Electrical Contractor.

G. Submit a complete list of all motors prior to final closeout of job indicating the location, horsepower, voltage, phase specified in Table 132 of ANSI B.1.

H. All field wiring and equipment must conform to the applicable section of the Electrical specifications, Division 26.

– **Product Handling**

A. Protection: Take all precautions necessary to protect the materials of this section, before, during and after installation.

B. Replacements: In the event of damage immediately repair all damaged and defective work to the approval of the Engineer, at no additional cost to the Owner.

– **Job Conditions**

A. Examination of site: Examine the site and include in bid proposal all conditions under which work is to be performed.

– **Miscellaneous**

A. Permit and Fees: Apply and pay for all necessary permits, inspections, examinations and fees or charges required by Public Authorities having jurisdiction.

B. Locations and Accessibility: Contractor shall fully inform himself regarding peculiarities and limitations of space available for installation of work under this section. Valves, motors, controls and other devices requiring service. Maintenance and adjustments shall be placed in fully accessible positions and locations, provide access doors where required in ductwork and/or construction whether specifically detailed or not, and mender all such devices accessible.

C. Scaffolding: Furnish all scaffolding, rigging and hoisting as required for the proper execution of the work.

D. All HVAC equipment shall be labeled. Information on labels shall include: Identification number and name same as the drawings, flow and static pressure and the area to which the unit serves. Labels shall be black faced Formica with white engraved lettering at least $\frac{1}{8}$ inch high.

E. All gas fired equipment shall include a label indication that the appliance has been adjusted, modified or re–calibrated for the altitude wherein the project is to be located. The appliance shall also include a compliance statement indicating that the appliance has been adjusted, modified or re–calibrated for the proper operation at the altitude of the project and shall be listed capable for use with natural gas or propane gas if propane is listed on the drawings.

– **Submittals**

A. Shop Drawings: Within 15 days after award of contract, and before any of the materials of this section are fabricated and delivered to the jobsite, submit complete shop drawings and equipment submittals for the Engineer to review in accordance with these specifications. show all details of all ductwork and equipments pads.

B. Product Data:
1. Submit six (6) copies of all manufacturer's product data simultaneously with all shop drawings submittals.

2. Product data to include, all air conditioning equipment, hangers, fans and other standard items as required to complement shop drawings for a submittal indications products to be used on this work.
C. Record Drawings: Maintain throughout the progress of the work project record drawings and submit to the Owner.

D. Operating Manuals and Maintenance Manuals:

1. Submit four (4) copies of all operating instructions and maintenance manuals.

2. Fully instruct Owner's operating personnel and demonstrate performance, operation and maintenance of equipment. Amount of allocated for said instruction and demonstration of equipment and systems shall be part of these obligations. Submit to Engineer a letter signed by Owner's representative who will operate system stating that he has been fully instructed by contractor about operation and maintenance of equipment and system.

3. Submit one (1) additional set of approved instructions and one (1) additional set of approved control diagrams.

E. Guarantees: In addition to equipment warranties, furnish a written guarantee against defects in materials and workmanship for one year. Guarantee shall include repair of damage to, or replacement of any part of equipment or premises caused by leaks or breaks in pipe or equipment provided under this section.

– **Equipment Identification**

A. Except for individual room heating units and items furnished under temperature control all items of mechanical equipment, including fans, pumps, boilers and electrical switches and starters for mechanical equipment and gauges shall be labeled.
B. Information on labels shall include the following:

1. Identification number and name. Generally this number and name shall be the same as that shown on the drawings or in the specs.

2. If the item is a fan or pump, the flow and head shall be indicated.

3. If the item is part of a unit, the label shall have in addition to its item number, the number of the main item it is serving.

4. Valves shall be tagged with the area served and their normal operating positions shall be indicated.

5. Where the main unit is served by the valve is apparent, only the valve function needs to be included on the nameplate.

C. The types of Nameplates shall be as follows:
1. The valve tags shall be $\frac{1}{2}$" embossed aluminum tapes with identification on one side for valves. Tags for magnetic starters shall be screwed to the metal starter cover. Gags sags shall be Addressograph No. B–5300.

2. Equipment nameplates shall be black faced Formica with white engraved lettering at least $\frac{1}{8}$" high.

D. Valve tags shall be connected to valve stems by steel rings or chains. Screws shall be used for equipment labels prior to installation. The contractor shall submit to the Engineer a complete list of all valves and each item of equipment to be identified with the proper identification.

– **Fire Stopping**

A. Only tested fire stop systems shall be used.

B. Fire stop system installation must meet requirements of ASTM E–814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.

C. Proposed fire stop materials and methods shall conform to applicable having codes having local jurisdiction.

D. Fire stop systems do not reestablish the structural integrity of the load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the Structural Engineer prior to penetrating any load bearing assembly.

E. For those fire stop applications that exist for which no UL tested system is available through a manufacturer, and engineering judgment derived from similar UL system design or other test will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineer judgment drawings must follow requirements set forth by the International Fire stop Council.

F. The work of this section shall be accomplished by a single source contractor or by those contractors who, by their contract, are penetrating rated construction with their work. Regardless of responsibility the General Contractor shall be responsible to assure and verify that all products, systems, etc. used under this section are appropriate and meet the intent of this specification and is accomplished by factory trained workmen.

G. Acceptable manufacturers are subject to compliance with through penetration firestop systems (XHEZ) listed in volume 2 of the UL fire resistance directory. Provide products from the following manufacturers as identified: 1. Hilti Inc. 2. 3M Corporations. 3. Specified Technologies Inc. 4. Metacaulk, Rectorseal Corp. F. Tremco. 6. Cafco, Isolatek International. 7. Nelson Firestop Product.

H. Use only firestop products that have been UL 1479, ASTM E–814, or UL 2079 listed for specific fire–rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements and fire–rating involved for each separate instance.

I. Cast–in–place firestop devices for use with non–combustible and combustible plastic pipe (closed and open piping systems) penetrating concrete floors, the following products are acceptable:

1. HILTI CP 680 cast–in–place firestop devise.

J. Add aerator adaptor when used in conjunction with aerator ("Solvent") system.

1. HILTI CP 681 tub box kit for use with tub installations.

K. Sealants, caulking materials, or foams for use with non–combustible items including steal pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT). The following products are acceptable:
1. HILTI FS–One Intumescent Firestop Sealant
2. HILTI CP 604 Self–leveling Firestop Sealant
3. HILTI CP 620 Fire Foam
4. HILTI CP 606 Flexible Firestop Sealant
5. HILTI CP 601S Elastomeric Firestop Sealant

L. Sealants or caulking materials for use with sheet metal ducts. The following products are acceptable:
1. HILTI CP 601S Elastomeric Firestop Sealant
2. HILTI CP 606 Flexible Firestop Sealant
3. HILTI FS–One Intumescent Firestop Sealant

M. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe. The following products are acceptable:
1. HILTI FS–One Intumescent Firestop Sealant

N. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed or open piping systems),
1. HILTI CP 642 Firestop Collar
2. HILTI CP 643 Firestop Collar
3. HILTI CP 645 Wrap Strips

O. Materials used for complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways in raceways. The following products are acceptable
1. HILTI CP 637 Trowelable Firestop Compound
2. HILTI FS 657 Fire Block
3. HILTI CP 620 fire Foam

P. Non curing, re–penetrable materials used for large size/complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways in raceways. The following products are acceptable:
1. HILTI FS 657 Fire Block

PART 2 – PRODUCTS

– **Equipment Design and Installation:**

A. Uniformity: Unless otherwise specified, provide all equipment of same type or classification by the same manufacturer.

B. Design: Design all equipment in accordance with ASME, AGA, UL and other applicable technical standards as follows:

C. Pressures vessels – ASME Code constructed and stamped

D. Electric appliances – UL labeled

E. Fire protection equipment – UL approved and labeled

F. Fans – AMCA rated and stamped

G. Cooling equipment – ARI certified

H. Fire dampers, smoke dampers, combination fire and smoke dampers – UL listed

I. Concrete Inserts:

1. The work under this section includes furnishing and installing all concrete inserts required for all materials and equipment specified herein or in other sections of Division 23.

2. Provide concrete inserts equal to Unistrut Series 3200 with standard, plain, oiled finish. Provide exposed Unistrut pipe supports with factory finished enamel paint.

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HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6393 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS

MECHANICAL SPECIFICATIONS

09/20/2019

M7.1

ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2226
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

REGISTERED PROFESSIONAL ENGINEER
MARK L MAKIN
9/20/19
STATE OF UTAH

– Diffusers, Registers and Grilles

Air distribution equipment shall be of sizes, types, and capacities indicated.

A. Registers, grilles, and diffusers of the sizes shown on the drawings and described here in shall be furnished and installed. all grilles, diffusers and registers shall be complete with frames with rubber gaskets suitable for the area and wall construction where shown on the drawings.

A. Finish for all registers, diffusers, grilles, etc. shall be off–white unless otherwise selected by the Owner. approved manufacturers for all air distribution products shall be Price Industries, Nailor, Metal Air, Tuttle & Bayley, Carnes, Hart and Cooley, or Anemostat.

B. Supply air shall be introduced into conditioned space in such a manner that conditioned air and room air is rapidly and evenly mixed, resulting in equalization of temperature and draftless air distribution through zone of occupancy with temperature differentials up to 25 degrees F for both cooling and heating air. Quantities and throws shall be as indicated.

C. Velocity of moving air below 5 foot level, during cooling cycle, shall not exceed limits of either 50 fpm at 1.5 degrees F below average room temperature or 70 fpm at 1 degree F below average room temperature. Velocity of moving air at the 1 foot level, during heating cycle shall not be less than 10 fpm. Temperature difference at or below the 5 foot level shall not exceed the following: 2 degrees F below average room temperature at 30 fpm, 1.5 degrees F below average room temperature at 50 fpm, 1 degree F below average room temperature at 70 fpm. Sound pressure level in all octave bands for each diffuser shall not exceed NC35 noise criteria curve at task level when units operate at designed capacities.

D. Ceiling diffusers, grilles and registers shall be independently supported from the structure so that they are not depending on the ceiling for support.

F. Ceiling diffusers may be round necked or equivalent size square neck. Provide square to round neck adapter as necessary. Flex duct shall typically connect directly to the diffuser using a 1–1/2" radius flexible duct elbow. If space does not allow for a full 1–1/2" radius to be provided, then a lined sheet metal boot shall be provided. The flexible duct shall b e connected to the side of the sheet metal boot. The flexible duct shall not be connected to the top of the sheet metal boot.

G. Ceiling supply air diffusers shall be louvered faced directional diffuser model SMD manufactured by Price Industries with border type 36 for lay in ceiling or border type 1 for surface mounting in other than lay in ceilings, baked enamel finish, blow and pattern shown on the drawings.

H. Supply, exhaust, transfer and return air grilles mounted on walls 6 feet above the floor shall be Price Industries model 635, with 45–degree deflection, $\frac{1}{2}$" blade spacing, horizontal extruded aluminum blades, baked enamel finish.

I. Supply, exhaust, transfer and return air grilles mounted on walls lower than 6 feet above the floor shall be sight–proof, heavy duty gymnasium type equal to Price Industries model 91 with horizontal 45–degree deflection blades, $\frac{3}{8}$" blade spacing, baked enamel finish.

J. Drum louvers shall be Price Industries model HCD with opposed blade damper.

K. Exposed duct round diffuser shall be Price Industries model RCD, 3–position adjustment, 4 cone style, baked enamel finish.

M. Linear slot supply diffusers shall be Price Industries model SDS75, extruded aluminum frame construction with 180° range of air pattern adjustments.

N. Linear slot supply diffusers shall be price industries model SDS75, extruded aluminum frame construction with 180° range of air pattern adjustments.

O. Make up air supply diffusers shall be Price Industries model PDC perforated face ceiling diffusers, fixed 1–way air pattern, hinged removable perforated face screen, baked enamel finish.

P. Ceiling filter return air grilles in lay in ceiling shall be Price Industries model 10FF, with hinged, perforated faceplate and 1" filter for lay in T–bar application, baked enamel finish. The contractor shall provide the 1" filter.

Q. Ceiling filter return grilles and transfer air grilles shall be Price Industries model PDR or PDDR perforated diffuser with removable perforated faceplate in lay in T–bar application, bake enamel finish.

R. Ceiling return, exhaust and transfer air grilles for surface mounting in other than lay in ceilings shall be Price industries model 10F, with perforated removable faceplate, baked enamel finish.

– Ducts and Sheet Metal Work

A. Provide ducts, plenums, access doors, fresh air intakes, and exhaust as indicated and required. All ductwork shall be constructed, erected and tested in accordance with the most restrictive of local regulations, procedures and detailed in the ASHRAE Handbook of Fundamentals or the applicable standards adopted by the Sheet Metal and Air Conditioning Contractors National Association (SMACNA). Provide prefabricated spiral lockseam ducts and fittings and rectangular ducts of galvanized steel. Aluminum flexible ductwork or gypsum board ductwork is not acceptable.

B. All connections to main ducts shall be made with low loss fittings.

C. Flat duct surfaces shall be crimped diagonally regardless of size. Longitudinal joints in all duct sizes may be flat lock joints. Transverse joints and intermediate bracing shall be constructed of galvanized sheet metal or galvanized structural angles in accordance with requirements of ASHRAE Guide and public authorities having jurisdiction.

D. Transverse joints on all ducts shall be sealed with mastic or tape.

E. Longitudinal joints on ducts with internal static pressures in excess of 0.75 inches of water pressure shall be sealed with mastic or tape.

F. Lock joints shall be hammered to make them airtight. Inside of duct shall present a smooth surface to flow air.

G. Changes in size of ducts shall increase gradually with a slope of not more than 12 inches in 5 feet where possible, but not more than 12 inches in 3 feet in any event.

H. Turns shall be made with throat radius of not less then the duct width.

I. Plenums shall be made of 18 gauge galvanized sheet steel reinforced horizontally on a maximum of 48" centers by 1–1/2"x1–1/4"x $\frac{1}{8}$" galvanized angles reinforced vertically by 1–1/2" standing seams.

– Temperature Controls

A. Thermostats shall be provided with the air conditioning units. They shall be installed and wired by the HVAC contractor. T–stats for roof top units shall be programmable with night setback and override control.

– Insulation

A. Thermal/Acoustical duct insulation: Line the first 10' of supply air and return air ducts from the mechanical unit, unless otherwise specified with Knauf or equal. Duct Liner shall be mat–faced to provide a smooth air–steam surface, mold resistant, 1–1/2" thick insulation wrapped entirely around duct with joints lapped at least 2" and secured with 16 gauge galvanized wire on 12" centers. Insulation shall cover all surfaces including standing seams.

B. Rectangular supply ducts and return air ducts located on unconditioned spaces shall be lined with Knauf un–acoustic or equal. 1 inch of 1–1/2 lb. thermal resistive value of duct liner shall be a minimum of R–6. Rectangular supply ducts and return air ducts located outside the building envelope shall be lined with Knauf un–acoustic or equal. 2 inch, 1–1/2 lb. thermal resistive value of duct liner shall be a minimum of R–8. Density coated fiberglass duct liner complying with friction correction factor not greater than 1.1 at a velocity of 3000 fpm. Apply insulation to inside of ducts with an approved fire retardant adhesive to provide 100% coverage and a smooth surface. In ducts with one side more than 12" secure insulation with mechanical fasteners in addition to adhesive, spaced at 14" centers in both directions. Mechanical fasteners shall be flush with the liner surface and shall start within 2" of the leading edge of each section and within 3" of the leading edge of all cross joints of the liner shall be heavily coated with an approved fire resistant adhesive. The duct liner shall shall be cut to assure snug closing corner joints. The black surface of the liner shall face the air stream. Transverse joints shall be neatly butted and all damaged areas shall be heavily coated with a approved adhesive.

C. All duct insulation shall have an NRC rating of not less than 0.60 and a K factor of not more than 0.27. Duct dimensions shall be increased 2 inches on each side from those shown on drawings to accommodated insulation.

– Ceiling Mounted Fan

A. Ceiling type exhaust fans of the capacity shown on the drawings shall be furnished and installed. Fans shall be direct drive of RPM shown and shall be complete with fan housing, inlet grille, backdraft damper and motor. Noise level shall not exceed 3.8 sones. Air quantities shall be certified by AMCA. Fans shall be Penn, Cook, ACME, Greenheck, Jenn, Pace or equal of Broan.

– Split System Indoor Furnace

A. Furnish and install a natural gas fired furnace of the size and capacity as listed on the drawings. Each furnace shall be up–flow, horizontal flow as indicated, completely factory assembled, certified by AGA. Complete with blower section, furnace section, filter section and steel casing. Unit shall come piped and wired. Cooling coil shall be provided as indicated.

B. Blower section shall consist of 22 GA. cold rolled steel cabinet with finish coat of baked–on enamel. Blower shall be class 1, full DWDI , and statically and dynamically balanced. Blower shall be driven by a motor with adjustable pitch V–belt or by multi–speed direct driven motor.

C. Cooling coil shall be provided with heavy gauge steel cabinet with baked–on enamel finish to match furnace. Coil shall have aluminum fins bonded to seamless copper tubing and shall be ARI rated. Drain pan with connections at either end shall be provided at each coil.

D. Filters shall be one–inch thick throw–away type as furnished by the furnace manufacturer.

E. Heat exchanger section shall be enclosed in a 22–gauge or heavier enameled steel casing lined with foil covered insulation. Exchanger shall be ceramic or glass coated, stainless steel or 18–gauge aluminized steel.

F. Unit shall be of manufacturer listed in equipment schedule.

– Split System Condensing Unit

A. Condensing unit shall be by the same manufacturer as the furnace and of size and capacity indicated. Units shall be completely assembled and tested complete with refrigerant charge and ready to operate. Unit shall be UL listed and carry a UL Label.

1. Cabinet shall be constructed of galvanized steel, bonderized and coated with a powder coat paint.

2. Coils shall be of nonferrous construction with aluminum plate fins mechanically bonded to seamless copper tubes with all joints brazed.

3. Compressors shall be hermetically sealed. Compressor will be mounted on rubber vibrations isolators.

4. Refrigerant circuit components shall include the following: Liquid tube shutoff valve with sweat connections, suction tub shutoff valves with sweat connections. System charged with Refrigerant R–410, Compressor oil, accumulator, and reversing valve. System shall have a low ambient kit installed.

5. Compressor fans shall be direct drive propeller type, discharging air upward. Fan motors shall be totally enclosed 1–phase type with class B insulation and permanently lubricated bearings. Shafts shall be corrosion resistant. Fan blades shall be statically and dynamically balanced. Condenser fan openings shall be equipped with steel wire safety guards.

6. Unit shall be of manufacturer listed in the equipment schedule.

– Duct Penetrations

A. All ducts penetrating through the fire rated walls and floors shall be properly safed with Dow Corning 3–6548 silicone RTV foam or equal. Install per manufacture's directions.

– Turning Vanes

A. Turning vanes shall be furnished and installed in all 90–degree turns in supply, return, mixed air and fresh air ducts, and elsewhere as shown on the drawings. Material of turning vanes shall match ductwork. Vanes are to be single blade, of size, gauge, and fabrication in accordance with SMACNA recommendations.

– Equal Materials and Substitutions

A. In addition to manufacturers specified, the following shall also be considered equal. Provided corresponding models meet specified requirements. Equivalent substituted equipment named herein shall be submitted to Architect for approval. Submit alternate selections at time of bid, listing major equipment:

Insulation:	Certainteed, Manville, Fiberglas
Air Filters:	AAF, Farr
Split System:	From manufacturers listed in the schedule.
Diffusers and Grilles:	Titus, Nailor, Price, Krueger, Hart and Cooley, Carnes, or Engineer approved equivalent.
Ceiling Exhaust Fan:	Broan, Fantech, Acme, Carnes, Penn, Cook, Breidert, Coolair, Captive aire, S&P, Greenheck, Twin City Fan, Delta Breez, Air King. (subject to project document conformance)
Roof Top Unit:	From manufacturers listed in the schedule.

– Refrigerant Lines

A. Refrigerant lines are to be sized as per manufacturer's requirements. Lines to be fully insulated with 1 inch foam flex or equal. Insulation exposed to the sun shall be painted with two coats of protective paint. The system is to be evacuated to 200 microns, hold vacuum 24 hours. Break with freon and leak test with halide detector. Each heat pump to be provided with a refrigerant line kit.

– Split System Outdoor Heat Pump Unit

Model of size and capacity indicated. Units shall be complete assembled and tested complete with refrigerant charge and ready to operate. Total unit shall be UL listed and carry a UL label

A. Cabinet shall be constructed of galvanized steel, bonderized and coated with a power coat paint.

B. Coils shall be of nonferrous construction with aluminum plate fins mechanically bonded to seamless copper tubes with all joints brazed.

C. Compressors shall be hermetically sealed. Compressor will be mounted on rubber vibrations isolators.

D. Refrigerant circuit components shall include the following: Liquid tube shutoff valve with seat connections, suction tube shutoff valves with sweat connections, system charge of refrigerant R410, Compressor oil, accumulator, freezestat, and reversing valve.

E. Compressor fans shall be direct drive propeller type, discharging air upward. Fan motors shall be totally enclosed, 1–phase type class B insulation and permanently lubricated bearings, shafts shall be corrosion resistant. Fan blades shall be statically and dynamically balanced. Condenser fan openings shall be equipped with steel wire safety guards.

– Heat Pump Controls Coordination

A. The heat pumps shall be provided with random start relays, interlocks, safeties, controllers, etc, necessary to make the units compatible with the control system. Once the bid is over any control items which could be normally supplied with the heat pumps and are necessary to facilitate the control sequences will be required to be provided installed at no additional cost.

– Hose Kits for Heat Pumps

A. Piping connections: Drawings indicate the general arrangements of piping, fittings and specialties. Specific connection requirements are as follows:

1. Ball valves: full opening ball valves shall be included in the hose kit package on both supply and return lines to the loop.

2. Hoses: Hoses shall consist of stainless steel outer braid with an inner core of tube made of a nontoxic synthetic polymer material. The hoses shall be suitable for fluid temperatures ranging between 27°F and 211°F.

3. Automatic flow devices: The automatic self–balancing device shall automatically limit the rate of flow to within 5% of the specified amount. For the 1/2 through 2 inch configuration, the cartridge shall be removable from the Y–body housing without the use of special tools to provide access for regulator change–out, inspection and cleaning without braking the main piping. (Similar to that provided for removal of a Y–strainer screen). True operating ranges of 2–32 PSIG of 5–60 PSIG shall be required. Each valve shall have two pressure/temperature ports to verify differential pressure and flow rate. The internal wear surfaces of the valve cartridge shall be constructed of electrolyses nickel or stainless steel for long wear.

B. An in–line strainer shall be provided with each hose kit for installation on the supply line.

C. Provide crossover piping with ball valves between supply and return line at each heat pump to allow circulation of the main supply and return lines without pumping through the heat pumps for initial cleaning and testing.

D. Hose kits shall be Griswold, Flow Design, Hayes, or Trane.

– High Efficiency Branch Take–Offs

A. Expanded throat high efficiency takeoffs shall be used for all branch takeoffs unless shown otherwise on the drawings. an opposed blade volume damper with locking quadrant shall be provided at each branch takeoff. Where dampers are not accessible for adjustment from above, concealed ceiling regulators with adjustable chrome–plated covers shall be provided. High efficiency take–offs shall be Hercules or Daniel.

– Thermostats

A. Thermostats for heat pump units shall be installed and wired by the ATC contractor. The thermostats shall be provide by the ATC contractor. Thermostats shall be low voltage type provided with automatic change over feature for both heating and cooling stages, seven day program with tow starts and stops per day, and provisions for damper operators. Approved manufacturer and model #: Basys SZ 1024 or equivalent.

MARK L. MAKIN
9/20/19
STATE OF UTAH

ROYAL ENGINEERING
ELECTRICAL
MECHANICAL
1837 S. EAST BAY BLVD.
PROVO, UTAH 84606
PHONE: 801.375.2228
FAX: 801.375.2676

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DRAWN BY
RDF

HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS

MECHANICAL SPECIFICATIONS

09/20/2019

PART 3 – EXECUTION

– **Verification of Dimensions:**

A. Scaled and figured dimensions are approximate only. Before proceeding with work, carefully check and verify dimensions at site, and be responsible for properly fitting equipment and materials together and to the structure in spaces provided.

B. Drawings are essentially diagrammatic and many offsets, bends, special fittings and exact locations are not indicated. Carefully study drawings and premises in order to determine best methods, exact locations, routes, building obstructions, and install apparatus and equipment in available locations. Install apparatus and equipment in manner and in locations to avoid obstructions, preserve headroom, and keep openings and passageways clear.

– **Cutting and Patching:** Cut work and patch per Division 1 as necessary to properly install the new work. As the work progresses, coordinate necessary openings, holes, chases, etc., in their correct location. If the required openings, holes and chases are not in their correct locations, make the necessary corrections at no cost to the Owner. Avoid excessive cutting and do not cut structural members without the consent of the Architect. Patching by General Contractor at Mechanical, Plumbing or Fire Protection Contractor's expense. Include as a part of the work under this contract all structural framing required by penetrations through the roof and necessary steel to support ducts and pipes between structural steel unless shown on the structural drawings.

– **Closing–in of Unfinished Work:** Cover no work until inspected, tested and approved. Where work is covered before inspection and test, uncover it, and when inspected, tested and approved, restore all work to original proper condition.

– **Excavation and Backfill:**

A. Perform all necessary excavation, shoring and backfilling required for the proper laying of all pipes and conduits inside the building and premises, and outside as may be necessary. Conform to Division 2 requirements. Remove all excess excavated materials from the site or dispose of on site as directed by General Contractor.

B. Excavate all trenches open cut, keep trench banks as nearly vertical as practicable, and sheet and brace trenches where required for stability and safety. Excavate trenches true to line and make bottoms not less than 18" wide but no wider than necessary to provide ample work room. Grade trench bottoms accurately to provide uniform bearing and support for each section of pipe on undisturbed soil along its entire length. Dig "bell" holes after the trench bottom has been graded. Machine grade only to the top line of the pipes, doing the balance by hand. Do not cut any trench near or under footings without first consulting the Architect. Comply with OSHA requirements.

C. Provide backfilling and compaction in accordance with requirement of Division 2 and under the direction of the Architect and the Owner's testing firm to the required density. Make the first 2 feet of fill in 6" layers, each thoroughly compacted as directed, and free from rocks, large clods of earth, leaves, branches, and debris. Compact the rest of the backfill to prevent settlement as directed, using in the backfill no rocks larger than 4" in diameter, and using no rocks at all in the top 12".

– **Accessibility:**

A. Install valves, dampers, thermometers, gauges, traps, cleanouts, control devices or other specialties requiring reading, adjustment, inspection, repairs, removal or replacement conveniently and accessibly throughout the finished building. Where any of these devices are shown on the contract drawings to be installed above any inaccessible ceiling, the Mechanical Contractor shall furnish access doors or panels as required.

B. All access doors or panels in walls and ceilings required for access to control devices, traps, valves and similar devices are to be furnished and installed as part of the work under this section. Provide type as specified under Division 8.

C. Provide ducts which pierce a fire separation with fire dampers of same fire rating as the separation.

D. Refer to drawings and "Finish Schedule" for type of wall and ceiling in each area and for rated construction.

E. Coordinate work of various sections to locate valves, traps, and dampers with others to avoid unnecessary duplication of access doors.

– **Roof Flashings:** Flash and counterflash all piping, conduits and ductwork penetrating roofing membrane with flashing per roofing manufacturer's recommendations. Refer to architectural drawings for detailing of duct and pipe penetrations through roof.

– **Equipment Rough–in:**

A. Rough in all equipment and fixtures as designated on the drawings and in the specifications. The drawings indicate only the approximate location of rough–ins. The exact rough–in locations must be determined from large–scale certified drawings. The Contractor shall obtain all certified rough–in information before progressing with any work for rough–in final connections.

B. Be responsible for providing all outlets and services of proper size at the required locations.

C. Minor changes in the contract drawings shall be anticipated and provided for under this division of the specifications.

D. Rough–in only (unless otherwise designated on the drawings) shall include the following:

1. Mechanical: Provide all services as indicated and required, including all ductwork, piping and valves. Valve and cap all piping stub–outs. Cap all ductwork stub–outs in a manner suitable for future extension.

E. Mechanical equipment installed on the roof shall not be installed any closer than 10'–0" to the edge of the roof unless there is a 42" high parapet or equipment guardrail.

– **Owner–Furnished and Other Equipment:**

A. Rough–in only for all Owner–furnished equipment (see Division 1) and all equipment furnished under other sections of the specifications, except as otherwise specified and/or noted on the drawings.

– **Equipment identification**

A. All major equipment shall bear firmly attached metal nameplates which state name of manufacturer, model number and electrical data.

– **Discrepancies**

A. In the event of discrepancy, immediately notify the Owner.

B. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

– **Initial Lubrication, Adjusting, and Filling Systems**

A. Before operating any mechanical system, equipment bearings shall be lubricated and bolts, pulleys, and other moving parts checked for alignment and tolerances in accordance with manufacturer's operating instructions. Vibrations and noise shall be suppressed.

– **Cleaning of Equipment, Materials and Premises**

A. Be painted smooth and clean, ready for painters. Clean entire premises of unused materials, rubbish, debris, grease spots and dirt left by subcontractor.

– **Equipment and Material**

A. Install all equipment and material per manufacturer's recommendations.

– **Accessibility**

A. Install work readily accessible for normal operation, reading of instruments, adjustment, service inspection and repair, provide access panels where indicated and required. Access panels shall be the responsibility of respective subcontractors.

B. Provide all services designated, valve and cap all piping, cap all waste piping and ductwork and leave in a clean and orderly manner.

C. Rough–in requirements shall be as outlined in the preceding paragraph titled "Equipment Rough–In."

– **Equipment Final Connections:**

A. Provide all piping and duct final connections for all equipment under Division 22 & 23 as required herein specified and indicated on the drawings.

B. Air Conditioning, Heating, and Ventilating: Provide final connections complete with necessary valves, drains, unions, flanges and duct connections for equipment furnished and installed under other sections of the specifications, except as otherwise designated. Included under the HVAC sections of the specifications are the final connections to the following:

1. Condensate and evaporative cooler drain piping from air conditioning equipment.

2. Supply, return, relief, outside air and exhaust duct connections for all equipment including exhaust fans.

3. Piping connections for all equipment.

4. Duct connections for all kitchen hoods.

– **Machinery Drives:** After tests have been performed on the air conditioning and air handling systems, make without cost not more than two changes in the size of the nonadjustable sheaves to obtain the required air quantities.

– **Machinery Accessories:**

A. Application: Do not install any equipment in an application not recommended by the manufacturer.

B. Installation: Align, level and adjust all equipment for proper operation. Install so connecting and disconnecting of piping and accessories can readily be done and so all parts are readily accessible for inspection, service and repair. Install equipment in accordance with manufacturer's recommendations.

– **Pipe and Equipment Supports:**

A. Where supports, foundations, stands, suspended platforms for machinery, tanks, or other equipment are indicated or specified, perform the following:

1. Locate support members to avoid equipment strains and interference with piping connections, tube pulling or other maintenance operations.

2. Where saddles are required, use cast iron or welded steel saddles with curvature to fit the tank shell.

3. Mount power–driven equipment on common base with driver.

B. Concrete Inserts: Furnish and install all concrete inserts required for all materials and equipment specified and/or shown on the drawings for Division 22.

C. Concrete Foundations: Work under this section includes coordination of construction of all concrete foundations indicated or required for equipment specified herein or in other sections under Division 22. Materials and workmanship shall be described under Division 3.

D. Grout under all equipment after leveling, filling completely the space between machinery bed plate and foundation surface as specified in Division 3. Finish exposed surface of grout for a neat appearance.

E. Floor Stands: Where equipment is mounted standard or on legs, construct of structural steel or steel pipe and fittings, cross–brace and fasten with flanges or plates bolted to floor.

F. Ceiling or Wall Supports: Use suspended platform, strap hangers, bracket or shelf, whichever is most suitable for equipment and location. Construct of structural steel members, steel plates, rods or pipe as required. Cross–brace and fasten to building structure or inserts in an approved manner.

G. Steel Work: Neatly fabricate and erect steel work with burrs and welding spatter ground off. Paint after fabrication with a rust–inhibitive primer.

H. Roof Mounted Equipment (Steel Supported): Provide curbs and flashings for metal support structures as shown in the latest SMACNA manual for roof supports.

– **Cleanup:**

A. In addition to cleanup specified under Division 1, thoroughly clean all parts of the equipment. Where exposed parts are to be painted, thoroughly clean off any splattered construction materials and remove all oil and grease spots. Wipe the surface carefully and scrape out all cracks and corners.

B. Thoroughly flush and clean out all water circulating systems. Remove, clean and replace all strainer elements.

C. During the progress of the work, keep the premises clean and free of debris.

– **Painting:**

A. Except as otherwise specified or indicated in the architectural drawings and/or specifications, paint all exposed unfinished metal with one coat of rust–inhibiting primer. (Galvanized ductwork and factory painted equipment shall be considered as having primed surface.)

B. Finished painting is specified under Division 9.

– **Objectionable Noise and Vibration:** Construct and brace the metal partitions, ducts and sheet metal housings to prevent vibration or rattling when systems are in operation. Install connections to equipment so noise and vibration will not reach the conditioned area through ducts, piping, conduit, sheet metal work, or the building structure. Provide power–driven equipment suspended from the structure with spring type isolation.

– **System Balancing**

A. Balancing work included:

1. Complete testing and balancing of the HVAC system as herein specified.

B. Verification of Conditions: Prior to testing and balancing, inspect equipment and materials and arrange with contractor for satisfactory correction of all defects in workmanship and/or material that could affect the work specified herein.

C. Protection: As specified herein.

D. System Operation: contractor shall put all parts of systems in full operation and shall continue to operation of same during each working day of testing and balancing.

E. Test Data: Submit copy of test data to Owner on completion of work under this section.

F. Test and balance contractor shall certify in writing that system has been adjusted and balanced and design conditions have been attained in all areas of the building.

G. Instruments: Instruments used by contractor shall be accurately calibrated and maintained in good working order.

H. Air Distribution Testing and Balancing:

1. Test and record motor full load amperes and RPM.
2. Test and record system static pressures, suction and discharge.
3. Adjust all supply and return air ducts to proper design CFM.
4. In cooperation with the control manufacturer's representative, the setting adjustment of automatically operated controls to operate as specified indicated and/or noted.

I. Witness: Notify Owner in writing two weeks prior to testing and balancing of all major equipment in order to arrange that Owner's representative will witness the test.

– **Operation**

D. Place system in operation and regulate and adjust to Owner's satisfaction. System shall operate quietly and without vibration or noise.

E. Contractor shall make necessary field adjustments for even temperatures throughout the project.

– **Certification**

A. Upon completion, the contractor shall inspect work of this section and deliver to Owner a written certification that installed materials and workmanship conform to specifications.

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3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS

MECHANICAL SPECIFICATIONS

REGISTERED PROFESSIONAL ENGINEER
MARK L MAKIN
9/20/19
STATE OF UTAH

ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

09/20/2019

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SEISMIC SUPPORT NOTES:

BRACING FOR SUSPENDED PIPING, ETC

1. PER ASCE STANDARD 7-10 SEISMIC SUPPORTS ARE NOT REQUIRED FOR THE FOLLOWING CONDITION:
   A. PIPING IS SUPPORTED BY ROD HANGERS 12" OR LESS IN LENGTH FROM THE TOP OF THE PIPE TO THE SUPPORTING STRUCTURE.
   B. HIGH-DEFORMABILITY PIPING IS USED.
2. IF INSTANCES OCCUR WHERE PIPING IS SUSPENDED BY HANGERS GREATER THAN 12" IN LENGTH, SYSTEM CONNECTORS AND COMPONENTS SHALL BE COMPATIBLE AND DESIGNED FOR THE APPLICATION THAT THEY ARE USED FOR. SHALL HAVE A MINIMUM OF TWO TRANSVERSE BRACES PER STRAIGHT PIPING RUN. THE MAXIMUM DISTANCE BETWEEN TRANSVERSE BRACES WILL BE DETERMINED BY PIPE SIZE AND PIPING COMPOSITION. SHALL HAVE A MINIMUM OF ONE LONGITUDINAL BRACE PER STRAIGHT DUCT RUN. IF LENGTH OF PIPING EXCEEDS LONGITUDINAL BRACE SPACING, ADDITIONAL LONGITUDINAL BRACES WILL BE REQUIRED.
3. FOR SEISMIC BRACING OF PLUMBING EQUIPMENT AND PIPING AN INDEPENDENT SEISMIC AND VIBRATION CONTROL SUBCONTRACTOR WITH EXPERIENCE, COMPUTING CAPABILITIES, AND MANUFACTURED PRODUCTS SHALL BE FURNISHED BY PLUMBING CONTRACTOR. INDEPENDENT SEISMIC CONSULTANT SHALL PROVIDE REQUIRED COMPUTATIONS, SHOP DRAWINGS, AND MANUFACTURED PRODUCTS TO MEET THE MINIMUM REQUIREMENTS OF ASCE 7-10 AND INTERNATIONAL BUILDING CODES (LATEST ADOPTED EDITION) FOR THE RESPECTIVE SEISMIC DESIGN FOR SEISMIC ZONE WITH IMPORTANCE FACTOR 1.5. SEISMIC SUBCONTRACTOR SHALL EXERCISE THE QUALITY CONTROL FOR THIS WORK AND SHALL NOT BE LIMITED TO INSTRUCTIONS DIRECTED TO THE PLUMBING CONTRACTOR. THE SEISMIC SUBCONTRACTOR SHALL CERTIFY IN WRITING THAT THEY HAVE INSPECTED THE INSTALLATION AND THAT ALL ISOLATION ANCHORS AND SEISMIC RESTRAINT MATERIALS ARE INSTALLED CORRECTLY AND FUNCTIONING PROPERLY. CERTIFICATION SHALL BE PROVIDED AFTER ALL CORRECTIVE WORK HAS BEEN COMPLETED.

PLUMBING SYMBOLS

NOTES:
1. ALL SYMBOLS MAY NOT BE USED.
2. DOTTED SYMBOLS INDICATE EXISTING EQUIPMENT, ETC

——— S ———	SANITARY OR WASTE PIPING
— — — — — — — —	VENT PIPING
——— - - CW ———	COLD WATER PIPING
— - - - HW ———	HOT WATER PIPING
— - - - - - GAS —	GAS PIPING
——— SD ———	STORM DRAIN PIPING
——— OSD ———	UNDERGROUND STORM SEWER PIPING
——— RD ———	ROOF DRAIN PIPING
——— ORD ———	OVERFLOW ROOF DRAIN PIPING
——— OSD ———	OVERFLOW STORM DRAIN PIPING
——— GR ———	GREASE PIPING
——— RW- - - RW —	RECIRCULATION WATER PIPING
——— C ———	CONDENSATE DRAIN PIPING
——— TD ———	TRENCH DRAIN PIPING
○	PIPE RISER OR FIXTURE CONNECTION
┼	WALL HYDRANT/HOSE BIB
⊕	FLOOR DRAIN
⊡ ■	AREA DRAIN
——— PRV ———	PRESSURE REDUCING VALVE STATION
———⋈——▭———	GATE VALVE & BACKFLOW PREVENTER
AAV	AIR ADMITTANCE VALVE

GENERAL PLUMBING NOTES:

1. PIPING SCHEMATIC(S) FOR ADDITIONAL INFORMATION ON WASTE & VENT, GAS AND CULINARY WATER PIPING DIAMETERS.
2. COORDINATE ALL WORK WITH OTHER TRADES AS REQUIRED. CONCEAL ALL PIPING IN FINISHED AREAS.
3. PROVIDE AND INSTALL ALL REQUIRED VALVES IN PIPING SYSTEM.
4. PROVIDE AND INSTALL NEW 1-1/2" WATER METER WITH 2"ø MAIN WATER SUPPLY LINE. PROVIDE AND INSTALL MAIN SHUT-OFF, PRV, ETC. (FIELD VERIFY LOCATION WITH SITE CONDITIONS AND OWNER REPRESENTATIVE.)
5. PROVIDE AND INSTALL 6"ø SEWER LINE. FIELD LOCATE. MAKE CONNECTION TO COMPLETE BUILDING SEWER SYSTEM. VERIFY ALL INVERT ELEVATIONS AND ALL REQUIREMENTS WITH OWNER REPRESENTATIVE AND CIVIL PLANS.
6. FIELD LOCATE NEW 2 POUND GAS METERS. VERIFY LOCATION AND ALL REQUIREMENTS WITH GAS COMPANY.
7. WHERE REQUIRED PLUMBING CONTRACTOR SHALL PROVIDE AND INSTALL 2 POUND TO 4 OUNCE PRESSURE REGULATORS WITH LEAK-LIMITING DEVICE AND TEST TEE FITTING. IFGC 410.
8. INSULATE ALL HOT AND COLD WATER PIPING PER APPLICABLE CODES. ALL EXPOSED HOT AND COLD WATER PIPING SHALL BE INSULATED. INSULATE HOT WATER PIPING THAT IS PLACED IN UNINSULATED INTERIOR WALLS. EXCEPTION: VERTICAL AND HORIZONTAL COLD WATER PIPING LOCATED INSIDE OF INTERIOR WALLS MAY HAVE THE INSULATION OMITTED.
9. MAKE PROVISIONS FOR A TRAP GUARD WHERE NOTED AND/OR CALLED FOR.
10. PIPING LOCATIONS ARE GRAPHICALLY SHOWN. PLUMBING CONTRACTOR SHALL DETERMINE ACTUAL PIPE ROUTING IN FIELD PER AVAILABLE SPACE AND BUILDING CONSTRUCTION.
11. NOT ALL CLEANOUTS ARE SHOWN. PROVIDE AND INSTALL ALL REQUIRED CLEANOUTS. CLEANOUTS FOR HORIZONTAL DRAINS SHALL BE INSTALLED NO MORE THAN 100' APART. CLEANOUTS SHALL BE INSTALLED AT EACH CHANGE OF DIRECTION GREATER THAN 45°. A CLEANOUT SHALL BE PROVIDED AT THE BASE OF EACH WASTE OR SOIL STACK. CLEANOUTS SHALL BE ACCESSIBLE AND THE SAME SIZE AS THE WASTE LINES ON WHICH THEY ARE INSTALLED.
12. COORDINATE WITH OTHER TRADES TO ENSURE AND ALL PLUMBING VENTS ARE A MINIMUM OF 10-FEET FROM ALL FRESH AIR INTAKES.
13. WATER PIPING MATERIAL SHALL MEET THE STANDARDS SET FORTH IN 2018 IPC TABLES 605.3, 605.4 & 605.5.
14. SANITARY WASTE AND VENT PIPING MATERIAL SHALL MEET THE STANDARDS SET FORTH IN 2018 IPC TABLES 702.1, 702.2 AND 702.3 & 702.4.
15. NATURAL GAS PIPING MATERIAL SHALL MEET THE STANDARDS SET FORTH IN 2018 IFGC SECTION 403.
16. PROVIDE AND INSTALL WATER HAMMER ARRESTORS WHERE QUICK-CLOSING VALVES ARE UTILIZED. THIS INCLUDES BUT IS NOT LIMITED TO: ICE MAKERS AND DISHWASHERS.

GENERAL PLUMBING NOTES:

17. TRENCHES THAT ARE EXCAVATED BELOW THE INSTALLATION LEVEL OF PIPE (SUCH THAT THE TRENCH BOTTOM DOES NOT FORM THE BED FOR THE PIPE) SHALL BE BACKFILLED TO THE INSTALLATION LEVEL OF THE BOTTOM OF THE PIPE WITH SAND OR FINE GRAVEL PLACED IN LAYERS OF 6 INCHES MAXIMUM DEPTH. THE BACKFILL SHALL BE COMPACTED AFTER EACH PLACEMENT. 2018 IPC 306.2.1.
18. PROVIDE AND INSTALL MARKING/LOCATING TAPE FOR ALL BURIED GAS LINES.
19. PLUMBING CONTRACTOR SHALL PROVIDE AND INSTALL COLD WATER SHUT-OFF AT EACH MAJOR RISE. COORDINATE LOCATION WITH SITE CONDITIONS AND OWNER REPRESENTATIVE.
20. CURRENT CODE REQUIRES THAT ALL EQUIPMENT THAT DOMESTIC WATER COMES IN CONTACT WITH MEETS THE CURRENT LEAD FREE REQUIREMENTS. IF THE HEATING COIL, PUMP, ETC. DO NOT MEET THE CURRENT LEAD FREE REQUIREMENTS IT WILL BE NECESSARY TO PROVIDE A HEAT EXCHANGER TO ISOLATE THE DOMESTIC WATER FROM THE HEATING EQUIPMENT.
21. SHOWER CONTROL VALVES. INDIVIDUAL SHOWER AND TUB/SHOWER COMBINATION VALVES SHALL BE EQUIPPED WITH CONTROL VALVES OF THE PRESSURE-BALANCE, THERMOSTATIC-MIXING OR COMBINATION PRESSURE-BALANCE/THERMOSTATIC-MIXING VALVE TYPES WITH A HIGH LIMIT STOP IN ACCORDANCE WITH ASSE 1016. THE HIGH LIMIT STOP SHALL BE SET TO LIMIT WATER TEMPERATURE TO A MAXIMUM OF 120°F. IN-LINE THERMOSTATIC VALVES SHALL NOT BE USED TO MEET THIS REQUIREMENT (2018 IPC 412.3, 2018 IRC P2708.4). INSTALL SHOWER HEADS 80" ABOVE FINISHED FLOOR.
22. PLUMBING CONTRACTOR IS RESPONSIBLE TO PROVIDE LOW NOx LISTED GAS FIRED WATER HEATERS WITH A LIMIT OF NITROGEN OXIDE TO 10 NANOGRAMS PER JOULE OF HEAT OUTPUT OR 15 PPM (CORRECTED TO 3% OXYGEN). COORDINATION WITH MECHANICAL CONTRACTOR FOR FLUE/PIPING INSTALLATION WILL BE REQUIRED.
23. THE PLUMBING CONTRACTORS SHALL ENSURE THAT LENGTH OF VENT PIPING FOR ALL WATER HEATERS WITH POWER DIRECT EXHAUST DOES NOT EXCEED MANUFACTURERS SPECIFICATIONS. IF THE VENT WILL EXCEED MANUFACTURERS RECOMMENDED VENTING LENGTH WATER HEATERS CAPABLE OF SIDEWALL VENT PIPING WILL BE REQUIRED. COORDINATION FINAL VENTING LOCATION WITH OWNER REPRESENTATIVE.
24. PLUMBING CONTRACTOR SHALL PROVIDE AND INSTALL A CHECK VALVE AND SHUT-OFF VALVE AT EACH UNIT. SEE PLUMBING FLOOR PLANS FOR SIZING AND PLUMBING SCHEMATICS FOR ADDITIONAL INFORMATION.
25. PLUMBING CONTRACTOR TO PROVIDE AND INSTALL BACKFLOW PREVENTER AT ALL HOSE BIB LOCATIONS.
26. PAINT ALL EXTERIOR GAS PIPING WITH WEATHER RESISTANT PAINT.

DESIGN CONTACTS

MECHANICAL ENGINEER:	MARK MAKIN (mark.makin@royaleng.com)
MECHANICAL PROJECT MANAGER:	CHRIS FALSLEV (chris.falslev@royaleng.com)
MECHANICAL DESIGNER:	ROGER FULLERTON (roger.fullerton@royaleng.com)

SHEET INDEX

30TH STREET APARTMENTS (18 UNITS) WATER PIPING CALCULATIONS

DESIGN CONDITIONS

CITY:	OGDEN, UTAH	
WATER PRESSURE	60	psi MIN. (VERIFY)
DEVELOPED PIPE LENGTH	150	FEET MAXIMUM (VERIFY)
ANTICIPATED FIXTURE UNITS	263	WSFU MAXIMUM

263 FIXTURE UNITS REQUIRES A:
1-1/2" METER AND A 2" DIAMETER DISTRIBUTION LINE
(47 GPM MAXIMUM ANTICIPATED FLOW).

30TH STREEET APARTMENTS 18 UNITS TOTAL BUILDING DRAINAGE UNIT LOADS

LOAD VALUES, IN DRAINAGE FIXTURE UNITS (DFU)

FIXTURE	*DFU*	*MIN TRAP SIZE*	*# FIXTURES*	*TOTAL*
BATH TUB/SHOWER	2	1½	33	66
SINKS W/ DISHWASHER	2	1½	18	36
LAVATORIES	1	1¼	50	50
WASHING MACHINES	2	2	18	36
WATER CLOSETS	3	SEE PLANS	33	99
			TOTAL	**287**

287 DRAINAGE FIXTURE UNITS REQUIRES:
ONE 6" DIAMETER DRAIN LINE AT @ 1/8"/FT SLOPE

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30th STREET APARTMENTS

GENERAL PLUMBING NOTES, SYMBOLS, AND SHEET INDEX

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P0.1

ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

REGISTERED PROFESSIONAL ENGINEER — MARK L MAKIN — 9/20/19 — STATE OF UTAH

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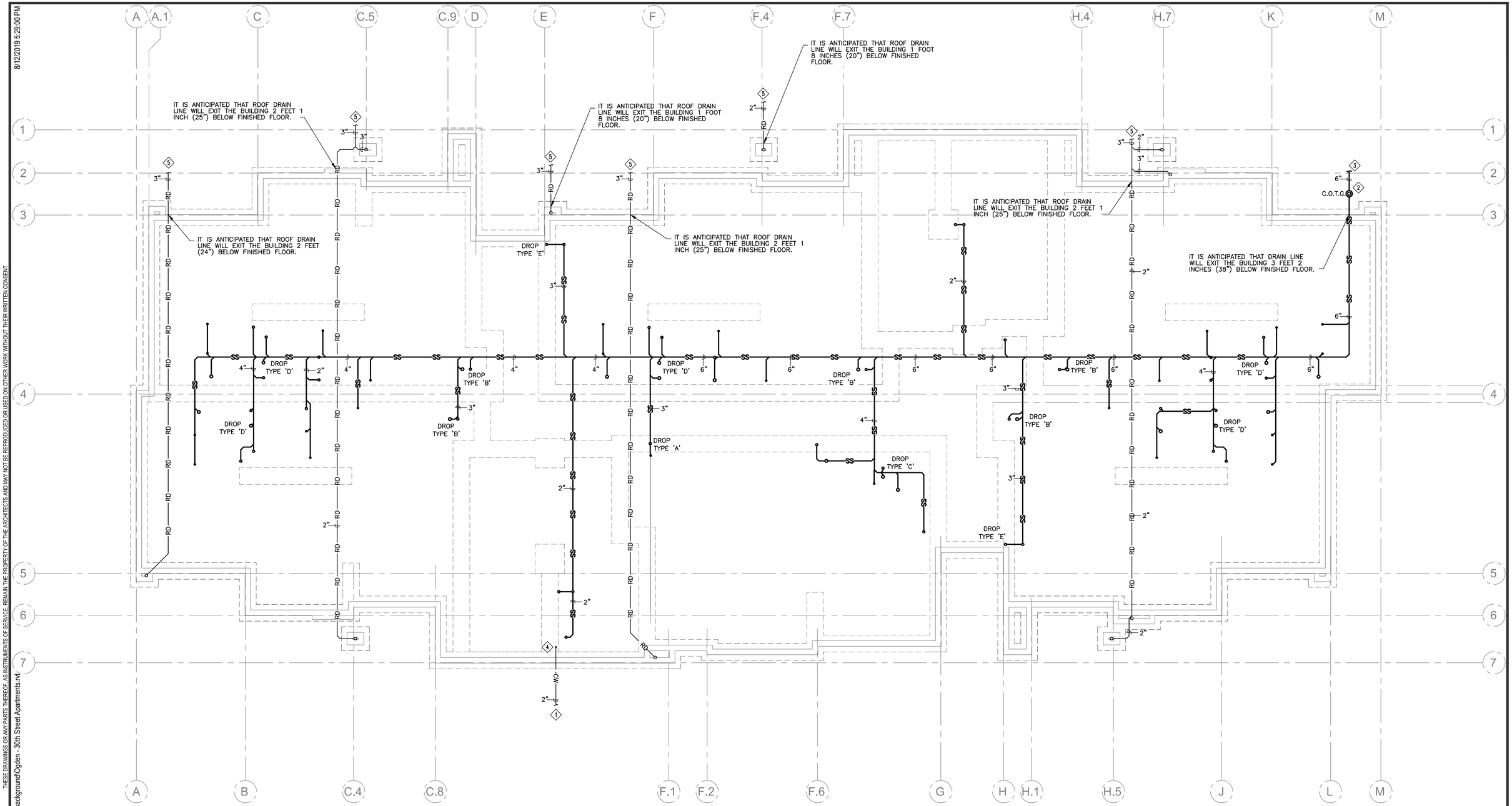

UNDERGROUND PLUMBING PLAN
SCALE: 3/16" = 1'-0"

PLUMBING KEYED NOTES:

1. FIELD VERIFY FINAL MAIN CULINARY WATER CONNECTION. SEE CIVIL PLANS FOR CONTINUATION.
2. PROVIDE AND INSTALL ALL REQUIRED CLEAN OUTS. NOT ALL CLEAN OUTS ARE SHOWN. SEE GENERAL NOTES AND DETAILS. INSTALL CLEAN OUTS SO THAT THE TOP OF CAP WILL BE LEVEL AND PLUMB WITH SURROUNDING SURFACE. COORDINATE ALL CLEANOUTS WITH STRUCTURE, LANDSCAPING AND OWNER REPRESENTATIVE.
3. PROPOSED LOCATION OF MAIN BURIED SEWER LINE. FIELD LOCATE FINAL CONNECTION WITH STRUCTURE, CIVIL DRAWINGS AND OWNER REPRESENTATIVE. MAKE ALL CONNECTIONS TO COMPLETE SYSTEM. PROVIDE AND INSTALL ALL REQUIRED CLEANOUTS. SEE PLUMBING SCHEMATICS AND NOTES.
4. PROPOSED LOCATION OF RISER TO BUILDING PRESSURE REDUCING VALVE STATION (PRV) ON LEVEL 1. CORDINATE FINAL LOCATION WITH OWNER REPRESENTATIVE. SEE DETAILS AND CONTINUATION ON LEVEL 1 PLUMBING PLAN.
5. ANTICIPATED LOCATION OF STORM DRAIN CONNECTION. FIELD LOCATE FINAL CONNECTION WITH STRUCTURE, CIVIL DRAWINGS, AND OWNER REPRESENTATIVE. MAKE ALL CONNECTIONS TO COMPLETE SYSTEM.

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30th STREET APARTMENTS

UNDERGROUND PLUMBING PLAN

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ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

LEVEL 1 PLUMBING PLAN

SCALE: 3/16" = 1'-0"

PLUMBING KEYED NOTES:

1. SEE ENLARGED UNIT PLANS AND SCHEMATICS FOR MORE INFORMATION. PROPOSED DROP LOCATIONS HAVE BEEN SHOWN. CONTRACTOR CAN EXPECT MINOR FIELD ADJUSTMENTS TO LOCATIONS SHOWN TO MEET SITE CONDITIONS. SEE DROP CONTINUATION ON UPPER LEVEL AND UNDERGROUND PLUMBING PLANS. COORDINATE FINAL LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE.
2. PROPOSED LOCATION OF ROOF DRAIN DROP. COORDINATE FINAL LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE. SEE UPPER LEVEL AND UNDERGROUND PLUMBING PLANS FOR CONTINUATION.
3. PROPOSED LOCATION OF ROOF OVERFLOW DROP AND LAMB'S TONGUE TERMINATION. COORDINATE FINAL LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE. SEE UPPER LEVEL PLUMBING PLANS FOR CONTINUATION. SEE PLUMBING DETAILS FOR MORE INFORMATION.
4. PROPOSED LOCATION OF CONDENSATE RECEPTOR. CONTRACTOR CAN EXPECT MINOR FIELD ADJUSTMENTS TO LOCATIONS SHOWN TO MEET SITE CONDITIONS. SEE CONTINUATION ON UPPER LEVEL AND UNDERGROUND PLUMBING PLANS. SEE PLUMBING SCHEMATICS FOR ADDITIONAL INFORMATION. COORDINATE FINAL LOCATION WITH STRUCTURE, MECHANICAL, AND OWNER REPRESENTATIVE.
5. PROPOSED LOCATION OF WATER SUPPLY RISER/DROP SERVING UNITS ON THIS LEVEL. SEE CONTINUATION ON UPPER LEVEL PLUMBING PLANS.
6. PROPOSED LOCATION OF GAS LINE RISER/DROP SERVING UNITS ON THIS LEVEL. SEE CONTINUATION ON UPPER AND LOWER LEVEL PLUMBING PLANS.
7. PROPOSED LOCATION OF GAS METERS. IT IS ANTICIPATED THAT METERS WILL NEED TO BE A MINIMUM OF 2 HIGH. VERIFY FINAL METER LOCATION AND ALL REQUIREMENTS WITH OWNER REPRESENTATIVE AND GAS COMPANY.
8. PROPOSED LOCATION OF GAS LINE RISERS. SEE GAS LINE SCHEMATICS AND ENLARGED PLANS FOR ADDITIONAL INFORMATION. COORDINATE LOCATION AND REQUIRED WALL WIDTH WITH OWNER REPRESENTATIVE AND SITE CONDITIONS.
9. IT IS PROPOSED THAT CULINARY SUPPLY PIPING IS RUN IN CEILING OF MAIN LEVEL. COORDINATE LOCATION WITH OWNER REPRESENTATIVE AND SITE CONDITIONS.
10. PROPOSED LOCATION OF HOSE BIB. PROVIDE AND INSTALL LOCKABLE COVER. IF HOSE BIB CANNOT BE INSTALLED TO ALLOW LINE TO DRAIN PROVIDE AND INSTALL HEAT TAPE AND INSULATION. COORDINATE FINAL LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE. SEE PLUMBING SCHEDULE AND DETAILS.
11. PROPOSED LOCATION OF BUILDING PRESSURE REDUCING VALVE STATION (PRV) AND FLOOR DRAIN. COORDINATE FINAL LOCATION WITH OWNER REPRESENTATIVE. SEE DETAILS AND LEVEL 1 PLUMBING PLANS FOR MORE INFORMATION.
12. PROPOSED LOCATION OF FLOOR DRAIN DROP FROM MECHANICAL ROOM ON FLOOR ABOVE. SEE UPPER LEVEL AND UNDERGROUND PLUMBING PLANS FOR CONTINUATION.

PROFESSIONAL ENGINEER 4858829 MARK L. MAKIN 9/20/19 STATE OF UTAH

ROYAL ENGINEERING
ELECTRICAL MECHANICAL
1837 S. EAST BAY BLVD. PROVO, UTAH 84606
PHONE: 801.375.2228 FAX: 801.375.2676

REVISIONS

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HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS

LEVEL 1 PLUMBING PLAN

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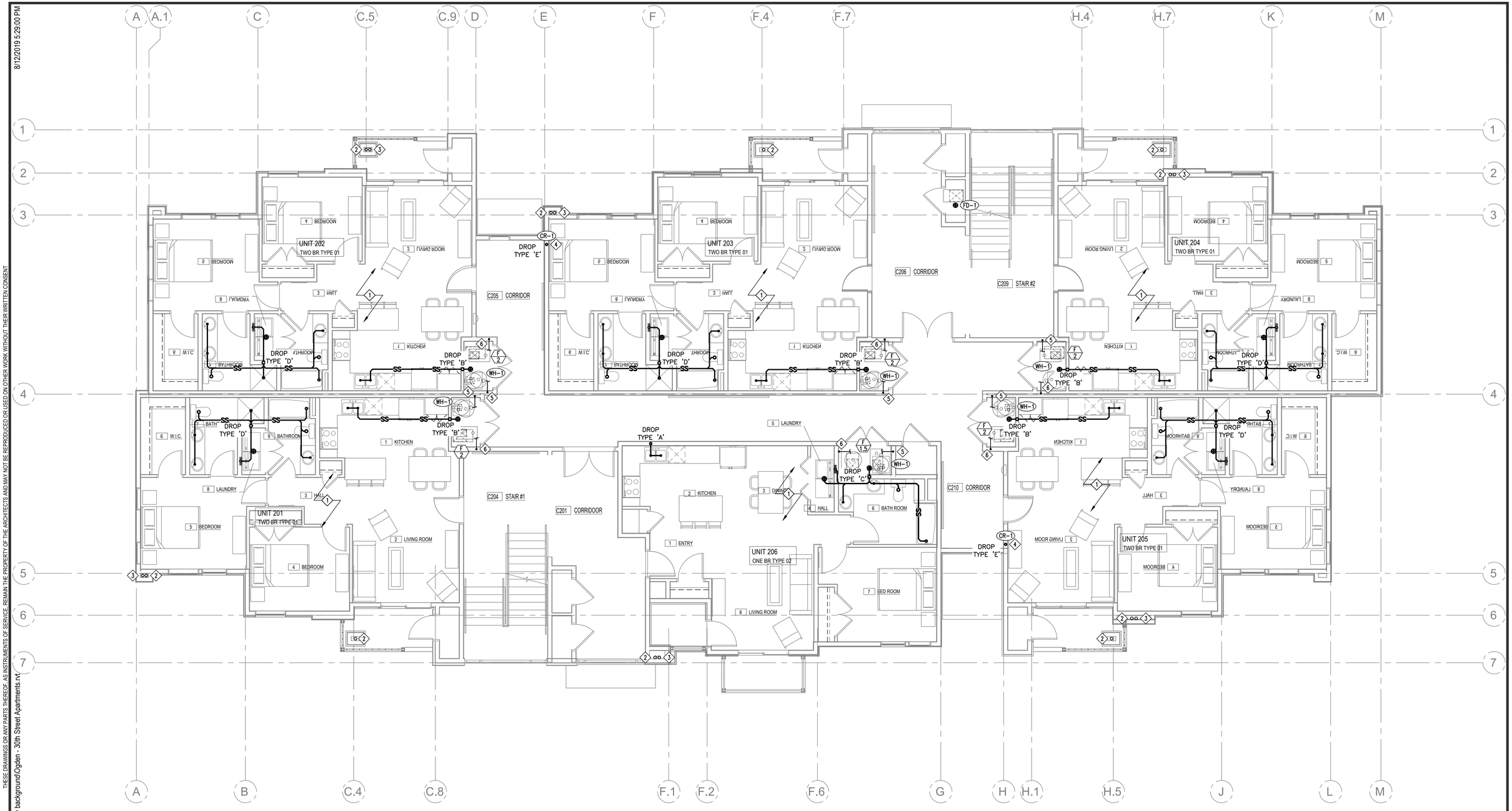

PLUMBING KEYED NOTES:

5. PROPOSED LOCATION OF WATER SUPPLY RISER SERVING UNITS ON THIS LEVEL. SEE SCHEMATICS AND CONTINUATION ON UPPER AND LOWER LEVEL PLUMBING PLANS.

6. PROPOSED LOCATION OF GAS LINE RISER SERVING UNITS ON THIS LEVEL. SEE SCHEMATICS AND CONTINUATION ON UPPER AND LOWER LEVEL PLUMBING PLANS.

PLUMBING KEYED NOTES:

1. SEE ENLARGED UNIT PLANS AND SCHEMATICS FOR MORE INFORMATION. PROPOSED DROP LOCATIONS HAVE BEEN SHOWN. CONTRACTOR CAN EXPECT MINOR FIELD ADJUSTMENTS TO LOCATIONS SHOWN TO MEET SITE CONDITIONS. SEE DROP CONTINUATION ON UPPER AND LOWER LEVEL PLUMBING PLANS. COORDINATE FINAL LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE.

2. PROPOSED LOCATION OF ROOF DRAIN DROP. COORDINATE FINAL LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE. SEE UPPER AND LOWER LEVEL PLUMBING PLANS FOR CONTINUATION.

3. PROPOSED LOCATION OF ROOF OVERFLOW DROP. COORDINATE FINAL LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE. SEE UPPER AND LOWER LEVEL PLUMBING PLANS FOR CONTINUATION.

4. PROPOSED LOCATION OF CONDENSATE RECEPTOR. CONTRACTOR CAN EXPECT MINOR FIELD ADJUSTMENTS TO LOCATIONS SHOWN TO MEET SITE CONDITIONS. SEE CONTINUATION ON UPPER AND LOWER LEVEL PLUMBING PLANS. SEE PLUMBING SCHEMATICS FOR ADDITIONAL INFORMATION. COORDINATE FINAL LOCATION WITH STRUCTURE, MECHANICAL, AND OWNER REPRESENTATIVE.

LEVEL 2 PLUMBING PLAN

SCALE: 3/16" = 1'-0"

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LEVEL 2 PLUMBING PLAN

09/20/2019

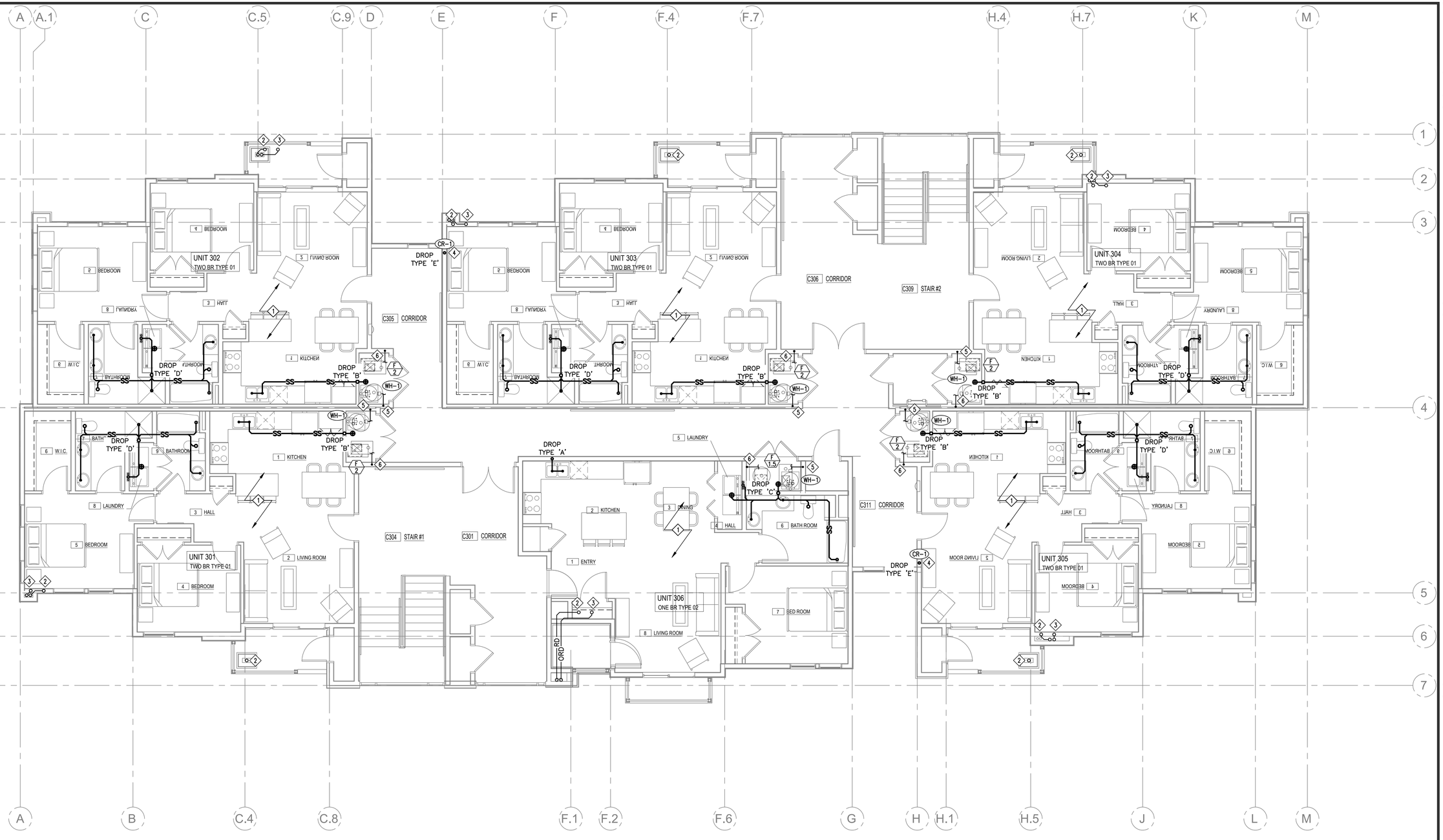
P1.3

REGISTERED PROFESSIONAL ENGINEER
STATE OF UTAH
MARK L MAKIN
9/20/19

ROYAL ENGINEERING

ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228

MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676



PLUMBING KEYED NOTES:

5. PROPOSED LOCATION OF WATER SUPPLY RISER SERVING UNITS ON THIS LEVEL. SEE SCHEMATICS AND CONTINUATION ON LOWER LEVEL PLUMBING PLANS.

6. PROPOSED LOCATION OF GAS LINE RISER SERVING UNITS ON THIS LEVEL. SEE SCHEMATICS AND CONTINUATION ON LOWER LEVEL PLUMBING PLANS.

PLUMBING KEYED NOTES:

1. SEE ENLARGED UNIT PLANS AND SCHEMATICS FOR MORE INFORMATION. PROPOSED DROP LOCATIONS HAVE BEEN SHOWN. CONTRACTOR CAN EXPECT MINOR FIELD ADJUSTMENTS TO LOCATIONS SHOWN TO MEET SITE CONDITIONS. SEE DROP CONTINUATION ON LOWER LEVEL PLUMBING PLANS. COORDINATE FINAL LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE.

2. PROPOSED LOCATION OF ROOF DRAIN DROP. COORDINATE FINAL LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE. SEE LOWER LEVEL PLUMBING PLANS FOR CONTINUATION.

3. PROPOSED LOCATION OF ROOF OVERFLOW DROP. COORDINATE FINAL LOCATION WITH STRUCTURE AND OWNER REPRESENTATIVE. SEE LOWER LEVEL PLUMBING PLANS FOR CONTINUATION.

4. PROPOSED LOCATION OF CONDENSATE RECEPTOR. CONTRACTOR CAN EXPECT MINOR FIELD ADJUSTMENTS TO LOCATIONS SHOWN TO MEET SITE CONDITIONS. SEE CONTINUATION ON LOWER LEVEL PLUMBING PLANS. SEE PLUMBING SCHEMATICS FOR ADDITIONAL INFORMATION. COORDINATE FINAL LOCATION WITH STRUCTURE, MECHANICAL, AND OWNER REPRESENTATIVE.

LEVEL 3 PLUMBING PLAN

SCALE: 3/16" = 1'-0"

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HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6393 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS

LEVEL 3 PLUMBING PLAN

09/20/2019

P1.4

ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

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ROOF DRAIN CALCULATIONS AREA 05	
1215	ROOF AREA, SQ FT
96	PARAPET WALL LENGTH, FT
3	PARAPET WALL HEIGHT, FT
1359	TOTAL AREA, SQ FT
1.5	RAINFALL, INCHES PER HOUR
23.3	CALCULATED GPM
3" DIA	PIPE SIZE @ 1/8" PER FOOT SLOPE
2018 INTERNATIONAL PLUMBING CODE 1106	

ROOF DRAIN CALCULATIONS AREA 03	
1514	ROOF AREA, SQ FT
68	PARAPET WALL LENGTH, FT
3	PARAPET WALL HEIGHT, FT
1616	TOTAL AREA, SQ FT
1.5	RAINFALL, INCHES PER HOUR
27.7	CALCULATED GPM
3" DIA	PIPE SIZE @ 1/8" PER FOOT SLOPE
2018 INTERNATIONAL PLUMBING CODE 1106	

ROOF DRAIN CALCULATIONS AREA 01	
1460	ROOF AREA, SQ FT
90	PARAPET WALL LENGTH, FT
3	PARAPET WALL HEIGHT, FT
1595	TOTAL AREA, SQ FT
1.5	RAINFALL, INCHES PER HOUR
27.3	CALCULATED GPM
3" DIA	PIPE SIZE @ 1/8" PER FOOT SLOPE
2018 INTERNATIONAL PLUMBING CODE 1106	

ROOF DRAIN CALCULATIONS AREA 02	
1021	ROOF AREA, SQ FT
69	PARAPET WALL LENGTH, FT
3	PARAPET WALL HEIGHT, FT
1125	TOTAL AREA, SQ FT
1.5	RAINFALL, INCHES PER HOUR
19.3	CALCULATED GPM
2" DIA	PIPE SIZE @ 1/8" PER FOOT SLOPE
2018 INTERNATIONAL PLUMBING CODE 1106	

ROOF DRAIN CALCULATIONS AREA 06	
1492	ROOF AREA, SQ FT
88	PARAPET WALL LENGTH, FT
3	PARAPET WALL HEIGHT, FT
1624	TOTAL AREA, SQ FT
1.5	RAINFALL, INCHES PER HOUR
27.8	CALCULATED GPM
3" DIA	PIPE SIZE @ 1/8" PER FOOT SLOPE
2018 INTERNATIONAL PLUMBING CODE 1106	

ROOF DRAIN CALCULATIONS AREA 04	
1727	ROOF AREA, SQ FT
99	PARAPET WALL LENGTH, FT
3	PARAPET WALL HEIGHT, FT
1875	TOTAL AREA, SQ FT
1.5	RAINFALL, INCHES PER HOUR
32.1	CALCULATED GPM
3" DIA	PIPE SIZE @ 1/8" PER FOOT SLOPE
2018 INTERNATIONAL PLUMBING CODE 1106	

ROOF PLUMBING PLAN

SCALE: 3/16" = 1'-0"

PLUMBING KEYED NOTES:

1. PROVIDE AND INSTALL ROOF DRAINS. MAINTAIN SLOPE OF NOT LESS THAN 1/8" PER FOOT ALONG FULL EXTENT. SEE PLUMBING DETAILS AND SCHEDULE. COORDINATE OVERFLOW TERMINATION WITH ARCHITECTURAL DRAWINGS AND STRUCTURE. RUN PRIMARY DRAIN DROPS TO OWNER REPRESENTATIVE APPROVED LOCATIONS. SEE LOWER LEVEL PLUMBING PLANS FOR CONTINUATION.
2. PROVIDE AND INSTALL ROOF DRAIN OVERFLOW. MAINTAIN SLOPE OF NOT LESS THAN 1/8" PER FOOT ALONG FULL EXTENT. SEE PLUMBING DETAILS AND SCHEDULE. COORDINATE OVERFLOW TERMINATION WITH ARCHITECTURAL DRAWINGS AND STRUCTURE. IT IS ANTICIPATED THAT OVERFLOW TO DISCHARGE NEAR GROUND LEVEL. SEE CONTINUATION ON LOWER L;EVEL PLUMBING PLANS. RUN OVERFLOW DRAIN DROPS TO OWNER REPRESENTATIVE APPROVED LOCATIONS.
3. APPROXIMATE LOCATION OF MECHANICAL EQUIPMENT. COORDINATE WITH MECHANICAL CONTRACTOR TO AVOID INSTALLATION CONFLICTS.
4. PROVIDE AND INSTALL ROOF DRAINS. MAINTAIN SLOPE OF NOT LESS THAN 1/8" PER FOOT ALONG FULL EXTENT. SEE PLUMBING DETAILS AND SCHEDULE. RUN PRIMARY DRAIN DROPS TO OWNER REPRESENTATIVE APPROVED LOCATIONS. SEE LOWER LEVEL PLUMBING PLANS FOR CONTINUATION.

REGISTERED PROFESSIONAL ENGINEER 4858829 MARK L. MAKIN 9/20/19 STATE OF UTAH

ROYAL ENGINEERING

ELECTRICAL MECHANICAL
1837 S. EAST BAY BLVD. PROVO, UTAH 84606
PHONE: 801.375.2228 FAX: 801.375.2676

JOB# J19141.00 | DATE PLOTTED: 09/20/2019

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30th STREET APARTMENTS

ROOF PLUMBING PLAN

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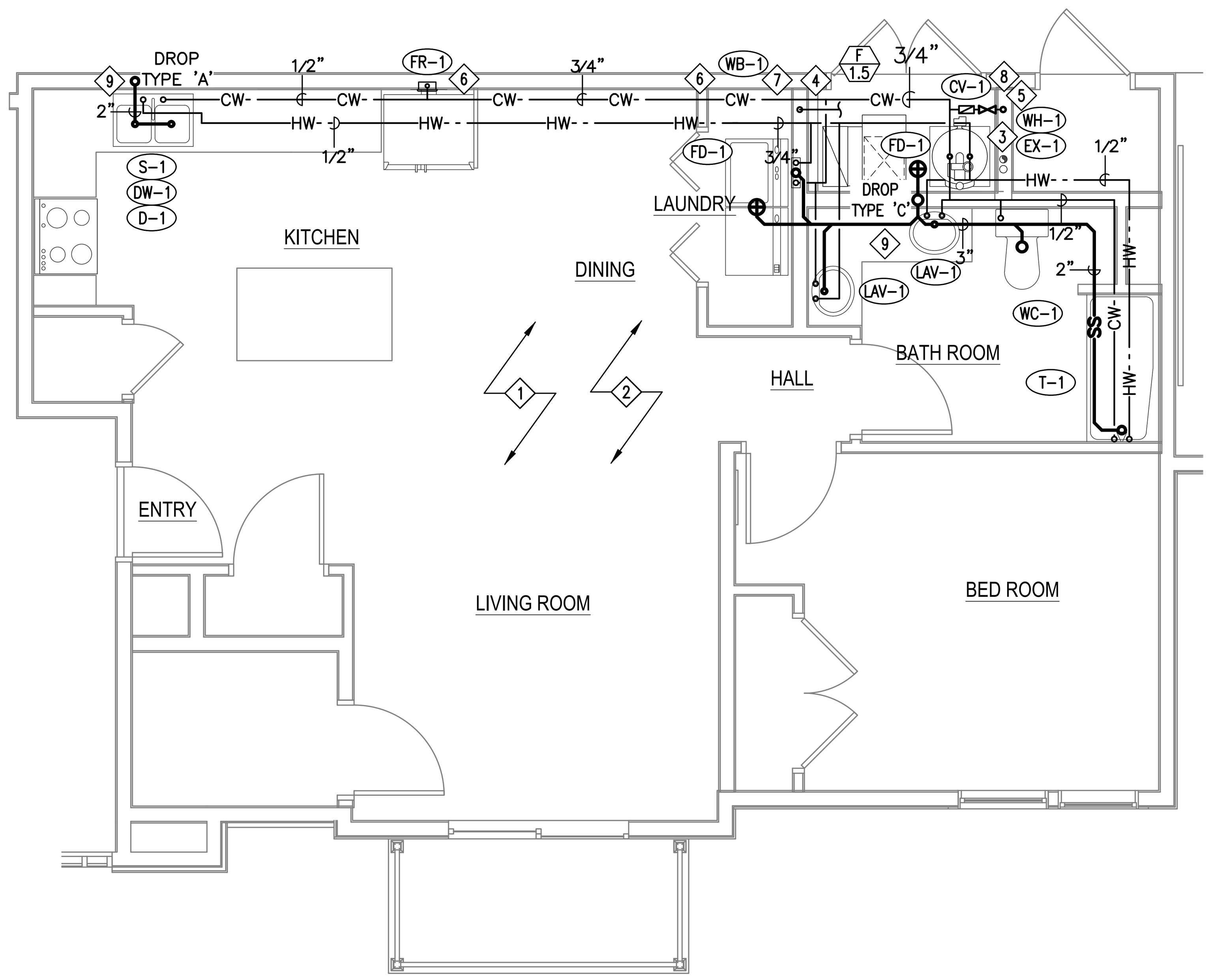

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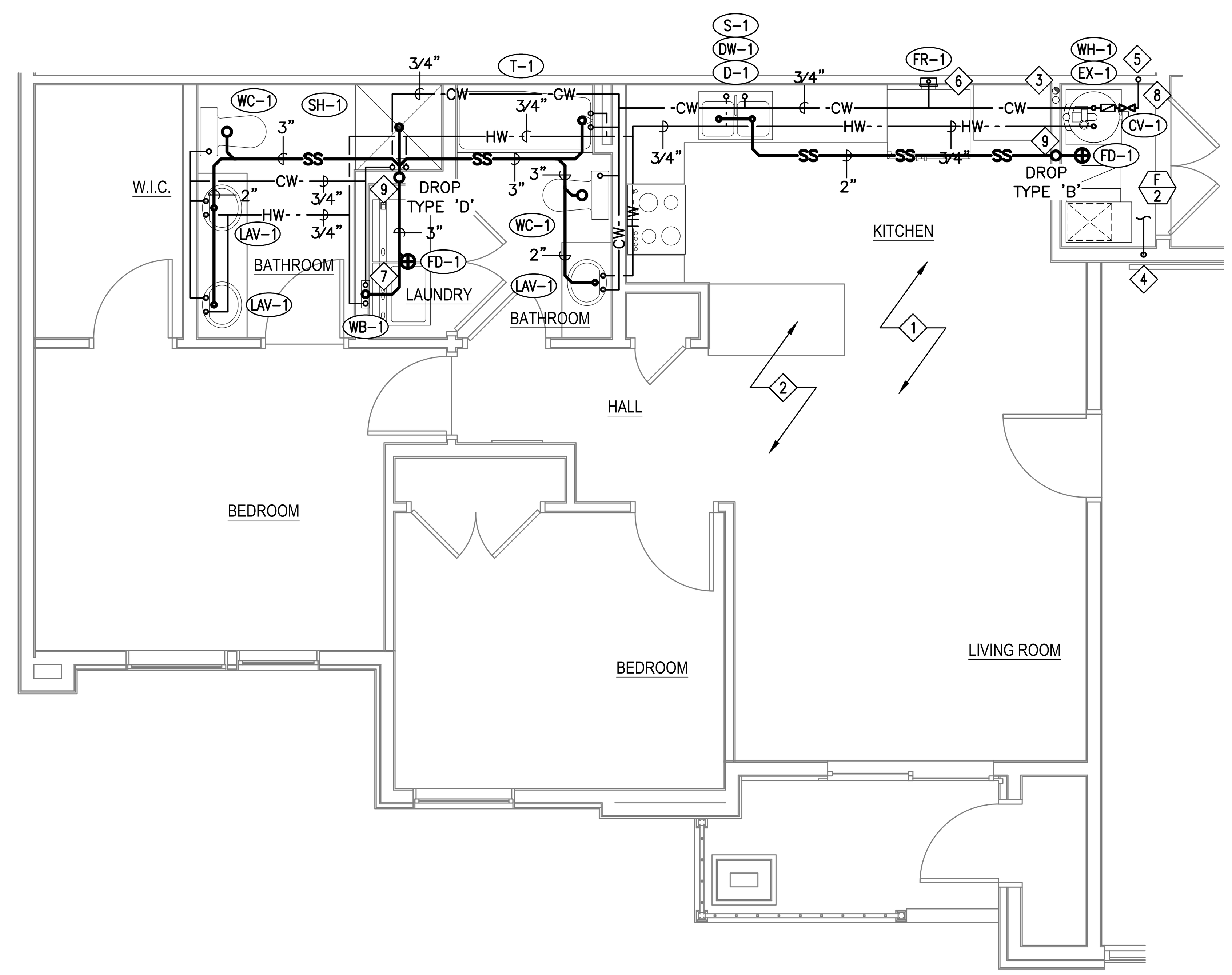

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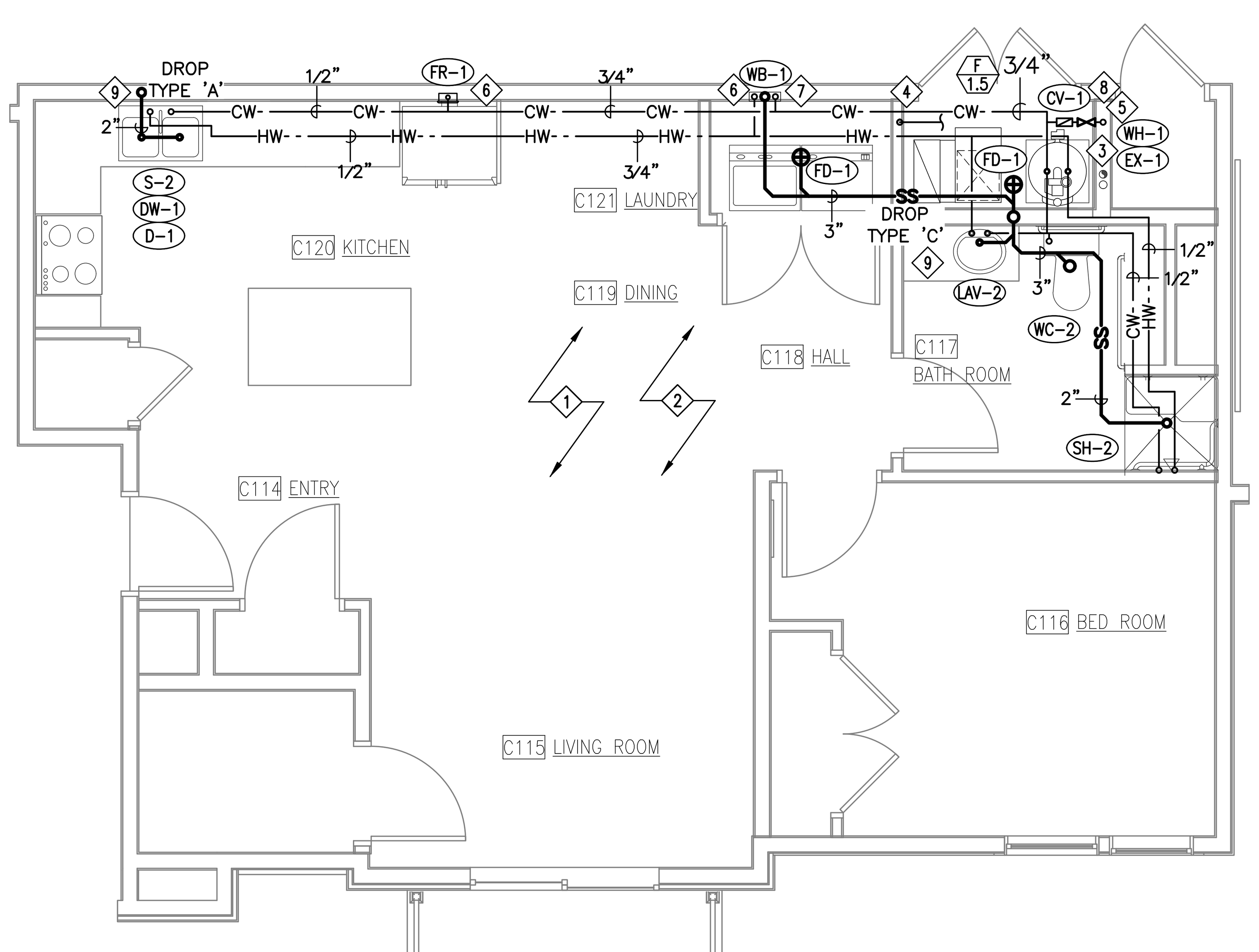

1 BR TYPE 03 ADA UNIT

ENLARGED TYPICAL UNITS PLUMBING PLANS

SCALE: 1/4"=1'0"

PLUMBING KEYED NOTES:

1. SEE TYPICAL UNIT PLUMBING SCHEMATICS FOR ADDITIONAL INFORMATION ON PIPING DIAMETERS AND CONTINUATION.
2. ANTICIPATED NUMBER OF FIXTURES AND PROPOSED PIPE ALIGNMENTS ARE SHOWN. PLUMBING CONTRACTOR CAN EXPECT FIELD ADJUSTMENTS TO ALIGNMENTS SHOWN TO MATCH SITE CONDITIONS. COORDINATE FIXTURES TYPES, PLUMBING DROPS AND PIPE ALIGNMENTS WITH OWNER REPRESENTATIVE.
3. PROVIDE AND INSTALL WATER HEATER POWER DIRECT VENTING. COORDINATE LOCATIONS WITH OTHER TRADES AND OWNER REPRESENTATIVE TO AVOID INSTALLATION CONFLICTS.
4. PROPOSED NATURAL GAS LINE RISER/DROP LOCATION. PLUMBING CONTRACTOR CAN EXPECT THAT MINOR FIELD ADJUSTMENTS AND TRANSITIONS TO LOCATIONS SHOWN WILL BE REQUIRED. COMPLETE CONNECTION TO GAS METER SUPPLYING THIS UNIT. COMPLETE CONNECTION TO UNIT WATER HEATER AND FURNACE. SEE BUILDING PLUMBING PLANS AND SCHEMATICS FOR PIPE DIAMETERS AND CONTINUATION.
5. PROPOSED CULINARY LINE RISER LOCATION. PLUMBING CONTRACTOR CAN EXPECT THAT MINOR FIELD ADJUSTMENTS AND TRANSITIONS TO LOCATIONS SHOWN WILL BE REQUIRED. COMPLETE CONNECTION TO MAIN CULINARY WATER LINE AND RISER. SEE BUILDING PLUMBING PLANS AND SCHEMATICS FOR RISER AND MAIN LINE PIPE DIAMETERS AND CONTINUATION.
6. FIRE RATED WASHER BOX OR ICE MAKER BOX WILL BE REQUIRED IF INSTALLED WITHIN FIRE RATED ASSEMBLY.
7. PROVIDE AND INSTALL WASHER BOX IN A LOCATION THAT ALLOWS CONVENIENT ACCESS TO APPLIANCE CONNECTIONS AND SHUTOFF VALVES. COORDINATE LOCATION WITH OWNER REPRESENTATIVE.
8. PROVIDE AND INSTALL CHECK VALVE/BACKFLOW PREVENTER AND SHUT OFF VALVE FOR EACH UNIT. COMPLETE CONNECTION TO MAIN CULINARY WATER SYSTEM. SEE BUILDING PLUMBING PLANS AND SCHEMATICS.
9. PROPOSED LOCATION OF A TYPICAL SEWER LINE DROP TO AND FROM EACH FLOOR. ANTICIPATED TYPE OF DROP IS SHOWN SEE PLUMBING FLOOR PLANS FOR CONTINUATION AND DROP CONFIGURATION. SEE TYPICAL DRAINAGE SCHEMATICS FOR DESIRED PIPE SIZES. LOCATION SHOWN IS IN ANTICIPATION OF MECHANICAL EQUIPMENT, DUCTING AND VENTING LOCATIONS. IF SHOWN LOCATION CONFLICTS WITH STRUCTURE OR OTHER DISCIPLINES, FIELD LOCATE ALTERNATE LOCATION WITH OWNER REPRESENTATIVE.

NOTE:

PLUMBING LINES ARE GRAPHICALLY SHOWN FOR CLARITY AND DO NOT REPRESENT ACTUAL LOCATIONS. PLUMBING CONTRACTOR CAN EXPECT ADJUSTMENTS TO LINE LOCATIONS SHOWN TO MEET SITE CONDITIONS AND STRUCTURE.

ROYAL ENGINEERING

ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228

MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

 JOB# J19141.00 DATE PLOTTED: 09/20/2019

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RDF

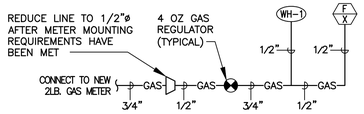
HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS

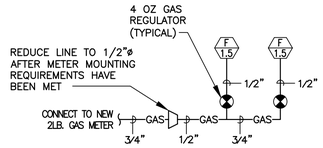
ENLARGED UNITS TYPICAL PLUMBING PLANS

09/20/2019

P4.1



TYPICAL UNIT NATURAL GAS SCHEMATIC



COMMON AREAS NATURAL GAS SCHEMATIC

30TH STREET APARTMENTS
TYPICAL ONE BEDROOM UNIT
GAS PIPING CALCULATIONS (DOMINION, NFPA)

DESIGN CONDITIONS

CITY:	OGDEN, UTAH	
LONGEST PIPE:	150	FEET MAXIMUM (VERIFY)
GAS PRESSURE:	2	LB
DERATION FACTOR:	885	

EQUIPMENT

FURNACE (F-1.5)	46 CFH	40,000	BTU PER HOUR
WATER HEATER (WH-1)	46 CFH	40,000	BTU PER HOUR
TOTAL	92 CFH	80,000	BTU PER HOUR

30TH STREET APARTMENTS
TYPICAL TWO BEDROOM UNIT
GAS PIPING CALCULATIONS (DOMINION, NFPA)

DESIGN CONDITIONS

CITY:	OGDEN, UTAH	
LONGEST PIPE:	150	FEET MAXIMUM (VERIFY)
GAS PRESSURE:	2	LB
DERATION FACTOR:	885	

EQUIPMENT

FURNACE (F-2)	68 CFH	60,000	BTU PER HOUR
WATER HEATER (WH-1)	46 CFH	40,000	BTU PER HOUR
TOTAL	114 CFH	100,000	BTU PER HOUR

30TH STREET APARTMENTS
COMMON AREAS
GAS PIPING CALCULATIONS (DOMINION, NFPA)

DESIGN CONDITIONS

CITY:	OGDEN, UTAH	
LONGEST PIPE:	150	FEET MAXIMUM (VERIFY)
GAS PRESSURE:	2	LB
DERATION FACTOR:	885	

EQUIPMENT

FURNACE (F-1.5)	46 CFH	40,000	BTU PER HOUR
FURNACE (F-1.5)	46 CFH	40,000	BTU PER HOUR
TOTAL	92 CFH	80,000	BTU PER HOUR

PLUMBING FIXTURE SCHEDULE

MARK	FIXTURE	PIPE SIZE					REMARKS
		TRAP	WASTE	VENT	C.W.	H.W.	
CV-1	UNIT CHECK VALVE	——	——	——	SEE PLANS	——	DESIGN GUIDE: NIBCO HYDRAPURE 480 SERIES. WATER CHECK VALVE TO MATCH PIPE SIZING.
D-1	DISPOSAL	——	——	——	——	——	3/4 HP, 120 VOLT DISPOSAL CONNECTED TO SINK. PROVIDE ALL MOUNTING HARDWARE. CONTROL BY DIV. 26.
DW-1	DISH WASHER CONNECTION	——	——	——	——	3/8"	CONNECT DRAIN TO SINK S-1 DRAIN PIPE. PROVIDE AND INSTALL HAMMER ARRESTOR
EX-1	EXPANSION TANK	——	——	——	3/4"	——	DESIGN GUIDE: WATTS PLT-5 (OR EQUAL)
FD-1	FLOOR DRAIN	2"	2"	1 1/2"	——	——	MAKE PROVISIONS FOR TRAP GUARD. ALL FLOOR DRAINS SHALL HAVE A TRAP GUARD.
FR-1	ICE MAKER OUTLET BOX	——	——	——	1/2"	——	ICE MAKER OUTLET BOX. 1/4-TURN VALVE. OUTLET TO MATCH REFRIGERATOR WATER SUPPLY TUBING. PROVIDE FIRE RATED BOX WHERE REQUIRED.
LAV-1	LAVATORY	1 1/4"	1 1/4"	1 1/4"	1/2"	1/2"	LAVATORY SINK WITH FAUCET. COUNTER MOUNTED.
LAV-2	LAVATORY - TYPE A	1 1/4"	1 1/4"	1 1/4"	1/2"	1/2"	LAVATORY SINK WITH FAUCET. COUNTER MOUNTED, TYPE A COMPLIANT. PROVIDE GUARDS FOR ALL EXPOSED PIPING.
ORD-1	ROOF DRAIN-OVERFLOW	——	SEE PLANS	——	——	——	OVERFLOW ROOF DRAIN WITH INTEGRAL GRAVEL GUARD, STANDPIPE AND SELF-LOCKING DOME.
RD-1	ROOF DRAIN-STANDARD	——	SEE PLANS	——	——	——	STANDARD ROOF DRAIN WITH INTEGRAL GRAVEL GUARD AND SELF-LOCKING DOME.
S-1	SINK	1 1/2"	1 1/2"	1 1/2"	1/2"	1/2"	DOUBLE BOWL SINK WITH FAUCET. MAKE PROVISIONS FOR DW CONNECTION.
S-2	SINK - TYPE A	1 1/2"	1 1/2"	1 1/2"	1/2"	1/2"	TYPE A COMPLIANT DOUBLE BOWL SINK WITH FAUCET. MAKE PROVISIONS FOR DW CONNECTION. PROVIDE GUARDS FOR ALL EXPOSED PIPING.
SH-1	SHOWER	2"	2"	1 1/2"	1/2"	1/2"	SHOWER WITH ANTI-SCALD SINGLE LEVER/HANDLE SHOWER VALVE
SH-2	SHOWER - ADA	2"	2"	1 1/2"	1/2"	1/2"	SHOWER WITH ANTI-SCALD SINGLE LEVER/HANDLE SHOWER VALVE, SLIDE BAR AND 60" HOSE WITH HAND HELD SHOWER HEAD.
T-1	TUB - STANDARD	2"	2"	1 1/2"	1/2"	1/2"	TUB WITH ANTI-SCALD SINGLE LEVER/HANDLE BATH/SHOWER VALVE, TUB SPOUT AND SHOWER HEAD.
WB-1	WASHER BOX	2"	2"	1 1/2"	1/2"	1/2"	WASHER BOX MOUNTED IN WALL. PROVIDE AND INSTALL HAMMER ARRESTOR AT EACH WASHER BOX. PROVIDE FIRE RATED BOX WHERE REQUIRED.
WC-1	WATER CLOSET - UNITS (FLOOR MOUNT)	INT.	3"	2"	1/2"	——	WITH TANK AND MINIMUM MAP FLUSH RATING OF 1000 GRAMS.
WC-2	WATER CLOSET - UNITS, TYPE A (FLOOR MOUNT)	INT.	3"	2"	1/2"	——	TYPE A COMPLIANT WITH TANK AND MINIMUM MAP FLUSH RATING OF 1000 GRAMS. FLUSH LEVER SHALL BE ON APPROACH SIDE.
WH-1	WATER HEATER - POWER DIRECT VENT (UNITS)	——	——	——	3/4"	3/4"	40 GALLON POWER DIRECT VENT GAS WATER HEATER W/ DRAIN PAN & DRAIN. 43 g.p.h RECOVERY @ 90° RISE. 40,000 BTU INPUT. SEE PLUMBING PERFORMANCE NOTES FOR LOW NOx REQUIREMENT.
WH-2	WATER HEATER-ELECTRIC	——	——	——	3/4"	3/4"	5 GALLON ELECTRIC WATER HEATER W/ DRAIN PAN & DRAIN. 7.5 g.p.h RECOVERY @ 90° RISE. 1650 WATTS, 14 AMPS, 120 VOLT.

NOTES:
1. VERIFY ALL MANUFACTURERS, FINISHES, AND OPTIONS WITH OWNER BEFORE ORDERING ANY PLUMBING FIXTURES.
2. MINIMUM UNDERGROUND PIPING SIZE SHALL BE 2 INCHES.

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HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6393 | WWW.HARRIS-ARCHITECTURE.COM

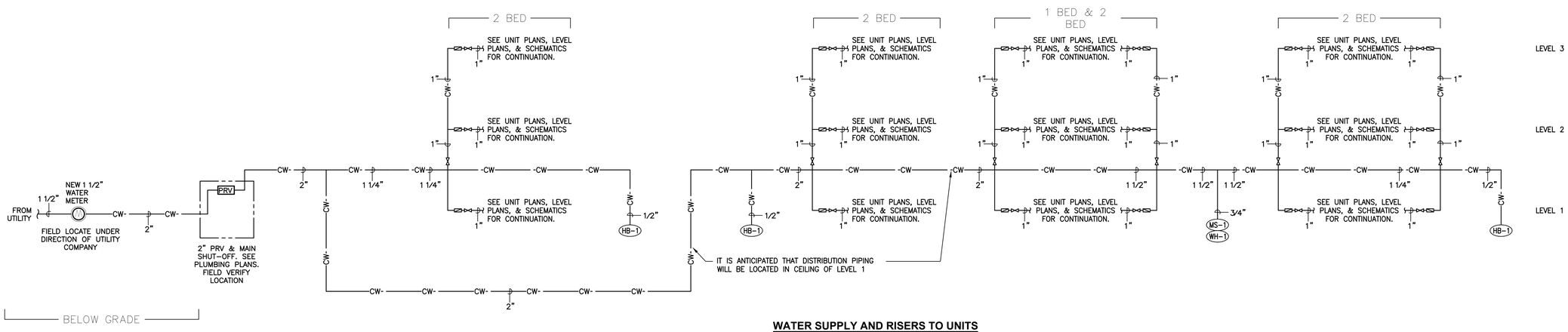
30th STREET APARTMENTS

PLUMBING SCHEDULE AND SCHEMATICS

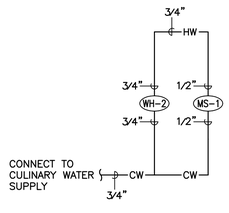
09/20/2019

P6.1

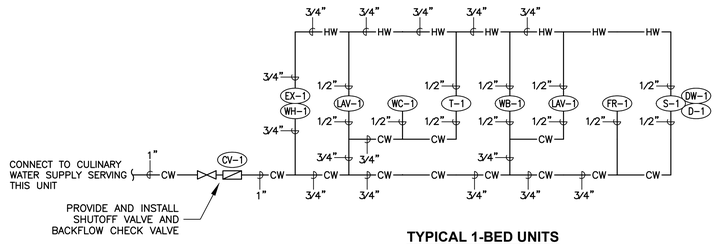
ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676



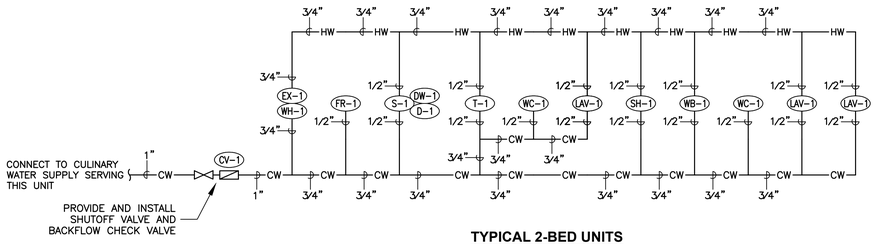
WATER SUPPLY AND RISERS TO UNITS



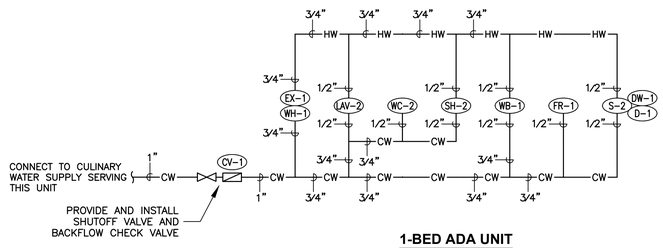
MOP SINK



TYPICAL 1-BED UNITS



TYPICAL 2-BED UNITS



1-BED ADA UNIT

CULINARY WATER SCHEMATICS

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30th STREET APARTMENTS

CULINARY WATER SCHEMATICS

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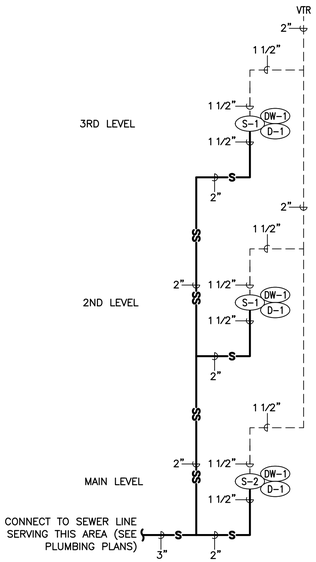
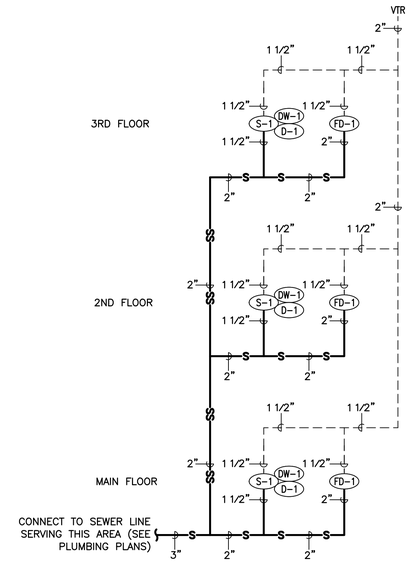
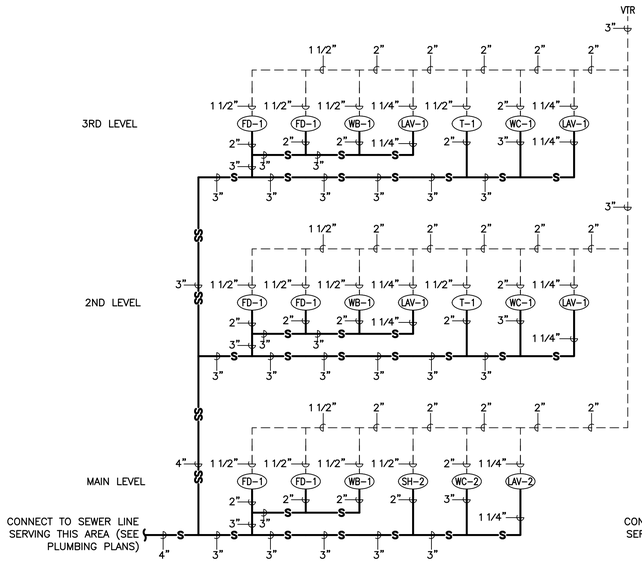
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676



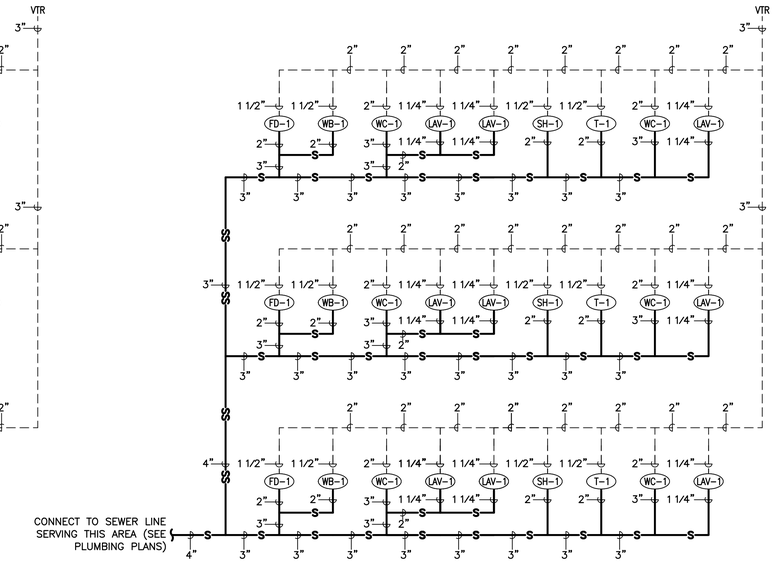
TYPE 'A' SEWER LINE DROP



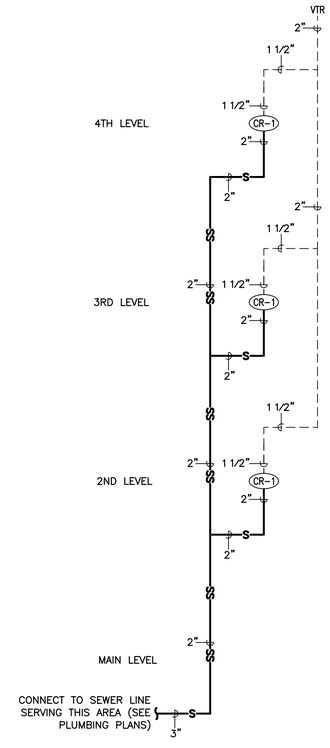
TYPE 'B' SEWER LINE DROP



TYPE 'C' SEWER LINE DROP



TYPE 'D' SEWER LINE DROP



TYPE 'E' SEWER LINE DROP

WASTE AND VENT SCHEMATICS

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30th STREET APARTMENTS

WASTE AND VENT SCHEMATICS

09/20/2019

P6.3

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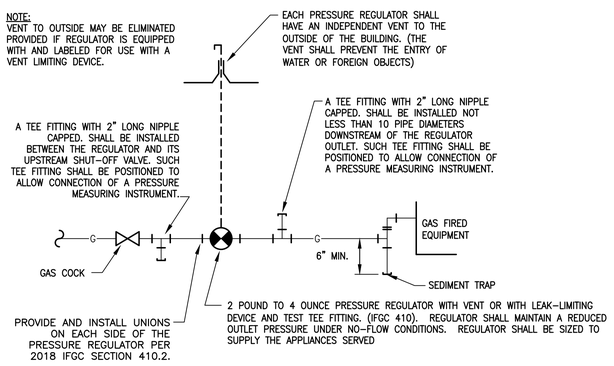
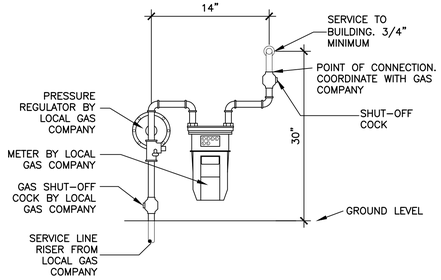
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676



PRESSURE REGULATORS INSTALLED INSIDE BUILDING SHALL BE PROVIDED WITH ACCESS.

TYPICAL 2LB GAS CONNECTION DETAIL

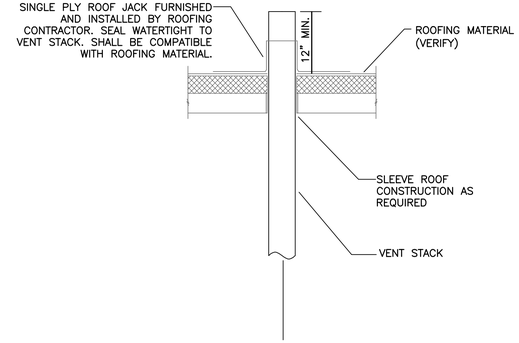
SCALE: NONE



NOTES:
1 – PAINT ALL EXTERIOR GAS PIPING WITH WEATHER RESISTANT PAINT.
2 – FOR MULTIPLE METER INSTALLATIONS WHERE TWO OR MORE HOUSE LINES TERMINATE AT A MULTIPLE METER SET, THEY SHOULD BE SPACED NOT LESS THAN 10" NOR MORE THAN 12" APART.
3 – METERS STACKED TWO ROWS HIGH (MAXIMUM).
4 – GAS PIPING AT MULTIPLE METER INSTALLATIONS SHALL BE PLAINLY MARKED BY A METAL TAG OR OTHER PERMANENT MEANS ATTACHED TO THE PIPE BY THE INSTALLING AGENCY, DESIGNATING THE BUILDING OR THE PART OF THE BUILDING BEING SUPPLIED.
5 – SEAL ALL PENETRATIONS INTO BUILDING WEATHER TIGHT.

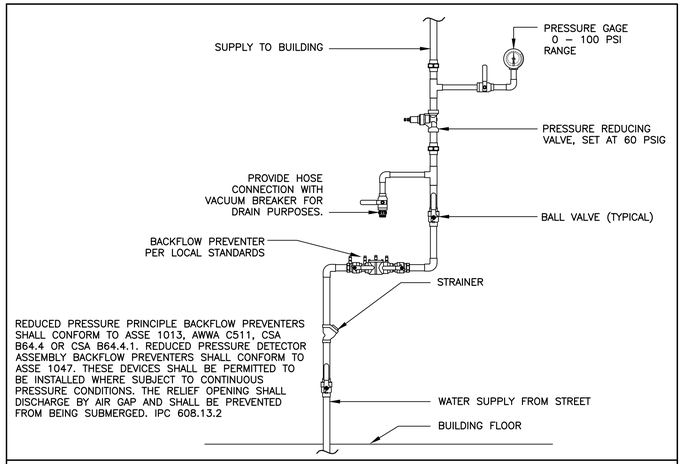
TYPICAL GAS PIPING BUILDING ENTRANCE

SCALE: NONE



TYPICAL VENT THROUGH FLAT ROOF DETAIL

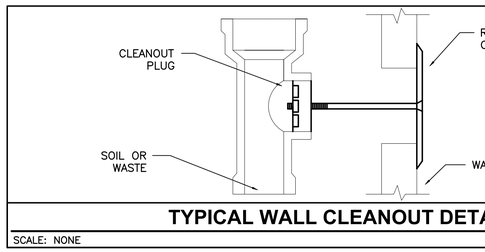
SCALE: NONE



REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTERS SHALL CONFORM TO ASSE 1013, AWWA C511, CSA B64.4 OR CSA B64.4.1. REDUCED PRESSURE DETECTOR ASSEMBLY BACKFLOW PREVENTERS SHALL CONFORM TO ASSE 1047. THESE DEVICES SHALL BE PERMITTED TO BE INSTALLED WHERE SUBJECT TO CONTINUOUS PRESSURE CONDITIONS. THE RELIEF OPENING SHALL DISCHARGE BY AIR GAP AND SHALL BE PREVENTED FROM BEING SUBMERGED. IPC 608.13.2

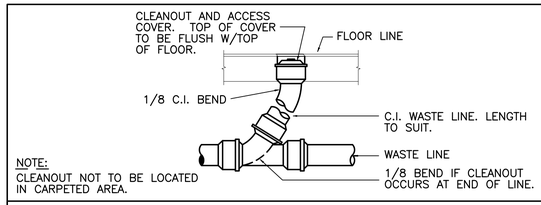
WATER PRV STATION WITH BACKFLOW PREVENTER DETAIL

SCALE: NONE



TYPICAL WALL CLEANOUT DETAIL

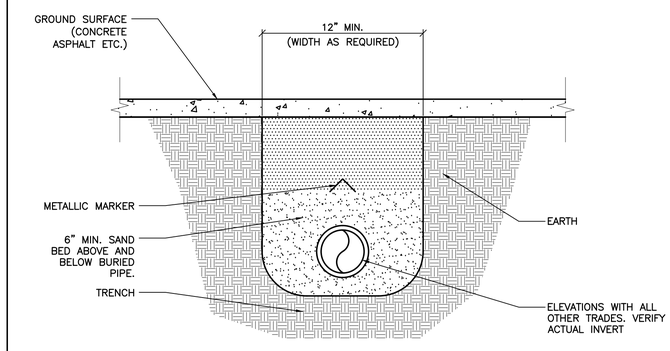
SCALE: NONE



NOTE:
CLEANOUT NOT TO BE LOCATED IN CARPETED AREA.

TYPICAL FLOOR CLEANOUT DETAIL

SCALE: NONE



BURIED PIPE DETAIL

SCALE: NONE

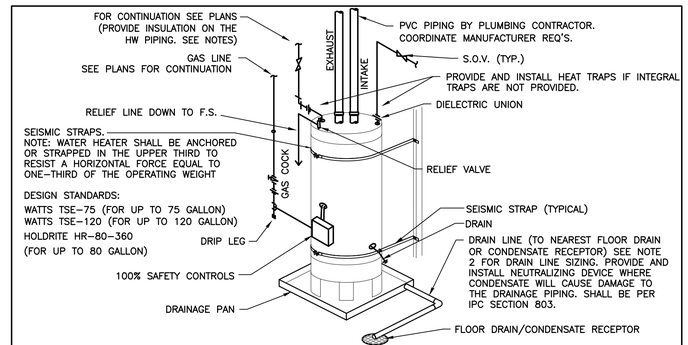


TABLE C403.2.10 PIPING INSULATION IECC 2018

FLUID OPERATING TEMPERATURE RANGE AND USAGE (F°)	INSULATION CONDUCTIVITY		NOMINAL PIPE SIZE OR TUBE SIZE (INCHES)				
	CONDUCTIVITY BTUxIN./(HxFT2xF°)	MEAN RATING TEMPERATURE, F°	<1	1 TO <1 1/2	1 1/2 TO < 4	4 TO < 8	> 8
>350	0.32 – 0.34	250	4.5	5.0	5.0	5.0	5.0
251 – 350	0.29 – 0.32	200	3.0	4.0	4.5	4.5	4.5
201 – 250	0.27 – 0.30	150	2.5	2.5	2.5	2.5	2.5
141 – 200	0.25 – 0.29	125	1.5	1.5	2.0	2.0	2.0
105 – 140	0.21 – 0.28	100	1.0	1.0	1.5	1.5	1.5
40–60	0.21 – 0.27	75	0.5	0.5	1.0	1.0	1.0
<40	0.20 – 0.26	50	0.5	1.0	1.0	1.0	1.5

NOTES:
1. PROVIDE AND INSTALL 2 SEISMIC STRAPS WITH TENSIONING BUCKLES ANCHORED TO STRUCTURE. INSTALL PER MANUFACTURERS REQUIREMENTS.
2. PROVIDE AND INSTALL PAN W/DRAIN WHERE REQUIRED, OR WHERE LEAK DAMAGE MAY OCCUR. DRAIN LINE SHALL BE 1 1/2" DIAMETER FOR PROJECTS LOCATED IN UTAH, 3/4" DIAMETER FOR OTHER PROJECT LOCATIONS.
3. PROVIDE HEAT TRAPS ON SUPPLY AND DISCHARGE PIPES.
4. THE FIRST 8 FEET OF PIPING IN NONCIRCULATING SYSTEMS SERVED BY EQUIPMENT WITHOUT INTEGRAL HEAT TRAPS SHALL BE INSULATED AS PER TABLE 403.2.10. IECC 2018.
5. FOR AUTOMATIC CIRCULATING HOT WATER SYSTEMS, PIPING SHALL BE INSULATED AS PER TABLE 403.2.10. IECC 2018.
6. WATER HEATER SHALL MEET UTAH NITROGEN OXIDE EMISSION LIMITS (HB0037): 10 NANOGRAMS PER JOULE OF HEAT OUTPUT OR 15 PPM, CORRECTED TO 3% OXYGEN FOR INPUTS LESS THAN OR EQUAL TO 75,000 BTU. 14 NANOGRAMS PER JOULE OF HEAT OUTPUT OR 20 PPM, CORRECTED TO 3% OXYGEN FOR INPUTS GREATER THAN 75,000 BTU AND LESS THAN 2,000,000 BTU.

TYPICAL DIRECT POWER VENT GAS WATER HEATER DETAIL

SCALE: NONE

REVISIONS

DRAWN BY
RDF

HARRIS ARCHITECTURE
3528 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6393 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS

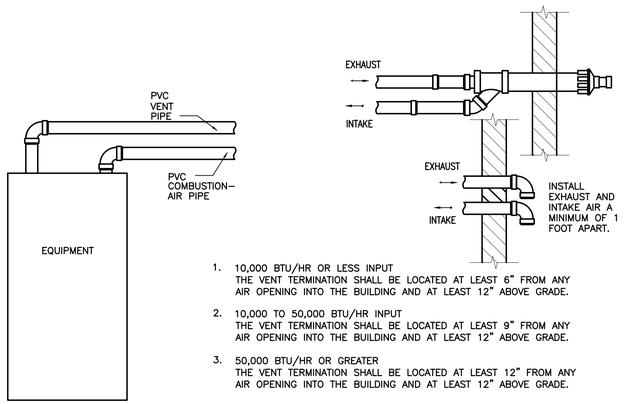
PLUMBING DETAILS

09/20/2019

P6.4

ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

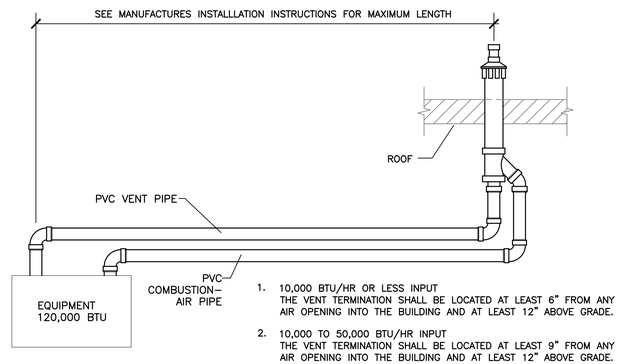
REGISTERED PROFESSIONAL ENGINEER
MARK L MAKIN
9/20/19
STATE OF UTAH



1. 10,000 BTU/HR OR LESS INPUT
   THE VENT TERMINATION SHALL BE LOCATED AT LEAST 6" FROM ANY AIR OPENING INTO THE BUILDING AND AT LEAST 12" ABOVE GRADE.
2. 10,000 TO 50,000 BTU/HR INPUT
   THE VENT TERMINATION SHALL BE LOCATED AT LEAST 9" FROM ANY AIR OPENING INTO THE BUILDING AND AT LEAST 12" ABOVE GRADE.
3. 50,000 BTU/HR OR GREATER
   THE VENT TERMINATION SHALL BE LOCATED AT LEAST 12" FROM ANY AIR OPENING INTO THE BUILDING AND AT LEAST 12" ABOVE GRADE.
4. INSTALL VENTING PER MANUFACTURES RECOMMENDATIONS & CLEARANCES. IT MAY BE NECESSARY TO PROVIDE A RAIN CAP.

DIRECT VENT EQUIPMENT DETAIL

SCALE: NONE



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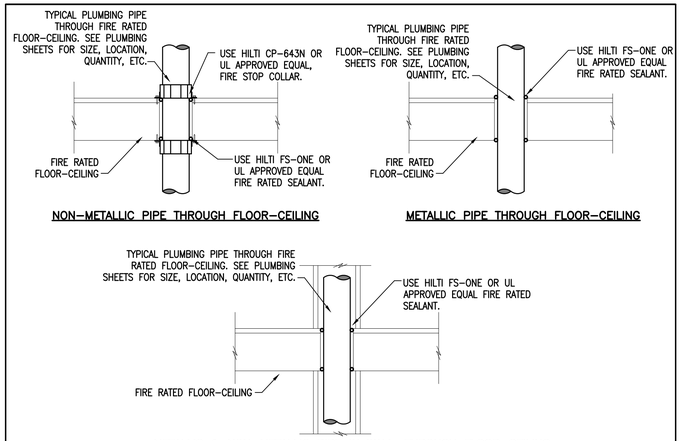
2. 10,000 TO 50,000 BTU/HR INPUT
   THE VENT TERMINATION SHALL BE LOCATED AT LEAST 9" FROM ANY AIR OPENING INTO THE BUILDING AND AT LEAST 12" ABOVE GRADE.
3. 50,000 BTU/HR OR GREATER
   THE VENT TERMINATION SHALL BE LOCATED AT LEAST 12" FROM ANY AIR OPENING INTO THE BUILDING AND AT LEAST 12" ABOVE GRADE.

DIRECT VENT TO ROOF APPLIANCE DETAIL

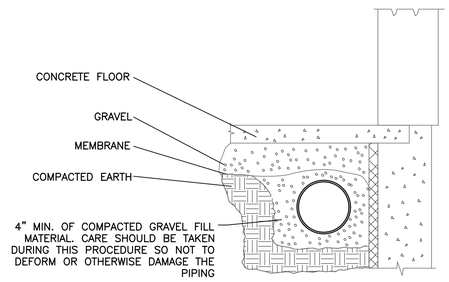
SCALE: NONE



NOTE:
ALL FIRE BARRIER COMPONENTS SHALL BE UL LISTED FOR THE APPLICATION AND SHALL BE AS APPROVED BY THE LOCAL CODE OFFICIAL. BEFORE USING AN INSTALLATION AS SHOWN, THE INSTALLATION MUST BE VERIFIED AS UL LISTED BY THE PROPOSED MANUFACTURER AND VERIFIED AS APPROVED BY THE LOCAL CODE OFFICIAL. PROVIDE ADDITIONAL FIRE BARRIER MEASURES AS REQUIRED.

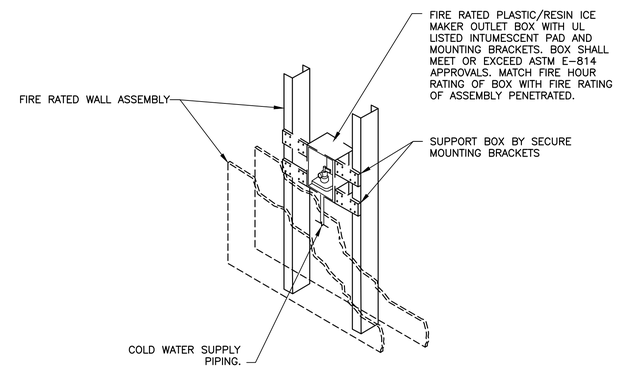
TYPICAL FIRE BARRIER PENETRATIONS

SCALE: NONE



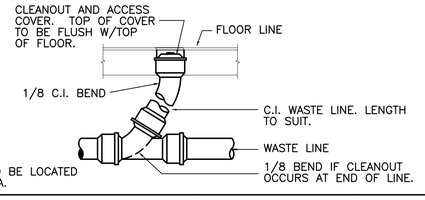
UNDERGROUND SOIL-GAS COLLECTION SYSTEM PIPING DETAIL

SCALE: NONE



FIRE RATED ICE MACHINE OUTLET BOX (AS REQ'D)

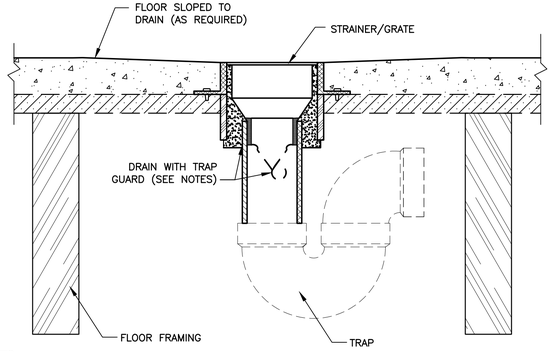
SCALE: NONE



NOTE:
CLEANOUT NOT TO BE LOCATED IN CARPETED AREA.

TYPICAL FLOOR CLEANOUT DETAIL

SCALE: NONE



NOTES:
1. DESIGN GUIDE: TRAP GUARD FLOOR DRAIN BY PROSET SYSTEMS INC.
2. FOLLOW ALL MANUFACTURER INSTALLATION AND OTHER INSTRUCTIONS.

FLOOR DRAIN WITH TRAP GUARD

SCALE: NONE

REVISIONS

DRAWN BY
RDF

HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6393 | WWW.HARRIS-ARCHITECTURE.COM

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PHONE: 801.375.2228
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FAX: 801.375.2676

REGISTERED PROFESSIONAL ENGINEER — JACOBO MARK L MAKIN — 9/20/19 — STATE OF UTAH

SECTION 22 PLUMBING – GENERAL PROVISIONS

Not all specification items are used in every project.

PART 1 – GENERAL

– **Scope:**

Furnish all labor, materials, equipment, appliances and necessary incidentals for the complete installation of all plumbing shown on the drawings and as specified.

A. Work specified in this section

1. Sanitary soil, waste and vent systems.
2. Domestic hot and cold water systems.
3. Domestic water heaters.
4. Furnish and set all sleeves for pipes passing through walls and floors.
5. Pipe covering, insulation and wrapping.
6. Excavation and backfill.
7. Rougn–in and final connections to air conditioning equipment of condensate drains.
8. All plumbing fixtures, water heaters, valves, and other miscellaneous items or equipment required for a complete installation.
9. Provide collars at fire rated penetrations.

B. Provisions of this section apply to all work specified in all sections under Division 22. All items indicated on site, Architectural, Mechanical, or Plumbing drawings are to be provided complete from point of connection to finished fixture in conformance with all governing authority requirements. Nothing in these drawings or specifications shall be construed to permit work in violation of governing codes.

C. In addition, work in Division 22 is governed by the provisions of the Bidding Requirements, Contract Forms, General Conditions and all sections under Division 1, General Requirements.

1. Examination of Premises: Visit the site, verify all measurements and job conditions, and pay all costs necessary to perform the work. Coordinate division of fee responsibilities with the General Contractor.
2. The Plumbing Contractor shall be licensed and hold a current contracting license as a Plumbing Contractor that has been valid for a minimum of two years in the State where the project is located.
3. The Plumbing Contractor shall have a minimum of five years experience installing commercial plumbing systems similar to those described in these specifications and provide a list of previous projects, including name of project and contact person names and phone numbers if required by the General Contractor.
4. The Plumbing Contractor shall be able to bond work he is bidding to perform and shall provide a written statement from the bonding agency proposed to be used for this project as a separate document in addition to the plumbing bid submitted if required by the General Contractor. The bonding agency shall be one having a Best's insurance rating of A or A+.

D. Contractor is responsible for results caused by deviating from the plans.

– **Regulations, Permits, Fees, Charges, Inspections:**

A. Regulations: Comply with all applicable codes, rules and regulations. All materials and work must comply with local construction, mechanical, plumbing, electrical and fire codes. As a minimum, comply with the following: IMC, IPC, IECC, NEC, NFPA codes and all City codes.

B. In addition to the requirements of all governing codes, ordinances and agencies, conform to the requirements of the following codes and standards:

1. 2015 International Plumbing Code
2. 2015 International Building Code
3. 2015 International Mechanical Code
4. 2015 International Energy Conservation Code.

C. Current codes adopted by the respective jurisdiction will supercede the listed codes.

D. Fees and Permits: Pay all connection, installation, use, development, etc., fees and/or charges. Obtain and pay for all required permits and licenses. Coordinate division of fee responsibilities with the General Contractor.

E. Inspections: All work must be inspected and approved by local authorities. Prior to final approval, furnish the Architect with certificates of inspections and approvals by the local authorities in accordance with Division 1.

1. Preheat and interpass temperature shall be determined by temperature indicating crayons, contact pyrometers or other equally suitable means.

F. Postweld Heat Treatment: Postweld heat treatment for pressure components shall be as specified in Table 131 of ANSI B31.1.

– **Drawings and Specifications:**

A. Refer to Division 1 for information on submittals and shop drawings.

B. If a conflict exists between the drawings and specifications, promptly notify the Architect and Engineer.

– **Record Drawings:** Provide record drawings for all work under sections in Division 22. See Division 1 for detailed requirements covering preparation of record drawings.

– **Work and Materials:** Unless otherwise specified, all materials must be new and of the quality specified. The workmanship shall be of a quality that is acceptable to the Architect and is equal to the standards of the trades. Contractor must staff the project with sufficient skilled workmen, including a fully qualified construction Superintendent, to complete the work in the time allotted. The Superintendent must be qualified to supervise all of the work in his work category.

– **Approvals of Materials and Equipment:** Refer to Division 1 for description of material and equipment for prior approvals and substitutions. Must be received by Engineer 10 days prior to due date/bid opening.

– **Maintenance Manual:**

A. Prior to completion of the project, compile a complete equipment and maintenance manual for all equipment supplied under sections of Division 22 as described in Division 1.

B. Manuals shall be bound in a three–ring binder. A preliminary submittal of the manual shall be made to the Architect 90 days after receiving approved submittals. Final submittal of the manual shall be made four weeks prior to substantial completion of the project.

– **Equipment Purchases:** Arrange for purchase and delivery of all materials and equipment within 15 days after approval of submittals. Coordinate with General Contractor.

– **Cooperative Work:**

A. Correct without charge any work requiring alteration due to lack of proper supervision or failure to make proper provision in time. Correct without charge any damage to adjacent work caused by the alteration. See Division 1 for additional requirements.

B. Cooperative Work Includes:

1. General supervision and responsibility for proper location, rough–in and size of work related to Division 22 but provided under other divisions of these specifications.

2. Installation of sleeves, inserts and anchors bolts for work under sections in Division 22.

3. Electrical work as specified herein. Refer to Division 26 for requirements.

– **Construction Facilities:**

A. General: Under this division of the specifications execute all work in a manner to provide safe and lawful ingress and egress to the Owner's establishment and such facilities shall be kept clear of materials or equipment as directed by the Architect. Refer to Division 1 for additional requirements.

B. Furnish and maintain from the beginning to the completion of all work all lawful and necessary guards, railings, fences, canopies, lights, and warning signs. Take all necessary precautions required by city and state laws to avoid injury or damage to any and all persons and property.

– **Guarantee:** Guarantee all material, equipment, and workmanship for all sections under Division 22 in writing to be free from defects of material and workmanship for one year from date of final acceptance as outlined in Division 1. Replace without charge any material or equipment proving defective during this period. The guarantee shall include performance of the equipment under all conditions of load, installing any additional items of control and/or protective devices as required and the replacing of any refrigerant lost.

– **Electrical Work:**

A. Electrical wiring, including power wiring and control wiring (except as otherwise specified under Automatic Temperature Controls), all raceways, wiring, outlet and junction boxes, and labor for installation of the wiring and equipment shall be included in Electrical Division 26 of the specifications.

B. All starters in motor control centers are to be furnished and installed under the Electrical Division of the specifications.

C. Before ordering any motors and equipment. Verify the available voltage and phase for all motors with the Electrical Contractor.

D. Submit a complete list of all motors prior to final closeout of job indicating the locations, horsepower, voltage, phase specified in Table 132 of ANSI B.1.

E. All field wiring and equipment must conform to the applicable sections of the Electrical specifications, Division 26.

– **Welding Codes and Standards:** All welding and other criteria covered by this specification shall be in accordance with the following code:

A. ASME Boiler and Pressure Vessel Code

B. Section IX ANSI Code for Power Piping: B31.1

C. AWS D10.12.D10.12M Welded joints for gas piping.

– **Product Handling**

A. Protection: Take all precautions necessary to protect the materials of this section before, during, and after installation.

B. Replacements: In the event of damage, immediately repair all damaged and defective work to the approval of the Engineer, at not additional cost to the Owner.

– **Submittals:**

A. Manufacturer's Literature: Within 35 days after award of contract and before any of the materials of this section are delivered to the job site submit seven complete brochures of all materials and equipment, per Division 1 of the specifications.

B. Other Submittals:

1. Shop Drawings.
2. Sterilization Test Report
3. Test Data.

C. Sets in bound booklet form of written operating and maintenance instructions and brochures for equipment specified in this section. Fully instruct Owners Operating Personnel.

D. Record Drawings: Keep an accurate dimensioned record of As–Built locations and elevations, as referred to approved base datum, of buried concealed.

E. Operation and Maintenance Instructions: Deliver to Architect tow complete lines, manhole, cleanouts, valves, plugged tees, capped ends, and of work which is installed different from shown in the plans.

– **Miscellaneous:**

A. Examination of the site: Exercise care in examining the site and coordinate all work indicated on the drawings with existing conditions. Report to Architect in writing conditions that will prevent proper provisions of this work. Verify depth and location of all service lines with servicing companies having jurisdiction before excavating, by submission of the bid. The contractor warrants that he has familiarized himself with the existing conditions and will perform all work as required for hookup and as required by the contract documents at no additional cost.

B. Permits and fees: Arrange and pay for all permits, inspections and fee required by all governing agencies.

C. Service connections: Make all necessary arrangements with applicable utility company for connection to existing service lines. Pay all fees associated with work including meters, hookup charge and utility assessments fees.

D. Drawings: Coordinate all space requirements with other trades, drawings indicate desired location and arrangement of piping, equipment, and other items and are to be followed as closely as possible.

PART 2 – PRODUCTS

– **General**

A. Pipe sleeves and wrapping: Provide polished chromium plated and brass set screw flanges where plumbing piping pass through walls, floors, ceilings, and partitions in finished portions of building including flanges on pipes at fixtures. All sleeves in concrete and exterior walls shall be 20 GA. galvanized iron one inch O.D. larger than the pipe, caulked if below grade in a moisture proof manner. All pipes penetrating through fire walls and floors shall be properly safed with Dow Corning 3=6548 silicone RTV foam or equal. Install per manufacturer's directions.

B. Pipe Identification:

1. Piping identification per ANSI and OSHA Standards: Each individual pipeline shall be marked for quick and easy identification as to contents and character of material carried in the pipes by set on SNA or STR Marker.
2. Markers shall be installed and spaced at not more than 20 foot intervals and so located that markers shall be visible where piping is exposed.
3. Color scheme shall be as follows:

	Background or Color Band	Identification Marker
Domestic Hot Water –	Yellow	Black on Yellow
Domestic Hot Water Return –	Yellow	Black on Yellow
Domestic Cold Water –	Green	White on Green
Sanitary Sewer –	Green	White on Green
Sanitary Vent –	Green	White on Green
Fire Protection (Sprinkler) –	Red	White on Red
Natural Gas –	Yellow	Black on Yellow
Storm Water –	Green	White on Green
Freon –	Black	White on Black
Steam –	Orange	White on Orange
Chiller Water Supply & Return –	Blue	White on Blue
Condenser Water Supply & Return –	Blue	White on Blue
Glycol Solution –	Purple	White on Purple
Secondary Heating Water Supply –	Brown	White on Brown
Secondary Heating Water Return –	Brown	White on Brown

C. One marker shall installed at each side of valves, special fittings and at branch take–offs. In furred spaces install one band 2 feet above floor and 19 inches below ceiling line.

D. Materials: Materials when not otherwise definitely specified shall conform to the applicable ASTM, ASME, AGA and ASA standards.

E. All gas fired equipment shall include a label indicating that the appliance has been adjusted, modified or re–calibrated for the altitude where in the project is to be located (Green Sticker). The appliance shall also include a compliance statement indicating that the appliance has been adjusted, modified or re–calibrated for the proper operation at the altitude of the project and shall be listed capable for use with natural gas or propane gas if propane is listed on the drawings.

– **Pipe and Fitting Schedule:**

Pipe and Fittings:

A. No pipe of foreign manufacturer will be acceptable on projects required to meet the Buy American Act.

B. All piping, fittings, flanges, etc. shall be free from defects and shall comply with the appropriate ASTM specifications.

C. Black steel pipe: ASTM A53 ERW Grade B, standard weight (schedule 40) or extra strong (schedule 80) as specified.

D. Copper tubing: ASTM B88, Type L or K as specified.

E. PVC pipe and fittings: ASTM D1785 Class 150 with ASTM D 2564 solvent cement joints unless otherwise specified. Schedule 40. PVC plastic pipe fittings: ASTM F 628, schedule 40.

F. PEX–AL–HPDE distribution system: ASTM F 1986 tubing and metal–insert type with copper or stainless–steel crimp ring and matching PEX–AL–HDPE tube dimensions. Manifold: Multiple–outlet, plastic or corrosion–resistand–metal assembly complying with ASTM F 877: with plastic or corrosion–resistant–metal valve for each outlet.

G. PP piping and fittings: ASTM F 2389; CSA B137.11

H. Acrylonitrile Butadiene Styrene (ABS) plastic pipe: ASTM D 2661, schedule 40, ASTM F 628 schedule 40. ABS plastic pipe fittings: ASTM F 409, accessible and replaceable, solvent cement and threaded types, drain pattern.

I. Cast iron soil pipe and fittings: ASTM A74

J. Welded black steel fittings: ASTM A234 grade B, 150–Pound for standard weight piping, 300–Pound for extra strong piping, or of weight or schedule of matching piping.

K. Threaded malleable iron fittings: ANSI B16.3, 150–Pound for standard weight piping, 300–Pound for extra strong piping, or weight or schedule of matching piping either black or galvanized to match piping.

L. Welded flanges: ASTM A181 grade B, 150–Pound for standard weight piping, 300–Pound for extra strong piping or of equal weight of connected equipment.

M. Copper fittings: Wrought copper, ANSI specification B16.22.

N. Ball valves domestic water: Bronze, fullport, class 150, threaded. NIBCO T–585 or equal

O. Partition stop valves: T&S B–0415, Loose key type with wall flange.

P. Balancing cocks 2 inches and smaller shall be by Armstrong, NIBCO, Taco or Watts.

Q. Solder: Joints in copper piping above grade shall be stay safe 50 solder or 95–5 solder shall be silfos or silverflow for all refrigerant piping joints.

R. Condensate drains shall be Type L hard copper tubing with wrought–copper fittings (can't be used for condensing gas–fired applications) or PVC pipe and fittings where allowed. A P–trap shall be provided at drains.

S. Gas piping in the building and not buried shall be standard weight black steel pipe and shall have welded fittings. Gas piping buried shall be polyethylene pipe with continuous 18 gauge tracing wire with schedule 40 black steel epoxy coated transition risers and/or transition fittings per ASTM D2513 and installed in accordance with Questar Supply Company (or local utility company) regulations. Paint all exterior exposed gas piping.

T. Chilled water and heating system lines shall be standard weight black steel. Pipe 2–1/2 inch and smaller shall either have welded fittings, mechanical grooved fittings or malleable iron screwed fittings.

U. Domestic hot water, hot water return, and cold water piping shall be Type L or K hard tempered copper pipe with wrought–copper fittings using 95–5 solder. Pex tube piping may be used in lieu of copper on sizes 2–inches and smaller. Where piping is exposed outside partitions, use Type L or K hard copper tubing and wrought copper fittings.

V. Domestic hot water and cold water piping buried below grade shall be Type K soft tempered (annealed) copper without fittings or joints and covered with IMCOA IMCOSHIELD unicellular insulation. PEX tube piping may be used in lieu of copper on sizes 2" and smaller.

W. Chilled water and heating system lines shall be standard weight black steel pipe. Pipe 2–1/2" and smaller shall either have welded fittings, mechanical grooved fittings or malleable iron screwed fittings.

X. All soil, waste, vent, roof drain and roof drain overflow piping below ground shall be ABS or PVC plastic pipe, rated for domestic waste and vent, with ABS or PVC plastic socket type drain, waste vent pattern fittings, solvent cemented joints. Install ABS drainage pipe and fittings according to ASTM D661. Install PVC drainage pipe and fittings according to ASTM F891.

Y. All soil, waste, vent, roof drain and overflow piping above ground shall be standard weight cast iron with no hub coupling or approved material meeting the standards set forth in IPC tables 702.1, 702.2, and 702.3 & 702.4..

Z. Kitchen waste and vent serving fixtures capable of discharging or receiving waste liquids with temperatures in excess of 120°F shall be piped using No–Hub standard wight cast iron pipe for a minimum of 20 feet before changing to ABS pipe.

– **Roof Flashing:**

A. Sanitary Vent Flashings: SEMCO 1100–3 or 1100–5, with one–piece lead flashing and counterflashing sleeve.

– **Pipe Sleeves:**

A. At concrete walls for floors, adjust–to–crete, paramount, hole–out Sperzel Cretesleeve floor sleeves shall extend to top of concrete curbs for piping rising through floors. Wall sleeves shall be flush with finished surface, sleeves shall be sized to allow $\frac{1}{2}$ inch clearance around pipe insulation. Insulation and covering shall be continuous through wall and floor sleeves.

– **Cleanouts:**

A. Full size cleanouts shall be installed at the base of each soil waste stack. All other cleanouts shall be installed where shown on the drawings and where required by State, Local or National Plumbing Codes.

B. All cleanouts shall be installed in locations easily accessible for rodding. Cleanouts in wall shall be JR Smith 4402, in floors JR Smith 4023/ Cleanouts shall be JR Smith, Wade or Josam.

– **Pipe Insulation:**

A. All domestic hot water, hot water recirculation and cold water piping shall be covered with Owens Corning ASJ–25 fiberglass pipe insulation with vapor seal jacket. Insulation thickness shall be $\frac{1}{2}$ inch for cold water and 1 inch for hot water.

B. Insulate all piping under Lavatories accessible to physically handicapped with hot water supply and "P" trap prefabricated insulation, Handi Lav Guard.

– **Pipe Hangers:**

A. Hangers shall be supplied with factory installed isolation and DI–Chromate finish.

B. Pipe 2 inches and smaller: Grinnel F69. Pipe 2–1/2 inch and larger: Grinnel F65. Concrete Inserts: Grinnel 281 and 282. Riser clamps for copper piping: Grinnel 261P, plastic coated. Riser clamps for other piping: Grinnel 261,

C. Hanger rods shall conform to the following: Pipe size 2 inch and smaller: $\frac{3}{8}$ inch rods. Pipe size 2–1/2 inch and 3 inch: $\frac{1}{2}$ inch rods. Pipe size 3 inch and larger: $\frac{5}{8}$ inch rods.

– **Plumbing Fixtures:**

A. Fixtures shall be the water saving typer with maximum usage of 1.6 gallons per flush for water closets, 2.5 gallons per minute for showers, 3.0 gallons per minute for service sinks, 1.0 gallon per flush for urinals, 0.5 gallons per minute for public lavatories, 2.2 gallons per minute for private lavatories and 2.2 gallons per minute for sinks.

B. All fixtures shall be caulked to the floor or wall with water resistant white butyl rubber caulking compound. Trim for shall match in design. Supply faucets shall have renewable seats and barrels.

PLUMBING EQUIPMENT	MANUFACTURER
Floor Drains & Floor Sinks:	Zurn, JR Smith, Wade, Josam, Ancon, Mifab, Watts, or Equal
Trench Drains:	Zurn, JR Smith, Watts, Josam or approved equal
Roof Drains and Overflow:	Zurn, JR Smith, Wade, Watts, Josam, Ancon, Mifab
Cleanouts:	Zurn, JR Smith, Wade, Josam, Mikro, Mifab, Watts, or Equal
Valves:	Watts, Milwaukee, Crane, Kennedy, Stockham, Misson, Grinnell, Keystone, American Valve, or NIBCO
Shower Valves:	Powers, Symmons, Delta, Leonard, Moen, Bradley, Zurn, Acorn
Pipe Hangers & Supports:	Grinnell, Elcen, Kin–Line, Unistrut, F&S, B–Line, Michigan, Wesanco, or Piping Technology & Products
Insulation:	CertainTeed, Manville, Pittsburgh, Armstrong, LSP Products, or Owens–Corning
Plumbing Faucets:	American Standard, Chicago, Delta, Moen, Kohler, Symmons, T&S, Gerber, Zurn
Plumbing Fixtures:	American Standard, Kohler, Toto, Gerber, Watts, Zurn, Sterling, Lasco
Plumbing Supply Stops:	Eastman, Crane, Kohler, Wolverine, McGuire, Brasscraft, EBC, Zurn, Chicago
Water Closets:	American Standard, Gerber, Kohler, Toto, Sterling
Flush Valves:	Sloan. Delany, Zurn, Moen, American Standard, Gerber
Toilet Seats:	American Standard, Bemis, Kohler, Sperzel, Olsonite, Beneke, Gerber or Church
Pressure Reducing Valves:	Watts series 223, Zurn or Wilkins
Hose Bibs:	Chicago, Acorn, Wolverine, Woodford, McGuire, Watts, Mifab, Josam, Zurn, Sioux Chief, Prier, Smith
Electric Water Coolers:	Elkay, Sunroc, Halsey Taylor, Haws Corporation, Westinghouse, Murdock
Stainless Steel Sinks:	Elkay, Just, Moen, or approved equal
Disposals:	Insinkerator, Evergrind, Kenmore, or appoved equal
Gas Pressure Regulator:	Fisher, Equimeter, Pietro Fiorentini
Thermostatic Tempered Water Valves:	Symmons, Powers, Leonard, Bradley, Watts, Caleffi, Lawler, Acorn
P–Traps:	American Standard, Kohler, McGuire, Brasscraft, Dearborn, EBC
Shock Absorbers:	Zurn, Smith, Wade, Josam, PPP, Sioux Chief, Watts, Mifab
Sewer Ejectors:	Peabody–Barnes, Weil, Hydromatic, Gorman–Rupp, Swaby, Weinman, Zoeller
Gas Water Heaters:	AO Smith, Bradford White, Rheem, State, Rinnai, Ruud, National, PVI, or approved equal
Electric Water Heaters:	Lochnivar, AO Smith, Rheem, State, Ruud, PVI, National, EEMAX, Chronomite & Vaughn, or approved equal

– **Electric Water Heater:**

A. The water heater(s) shall be an approved manufacturer (see approved manufacturer list in Plumbing Fixtures 2.10). Heater(s) shall be listed by underwriters laboratories. Heater(s) shall have 150 PSI working pressure and be equipped with extruded high density anode rod. All internal surfaces of the heater(s) exposed to water shall be glass–lined with an alkaline borosilicate composition that has been fused to steel by firing at a temperature range of 1600° F. Electric heating elements shall be medium watt density with zinc plated copper sheath. Each element shall be controlled by an individually mounted thermostat and high temperature cutoff switch. The outer jacket shall be baked enamel finish and shall be provided with full size control compartment for performance of service and maintenance through hinged front panels and shall enclose the tank with foam insulation. Electrical junction box with heavy duty terminal block shall be provided (except on 120V and 277V, not junction box on DEL–6 thru 20). The drain valve shall be located in the front for ease of servicing. Heater tank shall have a three year limited warranty as outlined in the written warranty. Fully illustrated instruction manual to be included.

REGISTERED PROFESSIONAL ENGINEER
4858829
MARK L. MAKIN
9/20/19
STATE OF UTAH

ROYAL ENGINEERING
ELECTRICAL
MECHANICAL
1837 S. EAST BAY BLVD.
PROVO, UTAH 84606
PHONE: 801.375.2228
FAX: 801.375.2676

 JOB# J19141.00 DATE PLOTTED: 09/20/2019

REVISIONS

DRAWN BY
RDF

HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS

PLUMBING SPECIFICATIONS

09/20/2019

P7.1

- **Gas Water Heater:**
  - A. A gas water heater of the size and capacity shown on the drawings shall be furnished and installed. Water heater shall be an approved manufacturer (see approved manufacturer list in Plumbing Fixtures 2.10).
  - B. The tank shall be constructed in accordance with ASME code and stamped with the appropriate symbol for 150 PSI. Tank interior shall be glass lined. Tank cabinet to have a baked enamel finish with bonderized undercoat.
  - C. Heater shall have a 3 year warranty.
  - D. The water heater shall be insulated with a high density fiberglass insulation.
  - E. ASME pressure and temperature relief valve, temperature limiting device. A low water protection device, magnesium anode rod and drain valve shall be factory installed.
- **Domestic Expansion Tank:**
  - A. ASME 150 PSI steel pressurized expansion tanks for portable use with ASME stamp of the size and capacity shown on the drawings shall be furnished and installed. Tank shall be complete with internal heavy duty Butyl Rubber Diaphragm, rigid Polypropylene liner on water side of tank, complying with FDA. Air charging fitting, tank drain, pressure gauge, air vent and connections as shown on the drawings. Supports for expansion tanks shall be furnished and installed by the plumber. Tanks shall be Watts, Amtrol, Taco, Armstrong or Zurn.

PART 3 – EXECUTION

- **Surface Conditions:**
  - A. Inspection: All plumbing shall be installed in accordance with the requirements of all governing authorities, The original design, and referenced standards.
  - B. Discrepancies:
    1. In the event of discrepancy, immediately notify the Architect.
    2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved. Interferences between installed work of various trades due to lack of coordination shall be resolved by the Architect whose decision is final. Relocate or offset any work as required to accommodate work of other trades at no extra cost to the Owner when so directed by the Architect.
- **Verification of Dimensions:**
  - A. Scaled and figured dimensions are approximate only. Before proceeding with work, carefully check and verify dimensions at site, and be responsible for properly fitting equipment and materials together and to the structure in spaces provided.
  - B. Drawings are essentially diagrammatic and many offsets, bends, special fittings and exact locations are not indicated. Carefully study drawings and premises in order to determine best methods, exact locations, routes, building obstructions, and install apparatus and equipment in available locations. Install apparatus and equipment in manner and in locations to avoid obstructions, preserve headroom, and keep openings and passageways clear.
- **Locations and Space Requirements:**
  - A. Contractor shall fully inform himself regarding peculiarities and limitation of spaces available for installation of work under this division. Drawings indicate desired location and arrangement of piping, equipment and other items and are to be followed as closely as possible. Work specified and not clearly defined by drawings shall be installed and arranged in a satisfactory manner. In any case and at any time a change in location required by obstacles or the installation of other trades not shown on the plumbing plans shall be made by contractor without additional charge provided the change is ordered before work is installed and no extra materials are required.
  - B. Verify all spaces, dimensions for all fixtures, equipment, or owner–furnished equipment and equipment furnished under other sections.
  - C. Obtain all necessary rough in data and dimensions for all fixtures, equipment, or owner–furnished equipment and equipment furnished under other sections.
  - D. Maintain ample headroom clearances and accessibility. Maintain ceiling heights.
  - E. Constantly check work of other trades to prevent interference with this installation.
- **Cutting and Patching:** Cut work and patch per Division 1 as necessary to properly install the new work. As the work progresses, coordinate necessary openings, holes, chases, etc., in their correct location. If the required openings, holes and chases are not in their correct locations, make the necessary corrections at no cost to the Owner. Avoid excessive cutting and do not cut structural members without the consent of the Architect. Patching by General Contractor at Mechanical, Plumbing or Fire Protection Contractor's expense. Include as a part of the work under this contract all structural framing required by penetrations through the roof and necessary steel to support ducts and pipes between structural steel unless shown on the structural drawings.
- **Closing–in of Unfinished Work:** Cover no work until inspected, tested and approved. Where work is covered before inspection and test,uncover it, and when inspected, tested and approved, restore all work to original proper condition.
- **Excavation and Backfill:**
  - A. Perform all necessary excavation, shoring and backfilling required for the proper laying of all pipes and conduits inside the building and premises, and outside as may be necessary. Conform to Division 2 requirements. Remove all excess excavated materials from the site or dispose of on site as directed by General Contractor.
  - B. Excavate all trenches open cut, keep trench banks as nearly vertical as practicable, and sheet and brace trenches where required for stability and safety. Excavate trenches true to line and make bottoms not less than 18" wide but no wider than necessary to provide ample work room. Grade trench bottoms accurately to provide uniform bearing and support for each section of pipe on undisturbed soil along its entire length. Dig "bell" holes after the trench bottom has been graded. Machine grade only to the top line of the pipes, doing the balance by hand. Do not cut any trench near or under footings without first consulting the Architect. Comply with OSHA requirements.
  - C. Provide backfilling and compaction in accordance with requirement of Division 2 and under the direction of the Architect and the Owner's testing firm to the required density. Make the first 2 feet of fill in 6" layers, each thoroughly compacted as directed, and free from rocks, large clods of earth, leaves, branches, and debris. Compact the rest of the backfill to prevent settlement as directed, using in the backfill no rocks larger than 4" in diameter, and using no rocks at all in the top 12".
- **Accessibility:**
  - A. Install valves, dampers, thermometers, gauges, traps, cleanouts, control devices or other specialties requiring reading, adjustment, inspection, repairs, removal or replacement conveniently and accessibly throughout the finished building. Where any of these devices are shown on the contract drawings to be installed above any inaccessible ceiling, the Mechanical Contractor shall furnish access doors or panels as required.
  - B. All access doors or panels in walls and ceilings required for access to control devices, traps, valves and similar devices are to be furnished and installed as part of the work under this section. Provide type as specified under Division 8.
  - C. Provide ducts which pierce a fire separation with fire dampers of same fire rating as the separation.
  - D. Refer to drawings and "Finish Schedule" for type of wall and ceiling in each area and for rated construction.
  - E. Coordinate work of various sections to locate valves, traps, and dampers with others to avoid unnecessary duplication of access doors.
- **Roof Flashings:** Flash and counterflash all piping, conduits and ductwork penetrating roofing membrane with flashing per roofing manufacturer's recommendations. Refer to architectural drawings for detailing of duct and pipe penetrations through roof.
- **Equipment Rough–in:**
  - A. Rough in all equipment and fixtures as designated on the drawings and in the specifications. The drawings indicate only the approximate location of rough–ins. The exact rough–in locations must be determined from large–scale certified drawings. The Contractor shall obtain all certified rough–in information before progressing with any work for rough–in final connections.
  - B. Be responsible for providing all outlets and services of proper size at the required locations.
  - C. Minor changes in the contract drawings shall be anticipated and provided for under this division of the specifications.
  - D. Rough–in only (unless otherwise designated on the drawings) shall include the following:
    1. Plumbing: Provide all services designated and required, including waste and water. Valve and cap all stub–outs for water and gas. Cap all waste and vent outlets.
    2. Mechanical: Provide all services as indicated and required, including all ductwork, piping and valves. Valve and cap all piping stub–outs. Cap all ductwork stub–outs in a manner suitable for future extension.
- **Owner–Furnished and Other Equipment:**
  - A. Rough–in only for all Owner–furnished equipment (see Division 1) and all equipment furnished under other sections of the specifications, except as otherwise specified and/or noted on the drawings.
  - B. Provide all services designated, valve and cap all piping, cap all waste piping and ductwork and leave in a clean and orderly manner.
  - C. Rough–in requirements shall be as outlined in the preceding paragraph titled "Equipment Rough–In."
- **Equipment Final Connections:**
  - A. Provide all piping final connections for all equipment under Division 22 as required herein specified and indicated on the drawings.
  - B. Plumbing: Provide final plumbing connections complete with shutoff valves, risers, traps, vacuum breakers and indirect wastes for all equipment furnished and installed under other sections of these specifications, except as otherwise designated. Included under the Plumbing section of the specifications are the final connections to the following:
    1. Miscellaneous equipment specified to be furnished and installed under other divisions of the specifications.
    2. Cold water make–up connections to air conditioning equipment.
    3. Kitchen equipment, furnished under other sections of the specifications.
- **Machinery Accessories:**
  - A. Application: Do not install any equipment in an application not recommended by the manufacturer.
  - B. Installation: Align, level and adjust all equipment for proper operation. Install so connecting and disconnecting of piping and accessories can readily be done and so all parts are readily accessible for inspection, service and repair. Install equipment in accordance with manufacturer's recommendations.
- **Pipe and Equipment Supports:**
  - A. Where supports, foundations, stands, suspended platforms for machinery, tanks, or other equipment are indicated or specified, perform the following:
    1. Locate support members to avoid equipment strains and interference with piping connections, tube pulling or other maintenance operations.
    2. Where saddles are required, use cast iron or welded steel saddles with curvature to fit the tank shell.
    3. Mount power–driven equipment on common base with driver.
  - B. Concrete Inserts: Furnish and install all concrete inserts required for all materials and equipment specified and/or shown on the drawings for Division 22.
  - C. Concrete Foundations: Work under this section includes coordination of construction of all concrete foundations indicated or required for equipment specified herein or in other sections under Division 22. Materials and workmanship shall be described under Division 3.
  - D. Grout under all equipment after leveling, filling completely the space between machinery bed plate and foundation surface as specified in Division 3. Finish exposed surface of grout for a neat appearance.
  - E. Floor Stands: Where equipment is mounted standard or on legs, construct of structural steel or steel pipe and fittings, cross–brace and fasten with flanges or plates bolted to floor.
  - F. Ceiling or Wall Supports: Use suspended platform, strap hangers, bracket or shelf, whichever is most suitable for equipment and location. Construct of structural steel members, steel plates, rods or pipe as required. Cross–brace and fasten to building structure or inserts in an approved manner.
  - G. Steel Work: Neatly fabricate and erect steel work with burrs and welding spatter ground off. Paint after fabrication with a rust–inhibitive primer.
- **Hangers and Supports:**
  - A. Hold horizontal pipe runs firmly in place using approved steel and iron hangers, supports, and/or pipe rest unless otherwise indicated. Suspend hanger rods from concrete inserts or from approved brackets, clamps or clips. Hang pipes individually or in groups if supporting structure is adequate to support weight of piping and fluid. Except for buried piping, hang or support pipe runs so that they may expand or contract freely without strain to pipe or equipment.
    1. Horizontal steel piping: Provide hangers or supports every 10 ft. except every 8 ft. for piping 1–1/4 inch and smaller.
    2. Horizontal copper tubing: For 2 inch diameter and over, provide hangers every 10 feet, for 1–1/2 inch diameter and smaller every 6 feet.
    3. Horizontal cast–iron no–hub piping: Provide hangers or supports at each side of no–hub fittings. Provide anti–separation bracing at each 90 degree change in direction.
    4. Horizontal cast–iron hub and spigot piping: Provide hangers or supports at each hub.
    5. Vertical piping: Support at floor with iron pipe clamps.
- **Test:**
  - A. Perform test to Architect's satisfaction. Make test in presence of Owner's Rep and at the time suitable to him if requested. Furnish necessary labor and equipment and bear cost for testing. Cost of replacing and/or repairing damage resulting therefor shall be borne by this contractor, should the contractor refuse or neglect to make test necessary to satisfy the Architect that requirement of specifications and drawings are met, such tests may be made by an independent testing company and the contractor charged for all expenses.
  - B. Hydrostatic test: Make by completely filling piping system with water and eliminating accumulations of air so that leakage, no matter how small, will be apparent on testing gauge immediately. Maintain pressure until pipe under test has been examined, but in no case less than 24 hours. Test system at the following pressure:

SYSTEM	TEST PRESSURE
Domestic Cold Water	150 PSIG
Domestic Hot Water	150 PSIG

  - C. Sanitary soil, waste, bent systems test: Before installation of fixtures, cap end of system and fill lines with water to 10 feet above the section being tested. (including bents) and allow to stand for at least fifteen (15) minutes before inspection starts. Make test in sections if necessary or convenient. However, include interconnections between new sections and previously tested section in the new test.
  - D. Roof drainage system: Test as specified for sanitary system.
  - E. Gas systems: Test with compressed air at 10 PSI for six hours or longer as directed to provide a tight seal without leaks. Use pressure recorder to record pressure of all lines for duration of test.
  - F. Repair all leaks and retest as required.
- **Cleanouts:**
  - A. Provide cleanouts where indicated and required. Unless otherwise indicated, cleanouts shall be accessible with extensions to grade to outside of buildings, or to floors above as indicated or required. Do not locate cleanouts in public lobbies and public corridors unless approved by Architect.
  - B. Membranes: Where waterproofing membrane occurs under floor, bring membrane to cleanout without puncturing and permanently anchor to integral anchoring flange with heavy cast–iron clamping collar and rustproof bolts.
  - C. Covers: Set cleanout covers with all finished wall, floor or grade. In all cases securely anchor by means of integral lugs and bolts. Where surfacing material such as resilient coverings is specified, ascertain thickness being used and set cleanout top so finished floor is smooth.
  - D. Use Acorn 3500 thread compound.
- **Pipe Installation:**
  - A. Make pipe runs straight and true. Springing or forcing piping into place is not permitted. Install in manner to prevent any undue strain on equipment. Make joints smooth and unobstructed inside and out, and ream pipe ends thoroughly to remove burrs. Conceal piping in finished portions of the building except as otherwise directed or indicated. Cap or plug ends and openings in pipe and fittings immediately to exclude dirt until equipment is installed or final connections are made.
  - B. Install piping to clear beams unless sleeving is indicated. Constantly check work of other trades to prevent interference with this installation. Obtain approval from Architect if coring or cutting of concrete work is necessary due to failure to install required sleeves prior to the time of concrete pour. Cost of coring and cutting work shall be borne by the subcontractor.
  - C. Exposed plated or enameled pipe: Make connections to equipment with special care. Show not tool marks or threads.
  - D. Dielectric Unions: Make connections between two dissimilar metal pipes with dielectric unions.
  - E. Unions: Provide a union on one side of each shutoff valve. At both sides of automatic valves. At equipment connections and elsewhere indicated or required, unless flanges are indicated.
  - F. Floor, wall ceiling plates: Provide where pipes pierce finished surfaces.
  - G. Noise: Install soil, waste, and water piping in a manner that prevents any unusual noise from flow of water under normal conditions.
  - H. Shutoff Valves: Provide where indicated and required for adequate control of system and for isolation of fixture groups and equipment.
  - I. Buried Pipe: Install with minimum 36 inches coverage unless otherwise indicated. Lay piping accurately to grade where invert elevations are indicated. When required provide thrust blocks per manufacturer's recommendations.
  - J. Equipment and Materials: Install per manufacturer's recommendations.
  - K. Accessibility: Install work readily accessible for normal operation, reading of instruments, adjustments, service, inspections and repair. Provide access panels where indicated and required.
  - L. Pipe Joints: Make screwed joints with a minimum amount of compound applied to the male thread only. All joints shall be made per code requirements and manufacturer's recommendations.
  - M. Provide pipe isolation at all hangers for non–insulated materials.
  - N. Piping Rough–in for Fixtures: Support or secure to building construction of firmly anchored waste piping so that pipes cannot be displaced. Do not secure to walls. Use of makeshift devices, such as rope, wire, tape, etc. is prohibited.
  - O. Horizontal drainage piping shall be installed in uniform alignment at uniform slopes. The minimum slope for horizontal pipe 4" or larger in diameter may have a slot of not less than 1% ($\frac{1}{8}$ inch per foot). The minimum slope of horizontal pipe less that 4'; may have a slope of not less than 2% ($\frac{1}{4}$ inch per foot).
- **Cleanup:**
  - A. In addition to cleanup specified under Division 1, thoroughly clean all parts of the equipment. Where exposed parts are to be painted, thoroughly clean off any splattered construction materials and remove all oil and grease spots. Wipe the surface carefully and scrape out all cracks and corners.
  - B. Thoroughly flush and clean out all water circulating systems. Remove, clean and replace all strainer elements.
  - C. During the progress of the work, keep the premises clean and free of debris.
- **Painting:**
  - A. Except as otherwise specified or indicated in the architectural drawings and/or specifications, paint all exposed unfinished metal with one coat of rust–inhibiting primer.
  - B. Finished painting is specified under Division 9.
- **Connections to Services:** Provide all connections to sanitary sewer lines, storm sewer, gas lines, water lines, electrical services furnished under other contracts, except as otherwise specifically designated. Provide all necessary tees, taps and connections required to properly connect to all mains. Verify all required City requirements before making any piping connections to sanitary sewer, storm sewer, water or gas piping and conform to them during installation.

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ROYAL ENGINEERING
ELECTRICAL MECHANICAL
1837 S. EAST BAY BLVD. PROVO, UTAH 84606
PHONE: 801.375.2228 FAX: 801.375.2676

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REVISIONS

DRAWN BY
RDF

HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS

PLUMBING SPECIFICATIONS

09/20/2019

P7.2

ELECTRICAL GENERAL NOTES:

1. WORK SHALL BE PERFORMED IN A WORKMANLIKE MANNER, PER INDUSTRY STANDARD, AND TO THE SATISFACTION OF THE ARCHITECT AND ENGINEER.
2. WORK, MATERIALS, AND EQUIPMENT SHALL CONFORM TO THE LATEST EDITIONS OF LOCAL, STATE AND NATIONAL CODES, STANDARDS AND ORDINANCES.
3. ALL MATERIALS USED IN THIS INSTALLATION SHALL BE U.L. APPROVED AND NEW.
4. DO NOT PENETRATE STRUCTURAL ELEMENTS OF FLOORS, WALLS, CEILINGS, ROOF, ETC.
5. DETAILS ARE SHOWN ON DIFFERENT SHEETS. THE CONTRACTOR SHALL REFER TO THOSE DETAILS WHETHER OR NOT CALLED IN REFERENCE NOTES.
6. ELECTRICAL CONTRACTOR SHALL NOTIFY AND COOPERATE WITH THE MECHANICAL CONTRACTOR SUCH THAT NO DUCTS, PIPING, OR EQUIPMENT FOREIGN TO THE OPERATION OF THE ELECTRICAL EQUIPMENT SHALL BE PERMITTED TO BE INSTALLED IN, ENTER, OR PASS THROUGH ELECTRICAL ROOMS OR SPACES, OR ABOVE OR BELOW ELECTRICAL EQUIPMENT IN OTHER AREAS.
7. NO WIRING SHALL RUN IN DUCT WORK.
8. THE MINIMUM SIZE OF THE CONDUCTORS ARE TO BE #14 AWG THHN COPPER, UNLESS INDICATED OTHERWISE ON THE DRAWINGS. STRANDED CONDUCTORS ARE NOT ALLOWED IN THE CONDUCTORS SMALLER THAN #10 AWG.
9. USE EPOXY ANCHORS TO SUPPORT THE ELECTRICAL EQUIPMENT. EXPANSION ANCHOR BOLTS ARE NOT ACCEPTED.
10. THE ELECTRICAL CONTRACTOR SHALL REVIEW AND COORDINATE WITH ARCHITECTURAL, CIVIL, STRUCTURAL, MECHANICAL, PLUMBING, AND OTHER DRAWINGS PRIOR TO BID.
11. ELECTRICAL CONTRACTOR SHALL REVIEW ALL ARCHITECT'S ELEVATIONS, SECTIONS, AND FLOOR PLANS PRIOR TO ROUGH–IN OF ELECTRICAL JUNCTION BOXES.
12. ALL JUNCTION BOXES SHALL HAVE MINIMUM DEPTH OF 2–1/8" UNLESS OTHERWISE SPECIFIED. SECURE ALL JUNCTION BOXES AS SHOWN IN THE DETAILS. FURNISH AND INSTALL PROPER PLASTER RINGS.
13. REFER TO ARCHITECTURAL CABINET CASEWORK ELEVATION DRAWINGS FOR CLARIFICATION ON MOUNTING AND PLACEMENT OF ALL RACEWAY, RECEPTACLES, AND SWITCHES.
14. MANY DEVICE MOUNTING LOCATIONS ARE DEPENDENT ON MILLWORK LOCATIONS. COORDINATE ALL APPLICABLE LOCATIONS WITH MILLWORK INSTALLER PRIOR TO BEGINNING WORK.
15. LIGHT SWITCHES INSTALLED ADJACENT TO EACH OTHER, SHALL BE GANGED TOGETHER WITH ONE PIECE COVER PLATE.
16. ALL WALL MOUNTED MOTION SENSORS SHALL BE A DUAL TECHNOLOGY MOTION SENSOR WITH INTEGRAL OVERRIDE SWITCH. MOTION SENSOR TO MOUNT IN A STANDARD SWITCH BOX. MOTION SENSOR TO HAVE A FIFTEEN MINUTE TIME DELAY SET AT TEN MINUTES TO SENSOR SET TO MANUAL ON. USE HUBBELL, SENSOR SWITCH, LEVITON, OR APPROVED EQUAL.
17. CONSULT ARCHITECTS REFLECTED CEILING PLANS FOR EXACT LOCATION OF LIGHTING FIXTURES, SPEAKERS, SMOKE DETECTORS, ETC.
18. ELECTRICAL CONTRACTOR SHALL MEET WITH THE CEILING AND MECHANICAL CONTRACTORS TO COORDINATE LOCATIONS, CLEARANCES, CEILING TYPES, AND ROUGH–IN REQUIREMENTS OF ALL LIGHTING FIXTURES PRIOR TO DUCT, PIPING, AND CEILING INSTALLATIONS.
19. ALL CEILING MOUNTED MOTION SENSORS SHALL BE A DUAL TECHNOLOGY MOTION SENSOR WITH POWER PACK AS REQUIRED TO CONTROL LIGHTING. MOTION SENSOR TO HAVE A FIFTEEN MINUTE DELAY SET AT TEN MINUTES TO SENSOR SET TO MANUAL ON. CONTRACTOR TO SUBMIT FLOOR PLAN TO MOTION SENSOR SUPPLIER FOR FACTORY TO LOCATED MOTION SENSOR FOR OPTIMAL PERFORMANCE TO AVOID NUISANCE SHUT OFF OF LIGHTING. MANUFACTURERS LAYOUT PLAN TO BE PART OF SUBMITTALS. PROVIDE SUFFICIENT BOX DEPTH AND CORRECT PLASTER RING TO ACCOMMODATE ACTUAL RELAY UNIT AND OCCUPANCY SENSOR INSTALLED. PROVIDE PROPER SEPARATION OF 120 VOLT AND CLASS 2 WIRING AS NECESSARY IN ACCORDANCE WITH NATIONAL ELECTRICAL CODE. USE HUBBELL, SENSOR SWITCH, LEVITON OR APPROVED EQUAL.
20. CONNECT ALL EM FIXTURES, NIGHT LIGHTS, EGRESS LIGHTS, AND EXIT SIGNS TO UNSWITCHED CONDUCTOR.
21. PROVIDE SELF–REGULATING HEAT TAPE OF LENGTH SUFFICIENT TO WRAP AROUND DRAIN AND DOWN 3 FEET INTO DRAINS. PROVIDE GFEP PROTECTION FOR HEAT TAPE CIRCUIT AS REQUIRED BY NEC 426.28. PROVIDE THERMOSTAT TO CONTROL EACH BRANCH CIRCUIT.
22. THE ELECTRICAL CONTRACTOR SHALL TERMINATE THE ELECTRICAL CONNECTIONS TO ALL THE EQUIPMENT BY PROVIDING THE NECESSARY MALE/FEMALE CONNECTOR, RECEPTACLE, PLUG, ETC.
23. FINAL CONNECTIONS TO EQUIPMENT SHALL BE MADE AS PER MANUFACTURERS WRITTEN INSTRUCTIONS AND APPROVED WIRING DIAGRAMS AND DETAILS. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO PROVIDE ALL MATERIALS AND EQUIPMENT COMPATIBLE WITH EQUIPMENT ACTUALLY SUPPLIED. THE ELECTRICAL CONTRACTOR SHALL VERIFY ALL ELECTRICAL LOADS (VOLTAGE, PHASE, CONNECTION REQUIREMENTS, ETC.) OF EQUIPMENT FURNISHED UNDER OTHER DIVISIONS WITH APPROVED SHOP DRAWINGS PRIOR TO BEGINNING ROUGH–IN.
24. VERIFY EXACT LOCATION(S) OF ALL EQUIPMENT TO BE FURNISHED BY OTHERS PRIOR TO ROUGH–IN.
25. AT THE END OF THE JOB, PROVIDE BLANK COVER PLATES TO MATCH THE OTHER COVER PLATES FOR ALL JUNCTION BOXES WHERE DEVICES HAVE NOT YET BEEN INSTALLED.
26. PROVIDE AND INSTALL TAMPER–RESISTANT RECEPTACLES ON ALL 120 VOLT RECEPTACLES IN ALL AREAS SPECIFIED IN 210.52 OF THE NATIONAL ELECTRICAL CODE AND AS REQUIRED UNDER 406.12 OF THE NATIONAL ELECTRICAL CODE.

ELECTRICAL SYMBOLS

SYMBOL	EXPLANATION	SYMBOL	EXPLANATION	SYMBOL	EXPLANATION
	BRANCH CIRCUIT CONCEALED IN CEILING OR WALL	F1	FIXTURE TYPE SYMBOL		TAMPER AND FLOW
	BRANCH CIRCUIT CONCEALED IN GROUND OR FLOOR		LINIER FIXTURE (TYPICAL)	FACP	FIRE ALARM CONTROL PANEL
A–1,3	BRANCH CIRCUIT HOMERUNS TO PANEL		EMERGENCY LIGHTING UNIT	RFAA	REMOTE FIRE ALARM ANNUNCIATOR PANEL
135	ROOM NUMBER		SURFACE OR PENDANT MOUNTED FIXTURE	NAC	FIRE ALARM NAC PANEL
CH 1	MECHANICAL EQUIPMENT SYMBOL		RECESSED FIXTURE	VOICE	FIRE ALARM VOICE PANEL
1	KEYED NOTE REFERENCE		WALL MOUNTED FIXTURE	D/H	DOOR HOLDER
42X	FEEDER TAG (SEE FEEDER SCHEDULE)		WALL PACK	F/S	FIRE/SMOKE DAMPER
	LIGHTING AND POWER PANELBOARD		STRIP FIXTURE	F	FIRE ALARM PULL STATION
NON–FUSED / FUSED	DISCONNECT SWITCH		TRACK LIGHTING		FIRE ALARM STROBE
NON–FUSED / FUSED	DISCONNECT SWITCH WITH MOTOR STARTER		EMERGENCY LIGHTING UNIT		FIRE ALARM HORN/STROBE
	MOTOR STARTER		WALL MOUNTED EXIT LIGHT (SINGLE FACE)	LF	FIRE ALARM HORN/STROBE (LF = LOW FREQUENCY)
VFD	VARIABLE FREQUENCY DRIVE		WALL MOUNTED EXIT LIGHT (DOUBLE FACE)		FIRE ALARM HORN/STROBE WITH PROTECTIVE COVER
©	CONDUIT STUB		CEILING MOUNTED EXIT LIGHT		FIRE ALARM SPEAKER/STROBE
J	JUNCTION BOX		CEILING MOUNTED EXIT LIGHT (DOUBLE FACE)	LF	FIRE ALARM SPEAKER/STROBE (LF = LOW FREQUENCY)
	ELECTRIC VEHICLE CHARGING STATION		EXIT LIGHT WITH PROTECTIVE COVER		FIRE ALARM SPEAKER
	DUPLEX RECEPTACLE OUTLET	$	SINGLE POLE SWITCH (SUBSCRIPT AS INDICATED BELOW)	LF	FIRE ALARM SPEAKER (LF = LOW FREQUENCY)
WP / A–3 / REF	WP —MODIFIER; A–3 —PANEL SPACE ASSIGNMENT; REF —EQUIPMENT DESIGNATION	2	TWO POLE SWITCH		FIRE ALARM HORN
		3	3–WAY SWITCH		
WP	WEATHERPROOF COVER & LISTED WEATHER RESISTANT DEVICE	4	4–WAY SWITCH	LF	FIRE ALARM HORN (LF = LOW FREQUENCY)
		D	DIMMER SWITCH		
GFCI	PROTECTED BY FAULT CIRCUIT INTERRUPTER	K	KEYED SWITCH		FIRE ALARM STROBE CEILING MOUNTED
+44	MOUNTING HEIGHT ABOVE FLOOR OR GRADE GIVEN IN INCHES.	T	TIMER SWITCH		
		M	MANUAL STARTER WITH THERMAL OVERLOAD		FIRE ALARM HORN/STROBE CEILING MOUNTED
REF	REFRIGERATOR	F	PADDLE FAN SPEED CONTROL. (CANARM "CN" SERIES)		
DW	DISHWASHER	OC	OCCUPANCY SENSOR SWITCH	LF	FIRE ALARM HORN/STROBE CEILING MOUNTED (LF = LOW FREQUENCY)
DISP	DISPOSAL	LV	LOW VOLTAGE CONTROL SWITCH		
WASH	WASHING MACHINE	LV/D	LOW VOLTAGE CONTROL SWITCH WITH DIMMER		FIRE ALARM HORN CEILING MOUNTED
EWC	ELECTRIC WATER COOLER	OC/D	OCCUPANCY SENSOR CONTROL SWITCH WITH DIMMER		
USB	COOPER TR7746 OR EQUAL DUPLEX PLUS USB CHARGER	OC/2	DUAL RELAY OCCUPANCY SENSOR CONTROL SWITCH	LF	FIRE ALARM HORN CEILING MOUNTED (LF = LOW FREQUENCY)
TR	TAMPER RESISTANT				
	QUAD RECEPTACLE OUTLET	$$	DOUBLE GANG SWITCH		SMOKE DETECTOR (SUBSCRIPT AS INDICATED BELOW)
	SPLIT WIRED DUPLEX RECEPTACLE OUTLET	$a,b,c LV / S a,b	LOW VOLTAGE MULTI BUTTON CONTROL SWITCH (LETTER INDICATES CONTROL OF CORRESPONDING FIXTURES)	B / C	SMOKE ALARM BATTERY–BACKED / SMOKE/CARBON MONOXIDE ALARM COMBO BATTERY–BACKED
	220V RECEPTACLE OUTLET	ab	CONTROLLING SWITCH (LETTER INDICATES CONTROL OF CORRESPONDING FIXTURES)	D / R	DUCT SMOKE DETECTOR / SMOKE DETECTOR WITH ADDRESSABLE RELAY
	ISOLATED GROUND RECEPTACLE	S	OCCUPANCY SENSOR (CEILING MOUNTED)	S	SMOKE DETECTOR WITH SOUNDER BASE
	RECEPTACLE FLOOR DEVICE	S DT	DUAL TECHNOLOGY OCCUPANCY SENSOR (CEILING MOUNTED)		HEAT DETECTOR
	CEILING MOUNTED DEVICE	RC	ROOM CONTROLLER		GAS DETECTOR
	SPECIAL RECEPTACLE	LS	DAYLIGHT SENSOR	CO / CO/NO2	CARBON MONOXIDE DETECTOR / CARBON MONOXIDE/NITROGEN DIOXIDE SENSOR (GARAGE)
	MOTOR OUTLET	P	PHOTOCELL		ADA TWO–WAY COMMUNICATIONS SYSTEM
	EXHAUST FAN	V	VOLUME CONTROL	KP	ACCESS CONTROL KEY PAD
T	THERMOSTAT OUTLET		WALL SPEAKER	CR	ACCESS CONTROL CARD READER
S	REMOTE SENSOR OUTLET		CEILING SPEAKER	SDS	ACCESS CONTROL DOOR STRIKE
	TELEPHONE OUTLET		SURVEILLANCE CAMERA	ML	ACCESS CONTROL MAG LOCK
∇(#)	COMPUTER DATA OUTLET (#) INDICATES JACK QUANTITIES	DVR	SURVEILLANCE DIGITAL VIDEO RECORDER	DS	ACCESS CONTROL DOOR SENSOR
	NETWORK AND VOICE OUTLET	NURSE	NURSE CALL ANNUNCIATOR PANEL		ACCESS CONTROL REQUEST TO EXIT
	WIRELESS ACCESS POINT CEILING MOUNTED	N	NURSE CALL EMERGENCY CALL DEVICE		PUSHBUTTON
TV	TELEVISION OUTLET	N	NURSE CALL EMERGENCY CALL LIGHT	B	BELL

NOTE: ALL SYMBOLS MAY NOT BE USED.

ABBREVIATIONS INDEX

#	NUMBER	DISP	DISPOSAL	LRA	LOCKED ROTOR AMPS	PV	PHOTOVOLTAIC
ϕ	PHASE	DRY	DRYER	LTG	LIGHTING	PVC	POLYVINYL CHLORIDE
1ϕ	SINGLE PHASE	DW	DISHWASHER	MATV	MASTER ANTENNA TELEVISION	(R)	RELOCATE
2P	TWO–POLE	DWG	DRAWING	MAX	MAXIMUM	RECP	RECEPTACLE
3ϕ	THREE PHASE	EC	EMPTY CONDUIT	MB	MAIN BUS	REF	REFRIGERATOR
4P	FOUR–POLE	EM	EMERGENCY	MCB	MAIN CIRCUIT BREAKER	REQ	REQUIRED
AC	ALTERNATING CURRENT	EMG	EMERGENCY GENERATOR	MCC	MOTOR CONTROL CENTER	RLA	RATED LOAD AMPS
AFF	ABOVE FINISHED FLOOR	EMT	ELECTRICAL METALLIC TUBING	MCM	1000 CIRCULAR MILLS	RMS	ROOT MEAN SQUARE
AFG	ABOVE FINISHED GRADE	EPO	EMERGENCY POWER OFF	MH	MANHOLE	SE	SERVICE ENTRANCE
AFP	ARC FAULT PROTECTOR	EWC	ELECTRIC WATER COOLER	MIC	MICROPHONE	SPD	SURGE PROTECTION DEVICE
AIC	AMP INTERRUPTING CURRENT (SYMMETRICAL)	EWH	ELECTRIC WATER HEATER	MIN	MINIMUM	SPEC	SPECIFICATION
AL	ALUMINUM	EX	EXISTING	MLO	MAIN LUGS ONLY	SPK	SPEAKER
AM	AMPS METER	(F)	FUTURE	MNF	MANUFACTURER	SS	SELECTOR SWITCH
AMP	AMPERE	FA	FIRE ALARM	MTG	MOUNTING	SW	SWITCH
ANN	ANNUNCIATOR	FACP	FIRE ALARM CONTROL PANEL	MTR	MOTOR	SWBD	SWITCHBOARD
ATS	AUTOMATIC TRANSFER SWITCH	FC	FOOT CANDLE	MW	MICROWAVE	SWGR	SWITCHGEAR
AUX	AUXILIARY	FLA	FULL LOAD AMPS	(N)	NEW	TTB	TELEPHONE TERMINAL BOARD
AWG	AMERICAN WIRE GAUGE	FT	FOOT	N/A	NOT APPLICABLE	TBC	TELEPHONE TERMINAL CABINET
BC	BARE COPPER	FRZ	FREEZER	NC	NORMALLY CLOSED	TV	TELEVISION
BFG	BELOW FINISH GRADE	FS	FUSED SWITCH	NEC	NATIONAL ELECTRICAL CODE	TYP	TYPICAL
C	CONDUIT	GFAF	DUAL FUNCTION GFCI/AFCI CIRCUIT BREAKER	NEMA	NATIONAL MANUFACTURING ASSOCIATION	UG	UNDERGROUND
CAB	CABINET	GFCI	GROUND FAULT CIRCUIT INTERRUPTER	NFC	NATIONAL FIRE CODE	UNO	UNLESS NOTED OTHERWISE
CATB	COMMUNITY ANTENNA TELEVISION	GFEP	GROUND–FAULT EQUIPMENT PROTECTION	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION	UPS	UNINTERRUPTIBLE POWER SUPPLY
CATV	CABLE TELEVISION	GFP	GROUND FAULT PROTECTOR	NFS	NON FUSED SWITCH	V	VOLT (KV–KILOVOLT)
CFCI	CONTRACTOR FURNISHED CONTRACTOR INSTALLED	GRC	GALVANIZED RIGID CONDUIT	NIC	NOT IN CONTRACT	VA/R	VOLT–AMPS/REACTIVE
CKT	CIRCUIT	GRD	GROUND	NL	NIGHT LIGHT	VM	VOLT METER
CLG	CEILING	HP	HORSE POWER	NO	NORMALLY OPEN	W	WATTS
CNTR	CONTRACTOR	HZ	HERTZ	NTS	NOT TO SCALE	W/	WITH
CO	CONDUIT ONLY	IG	ISOLATED GROUND	OFCI	OWNER FURNISHED CONTRACTOR INSTALLED	WASH	WASHER
CRT	COMPUTER TERMINAL	IMC	INTERMEDIATE METALLIC CONDUIT	OFOI	OWNER FURNISHED OWNER INSTALLED	WH	WATTHOUR
CT	CURRENT TRANSFORMER	IN	INCH	OS&Y	OUTSIDE SCREW AND YOKE	W/O	WITHOUT
CU	COPPER	J–BOX	JUNCTION BOX	PB	PUSH BUTTON	WP	WEATHER PROOF
C/W	CONDUIT WITH	KV	KILOVOLT	PF	POWER FACTOR	XFMR	TRANSFORMER
(D)	DEMOLISH/DELETE	KVA	KILOVOLT AMPERES	PFR	PHASE FAILURE RELAY	XFMR–SW	TRANSFORMER SWITCH
DB	DECIBEL	KVAR	KILOVARS	PNL	PANEL	XP	EXPLOSION PROOF
DC	DIRECT CURRENT	KW	KILOWATT	PT	POTENTIAL TRANSFORMER		

NOTE: THIS IS A TYPICAL ABBREVIATION LIST. NOT ALL ABBREVIATIONS MAY BE USED ON THIS PROJECT.

DESIGN CONTACTS

ELECTRICAL ENGINEER:	RYAN BEAGLES
ELECTRICAL TEAM LEAD:	MANUEL MASBERNAT
ELECTRICAL DESIGNER:	BENJAMIN KILLPACK

COMMISSIONING NOTES:

C408.3 LIGHTING SYSTEM FUNCTIONAL TESTING.
CONTROLS FOR AUTOMATIC LIGHTING SYSTEMS SHALL COMPLY WITH SECTION C408.3.

C408.3.1 FUNCTIONAL TESTING.
TESTING SHALL ENSURE THAT CONTROL HARDWARE AND SOFTWARE ARE CALIBRATED, ADJUSTED, PROGRAMMED AND IN PROPER WORKING CONDITION IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND MANUFACTURER'S INSTALLATION INSTRUCTIONS. THE CONSTRUCTION DOCUMENTS SHALL STATE THE PARTY WHO WILL CONDUCT THE REQUIRED FUNCTIONAL TESTING. WHERE REQUIRED BY THE CODE OFFICIAL, AN APPROVED PARTY INDEPENDENT FROM THE DESIGN OR CONSTRUCTION OF THE PROJECT SHALL BE RESPONSIBLE FOR THE FUNCTIONAL TESTING AND SHALL PROVIDE DOCUMENTATION TO THE CODE OFFICIAL CERTIFYING THAT THE INSTALLED LIGHTING CONTROLS MEET THE PROVISIONS OF SECTION C405. WHERE OCCUPANT SENSORS, TIME SWITCHES, PROGRAMMABLE SCHEDULE CONTROLS, PHOTOSENSORS OR DAYLIGHTING CONTROLS ARE INSTALLED, THE FOLLOWING PROCEDURES SHALL BE PERFORMED:

1. CONFIRM THAT THE PLACEMENT, SENSITIVITY AND TIME–OUT ADJUSTMENTS FOR OCCUPANT SENSORS YIELD ACCEPTABLE PERFORMANCE.
2. CONFIRM THAT THE TIME SWITCHES AND PROGRAMMABLE SCHEDULE CONTROLS ARE PROGRAMMED TO TURN THE LIGHTS OFF.

SHEET INDEX

ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

REVISIONS

DRAWN BY
BK

HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRIS-ARCHITECTURE.COM

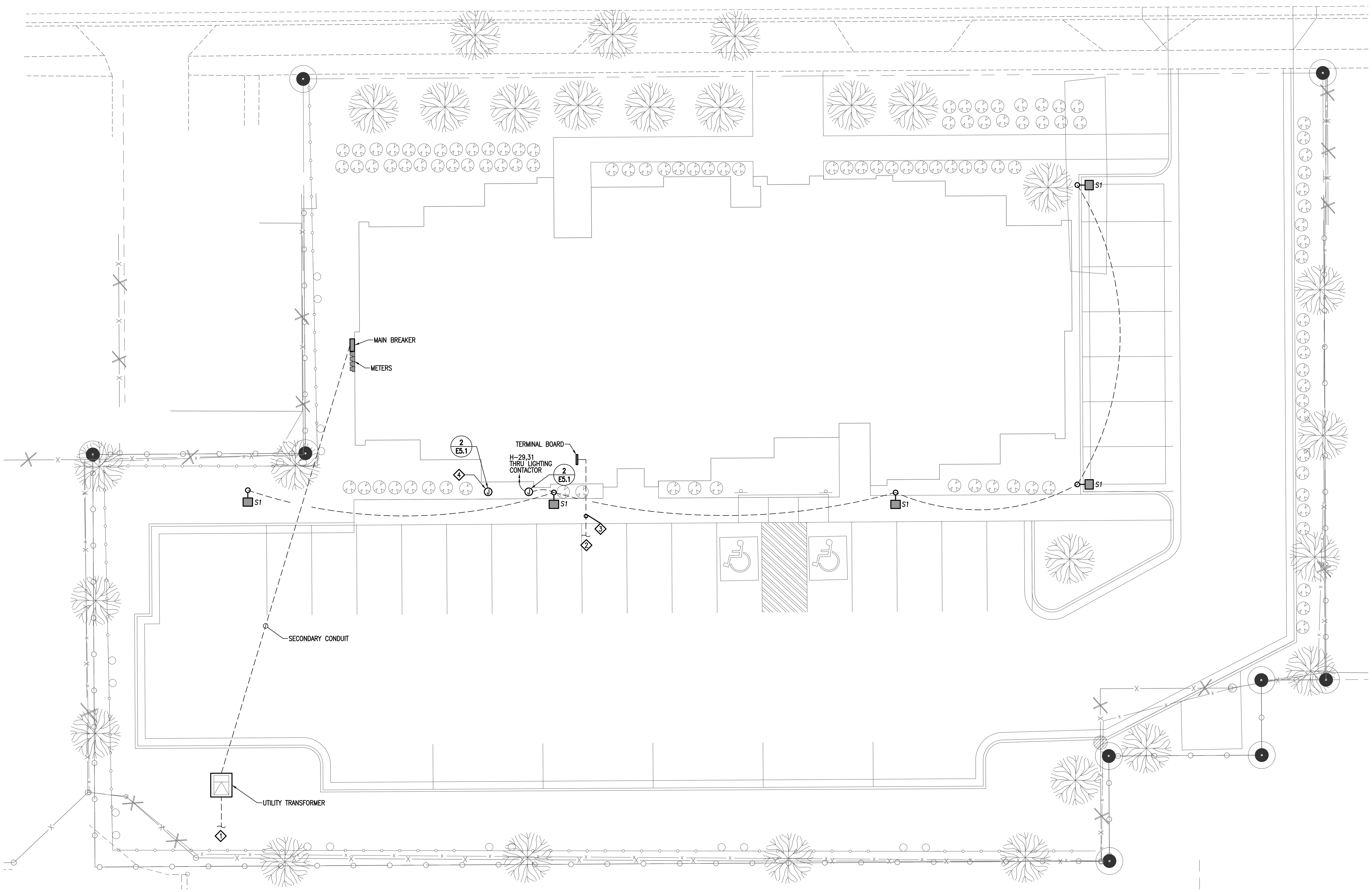
30th STREET APARTMENTS
ELECTRICAL COVER SHEET

09/20/2019

E0.1

ELECTRICAL KEYED NOTES:

1. TO LOCATION PER POWER COMPANY DIRECTION.
2. TO LOCATION PER COMMUNICATION COMPANY DIRECTION.
3. SEE COMMUNICATIONS RISER DIAGRAM FOR CONDUIT REQUIREMENTS.
4. PROVIDE AND INSTALL J-BOX FOR FUTURE EV CHARGERS. RUN (3) 1"C TO PANELBOARD.



SITE ELECTRICAL PLAN
SCALE: 1" = 10'-0"

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SITE ELECTRICAL PLAN

ROYAL ENGINEERING

ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228

MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

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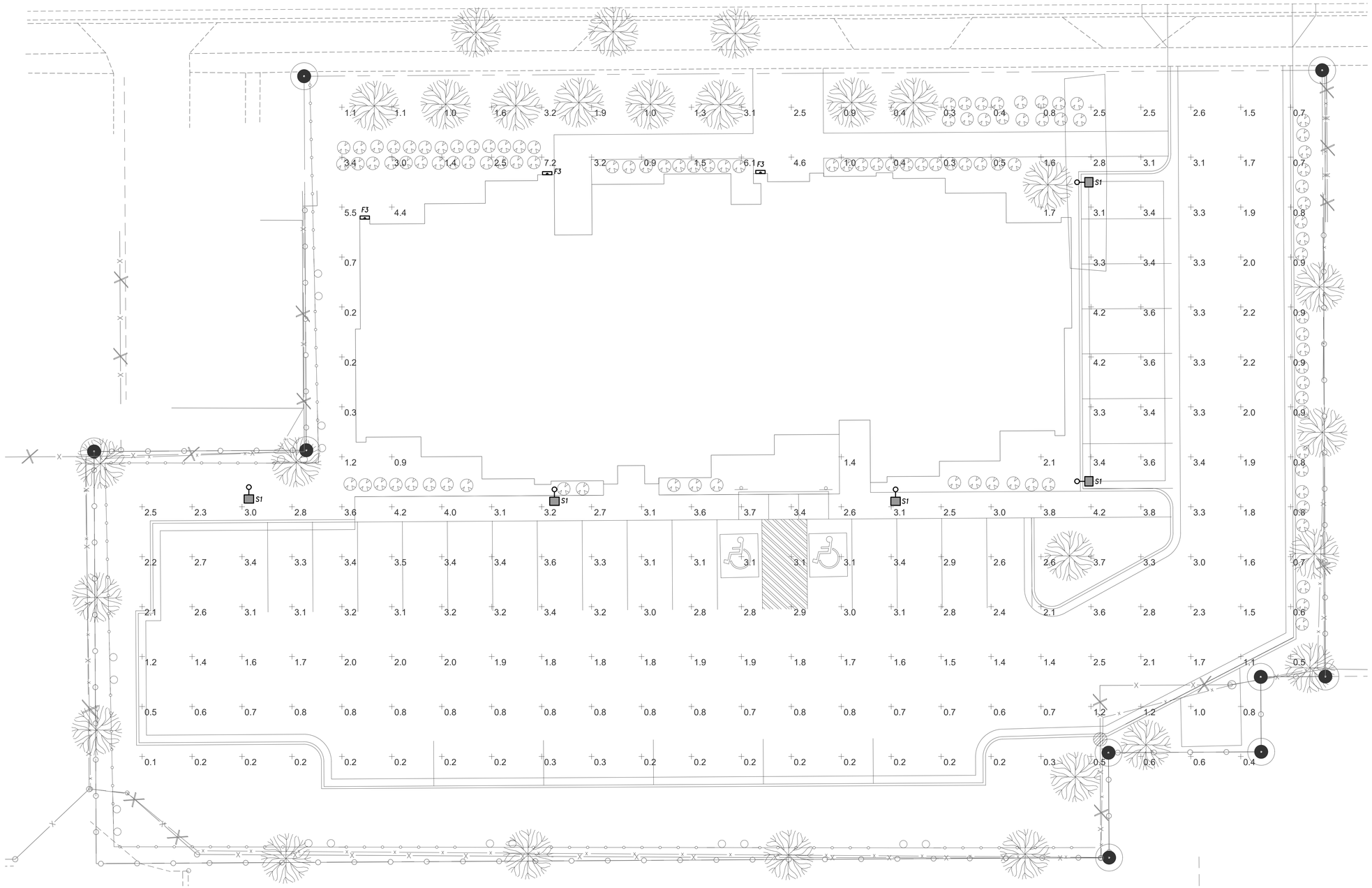

SITE PHOTOMETRIC PLAN

SCALE: 1" = 10'-0"

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SITE PHOTOMETRIC PLAN

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ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

TOBIAS W. RYAN BEAGLES 9/20/19 STATE OF UTAH

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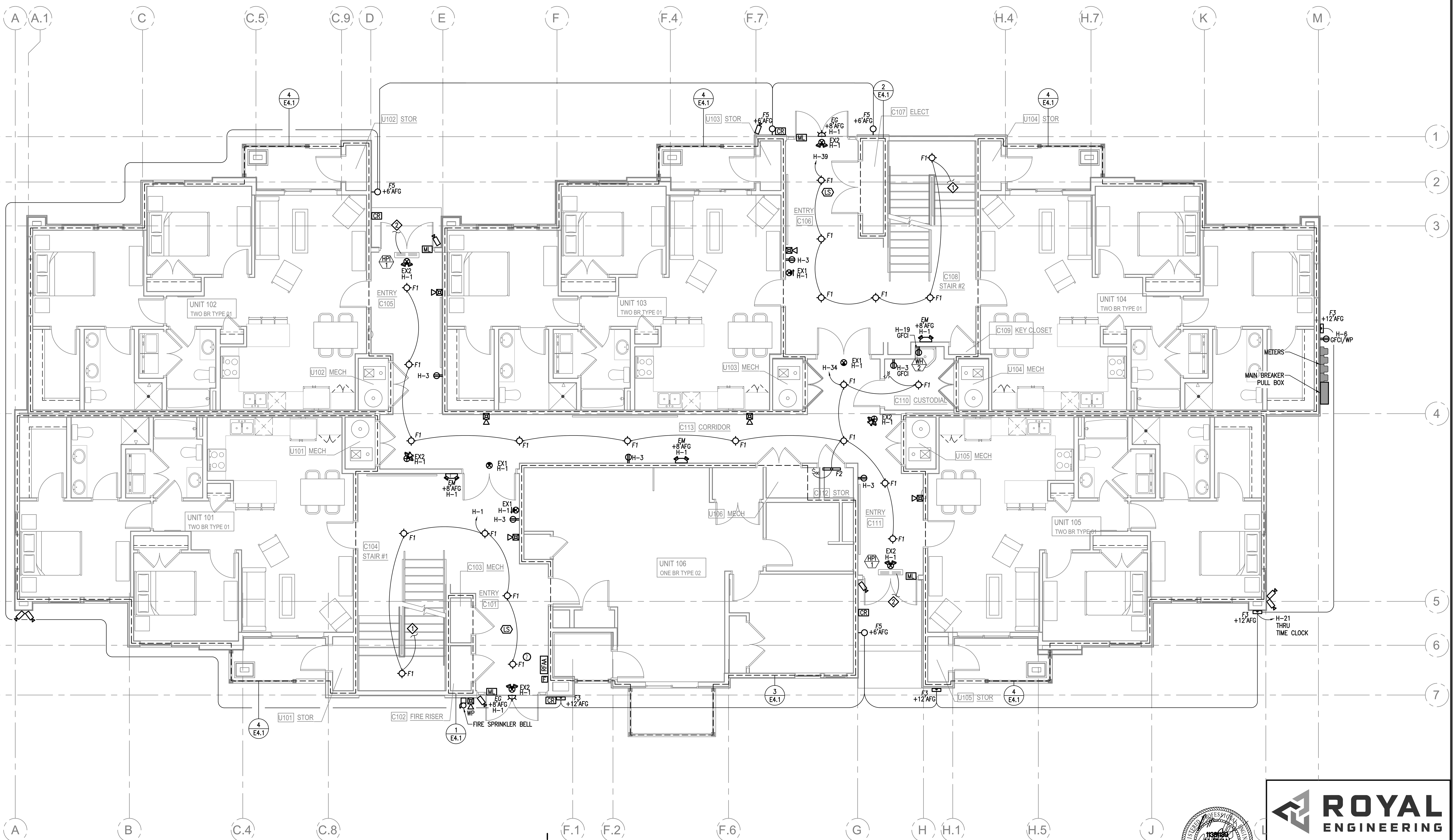
ELECTRICAL KEYED NOTES:

1. TO FIXTURE ABOVE.
2. CONNECT TO OUTDOOR UNIT.



LEVEL 1 ELECTRICAL PLAN

SCALE: 3/16" = 1'-0"

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LEVEL 1 ELECTRICAL PLAN

ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

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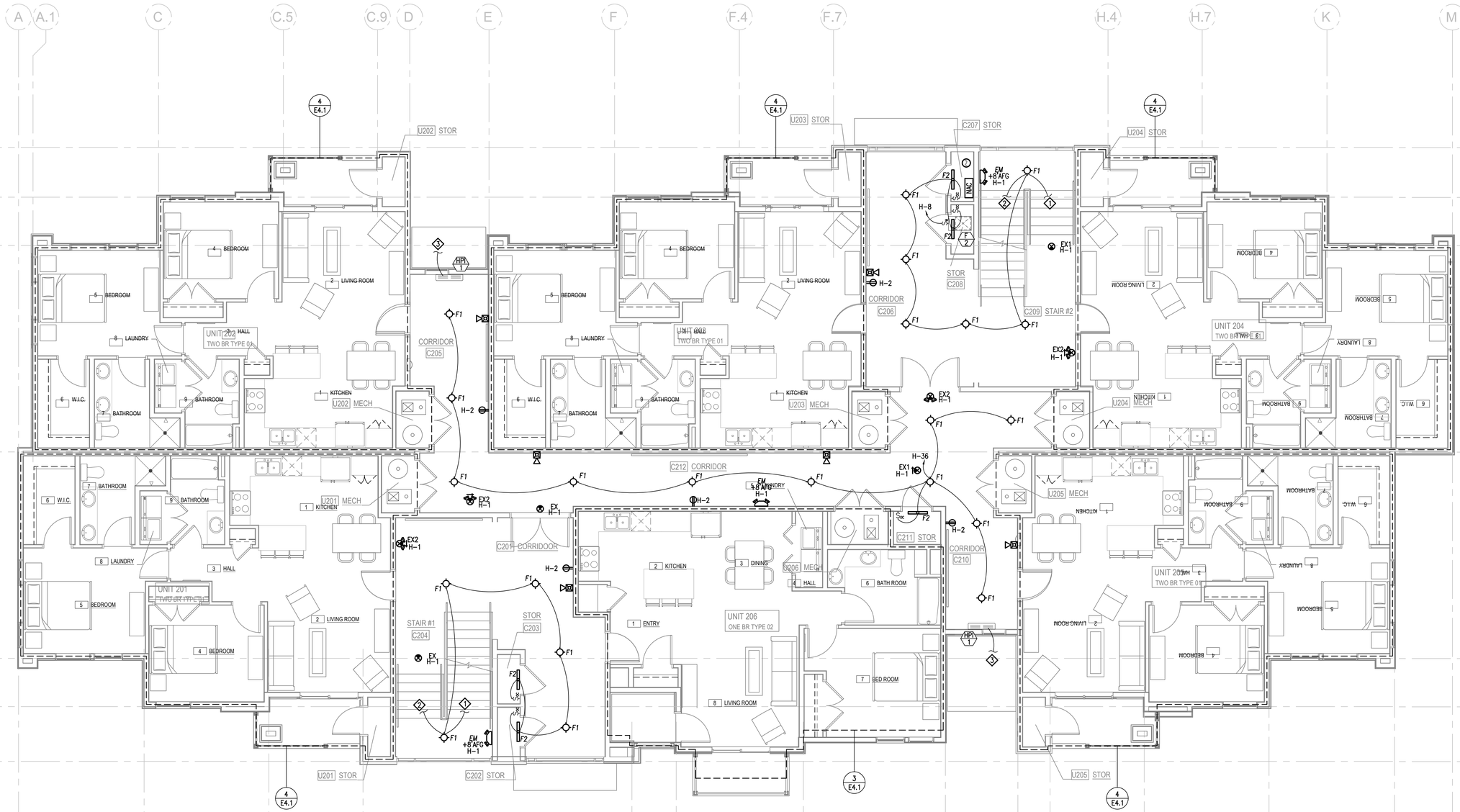
ELECTRICAL KEYED NOTES:

1. TO FIXTURE ABOVE.
2. TO FIXTURE BELOW.
3. CONNECT TO OUTDOOR UNIT.



LEVEL 2 ELECTRICAL PLAN

SCALE: 3/16" = 1'-0"

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LEVEL 2 ELECTRICAL PLAN

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E1.2

ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

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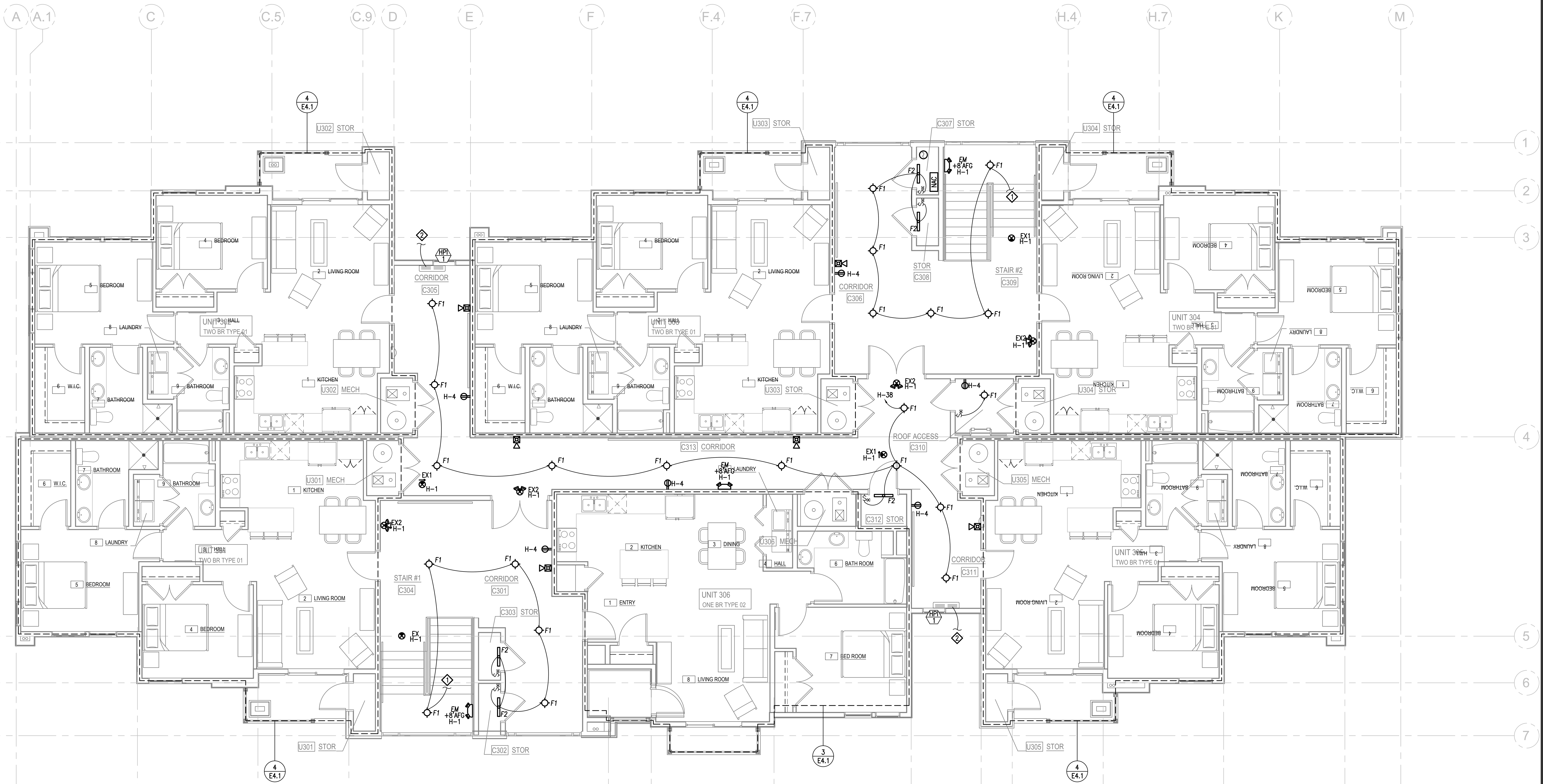
ELECTRICAL KEYED NOTES:

1. TO FIXTURE BELOW.
2. CONNECT TO OUTDOOR UNIT.



LEVEL 3 ELECTRICAL PLAN

SCALE: 3/16" = 1'-0"

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LEVEL 3 ELECTRICAL PLAN

ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

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E1.3

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ELECTRICAL KEYED NOTES:

1. CONDENSING UNIT CONNECTED TO DWELLING UNIT LOAD CENTER. COORDINATE CONNECTIONS TO EXACT UNIT WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.

ROOF ELECTRICAL PLAN
SCALE: 3/16" = 1'-0"

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ROOF ELECTRICAL PLAN

ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

PROFESSIONAL ENGINEER 11381139 M. RYAN BEAGLES 9/20/19 STATE OF UTAH

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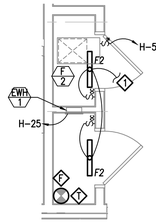
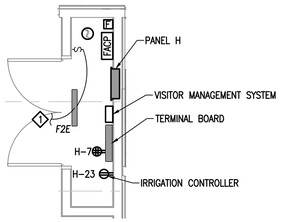
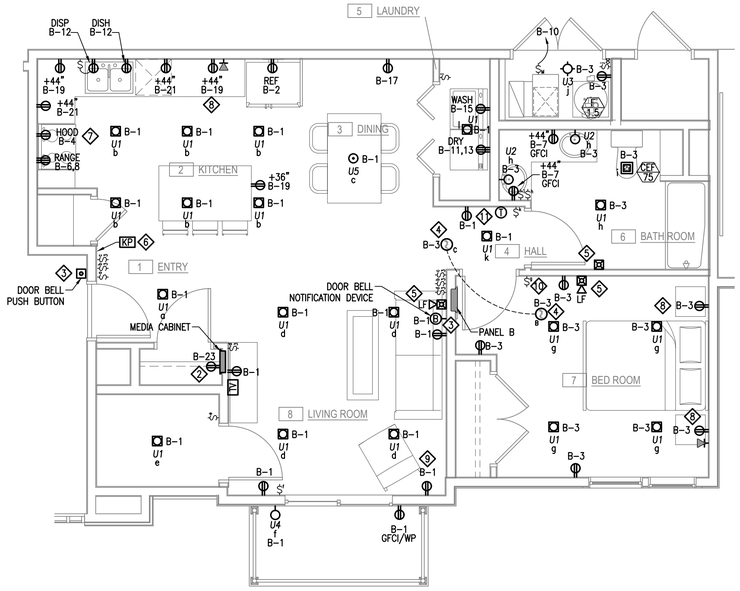


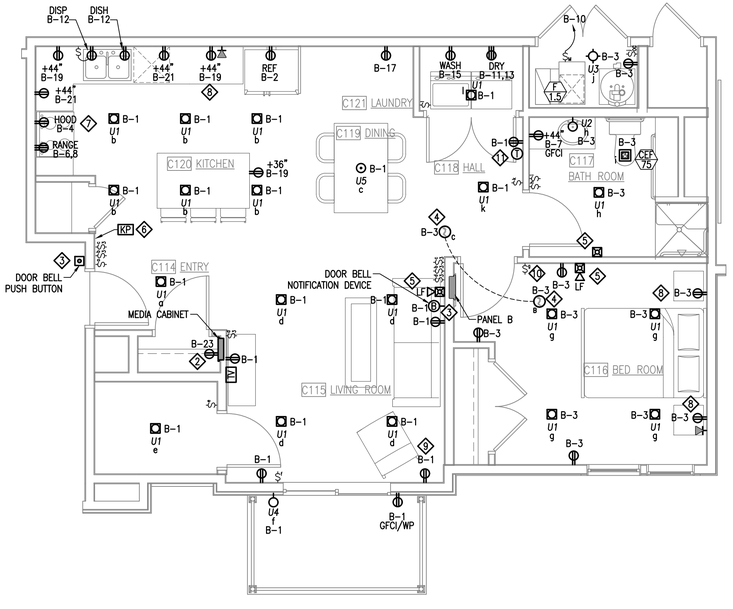
1 E4.1 ENLARGED MECHANICAL ROOM AND FIRE RISER ROOM ELECTRICAL PLAN
SCALE: 1/4" = 1'-0"



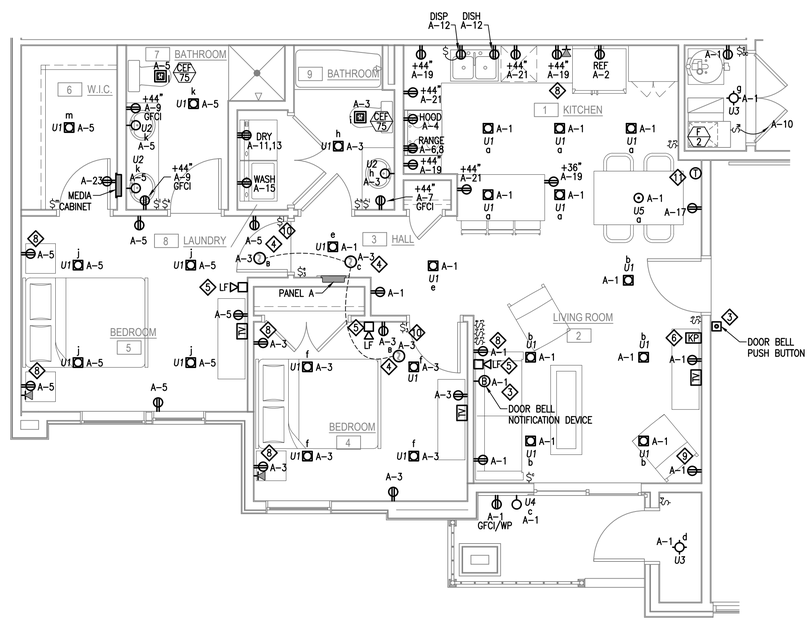
2 E4.1 ENLARGED ELECTRICAL ROOM ELECTRICAL PLAN
SCALE: 1/4" = 1'-0"



3 E4.1 TYPICAL 1-BEDROOM TYPE 2 UNIT ELECTRICAL PLAN
SCALE: 1/4" = 1'-0"



5 E4.1 TYPICAL 1-BEDROOM TYPE 3 ADA UNIT ELECTRICAL PLAN
SCALE: 1/4" = 1'-0"



4 E4.1 TYPICAL 2-BEDROOM TYPE 1 UNIT ELECTRICAL PLAN
SCALE: 1/4" = 1'-0"

ELECTRICAL KEYED NOTES:

1. CONNECT TO CORRIDOR LIGHTING CIRCUIT.
2. RECEPTACLE FOR MEDIA CABINET. COORDINATE MOUNTING HEIGHT WITH OWNER. SEE COMMUNICATIONS SYSTEM RISER DIAGRAM.
3. PROVIDE AND INSTALL DOOR BELL.
4. BATTERY BACKED COMBINATION SMOKE/CARBON MONOXIDE ALARM OR SMOKE ALARM AS INDICATED. RESIDENTIAL SMOKE ALARMS IN DWELLING UNITS AND SLEEPING UNITS SHALL BE INTERCONNECTED. ADA UNITS SHALL HAVE VISIBLE AND AUDIBLE NOTIFICATION.
5. PROVIDE FIRE ALARM LOW FREQUENCY HORN IN NON-ADA UNITS. PROVIDE FIRE ALARM STROBE IN BATHROOMS AND HORN/STROBES IN BEDROOMS AND LIVING ROOMS IN ADA UNITS.
6. PROVIDE AND INSTALL 4" SQUARE J-BOX AND 1" CONDUIT FROM MEDIA CABINET TO LOCATION INDICATED FOR HOME SECURITY SYSTEM.
7. COORDINATE RECEPTACLE MOUNTING HEIGHT WITH CABINET INSTALLER.
8. STANDARD USB CHARGER DUPLEX TAMPER RESISTANT RECEPTACLE. HUBBELL USB1SACSW.
9. HUBBELL iDEVICE WALL OUTLET.
10. HUBBELL iDEVICE DIMMER SWITCH.
11. HUBBELL iDEVICE SMART THERMOSTAT. COORDINATE WITH MECHANICAL INSTALLER.

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30th STREET APARTMENTS
TYPICAL UNIT ELECTRICAL PLANS

09/20/2019

E4.1

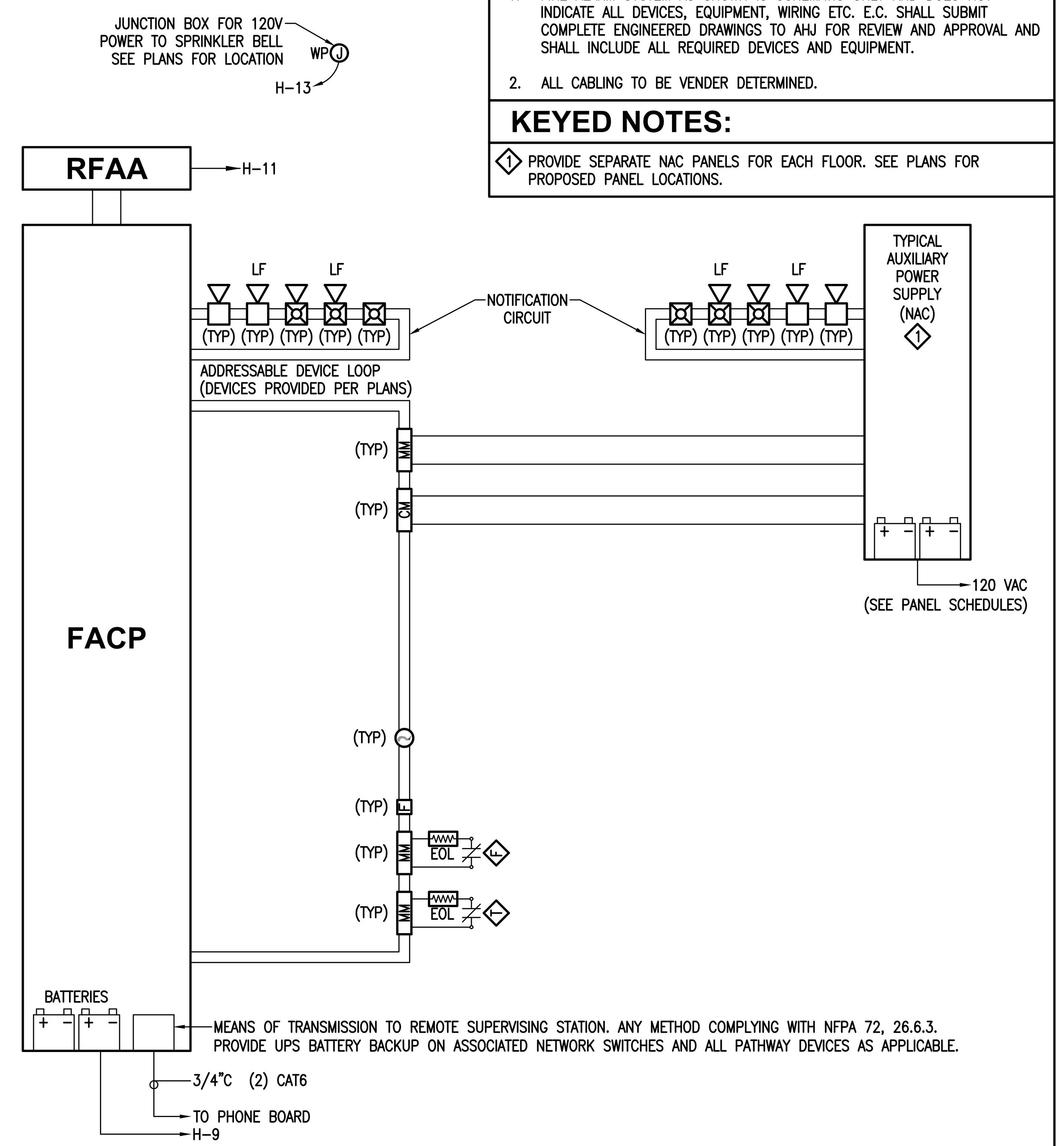
ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

NOTES:

1. FIRE ALARM SYSTEM AS SHOWN IS SCHEMATIC ONLY AND DOES NOT INDICATE ALL DEVICES, EQUIPMENT, WIRING ETC. E.C. SHALL SUBMIT COMPLETE ENGINEERED DRAWINGS TO AHJ FOR REVIEW AND APPROVAL AND SHALL INCLUDE ALL REQUIRED DEVICES AND EQUIPMENT.
2. ALL CABLING TO BE VENDER DETERMINED.

KEYED NOTES:

1. PROVIDE SEPARATE NAC PANELS FOR EACH FLOOR. SEE PLANS FOR PROPOSED PANEL LOCATIONS.



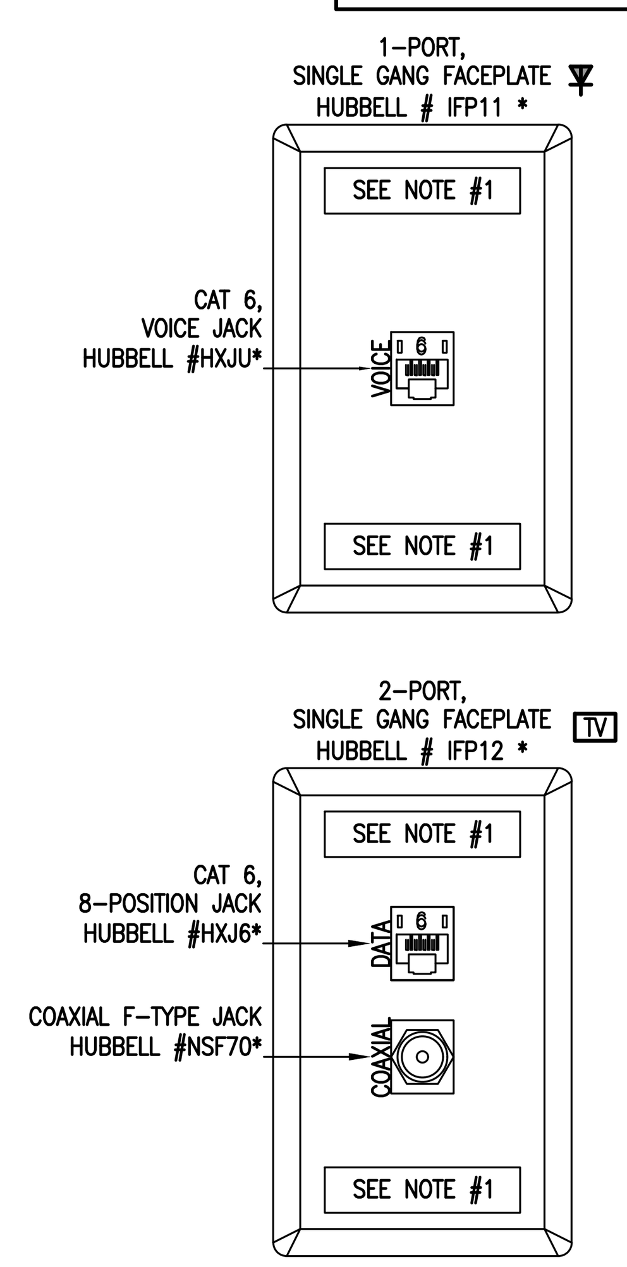
5 **FIRE ALARM RISER DIAGRAM**

SCALE: NTS

ELECTRICAL GENERAL NOTES:

1. COORDINATE STATION AND PORT LABELING WITH OWNER.
2. ALL PATCH CABLES AND STATION CABLES SHALL BE PROVIDED AND INSTALLED BY EC.
3. ALL PATCHING AND/OR CROSS CONNECTION SHALL BE PERFORMED BY THE EC.

* MATCH FACEPLATE COLOR TO RECEPTACLES.



6 **DATA/VOICE JACK INSTALLATION DETAIL**

SCALE: NTS

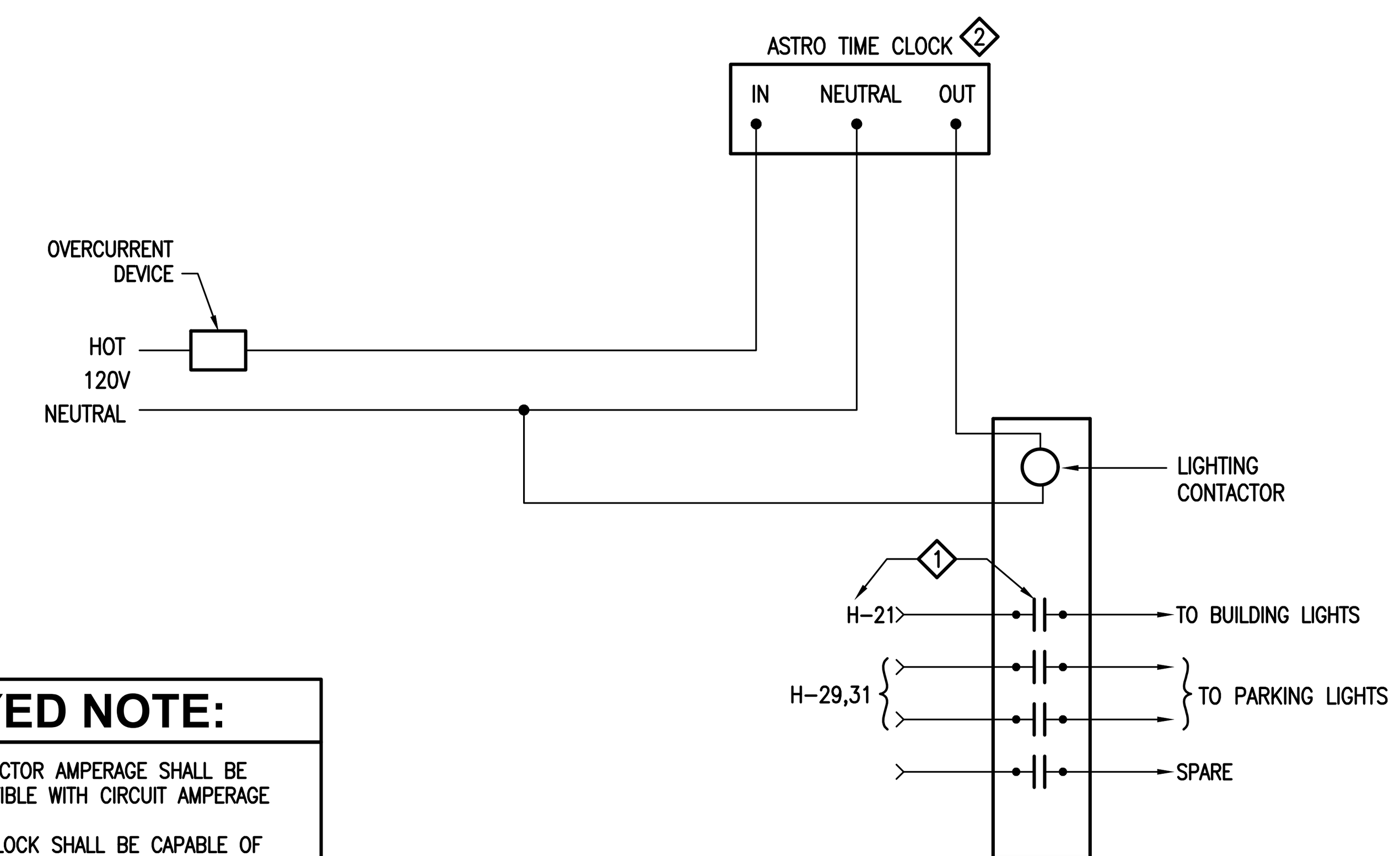
COPPER FEEDER SCHEDULE

TYPE	CONDUIT SIZE PVC	CONDUIT SIZE EMT	CONDUCTORS QUAN.	CONDUCTORS SIZE	75°C AMP RATING	TYPE	CONDUIT SIZE PVC	CONDUIT SIZE EMT	CONDUCTORS QUAN.	CONDUCTORS SIZE	75°C AMP RATING	TYPE	CONDUIT SIZE PVC	CONDUIT SIZE EMT	CONDUCTORS QUAN.	CONDUCTORS SIZE	75°C AMP RATING
212	3/4"	3/4"	2	#12	25	21	1-1/4"	1-1/4"	2	#1	130	235	2"	2"	2	350 KCMIL	310
312	3/4"	3/4"	3	#12		31	1-1/4"	1-1/4"	3	#1		335	2-1/2"	2-1/2"	3	350 KCMIL	
412	3/4"	3/4"	4	#12		41	1-1/2"	1-1/2"	4	#1		435	3"	2-1/2"	4	350 KCMIL	
20	3/4"	3/4"	2	#10	35	21X	1-1/4"	1-1/4"	2	1/0	150	240	2"	2"	2	400 KCMIL	335
30	3/4"	3/4"	3	#10		31X	1-1/2"	1-1/2"	3	1/0		340	2-1/2"	2-1/2"	3	400 KCMIL	
40	3/4"	3/4"	4	#10		41X	1-1/2"	1-1/2"	4	1/0		440	3"	3"	4	400 KCMIL	
28	3/4"	3/4"	2	#8	50	22X	1-1/4"	1-1/4"	2	2/0	175	250	2-1/2"	2-1/2"	2	500 KCMIL	380
38	3/4"	3/4"	3	#8		32X	1-1/2"	1-1/2"	3	2/0		350	3"	2-1/2"	3	500 KCMIL	
48	3/4"	3/4"	4	#8		42X	2"	2"	4	2/0		450	4"	3-1/2"	4	500 KCMIL	
26	3/4"	3/4"	2	#6	65	23X	1-1/2"	1-1/4"	2	3/0	200	260	2-1/2"	2-1/2"	2	600 KCMIL	420
36	3/4"	3/4"	3	#6		33X	2"	2"	3	3/0		360	3-1/2"	3-1/2"	3	600 KCMIL	
46	1"	1"	4	#6		43X	2"	2"	4	3/0		460	4"	4"	4	600 KCMIL	
24	3/4"	3/4"	2	#4	85	24X	1-1/2"	1-1/2"	2	4/0	230						
34	1"	1"	3	#4		34X	2"	2"	3	4/0							
44	1-1/4"	1-1/4"	4	#4		44X	2-1/2"	2-1/2"	4	4/0							
23	1"	1"	2	#3	100	225	2"	2"	2	250 KCMIL	255						
33	1"	1"	3	#3		325	2"	2"	3	250 KCMIL							
43	1-1/4"	1-1/4"	4	#3		425	3"	2-1/2"	4	250 KCMIL							
22	1"	1"	2	#2	115	230	2"	2"	2	300 KCMIL	285						
32	1-1/4"	1-1/4"	3	#2		330	2-1/2"	2-1/2"	3	300 KCMIL							
42	1-1/4"	1-1/4"	4	#2		430	3"	2-1/2"	4	300 KCMIL							

EQUIPMENT GROUNDING CONDUCTORS SCHEDULE

OVERCURRENT DEVICE	COPPER
15	14
20	12
30	10
40	10
60	10
100	8
200	6
300	4
400	3
500	2
600	1
800	1/0

NOTE:
1. SEE EQUIPMENT GROUND CONDUCTOR SCHEDULES OR SERVICE GROUNDING DETAIL FOR GROUND CONDUCTORS RATING.
2. ALL INSULATION SHALL BE THHN (ABOVE GRADE) OR THWN (BELOW GRADE) UNLESS NOTED OTHERWISE.
3. PVC CONDUIT SIZE IS BASED ON SCHEDULE 40 PVC. PVC & THWN ARE APPROVED FOR UNDERGROUND FEEDERS ONLY.



KEYED NOTE:

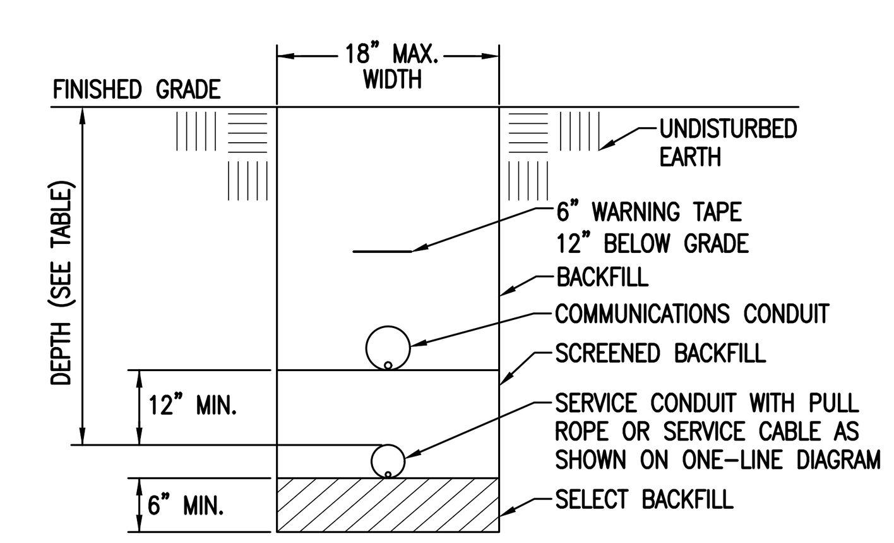
1. CONTRACTOR AMPERAGE SHALL BE COMPATIBLE WITH CIRCUIT AMPERAGE
2. TIME CLOCK SHALL BE CAPABLE OF RETAINING PROGRAMMING AND TIME SETTING DURING LOSS OF POWER FOR A PERIOD OF AT LEAST 10 HOURS.

3 **LIGHTING CONTROL WIRING DIAGRAM**

SCALE: NTS

LOCATION DESCRIPTION	MIN. DEPTH
BELOW CONCRETE SLAB (NOT TRAFFIC)	18 INCHES
BELOW TRAFFIC SURFACES	24 INCHES
PARKING LOT (PAVED OR NON-PAVED)	24 INCHES
OTHER LOCATIONS	24 INCHES
UTILITY SECONDARY	24 INCHES*
UTILITY PRIMARY	48 INCHES*

(SEE NEC TABLE 300.5)
* VERIFY ALL DIMENSIONS WITH LOCAL POWER COMPANY STANDARDS AND SPECIFICATIONS.

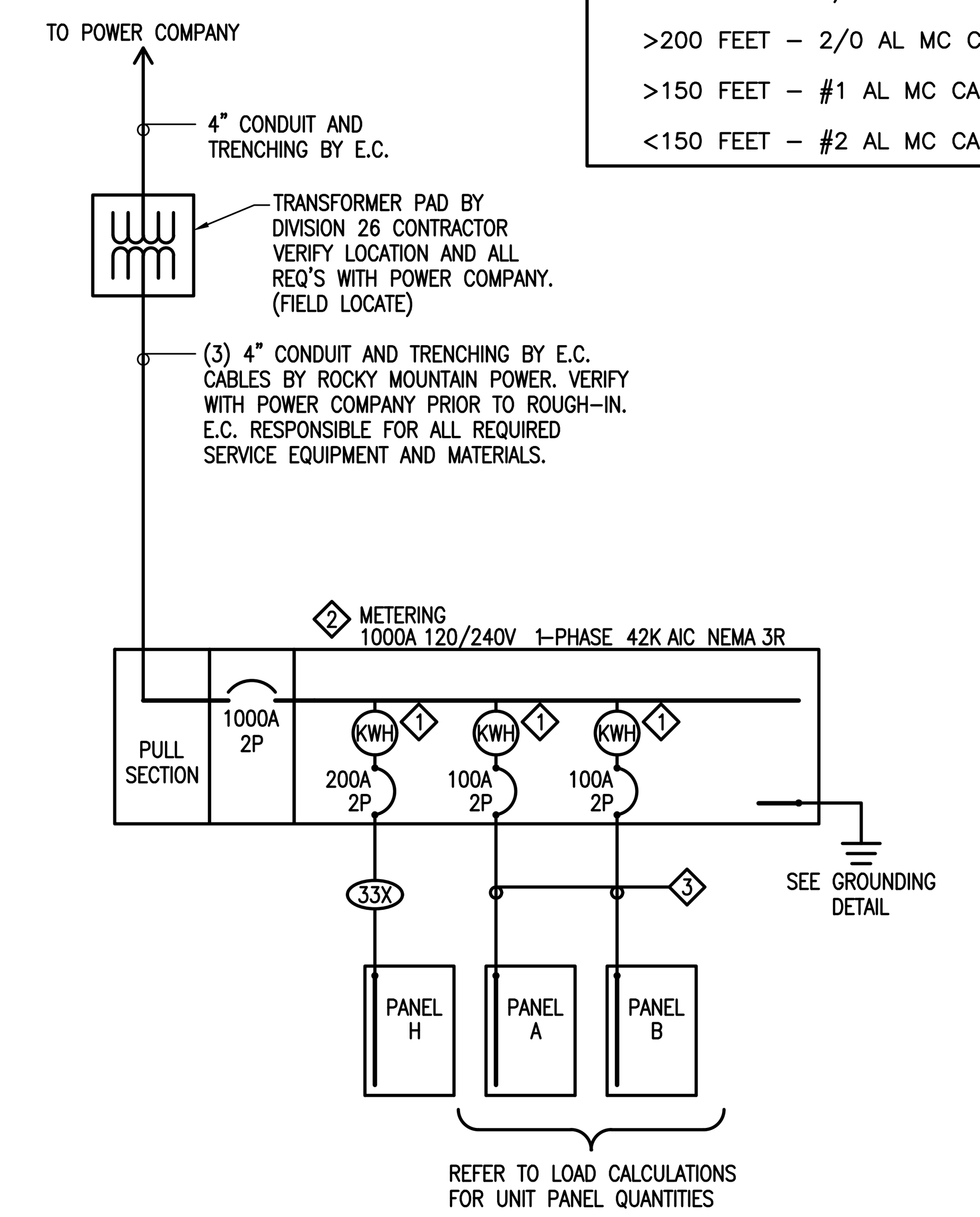


4 **TRENCHING DETAIL**

SCALE: NTS

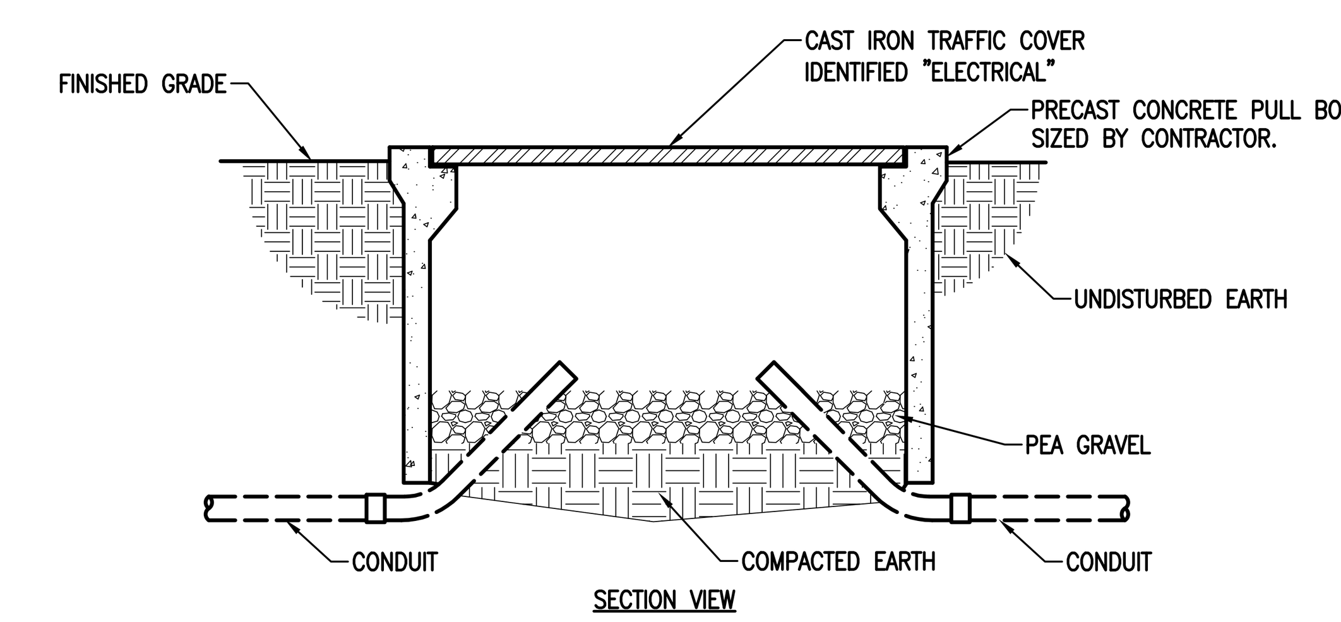
KEYED NOTES:

1. METER PER POWER COMPANY STANDARDS.
2. PROVIDE AVAILABLE FAULT CURRENT FIELD MARKINGS AT PANEL PER NEC 110.24.
3. PROVIDE THE FOLLOWING CONDUCTORS FOR FEEDER LENGTHS THAT ARE GREATER THAN:
   - >500 FEET – 300 AL MC CABLE
   - >400 FEET – 250 AL MC CABLE
   - >350 FEET – 4/0 AL MC CABLE
   - >250 FEET – 3/0 AL MC CABLE
   - >200 FEET – 2/0 AL MC CABLE
   - >150 FEET – #1 AL MC CABLE
   - <150 FEET – #2 AL MC CABLE



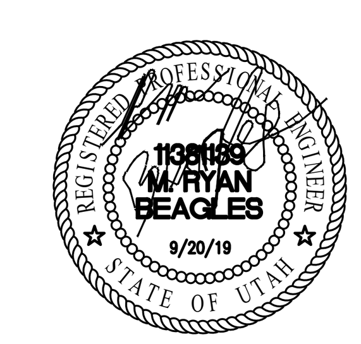
1 **POWER ONE-LINE DIAGRAM**

SCALE: NTS



2 **TYPICAL ELECTRICAL PULL BOX DETAIL**

SCALE: NTS



ROYAL ENGINEERING

ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

REVISIONS

DRAWN BY
BK

HARRIS ARCHITECTURE

3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRIS-ARCHITECTURE.COM

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NOTE:

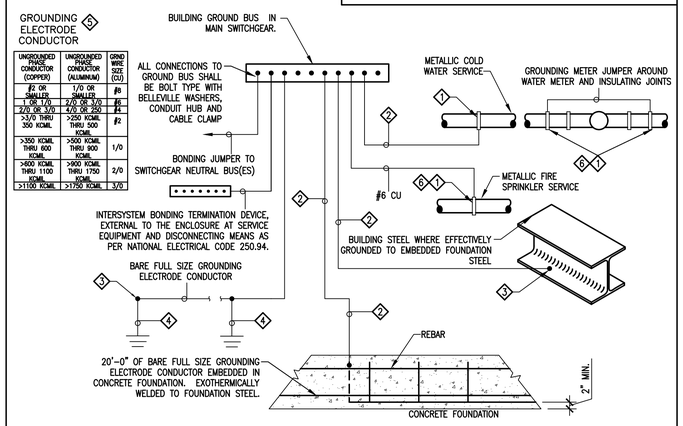
1. WHEN PRESENT CONTRACTOR SHALL PROVIDE ALL GROUNDING MEANS INDICATED. CONTRACTOR SHALL REFER TO ELECTRICAL ONE-LINE DIAGRAM AND GROUNDING ELECTRODE CONDUCTOR SCHEDULE (THIS DETAIL) FOR GROUNDING ELECTRODE CONDUCTOR SIZE. CONTRACTOR SHALL REFER TO ELECTRICAL SPECIFICATIONS FOR SPECIFICS OF GROUNDING SYSTEM INSTALLATION AND MATERIALS.
2. GROUNDING ROD SHALL BE MIN. 9FT. AWAY FROM IRRIGATION CONTROLLER.

KEYED NOTE:

1. T&B 3900 BU GROUND CLAMP WITH 3/4" CONDUIT HUB AND CABLE CLAMP
2. FULL SIZE GROUNDING ELECTRODE CONDUCTOR IN PVC.
3. EXOTHERMICALLY WELDED (TYPICAL)
4. DRIVEN GROUND RODS ⅝"x8' COPPER/STEEL ON BUILDING EXTERIOR
5. TABLE TAKEN FROM NEC 250.66. UNGROUNDED PHASE CONDUCTOR REFERS TO THE SIZE OF THE LARGEST UNGROUNDED SERVICE-ENTRANCE CONDUCTOR OR EQUIVALENT AREA FOR PARALLEL CONDUCTORS. SEE NEC 250.66.
6. BOND METAL PIPING PER NEC 250.104.

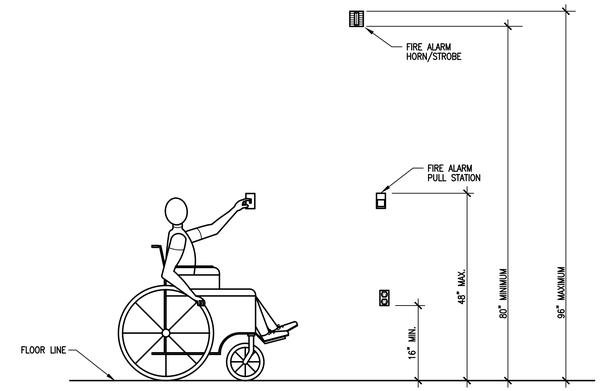
GROUNDING ELECTRODE CONDUCTOR (5)

UNGROUNDED POWER CONDUCTOR (COPPER)	UNGROUNDED POWER CONDUCTOR (ALUMINUM)	GRND WIRE SIZE (CU)
#1 OR SMALLER	1/0 OR SMALLER	#8
1 OR 1/0	2/0 OR 3/0	#6
2/0 OR 3/0	4/0 OR 250	#4
>3/0 THRU 350 KCMIL	>250 KCMIL THRU 500 KCMIL	#2
>350 KCMIL THRU 600 KCMIL	>500 KCMIL THRU 900 KCMIL	1/0
>600 KCMIL THRU 1100 KCMIL	>900 KCMIL THRU 1750 KCMIL	2/0
>1100 KCMIL	>1750 KCMIL	3/0



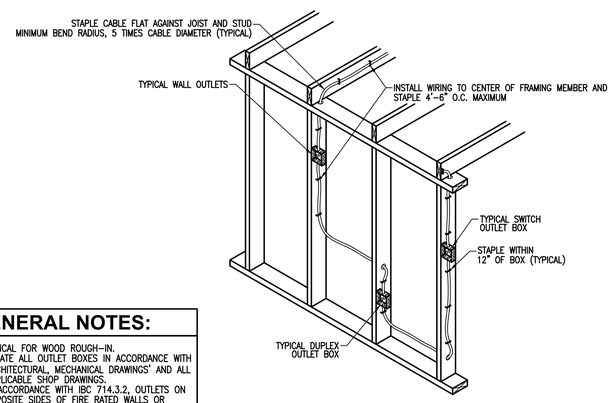
5 SERVICE GROUNDING DETAIL

SCALE: NTS



2 DEVICE MOUNTING HEIGHTS INSTALLATION DETAIL

SCALE: NTS



GENERAL NOTES:

1. TYPICAL FOR WOOD ROUGH-IN.
2. LOCATE ALL OUTLET BOXES IN ACCORDANCE WITH ARCHITECTURAL, MECHANICAL DRAWINGS' AND ALL APPLICABLE SHOP DRAWINGS.
3. IN ACCORDANCE WITH IBC 714.3.2, OUTLETS ON OPPOSITE SIDES OF FIRE RATED WALLS OR PARTITIONS IN THE SAME STUD SPACE MUST BE SEPARATED BY MINIMUM OF 24" HORIZONTAL DISTANCE.

3 ROUGH-IN DETAIL FOR NM CABLE

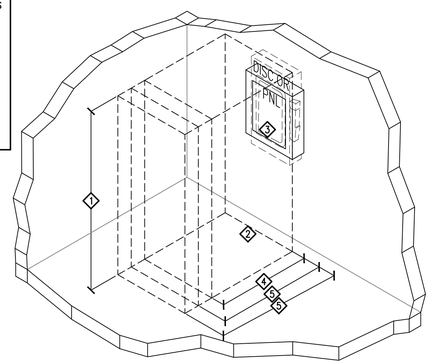
SCALE: NTS

KEYED NOTES:

1. THE MINIMUM HEADROOM OF WORKING SPACE SHALL BE 6½ FT.
2. THE WIDTH OF THE WORKING SPACE SHALL BE THE WIDTH OF THE EQUIPMENT OR 30 IN., WHICHEVER IS GREATER. THE PANEL DOOR SHALL OPEN AT LEAST 90 DEGREES.
3. ALL CIRCUIT BREAKERS OR DISCONNECT HANDLES SHALL BE NOT MORE THAN 6 FT 7 IN. ABOVE THE FLOOR WHEN IN THEIR HIGHEST POSITION.
4. 3 FT CLEARANCE IF 0-150V TO GROUND
5. 3.5FT CLEARANCE IF 151-600V TO GROUND. 4FT IF EXPOSED LIVE PARTS ON BOTH SIDES OF THE WORKING SPACE.

GENERAL NOTE:

1. ALL WORKING SPACE CLEARANCE FROM FACE OF PANEL.

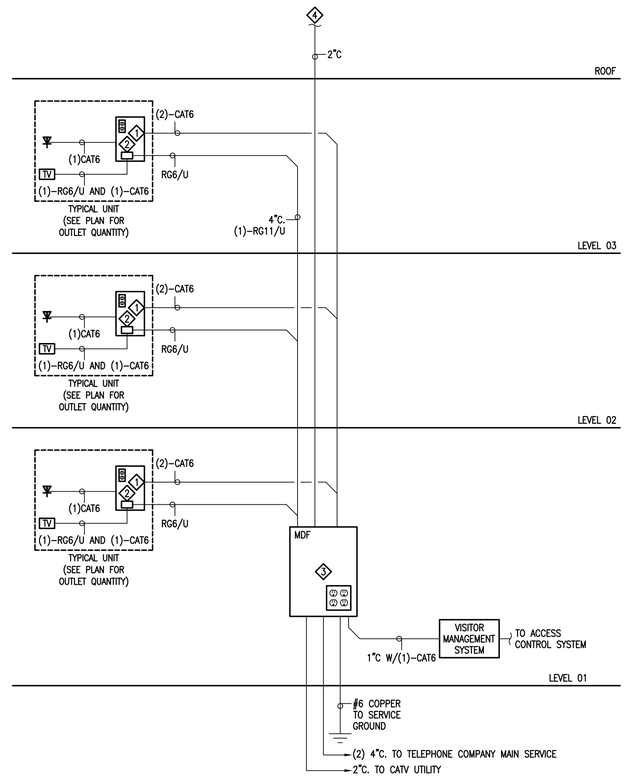


4 ELECTRICAL EQUIPMENT WORK SPACE CLEARANCES

SCALE: NTS

ELECTRICAL KEYED NOTES:

1. MEDIA CABINET. 14.5"WX 14"HX 4D" FLUSH MOUNTED CABINET NEMA 1 ENCLOSURE.
2. 3-WAY SPLITTER(S) (AS REQUIRED).
3. TELEPHONE TERMINAL BOARD. 24"X48"X3/4"CDX PLYWOOD PAINTED WITH THREE COATS OF FIRE RETARDANT PAINT.
4. 4" CONDUIT FOR SATELLITE ON ROOF. COORDINATE LOCATION OF TERMINATION WITH OWNER.



1 COMMUNICATIONS RISER DIAGRAM

SCALE: NTS

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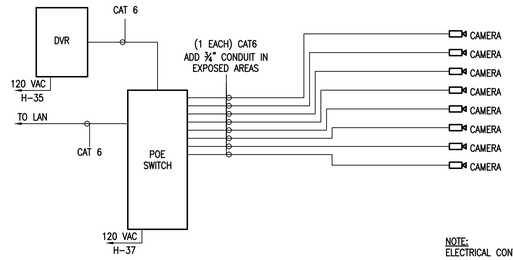
ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676



NOTE:
ELECTRICAL CONTRACTOR TO PROVIDE CABLE AND/OR CONDUIT AS NOTED. OWNER TO PROVIDE SURVEILLANCE SYSTEM EQUIPMENT.

8 SURVEILLANCE ONE-LINE DIAGRAM

SCALE: NTS

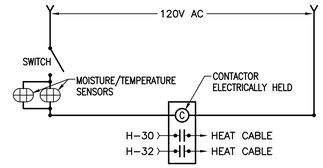
NOTE:
1. ALL FIRE STOPPING COMPOUND TO BE INSTALLED UNDER STRICT ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

4 FIRE RATED PENETRATION DETAIL

SCALE: NTS

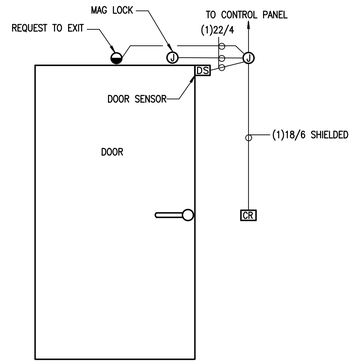
GENERAL NOTES:

1. PROVIDE GFEP AS REQUIRED BY NEC 426.28.
2. CONTRACTOR SHALL PROVIDE ACCESSORIES REQUIRED FOR A COMPLETE INSTALLATION.



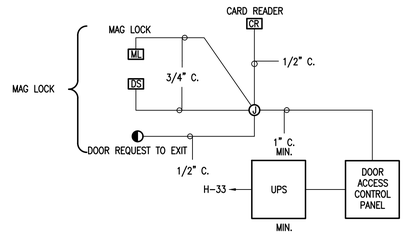
5 HEAT CABLE CONTROL DETAIL

SCALE: SCALE: NONE



6 ACCESS CONTROL DOOR LOCK DETAIL

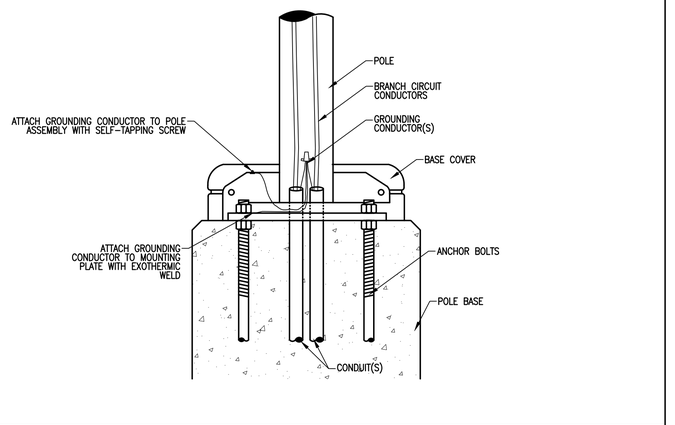
SCALE: NTS



NOTE: PROVIDE CABLING AS REQUIRED BY MANUFACTURER.

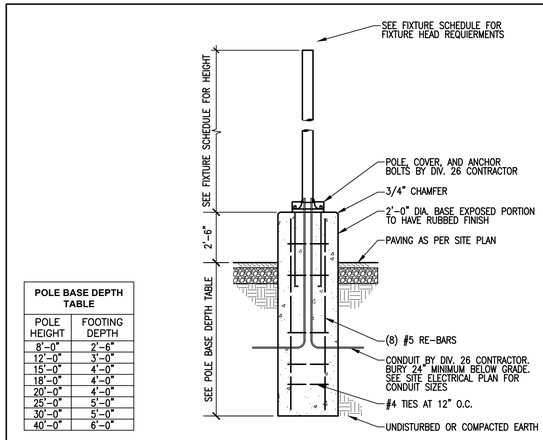
7 ACCESS CONTROL RISER DIAGRAM

SCALE: NTS



1 POLE LIGHT GROUNDING DETAIL

SCALE: NTS

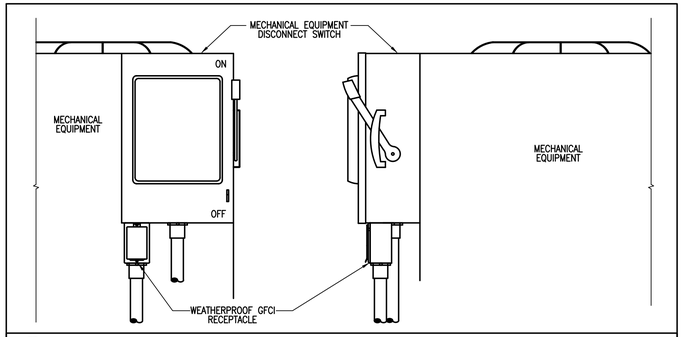


POLE BASE DEPTH TABLE

POLE HEIGHT	FOOTING DEPTH
8'-0"	2'-6"
12'-0"	3'-0"
15'-0"	4'-0"
18'-0"	4'-0"
20'-0"	4'-0"
25'-0"	5'-0"
30'-0"	5'-0"
40'-0"	6'-0"

2 POLE BASE DETAIL

SCALE: NTS



3 WEATHERPROOF RECEPTACLE INSTALLATION DETAIL

SCALE: NTS

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ROYAL ENGINEERING
ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228
MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

EQUIPMENT SCHEDULE

SYMBOL	DESCRIPTION	SERVICE VOLTS	SERVICE PHASE	DISCONNECT SIZE	DISCONNECT FUSE	STARTER	LOAD HP/TON	LOAD VA	LOAD AMPS	REMARKS
F 1.5	FURNACE FAN	120 V	1Ø	MANUAL STARTER	-	INTEGRAL	-	960	8.0A	
F 2	FURNACE FAN	120 V	1Ø	MANUAL STARTER	-	INTEGRAL	-	1,200	10.0A	
F 2	FURNACE FAN	120 V	1Ø	MANUAL STARTER	-	INTEGRAL	-	1,200	10.0A	
CU 1.5	AIR COOLED CONDENSING UNIT	240 V	1Ø	30A NEMA 3R	-	INTEGRAL	1½ TON	2,832	11.8A	
CU 2	AIR COOLED CONDENSING UNIT	240 V	1Ø	30A NEMA 3R	-	INTEGRAL	2 TON	4,152	17.3A	
CU 2	AIR COOLED CONDENSING UNIT	240 V	1Ø	30A NEMA 3R	-	INTEGRAL	2 TON	4,152	17.3A	
CEF 75	EXHAUST FAN	120 V	1Ø	INTEGRAL PLUG	-	-	-	100	0.8A	EF CONTROLLED WITH SEPARATE SWITCH
EWH 1	WALL HEATER	120 V	1Ø	T-STAT	-	-	-	1,500	12.5A	
HPI 1	AIR CONDITIONING UNIT - INDOOR UNIT	240 V	1Ø	60A NEMA 3R	-	-	-	7,200	30.0 A	INDOOR UNIT POWERED BY OUTDOOR UNIT. PROVIDE (2) 1/2"C FROM OUTDOOR UNIT TO INDOOR UNIT FOR POWER AND CONTROL.
HPO 3	AIR CONDITIONING UNIT - OUTDOOR UNIT									
WH 2	WATER HEATER	120 V	1Ø	PLUG/ CORD	-	-	-	1,650	14.0A	

NOTES:

1. VERIFY ALL EQUIPMENT LOCATIONS AND CONNECTION REQUIREMENTS (i.e. VOLTAGE, PHASE, FLA, ETC.) WITH MECHANICAL DRAWINGS/SUBMITTALS BEFORE FOR ACTUAL EQUIPMENT INSTALLED.
2. ALL FUSES SHALL BE DUAL ELEMENT TIME DELAY. FINAL BREAKER/FUSE & DISCONNECT SIZE SHALL BE DETERMINED BY MANUFACTURER'S RECOMMENDATION FOR ACTUAL EQUIPMENT INSTALLED.
3. MAXIMUM VALUES INDICATED.
4. DISCONNECTING MEANS NOT REQUIRED FOR EQUIPMENT WITHIN SIGHT (AS DEFINED IN NEC) OF BRANCH PANEL SERVING EQUIPMENT. SEE NEC 422.31 (B).
5. DISCONNECTING MEANS NOT REQUIRED FOR APPLIANCES NOT OVER 300 VA. SEE NEC 422.31 (A).

FAULT CURRENT CALCULATION TABLE

MAIN UTILITY COMPANY TRANSFORMER (ROCKY MOUNTAIN POWER)	TRANSFORMER KVA	AFC AT UTILITY	%Z
1Ø 120/240V -800A	167	39,990 A	1.74%

CONFIGURATION: FROM		CONFIGURATION: TO		LENGTH	SOURCE FAULT CURRENT	FEEDER: FEEDER SIZE	FEEDER: FEEDERS PER PHASE	FEEDER: WIRE CONSTANT	SYSTEM: LINE TO LINE VOLTS	SYSTEM: XFMR SECONDARY VOLTS	SYSTEM: PHASE	SYSTEM: KVA	SYSTEM: %Z	SYSTEM: MOTOR LOAD	FAULT CURRENT AT EQUIPMENT	FULL OR SERIES RATED	MINIMUM SYMMETRICAL EQUIPMENT AIC RATING
TRANSFORMER	UTILITY	SWITCHBOARD	METER	85'-0"	39,990 AIC	500 AL	3	21,390	240 V		1Ø		-		32,760 AIC	FULL	42,000 AIC
SWITCHBOARD	METER	PANELBOARD	H	60'-0"	32,760 AIC	3/0 CU	1	13,923	240 V		1Ø		-		20,627 AIC	FULL	22,000 AIC
SWITCHBOARD	METER	PANELBOARD	UNIT	60'-0"	32,760 AIC	1 CU	1	7,493	240 V		1Ø		-		15,652 AIC	FULL	22,000 AIC
SWITCHBOARD	METER	PANELBOARD	UNIT	100'-0"	32,760 AIC	1/0 CU	1	9,317	240 V		1Ø		-		13,290 AIC	FULL	22,000 AIC
SWITCHBOARD	METER	PANELBOARD	UNIT	150'-0"	32,760 AIC	2/0 CU	1	11,423	240 V		1Ø		-		11,732 AIC	FULL	22,000 AIC
SWITCHBOARD	METER	PANELBOARD	UNIT	190'-0"	32,760 AIC	3/0 CU	1	13,923	240 V		1Ø		-		11,444 AIC	FULL	22,000 AIC
SWITCHBOARD	METER	PANELBOARD	UNIT	240'-0"	32,760 AIC	4/0 CU	1	16,673	240 V		1Ø		-		11,049 AIC	FULL	22,000 AIC

NOTE: DISTANCES INDICATED ARE FOR FAULT-CURRENT ANALYSIS ONLY. CONTRACTOR SHALL USE FIELD MEASUREMENTS ESTABLISH CONDUCTOR LENGTHS FOR ORDERING PURPOSES.

ELECTRICAL LOAD CALCULATION

OPTIONAL METHOD USED (NEC 220 SECTION IV)

UNIT TYPE: 2BED TYPE 1

TOTAL SQUARE FOOTAGE	902	SQ FT
UNIT ELECTRICAL LOADS (PER UNIT)		
SMALL APPLIANCE LOAD (INCLUDES REFRIGERATOR)	3,000	VA
LAUNDRY CIRCUIT (INCLUDES WASHER)	1,500	VA
LIGHTING/RECEPTACLE LOAD (sq ft. x 3 VA)	2,706	VA
RANGE	8,000	VA
DRYER	5,000	VA
DISHWASHER	864	VA
DISPOSAL	828	VA
TOTAL GENERAL LOADS	21,898	VA
10,000 VOLT-AMPERES @ 100%	10,000	VA
11,898 VOLT-AMPERES @ 40%	4,759	VA
TOTAL GENERAL LOADS WITH DEMAND FACTOR APPLIED	14,759	VA
FURNACE -- @ 100%	1,200	VA
AIR CONDITIONER LOAD -- @100%	4,152	VA
TOTAL UNIT VA	20,111	VA
CALCULATED AMPS FOR 1 PHASE UNIT @ 240 V	84	A
REQUIRED SERVICE SIZE IN AMPS	100	A

ELECTRICAL LOAD CALCULATION

OPTIONAL METHOD USED (NEC 220 SECTION IV)

UNIT TYPE: 1BED TYPE 2

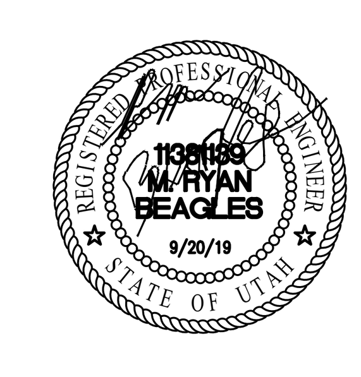
TOTAL SQUARE FOOTAGE	796	SQ FT
UNIT ELECTRICAL LOADS (PER UNIT)		
SMALL APPLIANCE LOAD (INCLUDES REFRIGERATOR)	3,000	VA
LAUNDRY CIRCUIT (INCLUDES WASHER)	1,500	VA
LIGHTING/RECEPTACLE LOAD (sq ft. x 3 VA)	2,388	VA
RANGE	8,000	VA
DRYER	5,000	VA
DISHWASHER	864	VA
DISPOSAL	828	VA
TOTAL GENERAL LOADS	21,580	VA
10,000 VOLT-AMPERES @ 100%	10,000	VA
11,580 VOLT-AMPERES @ 40%	4,632	VA
TOTAL GENERAL LOADS WITH DEMAND FACTOR APPLIED	14,632	VA
FURNACE -- @ 100%	960	VA
AIR CONDITIONER LOAD -- @100%	2,832	VA
TOTAL UNIT VA	18,424	VA
CALCULATED AMPS FOR 1 PHASE UNIT @ 240 V	77	A
REQUIRED SERVICE SIZE IN AMPS	100	A

LIGHT FIXTURE SCHEDULE

FIXTURE NUMBER	FIXTURE MANUFACTURER	FIXTURE CATALOG #	LAMPS TYPE	LAMPS QTY.	FIXTURE VOLTS	FIXTURE WATTS	FIXTURE MOUNTING	DESCRIPTION	REMARKS
F1	HALO OR APPROVED EQUAL	SMD6S-12-940-WH-E	LED 760 lm	1	120	10.3	SURFACE CEILING	SURFACE MOUNTED CAN LIGHT	
F2	METALUX OR APPROVED EQUAL	2SNLED-LD5-18SL-LC-UNV-L835-CD1-U	LED 1960 lm	1	120	14	SURFACE WALL	CLOSET STRIP LIGHT	
F2E	METALUX OR APPROVED EQUAL	2SNLED-LD5-18SL-LC-UNV-EL7W-L835-CD1-U	LED 1960 lm	1	120	14	SURFACE WALL	CLOSET STRIP LIGHT WITH EMERGENCY BATTERY BACKUP	
F3	LITHONIA OR APPROVED EQUAL	WSQ LED P2 40K SR3 MVOLT DDBTXD	LED 3129 lm	1	120	29	SURFACE WALL	LED WALL PACK	FINISH TO BE SELECTED BY ARCHITECT
F4	HALO COMMERCIAL LITHONIA LIGHTOLIER ATLANTIC PRESCOLITE MAXILUME	PD610ED015/PDM6A835/61VC LDN6 35/15 LO6AR LSS MVOLT EZ1 P6RD15NZ10UVB W/P6RD835VB W/P6RDCC LED6-DLM15-35K-U-6LED10-SS LF6SL-6LFSL15L35K HH6-LED-1500L-DIM10-MVOLT-MD-35K-90/HH6-6501-CL-WH	LED 3500 KELVIN 1500 LUMENS 80 CRI	-	120	21	RECESSED	LED DOWNLIGHT WITH ALZAK TRIM	
F5	LIGHTWAY OR APPROVED EQUAL	MERW-616-LED-D-U-13w-3-CBA-BB10	LED 1484 lm	1	120	13	SURFACE WALL	ENTRY WALL SCONCE	
EG	SURELITE LITHONIA PROLITE LSI DUAL-LITE MAXILUME	SELW25XX AFN-DB-EXT DBEL-ACEM-W-SDT-CW CSN-DB-CT PGZ-HTR ELM-807-BZ	6W XENON INCLUDED	2	120	12	SURFACE WALL	EMERGENCY EGRESS LIGHT	FINISH TO BE SELECTED BY ARCHITECT
EM	SURELITE LITHONIA LIGHTOLIER LSI DUAL-LITE MAXILUME	SEL17 ELM2 E611W LTEM-WH EZ-2 ELM-LED-861	INCLUDED	2	120	5.4	SURFACE WALL	2-HEAD EM WALL PACK (SURFACE)	
EX1	SURELITE LITHONIA CHLORIDE LSI DUAL-LITE MAXILUME	APX7G LQM-S-W-3-G-EL-N ER55L3WG EX-G-U-WB-WH EVEUGWE ELX-603-G-W	INCLUDED	2	120	1.5	UNIVERSAL	UNIVERSAL MOUNT WITH EXTRA FACE PLATE FOR FIELD CONVERSION 1-2 FACE	NICKEL/CADMIUM BATTERY SINGLE FACE EXIT

LIGHT FIXTURE SCHEDULE - UNITS

FIXTURE NUMBER	FIXTURE MANUFACTURER	FIXTURE CATALOG #	LAMPS TYPE	LAMPS QTY.	FIXTURE VOLTS	FIXTURE WATTS	FIXTURE MOUNTING	DESCRIPTION	REMARKS
U1	LIGHTING SCIENCE SEAGULL LIGHTING LITON	LS GLP6 WW 120 WH S1 BX 14701S-15 LCMLD56-UE-T40	13W LED	1	120	13	SEMI RECESSED	DISK LIGHT	
U2	BROWNLEE LIGHTING KICHLER	5654-CBA-418G-ES 10610NI	18W GU24 13W GU24	4	120	72	SURFACE WALL	BATHROOM VANITY LIGHT	
U3	LEVITON ENGINEERED PRODUCTS ALLIED MOULDED	9860-BL 16530-15675 LH-21WP	13W GU24	1	120	13	SURFACE CEILING	13W GU-24 LAMP HOLDER	
U4	ACCESS LIGHTING BROWNLEE LIGHTING	C20302MGSATRFREN118B 7577-CBA-18Q-ES	18W GU24	1	120	18	SURFACE WALL	PORCH LIGHT	PROVIDE LAMP GUARD
U5	LUMENCIA OR APPROVED EQUAL	LLF9515-BSN	LED 3000 lm	1	120	32	PENDANT	PENDANT LIGHT	



ROYAL ENGINEERING

ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228

MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

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HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS

ELECTRICAL SCHEDULES

09/20/2019

E6.1

LOAD CALCULATIONS (PANEL METERING)

GROSS BUILDING AREA:			21960	SQ. FT
BUILDING VOLTAGE:			240	VOLTS
PHASE			1	PHASE
OCCUPANCY TYPE:			MULTIFAMILY	
RESIDENTIAL LOADS:				
UNIT TYPE: UNIT TYPE: 2BED TYPE 1	902	SQ. FT.	27250	VA
NUMBER OF UNIT TYPE: 2BED TYPE 1 UNITS	3			
UNIT TYPE: UNIT TYPE: 1BED TYPE 2	796	SQ. FT.	25372	VA
NUMBER OF UNIT TYPE: 1BED TYPE 2 UNITS	15			
Total Residential Load			462330	VA
Total Number Of Units			18	
Residential Load Demand Factor			38	%
Total Revised Residential Load			175685	VA
GENERAL LOADS:				
LIGHTING LOAD W/ 125% DEMAND:			1636	VA
RECEPTACLE LOAD:			5040	VA
FIRST 10,000 VA @ 100%			5,040	VA
REMAINDER @50%			-	VA
TOTAL LOAD:			5040	VA
SMALL APPLIANCE LOAD:			0	VA
KITCHEN EQUIPMENT			0	VA
MISC:			720	VA
TOTAL LOAD:			720	VA
HVAC LOADS:				
COOLING/HEATING			25104	VA
RESISTANCE HEATING:			3000	VA
EXHAUST:			0	VA
WATER HEATING:			1650	VA
TOTAL:			29754	VA
EQUIPMENT LOADS:				
MACHINERY:			0	VA
ELEVATOR:			0	VA
PUMPS:			0	VA
WELDERS:			0	VA
AIR COMPRESSORS:			0	VA
MOTORS			0	VA
NET COMPUTED LOAD			212835	VA
NET COMPUTED LOAD (VA ¸ VOLTS):			887	AMPS

SITE LIGHTING FIXTURE SCHEDULE

FIXT	FIXTURE						LAMPS		POLE			REMARKS
#	MANUFACTURER	CATALOG #	VOLTS	#/POLE	WATTS	MOUNTING	TYPE	QTY/FIXT.	MANUFACTURER	HEIGHT	CATALOG #	
S1	McGRAW-EDISON	GLEON-AF-02-LED-E1-T3-8030	240	1	129	POLE	LED	1	LITHONIA GARDCO MCGRAW SPAULDING LTG CMT UNITED LSI	20'-0"	SSS 20 4C SSS-20-4-11 SSS-4A20-SFXXX SSS-20-40-1-**-SCBA ZA20-4-0-HS-PC-BC RPSQ-20-4-11 4SQBX-S11G-20-X-4BC	

PANEL SCHEDULE "H"

VOLTAGE: 240 / 120 VOLTS — BUS RATING (AMPS): 225 — REMARKS:
MOUNTING: FLUSH — PHASE: 1 — MAIN LUGS ONLY
ENCLOSURE: NEMA 1 — WIRE: 3 — SHORT CIRCUIT RATING: SEE FAULT CURRENT TABLE

CIRCUIT BREAKER				CIRCUIT NAME	FEEDER			CKT. LOAD		LOAD/PHASE (VA)		CKT. LOAD		FEEDER			CIRCUIT NAME	CIRCUIT BREAKER			
No.	AMPS	POLE	MOD.		C	WIRE	GRD	DEMAND FACTOR	WATTS	ØA	ØB	WATTS	DEMAND FACTOR	GRD	WIRE	C		MOD.	POLE	AMPS	No.
1	20	1	-	STAIR LTG	¾"	#12	#12	1.25	155	1,055		900	1.00	#12	#12	¾"	LEVEL 2 CORRIDOR REC	-	1	20	2
3	20	1	-	LEVEL 1 CORRIDOR REC	¾"	#12	#12	1.00	1,080		2,160	1,080	1.00	#12	#12	¾"	LEVEL 3 CORRIDOR REC	-	1	20	4
5	20	1	-	F-2	¾"	#12	#12	1.00	1,200	1,380		180	1.00	#12	#12	¾"	EXTERIOR REC	-	1	20	6
7	20	1	-	TERMINAL BOARD REC	¾"	#12	#12	1.00	360		1,560	1,200	1.00	#12	#12	¾"	F-2	-	1	20	8
9	20	1	RED	FACP	¾"	#12	#12	1.00	180	3,780		3,600	1.00	#10	#8	¾"	HPO-3	-	2	40	10
11	20	1	RED	RFAA	¾"	#12	#12	1.00	180		3,780	3,600	1.00	-	#8	-	-	-	-	-	12
13	20	1	RED	FIRE SPRINKLER BELL	¾"	#12	#12	1.00	180	2,256		2,076	1.00	#10	#10	¾"	CU-2	-	2	30	14
15	20	1	RED	NAC PANELS	¾"	#12	#12	1.00	180		2,256	2,076	1.00	-	#10	-	-	-	-	-	16
17	20	1	-	ROOF TOP REC	¾"	#12	#12	1.00	720	2,796		2,076	1.00	#10	#10	¾"	CU-2	-	2	30	18
19	20	1	-	WH-2	¾"	#12	#12	1.00	1,650		3,726	2,076	1.00	-	#10	-	-	-	-	-	20
21	20	1	-	BUILDING WALL PACKS	¾"	#10	#10	1.25	277	3,877		3,600	1.00	#10	#8	¾"	HPO-3	-	2	40	22
23	20	1	-	IRR CONTROLLER	¾"	#12	#12	1.00	180		3,780	3,600	1.00	-	#8	-	-	-	-	-	24
25	20	1	-	EWH-1	¾"	#12	#12	1.00	1,500	1,500			1.00			1"	SPARE	-	2	20	26
27	20	1	-	SPARE				1.00			0		1.00	-		-	-	-	-	-	28
29	20	2	-	PARKING LOT LTG	1"	#10	#10	1.25	323	1,823		1,500	1.00	#12	#12	¾"	ROOF DRAIN HEAT TAPE	GFEP	1	20	30
31	-	-	-	-	-	#10	-	1.25	323		1,823	1,500	1.00	#12	#12	¾"	ROOF DRAIN HEAT TAPE	GFEP	1	20	32
33	20	1	-	UPS	¾"	#12	#12	1.00	180	308		128	1.25	#12	#12	¾"	LEVEL 1 CORRIDOR LTG	-	1	20	34
35	20	1	-	DVR	¾"	#12	#12	1.00	180		308	128	1.25	#12	#12	¾"	LEVEL 2 CORRIDOR LTG	-	1	20	36
37	20	1	-	POE SWITCH	¾"	#12	#12	1.00	180	297		117	1.25	#12	#12	¾"	LEVEL 3 CORRIDOR LTG	-	1	20	38
39	20	1	-	STAIR LTG	¾"	#12	#12	1.25	186		186		1.00				SPACE	-			40
41			-	SPACE				1.00		0			1.00				SPACE	-			42

NOTES :

1. ALL INSULATION ON CONDUCTORS TO BE THHN UNLESS NOTED OTHERWISE. INSULATION ON ALL UNDERGROUND EXTERIOR CONDUCTORS SHALL BE THHW.
2. LOAD DEMANDS CALCULATED AS PER SECTIONS 210 & 220 OF THE NATIONAL ELECTRICAL CODE.
3. PANEL COVER SHALL BE FIELD MARKED FOR FLASH PROTECTION WITH A PERMANENT LABEL AS REQUIRED BY THE NATIONAL ELECTRICAL CODE SECTION 110. LABEL SHALL READ: "DANGER: POTENTIAL ARC FLASH HAZARD"
4. E.C. SHALL COORDINATE WITH HVAC CONTRACTOR FOR PLACEMENT OF PANEL EFFICIENCY CERTIFICATES PER IECC R401.3
5. FIRE ALARM SYSTEMS SHALL HAVE BRANCH CIRCUITS IDENTIFIED BY RED LABELS STATING "FIRE ALARM CIRCUIT" AS REQUIRED BY THE NATIONAL ELECTRICAL CODE ARTICLE 760.41B
6. ABBREVIATIONS: CO-CONVENIENCE OUTLET, RR-RESTROOM, (N)ORTH, (S)OUTH, (E)AST, (W)EST.

ØA	ØB	TOTALS	
19,072	19,579	38,650	CONNECTED LOAD (VA)
		161	CONNECTED LOAD (A)
250	159	409	DEMAND FACTOR ADJUSTMENTS (VA)
19,321	19,738	39,059	TOTAL LOAD (VA)
161	164		TOTAL LOAD (A)
		164	MAXIMUM LOAD (A)
49%	51%		PHASE BALANCE

LOAD CENTER SCHEDULE "A"

VOLTAGE: 240 / 120 VOLTS — BUS RATING (AMPS): 100 — REMARKS:
MOUNTING: FLUSH — PHASE: 1 — MAIN LUGS ONLY
ENCLOSURE: NEMA 1 — WIRE: 3 — SHORT CIRCUIT RATING: SEE FAULT CURRENT TABLE

CIRCUIT BREAKER				CIRCUIT NAME			CKT. LOAD		LOAD/PHASE (VA)		CKT. LOAD		FEEDER		CIRCUIT NAME	CIRCUIT BREAKER			
No.	AMPS	POLE	MOD.		WIRE	GRD	DEMAND FACTOR	WATTS	ØA	ØB	WATTS	DEMAND FACTOR	GRD	WIRE		MOD.	POLE	AMPS	No.
1	15	1	AFCI	LIVING/KITCHEN/HALL LTG/REC	#14	#14	1.00	1,429	2,629		1,200	1.00	#12	#12	REFRIGERATOR	GFAF	1	20	2
3	15	1	AFCI	BEDROOM LTG/REC	#14	#14	1.00	1,137		2,337	1,200	1.00	#12	#12	RANGE HOOD	GFAF	1	20	4
5	15	1	AFCI	BEDROOM LTG/REC	#14	#14	1.00	1,330	5,330		4,000	1.00	#10	#8	RANGE	-	2	50	6
7	20	1	-	BATH REC	#12	#12	1.00	180		4,180	4,000	1.00	-	#8	-	-	-	-	8
9	20	1	-	BATH REC	#12	#12	1.00	180	1,380		1,200	1.00	#14	#14	FURNACE	-	1	15	10
11	30	2	-	DRYER	#10	#10	1.00	2,500		3,700	1,200	1.00	#12	#12	DISHWASHER/DISPOSAL	GFAF	1	20	12
13	-	-	-	-	#10	-	1.00	2,500	4,576		2,076	1.00	#10	#12	CONDENSING UNIT	-	2	30	14
15	20	1	GFAF	WASHER	#12	#12	1.00	1,200		3,276	2,076	1.00	-	#12	-	-	-	-	16
17	20	1	AFCI	DINING REC	#12	#12	1.00	180	180			1.00			SPARE	-	1	20	18
19	20	1	GFAF	KITCHEN COUNTER REC	#12	#12	1.00	1,500		1,500		1.00			SPARE	-	1	20	20
21	20	1	GFAF	KITCHEN COUNTER REC	#12	#12	1.00	1,500	1,500			1.00			SPARE	-	1	20	22
23	15	1	AFCI	MEDIA ENCLOSURE	#14	#14	1.00	180		180		1.00			SPARE	-	1	20	24

NOTES :

* TOTAL LOAD REFLECTS TOTAL CALCULATED LOAD. SEE ELECTRICAL LOAD CALCULATIONS FOR NEC 220 SECTION IV OPTIONAL METHOD CALCULATION FOR SERVICE SIZE CALCULATION.

GFAF DUAL FUNCTION AFCI/GFCI CIRCUIT BREAKER

ØA	ØB	TOTALS	
15,595	15,173	30,768	CONNECTED LOAD (VA)
		128	CONNECTED LOAD (A)
		84	TOTAL LOAD (A)*
51%	49%		PHASE BALANCE

LOAD CENTER SCHEDULE "B"

VOLTAGE: 240 / 120 VOLTS — BUS RATING (AMPS): 100 — REMARKS:
MOUNTING: FLUSH — PHASE: 1 — MAIN LUGS ONLY
ENCLOSURE: NEMA 1 — WIRE: 3 — SHORT CIRCUIT RATING: SEE FAULT CURRENT TABLE

CIRCUIT BREAKER				CIRCUIT NAME			CKT. LOAD		LOAD/PHASE (VA)		CKT. LOAD		FEEDER		CIRCUIT NAME	CIRCUIT BREAKER			
No.	AMPS	POLE	MOD.		WIRE	GRD	DEMAND FACTOR	WATTS	ØA	ØB	WATTS	DEMAND FACTOR	GRD	WIRE		MOD.	POLE	AMPS	No.
1	20	1	AFCI	LIVING/KITCHEN/HALL LTG/REC	#12	#12	1.00	1,484	2,684		1,200	1.00	#12	#12	REFRIGERATOR	GFAF	1	20	2
3	15	1	AFCI	BEDROOM LTG/REC	#14	#14	1.00	1,330		2,530	1,200	1.00	#12	#12	RANGE HOOD	GFAF	1	20	4
5	20	1	-	SPARE			1.00		4,000		4,000	1.00	#10	#8	RANGE	-	2	50	6
7	20	1	-	BATH REC	#12	#12	1.00	180		4,180	4,000	1.00	-	#8	-	-	-	-	8
9	20	1	-	SPARE			1.00		960		960	1.00	#14	#14	FURNACE	-	1	15	10
11	30	2	-	DRYER	#10	#10	1.00	2,500		3,700	1,200	1.00	#12	#12	DISHWASHER/DISPOSAL	GFAF	1	20	12
13	-	-	-	-	#10	-	1.00	2,500	3,916		1,416	1.00	#10	#12	CONDENSING UNIT	-	2	20	14
15	20	1	GFAF	WASHER	#12	#12	1.00	1,200		2,616	1,416	1.00	-	#12	-	-	-	-	16
17	20	1	AFCI	DINING REC	#12	#12	1.00	180	180			1.00			SPARE	-	1	20	18
19	20	1	GFAF	KITCHEN COUNTER REC	#12	#12	1.00	1,500		1,500		1.00			SPARE	-	1	20	20
21	20	1	GFAF	KITCHEN COUNTER REC	#12	#12	1.00	1,500	1,500			1.00			SPARE	-	1	20	22
23	15	1	AFCI	MEDIA ENCLOSURE REC	#14	#14	1.00	180		180		1.00			SPARE	-	1	20	24

NOTES :

* TOTAL LOAD REFLECTS TOTAL CALCULATED LOAD. SEE ELECTRICAL LOAD CALCULATIONS FOR NEC 220 SECTION IV OPTIONAL METHOD CALCULATION FOR SERVICE SIZE CALCULATION.

GFAF DUAL FUNCTION AFCI/GFCI CIRCUIT BREAKER

ØA	ØB	TOTALS	
13,240	14,706	27,946	CONNECTED LOAD (VA)
		116	CONNECTED LOAD (A)
		77	TOTAL LOAD (A)*
47%	53%		PHASE BALANCE

REGISTERED PROFESSIONAL ENGINEER
1138139
M. RYAN BEAGLES
9/20/19
STATE OF UTAH

ROYAL ENGINEERING
ELECTRICAL — MECHANICAL
1837 S. EAST BAY BLVD.
PROVO, UTAH 84606
PHONE: 801.375.2228
FAX: 801.375.2676

 JOB# J19141.00 DATE PLOTTED: 09/20/2019

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DRAWN BY
BK

HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS

ELECTRICAL SCHEDULES

09/20/2019

E6.2

ELECTRICAL SPECIFICATIONS

GENERAL PROVISION

A. REFERENCE
1. THE GENERAL CONDITIONS AND OTHER CONTRACT DRAWINGS AS SET FORTH IN THE FOREGOING PAGES ARE HEREBY INCORPORATED INTO AND BECOME A PART OF THE SPECIFICATIONS FOR WORK UNDER THIS TITLE, INSOFAR AS THEY APPLY HERETO.
2. ALL SPECIFICATIONS UNDER THIS DIVISION TITLE ARE DIRECTED TO AND ARE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR, UNLESS OTHER TRADES OR PERSONS ARE SPECIFICALLY MENTIONED, "ELECTRICAL CONTRACTOR" IS INFERRED AND INTENDED.

B. CONTRACT DRAWINGS
1. THE DRAWINGS ACCOMPANYING THESE SPECIFICATIONS ARE COMPLEMENTARY EACH TO THE OTHER AND WHAT IS CALLED FOR BY ONE SHALL BE AS IF CALLED FOR BY BOTH.
2. CONSULT ALL CONTRACT DRAWINGS WHICH MAY AFFECT THE LOCATION OF EQUIPMENT, CONDUIT AND WIRING AND MAKE MINOR ADJUSTMENTS IN LOCATION TO SECURE COORDINATION.
3. WIRING LAYOUT IS SCHEMATIC AND EXACT LOCATIONS SHALL BE DETERMINED BY FIELD CONDITIONS.
4. OTHER THAN MINOR ADJUSTMENTS SHALL BE SUBMITTED TO THE OWNER'S REPRESENTATIVE FOR APPROVAL BEFORE PROCEEDING WITH THE WORK.

C. JOB-SITE COPY OF DOCUMENTS
1. MAINTAIN AT THE SITE, ONE COPY OF ALL DRAWINGS, SPECIFICATIONS, ADDENDA APPROVED SHOP DRAWINGS, CHANGE ORDERS AND OTHER MODIFICATIONS, IN GOOD ORDER AND MARKED TO RECORD ALL CHANGES MADE DURING CONSTRUCTION. THESE SHALL BE AVAILABLE TO THE OWNER'S REPRESENTATIVE. THE DRAWINGS MARKED TO RECORD ALL CHANGES MADE DURING CONSTRUCTION SHALL BE DELIVERED TO THE OWNER'S REPRESENTATIVE FOR THE OWNER UPON COMPLETION OF THE WORK. AN ADDITIONAL SET OF DRAWINGS WILL BE FURNISHED BY THE OWNER'S REPRESENTATIVE FOR THIS PURPOSE UPON REQUEST.

D. MANUFACTURER'S DRAWINGS
1. THE CONTRACTOR SHALL SUBMIT TO THE ARCHITECT FOR REVIEW. (6) COPIES OF MANUFACTURER'S DRAWINGS AND WIRING DIAGRAMS. THE ENGINEER WILL REVIEW CONTRACTOR'S SHOP DRAWINGS AND RELATED SUBMITTALS (AS INDICATED BELOW) WITH RESPECT TO THE ABILITY OF THE DETAILED WORK, WHEN COMPLETE, TO BE A PROPERLY FUNCTIONING INTEGRAL ELEMENT OF THE OVERALL SYSTEM DESIGNED BY THE ENGINEER. BEFORE SUBMITTING A SHOP DRAWING OR ANY RELATED MATERIAL TO THE ENGINEER, CONTRACTOR SHALL: REVIEW EACH SUCH SUBMISSION FOR CONFORMANCE WITH THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND OPERATIONS OF CONSTRUCTION, AND SAFETY PRECAUTIONS AND PROGRAMS INCIDENTAL THERETO, ALL OF WHICH ARE THE SOLE RESPONSIBILITY OF CONTRACTOR: APPROVE EACH SUCH SUBMISSION BEFORE SUBMITTING IT; AND SO STAMP EACH SUCH SUBMISSION BEFORE SUBMITTING IT. THE ENGINEER SHALL ASSUME THAT NO SHOP DRAWING OR RELATED SUBMITTAL COMPRISES A VARIATION UNLESS CONTRACTOR ADVISES ENGINEER OTHERWISE VIA A WRITTEN INSTRUMENT WHICH IS ACKNOWLEDGED BY ENGINEER IN WRITING. THE ITEMS, TYPES OF SUBMITTALS AND RELATED MATERIAL (IF ANY) CALLED FOR ARE INDICATED BELOW:

ITEMS	TYPE SUBMITTALS REQUESTED
LIGHTING AND POWER PANELS	SHOP DRAWINGS
LIGHTING FIXTURES	CATALOG CUTS

E. GUARANTEES
1. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEFECTS, REPAIRS AND REPLACEMENTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR AFTER DATE OF SUBSTANTIAL COMPLETION AS DETERMINED BY THE OWNER'S REPRESENTATIVE. PRODUCT GUARANTEES GREATER THAN ONE (1) YEAR SHALL BE PASSED ALONG TO THE OWNER FOR FULL BENEFIT OF THE MANUFACTURER'S WARRANTY.

WORK INCLUDED

A. INSTALLATION, MATERIALS, AND WORKMANSHIP
1. FURNISH AND INSTALL ALL NECESSARY ANCHORS, SUPPORTS, STRAPS, BOXES, FITTINGS AND OTHER SIMILAR APPURTENANCES NOT INDICATED ON THE DRAWINGS BUT WHICH ARE REQUIRED FOR A COMPLETE AND PROPERLY INSTALLED SYSTEM CONSISTENT WITH THE ARCHITECTURAL TREATMENT OF THE BUILDING.
2. THE ELECTRICAL CONTRACTOR, INSOFAR AS THE WORK IS CONCERNED, SHALL AT ALL TIMES KEEP THE PREMISES IN A NEAT AND ORDERLY CONDITION. AND AT THE COMPLETION OF THE WORK, SHALL PROPERLY CLEAN UP AND CART AWAY DEBRIS AND EXCESS MATERIALS. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF DUMPSTER & REFUSED DISPOSAL AS REQUIRED FOR ELECTRICAL WORK.
3. ALL MATERIALS SHALL BE NEW AND UNDETERIORATED AND OF A QUALITY NOT LESS THAN THE MINIMUM SPECIFIED.

B. COORDINATION OF PLANS AND SPECIFICATIONS
1. CONTACT THE OWNER'S REPRESENTATIVE IMMEDIATELY IF THERE IS ANY QUESTIONS REGARDING THE MEANING OR INTENT OF EITHER PLANS OR SPECIFICATIONS, OR UPON NOTICING ANY DISCREPANCIES OR OMISSIONS IN EITHER PLANS OR SPECIFICATIONS.

C. CUTTING AND PATCHING
1. ALL ELECTRICAL EQUIPMENT SHALL BE KEPT DRY AND CLEAN DURING THE CONSTRUCTION PERIOD. INTERIOR OF ALL ENCLOSURES SHALL BE CLEANED OF DIRT AND DEBRIS BEFORE INSTALLING TRIM OR COVERS.
2. ALL FINISHED SURFACES OF EQUIPMENT FURNISHED UNDER THIS CONTRACT SHALL BE THOROUGHLY CLEANED OF DIRT AND ALL SCRATCHED OR DAMAGED SURFACES SHALL BE TOUCHED UP WITH MATCHING MATERIALS BEFORE FINAL ACCEPTANCE OF THE WORK.
3. WHEN ALL WORK IS COMPLETED AND ALL WORK HAS BEEN SATISFACTORILY TESTED AND ACCEPTED BY THE OWNER'S REPRESENTATIVE, ALL CONDUIT AND OTHER EXPOSED SURFACES SHALL BE THOROUGHLY CLEANED.

CODES AND FEES

A. CODES:
1. ALL WORK PERFORMED UNDER THIS SPECIFICATION SHALL BE DONE IN ACCORDANCE WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE AS PREPARED AND PUBLISHED BY THE NATIONAL FIRE PROTECTION ASSOCIATION AND ANY APPLICABLE STATE OR LOCAL CODES.

B. FEES:
1. OBTAIN AND PAY FOR ANY AND ALL PERMITS REQUIRED BY ALL LAWS AND REGULATIONS AND PUBLIC AUTHORITY HAVING SUCH JURISDICTION.

TESTS AND INSPECTIONS

A. OBTAIN ALL INSPECTIONS REQUIRED BY ALL LAWS, ORDINANCES, RULES, REGULATIONS OR PUBLIC AUTHORITY HAVING JURISDICTION AND OBTAIN CERTIFICATES OF SUCH INSPECTIONS AND SUBMIT SAME TO THE OWNER'S REPRESENTATIVE. PAY ALL FEES, CHARGES AND OTHER EXPENSES IN CONNECTION THEREIN. OBTAIN OCCUPANCY PERMIT AS REQUIRED BY OWNER. FINAL PAYMENT SHALL NOT BE MADE UNTIL OCCUPANCY PERMIT IS OBTAINED.
B. WORK SHALL BE UNACCEPTABLE WHEN FOUND TO BE DEFECTIVE OR CONTRARY TO THE PLANS SPECIFICATIONS, CODES SPECIFIED OR ACCEPTED STANDARDS OF GOOD WORKMANSHIP.
C. THE CONTRACTOR SHALL PROMPTLY CORRECT ALL WORK FOUND UNACCEPTABLE BY THE OWNER'S REPRESENTATIVE WHETHER OBSERVED BEFORE OR AFTER SUBSTANTIAL COMPLETION AND WHETHER OR NOT FABRICATED, INSTALLED OR COMPLETED. THE CONTRACTOR SHALL BEAR ALL COSTS OF CORRECTING SUCH UNACCEPTABLE WORK, INCLUDING COMPENSATION FOR THE OWNERS REPRESENTATIVE ADDITIONAL SERVICES MADE NECESSARY THEREBY.

CONDUIT

A. FURNISH AND INSTALL ALL CONDUITS, BOXES, FITTINGS, ETC., FOR A COMPLETE RACEWAY SYSTEM.
B. ALL WIRING SHALL BE RUN IN EMT CONDUIT OR TYPE NM OR MC CABLE OR WITH GROUND CONDUCTOR UNLESS OTHERWISE NOTED.
C. ALL CONDUIT SIZES STATED HEREIN OR MARKED ON THE DRAWINGS ARE MINIMUM SIZE AND SHALL BE NO LESS THAN ½" UNLESS OTHERWISE NOTED.
D. ALL CONDUIT SHALL BE SUBSTANTIALLY SUPPORTED BY PIPE STRAPS OR SUITABLE CLAMPS OR HANGERS ATTACHED TO THE ELEMENTS OF THE BUILDING STRUCTURE TO PROVIDE RIGID INSTALLATION; IN NO CASE SHALL CONDUIT BE ATTACHED OR SUPPORTED FROM ADJOINING PIPE OR INSTALLED IN SUCH A MANNER AS TO PREVENT THE READY REMOVAL OF OTHER PIPE FOR REPAIRS.

WIRE AND CABLE

A. ALL CONDUCTORS SHALL BE COPPER AND OF THE AWG SIZE AND TYPE SHOWN ON THE DRAWINGS. WHERE NO SIZE OR TYPE IS SHOWN. CONDUCTORS SHALL NOT BE LESS THAN #12 TYPE XHHW, THHN, OR THWN. CONDUCTORS #8 AWG AND LARGER SHALL BE STRANDED COPPER AND HAVE 600 VOLT INSULATION; BE UL LABELED AND OF AMERICAN MANUFACTURER.
B. ALL CONNECTIONS ARE TO BE MADE USING PRESSURE TYPE TERMINALS.
C. THE FOLLOWING COLOR CODE SHALL BE USED:

	120/240 VOLT	120/208 VOLT	277/480 VOLT
PHASE A	BLACK	BLACK	BROWN
PHASE B	RED	RED	ORANGE
PHASE C		BLUE	YELLOW
NEUTRAL	WHITE	WHITE	WHITE
GROUND	GREEN	GREEN	GREEN

D. CONDUCTORS NO. 10 AWG OR SMALLER SHALL HAVE INSULATION COLORED AS NOTED ABOVE.
E. CONDUCTORS NO. 8 AWG OR LARGER SHALL HAVE INSULATION COLORED AS NOTED ABOVE OR COLORED TAPE, MINIMUM SIZE ½", WRAPPED TWICE AROUND AT THE FOLLOWING POINTS:
1. AT EACH TERMINAL
2. AT EACH CONDUIT ENTRANCE
3. AT INTERVALS NOT MORE THAN 12 INCHES APART IN ALL BOXES, PANEL TUBS, SWITCHBOARDS, ETC
F. ALL BRANCH CIRCUITS SHALL BE MARKED IN THE PANEL BOARD GUTTERS. MARKERS SHALL INDICATE CORRESPONDING BRANCH--CIRCUIT NUMBERS.
G. EACH BRANCH CIRCUIT REQUIRING A NEUTRAL SHALL BE FURNISHED WITH A SEPARATE INDIVIDUAL NEUTRAL CONDUCTOR.

BOXES AND PLATES

A. FURNISH AND INSTALL ALL OUTLET, JUNCTION, AND PULL BOXES AS INDICATED ON THE DRAWINGS AND AS NECESSARY TO INSTALL THE REQUIRED CONDUIT AND WIRING IN A NEAT AND WORKMANLIKE MANNER.
B. PULL BOXES AND JUNCTION BOXES SHALL BE GALVANIZED OR PLASTIC AND OF THE CORRECT SIZE AND GAUGE, SIZED IN ACCORDANCE WITH CODE REQUIREMENTS AND SHALL BE U.L. LABELED.
C. BOXES AT EXTERIOR AREAS TO BE WATERTIGHT AND DUST-TIGHT WITH GASKETED COVERS.
D. ALL BOXES FOR EXPOSED WORK IN FINISHED SPACES SHALL BE "FS" TYPE WITH THREADED HUBS WITH RIGID CONDUIT RISER (DEEP WIRE MOLD BOXES)
E. ALL BOXES SHALL BE RIGIDLY SUPPORTED INDEPENDENT OF THE CONDUIT SYSTEM. BOXES CAST INTO MASONRY OR CONCRETE ARE CONSIDERED TO BE RIGIDLY SUPPORTED.
F. FLOOR BOXES:
1. DESCRIPTION: FLOOR BOXES COMPATIBLE WITH FLOOR BOX SERVICE FITTINGS PROVIDED IN ACCORDANCE WITH THE WIRING DEVICES SECTION OF THIS SPECIFICATION; WITH PARTITIONS TO SEPARATE MULTIPLE SERVICES; FURNISHED WITH ALL COMPONENTS, ADAPTERS, AND TRIMS REQUIRED FOR COMPLETE INSTALLATION.
2. USE CAST IRON OR NONMETALLIC FLOOR BOXES WITHIN SLAB ON GRADE.
3. USE SHEET-STEEL, CAST IRON, OR NONMETALLIC FLOOR BOXES WITHIN SLAB ABOVE GRADE.
4. METALLIC FLOOR BOXES: FULLY ADJUSTABLE (WITH INTEGRAL MEANS FOR LEVELING ADJUSTMENT PRIOR TO AND AFTER CONCRETE POUR).
5. MANUFACTURER: SAME AS MANUFACTURER OF FLOOR BOX SERVICE FITTINGS.

G. UNDERGROUND BOXES/ENCLOSURES:
1. DESCRIPTION: IN-GROUND, OPEN BOTTOM BOXES FURNISHED WITH FLUSH, NON-SKID COVERS WITH LEGEND INDICATING TYPE OF SERVICE AND STAINLESS STEEL TAMPER RESISTANT COVER BOLTS.
2. SIZE: AS INDICATED ON DRAWINGS.
3. DEPTH: AS REQUIRED TO EXTEND BELOW FROST LINE TO PREVENT FROST UPHEAVAL, BUT NOT LESS THAN 12 INCHES.
4. APPLICATIONS:
   a. SIDEWALKS AND LANDSCAPED AREAS SUBJECT ONLY TO OCCASIONAL NONDELIBERATE VEHICULAR TRAFFIC: USE POLYMER CONCRETE OR COMPOSITE ENCLOSURE WITH MINIMUM SCTE 77, TIER 8 LOAD RATING.
   b. PARKING LOTS, IN AREAS SUBJECT ONLY TO OCCASIONAL NONDELIBERATE VEHICULAR TRAFFIC: USE POLYMER CONCRETE OR COMPOSITE ENCLOSURE WITH MINIMUM SCTE 77, TIER 15 LOAD RATING.
   c. DO NOT USE POLYMER CONCRETE ENCLOSURES IN AREAS SUBJECT TO DELIBERATE VEHICULAR TRAFFIC.

H. COMPOSITE UNDERGROUND BOXES/ENCLOSURES: COMPLY WITH SCTE 77.

WIRING DEVICES

A. WIRING DEVICES SHALL BE SIMILAR TO THOSE LISTED BELOW AND OF SPECIFIED AMPERAGE. OTHER SPECIAL PURPOSE DEVICES SHALL BE AS SPECIFIED ON THE DRAWINGS.
B. DUPLEX GROUNDING TYPE RECEPTACLE--20 AMP, 125 VOLT--
1. LEVITON TWR20-X TAMPER RESISTANT
2. OR APPROVED EQUAL
C. SINGLE POLE SWITCHES - 20 AMP, 120 VOLT
D. WEATHERPROOF RECEPTACLES - 20 AMP, 125 VOLT--NEMA 5--20R
1. HUBBELL--5352 WITH 5205 COVER INTERMATIC GUARDIAN
2. I SERIES, NEMA 3R COVER
3. ARROW HART--5352 WITH 4500 COVER
E. G.F.C.I. RECEPTACLE- 20 AMP, 125 VOLT--NEMA 5-20 R
1. LEVITON T7599-X TAMPER RESISTANT WITH MATCHING NYLON COVER PLATE OR WO-26 W.P. COVER
F. GROUND ALL RECEPTACLES IN ACCORDANCE WITH ARTICLE 250-146 OF NEC AND AS INDICATED IN THE GROUNDING SECTION OF THIS SPECIFICATION.

IDENTIFICATION

A. EACH PIECE OF SERVICE EQUIPMENT AND INDIVIDUAL SWITCHES, ALL DISCONNECTS, STARTERS, ALL EXHAUST FAN MANUAL STARTING SWITCHES.
B. IDENTIFICATION SHALL BE IN THE FORM OF LAMINATED PLASTIC NAMEPLATES, BLACK RACE, WITH THE LETTERS ENGRAVED INTO THE WHITE BACKGROUND, MINIMUM ¼" HIGH. PLATES SHALL BE DRILLED ON EACH END FOR SHEET METAL SCREW ATTACHMENT. NO "DYMO" OR SIMILAR TYPE LABELS WILL BE ALLOWED.
C. PANEL BOARD DIRECTORY: A TYPED CIRCUIT DIRECTORY SHALL BE PROVIDED INDICATING LOCAL AREA SERVED AND LOCATION FOR EACH BRANCH CIRCUIT.

GROUNDING

A. ALL FEEDERS AND BRANCH CIRCUITS OVER 100 VOLTS SHALL INCLUDE A GROUNDING CONDUCTOR SIZED IN ACCORDANCE WITH NEC TABLE 250.122, EXCEPT NOT BE SMALLER THAN #12 FOR POWER AND LIGHTING CIRCUITS AND #14 FOR CONTROL CIRCUITS. ALL GROUND CONDUCTORS SHALL BE GREEN AS SPECIFIED UNDER THE WIRE AND CABLE SECTION OF THIS SPECIFICATION, OR IN ACCORDANCE WITH NEC SECTION 200.6.
B. ALL GROUND CLAMPS SHALL BE PENN-UNION "GPL" TYPE OR SIMILAR BY O.Z. OR BURNDY.
C. CONDUIT FOR SOLITARY GROUND CONDUCTORS SHALL BE RIGID SCHEDULE 40 PVC NON- METALLIC ELECTRICAL CONDUIT WITH U.L. LABEL SOLITARY GROUND CONDUCTORS SHALL NOT BE PLACED THROUGH METALLIC SLEEVES OR CONDUITS AND SHALL NOT BE COMPLETELY ENCIRCLED BY METALLIC HANGERS OR SUPPORTS.
D. THE GROUND CONDUCTOR SHALL BE CONNECTED TO THE NEUTRAL IN ONLY TWO LOCATIONS -ON THE SUPPLY SIDE OF THE SERVICE DISCONNECT MEANS PER NEC--250--24 AND ON SEPARATELY DERIVED SYSTEMS PER NEC 250-30.
E. AT EACH RECEPTACLE BOX, THE GROUND CONDUCTOR SHALL ENTER AND CONNECT, WITH NORMAL WIRING CONNECTOR, TO: 1) THE GROUND PIGTAIL TO RECEPTACLE: 2) THE GROUND PIGTAIL TO THE BOX GROUND SCREW; AND 3) THE OUTGOING GROUND CONDUCTOR TO NEXT DEVICE, IF NOT AT END OF RUN. METAL TO METAL CONTACT BETWEEN THE DEVICE YOKE AND THE OUTLET BOX IS NOT ACCEPTABLE AS A BOND FOR EITHER SURFACE. MOUNTED BOXES OR FLUSH TYPE BOXES.
F. CONDUIT SYSTEM SHALL BE ELECTRICALLY CONTINUOUS. ALL LOCK NUTS SHALL CUT THROUGH ENAMELED OR PAINTED SURFACES ON ENCLOSURES. WHERE ENCLOSURES AND NON-CURRENT CARRYING METALS ARE ISOLATED FROM THE CONDUIT SYSTEM, USE BONDING JUMPERS WITH APPROVED CLAMPS. WHERE REDUCING WASHERS ARE USED AND WHERE CONCENTRIC OR ECCENTRIC KNOCKOUTS ARE NOT COMPLETELY REMOVED BONDING BUSHINGS SHALL BE REQUIRED.

POWER AND LIGHTING PANELS

A. FURNISH AND INSTALL, AS SCHEDULED AND SHOWN ON THE DRAWINGS, POWER PANELS FOR OPERATION ON VOLTAGES INDICATED.
B. ALL TERMINATIONS SHALL BE MARKED "75'C ONLY", "60/75' C" OR LISTED FOR USE OF 75' C INSULATED CONDUCTORS AT FULL 75' C AMPACITY.
C. ALL BUS BARS SHALL BE SILVER OR TIN PLATED COPPER.
D. CABINETS SHALL BE OF COMMERCIAL GALVANIZED SHEET STEEL, CODE GAUGE AND SIZE, SURFACE OR RECESSED MOUNTED AS CALLED FOR IN THE DRAWINGS.
E. NEUTRAL ASSEMBLY SHALL HAVE INDIVIDUAL ANTI-TURN SOLDERLESS TERMINALS, SIMILAR TO SQUARE D TYPE PK, FOR CONNECTION OF ULTIMATE NUMBER OF NEUTRAL WIRES. SHEET METAL TERMINAL STRIPS AND CONNECTIONS WILL BE REJECTED.
F. PANEL SHALL HAVE A COPPER GROUND BAR SIMILAR TO NEUTRAL BAR IN NUMBER, SIZE, AND TYPE OF ANTI-TURN SOLDERLESS LUGS. THIS GROUND BAR SHALL BE FACTORY BONDED TO THE PANEL TUB IN THE GUTTER SPACE OPPOSITE THE MAINS AND THE NEUTRAL ASSEMBLY AND SHALL HAVE THE SCREWDRIVER SLOTS FACING THE FRONT OF THE PANEL.
G. QUALITY STANDARD: SQUARE D TYPE QO OR HOMELINE

LIGHTING FIXTURES

A. CONTRACTOR SHALL FURNISH AND INSTALL LIGHTING FIXTURES AS INDICATED IN FIXTURE SCHEDULE SHOWN ON DRAWINGS, AND SPECIFIED HEREIN.
B. NEUTRAL ASSEMBLY SHALL HAVE INDIVIDUAL ANTI-TURN SOLDERLESS TERMINALS, SIMILAR TO SQUARE D TYPE PK, FOR CONNECTION OF ULTIMATE NUMBER OF NEUTRAL WIRES. SHEET METAL TERMINAL STRIPS AND CONNECTIONS WILL BE REJECTED.
C. ALL LIGHTING FIXTURES INSTALLED BY THE ELECTRICAL CONTRACTOR SHALL BE FURNISHED COMPLETE WITH AS INDICATED ON THE FIXTURE SCHEDULE.
D. ANY LIGHTING FIXTURES SCRATCHED, BENT, CRACKED OR IN ANY WAY DAMAGED BEFORE ACCEPTANCE BY OWNER SHALL BE REPLACED AT THIS CONTRACTOR'S EXPENSE.
E. ALL LIGHTING FIXTURES SHALL BE IN WORKING ORDER AT THE TIME OF FINAL ACCEPTANCE OF THE WORK BY THE OWNER.
F. ALL LIGHTING FIXTURES ARE TO BE GROUNDED ON THE INTERIOR OF THE FIXTURE HOUSING, ON CLEAN BARE METAL (FREE OF PAINT). BY USE OF PIGTAIL AND FASTENED BY A SCREW USED FOR NO OTHER PURPOSE.

ALARM & DETECTION SYSTEMS

A. SUMMARY
1. INCLUDES BUT NOT LIMITED TO: FURNISH AND INSTALL MICROPROCESSOR-CONTROLLED, INTELLIGENT REPORTING FIRE ALARM EQUIPMENT REQUIRED TO FORM A COMPLETE COORDINATED SYSTEM THAT IS READY FOR OPERATION.

B. SYSTEM DESCRIPTION
1. THE FIRE ALARM SYSTEM SHALL COMPLY WITH REQUIREMENTS OF NFPA STANDARD NO. 72 FOR PROTECTED PREMISES SIGNALING SYSTEMS EXCEPT AS MODIFIED AND SUPPLEMENTED BY THIS SPECIFICATION. THE SYSTEM SHALL BE ELECTRICALLY SUPERVISED AND MONITOR THE INTEGRITY OF ALL CONDUCTORS.
2. THE SYSTEM SHALL BE AN ACTIVE/INTERROGATIVE TYPE SYSTEM WHERE EACH DEVICE IS REPETITIVELY SCANNED, CAUSING A SIGNAL TO BE TRANSMITTED TO THE MAIN FIRE ALARM CONTROL PANEL (FACP) INDICATING THAT THE ASSOCIATED INITIATING DEVICE AND NOTIFICATION APPLIANCE CIRCUIT WIRING IS FUNCTIONAL. LOSS OF SUCH A SIGNAL AT THE MAIN FACP SHALL RESULT IN A TROUBLE INDICATION AS SPECIFIED HEREINAFTER FOR THE PARTICULAR INPUT.
3. SYSTEM OPERATION: OPERATION OF MANUAL STATION OR AUTOMATIC ACTIVATION OF ANY SMOKE DETECTOR OR HEAT DETECTOR SHALL -
   a. CAUSE SYSTEM EVACUATION HORNS TO SOUND AND LAMPS TO FLASH.
   b. THE 80 CHARACTER LCD DISPLAY SHALL INDICATE ALL INFORMATION ASSOCIATED WITH THE FIRE ALARM CONDITION, INCLUDING THE TYPE OF ALARM POINT AND ITS LOCATION WITHIN THE PROTECTED PREMISES.
   c. INITIATE OFF-SITE ALARM NOTIFICATION.
   d. RELEASE MAGNETIC DOOR HOLDERS.
   e. INITIATE SHUT DOWN OF MECHANICAL UNITS WITH AIR FLOW IN EXCESS OF 2000CFM.
   f. INITIATE CLOSURE OF ALL FIRE/SMOKE DAMPERS.
4. WIRING: THE MULTIPLEX BUSS AND DATA COMMUNICATION BUS (OPTIONS BUS) SHALL BE WIRED WITH STANDARD NEC 760 COMPLIANT WIRING. ALL FACP SCREW TERMINALS SHALL BE CAPABLE OF ACCEPTING 14 AWG (1.8 MM) TO 18 AWG (1.2 MM) WIRE. ALL SYSTEM WIRING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA 70, THE NATIONAL ELECTRICAL CODE (NEC) AND ALSO COMPLY WITH ARTICLE 760 OF THE NEC.

C. QUALITY ASSURANCE
1. REGULATORY REQUIREMENTS -
   a. SYSTEM SHALL MEET APPROVAL OF AUTHORITY HAVING JURISDICTION (AHJ). CHANGES OR ADDITIONS SHALL BE MADE TO THE SYSTEM AS REQUIRED WITHOUT ADDITIONAL COST TO OWNER.
   b. EQUIPMENT, DEVICES, AND CABLE SHALL BE UL OR FACTORY MUTUAL LISTED FOR USE IN FIRE ALARM SYSTEMS.

D. FACP COMPONENTS:
1. EQUIPMENT AND ACCESSORIES FURNISHED UNDER TERMS OF THIS SPECIFICATION SHALL BE STANDARD PRODUCTS OF SINGLE MANUFACTURER, OR INCLUDE WRITTEN STATEMENT BY CONTROL PANEL MANUFACTURER CONFIRMING COMPATIBILITY OF COMPONENTS AND INCLUSION OF THESE COMPONENTS UNDER SYSTEM WARRANTY.
2. THE MAIN FACP CENTRAL CONSOLE SHALL CONTAIN A MICROPROCESSOR BASED CENTRAL PROCESSING UNIT (CPU). THE FACP SHALL COMMUNICATE WITH AND CONTROL THE FOLLOWING TYPES OF EQUIPMENT USED TO MAKE UP THE SYSTEM: ADDRESSABLE DETECTORS, ADDRESSABLE MODULES, LOCAL AND REMOTE OPERATOR TERMINALS, ANNUNCIATORS, AND OTHER SYSTEM CONTROLLED DEVICES.
   a. THE MAIN FACP AND CENTRAL CONSOLE SHALL PERFORM THE FOLLOWING FUNCTIONS:
   b. SUPERVISE AND MONITOR ALL ADDRESSABLE DETECTORS AND MONITOR MODULES CONNECTED TO THE SYSTEM FOR NORMAL, TROUBLE AND ALARM CONDITIONS.
   c. SUPERVISE ALL NOTIFICATION CIRCUITS THROUGHOUT THE FACILITY.
   d. VISUALLY AND AUDIBLY ANNUNCIATE ANY TROUBLE, SUPERVISORY OR ALARM CONDITION ON OPERATOR'S TERMINAL, PANEL DISPLAY, AND ANNUNCIATORS.
3. THE FIRE ALARM CONTROL PANEL SHALL INCLUDE A FULL FEATURED OPERATOR INTERFACE CONTROL AND ANNUNCIATION PANEL WHICH SHALL INCLUDE A BACKLIT LIQUID CRYSTAL DISPLAY, INDIVIDUAL, COLOR CODED SYSTEM STATUS LEDS, AND AN ALPHA-NUMERIC KEYPAD FOR FIELD PROGRAMMING AND CONTROL OF THE FIRE ALARM SYSTEM.
4. THE SYSTEM SHALL INCLUDE EMERGENCY EVACUATION SIGNAL UTILIZING INTELLIGENCE SUCH THAT LOSS OF OPERATION BY THE MAIN FACP WILL NOT RESULT IN THE LOSS OF EVACUATION SIGNAL THROUGHOUT THE BALANCE OF THE BUILDING.
5. THE MAIN COMMUNICATION BUS (OPTIONS BUS) SHALL BE CAPABLE OF CLASS A OR CLASS B CONFIGURATION WITH A TOTAL BUS LENGTH OF 5,900 FEET (1,798 M).
6. OFF-SITE ALARM NOTIFICATION SYSTEM
   a. PROVIDE TELEPHONE LINE CONNECTION FROM TELEPHONE TERMINAL BOARD TO FIRE ALARM CONTROL PANEL.
   b. PROVIDE DIALER DEVICE TO NOTIFY OFF-SITE PERSONNEL OF ALARM OR ABNORMAL CONDITIONS.
   c. CONNECT TO FIRE ALARM CONTROL PANEL SO SPECIFIED CONDITIONS INITIATE OFF-SITE CALL. USE ONE ALARM CODE FOR ALARM AND SECOND CODE FOR SUPERVISORY/TROUBLE ALARM.
7. AUDIBLE HORN ALARM ANNUNCIATION -
   a. PROVIDE SEPARATE AND DISTINCT ALARM SIGNALS FOR ALARM AND TROUBLE CONDITIONS.
   b. ALARM SIGNAL SHALL ALSO OPERATE STROBE LIGHTS, IF SPECIFIED.
   c. PROVIDE ALARM SILENCE SWITCHES AT CONTROL PANEL.
   d. TROUBLE ALARM SHALL BE HORN INTEGRAL TO CONTROL PANEL.
   e. SUPERVISORY ALARM MAY BE SAME AUDIBLE ALARM AS TROUBLE ALARM, BUT WITH SEPARATE VISUAL ANNUNCIATION.

E. FIELD MOUNTED SYSTEM COMPONENTS
1. FIRE ALARM INITIATING DEVICES
   a. DUCT DETECTOR HOUSING: PROVIDE SMOKE DETECTOR DUCT HOUSING ASSEMBLIES TO MOUNT AN ADDRESSABLE DETECTOR ALONG WITH A STANDARD, RELAY OR ISOLATOR DETECTOR MOUNTING BASE. THE HOUSING SHALL ALSO PROTECT THE MEASURING CHAMBER FROM DAMAGE AND INSECTS. THE HOUSING SHALL UTILIZE AN AIR EXHAUST TUBE AND AN AIR SAMPLING INLET TUBE THAT EXTENDS INTO THE DUCT AIR STREAM UP TO TEN FEET. DRILLING TEMPLATES AND GASKETS TO FACILITATE LOCATING AND MOUNTING THE HOUSING SHALL ALSO BE PROVIDED. THE HOUSING SHALL BE FINISHED IN BAKED RED ENAMEL. REMOTE ALARM LED INDICATORS AND REMOTE TEST STATIONS SHALL BE PROVIDED.
   b. ADDRESSABLE SMOKE DETECTORS
      1) CEILING MOUNTED, ADDRESSABLE PHOTOELECTRIC
      2) UL LISTED COMPATIBLE WITH THE FIRE ALARM CONTROL PANEL.
      3) SHALL HAVE A FLASHING STATUS LED FOR VISUAL SUPERVISION. WHEN THE DETECTOR IS ACTUATED, THE FLASHING LED WILL LATCH ON SOLID. THE LED SHALL FLASH AT A 1/SEC RATE IF THE CHAMBER IS OUT OF CALIBRATION RANGE. THE DETECTOR MAY BE RESET BY ACTUATING THE CONTROL PANEL'S RESET SWITCH.
   c. SMOKE DETECTOR GUARDS
      1) UNDERWRITERS LABORATORIES TESTED AND LISTED BY FOR USE WITH THE SMOKE DETECTORS THEY PROTECT.
      2) GUARD DESIGN SHALL NOT AFFECT THE DETECTOR OPERATING SENSITIVITY AND SHALL NOT REDUCE THE LISTED DETECTOR SPACING.
      3) CONSTRUCTED OF 16-GAUGE STEEL WITH A BAKED WHITE FINISH TO MATCH THE DETECTORS.
      4) TAMPERPROOF MOUNTING HARDWARE SHALL BE PROVIDED.
   d. ADDRESSABLE FIXED TEMPERATURE-ROR HEAT DETECTOR
      1) ADDRESSABLE COMBINATION FIXED TEMPERATURE / RATE-OF-RISE
      2) NOMINAL FIXED TEMPERATURE ALARM POINT RATING OF 135°F (57°C) AND A RATE OF RISE ALARM POINT OF 15°F(9°C) PER MINUTE.
      3) RATED FOR CEILING INSTALLATION AT A MINIMUM OF 70 FT (21.3M) CENTERS AND BE SUITABLE FOR WALL MOUNT APPLICATIONS.
   e. DETECTOR BASES: STANDARD DETECTOR MOUNTING BASES SUITABLE FOR MOUNTING ON EITHER NORTH AMERICAN 1-GANG, 3½ OR 4 INCH OCTAGON BOX AND 4 INCH SQUARE BOX, OR EUROPEAN BESA OR 1-GANG BOX. THE BASE SHALL, CONTAIN NO ELECTRONICS AND SUPPORT ALL SERIES DETECTOR TYPES.
   f. ADDRESSABLE MANUAL STATION
      1) ADDRESSABLE DOUBLE ACTION, SINGLE STAGE
      2) POLYCARBONATE CONSTRUCTION WITH INTERNAL TOGGLE SWITCH.
      3) FINISHED IN RED WITH SILVER "PULL IN CASE OF FIRE" LETTERING
      4) SUITABLE FOR MOUNTING ON NORTH AMERICAN 2 ½ (64MM) DEEP 1-GANG BOXES AND 1 ½ (38MM) DEEP 4 SQUARE BOXES WITH 1-GANG COVERS.
2. FIRE ALARM ACTUATING DEVICES
   a. DOOR HOLDING DEVICES: DOOR RELEASE UNITS SHALL BE ELECTRICALLY OPERATED MAGNETIC DEVICES WHICH HOLD DOORS OPEN UNTIL RELEASED BY THE MAIN CONTROL UNIT. PROVIDE DOOR PLATES AND COORDINATE WITH THE GENERAL CONTRACTOR TO INSURE THAT THE PLATES ARE PROPERLY MOUNTED ON THE DOORS.
   b. NOTIFICATION APPLIANCES
      1) LOW PROFILE HORN-STROBES
         a) AUDIBLE OUTPUT OF 92 DBA AT 10 FT. WHEN MEASURED IN REVERBERATION ROOM PER UL-464.
         b) INTEGRALLY MOUNTED FLASHING LIGHT UNIT WITH BLOCK LETTERS 'FIRE'. MULTI-CANDELA WITH FIELD-SELECTABLE SETTINGS OF 15CD, 30CD, 60CD, 75CD & 110CD, AND FLASH RATE BETWEEN ONE AND THREE HERTZ. ALL UNITS SHALL FLASH IN SYNCHRONIZATION WITH EACH OTHER.
         c) THE HORN SHALL HAVE A SELECTABLE STEADY OR SYNCHRONIZED TEMPORAL OUTPUT.
         d) IN AND OUT SCREW TERMINALS SHALL BE PROVIDED FOR WIRING.
         e) LOW PROFILE HORN/STROBES SHALL MOUNT IN A NORTH AMERICAN 1-GANG BOX.
      2) LOW PROFILE STROBES
         a) PROVIDE LOW PROFILE WALL MOUNTED STROBES AT THE LOCATIONS SHOWN ON THE DRAWINGS. IN AND OUT SCREW TERMINALS SHALL BE PROVIDED FOR WIRING. STROBES SHALL PROVIDE SYNCHRONIZED FLASH OUTPUTS. STROBE OUTPUT SHALL BE DETERMINED AS REQUIRED BY ITS SPECIFIC LOCATION AND APPLICATION FROM A FAMILY OF 15CD, 30CD, 60CD, 75CD, OR 110CD DEVICES. LOW PROFILE STROBES SHALL MOUNT IN A NORTH AMERICAN 1-GANG BOX.
      3) LOW FREQUENCY HORN-STROBES
         a) SHALL COMPLY WITH NFPA 72 18.4.5.3.
         b) 520 HZ (+/- 10%) SQUARE WAVE TONE.
         c) AUDIBLE OUTPUT OF 76 DBA AT 10 FT. WHEN MEASURED IN REVERBERATION ROOM PER UL-464.
         d) INTEGRALLY MOUNTED FLASHING LIGHT UNIT WITH BLOCK LETTERS 'FIRE'. MULTI-CANDELA WITH FIELD-SELECTABLE SETTINGS OF 15CD, 30CD, 60CD, 75CD & 100CD, AND FLASH RATE BETWEEN ONE AND THREE HERTZ. STROBE OUTPUT SHALL BE DETERMINED AS REQUIRED BY ITS SPECIFIC LOCATION AND APPLICATION.
         e) ALL UNITS SHALL FLASH IN SYNCHRONIZATION WITH EACH OTHER.
      4) LOW FREQUENCY HORNS
         a) SHALL COMPLY WITH NFPA 72 18.4.5.3.
         b) 520 HZ (+/-10%) SQUARE WAVE TONE.
         c) AUDIBLE OUTPUT OF 76 DBA AT 10 FT. WHEN MEASURED IN REVERBERATION ROOM PER UL-464.
3. INITIATION & CONTROL MODULES
   a. RELAY MODULE
      1) PROVIDE ADDRESSABLE CONTROL RELAY CIRCUIT MODULES AS REQUIRED. THE MODULE SHALL PROVIDE ONE (1) FORM C DRY RELAY CONTACTS RATED AT 24VDC @ 2 AMPS (PILOT DUTY) TO CONTROL EXTERNAL APPLIANCES OR EQUIPMENT. THE POSITION OF THE RELAY CONTACT SHALL BE CONFIRMED BY THE SYSTEM FIRMWARE.

F. BATTERIES
1. SHALL BE 12 VOLT, GELL-CELL TYPE.
2. BATTERY SHALL HAVE SUFFICIENT CAPACITY TO POWER THE FIRE ALARM SYSTEM FOR NOT LESS THAN TWENTY-FOUR HOURS PLUS 5 MINUTES OF ALARM UPON A NORMAL AC POWER FAILURE.
3. THE BATTERIES ARE TO BE COMPLETELY MAINTENANCE FREE. NO LIQUIDS ARE REQUIRED. FLUID LEVEL CHECKS REFILLING, SPILLS AND LEAKAGE SHALL NOT BE REQUIRED.

G. INSTALLATION
1. INSTALL FIRE ALARM AND DETECTION SYSTEMS AS INDICATED, IN ACCORDANCE WITH EQUIPMENT MANUFACTURER'S WRITTEN INSTRUCTIONS, AND COMPLYING WITH APPLICABLE PORTIONS OF NEC, NFPA AND NECA'S "STANDARD OF INSTALLATION".
2. INSTALL WIRING, RACEWAYS, CONDUCTORS, ELECTRICAL BOXES AND FITTINGS IN ACCORDANCE WITH SECTION 16 050 - BASIC MATERIALS AND METHODS.
3. LABEL PULL AND JUNCTION BOXES "FIRE ALARM" WITH RED INDELIBLE INK.
4. LOOP WIRES THROUGH EACH DEVICE ON ZONE FOR PROPER SUPERVISION. TEE-TAPS NOT PERMITTED.
5. PROVIDE DUST PROTECTION FOR INSTALLED SMOKE DETECTORS UNTIL FINISH WORK IS COMPLETED AND BUILDING IS READY FOR OCCUPANCY.
6. PROTECT CONDUCTORS FROM CUTS, ABRASION AND OTHER DAMAGE DURING CONSTRUCTION.
7. MINIMUM CONDUCTOR SIZE SHALL BE 14 AWG UNLESS OTHERWISE SPECIFIED.
8. DO NOT INSTALL CEILING MOUNTED DETECTORS WITHIN 3 FEET OF AIR DISCHARGE GRILLS. COORDINATE WITH OTHER TRADES AS REQUIRED.
9. POST COPY OF WIRE IDENTIFICATION LIST INSIDE FIRE ALARM PANEL DOOR OR OTHER AREA ACCESSIBLE TO FIRE ALARM SERVICE PERSONNEL.
10. PROVIDE DUCT SMOKE DETECTORS FOR ALL MECHANICAL UNITS WITH AIR FLOW IN EXCESS OF 2000 CFM AND TIE INTO FIRE ALARM CONTROL PANEL. PROVIDE FAN SHUT DOWN CIRCUIT AND ASSOCIATED CONTROL EQUIPMENT FOR ALL REQUIRED MECHANICAL UNITS.
11. INSTALL CONDUCTORS AND MAKE CONNECTIONS TO ALL, WATER FLOW SWITCHES, VALVE TAMPER SWITCHES, LOW AIR PRESSURE SWITCHES, AND DOOR HOLDING DEVICES.
12. INSTALL CONDUCTORS AND MAKE CONNECTIONS TO ALL FIRE/SMOKE DAMPERS. REFER TO MECHANICAL DRAWINGS FOR EXACT NUMBER AND LOCATIONS.

H. FIELD QUALITY CONTROL
1. TEST & INSPECTION
   a. ALL INTELLIGENT ADDRESSABLE DEVICES SHALL BE TESTED FOR CURRENT ADDRESS AND USER DEFINED MESSAGE.
   b. ALL WIRING SHALL BE TESTED FOR CONTINUITY, SHORTS, AND GROUNDS BEFORE THE SYSTEM IS ACTIVATED.
   c. ALL TEST EQUIPMENT, INSTRUMENTS, TOOLS AND LABOR REQUIRED TO CONDUCT THE TESTS SHALL BE MADE AVAILABLE BY THE INSTALLING CONTRACTOR.
   d. THE SYSTEM INCLUDING ALL ITS SEQUENCE OF OPERATIONS SHALL BE DEMONSTRATED TO THE OWNER, HIS REPRESENTATIVE, AND THE LOCAL FIRE INSPECTOR. IN THE EVENT THE SYSTEM DOES NOT OPERATE PROPERLY, THE TEST SHALL BE TERMINATED. CORRECTIONS SHALL BE MADE AND THE TESTING PROCEDURE SHALL BE REPEATED UNTIL IT IS ACCEPTABLE TO THE OWNER, HIS REPRESENTATIVES AND THE FIRE INSPECTOR.
   e. ALL FIRE ALARM TESTING SHALL BE IN ACCORDANCE WITH NATIONAL FIRE ALARM CODE, NFPA 72 - 2002, CHAPTER 10.

I. MANUFACTURER'S FIELD SERVICE -
1. INSTRUCT OWNER'S REPRESENTATIVE IN PROPER OPERATION AND MAINTENANCE PROCEDURES.
2. PROVIDE A MINIMUM OF 4 HOURS TRAINING.

TELEPHONE/DATA SYSTEMS

A. SUMMARY
1. INCLUDES BUT NOT LIMITED TO
   a. FURNISH AND INSTALL BUILDING TELEPHONE AND COMPUTER NETWORK RACEWAY AND CABLE SYSTEM AS DESCRIBED IN CONTRACT DOCUMENTS INCLUDING, BUT NOT LIMITED TO, RACEWAY, OUTLETS, MODULAR JACKS, DEVICE PLATES, CABLES, PUNCH DOWN BLOCKS, BACKBOARDS, CABINETS, PATCH PANELS, GROUNDING AND OTHER MISCELLANEOUS ITEMS REQUIRED FOR A COMPLETE SYSTEM.
   b. FURNISH AND INSTALL MAIN SERVICE RACEWAY AS DESCRIBED IN CONTRACT DOCUMENTS AND TO COMPLY WITH TELEPHONE COMPANY REQUIREMENTS.

B. COMPONENTS
1. TELEPHONE OUTLET BOX SHALL BE SINGLE DEVICE BOX.
2. BUILDING TELEPHONE AND COMPUTER NETWORK SYSTEM CABLE
   a. 23 GAUGE, SOLID TINNED COPPER, FOUR TWISTED PAIRS. CATEGORY 6
   b. USE PLENUM-RATED CABLE IN CEILINGS AND AREAS USED FOR PLENUM AIR RETURN
3. TELEPHONE TERMINATION BLOCKS
   a. UL VERIFIED CATEGORY 6.
   b. 110 TERMINATION WITH TIN LEAD PLATED IDC
4. TELEPHONE/NETWORK JACKS
   a. WALL JACKS
      1) CAT6 - HUBBELL HXJ6 OR ALTERNATE MANUFACTURER WITH EQUIVALENT PERFORMANCE STANDARD.
   b. PLATES
      1) HUBBELL - IFP SERIES (PORT QUANTITY AS REQUIRED, COLOR BY ARCHITECT)
5. BACKBOARDS: INTERIOR GRADE PLYWOOD WITHOUT VOIDS, ¾ INCH THICK; UL-LABELED FIRE RETARDANT.
   a. SIZE: 48 INCHES WIDE 96 INCHES HIGH.
   b. DO NOT PAINT OVER UL LABEL.
   c. PROVIDE ONE 48" MULTI-OUTLET POWER STRIP WITH INTEGRAL SURGE PROTECTION AND OUTLETS AT 6" O.C. (MINIMUM 7 OUTLETS) MOUNTED AT CENTER OF TERMINAL BOARD.
6. STRUCTURED MEDIA CENTERS
   a. FLUSH-MOUNT ENCLOSURE WITH COVER.
   b. MINIMUM DIMENSIONS: 14.38"H X 14.38"W X 3.60"D
   c. INCLUDE THE FOLLOWING CABLING PANELS:
      1) TELEPHONE PATCHING BOARD WITH 7 MULTI-LINE TELEPHONE CONNECTIONS
      2) CATEGORY 6 VOICE & DATA MODULE WITH 6 RJ45 PORTS
      3) 4-WAY 2GHZ VIDEO SPLITTER
7. CONNECTOR BLOCKS FOR CATEGORY 6 AND UP CABLING: TYPE 110 INSULATION DISPLACEMENT CONNECTORS; CAPACITY SUFFICIENT FOR CABLES TO BE TERMINATED PLUS 25 PERCENT SPARE.

C. INSTALLATION
1. INSTALL CABLE FROM TERMINAL BOARD TO EACH TELEPHONE/NETWORK OUTLET.
2. TERMINATE CABLES AT EACH OUTLET WITH SPECIFIED MODULAR JACK ASSEMBLY.
3. TERMINATE CABLES ON PUNCH DOWN BLOCKS OR PATCH PANELS AT TERMINAL BOARD.
4. PROVIDE TYPED LABELS AT ALL JACKS CORRESPONDING TO TYPED NUMBERING SYSTEM AT PATCH PANEL OR TERMINAL STRIP.

D. QUALITY ASSURANCE
1. COMPLY WITH APPLICABLE PORTIONS OF NEC ANSI/EIA/TIA 568 AS TO TYPE PRODUCTS USED AND INSTALLATION OF COMPONENTS. PROVIDE PRODUCTS AND MATERIALS WHICH HAVE BEEN UL-LISTED AND LABELED.

REGISTERED PROFESSIONAL ENGINEER
M. RYAN BEAGLES
9/20/19
STATE OF UTAH

ROYAL ENGINEERING

ELECTRICAL
1837 S. EAST BAY BLVD.
PHONE: 801.375.2228

MECHANICAL
PROVO, UTAH 84606
FAX: 801.375.2676

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REVISIONS

DRAWN BY
BK

HARRIS ARCHITECTURE
3520 N UNIVERSITY AVENUE #200, PROVO UT 84604 | 801-377-6303 | WWW.HARRIS-ARCHITECTURE.COM

30th STREET APARTMENTS
ELECTRICAL SPECIFICATIONS

09/20/2019

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