1112 Manatee Ave. West
Bradenton, FL 34205
purchasing@mymanatee.org

Solicitation Addendum

Addendum No.:	2
Solicitation No.:	17-2001OV
Project No.:	
Solicitation Title:	Chiller and Exhaust Fan Replacement at the Water Treatment Lab
Addendum Date:	October 20, 2017
Procurement Contact:	Olga Valcich olga.valcich@mymanatee.org

IFB NO. 17-2001OV IS AMENDED AS SET FORTH HEREIN. RESPONSES TO QUESTIONS POSED BY PROSPECTIVE BIDDERS ARE PROVIDED BELOW. THIS ADDENDUM IS HEREBY INCORPORATED IN AND MADE A PART OF IFB NO. 17-2001OV CHILLER AND EXHAUST FAN REPLACEMENT AT THE WATER TREATMENT LAB.

Change to:

SECTION 15000-MASTER MECHANICAL SPECIFICATIONS, DIVISION 15 – INDEX 10, SECTION 15682-2, PARAGRAPH 1.07(A)

Provide a <u>five (5) year warranty</u> on the entire unit, including parts and labor for the entire machine.

Replace:

WATER TREATMENT LAB CHILLER & EXHAUST FAN REPLACEMENT CONSTRUCTION DOCUMENTS

Replace the Water Treatment Lab Chiller & Exhaust Fan Replacement Construction Documents with the attached Water Treatment Lab Chiller & Exhaust Fan Replacement Construction Documents revised per Addendum 2.

NOTE: Items that are ~~struck through~~ are deleted. Items that are <u>underlined</u> have been added. All other terms and conditions remain as stated in the Invitation for Bid.

Q1. On print CHM1.1 note 4 'saw cut slab to extend chiller pad'. Are we matching the existing 1" chiller pad?
R1. Chiller Pad: The top of the existing chiller pad is about one inch above the surrounding concrete, however, the concrete goes down much deeper than that. Per 1998 As-Built Drawing, C8.0, the pad should be 12" deep along the perimeter and 6" deep in the middle. There is no way to know how it was built until ground is broken. For the pad extension, refer to detail 9, Sheet Ch-M3.2.

Q2. On print CHM2.1, states to flush system and fill with glycol. I believe this is a regular chiller water system. Can we clarify? In addition, who is the Water Treatment Company the County is currently using.
R2. Currently the system is filled with water. At the end of this chiller change-out, it is to be 15 percent ethylene glycol as per plans. Chiller controls to be configured for glycol mix per control notes so that the County may reset the temperature down lower in the future if operations call for it. The County currently has a Blanket Purchase Order for water treatment with Kibler Chemical Corp., St. Cloud, FL (407) 738-7732 which is valid through January 31, 2018.

Q3. What is the material required for 6" beam that the chiller sits on? Black or hot dipped galvanized?
R3. Per detail 8 on Sheet CH-M3.2, the beams shall be galvanized.

Q4. Spec Section 15683-2 number 1.07 calls for ten (10) year warranty. Is that for the chiller and fans? Section B of the Invitation for Bid, Scope of Work calls for five (5) year factory warranty? Which is correct?
R4. The warranty is for five years and has been corrected and clarified per this Addendum No. 2.

Q5. Can you let us know who the lightning protection company is since these systems need to be certified?
R5. Bidder shall be responsible to obtain the services of Certified Lightning Protection Company in accordance with Electrical Plans, Sheet Nos. EF-E0.0, EF-E1.0 and EF-E2.0 provided in the Invitation for Bid.

Q6. Please provide the name of the Fire Alarm Company utilized at the Lab to disconnect and reconnect the Fire Alarm Smoke Detector for the Exhaust Fan replacement as required per Plan Sheet No. EF-E1.0.

R6. The name of the Fire Alarm Company is Electronic Protection Systems, located in Bradenton, FL, (941) 749-0717.

End of Addendum

INSTRUCTIONS:
Receipt of this addendum must be acknowledged as instructed in the solicitation document. Failure to acknowledge receipt of this Addendum may result in the response being deemed non-responsive.

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MANATEE COUNTY

WATER TREATMENT LAB

CHILLER & EXHAUST FAN REPLACEMENT

4751 65th STREET WEST
BRADENTON, FL 334210

CONSTRUCTION DOCUMENTS

SHEET INDEX

REVISION TRACKING

DATE	REV	DESCRIPTION	SHEETS

PROJECT DESCRIPTION

CHILLER AND EXHAUST FAN REPLACEMENT.

PROJECT TEAM

MEP ENGINEER

ADVANCED SYSTEMS ENGINEERING, INC.
13555 AUTOMOBILE BLVD., SUITE 330
CLEARWATER, FL 33762
TEL: (727) 540-9396
CONTACT: JOHN WOOD, PE

PROJECT LOCATION

WATER TREATMENT LAB
MANATEE COUNTY, FL

KEY PLAN
SCALE: NOT TO SCALE

REVISIONS
△
△
△
△
△
△

Advanced Systems Engineering, Inc.
Job No.14079.06DE
Manager: JRW
CADD: JRW
CA-8468
13555 Automobile Boulevard, Suite 330, Clearwater, FL 33762 • Office: 727.540.9396 • Facsimile: 727.540.9376

Project Engineer
John R. Wood
PE-64788

COVER SHEET

MANATEE COUNTY - WATER TREATMENT LAB
CHILLER & EXHAUST FAN REPLACEMENT
4751 65th STREET WEST
BRADENTON, FL 34210

JOB NO: 14079.06DE
PROJ. MNGR: JRW
DRAWN BY: JRW
ISSUE DATE: 07.24.2017

SHEET NUMBER
CS
BID SET

MECHANICAL LEGEND

- TO BE REMOVED
- NEW POINT OF CONNECTION
- CWR — EXISTING CONDENSER WATER RETURN LINE
- CWR — NEW CONDENSER WATER RETURN LINE
- CWS — EXISTING CONDENSER WATER SUPPLY LINE
- CWS — NEW CONDENSER WATER SUPPLY LINE
- CHWR — EXISTING CHILLED WATER RETURN LINE
- CHWR — NEW CHILLED WATER RETURN LINE
- EXISTING CHILLED WATER SUPPLY LINE
- CHWS — NEW CHILLED WATER SUPPLY LINE
- CD — EXISTING CONDENSATE LINE
- CD — NEW CONDENSATE LINE
- ISOLATION VALVE (BALL OR BUTTERFLY)
- EQ NO — EQUIPMENT TAG
- BUTTERFLY VALVE
- TRIPLE DUTY VALVE
- Y-STRAINER
- NEW WORK
- EXISTING WORK

MECHANICAL NOTES

MECHANICAL SPECIFICATIONS

1. GENERAL RESPONSIBILITIES OF THE CONTRACTORS

PRIOR TO STARTING THE PROJECT, THE MECHANICAL CONTRACTOR SHALL PROVIDE THE SERVICES OF A STRUCTURAL PROFESSIONAL ENGINEER WHO SHALL CERTIFY THE INSTALLATION AND ATTACHMENT OF ALL ITEMS REQUIRING STRUCTURAL SUPPORT OR WIND LOADING ARE ACCEPTABLE AND MEET THE CODE REQUIREMENTS. ALL DETAILS SHOWN ARE ONLY INTENDED TO BE USED BUDGETING PURPOSES.

THE GENERAL, MECHANICAL, AND ELECTRICAL CONTRACTORS SHALL PROVIDE THE LABOR, MATERIALS, AND EQUIPMENT REQUIRED FOR THE HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM(S) AS DESCRIBED IN THE COMPLETE SET OF CONSTRUCTION DOCUMENTS. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE 2014 FLORIDA BUILDING CODE AND 2014 FLORIDA ENERGY CODE, 2011 NATIONAL ELECTRIC CODE, NFPA NATIONAL FIRE CODES, AND ALL OTHER STATE AND LOCAL CODES.

THE OWNER SHALL NOT BE RESPONSIBLE FOR ANY PORTION OF THE SCOPE OF WORK UNLESS SPECIFICALLY NOTED IN THE CONSTRUCTION DOCUMENTS.

THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION SCHEDULES OF ALL TRADES. FIXED WORK SUCH AS DUCTWORK AND SANITARY AND STORM PIPING SHALL BE INSTALLED PRIOR TO ANY TRADE WORK THAT CAN BE EASILY RELOCATED OR OFFSET SUCH AS ELECTRICAL CONDUIT AND FIRE PROTECTION AND WATER PIPING. ALL ELECTRICAL CONDUIT AND WATER PIPING SHALL BE INSTALLED AS CLOSE TO WALLS AND AS CLOSE TOGETHER AS POSSIBLE TO ALLOW FOR MAXIMUM DUCT ACCESSIBILITY.

ALL CONTRACTORS SHALL COORDINATE THE SCOPE OF THEIR WORK AND THEIR CONSTRUCTION SCHEDULES WITH THE OWNER TO PREVENT ANY INTERRUPTIONS UNACCEPTABLE TO THE OWNER. THIS MAY REQUIRE WORK AFTER NORMAL OPERATING HOURS AND/OR ON WEEKENDS.

2. BIDS, SHOP DRAWINGS, EQUIPMENT SUBMITTALS, AND CHANGE ORDERS

EACH PROSPECTIVE CONTRACTOR SHALL EVALUATE THE SCOPE OF WORK THOROUGHLY PRIOR TO SUBMITTING A BID. SOME CONDUIT, PIPING, AND OTHER OBSTACLES MAY NEED TO BE RELOCATED AND SUCH RELOCATION SHOULD BE INCLUDED IN EACH PROSPECTIVE MECHANICAL CONTRACTOR'S BID.

EACH PROSPECTIVE MECHANICAL CONTRACTOR SHALL PROVIDE A DETAILED COST BREAKDOWN FOR EACH TASK IN THE SCOPE OF WORK AS SHOWN ON THE CONSTRUCTION DOCUMENTS, INCLUDING EQUIPMENT, MATERIALS, AND LABOR. ANY PROPOSED VALUE-ENGINEERING, INCLUDING SUBSTITUTIONS FOR SCHEDULED EQUIPMENT, SHALL BE PRESENTED SEPARATELY AS AN ALTERNATE WITH A SIMILAR COST BREAKDOWN. THE SCOPE OF WORK SHALL BE BID WITH THE SCHEDULED EQUIPMENT AND ANY PROPOSED VALUE-ENGINEERING OR EQUIPMENT SUBSTITUTIONS SHALL BE IDENTIFIED AS ALTERNATE DEDUCTIONS FROM THE CONTRACTOR'S BASE BID. ANY CHANGE ORDERS MUST BE SUBMITTED WITH BOTH THE ORIGINAL COST BREAKDOWN AND THE NEW COST BREAKDOWN FOR COMPARISON.

EACH PROSPECTIVE MECHANICAL CONTRACTOR SHALL PROVIDE A CONSTRUCTION SCHEDULE DETAILING THE START DATE, DURATION, AND FINISH DATE OF EACH MAJOR TASK IN THE SCOPE OF WORK AS SHOWN ON THE CONSTRUCTION DOCUMENTS. IF ANY PROPOSED VALUE-ENGINEERING OR EQUIPMENT SUBSTITUTIONS AFFECT THIS SCHEDULE, THEN THOSE IMPACTS SHALL BE IDENTIFIED SEPARATELY.

PRIOR TO STARTING THE PROJECT, THE MECHANICAL CONTRACTOR SHALL STUDY THE COMPLETE SET OF CONSTRUCTION DOCUMENTS AND COORDINATE WITH THE OTHER TRADES AS REQUIRED TO PROVIDE SHOP DRAWINGS TO SUBMIT TO THE MECHANICAL ENGINEER FOR APPROVAL. THE SHOP DRAWINGS MAY BE SUBMITTED AS HAND-DRAWN NOTES UPON A COPY OF THE CONSTRUCTION DOCUMENTS IF PERMISSION IS OBTAINED FROM THE MECHANICAL ENGINEER. THE CONSTRUCTION DOCUMENTS ARE DIAGRAMMATIC IN NATURE AND INTENDED SOLELY TO CLARIFY THE SCOPE OF WORK AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. THE CONSTRUCTION DOCUMENTS ARE NOT INTENDED TO ALERT THE CONTRACTOR(S) OF ALL OBSTACLES. THE SHOP DRAWINGS SHALL SHOW THE COORDINATION OF DUCTWORK AND MECHANICAL EQUIPMENT INSTALLATION WITH EXISTING AND NEW OBSTACLES INCLUDING, BUT NOT LIMITED TO, ELECTRICAL CONDUITS, FIRE PROTECTION PIPING, RAIN LEADERS, SANITARY DRAINS, STRUCTURAL MEMBERS, AND WATER PIPING, AS WELL AS THE MECHANICAL EQUIPMENT MANUFACTURER'S RECOMMENDED THE MECHANICAL CONTRACTOR SHALL ALSO SHOW THE EXISTING CONDITIONS ON THE SHOP DRAWINGS WHERE THE EXISTING CONDITIONS ARE DIFFERENT FROM THOSE SHOWN ON THE CONSTRUCTION DOCUMENTS.

PRIOR TO STARTING THE PROJECT, THE MECHANICAL CONTRACTOR SHALL STUDY THE COMPLETE SET OF CONSTRUCTION DOCUMENTS AND COORDINATE WITH THE MANUFACTURER(S) AS REQUIRED TO PROVIDE EQUIPMENT SUBMITTALS TO SUBMIT TO THE MECHANICAL ENGINEER FOR APPROVAL. THE EQUIPMENT SUBMITTALS SHALL INCLUDE DIMENSIONS, WEIGHTS, SPECIFIED ACCESSORIES AND REQUIRED CLEARANCES, AS WELL AS FAN CURVES, SOUND LEVELS, CONSTRUCTION DETAILS, WARRANTY INFORMATION, AND ALL OTHER RELEVANT DATA PRESENTED IN THE SAME FORMAT AS THE EQUIPMENT SCHEDULES ON THE CONSTRUCTION DOCUMENTS.

THE BASE PRICE SHALL USE ALL EQUIPMENT AS SPECIFIED. ALL VALUE ENGINEERING ALTERNATES SHALL BE LISTED AS ALTERNATES FOR THE OWNERS CONSIDERATION. IF ALTERNATE PRICING IS NOT ACCEPTED BY THE OWNER AND ENGINEER, THEN THE CONTRACTOR SHALL PROVIDE ALL EQUIPMENT AS SPECIFIED. THE OWNER WILL CONSIDER A CHEAPER PIECE OF EQUIPMENT IF THE DEDUCT IS ENOUGH AND THE PERFORMANCE IS STILL ACCEPTABLE. THE OWNER WILL CONSIDER A MORE EXPENSIVE PIECE OF EQUIPMENT IF BETTER PERFORMANCE WOULD JUSTIFY THE ADDITIONAL UPFRONT COST. PLEASE PROVIDE ALL ALTERNATES THAT WOULD BE USEFUL FOR THE OWNER TO CONSIDER TO SAVE MONEY OR IMPROVE PERFORMANCE. ALTERNATES MUST MEET THE SPECIFICATION REQUIREMENTS AND THE CONTRACTOR ASSUMES FULL RESPONSIBILITY OF COORDINATING WITH OTHER TRADES FOR ALL CHANGES AND COST REQUIRED.

ALTERNATIVES TO THE SCHEDULED EQUIPMENT AND MATERIALS MUST BE EQUAL TO OR EXCEED THOSE SCHEDULED. IF SUBSTITUTIONS FOR SCHEDULED EQUIPMENT AND MATERIALS ARE TO BE MADE, THEN THE MECHANICAL CONTRACTOR SHALL FIRST SUBMIT TO THE MECHANICAL ENGINEER COMPARATIVE LITERATURE CLEARLY SHOWING THE EQUIVALENT OPERATING CAPABILITIES AND OTHER PROPERTIES OF THE SUBSTITUTIONS. ALL DEVIATIONS MUST BE CLEARLY IDENTIFIED AND A REQUEST MUST BE MADE SPECIFIC FOR ALL DEVIATIONS. WHEN SUBSTITUTIONS ARE MADE, THE CONTRACTOR ASSUMES FULL RESPONSIBILITY OF COORDINATING WITH OTHER TRADES ON ANY CHANGES REQUIRED FOR THE SUBSTITUTION, INCLUDING COSTS, ASSOCIATED WITH DUCTWORK, PIPING, ELECTRICAL AND STRUCTURAL TO IMPLEMENT THE SUBSTITUTED ITEM(S).

ANY CHANGE ORDER SUBMITTED BY THE GENERAL, MECHANICAL, OR ELECTRICAL CONTRACTORS FOR WORK WITHIN THE SCOPE OF THIS PROJECT SHALL NOT EXCEED THE VALUES LISTED IN THE MOST CURRENT VERSIONS OF THE MEANS COST DATA BOOKS FOR THE APPLICABLE TRADES. EVERY CHANGE ORDER SHALL BE ACCOMPANIED BY A DETAILED COST BREAKDOWN FOR EACH TASK, INCLUDING EQUIPMENT, MATERIALS, AND LABOR. THE MECHANICAL ENGINEER MAY, AT HIS DISCRETION, REQUIRE THE CONTRACTOR(S) TO PROVIDE A FINAL, VERIFIABLE ACCOUNTING OF EQUIPMENT, MATERIALS, AND LABOR AFTER THE WORK IS COMPLETE AND PRIOR TO THE MECHANICAL ENGINEER'S APPROVAL OF THE CONTRACTOR'S' FINAL PAY APPLICATION(S). LABOR RATES FOR CHANGE ORDERS SHALL NOT EXCEED $50/HOUR ($75/HR OVERTIME) FOR ANY CHANGE ORDERS INCLUDING ALL OVERHEAD AND PROFIT UNLESS APPROVED BY THE ENGINEER OF RECORD. MATERIALRATES FOR PIPING SHALL NOT EXCEED A 0.35 MULTIPLER FOR NIBCO MATERIALS UNLESS APPROVED BY ENGINEER OF RECORD.

3. MECHANICAL EQUIPMENT INSTALLATION

ALL MECHANICAL EQUIPMENT SHALL BE INSTALLED AS REQUIRED BY THE MANUFACTURER'S' INSTALLATION AND MAINTENANCE MANUALS. THOSE MANUALS WILL TYPICALLY PROVIDE MORE DETAIL THAN THE CONSTRUCTION DOCUMENTS. IF THERE IS A CONFLICT BETWEEN THE INSTALLATION AND MAINTENANCE MANUALS AND THE CONSTRUCTION DOCUMENTS, THEN THE MECHANICAL CONTRACTOR SHALL SUBMIT A REQUEST-FOR-INFORMATION TO THE MECHANICAL ENGINEER.

ALL MECHANICAL EQUIPMENT SHALL BE INSTALLED SUCH THAT SUFFICIENT CLEARANCES ARE PROVIDED FOR MAINTENANCE. ALL MECHANICAL EQUIPMENT AT A HEIGHT GREATER THAN SIXTEEN (16) FEET SHALL HAVE A PERMANENT MEANS OF ACCESS. ALL COMPRESSORS SHALL HAVE A MINIMUM OF THIRTY (30) INCHES OF CLEAR SPACE ON THE SERVICE SIDE(S).

THE GENERAL AND MECHANICAL CONTRACTORS SHALL PROVIDE A CONCRETE HOUSEKEEPING PAD UNDER ALL MECHANICAL EQUIPMENT. THE HOUSEKEEPING PAD SHALL BE AT THE REQUIRED HEIGHT TO PROVIDE THE REQUIRED P-TRAP HEIGHT AND SHALL EXTEND 8" BEYOND THE MECHANICAL EQUIPMENT ON ALL SIDES.

THE MECHANICAL CONTRACTOR SHALL PROVIDE VIBRATION ISOLATION AS RECOMMENDED BY THE MANUFACTURER(S) AND/OR REQUIRED BY THE MECHANICAL ENGINEER TO ENSURE QUIET OPERATION OF THE MECHANICAL EQUIPMENT. NO UNDUE VIBRATION OR SOUND SHALL BE TRANSMITTED TO THE STRUCTURE OR ANY OCCUPIED SPACES WITHIN THE STRUCTURE.

THE MECHANICAL CONTRACTOR SHALL PROVIDE ALL STARTERS, CONTACTORS, RELAYS, CONTROLS, AND ACCESSORIES NECESSARY TO PROVIDE A COMPLETE AND WORKING POWER AND CONTROL SYSTEM FOR THE MECHANICAL EQUIPMENT WITHIN THE SCOPE OF WORK. THE ELECTRICAL CONTRACTOR WILL PROVIDE ALL DISCONNECT SWITCHES, CONDUIT, AND WIRING FOR THE MECHANICAL EQUIPMENT WITHIN THE SCOPE OF WORK. ALL ELECTRICAL WORK SHALL COMPLY WITH THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER OPERATION OF THE COMPLETE SYSTEM AND SHALL ENSURE THAT WIRING DIAGRAMS ARE PROVIDED TO THE OWNER. NO WIRING OF ANY KIND SHALL BE EXPOSED IN FINISHED AREAS.

THE MECHANICAL CONTRACTOR SHALL ENSURE THAT ALL MECHANICAL EQUIPMENT IS STARTED, TESTED, ADJUSTED, AND PLACED IN SATISFACTORY OPERATING CONDITION PRIOR TO SUBSTANTIAL COMPLETION. THE MECHANICAL CONTRACTOR SHALL GUARANTEE ALL WORKMANSHIP, MATERIALS, AND MECHANICAL EQUIPMENT TO BE FREE OF DEFECTS FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE BY THE OWNER AND SHALL REPAIR ANY DEFECTS OCCURRING WITHIN THAT TIME WITHOUT COST TO THE OWNER. ALL MECHANICAL EQUIPMENT IN THE SCOPE OF WORK SHALL BE COVERED FOR THE DURATION OF THE MANUFACTURER'S WARRANTIES AND THE CONTRACTOR SHALL PROVIDE THE OWNER WITH ORIGINALS OF ALL MANUFACTURER'S GUARANTEES AND WARRANTIES. ALL COMPRESSORS SHALL BE PROVIDED WITH A MINIMUM FIVE (5) YEAR WARRANTY. THE CONTRACTOR SHALL PROVIDE THE COST OF ALL WARRANTIES TO THE OWNER AND GIVE THE OWNER THE OPTION TO DEDUCT THIS COST FROM THE CONTRACTOR PRICE AND PURCHASE THE WARRANTIES DIRECTLY.

THE MECHANICAL CONTRACTOR SHALL COORDINATE ALL MECHANICAL EQUIPMENT VOLTAGE REQUIREMENTS WITH THE VOLTAGE AVAILABLE AT THE PROJECT SITE PRIOR TO ORDERING ANY MECHANICAL EQUIPMENT.

THE MECHANICAL CONTRACTOR SHALL RETURN ANY EXISTING MECHANICAL EQUIPMENT IN THE SCOPE OF WORK AS REQUESTED BY THE OWNER. THIS MAY INCLUDE MAKING PROVISIONS TO RECLAIM THE REFRIGERANT. THE MECHANICAL CONTRACTOR SHALL REMOVE EXISTING MECHANICAL EQUIPMENT NOT REQUESTED BY THE OWNER FROM THE PROJECT SITE AND DISPOSE OF IT IN ACCORDANCE WITH ALL APPLICABLE LAWS.

4. CONDENSER, CHILLED, PIPING

WATER LINES WITH DIAMETERS OF TWO (2) INCHES OR LESS SHALL BE CONSTRUCTED OF COPPER (TYPE 'L' OR HEAVIER). WATER LINES WITH DIAMETERS OF MORE THAN TWO (2) INCHES SHALL BE CONSTRUCTED OF STEEL (MINIMUM SCHEDULE 40). ALL WATER LINES SHALL BE PITCHED UP ONE (1) INCH PER FORTY (40) LINEAR FEET IN THE DIRECTION OF WATER FLOW. THE MECHANICAL CONTRACTOR SHALL PROVIDE DRAIN VALVES AT ALL LOW POINTS AND MANUAL AIR VENTS AT ALL HIGH POINTS IN ALL WATER LINES.

ALL CONTROL VALVES SHALL BE TWO-WAY CONTROL VALVES UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DOCUMENTS. THE MECHANICAL CONTRACTOR SHALL SUBMIT CONTROL VALVE Cv AND PRESSURE DROPS TO THE MECHANICAL ENGINEER FOR APPROVAL.

THE MECHANICAL CONTRACTOR SHALL SLEEVE AND SEAL ALL WATER LINES AND OTHER PIPING PASSING THROUGH FLOORS, WALLS, AND ROOFS UNLESS NOTED OTHERWISE ON THE CONSTRUCTION DOCUMENTS. THE MECHANICAL CONTRACTOR SHALL PROVIDE FIRE-RATED SLEEVES FOR ALL WATER LINE OR OTHER PIPING PENETRATIONS OF FIRE-RATED OR FIRE/SMOKE-RATED ASSEMBLIES. THE CONCENTRIC ANNULAR SPACE BETWEEN EACH SLEEVE AND WATER LINE OR PIPE SHALL BE PACKED WITH FIRE-SAFING MATERIAL.

EVERY PENETRATION FOR WATER LINES OR OTHER PIPING, CONDUITS, OR ANY OTHER PURPOSE THROUGH AN ASSEMBLY WITH A REQUIRED FIRE RESISTANCE RATING SHALL BE SEALED IN AN APPROVED MANNER TO MAINTAIN THE REQUIRED FIRE RESISTANCE RATING OF THE ASSEMBLY AS FOLLOWS:

A. WHERE HOLES FOR PENETRATIONS ARE CIRCULAR OR CORE-BORED, THE MECHANICAL CONTRACTOR SHALL SEAL EACH PENETRATION WITH FIRE-SEAL BRAND SMOKE AND FIRE STOP FITTINGS MANUFACTURED BY O-Z GEDLEY, LINK SEAL BRAND SMOKE AND FIRE STOP FITTINGS MANUFACTURED BY THUNDER LINE, OR AN EQUAL APPROVED BY THE MECHANICAL ENGINEER.

B. WHERE HOLES FOR PENETRATIONS ARE IRREGULAR (NON-CIRCULAR), THE MECHANICAL CONTRACTOR SHALL PROTECT EACH PENETRATION WITH DOW CORNING 3-6548, SILICONE RTV FOAM, 3M FIRE BARRIER PENETRATION SEAL SYSTEM, OR AN EQUAL APPROVED BY THE MECHANICAL ENGINEER.

THE MECHANICAL CONTRACTOR SHALL INSULATE ALL CHILLED WATER LINES WITH CLOSED CELLULAR GLASS INSULATION. INTERIOR CHILLED WATER LINES WITH DIAMETERS OF TWO (2) INCHES OR LESS SHALL BE PROVIDED WITH 1-1/2" OF INSULATION, INTERIOR CHILLED WATER LINES WITH DIAMETERS OF MORE THAN TWO (2) INCHES SHALL BE PROVIDED WITH 2" OF INSULATION, AND ALL EXTERIOR CHILLED WATER LINES (TO INCLUDE THOSE IN UNCONDITIONED INTERIOR SPACES) SHALL BE PROVIDED WITH 2-1/2" OF INSULATION. INTERIOR CHILLED WATER LINES SHALL BE FINISHED WITH VINYL-FOIL LAMINATE SERVICE JACKETS AND EXTERIOR CHILLED WATER LINES SHALL BE FINISHED WITH ALUMINUM SERVICE JACKETS. ALL INSULATION AND SERVICE JACKETS FOR ELBOWS OR OTHER PIPE FITTINGS SHALL BE PRE-FORMED TO ELIMINATE VOIDS.

THE MECHANICAL CONTRACTOR SHALL CLEARLY LABEL ALL PIPING TO INDICATE CONTENT AND DIRECTION OF FLOW.

THE MECHANICAL CONTRACTOR SHALL PROVIDE ALL NECESSARY CHEMICAL WATER TREATMENT SYSTEM COMPONENTS. AFTER EACH WATER SYSTEM IS INSTALLED AND CLEANED AND BEFORE SUBSTANTIAL COMPLETION, THE MECHANICAL CONTRACTOR SHALL INITIATE A CHEMICAL WATER TREATMENT PROGRAM AND PROVIDE ANY NECESSARY TRAINING IN CHEMICAL WATER TREATMENT TO THE OWNER. THE CONTRACTOR SHALL USE THE OWNER CHEMICAL TREATMENT VENDOR FOR ALL REQUIRED CHEMICAL TREATMENT SERVICES.

ALL NEW CHILLED WATER PIPE SHALL BE FLUSHED AT A MINIMUM OF 6 FPS. PROVIDE BOTTOM MOUNTED STRAINERS (WITH OPENING NO LARGER THAN 0.45 INCHES) WITH BLOWDOWNS EVERY 300 FEET. PROVIDE RENTAL PUMP AND TEMPORARY PIPING AS REQUIRED. USE PIPE CLEANING COMPOUND SIMILAR TO NALCO 2567 - TO REMOVE ORGANIC SOIL, HYDROCARBONS, FLUX, PIPE MILL, VARNISH, PIPE COMPOUNDS, IRON OXIDE, AND LIKE DELETERIOUS SUBSTANCES - WITH OR WITHOUT INHIBITOR, SUITABLE FOR SYSTEM METALS WITHOUT DELETERIOUS EFFECTS. CLEANER SHALL CONTAIN NO TRISODIUM PHOSPHATE. PROVIDE BY-PASS TYPE BATCH FEEDER TO RECEIVE CHEMICALS IN LIQUID OR PELLET FORM. REMOVE FEEDER FROM ME ROOM WHEN PROCESS IS COMPLETED. ALL FLUSHING AND CLEANING SHALL BE PREFORMED BY A COMPANY THAT SPECIALIZES IN CHEMICAL WATER TREATMENT.

ALL PIPING SHALL BE LABELED TO ANSI/ASME A13.1 SHALL BE FABRICATED IN THE USA.

6. CONTROLS

THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR CONTRACTING WITH THE EXISTING CONTROLS CONTRACTOR AND DETERMINING WHAT IS REQUIRED TO INCORPORATE NEW MECHANICAL EQUIPMENT AND CONTROLS INTO THE EXISTING CONTROL SYSTEM(S) AND INCLUDING ALL COSTS ASSOCIATED WITH INCORPORATING NEW MECHANICAL EQUIPMENT AND CONTROLS INTO THE EXISTING CONTROL SYSTEM(S) IN HISHER BID. THE CONTROLS CONTRACTOR SHALL PROVIDE A COMPLETE DESCRIPTION OF THE ENTIRE CONTROL SYSTEM, INCLUDING SCHEMATIC DRAWINGS. THE MECHANICAL CONTRACTOR SHALL PROVIDE ALL CONTROLS AND SUB-CONTRACT TO THE ELECTRICAL CONTRACTOR ALL CONTROLS POWER AND TRANSFORMERS NOT IDENTIFIED IN THE ELECTRICAL PORTION OF THE CONSTRUCTION DOCUMENTS.

7. TESTING AND BALANCING THE HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM

THE CONTRACTOR SHALL PROVIDE THE SERVICES OF AN INDEPENDENT TEST AND BALANCE AGENCY TO TEST, BALANCE, AND CERTIFY THE PERFORMANCE OF THE COMPLETE HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM, TO INCLUDE SUPPLY, RETURN, OUTSIDE / MAKE-UP, AND EXHAUST AIR SYSTEMS, AS WELL AS CONDENSER, CHILLED, AND HEATING HOT WATER SYSTEMS. THE TEST AND BALANCE CONTRACTOR SHALL PERFORM ALL TESTING, ADJUSTING, BALANCING, AND DATA RECORDING NECESSARY TO ESTABLISH THE CAPACITY AND QUALITY OF THE SYSTEMS AND CONFIRM THE SATISFACTORY COMPLETION OF ALL ASPECTS OF THE SCOPE OF WORK. THIS WILL INCLUDE NOT ONLY THE NEW SYSTEMS, BUT ALSO ALL OF THE EXISTING SYSTEMS THAT HAVE BEEN MODIFIED.

THE TEST AND BALANCE CONTRACTOR SHALL BE AN APPROVED MEMBER OF THE AABC OR NEBB AND SHALL SPECIALIZE IN THE TESTING AND BALANCING OF HEATING, VENTILATION, AND AIR CONDITIONING SYSTEMS. THE FOLLOWING TEST AND BALANCE CONTRACTORS ARE PRE-APPROVED: THE PHOENIX AGENCY, SITA, TEST AND BALANCE CORPORATION AND SPEC TECH CONSULTANTS. THE CONTRACTOR SHALL SUBMIT ANY NON-PRE-APPROVED TEST AND BALANCE CONTRACTOR TO THE MECHANICAL ENGINEER FOR APPROVAL PRIOR TO SUBMITTING A BID.

CONTROLS CONTRACTOR SHALL PROVIDE REQUIRED BAS HARDWARE, SOFTWARE, PERSONNEL AND ASSISTANCE TO TAB AGENCY AS REQUIRED TO BALANCE THE SYSTEMS. CONTROLS CONTRACTOR SHALL ALSO PROVIDE TRENDING REPORT TO DEMONSTRATE THAT SYSTEMS ARE COMPLETE.

MECHANICAL CONTRACTOR SHALL PROVIDE TAB AGENCY ONE COMPLETE SET OF CONTRACT DOCUMENTS, CHANGE ORDERS, AND APPROVED SUBMITTALS. MECHANICAL CONTRACTOR SHALL COORDINATE MEETINGS AND ASSISTANCE FROM SUPPLIERS AND CONTRACTORS AS REQUIRED BY TAB AGENCY. MECHANICAL CONTRACTOR SHALL PROVIDE ADDITIONAL VALVES, DAMPERS, SHEAVES AND BELTS AS REQUIRED BY TAB AGENCY. MECHANICAL CONTRACTOR SHALL PROVIDE ACCESS TO ALL DAMPERS, VALVES, TEST PORTS, NAMEPLATES AND OTHER APPURTENANCES AS REQUIRED BY TAB AGENCY. MECHANICAL CONTRACTOR SHALL REPLACE OR REPAIR INSULATION AS REQUIRED BY TAB AGENCY.

THE TEST AND BALANCE CONTRACTOR SHALL, UPON COMPLETION OF ALL NECESSARY TESTING AND BALANCING AND AT LEAST ONE (1) WEEK PRIOR TO SUBSTANTIAL COMPLETION, SUBMIT THREE (3) BOUND COPIES OF THE TEST AND BALANCE REPORT TO THE MECHANICAL ENGINEER.

THE MECHANICAL CONTRACTOR SHALL INCLUDE IN HIS/HER BID THE COST OF ANY SHEAVE CHANGES REQUIRED FOR REBALANCING THE SYSTEM. WHEN BALANCING AN AIR HANDLER EQUIPPED WITH A VARIABLE FREQUENCY DRIVE, THE TEST AND BALANCE AND MECHANICAL CONTRACTORS SHALL PROVIDE A FAN MOTOR SHEAVE THAT CREATES THE MAXIMUM AIRFLOW POSSIBLE WITHOUT OVERLOADING THE FAN MOTOR WHEN THE VARIABLE FREQUENCY DRIVE IS IN FULL BYPASS MODE. THE VARIABLE FREQUENCY DRIVE SHALL THEN BE USED TO BALANCE THE AIR HANDLER TO PROVIDE THE DESIGN AIRFLOW. THE TAB SHALL OPEN THE DAMPERS TO THE CRITICAL PATH DUCTWORK AND OPERATE THE VFD AT THE LOWEST SPEED POSSIBLE TO ACHIEVE DESIGN AIRFLOW.

THE BALANCING VALVES AT THE PUMP AND AT THE CHILLER SHOULD BE FULLY OPEN AND CBV TO THE CRITICAL AHU LOOPS SHOULD BE FULLY OPEN WITH THE PUMP TO ACHIEVE THIS REQUIRED WATER FLOW WITH THE MINIMUM VFD SPEED. ANY USE OF THE CHILLER OR PUMP CBVS MUST GET THE APPROVAL FROM THE ENGINEER OF RECORD.

THE TEST AND BALANCE CONTRACTOR SHALL BALANCE THE SCOPE OF WORK AS SHOWN ON THE CONSTRUCTION DOCUMENTS AND RETURN AREAS OUTSIDE OF THE SCOPE OF WORK AND SERVED BY EXISTING SYSTEMS WITHIN THE SCOPE OF WORK TO THE ORIGINAL DESIGN AIRFLOWS OR RE-BALANCE THE ORIGINAL DESIGN AIRFLOWS IN LOCATIONS WHERE THE EXISTING SYSTEM MAY NOT BE BALANCED PROPERLY.

8. SUBSTANTIAL AND FINAL COMPLETION

THE MECHANICAL CONTRACTOR SHALL MAINTAIN A SET OF CONTINUOUSLY UPDATED, REPRODUCIBLE AS-BUILT DRAWINGS DURING CONSTRUCTION AND PROVIDE A COMPLETE SET OF THOSE DRAWINGS IN BOTH ELECTRONIC AND HARDCOPY FORMATS TO THE OWNER UPON FINAL COMPLETION.

THE MECHANICAL AND ELECTRICAL CONTRACTORS SHALL PROVIDE FIVE (5) BOUND COPIES OF ALL MECHANICAL AND ELECTRICAL CONTRACTOR WARRANTIES, MANUFACTURERS' WARRANTIES, PARTS LISTS, AND INSTALLATION AND MAINTENANCE MANUALS FOR ALL MECHANICAL EQUIPMENT, AS WELL AS INSTRUCTIONS FOR OPERATING AND MAINTAINING ALL MECHANICAL EQUIPMENT TO THE OWNER UPON FINAL COMPLETION.

9. COMMISSIONING

THE FLORIDA ENERGY CONSERVATION CODE 2014 C408.2 REQUIRES MECHANICAL COMMISSIONING WHERE TOTAL MECHANICAL COOLING CAPACITY EXCEEDS 480 MBH OR MECHANICAL HEATING CAPACITY EXCEEDS 600 MBH. THIS SCOPE, AS DETERMINED NECESSARY BY THE AUTHORITY HAVING JURISDICTION, MUST BE INCLUDED IN THE BASE BID. THE TEST AND BALANCE CONTRACTOR SHALL PERFORM COMMISSIONING PER C408.2 AND SUBMIT A REPORT TO THE ENGINEER FOR REVIEW. THE FOLLOWING SHALL BE PERFORMED AND INCLUDED IN THE REPORT:

- ALL ITEMS AS SPECIFIED UNDER TEST AND BALANCE SECTION ABOVE
- CONFIRMATION OF ALL SEQUENCES OF OPERATION AS SPECIFIED ON PLANS.
- CONFIRMATION OF ALL SYSTEM PERFORMANCE AND FUNCTION AS SPECIFIED ON PLANS
- CONFIRMATION OF FUNCTION OF ALL ACTUATED DEVICES SUCH AS DAMPERS, ECONOMIZERS AND VALVES CONSISTENT WITH CONTROLS SEQUENCES OF OPERATION.
- CALIBRATION OF ALL SENSORS, THERMOSTATS, ETC.
- DOCUMENTATION OF ANY AS-BUILT CONDITIONS THAT DIFFER FROM CONSTRUCTION DOCUMENTS WHICH MAY AFFECT SYSTEM PERFORMANCE.

10. SCHEDULE

THE CONTRACTORS SHALL COORDINATE THE CONSTRUCTION SCHEDULE WITH MANATEE COUNTY TO MINIMIZE DISRUPTION OF LABORATORY OPERATIONS. DOWNTIME SHALL PREFERABLY OCCUR OVER A WEEKEND DURING UN-OCCUPIED HOURS. THE LABORATORY CLOSES AT 1PM ON SATURDAYS AND SUNDAYS. THE SIGNIFICANT PERIODS OF DOWNTIME WILL BE:

- THE INSTALLATION OF NEW CHILLED WATER VALVES AND AUXILIARY CONNECTIONS TO START UP THE RENTAL CHILLER.
- THE REPLACEMENT OF THE CHILLED WATER PUMP.
- DISCONNECT OF TEMPORARY CHILLER AND STARTUP OF NEW CHILLER.

ALL BUILDING HVAC SYSTEMS SHALL BE RUNNING AND OPERATIONAL BEFORE START OF NEXT BUSINESS DAY. CONSTRUCTION MAY OCCUR DURING BUSINESS HOURS, BUT OPERATIONS THAT CREATE EXCESSIVE NOISE MAY NEED TO OCCUR AFTER BUSINESS HOURS.

MECHANICAL SHEET INDEX

REVISIONS

Advanced Systems Engineering, Inc.
Job No.14079.06DE
Manager: JRW
CADD: JRW
Project Engineer
John R. Wood
PE-64788
CA-8468
10505 Automobile Boulevard, Suite 330, Clearwater, FL 33762 • Office: 727.540.9394 • Facsimile: 727.540.9376

MECHANICAL SPECIFICATIONS

MANATEE COUNTY - WATER TREATMENT LAB

CHILLER & EXHAUST FAN REPLACEMENT

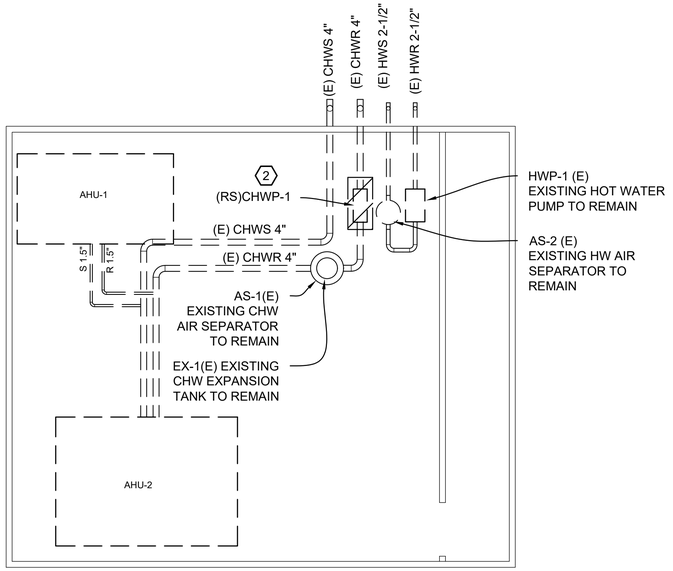
4751 65th STREET WEST
BRADENTON, FL 34210

JOB NO: 14079.06DE
PROJ. MNGR: JRW
DRAWN BY: JRW
ISSUE DATE: 07.24.2017

SHEET NUMBER
CH-M0.1
BID SET

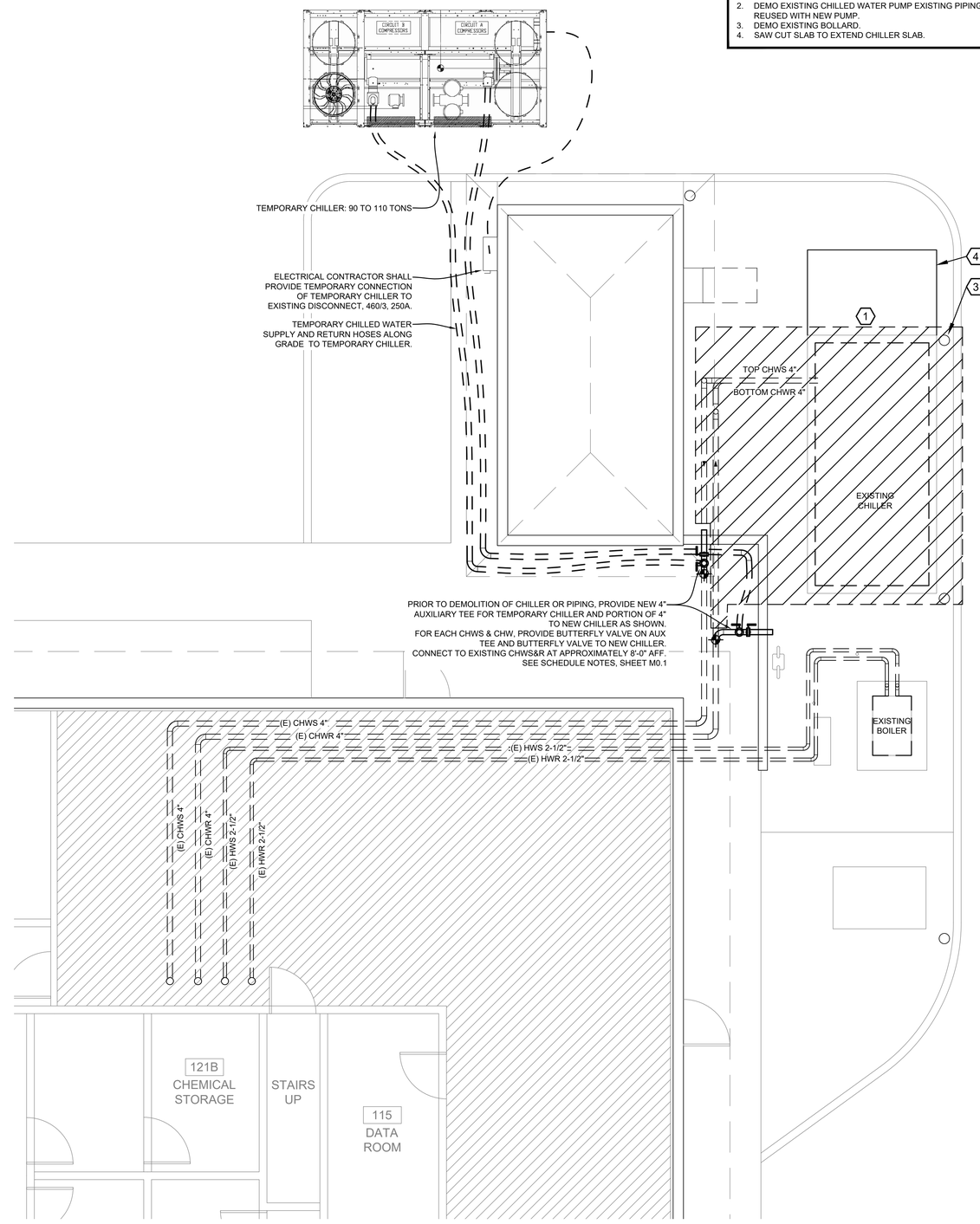
DEMOLITION KEYED NOTES

1. DEMO EXISTING CHILLER AND ALL ASSOCIATED PIPING IN THIS AREA.
2. DEMO EXISTING CHILLED WATER PUMP EXISTING PIPING SHALL BE REUSED WITH NEW PUMP.
3. DEMO EXISTING BOLLARD.
4. SAW CUT SLAB TO EXTEND CHILLER SLAB.



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

N



2 MECHANICAL DEMOLITION PLAN
SCALE: 1/4"=1'-0"

N

REVISIONS

Advanced Systems Engineering, Inc.
ASE
Job No.14079.06DE
Manager: JRW
CADD: JRW
CA-8468
Project Engineer
John R. Wood
PE-64788
13555 Automobile Boulevard, Suite 330, Clearwater, FL 33762 • Office: 727.540.9396 • Facsimile: 727.540.9376

MECHANICAL DEMOLITION PLAN

MANATEE COUNTY - WATER TREATMENT LAB
CHILLER & EXHAUST FAN REPLACEMENT
4751 65th STREET WEST
BRADENTON, FL 34210

JOB NO: 14079.06DE
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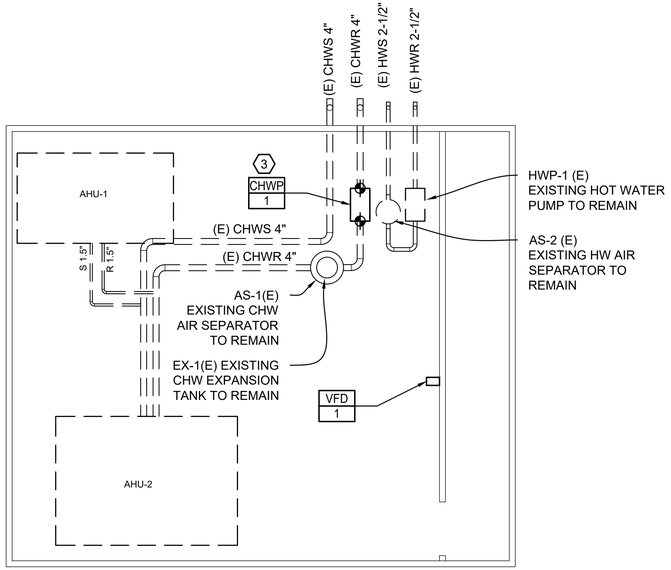
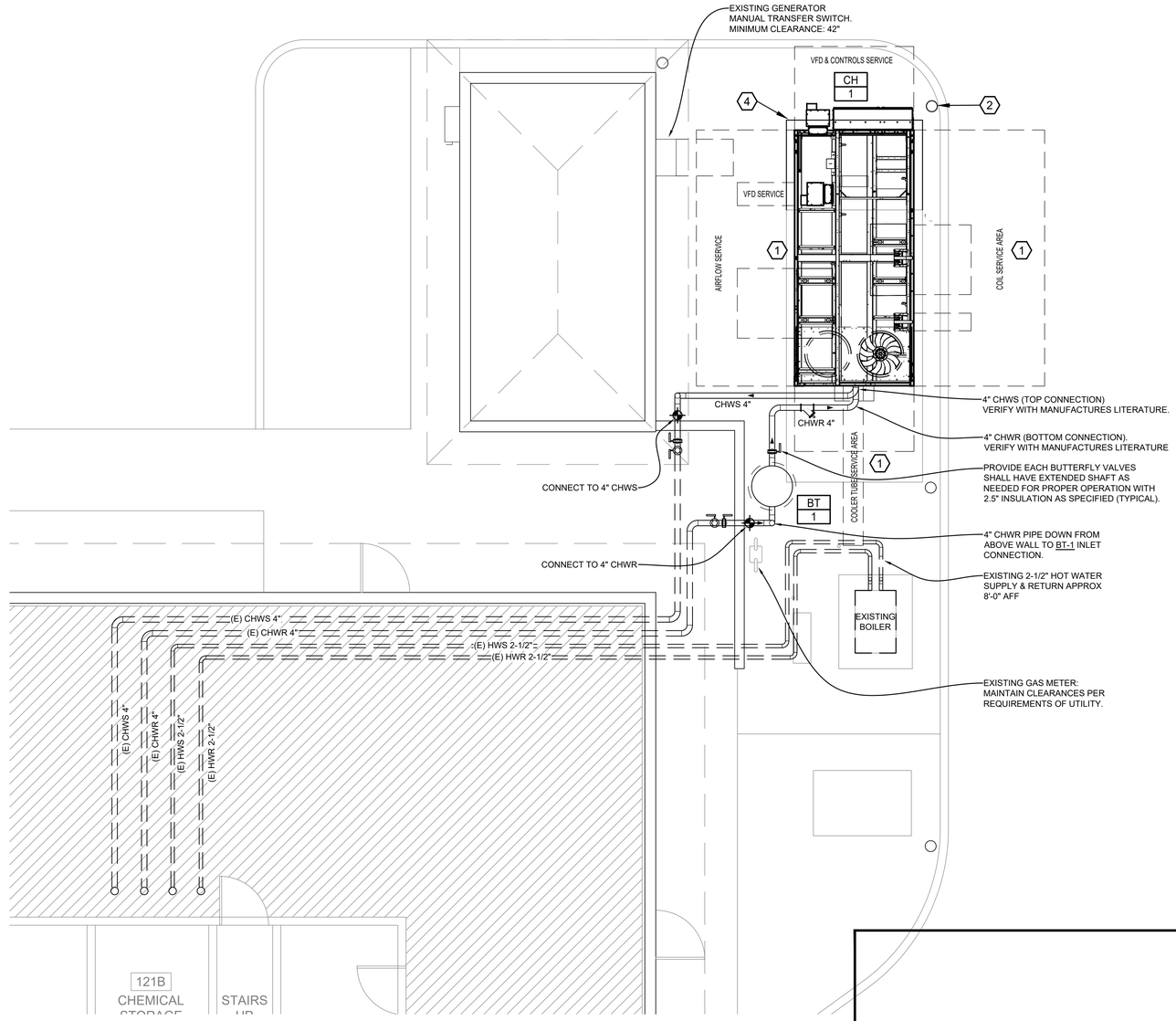
SHEET NUMBER
CH-M1.1
BID SET

RENOVATION KEYED NOTES

1. FIELD VERIFY SERVICE CLEARANCES WITH FIELD CONDITIONS AND MANUFACTURERS LITERATURE.
2. PROVIDE NEW BOLLARD TO CORNER OF NEW EXTENDED CHILLER PAD THIS LOCATION.
3. RECONNECT NEW CHWP-1 TO EXISTING PIPING AS SHOWN. SEE DETAIL 3 ON SHEET M3.2.
4. EXTEND CHILLER PAD APPROXIMATELY 5-6" (FIELD VERIFY) TO ACCOMMODATE CHILLER FOOT PRINT AND SERVICE CLEARANCES.



1 MECHANICAL ROOM RENOVATION PIPING PLAN
SCALE: 3/16"=1'-0"



2 MECHANICAL RENOVATION PIPING PLAN
SCALE: 3/16"=1'-0"

KEY PLAN
SCALE: NOT TO SCALE

REVISIONS

Advanced Systems Engineering, Inc.
ASE
Job No.14079.06DE
Manager: JRW
CADD: JRW
Project Engineer
John R. Wood
PE-64788
CA-8468
13505 Automobile Boulevard, Suite 330, Clearwater, FL 33762 • Office: 727.540.9396 • Faxalmile: 727.540.9376

MECHANICAL PLAN

MANATEE COUNTY - WATER TREATMENT LAB
CHILLER & EXHAUST FAN REPLACEMENT
4751 65th STREET WEST
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SHEET NUMBER
CH-M1.2
BID SET

MECHANICAL DIAGRAM LEGEND

- NEW POINT OF CONNECTION
- EXISTING CHILLED WATER RETURN LINE
- CHWR — NEW CHILLED WATER RETURN LINE
- EXISTING CHILLED WATER SUPPLY LINE
- CHWS — NEW CHILLED WATER SUPPLY LINE
- EXISTING CONDENSATE LINE
- CD — NEW CONDENSATE LINE
- ISOLATION VALVE (BALL OR BUTTERFLY)
- EQ NO — EQUIPMENT TAG
- T — THERMOMETER
- FM — FLOW METER; IMPELLER OR ULTRASONIC TO BMS
- TS — TEMPERATURE SENSOR TO BMS
- 3-WAY VALVE
- BUTTERFLY VALVE
- TRIPLE DUTY VALVE
- Y-STRAINER
- NEW WORK
- EXISTING WORK

CONTROLS WORK SHALL BE BY "BOYD BROTHERS SERVICE INC".

THE CONTROLS CONTRACTOR SHALL PROVIDE ALL CONTROLS HARDWARE AND PROGRAMMING TO INTERFACE WITH EXISTING OR NEW NON-PROPRIETARY DDC SYSTEM.

THE MECHANICAL CONTRACTOR, IN CONJUNCTION WITH THE CHILLER MANUFACTURER, SHALL PROVIDE THE PROPER PROTOCOL PANEL FOR CHILLER CONTROL, MONITORING AND INTEGRATION (BACNET, OPEN PROTOCOL, ETC.).

THE BMS SHALL MONITOR CHILLER FUNCTION INCLUDING ALARMS AND MAINTENANCE ALERTS AS COORDINATED WITH OWNER.

THE TEST AND BALANCE CONTRACTOR SHALL BALANCE THE CHILLED WATER SYSTEM AS SHOWN ON THE FLOW DIAGRAM.
AHU-1: 22 GPM
AHU-2: 218 GPM
DESIGN TOTAL FLOW: 240 GPM
THE LEAVING AIR TEMP SETPOINT FOR AHU-1 (OFFICES) SHALL BE SET TO 55°F.
THE LEAVING AIR TEMP SETPOINT FOR AHU-2 (100% OUTSIDE AIR) SHALL BE SET TO 50°F

CHILLER INTERNAL CONTROLS SHALL BE CONFIGURED GLYCOL MIXTURE.

SEQUENCE OF OPERATIONS: CHILLER AND PUMP

THE CENTRAL CHILLED WATER PLANT IS A VARIABLE PRIMARY PUMPING ARRANGEMENT, WITH 3 WAY VALVES AT EACH OF TWO EXISTING AIR HANDLERS.

OPERATION OF THE SYSTEM IS CONTINUOUS, 24 HOURS PER DAY, 365 DAYS PER YEAR.

CHILLER CONTROLS SHALL ALTERNATE THE LEAD COMPRESSOR PERIODICALLY.
CHILLER CONTROLS SHALL ENGAGE AND MODULATE COMPRESSORS TO MAINTAIN CONSTANT LEAVING WATER TEMPERATURE AS SCHEDULED.

THE CHILLED WATER PUMP VARIABLE FREQUENCY DRIVE (VFD) SHALL BE SET TO A MAXIMUM BASED ON THE DESIGN FLOW RATE AS SCHEDULED. THE "MAXIMUM FLOW RATE" AS SCHEDULED IS PROVISION FOR FUTURE CAPACITY EXPANSION OF THE SYSTEM. THE VFD SHALL HAVE A MINIMUM FLOW RATE CORRESPONDING TO THE MINIMUM FLOW AS DICTATED BY CHILLER MANUFACTURER.

IF THE VFD FAILS, IT SHALL GO TO BYPASS AND A ALARM SHALL BE SENT THROUGH THE BMS.

THE POSITION OF EACH OF THE 3-WAY CHW VALVES AT THE COILS SHALL BE POLED. THE CHILLED WATER PUMP VFD SHALL BE MODULATED DOWN TO MINIMUM SETTING SUCH TO MAINTAIN THAT THE MOST OPEN VALVE BE FULLY OR NEAR FULLY OPEN (85% - ADJUSTABLE).

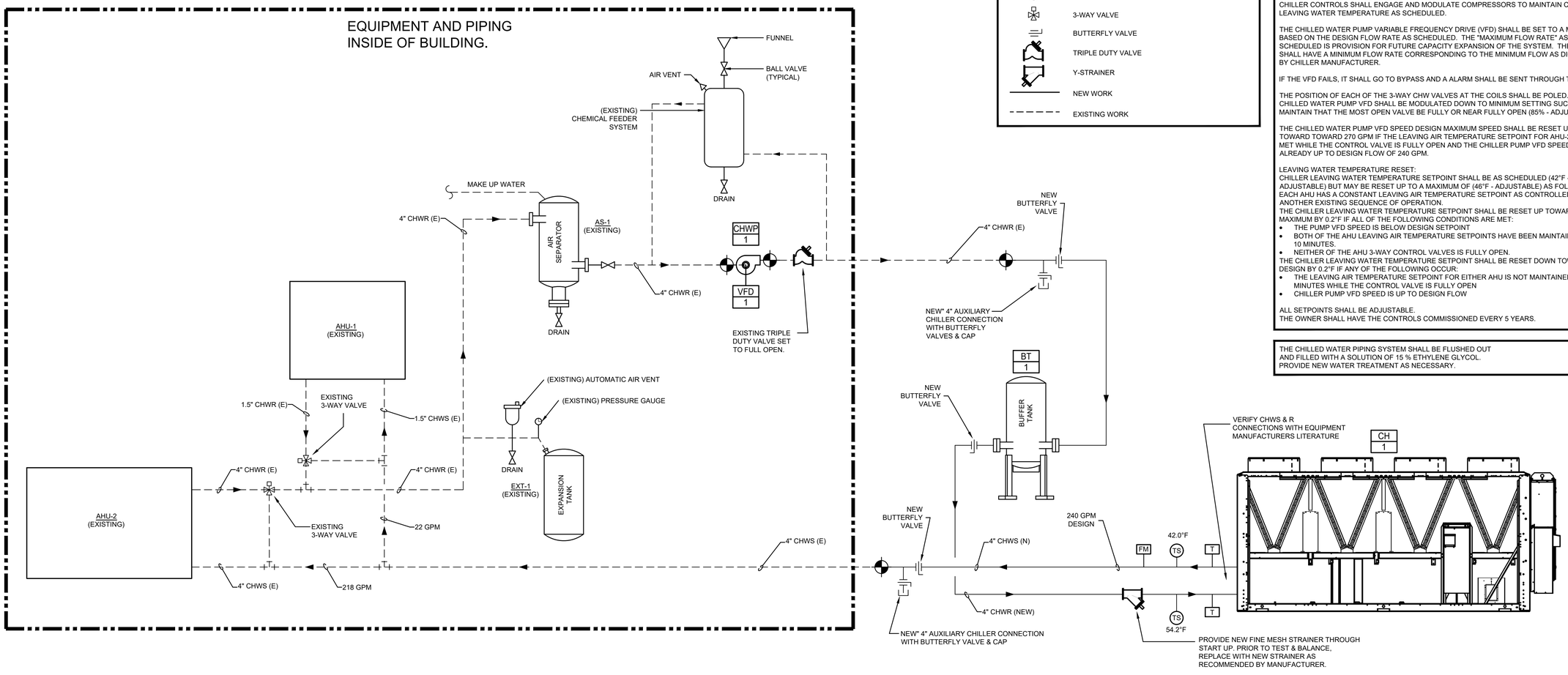
THE CHILLED WATER PUMP VFD SPEED DESIGN MAXIMUM SPEED SHALL BE RESET UP TOWARD TOWARD 270 GPM IF THE LEAVING AIR TEMPERATURE SETPOINT FOR AHU-2 IS NOT MET WHILE THE CONTROL VALVE IS FULLY OPEN AND THE CHILLER PUMP VFD SPEED IS ALREADY UP TO DESIGN FLOW OF 240 GPM.

LEAVING WATER TEMPERATURE RESET:
CHILLER LEAVING WATER TEMPERATURE SETPOINT SHALL BE AS SCHEDULED (42°F - ADJUSTABLE) BUT MAY BE RESET UP TO A MAXIMUM OF (46°F - ADJUSTABLE) AS FOLLOWS: EACH AHU HAS A CONSTANT LEAVING AIR TEMPERATURE SETPOINT AS CONTROLLED BY ANOTHER EXISTING SEQUENCE OF OPERATION.
THE CHILLER LEAVING WATER TEMPERATURE SETPOINT SHALL BE RESET UP TOWARD MAXIMUM BY 0.2°F IF ALL OF THE FOLLOWING CONDITIONS ARE MET:
- THE PUMP VFD SPEED IS BELOW DESIGN SETPOINT
- BOTH OF THE AHU LEAVING AIR TEMPERATURE SETPOINTS HAVE BEEN MAINTAINED FOR 10 MINUTES.
- NEITHER OF THE AHU 3-WAY CONTROL VALVES IS FULLY OPEN.

THE CHILLER LEAVING WATER TEMPERATURE SETPOINT SHALL BE RESET DOWN TOWARD DESIGN BY 0.2°F IF ANY OF THE FOLLOWING OCCUR:
- THE LEAVING AIR TEMPERATURE SETPOINT FOR EITHER AHU IS NOT MAINTAINED FR 10 MINUTES WHILE THE CONTROL VALVE IS FULLY OPEN
- CHILLER PUMP VFD SPEED IS UP TO DESIGN FLOW

ALL SETPOINTS SHALL BE ADJUSTABLE.
THE OWNER SHALL HAVE THE CONTROLS COMMISSIONED EVERY 5 YEARS.

THE CHILLED WATER PIPING SYSTEM SHALL BE FLUSHED OUT AND FILLED WITH A SOLUTION OF 15 % ETHYLENE GLYCOL.
PROVIDE NEW WATER TREATMENT AS NECESSARY.



1 MECHANICAL CHILLED WATER FLOW & PIPING DIAGRAM
SCALE: NTS

REVISIONS
1
2
3
4
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6

Advanced Systems Engineering, Inc.
ASE
Job No.14079.06DE
Manager: JRW
CADD: JRW
CA-8468
Project Engineer
John R. Wood
PE-64788
15505 Autmobile Boulevard, Suite 330, Clearwater, FL 33762 • Office: 727.540.9396 • Faxaimile: 727.540.9376

MECHANICAL FLOW DIAGRAM

MANATEE COUNTY - WATER TREATMENT LAB

CHILLER & EXHAUST FAN REPLACEMENT

4751 65th STREET WEST
BRADENTON, FL 34210

JOB NO: 14079.06DE
PROJ. MNGR: JRW
DRAWN BY: JRW
ISSUE DATE: 07.24.2017

SHEET NUMBER
CH-M2.1
BID SET

VFD Schedule - 14079.06D - Manatee water treatment facility pump VFD Engineer: Advanced Systems Engineering

VFD #	Serving	HP	ABB Model	Voltage	Enclosure	Mounting Location	Disconnect/Circuit or none	Bypass	Minimum Amp Rating
1	CWP-1	10	ACH550-VCR-015A-4+F267	460/3	UL Type 1	Indoors	Circuit Breaker	Yes	15.4

NOTES:

1	Drive amps shall be rated per National Electrical Code Table 430.250.
2	Provide 5% Internal Line Reactor (VFD's that use optional external reactors are not accepted).
3	Provide Internal EMI/RFI Filter. Drive input current shall not exceed drive output current.
4	VFD shall be BTL Listed (Communication "gateways" are not acceptable). VFD shall have Modbus, BACnet, Johnson N2 and Siemens FLN serial communications to interface to BMS system now or in the future.
5	The VFD shall be rated for 100KAIC without the need for input fusing.
6	All enclosures shall be UL type approved. (self certified NEMA enclosures not acceptable).
7	UL type 1 enclosures shall be plenum rated. Drives are mounted indoors, UL Type 1 enclosure
8	VFD and Bypass complete assembly shall be Seismically tested and certified to IBC2006 Ip factor of 1.5
9	Include on site factory-authorized start-up validating ABB Warranty (Parts and on-site labor including travel), 36 months from date of shipment.

ADDITIONAL BYPASS NOTES:

9	The Bypass shall have the ability to communicate with the Building Automation System even if the VFD is removed.
10	The Bypass shall have a plain English display of Bypass functions / operation. Provide service switch.
11	Distinct Annunciation of up to (4) Safety Interlocks in plain English on the Bypass keypad.
12	The VFD/Bypass system shall be capable of auto transfer to Bypass on selectable VFD faults.
13	The VFD/Bypass system shall have positive contactor control over a +30 / -35 % voltage range. (115 Volt CPT contactor control not allowed).
14	The Bypass system shall have single phase protection.
15	The VFD/Bypass system shall be UL listed to 100 KAIC short circuit rating as a package.

PIPE WEIGHTS

SIZE	PIPE	WATER	TOTAL
0.5"	0.285	0.101	0.386
0.75"	0.445	0.210	0.665
1.0"	0.655	0.358	1.013
1.25"	0.884	0.545	1.429
1.5"	1.14	0.77	1.91
2"	1.75	1.34	3.09
2.5"	5.80	2.073	7.873
3"	7.58	3.201	10.781
4"	10.80	5.516	16.316
6"	19.00	12.52	31.52
8"	28.60	21.68	50.28
10"	40.50	34.16	74.66
12"	53.60	48.50	102.10
14"	63.30	58.64	121.94

CHWS&R PIPE 0-2" TO BE TYPE "L" COPPER
CHWS&R PIPE 2.5"-12" TO BE SCHEDULE 40 STEEL
WEIGHTS SHOWN ARE LBS./FT. AS LISTED IN
2003 ASPE DATA BOOK VOL. 4, TABLE 2-6 & 2-9.

CHILLER SCHEDULE

CHILLER / CONDENSER DATA	MARK	CH-1
	MANUFACTURER	CARRIER
	MODEL NUMBER	30XV140
	CAPACITY (TONS)	134.3
	REFRIGERANT	R-134A
	REFRIGERANT CHARGE (LBS)	-
	AMBIENT TEMPERATURE (°F) (DB)	92
	FULL-LOAD SOUND PRESS. (dBA)	97
	OPERATING WEIGHT (LBS)	10695
EVAPORATOR DATA	EVAPORATOR TYPE	VFD SCREW
	NUMBER OF PASSES	2
	BRINE	15% EG
	ENTERING WATER TEMP. (°F)	54.2
	LEAVING WATER TEMP - DESIGN (°F)	42.0
	LEAVING WATER TEMP - MIN (°F)	35
	DESIGN FLOW RATE (GPM)	240
	MINIMUM FLOW RATE (GPM)	184
	MAXIMUM FLOW RATE (GPM)	270
	DESIGN PRESSURE DROP (FWG)	10.6
	MAXIMUM PRESSURE DROP (FWG)	10.6
ELECTRICAL DATA	ELECTRICAL SERVICE	460-3-60
	IPLV (EER)	19.65
	MCA (AMPS)	281.0
	RECOMMENDED OCP (AMPS)	350.0
	MAXIMUM OCP (AMPS)	350.0

NOTES

1. PROVIDE VAPOR-PROOF CHILLED WATER FLOW SWITCH, MICRO-PROCESSOR CONTROLS, AND CONTROLS POWER TRANSFORMER.
2. PROVIDE OPEN PROTOCOL BUILDING AUTOMATION SYSTEM COMMUNICATION, BACNET MSTP.
3. PROVIDE NEOPRENE ISOLATORS.
4. PROVIDE FULL START-UP BY MANUFACTURER'S FACTORY- AUTHORIZED SERVICE PROVIDER.
5. CONDENSER COILS SHALL HAVE E-COAT BY LUVATA, DIPPED AND BAKED FOR CORROSION PROTECTION. PROVIDE LINE ITEM ADDITIVE ALTERNATE FOR OWNER CONSIDERATION, FOR ADDITIONAL COATING OPTIONS RECOMMENDED BY MANUFACTURER FOR CASING AND / OR OTHER COMPONENTS.
6. PROVIDE WITH VARIABLE SPEED CONDENSER FAN CONTROLS.
7. PROVIDE CHILLER WITH INTEGRAL DISCONNECT.
8. PROVIDE COUNTY WITH 1 YEAR SUPPLY OF CLEANING FLUID FOR CONDENSER COILS.

NEW WATER PUMP SCHEDULE

WATER PUMP DATA	MARK	CHWP-1
	SERVICE	PRIMARY
	MANUFACTURER	PENTAIR
	MODEL NUMBER	342A
	SIZE	4x5x9
	PUMP TYPE	IN-LINE
	SUCTION DIAMETER (IN)	5
	DISCHARGE DIAMETER (IN)	4
	MAXIMUM IMPELLER DIAMETER (IN)	9
	DESIGN IMPELLER DIAMETER (IN)	9
	DESIGN FLOW RATE (GPM)	240
	SYSTEM HEAD @ 240 GPM (FT)	59.83
	RPM @ 240 GPM	1558
	MAXIMUM FLOW RATE (GPM)	270
	SYSTEM HEAD @ 270 GPM (FT)	75.72
	BHP @ 270 GPM	6.68
	RPM @ 270 GPM	1750
	BHP MAXIMUM (DEAD HEAD)	9.34
	PUMP EFFICIENCY @ 270 GPM	78.9%
	WEIGHT (LBS)	382
MOTOR DATA	TYPE	TEFC
	HORSEPOWER-NOMINAL	10
	RPM	1750
	ELECTRICAL SERVICE	460/3/60

NOTES

1. BASIS OF DESIGN : PENTAIR (AURORA). APPROVED ALTERNATE MANUFACTURERS, REQUIRE OWNER APPROVAL: B&G, ARMSTRONG, WEINMAN, TACO.
2. VERIFY EXISTING PIPING ACCESSORIES, AND PROVIDE NEW WERE REQUIRED PER DETAIL ON DETAIL SHEET.
3. MECHANICAL CONTRACTOR MUST OBTAIN SUBMITTAL APPROVAL FROM ELECTRICAL AND MECHANICAL ENGINEERS BEFORE FINAL ORDER IS MADE.
4. PROVIDE HIGH-EFFICIENCY TEFC MOTOR, 1750 OR LESS RPM. VFD COMPATIBLE.
5. VERTICAL END SUCTION, UNLESS OTHERWISE DIRECTED.
6. FLEXIBLE COUPLING WITH COUPLING GUARD.
7. CAST IRON CASING WITH GAGE PORTS AND FLANGED SUCTION AND DISCHARGE.
8. BRONZE OR STAINLESS STEEL IMPELLER KEYED TO MOTOR SHAFT.
9. BEARINGS: L10 RATED LIFE OF 30,000 HOURS MINIMUM
10. CARBON STEEL SHAFT WITH BRONZE KEY.
11. SEAL: STAINLESS STEEL.
12. THE MECHANICAL CONTRACTOR SHALL PROVIDE IMPELLER PRE-TRIMMED AS SCHEDULED TEST AND BALACE CONTRACTOR SHALL SUBMIT HEAD PRESSURE MEASUREMENTS TO MECHANICAL ENGINEER TO REVIEW WHETHER FURTHER TRIMMING MAY BE REQUIRED.
13. PROVIDE LASER ALIGNMENT FOR ALL PUMPS 20 HP OR LARGER.
14. PROVIDE ALIGNMENT BY FACTORY TRAINED AND AUTHORIZED REPRESENTATIVE.
15. PROVIDE FULL 5 YEAR MANUFACTURER WARRANTY FOR PARTS. PROVIDE LINE ITEM ADDITIVE ALTERNATE FOR 5 YEAR MANUFACTURER WARRANTY ON LABOR.
16. PROVIDE PIPING ACCESSORIES PER DETAIL ON DETAIL SHEET.
17. MECHANICAL CONTRACTOR MUST OBTAIN SUBMITTAL APPROVAL FROM ELECTRICAL AND MECHANICAL ENGINEERS BEFORE FINAL ORDER IS MADE.

NOTE: PROVIDE LINE ITEM ADDITIVE ALTERNATE TO COUNTY FOR CONSIDERATION, TO PROVIDE SPARE PUMP MOTOR, WRAPPED AND SEALED FOR STORAGE.

BUFFER TANK SCHEDULE

MARK	MANUFACTURER	MODEL	SYSTEM	SYSTEM TEMPERATURE		WORKING PRESSURE (PSIG)	TANK SIZE (GALLONS)	SHIPPING WEIGHT (LBS)	OPERATING WEIGHT (LBS)
				MIN. °F	MAX °F				
BT-1	WESSELS CO.	CBT-300	CHW	-	450	125	300	793	3283

NOTES:

1. PROVIDE INSULATION AND JACKETING PER DETAIL.

REVISIONS

Advanced Systems Engineering, Inc.
Job No.14079.06DE
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ASE
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Project Engineer
John R. Wood
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13505 Automobile Boulevard, Suite 330, Clearwater, FL 33762 • Office: 727.540.9396 • Facsimile: 727.540.9376

MECHANICAL SCHEDULES

MANATEE COUNTY - WATER TREATMENT LAB
CHILLER & EXHAUST FAN REPLACEMENT
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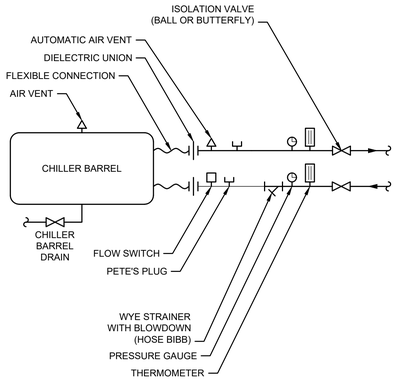
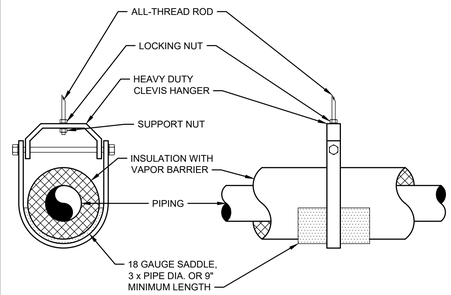


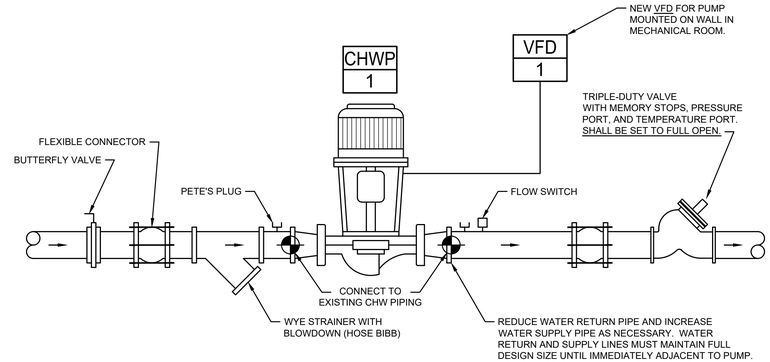
NOTE:
PIPING SCHEMATIC TYPICAL OF CONDENSER WATER AND CHILLED WATER SYSTEMS. CHILLED WATER SHALL NOT HAVE A CALIBRATED BALANCING VALVE.

1 CHILLER PIPING DETAIL
NOT TO SCALE

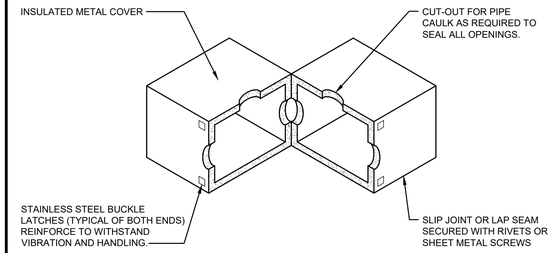


ALL PIPING IN NON-CONDITIONED AREAS: 2.5" INSULATION PER M0.0. PLAN FOR INSULATION THICKNESS WHEN SPECIFYING PIPING APPURTENANCES. SUCH AS PROBE LENGTH, VALVE SHAFT LENGTH, ETC. ALL OUTSIDE PIPING SHALL HAVE ALUMINUM JACKET.

2 PIPE HANGER DETAIL
NOT TO SCALE

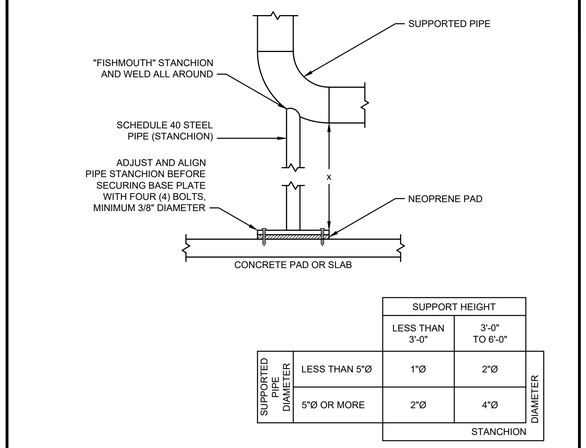


3 INLINE PUMP PIPING DETAIL
NOT TO SCALE



NOTES:
1. THE PUMP COVER SHALL BE FABRICATED IN SECTIONS OF METAL LINED WITH 2" FOAMGLASS INSULATION. ALL AREAS OF EXPOSED INSULATION INSIDE OR OUTSIDE THE COMPARTMENT SHALL BE LINED WITH PITTCOTE 404 AND REINFORCED WITH A WHITE OPEN-WEAVE MEMBRANE. THE COVER SHALL ENCLOSE ALL FLANGES OR OTHER CONNECTIONS TO THE PUMP AS WELL AS THE BODY OF THE PUMP, AND SHALL BE STURDY ENOUGH TO WITHSTAND NORMAL VIBRATION AND HANDLING. ALL COLD SURFACES MUST BE INSULATED.
2. PROVIDE SEVERAL LAYERS OF FOAM INSULATION TO CREATE AN AIRTIGHT SEAL AT ALL CUT-OUTS FOR PIPES AND SHAFT, AS WELL AS ALL MATING HALVES. SEAL AIRTIGHT. PUMP COVER MUST BE REMOVABLE.
3. COORDINATE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS TO KEEP ALL REQUIRED VENT SLOTS UNCOVERED AND COMPLETELY OPEN IF NECESSARY.
4. COORDINATE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS TO ENSURE THE BEARING ASSEMBLY GREASE FITTINGS REMAIN ACCESSIBLE AND VISIBLE IF NECESSARY.
5. IF A PART REQUIRING LUBRICATION IS CONCEALED OR INACCESSIBLE, EXTEND A LUBRICATION TUBE WITH A SUITABLE FITTING TO AN ACCESSIBLE LOCATION AND SUITABLY IDENTIFY IT.

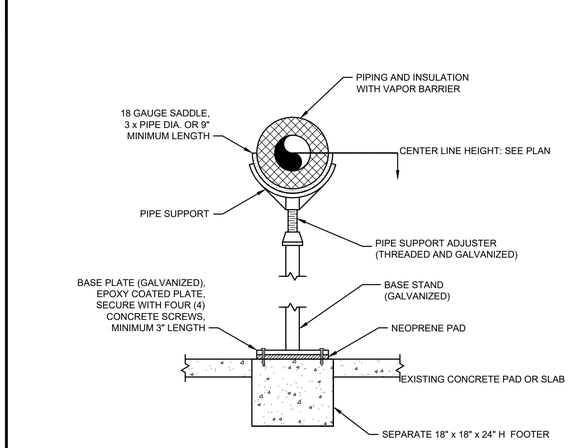
4 REMOVABLE/REUSABLE INSULATED PUMP COVER DETAIL
NOT TO SCALE



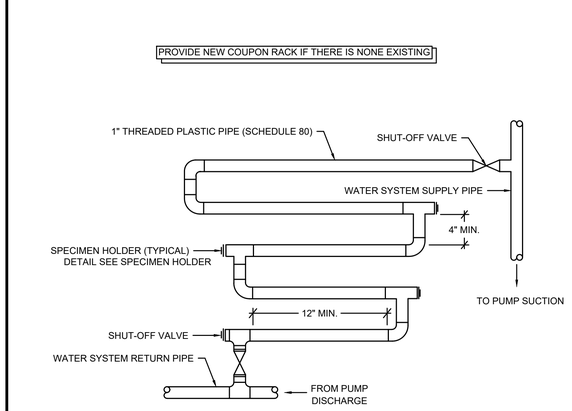
SUPPORTED PIPE DIAMETER	SUPPORT HEIGHT: LESS THAN 3'-0"	SUPPORT HEIGHT: 3'-0" TO 6'-0"
LESS THAN 5"Ø	1"Ø	2"Ø
5"Ø OR MORE	2"Ø	4"Ø

STANCHION DIAMETER

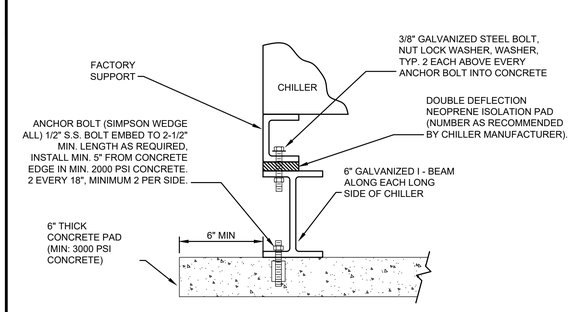
5 PIPE ELBOW SUPPORT DETAIL
NOT TO SCALE



6 PIPE STAND DETAIL
NOT TO SCALE

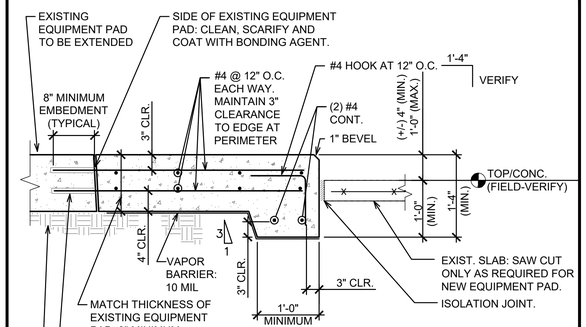


7 TYPICAL CORROSION COUPON STATION DETAIL
NOT TO SCALE



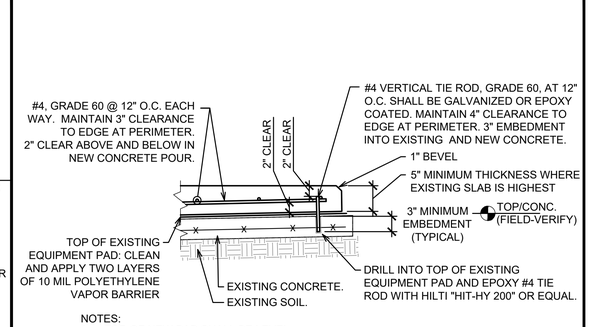
NOTES:
1. THE UNIT SHALL BE SECURED TO A CONCRETE SLAB, FOR WIND RESISTANCE PER THE FLORIDA BUILDING CODE.
2. NEOPRENE ISOLATION TO BE MIN 1/4" THICK, BLACK OR RED, AND SHALL EXTEND UNDER ENTIRE METAL SURFACE INTENDED TO REST ON THE CONCRETE PAD.

8 TYPICAL CHILLER TIE-DOWN DETAIL
NOT TO SCALE



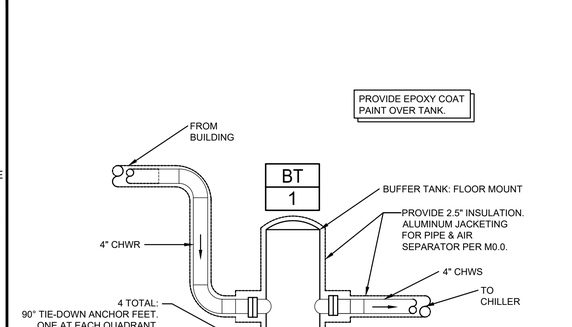
NOTES:
1. TOP OF PAD SHALL BE LEVEL.
2. FIELD VERIFY DIMENSIONS OF FINISHED PAD PER DIMENSIONS OF EQUIPMENT MANUFACTURER.
3. SEE TIE DOWN DETAIL FOR MINIMUM CLEARANCE AROUND EQUIPMENT PERIMETER.
4. 3000 PSI (MIN.) CONCRETE AND GRADE 60 REBAR.

9 CHILLER PAD EXPANSION DETAIL
NOT TO SCALE

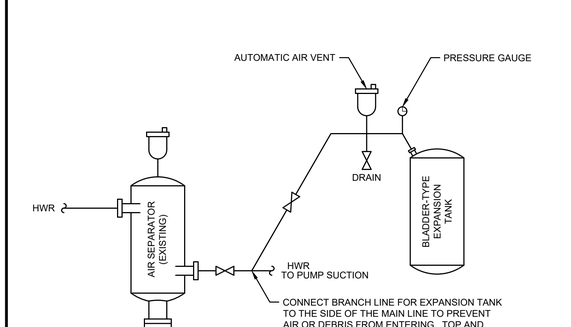


NOTES:
1. TOP OF NEW PAD SHALL BE LEVEL.
2. FIELD VERIFY DIMENSIONS OF FINISHED PAD PER DIMENSIONS OF EQUIPMENT MANUFACTURER.
3. SEE TIE DOWN DETAIL FOR MINIMUM CLEARANCE AROUND EQUIPMENT PERIMETER.
4. 3000 PSI (MIN.) CONCRETE AND GRADE 60 REBAR.

10 NEW PAD ON EXISTING CONCRETE DETAIL
NOT TO SCALE



11 BUFFER TANK DETAIL
NOT TO SCALE



NOTE: PROVIDE A REMOVABLE ALUMINUM CAP FOR STRAINER AND DRAIN ACCESS.

12 EXPANSION TANK PIPING DETAIL - ADDITIVE ALTERNATE
NOT TO SCALE

REVISIONS

Advanced Systems Engineering, Inc.
ASE
Job No.14079.06DE
Manager: JRW
CADD: JRW
CA-8468
Project Engineer
John R. Wood
PE-64788
13505 Automobile Boulevard, Suite 330, Clearwater, FL 33762 • Office: 727.540.9394 • Facsimile: 727.540.9376

MECHANICAL DETAILS

MANATEE COUNTY - WATER TREATMENT LAB
CHILLER & EXHAUST FAN REPLACEMENT
4751 65th STREET WEST
BRADENTON, FL 34210

JOB NO: 14079.06DE
PROJ. MNGR: JRW
DRAWN BY: JRW
ISSUE DATE: 07.24.2017

SHEET NUMBER
CH-M3.2
BID SET

MECHANICAL SPECIFICATIONS

MECHANICAL SPECIFICATIONS

1. GENERAL RESPONSIBILITIES OF THE CONTRACTORS

PRIOR TO STARTING THE PROJECT, THE MECHANICAL CONTRACTOR SHALL PROVIDE THE SERVICES OF A STRUCTURAL PROFESSIONAL ENGINEER WHO SHALL CERTIFY THE INSTALLATION AND ATTACHMENT OF ALL ITEMS REQUIRING STRUCTURAL SUPPORT OR WIND LOADING ARE ACCEPTABLE AND MEET THE CODE REQUIREMENTS. ALL DETAILS SHOWN ARE ONLY INTENDED TO BE USED BUDGETING PURPOSES. THE MECHANICAL CONTRACTOR SHALL PROVIDE A SIGNED AND SEAL LETTER FROM THE STRUCTURAL ENGINEER STATING THAT THE ENTIRE MECHANICAL INSTALLATION MEETS FLORIDA WIND LOAD AND STRUCTURAL SUPPORT REQUIREMENTS.

THE GENERAL CONTRACTORS SHALL PROVIDE THE LABOR, MATERIALS, AND EQUIPMENT REQUIRED FOR THE HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM(S) AS DESCRIBED IN THE COMPLETE SET OF CONSTRUCTION DOCUMENTS. ALL WORK SHALL CONFORM TO THE REQUIREMEMENTS OF THE 2014 FLORIDA BUILDING CODE AND 2014 FLORIDA ENERGY CODE, 2011 NATIONAL ELECTRIC CODE, NFPA NATIONAL FIRE CODES, AND ALL OTHER STATE AND LOCAL CODES.

THE OWNER SHALL NOT BE RESPONSIBLE FOR ANY PORTION OF THE SCOPE OF WORK UNLESS SPECIFICALLY NOTED IN THE CONSTRUCTION DOCUMENTS.

THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE INSTALLATION SCHEDULES OF ALL TRADES. FIXED WORK SUCH AS DUCTWORK AND SANITARY AND STORM PIPING SHALL BE INSTALLED PRIOR TO ANY TRADE WORK THAT CAN BE EASILY RELOCATED OR OFFSET SUCH AS ELECTRICAL CONDUIT AND FIRE PROTECTION AND WATER PIPING. ALL ELECTRICAL CONDUIT AND WATER PIPING SHALL BE INSTALLED AS CLOSE TO WALLS AND AS CLOSE TOGETHER AS POSSIBLE TO ALLOW FOR MAXIMUM DUCT ACCESSIBILITY.

ALL CONTRACTORS SHALL COORDINATE THE SCOPE OF THEIR WORK AND THEIR CONSTRUCTION SCHEDULES WITH THE OWNER TO PREVENT ANY INTERRUPTIONS UNACCEPTABLE TO THE OWNER. THIS MAY REQUIRE WORK AFTER NORMAL OPERATING HOURS AND/OR ON WEEKENDS.

2. BIDS, SHOP DRAWINGS, EQUIPMENT SUBMITTALS, AND CHANGE ORDERS

EACH PROSPECTIVE CONTRACTOR SHALL EVALUATE THE SCOPE OF WORK THOROUGHLY PRIOR TO SUBMITTING A BID. SOME CONDUIT, PIPING, AND OTHER OBSTACLES MAY NEED TO BE RELOCATED AND SUCH RELOCATION SHOULD BE INCLUDED IN EACH PROSPECTIVE MECHANICAL CONTRACTOR'S BID.

EACH PROSPECTIVE MECHANICAL CONTRACTOR SHALL PROVIDE A DETAILED COST BREAKDOWN FOR EACH TASK IN THE SCOPE OF WORK AS SHOWN ON THE CONSTRUCTION DOCUMENTS, INCLUDING EQUIPMENT, MATERIALS, AND LABOR. ANY PROPOSED VALUE-ENGINEERING, INCLUDING SUBSTITUTIONS FOR SCHEDULED EQUIPMENT, SHALL BE PRESENTED SEPARATELY AS AN ALTERNATE WITH A SIMILAR COST BREAKDOWN. THE SCOPE OF WORK SHALL BE BID WITH THE SCHEDULED EQUIPMENT AND ANY PROPOSED VALUE-ENGINEERING OR EQUIPMENT SUBSTITUTIONS SHALL BE IDENTIFIED AS ALTERNATE DEDUCTIONS FROM THE CONTRACTOR'S BASE BID. ANY CHANGE ORDERS MUST BE SUBMITTED WITH BOTH THE ORIGINAL COST BREAKDOWN AND THE NEW COST BREAKDOWN FOR COMPARISON.

EACH PROSPECTIVE MECHANICAL CONTRACTOR SHALL PROVIDE A CONSTRUCTION SCHEDULE DETAILING THE START DATE, DURATION, ASSIGNED MAN-HOURS, AND FINISH DATE OF EACH TASK IN THE SCOPE OF WORK AS SHOWN ON THE CONSTRUCTION DOCUMENTS. IF ANY PROPOSED VALUE-ENGINEERING OR EQUIPMENT SUBSTITUTIONS AFFECT THIS SCHEDULE, THEN THOSE IMPACTS SHALL BE IDENTIFIED SEPARATELY.

PRIOR TO STARTING THE PROJECT, THE MECHANICAL CONTRACTOR SHALL STUDY THE COMPLETE SET OF CONSTRUCTION DOCUMENTS AND COORDINATE WITH THE OTHER TRADES AS REQUIRED TO PROVIDE SHOP DRAWINGS TO SUBMIT TO THE MECHANICAL ENGINEER FOR APPROVAL. THE SHOP DRAWINGS MAY BE SUBMITTED AS HAND-DRAWN NOTES UPON A COPY OF THE CONSTRUCTION DOCUMENTS IF PERMISSION IS OBTAINED FROM THE MECHANICAL ENGINEER. THE CONSTRUCTION DOCUMENTS ARE DIAGRAMMATIC IN NATURE AND INTENDED SOLELY TO CLARIFY THE SCOPE OF WORK AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. THE CONSTRUCTION DOCUMENTS ARE NOT INTENDED TO ALERT THE CONTRACTOR(S) OF ALL OBSTACLES. THE SHOP DRAWINGS SHALL SHOW THE COORDINATION OF DUCTWORK AND MECHANICAL EQUIPMENT INSTALLATION WITH EXISTING AND NEW OBSTACLES INCLUDING, BUT NOT LIMITED TO, ELECTRICAL CONDUITS, FIRE PROTECTION PIPING, RAIN LEADERS, SANITARY DRAINS, STRUCTURAL MEMBERS, AND WATER PIPING, AS WELL AS THE MECHANICAL EQUIPMENT MANUFACTURER'S' RECOMMENDED CLEARANCES AND THE STRUCTURAL ENGINEER'S RECOMMENDATIONS REGARDING THE INSTALLATION AND ATTACHMENT OF ALL ITEMS REQUIRING STRUCTURAL SUPPORT OR WIND LOADING. THE MECHANICAL CONTRACTOR SHALL ALSO SHOW THE EXISTING CONDITIONS ON THE SHOP DRAWINGS WHERE THE EXISTING CONDITIONS ARE DIFFERENT FROM THOSE SHOWN ON THE CONSTRUCTION DOCUMENTS.

PRIOR TO STARTING THE PROJECT, THE MECHANICAL CONTRACTOR SHALL STUDY THE COMPLETE SET OF CONSTRUCTION DOCUMENTS AND COORDINATE WITH THE MANUFACTURER(S) AS REQUIRED TO PROVIDE EQUIPMENT SUBMITTALS TO SUBMIT TO THE MECHANICAL ENGINEER FOR APPROVAL. THE EQUIPMENT SUBMITTALS SHALL INCLUDE DIMENSIONS, WEIGHTS, SPECIFIED ACCESSORIES AND REQUIRED CLEARANCES, AS WELL AS FAN CURVES, SOUND LEVELS, CONSTRUCTION DETAILS, WARRANTY INFORMATION, AND ALL OTHER RELEVANT DATA PRESENTED IN THE SAME FORMAT AS THE EQUIPMENT SCHEDULES ON THE CONSTRUCTION DOCUMENTS.

THE BASE PRICE SHALL USE ALL EQUIPMENT AS SPECIFIED. ALL VALUE ENGINEERING ALTERNATES SHALL BE LISTED AS ALTERNATES FOR THE OWNERS CONSIDERATION. IF ALTERNATE PRICING IS NOT ACCEPTED BY THE OWNER AND ENGINEER, THEN THE CONTRACTOR SHALL PROVIDE ALL EQUIPMENT AS SPECIFIED. THE OWNER WILL CONSIDER A CHEAPER PIECE OF EQUIPMENT IF THE DEDUCT IS ENOUGH AND THE PERFORMANCE IS STILL ACCEPTABLE. THE OWNER WILL CONSIDER A MORE EXPENSIVE PIECE OF EQUIPMENT IF BETTER PERFORMANCE WOULD JUSTIFY THE ADDITIONAL UPFRONT COST. PLEASE PROVIDE ALL ALTERNATES THAT WOULD BE USEFUL FOR THE OWNER TO CONSIDER TO SAVE MONEY OR IMPROVE PERFORMANCE. ALTERNATES MUST MEET THE SPECIFICATION REQUIREMENTS AND THE CONTRACTOR ASSUMES FULL RESPONSIBILITY OF COORDINATING WITH OTHER TRADES FOR ALL CHANGES AND COST REQUIRED.

ALTERNATIVES TO THE SCHEDULED EQUIPMENT AND MATERIALS MUST BE EQUAL TO OR EXCEED THOSE SCHEDULED. IF SUBSTITUTIONS FOR SCHEDULED EQUIPMENT AND MATERIALS ARE TO BE MADE, THEN THE MECHANICAL CONTRACTOR SHALL FIRST SUBMIT TO THE MECHANICAL ENGINEER COMPARATIVE LITERATURE CLEARLY SHOWING THE EQUIVALENT OPERATING CAPABILITIES AND OTHER PROPERTIES OF THE SUBSTITUTIONS. ALL DEVIATIONS MUST BE CLEARLY IDENTIFIED AND A REQUEST MUST BE MADE SPECIFIC FOR ALL DEVIATIONS. WHEN SUBSTITUTIONS ARE MADE, THE CONTRACTOR ASSUMES FULL RESPONSIBILITY OF COORDINATING WITH OTHER TRADES ON ANY CHANGES REQUIRED FOR THE SUBSTITUTION, INCLUDING COSTS, ASSOCIATED WITH DUCTWORK, PIPING, ELECTRICAL AND STRUCTURAL TO IMPLEMENT THE SUBSTITUTED ITEM(S).

ANY CHANGE ORDER SUBMITTED BY THE GENERAL, MECHANICAL, OR ELECTRICAL CONTRACTORS FOR WORK WITHIN THE SCOPE OF THIS PROJECT SHALL NOT EXCEED THE VALUES LISTED IN THE MOST CURRENT VERSIONS OF THE MEANS COST DATA BOOKS FOR THE APPLICABLE TRADES. EVERY CHANGE ORDER SHALL BE ACCOMPANIED BY A DETAILED COST BREAKDOWN FOR EACH TASK, INCLUDING EQUIPMENT, MATERIALS, AND LABOR. THE MECHANICAL ENGINEER MAY, AT HIS DISCRETION, REQUIRE THE CONTRACTOR(S) TO PROVIDE A FINAL, VERIFIABLE ACCOUNTING OF EQUIPMENT, MATERIALS, AND LABOR AFTER THE WORK IS COMPLETE AND PRIOR TO THE MECHANICAL ENGINEER'S APPROVAL OF THE CONTRACTORS' FINAL PAY APPLICATION(S). LABOR RATES FOR CHANGE ORDERS SHALL NOT EXCEED $50/HOUR ($75/HR OVERTIME) FOR ANY CHANGE ORDERS INCLUDING ALL OVERHEAD AND PROFIT UNLESS APPROVED BY THE ENGINEER OF RECORD. MATERIALRATES FOR PIPING SHALL NOT EXCEED A 0.35 MULTIPLER FOR NIBCO MATERIALS UNLESS APPROVED BY ENGINEER OF RECORD.

3. MECHANICAL EQUIPMENT INSTALLATION

ALL MECHANICAL EQUIPMENT SHALL BE INSTALLED AS REQUIRED BY THE MANUFACTURER'S' INSTALLATION AND MAINTENANCE MANUALS. THOSE MANUALS WILL TYPICALLY PROVIDE MORE DETAIL THAN THE CONSTRUCTION DOCUMENTS. IF THERE IS A CONFLICT BETWEEN THE INSTALLATION AND MAINTENANCE MANUALS AND THE CONSTRUCTION DOCUMENTS, THEN THE MECHANICAL CONTRACTOR SHALL SUBMIT A REQUEST-FOR-INFORMATION TO THE MECHANICAL ENGINEER.

ALL MECHANICAL EQUIPMENT SHALL BE INSTALLED SUCH THAT SUFFICIENT CLEARANCES ARE PROVIDED FOR MAINTENANCE. ALL MECHANICAL EQUIPMENT AT A HEIGHT GREATER THAN SIXTEEN (16) FEET SHALL HAVE A PERMANENT MEANS OF ACCESS.

EXHAUST FANS SHALL HAVE A FLORIDA PRODUCT APPROVAL, MIAMI-DADE NOA AND BE RATED FOR HIGH WIND PER THE FLORIDA BUILDING CODE.

THE MECHANICAL CONTRACTOR SHALL PROVIDE VIBRATION ISOLATION AS RECOMMENDED BY THE MANUFACTURER(S) AND/OR REQUIRED BY THE MECHANICAL ENGINEER TO ENSURE QUIET OPERATION OF THE MECHANICAL EQUIPMENT. NO UNDUE VIBRATION OR SOUND SHALL BE TRANSMITTED TO THE STRUCTURE OR ANY OCCUPIED SPACES WITHIN THE STRUCTURE.

THE MECHANICAL CONTRACTOR SHALL PROVIDE ALL STARTERS, CONTACTORS, RELAYS, CONTROLS, AND ACCESSORIES NECESSARY TO PROVIDE A COMPLETE AND WORKING POWER AND CONTROL SYSTEM FOR THE MECHANICAL EQUIPMENT WITHIN THE SCOPE OF WORK. THE ELECTRICAL CONTRACTOR WILL PROVIDE ALL DISCONNECT SWITCHES, CONDUIT, AND WIRING FOR THE MECHANICAL EQUIPMENT WITHIN THE SCOPE OF WORK. ALL ELECTRICAL WORK SHALL COMPLY WITH THE REQUIREMENTS OF THE NATIONAL ELECTRIC CODE. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER OPERATION OF THE COMPLETE SYSTEM AND SHALL ENSURE THAT WIRING DIAGRAMS ARE PROVIDED TO THE OWNER. NO WIRING OF ANY KIND SHALL BE EXPOSED IN FINISHED AREAS.

THE MECHANICAL CONTRACTOR SHALL ENSURE THAT ALL MECHANICAL EQUIPMENT IS STARTED, TESTED, ADJUSTED, AND PLACED IN SATISFACTORY OPERATING CONDITION PRIOR TO SUBSTANTIAL COMPLETION. THE MECHANICAL CONTRACTOR SHALL GUARANTEE ALL WORKMANSHIP, MATERIALS, AND MECHANICAL EQUIPMENT TO BE FREE OF DEFECTS FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE BY THE OWNER AND SHALL REPAIR ANY DEFECTS OCCURRING WITHIN THAT TIME WITHOUT COST TO THE OWNER. ALL MECHANICAL EQUIPMENT IN THE SCOPE OF WORK SHALL BE COVERED FOR THE DURATION OF THE MANUFACTURER'S WARRANTIES AND THE CONTRACTOR SHALL PROVIDE THE OWNER WITH ORIGINALS OF ALL MANUFACTURER'S GUARANTEES AND WARRANTIES. THE CONTRACTOR SHALL PROVIDE THE COST OF ALL WARRANTIES TO THE OWNER AND GIVE THE OWNER THE OPTION TO DEDUCT THIS COST FROM THE CONTRACTOR PRICE AND PURCHASE THE WARRANTIES DIRECTLY.

THE MECHANICAL CONTRACTOR SHALL COORDINATE ALL MECHANICAL EQUIPMENT VOLTAGE REQUIREMENTS WITH THE VOLTAGE AVAILABLE AT THE PROJECT SITE PRIOR TO ORDERING ANY MECHANICAL EQUIPMENT.

4. CONTROLS

THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR CONTRACTING WITH THE EXISTING CONTROLS CONTRACTOR AND DETERMINING WHAT IS REQUIRED TO INCORPORATE NEW MECHANICAL EQUIPMENT AND CONTROLS INTO THE EXISTING CONTROL SYSTEM(S) AND INCLUDING ALL COSTS ASSOCIATED WITH INCORPORATING NEW MECHANICAL EQUIPMENT AND CONTROLS INTO THE EXISTING CONTROL SYSTEM(S) IN HIS/HER BID. THE CONTROLS CONTRACTOR SHALL PROVIDE A COMPLETE DESCRIPTION OF THE ENTIRE CONTROL SYSTEM, INCLUDING SCHEMATIC DRAWINGS. THE MECHANICAL CONTRACTOR SHALL PROVIDE ALL CONTROLS AND SUB-CONTRACT TO THE ELECTRICAL CONTRACTOR ALL CONTROLS POWER AND TRANSFORMERS NOT IDENTIFIED IN THE ELECTRICAL PORTION OF THE CONSTRUCTION DOCUMENTS.

5. TESTING AND BALANCING THE HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM

THE GENERAL CONTRACTOR SHALL PROVIDE THE SERVICES OF AN INDEPENDENT TEST AND BALANCE AGENCY TO TEST, BALANCE, AND CERTIFY THE PERFORMANCE OF THE COMPLETE EXHAUST AIR SYSTEMS. THE TEST AND BALANCE CONTRACTOR SHALL PERFORM ALL TESTING, ADJUSTING, BALANCING, AND DATA RECORDING NECESSARY TO ESTABLISH THE CAPACITY AND QUALITY OF THE SYSTEMS AND CONFIRM THE SATISFACTORY COMPLETION OF ALL ASPECTS OF THE SCOPE OF WORK. THIS WILL INCLUDE NOT ONLY THE NEW SYSTEMS, BUT ALSO ALL OF THE EXISTING SYSTEMS THAT HAVE BEEN MODIFIED.

THE TEST AND BALANCE CONTRACTOR SHALL BE AN APPROVED MEMBER OF THE AABC OR NEBB AND SHALL SPECIALIZE IN THE TESTING AND BALANCING OF HEATING, VENTILATION, AND AIR CONDITIONING SYSTEMS. THE FOLLOWING TEST AND BALANCE CONTRACTORS ARE PRE-APPROVED: THE PHOENIX AGENCY, SITA, TEST AND BALANCE CORPORATION AND SPEC TECH CONSULTANTS. THE CONTRACTOR SHALL SUBMIT ANY NON-PRE-APPROVED TEST AND BALANCE CONTRACTOR TO THE MECHANICAL ENGINEER FOR APPROVAL PRIOR TO SUBMITTING A BID.

THE TEST AND BALANCE CONTRACTOR SHALL ENSURE THAT THE BUILDING IS UNDER POSITIVE PRESSURE AT THE CONCLUSION OF THE TEST AND BALANCE PROCESS. IF THE BUILDING IS NOT UNDER POSITIVE PRESSURE AT THE CONCLUSION OF THE TEST AND BALANCE PROCESS, THEN THE TEST AND BALANCE AND MECHANICAL CONTRACTORS SHALL IMMEDIATELY AND WITHOUT DELAY NOTIFY THE ARCHITECT AND MECHANICAL ENGINEER. THE TEST AND BALANCE CONTRACTOR SHALL WORK WITH THE ENGINEER TO COMFORT BALANCE AS REQUIRED TO SATISFY THE CLIENT.

CONTROLS CONTRACTOR SHALL PROVIDE REQUIRED BAS HARDWARE, SOFTWARE, PERSONNEL AND ASSISTANCE TO TAB AGENCY AS REQUIRED TO BALANCE THE SYSTEMS. CONTROLS CONTRACTOR SHALL ALSO PROVIDE TRENDING REPORT TO DEMONSTRATE THAT SYSTEMS ARE COMPLETE. MECHANICAL CONTRACTOR SHALL PROVIDE TAB AGENCY ONE COMPLETE SET OF CONTRACT DOCUMENTS, CHANGE ORDERS, AND APPROVED SUBMITTALS. MECHANICAL CONTRACTOR SHALL COORDINATE MEETINGS AND ASSISTANCE FROM SUPPLIERS AND CONTRACTORS AS REQUIRED BY TAB AGENCY. MECHANICAL CONTRACTOR SHALL PROVIDE ADDITIONAL VALVES, DAMPERS, SHEAVES AND BELTS AS REQUIRED BY TAB AGENCY. MECHANICAL CONTRACTOR SHALL FLAG ALL MANUAL VOLUME DAMPERS WITH FLUORESCENT OR OTHER HIGH-VISIBILITY TAPE. MECHANICAL CONTRACTOR SHALL PROVIDE ACCESS TO ALL DAMPERS, VALVES, TEST PORTS, NAMEPLATES AND OTHER APPURTENANCES AS REQUIRED BY TAB AGENCY. MECHANICAL CONTRACTOR SHALL REPLACE OR REPAIR INSULATION AS REQUIRED BY TAB AGENCY.

THE TEST AND BALANCE CONTRACTOR SHALL, UPON COMPLETION OF ALL NECESSARY TESTING AND BALANCING AND AT LEAST ONE (1) WEEK PRIOR TO SUBSTANTIAL COMPLETION, SUBMIT THREE (3) BOUND COPIES OF THE TEST AND BALANCE REPORT TO THE MECHANICAL ENGINEER.

THE TEST AND BALANCE CONTRACTOR SHALL BALANCE THE SCOPE OF WORK AS SHOWN ON THE CONSTRUCTION DOCUMENTS AND RETURN AREAS OUTSIDE OF THE SCOPE OF WORK AND SERVED BY EXISTING SYSTEMS WITHIN THE SCOPE OF WORK TO THE ORIGINAL DESIGN AIRFLOWS OR RE-BALANCE THE ORIGINAL DESIGN AIRFLOWS IN LOCATIONS WHERE THE EXISTING SYSTEM MAY NOT BE BALANCED PROPERLY.

6. SUBSTANTIAL AND FINAL COMPLETION

THE MECHANICAL CONTRACTOR SHALL MAINTAIN A SET OF CONTINUOUSLY UPDATED, REPRODUCIBLE AS-BUILT DRAWINGS DURING CONSTRUCTION AND PROVIDE A COMPLETE SET OF THOSE DRAWINGS IN BOTH ELECTRONIC AND HARDCOPY FORMATS TO THE OWNER UPON FINAL COMPLETION.

THE MECHANICAL AND ELECTRICAL CONTRACTORS SHALL PROVIDE FIVE (5) BOUND COPIES OF ALL MECHANICAL AND ELECTRICAL CONTRACTOR WARRANTIES, MANUFACTURER'S' WARRANTIES, PARTS LISTS, AND INSTALLATION AND MAINTENANCE MANUALS FOR ALL MECHANICAL EQUIPMENT, AS WELL AS INSTRUCTIONS FOR OPERATING AND MAINTAINING ALL MECHANICAL EQUIPMENT TO THE OWNER UPON FINAL COMPLETION.

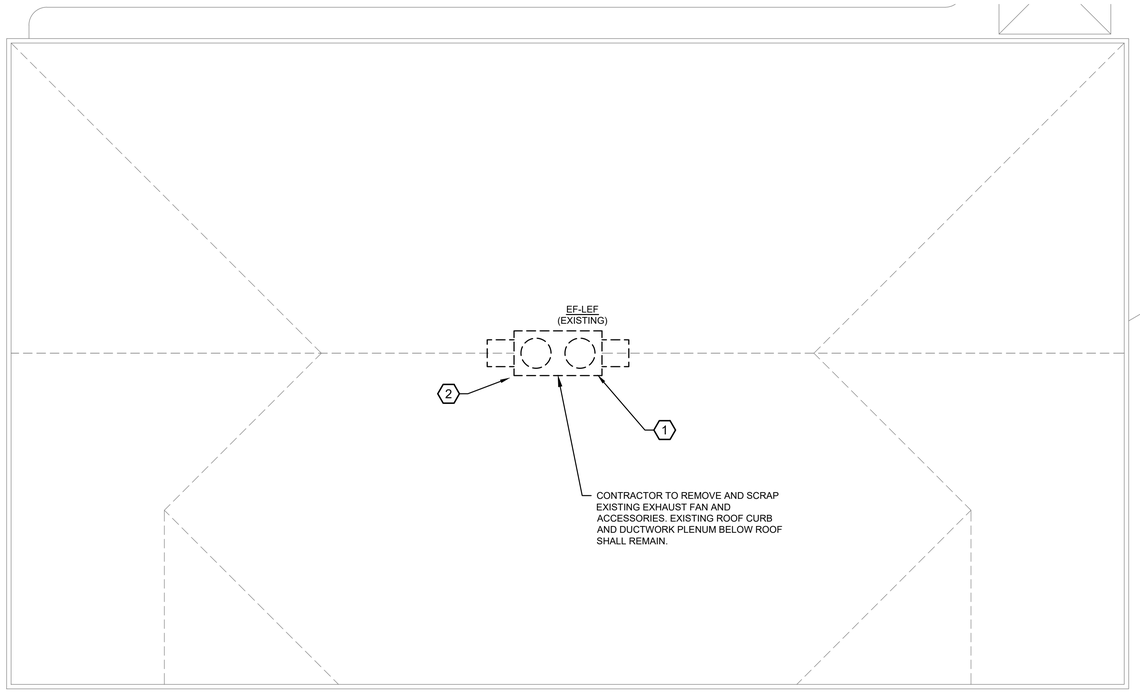
7. ROOF WORK

CONTRACTOR SHALL SUBCONTRACT WITH OWNERS ROOFING CONTRACTOR TO PROVIDE ALL WORK REQUIRED TO MAINTAIN ROOF INTEGRITY AND WARRANTY.

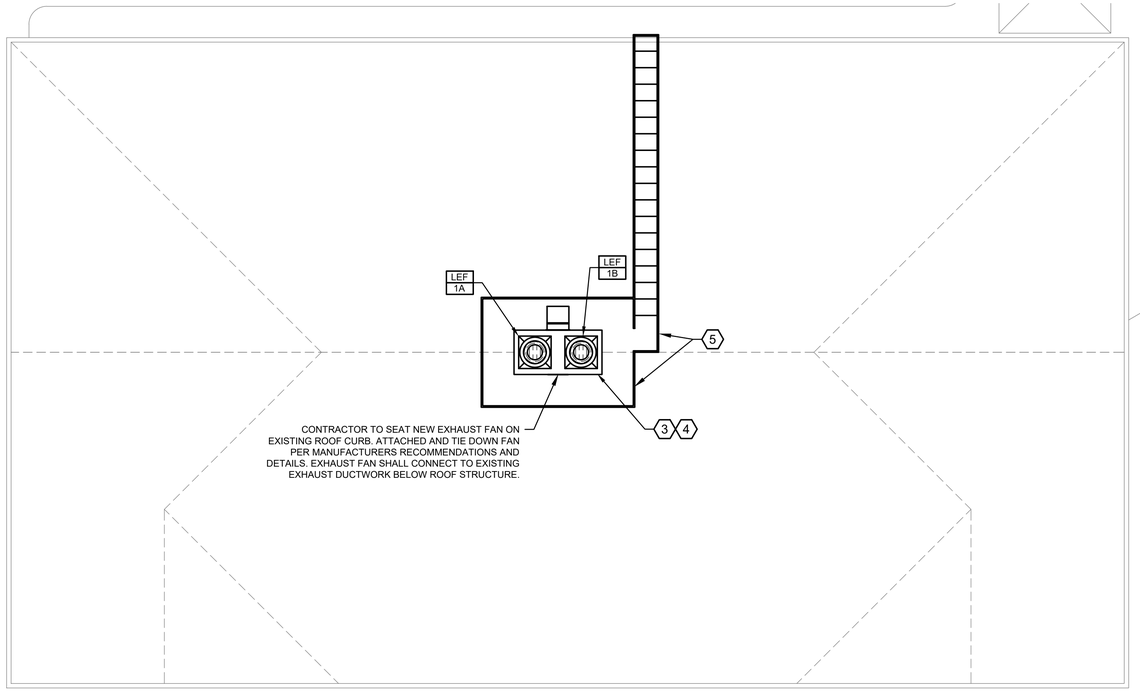
(#) MECHANICAL NOTES

1. CONTRACTOR TO RETAIN EXISTING LIGHTING PROTECTION, AND SHALL BE REINSTALLED ON NEW EXHAUST FAN.
2. EXISTING CONVENIENCE OUTLET TO REMAIN. (SEE ELECTRICAL PLANS.)
3. CONTRACTOR TO INSTALL FAN PER MANUFACTURES LITERATURE AND DETAILS ON MECHANICAL SHEET M2. THE MANUFACTURER OF THE FAN ASSEMBLY SHALL PROVIDE STRUCTURAL ENGINEERING SERVICES AND DOCUMENTATION, SIGNED AND SEALED BY A FLORIDA LICENSED PROFESSIONAL ENGINEER. THIS SHALL INCLUDE WIND LOAD CALCULATIONS PER FLORIDA CODE AND DETAILS TO SECURE FAN ASSEMBLY TO EXISTING CURB, AND FAN COMPONENTS TO EACH OTHER.
4. REINSTALL EXISTING LIGHTING PROTECTION ONTO NEW EXHAUST FAN PER MANUFACTURES LITERATURE.
5. THE MECHANICAL CONTRACTOR SHALL PROVIDE SERVICE PLATFORM AND STAIR COMPLIANT WITH FLORIDA MECHANICAL CODE 306.5.1. PROVIDE STAIR, WITH HANDRAILS, UP SLOPE OF ROOF TO REAR OF BUILDING. STAIR AND PLATFORM SHALL BE SECURED TO ROOF STRUCTURE, PER ENGINEERED DRAWINGS BY MANUFACTURER. SEE DETAIL.

CONSTRUCTION SCHEDULE:
THE CONTRACTORS SHALL COORDINATE THE CONSTRUCTION SCHEDULE WITH MANATEE COUNTY TO MINIMIZE DISRUPTION OF LABORATORY OPERATIONS. THE REPLACEMENT OF THE EXHAUST FAN AND STARTUP SHALL PREFERABLY OCCUR OVER A WEEKEND. FURTHER WORK, INCLUDING THE PLATFORM AND STAIR MAY OCCUR AFTERWARD.
PRIOR TO ORDERING THE EQUIPMENT (FAN ASSEMBLY, PLATFORM, STAIR), THE MECHANICAL CONTRACTOR SHALL FIELD VERIFY AND COORDINATE ALL PERTINENT MEASUREMENTS AND / OR CONDITIONS WITH THE MANUFACTURES OF THE EQUIPMENT. SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW.



1 MECHANICAL DEMOLITION PLAN: ROOF
SCALE: 1/8"=1'-0"



2 MECHANICAL RENOVATION PLAN: ROOF
SCALE: 1/8"=1'-0"

REVISIONS

Advanced Systems Engineering, Inc.
Job No.14079.06DE
Manager: JRW
CADD: JRW
ASE
CA-8468
Project Engineer
John R. Wood
PE-64788
13505 Automobile Boulevard, Suite 330, Clearwater, FL 33762 • Office: 727.540.9396 • Facsimile: 727.540.9376

MECHANICAL RENOVATION PLAN

MANATEE COUNTY - WATER TREATMENT LAB
CHILLER & EXHAUST FAN REPLACEMENT
4751 65th STREET WEST
BRADENTON, FL 34210

JOB NO: 14079.06DE
PROJ. MNGR: JRW
DRAWN BY: DCD
ISSUE DATE: 07.24.2017

SHEET NUMBER
EF-M1.0
BID SET

CONTROLS SEQUENCE OF OPERATION

FUME HOOD EXHAUST FANS

* Only one fan, LEF-1A or LEF-1B shall run at one time. Two fans are designed for redundancy.
  Exhaust shall operate at all times regardless of occupancy.
* Lead fan shall be alternated periodically, such as weekly. Switching of lead fan shall be scheduled during un-occupied hours.
  Switching of fans shall provide continuous exhaust flow. During switch, the VFD of one fan shall ramp down to zero while the VFD of the other fan simultaneously ramps up to setpoint.
* When the lead fan is energized, its motorized isolation damper shall open 100%. The motorized damper of the redundant fan shall close shut.
* If a run fault is found in one of the fans, an alert shall be sent through the BMS.
  The other fan shall operate as lead until repair has been made, and fault reset.
* Occupied hours:
  - The VFD of the lead fan shall ramp up to balanced setpoint to provide balanced exhaust flow. This is a constant flow exhaust system.
  - The bypass damper shall be closed shut, so that the full balanced exhaust the fan is drawn through the exhaust duct system.
  - The VFD of AHU-2 shall ramp up to the balanced setpoint to provide balanced supply flow. This is a constant flow supply system.
  AHU-2 shall provide a constant leaving coil temperature of 50˚F. Zone heaters shall modulate to maintain room temperature.
* All hours:
  - AHU-2 shall modulate chilled water supply valve to provide a constant leaving coil temperature of 50˚F.
  - Zone heaters shall modulate to maintain room temperature. Default setpoints are 65˚F in metals analysis and 68˚F in all other spaces of lab.
  - Monitor pressure differential from inside of lobby to the exterior to verify that the building is maintained at a slight positive pressure.
  Send alarm if a negative pressure persists for over one hour.
* AHU-2 fault: If AHU airflow fault is detected or AHU-2 is shut down, an alarm shall sound indicating to evacuate building.
  Exhaust flow shall modulate down to a lower, but safe airflow to prevent a door closure hazard.
  The controls contractor, the mechanical contractor, the T&B contractor and ASE shall work together to determine the proper airflow setpoint.
* Upon detection of smoke from the exhaust system smoke detector, the fire alarm system shall sound an alarm indicating to evacuate the building. AHU-2 shall shut down and outside air damper shall close. The exhaust fan shall continue to operate at reduced airflow.
* EF fault: If exhaust flow cannot be achieved with either exhaust fan or the exhaust fans are shut down, an alarm shall sound indicating to evacuate building. AHU-2 shall shut down and outside air damper shall close.
* Un-occupied hours mode (optional line item alternate): Energy saving measure
  The controls contractor shall write progamming to enable a low-flow operation during un-occupied hours.
  This shall include an adjustable time of day schedule; unoccupied from 8pm to 4 am, and 4 occupancy sensors located throughout laboratory area.
  The un-occupied mode will occur if and only if the schedule indicates un-occupied and none of the occupancy sensors detect people.
  Provide adjustable Setpoints for both exhaust and supply (AHU-2) VFD as a percentage of the occupied mode VFD setting.
  Set original low-flow airflow for both supply and exhaust to 100% of occupied airflow. Owner may initialize programming by adusting this setting.
  When this mode is intitialized, the controls contractor, the mechanical contractor, the T&B contractor and ASE shall work together to commission and determine the proper airflow setpoints.

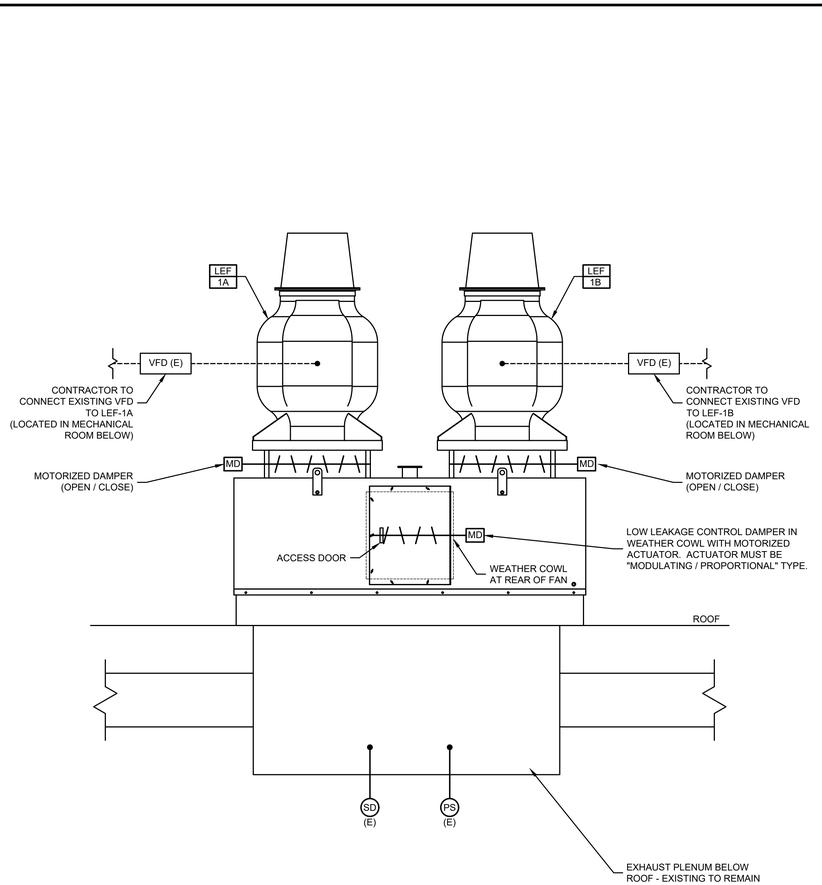
  The owner should have the controls commissioned every 5 years.
  All setpoints shall be adjustable.

MECHANICAL LEGEND

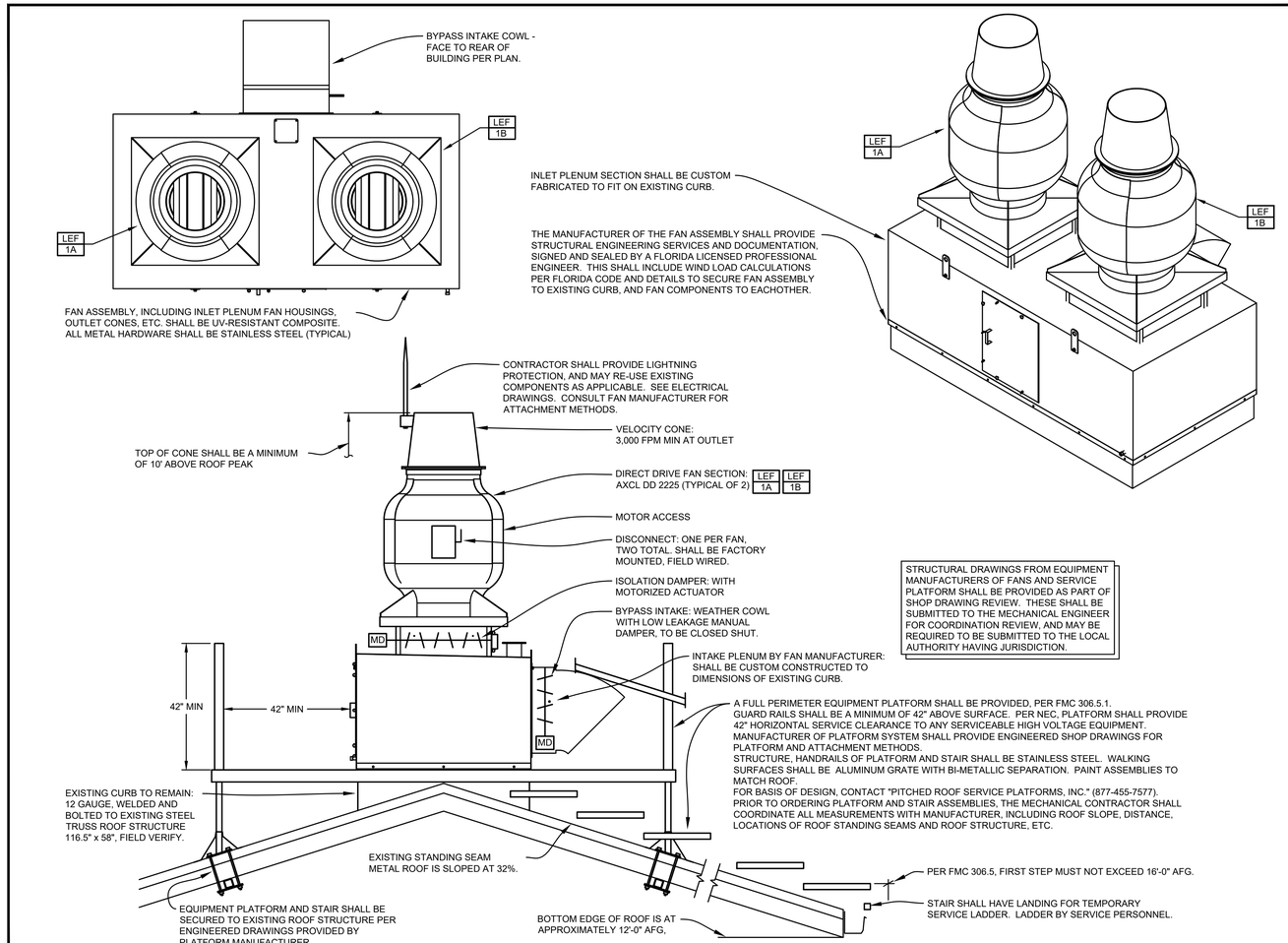
	NEW POINT OF CONNECTION
EQ NO	EQUIPMENT TAG
HS	HUMIDISTAT
PS	PRESSURE SENSOR
RS	REMOTE TEMPERATURE SENSOR
SD	SMOKE DETECTOR
T	THERMOSTAT
TC	TIME CLOCK
BD	BACKDRAFT DAMPER (WITH ACCESS DOOR ON ACCESSIBLE SIDE)
MD	MOTORIZED DAMPER (WITH ACCESS DOOR ON ACCESSIBLE SIDE)
M	MANUAL DAMPER

FAN SCHEDULE - ROOF MOUNTED

	MARK	LEF-1A	LEF-1B
FAN DATA	MANUFACTURER - BASIS OF DESIGN	MK PLASTICS	MK PLASTICS
	MODEL NUMBER	AXCL - 2225	AXCL - 2225
	CFM	8,680	8,680
	EXTERNAL STATIC PRESSURE (IWG)	2.5"	2.5"
	DRIVE	DIRECT	DIRECT
	CONE VELOCITY (FPM)	3,979	3,979
	FAN RPM	1,911	1,911
	ELECTRICAL SERVICE	460/3/60	460/3/60
	MOTOR (HP)	10	10
	MOTOR RPM	1,800	1,800
	OPERATING WEIGHT	534	534
NOTES	1. LEF-1A & LEF-1B SHALL SHARE A FIELD FABRICATED PLENUM		
	2. FOR MK PLASTICS BASIS OF DESIGN CONTACT TOM BARROW CO, CYRIL JOHN, 813-990-9010.		
	3. SHALL BE MIAMI-DADE NOA HIGH WIND LOAD CERTIFIED.		



1 CONTROLS SCHEMATIC: EXHAUST SYSTEM
NOT TO SCALE



STRUCTURAL DRAWINGS FROM EQUIPMENT MANUFACTURERS OF FANS AND SERVICE PLATFORM SHALL BE PROVIDED AS PART OF SHOP DRAWING REVIEW. THESE SHALL BE SUBMITTED TO THE MECHANICAL ENGINEER FOR COORDINATION REVIEW, AND MAY BE REQUIRED TO BE SUBMITTED TO THE LOCAL AUTHORITY HAVING JURISDICTION.

2 MK PLASTICS EXHAUST FAN DETAIL
NOT TO SCALE

REVISIONS

Advanced Systems Engineering, Inc.
Job No.14079.06DE
Manager: JRW
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ASE
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Project Engineer
John R. Wood
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13505 Automobile Boulevard, Suite 330, Clearwater, FL 33762 • Office: 727.540.9396 • Facsimile: 727.540.9376

MECHANICAL SCHEDULES & DETAILS

MANATEE COUNTY - WATER TREATMENT LAB

CHILLER & EXHAUST FAN REPLACEMENT
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DIVISION 16000 ELECTRICAL SPECIFICATIONS

SECTION 16010
GENERAL PROVISIONS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish all labor, materials, and equipment as required by the plans and specifications to provide a complete and operable electrical system. This specification describes the types of materials, methods, and management to be utilized. This includes the work listed in this division as well as equipment furnished under other divisions not specifically mentioned herein.

1.02 CODES AND STANDARDS

A. All equipment, materials, and methods of design and installation are to comply with the 2011 National Electrical Code (NEC), the Occupational Safety and Health Act (OSHA), and the requirements of applicable local codes. Codes and standards of the following organizations may be referred to in this section and shall be considered as the minimum acceptable. A reference herein to any portion of the standard or code is not to be considered as negating any other portion of the standard or code.

1. American Society for Testing & Materials (ASTM)
2. Institute of Electrical & Electronic Engineers (IEEE)
3. National Electrical Code (NEC), 2011 ed.
4. National Electric Manufacturers Association (NEMA)
5. Underwriters Laboratories, Inc. (UL)
6. Florida Building Code (FBC), 2010, 5th ed.
7. Florida Fire Prevention Code (Florida Specific edition of NFPA 101), 2010 ed.

1.03 EQUIPMENT, MATERIAL AND WORKMANSHIP

A. All equipment and material shall be new, free from defects, of current manufacture, and listed by Underwriters Laboratories, Inc., (UL) where UL requirements apply. All materials are to be products of reputable and experienced manufacturers. Similar items in the project are to be of the same manufacturer. Use only equipment and materials of commercial quality and durability, and capable of long, reliable, trouble free service.

B. Provide protection for materials and equipment against loss or damage throughout the contract. Provide protection from the effect of weather prior to installation, store items to be installed in indoor weather protected location.

C. Following installation, protect materials and equipment from corrosion, physical damage and effects of moisture on insulation.

D. Layout work carefully in advance.

E. Do not cut or notch any structural member or building surface without specific approval of the Structural Engineer. Carefully carry out any cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, paving, or other surfaces required for the installation, support, or anchorage of conduit, raceways, or other electrical equipment. Following such work, restore surfaces neatly to new conditions using skilled craftsmen of the trades involved at no additional cost to the Owner.

F. All work will be performed by accomplished, qualified and experienced personnel working under continuous competent supervision.

G. Contractor shall restore fire ratings of all rated assemblies penetrated with the appropriate assembly: WL-1001, CAJ-1045, WL-1049, WL-3214, WJ-1055, or WJ-3094 or equivalent.

1.04 PERMITS

A. Obtain and pay for all permits and inspections pertinent to the electrical installation.

1.05 SITE INSPECTION

A. Prior to submitting a bid, visit the project site and ascertain conditions affecting the proposed work and all existing electrical facilities.

B. Furnish all labor associated with accompanying Engineer during observations of construction.

1.06 SHOP DRAWINGS

A. Submit 6 copies of all project submittal data and shop drawings.

B. Submit complete shop drawings for review prior to purchase of the following:

1. Breakers and breaker mounting hardware.
2. Conduit and conduit fittings.
3. Supporting hardware.

1.07 RECORD DRAWINGS

A. Maintain a neatly marked set of record drawings showing installation location, and/or routing of conduits, depth of buried cables, pull boxes, junction boxes, and outlets. Mark this set to show current job progress and any deviation from the contract drawings. These drawings shall available upon request of the Engineer. After final inspection, transfer all record information to the Owner as required in the contract.

PART 2 - EXECUTION

2.01 INSTALLATION

A. The electrical plans show general arrangements and locations for equipment conduit, outlets, etc. Unless detailed or dimensioned, exact locations of conduit, routing of cables and placement of equipment will be governed by structural conditions, physical interference, and locations of electrical termination on equipment. Examine architectural, structural, and mechanical plans and shop drawings for the various equipment in order to determine exact routing and placement of all raceways, cables, and equipment, to assure a workable installation in accordance with NEC.

2.02 CLEAN-UP

A. Continuously remove debris, cuttings, crates, cartons, etc.

B. Before acceptance, carefully clean all cabinets, panels, boxes, wiring devices, cover plates, etc. Replace all damaged or blemished fixtures.

END OF SECTION

SECTION 16070
ELECTRICAL CONNECTIONS FOR EQUIPMENT

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide all labor, materials and equipment as required furnishing connections to all electrical equipment, lights, etc.

PART 2 - PRODUCTS

2.01 GENERAL

A. For each electrical connection indicated, provide complete assembly of materials, including but not necessarily limited to, raceways, conductors, cords caps, wiring devices, pressure connectors, terminals (lugs), electrical insulating tape, heat-shrinkable insulating tubing, cable ties, solderless wire nuts, and other items and accessories as needed to complete splices, terminations, and connections as required.

B. See Section 16111, Conduit Raceways; Section 16140 Wiring Devices; and Section 16120 Wire and Cables for additional requirements. Provide final connections for equipment consistent with the following:

1. Permanently installed fixed equipment - flexible seal-tite conduit from branch circuit terminal equipment, or raceway; to equipment, control cabinet, terminal junction box, or wiring terminals. Totally enclose all wiring in raceway.
2. Other methods as required by the National Electrical Code and/or as required by special equipment or field conditions.

PART 3 - EXECUTION

3.01 INSTALLATION OF ELECTRICAL CONNECTIONS

A. Make electrical connections in accordance with connector manufacturer's written instructions and with recognized industry practices, and complying with requirements of NEC and NECA's "Standard of Installation" to ensure that products fulfill requirements.

B. Connect electrical power supply conductors to equipment conductors in accordance with equipment manufacturer's written instructions and wiring diagrams.

C. Coordinate installation of electrical connections for equipment with equipment installer.

D. Verify all electrical loads (voltage, phase, full load amperes, number and point of connections, minimum circuit ampacity, etc.) for equipment furnished under other Sections of this specification, by reviewing respective shop drawings furnished under each section. Meet with each subcontractor who is responsible for furnishing equipment that requiring electrical service connection and review equipment electrical characteristics. Report any variances from electrical characteristics noted on the electrical drawings to the Engineer before proceeding with rough-in work.

E. Obtain and review the equipment shop drawings to determine particular final connection requirements before rough in begins for each equipment item.

F. Refer to basic materials and methods Section 16120, Conductors, for identification of electrical power supply conductor terminations.

END OF SECTION

SECTION 16111
CONDUIT RACEWAYS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish all labor, materials and equipment as required to install all flexible or rigid conduit, couplings, supports and nonmetallic ducts, as shown on the Plans.

PART 2 - PRODUCTS

2.01 MATERIALS

A. GENERAL: Provide conduit, and fittings of types, grades, sizes, and weights (wall thicknesses) as indicated; with minimum trade size of 1/2" above grade and 3/4" below grade.

B. Electrical Metallic Tubing (EMT) with zinc die cast or steel set screw fittings for dry and damp locations, compression fittings for wet locations.

C. RIGID METAL CONDUIT (RMC) with threaded fittings.

D. RIGID NON-METALLIC CONDUIT (RNC): Schedule 40, with matching glue on socket fittings.

E. FLEXIBLE METALLIC CONDUIT (FMC): Galvanized interlocked steel strip with cadmium plated steel or malleable iron fittings.

F. LIQUID-TIGHT FLEXIBLE METAL CONDUIT (LT): Provide liquid-tight, flexible metal conduit; constructed of single strip, flexible continuous, interlocked, and double-wrapped steel; galvanized inside and outside; coated with liquid-tight jacket of flexible polyvinyl chloride (PVC) with cadmium plated steel or malleable iron fittings and compression type steel ferrule and neoprene gasket sealing rings.

G. EXPANSION FITTINGS: OZ Type AX, or equivalent to suit application.

2.02 SCHEDULE OF LOCATIONS

A. RMC in all areas subject to physical damage to an elevation of 48" AFF/AFG.

B. EMT for all above grade areas in the building unless noted otherwise.

C. RNC for all areas below grade.

D. Make connections to motors and equipment with FMC and LT as environmental conditions dictate.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install conduit concealed in all areas where possible.

B. Plug ends of conduits to prevent entry of dirt or moisture.

C. Clean out conduit before installation of conductors.

D. Route all exposed conduits parallel or perpendicular to building lines.

E. Do not exceed number of bends in conduit beyond that allowed by the NEC.

F. Cut conduit with hacksaw or other approved pipe cutting tool and ream ends to clean out all burrs before connecting.

G. Keep conduits at least 12" away from gas lines and hot water pipes, and in no case permit conductors to reach higher than rated temperatures.

H. Fasten raceways securely in place. Firmly fasten conduit within three feet of each outlet, junction box, cabinet, or fitting. Support metallic conduit in accordance with the NEC. Use raceway fasteners designed for the purpose.

I. Provide pull boxes as shown on the plans, plus any such items required to assemble conduits and other raceways. Provide pull boxes as dictated by wire pulling requirements. Unless shown otherwise, face into secondary or unfinished rooms.

END OF SECTION

SECTION 16120
BUILDING WIRE AND CABLE

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish all labor, materials, and equipment as required to install all wires and cables as n the Plans, and as required to connect all electrical services and equipment.

1.02 RELATED WORK

A. Section 16000 - Electrical General Requirements

B. Section 16111 - Conduit

PART 2 - PRODUCTS

2.01 MATERIALS

A. All wiring shall be copper unless specifically noted otherwise on plans.

B. Minimum size conductors:

1. Branch circuits, # 12 AWG THHN/THWN.
2. Control circuits, # 14 AWG THHN/THWN.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Color coding shall be as follows:

Voltage	Phase A	Phase B	Phase C	Neutral
277/480	Brown	Orange	Yellow	Gray

B. Provide a green grounding conductor in all raceways except service entrance.

C. Provide conductors with identification tags as manufactured by Brady or approved equal.

D. Install wires and cables continuous without splices from source of supply to distribution equipment and from source of supply to motors, lighting, or power outlets. Do not use pull boxes for making splices. Do not install splices in conduits or trench.

E. Install all wiring in accordance with NEC.

END OF SECTION

SECTION 16130
PULL AND JUNCTION BOXES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Construct junction or pull boxes less than 100 cubic inches as "standard outlet boxes".

B. Construct junction or pull boxes greater than 100 cubic inches as "cabinets".

C. Provide all covers of same gauge metal and include screws.

PART 2 - PRODUCTS

2.01 STANDARD OUTLET BOXES

A. Make of material resistant to corrosion or suitably protected, both internally and externally by galvanizing.

B. Boxes installed in damp or wet locations shall be U.L. approved for the purpose.

C. Comply with U.L. Standard 50.

D. Metal boxes to meet NEC construction specifications.

E. Boxes exposed or surface mounted shall be die-cast or permanent-mold cast aluminum body with threaded external hub and cast cover.

F. Interior metal boxes shall be labeled with the circuits contained within. Labeling shall be by permanent black magic marker.

2.02 CABINETS

A. 14 gauge sheet steel with corrosion resistant finish.

B. Ample space for wires, connections and equipment.

C. Cabinet fronts: Sheet steel panels with hinged door and locking provisions.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install junction boxes so that covers are readily accessible after the completion of the installation.

B. Mount rigidly in place with front of box level and plumb.

C. Secure flush covers with corrosion resistant screws or bolts.

D. Provide each pull box with sufficient clamps to which cables shall be secured in neat and orderly fashion permitting ready identification.

END OF SECTION

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION	MOUNTING
	DISCONNECT SWITCH. NEMA/AMPERAGE/POLE/FUSE/VOLTAGE. PROVIDE NEMA 1, 600V UON.	AS NOTED.
	MOTOR CONNECTION OR EXHAUST FAN.	BY OTHERS.
J	JUNCTION BOX OR OUTLET BOX.	AS NOTED.
	DRIVEN GROUND ROD.	AS NOTED.
	CONDUIT CONCEALED IN WALL OR CEILING.	SEE SPECIFICATIONS.
	CONDUIT CONCEALED IN SLAB OR UNDERGROUND.	SEE SPECIFICATIONS.
	CONDUIT EXPOSED ON WALL OR CEILING.	SEE SPECIFICATIONS.
#12 #12 #12 #12	PHASE,NEUTRAL,EQUIPMENT GROUND, AND ISOLATED GROUND. ALL HOMERUNS SHALL BE 1/2" WITH 3 #12 UON.	
	480Y/277V PANELBOARD.	78" AFF TO TOP.
	208Y/120V OR 240/120V PANELBOARD.	78" AFF TO TOP.
	REFER TO KEYED NOTES.	

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR	HID	HIGH INTENSITY DISCHARGE
AFG	ABOVE FINISHED GRADE	HP	HORSEPOWER
C	CONDUIT	N	NEW
CLG	CEILING MOUNTED	NF	NON-FUSED
D	DEMOLISHED	NL	NIGHT LIGHT
E	EXISTING	NP	NAMEPLATE
EC	ELECTRICAL CONTRACTOR	PNL	PANEL
EG	EQUIPMENT GROUND	R	RELOCATED
EWC	ELECTRIC WATER COOLER	TTB/C	TELEPHONE TERMINAL BOARD/CABINET
EWH	ELECTRIC WATER HEATER	UON	UNLESS OTHERWISE NOTED
GEC	GROUNDING ELECTRODE CONDUCTOR	WP	WEATHERPROOF
GFI	GROUND FAULT INTERRUPTER	WPI	WEATHERPROOF WHILE IN USE

GENERAL PROJECT NOTES

1. CONTRACTOR SHALL PERFORM A SITE VISIT TO VERIFY EXISTING SYSTEMS AND CONDITIONS PRIOR TO SUBMITTING BID.
2. THE EXISTING CIRCUITRY ON THE PLANS IS SHOWN FOR REFERENCE ONLY AND WAS TAKEN FROM THE ORIGINAL CONSTRUCTION DOCUMENTS. THE CONTRACTOR SHALL PROVIDE ALL CIRCUITRY WITHIN THE AREA UNDER CONSTRUCTION AS REQUIRED TO PROVIDE A FULLY FUNCTIONAL ELECTRICAL SYSTEM MEETING THE INTENTION OF THE PLANS AND SPECIFICATIONS. CONTRACTOR SHALL VERIFY THE ACCURACY OF EXISTING CONDITIONS, INCLUDING THE ACCURACY OF THE AS-BUILT CIRCUITRY INDICATED ON THE PLANS PRIOR TO SUBMITTING BID. NO ADDITIONAL COSTS FOR INACCURATE OR UNCONFIRMED EXISTING CONDITIONS WILL BE ACCEPTED.
3. CONTRACTOR MAY RE-USE EXISTING PANELBOARDS, CIRCUIT BREAKERS, TRANSFORMERS, SAFETY SWITCHES, ETC. ONLY WHERE INDICATED TO BE REUSED ON THE PLANS.
4. CONTRACTOR MAY RE-USE EXISTING CONDUIT, CONDUCTORS, FITTINGS, SUPPORTS, ETC. WHERE THESE ITEMS COMPLY WITH CURRENT CODE AND THE REQUIREMENTS OF THE SPECIFICATIONS.
5. CONTRACTOR SHALL VERIFY THE PRESCENCE OF EXISTING SPARES AND SPACES IN THE PANELBOARDS UNDER THIS SCOPE OF WORK. CONTRACTOR SHALL PROVIDE ALL NECESSARY NEW BREAKERS TO FACILITATE THE ELECTRICAL INSTALLATION WHETHER SHOWN ON THE PLANS OR NOT. ANY CONFLICTS BETWEEN THE ELECTRICAL PLANS AND SITE CONDITIONS SHALL BE DOCUMENTED ON THE AS-BUILT PLANS.
6. ITEMS TO BE DEMOLISHED, SUCH AS DISCONNECTS, TRANSFORMERS, ETC. SHALL BE HANDED OVER TO THE OWNER TO BE KEPT AS SPARE INVENTORY OR REMOVED FROM SITE AT THE SOLE DISCRETION OF THE OWNER.
7. ANY MECHANICAL EQUIPMENT TO BE DEMOLISHED OR RELOCATED SHALL BE COORDINATED WITH THE MECHANICAL PLANS AND MECHANICAL CONTRACTOR PRIOR TO REMOVAL.
8. CONTRACTOR IS RESPONSIBLE FOR REVIEWING THE MECHANICAL PLANS. ADDITIONAL WORK NOT SHOWN ON THE ELECTRICAL PLANS MAY BE REQUIRED BY THE CONTRACTOR IN ORDER TO ASSIST THE WORK OF OTHER TRADES. ANY SUCH WORK SHALL BE COMPLETED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
9. CONTRACTOR SHALL MAINTAIN EXISTING DOWNSTREAM CIRCUITRY FOR DEVICES AND EQUIPMENT TO REMAIN. WHERE DEMOLITION WORK IS BEING PERFORMED THAT WOULD DISRUPT SERVICE, THE CONTRACTOR SHALL EXTEND OR REPLACE FEEDERS OR BRANCH CIRCUITS AS REQUIRED AT NO ADDITIONAL COST TO THE OWNER.

REVISIONS

Advanced Systems Engineering, Inc.
ASE
Job No.14079.06DE
Manager: KCW
CADD: KCW
CA-8468
Project Engineer
David S. Bess
PE-51871
13505 Automobile Boulevard, Suite 330, Clearwater, FL 33762 • Office: 727.540.9396 • Facsimile: 727.540.9376

ELECTRICAL LEGEND & SPECIFICATIONS

MANATEE COUNTY - WATER TREATMENT LAB
CHILLER & EXHAUST FAN REPLACEMENT
4751 65th STREET WEST
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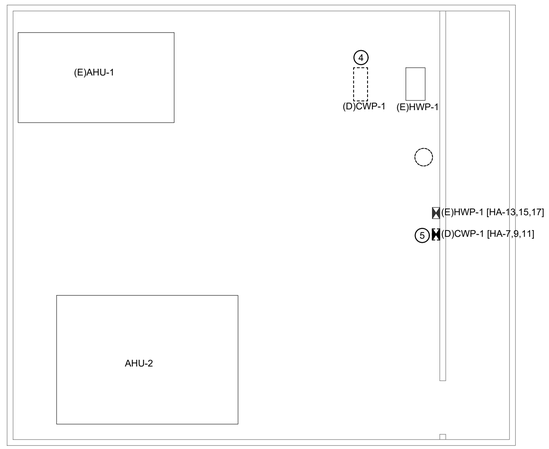
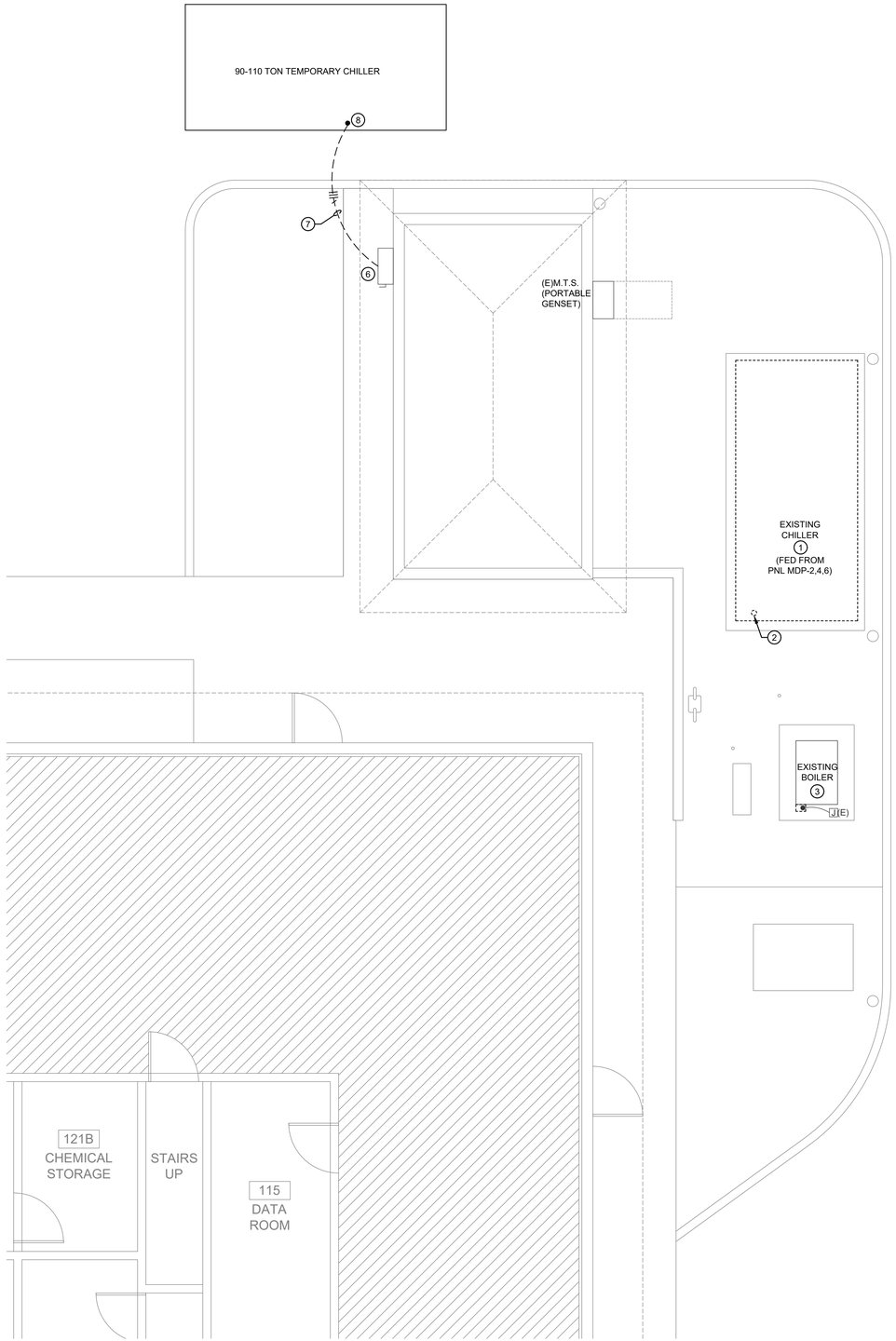


1 ELECTRICAL MECHANICAL ROOM DEMOLITION PLAN
SCALE: 1/4"=1'-0"

N



2 ELECTRICAL CHILLER YARD DEMOLITION PLAN
SCALE: 1/4"=1'-0"

N

ELECTRICAL NOTES ○

1. EXISTING MECHANICAL EQUIPMENT TO BE REMOVED IN ITS ENTIRETY BY MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL DISCONNECT ALL LINE AND LOW VOLTAGE CONNECTIONS TO FACILITATE THE REMOVAL OF MECHANICAL EQUIPMENT. LOW VOLTAGE CONNECTIONS TO BE REMOVED SHALL INCLUDE BUILDING MANAGEMENT SYSTEM, CONTROLS, FIRE ALARM, ETC.
2. REMOVE EXISTING FEEDERS SERVING EXISTING MECHANICAL EQUIPMENT TO BE REMOVED IN ITS ENTIRETY BACK TO SOURCE PANEL. REMOVE ALL EXISTING SURFACE MOUNTED WEATHERPROOF POWER CONNECTIONS IN THEIR ENTIRETY AND CUT EXISTING CONDUIT OFF FLUSH WITH EXISTING GRADE AND CAP AS REQUIRED.
3. EXISTING MECHANICAL EQUIPMENT TO REMAIN.
4. EXISTING CHILLED WATER PUMP TO BE REPLACED IN PLACE WITH NEW OF SAME HORSE POWER. ELECTRICAL CONTRACTOR SHALL DISCONNECT PUMP AND MAKE SAFE FOR REMOVAL BY MECHANICAL CONTRACTOR.
5. REMOVE EXISTING COMBINATION STARTER/DISCONNECT SERVING CHILLED WATER PUMP COMPLETELY. ALL EXISTING BRANCH CIRCUIT CONDUIT AND WIRE TO REMAIN FOR NEW WORK. REFER TO RENOVATION PLAN ON SHEET E2.0 FOR MORE INFORMATION.
6. EXISTING N3R/400/3/NF/600V DISCONNECT FOR TEMPORARY CHILLER.
7. PROVIDE 3 #250 KCMIL CU, 1 #4 CU E.G. IN 2-1/2"C FOR TEMPORARY CONNECTION TO CHILLER.
8. MAKE CONNECTIONS TO TEMPORARY CHILLER AS REQUIRED.

GENERAL NOTES

1. CONTRACTOR SHALL PERFORM A SITE VISIT TO VERIFY EXISTING SYSTEMS AND CONDITIONS PRIOR TO SUBMITTING BID.
2. THE EXISTING CIRCUITRY ON THE PLANS IS SHOWN FOR REFERENCE ONLY AND WAS TAKEN FROM THE ORIGINAL CONSTRUCTION DOCUMENTS AND WHAT COULD BE DETERMINED FROM A SITE SURVEY. THE CONTRACTOR SHALL PROVIDE ALL CIRCUITRY WITHIN THE AREA UNDER CONSTRUCTION AS REQUIRED TO PROVIDE A FULLY FUNCTIONAL ELECTRICAL SYSTEM MEETING THE INTENTION OF THE PLANS. CONTRACTOR SHALL VERIFY THE ACCURACY OF EXISTING CONDITIONS, INCLUDING THE ACCURACY OF THE AS-BUILT CIRCUITRY INDICATED ON THE PLANS PRIOR TO SUBMITTING BID. NO ADDITIONAL COSTS FOR INACCURATE OR UNCONFIRMED EXISTING CONDITIONS WILL BE ACCEPTED.
3. CONTRACTOR MAY RE-USE EXISTING PANELBOARDS, CIRCUIT BREAKERS, TRANSFORMERS, SAFETY SWITCHES, ETC. ONLY WHERE INDICATED TO BE REUSED ON THE PLANS.
4. CONTRACTOR MAY RE-USE EXISTING CONDUIT, CONDUCTORS, FITTINGS, AND SUPPORTS, ETC. WHERE THESE ITEMS ARE SUPPORTED AND SECURED WITH STRAPS COMPLY WITH CURRENT NEC CODE AND THE REQUIREMENTS OF THE SPECIFICATIONS.
5. ITEMS TO BE DEMOLISHED, SUCH AS STARTERS, DISCONNECTS, JUNCTION BOXES, ETC. SHALL BE HANDED OVER TO THE OWNER TO BE KEPT AS SPARE INVENTORY OR REMOVED FROM SITE AT THE SOLE DISCRETION OF THE OWNER.

REVISIONS
△
△
△
△
△
△

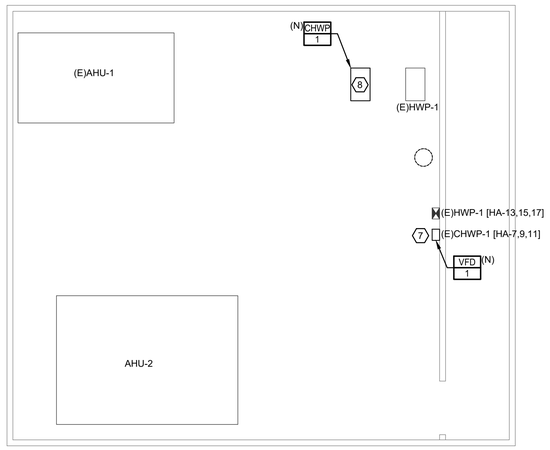
Advanced Systems Engineering, Inc.
Job No.14079.06DE
Manager: KCW
CADD: KCW
ASE
CA-8468
Project Engineer
David S. Bess
PE-51871
15505 Autorobbe Boulevard, Suite 330, Clearwater, FL 33762 • Office: 727.540.9398 • Facsimile: 727.540.9376

ELECTRICAL CHILER YARD DEMOLITION PLAN

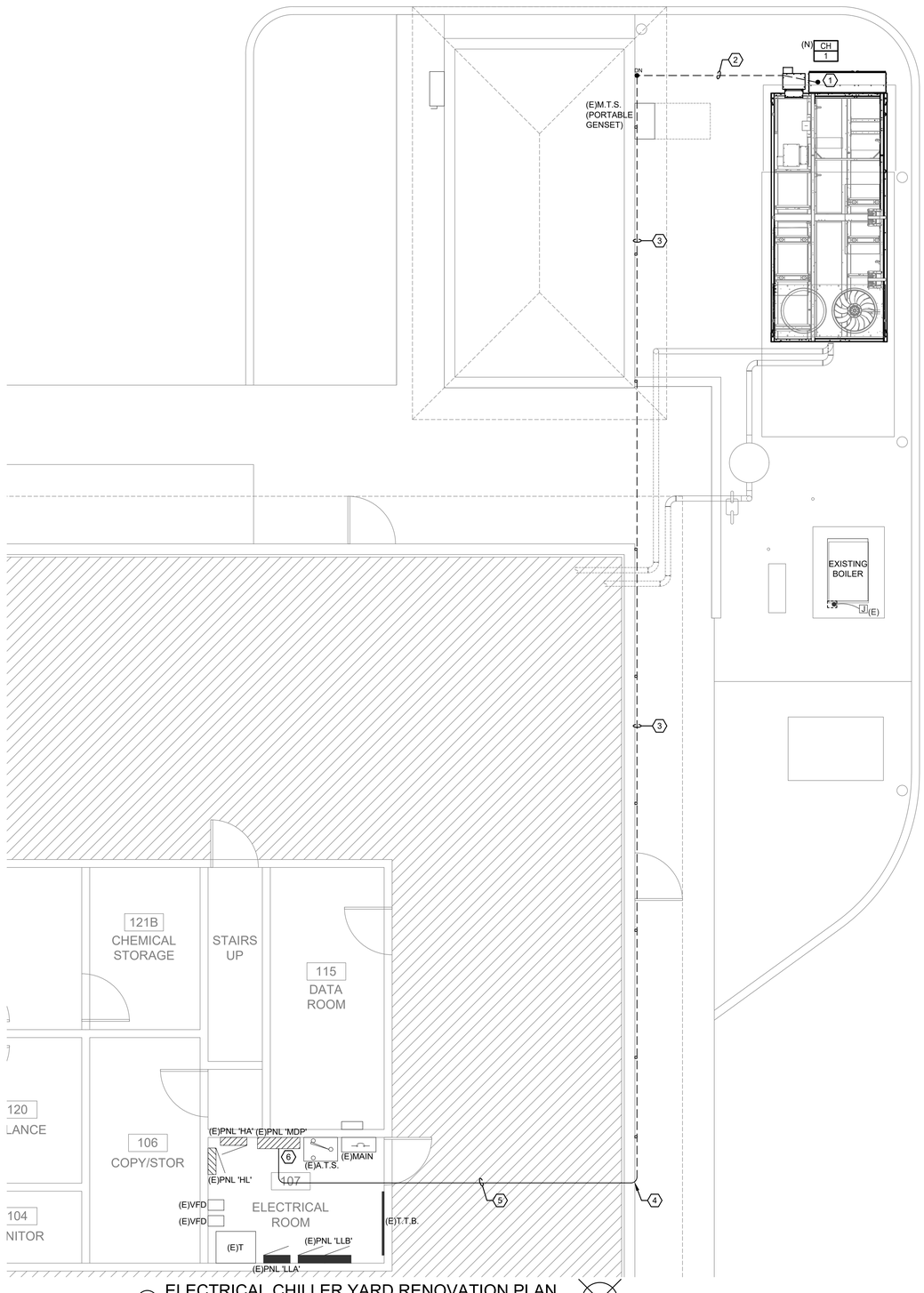
MANATEE COUNTY - WATER TREATMENT LAB
CHILLER & EXHAUST FAN REPLACEMENT
4751 65th STREET WEST
BRADENTON, FL 34210

JOB NO: 14079.06DE
PROJ. MNGR: KCW
DRAWN BY: KCW
ISSUE DATE: 07.24.2017

SHEET NUMBER
CH-E1.0
BID SET



1 ELECTRICAL MECHANICAL ROOM RENOVATION PLAN
SCALE: 1/4"=1'-0"



2 ELECTRICAL CHILLER YARD RENOVATION PLAN
SCALE: 1/4"=1'-0"

ELECTRICAL NOTES

1. PROVIDE MINIMUM OF A 24" FLEXIBLE SEALTIGHT CONNECTION TO CHILLER CONTROL PANEL AND PROVIDE FINAL CONNECTION TO CHILLER. COORDINATE EXACT STUB UP AND CONNECTION POINT WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN. CHILLER TO BE PROVIDED WITH INTEGRAL DISCONNECT IN CONTROL PANEL.
2. 3 #350 KCMIL CU AND 1 #4 CU E.G. IN 2-1/2"C. ROUTED EXPOSED ABOVE GROUND. MOUNT CONDUIT TO GROUND WITH ALUMINUM UNISTRUT AND UNISTRUT STYLE STRAPS. PROVIDE ALUMINUM RIGID CONDUIT AND MALLEABLE IRON "LB" FITTINGS ALL FOR EXPOSED EXTERIOR CONDUIT.
3. 3 #350 KCMIL CU AND 1 #4 CU E.G. IN 2-1/2"C. ROUTE CONDUIT AND WIRE OVERHEAD TIGHT TO BOTTOM OF ROOF OVERHANG AND SUPPORT FROM WALL WITH ALUMINUM UNISTRUT AND STRUT STYLE STRAPS.
4. PENETRATE WALL ABOVE EXISTING ACCESSIBLE CEILING SPACE. CONTRACTOR SHALL MAKE A WEATHRPROOF SEAL AT PENETRATION POINT.
5. 3 #350 KCMIL CU AND 1 #4 CU E.G. IN 2-1/2"C. ROUTE CONDUIT AND WIRE OVERHEAD ABOVE ACCESSIBLE CEILING SPACE AND SUPPORT FROM STRUCTURE.
6. PROVIDE NEW 350A, 3 POLE BREAKER IN EXISTING SQUARE D., I-LINE, 600 AMP, 277/480 VOLT, 3 PHASE, 4 WIRE, PANELBOARD. NEW BREAKER SHALL MATCH EXISTING BREAKER STYLE AND A.I.C. RATING. CONTRACTOR SHALL PROVIDE ALL NECESSARY BREAKER MOUNTING HARDWARE AND ADDITIONAL BLANK PLATES AS REQUIRED. REFER TO PANEL SCHEDULES ON SHEET E3.0 FOR MORE INFORMATION.
7. NEW VARIABLE FREQUENCY DRIVE (VFD) WITH INTEGRAL DISCONNECT FURNISHED BY MECHANICAL CONTRACTOR. INSTALLATION AND ALL FINAL LINE VOLTAGE CONNECTIONS BY ELECTRICAL CONTRACTOR. CONNECT NEW VFD TO EXISTING BRANCH CIRCUIT CONDUIT AND WIRE SERVING CHILLED WATER PUMP.
8. PROVIDE MINIMUM OF 24" FLEXIBLE CONNECTIONS TO NEW PUMP. ELECTRICAL CONTRACTOR SHALL EXTEND EXISTING BRANCH CIRCUIT CONDUIT AND WIRE AS REQUIRED.

GENERAL NOTES

1. ELECTRICIAN SHALL PERFORM A SITE VISIT TO VERIFY EXISTING SYSTEMS AND CONDITIONS PRIOR TO SUBMITTING BID.
2. THE EXISTING CIRCUITRY ON THE PLANS IS SHOWN FOR REFERENCE ONLY AND WAS TAKEN FROM THE ORIGINAL CONSTRUCTION DOCUMENTS AND WHAT COULD BE DETERMINED FROM A SITE SURVEY. THE ELECTRICIAN SHALL PROVIDE ALL CIRCUITRY WITHIN THE AREA UNDER CONSTRUCTION AS REQUIRED TO PROVIDE A FULLY FUNCTIONAL ELECTRICAL SYSTEM MEETING THE INTENTION OF THE PLANS. ELECTRICIAN SHALL VERIFY THE ACCURACY OF EXISTING CONDITIONS, INCLUDING THE ACCURACY OF THE AS-BUILT CIRCUITRY INDICATED ON THE PLANS PRIOR TO SUBMITTING BID. NO ADDITIONAL COSTS FOR INACCURATE OR UNCONFIRMED EXISTING CONDITIONS WILL BE ACCEPTED.
3. ELECTRICIAN MAY RE-USE EXISTING PANELBOARDS, CIRCUIT BREAKERS, TRANSFORMERS, SAFETY SWITCHES, ETC. ONLY WHERE INDICATED TO BE REUSED ON THE PLANS.
4. ELECTRICIAN MAY RE-USE EXISTING CONDUIT, CONDUCTORS, FITTINGS, SUPPORTS, ETC. WHERE THESE ITEMS COMPLY WITH CURRENT CODE AND THE REQUIREMENTS OF THE SPECIFICATIONS.
5. AT PROJECT COMPLETION ELECTRICAL CONTRACTOR SHALL REDLINE DRAWINGS TO DOCUMENT INSTALLED CONDITIONS AND POINT OUT DISCREPANCIES IN INDICATED "AS-BUILT" CONDITIONS.
6. ELECTRICAL CONTRACTOR SHALL PROVIDE CIRCUIT IDENTIFICATION LABEL ON NEW DEVICES AS PER SPECIFICATIONS. LABEL SHALL INCLUDE SOURCE PANEL AND CIRCUIT NUMBER. REFER TO ELECTRICAL SPECIFICATIONS FOR MORE INFORMATION.

REVISIONS

Advanced Systems Engineering, Inc.
ASE
Job No.14079.06DE
Manager: KCW
CADD: KCW
CA-8468
Project Engineer
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PE-51871
15505 Automobile Boulevard, Suite 330, Clearwater, FL 33762 • Office: 727.540.9396 • Facsimile: 727.540.9376

ELECTRICAL CHILLER YARD RENOVATION PLAN
MANATEE COUNTY - WATER TREATMENT LAB
CHILLER & EXHAUST FAN REPLACEMENT
4751 65th STREET WEST
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JOB NO:	14079.06DE
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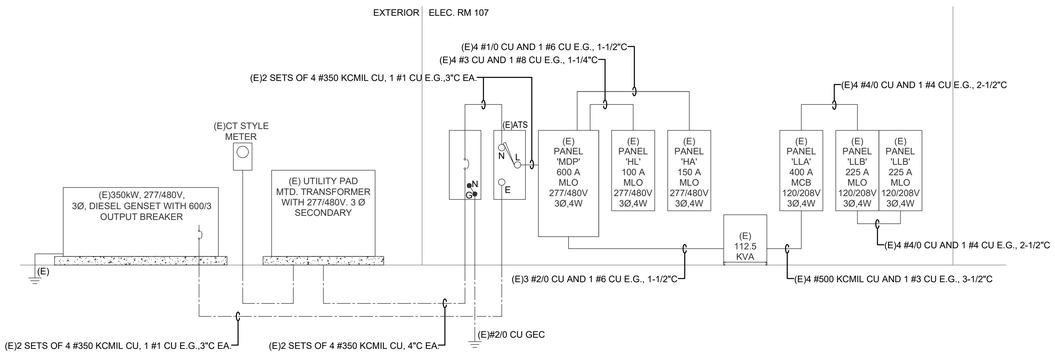

1 PARTIAL ELECTRICAL RISER DIAGRAM

SCALE: NO SCALE

NOTE: RISER DIAGRAM SHOWN FOR REFERENCE ONLY. NO WORK TO EXISTING ELECTRICAL SERVICE IS PART OF THIS SCOPE OF WORK.

PANEL: 'MDP' (RENO.) — ACCESSORIES: EXIST. SQUARE D I-LINE PNLBRD (HCM)

VOLTAGE: 480 /Y277 PHASE: 3 — MOUNTING: SURFACE
AMPS: 600 AMP MLO WIRE: 4 — NEMA 1 AIC: 35,000

LOAD (KVA) LTG	REC	MISC	COOL	HEAT	MTR	AMPS	POLE	LOAD DESCRIPTION	CKT	A	B	C	CKT	LOAD DESCRIPTION	AMPS	POLE	LOAD (KVA) LTG	REC	MISC	COOL	HEAT	MTR
						100	3	PANEL 'HL' (1)	1				2	**CHILLER CH-1 (3)(4)**	**350**	**3**						
						--	-	----------	3				4	----------	--	-						
						--	-	----------	5				6	----------	--	-						
						150	3	PANEL 'HA' (1)	7				8	----------	--	-						
						--	-	----------	9				10	**1.5" SPACE**	--	-						
						--	-	----------	11				12	**1.5" SPACE**	--	-						
						125	3	PANEL 'LLC' (1)	13				14	**TRANSFORMER T1 (2)**	**175**	**3**						
						--	-	----------	15				16	----------	--	-						
						--	-	----------	17				18	----------	--	-						
						125	3	UPS (1)	19				20	**TVSS (2)**	**60**	**3**						
						--	-	----------	21				22	----------	--	-						
						--	-	----------	23				24	----------	--	-						
								1.5" SPACE	25				26	**TEMP CHILLER (2)**	**250**	**3**						
								1.5" SPACE	27				28	----------	--	-						
								1.5" SPACE	29				30	----------	--	-						

CONNECTED LOAD SUMMARY (KVA)

	A	B	C	TOTALS	D.F.
LTG	0.0	0.0	0.0	0.0	
REC	0.0	0.0	0.0	0.0	
MISC	0.0	0.0	0.0	0.0	
COOL	0.0	0.0	0.0	0.0	
HEAT	0.0	0.0	0.0	0.0	
MTR	0.0	0.0	0.0	0.0	

DEMAND LOAD SUMMARY

COMMENTS	LOAD
	0.0 KVA
	0.0 KVA
	0.0 KVA
	0.0 KVA
	0.0 KVA
	0.0 KVA

CONNECTED LOAD PER PHASE

PHASE A 0.0 KVA **0.0 AMPS**
PHASE B 0.0 KVA **0.0 AMPS**
PHASE C 0.0 KVA **0.0 AMPS**

Breaker Notes ( ):
1. EXISTING BREAKER, EXISTING WIRE
2. EXISTING BREAKER TO BE RELOCATED
3. NEW BREAKER, NEW WIRE
4. NEW BREAKER REQUIRES 6" OF MOUNTING SPACE
5.
6.

DEMAND LOAD: 0.0 KVA

REFER TO LOAD SUMMARY

DEMAND CURRENT: **0.0 AMPS**

BUILDING LOAD SUMMARY

EXISTING 1-YEAR PEAK DEMAND (IN KW)	159.0 KW
POWER FACTOR CORRECTION	0.9
EXISTING 1-YEAR PEAK DEMAND (IN KVA)	176.7 KVA
125% OF EXISTING 1-YEAR PEAK DEMAND	220.8 KVA
LESS LOADS REMOVED	-121.3 KVA
PLUS LOADS ADDED	151.4 KVA
TOTAL	250.9 KVA
AMPERES 480 V, 3 PHASE	301.8 Amps

PANEL: 'MDP' (EXIST.) — ACCESSORIES: EXIST. SQUARE D I-LINE PNLBRD (HCM)

VOLTAGE: 480 /Y277 PHASE: 3 — MOUNTING: SURFACE
AMPS: 600 AMP MLO WIRE: 4 — NEMA 1 AIC: 35,000

LOAD (KVA) LTG	REC	MISC	COOL	HEAT	MTR	AMPS	POLE	LOAD DESCRIPTION	CKT	A	B	C	CKT	LOAD DESCRIPTION	AMPS	POLE	LOAD (KVA) LTG	REC	MISC	COOL	HEAT	MTR
						100	3	PANEL 'HL' (1)	1				2	CHILLER CH-1	250	3						
						--	-	----------	3				4	----------	--	-						
						--	-	----------	5				6	----------	--	-						
						150	3	PANEL 'HA' (1)	7				8	TRANSFORMER T1 (3)	175	3						
						--	-	----------	9				10	----------	--	-						
						--	-	----------	11				12	----------	--	-						
						125	3	PANEL 'LLC' (1)	13				14	TVSS (3)	60	3						
						--	-	----------	15				16	----------	--	-						
						--	-	----------	17				18	----------	--	-						
						125	3	UPS (1)	19				20	TEMP CHILLER (3)	250	3						
						--	-	----------	21				22	----------	--	-						
						--	-	----------	23				24	----------	--	-						
								1.5" SPACE	25				26	1.5" SPACE								
								1.5" SPACE	27				28	1.5" SPACE								
								1.5" SPACE	29				30	1.5" SPACE								

CONNECTED LOAD SUMMARY (KVA)

	A	B	C	TOTALS	D.F.
LTG	0.0	0.0	0.0	0.0	
REC	0.0	0.0	0.0	0.0	
MISC	0.0	0.0	0.0	0.0	
COOL	0.0	0.0	0.0	0.0	
HEAT	0.0	0.0	0.0	0.0	
MTR	0.0	0.0	0.0	0.0	

DEMAND LOAD SUMMARY

COMMENTS	LOAD
	0.0 KVA
	0.0 KVA
	0.0 KVA
	0.0 KVA
	0.0 KVA
	0.0 KVA

CONNECTED LOAD PER PHASE

PHASE A 0.0 KVA **0.0 AMPS**
PHASE B 0.0 KVA **0.0 AMPS**
PHASE C 0.0 KVA **0.0 AMPS**

Breaker Notes ( ):
1. EXISTING BREAKER, EXISTING WIRE
2. EXISTING BREAKER TO BE REMOVED
3. EXISTING BREAKER TO BE RELOCATED
4.
5.
6.

DEMAND LOAD: 0.0 KVA

REFER TO LOAD SUMMARY

DEMAND CURRENT: **0.0 AMPS**

PANEL: 'HA' (EXISTING) — ACCESSORIES: EXISTING SQUARE D NF PNLBRD

VOLTAGE: 480 /Y277 PHASE: 3 — MOUNTING: SURFACE
AMPS: 150 AMP MLO WIRE: 4 — NEMA 1 AIC: 35,000

LOAD (KVA) LTG	REC	MISC	COOL	HEAT	MTR	AMPS	POLE	LOAD DESCRIPTION	CKT	A	B	C	CKT	LOAD DESCRIPTION	AMPS	POLE	LOAD (KVA) LTG	REC	MISC	COOL	HEAT	MTR
		4.0				20	3	WATER HEATER (1)	1				2	LEF-1 (1)	30	3						3.9
		4.0				--	-	----------	3				4	----------	--	-						3.9
		4.0				--	-	----------	5				6	----------	--	-						3.9
					3.9	30	3	CWP-1 (1)	7				8	LEF-2 (1)	30	3						3.9
					3.9	--	-	----------	9				10	----------	--	-						3.9
					3.9	--	-	----------	11				12	----------	--	-						3.9
					0.9	15	3	HWP-1 (1)	13				14	AHU-1 (1)	15	3				0.7		
					0.9	--	-	----------	15				16	----------	--	-				0.7		
					0.9	--	-	----------	17				18	----------	--	-				0.7		
						20	3	TVSS (1)	19				20	AHU-2 (1)	40	3				5.8		
						--	-	----------	21				22	----------	--	-				5.8		
						--	-	----------	23				24	----------	--	-				5.8		
					2.1	30	3	LIFT STATION (1)	25				26	SPACE								
					2.1	--	-	----------	27				28	SPACE								
					2.1	--	-	----------	29				30	SPACE								
								SPACE	31				32	SPACE								
								SPACE	33				34	SPACE								
								SPACE	35				36	SPACE								
								SPACE	37				38	SPACE								
								SPACE	39				40	SPACE								
								SPACE	41				42	SPACE								

CONNECTED LOAD SUMMARY (KVA)

	A	B	C	TOTALS	D.F.
LTG	0.0	0.0	0.0	0.0	
REC	0.0	0.0	0.0	0.0	
MISC	4.0	4.0	4.0	12.0	1.00
COOL	6.5	6.5	6.5	19.6	1.00
HEAT	0.0	0.0	0.0	0.0	
MTR	14.7	14.7	14.7	44.1	1.07

DEMAND LOAD SUMMARY

COMMENTS	LOAD
	0.0 KVA
	0.0 KVA
	12.0 KVA
	19.6 KVA
	0.0 KVA
	47.0 KVA
125% OF LARGEST MOTOR PLUS 100% OF REMAINDER	

CONNECTED LOAD PER PHASE

PHASE A 25.2 KVA **91.1 AMPS**
PHASE B 25.2 KVA **91.1 AMPS**
PHASE C 25.2 KVA **91.1 AMPS**

Breaker Notes ( ):
1.
2.
3.
4.
5.
6.

DEMAND LOAD: 78.6 KVA

DEMAND CURRENT: **94.6 AMPS**

REVISIONS

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6	

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ELECTRICAL RISER DIAGRAM & SCHEDULES

MANATEE COUNTY - WATER TREATMENT LAB

CHILLER & EXHAUST FAN REPLACEMENT

4751 65th STREET WEST
BRADENTON, FL 34210

JOB NO: 14079.06DE
PROJ. MNGR: KCW
DRAWN BY: KCW
ISSUE DATE: 07.24.2017

SHEET NUMBER
CH-E3.0
BID SET

DIVISION 16000 ELECTRICAL SPECIFICATIONS

SECTION 16010
GENERAL PROVISIONS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish all labor, materials, and equipment as required by the plans and specifications to provide a complete and operable electrical system. This specification describes the types of materials, methods, and management to be utilized. This includes the work listed in this division as well as equipment furnished under other divisions not specifically mentioned herein.

1.02 CODES AND STANDARDS

A. All equipment, materials, and methods of design and installation are to comply with the 2011 National Electrical Code (NEC), the Occupational Safety and Health Act (OSHA), and the requirements of applicable local codes. Codes and standards of the following organizations may be referred to in this section and shall be considered as the minimum acceptable. A reference herein to any portion of the standard or code is not to be considered as negating any other portion of the standard or code.

1. American Society for Testing & Materials (ASTM)
2. Institute of Electrical & Electronic Engineers (IEEE)
3. National Electrical Code (NEC), 2011 ed.
4. National Electric Manufacturers Association (NEMA)
5. Underwriters Laboratories, Inc. (UL)
6. Florida Building Code (FBC), 2014, 5th ed.
7. Florida Fire Prevention Code (Florida Specific edition of NFPA 101), 2010 ed.

1.03 EQUIPMENT, MATERIAL AND WORKMANSHIP

A. All equipment and material shall be new, free from defects, of current manufacture, and listed by Underwriters Laboratories, Inc., (UL) where UL requirements apply. All materials are to be products of reputable and experienced manufacturers. Similar items in the project are to be of the same manufacturer. Use only equipment and materials of commercial quality and durability, and capable of long, reliable, trouble free service.

B. Provide protection for materials and equipment against loss or damage throughout the contract. Provide protection from the effect of weather prior to installation, store items to be installed in indoor weather protected location.

C. Following installation, protect materials and equipment from corrosion, physical damage and effects of moisture on insulation.

D. Layout work carefully in advance.

E. Do not cut or notch any structural member or building surface without specific approval of the Structural Engineer. Carefully carry out any cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, paving, or other surfaces required for the installation, support, or anchorage of conduit, raceways, or other electrical equipment. Following such work, restore surfaces neatly to new conditions using skilled craftsmen of the trades involved at no additional cost to the Owner.

F. All work will be performed by accomplished, qualified and experienced personnel working under continuous competent supervision.

G. Contractor shall restore fire ratings of all rated assemblies penetrated with the appropriate assembly: WL-1001, CAJ-1045, WL-1049, WL-3214, WJ-1055, or WJ-3094 or equivalent.

1.04 PERMITS

A. Obtain and pay for all permits and inspections pertinent to the electrical installation.

1.05 SITE INSPECTION

A. Prior to submitting a bid, visit the project site and ascertain conditions affecting the proposed work and all existing electrical facilities.

B. Furnish all labor associated with accompanying Engineer during observations of construction.

1.06 SHOP DRAWINGS

A. Submit 6 copies of all project submittal data and shop drawings.

B. Submit complete shop drawings for review prior to purchase of the following:

1. Safety switches, and fuses.

1.07 RECORD DRAWINGS

A. Maintain a neatly marked set of record drawings showing installation location, and/or routing of conduits, depth of buried cables, pull boxes, junction boxes, and outlets. Mark this set to show current job progress and any deviation from the contract drawings. These drawings shall available upon request of the Engineer. After final inspection, transfer all record information to the Owner as required in the contract.

PART 2 - EXECUTION

2.01 INSTALLATION

A. The electrical plans show general arrangements and locations for equipment conduit, outlets, etc. Unless detailed or dimensioned, exact locations of conduit, routing of cables and placement of equipment will be governed by structural conditions, physical interference, and locations of electrical termination on equipment. Examine architectural, structural, and mechanical plans and shop drawings for the various equipment in order to determine exact routing and placement of all raceways, cables, and equipment, to assure a workable installation in accordance with NEC.

2.02 CLEAN-UP

A. Continuously remove debris, cuttings, crates, cartons, etc.

B. Before acceptance, carefully clean all cabinets, panels, boxes, wiring devices, cover plates, etc. Replace all damaged or blemished fixtures.

END OF SECTION

SECTION 16070
ELECTRICAL CONNECTIONS FOR EQUIPMENT

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide all labor, materials and equipment as required furnishing connections to all electrical equipment, lights, etc.

PART 2 - PRODUCTS

2.01 GENERAL

A. For each electrical connection indicated, provide complete assembly of materials, including but not necessarily limited to, raceways, conductors, cords caps, wiring devices, pressure connectors, terminals (lugs), electrical insulating tape, heat-shrinkable insulating tubing, cable ties, solderless wire nuts, and other items and accessories as needed to complete splices, terminations, and connections as required.

B. See Section 16111, Conduit Raceways; and Section 16120 Wire and Cables for additional requirements. Provide final connections for equipment consistent with the following:

1. Permanently installed fixed equipment - flexible seal-tite conduit from branch circuit terminal equipment, or raceway; to equipment, control cabinet, terminal junction box, or wiring terminals. Totally enclose all wiring in raceway.
2. Movable and/or portable equipment - wiring device, cord cap, and multi-conductor cord suitable for the equipment and in accordance with NEC requirements (Article 400).
3. Other methods as required by the National Electrical Code and/or as required by special equipment or field conditions.

PART 3 - EXECUTION

3.01 INSTALLATION OF ELECTRICAL CONNECTIONS

A. Make electrical connections in accordance with connector manufacturer's written instructions and with recognized industry practices, and complying with requirements of NEC and NECA's "Standard of Installation" to ensure that products fulfill requirements.

B. Connect electrical power supply conductors to equipment conductors in accordance with equipment manufacturer's written instructions and wiring diagrams.

C. Coordinate installation of electrical connections for equipment with equipment installer.

D. Verify all electrical loads (voltage, phase, full load amperes, number and point of connections, minimum circuit ampacity, etc.) for equipment furnished under other Sections of this specification, by reviewing respective shop drawings furnished under each section. Meet with each subcontractor who is responsible for furnishing equipment that requiring electrical service connection and review equipment electrical characteristics. Report any variances from electrical characteristics noted on the electrical drawings to the Engineer before proceeding with rough-in work.

E. Obtain and review the equipment shop drawings to determine particular final connection requirements before rough in begins for each equipment item.

F. Refer to basic materials and methods Section 16120, Conductors, for identification of electrical power supply conductor terminations.

END OF SECTION

SECTION 16111
CONDUIT RACEWAYS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish all labor, materials and equipment as required to install all flexible or rigid conduit, couplings, supports and nonmetallic ducts, as shown on the Plans.

PART 2 - PRODUCTS

2.01 MATERIALS

A. GENERAL: Provide conduit, and fittings of types, grades, sizes, and weights (wall thicknesses) as indicated; with minimum trade size of 1/2" above grade and 3/4" below grade.

B. Electrical Metallic Tubing (EMT) with zinc die cast or steel set screw fittings for dry and damp locations, compression fittings for wet locations.

C. RIGID METAL CONDUIT (RMC) with threaded fittings.

D. RIGID NON-METALLIC CONDUIT (RNC): Schedule 40, with matching glue on socket fittings.

E. FLEXIBLE METALLIC CONDUIT (FMC): Galvanized interlocked steel strip with cadmium plated steel or malleable iron fittings.

F. LIQUID-TIGHT FLEXIBLE METAL CONDUIT (LT): Provide liquid-tight, flexible metal conduit; constructed of single strip, flexible continuous, interlocked, and double-wrapped steel; galvanized inside and outside; coated with liquid-tight jacket of flexible polyvinyl chloride (PVC) with cadmium plated steel or malleable iron fittings and compression type steel ferrule and neoprene gasket sealing rings.

G. EXPANSION FITTINGS: OZ Type AX, or equivalent to suit application.

2.02 SCHEDULE OF LOCATIONS

A. RMC in all areas subject to physical damage to an elevation of 48" AFF/AFG.

B. EMT for all above grade areas in the building unless noted otherwise.

C. RNC for all areas below grade.

D. Make connections to motors and equipment with FMC and LT as environmental conditions dictate.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install conduit concealed in all areas where possible.

B. Coordinate installation of conduit in masonry work.

C. Do not install conduit larger than 2-1/2" in concrete slabs. Provide a minimum concrete cover over conduits of two inches, but not less than required to maintain any established fire ratings.

D. Plug ends of conduits to prevent entry of dirt or moisture.

E. Clean out conduit before installation of conductors.

F. Route all exposed conduits parallel or perpendicular to building lines.

G. Do not exceed number of bends in conduit beyond that allowed by the NEC.

H. Cut conduit with hacksaw or other approved pipe cutting tool and ream ends to clean out all burrs before connecting.

I. Keep conduits at least 12" away from gas lines and hot water pipes, and in no case permit conductors to reach higher than rated temperatures.

J. Fasten raceways securely in place. Firmly fasten conduit within three feet of each outlet, junction box, cabinet, or fitting. Support metallic conduit in accordance with the NEC. Use raceway fasteners designed for the purpose.

K. Provide pull boxes as shown on the plans, plus any such items required to assemble conduits and other raceways. Provide pull boxes as dictated by wire pulling requirements. Unless shown otherwise, face into secondary or unfinished rooms.

END OF SECTION

SECTION 16120
BUILDING WIRE AND CABLE

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish all labor, materials, and equipment as required to install all wires and cables as n the Plans, and as required to connect all electrical services and equipment.

1.02 RELATED WORK

A. Section 16000 - Electrical General Requirements

B. Section 16111 - Conduit

PART 2 - PRODUCTS

2.01 MATERIALS

A. All wiring shall be copper unless specifically noted otherwise on plans.

B. Minimum size conductors:

1. Branch circuits, # 12 AWG THHN/THWN.
2. Control circuits, # 14 AWG THHN/THWN.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Color coding shall be as follows:

Voltage	Phase A	Phase B	Phase C	Neutral
277/480	Brown	Orange	Yellow	Gray

B. Provide a green grounding conductor in all raceways except service entrance.

C. Provide conductors with identification tags as manufactured by Brady or approved equal.

D. Install wires and cables continuous without splices from source of supply to distribution equipment and from source of supply to motors, lighting, or power outlets. Do not use pull boxes for making splices. Do not install splices in conduits or trench.

E. Install all wiring in accordance with NEC.

END OF SECTION

SECTION 16130
PULL AND JUNCTION BOXES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Construct junction or pull boxes less than 100 cubic inches as "standard outlet boxes".

B. Provide all covers of same gauge metal and include screws.

PART 2 - PRODUCTS

2.01 STANDARD OUTLET BOXES

A. Make of material resistant to corrosion or suitably protected, both internally and externally by galvanizing.

B. Boxes installed in damp or wet locations shall be U.L. approved for the purpose.

C. Comply with U.L. Standard 50.

D. Metal boxes to meet NEC construction specifications.

E. Boxes exposed or surface mounted shall be die-cast or permanent-mold cast aluminum body with threaded external hub and cast cover.

F. Interior metal boxes shall be labeled with the circuits contained within. Labeling shall be by permanent black magic marker.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install junction boxes so that covers are readily accessible after the completion of the installation.

B. Mount rigidly in place with front of box level and plumb.

C. Secure flush covers with corrosion resistant screws or bolts.

D. Provide each pull box with sufficient clamps to which cables shall be secured in neat and orderly fashion permitting ready identification.

E. Mount pull boxes connected to concealed conduits with covers flush with the finished wall.

END OF SECTION

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION	MOUNTING
	DISCONNECT SWITCH. NEMA/AMPERAGE/POLE/FUSE/VOLTAGE. PROVIDE NEMA 1, 600V UON.	AS NOTED.
	MOTOR CONNECTION OR EXHAUST FAN.	BY OTHERS.
J J	JUNCTION BOX OR OUTLET BOX.	AS NOTED.
	DRIVEN GROUND ROD.	AS NOTED.
	CONDUIT CONCEALED IN WALL OR CEILING.	SEE SPECIFICATIONS.
	CONDUIT CONCEALED IN SLAB OR UNDERGROUND.	SEE SPECIFICATIONS.
	CONDUIT EXPOSED ON WALL OR CEILING.	SEE SPECIFICATIONS.
#2	PHASE,NEUTRAL,EQUIPMENT GROUND, AND ISOLATED GROUND. ALL HOMERUNS SHALL BE 1/2" WITH 3 #12 UON.	
	480Y/277V PANELBOARD.	78" AFF TO TOP.
	208Y/120V OR 240/120V PANELBOARD.	78" AFF TO TOP.
	REFER TO KEYED NOTES.	
FACP	FIRE ALARM CONTROL PANEL.	78" AFF TO TOP.
FAA	FIRE ALARM ANNUNCIATOR PANEL.	66" AFF TO TOP.
P	FIRE ALARM SYSTEM SMOKE DETECTOR.	CEILING UON.
	FIRE ALARM SYSTEM DUCT TYPE SMOKE DETECTOR.	IN RETURN DUCT UON.
P	FIRE ALARM SYSTEM PULL STATION.	48" AFF TO CENTERLINE UON.
	FIRE ALARM SYSTEM STROBE.	80" AFF TO BOTTOM OR 6" BELOW CEILING.
	FIRE ALARM SYSTEM HORN/STROBE.	80" AFF TO BOTTOM OR 6" BELOW CEILING.
G	FIRE ALARM SYSTEM BELL.	96" AFF TO TOP UON.
T	TAMPER SWITCH.	FIELD COORDINATE.
F	FLOW SWITCH.	FIELD COORDINATE.
M	FIRE ALARM MONITORING MODULE	FIELD COORDINATE.
R	FAN SHUTDOWN RELAY.	FIELD COORDINATE.

ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR	HID	HIGH INTENSITY DISCHARGE
AFG	ABOVE FINISHED GRADE	HP	HORSEPOWER
C	CONDUIT	N	NEW
CLG	CEILING MOUNTED	NF	NON-FUSED
D	DEMOLISHED	NL	NIGHT LIGHT
E	EXISTING	NP	NAMEPLATE
EC	ELECTRICAL CONTRACTOR	PNL	PANEL
EG	EQUIPMENT GROUND	R	RELOCATED
EWC	ELECTRIC WATER COOLER	TTB/C	TELEPHONE TERMINAL BOARD/CABINET
EWH	ELECTRIC WATER HEATER	UON	UNLESS OTHERWISE NOTED
GEC	GROUNDING ELECTRODE CONDUCTOR	WP	WEATHERPROOF
GFI	GROUND FAULT INTERRUPTER	WPI	WEATHERPROOF WHILE IN USE

GENERAL PROJECT NOTES

1. CONTRACTOR SHALL PERFORM A SITE VISIT TO VERIFY EXISTING SYSTEMS AND CONDITIONS PRIOR TO SUBMITTING BID.
2. THE EXISTING CIRCUITRY ON THE PLANS IS SHOWN FOR REFERENCE ONLY AND WAS TAKEN FROM THE ORIGINAL CONSTRUCTION DOCUMENTS. THE CONTRACTOR SHALL PROVIDE ALL CIRCUITRY WITHIN THE AREA UNDER CONSTRUCTION AS REQUIRED TO PROVIDE A FULLY FUNCTIONAL ELECTRICAL SYSTEM MEETING THE INTENTION OF THE PLANS AND SPECIFICATIONS. CONTRACTOR SHALL VERIFY THE ACCURACY OF EXISTING CONDITIONS, INCLUDING THE ACCURACY OF THE AS-BUILT CIRCUITRY INDICATED ON THE PLANS PRIOR TO SUBMITTING BID. NO ADDITIONAL COSTS FOR INACCURATE OR UNCONFIRMED EXISTING CONDITIONS WILL BE ACCEPTED.
3. CONTRACTOR MAY RE-USE EXISTING PANELBOARDS, CIRCUIT BREAKERS, TRANSFORMERS, SAFETY SWITCHES, ETC. ONLY WHERE INDICATED TO BE REUSED ON THE PLANS.
4. CONTRACTOR MAY RE-USE EXISTING CONDUIT, CONDUCTORS, FITTINGS, SUPPORTS, ETC. WHERE THESE ITEMS COMPLY WITH CURRENT CODE AND THE REQUIREMENTS OF THE SPECIFICATIONS.
5. CONTRACTOR SHALL VERIFY THE PRESCENCE OF EXISTING SPARES AND SPACES IN THE PANELBOARDS UNDER THIS SCOPE OF WORK. CONTRACTOR SHALL PROVIDE ALL NECESSARY NEW BREAKERS TO FACILITATE THE ELECTRICAL INSTALLATION WHETHER SHOWN ON THE PLANS OR NOT. ANY CONFLICTS BETWEEN THE ELECTRICAL PLANS AND SITE CONDITIONS SHALL BE DOCUMENTED ON THE AS-BUILT PLANS.
6. ITEMS TO BE DEMOLISHED, SUCH AS DISCONNECTS, TRANSFORMERS, ETC. SHALL BE HANDED OVER TO THE OWNER TO BE KEPT AS SPARE INVENTORY OR REMOVED FROM SITE AT THE SOLE DISCRETION OF THE OWNER.
7. ANY MECHANICAL EQUIPMENT TO BE DEMOLISHED OR RELOCATED SHALL BE COORDINATED WITH THE MECHANICAL PLANS AND MECHANICAL CONTRACTOR PRIOR TO REMOVAL.
8. CONTRACTOR IS RESPONSIBLE FOR REVIEWING THE MECHANICAL PLANS. ADDITIONAL WORK NOT SHOWN ON THE ELECTRICAL PLANS MAY BE REQUIRED BY THE CONTRACTOR IN ORDER TO ASSIST THE WORK OF OTHER TRADES. ANY SUCH WORK SHALL BE COMPLETED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
9. CONTRACTOR SHALL MAINTAIN EXISTING DOWNSTREAM CIRCUITRY FOR DEVICES AND EQUIPMENT TO REMAIN. WHERE DEMOLITION WORK IS BEING PERFORMED THAT WOULD DISRUPT SERVICE, THE CONTRACTOR SHALL EXTEND OR REPLACE FEEDERS OR BRANCH CIRCUITS AS REQUIRED AT NO ADDITIONAL COST TO THE OWNER.
10. ALL FIRE ALARM DEVICES SHALL CONFORM TO BUILDING STANDARDS. NEW NOTIFICATION DEVICES ARE TO BE INTEGRATEDINTO THE EXISTING FIRE ALARM SYSTEM. PROVIDE SIGNAL EXPANDER IF REQUIRED TO ACCOMMODATE NEW DEVICES. UPON COMPLETION OF WORK, THE FIRE ALARM SYSTEM SHALL BE CERTIFIED BY MANUFACTURER. CONTRACTOR SHALL OBTAIN A SEPARATE PERMIT FOR ALL WORK ASSOCIATED WITH THE FIRE ALARM SYSTEM.

REVISIONS

Advanced Systems Engineering, Inc.
ASE
CA-8468
Job No.14079.06DE
Manager: KCW
CADD: KCW
Project Engineer
David S. Bess
PE-51871
15505 Autenoble Boulevard, Suite 330, Clearwater, FL 33762 • Office: 727.540.9396 • Facsimile: 727.540.9376

ELECTRICAL LEGEND, SPECIFICATIONS & GEN. PROJECT NOTES

MANATEE COUNTY - WATER TREATMENT LAB
CHILLER & EXHAUST FAN REPLACEMENT
4751 65th STREET WEST
BRADENTON, FL 34210

JOB NO: 14079.06DE
PROJ. MNGR: KCW
DRAWN BY: KCW
ISSUE DATE: 07.24.2017

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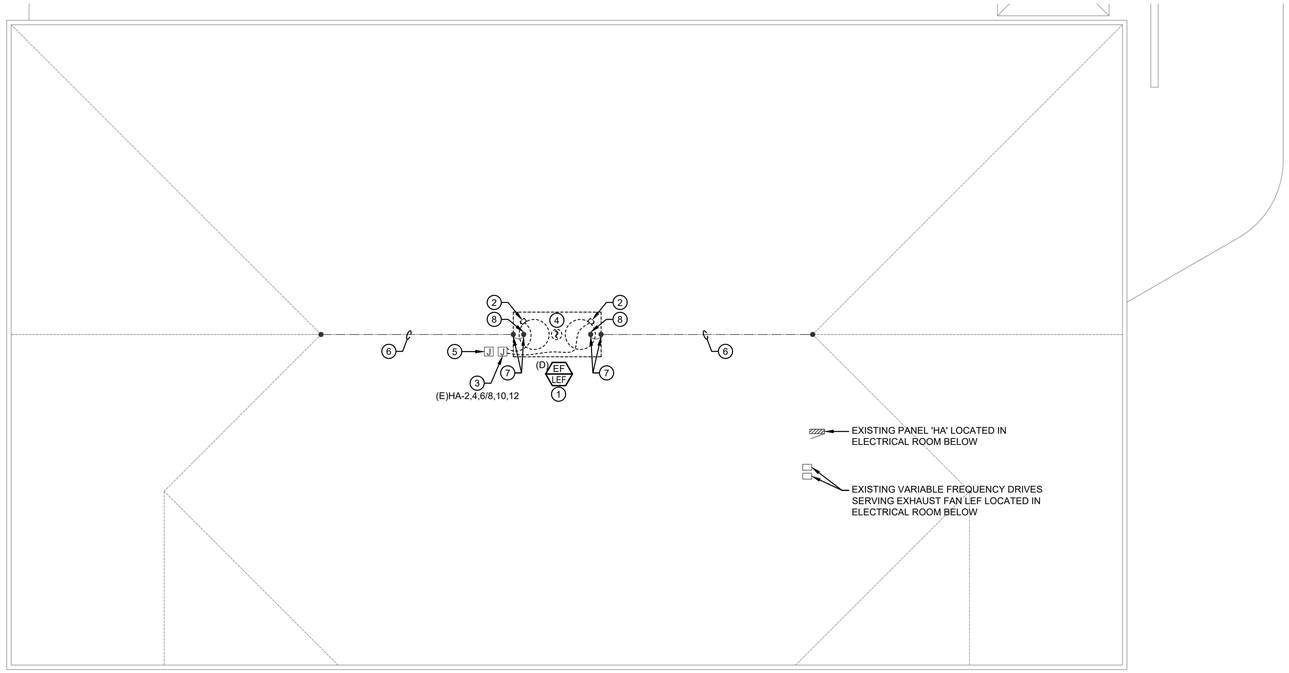

1 ELECTRICAL DEMOLITION PLAN
SCALE: 1/8"=1'-0"

1 ELECTRICAL RENOVATION PLAN
SCALE: 1/8"=1'-0"

ELECTRICAL DEMOLITION NOTES

1. EXISTING MECHANICAL EQUIPMENT TO BE REMOVED IN ITS ENTIRETY BY MECHANICAL CONTRACTOR AND REPLACED IN PLACE WITH SAME SIZE UNIT. ELECTRICAL CONTRACTOR SHALL DISCONNECT ALL LINE AND LOW VOLTAGE CONNECTIONS TO FACILITATE THE REMOVAL OF MECHANICAL EQUIPMENT. LOW VOLTAGE CONNECTIONS TO BE REMOVED SHALL INCLUDE BUILDING MANAGEMENT SYSTEM, FIRE ALARM, ETC.
2. REMOVE EXISTING DISCONNECT SERVING EXISTING MECHANICAL EQUIPMENT TO BE REMOVED IN ITS ENTIRETY. REMOVE ALL EXISTING SURFACE MOUNTED WEATHERPROOF POWER CONNECTIONS IN THEIR ENTIRETY BACK TO SOURCE JUNCTION BOX.
3. EXISTING NEMA 3R JUNCTION BOX FOR POWER TO REMAIN.
4. REMOVE EXISTING FIRE ALARM SMOKE DETECTOR TO FACILITATE THE REMOVAL OF MECHANICAL EQUIPMENT. ELECTRICAL CONTRACTOR SHALL TEMPORARILY SUSPEND/SUPPORT EXISTING FIRE ALARM DEVICE AS REQUIRED UNTIL NEW EXHAUST FAN IS INSTALLED.
5. EXISTING NEMA 3R JUNCTION BOX FOR CONTROLS TO REMAIN.
6. EXISTING LIGHTNING PROTECTION CABLE TO REMAIN. CONTRACTOR TO TAKE CARE TO NOT DAMAGE CABLE DURING REMOVAL OF MECHANICAL EQUIPMENT.
7. EXISTING LIGHTNING PROTECTION CABLE CONNECTED TO EXISTING MECHANICAL EQUIPMENT TO BE REMOVED TO FACILITATE THE EQUIPMENTS REMOVAL. REMOVE LIGHTNING PROTECTION CABLE TO NEAREST SPLICE POINT. CONTRACTOR TO RETAIN EXISTING LIGHTNING PROTECTION CABLE FOR RE-USE ON NEW MECHANICAL EQUIPMENT. REFER TO RENOVATION PLAN ON THIS SHEET FOR NEW WORK.
8. EXISTING LIGHTNING PROTECTION ARIEL ROD CONNECTED TO EXISTING MECHANICAL EQUIPMENT TO BE REMOVED TO FACILITATE THE EQUIPMENTS REMOVAL. CONTRACTOR TO RETAIN EXISTING ARIEL RODS FOR RE-USE ON NEW MECHANICAL EQUIPMENT. REFER TO RENOVATION PLAN ON THIS SHEET FOR NEW WORK.

ELECTRICAL RENOVATION NOTES

1. NEW DISCONNECT TO BE FURNISHED WITH MECHANICAL EQUIPMENT. ELECTRICAL SHALL MOUNT AND PROVIDE ALL NEW WIRING TO DISCONNECT AND MAKE FINAL CONNECTIONS TO NEW MECHANICAL EQUIPMENT. PROVIDE 3 #12 CU AND 1 #12 CU E.G. IN 1/2" C. ALL NEW WIRING TO BE IN WEATHER PROOF FLEXIBLE CONDUIT. CONTRACTOR SHALL PROVIDE LABELING ON DISCONNECT THAT STATES "CAUTION-DAMAGE TO DRIVE MAY OCCUR IF CIRCUIT IS OPENED WHILE IN USE". LABELING TO BE BLACK LETTERS ON YELLOW BACKGROUND.
2. EXISTING NEMA 3R JUNCTION BOX FOR POWER. EXTEND EXISTING CIRCUITRY TO NEW DISCONNECTS AS REQUIRED.
3. REINSTALL EXISTING FIRE ALARM SMOKE DETECTOR IN NEW MECHANICAL EQUIPMENT. COORDINATE EXACT LOCATION WITH MECHANICAL CONTRACTOR.
4. EXISTING NEMA 3R JUNCTION BOX FOR CONTROLS. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL NEW CONDUIT FOR CONTROLS AS REQUIRED. ALL NEW CONTROL CONDUIT SHALL BE IN WEATHER PROOF FLEXIBLE CONDUIT. ALL LOW VOLTAGE WIRE/CABLE TO BE PROVIDED AND TERMINATED BY MECHANICAL CONTRACTOR. COORDINATE EXACT REQUIREMENTS WITH MECHANICAL CONTRACTOR.
5. EXISTING LIGHTNING PROTECTION SYSTEM MAIN CABLE.
6. LOCATION OF RELOCATED LIGHTNING PROTECTION ARIEL ROD. MOUNT TO NEW ROOF MOUNTED MECHANICAL EQUIPMENT AS REQUIRED. CONTRACTOR SHALL PROVIDE ALL NECESSARY HARDWARE NEEDED TO MOUNT EXISTING ROD TO NEW MECHANICAL EQUIPMENT.
7. BOND NEW MECHANICAL EQUIPMENT TO EXISTING LIGHTNING PROTECTION SYSTEM UTILIZING EXISTING LIGHTNING PROTECTION SYSTEM CABLING MADE AVAILABLE BY DEMOLITION. PROVIDE NEW LIGHTNING PROTECTION CONNECTION POINTS TO MATCH EXISTING MAIN LIGHTNING PROTECTION SYSTEM. BOND AT CLOSEST POINT TO EXISTING LIGHTNING PROTECTION SYSTEM.

GENERAL NOTES

1. CONTRACTOR SHALL PERFORM A SITE VISIT TO VERIFY EXISTING SYSTEMS AND CONDITIONS PRIOR TO SUBMITTING BID.
2. THE EXISTING CIRCUITRY ON THE PLANS IS SHOWN FOR REFERENCE ONLY AND WAS TAKEN FROM THE ORIGINAL CONSTRUCTION DOCUMENTS AND WHAT COULD BE DETERMINED FROM A SITE SURVEY. THE CONTRACTOR SHALL PROVIDE ALL CIRCUITRY WITHIN THE AREA UNDER CONSTRUCTION AS REQUIRED TO PROVIDE A FULLY FUNCTIONAL ELECTRICAL SYSTEM MEETING THE INTENTION OF THE PLANS. CONTRACTOR SHALL VERIFY THE ACCURACY OF EXISTING CONDITIONS, INCLUDING THE ACCURACY OF THE AS-BUILT CIRCUITRY INDICATED ON THE PLANS PRIOR TO SUBMITTING BID. NO ADDITIONAL COSTS FOR INACCURATE OR UNCONFIRMED EXISTING CONDITIONS WILL BE ACCEPTED.
3. CONTRACTOR MAY RE-USE EXISTING PANELBOARDS, CIRCUIT BREAKERS, TRANSFORMERS, SAFETY SWITCHES, ETC. ONLY WHERE INDICATED TO BE REUSED ON THE PLANS.
4. CONTRACTOR MAY RE-USE EXISTING CONDUIT, CONDUCTORS, FITTINGS, AND SUPPORTS, ETC. WHERE THESE ITEMS ARE SUPPORTED AND SECURED WITH STRAPS COMPLY WITH CURRENT NEC CODE AND THE REQUIREMENTS OF THE SPECIFICATIONS.
5. ITEMS TO BE DEMOLISHED, SUCH AS DISCONNECTS, JUNCTION BOXES, ETC. SHALL BE HANDED OVER TO THE OWNER TO BE KEPT AS SPARE INVENTORY OR REMOVED FROM SITE AT THE SOLE DISCRETION OF THE OWNER.
6. ALL NEW JUNCTION BOXES SHALL CONTAIN A GROUND PIGTAIL TO BE GROUNDED TO THE JUNCTION BOX BY A THREADED CONNECTION.
7. DURING THE COURSE OF CONSTRUCTION, THE CONTRACTOR SHALL MAINTAIN AN UPDATED SET OF CONSTRUCTION PLANS INDICATING DISCREPANCIES IN EXISTING CONDITIONS AND MODIFICATIONS MADE DURING THE CONSTRUCTION PROCESS. AT PROJECT COMPLETION THE INSTALLER SHALL PROVIDE THESE RED LINE DRAWINGS DOCUMENTING ACTUAL INSTALLED "AS-BUILT" CONDITIONS TO THE ENGINEER.
8. NO LOAD WAS ADDED TO THE EXISTING SERVICE, BRANCH CIRCUITRY OR PANELBOARD 'HA' AS PART OF THIS PROJECT. PROJECT SCOPE IS REPLACING EXISTING EXHAUST FAN WITH ONE OF SAME SIZE AND HORSE POWER.

REVISIONS

Advanced Systems Engineering, Inc.
Job No.14079.06DE
Manager: KCW
CADD: KCW
ASE
CA-8468
Project Engineer
David S. Bess
PE-51871
15505 Autonoble Boulevard, Suite 330, Clearwater, FL 33762 • Office: 727.540.9396 • Facsimile: 727.540.9376

ELECTRICAL PLANS

MANATEE COUNTY - WATER TREATMENT LAB
CHILLER & EXHAUST FAN REPLACEMENT
4751 65th STREET WEST
BRADENTON, FL 34210

JOB NO: 14079.06DE
PROJ. MNGR: KCW
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ISSUE DATE: 07.24.2017

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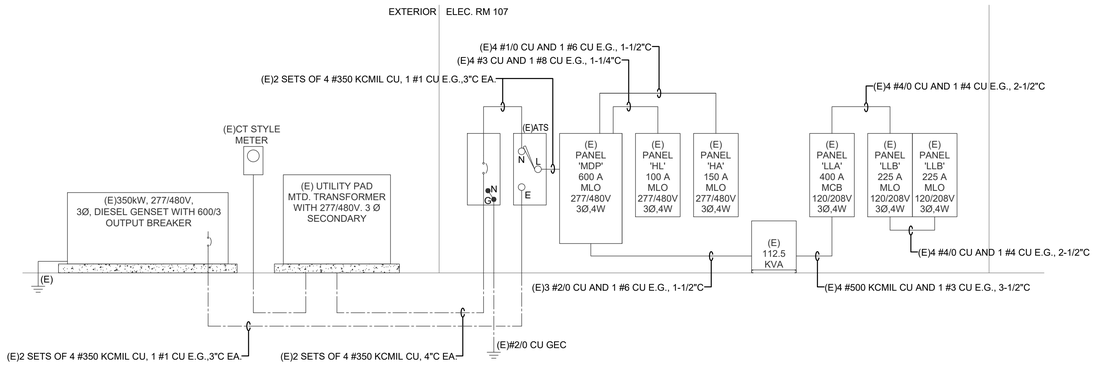

1 PARTIAL ELECTRICAL RISER DIAGRAM

SCALE: NO SCALE

NOTE: RISER DIAGRAM SHOWN FOR REFERENCE ONLY. NO WORK TO EXISTING ELECTRICAL SERVICE IS PART OF THIS SCOPE OF WORK.

PANEL: 'HA' (EXISTING) — ACCESSORIES: EXISTING SQUARE D NF PNLBRD

VOLTAGE: 480 /Y277 | PHASE: 3 | MOUNTING: SURFACE
AMPS: 150 AMP MLO | WIRE: 4 | NEMA 1 | AIC: 35,000

LOAD (KVA)						AMPS	POLE	LOAD DESCRIPTION	CKT	A	B	C	CKT	LOAD DESCRIPTION	AMPS	POLE	LOAD (KVA)					
LTG	REC	MISC	COOL	HEAT	MTR												LTG	REC	MISC	COOL	HEAT	MTR
		4.0				20	3	WATER HEATER (1)	1	■			2	LEF-1 (1)	30	3						3.9
		4.0				--	-	----------	3		■		4	----------	--	-						3.9
		4.0				--	-	----------	5			■	6	----------	--	-						3.9
					3.9	30	3	CWP-1 (1)	7	■			8	LEF-2 (1)	30	3						3.9
					3.9	--	-	----------	9		■		10	----------	--	-						3.9
					3.9	--	-	----------	11			■	12	----------	--	-						3.9
					0.9	15	3	HWP-1 (1)	13	■			14	AHU-1 (1)	15	3				0.7		
					0.9	--	-	----------	15		■		16	----------	--	-				0.7		
					0.9	--	-	----------	17			■	18	----------	--	-				0.7		
						20	3	TVSS (1)	19	■			20	AHU-2 (1)	40	3				5.8		
						--	-	----------	21		■		22	----------	--	-				5.8		
						--	-	----------	23			■	24	----------	--	-				5.8		
					2.1	30	3	LIFT STATION (1)	25	■			26	SPACE								
					2.1	--	-	----------	27		■		28	SPACE								
					2.1	--	-	----------	29			■	30	SPACE								
								SPACE	31	■			32	SPACE								
								SPACE	33		■		34	SPACE								
								SPACE	35			■	36	SPACE								
								SPACE	37	■			38	SPACE								
								SPACE	39		■		40	SPACE								
								SPACE	41			■	42	SPACE								

CONNECTED LOAD SUMMARY (KVA)

	A	B	C	TOTALS	D.F.
LTG	0.0	0.0	0.0	0.0	
REC	0.0	0.0	0.0	0.0	
MISC	4.0	4.0	4.0	12.0	1.00
COOL	6.5	6.5	6.5	19.6	1.00
HEAT	0.0	0.0	0.0	0.0	
MTR	14.7	14.7	14.7	44.1	1.07

CONNECTED LOAD PER PHASE

PHASE A 25.2 KVA **91.1 AMPS**
PHASE B 25.2 KVA **91.1 AMPS**
PHASE C 25.2 KVA **91.1 AMPS**

DEMAND LOAD SUMMARY

COMMENTS	LOAD	
	0.0	KVA
	0.0	KVA
	12.0	KVA
	19.6	KVA
	0.0	KVA
125% OF LARGEST MOTOR PLUS 100% OF REMAINDER	47.0	KVA

Breaker Notes ( ):
1.
2.
3.
4.
5.
6.

DEMAND LOAD: 78.6 KVA

DEMAND CURRENT: **94.6 AMPS**

REVISIONS

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ASE
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15555 Automobile Boulevard, Suite 330, Clearwater, FL 33762 • Office: 727.540.9396 • Facsimile: 727.540.9376

ELECTRICAL RISER DIAGRAM & SCHEDULES

MANATEE COUNTY - WATER TREATMENT LAB

CHILLER & EXHAUST FAN REPLACEMENT

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