

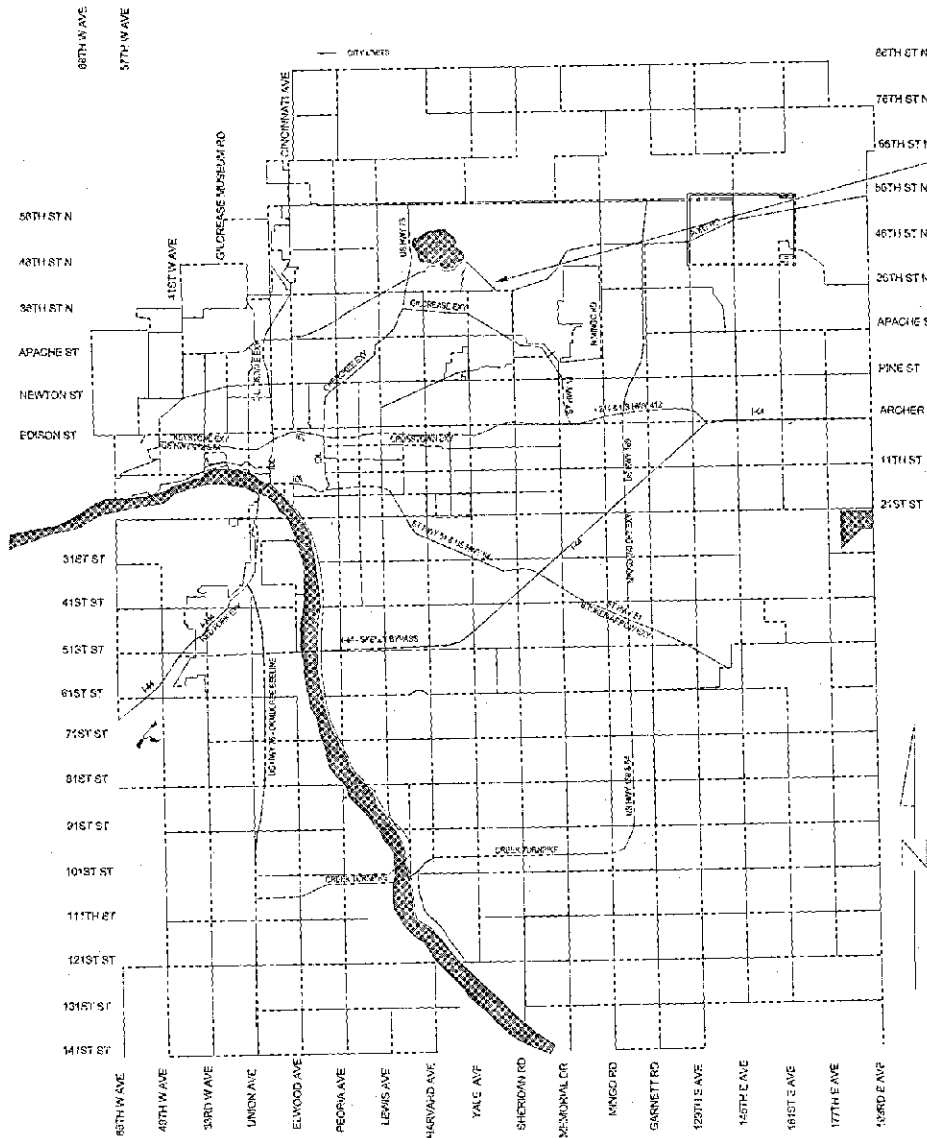
INDEX TO DRAWINGS	
SHEET NO.	DESCRIPTION
COVER	Cover Sheet
G001	Pay Items
G002	Pay Items
M001	Mechanical General Notes, Abbreviations & Legend
MS101	Mechanical Site Plan
MPD101	Mechanical Demolition Plan - Veterinary Clinic
MD101	Mechanical Demolition Plan - Rainforest
MPD401	Enlarged Mechanical Demolition Plans - Veterinary Clinic
MPD501	Mechanical Details
M101	Mechanical Plan - Rainforest
MP101	Mechanical Piping Plan
MP102	Mechanical Piping Plan - Veterinary Clinic
MP401	Enlarged Mechanical Plans - Veterinary Clinic
M501	Mechanical Details
M502	Mechanical Details
MP501	Mechanical Details
MP502	Mechanical Details
M601	Mechanical Schedules
M602	Mechanical Schedules
MP601	Mechanical Schedules
E001	Electrical General Notes, Abbreviations & Legend
MEPS101	MEP Site Plan
ED101	Electrical Demolition Plan - Rainforest
ED102	Electrical Demolition Plan - Veterinary Clinic
EP101	Power Plan - Rainforest
E401	Enlarged Electrical Plans
E501	Electrical Details
E502	Electrical Details
E503	Electrical Details
E504	Electrical Details
E601	Electrical Schedules

UTILITY COORDINATION	
	NUMBER
CITY PROJECTS	918-596-9512
WATER DESIGN	918-596-9566
WASTEWATER DESIGN	918-596-9564
TRANSPORTATION DESIGN	918-596-9636
TRAFFIC ENGINEERING DESIGN	918-596-9749
STORMWATER DESIGN	918-596-9498
OKLAHOMA NATURAL GAS CO.	918-831-8293
COX COMMUNICATIONS	918-286-4666
PUBLIC SERVICE CO./AEP	918-599-2233
AT&T	918-576-2142

CONSTRUCTION PLANS FOR TULSA ZOO - RAINFOREST HVAC / ELECTRICAL UPGRADES

PROJECT NO: CP 24-20

CITY OF TULSA, OKLAHOMA
PARKS, CULTURE, AND RECREATION DEPARTMENT



GENERAL NOTES

ALL CONSTRUCTION SHALL BE IN STRICT ACCORDANCE WITH CURRENT CITY OF TULSA CODES AND ORDINANCES, ENGINEERING SERVICES STANDARDS AND SPECIFICATIONS. (CITY OF TULSA ORDINANCES AND CODE AMENDMENTS SUPERCEDE NATIONAL CODES.)

CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO ALL STRUCTURES, LANDSCAPING, PAVING, AND ANY OTHER ITEMS LOCATED WITHIN AND OUTSIDE THE WORK AREA. ANY DAMAGE TO PERMANENT ITEMS INCURRED BY CONTRACTOR THROUGH HIS WORK IN THIS CONTRACT SHALL BE REPAIRED TO ORIGINAL CONDITION, BY THE CONTRACTOR, AT HIS OWN EXPENSE.

CONTRACTORS WILL COORDINATE WITH IDENTIFIED MAINTENANCE OPERATIONS PERSONNEL FOR APPLICATION, SHUT OFF, AND REMOVAL OF ALL UTILITIES.

PROJECT SITE
6421 E 36TH ST. NORTH, TULSA, OK 74115

PLANS PREPARED BY:
EDA+FKI ENGINEERS
10810 E. 45TH STREET - SUITE 201
TULSA, OK 74146
918.258.6890



APPROVED BY:

[Signature]
EXECUTIVE DIRECTOR TZMI

[Signature]
DIRECTOR OF PARKS, CULTURE,
AND RECREATION DEPARTMENT

4/17/2025
DATE

5-22-2025
DATE

[Signature] 5/20/2025

PAY ITEMS SCHEDULE

BID ITEM	SPEC NO.	DESCRIPTION	UNIT	QTY	PAY ITEM NOTES
BASE BID:					
001	SPEC 01 2100	General conditions	LOT	1	8
002	SPEC 01 2100	Owner Allowance	ALLOW	170,000	7
003		Site prep, tree removal, and prepare level grade for equipment and equipment pad installation	LOT	1	9,10,17
004	SPEC 02 4119	Demolition and removal of existing Governor HVAC Package Housing Unit and (2) Cooling Towers from the site.	LOT	1	8,11,18
005	SPEC 02 4119	Removal of existing roof mounted exhaust fans (EF-1, EF-2, EF-3); install new corrugated metal panel under exhaust fan EF-2. Provide a water tight seal around roof penetrations.	EA	3	18
006	SPEC 02 4119	Removal of existing inline exhaust fan (EF-4) and support structure.	EA	1	18
007	SPEC 02 4119	Removal of existing return ductwork from ground level up to return grille plenum transition. Install sheet metal to cap and seal underground branch duct connection. Removal of existing supply ductwork and fittings at Rm. 124. Demolition of existing supply ductwork (west exterior). Install cap and seal at specified return and supply ductwork, roof openings, and piping.	EA	3	19
008	SPEC 02 4119	Removal of existing HVAC equipment thermostats and associated wiring.	EA	1	15
009	SPEC 02 4119	Demolition of existing service shed, electrical fixture and wiring.	EA	1	18
010	SPEC 23 1123	Reconnection of gas services to existing 175kw generator and cab.	EA	2	16,18
011	SPEC 23 1123	New gas service manifold and distribution provisions for services to generators, HVAC package units, new connection to existing 175kw generator, service to cab.	EA	1	1,12,19
012	SPEC 02 4119	Removal of existing 2" above grade natural gas piping back to gas riser manifold and capping existing service	EA	1	16
013	SPEC 23 0713, 23 3113, 23 0529, 23 3500	Install exterior supply duct. Provide R8 exterior duct insulation on interior ductwork. Provide long rectangular radius elbows	LB	960	13,20
014	SPEC 23 0713, 23 3113	Install 5" Armaflex insulation and aluminum jacketing for all exterior supply & return ducts.	SF	7000	20,21
015	SPEC 23 0713, 23 3113, 23 3300	Install exterior supply & return duct, including all long rectangular radius elbows.	LB	8300	13,14,20
016	SPEC 23 1123	Natural Gas service upgrade including (ONG) ONEOK fees, boring, piping, unions, shut off valves, regulators, sediment traps and field connections.	EA	1	12
017	SPEC 23 1123	Natural gas piping to generators including unions, shut off valves, regulators, sediment traps and all terminations.	EA	3	1,19
018	SPEC 23 1123	Gas piping to package units, includes trench, backfill, piping, unions, shut off valves, regulators, sediment traps and terminations.	EA	10	12,19
019	SPEC 23 3113, 23 7413	Set package unit on pad & make required connections for natural gas, ductwork, controls, condensate piping.	EA	10	12,19,20
020		Condensate piping system for HVAC package units.	EA	10	16,19
021		Install new structurally reinforced concrete pad for HVAC Package Units.	CY	20	4,10,20,21
022	SPEC 23 0500, 23 0590, 23 0713	Connection of RTU 3 supply duct to existing duct @ supply air tunnel.	EA	1	20,21
023		Connection of RTU-5, RTU 5-1 and RTU-2 return air connection to existing central return.	EA	1	20,21
024	SPEC 23 0500, 23 0590, 23 3113, 23 3423, 23 0529	Install new exhaust fan on low roof (EF-1, EF-2). Install new inline exhaust fan (EF-2) and support structure. Provide associated controls for both fans.	EA	2	20
025	SPEC 23 0529	Rectangular duct supports for exterior ductwork.	EA	60	20
026	SPEC 23 3713.13	Provide insect screening over return grille (R2) free area. Return grille serves RTU-1 & RTU-1.1.	EA	1	20
027	SPEC 23 3300	Protective Shield at RTU-1.1 provide accessible ductwork locations.	EA	2	20
028	SPEC 23 3300	MotORIZED Dampers & wiring	EA	20	20
029		HVAC control system allowance, including LV wiring (exclude raceway) to each package unit, sensors, thermostats, interface modules and all associated hardware.	EA	10	20,22,34
030	SPEC 02 4119	Disconnect, remove and relocate existing generator set per owner direction, demo existing pad and patch existing pad location.	EA	1	29
031	SPEC 02 4119	Disconnect and remove existing secondary conductors from existing PSO transformer, demo existing pad and patch existing pad location.	EA	1	29
032	SPEC 02 4119	Demc. existing transfer switches and associated connections	EA	2	29
033	SPEC 02 4119	Demolition existing electrical service disconnects	EA	4	20
034		Install new site lights with pole base and wiring	EA	3	38
035	SPEC 26 3213	Generators (3-350KW natural gas unit) installed on pad	EA	3	39
036	SPEC 26 2413	Service switchgear MSB	EA	1	39
037	SPEC 26 3623	Transfer switch, 800A, 480V, 3P, 4 W, free standing NEMA 3R	EA	2	39
038	SPEC 26 3023	Transfer switch, 120A, 480V, 3P, 4 W, free standing NEMA 3R	EA	1	39
039	SPEC 26 2413	Distribution panel "AMDP"	EA	1	39
040	SPEC 26 2413	Distribution panel "BMDP"	EA	1	39
041	SPEC 26 2413	Generator switchboard GDP	EA	1	39
042		Reinforced concrete generator pad	CY	50	40
043		Reinforced concrete switchgear pad	CY	8	40
044		Reinforced concrete transformer pad	CY	4	40
045	SPEC 26 3213	Remote wireless generator monitor	EA	1	41
046	SPEC 26 3213	Remote emergency stops @ generator	EA	3	39
047	SPEC 26 2416	Electrical panelboard LTC, installed	EA	1	42
048	SPEC 26 2416	Electrical Panelboard LS, installed	EA	1	42
049	SPEC 26 2200	Dry type 112.5kva transformer installed	EA	1	43
050	SPEC 26 4313	Surge Protective Device LS3 series and associated wiring.	EA	2	44
051	SPEC 26 4313	Surge Protective Device TQ series and associated wiring.	EA	3	44
052	SPEC 26 0519, 26 0533, 26 0526	Feeder & termination for pad mounted 1000kva PSQ furnished transformer to MSB, 1600A-4	LF	30	45
053	SPEC 26 0519, 26 0533, 26 0526	Feeder & termination for HVAC package unit RTU-1, 80A-3+G	LF	50	45
054	SPEC 26 0519, 26 0533, 26 0526	Feeder & Termination for HVAC package unit RTU-1.1, 80A-3+G	LF	80	45

055	SPEC 26 0519, 26 0533, 26 0526	Feeder & termination for HVAC package unit RTU-2, 80A-3+G	LF	160	45
056	SPEC 26 0519, 26 0533, 26 0526	Feeder & termination for HVAC package unit RTU-2.1, 80A-3+G	LF	120	45
057	SPEC 26 0519, 26 0533, 26 0526	Feeder & termination for HVAC package unit RTU-3, 110A-3+G	LF	80	45
058	SPEC 26 0519, 26 0533, 26 0526	Feeder & termination for HVAC package unit RTU-4, 100A-3+G	LF	100	45
059	SPEC 26 0519, 26 0533, 26 0526	Feeder & termination for HVAC package unit RTU-5, 110A-3+G	LF	250	45
060	SPEC 26 0519, 26 0533, 26 0526	Feeder & termination for HVAC package unit RTU-5.1, 110A-3+G	LF	200	45
061	SPEC 26 0519, 26 0533, 26 0526	Feeder & termination for HVAC package unit RTU-6, 70A-3+G	LF	150	45
062	SPEC 26 0519, 26 0533, 26 0526	Feeder & termination for HVAC package unit RTU-7, 30A-3+G	LF	225	45
063	SPEC 26 0533	3/4" PVC schedule 40 underground control conduit to RTU-1, RTU-1.1, RTU-2, RTU-2.1, RTU-3, RTU-4, RTU-5, RTU-5.1, RTU-6 and RTU-7	LF	1500	41
064	SPEC 26 0519, 26 0533, 26 0526	Feeder from BMDP to Anheuser building, 200-4+G	LF	180	41
065	SPEC 26 0519, 26 0533, 26 0526	Feeder from ATSS to panel LS, 100-4+G	LF	40	45
066	SPEC 26 0519, 26 0533, 26 0526	Feeder from BMDP to 112.5 kva transformer 175A-3+G	LF	200	45
067	SPEC 26 0519, 26 0533, 26 0526	Feeder from 112.5KVA transformer to panel LTC 400A-4+G	LF	200	45
068	SPEC 26 0519, 26 0533, 26 0526	Feeder from BMDP to HIA 200A-4+G	LF	40	45
069	SPEC 26 0519, 26 0533, 26 0526	Feeder from BMDP to H1B 200A-4+G	LF	40	45
070	SPEC 26 0519, 26 0533, 26 0526	Feeder from BMDP to ATS1, 800A-4+G	LF	20	45
071	SPEC 26 0519, 26 0533, 26 0526	Feeder from AMDP to ATS2, 800A-4+G	LF	20	45
072	SPEC 26 0519, 26 0533, 26 0526	Feeder from GDP to ATS1, 800A-4+G	LF	20	45
073	SPEC 26 0519, 26 0533, 26 0526	Feeder from GDP to ATS2, 800A-4+G	LF	30	45
074	SPEC 26 0519, 26 0533, 26 0526	Feeder from GDP to ATS3, 100A-4+G	LF	40	45
075	SPEC 26 0519, 26 0533, 26 0526	Feeder from MSB to ATS1, 800A-4+G	LF	15	45
076	SPEC 26 0519, 26 0533, 26 0526	Feeder from MSB to ATS2, 800A-4+G	LF	25	45
077	SPEC 26 0519, 26 0533, 26 0526	Feeder from MSB to ATS3, 100A-4+G	LF	25	45
078	SPEC 26 0519, 26 0533, 26 0526	Feeder from ATS1 to BMDP, 800A-4+G	LF	200	45
079	SPEC 26 0519, 26 0533, 26 0526	Feeder from ATS2 to AMDP, 800A-4+G	LF	50	45
080	SPEC 26 0519, 26 0533, 26 0526	Feeder from ATS3 to Panel LS, 100A-4+G	LF	80	45
081	SPEC 26 0519, 26 0533, 26 0526	Feeder from Generator 1 to GDP, 800A-4+G	LF	50	45
082	SPEC 26 0519, 26 0533, 26 0526	Feeder from Generator 2 to GDP, 800A-4+G	LF	50	45
083	SPEC 26 0519, 26 0533, 26 0526	Feeder from Generator 3 to GDP, 800A-4+G	LF	40	45
084		EHS Repair as needed	SF	10	20
085		Exterior KALWALL penetration and repair	SF	5	20
086	SPEC 26 0526	Electrical grounding system	LOT	1	5
087		3500 PSI concrete mix to close off existing supply and return openings to the underground HVAC tunnel	CY	10	20

PAY ITEM ABBREVIATIONS LEGEND

ALLOW - ALLOWANCE
CY - CUBIC YARD
EA - EACH
LB - POUND
LF - LINEAR FEET
LOT - SET OF ARTICLES
SF - SQUARE FEET

TULSA ZOO - RAINFOREST
HVAC / ELECTRICAL
UPGRADES
6421 E 36TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20



PARKS, CULTURE & RECREATION

GABS (City Architectural Building Services)

DRAWN	PROJ. MGR: RJB	DESIGNED	PROJ. MGR: RJB
SURVEY	FIELD MGR: RJB	DESIGNED	PROJ. MGR: RJB

ISSUE BLOCK	BY	DATE
-------------	----	------

ISSUE BLOCK	BY	DATE
-------------	----	------

ISSUE BLOCK	BY	DATE
-------------	----	------

Sheet Name: Pay Items

SHEET 2 OF 31	SHEET NO. G001
---------------	----------------



EDA+FKI
ENGINEERS

EDA + FKI Engineers PC
10010 E. 45th Street - Suite 201
Tulsa, OK 74145
P: 918.258.8970 F: 918.610.4228

PAY ITEM NOTES

1. THE CONTRACTOR SHALL CONSTRUCT A FULLY COMPLETE AND OPERATIONAL SYSTEM IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. ALL NECESSARY TOOLS, HARDWARE, EQUIPMENT, AND LABOR REQUIRED TO COMPLETE THIS PORTION OF THE PROJECT SHALL BE INCORPORATED INTO THE APPROPRIATE PAY ITEM.
2. THE CONTRACTOR SHALL BE PAID ACCORDING TO UNIT PRICING LISTED ON PAY ITEM.
3. NOT USED
4. THE PAY ITEM SHALL INCLUDE THE COMPLETE CONCRETE PAD COST AS INDICATED ON PLANS AND DETAILS.
5. THIS PAY ITEM SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY FOR THE GROUND ELECTRODE SYSTEM, INCLUDING THE GROUND ROD, GROUND ELECTRODE WIRE, AND BONDING JUMPER.
6. THIS PAY ITEM SHALL INCLUDE THE COST OF GENERATOR COMMISSIONING AND START-UP PROCEDURE IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.
7. AN ALLOWANCE HAS BEEN PROVIDED IN THE CONTRACT FOR UNFORESEEN CONDITIONS. THE ALLOWANCE SHALL BE USED FOR COST OF MATERIALS, LABOR (INSTALLATION, OVERHEAD, AND PROFIT FOR ADDITIONAL WORK THAT IS NOT IDENTIFIED IN THE CONSTRUCTION DOCUMENTS, AND NOT INCLUDED IN THE BASE BID AND ADD ALTERNATES. ALLOWANCE USAGE SHALL BE GOVERNED BY THE SPECIAL SPECIFICATIONS SECTION 012103.
8. MOBILIZATION INCLUDES BUT IS NOT LIMITED TO DUMPSTERS AND PORTABLE TOILET FACILITIES, SITE MANAGEMENT, PROJECT MANAGEMENT, TEMPORARY SITE FACILITIES, WASTE CONTROL, SAFETY COMPLIANCE, PERMITS, SECURITY, FENCING, BOND, AND INSURANCE.
9. CONTRACTOR TO REPLACE ALL SOD REMOVED OR DAMAGED DURING CONSTRUCTION. THE CONTRACTOR SHALL DETERMINE THE TYPE OF EXISTING SOD AND REPLACE WITH THE SAME TYPE.
10. REFER TO PLANS FOR ALL PAD DETAILS AND REQUIREMENTS.
11. THE PAY ITEM SHALL INCLUDE THE DISCONNECTION OF EXISTING DUCTWORK, CONDENSATE VENT PIPING, GAS PIPING, HYDRONIC PIPING AND ELECTRICAL SUPPLY. ALL EXISTING DUCTWORK AND GAS PIPING CONNECTIONS TO BE CAPPED OFF DURING DEMOLITION OF EXISTING.
12. THE CONTRACTOR SHALL CONSTRUCT A FULLY COMPLETE AND OPERATIONAL SYSTEM IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. ALL NECESSARY TOOLS, HARDWARE, EQUIPMENT, AND LABOR REQUIRED TO COMPLETE THIS PORTION OF THE PROJECT SHALL BE INCORPORATED INTO THE APPROPRIATE PAY ITEM. THIS PAY ITEM SHALL INCLUDE ALL HVAC EQUIPMENT APPURTENANCES THAT ARE NOT IDENTIFIED BY INDIVIDUAL PAY ITEM.
13. REFER TO PLANS M101 FOR REQUIREMENTS.
14. THE CONTRACTOR SHALL CONSTRUCT A FULLY COMPLETE AND OPERATIONAL SYSTEM IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. ALL NECESSARY TOOLS, HARDWARE, EQUIPMENT, AND LABOR REQUIRED TO COMPLETE THIS PORTION OF THE PROJECT SHALL BE INCORPORATED INTO THE APPROPRIATE PAY ITEM. THIS PAY ITEM SHALL INCLUDE ANY HVAC DUCTWORK SUPPORTS THAT ARE NOT IDENTIFIED BY INDIVIDUAL PAY ITEM.
15. THE CONTRACTOR SHALL CONSTRUCT A FULLY COMPLETE AND OPERATIONAL SYSTEM IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. ALL NECESSARY TOOLS, HARDWARE, EQUIPMENT, AND LABOR REQUIRED TO COMPLETE THIS PORTION OF THE PROJECT SHALL BE INCORPORATED INTO THE APPROPRIATE PAY ITEM. THIS PAY ITEM SHALL INCLUDE PIPING SUPPORTS, CATCH BASINS, DRY WELLS THAT ARE NOT IDENTIFIED BY INDIVIDUAL PAY ITEM.
16. THE CONTRACTOR SHALL CONSTRUCT A FULLY COMPLETE AND OPERATIONAL SYSTEM IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. ALL NECESSARY TOOLS, HARDWARE, EQUIPMENT, AND LABOR REQUIRED TO COMPLETE THIS PORTION OF THE PROJECT SHALL BE INCORPORATED INTO THE APPROPRIATE PAY ITEM. THIS PAY ITEM SHALL INCLUDE HYDRONIC PIPING SUPPORTS THAT ARE NOT IDENTIFIED BY INDIVIDUAL PAY ITEM.
17. REFER TO MEPS101 FOR FURTHER DIRECTION.
18. REFER TO MD101 FOR FURTHER DIRECTION.
19. REFER TO MP101 AND MEPS101 FOR FURTHER DIRECTION.
20. REFER TO M101 FOR FURTHER DIRECTION.
21. REFER TO MS02 FOR FURTHER DIRECTION.
22. REFER TO M801 FOR FURTHER DIRECTION.
23. REFER TO MPD101, MPD401 & MPD501 FOR FURTHER DIRECTION.
24. REFER TO MP501 FOR FURTHER DIRECTION.
25. REFER TO MP401 & MP501 FOR FURTHER DIRECTION.
26. REFER TO MPD401, MP601, MP501 FOR FURTHER DIRECTION.
27. REFER TO MP401, MP501 MP502 FOR FURTHER DIRECTION.
28. REFER TO MPD401 FOR FURTHER DIRECTION.
29. REFER TO SHEET ED101 FOR REQUIRED SCOPE.
30. REFERENCE EP101 AND ES01 FOR REQUIRED SCOPE.
31. PROVIDE REQUIRED RACEWAYS, WIRING, AND CONNECTIONS FROM EACH GENERATOR AUTOMATIC TRANSFER SWITCH TO RAINFOREST BUILDING FOR MONITORING PURPOSES. INTERFACE EQUIPMENT WITH EXISTING "NIAGRA" BAS SYSTEM. INCLUDE WIRING, TERMINATIONS, PROGRAMMING, CONTROL MODULES FOR COMPLETE SYSTEM OPERATION.
32. REFER TO SHEET E601 FOR PANELBOARD SCHEDULE.
33. REFER TO ES01 FOR REQUIREMENTS.
34. DDC CONTROL SYSTEM SHALL BE EXTENSION OF THE EXISTING "NIAGRA" SYSTEM AND SHALL INCLUDE ALL WIRING AND ALL REQUIRED HARDWARE AND PROGRAMMING.

PAY ITEM NOTES

35. REFER TO ELECTRICAL PLANS E401.
36. REFER TO ELECTRICAL PLANS SHEET E601, DETAIL 2 FOR REFERENCE.
37. REFERENCE SHEET MPD401.
38. SITE LIGHTING SHALL INCLUDE CONCRETE POLE BASE, LIGHT POLE, LIGHT FIXTURE, AND ASSOCIATED WIRING AND CONTROLS.
39. REFER TO MEPS101, EP101, AND ES01 FOR CONNECTION REQUIREMENT.
40. REFER TO ES02 FOR EQUIPMENT PAD REQUIREMENTS. ALL CONCRETE SHALL BE 3500 PSI. ALL REINFORCING REBAR SHALL BE #5, EPOXY COATED.
41. REFER TO EP101 FOR CONNECTION REQUIREMENT.
42. REFER TO E601 FOR SCHEDULE.
43. REFER TO ES01 AND ES02 SHEETS.
44. REFER TO ES01 SHEET.
45. REFER TO ED101 AND ES01.
46. REFER TO ED102 SHEET.

CITY SURPLUS

1. THE CONTRACTOR IS RESPONSIBLE TO TRANSPORT EXISTING GENERATOR TO THE CITY SURPLUS. CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE CITY CONCERNING REQUIRED PAPERWORK, FORMS, AND PROCEDURES. FORKLIFT IS AVAILABLE FOR OFFLOADING.

TULSA SURPLUS
1750 NEWBLOCK PARK DR.

ADD ALTERNATE #1 - Electrical Primary Metering

BID ITEM	SPEC NO.	DESCRIPTION	UNIT	QTY	PAY ITEM NOTES
088	SPEC 26 1329	15kv pad mounted primary switch installed as per plans	EA	1	36
089	SPEC 26 1213	1000kva pad mounted oil filled transformer installed per plans and specifications	EA	1	36
090		Pad mounted primary metering cabinet per PSO specifications	EA	1	4
091		MV cabling from metering cab. to primary switch & primary switch to transformer, 3-#1 25kv, #2G AL, 4" C	LF	10	36
092		MV cable terminations	EA	6	36
093		Reinforced concrete pad for Primary switch	CY	4	4
094		Reinforced concrete pad for Primary metering cabinet	CY	4	4
095	SPEC 26 0533	6" PVC schedule 40, long radius elbow	EA	4	
096	SPEC 26 0533	6" under ground PVC schedule 40, 52" below grade from metering cabinet to PSO dip pole	LF	200	
097	SPEC 26 0533	6" RGS long radius elbow	EA	2	

ADD ALTERNATE #2 - Rainforest Contractor Furnished Package Units

BID ITEM	SPEC NO.	DESCRIPTION	UNIT	QTY	PAY ITEM NOTES
098	SPEC 23 7413	RTU-1.1 (equipment cost only), 25 TON	EA	1	20
099	SPEC 23 7413	RTU-2.1 (equipment cost only), 25 TON	EA	1	20
100	SPEC 23 7413	RTU-5.1 (equipment cost only), 40 TON	EA	1	20

ADD ALTERNATE #3 - Veterinary Clinic MEP upgrade

BID ITEM	SPEC NO.	DESCRIPTION	UNIT	QTY	PAY ITEM NOTES
101	SPEC 23 7413, 23 3113, 23 0593, 23 0713, 3713.13	Temporary heating/cooling allowance	LOT	1	12,14,23
102	SPEC 02 4119	Demolition of existing cooling tower, cooling lower pumps, associated above-grade piping; remove all internal piping from existing condenser water pit and seal all existing openings	LOT	1	8,23
103	SPEC 02 4119	Demolition of existing boiler, boiler circulation pump, and associated piping; demolition of existing supply fan and existing combustion air ductwork	LOT	1	8,23
104	SPEC 02 4119	Demolition of existing heat pump loop pumps, hydronic specialties, heat exchanger, and associated piping; coordinate with water treatment service provider regarding removal of existing water treatment equipment	LOT	1	8,24
105	SPEC 02 4119	Demolish existing pad, fill existing condenser water pit using native soil/wet sand and prepare for new pad.	LOT	1	25
106		Install new reinforced concrete equipment pads, exterior and interior, and anchorage	LOT	1	25
107	SPEC 23 2113, 23 2116, 23 2123, 23 5216, 0923.11, 23 0719, 23 0553	Installation of heat pump loop duplex packaged pumping system, associated piping and insulation, hydronic specialties, air and dirt separator, expansion tank; provide packaged pumping system's remote control panel to site for electrical contractor to install	LOT	1	25
108	SPEC 23 6514.16, 23 2113, 23 2116, 23 2123, 23 5216, 23 0923.11, 23 0719, 23 0553, 23 0529	Installation of closed-circuit fluid cooler, steelwork, associated piping including makeup water and drain piping, heat trace, and insulation with jacketing; provide fluid cooler control panel to site for electrical contractor to install	LOT	1	26
109	SPEC 23 6216, 23 2123, 23 2116, 23 2113, 23 0719, 23 0716, 23 0593, 23 0553, 23 0529	Installation of condensing boiler, associated circulation pump, hydronic piping and insulation, gas-piping connector, and separated combustion roof vent and air intake	LOT	1	16,26
110		Replace existing backflow preventers and PRV stations in existing mechanical room	LOT	1	27
111		Building automation system controls installation and integration allowance	LOT	1	25
112	SPEC 23 0593	Water treatment testing and equipment	LOT	1	24
113	SPEC 23 0593	Perform startup, test, adjust, and balance installed equipment	LOT	1	
114	SPEC 26 0519, 26 0573, 26 2726	Wiring HFUP-1 pumps, 30A-3+G	LF	60	35
115	SPEC 26 0519, 26 0573, 26 2726	Wiring CCFCN-1, 50A-3+G	LF	29	35
116	SPEC 26 0519, 26 0573, 26 2726	Wiring MWP-2, 20-2+G	LF	30	35
117	SPEC 26 2816	30A, 3P, NF, 3R installed @ fluid cooler	EA	2	35
118	SPEC 26 0519, 26 0573, 26 2726	Wiring CCFCN-1 to basin heater, 30A-3+G	LF	30	35
119	SPEC 26 0519, 26 0573, 26 2726	Wiring CCFCN-1 to spray fan, 20A-3+G	LF	40	35
120	SPEC 26 0519, 26 0573, 26 2726	Wiring CCFCN-1 to tower fan, 50A-3+G	LF	60	35
121	SPEC 26 0519, 26 0573, 26 2726	Install and wire new receptacle inside equipment room	EA	4	35
122	SPEC 26 2816	50A, 3P, NF, 3R installed @ fluid cooler	EA	1	35
123	SPEC 26 2418	New circuit breakers added to existing panel	EA	10	35
124	SPEC 26 4313	Surge Protective Device 1.53 series and associated wiring	EA	1	
125	SPEC 26 4313	Surge Protective Device TG series and associated wiring	EA	1	
126	SPEC 26 0519, 26 0533, 26 0526	Wiring to generator panel, #8A-3+G	LF	300	36
127	SPEC 26 0519, 26 0533, 26 0526	Wiring to boiler	EA	1	35

PAY ITEM ABBREVIATIONS LEGEND

ALLOW - ALLOWANCE

CY - CUBIC YARD

EA - EACH

LB - POUND

LF - LINEAR FEET

LOT - SET OF ARTICLES

SF - SQUARE FEET

TULSA ZOO - RAINFOREST
HVAC / ELECTRICAL
UPGRADES
6421 E 36TH ST. NORTH, TULSA, OK 74115

PROJECT NO. CP 24-20



PARKS, CULTURE & RECREATION
CABS (City Architectural Building Services)

DRAWN	PROJ. MGR. <i>[Signature]</i> 10/9/25
DESIGNED	LEAD MGR. <i>[Signature]</i> 05/25
SURVEY	FIELD MGR. <i>[Signature]</i> 5/15

ISSUE BLOCK	BY	DATE

Sheet Name: Pay Items

SHEET 3 OF 31

SHEET NO.
G002

EDA+FKI
ENGINEERS

EDA + FKI Engineers PC
Oklahoma C.A. 20
10610 E. 45th Street - Suite 521
Tulsa, OK 74116
P: 918.559.6800 F: 918.513.4252



4-19-25

MECHANICAL SYMBOL LEGEND	
SYMBOL	DESCRIPTION
	RECTANGULAR SUPPLY AIR DUCT DOWN; (UP)
	RECTANGULAR RETURN AIR DUCT DOWN; (UP)
	RECTANGULAR EXHAUST AIR OR OUTSIDE AIR DUCT DOWN; (UP)
	ROUND DUCT DOWN; (UP)
	ROUND DUCT - SIZE INDICATES INSIDE DIAMETER DIMENSION
	RECTANGULAR DUCT - SIZE INDICATES INSIDE WIDTH/DEPTH DIMENSION
	RECTANGULAR DUCT ELBOW WITH TURNING VANES
	STRAIGHT "SPIN-IN" EXTRACTOR FITTING WITH MANUAL VOLUME DAMPER
	DUCT TRANSITION - (RECTANGLE TO RECTANGLE)
	DUCT TRANSITION - (RECTANGLE TO ROUND)
	ROUND FLEXIBLE DUCT
	FIRE DAMPER
	SMOKE DAMPER
	COMBINATION FIRE / SMOKE DAMPER
	SINGLE LINE DUCTWORK
	MANUAL VOLUME BALANCING DAMPER
	MOTORIZED DAMPER
	BACKDRAFT DAMPER
	DIFFUSER, CEILING, SUPPLY AIR
	DIFFUSER, CEILING, SUPPLY AIR
	DIFFUSER, CEILING, ROUND
	GRILLE, CEILING, RETURN AIR
	DIFFUSER/ GRILLE, SIDE WALL
	GRILLE, CEILING, EXHAUST
	AIR FLOW DIRECTION
	CONNECT TO EXISTING
	THERMOSTAT FOR AHU-1; MTD 48" AFF. U.N.O. COORDINATE W/ DIV. 26 FOR CONDUIT ROUTING
	HUMIDISTAT FOR AHU-1; MTD 48" AFF. U.N.O. COORDINATE W/ DIV. 26 FOR CONDUIT ROUTING
	EQUIPMENT IDENTIFICATION
	NATURAL GAS PIPING
	UNIT CONDENSATE DRAIN PIPING
	REFRIGERANT SUCTION PIPING
	REFRIGERANT LIQUID PIPING
	CONDENSER WATER SUPPLY PIPING
	CONDENSER WATER RETURN PIPING
	HEAT PUMP LOOP WATER SUPPLY PIPING
	HEAT PUMP LOOP WATER RETURN PIPING
	HEATING WATER SUPPLY PIPING
	HEATING WATER RETURN PIPING
	EXISTING DOMESTIC COLD WATER PIPING
	GATE VALVE
	BALL VALVE
	CALIBRATED BALANCING VALVE (CIRCUIT SETTER)
	TEMPERATURE GAUGE
	PRESSURE GAUGE
	GAS COCK VALVE
	DUCT TO BE DEMOLISHED OR MODIFIED SHOWN DASHED
	NEW DUCT SHOWN W/ BOLD LINE WEIGHT CONNECT TO EXISTING SHOWN W/ LIGHT LINE WEIGHT

- GENERAL MECHANICAL NOTES
- WORK SHOWN ON THE DRAWINGS IS TO BE COORDINATED WITH ALL OTHER TRADES AND ACTUAL CONDITIONS OF CONSTRUCTION.
 - INSTALL ALL EQUIPMENT IN ACCORDANCE WITH ALL APPLICABLE CODE REQUIREMENTS, MANUFACTURER RECOMMENDATIONS, AND ADHERE TO REQUIRED CLEARANCES FOR OPERATION AND SERVICE.
 - ELECTRICAL REQUIREMENTS OF FURNISHED AND INSTALLED DIVISION 23 EQUIPMENT AND SYSTEM COMPONENTS SHALL BE PROVIDED IN WRITING BY THE DIVISION 23 CONTRACTOR TO THE DIVISION 26 CONTRACTOR FOR INCLUSION AND COORDINATION OF DIVISION 26 WORK.
 - PROVIDE FLEXIBLE DUCT CONNECTIONS TO AIR HANDLING EQUIPMENT.
 - DUCTWORK CONSTRUCTION AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE MOST RECENT SMACNA STANDARDS FOR PRESSURE AND VELOCITY. ALL DUCT JOINTS SHALL BE SEALED AS NOTED IN THE SPECIFICATIONS.
 - DUCT SIZES SHOWN ON DRAWING ARE INSIDE, CLEAR DIMENSIONS.
 - MAKE TRANSITIONS FROM DUCTWORK SIZES SHOWN ON THE DRAWINGS TO THE EQUIPMENT DUCT CONNECTION SIZES. VERIFY EQUIPMENT CONNECTION SIZES WITH FACTORY CERTIFIED DRAWINGS. MAKE ALL TRANSITIONS IN ACCORDANCE WITH THE MOST RECENT SMACNA STANDARDS.
 - ALL MAJOR BRANCH DUCTS SHALL BE CONSTRUCTED USING OPPOSED BLADE DAMPERS OR SPLITTER DAMPERS AND SUITABLE LOCKING DEVICES FOR BALANCING OF THE DUCT SYSTEM.
 - TURNING VANES SHALL BE INSTALLED IN ALL RECTANGULAR 90 DEGREE ELBOWS IN SUPPLY, RETURN, AND EXHAUST DUCTWORK, AND AS INDICATED ON THE DRAWINGS.
 - MINIMIZE FLEXIBLE DUCT LENGTHS TO AIR DEVICES (MAXIMUM OF FIVE FEET); USE FLEX DUCT ONLY IN FULLY ACCESSIBLE CEILING SPACES. PROVIDE A 90 DEGREE SHEET METAL ELBOW AT THE CEILING DIFFUSER NECK CONNECTION. PROVIDE A SADDLE UNDER FLEXIBLE DUCT HANGERS TO SUPPORT THE DUCT AND PREVENT DUCTWORK "PINCHING". FLEXIBLE DUCT SHALL BE INSTALLED TO PREVENT REDUCTION OF DUCT CROSS SECTION.
 - THE CONTRACTOR SHALL COORDINATE ROUTING AND SIZE OF THE DUCTWORK WITH THE EXISTING FINAL BUILDING CONDITIONS (STRUCTURE, SIZE, LOCATION, LIGHT LOCATIONS, ARCHITECTURAL FEATURES, AND WORK OF OTHER TRADES). WHERE DUCT SIZES MUST BE REVISED FROM THOSE SHOWN ON THE DRAWINGS, MAINTAIN THE SAME CROSS SECTIONAL AREA, VELOCITY, AND PRESSURE DROP. WHEN NECESSARY, REROUTE DUCT TO CLEAR OBSTRUCTIONS WITH A MINIMUM NUMBER OF FITTINGS AND ELEVATION CHANGES. WHERE DUCTWORK MUST BE SIGNIFICANTLY ALTERED FROM THAT SHOWN ON THE DRAWINGS, NOTIFY THE ARCHITECT PRIOR TO PROCEEDING.
 - THE DIVISION 23 CONTRACTOR SHALL TEST AND BALANCE HVAC SYSTEMS. TEST AND BALANCE SHALL BE PERFORMED AND REPORTED AS DESCRIBED BY NEBS WITH NEW AND CLEAN FILTERS, CLEAN DUCTWORK, AND FULLY FUNCTIONAL EQUIPMENT CONTROLS / DEVICES AT THE TIME OF TESTING.
 - MAINTAIN MINIMUM 10'-0" CLEAR BETWEEN ANY FLUE, VENT OR TOILET EXHAUST AND OUTSIDE AIR INTAKES. WHERE MINIMUM HORIZONTAL DISTANCE CANNOT BE PROVIDED, EXTEND THE FLUE VENT 3'-0" ABOVE THE OUTSIDE AIR INTAKE.
 - PROVIDE SMOKE DETECTORS IN RETURN DUCTS FOR HVAC UNITS WITH 2000 CFM AND GREATER CAPACITY. PROVIDE SMOKE DETECTORS IN SUPPLY AND RETURN DUCTS FOR HVAC UNITS WITH 15000 CFM AND GREATER CAPACITY. SMOKE DETECTORS SHALL BE FURNISHED AND INSTALLED UNDER DIVISION 23 AND COORDINATED WITH DIVISION 26 CONTRACTOR. PROVIDE REMOTE INDICATOR AND TEST STATION WHERE UNITS ARE NOT READILY VISIBLE FOR INSPECTION. INTERLOCK DETECTORS WITH THE BUILDING FIRE ALARM SYSTEM.
 - INSTALL ALL MOTOR DRIVEN EQUIPMENT WITH VIBRATION ISOLATORS OR PADS TO REDUCE NOISE TRANSFER. TYPE AND METHOD OF ISOLATION SHALL BE AS SPECIFIED FOR THE DUTY, TYPE, AND APPLICATION OF THE EQUIPMENT.
 - ALL EQUIPMENT SHALL BE PERMANENTLY LABELED WITH SECURED SIGNAGE.
 - CONDENSATE PIPING SHALL BE AS NOTED ON THE DRAWING, BUT IN NO CASE SHALL BE LESS THAN 1-1/2 INCHES.
 - ROUTE CONDENSATE PIPING TO AN APPROVED DISCHARGE LOCATION. PROVIDE A CONDENSATE TRAP WITH SECONDARY CONDENSATE OVERFLOW SWITCH. PROVIDE CLEANOUTS AND VENT ON THE DISCHARGE SIDE OF THE TRAP FOR ALL UNITS WITH COOLING COILS. TRAP DEPTH SHALL BE A MINIMUM OF THE UNIT TOTAL PRESSURE PLUS 2 INCHES.
 - INTERLOCK SMOKE DAMPERS WITH THE BUILDING FIRE ALARM SYSTEM.
 - FIRE DAMPERS SHALL BE DYNAMIC TYPE WITH A MINIMUM 88% FREE AREA. PROVIDE FIRE DAMPERS IN ALL DUCT PENETRATIONS OF FIRE RATED ASSEMBLIES WITH ACCESS DOORS FOR OBSERVATION AND MAINTENANCE. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATION AND RATING OF FIRE RATED WALLS, CEILINGS AND FLOOR ASSEMBLIES.
 - INSTALL ALL THERMOSTATS WITH CONTROLS TO A HEIGHT NOT TO EXCEED 48" A.F.F.
 - NO MODIFICATIONS NEEDED ON EXISTING FIRE PROTECTION SYSTEM.

- GAS PIPING GENERAL NOTES
- WORK SHOWN ON THE DRAWINGS SHALL BE COORDINATED WITH ALL OTHER TRADES, ALL NEW AND EXISTING UTILITIES, AND ACTUAL CONDITIONS OF CONSTRUCTION.
 - GAS PIPING SHALL NOT BE INSTALLED BELOW BUILDING SLAB UNLESS SPECIFICALLY INDICATED. WHERE INDICATED TO BE BELOW SLAB, PIPING SHALL BE SLEEVED AND VENTED TO THE OUTSIDE.
 - FURNISH AND INSTALL INDIVIDUAL GAS COCK AND UNION AT EACH GAS FIRED APPLIANCE AND BUILDING PENETRATION THROUGH EXTERIOR WALLS.
 - GAS COCK SHALL BE FULL SIZE OF REQUIRED EQUIPMENT BRANCH RUNOUT PIPE SIZE BASED ON GAS PRESSURE AND FURTHERMOST PIPE DISTANCE FROM GAS METER OR POINT OF PRESSURE REDUCTION. RUNOUT PIPE SHALL NOT BE REDUCED TO EQUIPMENT CONNECTION PIPE SIZE UNTIL IMMEDIATELY AHEAD OF CONNECTION TO EQUIPMENT.
 - BRANCH GAS PIPING SHALL BE CONNECTED TO THE TOP OR SIDE OF HORIZONTAL PIPING.
 - INSTALL GAS PIPING AT UNIFORM GRADE OF 0.1 PERCENT SLOPE UPWARD TOWARDS RISERS.
 - INSTALL GAS PIPING SO AS TO ALLOW FOR SERVICE AND MAINTENANCE OF EQUIPMENT AND APPLIANCES.
 - OPEN ENDS OF GAS PIPING SHALL BE CAPPED DURING CONSTRUCTION TO PREVENT INTRODUCTION OF FOREIGN MATERIAL.
 - PROVIDE DOUBLE 90 DEGREE OFFSETS IN PIPING RUNOUTS TO GAS FIRED EQUIPMENT. INSTALL PIPING WITH DISTANCE BETWEEN ELBOWS TO ALLOW FOR MOVEMENT OF PIPING SYSTEM.
 - CONTRACTOR SHALL WIRE BRUSH AND PAINT ALL UNSHIED GAS PIPE AND ACCESSORIES EXPOSED TO WEATHER.
 - LOCATE PIPING SUPPORTS AWAY FROM PIPE JOINTS TO ALLOW FREE MOVEMENT OF PIPING WITHOUT INTERFERENCE OF PIPE SUPPORTS.
 - THE CONTRACTOR SHALL VERIFY THE FINAL APPROVED LOCATION OF THE GAS SERVICE METER AND/OR PRESSURE REDUCING STATION AND ADJUST THE GAS PIPE SIZES INDICATED FOR THE TOTAL SYSTEM LENGTH IF DIFFERENT FROM THE DISTANCE LISTED OR SHOWN ON THE DRAWINGS. DRAWINGS INDICATING THE SYSTEM REVISIONS SHALL BE SUBMITTED FOR REVIEW AND APPROVAL.
 - COORDINATE INSTALLATION OF GAS SERVICE METER AND PRESSURE REGULATING STATIONS WITH THE GAS UTILITY COMPANY.
 - PLASTIC GAS SERVICE PIPE SHALL BE INSTALLED WITH AN INSULATED COPPER TRACER WIRE NO LESS THAN #14 AWG LOCATED ADJACENT TO THE TOP OF THE PIPING. THE COPPER TRACER WIRE SHALL EXTEND TO GRADE AND TERMINATE AT EACH END OF THE PLASTIC SERVICE PIPING.
 - TRANSITION RISER FROM PLASTIC SERVICE PIPING TO BLACK STEEL PIPING IS TO BE MADE BELOW GRADE. BLACK STEEL PIPING EXTENDING BELOW GRADE SHALL BE FURNISHED WITH FACTORY APPLIED CORROSION RESISTANT POLYETHYLENE COATING.
 - WHERE UNDERGROUND GAS PIPING RISES THROUGH PAVING OR CONCRETE SURFACES, PROVIDE PIPE SLEEVE TWO PIPE SIZES LARGER THAN INSTALLED PIPING. EXTEND SLEEVE A MINIMUM OF 1 INCH ABOVE FINISHED SURFACE AND DEEPER THAN DEPTH OF PAVING OR CONCRETE. FILL SLEEVE VOID WITH SMALL, ROUNDED, WASHED GRAVEL.

TULSA ZOO - RAINFOREST
HVAC / ELECTRICAL
UPGRADES
6421 E 36TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20



PARKS, CULTURE & RECREATION

CABS (City Architectural Building Services)

DRAWN	PROJ. MGR. <i>JB</i>	08/25
DESIGNED	LEAD MGR. <i>MM</i>	09/25
SURVEY	FIELD MGR. <i>MM</i>	5/25

Tullis starts

ISSUE BLOCK	BY	DATE

Sheet Name: Mechanical General Notes,
Abbreviations & Legend

SHEET NO. **M001**
SHEET 4 OF 31



EDA+FKI
ENGINEERS

EDA + FKI Engineers PC
1700 N.E. 45th Street - Suite 201
Tulsa, OK 74116
or 918.250.6900 | 918.250.6928

KEYNOTES	
1	EXISTING COOLING TOWER TO BE REMOVED
2	EXISTING CONDENSER WATER PUMPS TO BE REMOVED
3	EXISTING PLATE AND FRAME HEAT EXCHANGER TO BE REMOVED
4	EXISTING ATMOSPHERIC BOILER (GAS FIRED, HOT WATER) TO BE REMOVED

PHASING LEGEND	
DEMOLITION	-----
EXISTING	-----
NEW WORK	-----

TULSA ZOO - RAINFOREST
HVAC / ELECTRICAL
UPGRADES
6421 E 36TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20



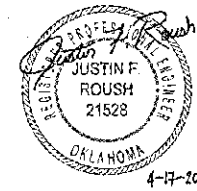
PARKS, CULTURE & RECREATION
CARS (City Architectural Building Services)

DRAWN	PROJ. MGR.	08/15
DESIGNED	LEAD MGR. / M.W.	08/28
SURVEY	FIELD MGR.	5/25

ISSUE BLOCK	BY	DATE
-------------	----	------

Sheet Name: Mechanical Demolition Plan -
Veterinary Clinic

SHEET NO.
MPD101



EDA + FKI
ENGINEERS

EDA + FKI Engineers PC
10810 E. 45th Street • Tulsa, OK 74146
© 2025 COPYRIGHT EDA + FKI ENGINEERS

REFER TO THE
ELECTRICAL DRAWINGS

1 MECHANICAL DEMOLITION PLAN - VETERINARY CLINIC
1/8" = 1'-0"



- KEYNOTES
1. CONTRACTOR REMOVE EXISTING GOVERNOR AIR HANDLING UNIT. DISCONNECT EXISTING SUPPLY AND RETURN LINES AND CAP AT BUILDING ENTRY FOR FUTURE REUSE. REMOVE EXISTING CONDENSATE PIPING, CAP, SEAL, AND ABANDON EXISTING GAS SUPPLY LINE TO BELOW GRADE.
 2. CONTRACTOR TO REMOVE EXISTING ROOF MOUNTED EXHAUST FAN (EF-3). DISCONNECT EXISTING ELECTRICAL SUPPLY AND MAKE READY FOR REUSE. CAP AND SEAL EXISTING ROOF OPENING FOR FUTURE NEW EXHAUST FAN. EXISTING EXHAUST DUCTWORK TO REMAIN.
 3. CONTRACTOR TO REMOVE EXISTING INLINE EXHAUST FAN (EF-4) AND SUPPORT STRUCTURE. DISCONNECT EXISTING ELECTRICAL SUPPLY AND MAKE READY FOR REUSE. EXISTING EXHAUST DUCTWORK TO REMAIN.
 4. EXISTING UNDERGROUND DUCTWORK TO BE ABANDONED IN PLACE.
 5. EXISTING DUCTWORK AND SUPPLY DIFFUSERS TO REMAIN.
 6. REMOVE EXISTING RETURN DUCTWORK FROM GROUND LEVEL UP TO RETURN GRILLE PLENUM TRANSITION. CAP AND SEAL RETURN DUCTWORK AT GROUND LEVEL.
 7. REMOVE ALL EXISTING THERMOSTATS AND ASSOCIATED WIRING. FIELD VERIFY EXACT LOCATIONS PRIOR TO REMOVAL. EXISTING CONDENSATE DRY WELL STUB UP AND VENTING PIPE TO REMAIN FOR REUSE.
 8. CONTRACTOR TO CAP, SEAL, AND ABANDON UNDERGROUND BRANCH DUCT CONNECTION WITH SHEET METAL.
 9. REMOVE EXISTING SUPPLY DUCT AND FITTINGS AND MAKE READY FOR FUTURE RECONNECTION. CAP, SEAL, AND ABANDON EXISTING SUPPLY DUCT AT GROUND LEVEL.
 10. REMOVE EXISTING EXHAUST FAN (EF-2) AND ASSOCIATED CONTROLS/WIRING. REMOVE ASSOCIATED CORRUGATED METAL PANEL UNDER EXHAUST FAN AND REPLACE WITH NEW PROVIDE WATER TIGHT SEAL AROUND OPENINGS.
 11. CONTRACTOR TO REMOVE EXISTING ROOF MOUNTED EXHAUST FAN (EF-1). REMOVE EXISTING ELECTRICAL SUPPLY AND CONTROL WIRING. TEMPORARILY CAP AND SEAL EXISTING ROOF OPENING FOR FUTURE NEW RETURN DUCT CONNECTION. EXISTING EXHAUST DUCTWORK TO REMAIN.
 12. REMOVE EXISTING SUPPLY DUCTWORK.
 13. REMOVE EXISTING SERVICE SHED 128 TO MAKE ROOM FOR NEW RTU-6. REFER TO M101 FOR FURTHER DIRECTION.
 14. EXISTING COOLING TOWER, ASSOCIATED PIPING, AND WIRING TO BE REMOVED.
 15. REMOVE EXISTING TRANSFORMER AND GENERATOR DURS.
 16. REMOVE EXISTING SIDEWALL EXHAUST FAN AND ASSOCIATED WIRING IN THIS LOCATION. EXTERIOR WALL OPENING TO BE REUSED FOR NEW INTAKE LOUVER (LV-1). REFER TO M101 FOR FURTHER DIRECTION.
 17. REMOVE EXISTING 4" UNDERGROUND NATURAL GAS PIPING BACK TO NATURAL GAS PIPING MANIFOLD AND CAP.
 18. REMOVE EXISTING MEDIUM PRESSURE NATURAL GAS RISER MANIFOLD. CAP, SEAL, AND ABANDON EXISTING BELOW GRADE NATURAL GAS PIPING IN AN APPROVED MANNER. REFER TO SITE PLANS FOR APPROXIMATE LOCATION OF BRANCH MAIN. REFER TO M101 FOR LOCATION OF NEW LOW PRESSURE REGULATOR AND NEW MANIFOLD SERVING INTERIOR BUILDING GAS-FIRED EQUIPMENT.
 19. REMOVE EXISTING GOVERNOR UNDERGROUND MAKEUP WATER PIPING. REMOVE ABANDONED BACKFLOW PREVENTER (AND PRV STATION IN ROOM HWT 111) BACK TO DOMESTIC WATER MAIN AND CAP AT MAIN.
 20. REMOVE EXISTING GAS LINE BACK TO MAIN AND CAP AT EXISTING MAIN. VERIFY ACTUAL LOCATION OF EXISTING 2" MEDIUM PRESSURE NATURAL GAS BRANCH PRIOR TO REMOVAL. REFER TO MEP SITE PLAN FOR APPROXIMATE LOCATION OF BRANCH TO BE CAPPED AND SEALED IN AN APPROVED MANNER.
 21. EXISTING INTERIOR RETURN AIR GRILLE TO REMAIN. EXISTING EXTERIOR RETURN AIR PLENUM TO REMAIN FOR FUTURE DUCTWORK CONNECTION. EXISTING EXTERIOR ARMAFLEX DUCT INSULATION TO BE REMOVED. PROVIDE TEMPORARY DUCT CAP AT BOTTOM OF EXISTING RETURN PLENUM. REFER TO M101 FOR FURTHER DIRECTION.
 22. CAP SEAL AND ABANDON EXISTING SUPPLY TUNNEL OPENING IN THIS LOCATION.
 23. EXISTING EXHAUST DUCTWORK TO REMAIN. REMOVE EXISTING ARMAFLEX INSULATION. REFER TO M101 FOR FURTHER DIRECTION.

TULSA ZOO - RAINFOREST
HVAC / ELECTRICAL
UPGRADES
6421 E 36TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20



PARKS, CULTURE & RECREATION
CABS (City Architectural Building Services)

DRAWN	PROJ. MGR.	10/22
DESIGNED	LEAD MGR.	09/28
SURVEY	FIELD MGR.	5/25

ISSUE BLOCK

BY	DATE

Sheet Name: Mechanical Demolition Plan - Rainforest

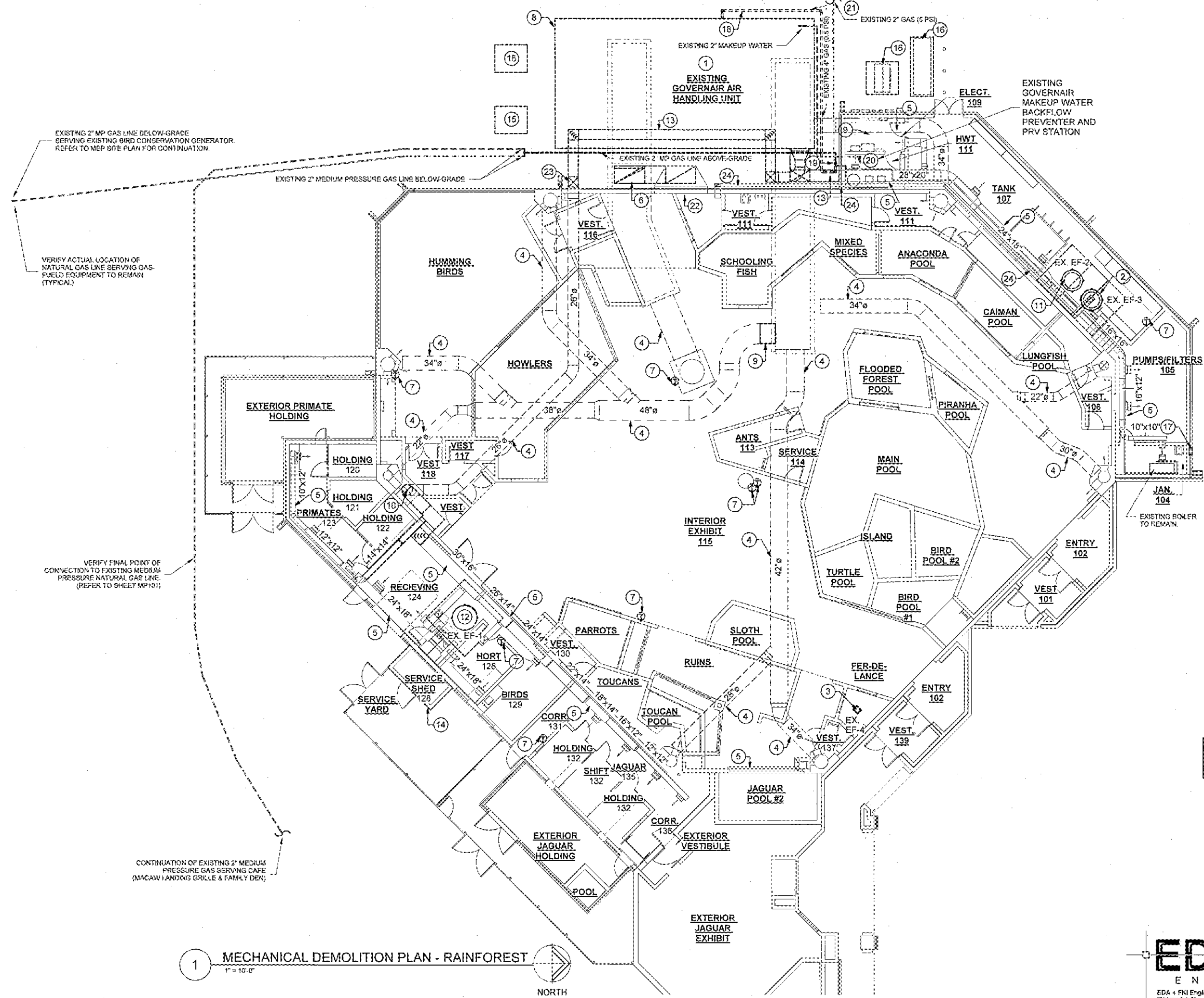
SHEET 7 OF 31
MD101

PHASING LEGEND	
DEMOLITION ABOVE GROUND	---
EXISTING UNDERGROUND	---
NEW WORK	---



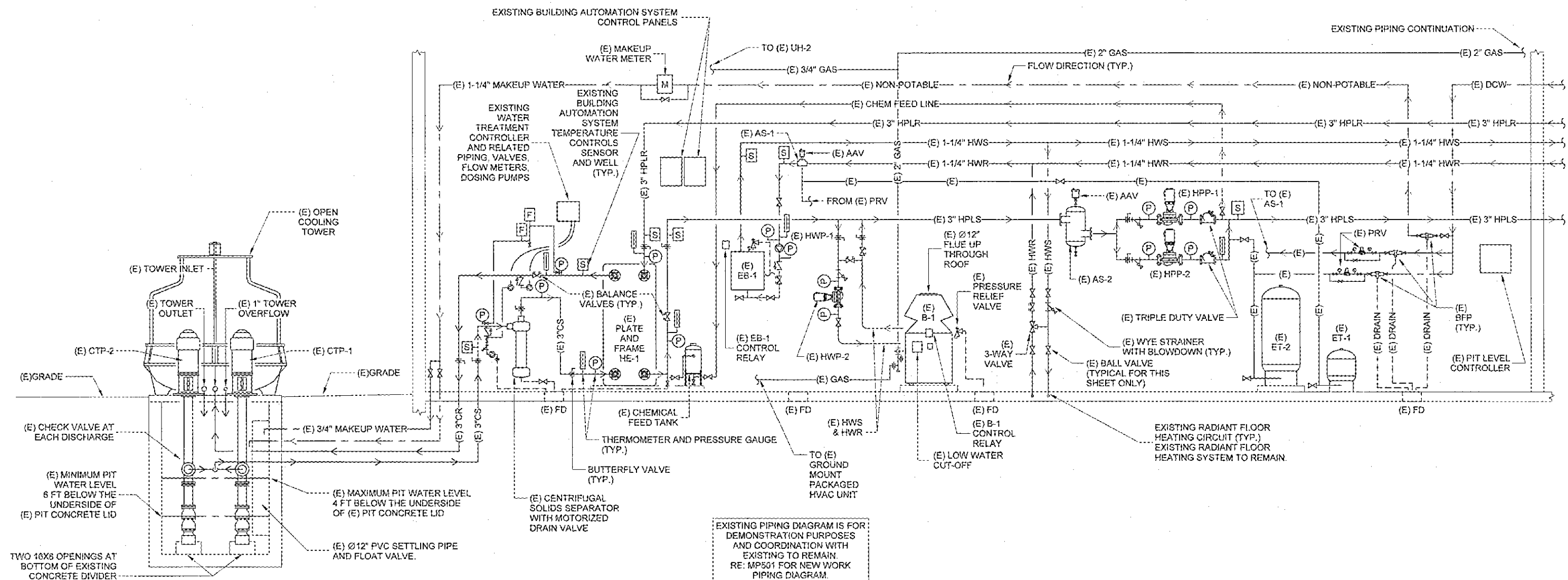
EDA+FKI
ENGINEERS

EDA + FKI Engineers PC
10110 E. 45th Street - Suite 201
Tulsa, OK 74146
918.266.6900



1 MECHANICAL DEMOLITION PLAN - RAINFOREST
1" = 10'-0"
NORTH

4/16/2025 3:20:25 PM



1 EXISTING VETERINARY CLINIC PIPING DIAGRAM (RE: MPD101)
N.T.S.

TULSA ZOO - RAINFOREST
HVAC / ELECTRICAL
UPGRADES
6421 E 36TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20

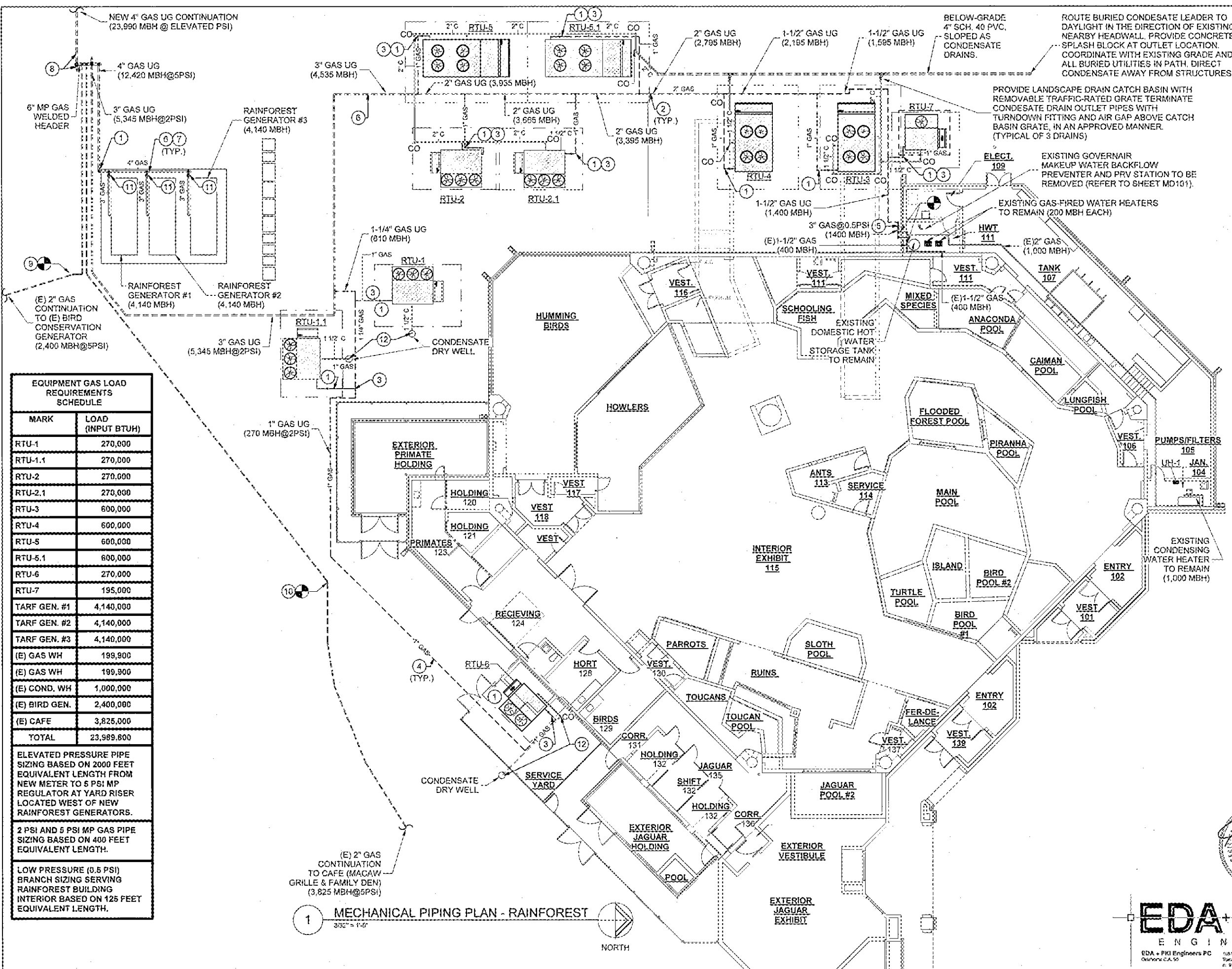


PARKS, CULTURE & RECREATION
CABS (City Architectural Building Services)

DRAWN	PROJ. MGR.	DATE
DESIGNED	LEAD MGR.	DATE
SURVEY	FIELD MGR.	DATE

ISSUE BLOCK BY DATE

ISSUE BLOCK	BY	DATE



- KEYNOTES
1. PROVIDE GAS PIPING LINE SIZE GAS COCK, 8" SEDIMENT TRAP, PRESSURE REGULATOR, AND UNION AT POINT OF CONNECTION TO GAS-FIRED EQUIPMENT. REGULATOR VENTS SHALL BE AT LEAST 10 FEET SEPARATION FROM AIR INTAKES.
 2. BURIED NATURAL GAS PIPING SHALL BE POLYETHYLENE (PE) 11. ALL TRENCHED AND BURIED GAS PIPING TO HAVE 6" OF SAND ABOVE GAS PIPING AND 6" OF SAND BELOW GAS PIPING. BACKFILL ABOVE SAND BEDDING TO GRADE.
 3. ROUTE BURIED NATURAL GAS BRANCH LINE UP THROUGH TO GRADE LEVEL AT THIS APPROXIMATE LOCATION.
 4. ROUTE NATURAL GAS MAIN LINE BELOW FROST LINE.
 5. PROVIDE NEW LOW PRESSURE GAS REGULATOR AND MANIFOLD AT THIS LOCATION. PROVIDE ADDITIONAL LOW PRESSURE FEED LINE TO SERVE DOMESTIC WATER HEATERS SEPARATELY FROM EXISTING 2" NATURAL GAS LINE. SLEEVE AND SEAL PENETRATION OF EXISTING WALL. PROVIDE NEW 1-1/2" NATURAL GAS LINE AND CONNECT TO EXISTING WATER HEATERS IN MECHANICAL ROOM HWT 111.
 6. UNBURIED NATURAL GAS PIPING SHALL BE SCHEDULE 40 BLACK STEEL. UNBURIED CONDENSATE PIPING AS SHOWN ON THE PLANS SHALL BE GALVANIZED. PROVIDE PIPE SUPPORTS EQUAL TO DURABLOCK FOR ALL UNBURIED NATURAL GAS AND CONDENSATE PIPING. SPACE DURABLOCK SUPPORTS AS REQUIRED PER CODE FOR TYPE AND PIPE SIZE BEING SUPPORTED.
 7. PROVIDE EXTERIOR RATED YELLOW COLORED PAINT ON ALL EXISTING AND NEW UNBURIED NATURAL GAS PIPING.
 8. PROVIDE NEW 4" POLYETHYLENE ELEVATED PRESSURE NATURAL GAS SERVICE LINE BACK TO NEW METER LOCATION (SEE SITE PLANS). UPSTREAM OF YARD MANIFOLD MEDIUM PRESSURE HEADER. PROVIDE GAS REGULATOR TO REDUCE ELEVATED PRESSURE TO EXISTING MEDIUM PRESSURE OF 5 PSI. PROVIDE OVER PRESSURE PROTECTION DEVICE AT YARD MANIFOLD AS REQUIRED IF EXISTING GAS PRESSURE VARIES FROM WHAT IS SHOWN ON THE PLANS. NOTIFY ENGINEER OF RECORD.
 9. PROVIDE NEW 2" NATURAL GAS SERVICE LINE FOR EXISTING BIRD CONSERVATION GENERATOR AND CONNECT INTO EXISTING MEDIUM PRESSURE SERVICE LINE (5 PSI) AT THIS APPROXIMATE THIS LOCATION. VERIFY EXISTING GAS PRESSURE BEFORE DEMOLITION. IF EXISTING GAS PRESSURE VARIES FROM WHAT IS SHOWN ON THESE PLANS, NOTIFY ENGINEER OF RECORD.
 10. PROVIDE NEW 2" MEDIUM PRESSURE GAS LINE FOR EXISTING CAFE AND CONNECT INTO EXISTING AT THIS APPROXIMATE LOCATION. IF EXISTING GAS PRESSURE VARIES FROM WHAT IS SHOWN ON THESE PLANS, NOTIFY ENGINEER OF RECORD.
 11. ROUTE MEDIUM PRESSURE NATURAL GAS LINE ABOVE GRADE FULL SIZE AS SHOWN ON THE PLANS. PROVIDE INDEPENDENT GAS PRESSURE REGULATOR FOR EACH GASEOUS GENERATOR TO REDUCE NATURAL GAS PRESSURE FROM 5 PSI TO 2 PSI. PROVIDE OVER PRESSURE PROTECTION DEVICES AS REQUIRED.
 12. ROUTE DOWN TO NEW CONDENSATE DRY WELL IN THIS LOCATION. REFER TO DETAIL 2/5501.

EQUIPMENT GAS LOAD REQUIREMENTS SCHEDULE	
MARK	LOAD (INPUT BTUH)
RTU-1	270,000
RTU-1.1	270,000
RTU-2	270,000
RTU-2.1	270,000
RTU-3	600,000
RTU-4	600,000
RTU-5	600,000
RTU-5.1	600,000
RTU-6	270,000
RTU-7	195,000
TARF GEN. #1	4,140,000
TARF GEN. #2	4,140,000
TARF GEN. #3	4,140,000
(E) GAS WH	199,900
(E) GAS WH	199,900
(E) COND. WH	1,000,000
(E) BIRD GEN.	2,400,000
(E) CAFE	3,825,000
TOTAL	23,989,800
ELEVATED PRESSURE PIPE SIZING BASED ON 2000 FEET EQUIVALENT LENGTH FROM NEW METER TO 5 PSI MP REGULATOR AT YARD RISER LOCATED WEST OF NEW RAINFOREST GENERATORS.	
2 PSI AND 5 PSI MP GAS PIPE SIZING BASED ON 400 FEET EQUIVALENT LENGTH.	
LOW PRESSURE (0.5 PSI) BRANCH SIZING SERVING RAINFOREST BUILDING INTERIOR BASED ON 125 FEET EQUIVALENT LENGTH.	

TULSA ZOO - RAINFOREST HVAC / ELECTRICAL UPGRADES
6421 E 36TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20

CITY OF
TULSA

PARKS, CULTURE & RECREATION
CABS (City Architectural Building Services)

DRAWN	PROJ. MGR.	05/25
DESIGNED	LEAD MGR.	05/25
SURVEY	FIELD MGR.	05/25

ISSUE BLOCK

BY DATE

SHEET NO. MP101

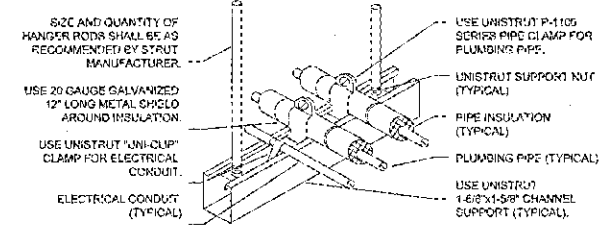
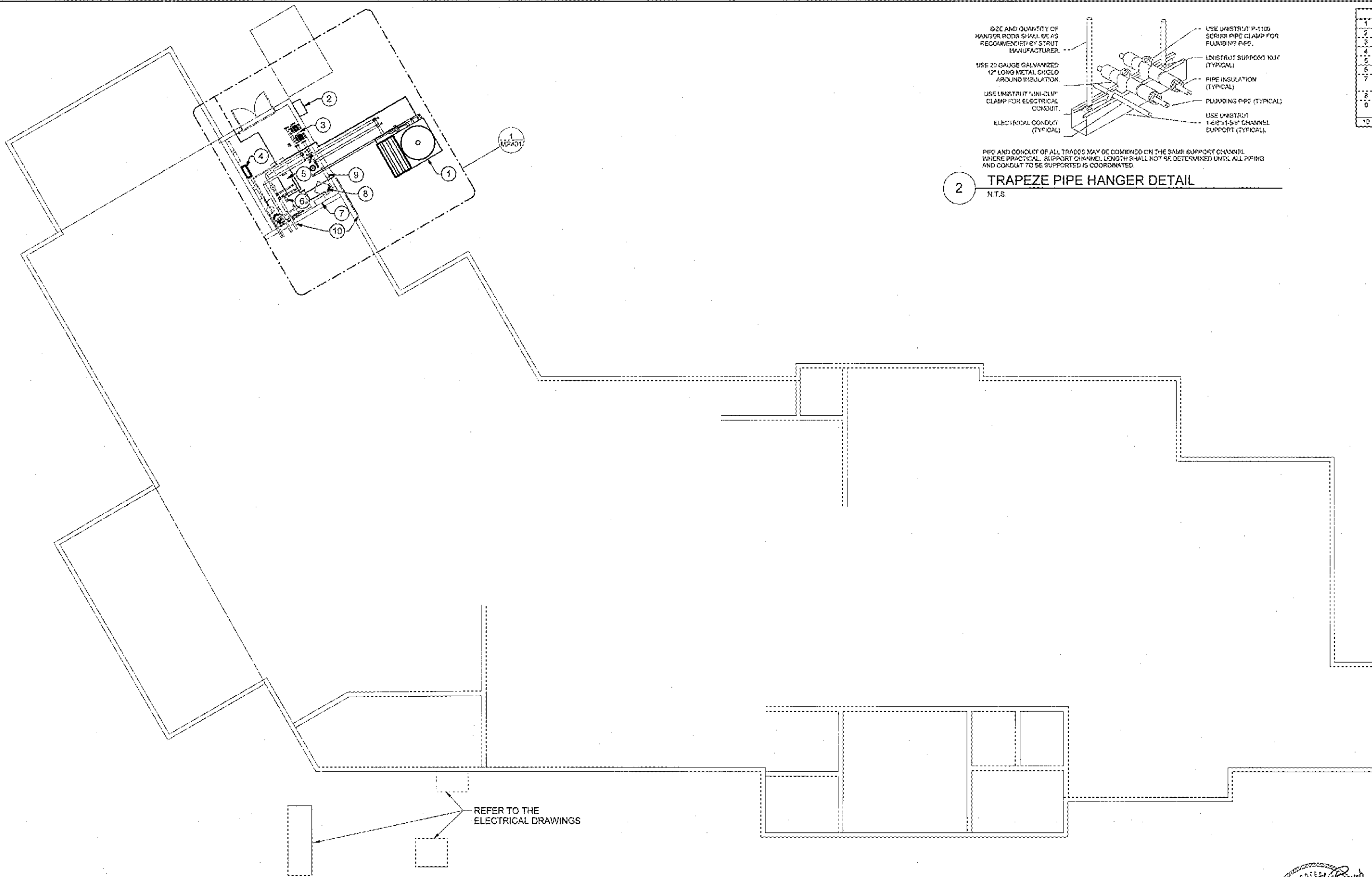
SHEET 11 OF 31

EDA+FKI
ENGINEERS

EDA + FKI Engineers PC
Oklahoma City, OK 73102

10010 E. 46th Street, Suite 201
Tulsa, OK 74116
P: 918.253.8500 F: 918.253.4329

1 MECHANICAL PIPING PLAN - RAINFOREST
3/32" = 1'-0"



2 TRAPEZE PIPE HANGER DETAIL
N.T.S.

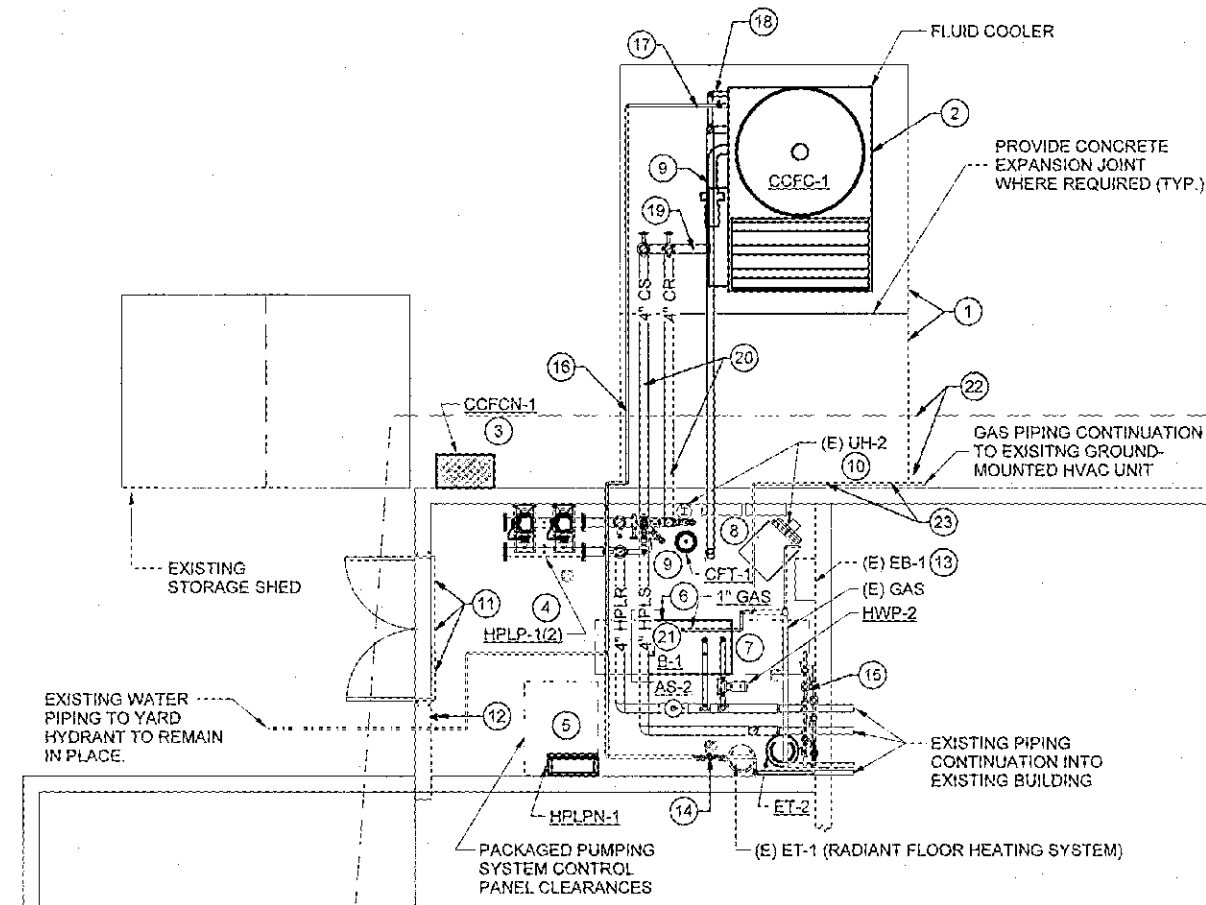
KEYNOTES	
1	CLOSED CIRCUIT FLUID COOLER
2	CLOSED CIRCUIT FLUID COOLER CONTROL PANEL
3	DUPLEX PACKAGED PUMPING SYSTEM
4	PACKAGED PUMPING SYSTEM CONTROL PANEL
5	CONDENSING BOILER (GAS FIRED, HOT WATER)
6	BOILER CIRCULATOR PUMP
7	EXISTING ELECTRIC BOILER SERVING EXISTING RADIANT FLOOR HEATING SYSTEM
8	EXISTING UNIT HEATER (GAS FIRED)
9	EXISTING BUILDING AUTOMATION SYSTEM CONTROL CABINETS
10	PIPING CONTINUATION TO AREAS BEYOND SCOPE OF WORK

1 MECHANICAL PIPING PLAN - VETERINARY CLINIC
1/8" = 1'-0"
NORTH



EDA + FKI
ENGINEERS
EDA + FKI Engineers PC
10910 E. 46th Street - Suite 201
Tulsa, OK 74146
O: 918.258.0901 F: 918.513.4379

TULSA ZOO - RAINFOREST HVAC / ELECTRICAL UPGRADES 8421 E 36TH ST. NORTH, TULSA, OK 74115 PROJECT NO. CP 24-20			
CITY OF TULSA PARKS, CULTURE & RECREATION CABS (City Architectural Building Services)			
DESIGN	PROJ. MGR.	DATE	
DESIGNED	LEAD MGR.	DATE	
SURVEY	FIELD MGR.	DATE	
ISSUE BLOCK			
BY	DATE		
Sheet Name: Mechanical Piping Plan - Veterinary Clinic			
SHEET NO.			MP102
SHEET 12 OF 31			



1 MECHANICAL PIPING ENLARGED PLAN - VETERINARY CLINIC
1/8" = 1'-0"



KEYNOTES	
1	PROVIDE REINFORCED CONCRETE BASE FOR SUPPORT AND ANCHORAGE OF FLUID COOLER. STEELWORK AND PIPE HANGER SUPPORT STANDS. STEELWORK SHALL BE GALVANIZED.
2	INSTALL CLOSED CIRCUIT FLUID COOLER TO STEELWORK ON REINFORCED CONCRETE BASE.
3	PROVIDE CLOSED CIRCUIT FLUID COOLER CONTROL PANEL FOR INSTALLATION BY OTHERS.
4	INSTALL PACKAGED PUMPING SYSTEM PER MANUFACTURER'S REQUIREMENTS. PROVIDE 4" CONCRETE HOUSEKEEPING PAD.
5	PROVIDE PACKAGED PUMPING SYSTEM CONTROL PANEL FOR INSTALLATION BY OTHERS.
6	INSTALL CONDENSING BOILER ON 4" CONCRETE HOUSEKEEPING PAD.
7	INSTALL CONDENSING BOILER FLUE VENT AND COMBUSTION-AIR-INTAKE ACCORDING TO MANUFACTURER'S REQUIREMENTS AND RECOMMENDATIONS FOR FINAL INSTALLED EQUIVALENT LENGTHS. PROVIDE AIR-INTAKE PIPING, VENT PIPING, AND TERMINATIONS PER MATERIAL SPECIFICATIONS.
8	PROVIDE COST FOR INDEPENDENT CONTROLS CONTRACTOR TO INTEGRATE NEW EQUIPMENT'S BACKUP COMMUNICATIONS WITH EXISTING BUILDING AUTOMATION SYSTEM (NIAGARA). COORDINATE FINAL ELECTRICAL REQUIREMENTS WITH ENGINEER OF RECORD.
9	PROVIDE COST FOR INDEPENDENT WATER TREATMENT CONTRACTOR TO ASSESS WATER TREATMENT PLAN FOR HEAT PUMP LOOP AND FLUID COOLER EVAPORATIVE WATER. COORDINATE FINAL ELECTRICAL REQUIREMENTS OF NEW WATER TREATMENT EQUIPMENT WITH ENGINEER OF RECORD.
10	VERIFY PROPER OPERATION OF EXISTING UNIT HEATER (CAS TYPED). COORDINATE FINAL LOCATION OF EXISTING THERMOSTAT WITH NEW PIPING AS REQUIRED. UNIT HEATER TO REMAIN IN PLACE AND IN USE.
11	VERIFY ALL ABANDONED OPENINGS IN EXISTING INTAKE LOUVER PLENUM ARE PATCHED WITH INSULATED SHEET METAL AND MASTIC SEALANT.
12	PROVIDE NEW EMERGENCY BOILER SHUTDOWN SWITCH.
13	EXISTING ELECTRIC BOILER AND RADIANT FLOOR HEATING SYSTEM TO REMAIN IN PLACE. REFER TO SHEET MPD401 AND MPD501.
14	REFER TO SHEET MPD401 FOR REQUIREMENTS OF NEW BACKFLOW PREVENTERS.
15	REFER TO SHEET MPD401 FOR REQUIREMENTS OF NEW PRESSURE REDUCING VALVE STATIONS WITH WATER REGULATORS.
16	EXTEND MAKEUP WATER TO FLUID COOLER BASIN CONNECTION. MAKEUP WATER PIPING SHALL BE TYPE L COPPER. PROVIDE INSULATION AND JACKETING PER SPECIFICATIONS. INSTALL MAKEUP WATER PIPING IN SUCH A MANNER SO AS TO ALLOW OUTDOOR PIPING TO BE ISOLATED FROM INDOOR PIPING AND FULLY DRAINED.
17	PROVIDE Y-STRAINER UPSTREAM OF MAKEUP WATER SOLENOID VALVE WITH MESH PER SOLENOID VALVE MANUFACTURER'S REQUIREMENTS.
18	FLUID COOLER DRAIN PIPING AND FITTINGS SHALL BE SCHEDULE 40 CPVC. PROVIDE INSULATION AND JACKETING PER SPECIFICATIONS. PROVIDE PIPE SUPPORT EQUAL TO MRO MODEL SH, RE. DETAIL 8/MP501.
19	PITCH CONDENSER WATER SUPPLY OUTLET PIPING TOWARD THE HIGHEST FLANGED COIL CONNECTION. PITCH CONDENSER WATER RETURN INLET PIPING AWAY FROM THE LOWER FLANGED COIL CONNECTION. INSTALL CONDENSER WATER PIPING IN SUCH A MANNER SO AS TO ALLOW THE FLUID COOLER COIL TO BE FULLY DRAINED.
20	INSTALL CONDENSER WATER PIPING IN SUCH A MANNER SO AS TO ALLOW OUTDOOR PIPING TO BE ISOLATED FROM INDOOR PIPING (INSIDE MECHANICAL ROOM). PITCH CONDENSER WATER PIPING TO ALLOW FLUID COOLER COIL AND OUTDOOR PIPING TO BE FULLY DRAINED VIA DRAIN VALVES LOCATED IN MECHANICAL ROOM. NORMALLY CLOSED DRAIN VALVES SHALL BE 2 INCH WITH PLUGS.
21	PROVIDE GAS COCK, 6" SEDIMENT TRAP, AND UNION AT POINT OF CONNECTION TO GAS FIRED EQUIPMENT.
22	COORDINATE WITH EXISTING STRUCTURES AND ROOF GLITTER TO REMAIN. VERIFY EXISTING DOWNSPOUT OUTLETS IN PROXIMITY TO THE AREA OF NEW WORK ARE DIRECTED AWAY FROM BUILDINGS AND THE NEW REINFORCED CONCRETE INSTALLATIONS.
23	RELOCATE GAS PIPING SERVING EXISTING GROUND MOUNTED HVAC UNIT AS REQUIRED WHERE EXISTING GAS PIPING CONFLICTS WITH NEW WORK.

TULSA ZOO - RAINFOREST
HVAC / ELECTRICAL
UPGRADES
8421 E 36TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20



PARKS, CULTURE & RECREATION
CABS (City Architectural Building Services)

DESIGNED	PROJ. MGR.	DATE
SURVEY	LEAD MGR.	DATE
	FIELD MGR.	DATE

ISSUE BLOCK	BY	DATE
-------------	----	------

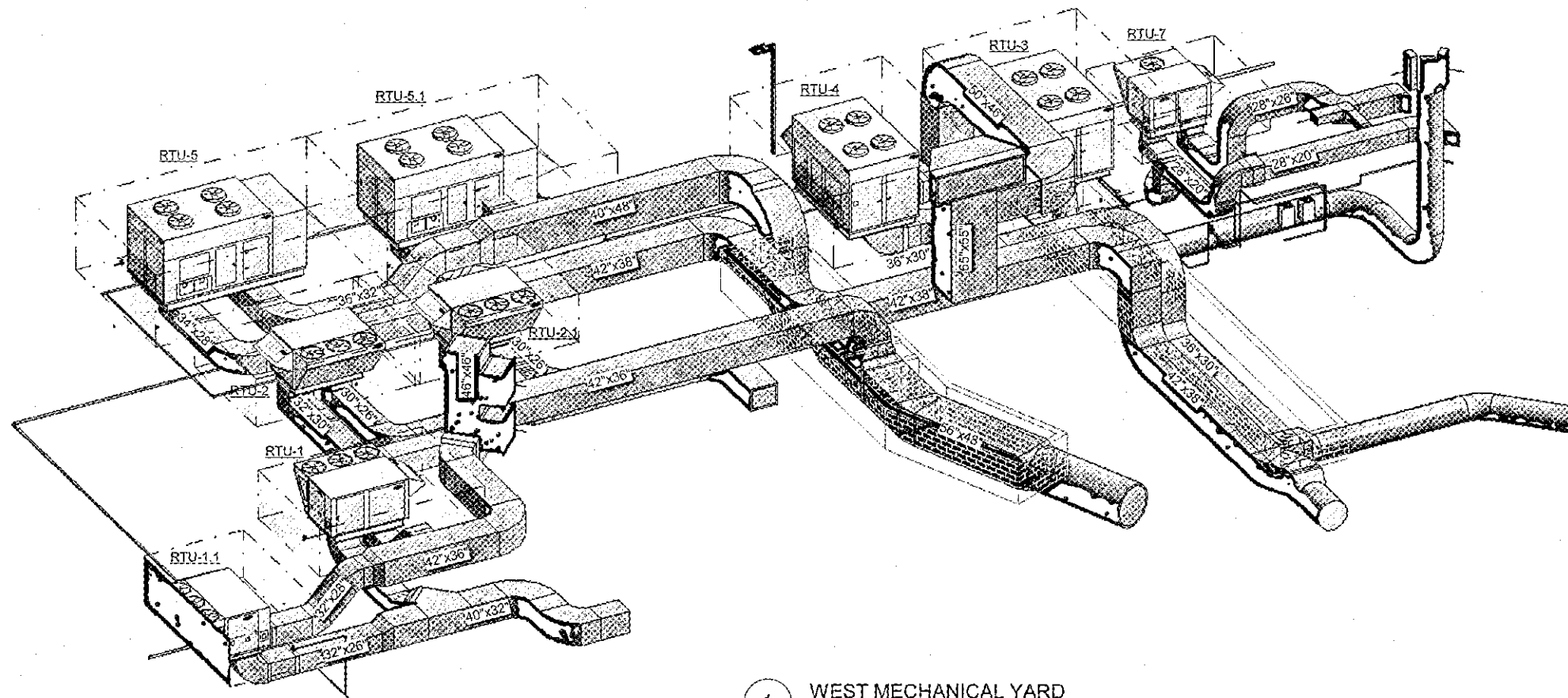
Sheet Name: Enlarged Mechanical Plans -
Veterinary Clinic

SHEET NO. 13 OF 31
MP401

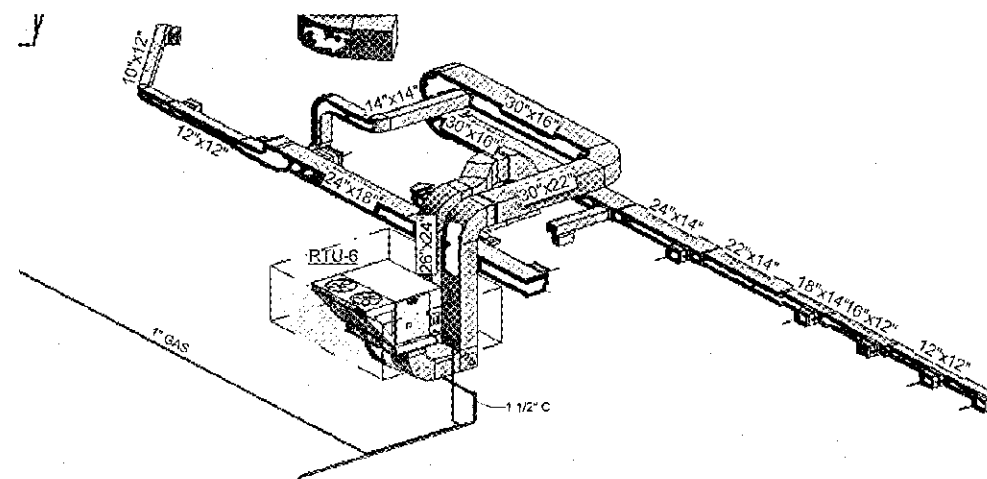


EDA+FKI
ENGINEERS

EDA + FKI Engineers PC
10810 E. 43rd Street - Suite #201
Tulsa, OK 74146
P: 918.256.0900 • F: 918.615.8388



1 WEST MECHANICAL YARD
NTS



2 EAST RTU-6 DETAIL
NTS

TULSA ZOO - RAINFOREST
HVAC / ELECTRICAL
UPGRADES
8421 E 36TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20



PARKS, CULTURE & RECREATION
CARS (City Architectural Building Services)

DRAWN	PROJ. MGR.	DATE
DESIGNED	LEAD MGR.	DATE
SURVEY	FIELD MGR.	DATE

ISSUE BLOCK	BY	DATE

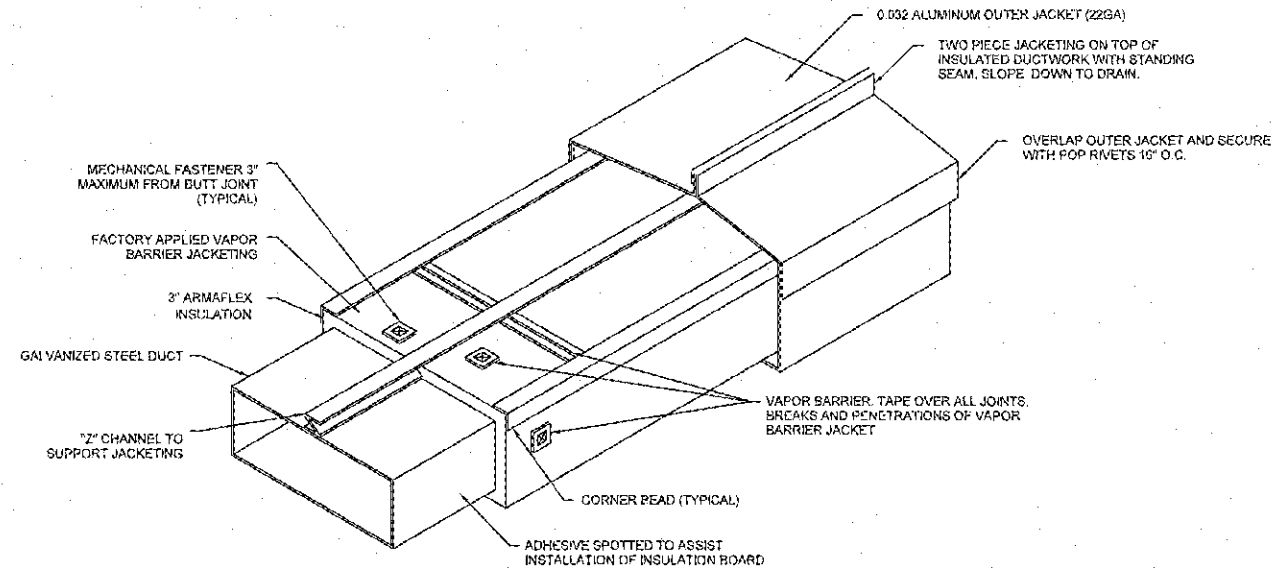
Sheet Name: Mechanical Details

SHEET NO. M501
SHEET 14 OF 31

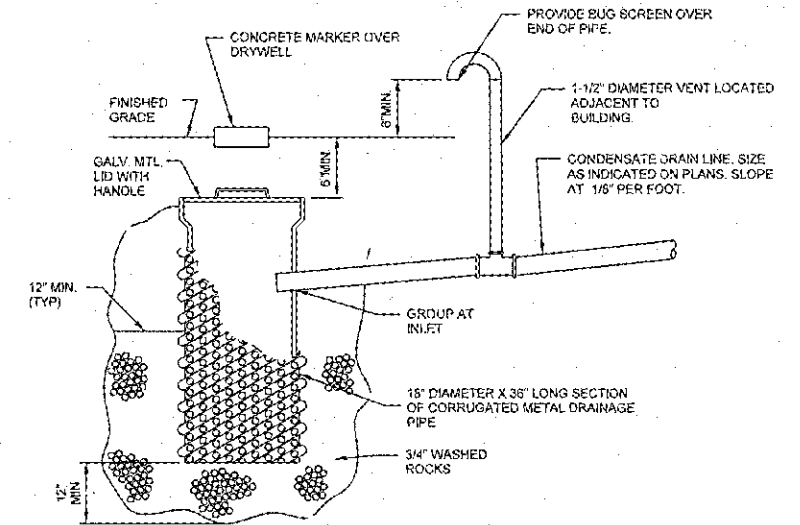


EDA+FKI
ENGINEERS

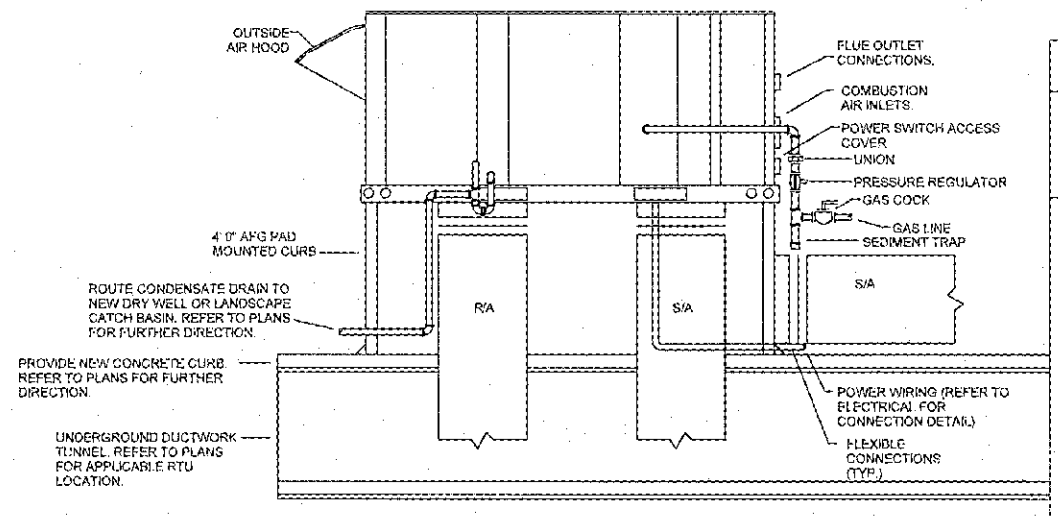
EDA + FKI Engineers PC
10010 E. 45th Street - Suite 201
Tulsa, OK 74146
Tel: 918.250.0800 Fax: 918.250.0800



2 EXTERIOR DUCTWORK DETAIL
N.T.S.

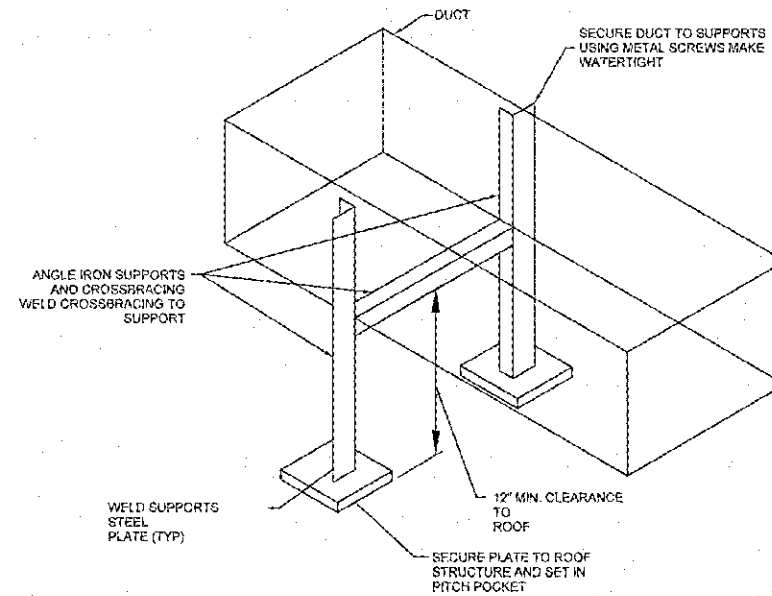


1 DRY WELL DETAIL
N.T.S.



- NOTES:
1. ALL CONNECTIONS AND SERVICES MUST BE MADE INSIDE THE PERIMETER CURB.
 2. DISCONNECT SWITCHES, BRACKETS, AND CONDUITS MUST BE TO STRUCTURAL MEMBERS OF UNIT.
 3. UNIT CONFIGURATION AND CONNECTIONS VARY BY UNIT TYPE. REFER TO PLANS FOR FURTHER DIRECTION.

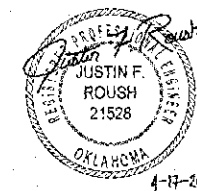
3 GROUND MOUNTED RTU DETAIL
N.T.S.



NOTE: COAT ALL WELDED JOINTS W/ASPHALT EMULSION

4 EXTERIOR RECTANGULAR DUCT SUPPORT DETAIL
N.T.S.

TULSA ZOO - RAINFOREST HVAC / ELECTRICAL UPGRADES			
6421 E 36TH ST. NORTH, TULSA, OK 74115			
PROJECT NO. CP 24-20			
CITY OF TULSA PARKS, CULTURE & RECREATION CABS (City Architectural Building Services)			
DRAWN	DESIGNED	SURVEY	PROJ. MGR. <i>[Signature]</i> 05/25 LEAD MGR. <i>[Signature]</i> 05/25 FIELD MGR. <i>[Signature]</i> 5/25 <i>[Signature]</i> 5/25
ISSUE BLOCK	BY	DATE	
Sheet Name: Mechanical Details			
SHEET 15 OF 31			
M502			



EDA + FKI
ENGINEERS

EDA + FKI Engineers PC
19810 S. 43rd Street • Suite 201
Tulsa, OK 74149
P: 918.250.0801 F: 918.215.4338

HEATING WATER SYSTEM SEQUENCE OF OPERATION

GENERAL DESCRIPTION:

THE HEATING WATER SYSTEM CONSISTS OF A CONDENSING BOILER (B-1) AND ASSOCIATED CIRCULATION PUMP (HWP-2). THE BUILDING AUTOMATION SYSTEM (BAS) CONTROLLER SHALL PROVIDE STAND-ALONE CONTROL OR BAS WORKSTATION CONTROL OF SUPPLY HEATING WATER TEMPERATURE SETPOINT (ADJ.) BY CONTROLLING BOILER'S ENABLE/DISABLE SIGNAL.

HEATING SYSTEM ENABLE/DISABLE:

THE HEATING WATER SYSTEM WILL BE ENABLED MANUALLY BY THE USER AT THE BAS OR AUTOMATICALLY WHEN THE OUTSIDE AIR TEMPERATURE (ATB) FALLS BELOW 60°F (ADJ.). THE BAS SHALL ENABLE THE BOILER CIRCULATION PUMP START/STOP CONTROL. THE BOILER FACTORY CONTROL SHALL OPERATE THE BOILER TO MAINTAIN HPL SUPPLY WATER TEMPERATURE (T6) SETPOINT OF 60°F (ADJ.). THE HEATING WATER SYSTEM WILL BE DISABLED MANUALLY BY THE USER AT THE BAS OR AUTOMATICALLY BY THE SYSTEM WHEN OUTSIDE AIR TEMPERATURE RISES ABOVE 65°F (ADJ.). AFTER A 5 MINUTE (ADJ.) DELAY, HWP-2 SHALL BE DISABLED AND ISOLATION CONTROL VALVE SHALL CLOSE.

BOILER CONTROL:

BOILER IS CONTROLLED BY A SELF-CONTAINED CONTROLS SYSTEM TO CONTROL SYSTEM HEATING WATER TEMPERATURE (T3 TO MAINTAIN T6 SETPOINT). THE BOILER WILL CONTROL THE 2-WAY MOTORIZED ISOLATION VALVE. THE BAS WILL MONITOR THE VALVE POSITION.

HEATING WATER RESET:

THE HPL SUPPLY WATER TEMPERATURE SETPOINT SHALL BE LINEARLY RESET FROM 60°F (ADJ.) TO 70°F (ADJ.) AS THE OUTSIDE AIR TEMPERATURE FALLS FROM 60°F (ADJ.) TO 35°F (ADJ.)

BOILER CIRCULATION PUMP (HWP-2) START/STOP CONTROL:

THE BOILER CIRCULATION PUMP (HWP-2) WILL AUTOMATICALLY START WHEN THE HEATING WATER SYSTEM IS ENABLED AND 2-WAY ISOLATION CONTROL VALVE IS PROVEN TO BE OPEN.

HEATING WATER PUMP (HWP-2) STATUS/FAILURE

THE BAS CONTROLLER SHALL MONITOR RUN STATUS OF HWP-2 BY LINE CURRENT SENSOR SWITCH STATUS. IF HWP-2 COMMAND STATUS DOES NOT MATCH THE COMMANDED VALUE, A FAILURE ALARM WILL BE GENERATED TO THE BAS.

HEATING WATER PUMP SPEED:

THE BOILER WILL CONTROL THE VARIABLE SPEED BOILER CIRCULATION PUMP'S SPEED. BOILER PRE-PURGE AND POST-PURGE SPEED SHALL BE PROPORTIONAL TO PUMP HWP-2 SCHEDULED FLOWRATE. AFTER A 60 SECOND (ADJ.) DELAY, BOILER WILL CONTROL VARIABLE SPEED PUMP HWP-2 TO MAINTAIN A 30°F (ADJ.) TEMPERATURE RISE ACROSS THE BOILER (T3 MINUS T2). PROVIDE HEATING WATER SYSTEM TEMPERATURE VALUES (T2 & T3) TO THE BUILDING AUTOMATION SYSTEM.

HEATING WATER SYSTEM STATUS:

PROVIDE RUN STATUS TO SIGNAL TO BAS FOR BOILER CIRCULATION PUMP HWP-2, BOILER B-1. AND BOILER REMOTE SHUTDOWN SWITCH ACTIVATED.

HEATING WATER SYSTEM ALARMS:

FAILURE OF BOILER CIRCULATION PUMP HWP-2 TO START WHEN ENABLED.
FAILURE OF BOILER B-1 TO START WHEN ENABLED.
CARBON MONOXIDE ALARM CONDITION.
BOILER REMOTE SHUTDOWN SWITCH ACTIVATED.

CONDENSER WATER SYSTEM SEQUENCE OF OPERATION

GENERAL DESCRIPTION:

THE CONDENSER WATER SYSTEM CONSISTS OF CLOSED-CIRCUIT FLUID COOLER WITH POSITIVE CLOSURE DAMPER HOOD, SPRAY PUMP, FAN MOTOR VFD, BASIN HEATER, FAN MOTOR HEATER, ELECTRIC WATER LEVEL CONTROL, MAKEUP WATER SOLENOID VALVE, FLUID COOLER CONTROL PANEL, AND STAND-ALONE BLEED SOLENOID VALVE WITH TIME CLOCK. THE BUILDING AUTOMATION SYSTEM SHALL PROVIDE STAND-ALONE CONTROL OR BAS WORKSTATION CONTROL OF THE CONDENSER SUPPLY WATER TEMPERATURE SETPOINT (ADJ.) BY ENABLING THE FLUID COOLER.

CONDENSER WATER SYSTEM ENABLE/DISABLE:

THE CONDENSER WATER SYSTEM WILL BE ENABLED MANUALLY BY THE USER AT THE BAS OR AUTOMATICALLY BASED ON HPL RETURN WATER TEMPERATURE (T1).

THE CONDENSER WATER SYSTEM WILL BE DISABLED MANUALLY BY THE USER AT THE BAS OR AUTOMATICALLY BY THE BAS SYSTEM.

CLOSED-CIRCUIT FLUID COOLER CONTROL:

FLUID COOLER SYSTEM IS CONTROLLED BY A SINGLE-POINT CONNECTION CONTROL PANEL EQUAL TO FRANKLIN ELECTRIC TOWER IQ WITH INTEGRAL PANEL HEATER AND COOLING FANS. CONTROL PANEL SHALL INCLUDE TEMPERATURE CONTROLLER AND IMMERSION TEMPERATURE SENSOR WELL IN FLUID COOLER OUTLET PIPE (CST1).

WHEN LOOP RETURN WATER TEMPERATURE (T1) IS GREATER THAN OR EQUAL TO 90°F (ADJ.) AND LESS THAN 95°F (ADJ.) POSITIVE CLOSURE DAMPER IS OPENED AND FLUID COOLER SPRAY PUMP IS ENABLED. SPRAY PUMP WILL BE INTERLOCKED WITH DAMPER END SWITCH SO THAT DAMPERS ARE PROVED OPEN BEFORE SPRAY PUMP RUNS.

WHEN LOOP RETURN WATER TEMPERATURE (T1) RISES TO 95°F (ADJ.), SPRAY PUMP IS RUNNING AND FLUID COOLER FAN WILL BE ENABLED. FLUID COOLER CONTROL PANEL SHALL CONTAIN TEMPERATURE CONTROLLER WHICH PROVIDES ANALOG INPUT TO FAN VARIABLE FREQUENCY DRIVE. FLUID COOLER FAN VFD WILL BE CONTROLLED TO MAINTAIN 85°F (ADJ.) FLUID COOLER LEAVING WATER TEMPERATURE (CST1).

PROVIDE NEW OUTSIDE AIR TEMPERATURE AND RELATIVE HUMIDITY SENSOR (OSA) INPUT TO BUILDING AUTOMATION SYSTEM. PROVIDE CONDENSER WATER TEMPERATURE VALUES (T4 & T5) AND TEMPERATURE DROP ACROSS THE FLUID COOLER INLET AND OUTLET (T5 MINUS T4) TO THE BUILDING AUTOMATION SYSTEM.

THE 6-PROBE ELECTRIC WATER LEVEL CONTROL (EWLC) WILL BE INTERLOCKED WITH SLOW-CLOSING MAKEUP WATER SOLENOID VALVE TO MAINTAIN BASIN WATER LEVEL DURING OPERATION.

THE BASIN IMMERSION HEATER WILL BE THERMOSTATICALLY CONTROLLED TO MAINTAIN BASIN WATER TEMPERATURE ABOVE 45°F. THE BASIN HEATER SHALL BE INTERLOCKED TO DE-ENERGIZE WHEN SPRAY PUMP IS RUNNING. PROVIDE LOW WATER LEVEL RELAY TO DISABLE BASIN IMMERSION HEATER. IF BASIN HEATER COMMAND STATUS DOES NOT MATCH ITS COMMANDED VALUE A FAILURE ALARM WILL BE GENERATED.

FLUID COOLER BLEED LINE (BLOW-DOWN) SOLENOID VALVE WILL BE CONTROLLED TO OPEN VIA TIMECLOCK (ADJ.) WITH MANUAL OVERRIDE SWITCH. TIMECLOCK AND BLEED LINE SOLENOID VALVE WILL BE INTERLOCKED WITH SPRAY PUMP BY LINE CURRENT STATUS TO ENSURE SPRAY PUMP IS RUNNING WHILE BLEED DURATION IS ACCRUING.

CONDENSER WATER SYSTEM STATUS:

PROVIDE RUN STATUS SIGNAL TO BAS FOR FLUID COOLER CCFC-1 POSITIVE CLOSURE DAMPER, SPRAY PUMP, FAN, AND BASIN HEATER, RESPECTIVELY.

CONDENSER WATER SYSTEM ALARMS:

FAILURE OF DAMPER ACTUATOR TO OPEN WHEN ENABLED.
FAILURE OF SPRAY PUMP TO START WHEN ENABLED.
FAILURE OF FLUID COOLER FAN OR FAN VFD TO START WHEN ENABLED.
FAILURE OF BASIN HEATER TO START WHEN ENABLED.
VIBRATION CUTOFF SWITCH CLOSURE.

HEAT TRACE SYSTEM SEQUENCE OF OPERATION

SELF-REGULATING HEAT TRACE (5 WATTS PER FOOT) SHALL BE INSTALLED ON ALL OUTDOOR EXPOSED WATER AND DRAIN PIPING EXTERNAL TO THE FLUID COOLER INCLUDING VALVES AND FITTINGS OF THE CONDENSER WATER PIPING, MAKEUP WATER PIPING, AND DRAIN PIPING. ALL OUTDOOR PIPING SHALL BE INSULATED AND PROVIDED WITH WEATHERPROOF JACKETING PER SPECIFICATIONS.

STAND-ALONE HEAT TRACE CONTROLLER WILL CONSIST OF PIPE LINE SENSING CONTROL THERMOSTAT AND AMBIENT OUTSIDE AIR TEMPERATURE SENSOR (ATH) AND CONTROL THERMOSTAT. SELF-REGULATING HEAT TRACE WILL BE ENABLED TO ENERGIZE WHEN OUTSIDE AMBIENT AIR TEMPERATURE FALLS BELOW 50°F. ENERGIZED SELF-REGULATING HEAT TRACE WILL OPERATE TO MAINTAIN 50°F SETPOINT.

HEAT TRACE SYSTEM STATUS:

PROVIDE RUN STATUS SIGNAL TO BAS WHEN HEAT TRACE IS ENERGIZED.

HEAT TRACE SYSTEM ALARMS:

FAILURE OF HEAT TRACE TO ENERGIZE WHEN ENABLED.
ALARM CONDITION OF LOOP TEMPERATURE OF LESS THAN 45°F (ADJ.) ANYWHERE IN THE SYSTEM SHALL ENERGIZE SELF-REGULATING HEAT TRACE.

EXISTING WATER SOURCE HEAT PUMP SYSTEM

GENERAL DESCRIPTION:

EXISTING WATER SOURCE HEAT PUMP (WSHP) CONTROL SYSTEM INCORPORATES EXISTING ZONE THERMOSTATS TO ENABLE/DISABLE WSHP OPERATION. LOOP FLOW CONTROL CONSISTS OF MANUAL BALANCING VALVES VIA CONTINUOUS FLOW AT WATER-TO-REFRIGERANT HEAT EXCHANGERS AT 11 EXISTING WSHPs.

VERIFY EXISTING BUILDING AUTOMATION SYSTEM REQUIREMENTS FOR COORDINATION WITH NEW EQUIPMENT AND NEW WORK.

HEAT PUMP LOOP PUMP SYSTEM SEQUENCE OF OPERATION

GENERAL DESCRIPTION:

THE HEAT PUMP LOOP SYSTEM CONSISTS OF A DUPLEX PACKAGED PUMP SYSTEM WITH LEAD/LAG CONTROL AND INTEGRATED VARIABLE FREQUENCY DRIVES (VFD).

LOOP PUMP ENABLE/DISABLE:

ONE PUMP OF DUPLEX PACKAGED PUMP SYSTEM SHALL RUN CONTINUOUSLY AT SCHEDULED FLOWRATE.

LOOP PUMP LEAD/LAG:

LOOP PUMP LEAD/LAG SEQUENCE WILL BE BASED ON A WEEKLY SCHEDULE. FROM BAS WORKSTATION OR MANUFACTURER'S PUMP CONTROL PANEL AN OPERATOR WILL BE ABLE TO MANUALLY CHANGE THE LEAD/LAG SCHEDULE.

LOOP PUMP SPEED:

THE BAS CONTROLLER WILL MONITOR THE HEAT PUMP LOOP SYSTEM DIFFERENTIAL PRESSURE SENSOR. WHEN PUMP VFD IS ENABLED, THE LOOP PUMPS CONTROL PANEL HPLPN-1 WILL CONTROL THE RUNNING PUMP'S SPEED TO DELIVER SCHEDULED FLOWRATE. LOOP PUMP WILL MAINTAIN A HEAT PUMP LOOP PRESSURE DIFFERENTIAL PRESSURE SETPOINT OF 39 PSI (ADJ.). FINAL DIFFERENTIAL PRESSURE SETPOINT TO BE DETERMINED BY TEST AND BALANCE.

LOOP PUMP FAILURE:

IF THE LEAD PUMPS COMMAND STATUS DOES NOT MATCH ITS COMMANDED VALUE A FAILURE ALARM WILL BE GENERATED. AFTER 1-MINUTE DELAY, THE LAG PUMP WILL BE STARTED AND THE LEAD/LAG AUTOMATION WILL BE DISABLED. ONCE THE CAUSE OF THE FAILURE ALARM HAS BEEN CORRECTED, THE OPERATOR WILL BE ABLE TO MANUALLY RE-ENABLE THE LEAD/LAG SEQUENCE. THE LEAD PUMP WILL BEGIN TO RUN AND THE LAG PUMP WILL STOP.

LOOP PUMP STATUS:

RUN STATUS FOR LOOP PUMP HPLP-1 AND HPLP-2, RESPECTIVELY.

LOOP SYSTEM ALARMS:

FAILURE OF HPLP-1 OR HPLP-2 TO START WHEN ENABLED.
LOOP TEMPERATURE OF LESS THAN 45°F (ADJ.) OR OVER 100°F (ADJ.) ANYWHERE IN THE SYSTEM.

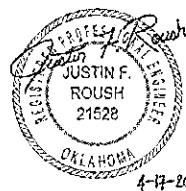
TULSA ZOO - RAINFOREST HVAC / ELECTRICAL UPGRADES			
6421 E 36TH ST. NORTH, TULSA, OK 74115			
PROJECT NO. CP 24-20			
CITY OF TULSA PARKS, CULTURE & RECREATION CAAS (City Architectural Building Services)			
DRAWN	PROJ. MGR.	DESIGNED	LEAD MGR.
SURVEY	FIELD MGR.		
ISSUE BLOCK		BY	DATE
Sheet Name: Mechanical Details			
SHEET 17 OF 31		SHEET NO. MP502	



4/25/2025 2:14:09 PM

GROUND MOUNTED GAS-FIRED PACKAGE UNIT SCHEDULE																										
MARK	MANUFACTURER	MODEL	NOMINAL TONS	CFM	OUTSIDE AIR CFM	TOTAL COOLING CAPACITY (MBH)	TOTAL SENSIBLE CAPACITY (MBH)	COOLING EDBT	COOLING EWBT	COOLING OUTDOOR AIR DBT	COOLING OUTDOOR AIR WBT	HEATING INPUT (MBH)	HEATING OUTPUT (MBH)	HEATING OUTDOOR AIR TEMP	ENTERING HEATING TEMP.	LEAVING HEATING TEMP	WEIGHT (LBS)	FAN QUANTITY	FAN RATED HP (EACH)	FAN BHP (EACH)	ESP (in W.C.)	MCA	MOCP	VOLTAGE	PHASE	NOTES
RTU-1	AAON.	RNA-025-C-A-3-GAA0B-CB1B0	25	6790	1220 CFM	282.7	174	82.1 °F	69.6 °F	101 °F	80 °F	270	218.7	0 °F	61.5 °F	91.6	2960	1	7.5	3.78	2.1	67 A	80 A	460	3	1,2,3,4,5,6,7,8,9,10,11,12,14,16,17,18,19,20,23,24,25
RTU-1.1	AAON.	RNA-025-C-A-3-GAA0B-CB1B0	25	6790	1220 CFM	282.7	174	82.1 °F	69.6 °F	101 °F	80 °F	270	218.7	0 °F	61.5 °F	91.6	2960	1	7.5	3.78	2.1	67 A	80 A	460	3	1,2,3,4,5,6,7,8,9,10,11,12,14,16,17,18,19,20,23,24,26
RTU-2	AAON.	RNA-025-C-A-3-GAA0B-CB1B0	25	7015	1265 CFM	284	176.2	82.1 °F	69.6 °F	101 °F	80 °F	270	218.7	0 °F	61.5 °F	90.6	2960	1	7.5	4.02	2.2	67 A	80 A	460	3	1,2,3,4,5,6,7,8,9,10,11,12,14,16,17,18,19,20,23,24,25
RTU-2.1	AAON.	RNA-025-C-A-3-GAA0B-CB1B0	25	7015	1265 CFM	284	176.2	82.1 °F	69.6 °F	101 °F	80 °F	270	218.7	0 °F	61.5 °F	90.6	2960	1	7.5	4.02	2.15	67 A	80 A	460	3	1,2,3,4,5,6,7,8,9,10,11,12,14,16,17,18,19,20,23,24,26
RTU-3	AAON.	RNA-040-D-A-3-GAB0B-CB2K0	40	11870	2135 CFM	509	324.3	83.7 °F	70.2 °F	101 °F	80 °F	600	480	0 °F	61.4 °F	99.2	5880	2	5	2.78	1.78	97 A	110 A	460	3	1,2,3,4,5,6,7,8,9,10,11,12,13,16,17,18,19,20,22,23,25
RTU-4	AAON.	RNA-040-D-A-3-GAB0A-CB2K0	40	10705	1930 CFM	497.5	310	83.4 °F	69.9 °F	101 °F	80 °F	600	480	0 °F	61.1 °F	103	5855	2	3	2.29	1.63	91 A	100 A	460	3	1,2,3,4,5,6,7,8,9,10,11,12,13,16,17,18,19,20,22,23,25
RTU-5	AAON.	RNA-040-D-A-3-GAB0A-CB2K0	40	9160	1650 CFM	457.1	299.9	82.1 °F	67.3 °F	101 °F	80 °F	800	480	0 °F	64.0 °F	113	6160	2	10	2.48	1.78	110 A	125 A	460	3	1,2,3,4,5,6,7,8,9,10,11,12,13,15,16,17,18,19,20,22,23,25
RTU-5.1	AAON.	RNA-040-D-A-3-GAB0A-CB2K0	40	9160	1650 CFM	457.1	299.9	82.1 °F	67.3 °F	101 °F	80 °F	800	480	0 °F	64.0 °F	113	6160	2	10	2.48	1.78	110 A	125 A	460	3	1,2,3,4,5,6,7,8,9,10,11,12,13,15,16,17,18,19,20,22,23,26
RTU-6	AAON	RNA-016-C-A-3-GAA0B-CB1B0	16	7965	1435 CFM	166.5	166.5	82.1 °F	65.8 °F	101 °F	80 °F	270	218.7	0 °F	61.5 °F	87.2	2730	1	15	8.91	4.71	59 A	80 A	460	3	1,2,3,4,5,6,7,8,9,10,11,12,14,16,17,18,19,20,21,23,25
RTU-7	AAON	RNA-011-B-A-3-GAA0B-CB1K0	11	4175	865 CFM	116.6	103.3	82.1 °F	65.8 °F	101 °F	80 °F	195	156	0 °F	61.5 °F	96.5	1735	1	3	1.71	1.56	25 A	30 A	460	3	1,2,3,4,5,6,7,8,9,10,11,12,14,16,17,18,19,20,21,23,25

- NOTES:
1. PROVIDE STRUCTURALLY REINFORCED CONCRETE MECHANICAL EQUIPMENT PAD, IF NOT ALREADY EXISTING.
 2. PROVIDE 4' 0" TALL INSULATED CURB.
 3. PROVIDE HOT GAS REHEAT.
 4. PROVIDE STAINLESS STEEL HEAT EXCHANGER.
 5. PROVIDE LOW LEAK ECONOMIZER.
 6. PROVIDE HAIL GUARDS.
 7. PROVIDE RETURN AIR SMOKE DETECTOR MOUNTED IN RETURN MAIN DUCT.
 8. PROVIDE UNFUSED DISCONNECT SWITCH.
 9. PROVIDE UNPOWERED CONVENIENCE OUTLET.
 10. PROVIDE BACNET CARD CAPABLE OF INTEGRATING INTO EXISTING NIAGARA BUILDING OPERATION SYSTEM.
 11. PROVIDE 7-DAY PROGRAMMABLE THERMOSTAT. PROVIDE TEMPERATURE/HUMIDITY SENSORS AND MOUNT INSIDE RETURN AIR DUCT. REFER TO PLANS FOR FURTHER DIRECTIONS.
 12. PROVIDE NATURAL GAS CONNECTION. REFER TO DETAIL 3/M502.
 13. PROVIDE TRAPPED CONDENSATE DRAIN PIPING WITH OVERFLOW SWITCH. ROUTE CONDENSATE DRAIN PIPING TO EXISTING DRY WELL.
 14. PROVIDE TRAPPED CONDENSATE DRAIN PIPING WITH OVERFLOW SWITCH. ROUTE CONDENSATE DRAIN PIPING TO DRY WELL, REFER TO DETAIL 1/M502 FOR FURTHER DIRECTION.
 15. UNIT TO BE PROVIDED WITH 2 COMPRESSOR, 2 SUPPLY FANS, 6 CONDENSER FANS.
 16. MODULATING GAS HEAT - TEMPERATURE CONTROL.
 17. PROVIDE 2" PLEATED - MERV 8 UNIT FILTERS.
 18. PROVIDE DOUBLE WALL R-13 FOAM INSULATION CABINET.
 19. PREMIUM AAON GRAY PAINT EXTERIOR PAINT. FUTURE PAINTING OF THE UNITS TO BE COORDINATED WITH FACILITIES STAFF.
 20. BOTTOM SUPPLY AND RETURN LOCATIONS.
 21. UNIT TO BE PROVIDED WITH 2 COMPRESSORS, 1 SUPPLY FAN, 2 CONDENSER FANS.
 22. UNIT TO BE PROVIDED WITH 4 COMPRESSORS, 2 SUPPLY FANS, 4 CONDENSER FANS.
 23. UNIT TO BE PROVIDED WITH 454B REFRIGERANT.
 24. UNIT TO BE PROVIDED WITH 2 COMPRESSORS, 1 SUPPLY FAN, 3 CONDENSER FANS.
 25. UNIT IS TO BE PROVIDED BY OWNER AND INSTALLED BY CONTRACTOR.
 26. UNIT IS TO BE PROVIDED BY CONTRACTOR UNDER ADD ALTERNATE #2.



EDA+FKI

ENGINEERS

EDA + FKI Engineers PC
Oklahoma, CA, US

10010 C. Ave. Suite 201
Oklahoma, CA 94146
P: 916.204.0011 F: 916.316.4306

TULSA ZOO - RAINFOREST
HVAC / ELECTRICAL
UPGRADES
6421 E 36TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20



PARKS, CULTURE & RECREATION	
CAOS (City Architectural Building Services)	
DRAWN	PROJ. MGR. <i>[Signature]</i>
DESIGNED	LEAD MGR. <i>[Signature]</i>
SURVEY	FIELD MGR. <i>[Signature]</i>
<i>[Signature]</i>	
ISSUE BLOCK	BY DATE
Sheet Name: Mechanical Schedules	
SHEET NO. M601	
SHEET 18 OF 31	

AIR TERMINAL SCHEDULE						
TYPE MARK	MANUFACTURER	MODEL	SIZE	MATERIAL	MOUNTING FRAME	NOTES
LV-1	GREENHECK	EAD-632W	24"X30"	Aluminum - Painted, Black	SURFACE MOUNT	1,3,6,7
LV-2	GREENHECK	EAD-632W	24"X30"	Aluminum - Painted, Black	SURFACE MOUNT	1,3,6,7
R1	TITUS	355RF	22"X22"	Aluminum - Titus - 26 White	DUCT PFA	2,3,4,5
R2	TITUS	350FLF	48"X48"	Aluminum - Titus - 26 White	SURFACE MOUNT	2,3,4,5

- NOTES:
- COORDINATE COLOR FINISH WITH ARCHITECT.
 - NECK MOUNTED OPPOSED BLADE DAMPER.
 - PROVIDE INSECT SCREEN.
 - PROVIDE DEBRIS SCREEN.
 - MOUNTING FRAME PFA ALUMINUM PLASTER FRAME.
 - PROVIDE FLANGE FRAME AND MOUNTING CLIPS.
 - PROVIDE MOTORIZED DAMPER AND INTERLOCK WITH EXISTING BOILER. DAMPER SHALL OPEN WHEN BOILER GAS BURNER IS ENERGIZED.

EXHAUST FAN SCHEDULE													
TAG	MANUFACTURER	MODEL NUMBER	EXHAUST AIR FLOW	STATIC PRESSURE	RPM	H.P.	SONES	LOCATION	NOTES	MCA	MOCP	VOLTAGE	PHASE
EF-1	GREENHECK	CSP-A510-VG	120 CFM	.3	953	0.04	0.3	WEST - TANK 107	1,2,3,4,5,6,7,8	3 A	15 A	120 V	1
EF-2	GREENHECK	CUE-070-VG	275 CFM	.3	1662	0.03	5.5	WEST - TANK 107	1,2,3,4,5,6,7	2 A	15 A	120 V	1

- NOTES:
- PROVIDE INSULATED 14" ROOF CURB.
 - PROVIDE 24V DAMPER ACTUATOR, INTERLOCK WITH BUILDING AUTOMATION SYSTEM TO OPEN WHEN THE FAN IS RUNNING.
 - PROVIDE BIRD SCREEN.
 - PROVIDE MOTOR STARTER, MOUNT NEAR EXHAUST FAN INSIDE HIGH AND TIGHT TO STRUCTURE.
 - PROVIDE VARIABLE FREQUENCY DRIVE.
 - PROVIDE ELECTRICAL DISCONNECT.
 - REFER TO ELECTRICAL FOR FURTHER CONTROL DIRECTION.
 - UNIT TO BE PLATFORM MOUNTED TO STRUCTURE WITH ALL THREAD ROD AND SPRING VIBRATION ISOLATORS.

UNIT HEATER SCHEDULE (ELECTRIC)											
MARK	MANUFACTURER	MODEL	AIR FLOW	FAN RPM	MBH	KW	VOLTAGE	PHASE	MOUNTING HEIGHT (FT.)	WEIGHT (LBS.)	NOTES
UH-1	QMARK	MUH03-81	350 CFM	800	10,200	3	208	1	7' 0"	30	ALL

- NOTES:
- PROVIDE OPTIONAL INTEGRAL THERMOSTAT. THERMOSTAT TO BE SET TO 55° F.
 - PROVIDE OPTIONAL MOUNTING BRACKET AND HARDWARE.

TULSA ZOO - RAINFOREST
HVAC / ELECTRICAL
UPGRADES
6421 E 36TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20

CITY OF

TULSA

PARKS, CULTURE & RECREATION

CABS (City Architectural Building Services)

DRAWN

DESIGNED

SURVEY

PROJECT MGR

FIELD MGR

DATE

10/5/25

09/25

5/25

5/25

5/25

ISSUE BLOCK

BY

DATE

Sheet Name: Mechanical Schedules

SHEET NO.

M602



EDA+FKI

ENGINEERS

EDA + FKI Engineers PC
Oneonta, CA 95956
15810 E. 45th Street - Suite 201
Tulsa, OK 74146
P: 918.258.6931 F: 918.615.4238

CLOSED CIRCUIT FLUID COOLER SCHEDULE

MARK	MANUFACTURER	MODEL NUMBER	WEIGHT (LBS)	GPM	HOT WATER TEMP (F)	COLD WATER TEMP (F)	WET BULB TEMP (F)	NOTES	HP	VOLTAGE	PHASE
CCFC-1	BALTIMORE AIRCOIL COMPANY	FXV-0806A-20D-K	8925	120	95	85	80	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24	10	208 V	3
CCFCN-1	FRANKLIN ELECTRIC	CTP3R-BYP010-2V-3 (100 kA SCCR)						1, 25, 26, 27, 28, 29, 30, 31, 32, 33		208 V	3

NOTES:

- REFER TO ELECTRICAL DRAWINGS FOR ELECTRICAL CHARACTERISTICS.
- CTI CERTIFICATION PER STD-201.
- 2 HP CLOSE-COUPLED, BRONZE-FITTED 290 GPM SPRAY PUMP (208V, 3PH) WITH LIFT OUT, STAINLESS STEEL STRAINER SCREENS AND ANTI-VORTEXING BAFFLES.
- PROVIDE EVAPORATIVE WATER SYSTEM BLEED/BLOW-DOWN LINE WITH METERING VALVE AND SOLENOID VALVE (120VAC) TO CONTROL THE BLEED RATE FROM SPRAY PUMP DISCHARGE TO FLUID COOLER OVERFLOW DRAIN. PROVIDE TIME CLOCK WITH MANUAL OVERRIDE TO CONTROL THE BLEED/BLOW-DOWN SOLENOID VALVE TO OPEN, INTERLOCK TIME CLOCK WITH SPRAY PUMP VIA LINE CURRENT SENSOR.
- PROVIDE POSITIVE CLOSURE DAMPER (120V, 1PH) HOOD ASSEMBLY WITH INSULATION AND STAINLESS STEEL LINKAGES. PROVIDE FACTORY-INSTALLED THERMAL INSULATION ON THE CASING PANELS SURROUNDING THE FLUID COOLER COIL.
- 6 KW BASIN HEATER (208V, 3PH) WITH FLUID COOLER MANUFACTURER-PROVIDED 120VAC THERMOSTAT EQUAL TO PENN A19ANC.
- PROVIDE MANUFACTURER'S 6-PORT ELECTRIC WATER LEVEL CONTROL (EWLC) SYSTEM WITH LOW AND HIGH LEVEL ALARM, BASIN HEATER LOW WATER CUTOFF. PROVIDE 3A MAX FUSE PER MANUFACTURER'S REQUIREMENT.
- PROVIDE 1" SLOW-CLOSING MAKEUP WATER SOLENOID VALVE (120V, 1PH). PROVIDE STRAINER BEFORE MAKEUP WATER SOLENOID VALVE.
- PROVIDE FACTORY-MOUNTED SOLID-STATE MECHANICAL VIBRATION CUTOFF SWITCH (VCOS). PROVIDE VCOS WITH AUXILIARY ALARM CONTACTOR AND REMOTE RESET CONTACTOR. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
- PROVIDE TENSIONER ASSEMBLY EQUAL TO BALTDRIVE POWER TRAIN OPTION FOR FAN MOTOR. PROVIDE G-235 FAN GUARD. COORDINATE WITH ELECTRICAL CONTRACTOR TO HAVE MOTOR SPACE HEATERS FIELD-WIRED AT TIME OF INITIAL INSTALLATION.
- INSTALL FLUID COOLER PER MANUFACTURER'S REQUIREMENTS AND RECOMMENDATIONS.
- SET FLUID COOLER LEVEL. PROVIDE SUPPORT AND ANCHOR TO REINFORCED CONCRETE STRUCTURE IN AN APPROVED MANNER.
- PROVIDE MANUFACTURER PLENUM ACCESS DOORS, INTERNAL WALKWAY WITH ALUMINUM LADDER.
- PROVIDE MANUFACTURER ALUMINUM FAN DECK LADDER WITH HANDRAILS.
- PROVIDE MATERIALS OF CONSTRUCTION EQUAL TO MANUFACTURER'S EVERTOUGH CONSTRUCTION WITH TRI-LAYER CORROSION PROTECTED BASIN. STANDARD GALVANIZED WET COIL. REFER TO MANUFACTURER'S PASSIVATION REQUIREMENTS AND RECOMMENDATIONS.
- PROVIDE SELF-REGULATING HEAT TRACE SW/FT TO ALL NEW OUTDOOR PIPING AND VALVES/FITTINGS RELATED TO THE FLUID COOLER INSTALLATION.
- PROVIDE HEAT TRACE SETPOINT CONTROLLER WITH AMBIENT OUTDOOR AIR SENSOR.
- LARGE DIAMETER, NON-CLOG, 360° SPRAY PATTERN NOZZLES.
- PROVIDE FAN SHAFT BEARING EXTENDED LUBE LINES.
- STANDARD FILL WITH INTEGRAL DRIFT ELIMINATORS.
- PROVIDE COMBINED INLET SHIELDS (CIS).
- PROVIDE MOTOR DAVIT ARM ASSEMBLY OPTION WITH CASING ACCESS PANEL.
- PROVIDE SINGLE-POINT CONNECTION FLUID COOLER CONTROL PANEL EQUAL TO TOWER IQ CONTROLLER FOR ELECTRICAL CONTRACTOR TO INSTALL IN PROXIMITY TO FLUID COOLER.
- FLUID COOLER CONTROL PANEL SHALL CONTAIN FAN VARIABLE FREQUENCY DRIVE, 3-PHASE FAN TEMPERATURE CONTROLLER, AND 3% LINE REACTOR. 3% OUTPUT REACTOR PROVIDED BY OTHERS, AS REQUIRED.
- UL TYPE 3R ENCLOSED PANEL SHALL INCLUDE FORCED AIR COOLING BY INTERNAL FANS, MAGNETIC CONTACTORS, FAN MOTOR HEATER(S), 500VA 120VAC CONTROL POWER TRANSFORMER, PANEL SPACE HEATER.
- CONTROL PANEL SHALL INCLUDE INTEGRAL HAND/OFF/AUTO SWITCHES FOR DAMPER AND SPRAY PUMP, OFF/AUTO SWITCH FOR BASIN HEATER CIRCUIT, AND HAND/OFF/BYPASS SWITCH FOR FAN VFD.
- CONTROL PANEL SHALL INCLUDE INTEGRAL VFD PANEL WITH HAND/AUTO SWITCH AND EMERGENCY STOP SWITCH.
- CONTROL PANEL SHALL INTEGRATE WITH FLUID COOLER BASIN HEATER THERMOSTAT, 6-PROBE EWLC, AND MAKEUP WATER SOLENOID VALVE.
- CONTROL PANEL SHALL INCLUDE INTERLOCK TO DE-ENERGIZE BASIN HEATER WHEN SPRAY PUMP IS RUNNING.
- PROVIDE IMMERSION TEMPERATURE SENSOR FOR CONNECTION TO CONTROL PANEL INTEGRAL TEMPERATURE CONTROLLER. PROVIDE TEMPERATURE WELL FIT TO FLUID COOLER OUTLET PIPE IN AN APPROVED MANNER.
- CONTROL PANEL SHALL INCLUDE THE FOLLOWING STANDARD PILOT LIGHTS: FAN RUN, VFD BYPASS, FAULT, BASIN HEATER RUN, SPRAY PUMP RUN, DAMPER RUN.
- CONTROL PANEL SHALL INCLUDE CONTROL INTERFACE TO BUILDING AUTOMATION SYSTEM.

BOILER SCHEDULE (GAS FIRED, HOT WATER)

MARK	MANUFACTURER	MODEL NUMBER	WEIGHT (LBS)	GPM	HEATING INPUT (MBH)	HEATING OUTPUT (MBH)	TEMP. RISE (F)	NOTES	VOLTAGE	PHASE
B-1	LAARS HEATING SYSTEMS	NT2H-0500-N	445	48	500	480	20	ALL	120 V	1

NOTES:

- REFER TO ELECTRICAL DRAWINGS FOR ELECTRICAL CHARACTERISTICS.
- INSTALL BOILER PER MANUFACTURER'S REQUIREMENTS AND RECOMMENDATIONS.
- INSTALL BOILER PER AUTHORITY HAVING JURISDICTION'S RISK MANAGEMENT BOILER REQUIREMENTS.
- PROVIDE MANUFACTURER'S FILTER BOX AND FLOW PROVING SWITCH.
- VARI-PRIME VARIABLE SPEED BOILER CIRCULATION PUMP CONTROLLER WITH INTEGRAL HEATING WATER SUPPLY AND RETURN TEMPERATURE SENSORS.
- PROVIDE LOW WATER CUT OFF, HIGH AND LOW GAS PRESSURE SWITCHES.
- BOILER MANUFACTURER'S STANDARD ASME RATED PRESSURE RELIEF VALVE (75 PSI).
- ROOF-MOUNTED, SEPARATED COMBUSTION INSTALLATION CATEGORY IV DIRECT VENT AND AIR PIPING INSTALLED PER MANUFACTURER'S REQUIREMENTS AND RECOMMENDATIONS FOR FINAL INSTALLED EQUIVALENT LENGTHS.
- PROVIDE FLUE GAS SAMPLING PORT WITHIN 2 FEET OF BOILER'S FLUE CONNECTION.
- MANUAL RESET HIGH-LIMIT.
- MANUFACTURER'S CONDENSATE TRAP. PROVIDE CONDENSATE NEUTRALIZER.
- MANUFACTURER'S DRAIN VALVE.
- PROVIDE NEW EMERGENCY BOILER SHUTDOWN SWITCH. MANUALLY OPERATED REMOTE SHUTDOWN SWITCH SHALL BE LOCATED JUST INSIDE EACH BOILER ROOM DOOR ON BUILDING EXTERIOR. SWITCH ACTIVATION SHALL IMMEDIATELY SHUT OFF THE FUEL TO THE BOILER. COORDINATE WITH ELECTRICAL CONTRACTOR.
- PROVIDE HARD-WIRED CARBON MONOXIDE DETECTOR WITH ALARM.
- PROVIDE CONTROL INTERFACE TO BUILDING AUTOMATION SYSTEM.
- PROVIDE NEW 4" REINFORCED CONCRETE HOUSEKEEPING PAD TO ACCOMMODATE NEW BOILER FOOTPRINT.

AIR DIRT SEPARATOR SCHEDULE

MARK	MANUFACTURER	MODEL NUMBER	SERVICE	INLET SIZE (IN)	DIAMETER (IN)	HEIGHT (IN)	DRY WEIGHT (LBS)	MAX FLOW RATE (GPM)	NOTES
AS-2	SPIROTHERM	VDT400FAM	HEAT PUMP LOOP	4	8.6	41.4	160	240	ALL

NOTES:

- PROVIDE NEODYMIUM MAGNETS.
- MAXIMUM WORKING PRESSURE 150 PSIG. MAXIMUM OPERATING TEMPERATURE 270°F.
- FLANGED ASME SECTION VIII, DIVISION 1 STAMPED AND REGISTERED.

EXPANSION TANK SCHEDULE

MARK	MANUFACTURER	MODEL NUMBER	SERVICE	ACCEPTANCE VOLUME (GAL)	DIAMETER (IN)	HEIGHT (IN)	DRY WEIGHT (LBS)	NOTES
ET-2	WESSELS COMPANY	NLA-130	HEAT PUMP LOOP	35	20	37	125	ALL

NOTES:

- MAXIMUM WORKING PRESSURE 125 PSIG AT 240°F. VERIFY FACTORY PRE-CHARGE PRESSURE OF 40 PSIG.
- COORDINATE CHARGE PRESSURE WITH HEAT PUMP LOOP SYSTEM PRESSURE REQUIREMENTS.
- IF ADDITIONAL CHARGE IS REQUIRED, PROVIDE OIL-FREE DRY COMPRESSED AIR OR NITROGEN.
- PROVIDE EXPANSION TANK MANUFACTURER'S PRESSURE GAUGE AND BLADDER INTEGRITY MONITOR.
- ASME SECTION VIII, DIVISION 1 STAMPED AND REGISTERED.

CHEMICAL FEED TANK SCHEDULE

MARK	MANUFACTURER	MODEL NUMBER	SERVICE	VOLUME (GAL)	DIAMETER (IN)	HEIGHT (IN)	DRY WEIGHT (LBS)	NOTES
CFT-1	J.L. WINGERT COMPANY	DB-6HD	HEAT PUMP LOOP	6	10	30.5	36	ALL

NOTES:

- MAXIMUM WORKING PRESSURE 200 PSIG AT 200°F.
- PROVIDE DOME BOTTOM VALVE PACKAGE WITH FILL FUNNEL EQUAL TO MANUFACTURER'S PART NUMBER 3139F.

PUMP SCHEDULE

MARK	MANUFACTURER	MODEL NUMBER	SERVICE	GPM	HDFT WATER	RPM	NOTES	REMARKS	HP	VOLTAGE	PHASE
HPLP-1(2)	GRUNDFOS	HYDRO MPC-E 2CREH 20-2 3x208V	HEAT PUMP LOOP	120	90	3484	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	DUPLEX PACKAGED PUMPING SYSTEM (N+1)	5	208 V	3
HPLPN-1	GRUNDFOS	CONTROL MPC E (100 kA SCCR)	DUPLEX PACKAGED PUMPING SYSTEM				1, 11	DUPLEX PACKAGED PUMPING SYSTEM CONTROL PANEL		208 V	3
HWP-2	GRUNDFOS	MAGNA3 40-80 GF	BOILER B-1 CIRCULATOR PUMP	48	15	3613	1, 9, 12, 13	GF15/43 1.5x1 5. CAST IRON BODY	1/3	115 V	1

NOTES:

- REFER TO ELECTRICAL DRAWINGS FOR ELECTRICAL CHARACTERISTICS.
- VERTICAL MULTI-STAGE CENTRIFUGAL PUMP(S) HAVING INTEGRAL MOTOR VFD(S).
- DUPLEX PACKAGED PUMPING SYSTEM SHALL INCLUDE MANIFOLDS AND RELATED PIPING, SUCTION AND DISCHARGE ISOLATION VALVES PER PUMP, SUCTION AND DISCHARGE MANIFOLD PRESSURE TRANSDUCERS AND GAUGES, DISCHARGE CHECK VALVE PER PUMP, AND ASTM A36 STEEL BASE/FRAMES WITH 304SS PLINTHS.
- BASES AND FRAMES SHALL BE BRACED/ANCHORED TO STRUCTURE ACCORDING TO MANUFACTURER'S REQUIREMENTS AND RECOMMENDATIONS. PROVIDE 4" CONCRETE HOUSEKEEPING PAD.
- PROVIDE 4" CLASS 150, 316SS SCHEDULE 10S SUCTION AND DISCHARGE MANIFOLDS.
- ENTIRE SYSTEM (PUMPS, VFDS, BASES, FRAMES, CONTROL PANEL) SHALL BE PROVIDED VIA SAME MANUFACTURER.
- SYSTEM DESIGNED FOR 1 PUMP TO HANDLE FULL LOAD WITH 2ND PUMP AS STANDBY.
- SUCTION AND DISCHARGE FLEX CONNECTORS BETWEEN PUMP SYSTEM MANIFOLDS AND HEAT PUMP LOOP PIPING MAINS.
- ECM MOTOR(S) WITH PERMANENT MAGNET ROTOR(S).
- PROVIDE DUPLEX PACKAGED PUMPING SYSTEM MANUFACTURER'S UL TYPE 3R/12 RATED ELECTRICAL PANEL WITH PUMP DISCONNECTS, LOGIC CONTROLLER, MAGNETIC MOTOR STARTERS, AND USER INTERFACE. PROVIDE INTERFACE TO BUILDING AUTOMATION SYSTEM.
- PUMPING SYSTEM CONTROL PANEL SHALL INCLUDE LOGIC CONTROLLER CAPABLE OF SCHEDULING SEQUENCE OF OPERATION TO ADJUST, BALANCE, AND RECORD RUN-TIME HOURS OF PUMP(S). PUMP CURVES SHALL BE PROGRAMMED INTO CONTROLLER.
- CANNED, WET-ROTOR CIRCULATOR PUMP WITH INTEGRAL VFD. PROVIDE CONTROL INTERFACE TO BUILDING AUTOMATION SYSTEM. INTERLOCK HWP-2 WITH BOILER B-1 VARIABLE SPEED PUMP CONTROLLER.
- PROVIDE PUMP MANUFACTURER'S DIELECTRIC ISOLATION FLANGES, AS REQUIRED.

TULSA ZOO - RAINFOREST
HVAC / ELECTRICAL
UPGRADES
8421 E 36TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20



PARKS, CULTURE & RECREATION

C495 (City Architectural Building Services)

DRAWN	PROJ. MGR.	DESIGNED	LEAD MGR.	SURVEY	FIELD MGR.
	Justin F. Roush		Justin F. Roush		

ISSUE BLOCK

BY

DATE

Sheet Name: Mechanical Schedules

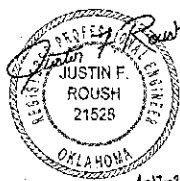
SHEET 20 OF 31

SHEET NO.

MP601

EDA + FKI
ENGINEERS

EDA + FKI Engineers PC
10010 E. 45th Street - Suite 201
Tulsa, OK 74146
O: 918.588.0600 F: 918.519.4310



4-17-2025

ELECTRICAL SYMBOLS LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	LIGHT FIXTURE 2x4		COMMUNICATION OUTLET WITH 2-DATA DROPS U.N.O.
	LIGHT FIXTURE 2x4 EMERGENCY AND/OR NIGHT LIGHT		COMMUNICATION OUTLET WITH 1-CAT.6 AND 14IDM CONNECTOR
	LIGHT FIXTURE 2x2		HORIZONTAL MOUNTED COMMUNICATION OUTLET WITH 2-DATA DROPS U.N.O.
	INDUSTRIAL STRIP LIGHT FIXTURE		PROVIDE 1 DATA DROP FOR OFDI WIRELESS ACCESS POINT AT CEILING
	EXIT SIGN		INTERCOMM STATION, REFER TO SPECIFICATIONS.
	RECESSED DOWNLIGHT		CEILING MOUNTED PA SYSTEM SPEAKER
	TOGGLE SWITCH - SINGLE POLE 20A-120V/277V		CEILING MOUNTED FIRE ALARM SYSTEM SPEAKER
	TOGGLE SWITCH - THREE WAY		CEILING MOUNTED FIRE ALARM SYSTEM SPEAKER WITH STROBE
	TOGGLE SWITCH - FOUR WAY		FIRE ALARM SMOKE DETECTOR - CEILING MOUNTED U.N.O.
	LIGHTING DIMMER SWITCH		FIRE ALARM SMOKE DETECTOR WITH INTEGRAL CARBON MONOXIDE DETECTOR
	LIGHTING DIMMER SWITCH WITH INTEGRAL OCCUPANCY SENSOR		FIRE ALARM SMOKE DETECTOR WITH SOUNDER BASE
	TOGGLE SWITCH - WEATHER PROOF		FIRE ALARM MANUAL PULL STATION
	NIGHT LIGHT SWITCH		FIRE ALARM REMOTE ANNUNCIATOR
	SINGLE POLE MOMENTARY SWITCH 1-WIRE TO LOW VOLTAGE CONTROLLER OF PATIENT BED LIGHT CONTROL READING/AMBIENT LIGHT FUNCTIONS		FIRE ALARM MAGNETIC DOOR HOLDER
	TIMER SWITCH		FIRE ALARM STROBE ONLY - CEILING MOUNTED U.N.O.
	OVERRIDE SWITCH		FIRE ALARM HORN STROBE - CEILING MOUNTED
	WALL MOUNTED OCCUPANCY SENSOR		FIRE ALARM HORN STROBE - WALL MOUNTED
	WALL MOUNTED CORNER OCCUPANCY SENSOR		FIRE ALARM HEAT DETECTOR
	CEILING MOUNTED LIGHT SWITCHING OCCUPANCY SENSOR-LOW VOLTAGE		FIRE ALARM CONTROL PANEL
	CEILING MOUNTED LIGHT SWITCHING OCCUPANCY SENSOR-LINE VOLTAGE		FIRE ALARM VOICE EVACUATION CABINET
	POWER PACK FOR OCCUPANCY SENSOR		WALL MOUNTED DIGITAL CLOCK, PROVIDE 20A, 120V CIRCUIT AND DATA CONNECTION, REFER TO SPECIFICATIONS.
	INDICATES DEVICE TO BE MOUNTED ABOVE COUNTER		SECURITY KEY PAD
	DUPLEX RECEPTACLE 20A, 120V U.N.O.		LOCK DOWN SIGNAL LIGHT
	DUPLEX RECEPTACLE WITH INTEGRAL USB CHARGING PORTS		SECURITY CONTROL PANEL
	DOUBLE DUPLEX RECEPTACLE 20A, 120V U.N.O.		ACCESS CONTROL PANEL
	250V/1PHASE RECEPTACLE 20A U.N.O.		INTERCOMM MASTER PANEL
	GROUND FAULT CURRENT INTERRUPTER RECEPT 20A U.N.O.		CARD READER
	HORIZONTAL MOUNTED DUPLEX RECEPTACLE 20A, 120V U.N.O.		DOOR RELEASE
	HORIZONTAL MOUNTED DUPLEX GFCI RECEPTACLE 20A, 120V U.N.O.		GLASS BREAK SENSOR
	POWER/DATA RECESSED FLOOR BOX LEGRAND #RFB4E-0G OR APPROVED EQUAL, # INDICATES NUMBER OF DATA DROPS		DOOR CONTACT
	POWER/DATA POKE THROUGH-LEGRAND #RFB4E-0G OR APPROVED EQUAL, # INDICATES NUMBER OF DATA DROPS		MOTION DETECTION SENSOR
	POWER/DATA POKE THROUGH-FURNITURE FEED LEGRAND # AFFCT15XX OR APPROVED EQUAL, # INDICATES NUMBER OF DATA DROPS		PUSH PLATE FOR POWER OPERATED DOOR
	TWIST LOCK RECEPTACLE-REFER TO PLANS FOR NEMA DESIGNATION		PANIC BUTTON
	PANELBOARD		REQUEST TO EXIT BUTTON
	TRANSFORMER		CEILING MOUNTED DOME TYPE CAMERA 180 DEGREES-PROVIDE 1 DATA DROP AND 10FT SERVICE LOOP COILED IN CEILING SPACE
	AUTOMATIC TRANSFER SWITCH		CEILING MOUNTED DOME TYPE CAMERA 270 DEGREES-PROVIDE 1 DATA DROP AND 10FT SERVICE LOOP COILED IN CEILING SPACE
	ADJUSTABLE FREQUENCY DRIVE - MECHANICAL CONTRACTOR		CEILING MOUNTED DOME TYPE CAMERA 360 DEGREES-PROVIDE 1 DATA DROP AND 10FT SERVICE LOOP COILED IN CEILING SPACE
	DISCONNECT SWITCH		WALL MOUNTED DOME TYPE CAMERA INTERIOR-PROVIDE 1 DATA DROP
	JUNCTION BOX		WALL MOUNTED BULLET TYPE CAMERA EXTERIOR-PROVIDE 1 DATA DROP
	GROUND ROD		ARM MOUNTED DOME TYPE CAMERA EXTERIOR-PROVIDE 1 DATA DROP
	INDICATES CONDUIT CONCEALED IN WALL OR CEILING SPACE		INDICATES GROUND CONDUCTOR
	INDICATES CONDUIT RUN BELOW CONCRETE FLOOR OR BELOW FINISHED GRADE		INDICATES NEUTRAL CONDUCTOR
	INDICATES CIRCUIT HOMERUN		INDICATES LINE CONDUCTOR
	WALL MOUNTED POWER CONNECTION FOR SYSTEMS FURNITURE, # INDICATES NUMBER OF CIRCUITS		ELEVATION REF.
	WALL MOUNTED DATA CONNECTION FOR SYSTEMS FURNITURE, # INDICATES NUMBER OF DATA DROPS		INTERIOR ELEVATION
	POWER CORD REEL WITH RECEPTACLES		SHEET REF.
	POWER J-BOX WITH DROP CORD		
	EPO-EMERGENCY POWER OFF SWITCH		
	DATA DROP CORD		

MEP ABBREVIATIONS			
A	AMPERES	FLUOR	FLUORESCENT
AAV	AUTOMATIC AIR VENT	FP	FIRE PROTECTION WATER SUPPLY
ACU	AIR CONDITIONING UNIT	FPHS	FROST PROOF HOSE BISH
AFCI	ARC FAULT CIRCUIT INTERRUPTER	FRF	FIRE PROOFING
AF	ABOVE FINISHED FLOOR	FS	FLOOR SINK
AFG	ABOVE FINISHED GRADE	FSP	FIRE STANDPIPE
AHJ	AUTHORITY HAVING JURISDICTION	FT	FEET
AHU	AIR HANDLING UNIT	FU	FUSE
ALM	ALARM	G	GAS OR GROUND
ALT	ALTERNATE	GA	GAUGE
AMB	AMBIENT	GSD	GRAVITY BACKDRAFT DAMPER
ARCH	ARCHITECT OR ARCHITECTURAL	GC	GENERAL CONTRACTOR
BAT	BATTERY	GD	GUTTER DRAIN
BBH	BASEBOARD HEATER	GEN	GENERAL
BDD	BACKDRAFT DAMPER	GF	GROUND FAULT
BFF	BELOW FINISHED FLOOR	GFCI	GROUND FAULT CIRCUIT INTERRUPTER
BFS	BELOW FINISHED GRADE	GND	GROUND
BKR	BREAKER	GPM	GALLONS PER MINUTE
BMS	BUILDING MANAGEMENT SYSTEM	GR	GRADE
BOD	BOTTOM OF DUCT	GRS	GALVANIZED RIGID STEEL
BTU	BRITISH THERMAL UNIT	GT	GREASE TRAP
BTUH	BRITISH THERMAL UNIT PER HOUR	GVP	GRAVITY VENT
C	CONDUIT	H	HIGH OR HUMIDISTAT
CB	CIRCUIT BREAKER	HB	HOSE BISH
CD	CONDENSATE DRAIN	HD	HUB DRAIN
CEG	CEILING EXHAUST GRILLE	HP	HORSEPOWER
CER	CEILING EXHAUST REGISTER	HT	HEIGHT
CFCI	CONTRACTOR FURNISHED & INSTALLED	HTG	HEATING
CFM	CUBIC FEET PER MINUTE	HTR	HEATER
CHWR	CHILLED WATER RETURN	HW	HOT WATER
CHWS	CHILLED WATER SUPPLY	HWR	HEATING WATER RETURN OR HOT WATER
CI	CONTROLS INTEGRATOR	I	INSTANTANEOUS
CKT	CIRCUIT	HWS	HEATING WATER SUPPLY
CL	CENTERLINE	HWT	HOT WATER TANK
CO	CLEANOUT OR CONDUIT ONLY	HZ	HERTZ
COND	CONDENSATE OR CONDENSER	I	INSTANTANEOUS
CONT	CONTINUOUS	IA	INSTRUMENT AIR-MED GAS
CONTR	CONTRACTOR	ID	INSIDE DIAMETER
COORD	COORDINATE	IES	ILLUMINATING ENGINEERS SOCIETY
COMPR	COMPRESSOR	IG	ISOLATED GROUND
CR	CRITICAL BRANCH	INH	INSTANTANEOUS WATER HEATER
CRG	CEILING RETURN GRILLE	IN	INCHES
CRR	CEILING RETURN REGISTER	INSUL	INSULATED
CSD	CEILING SUPPLY DIFFUSER	INTLK	INTERLOCK
CSE	CEILING SUPPLY REGISTER	J	JUNCTION BOX
CTR	CENTER	JB	JUNCTION BOX
CU	COLD WATER	KVA	KILOVOLT-AMP
CW	COLD WATER	KW	KILOWATT
CWR	CONDENSER WATER RETURN	L	LENGTH OR LAVATORY
CWS	CONDENSER WATER SUPPLY	LAHJ	LOCAL AUTHORITY HAVING JURISDICTION
DB	DRY BULB	LAT	LEAVING AIR TEMPERATURE
DDC	DIRECT DIGITAL CONTROL	LDC	LOCATION
DET	DETECTOR	LP	LOW PRESSURE OR LIGHT POLE
DFU	DRAINAGE FIXTURE UNIT	LPT	LOW POINT
DI	DIAMETER	LS	LIFE SAFETY BRANCH
DIFF	DIFFUSER	LT	LIGHT OR LONG TIME
DM	DIMENSION	LTG	LIGHTING
DISC	DISCONNECT	LV	LOW VOLTAGE
DIV	DIVISION	LVR	LOUVER
DN	DOWN	LWT	LEAVING WATER TEMPERATURE
DP	DISTRIBUTION PANEL	MA	COMPRESSED AIR-MED GAS
DS	DOWNSPOUT	MATL	MATERIAL
DTL	DETAIL	MAX	MAXIMUM
DWG	DRAWING	MBD	MULTI-BLADE DAMPER
DWH	DOMESTIC WATER HEATER	MSH	1,000 BTUH
DWV	DRAIN, WASTE AND VENT	MCC	MOTOR CONTROL CENTER
E/A	EXHAUST AIR	MD	MOTORIZED DAMPER
EAT	ENTERING AIR TEMPERATURE	MOP	MAIN DISTRIBUTION PANEL
EF	EXHAUST FAN	MECH	MECHANICAL
EL	ELEVATION	MEZZ	MEZZANINE
ELEC	ELECTRICAL	MFR	MANUFACTURER
ELEV	ELEVATOR	MIN	MINIMUM
EM	EMERGENCY	MR	MARK
EMT	ELECTRICAL METALLIC TUBING	MSS	MAN SWITCHBOARD
ENG	ENGINEER	MNTD	MOUNTED
ENT	ENTERING	MTR	MOTOR
EQUIP	EQUIPMENT	N	NITROGEN-MED GAS
EWIC	ELECTRIC WATER COOLER	N2O	NITROUS OXIDE-MED GAS
EWT	ENTERING WATER TEMPERATURE	NC	NORMALLY CLOSED OR NOISE COEFFICIENT
EXH	EXHAUST	NEC	NATIONAL ELECTRICAL CODE
EXT	EXTERIOR	NF	NON-FUSED
(E)	EXISTING	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
F	FAHRENHEIT OR FUSE	NG	NATURAL GAS
F&I	FURNISH AND INSTALL	NI	NIGHT LIGHT UNSWITCHED
FACF	FIRE ALARM CONTROL PANEL	NO	NORMALLY OPEN OR NUMBER
FC	FOOT CANDLE	NPT	NATIONAL PIPE THREAD
FCO	FLOOR CLEANOUT	NTS	NOT TO SCALE
FCU	FAN COIL UNIT	O2	OXYGEN-MED GAS
FD	FLOOR DRAIN OR FIRE DAMPER	OA	OPPOSED BLADE DAMPER
FEC	FIRE EXTINGUISHER CABINET	OC	ON CENTER
FF	FINISH FLOOR	OFCD	OWNER FURNISHED, CONTRACTOR INSTALLED
FG	FINISH GRADE	OFDI	OWNER FURNISHED, OWNER INSTALLED
FHC	FIRE HOSE CABINET	OFDI	OWNER FURNISHED, OWNER INSTALLED
FHD	FIRE HYDRANT	ORD	OVERFLOW ROOF DRAIN
FL	FLOW LINE		

GENERAL ELECTRICAL NOTES	
1.	ALL WORK SHALL BE ACCOMPLISHED IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL CODES AND ORDINANCES. IN EVENT OF CONFLICT BETWEEN DRAWINGS, SPECIFICATIONS, CODES AND ORDINANCES, THE MOST STRINGENT REQUIREMENT FROM THE AUTHORITY HAVING JURISDICTION SHALL TAKE PRECEDENCE.
2.	THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS OR LICENSES REQUIRED FOR WORK, PAY ALL LAWFUL FEES, INCLUDING, BUT NOT LIMITED TO UTILITY DEPOSITS, INSPECTION FEES, AND CONSTRUCTION PERMITS.
3.	CONTRACTOR SHALL COORDINATE WITH ALL OTHER TRADES FOR EXACT LOCATION OF EQUIPMENT TO BE INSTALLED SO THAT ANY INTERFERENCE OF THE DIFFERENT EQUIPMENT SHALL BE INSTALLED SO AS TO FUNCTION PROPERLY. COORDINATE POWER REQUIREMENTS FOR ALL MECHANICAL EQUIPMENT BEFORE FINAL ROUGH IN AND INSTALLATION.
4.	EACH BIDDER SHALL CAREFULLY CHECK DRAWINGS. IN THE EVENT ANY PROPOSED OR ALTERNATE EQUIPMENT REQUIRES SPACE, SUPPORT OR LAYOUT CONDITIONS OTHER THAN THOSE SHOWN ON THE PLANS, BIDDERS SHALL NOTIFY ARCHITECT FOR SUCH SPACE PRIOR TO TAKING BIDS.
5.	PROVIDE PROTECTION FOR ALL ITEMS OF APPARATUS, FIXTURES, APPLIANCES, MATERIALS, EQUIPMENT, AND INSTALLATION SO AS TO PREVENT DAMAGE BY ANY TRADE. CONTRACTOR SHALL REPLACE AT NO EXPENSE TO THE OWNER, ANY ITEM THAT IS MARRED, DEFACED, OR BROKEN PRIOR TO ACCEPTANCE BY OWNER.
6.	MECHANICAL AND ELECTRICAL PLANS ARE DIAGRAMATIC, BUT THEY SHALL BE FOLLOWED AS CLOSELY AS ACTUAL CONSTRUCTION OF THE BUILDING AND WORK OF OTHER TRADES WILL ALLOW. CONTRACTOR SHALL COORDINATE THE GENERAL WORK IN ORDER THAT THEIR WORK WILL BE PROPERLY INSTALLED IN THE BUILDING. THE APPROVAL OF THE ARCHITECT SHALL BE OBTAINED BEFORE ANY DEVIATIONS FROM THESE PLANS ARE MADE.
7.	CONTRACTOR SHALL PROVIDE TEMPORARY WIRING AND CONNECTIONS DURING CONSTRUCTION AS REQUIRED. FOLLOW LOCAL AND OSHA REGULATIONS.
8.	CONTRACTOR SHALL INFORM ARCHITECT OF EXISTING CONDITIONS THAT ARE DISCOVERED DURING WORK IN PROGRESS THAT WOULD REQUIRE DEVIATIONS AND ADDITIONAL COSTS FROM THE ORIGINAL CONSTRUCTION DOCUMENTS BEFORE PROCEEDING WITH WORK.
9.	WHERE DEVICES ARE SHOWN SIDE BY SIDE CONTROLLING DIFFERENT VOLTAGES, PROVIDE DIVIDER IN THE OUTLET BOX.
10.	WHERE SWITCHES AND/OR DIMMERS ARE INDICATED SIDE BY SIDE ON THE PLANS, GROUP THE DEVICES IN A COMMON OUTLET BOX AND PROVIDE A COMMON COVER PLATE. PROVIDE CUSTOM PLATES AS REQUIRED.
11.	UNLESS OTHERWISE NOTED, ALL RECEPTACLES SHALL BE MOUNTED AT 18" A.F.F. AND SWITCHES 48" A.F.F. TO CENTER OF DEVICE. COORDINATE MOUNTING OF OUTLETS OVER COUNTERS WITH ARCHITECTURAL ELEVATIONS BEFORE INSTALLATION.
12.	ROUTE ALL CONDUCTORS IN CONDUIT PER NEC OR AUTHORITY HAVING JURISDICTION.
13.	PROVIDE GALVANIZED RIGID CONDUIT ELBOWS WHERE STUBBED UP THROUGH SLAB. ALL EXPOSED EXTERIOR CONDUIT SHALL BE RIGID STEEL UNLESS NOTED OTHERWISE.
14.	FEEDERS: CONCEAL CONDUIT WITHIN FINISHED WALLS, CEILINGS, AND FLOORS UNLESS OTHERWISE INDICATED. INSTALL CONDUITS PARALLEL OR PERPENDICULAR TO BUILDING LINES.
15.	BRANCH CIRCUITS: CONCEAL CONDUIT WITHIN FINISHED WALLS AND CEILINGS. CONDUIT SHALL NOT BE INSTALLED BELOW FLOOR SLAB UNLESS SPECIFICALLY INDICATED. INSTALL CONDUITS PARALLEL OR PERPENDICULAR TO BUILDING LINES.
16.	ALL JUNCTION BOXES TO BE PERMANENTLY MARKED WITH CIRCUIT NUMBER ON OUTSIDE OF BOX WHEN ABOVE CEILING, AND ON INSIDE OF BOX WHEN CONCEALED IN WALL (NOT WITH MARKER).
17.	ANY CONDUIT STUB-UPS FOR SPECIAL SYSTEMS AND OTHER EQUIPMENT SHALL HAVE ROUNDED PROTECTIVE BUSHINGS AT THE TOP OF CONDUIT.

TULSA ZOO - RAINFOREST
HVAC / ELECTRICAL
UPGRADES
8421 E 38TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20



PARKS, CULTURE & RECREATION
CARS (City Architectural Building Services)

DRAWN	DESIGNED	SURVEY	PPOL MGR	LEAD MGR	FIELD MGR

ISSUE BLOCK	BY	DATE

SHEET NO.	E001
SHEET 21 OF 31	

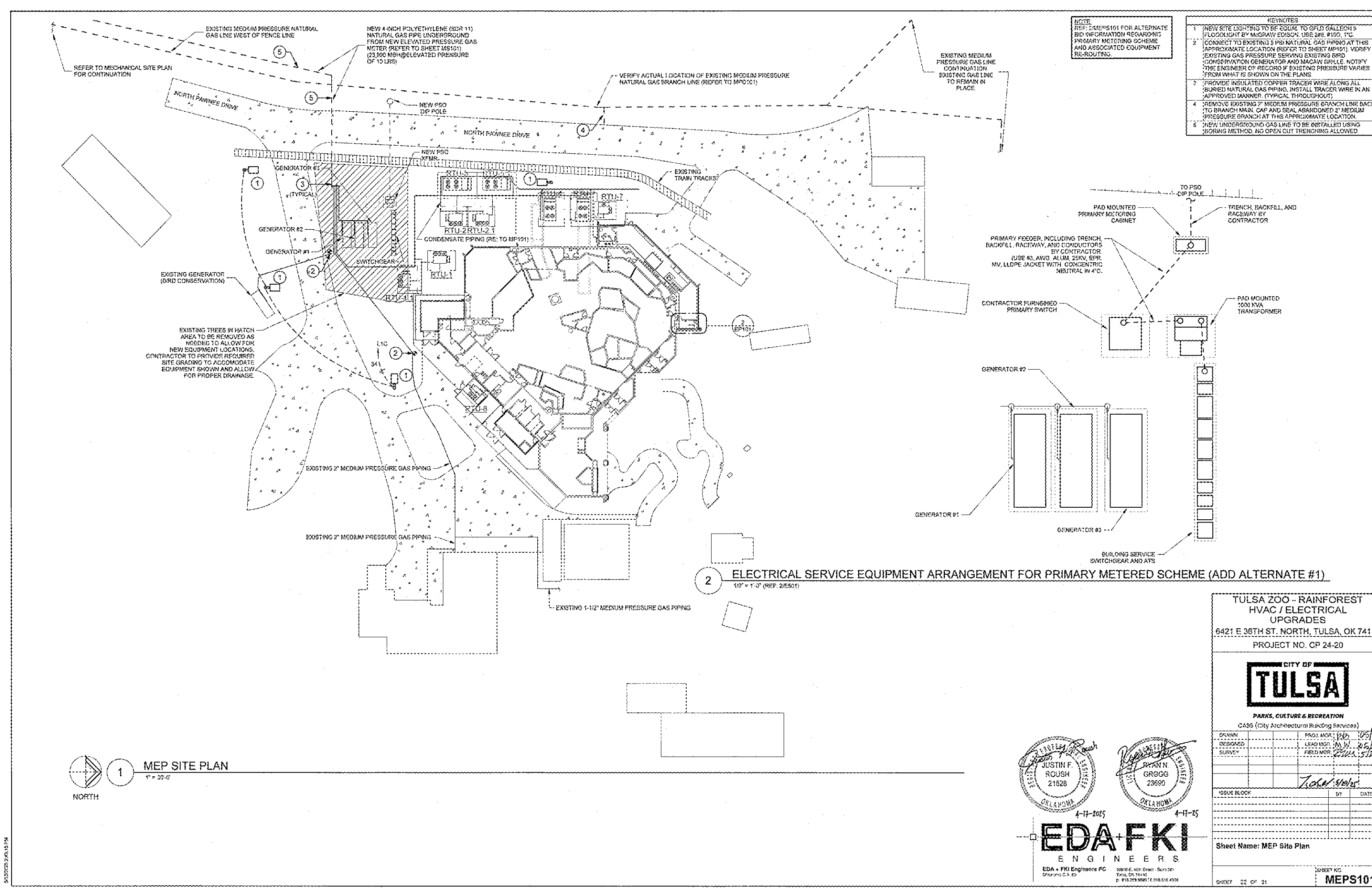
Sheet Name: Electrical General Notes, Abbreviations & Legend

EDA+FKI
ENGINEERS

EDA + FKI Engineers PC
15015 N. 49th Street - Suite 201
Tulsa, OK 74146
P: 918.250.6800 / F: 918.615.4345



4-17-25



NOTE:
REF: 2/MEPS101 FOR ALTERNATE
BID INFORMATION REGARDING
PRIMARY METERING SCHEME
AND ASSOCIATED EQUIPMENT
RE-ROUTING.

- KEYNOTES
1. NEW SITE LIGHTING TO BE EQUAL TO GFLD GALLEON II FLOODLIGHT BY MCGRAW HILL. USE 2#8, #100, 1" C.
 2. CONNECT TO EXISTING 5 PSI NATURAL GAS PIPING AT THIS APPROXIMATE LOCATION (REFER TO SHEET MP101). VERIFY EXISTING GAS PRESSURE SERVING EXISTING 6"RD CONSERVATION GENERATOR AND MACHINERY. NOTIFY THE ENGINEER OF RECORD IF EXISTING PRESSURE VARIES FROM WHAT IS SHOWN ON THE PLANS.
 3. PROVIDE INSULATED COPPER TRACER WIRE ALONG ALL BURIED NATURAL GAS PIPING. INSTALL TRACER WIRE IN AN APPROVED MANNER. (TYPICAL THROUGHOUT)
 4. REMOVE EXISTING 2" MEDIUM PRESSURE BRANCH LINE BACK TO BRANCH MAIN. CAP AND SEAL ABANDONED 2" MEDIUM PRESSURE BRANCH AT THIS APPROXIMATE LOCATION.
 5. NEW UNDERGROUND GAS LINE TO BE INSTALLED USING BORING METHOD. NO OPEN CUT TRENCHING ALLOWED.

1 MEP SITE PLAN
1" = 30'-0"

2 ELECTRICAL SERVICE EQUIPMENT ARRANGEMENT FOR PRIMARY METERED SCHEME (ADD ALTERNATE #1)
1/8" = 1'-0" (REF: 2/ES01)

TULSA ZOO - RAINFOREST
HVAC / ELECTRICAL
UPGRADES
6421 E 36TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20



PARKS, CULTURE & RECREATION
CASS (City Architectural Building Services)

DRAWN	PROJ. MGR.	10/5/25
DESIGNED	LEAD MGR.	10/5/25
SURVEY	FIELD MGR.	10/5/25

Issue Block

BY	DATE

Sheet Name: MEP Site Plan

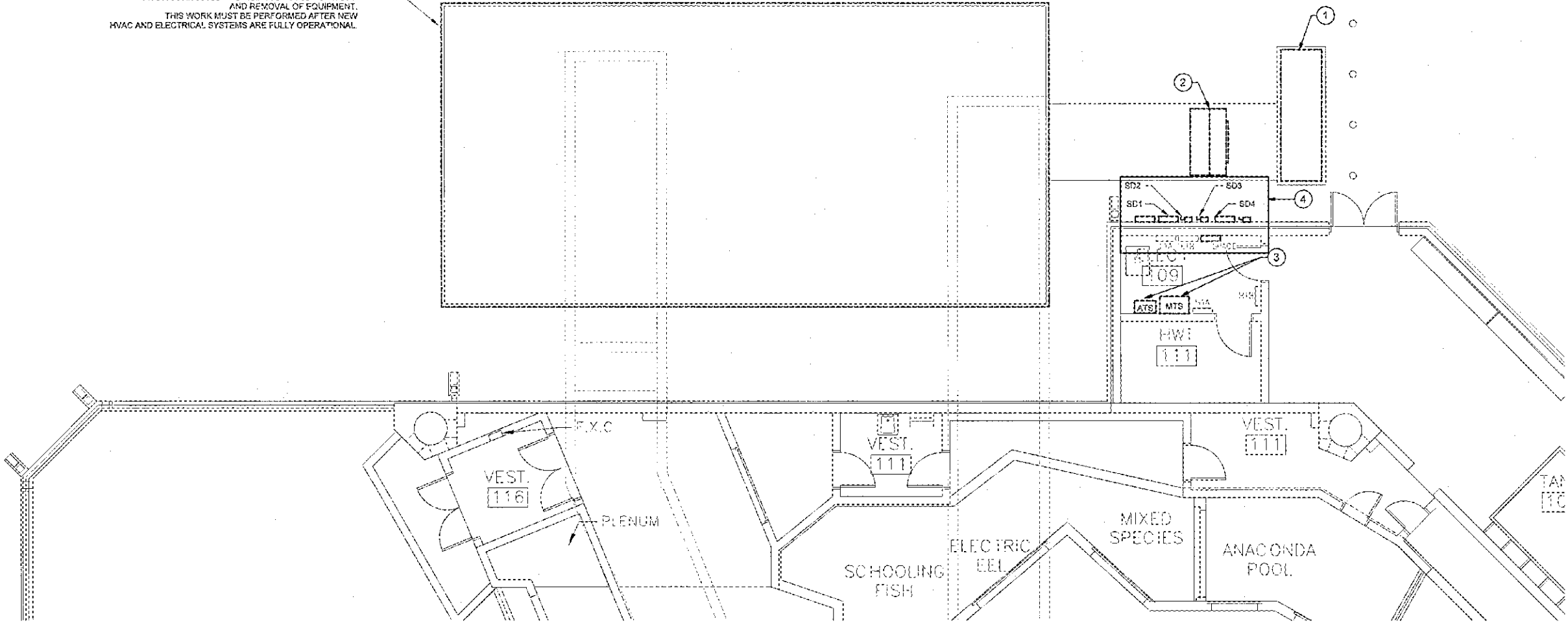
SHEET NO. 22 OF 31
MEPS101



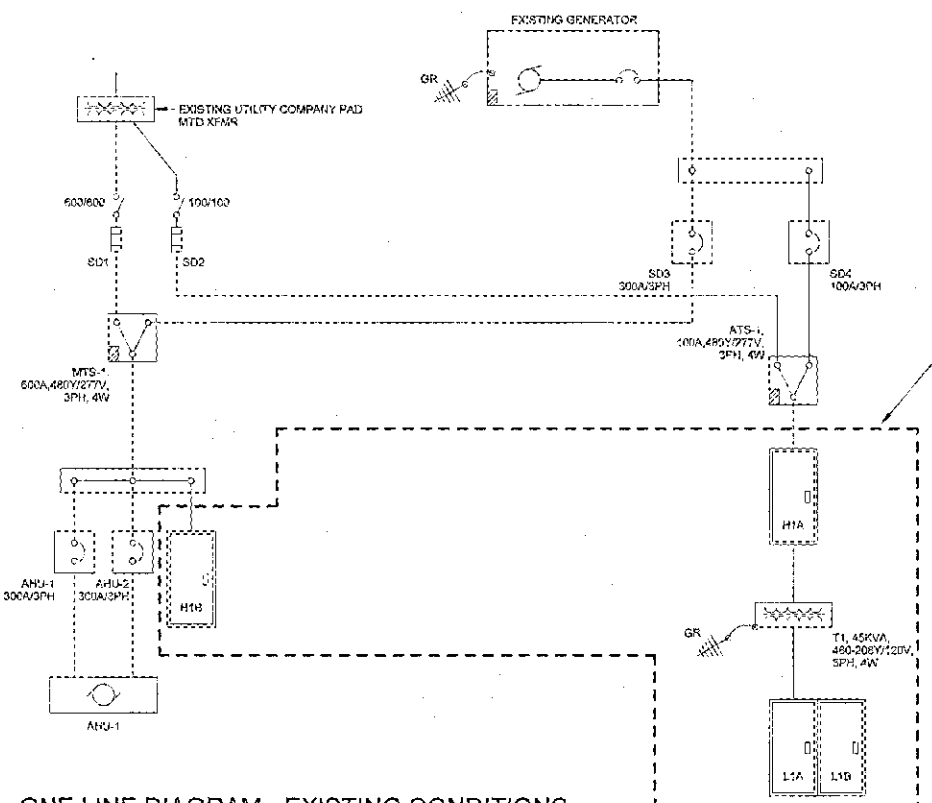
EDA + FKI
ENGINEERS
EDA + FKI Engineers PC
10810 E. 40th Street - Suite 201
Tulsa, OK 74142
p. 918.269.9890 f. 918.516.4508

ALL ELECTRICAL CONNECTIONS TO THE
EXISTING HVAC EQUIPMENT HOUSING MUST
BE DISCONNECTED AND REMOVED TO ALL FOR DEMO
AND REMOVAL OF EQUIPMENT.
THIS WORK MUST BE PERFORMED AFTER NEW
HVAC AND ELECTRICAL SYSTEMS ARE FULLY OPERATIONAL.

KEYNOTES	
1	EXISTING GEN SET TO BE DISCONNECTED AND RETURNED TO OWNER. RELOCATE UNIT TO OWNER DIRECTED LOCATION ON PROPERTY.
2	DISCONNECT ALL CONNECTORS TO EXISTING PSD TRANSFORMER TO ALLOW FOR REMOVAL BY PSD.
3	DISCONNECT AND REMOVE EXISTING TRANSFER SWITCHES AND ASSOCIATED CONNECTIONS.
4	DISCONNECT AND REMOVE ALL EXISTING ELECTRICAL SERVICE DISCONNECTS.



1 ELECTRICAL DEMOLITION PLAN - RAINFOREST
3/16" = 1'-0"

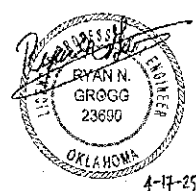


EQUIPMENT TO BE
MAINTAINED FOR FUTURE
USE. ALL OTHER EQUIPMENT
AND WIRING TO BE REMOVED.
REF: 1/ED101

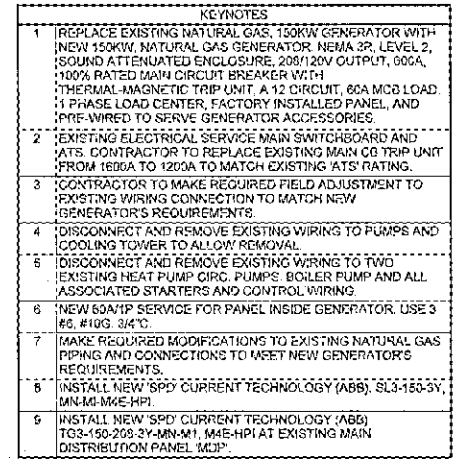
2 ONE LINE DIAGRAM - EXISTING CONDITIONS
NTS

TULSA ZOO - RAINFOREST HVAC / ELECTRICAL UPGRADES 8421 E 36TH ST. NORTH, TULSA, OK 74115 PROJECT NO. CP 24-20			
CITY OF TULSA PARKS, CULTURE & RECREATION CABS (City Architectural Building Services)			
DESIGNED	PROJ. MGR.	DATE	03/25
SURVEY	LEAD MGR.	DATE	03/23
	FIELD MGR.	DATE	03/25
ISSUE BLOCK			
BY DATE			
SHEET NAME: Electrical Demolition Plan - Rainforest			
SHEET NO. ED101			
SHEET 23 OF 31			

EDA + FKI
ENGINEERS
10010 E. 46th Street - Suite 201
Tulsa, OK 74146
P: 918.592.0000 F: 918.513.4290

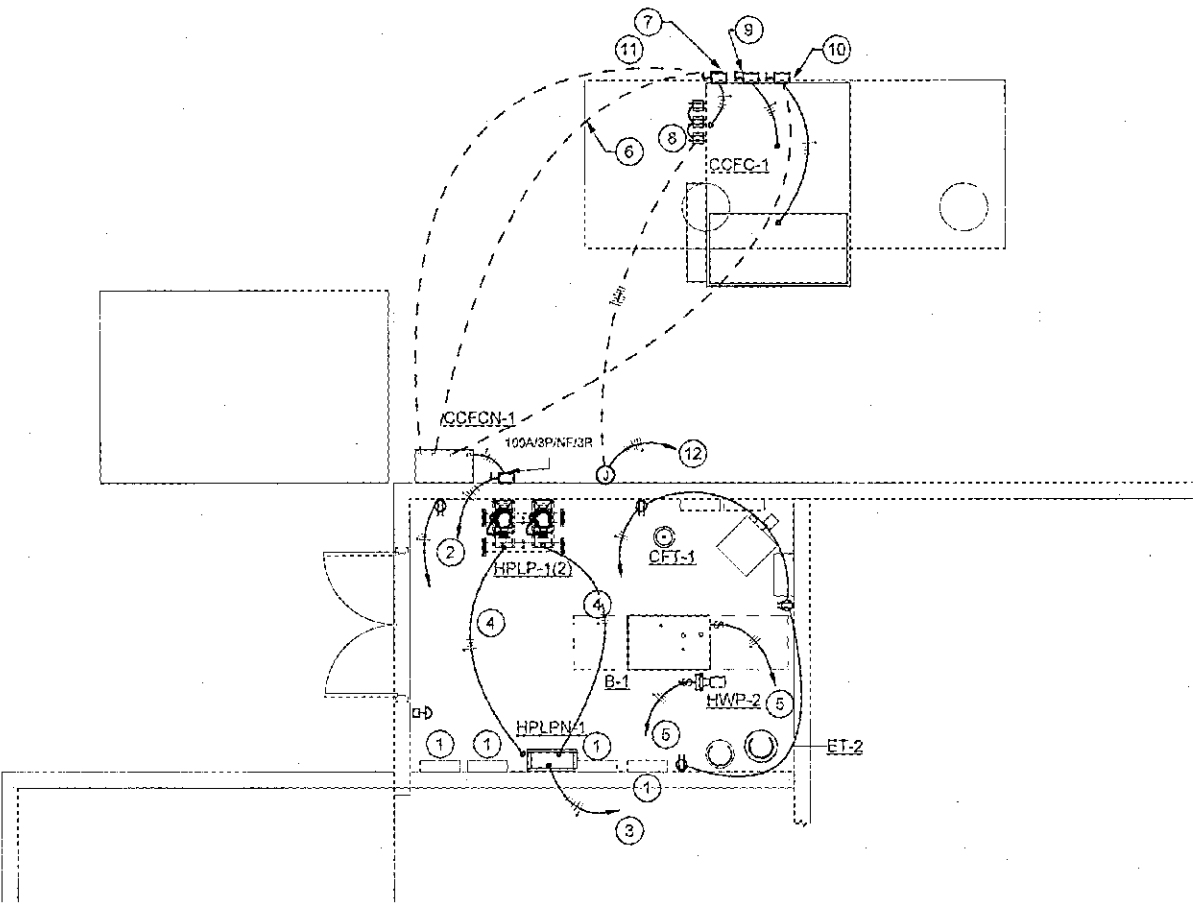


4/15/2025 3:07:39 PM



SHEET 24 OF 31	ED102
----------------	--------------

KEYNOTES	
1	EXISTING ELECTRICAL PANELS SHALL BE UTILIZED TO FEED NEW LOADS. INSTALL NEW BREAKERS AS CALLED FOR TO SUPPORT NEW LOADS. EXISTING AVAILABLE BREAKERS MAY BE UTILIZED WHERE PROPER AMPACITY APPLIES.
2	WIRE TO EXISTING PANEL IN MECHANICAL ROOM. INSTALL NEW 80A/3P BREAKER IN EXISTING PANEL TO SUPPORT NEW LOAD. USE 4 #4, 80G, 1-1/2" C.
3	WIRE TO EXISTING PANEL. INSTALL 35A/3P BREAKER IN PANEL. USE 3 #10, #10G, 3/4" C.
4	RUN 3 #10, #10G, 3/4" C TO EACH PUMP.
5	WIRE TO EXISTING PANEL. INSTALL 20A/1P BREAKER.
6	WIRE TO CCFCN-1 CONTROL PANEL. USE 3 #8, #10G, 3/4" C.
7	30A/3P/NF/GR DISCONNECT TO FEED BASIN HEATER.
8	RECEPT FOR HEAT TRACE.
9	20A/3P/NF/GR, FEEDING FAN CIRCUIT.
10	30A/3P/NF/GR FEEDING SPRAY PUMP CIRCUIT.
11	WIRE TO CONTROL PANEL CCFCN-1 USING 3 #10, #10G, 3/4" C.
12	WIRE TO EXISTING PANEL. ADD 3-20A/1P BREAKERS.



1 ENLARGED POWER PLAN - VETERINARY CLINIC
1/4" = 1'-0"



TULSA ZOO - RAINFOREST
HVAC / ELECTRICAL
UPGRADES
6421 E 36TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20

CITY OF
TULSA
PARKS, CULTURE & RECREATION
CABS (City Architectural Building Services)

DRAWN	PKL MGR. <i>[Signature]</i> 05/25
DESIGNED	LOAD MGR. <i>[Signature]</i> 05/25
SURVEY	FIELD MGR. <i>[Signature]</i> 5/15

[Signature]
RYAN N. GROGG
23690
4-17-25

ISSUE BLOCK	BY	DATE

Sheet Name: Enlarged Electrical Plans
SHEET NO. **E401**
SHEET 28 OF 31

EDA+FKI
ENGINEERS

EDA + FKI Engineers PC
10510 E. 48th Street, Suite 201
Tulsa, OK 74146
P: 918.259.4297 F: 918.515.4329

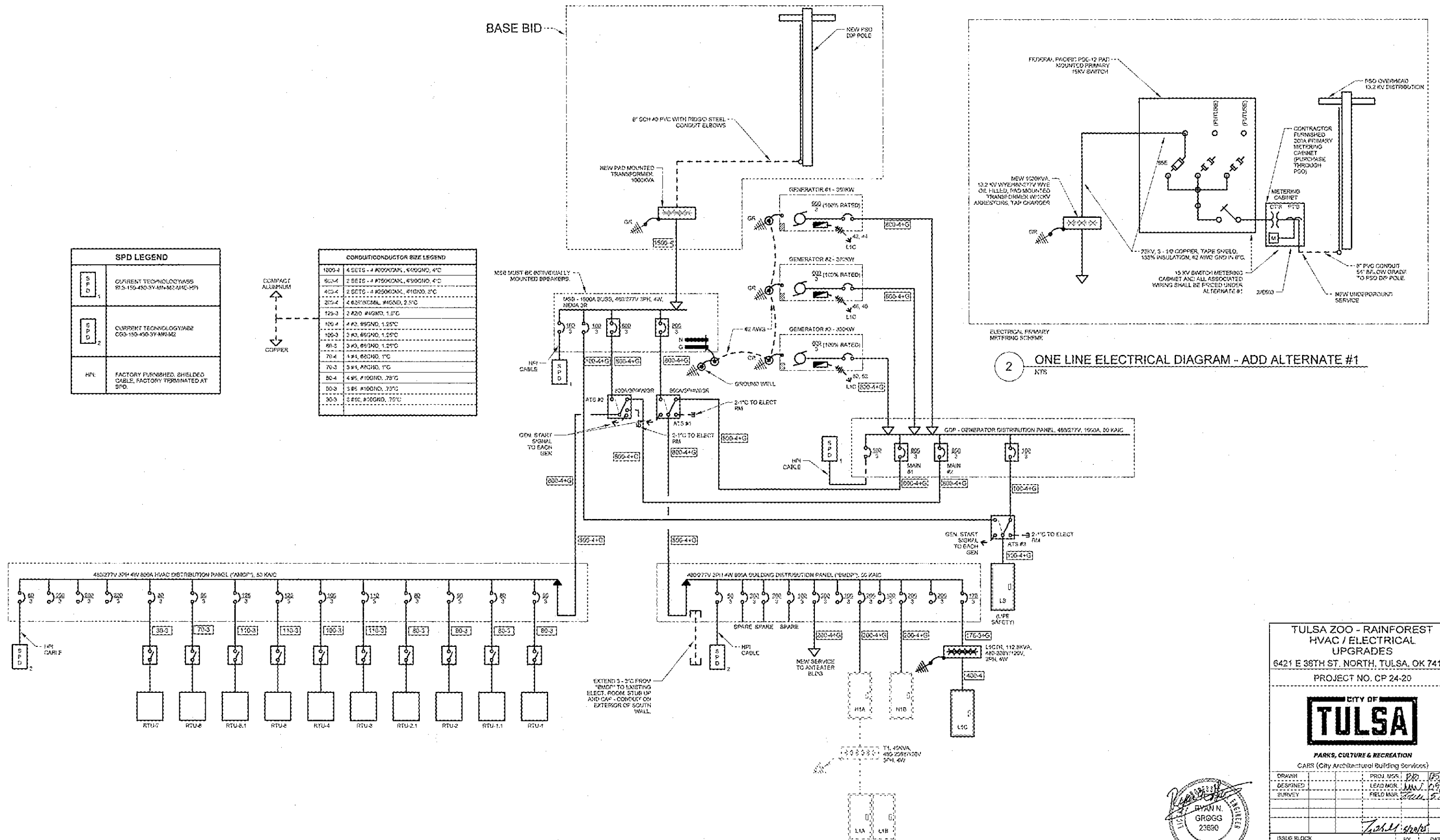
4/15/2025 2:08:15 PM

SPD LEGEND	
SPD 1	CURRENT TECHNOLOGY/ABE SIS-150-480-3Y-M2-M2-M2-M2-M2
SPD 2	CURRENT TECHNOLOGY/ABE CGS-150-480-3Y-M2-M2
HPL	FACTORY FURNISHED, SHIELDED CABLE, FACTORY TERMINATED AT SPD

CONDUIT/CONDUCTOR SIZE LEGEND	
1000-4	4 SETS - 4 #1000KVM, 4#1000, 4" C
800-4	2 SETS - 4 #750KVM, 4#1000, 4" C
400-4	2 SETS - 4 #250KVM, 4#1000, 2" C
200-4	4 #250KVM, 4#1000, 2.5" C
125-3	2 #250 #1000, 1.5" C
100-4	4 #2, #500, 1.25" C
100-3	3 #3, #500, 1.25" C
80-3	3 #3, #500, 1.25" C
70-4	4 #4, #500, 1" C
70-3	3 #4, #500, 1" C
50-4	4 #5, #1000, .75" C
50-3	3 #5, #1000, .75" C
30-3	3 #10, #1000, .75" C

COMPACT
ALUMINUM
COPPER

BASE BID



1 ONE LINE ELECTRICAL DIAGRAM - NEW WORK
NTS

2 ONE LINE ELECTRICAL DIAGRAM - ADD ALTERNATE #1
NTS

TULSA ZOO - RAINFOREST
HVAC / ELECTRICAL
UPGRADES
6421 E 38TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20



PARKS, CULTURE & RECREATION
CARS (City Architectural Building Services)

DRAWN: [Signature]
DESIGNED: [Signature]
SURVEY: [Signature]

PROJ MGR: [Signature]
LEAD MGR: [Signature]
FIELD MGR: [Signature]

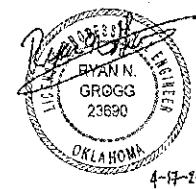
ISSUE BLOCK: [Table with 3 columns: Issue, By, Date]

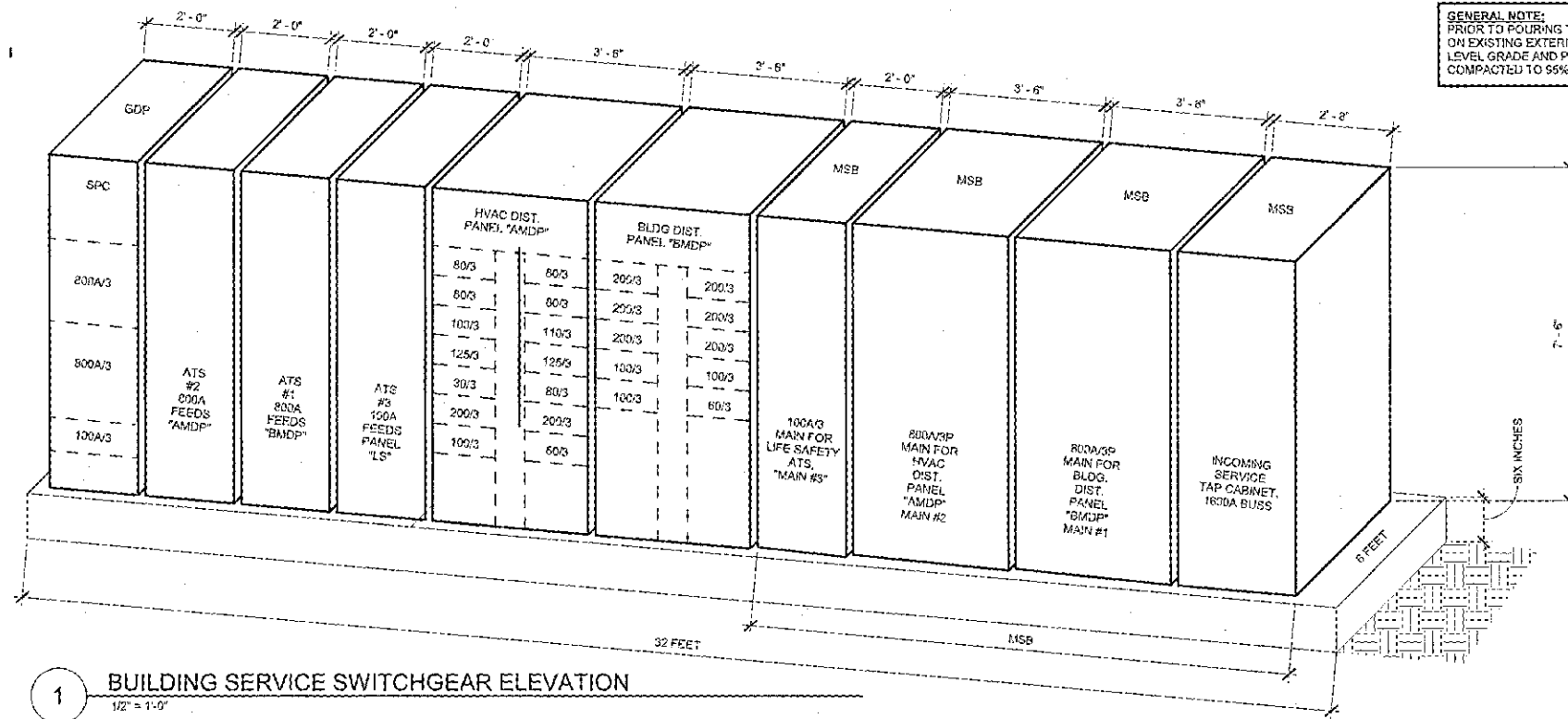
Sheet Name: Electrical Details

SHEET 27 OF 31
E501

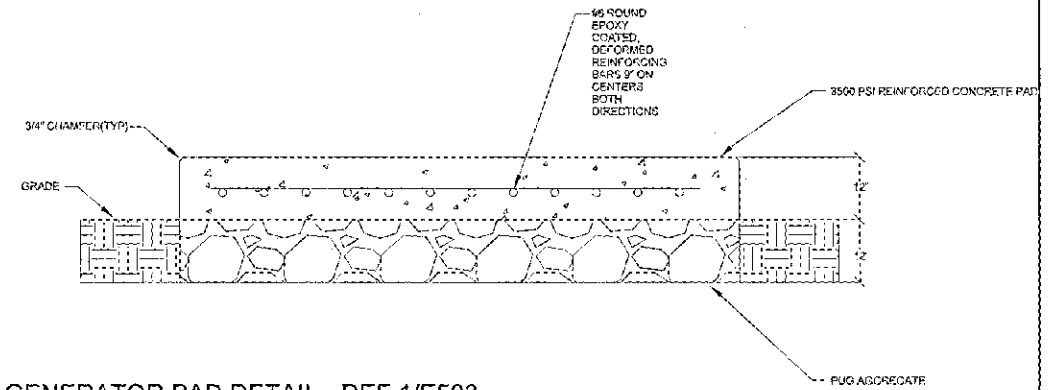
EDA FKI
ENGINEERS

EDA + FKI Engineers PC
10010 E. 45th Street - Suite 201
Tulsa, OK 74146
p: 918.256.8900 f: 918.616.4730

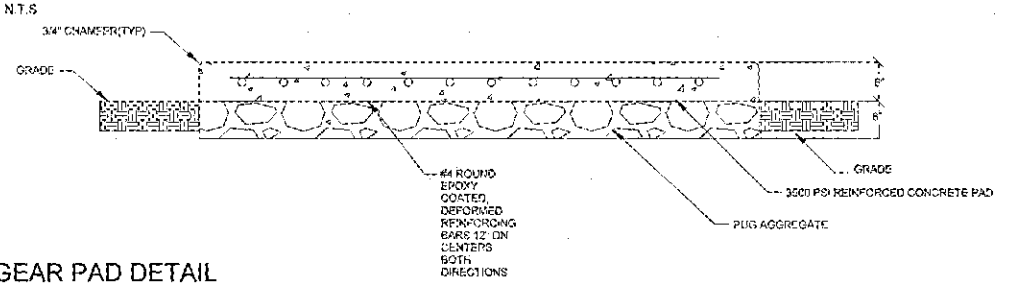




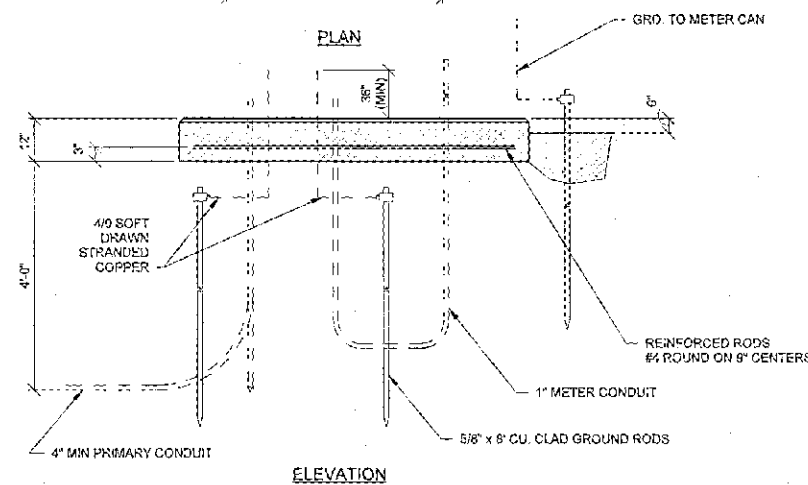
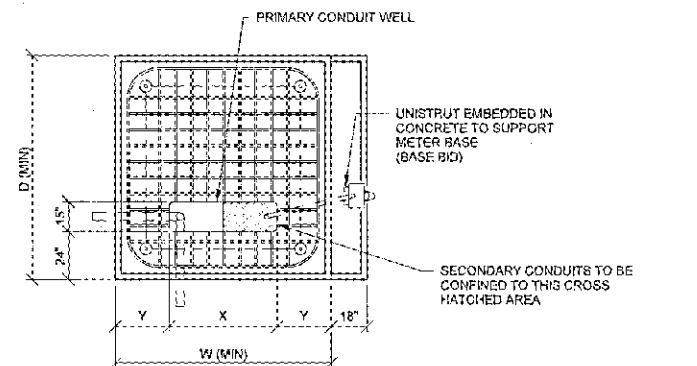
GENERAL NOTE:
PRIOR TO POURING THE EQUIPMENT CONCRETE PAD ON EXISTING EXTERIOR GRADE, CONTRACTOR SHALL LEVEL GRADE AND PROVIDE PUG AGGREGATE BASE COMPACTED TO 95% MAXIMUM DENSITY.



3 GENERATOR PAD DETAIL - REF 1/E503



2 SWITCHGEAR PAD DETAIL



INITIAL INSTALLATION	TRANSFORMER REPLACEMENT				
TRANSFORMER KVA	W IN	D IN	X IN	Y IN	TRANSFORMER KVA
150 - 750	75"	78"	42"	16 1/2"	UP TO 1000
1000 - 2500	100"	112"	54"	27"	1500 - 2500

4 TRANSFORMER PAD DETAIL

N.T.S.

CONCRETE, FOUNDATIONS AND REINFORCING STEEL NOTES:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 338, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.

2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.

3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH

(f_c) OF 3000psi AT 28 DAYS, UNLESS NOTED OTHERWISE, NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF THE CONCRETE SHALL NOT EXCEED 90°F AT TIME OF PLACEMENT.

4. CONCRETE EXPOSED TO FREEZE-THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE I PORTLAND CEMENT WITH A MAXIMUM WATER-TO-CEMENT RATIO(W/C) OF 0.45.

5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A618. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A188. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH(F_y) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:

#4 BARS AND SMALLER 40 ksi

#6 BARS AND LARGER 60 ksi

6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

• CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3"

• CONCRETE EXPOSED TO EARTH OR WEATHER:

• #6 BARS AND LARGER 2"

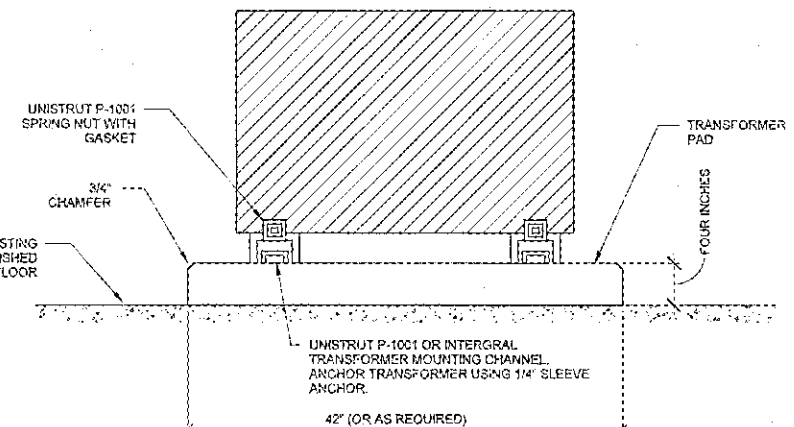
• #5 BARS AND SMALLER 1-1/2"

• CONCRETE NOT EXPOSED TO EARTH OR WEATHER:

• SLAB AND WALLS 3/4"

• BEAMS AND COLUMNS 1-1/2"

7. A TOOLED EDGE OR A 1/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS OTHERWISE IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.



5 FLOOR MOUNTED DRY TYPE TRANSFORMER INSTALLATION DETAIL

12" = 1'-0"

TULSA ZOO - RAINFOREST
HVAC / ELECTRICAL
UPGRADES
6421 E 36TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20



PARKS, CULTURE & RECREATION
CAGS (City Architectural Building Services)

DESIGN	PROJ. MGR.	DD	08/25
DESIGNED	LEAD MGR.	MW	09/25
SURVEY	FIELD MGR.	2/22/25	5/1/25

ISSUE BLOCK

BY	DATE

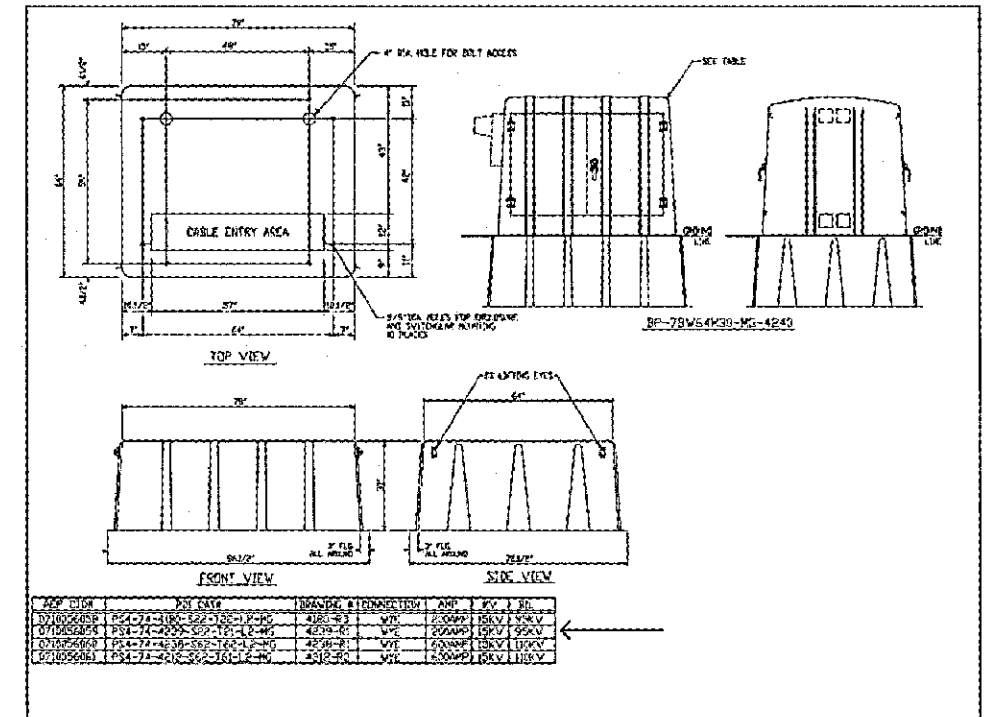
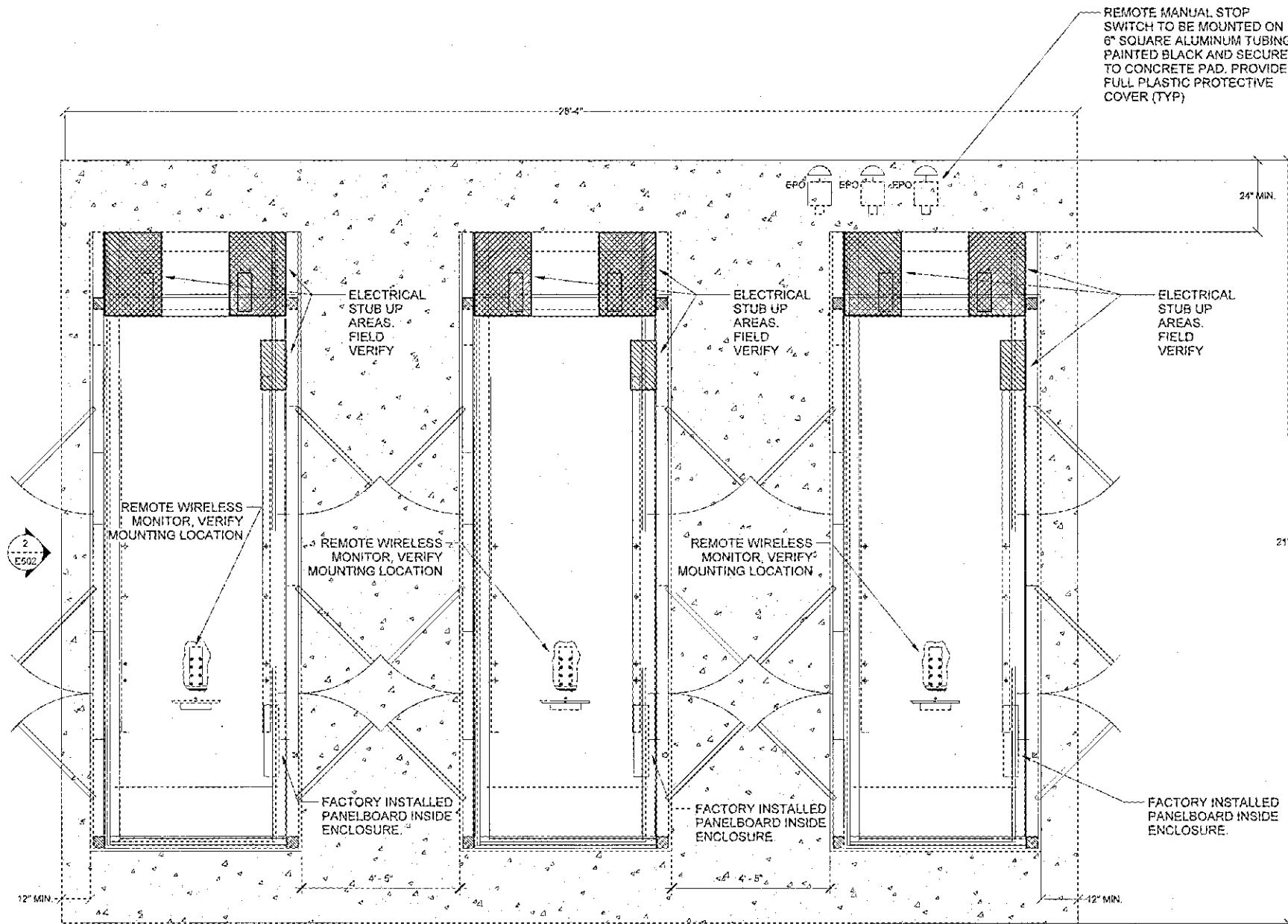
Sheet Name: Electrical Details

SHEET NO. E502
SHEET 28 OF 31



EDA+FKI
ENGINEERS

EDA + FKI Engineers PC
10010 E. 40th Street, Suite 201
Tulsa, OK 74112
P: 918.255.4600 F: 918.515.4539



2 200A, 15KV, PRIMARY METERING CABINET DETAIL - PROVIDE CONCRETE PAD PER PSO SPEC NTS

1 GENERATOR DETAIL - PLAN VIEW, 3 - 350 KW NATURAL GAS UNITS 1/2" = 1'-0"

TULSA ZOO - RAINFOREST HVAC / ELECTRICAL UPGRADES
6421 E 36TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20

CITY OF TULSA
PARKS, CULTURE & RECREATION
CARG (City Architectural & Building Services)

DESIGN	PROJ. MGR.	DATE
DESIGNED	LEAD MGR.	05/25
SURVEY	FIELD MGR.	05/25

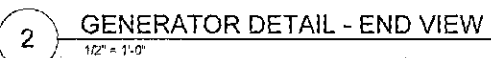
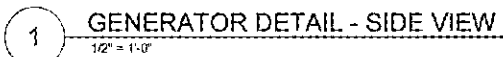
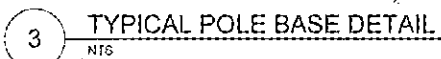
ISSUE BLOCK

RYAN N. GROGG
23690
OKLAHOMA
4-17-25

EDA + FKI
ENGINEERS
EDA + FKI Engineers PC
15810 E. 45th Street - Suite 201
Tulsa, OK 74146
P: 918.264.9900 F: 918.215.4334

Sheet Name: Electrical Details
SHEET 29 OF 31
E503

4/15/2025 3:08:20 PM



SHEET 30 OF 31	SHEET NO. E504
----------------	--------------------------

EDA + FKI Engineers PC
Olathe, KS 66061
10510 E. 48th Street - Suite 205
Tulsa, OK 74116
o: 918.253.0291 f: 918.615.4329

Branch Panel: LS

Location:
Supply From:
Mounting: Surface
Enclosure: Type 1

Voltage: 120/208 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 22 KAIC
Main Type: MCB
Main Rating: 100 A

Notes:

CKT	Circuit Description	Tripp	Poles	A	B	C	Poles	Tripp	Circuit Description	CKT
1	SPARE	20 A	1	0.0 KVA	0.0 KVA			1	20 A	SPARE
3	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SPARE
5	SPARE	20 A	1			0.0 KVA	0.0 KVA	1	20 A	SPARE
7	SPARE	20 A	1	0.0 KVA	0.0 KVA			1	20 A	SPARE
9	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SPARE
11	SPARE	20 A	1			0.0 KVA	0.0 KVA	1	20 A	SPARE
13	SPARE	20 A	1	0.0 KVA	0.0 KVA			1	20 A	SPARE
15	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SPARE
17	SPARE	20 A	1			0.0 KVA	0.0 KVA	1	20 A	SPARE
19	SPARE	20 A	1	0.0 KVA	0.0 KVA			1	20 A	SPARE
21	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SPARE
23	SPARE	20 A	1			0.0 KVA	0.0 KVA	1	20 A	SPARE
Total Load:				0.0 KVA	0.0 KVA	0.0 KVA				
Total Amps:				0 A	0 A	0 A				

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals
				Total Conn. Load: 0.0 KVA
				Total Est. Demand: 0.0 KVA
				Total Conn. Current: 0 A
				Total Est. Demand Current: 0 A

Notes:

Branch Panel: L1C

Location:
Supply From:
Mounting: Surface
Enclosure: Type 1

Voltage: 120/208 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 10,000
Main Type: MCB
Main Rating: 400 A
MCB Rating: 400 A

Notes:

CKT	Circuit Description	Tripp	Poles	A	B	C	Poles	Tripp	Circuit Description	CKT
1	GENERATOR #1 (3#8, #10G, 1.75°C)	60 A	3	0.0 KVA	0.0 KVA			2	60 A	GENERATOR #2 (3#8, #10G, 1.75°C)
5	Receptacle	20 A	1		0.0 KVA	0.0 KVA		1	20 A	Receptacle
7	Receptacle	20 A	1	0.4 KVA	0.4 KVA			1	20 A	Receptacle
9	Receptacle	20 A	1		0.5 KVA	0.0 KVA		1	20 A	SPARE
11	MOTORIZED LOUVER	20 A	1			0.0 KVA	0.0 KVA	1	20 A	SPARE
13	SPARE	20 A	1	0.0 KVA	0.0 KVA			1	20 A	SPARE
15	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SPARE
17	SPARE	30 A	3	0.0 KVA	0.0 KVA			3	30 A	SPARE
19	SPARE	30 A	3	0.0 KVA	0.0 KVA			3	30 A	SPARE
21	SPARE	100 A	3	0.0 KVA	0.0 KVA			3	100 A	SPARE
23	SPARE	100 A	3	0.0 KVA	0.0 KVA			3	100 A	SPARE
25	SPARE	60 A	3	0.0 KVA	0.0 KVA			3	60 A	SPARE
27	SPARE	60 A	3	0.0 KVA	0.0 KVA			3	60 A	SPARE
29	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SITE LIGHTING
31	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SPARE
33	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SPARE
35	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SPARE
37	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SPARE
39	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SPARE
41	SPARE	20 A	1			0.0 KVA	0.0 KVA	2	60 A	GENERATOR #1 PANEL
43	SPARE	20 A	1	0.0 KVA	0.0 KVA			2	60 A	GENERATOR #2 PANEL
45	SPARE	20 A	1		0.0 KVA	0.0 KVA		2	60 A	GENERATOR #3 PANEL
47	SPARE	20 A	1		0.0 KVA	0.0 KVA		2	60 A	GENERATOR #3 PANEL
49	SPARE	20 A	1	0.0 KVA	0.0 KVA			1	20 A	SPARE
51	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SPARE
53	SPARE	20 A	1			0.0 KVA	0.0 KVA	1	20 A	SPARE
55	SPARE	20 A	1	0.0 KVA	0.0 KVA			1	20 A	SPARE
57	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SPARE
59	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SPARE
61	SPARE	20 A	1	0.0 KVA	0.0 KVA			1	20 A	SPARE
63	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SPARE
65	SPARE	20 A	1			0.0 KVA	0.0 KVA	1	20 A	SPARE
67	SPARE	20 A	1	0.0 KVA	0.0 KVA			1	20 A	SPARE
69	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SPARE
71	SPARE	20 A	1			0.0 KVA	0.0 KVA	1	20 A	SPARE
73	SPARE	20 A	1	0.0 KVA	0.0 KVA			1	20 A	SPARE
75	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SPARE
77	SPARE	20 A	1			0.0 KVA	0.0 KVA	1	20 A	SPARE
79	SPARE	20 A	1	0.0 KVA	0.0 KVA			1	20 A	SPARE
81	SPARE	20 A	1		0.0 KVA	0.0 KVA		1	20 A	SPARE
83	SPARE	20 A	1			0.0 KVA	0.0 KVA	1	20 A	SPARE
Total Load:				0.7 KVA	1.3 KVA	0.5 KVA				
Total Amps:				6 A	11 A	6 A				

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals
Lighting	774 VA	100.00%	774 VA	Total Conn. Load: 2.5 KVA
Other	0 VA	0.00%	0 VA	Total Est. Demand: 2.5 KVA
Receptacles	1800 VA	100.00%	1800 VA	Total Conn. Current: 7 A
				Total Est. Demand Current: 7 A

Notes:

TULSA ZOO - RAINFOREST
HVAC / ELECTRICAL
UPGRADES
8421 E 36TH ST. NORTH, TULSA, OK 74115
PROJECT NO. CP 24-20



PARKS, CULTURE & RECREATION
CABS (City Architectural Building Services)

DRAWN	PROJ. MGR.	05/25
DESIGNED	LEAD MGR.	05/25
SURVEY	FIELD MGR.	05/25

ISSUE BLOCK	BY	DATE

Sheet Name: Electrical Schedules

SHEET NO. E601

SHEET 31 OF 31



EDA + FKI
ENGINEERS

EDA + FKI Engineers PC
23690 E. 40th Street, Suite 201
Tulsa, OK 74116
Tel: 918.258.8800 Fax: 918.258.8801