

BID PACKAGE 02 – ADDENDUM 03

Date: February 05, 2020

- **Re:** Wilma P Mankiller Health Center Expansion
- From: James R Childers Architect, Inc. 45 South 4th Street Fort Smith, Arkansas 72901



This addendum forms part of the Contract Documents, and modifies the documents as noted below. Acknowledge receipt of this addendum in the space provided on the bid form. Failure to do so may subject the bidder to disgualification.

Item 01 Benco/Adec Dental Equipment Drawings

Item 02 Updated table of contents and added sections listed below in volume 02 27 0000 – CNIS Network Construction Standards and Requirements

${}^{\mbox{\tiny \ensuremath{ \blacksquare} }} AIA^{\mbox{\tiny \ensuremath{ \bullet} }}$ Document G710^{$\mbox{\tiny \ensuremath{ \bullet} }}$ – 2017}

Architect's Supplemental Instructions

PROJECT: (name and address	s)
Wilma P. Mankiller Health C	enter
Expansion	
Stilwell, OK	

CONTRACT INFORMATION: Contract For: CMAR

Date:

OWNER: (name and address) Cherokee Nation Property Management LLC.

ARCHITECT: (name and address) James R. Childers Architect, Inc. 45 South 4th Street Fort Smith, AR 72901

ASI INFORMATION: ASI Number: Bid Package 02 - ASI 003

Date: 03-30-20

CONTRACTOR: (name and address) M. Ross, Inc.

The Contractor shall carry out the Work in accordance with the following supplemental instructions without change in Contract Sum or Contract Time. Proceeding with the Work in accordance with these instructions indicates your acknowledgment that there will be no change in the Contract Sum or Contract Time. (Insert a detailed description of the Architect's supplemental instructions and, if applicable, attach or reference specific exhibits.)

See attached MEP Narrative.

ISSUED BY THE ARCHITECT:

James R. Childers Architect, Inc. **ARCHITECT** (*Firm name*)

J. Breel Cled

SIGNATURE

J. Breck Childers, Architect PRINTED NAME AND TITLE

03-30-20 DATE

1



5214 W. Village Parkway, Suite 120, Rogers, AR 72758 | 479-899-6370

CHANGE NARRATIVE LETTER

TO: MATHEW THOMAS- CHILDERS ARCHITECTS

FROM: STEPHEN EDMONDSON, JAMISON MIRANDA, BETSY WELLS– HP ENGINEERING, INC.

DATE: 1/10/2020

PROJECT: WPMHC EXPANSION BID PACKAGE 02 ADDENDUM 01

MECHANICAL DESIGN ITEMS

- 1. M1.01
 - a. Item 1 Response: Outside air ductwork will only be lined it shown hatched on plans. There is not hatched outside air ductwork on plans.
 - b. Item 2 Response: Plans revised to have condensate neutralizer. Building controls sequence note for hot water temperature reset with will vary the hot water temperature based on ambient outside air temperature
 - c. Item 3 Response: Plans revised to show pre-insulated piping below grade.
 - d. Item 4 Response: This is the primary heating coil and is located in the preheat position. Nomenclature will be changed on schedule.

e. Item 5,6,7 Reponses: The AHU coil size can be revised. This will change AHU1 & AHU-3 items below. This will add approx. \$4k-\$7k to each unit. This will be coordinated with the owner and design team to determine if they want to make the change.

_	Old	New	Delta
Height	73.4	73.4	0
Width	100	112.5	12.5"
Length	295.6	300.6	5"
Weight	10381	10954	573 lbs
MCA	78.7	78.7	
MOP	90	90	
WPD	29.84	12.36	17.48
APD	1.325	0.869	0.456
Face Vel	522	454	68

- f. Item 8 Response: Although, not required, we were asked to design this building similar to healthcare requirements. This included the extra filtration.
- g. Item 9 Response: If power goes out or equipment goes down, there will be no freeze protection if there is no glycol in the system. We prefer to account for multiple points of failure.

2. M2.02

a. Item 10 Response: Recirculating pump will be removed from detail. No recirculating pump will be required since we have glycol in the system.

3. M8.10

a. Item 11 Response: Chilled water piping is not routed below the boilers.

4. M9.01

- a. Item 12 Response: Plans revised.
- 5. M9.02
 - a. Item 13 Response: Plans revised.
 - b. Item 14 Response: Coil is primary heating coil located in the preheat position.

ELECTRICAL DESIGN ITEMS

- 1. ELECTRICAL TYPICAL
 - a. Noted on plans to coordinate mounting heights with all architect/owner.

2. ELECTRICAL TYPICAL

a. Noted on plans to reference equipment plans.

3. ELECTRICAL TYPICAL

a. This has been verified.

4. ELECTRICAL TYPICAL

a. Circuit provided for automatic door.

5. E1.02

a. Exterior receptacle circuit divided into 2 circuits.

6. E1.06

a. Power added for automatic doors.

7. E1.07

a. Latest Interior Logistics plans we have don't show 2 freezer. Will coordinate with ILO.

8. E1.14

a. Power provided for VAV2.22. no changes required

9. E1.18

a. Additional receptacles added to roof. Receptacles are provided with AHU.

10. E1.24

a. Note added to provided smoke rated penetrations at all smoke walls.

11. E1.25

a. Note added to provided smoke rated penetrations at all smoke walls.

12. E2.05

a. Provided photometrics for fire lane. Site lights added to perimeter lot entrances.

13. E2.09

a. Exit sign added in hallway.

14. E3.02

- a. Panel HE1 has 114 amps of spare capacity. We feel this will be sufficient.
- b. Circuit added for site lights.
- c. Chiller loads matches chiller MCA.

15. E3.04

a. Future loads have been taken into account for panel L4B. no changes required

PLUMBING DESIGN ITEMS

- 1. P1.00:
 - a. Note 7 & 8 have been added to the water heater schedule.
 - b. The booster pump information was added to the schedule in Bid Package 02 ADD 01 in January.
 - c. Wall hung water closets are provided with 4" waste connection and floor mount are provided with 3" waste connection. This has been adjusted in the Rough-In Mounting Height Schedule.
 - d. OHD-1 have been added to the Plumbing Equipment Schedule and the Rough-In Mounting Height Schedule.
- 2. P2.00:
 - a. Sewer mains are sized according to code and DFU.
- 3. P2.11:
 - a. Per table 709.1 of the 2015 IPC for water closets, note D "trap size shall be consistent with the fixture outlet size." Floor mounted toilets are typically installed with 3" lines and wall hung toilets are typically installed with 4" lines due to the carrier. The toilets that are being used on this project are low flow type and do not exceed 1.6 GPF. Per table 709.2 of the 2015 IPC fixture drain or trap size for 4 drainage fixture units is 2-1/2" which we would never use for a toilet. Please indicate where in the 2015 IPC it specifically states that a 3" waste connection to a water closet is only allowed if it is the only fixture on the branch?
- 4. P2.12:
 - a. Couldn't find a 01-01-10 Storage room. Assumed that it was 01-07-10 Storage. A floor drain has been added.
 - b. Note 22.39 has been added to this sheet stating, "PROVIDE OPEN HUB DRAIN WITH TRAP GUARD UNDER COUNTER FOR DRAIN FROM COUNTER MOUNTED ICE MACHINE. HUB DRAIN SHALL BE CONNECTED TO THE DRAIN LINE AT THE SINK NEAR BY."

- 5. P2.14:
 - a. Per table 709.1 of the 2015 IPC for water closets, note D "trap size shall be consistent with the fixture outlet size." Floor mounted toilets are typically installed with 3" lines and wall hung toilets are typically installed with 4" lines due to the carrier. The toilets that are being used on this project are low flow type and do not exceed 1.6 GPF. Per table 709.2 of the 2015 IPC fixture drain or trap size for 4 drainage fixture units is 2-1/2" which we would never use for a toilet. Please indicate where in the 2015 IPC it specifically states that a 3" waste connection to a water closet is only allowed if it is the only fixture on the branch?
- 6. P3.11:
 - a. The keynotes have been added to this sheet.
- 7. P3.12:
 - a. TMV-1 is in the mechanical room. The TMV-2 at Group room 01-08-10 needs to stay a TMV-2. This room may be accessed by the public therefore requires no more than 110 degrees. All lavatories in restrooms and public access areas are marked with the TMV-2. Sinks (stainless steel) located in areas that are not accessed by the public do not
 - b. Equipment was shown to indicate spacing. Equipment with no connections have been hidden.
 - c. Note 22.38 has been added to the plans stating, "PROVIDE CW LINE TO LAUNDRY DETERGENT DISPENSER. PROVIDE BACKFLOW PREVENTER PRIOR TO SOAP DISPENSER CONNECTION. COORDINATE WITH EQUIPMENT SUPPLIER FOR EXACT LOCATION OF DETERGENT DISPENSER AND SIZE OF CONNECTION."
 - d. Water line has been added at 01-07-13 Nourishment for the #3307 ice maker along with SB-1 & WHA-1.

END OF RESPONSES

WILMA P. MANKILLER HEALTH CENTER EXPANSION

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CU500	WATER DETAILS					P2.00	OVERALL LEVEL 0
CU501	STORM DETAILS					P2.11	DRAIN PLAN LEVE
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BID PACKAGE 02

(CIVIL / ARCHITECTURAL / STRUCTURAL / MEP)

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1836 SOUTH BALTIMORE AVE. TULSA, OK 74119 (539) 664-4618

MECHANICAL / ELECTRICAL / PLUMBING ENGINEER



<u>CIVIL ENGINEER</u>



4700 LINCOLN ROAD NE, SUITE 102 ALBUQUERQUE, NM 87109 (505) 344-4080

STRUCTURAL ENGINEER



(281) 589-5900

FIRE PROTECTION / LIFE SAFETY

EQUIPMENT PLANNER



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DOMESTIC CO	PIPING ABOVE G	BELOW GRADE	ELASTOM COMPLIAN SPACES	IDPE JACK ON IERIC, ADE NT JACKE ⁻	ET ONLY, NO ASTM E84 T IN AIR PLEN	NUM	1 0.5	1		1.5 1	1.5 1
DOMESTIC CC CONDENSATE PVC WASTE V PLENUM SPAC WATER COOLI AND SINK TRA WATER SUPPI DEVICES	ED WATER PIPING PIPING ABOVE G ENT AND WASTE ER TRAPS, ALL EX PS, TAILPIECES, H LY LINES/ANGLE V	G BELOW GRADE RADE DRAIN IN AIR RPOSED LAVATOR HOT AND COLD (ALVES TO THESE	YVC OR H INSULATIO ELASTOM COMPLIAN SPACES ELASTOM COMPLIAN COMPLIAN Y EQUIVALE COVER	IDPE JACK ON IERIC, ADE NT JACKE ⁻ SSED FIBE IERIC WITH NT JACKE ⁻ ENT TO TR	ET ONLY, NO ASTM E84 T IN AIR PLEN RGLASS OR H ASTM E84 T UEBRO 102 E	NUM E-Z PIPE	1 0.5 0.5 0.125	0.125	0	1.5 1 0.5 0.125	1.5 1 0.5 0.125
DOMESTIC CC CONDENSATE PVC WASTE V PLENUM SPAC WATER COOLI AND SINK TRA WATER SUPPI DEVICES DOMESTIC HO PIPING BELOW DOMESTIC CC WATER RETUR	ENT AND WATER PIPING PIPING ABOVE G ENT AND WASTE ER TRAPS, ALL EX PS, TAILPIECES, I LY LINES/ANGLE V T WATER AND HC V GRADE DLD WATER, HOT V RN PIPING ABOVE	G BELOW GRADE RADE DRAIN IN AIR POSED LAVATOR HOT AND COLD ALVES TO THESE DT WATER RETURN WATER, AND HOT GRADE	PVC OR H INSULATION ELASTOM COMPLIAN SPACES ELASTOM COMPLIAN Y EQUIVALE COVER N ELASTOM WITH PVC ELASTOM COMPLIAN	IDPE JACK ON IERIC, ADE NT JACKE ⁻ SSED FIBE IERIC WITH NT JACKE ⁻ ENT TO TR IERIC OR F OR HDPE IERIC, ADE NT JACKE ⁻	ET ONLY, NO O ASTM E84 T IN AIR PLEN RGLASS OR H ASTM E84 T UEBRO 102 E OAM. ENCA JACKET O ASTM E84 T IN AIR PLEN	NUM E-Z PIPE PSULATE	1 0.5 0.5 0.125 1 1	1 1 0.5 0.125 1 1	0	1.5 1 0.5 0.125 1.5 1.5	1.5 1 0.5 0.125 1.5 1.5
DOMESTIC CO CONDENSATE PVC WASTE V PLENUM SPAC WATER COOLI AND SINK TRA WATER SUPPI DEVICES DOMESTIC HO PIPING BELOW DOMESTIC CO WATER RETUR PVC WASTE D ALL AREAS AE	ENT AND WASTE ENT AND WASTE ER TRAPS, ALL EX PS, TAILPIECES, I LY LINES/ANGLE V T WATER AND HO V GRADE DID WATER, HOT V RN PIPING ABOVE RAIN IN WALLS, A BOVE GRADE	G BELOW GRADE RADE DRAIN IN AIR DRAIN IN AIR (POSED LAVATOR HOT AND COLD (ALVES TO THESE DT WATER RETURN WATER, AND HOT GRADE ND WASTE VENT I	PVC OR H INSULATION ELASTOM COMPLIAN SPACES ELASTOM COMPLIAN Y EQUIVALE COVER N ELASTOM WITH PVC ELASTOM COMPLIAN SPACES N COMPRES ELASTOM COMPLIAN	IDPE JACK ON IERIC, ADE NT JACKE ^T SSED FIBE IERIC WITH NT JACKE ^T ENT TO TR IERIC, ADE IERIC, ADE IERIC, ADE IERIC, ADE IERIC WITH NT JACKE ^T	ET ONLY, NO O ASTM E84 T IN AIR PLEN RGLASS OR H ASTM E84 T UEBRO 102 E GOAM. ENCA JACKET O ASTM E84 T IN AIR PLEN RGLASS OR H ASTM E84 T	NUM E-Z PIPE PSULATE NUM	1 0.5 0.5 0.125 1 1 1	1 1 0.5 0.125 1 1 1"		1.5 1 0.5 0.125 1.5 1.5 1.5	1.5 1 0.5 0.125 1.5 1.5 1.5
DOMESTIC CO CONDENSATE PVC WASTE V PLENUM SPAC WATER COOLI AND SINK TRA WATER SUPPI DEVICES DOMESTIC HO PIPING BELOW DOMESTIC CO WATER RETUF PVC WASTE D ALL AREAS AE ABOVE GROUT ABOVE GROUT FLEXIBLE GAS	ENT AND WASTE ENT AND WASTE ER TRAPS, ALL EX PS, TAILPIECES, I LY LINES/ANGLE V T WATER AND HC V GRADE DLD WATER, HOT V RN PIPING ABOVE RAIN IN WALLS, A BOVE GRADE DESCRIP ND GAS ND SANITARY SEV B PIPING INSIDE BI	BELOW GRADE RADE RADE DRAIN IN AIR POSED LAVATOR HOT AND COLD ALVES TO THESE TWATER RETURN NATER, AND HOT GRADE ND WASTE VENT I UILDING	PVC OR H INSULATION ELASTOM COMPLIAN SPACES ELASTOM COMPLIAN Y EQUIVALE COVER N ELASTOM COMPLIAN SPACES N COMPRES ELASTOM COMPLIAN SPACES N COMPLIAN SCH	ERIC OR FIBE ERIC WITH NT JACKET SED FIBE ERIC WITH NT JACKET ENT TO TR ERIC OR FIDE ERIC, ADE ERIC, ADE E	ASTM E84 T IN AIR PLEN RGLASS OR ASTM E84 T UEBRO 102 E OAM. ENCA JACKET OASTM E84 T IN AIR PLEN RGLASS OR ASTM E84 T IN AIR PLEN RGLASS OR ASTM E84 T D BLACK STE GS. PROVIDE E OR IN CON LE 40 PIPE A P PVC WITH 1 DNNECTION NE JACKET A S AS AN ACC PROVIDE PI NINSTRUCTI O GALVANIZE	E-Z PIPE PSULATE PSULATE NUM EL WITH MA E CORROSIO TACT WITH ND FITTING "FIRE WRA TO EQUIPME AND FITTING EPTABLE G. PING EQUA IONS. D STEEL WI	1 0.5 0.5 0.125 1 1 1 1 1 T EDUL MA LLEABLE DN-RESIS MATERIA S EXCEP DN-RESIS MATERIA S EXCEP DN-RESIS MATERIA S EXCEP D. S BY MF AS PIPING TO TRA	1 0.5 0.125 1 1 1 1 1 1 1 1 E ATERIAL IRON FITT STANT MATH L EXERTING T IN PLENU (. CORRUG G. MUST M G. MUST M G MATERIAL CPIPE BY C	INGS OR W ERIAL ON F G A CORRO M RETURN GATED STA IEET ANSI, L, ALL STA DMEGA FLE	1.5 1 0.5 0.125 0.125 1.5 <td< td=""><td>1.5 1 0.5 0.125 1.5 1.5 1.5 1.5 0.5 ENUM RETU GAS LINE W YMUTUAL O CODE ANUFACTUF</td></td<>	1.5 1 0.5 0.125 1.5 1.5 1.5 1.5 0.5 ENUM RETU GAS LINE W YMUTUAL O CODE ANUFACTUF
DOMESTIC CO CONDENSATE PVC WASTE V PLENUM SPAC WATER COOLI AND SINK TRA WATER SUPPI DEVICES DOMESTIC HO PIPING BELOW DOMESTIC CO WATER RETUR PVC WASTE D ALL AREAS AE ABOVE GROUN ABOVE GROUN FLEXIBLE GAS UNDER GROUN	DESCRIP ND GAS DESCRIP ND GAS	3 BELOW GRADE RADE DRAIN IN AIR DRAIN IN AIR (POSED LAVATOR HOT AND COLD (ALVES TO THESE DT WATER RETURN WATER, AND HOT GRADE ND WASTE VENT I VER AND VENT UILDING	PVC OR H INSULATION ELASTOM COMPLIAN SPACES ELASTOM COMPLIAN Y EQUIVALE COVER V ELASTOM COMPLIAN SPACES N COMPRES ELASTOM COMPLIAN SPACES N COMPLIAN SPACES N CO	ERIC, ADE SED FIBE ERIC WITH NT JACKET SED FIBE ERIC WITH NT JACKET ENT TO TR ERIC, ADE NT TO TR ERIC, ADE NT JACKET SED FIBE ERIC, ADE NT JACKET SED FIBE SED FIBE ERIC, ADE NT JACKET SED FIBE SED FI	ASTM E84 TIN AIR PLEN RGLASS OR ASTM E84 TUEBRO 102 F OAM. ENCA DASTM E84 TUEBRO 102 F OAM. ENCA DASTM E84 TIN AIR PLEN RGLASS OR ASTM E84 TIN AIR PLEN RGLASS OR ASTM E84 T OASTM E84 T O	E-Z PIPE PSULATE PSULATE PSULATE NUM EL WITH MA E CORROSIC TACT WITH ECORROSIC TACT WITH ECORROSIC TACT WITH FIRE WRA TO EQUIPME AND FITTING EPTABLE GA PING EQUAL PING EQUAL OPPER WIT RY CLEANED I COMPATIB ICE WITH GA INTS WITH E INTS WITH E ICE WITH GA INTS WITH E INTS WITH E	1 0.5 0.5 0.125 1 1 1 1 1 1 1 EDUL EDUL I 1 1 1 1 1 EDUL I I I I I I I I I I	1 0.5 0.125 1 1 1 1 1 1 1 1 1 1 1 1 1	INGS OR W ERIAL ON F G A CORRO M RETURN G A CORRO M RETURN EET ANSI, L, ALL STA DMEGA FLE TS. ER FITTING D PER NFF DRMING WI CH. 40 STE S. MILL CC FIELD JOII (ER TAPE.	1.5 1 0.5 0.125 0.125 1.5 .1.5 .1.5 .1.5 .1.5 .1.5 .1.5 .1.5 .1.5 .1.5 .1.5 .1.5 .1.5 .1.5 .1.5 .1.5 .1.5 .1.5 .1.6 .1.7 .1.8 <td>1.5 1 0.5 0.125 1.5 5 0.00000000000000000000000000000000000</td>	1.5 1 0.5 0.125 1.5 5 0.00000000000000000000000000000000000
DOMESTIC CO CONDENSATE PVC WASTE V PLENUM SPAC WATER COOLI AND SINK TRA WATER SUPPI DEVICES DOMESTIC HO PIPING BELOW DOMESTIC CO WATER RETUR PVC WASTE D ALL AREAS AE ABOVE GROUN FLEXIBLE GAS FORCED MAIN MEDICAL GAS UNDER GROUN INSIDE BUILDI WATER DISTR	PIPING ABOVE G ENT AND WASTE ER TRAPS, ALL EX PS, TAILPIECES, I LY LINES/ANGLE V T WATER AND HC V GRADE LD WATER, HOT V RN PIPING ABOVE RAIN IN WALLS, A 30VE GRADE DESCRIP ND GAS ND SANITARY SEV 5 PIPING INSIDE BI I PIPING PIPING ND GAS	S BELOW GRADE RADE DRAIN IN AIR (POSED LAVATOR HOT AND COLD (ALVES TO THESE DT WATER RETURN WATER, AND HOT GRADE ND WASTE VENT I VER AND VENT UILDING	PVC OR H INSULATION COMPLIAN SPACES ELASTOM COMPLIAN Y EQUIVALE COVER V ELASTOM WITH PVC ELASTOM COMPLIAN SPACES N COMPRES ELASTOM COMPLIAN SPACES N COMPRES ELASTOM COMPLIAN SPACES N COMPLIAN SPACES N COMPLIAN	BERIC, ADE NT JACKET SED FIBE ERIC WITH NT JACKET ENT TO TR ERIC OR F OR HDPE ERIC, ADE NT JACKET SED FIBE ERIC, ADE NT JACKET SED FIBE SED FIBE SE	ASTM E84 TIN AIR PLEN RGLASS OR ASTM E84 TUEBRO 102 F COAM. ENCA JACKET UEBRO 102 F COAM. ENCA JACKET ASTM E84 TIN AIR PLEN RGLASS OR ASTM E84 TIN AIR PLEN RGLASS OR ASTM E84 T DISTRUCTION E OR IN CON LE 40 PIPE A PVC WITH 1 DNNECTION NE JACKET A S AN ACC PROVIDE PI NINSTRUCTION NE JACKET A S AN ACC PROVIDE PI NINSTRUCTION DALVANIZE PE L HARD C BE FACTOF LASTIC WITH ACCORDAN WELDED AD TRU-TAPE" C LE 40 PIPE A RIBUTION PIF DARDS LIST ICE PIPE SH LISTED IN TA	E-Z PIPE PSULATE PSULATE PSULATE NUM EL WITH MA E CORROSIG TACT WITH ND FITTING FIRE WRA TO EQUIPME AND FITTING EPTABLE GA PING EQUAL PING EQUAL D STEEL WI OPPER WITH COMPATIB ICOMPATIB ICOMPATIB ICE WITH GA INTS WITH E HESIVE UNI DR EQUAL. F ND FITTING PE SHALL CO ED IN TABLE ALL CONFO BLE 605.3 C	1 0.5 0.5 0.125 1 1 1 1 1 1 1 EDUL EDUL EDUL I 1 1 1 1 1 1 EDUL I 1 1 1 1 1 1 EDUL I I I I I I I I I I	1 0.5 0.125 0.125 1 1 1 1 1 1 1 1 1 1 1 1 1	INGS OR W ERIAL ON F G A CORRO M RETURN GATED STA IEET ANSI, L, ALL STA DMEGA FLE TS. ER FITTING D PER NFF DRMING WI CH. 40 STE S. MILL CC FIELD JOII KER TAPE. AND SHALL SHALL BE O	1.5 1 0.5 0.125 0.125 0.125 1.5 0.125 0.125 0.125 0.125 0.125 0.125 0.125 0.125 0.1100 NFPA, FACTOR NFPA, FACTOR NFPA, FACTOR SS. MEDICAL GA PA 99. JOINTS T ITH ASTM D 251. EL WITH MALLI DAT PIPE WITH H NTS AND	1.5 1 0.5 0.125 1.5 1.5 1.5 1.5 1.5 1.5 1.5 Supply GAS LINE W YMUTUAL OCODE ANUFACTUP AS SUPPLY TO BE BRAZ 3 AND SHAL EABLE IRON HIGH DENSI IGS WITH ND CONFO ONFORM TO
DOMESTIC CO CONDENSATE PVC WASTE V PLENUM SPAC WATER COOLI AND SINK TRA WATER SUPPI DEVICES DOMESTIC HO PIPING BELOW DOMESTIC CO WATER RETUF PVC WASTE D ALL AREAS AE ABOVE GROUF ABOVE GROUF FLEXIBLE GAS FORCED MAIN MEDICAL GAS UNDER GROUF INSIDE BUILDI WATER DISTR WATER SERVI	PIPING ABOVE G ENT AND WASTE ER TRAPS, ALL EX PS, TAILPIECES, I LY LINES/ANGLE V T WATER AND HC V GRADE ILD WATER, HOT V RN PIPING ABOVE RAIN IN WALLS, A BOVE GRADE DESCRIP ND GAS ND SANITARY SEV B PIPING INSIDE BI I PIPING ND GAS	BELOW GRADE RADE RADE DRAIN IN AIR (POSED LAVATOR HOT AND COLD (ALVES TO THESE DT WATER RETURN WATER, AND HOT GRADE ND WASTE VENT I VER AND VENT UILDING VER AND VENT UILDING VER AND VENT PIF BUILDING ROUGH-I ARE MINIMUM UN REFOR RISERS O	PVC OR H INSULATION ELASTOM COMPLIAN SPACES ELASTOM COMPLIAN Y EQUIVALE COVER N ELASTOM COMPLIAN SPACES N COMPRES ELASTOM COMPLIAN SPACES N COMPLIAN SPACES N COMP	ERIC, ADE NT JACKE SED FIBE ERIC WITH NT JACKE ENT TO TR ERIC OR F OR HDPE ERIC, ADE NT JACKE ENT TO TR ERIC, ADE NT JACKE SED FIBE ERIC, ADE NT JACKE SED FIBE SED FI	ASTM E84 TIN AIR PLEM RGLASS OR ASTM E84 TUEBRO 102 F OAM. ENCA JACKET DASTM E84 TIN AIR PLEM COAM. ENCA JACKET DASTM E84 TIN AIR PLEM RGLASS OR ASTM E84 TIN AIR PLEM RGLASS OR ASTM E84 TIN AIR PLEM RGLASS OR ASTM E84 TIN AIR PLEM COAM. ENCA JACKET DASTM E84 TIN AIR PLEM COAM. ENCA JACKET DASTM E84 TIN AIR PLEM COAM. ENCA JACKET DASTM E84 TIN AIR PLEM CON INCOM DASTM E84 TIN AIR PLEM CON INCOM DASTM E84 TIN AIR PLEM CON INCOM DASTM E84 TIN AIR PLEM CON INCOM CON INCOM CON RISER D	E-Z PIPE PSULATE PSULATE PSULATE NUM EL WITH MA E CORROSIG TACT WITH ND FITTING FIRE WRA TO EQUIPME AND FITTING EPTABLE GA PING EQUAL PING EQUAL PING EQUAL OPPER WIT AND FITTING PE SHALL CO ED IN TABLE ALL CONFO BLE 605.3 C BLE 605.3 C	1 0.5 0.5 0.125 1 1 1 1 1 1 DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL DUL D	1 0.5 0.125 1 1 1 1 1 1 1 1 1 1 1 1 1	INGS OR W ERIAL ON F G A CORRO M RETURN G A CORRO M RETURN EET ANSI, L, ALL STA DMEGA FLE TS. ER FITTING D PER NFF DRMING WI CH. 40 STE S. MILL CO FIELD JOII CH. 40 STE S. MILL CO FIELD JOII COULE	1.5 1 0.5 0.125 0.125 1.5 0.125 0.125 0.125 0.125 0.125 0.125 0.125 0.125 0.125 0.125 0.125 0.125 0.125 0.125 0.125 0.125 0.125 0.125 0.125 <td< td=""><td>1.5 1 0.5 0.125 1.5 </td></td<>	1.5 1 0.5 0.125 1.5
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DOMESTIC CO CONDENSATE PVC WASTE V PLENUM SPAC WATER COOLI AND SINK TRA WATER SUPPI DEVICES DOMESTIC HO PIPING BELOW DOMESTIC CO WATER RETUR PVC WASTE D ALL AREAS AE ABOVE GROUI ABOVE GROUI FLEXIBLE GAS FORCED MAIN MEDICAL GAS UNDER GROU UNDER GROU	DESCRIP ND GAS DESCRIP ND GAS DESCRIP ND GAS DESCRIP ND GAS ND SANITARY SEV PIPING INSIDE BI I PIPING ND GAS ND SANITARY SEV S PIPING INSIDE BI I PIPING ND GAS ND SANITARY SEV S PIPING INSIDE BI I PIPING ND GAS ND SANITARY SEV S HALL RISE 6" AE YN APPLY UNLESS S HALL RISE 6" AE YN APPLY ON AN	S BELOW GRADE RADE RADE DRAIN IN AIR (POSED LAVATOR HOT AND COLD /ALVES TO THESE DT WATER RETURN VATER, AND HOT GRADE ND WASTE VENT I VER AND VENT UILDING VER AND VENT UILDING VER AND VENT PIF BUILDING VER AND VENT PIF BUILDING VER AND VENT PIF BUILDING VER AND VENT PIF BUILDING TER MOUNTED MOUNTED MOUNTED	PVC OR H INSULATION ELASTOM COMPLIAN SPACES COMPRESE ELASTOM COMPLIAN SPACES NELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM COMPLIAN SPACES NCOMPRESE ELASTOM SPACES NCOMPRESE ELASTOM SPACES NCOMPRESE SPACES NCOMPRESE ELASTOM SPACES NCOMPRESE ELASTOM SPACES NCOMPRESE ELASTOM SPACES NCOMPRESE ELASTOM SPACES NCOMPRESE	BERIC, ADE NT JACKE SED FIBE ERIC WITH NT JACKE ERIC OR F COR HDPE ERIC, ADE NT TO TR ERIC, ADE NT JACKE SED FIBE ERIC, ADE NT JACKE SED FIBE SED FIBE	COLD CASTM E84 TIN AIR PLEN RGLASS OR ASTM E84 TUEBRO 102 E COAM. ENCA DACKET OAM. ENCA DACKET COAM. ENCA DACKET OAM. ENCA DACKET CAM. ENCA DACKET OAM. ENCA DACKET		1 0.5 0.5 0.125 1	1 1 0.5 0.125 1 <td>INGS OR WERIAL ON F G A CORRO MERIAL ON F G</td> <td>1.5 1.5 1.5 0.5 0.125 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.</td> <td>1.5 1 0.5 0.125 1.5 1.5 1.5 1.5 1.5 1.5 1.5 0.5 0.125 1.5 1.5 1.5 0.5 0.125 1.5 1.5 1.5 0.7 ENUM RETU GAS LINE W YMUTUAL O CODE ANUFACTUE ANUFACTUE ANUFACTUE ANUFACTUE ANUFACTUE AND CONFO ONFORM TO ONFORM TO OORS. OORS. IDE IGHT REQUI IGHT REQUI</td>	INGS OR WERIAL ON F G A CORRO MERIAL ON F G	1.5 1.5 1.5 0.5 0.125 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.	1.5 1 0.5 0.125 1.5 1.5 1.5 1.5 1.5 1.5 1.5 0.5 0.125 1.5 1.5 1.5 0.5 0.125 1.5 1.5 1.5 0.7 ENUM RETU GAS LINE W YMUTUAL O CODE ANUFACTUE ANUFACTUE ANUFACTUE ANUFACTUE ANUFACTUE AND CONFO ONFORM TO ONFORM TO OORS. OORS. IDE IGHT REQUI IGHT REQUI

2" 1-1/2" 1/2" 1/2" 36" TO BOTTOM OF BOX 1-1/2" 1/2" 1/2" 18" TO BOTTOM OF BOX WATER CLOSET FLUSH VALVE FLOOR MOUNTED 1-1/2" 1-1/4"

2"

4"

Land Land

)1-1/2" 1-1/4"

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UTILITY BOX

WASHER BOX

WATER CLOSET FLUSH VALVE WALL MOUNTED

NON-ADA 15" TO TOP OF BOWL ADA 17" TO TOP OF BOWL

PLUMBING EQUIPMENT SCHEDULE

		FIXTURE			
		TAG	DESCRIPTION	MANUFACTURER	
		BA-J		94ALF-A	NUT
		CBV-1	CALIBRATED BALANCE VALVE	BELL&GOSSETT CIRCUIT SETTER PLUS	LEAD FREE, CIRCUIT SETTER PLUS
		COTG-1	CLEANOUT TO GRADE, SPEEDI-SET OUTLET	J. R. SMITH 4237	UNFINISHED FLOOR CLEANOUT WIT
		0.5.4			REFER TO PLANS FOR SIZES
		CP-1		ARMSTRONG ASTRO 280 SS	HEAD-FEET
	7	CP-2	CIRCULATING PUMP	ARMSTRONG ASTRO 286 SS	THREE SPEED, BRONZE BODY WITH HEAD-FEET
		DI-1	DEIONIZED WATER	PROVIDED BY OTHER INSTALLED BY	CONTRACTOR SHALL COORDINATE
		ET-1	EXPANSION TANK	WATTS	BRASS CONNECTION, WELDED STE
	_	EWC-1		PLT-20 FLKAY	DIAPHRAGM HOOP RING, WELDED
	1		HANDICAPPED, NO LEAD DESIGN, ONE PIECE, STAINLESS STEEL BASIN.	ERPBM28K	
		EWS-1	EYE WASH STATION	STINGRAY	WALL MOUNTED STAINLESS STEEL
		FWS-2	2-HEADS EVE WASH STATION	S2230FLTSS/NA STINGRAY	STAY-OPEN BALL VALVE, TMV-3
			2-HEADS DECK MOUNTED	S2240FLT	CERAMIC STAY OPEN VALVE, LEAD
		FD-1	FLOOR DRAIN-SQUARE	F1000-S	GRATE AND SEDIMENT BUCKETS, M
		FPHB-1	FROST PROOF HOSE BIBB - BOX	J.R. SMITH 5509QT	AUTOMATIC DRAINING, ANTI-SIPHO ACCESSIBLE LOCATION
		FS-1	FLOOR SINK	J. R. SMITH	CAST IRON FLANGED RECEPTOR, S
	1	GI-1	GREASE INTERCEPTOR	SCHIER	POLYETHYLENE GREASE INTERCEP
				GB-#75	COMPOSITE COVER, CONTRACTOR APPROVAL PRIOR TO ORDERING AI
		HL-1	HANDICAPPED LAVATORY, COUNTER MOUNT, VITREOUS CHINA - OVAL	AMERICAN STANDARD	AMERICAN STANDARD RELIANT 3 -
NOTES					STOP WITH FLEXIBLE SUPPLIES AN
ALL APPLY	-	HL-2	HANDICAPPED LAVATORY, WALL MOUNT, VITREOUS CHINA	AMERICAN STANDARD	AMERICAN STANDARD RELIANT 3 -
				DECLYN 0321.026	PLATED, TMV-1 BELOW DECK, ZURN STOP WITH FLEXIBLE SUPPLIES AN
					PVC TYPE INSULATION AROUND "P" 0700, THREE HOLES ON DECK 4" CE
		HSH-1	HANDICAPPED SHOWER,	AQUA BATH	STAINLESS STEEL DRAIN BODY STR
		HWC-1	HANDICAPPED WATER CLOSET, VITREOUS CHINA, FLUSH VALVE, FLOOR	AMERICAN STANDARD	BEMIS 1955CT OPEN FRONT SEAT, 5
		HWC-2	MOUNTED, ELONGATED RIM, 12" ROUGH-IN, SIPHON JET BOWL, 1.28 GPF	MADERA 3461.001	TRANSFORMER, Z5972-COMB CLOS
NSIBILITY.			MOUNTED, ELONGATED RIM, 12" ROUGH-IN, SIPHON JET BOWL, 1.28 GPF	Z5615 HET SERIES	TRANSFORMER, Z5972-COMB CLOS
		JS-1	JANITOR'S SINK, FLOOR MOUNTED	FIAT FLOOR SINK	CHICAGO FAUCET 897-CP WALL MO BUMPER GUARDS, WALL GUARDS 2
			24"x 24", ONE PIECE MOLDED CONSTRUCTION OF NATURAL CRUSHED STONE AND POLYESTER RESIN	MSB 2424	VALVES ON HOT AND COLD WATER
		JS-2		AMERICAN STANDARD	AMERICAN STANDARD 6047.117 MA
					ADJUSTABLE, DUCO CAST IRON BO
		т үү үү ОНД-1		1072 mm mm	SUMPPAN Y Y Y Y Y
	كر	PI	PLASTER TRAP	TRAP-EZE MANA	TRAPEXERIPOSABLEPLASTER TR
)<8 ≥8		RD-1	ROOF DRAINS	J.R. SMITH	ADJUSTABLE EXTENSION, DUCO CA
.5 1.5		RDOD-1	BOOF DRAIN/OVERELOW COMBINATION	1015 ZURN	AND SUMP PAN 12" DIAMETER COMBINATION MAIN
1 15				Z164	TOP-SET DECK PLATE
1 1.0	_	RH-1	ROOF HYDRANI	SRH-MS	VENT, NO DRAIN REQUIRED
.5 0.5		RPZ-1	REDUCE PRESSURE PRINCIPLE BACKFLOW PREVENTER WITH WYE STRAINER, FOR DOMESTIC WATER, LEAD FREE	WATTS 375AST	PROVIDE SAME SIZE AS WATER LIN APPROVAL BY FOUNDATION FOR C
	_			MATTS	UNIVERSITY OF SOUTHERN CALIFO
0.125		RFZ-Z	WATER	LF009M2 QT	APPROVAL BY FOUNDATION FOR C
	_	S-1	SINK	ELKAY	ELKAY MODEL LK800GN08T4 CONC
.5 1.5			SINGLE COMPARTMENT, OVERALL 19"x 19"x 6", OFF CENTER REAR DRAIN	LRAD1919	DRAIN. McGUIRE 151M HEAVY DUTY 8912 1 1/2" x 1 1/2" HEAVY DUTY CHE
5 15					CHROME PLATED SOLID BRASS AN
.0 1.0	_				PROVIDE THREE FAUCET HOLES OF
5" 1.5"		S-2	SINK- COMMERCIAL SINGLE COMPARTMENT, WALL MOUNT KITCHEN	ADVANCE TABCO 7-PS-60	CHROME PLATED TAILPIECE. McGU
					CLEANOUT PLUG, McGUIRE 170LK C EXTENSION TUBE & LOOSE KEYS, F
		6.2			OUTLET CONTINUOUS WASTE, PRO
		5-5	THREE COMPARTMENT KITCHEN	DI-3-1612	HEAVY DUTY BRASS BASKET & STR
	-				BRASS ANGLE STOPS W/ 5" CHROM
/ITH BUTT	-				FAUCET HOLES ON DECK
ТО		S-4	SINK SINGLE COMPARTMENT DENTAL	PROVIDED BY OTHER INSTALLED BY	FAUCET PROVIDED BY OTHER AND STRAINER 1 1/2" CHROME PLATED
NUM RETURN	-				BRASS P-TRAP W/ CLEANOUT PLUG
AS LINE WITH	-				McGUIRE 111C SERIES 1 1/2" END O
MUTUAL CODE	=	S-5	SINK SINGLE COMPARTMENT, OVERALL 25"x 21"x 8", OFF CENTER REAR DRAIN	ELKAY LR2521	ELKAY MODEL LK500GN08T4 SINGL BLADE HANDLES, 0.5GPM AERATOF
IUFACTURER'S	5				STRAINER, 1 1/2", CHROME PLATED
	-				CHROME PLATED COPPER EXTENS
SUPPLY BE BRAZED.		S-6	SINK	PROVIDED BY OTHER AND	FACUET PROVIDED BY OTHER AND
	1		SINGLE COMPARTMENT	INSTALLED BY CONTRACTOR	STRAINER, 1 1/2", CHROME PLATED BRASS P-TRAP W/ CLEANOUT PLUC
GH DENSITY					CHROME PLATED COPPER EXTENS McGUIRE 111C SERIES 1 1/2" END O
SWITH		SB-1	SUPPLY BOX	GUY GRAY	(1) 1/2" SUPPLY, PROVIDE WHA-1 (W
	1	SCO-1	STACK CLEANOUT	J. R. SMITH	DUCO CAST IRON CLEANOUT TEE. I
D CONFORM	-	SD 1		4510	SIZE, PROVIDE ROUND OR SQUARE
		5-1		1412-OSS	IMPELLER, 304 STAINLESS STEEL S
					ZOELLER # 30-0030 NON-CLOG, FLA
]	SV-1	SINK	FLKAY	SWITCHES AND WEIL #8109-L SIMPL BE SAFE PRO #SE380 LIGATURE RE
			SINGLE COMPARTMENT, BEHAVIORAL SAFETY, LIGATURE FREE	LRAD1919	MINI THERMOSTATIC MIXING VALVE & STRAINER 1 1/2" CHROME PLATE
					CAST BRASS P-TRAP W/ CLEANOUT
					McGUIRE 111C SERIES 1 1/2" END O
ORS.		TMV-1	THERMOSTATIC MIXING VALVE - MAIN 120° LINE	BRADI FY	LEAD FREE, INTEGRAL CHECK VAL
	-			S59-3045	
N		11/1/-2		E480-10	
		TMV-3	THERMOSTATIC MIXING VALVE - EMERGENCY	STINGRAY SV107	LEAD FREE, INTEGRAL CHECK VALV BE LOCATED IN A VISIBALE AND AC
	-	TWCO-1	TWO WAY CLEANOUT, SPEEDI-SET OUTLET	J. R. SMITH	UNFINISHED FLOOR DUCO CAST IR
E	1	UB-1	UTILITY BOX,	HZ37 OATLEY	(2) 1/2" SUPPLY VALVES, 2" DRAIN C
<u> </u>	-	UR-1			
_				WASHBROOK 6590.001	0637 URINAL SUPPORT, FLUSH VAL
\sim	L	VVB-1	WASHER BOX, WASTE AND SUPPLY	QUADTRO	(2) 1/2" SUPPLY VALVES, 2" DRAIN C ARRESTOR), INSTALL 18" AFF, COO
HT REQUIRED	3	WC-2	WATER CLOSET, VITREOUS CHINA, FLUSH VALVE, WALL MOUNTED, ELONGATED RIM, 1,28 GPF	ZURN Z5615 HET SERIES	BEMIS 1955CT OPEN FRONT SEAT, S TRANSFORMER 75972-COMP CLOSE
	ſ	WCO-1	WALL CLEANOUT	J. R. SMITH	DUCO CAST IRON CLEANOUT TEE, I
		WHA-1	WATER HAMMER ARRESTOR	SIOUX CHIEF	SIZE, PROVIDE ROUND OR SQUARE
	-			650&660 HYDRARESTER	CONTACT THE ARCHITECT
		YH-1	YARD HYDRANT	WOODFORD	BACKFLOW PROTECTED, AUTOMAT

	GAS LOAD CALC	GAS LO		LCULA	ΤΙΟΝ
	GAS LINES HAVE FUEL GAS CODE F 0.5" WATER COLU	BEEN SIZED AS FOR PRESSURE JMN AND 0.6 SPI	PER TABLE S OF LESS T ECIFIC GRAV	402.4(2) OF T HAN 2PSI AN ITY. USING /	THE 2006 INTERNATIONAL ID A PRESSURE DROP OF A DISTANCE OF 125 FEET.
	LONGEST RUN	1	94 (FEE 117.5 FEET	Г) X 1.25 (FIT TOTAL DEVE	TING LOSS) = ELOPED LENGTH
	GAS TYPE:			< 0.5 PSI NAT	URAL
	EQUIPMENT BOILER GWH-1	(EACH) 1000 399.9	QTY 2 2000 2 799.8		AL MBH INPUT
	GUH-1&2 Grand total	30	2 60 2859	.8	
	TRIM				ELECTRICAL
BLOWOUT-PROC	F, PRESSURE RETA	INING, ADJUSTA	ABLE STEM P	PACKING	
ADJUSTABLE RC	OUND CAST IRON TR	ACTOR COVER	TOP, DUCO (
RASS IMPELLER	, WITH AQUASTAT A	ND AUTOMATIC	TIMER KIT, 8	5 GPM @ 25	230V, 1PH, 218 WATTS
	, WITH AQUASTAT A		TIMER KIT, 1	17 GPM @ 25	230V, 1PH, 370 WATTS
	N, POLYPROPYLENE	LINER, BUTYL E	DIAPHRAGM,	GROOVED	
FRONT, FLEXIBL	E SAFETY BUBBLER	R, P-TRAP, WATE	ER VALVE		115V, 1PH, 380W
	GS-PLUS SPRAY HEA	ADS, 1/2" IPS CH	ROME PLATE	ED BRASS	
EE BRASS BOD' ECURED ROUNI	Y, TMV-3 D ADJUSTABLE STRA REFER TO PLANS F	AINER HEAD WIT	TH HOLE GR/	ATE, LOOSE	
REEZELESS, PR					
R WITH HIGHW	GRATE, MIFAB TRAF AY TRAFFIC LOAD RA	P GUARD ATED, BOLTED, ADMINISTRATIV	GAS/WATER	TIGHT	
INSTALLATION 5.004 SINGLE LE 3743-PC GRID S	EVER FAUCET, 0.5 GI	PM AERATOR, 4 00 SERIES P-TRA	" CENTER SE	ET TRIM	
URN KEY, ZURN AP & IPS CONN 5.004 SINGLE LF	Z8946-1-NT ADA TR ECTIONS, THREE HC EVER FAUCET, 0.5 G	AP, STOP AND S DLES ON DECK 4 PM AERATOR: 4	SUPPLY PRO " CENTERS " CENTER SF		
3743-PC GRID ST URN KEY, ZURN AP & IPS CONN	TRAINER, ZURN Z870 Z8946-1-NT ADA TR ECTIONS, CONCEAL	00 SERIES P-TRA AP, STOP AND S ED ARM CARRIE	AP, ZURN Z88 SUPPLY PRO ER SYSTEM J	300 SERIES TECTOR J.R. SMITH	
ERS IER, SEAT, GRA	B BARS, DELTA T13H	1332-25 SHOWE	R FAUCET S	YSTEM	
AN ECOS 8111- BOLT/WAX RING AN ECOS 8111-	1.6/1.1 HARDWIRED KIT 1.6/1.1 HARDWIRED	SENSOR FLUSH	I VALVE, EL-4	451	120V, 25W 120V, 25W
BOLT/WAX RING TED 8" BODY W/ NELS & 1 BRAC	S KIT, J.R. SMITH 021 VACUUM BREAKER KET, SUPPLIED W/ C	0-M54-XK 1000# , HOSE BRACKE CAST BRASS DR	CARRIER T, MOP HAN AIN, PROVIDI	GER, E CHECK	
IES IN AN ACCE	SSIBLE LOCATION	CAN STANDARD	7880.191 BE	DPAN	
2504.075 RIM GU	JARD, CARRIER			ER DAM,	
IFAB TRAP GUAF		m	m	~~~	mm
TRON BODY, FL	ASHING CLAMP, GRA	AVEL STOP, POL	DOMES AND	DOME,	
OW PROTECTE	D WITH DOUBLE CH	ECK BACKFLOW	/ PREVENTE	R, BUILT IN	
ROM METER, W SS CONNECTION	ATTS BALL VALVES N CONTROL AND HYI	AND "Y" STRAIN DRAULIC RESEA	ER, SHALL M ARCH AT THE	1EET E	
ROM METER, W SS CONNECTION	ATTS BALL VALVES	AND "Y" STRAIN DRAULIC RESEA	ER, SHALL M ARCH AT THE	1EET E	
ED DECK MOUN ASS BASKET & AE PLATED CAS	JT 13" HIGH SPOUT, 5 STRAINER, 1 1/2", CH T BRASS P-TRAP W/ HROME PLATED COL	8" REACH, AERA HROME PLATED CLEANOUT PLL PPER EXTENSIO	ATOR, 3-1/2" (TAILPIECE. JG, McGUIRE	OPENING McGUIRE 170LK	
ISERS, McGUIRI	E 111C SERIES 1 1/2'	"END OUTLET C		WASTE,	
XIN. MCGUIRE 1 8912 1 1/2" x 1 1 OME PLATED S XIBLE CHROME	/2" HEAVY DUTY BI /2" HEAVY DUTY CH OLID BRASS ANGLE PLATED COPPER RIS	RASS BASKET & ROME PLATED (STOPS W/ 5" CH SERS. McGUIRE	CAST BRASS IROME PLAT 111C SERIE	ED COPPER S 1 1/2" END	
E TWO FAUCET REACH, 3-1/2" C NER, 1 1/2", CHR	HOLES ON DECK PENING DRAIN. ZUP OME PLATED TAILPI	RN Z89600 TWIS ECE. McGUIRE 8	T DRAIN, Mc 912 1 1/2" x 1	GUIRE 151M 1 1/2" HEAVY	
P-TRAP W/ CLEA PLATED COPPER 1C SERIES 1 1/2	NOUT PLUG, McGUIF REXTENSION TUBE & END OUTLET CONT	RE 170LK CHROI & LOOSE KEYS, TINUOUS WASTE	ME PLATED S FLEXIBLE CH E, PROVIDE T	SOLID HROME TWO	
STALLED BY CON	NTRACTOR. McGUIRI RE 8912 1 1/2" x 1 1/2	E 151M HEAVY [" HEAVY DUTY (OUTY BRASS	BASKET & ATED CAST	
CGUIRE 170LK C	HROME PLATED SO KEYS, FLEXIBLE CH SWASTE	LID BRASS ANG	LE STOPS W COPPER RIS	// 5" SERS,	
OST MOUNT, CIE ·1/2" OPENING D ILPIECE. McGUII	RCULAR BASE, 11" H RAIN. McGUIRE 151M RE 8912 1 1/2" x 1 1/2 SHROME PLATED SO	IIGH SWING SPO M HEAVY DUTY I " HEAVY DUTY (I ID BRASS ANG	DUT, 9" REAC BRASS BASK CHROME PLA	XH, 4" WRIST XET & ATED CAST	
I TUBE & LOOSE ET CONTINUOL	KEYS, FLEXIBLE CH IS WASTE, PROVIDE	ROME PLATED	COPPER RIS	SERS, CK	
ILPIECE. McGUII cGUIRE 170LK C I TUBE & LOOSE	RE 8912 1 1/2" x 1 1/2 HROME PLATED SO KEYS, FLEXIBLE CH	" HEAVY DUTY (LID BRASS ANG ROME PLATED	CHROME PLA LE STOPS W COPPER RIS	ATED CAST // 5" SERS,	
LET CONTINUOU ER HAMMER AR	IS WASTE RESTOR)				
ONZE PLUG, REM AME AND COVE	NOVABLE STAINLES R AS REQUIRED, RE SUBMERSIBLE TYPF	S STEEL COVER FER TO ARCHIT PUMP, CAST IR	R. REFER TO FECT	PLANS FOR	115V, 60HZ, 1PH.
AINER AND HARI /2" OUTLET, ANI ER TYPE, CHECI	DWARE, AIR-FILLED D CAPABLE OF 50 GF (VALVE. PROVIDE W	HERMETICALLY PM AT 14 FEET H VITH 3 HARD WI	SEALED SH HEAD. PROVI RED WEIL #8	AFT, 15 DE WITH 230 FLOAT	1/2 HP, 1750 RPM - ALARM/SWITCH 10 FT CORD AND PLUG-115V
CONTROL PAN TANT METERING F372, 3-1/2" OPE	L, OIL SMART ALAR G FAUCET, A/C CON ENING DRAIN. McGUI	M AND SWITCH VERSION KIT FC IRE 151M HEAVY	R #SP390, LI (DUTY BRAS	EAD FREE	120V, 1PH, 60HZ, 0.3A
AILPIECE. McGU UG, McGUIRE 17 I TUBE & LOOSE	JIRE 8912 1 1/2" x 1 1 70LK CHROME PLATE 5 KEYS, FLEXIBLE CH	I/2" HEAVY DUTY ED SOLID BRASS IROME PLATED	Y CHROME P S ANGLE STO COPPER RIS	LATED OPS W/ 5" SERS, DECK_0"	
	PROVIDE, TEMPERA	ATURE CONTRC	DL SET AT 11	υευκ, 8" 0°	
AND STRAINER,	PROVIDE, TEMPERA	ATURE CONTRC	DL SET AT 11	0°	
AND STRAINER,			L SET AT 85	°, VALVE TO	
AND STRAINER, AND STRAINER, AND STRAINER, SSIBLE LOCATIC CLEANOUT WIT	PROVIDE, TEMPERA N AND WITHIN 4 TO H ROUND ADJUSTAE	BLE SCORIATED	SECURED C	ASTIRON	1
AND STRAINER, AND STRAINER, AND STRAINER, SSIBLE LOCATIC CLEANOUT WIT REFER TO PLA NECTION, 1/4" T	PROVIDE, TEMPER/ ON AND WITHIN 4 TO H ROUND ADJUSTAE ANS FOR SIZES URN VALVE, PROVID	DE WHA-1 (WATE	SECURED C	ARRESTOR)	
AND STRAINER, AND STRAINER, SSIBLE LOCATIC CLEANOUT WIT 3, REFER TO PLA INECTION, 1/4" T , INTEGRAL TRA SLOAN 186-0.5 H NECTION, 1/4" T	PROVIDE, TEMPER/ N AND WITHIN 4 TO H ROUND ADJUSTAE NS FOR SIZES URN VALVE, PROVID P, 2" FEMALE FLANC HIGH EFFICIENCY URN VALVE, PROVID	DE WHA-1 (WATE GED OUTLET CC	ER HAMMER	ARRESTOR) J.R. SMITH	
AND STRAINER, AND STRAINER, AND STRAINER, SSIBLE LOCATIC CLEANOUT WIT ; REFER TO PL4 NECTION, 1/4" T NECTION, 1/4" T NATE WITH DISH DAN ECOS 8111- BOLT/WAX RINC	PROVIDE, TEMPER/ N AND WITHIN 4 TO H ROUND ADJUSTAE ANS FOR SIZES URN VALVE, PROVID IGH EFFICIENCY URN VALVE, PROVID IWASHER EQUIPME 1.6/1.1 HARDWIRED S KIT, J.R. SMITH 021	DE WHA-1 (WATE DE WHA-1 (WATE GED OUTLET CC DE WHA-1 (WATE NT SUPPLIER SENSOR FLUSH 0-M54-XK 1000#	ER HAMMER NNECTION, A R HAMMER	ARRESTOR) J.R. SMITH	120V, 24W
AND STRAINER, AND STRAINER, AND STRAINER, SIBLE LOCATIC CLEANOUT WIT CLEANOUT WIT REFER TO PL/ NECTION, 1/4" T NECTION, 1/4" T NATE WITH DISH DAN ECOS 8111- BOLT/WAX RINC DNZE PLUG, REM AME AND COVE ESTER. TYPF 1	PROVIDE, TEMPER/ N AND WITHIN 4 TO H ROUND ADJUSTAE NS FOR SIZES URN VALVE, PROVID IGH EFFICIENCY URN VALVE, PROVID WASHER EQUIPME 1.6/1.1 HARDWIRED KIT, J.R. SMITH 021 MOVABLE STAINLESS R AS REQUIRED, RE COPPER CONSTRUCT	DE WHA-1 (WATE DE WHA-1 (WATE DE WHA-1 (WATE DE WHA-1 (WATE NT SUPPLIER SENSOR FLUSH 0-M54-XK 1000# S STEEL COVER EFER TO ARCHIT	ER HAMMER ER HAMMER ER HAMMER I VALVE, EL-4 CARRIER CARRIER CARRIER CARRIER CESS DOOR	ARRESTOR) J.R. SMITH 451 PLANS FOR	120V, 24W

PLUMBING PI

DESCRIPTION	TAG
COLD WATER	CW
FIRE	F
FORCED MAIN	FM
GAS	G
GREASE	GR
HOT WATER	НW
HOT WATER RETURN	HWR
MEDIUM PRESSURE GAS	MPG
SANITARY SEWER	SS
VENT	V
MEDICAL AIR	MA
MEDICAL NITROUS	NO2
MEDICAL OXYGEN	02
MEDICAL VACUUM	VAC

IPE LEGEND
LINETYPE
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PLUMBING SYMBOL LEGEND

D.F.U.	DRAIN FIXTURE UNITS		FROST PROOF BIBB (FPHB-1)
GPM	GALLONS PER MINUTE	• FD-1	FLOOR DRAIN
F.L.	FLOW LINE INVERT	SWD-1	SAFE WASTE [
M	WATER/GAS METER		FLOOR SINK
R	REGULATOR	General WCO-1/ SCO-1	WALL CLEAN C STACK CLEAN
	PRESSURE REDUCING VALVE	COTG-1/ TWCO-1	CLEAN OUT TO TWO-WAY CLE
-1 \bigcirc \vdash	BALL VALVE	HOR. OR VERT.	BACKFLOW PREVENTER
	MIXING VALVE	UB-1/ SB-1	UTILITY BOX/ SUPPLY BOX

GENERAL PLUMBING NOTES THE ENTIRE PLUMBING SYSTEM SHALL BE IN ACCORDANCE WITH THE LATEST EDIT THE INTERNATIONAL PLUMBING CODE REGULATIONS AND LOCAL PLUMBING INSPECTIVE THE PIPING INDICATED ON THESE PLANS ARE DIAGRAMMATICAL. ALL WORK SHALL COORDINATED WITH ALL OTHER TRADES PRIOR TO INSTALLATION. CONTRACTOR S COORDINATE ROUTING OF ALL PIPING WITH EXISTING CONDITIONS AND SHALL PRO NECESSARY OFFSETS, REROUTING, TEES, ELBOWS, ETC. REQUIRED FOR A COMPL COORDINATED INSTALLATION. THE CONTRACTOR SHALL OBTAIN AND PAY ALL FEES RELATED TO PERMITTING, INSPECTIONS, TAP-ON FEES, ETC. THE CONTRACTOR SHALL COORDINATE ANY PLUMBING OR PIPING SYSTEM SHUTD THE OWNER 48 HOURS IN ADVANCE. ALL DOMESTIC WATER, NATURAL GAS, MEDICAL AIR, NITROUS OXIDE AND OXYGEN SHOWN IS ABOVE CEILING, EXPOSED OVERHEAD, AND WITHIN WALLS UNLESS OTH NOTED. WATER HAMMER ARRESTORS SHALL BE INSTALLED AT DISHWASHERS, WA MACHINES, SUPPLY BOXES, AND QUICK CLOSING VALVES NOT LISTED. INSTALL WH CLOSE TO QUICK CLOSING VALVE AS POSSIBLE PER MANUFACTURES RECOMMEND ISOLATION VALVES SHALL BE INSTALLED ON ALL SUPPLY FIXTURE GROUPS AND HO BALANCING VALVES. FROST PROOF HOSE BIBBS AND SUPPLY PIPING SHALL BE INSTALLED ON THE INSI INSULATION. SEAL SHEATHING PENETRATION TO PREVENT AIR FROM REACHING TH ALL SANITARY, GREASE WASTE AND VACUUM PIPING SHOWN IS BELOW SLAB, BELC OR WITHIN WALLS UNLESS OTHERWISE NOTED. ALL SANITARY VENT PIPING SHOWI ABOVE CEILING, EXPOSED OVERHEAD, OR WITHIN WALLS UNLESS OTHERWISE NO FLOOR DRAINS ARE TO BE THE SAME SIZE AS THE DRAIN LINE IT CONNECTS UNLES OTHERWISE. IF SIZE IS NOT INDICATED ON DRAWINGS REFER TO PLUMBING ROUGH SCHEDULE FOR PROPER SIZE. FLUSH CONTROLS FOR HANDICAPPED WATER CLOSETS ARE TO BE MOUNTED TO T SIDE OF THE TOILET AREAS. 10 CONTRACTOR SHALL COORDINATE AND PROVIDE ALL NECESSARY PIPING & PLUMB FITTINGS, PIPING, MISCELLANEOUS ITEMS REQUIRED FOR A COMPLETE INSTALLATI ALL PLUMBING RELATED ITEMS. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL UNDER SLAB PIF EXISTING STRUCTURAL FOUNDATIONS. UNDERGROUND UTILITY LOCATIONS SHALL VERIFIED PRIOR TO ANY WORK BEING PERFORMED. CONTRACTOR SHALL REPAIR (REPLACE ALL PIPING NOT IN PROPER WORKING ORDER OR DAMAGED DURING INST OF THE NEW UNDERGROUND PIPING. 2 ALL PIPING PENETRATIONS THROUGH NEW, EXISTING WALL, OR FLOOR SHALL BE S EQUAL THE RATING OF THE NEW, EXISTING WALL OR FLOOR. 13 THE PLUMBING SYSTEM SHALL BE TESTED AS REQUIRED BY LOCAL CODE OR BY T REQUIREMENTS OF THE LOCAL PLUMBING INSPECTOR. THE ENTIRE DOMESTIC WATER SYSTEM (EXISTING/NEW) SHALL BE DISINFECTED IN ACCORDANCE TO THE LOCAL CODE & HEALTH DEPARTMENT REQUIREMENTS. DOMESTIC WATER AND SEWER LOCATED OUTSIDE OF FOOTING SHALL MAINTAIN A SEPARATION UNLESS WRITTEN PERMISSION IS OBTAINED FROM LOCAL AUTHORITI AND/OR PROPER CONTAMINATION PROVISIONS PER LOCAL CODE HAVE BEEN MET. 16 FINISHED FLOOR ELEVATION (F.F.E.) SHALL BE 0.00' FOR CALCULATION PURPOSES UNLESS NOTED OTHERWISE. 7 THE BACKFLOW PREVENTION DEVICE SHALL BE INSTALLED PER LOCAL CODE & PEF AUTHORITY HAVING JURISDICTION REQUIREMENTS. NON-LEAD TYPE ONLY. 8 ALL VENT THRU ROOF (VTR'S) PENETRATIONS INDICATED ON PLANS ARE PRELIMIN. FINAL LOCATIONS SHALL BE COORDINATED WITH ALL TRADES. ALL VTR'S SHALL BE MINIMUM OF 10'-0" FROM ALL FRESH AIR INTAKE OPENINGS. ANY PVC PIPE PENETRATING A FIRE RATED ASSEMBLY SHALL BE EXTERNALLY SLE WITH STEEL, FERROUS, OR COPPER MATERIALS, SECURELY FASTENED TO THE FIRE ASSEMBLY. ANY SPACE BETWEEN THE SLEEVE AND THE FIRE RATED ASSEMBLY PENETRATED SHALL BE PROTECTED USING MATERIAL THAT CONFORMS TO ASTM E UL 1479, SUCH AS FIRE STOP FS-1900 OR FLAME STOPPER 5000. 0 CONTRACTOR SHALL MAKE ALL FINAL CONNECTIONS FOR DISHWASHER, WASHING REFRIGERATOR, ETC. PROVIDE SHUT-OFF VALVES FOR PROPER OPERATION AND SERVICING OF DOMEST DISTRIBUTION SYSTEM, LOCATION SHALL INCLUDE BUT NOT BE LIMITED TO THE FO AT EACH FIXTURE GROUP, AT EACH BRANCH TAKE-OFF FROM MAINS AND AT THE EACH RISER. COORDINATE WITH ARCHITECTURAL PLAN FOR ACCESS DOOR LOCA 22 VALVES SHALL BE LOCATED 6" ABOVE ACCESSIBLE CEILING WHEN AT ALL POSSIBL SHALL BE CLEAR OF ANY OBSTRUCTIONS FROM OTHER TRADES. MAINTENANCE SH ABLE TO ACCESS VALVES WITH STANDARD LADDER. SHOULD LOCATION NOT BE A CONTRACTOR SHALL PROVIDE A CONTROL CHAIN AND/OR ARM. 3 TEMPERED WATER, NOT EXCEEDING A MAXIMUM OF 110° F, SHALL BE DELIVERED F PUBLIC HANDWASHING FACILITIES THROUGH AN APPROVED WATER TEMPERATURE DEVICE THAT CONFORMS TO ASSE 1070. 24 | PLUMBING CONTRACTOR SHALL PROVIDE AS AN ADD ALTERNATE BID: HAVE A FLO DONE FOR THE DOMESTIC WATER TO DETERMINE IF A BOOSTER PUMP WILL BE RE IF ONE IS REQUIRED, CONTRACTOR SHALL HAVE ONE SIZED AND PROVIDE IT FOR T PROJECT. COORDINATE ELECTRICAL REQUIREMENTS WITH THE ELECTRICAL CON 25 REGULATORS INSTALLED ON THE INTERIOR OF THE BUILDING SHALL BE VENTED T EXTERIOR PER LOCAL AND STATE CODES. 11 IS THE PLUMBING CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE CONTRACTOR TO CONFIRM THAT THE INVERTS AND LOCATIONS OF THE BUILDING ARE COMPATABLE WITH THE SITE UTILITIES PRIOR TO BEGINNING WORK. CONTRACTOR SHALL PROVIDE A PRESSURE REDUCING VALVE (PRV-1) SHOULD THE

PRESSURE EXCEED 75 PSI. CONTRACTOR SHALL CONFIRM WITH ON SITE CONDITION LOCAL UTILITY. PROVIDE BALANCING VALVES FOR PROPER OPERATION AND PRESSURE OF DOMES WATER DISTRIBUTION SYSTEM. LOCATION SHALL INCLUDE BUT NOT BE LIMITED TO FOLLOWING: AT EACH FIXTURE GROUP, AT EACH BRANCH TAKE-OFF FROM MAINS A THE EACH RISER. INSTALL PER MANUFACTURE'S REQUIREMENTS. 29 CONTRACTOR SHALL PAINT PIPING ABOVE OPEN CEILING AREAS TO MATCH ARCHI COORDINATE COLORS WITH ARCHITECTURAL PLANS.

	Image: Additional intervention of the second sec
ROOF HOSE B-1) RAIN STE DRAIN	CONSULTANT LOGO:
NK AN OUT/ EAN OUT EAN OUT JT TO GRADE/ CLEAN OUT DW TER (RPZ-1) BOX/ BOX BOX T EDITION OF INSPECTOR. SHALL BE TOR SHALL L PROVIDE ANY OMPLETE AND NG, HUTDOWN WITH YGEN PIPING S OTHERWISE S, WASHING ALL WHA-1 AS IMENDATIONS. ND HOT WATER E INSIDE OF THE ING THE VALVE. S BELOW FLOOR, SHOWN IS SE NOTED. UNLESS NOTED O TO THE OPEN PLUMBING ALLATION OF AB PIPING WITH SHALL BE PAIR OR G INSTALLATION L BE SEALED TO R BY THE	WILMA P. MANKILLER HEALTH CENTER EXPANSION STILWELL, OKLAHOMA
TED IN 5. TAIN A 10' HORITIES N MET. OSES ONLY, E & PER ELIMINARY. ALL BE A Y SLEEVED	KEY PLAN:
HE FIRE RATED BLY ASTM E 814 OR SHING MACHINE, DMESTIC WATER THE FOLLOWING: THE BASE OF LOCATIONS. DSSIBLE AND NCE SHALL BE TBE APPLICABLE RED FROM ATURE LIMITING A FLOW TEST BE REQUIRED. FOR THE CONTRACTOR. TED TO THE THE SITE DING UTILITIES	PROJECT PHASE: BID PACKAGE 02 # DATE DESCRIPTION 1 1/10/20 BID PACKAGE 02 - ADD 01 2 3/30/20 BID PACKAGE 02 - ASI 03 DATE: JOB NUMBER: 12-06-19 18-01.01
DOMESTIC TED TO THE AINS AND AT ARCHITECT.	P1.00 PLUMBING LGD, NOTES & SCHS









KEYNOTES22.01NEW 6" BUILDING DRAIN LINE.
REFER TO CIVIL PLANS FOR
CONTINUATION. 486 D.F.U.

BUILDING IS CLASSIFIED AS SEISMIC DESIGN CATEGORY C. CONTRACTOR SHALL PROVIDE SEISMIC BRACING FOR PIPING, DUCTWORK AND EQUIPMENT TO MEET ALL

SEISMIC RESTRAINTS FOR MEP EQUIPMENT AND SYSTEMS

LOCAL AND NATIONAL CODE REQUIREMENTS. CONTRACTOR'S RESPONSIBILITIES INCLUDE PROVIDING ALL SUBMITTAL'S AND DETAILS WITH STRUCTURAL ENGINEER'S CERTIFICATION FOR PERMITTING.

NOTE: IT IS THE PLUMBING CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE SITE CONTRACTOR TO CONFIRM THAT THE INVERT AND LOCATION OF THE SANITARY SERVICE IS COMPATIBLE WITH THE SITE UTILITIES PRIOR TO BEGINNING WORK.

FLOOR PLAN LEVEL 01 SECTOR 01 - DRAIN PLAN 1/8" = 1'-0"

























FLOOR PLAN LEVEL 01 SECTOR 01 - SUPPLY PLAN 1/8" = 1'-0"

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James R. Ch As South 4th Str Fort Smith, AR 72 479-783-2480 www.childersarchite	nilders Inc.
PROFESSIONAL SEAL: PROFESS I ON A PROFESS I ON A Shane Wells 28910 Of L AHOMP CA5338(PE) 03/27/2020	EL REEP
CONSULTANT LOGO:	ERING 18068R ETE IC. IRKWAY
CHEROKEE CHEROKEE CHEROKEE CHEROKEE	ATTION CRIZZ
WILMA P. MANKILLER HEALTH CENTER EXPANSION	STILWELL, OKLAHOMA
KEY PLAN:	01
PROJECT PHASE: BID PACKAGE	E 02
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DATE: JOB NUM 12-06-19 18 SHEET NUMBER:	BER: -01.01
P3.11 SUPPLY F LEVEL SECTOR	PLAN 01 2 01







FLOOR PLAN LEVEL 01 SECTOR 02 - SUPPLY PLAN 1/8" = 1'-0"

22.07 IRRIGATION LINE TO RPZ-2. COORDINATE SIZE WITH IRRIGATION CONTRACTOR. REFER TO CIVIL PLANS FOR CONTINUATION.

REFER TO CIVIL PLANS FOR CONTINUATION.

DETERGENT DISPENSER AND SIZE OF CONNECTION.

22.08 IRRIGATION LINE. COORDINATE SIZE WITH IRRIGATION CONTRACTOR.

22.20 PROVIDE 1" CW LINE TO THE MECHANICAL YARD YH-1. COORDINATE EXACT LOCATION OF THE YH-1 WITH EQUIPMENT AND OWNER/OWNER

22.38 PROVIDE CW LINE TO LAUNDRY DETERGENT DISPENSER. PROVIDE BACKFLOW PREVENTER PRIOR TO SOAP DISPENSER CONNECTION. COORDINATE WITH EQUIPMENT SUPPLIER FOR EXACT LOCATION OF

KEYNOTES



EXPANSION TANK SCHEDULE GENERAL NOTE: TAG DESCRIPTION MFR MODEL CAPACITY (YES/NO) CAPACITY (GALLONS) ACCEPTANCE (PSIG) NOTES E1-1 HEATING WATER EXPANSION TANK A200-L YES 30 30 12 35% ETYLENE GLYCOL E1-2 CHILED WATER EXPANSION TANK ARMSTRONG A200-L YES 50 50 12 35% ETYLENE GLYCOL	MECHANICAL NOTES	
Image: Application in the image: Applic	MPLY THAT THE BIDDER HAS EXAMINED THE JOB SITE UNDER ACT. NO EXTRA CHARGE WILL BE ALLOWED FOR FAILURE OF	WHICH HE WILL F
TAG DESCRIPTION MFR MODEL CONSTRUCTION CAPACITY ACCEPTANCE PRESSORE TAG DESCRIPTION MFR MODEL (YES/NO) (GALLONS) (GALLONS) NOTES ET-1 HEATING WATER EXPANSION TANK ARMSTRONG A200-L YES 30 30 12 35% ETYLENE GLYCOL ET-2 CHILLED WATER EXPANSION TANK ARMSTRONG A300-L YES 50 50 12 35% ETYLENE GLYCOL 4 ALL WORK SHALL CONFORM TANK AS00-L YES 50 12 35% ETYLENE GLYCOL 10 10 12 12 12 12 35% ETYLENE GLYCOL 10		ANY BIDDER TO
ET-1HEATING WATER EXPANSION TANKARMSTRONGA200-LYES30301235% ETYLENE GLYCOLET-2CHILLED WATER EXPANSION TANKARMSTRONGA300-LYES50501235% ETYLENE GLYCOLThe rest of the insulation th	ENSIONS DUCT DIMENSIONS AI READY HAVE ALLOWANCES F	
ET-2 CHILLED WATER EXPANSION TANK ARMSTRONG A300-L YES 50 12 35% ETYLENE GLYCOL INSULATION INSULATION INSULATION INSULATION INSULATION 50 12 35% ETYLENE GLYCOL 12 35% ETYLENE GLYCOL	CTS, THE DIMENSION SHOWN IS THE OUTSIDE METAL DUCT SI	IZE AND ALREAD
	JULATIONS, AND ORDINANCES WHICH SHALL TAKE PRECEDEN	NCE OVER THE P
PUMP SCHEDULE 4 THE DRAWINGS INDICATE THE GENERAL LAYOUT REQUIREMENTS FOR ACTUAL SITE CONDITIONS.	EQUIPMENT, FIXTURES, PIPING, DUCTWORK, ETC. FINAL LAYC	OUT SHALL BE M
ALL RUNOUTS TO SUPPLY DIFFUSERS AND RETURN AND RETURN A	ORS. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RIGGIN	NG, HANDLING, A
TAG MFR MODEL TYPE SERVICE GPM HEAD (ft) MAX HP PHASE NOTES 6 IN CASES OF EQUIPMENT SUBSTITUTION, CONTRACTOR IS RESPONS ALL SUPPLY AIR DIFFUSERS (BACKSIDE, N/A 6 IN CASES OF EQUIPMENT SUBSTITUTION, CONTRACTOR IS RESPONS	LE FOR VERIFYING THAT ALL SYSTEMS AND COMPONENTS WI	
CHWP-1 GRUNDFOS HYDRO MPCE 3CRE64-2-2 TRIPLEX CHILLED WATER 620 150 (3) 20 460 / 3 SEE BELOW HWP-1 GRUNDFOS HYDRO MPCE 3CRE20-2 TRIPLEX HEATING WATER 230 100 (3) 5 460 / 3 SEE BELOW 100 (3) 5 460 / 3 SEE BELOW	LL NOT BE CHANGED TO ROUND DUCTS. PROVIDE COMPLETE INIT LOCATIONS TO BE INSTALLED. THIS SHALL BE DONE PRIC	E SHEET METAL S
GENERAL NOTES APPLICABLE TO ALL UNITS :	TS 20" AND LARGER INSTALL RADIUS TYPE FLOWS IN RECT	
1.) POMPS TO BE FORNISHED WITH INTEGRAL MOTOR VED'S 2.) PUMPS TO BE VERTICAL MULTI-STAGE WITH SPLIT COUPLING 2.) PUMPS TO BE VERTICAL MULTI-STAGE WITH SPLIT COUPLING 3.) PUMPS TO HAVE USED ON PLANS.		
4.) SUCTION AND DISCHARGE HEADERS TO BE 316L STAINLESS STEEL 5.) PUMP BASEPLATE SHALL BE 304 STAINLESS STEEL LINED, AS INDICATED ON PLANS. FIBERGLASS LINER FIBERGLASS FIBERGLASS FIEL	OVIDE ACCESS PANELS IN SOLID WALLS AND CEILINGS FOR B	JALANCING DAMP
6.) ON-BOARD PUMP CONTROLLER SHALL CASECADE AND SEQUENCE PUMPS FOR MAXIMUM EFFICIENCY 7.) PUMP CURVES SHALL BE PROGRAMMED INTO CONTROLLER ALL MEDIUM PRESSURE CONSTANT DOUBLE WALL SPIRAL WITH DOUBLE WALL SPIRAL WITH D	ING ALL INCIDENTAL ITEMS AND CONNECTIONS NECESSARY F	FOR PROPER OP
8.) ENTIRE SYSTEM (PUMPS, VFD'S, CONTROLLER) SHALL BE MADE BY A SINGLE MANUFACTURER 9.) PUMPS TO BE OPERATED IN PARALLEL CONTROL 9.) PUMPS TO BE OPERATED IN PARALLEL CONTROL 9.) PUMPS TO BE OPERATED IN PARALLEL CONTROL 9.) PUMPS TO BE OPERATED IN PARALLEL CONTROL	FFICIENT AND EASILY MAINTAINED WITH ADEQUATE PROVISIC	ONS ALLOWED F
10.) EACH SKID MOUNTED SYSTEM SHALL INCLUDE ALL PIPE, VALVES AND FITTINGS, AND OFFER SINGLE POINT CONNECTIONS 11.) FURNISH EACH SYSTEM WITH BACNET INTERFACE CARD 12.) SYSTEM DESIGNED FOR 2 DUMPS TO HANDLE FULL LOAD WITH 3PD DUMP AS RACKUP	LS BELOW THE CRITERIA RECOMMENDED FOR THE APPLICAT	TION BY ASHRAE.
VOLUME AND VAV SUPPLY AIR DUCT 13.) FURNISH EACH SYSTEM WITH DIFFERENTIAL PRESSURE TRANSDUCERS 14.) SCCR 100K	IS SHOWN TO ALLOW FOR AIR TRANSFER (DO NOT UNDERCL	UT FIREDOORS.)
PACKAGED UNIT 14 REFER TO ARCH. PLANS AND DETAILS FOR EXACT LOCATION OF ALL FUMEHOOD EXHAUST DUCT 304 STAINLESS STEEL SEALED WITH FIBERGLASS WRAP 1-1/2", R VALUE=6.0 1-1/2", R VALUE=6.0	ALL AND CEILING MOUNTED DEVICES. ADJUST LOCATION OF S STRICAL DEVICES.	
AIR DEVICE SCHEDULE FLAMMABLE STORAGE EXHAUST DUCT EXPLOSION PROF AND CORROSION FIBERGLASS WRAP 1-1/2", R VALUE=6.0 15 WHERE CONDUIT, CABLES, DUCTWORK OR PIPING PASSES THROUG STOP MATERIAL THAT IS UL LISTED AND ACCEPTED BY LOCAL AUTH CORNING CORP. "SULCONE ELASTOMER, BTV FOAM, OR SIMILAR MAT	IRE-RATED FLOORS OR WALLS, THE SLEEVES SHALL BE COMP ITIES HAVING JURISDICTION (AHJ) AS BEING SUITABLE FOR TH	HIS SERVICE SUC
FACE FRAME NECK MATERIAL/ MAX TAC DESCRIPTION MER NECK MATERIAL/ MAX TAC DESCRIPTION MER NECK SIZE SIZE <t< td=""><td>NETRATIONS AS IT RELATES TO HIS WORK.</td><td></td></t<>	NETRATIONS AS IT RELATES TO HIS WORK.	
CD-1 CEILING DIFFUSER, LOUVERED FACE, ADJUSTABLE PRICE AMD 9x9 12x12 6 ALUMINUM/ NULL 100 CFM ACCESS AFTER CONSTRUCTION IS COMPLETED. IF INSTALLATION A 0.0000 SENSITIVE ROOMS 0.0000 SENSITIVE ROOMS 0.0000 SENSITIVE ROOMS 0.0000 SENSITIVE ROOMS 0.00000 SENSITIVE ROOMS 0.0000 SENSITIVE ROOM	ALL SUPPLY AND RETURN DUCT DOUBLE WALL SPIRAL WITH FIBERGLASS EQUAL TO UNITED MCGILL 1-1/2", R VALUE=6.0 SERVING SOUND SENSITIVE ROOMS PERFORATED METAL LINER FIBERGLASS EQUAL TO UNITED MCGILL 1-1/2", R VALUE=6.0 GREASE DUCT 16 GAUGE, CARBON STEEL WELDED THERMAL CERAMICS FIREMASTER. UL 3" AIR TIGHT AT ALL JOINTS AND SEAMS. THERMAL CARANCE TO 3" DOORS EQUAL TO ACUDOR MODEL FW-505 WHERE REQUIRED. LISTED FOR ZERO CLEARANCE TO 3" AIR TIGHT AT ALL JOINTS AND SEAMS. MECHANICAL FASTENERS SHALL NOT S" IM PENETRATE DUCT WALL PENETRATE DUCT WALL S" IM PENETRATE DUCT WALL PENETRATE DUCT WALL	
AIR TIGHT AT ALL JOINTS AND SEAMS. LISTED FOR ZERO CLEARANCE TO CD-2 CEILING DIFFUSER, LOUVERED FACE, ADJUSTABLE PRICE AMD 18X18 24x24 8 ALUMINUM/ DEMOTIONED 200 CFM 12"x12". USE 18"x18" WHEN PERSONNEL ACCESS IS REQUIRED. 18X18 24x24 8 ALUMINUM/ DEMOTIONED 200 CFM	THE SENSORS THAT ARE MOUNTED ON CALL OR HOLLOW WAL	
CD-3 CEILING DIFFUSER, LOUVERED FACE, ADJUSTABLE PRICE AMD 18x18 24x24 10 ALUMINUM/ 350 CFM	IN COMMERCIAL / RETAIL SPACES.	
CD-4 CEILING DIFFUSER, LOUVERED FACE, ADJUSTABLE PRICE AMD 18x18 24x24 12 ALUMINUM/ 475 CFM 20 IF A CENTRAL FIRE ALARM SYSTEM IS REQUIRED FOR THIS PROJECTION PROVIDE FIRE ALARM SYSTEM IS REQUIRED FOR THIS PROJECTION PROVIDE FIRE ALARM SYSTEM IS REQUIRED FOR THIS PROJECTION	ACTIONS. REFER TO ARCHITECTURAL DRAWINGS FOR FIRE E	MOKE DETECTO
EAG-1 EGG CRATE EXHAUST GRILLE PRICE 80 12X12 14X14 N/A ALUMINUM/ 500 CFM	G SHUTDOWN CONTROLS. FIRE ALARM CONTRACTOR SHALL DENTIF	. WIRE FROM DUC
EAG-2 EGG CRATE EXHAUST GRILLE PRICE 80 22X22 24X24 N/A ALUMINUM/ 1000 CFM 21 AT PENETRATIONS THROUGH FIRE WALLS: ANY PVC PIPE OR DUCT (EASTENED TO THE FIRE BATED ASSEMBLY, AND ANY SPACE BETWER 1000 CFM 21 AT PENETRATIONS THROUGH FIRE WALLS: ANY PVC PIPE OR DUCT (EASTENED TO THE FIRE BATED ASSEMBLY, AND ANY SPACE BETWER	JULD BE EXTERNALLY SLEEVED WITH STEEL, FERROUS, OR C	
LR-1 LINEAR 1" SLOT RETURN WITH SDA PLENUM PRICE SDR 1", 1 SLOT 60" N/A ALUMINUM/ 200 CFM MR MODEL MIXTURE (GALLONS) (PSI) HP VOLT/PH ACCESSORIES CONFORMS TO ASTME 814 OR UL 1479, SUCH AS FIRE STOP FS-1900	R FLAME STOPPER 5000.	
Image: Contract of the second of the seco	PROVIDE WIRING FOR FAN SHUTDOWN CONTROLS. COORDIN	JATE WITH ELECT
LS-2 LINEAR 1" SLOT DIFFUSER WITH SDA PLENUM, 1 SLOT PRICE SDS 1", 1 SLOT 60" N/A ALUMINUM/ 200 CFM	DMPLETE AND OPERATIONAL SYSTEM.	
Linear 1" SLOT DIFFUSER WITH SDA PLENUM, 2 SLOT PRICE SDS 1", 2 SLOT 60" N/A ALUMINUM/ 400 CFM 24 SEISMIC PROTECTION FOR CONCERNS OF ALL BUILDING SYSTEMS I' 1, 2 SLOT 60" N/A ALUMINUM/ 400 CFM	LUDING BUT NOT LIMITED TO MECHANICAL, PLUMBING, AND E ED SEISMIC PROTECTION MEASURES TO BE APPLIED SHALL F	
REF ARCH REF ARCH 3. 1/3 HP BRASS ROTARY VANE PUMP LS-4 LINEAR 1" SLOT DIFFUSER WITH SDA PLENUM, 1 SLOT PRICE SDS 1", 1 SLOT 24" N/A ALUMINUM/ 100 CFM 3. 1/3 HP BRASS ROTARY VANE PUMP 26 NO DECTANICIULAD DUICT SMALLED THAN 10"Y10" AUMINUM/ 100 CFM 4 MAGNETIC STARTER	CODES AND WITH MANUFACTURERS'S REQUIREMENTS, THE M	MOST STRINGEN
LV-1 WIND DRIVEN RAIN LOUVER GREENHECK EVH-501 12X14 N/A N/A ALUMINUM/ 150 CFM 6. PROVIDE WITH PRESSURE GUAGES, PRESSURE REDUCING VALVE AND SYSTEM ISOLATION VALVES. 5. PRESSURE REDUCING VALVE AND SYSTEM ISOLATION VALVES. 5. PRESSURE REDUCING VALVE AND SYSTEM ISOLATION VALVES.		
LV-2 WIND DRIVEN RAIN LOUVER GREENHECK EVH-501 22X36 N/A N/A ALUMINUM/ 1300 CFM		
RAG-1 EGG CRATE RETURN GRILLE PRICE 80 22x22 24x24 REF ALUMINUM/ 2500 CFM		
STG-1 SIDEWALL RETURN GRILLE 30° DEFLECTION 1/2" O.C. PRICE 630 8x6 10x8 N/A ALUMINUM/ 250 CFM		
SPACING. BLADES PARALLEL TO LONG DIMENSION Image: Margin of the second seco		
SPACING. BLADES PARALLEL TO LONG DIMENSION WHITE WHITE WHITE WHITE WHITE ACCESCINES TG-1 SIDEWAL TRANSFER GRILLE. 35 DEGREE DEFLECTION PRICE 630 14X14 16X16 N/A ALUMINUM/ 672 CFM		
AS-2 CHILLED WATER SYSTEM SPIROTHERM VDT 600 FA 19.8 3 260 STEEL MESH STRAINER TPG-1 MAXIMUM SECURITY GRILLE - SUICIDE DETERRENT - FIELD TITUS SG-SD 8X8 10X10 N/A AL UMINUM/ 150 CFM		$\sim\sim\sim\sim$
MECHANICAL PIPING & INSULATION SCHEDULE	<u> </u>	<u> </u>
GENERAL NOTES APPLICABLE TO ALL UNITS: 1. COORDINATE AIR DEVICE DEFLECTION ADJUSTMENTS WITH THE MECHANICAL ENGINEER DURING AIR BALANCE. 2. PROVIDE 2" EACTORY EIBERGLASS WRAP ON ALL SUPPLY DIFFUSERS WITH BACKSIDE NOT EXPOSED TO SPACE	INSULATION THICKNESS	
A LL AIR DEVICES ARE 4-WAY THROW UNLESS OTHERWISE NOTED IN SCHEDULES OR WITH FLOW ARROWS ON DRAWINGS	NOMINAL PIPE SIZE	ТО
5. REFER TO SPECIFICATIONS FOR APPROVED ALTERNATES. 6. BRANCH DUCT SIZE SHALL BE SAME AS NOTED DIFFUSER NECK SIZE UNLESS NOTED OTHERWISE. PROVIDE TRANSITION WHERE DUCT SIZE DIFFERS	J THICKNESS <1 <1-1/2 <4	4 TO <
FROM NECK SIZE. FIBERGLASS 1" UP TO 2" PIPE 1" 7. WHERE FINISH AND COLOR ARE NOTED TO BE SELECTED BY ARCHITECT/OWNER, THIS CONTRACTOR SHALL PROVIDE A COLOR PALETTE SAMPLE 1" UP TO 2" PIPE 1"	E 1 1/2" ABOVE 2"	
FOR FINAL APPROVAL WITH THE SUBMITTALS. FIBERGLASS 1" ABOVE GRADE 8. COORDINATE WITH ARCHITECT'S REFLECTED CEILING PLAN TO PROVIDE APPROPRIATE FRAME TYPE AND MOUNTING ACCESSORIES. 1" ABOVE GRADE	A BELOW GRADE	
	ACE N/A EXTERIOR 0.5 0.5 1.0	1.0
CONDENSATE LINES, AND OVERFLOWS	NA NA NA 1.0 1.0 1.0	NA 0 1.0
CONDENSATE LINES, AND OVERFLOWS IT TO THAN OUT		
All OUTDOOR INSULATED PIPING PROVIDE WITH EMBOSSED ALUMINUM JACKET OVER SCHEDULED INSULATION PER SCHEDULE NA EXHAUST FAN SCHEDULE Internet provide with embossed aluminum provide wither provide with embossed aluminum provide with embossed aluminum		
In the context In the context In the context State In the context State State In the context In the context In the context In the context In the context In the context In the context In the context In the context In the context In the context In the context In the context In the context In the context In the context In the context In the context In the context In the context In the context <td></td> <td></td>		
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Condensitie Condensitie <thcondensitie< th=""> <thcondensitie< th=""></thcondensitie<></thcondensitie<>	0.5 0.5 1.0	1.0

	EXHAUST FAN SCHEDULE													
								VOLTS /		CONTROL				
TAG	DESCRIPTION	MFR	MODEL	DRIVE	FLOW	ESP	RPM	PH	POWER	TYPE	ACCESSORIES			
EF-1	CABINET EXHAUST FAN	GREENHECK	SP-A125	DIRECT	75	0.25	1100	120/1	21 W	WALL SWITCH	A, F, G, I			
EF-2	CABINET EXHAUST FAN	GREENHECK	SP-A125	DIRECT	75	0.25	1100	120/1	21 W	WALL SWITCH	A, F, G, I			
EF-3	CABINET EXHAUST FAN	GREENHECK	SP-A125	DIRECT	75	0.25	1100	120/1	21 W	WALL SWITCH	A, F, G, I			
EF-4	CABINET EXHAUST FAN	GREENHECK	SP-A125	DIRECT	75	0.25	1100	120/1	21 W	WALL SWITCH	A, F, G, I			
EF-5	RECTANGULAR INLINE DUCT FAN	GREENHECK	SQ-120-VG	DIRECT	1300	1	1654	120/1	1/2 HP	CONTINUOUS, BAS	A, G, H			
EF-6	RECTANGULAR INLINE DUCT FAN	GREENHECK	SQ-97-VG	DIRECT	150	0.6	1494	120/1	1/4 HP	CONTINUOUS, BAS	A, G, H			
EF-7	DOWNBLAST EXHAUST FAN	GREENHECK	G-090-VG	DIRECT	300	0.25	1058	120/1	1/10 HP	WALL SWITCH	В			
EF-8	DOWNBLAST EXHAUST FAN	GREENHECK	G-143-VG	DIRECT	1250	0.6	1133	120/1	1/2 HP	CONTINUOUS, BAS	В			
EF-9	CABINET EXHAUST FAN	GREENHECK	SP-A125	DIRECT	75	0.25	1100	120/1	21 W	WALL SWITCH	A, F, G, I			
EF-10	RECTANGULAR INLINE DUCT	GREENHECK	SQ-90-VG	DIRECT	250	0.3	1194	120/1	1/10	T-STAT	A, D, H			

GENERAL NOTES APPLICABLE TO ALL UNITS: PROVIDE PRE-WIRED FACTORY MOUNTED INTEGRAL DISCONNECT DEVICE (NEMA 3R FOR EXTERIOR).
 PROVIDE VARIABLE SPEED CONTROLLER (FACTORY INSTALLED IF AVAILABLE) ON ALL DIRECT DRIVE FANS FOR FAN BALANCING. 3. PROVIDE BELT TENSIONER ON ALL BELT DRIVE FANS. 4. PROVIDE WALL SLEEVE, FAN GUARD, EXTERIOR WEATHER HOOD AND MOTORIZED DAMPER WITH TIME DELAY CONTROLS ON ALL WALL MOUNTED PROPELLER FANS.
 5. MOUNT FAN SPEED CONTROLLER IN ACCESSIBLE LOCATION ABOVE CEILING UNLESS OTHERWISE NOTED.

NOTES A PROVIDE BACKDRAFT DAMPER.

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B PROVIDE MOTORIZED DAMPER WITH TIME DELAY FAN START. MECHANICAL CONTRACTOR RESPONSIBLE FOR INSTALLING FAN, ROOF CURB, BACK DRAFT DAMPER, AND ALL INTERNAL POWER AND CONTROL WIRING AS REQUIRED TO PROVIDE FULLY OPERATIONAL FAN AND DAMPER. C PROVIDE WITH VARIABLE FREQUENCY DRIVE SAME SIZE AS LISTED MOTOR HORSE POWER. PROVIDE WITH INVERTER DUTY (NEMA MGI PART 31), MOTOR-MOUNTED GROUNDING RING. REFER TO VARIABLE FREQUENCY DRIVE SCHEDULE FOR SPECIFICS.

D PROVIDE SPUN ALUMINUM VENT CAP, COOK MODEL "PR" WITH ROOF CURB.

6. PROVIDE ROOF CURB TO MATCH ROOF TYPE AND SLOPE AT ALL ROOF MOUNTED FANS.

E PROVIDE MANUFACTURER'S BRICK VENT. COLOR TO BE SELECTED BY ARCHITECT. F PROVIDE MANUFACTURER'S WHITE ALUMINUM GRILLE.

G PROVIDE BIRD SCREEN. H PROVIDE ISOLATOR KIT.

I PROVIDE MANUFACTURER'S WALL CAP.

J PROVIDE GREASE COLLECTION CUP.

0																	R	OOFTO	P CH	ILLE) WATE	R VAV A	AIR HANE	DLING	UNIT W	ITH H	OT WA	TER HE	AT														
∞					Ş	SUPPLY	FAN		E	EXHAUS ⁻	T FAN					HE	ATING CO		$\langle \cdot \cdot \rangle$	$\overline{)}$	2					С		OIL WATER								CIRCL	JIT #1 - SIN INT POWEI	GLE R	CIRCUIT # UV LIGHT	¢2 - (ΓS LIG	CIRCUIT #3 - HTS & SWITC	CIRC	CUIT #4 - PTACLE
	TAG	DESCRIPTI			E FAN	ES		FA		ESP					EAT / LAT	FACE M AREA V SQ FT)	IAX FACE ELOCITY		D HEAT	FINS /	MAX WP[GPM (FT)	ENT / LVG WATER		SENS TOT CA (MBH)	/ NP EAT DB		FACE 3 / AREA 5) (SQ FT)	MAX FACE VELOCITY (FPM)	MAX APD (IN-WG)	ROWS	MA) WP[GPM (FT)	EWT / LWT (°F)	OA CEM	PRIMARY AIR FILTERS	PRE-AIR	FLA (AMPS)	MCA N		MCA MC		CA MOCP	MCA	
4	AHU-1	ROOFTOP MULTI-ZONE	E TRANE	CSAA035 DIREC	T (4) 10 17	500 3	6.91	2842 (4)	3.5 17500	2	2.66	2180 35% E GL	THYLENE YCOL	569.36	35 / 65	32.63	536	0.078	1	81	62.74 7.46	180 / 160	35% ETHYLEN GLYCOL	E 557.50 837.34	80 / 67	51.10/5	1 33.53	522	1.325	8	196.3 29.84	45 / 55	4175 (*	12) MERV 8 / 12) MERV 13	(12) MERV 5	75.2	78.70	90	3.85	15 3.	26 15	10	15
	AHU-2	ROOFTOP MULTI-ZONE	E TRANE	CSAA021 DIREC	T (4) 5 10	500 3	6.21	3738 (4)	2.5 10500	2	2.65	2717 35% ET GL	THYLENE YCOL	341.62	35 / 65.89	19.83	529	0.078	1	80	35.12 2.91	180 / 160	35% ETHYLEN GLYCOL	E 332.18 497.27	80 / 67	51.30 / 51.20	20.81	505	1.179	8	116.57 12.38	45 / 55	2750 (7	7) MERV 13 / (7) MERV 8	(7) MERV 5	52	54.05	60	1.93 1	15 3.	26 15	10	15
	AHU-3	ROOFTOP MULTI-ZONE	E TRANE	CSAA035 DIREC	T (4) 10 17	500 3	6.89	2842 (4)	3.5 17500	2	2.66	2180 35% E GL	THYLENE YCOL	569.36	35 / 65	32.63	536	0.078	1	81	62.74 7.46	180 / 160	35% ETHYLEN GLYCOL	E 557.50 837.34	80 / 67	51.10 / 5	33.53	522	1.325	8	196.3 29.84	45 / 55	4175 (* (*	12) MERV 8 / 12) MERV 13	(12) MERV 5	75.2	78.70	90	3.85 1	15 3.	26 15	10	15
4	AHU-4	ROOFTOP MULTI-ZONE	E TRANE	CSAA021 DIREC	T (4) 5 10	500 3	6.91	3738 (4)	2.5 10500	2	2.65	2717 35% ET GL	THYLENE YCOL	341.62	35 / 65.89	19.83	529	0.078	1	80	35.12 2.91	180 / 160	35% ETHYLEN GLYCOL	E 332.18 497.27	80 / 67	51.30 / 51.20	20.81	505	1.179	8	116.57 12.35	45 / 55	2500 (7	7) MERV 13 / (7) MERV 8	(7) MERV 5	52	54.05	60	1.93 1	15 3.	26 15	10	15
international de la construcción de la construcció	GENER	RAL NOTES AP	PLICABLE TO) ALL UNITS: JRB.									AC A I	CCEPTABLE	MANUFAC	TURERS																											

ℜ ____ 2. PROVIDE THROUGH THE BASE ELECTRICAL.

3. PROVIDE UNIT MOUNTED CONVENIENCE OUTLET. 4. E.C. TO PROVIDE DISCONNECT SWITCH.

5. PROVIDE BACNET INTERFACE 6. PROVIDE 0-100% ECONOMIZER

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4

-0"

7. PROVIDE OUTSIDE AIRFLOW MONITOR. 8. PROVIDE STAINLESS STEEL DRAIN PAN.

9. PROVIDE DOUBLE WALL CONSTRUCTION. 10. PROVIDE PHASE LOSS MONITORING THROUGH BAS.

11. DIRECT DRIVE FAN AND MOTOR ASSEMBLIES TO BE INTERNALLY ISOLATED FROM THE UNIT CASING WITH 2" DEFLECTION SPRING ISOLATORS. ∞ └──┐

12. PROVIDE WITH HYDRONIC PIPING HOUSING.

13. PROVIDE 2X2 FAN ARRAY FOR SUPPLY AND EXHAUST. 14. PROVIDE FACTORY MOUNTED VFDS. PROVIDE 1 VFD PER SUPPLY FAN (QTY. 4). PROVIDE 1 VFD TO SERVE ALL EXHAUST FANS (QTY. 1). 15. PROVIDE WITH SINGLE POINT POWER.

16. PROVIDE WITH UV LIGHTS. 17. PROVIDE WITH 5 YEAR FACTORY WARRENTY 18. SCCR 65K ON AHU NOTED

	SERVICE	DUCT TYPE	INSULATION T
	ALL RUNOUTS TO SUPPLY DIFFUSERS AND RETURN GRILLES CONCEALED ABOVE CEILINGS	ROUND WRAPPED OR RECTANGULAR LINED, AS INDICATED ON PLANS.	FIBERGLASS WRAP OR MAT FIBERGLASS LINER
	ALL SUPPLY AIR DIFFUSERS (BACKSIDE,	N/A	FIBERGLASS WRAP
Ľ	FRESH AIR SUPPLY DUCT	ROUND WRAPPED	FIBERGLASS WRAP
	FRESH AIR EXHAUST DUET	ROUND WRAPPED OR RECTANGULAR LINED, AS INDICATED ON PLANS.	FIBERGLASS WRAP OR MAT FIBERGLASS LINER. N/A IF I UNCONDITIONED SPACE
	RESTROOM EXHAUST DUCT	ROUND WRAPPED OR RECTANGULAR LINED, AS INDICATED ON PLANS.	FIBERGLASS WRAP OR MAT FIBERGLASS LINER FIBERGLASS LINER
	ALL MEDIUM PRESSURE CONSTANT VOLUME AND VAV SUPPLY AIR DUCT FOR FIRST 20' FROM AIR HANDLER OR PACKAGED UNIT	DOUBLE WALL SPIRAL WITH PERFORATED METAL LINER	FIBERGLASS EQUAL TO UNI ACOUSTIC - K27
	ALL MEDIUM PRESSURE CONSTANT VOLUME AND VAV SUPPLY AIR DUCT BEYOND 20' FROM AIR HANDLER OR PACKAGED UNIT	ROUND WRAPPED OR RECTANGULAR LINED, AS INDICATED ON PLANS.	FIBERGLASS WRAP OR MAT FIBERGLASS LINER FIBERGLASS LINER
	FUMEHOOD EXHAUST DUCT	304 STAINLESS STEEL SEALED WITH MASTIC JOINT SEALER	FIBERGLASS WRAP
	FLAMMABLE STORAGE EXHAUST DUCT	EXPLOSION PROOF AND CORROSION PROOF WELDED 304 STAINLESS STEEL	FIBERGLASS WRAP
	ALL SUPPLY AND RETURN DUCT SERVING SOUND SENSITIVE ROOMS	DOUBLE WALL SPIRAL WITH PERFORATED METAL LINER	FIBERGLASS EQUAL TO UNI ACOUSTIC - K27
	GREASE DUCT	16 GAUGE, CARBON STEEL WELDED AIR TIGHT AT ALL JOINTS AND SEAMS.	THERMAL CERAMICS FIREM LISTED FOR ZERO CLEARAN

		AIR S	SEPAR	ATOR SO	CHEDULE															
ARK AS-1 AS-2	SERVES HEATING WATER SYSTEM CHILLED WATER SYSTEM	MFR SPIROTHERM SPIROTHERM	MOE VDT 60 VDT 60	DEL (C	LUME GAL) WPD (F 19.8 3 19.8 3	T) WEIGHT (LB) 260 260	ACCESSORIES STEEL MESH STRAINE STEEL MESH STRAINE	R												
							MECHAN		NG & INSULATIO	N SCHEDUL	.E	\sim	\sim	\sim	\sim	\sim	\sim			
		RIOR INSULATED F	PIPING TO BE F	PROVIDED WITH AL	UMINUM JACKET.									I	NSULATION THIC	KNESS				
		SERVICE EATING TO 250°	F	STEEL, SCHEDL	P JLE 40, BLACK TYPE	IPING TYPE "L" HARD COPPEF	२	FIBERGLASS	INSULATION TYPE	INS 1" UP TC		ON THIC	CKNESS	<1	<1-1/2	<4	4 TO <			
		WATER		STEEL, SCHEDU	JLE 40, BLACK TYPE	"L" HARD COPPER	र	FIBERGLASS		PIPE SIZ 1" ABOV N/A BELO	e Grade Dw grae	N/A BELC	W GRADE							
		RAINS, COOLING	RELOWS	TYPE "L" HARD	COPPER			ELASTOMERIC	;	3/8" IF IN SPACE	TERIOR	SPACE N//	AEXTERIOR	0.5	0.5	1.0	1.0			
			ING	PROVIDE WITH	EMBOSSED ALUMINU	JM JACKET OVER	SCHEDULED INSULATION	PER SCHEDUL	E	N/A	NA NA NA									
		ER BELOW GRAD	E	PREMANUFACT OF HIGH DENSI FITTINGS MANU POLYETHYLENE SHALL BE HEAT THAT BUTT FUS UNINSULATED F	URED SYSTEM MEET TY POLYETHYLENE (IFACTURED FROM E) E COMPOUND MANUF FUSION BUTT-WELD SION WELDED IN THE FITTINGS SHALL BE F	FING THE FOLLOW HDPE), CONFORM XTRA HIGH MOLE(FACTURED FOR LI DED TO ADJACEN E FIELD ARE NOT II FIELD APPLIED HE	VING CRITERIA: CARRIER PIF /ING TO ASTM D. PIPE AND CULAR WEIGHT ISTED SERVICE. FITTINGS T PIPE SECTIONS. FITTINGS NSULATED. END SEALS AT EAT SHRINKABLE END SEALS	PE POLYURETHAN INJECTED WIT BETWEEN CAR THICKNESS OF 90-95% CLOSE POUNDS PER 5. THERMAL CON CONFORM TO	NE FOAM EITHER SPRAY APPLIE TH ONE SHOT INTO THE ANNULA RRIER PIPE AND JACKET WITH A F ONE INCH. INSULATION SHALL ID CELL POLYURETHANE WITH A CUBIC FOOT DENSITY AND COE IDUCTIVITY (K-FACTOR) OF 0.16 ASTM C-591	ED OR R SPACE MINIMUM BE RIGID, A 2.0 TO 3.0 FFICIENT OF AND SHALL	IZES			1.0	1.0	1.0	1.0			
	CHILLED WATE GRADE BETWE	ER ABOVE AND B EEN 40-60°F	ELOW	STEEL, SCHEDULE 40, BLACK TYPE "L" HARD COPPER						1" ALL S	ZES			0.5	0.5	1.0	1.0			
		<u> </u>	M	<u> </u>	<u> </u>		unit.						<u> </u>				<u> </u>			
							C	JNDENSI	NG BOILER SCHE	DULE										
	TAG	DESCRIPT	MNFR	MODEL	FLUID	WPD (FT)	FLOW RATE MAX/ MIN(GPM)	TURNDOWN	EFFICIENCY @ 100% FIRE / DESIGN EWT	OPERATING WEIGHT (LBS)	MBH IN	MBH OUT	BOILER VOLT PHASE / AN	⁻ AGE / MPS	PUMP VOLT PHASE / A	TAGE / MPS	N			
	B-1	CONDENSING BOILER	CAMUS HYDRONICS	AVNH1600	35% ETHYLENE GLYCOL	4	115/13	22:1	92	1640	1600	1498	115V /1 /8A	4	115V /1 /8	BA E	EFF. % FOR 18			
	B-2	CONDENSING BOILER	CAMUS HYDRONICS	AVNH1600	35% ETHYLENE GLYCOL	4	115/13	22:1	92	1640	1600	1498	115V /1 /8A	4	115V /1 /8	3A E	EFF. % FOR 18			
	GENERAL NOT 1.) REQ 2.) INST 3.) MAN 4.) MAN 5.) MAN 6.) HEA 7.) BOIL 8.) BOIL 9.) INST 10.) MAN 11.) MAN 12.) MAN 13.) PRO	ES APPLICABLE UIRED GAS PRES ALL BOILERS ON UFACTURER TO UFACTURER TO UFACTURER TO TING OUTPUT BA ER MANUFACTU ER MANUFACTU ER MANUFACTU ALL BOILER ON F UFACTURER TO UFACTURER TO UFACTURER TO	TO ALL UNIT SSUREIS 7.0" I EXISTING CO PROVIDE ST/ SUBMIT EQU PROVIDE BA SED ON 160 RER SHALL F RER SHALL F EXISTING CO INCLUDE ALL PROVIDE BA PROVIDE BA TE NUETRAL	S: W.C. MINIMUM T ONRETE PAD. 10 ARTUP SERVICE IPMENT SHEETS CNET COMMUNI DEG. RETURN W URNISH THE FO URNISH BOILER NCRETE PAD. STEP CONTRO CNET COMMUNI HEREMERGEN LZER KIT.	TO 14" W.C. MAXIMUN " DIA. FLUE VENT CC AND FIRST YEAR LA WITH QUOTE INCLU CATION INTERFACE (ATER, 180 DEG. SUP CLOWING FIELD INS ^T CIRCULATION PUMF L FOR BOILER CAPAC CATION INTERFACE CY SHUT-DOWN SWIT	A. DNNECTION, 10" D BOR WARRENTY JDING CAPACITY, J TO TEMPERATUR PLY WATER. TALLATION: 50 PS P FOR INSTALLATI CITY CONTROL. TO TEMPERATUR TCH (RED MUSHR	DIA. COMBUSTION AIR CONN WITH DIAGNOSTICS EFFICIENCY, MCA, LENGTH, E CONTROL SYSTEM FOR E I RELIEF VALVES; 100% LOC ION. E CONTROL SYSTEM.	ECTION, 2" NPT GA WIDTH, HEIGHT, AI NABLE/DISABLE, ST KUP GAS PRESSUF	S CONNECTION, 4" FLANGED WA ND WEIGHT "ATUS, ALARM, SETPOINT ADJUS RE REGULATOR FOR EACH BOIL	ATER CONNECTIONS. STMENT AND FIRING R ER, CONDENSATE NEL	ATE FOR JTRALIZA	EACH BO TION KIT;	ILER. AND COMBUSTION	AIR INLE	T FILTER.					

	CHILLER SCHEDULE																
TAG	DESCRIPTION	MFR	MODEL	NOM. TONS	NET TONS	FLUID	FLOW RATE (GPM)	EVAP COIL PD	EWT (°F)	LWT (°F)	FAN FLA	TOTAL POWER	VOLTS	PH	MCA	MOCP	NOTES
CH-1	AIR COOLED SCROLL TYPE	TRANE	CGAM130	130	107.5	35% ETHYLENE GLYCOL	195	19.5 FT H20	51	40	33A	158.7 kW	460 V	3	261 A	300 A	UNIT HAS SIX COMPRESSOR
CH-2	AIR COOLED SCROLL TYPE	TRANE	CGAM130	130	107.5	35% ETHYLENE GLYCOL	195	19.5 FT H20	51	40	33A	158.7 kW	460 V	3	261 A	300 A	UNIT HAS SIX COMPRESSOR
GENERAL N 1. PROVIDE 2. SCCR 65H 3. PHASE PI	OTES APPLICABLE TO ALL UNITS WITH SINGLE POINT POWER. (ROTECTION	S:										·					

4. BACNET INTERFACE 5. PROVIDE WITH FACTORY MOUNTED DISCONNECT.

6. PROVIDE WITH 5 YEAR FACTORY WARRENTY.

B.YORK-A JOHNSON CONTROL COMPANY

C.TRANE D. AAON



SCHEDULES

	SHEETMETAL ANGLE RING (MIN. 22 GA.) SECURE TO SLEEVE FIBERGLASS ROPE (1000°) MIN. 3 WRAPS REQ'D	SHEETMETAL SLEEVE (MIN. 22 GA.) DRYWALL PARTITION
6 ¹ 0 1 ¹ = 1 ⁻⁰	9 PIPE SLEEVE THRU WALL DETAIL SCALE: N.T.S.	
2	AUTOMATIC HIGH CAPACITY AIR VENT FROM BOILER AIR SEPARATOR MANUAL BLOW DOWN VALVE PIPED TO DRIAN.	P FF VALVE L) WYE STRAINER WITH BLOW DOWN VALVE AND CAP UNION (TYPICAL) BY-PASS VALVE
4 6" 0 3/4" =1'-0"	AUTOMATIC AIR VENT	PIPE DOWN TO DRAIN
=1:-0" =1:-0"	6 HEATING WATER SYSTEM MAKEU SCALE: N.T.S.	P AND EXPANSION TANK DETAIL
3/8"=		HWS HWS HWR HWR HWR HWR
16 20 0 0 1/4 = 1:-0" 4	MANUAL AIR VENT UNION (TYPICAL) PRESSURE / TEMPERATURE PORT (TYPICAL) COIL DRAIN VALVE	CIRCUIT SETTER
0 4 8 1/8" =1".0"	3 HOT WATER REHEAT COIL AT VAV E 3/16" = 1'-0"	3OX

INSULATION

(WHERE REQ'D.) -



CAPPED HOSE CONNECTION

REFER TO MANUFACTURER'S GUIDELINES FOR EXACT SIZE OF MANIFOLD FOR THE HOT WATER PUMPS.

8 TRIPLEX PUMP SYSTEM DETAIL 1/4" = 1'-0"

2 AHU REHEAT COIL PIPING 3/16" = 1'-0"

AUTOMATIC

HIGH CAPACITY

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Manifolds 8" ANSI Class 150 AISI 316SS Schedule 10s ASTM A312 or Ø219.1mm x3mm
 Base/Frame AISI 304SS
 Standard system layout : panel right facing suction
 4" lug style ANSI 150# class butterfly valve
 UL Type 3R/12 rated electrical panel Note: panel size will vary with options

ONE OR BOTH SIDES WHERE ESCUTCHEON PLATE ON

- METAL STUD

PIPE

PIPING IS EXPOSED.

RPZ BACKFLOW
 PREVENTER

 $\vdash \lor \leftarrow$ FROM DOMESTIC WATER SUPPLY

ROUTE DRAIN -TO NEAREST FLOOR DRAIN

4 AIR COOLED CHILLER PIPING CONNECTION DETAIL SCALE: N.T.S.

Sequence of Operation – Airside Optimization

System Operating Modes: The Building Automation System (BAS) shall include a adjustable time-of-day schedule to define when the various areas of the facility are expected to be occupied versus unoccupied. Then, based on current zone conditions, the BAS determines the current system operating mode.

Occupied Heat/Cool During the Occupied Mode, each VAV terminal unit varies primary airflow, cycles a terminal fan (if equipped), and/or modulates (or stages) a local or remote heat source (if equipped) to maintain zone temperature at the occupied setpoint (cooling or heating). Meanwhile, the air-handling unit (AHU) modulates the supply fan and return fan (if equipped) to deliver the required airflow to the zones, positions the outdoor-air damper to bring in required amount of ventilation, modulates the central relief damper (or relief fan) to maintain building pressure at the desired setpoint, and modulates the chilledwater valve, modulates (or stages) the source of heat, and/or enables the airside economizer to discharge air at the desired setpoint.

Unoccupied Heat/Cool

During the Unoccupied Mode, each VAV terminal unit varies primary airflow, cycles a terminal fan (if equipped), and/or modulates (or stages) a local or remote heat source (if equipped) to maintain zone temperature at the unoccupied setpoint (cooling or heating). Meanwhile, the AHU shuts off, unless a zone requires unoccupied cooling or heating. If needed to operate, the AHU modulates the supply fan and return fan (if equipped) to deliver the required airflow to the zones, closes the outdoor-air damper, closes the central relief damper (or shuts off the central relief fan), and modulates the chilled-water valve or modulates (or stages) the source of heat to discharge air at the desired setpoint.

Morning Warm-up/Pre-cool

During the Morning Warm-up/Pre-cool Mode, each VAV terminal unit varies primary airflow, cycles a terminal fan (if equipped), and/or modulates (or stages) a local or remote heat source (if equipped) to raise/lower the zone temperature to the occupied setpoint (heating or cooling), and then closes. Meanwhile, the AHU modulates the supply fan and return fan (if equipped) to deliver the required airflow to the zones, closes the outdoor-air damper, closes the central relief damper (or shuts off the central relief fan), and modulates the chilled-water valve or modulates (or stages) the source of heat to discharge air at the desired setpoint. For a cold

-air VAV system, if the return air dew point temperature is higher than 55°F (adj) during Morning Pre-cool Mode, the discharge-air temperature setpoint will be reset every 10 minutes so that it is only 2°F (adj) below the current return air dew point temperature .

Optimized System -Level Control Sequences: The BAS shall perform the following

optimized system-level control strategies:

Optimal Start The BAS shall initiate Optimal Start mode such that the AHU is started and VAV boxes are enabled to allow the zone temperature to reach the occupied heating or cooling setpoint prior to scheduled occupancy. The system shall wait as long as possible before starting, so that the temperature in each zone reaches the occupied setpoint just in time for scheduled occupancy.

Optimal Stop The BAS shall initiate Optimal Stop mode such that cooling or heating is disabled so that the zone temperature does not drift beyond the occupied standby setpoint by the end of the scheduled occupancy period. The AHU supply fan shall continue operating, and ventilation control shall continue, through the end of the scheduled occupancy period.

CONTROLS - RISER AND MAIN SEQUENCE OF OPERATIONS

Sequence of Operations

- Chilled Water Plant

System General Description:

The chilled water system consists of the following:

Two (2) chillers, configured as: one (1) lead and one (1) lag

Three (3) chilled water pumps: one (1) lead, one (1) lag and one (1) standby One (1) chilled water isolation valve per chiller

Chilled water bypass valve

The Building Automation System

(BAS) controller provides stand-alone control or control from a higher level BAS and provides lead/lag/standby control for the chilled water pumps and controls the chilled water bypass valve to maintain minimum flow

through operating chillers.

Chilled Water Plant Enable The chilled water plant will be enabled in response to a need for chilled water from any system load as indicated by any chilled water valve being commanded to more than 50%

open for more than 5 minutes. Startup – Soft Start System Soft Start - The chiller plant control system will initiate a "soft start" mode

determined by percent run load amps, for 20 (adj) minutes.

whenever the system chilled water temperature exceeds the specified chilled water system setpoint by 20°F (adj) at system start-up. The chiller plant control application will add cooling capacity during soft start mode only if return water temperature is not declining at a rate of at least 0.5°F (adj) per minute. This prevents the unnecessary operation of chillers and limits system electrical demand during chilled water loop pull

down. Chiller Sequencing

When the chilled water system is enabled the chiller plant control system will send an Enable signal to the lead chiller and chilled water pumping control. The chiller plant control system will initiate the start of the next chiller in the sequence whenever the chilled water load, as determined by the system supply water temperature, is not met for 20 (adj) minutes. The chiller plant control system will initiate the shutdown of the next chiller in the sequence whenever excess chilled water capacity exists, as

Chiller Rotation

Chiller rotation will be initiated based on an operator editable day of week/time, fixed number of days, number of run hours, or by the cycling of a binary input. Chiller cycling caused by normal system load fluctuations will cause the chillers to change rotation sequence or at the operator's option chillers may be forced into the new rotation

sequence at the time of sequence change.

Chiller Setpoint Control The chiller plant control system will control individual chiller setpoints to maintain the

system supply water temperature setpoint.

Failure Recovery Upon sensing a chiller failure the chiller plant control system will shut down the failed

chiller immediately and initiate the start of the next chiller in the rotation sequence. In of chillers running to the number of chillers running prior to the power loss. The

the event of a power loss, the chiller plant control application will compare the number application will add chillers one at a time, skipping normal delay timers, until the chillers

running equals the number of chillers running prior to the power loss. Chilled Water Supply Temp Reset:

The chilled water supply temperature setpoint default shall be 42 deg. F. (adj.) This setpoint shall be reset based on outside air dry bulb temperature. When the outside air dry bulb is 65 deg. F or greater, the chilled water supply temperature shall be

42 deg. F. When the outside air dry bulb is 55 deg. F or less, the chilled water supply temperature shall be 55 deg. F. When the outside air dry bulb temperature is between 65 and 55 deg. F the chilled water supply temperature setpoint shall be linearly reset

between 42 and 55 deg. F. If at any time any AHU chilled water valve is more than 97% open, this reset shall be disabled and the chilled water supply temperature setpoint shall revert to default.

If the system global outside air temperature sensor is in fault, an alarm shall be annunciated at the BAS and the chilled water supply temperature setpoint shall revert to default.

Chilled Water Pumping System Enable/Disable:

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The chilled water pumping system shall be enabled on a contact closure from any system chiller. When enabled, the BAS controller shall open the isolation valve and starts the lead chilled water pump. As additional chillers make chilled water requests, the next pump in the sequence shall be enabled and chiller isolation valves opened. When the chilled water pumping system is disabled

, the chilled water pumps shall be off and the isolation valves shall be closed unless requested by one of the chillers. The

isolation valve for the first chiller in the sequence shall be an exception to this. If the plant is disabled, the isolation valve for that chiller shall be opened so that the pump can start immediately when the plant is enabled.

Chilled Water Pump Control: When enabled as described above,

pump through a contact closure of t enable contacts. The BAS controller shall monitor th

default setpoint shall be 15 psig (adj.). When the running pump(s)' speed is controlled to 100% (60 hz)and the system

shall be modulated in unison.

(adi.). current flow and pressure at 90% or less speed.

the sequence. pump on momentarily. This shall re-enable the pumps participation in the lead/lag sequence. Chilled Water Pump Lead/Lag Rotation:

BAS. System Differential Setpoint Optimization:

in this optimization.

At chilled water system startup , the differential pressure setpoint is 100% of the maximum pressure setpoint. When all valves are less than 85% open, the differential pressure setpoint shall be lowered by 0.1 psig (adj.). This occurs every 5 minutes until at least one valve is more than 85% open, or if the setpoint is equal to the minimum

differential pressure setpoint, or if the pump VFD's are at a minimum speed setting (22 When any valve is more than 95% open, the differential pressure setpoint shall increases by 0.1 psig (adj.). This occurs every 5 minutes until no valve is more than 95%

or if the pump VFD's are at the maximum setting (60 Hz). BAS and the differential setpoint shall revert to default.

Chiller Isolation Valves:

operation.

Bypass Valve Control:

minimum pressure (flow) on all operating chillers.

Unoccupied Economizing (Night Purge)

Between 4:00 AM (adj.) and 6:00 AM (adj), the BAS shall initiate Unoccupied Economizing mode if the current zone temperature is at least 1°F warmer than the occupied cooling setpoint and the outdoor dry-bulb temperature is more than 15°F (adj) cooler than the current zone temperature. When initiated, the AHU is started (OA damper fully open, chilled-water valve closed) and VAV boxes are enabled to allow the zone temperature to cool to the occupied cooling setpoint.

Optimized Control of Supply Duct Static Pressure (Fan-Pressure Optimization) At a frequency of once every 10 minutes, the BAS shall monitor the damper position of all VAV terminal units. The BAS shall calculate a new supply fan duct static pressure setpoint based on the position of the furthest-open VAV damper, and send this newlycalculated setpoint to the AHU controller. When any VAV damper is more than 75% (adj) open, the supply fan duct static pressure setpoint shall be reset upward by 5% until no damper is more than 75% (adj) open or the static pressure setpoint has reset to the maximum setting. When all VAV dampers are less than 65% (adj) open, the supply fan duct static pressure setpoint shall be reset downward by 5% until at least one damper is more than 65% (adj) open or the static pressure setpoint has reset to the minimum setting.

Optimized Control of Supply Air Temperature (SAT Reset)

At a frequency of once every 10 minutes, the BAS shall monitor the outdoor dry-bulb temperature, as well as the zone temperature and damper position of all VAV terminal units. The BAS shall calculate a new SAT setpoint based on current outdoor air (OA) temperature, and send this newly-calculated SAT setpoint to the AHU controller. When the OA temperature is warmer than 65° F (adj), the SAT setpoint shall be 55° F (adj). When the OA temperature is colder than 55°F (adj), the SAT setpoint shall be 60°F (adj). When the OA temperature is between 55°F (adj) and 65°F (adj), the SAT setpoint shall be reset proportionally between 55°F (adj) and 60°F (adj). If at least two (adj) zones have both 1) a VAV damper that is more than 75% open, and 2) a current zone temperature that is higher than the current cooling setpoint, then the SAT setpoint shall return to 55°F (adj) If the outdoor dew point is higher than 60°F (adj), this SAT Reset sequence shall be suspended and the SAT setpoint shall be reset to 55°F (adj) until outdoor dew point drops below 57°F (adj).

Optimized Control of Ventilation (Ventilation Optimization)

The actual outdoor airflow shall be sensed at the outdoor air intake of the AHU, and controlled to an airflow setpoint determined according to ASHRAE Standard 62.1. When the BAS time-of-day schedule indicates that a zone is unoccupied, the required outdoor airflow for that zone shall be zero. When the schedule indicates that a zone is occupied, the required outdoor airflow for that zone shall equal the design outdoor airflow, unless the zone is equipped with occupancy sensor and/or a carbon dioxide (CO sensor, or

uses a time-of-day ventilation schedule, to reduce the required outdoor airflow during periods of partial occupancy. The required outdoor-air fraction (current required outdoor airflow divided by the current primary airflow) shall be continuously calculated for each zone (VAV terminal unit). At a frequency of once every 10 minutes, the BAS shall gather this data from all VAV terminal units, calculate the minimum required outdoor airflow for the system according to ASHRAE 62.1, and send this newlycalculated outdoor airflow setpoint to the AHU controller.

, the BAS controller shall start the lead chilled water f the pumps Variable Frequency Drive (VFD) drive run-	
ne chilled water system differential pressure sensor.	

When the pump VFD is enabled, the BAS controller shall control the analog speed signal that is sent to the pump VFD to maintain the chilled water differential pressure setpoint which is reset as described in the Pump Optimzation section of this sequence. The

differential pressure setpoint is not maintained for 5 minutes, the next available lag pump shall start. When multiple pumps are running to maintain setpoint, their speed

If more than 1 pump is running and their speed is over 75% **, the last pump most recently started shall be disabled, subject to a minimum on/off timer of 10 minutes

** this speed shall be adjusted by the BAS Contractor according to the pump curves provided by the pump manufacturer. The speed shall be chosen which according to the pump curves, indicates the resulting running pump(s) would be able to maintain the

If a pump is commanded on and fails to prove status (through the VFD) for more than 30 seconds (adj.), the BAS controller shall cancel the start command to that pump, annunciate a chilled water pump failure alarm to the BAS, and start the next pump in

Once the problem has been corrected, the operator shall be able to clear the alarm failure from the BAS controller from the BAS interface or by manually overriding the

The chilled water pump lead/lag sequence shall be rotated on a weekly schedule. The sequence shall be based on calculated run time with the pump having the least run time as lead, the pump with the next lowest run time will be the second in the sequence and so on. An operator shall be able to manually change the lead/lag sequence from the

The BAS shall continually monitor the position of all valves in the chilled water system. From the BAS interface an operator shall be able to exclude any valve for consideration

open, or if the differential pressure setpoint has risen to the system's maximum setting, If the system differential pressure sensor is in fault, an alarm shall be annunciated at the

Chiller isolation valves shall prevent the flow of water through non-operating chillers. Chiller chilled water pump operation will be coordinated with the isolation valve

The BAS controller shall monitor the evaporator differential pressure of the chillers. When the pressure of an operating chiller indicates a low pressure (flow), the BAS controller shall control the analog signal that is sent to the bypass valve to maintain

CHILLED WATER RESET SCHEDULE GRAPH

When in the occupied mode, the flow-measuring outdoor-air (Traq™) damper shall modulate to maintain the current outdoor airflow at setpoint. The BAS shall calculate and reset this outdoor airflow setpoint based on the current ventilation requirements of CONTROLS- AHU'S

The economizer shall disable when OA enthalpy is greater than RA enthalpy. **Demand Control Ventilation:**

Outside air (OA) enthalpy shall be compared with Return air (RA) enthalpy point. The economizer shall enable when OA enthalpy is less than RA enthalpy - 2.0 BTU/LB.

temperature falls below the low temperature limit setting. Comparative Enthalpy

The discharge air temperature sensor shall measure the dry bulb temperature of the air leaving the cooling coil while economizing. When economizing is enabled and the unit is operating in the cooling mode, the economizer damper shall be modulated between its minimum position and 100% to maintain the discharge air temperature setpoint. The economizer damper shall modulate toward minimum position in the event the mixed air

temperature rises above the maximum limit, a high temperature alarm shall be annunciated. Economizer:

temperature alarm shall be annunciated and the unit shall shut down. If the supply air

communicated by the BAS. The BAS shall reset the supply air temperature setpoint based on the current outside air temperature, but shall override this reset function and return the supply air temperature setpoint to 55.0 deg. F (adj.) if more than two (adj.) outdoor dew point is higher than 60.0 deg. F (adj.) or indoor humidity is higher than 60% RH (adj.). If the supply air temperature drops below the minimum limit, a low

The supply air temperature setpoint shall be reset to the optimal setpoint zones begin to overheat. Also, the BAS shall override this reset function whenever

sensor, the unit shall transition from its current occupancy mode to occupied bypass mode and the unit shall maintain the space temperature to the occupied setpoints (adj.). Supply Air Temperature Reset Control:

temperature sensors. When an occupied bypass request is received from a space

minimum ventilation. Occupied Bypass: The BAS shall monitor the status of the "on" and "cancel" buttons of the space

active the unit controller shall maintain the space temperature to the space temperature offset setpoint. Outside air damper shall remain enabled to provide

The BAS shall monitor the scheduled unoccupied time, occupied setpoints and space temperature to calculate when the optimal stop occurs. When the optimal stop mode is

(adj.), the unit shall transition to the occupied mode. Optimal Stop:

unless economizing. When the space temperature reaches occupied cooling setpoint

During optimal start, if the average space temperature is above the occupied cooling

enable the fan and cooling or economizer. The outside air damper shall remain closed,

initiated the unit shall enable the heating and supply fan. The outside air damper shall remain closed. When the space temperature reaches the occupied heating setpoint (adj.), the unit shall transition to the occupied mode. Pre-Cool Mode: setpoint, pre-cool mode shall be activated. When pre-cool is initiated the unit shall

During optimal start, if the average space temperature is below the occupied heating

setpoint a morning warm-up mode shall be activated. When morning warm-up is

Unoccupied: the supply fan shall stop and the hot water valve shall close.

85.0 deg. F

Morning Warm-Up Mode:

When the space temperature is below the unoccupied heating setpoint of 60.0 deg. F water valve shall open. When the space temperature rises above the unoccupied heating setpoint of 60.0 deg. F (adj.) plus the unoccupied differential of 4.0 deg. F (adj.)

(adj.) the supply fan shall start, the outside air damper shall open if economizing is

enabled and remain closed if economizing is disabled and the chilled water valve shall

open. When the space temperature falls below the unoccupied cooling setpoint of 85.0

The BAS shall monitor the scheduled occupied time, occupied space setpoints and space

deg. F (adj.) minus the unoccupied differential of 4.0 deg. F (adj.) the supply fan shall

stop, the chilled water valve shall close and the outside air damper shall close. **Optimal Start:**

temperature to calculate when the optimal start occurs.

When the space temperature is above the unoccupied cooling setpoint of

chilled water and hot water valves shall close and an alarm shall be annunciated at the (adj.) the supply fan shall start, the outside air damper shall remain closed and the hot

If economizing is enabled the outside air damper shall also modulate to maintain the discharge air temperature setpoint. If the discharge air temperature sensor fails the

setpoints. Occupied: During occupied periods, the supply fan shall run continuously and the outside air damper shall open to maintain minimum ventilation requirements. The chilled water and hot water valves shall modulate to maintain the discharge air temperature setpoint.

Sequence of Operations - Air Handling Units - Air Handling Units Building Automation System Interface: The Building Automation System (BAS) shall send the controller Occupied Bypass, Morning Warm-up/Pre-Cool, Occupied/Unoccupied and Heat/Cool modes. The BAS shall also send the discharge air temperature setpoint and the duct static pressure setpoint. If communication is lost with the BAS the controller shall operate using default modes and

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The hot water system consists of multiple boilers with factory BACnet interfaces, and associated pumps. The Building Automation System (BAS) controller shall control of the supply of heating water at a temperature setpoint (adj.) by communicating setpoints and enable/disable commands to the boilers via their BACnet interface, and directly controlling the secondary system pumps.

Sequence of Operations - Heating Water System

General Description:

65.0 deg. F (adj.)

Hot Water Reset:

be disabled.

lag sequence.

(adj.).

the sequence.

pump on momentarily.

At hot water system startup

When any hot water valve is more than 95% open, the hot water pressure setpoint shall

Pump Optimization:

hot water system.

If the lead pump speed falls below

Hot Water Distribution Pump Failure:

Hot Water Distribution Pump Speed:

The default setpoint shall be 15 psig (adj.).

current flow and pressure at 90% or less speed. If a pump is commanded on and fails to prove status

(through the VFD) for more than 30

shall be modulated in unison.

40% (adj.) for five minutes (adj.) the lag pump shall

Boiler Control:

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against low water temperature.

Make-Up Water Flow Monitoring:

When the outdoor air temperature falls below 35.0 deg. F (adj.), the hot water

distribution pump shall operate continuously to provide hot water circulation to all

associated hot water coils. If the hot water supply temperature falls below 60.0 deg. 🗲

If the Make-Up flow meter registers flow for more than 10 minutes (adjustable), or if the

totalized flow surpases 2 gallons (adj.) in a single month, an alarm shall be generated a

HOT WATER RESET SCHEDULE GRAPH

5 10 15 20 25 30 35 40 45 50 55 60 65 70

BOILER

CONTROLLER

OSA TEMP

OUTDOOR AIR TEMP °F

100°F at 60°F –

BACNET TO BAS

BLR BACNET

FBK - AI

- FLT -(BI

SPD - AO

- S/S -(BO

RF VFD

AI

SA CFM

TRAQ OA VCM

AI

MA ACT

7 VCM

TYPICAL

FOR 4 🗎

EA

OA

BLR - 1

BLR - 2

CMD

CMD

STATUS

STATUS

OA PRESS

SPACE PRESS

AI

PRES

L-O- BI

- 180°F at 20°F

(adj.) during unoccupied periods, the boiler sequence shall be enabled to safeguard

Freeze Protection:

the BAS.

190

180

- 160 -

2 150

130

5 120

110

100

Heating System Enable/Disable: The heating system shall be enabled when the outdoor air temperature is below 60.0 deg. F (adj.) or any system AHU heating valve is commanded more than 50% open for 5 minutes, or when at least 3 VAV heating valves are commanded more than 50% open for 5 minutes. When enabled, the BAS controller shall start the lead hot water distribution pump, the lead boiler circulating pump, and enable the lead boiler. The

boiler factory control shall operate the boiler to maintain its local supply setpoint. Heating shall be disabled when the outdoor air temperature is above and no hot water valve is commanded 50% or more open. When heating is disabled, the hot water pumps and boilers shall be commanded to OFF.

Boilers will be controlled by their factory controller including lead/lag, rotation, and firing based on enable/disable and setpoints communicated to the boiler controllers via their factory BACnet interface from the BAS.

(adj.) to 180.0 deg. F (adj.) as the outside air temperature falls from 60.0 deg. F (adj.) to

The hot water supply temperature setpoint shall be linearly reset from 100.0 deg. F

20.0 deg. F (adj.) per the provided hot water reset schedule graph. Hot Water Distribution Pump Start/Stop:

The BAS controller shall start a hot water pump through a contact closure of the pump's variable frequency drive (VFD) run-enable contacts.

Hot Water Distribution Pump Status: The BAS controller shall detect hot water pump run status by comparing the VFD speed

feedback to the commanded speed and monitoring the VFD fault contacts.

The hot water pump lead/lag sequence shall be based on a weekly schedule. From the BAS controller's optional Tracer™ TD7 Color Touch Screen Display or a BAS workstation, an operator shall be able to manually change the lead/lag sequence.

Hot Water Distribution Pump Lead/Lag:

If the lead start/stop relay is enabled and the current switch status is off for more than 30 seconds (adi.), the BAS controller shall annunciate a hot water pump failure alarm to

the BAS workstation and starts the lag pump. When a pump failure exists, lead/lag automation shall be disabled and the currently running pump becomes the lead pump.

Once the problem has been corrected, the operator shall be able to clear the alarm failure from the BAS controller or BAS workstation. This action shall re-enable the lead/

The BAS controller shall monitor the heating water system differential pressure sensor. When the pump VFD is enabled, the BAS controller shall control the analog speed signal

setpoint which is reset as described in the Pump Optimzation section of this sequence.

pump shall start. When multiple pumps are running to maintain setpoint, their speed

If more than 1 pump is running and their speed is over 75% **, the last pump most

recently started shall be disabled, subject to a minimum on/off timer of 10 minutes

** this speed shall be adjusted by the BAS Contractor according to the pump curves

seconds (adj.), the BAS controller shall cancel the start command to that pump, annunciate a chilled water pump failure alarm to the BAS, and start the next pump in

Once the problem has been corrected, the operator shall be able to clear the alarm failure from the BAS controller from the BAS interface or by manually overriding the

The BAS shall continually monitor the hot water control valve position of all AHU's in the

pressure setpoint. When all hot water valves are less than 85% open, the hot water differential pressure setpoint shall be lowered by 0.1 psig (adj.) of the current hot water

differential pressure setpoint. This occurs every 5 minutes until at least one valve is

increases by 0.1 psig (adj.) of the current hot water differential setpoint. This occurs every 5 minutes until no valve is more than 95% open, or if the hot water differential pressure setpoint has risen to the system's maximum setting, or if the pump VFD's are

If the supply fan fails to prove status for

be required to restart the fan.

Building Pressure Control:

Building Pressure Control:

Mixed Air Low Limit:

position.

either

Freeze Protection:

switch shall be required to restart the fan.

30 seconds (adj.), the fan shall be commanded

The fan shall be off in the unoccupied mode. When the unit controller is in the occupied

sent by the BAS and shall be reset between the minimum and maximum static pressure

limits to maintain the critical zone VAV air damper in a position between 65% and 75%

hardwired, high static pressure cut-off switch shall be electrically interlocked with the

variable speed drive. If the high static pressure cut-off switch is tripped the fan shall

annunciated at the BAS. A manual reset of the high static pressure cut-off switch shall

stop, the outside air damper shall close, all valves will close and an alarm will be

A differential pressure transducer shall actively monitor the difference in pressure

exhaust fan VFD to control building pressure at setpoint. If the building pressure

decreases below the desired setpoint, the controller shall turn off the exhaust fan.

A differential pressure transducer shall actively monitor the difference in pressure

exhaust fan VFD to control building pressure at setpoint. If the building pressure

decreases below the desired setpoint, the controller shall disable the exhaust fan.

between the building (indoors) and outdoors. If the building pressure increases above

the desired setpoint, the AHU controller shall turn on the exhaust fan and modulate the

between the building (indoor) and outdoor. If the building pressure increases above the

The initial damper opening rate shall be limited to 2% per minute (adj.) until the damper

has reached its minimum ventilation position. The outside air damper shall modulate to 🔔

a position less than the minimum damper position if the mixed air temperature drops

below 50.0 deg. F (adj.). If the mixed air temperature sensor fails an alarm shall be

A hardwired, low limit temperature switch shall be electrically interlocked with the

alarm shall be annunciated at the BAS. A manual reset of the low limit temperature

smoke detector indicating the presence of smoke. The smoke detectors shall be

of the smoke detectors shall be required to restart the unit.

variable speed drive. If the low limit temperature switch is tripped 38.0 deg. F (adj.), the

outside air damper shall close, all valves shall open to 100% (adjust per climate) and an

Smoke Detector Shutdown: The unit shall shut down in response to a signal from

interlocked to the unit through the dry contacts of the smoke detectors. A manual reset

annunciated at the BAS and the outside air damper shall return to the minimum

desired setpoint, the AHU controller shall enable the exhaust fan, and modulate the

mode, the supply fan shall operate continuously and its speed shall be modulated to

maintain the duct static pressure setpoint. The duct static pressure setpoint shall be

off, the outside air damper shall close, all valves will close and an alarm will be

annunciated at the BAS. A manual reset shall be required to restart the fan. A

CONTROLS- HEATING WATER PLANT

more than 85% open, or if the setpoint is equal to the minimum hot water differential pressure setpoint, or if the pump VFD's are at a minimum speed setting (22 Hz).

This shall re-enable the pumps participation in the lead/lag sequence.

, the hot water pressure setpoint is 100% of the maximum

provided by the pump manufacturer. The speed shall be chosen which according to the pump curves, indicates the resulting running pump(s) would be able to maintain the

that is sent to the pump VFD to maintain the heating water differential pressure

When the running pump(s)' speed is controlled to 100% (60 hz)and the system differential pressure setpoint is not maintained for 5 minutes, the next available lag

AIR HANDLING UNITS

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KEYNOTES

 26.24 MAKE CONNECTIONS TO AUTOMATIC FLUSH TOILETS/URINAL AND AUTOMATIC SINKS PER MANUFACTURER SPECIFICATIONS.
 26.55 COORDINATE SUMP PUMP ALARM LOCATION WITH OWNER AND MECHANICAL CONTRACTOR PRIOR TO ROUGH IN.

POWER PLAN NOTES

COORDINATE MOUNTING HEIGHTS FOR POWER ASSOCIATED WITH TV OUTLETS WITH ARCHITECT PRIOR TO ROUGH-IN. E.C. SHALL COORDINATE ALL EQUIPMENT WITH THE ILO DESIGN DRAWINGS TO ENSURE PLACEMENT OF EQUIPMENT WORKS AS DESIGNED.

GROUNDING OF RECEPTACLES AND FIXED ELECTRICAL EQUIPMENT IN PATIENT CARE SPACES SHALL COMPLY WITH NEC 517.13.

POWER PLAN LEVEL 01 SECTOR 01 NORTH 3/16" = 1'-0"

KEYNOTES

26.06 CORDINATE POWER REQUIREMENT WITH SP 200 FROM SCRIPTPRO. 26.24 MAKE CONNECTIONS TO AUTOMATIC FLUSH TOILETS/URINAL AND AUTOMATIC SINKS PER MANUFACTURER SPECIFICATIONS.

POWER PLAN NOTES

COORDINATE MOUNTING HEIGHTS FOR POWER ASSOCIATED WITH TV OUTLETS WITH ARCHITECT PRIOR TO ROUGH-IN. E.C. SHALL COORDINATE ALL EQUIPMENT WITH THE ILO DESIGN DRAWINGS TO ENSURE PLACEMENT OF EQUIPMENT WORKS AS DESIGNED.

GROUNDING OF RECEPTACLES AND FIXED ELECTRICAL EQUIPMENT IN PATIENT CARE SPACES SHALL COMPLY WITH NEC 517.13.

MECHANICAL POWER PLAN NOTES E.C.SHALL MAKE CONNECTIONS BETWEEN THE OUTDOOR AND INDOOR UNITS OF THE MINI-SPLIT SYSTEM. EXHAUST FANS SHALL BE CIRCUITED WITH LIGHTS UNLESS SHOWN OTHERWISE. REFER TO MECHANICAL PLANS FOR CONTROLS OF EXHAUST FANS. VAV DISCONNECTS ARE FACTORY INSTALLED.

\sim	HE1-18 VIA LCP	\sim	$\sim \sim \sim$	~~~~	\sim	$\gamma \gamma \gamma \gamma$		s2		
	O S2 O	0	1.1	⁺ 0,6 ⁺ 0.4	⁺⁰ .4 ⁺⁰ .8	¹ .4 <u>2.0</u>	3.0 O ⁺ 4.6	⁺ 6.1 ⁺ 6.6	⁺ 7.2 ⁺ O 4.6	+3 0 $+2$ 0 $+1$
$.9 ^{+}2.5 ^{+}3.3 ^{+}4.6$	⁺ 6.3 ⁺ 6.8 ⁺ 4	.5 ⁺ 3.4 ⁺ 2.3	⁺ 1.8 ⁺ 1.2	⁺ 0.7 ⁺ 0.5	⁺ 0.6 ⁺ 1.0	⁺ 1.5 ⁺ 2.2	⁺ 2.8 ⁺ 3.8	⁺ 4.2 ⁺ 4.9	⁺ 5.1 ⁺ 4.1	⁺ 2.7 ⁺ 2.4 ⁺ 3
.1 ⁺ 2.6 ⁺ 3.1 ⁺ 3.6	4.7 ⁺ 5.0 ⁺ 3	.2 3.1 2.3	2.0 1.5	⁺ 0.9 ⁺ 0.6	⁺ 0.7 ⁺ 1.1	⁺ 1.7 ⁺ 2.5	⁺ 3.1 ⁺ 3.7	⁺ 3.4 ⁺ 4.2	⁺ 4.1 ⁺ 3.9	*3.1 <u>+</u> 27
3 $\frac{1}{2}$.8 $\frac{1}{3}$.1 $\frac{1}{3}$.5	⁺ 3.8 ⁺ 4.0 ⁺ 3	.7 +3 4 +2.9	⁺ 2.3 ⁺ 1.7	<u>+</u> 1.2 ⁺ 0.9	⁺ 0.9 ⁺ 1.3	⁺ 1.9 ⁺ 2.7	⁺ 3.4 ⁺ 3.5	⁺ 3.9 ⁺ 4.4	⁺ 4.3 ⁺ 3.9	⁺ 3.3 ⁺ 2.6 ⁺ 2
1 ⁺ 2.4 ⁺ 2.8 ⁺ 3.1	⁺ 3.4 ⁺ 3.5 ⁺ 3	.5 *3.3 *2.9	⁺ 2.4 ⁺ 1.8	⁺ 1.4 ⁺ ①3	(j. 3) (l. 7	\bigcirc_{1}^{+}) + 3.1 3.6	, O 3.7 , 3.9	O O *3.8 *3.6	$\bigcirc \qquad \bigcirc \qquad$
.7 ⁺ 2.0 ⁺ 2.0 ⁺ 2.1	⁺ 2.3 ⁺ 2.5 ⁺ 2	.5 2.6 2.5	⁺ 2.4	⁺ 2.0 ⁺ 1.9	+1.9 +2.2	2.5 3.0	*3.3 *3.7	⁺ 3.6 ⁺ 3.6	⁺ 3.7 ⁺ 3.6	⁺ 3.2 ⁺ 3.0 ⁺ 2
.3 [†] 1.3 [†] 1.4 [†] 1	1.6 ¹	.8 2.1 2.2	⁺ 2.4 [‡] 2.5	⁺ 2.7 ⁺ 2.5	Ð.7 Ð.9	$\bigcirc_{2.9}$ $\bigcirc_{3.0}$	\bigcirc $_{^{+}3}$ $_{^{+}3}$ \bigcirc $_{^{+}3}$ \bigcirc \bigcirc	$\begin{array}{c c} & & & \\ & & \\ & & \\ & & \\ & & 3 \cdot 8 \end{array} \begin{array}{c} & & \\ & & \\ & & 4 \cdot 0 \end{array}$	$\begin{array}{c c} & & \bigcirc \\ & & & \uparrow \\ & & 4.1 \end{array} \begin{array}{c} & & & 0 \\ & & & 4.2 \end{array}$	
.0 [†] 10 [†] 1.0 [†] 1.0	⁺ 1.0 ⁺ 1.1 ⁺ 1	0 .4 [†] 1.7 [†] 2.2	⁺ 2.6 ⁺ 3.0	+ <u>+</u> 3.6	⁺ 3.8 ⁺ 3.7	⁺ 3.6 ⁺ 3.9	⁺ 3.9 ⁺ 3.8	4.1 ⁴ .4	⁺ 4.9 ⁺ 5.2	⁺ 5.4 ⁺ 5.3 ⁺ 4
.9 0.9 0.9 0.9	⁺ 0 9 ⁺ 1.0 ⁺	, 1 ,5 ⁺ 2.0	⁺ 2.7 ⁺ 3.4	⁺ 4.1 ⁺ 4.7	⁺ 5.0 ⁺ 5.0	⁺ 4.2 ⁺ 4.3	4.0 3.8	+ <u>+</u> +.0 +	5.6 6.1	*6.4 *6.5 *5
	+1.4 +1	.3 [†] 1.4 [†] 1.9	⁺ 2.7 ⁺ 3.4	⁺ 4.1 ⁺ 5.1	⁺ 5.7 ⁺ 5.8	⁺ 4.8 ⁺ 4.3	⁺ 3.7 ⁺ 3.7	4.0 4.9	⁺ 5.8 ⁺ 6.2	⁺ 7.3 ⁺ 8.6 ⁺
.4 \t_1.5 t_1.6 t_Q7		.8 1.6 2.1	⁺ <u>7</u> .7 ⁺ <u>3.4</u>	⁺ 4.8 ⁺ 7.0/	⁺ 9.3 ⁺ 9.1	⁺ 6.7 ⁺ 4.8	⁺ 3.8 ⁺ 3.6	4.14.6	⁺ 5 (5) ⁺ 6(-)6	±€)2 (D1.2 (C
.6 1.8 2.2 2.2	+2.4 n. 12.8 +2	.6 +2.1 +2.6) 	\	S3 12 A ⁺ 12.1	0 0 +8.5+ +5.5	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		⁺	
$3.8 {}^{+}2.1 {}^{+}2.6 {}^{+}2.9$.3 +3.1 +3.6	· · · · · · · · · · · · · · · · · · ·		S30 ⁺ 11.1 ⁺ 10.9	*8.2 *5.2	⁺ 4.2 - ⁺ 3.5	$-\frac{1}{3}.6-\frac{1}{4}.1$	5.2) [†] 6.0	⁺ √.8 ⁺ €0.7 [€]
6 ⁺ 2 1 ⁺ 2 8 ⁺ 3 3	0 VI. +3 5 +5 1	A LCP HE1-4		⁺ 4 9 ⁺ 6 8	+7 8 +8 8			+3 2 +3 6		
	+2.5 to 1 S2			+ 3 + 5 0	+5 2 +6 0	⁺ 5 1 ⁺ 4 2	+3 5 +3 2	+3 0 +3 3	⁺ 3 5 ⁺ 4 0	*4 3 *4 5 *
	+			+	+4 6 +4 7		+	*	*	+++
	3.6 5.4 6			4.1 4.1	4.0 4.7	4.5 4.1	3.6 3.0	2.9 3.1	3.3 3.5	
	3.9 4.1 4		3.0 3.0	3.2 3.1	3.3 3.6	3/5 3.4	$\begin{array}{c c} 3.1 & 2.9 \\ \bigcirc & \bigcirc \\ \downarrow & \downarrow \end{array}$	$\begin{array}{c c} 2 \cdot 9 & 2 \cdot 7 \\ 0 & 0 \\ 1 & 0$	$\begin{array}{c c} 2.8 & 2.8 \\ \hline \\ 0 & \hline \\ \end{array} \end{array} $	$) \begin{vmatrix} 2.6 \\ 0 \\ 0 \end{vmatrix} \begin{vmatrix} 2.4 \\ 0 \\ 0 \\ 1 \end{vmatrix} \begin{vmatrix} 2.4 \\ 0 \\ 0 \\ 1 \end{vmatrix}$
	3.4 3.5 3	·6 3.2 1 3.6	2.2	2.3 2.4	2.2 2.5	2.6 2.7	2.6 2.5	2.6 2.6	2.5 2.4	2.2 2.0
	⁺ 2.8 ⁺ 3.1 ⁺ 2	·9 2.8 25	2.0 1.7	¥1.6 (1.6	⁺ 1.6 ⁺ 1.9	⁺ 2.1 ⁺ 2.3	⁺ 2.5 ⁺ 2.6	$\begin{array}{c c} {}_{2} \cdot 7 & {}_{2} \cdot 7 \\ \bigcirc & \bigcirc \\ \end{array}$	$\bigcirc 12.5$ 2.3	$\begin{array}{c c} \uparrow 2.2 \\ \bigcirc \\ $
	[†] 2.5 [†] 2.6 [†] 2	.5 +2.2 +2.0		⁺ 1.3 ⁺ 1.2	⁺ 1.2 ⁺ 1.5	[†] 1.9 [‡] 2.4	⁺ 2.7 ⁺ 2.9	⁺ 3.0 ⁺ 3.1	⁺ 2.9 ⁺ 2.7	[*] 2.4 [†] 2.2 [†] 1
	⁺ 2.0 ⁺ 2.2 ⁺ 2	.2 2.0 1.9	11.7 ⁺ 1.6	1.4	⁺ 1.0 ⁺ 1.3	⁺ 1.8 ⁺ 2.5	⁺ 3.0 ⁺ 3.6	⁺ 3.7 ⁺ 3.9	⁺ 3.3 ⁺ 3.5	⁺ 3.0 ⁺ 2.7 ⁺ 2
	1.7 ¹ .8 ¹	.0 [†] 2.0 [†] 2.1		⁺ 1.8 ⁺ 1.3	⁺ 1.0 ⁺ 1.4	⁺ 1.9 2.6	[*] 3.3 [*] 4.1	⁺ 4.5 ⁺ 4.9	⁺ 4.0 ⁺ 4.1	⁺ 3.7 ⁺ 3.0 ⁺ 2
⁺ 0.6 ⁽¹⁾ 0.8 ⁽¹⁾ 2.0	⁺ 1.3 ⁺ 1.5 ⁺ 1	.9 *2.3 *2.5	⁺ 2.5 2.5	[†] 2.5 [†] 1.9	1.4 01.5	⁺ 2.1 ⁺ 2.6	⁺ 3.3 ⁺ 4.4	÷5.9	⁺ 6.6 ⁺ 5.2	⁺ 4.0 ⁺ 3.1 ⁺ 2
0.7 to.9	1.0 1.3 1	.9 2.4 3.0	+3.0 +3.1	3.6	±.0 ±2O2	⁺ 2.3 ⁺ 2.9	⁺ 3.9 ⁺ 5.3	*8.1 €0.0	Ċ, 8 ○+7.2	\bigcirc $_{4}$ $_{7}$ \bigcirc $_{3.3}$ $\overset{+}{_{2}}$
⁺ 0.5 ⁺ 0,6		.7 ⁺ 2.3 ⁺ 3.1	*3.0 ⁺ 4.1	1.5 4.4	⁺ 3.1 ⁺ 3.0) <u>+</u> 2.8 ⁺ 3.4	¥.8 ⁺ 7.0	⁺ 9.7 <u>12.0</u>	S3 13.0 9.4	⁺ 5.7 ⁺ 3.8 ⁺ 2
		.6 *2.4 *3.3	⁺ 3.2 ⁺ 5.2	¹ 7.2 ¹ 6.6	4.8 43.6	⁺ 2.9 ⁺ 3.5	⁺ 4.2 <u>-</u> ⁺ 6.0	⁺ 9.5 ⁺ 11.7	₽0.6 ⁰ 7.9	\bigcirc_{4}^{+} , 7 \bigcirc_{3}^{+} , 6 \bigcirc_{7}^{+}
		.4 ^t 2.3 ^t 3.8	4.1	7.1 6.6	+4.5 +3.5	* <u>3.2</u> * <u>3.2</u>	⁺ 3.8 ⁺ 5.3	+ 6.7 7.3	7.8 ⁵ .7	4.0 ⁺ 3.0 ⁺ 2
10	to. A I	10 .4 .4 .3 .3	4.0 4.6	/ HE1t-17 ⁺ 6.1	⁺ 4.2 ⁺ 3.6	⁺ 3.3 ⁺ 3.5	⁺ 4.6 ⁺ 5.2	⁺ 5.9 ⁺ 5.9	⁺ 5.6 ⁺ 4.7	<u>+4.0</u> +3.0 +2
		·5 2 ·3.1	*3.8 *4.1	¹ 4.3 ⁺ 4.7	⁺ 4.4 ⁺ 3.9	+3.8 +4.5	⁺ 5.7 ⁺ 6.2	⁺ 6.1 ⁺ 5.4	⁺ 5.1 ⁺ 4.3	⁺ 3.6 ⁺ 2.8 ⁺ 2
		.8 *2.2 *2.9	*3.5	⁺ 4.2 ⁺ 4.5	+ <u>+</u> + <u>+</u> + <u>6</u>	⁺ 4.3 ⁺ 升度1-	-23 ⁺ 6.7	⁺ 6.5 ⁺ 4.7	⁺ 3.8 ⁺ 3.1	[†] 2.8 [†] 2.3 [†] 1
	2.9 2	. 2 * 2.6 * 2.7	2.9 *3.3	*3.8 *4.4	⁺ 5.3 ⁺ 5.6	⁺ 5.4 ⁺ 6.2	5.8 S2 5.9	⁺ <u>5</u> 9 ⁺ 3 <u>.7</u>	⁺ 2.5 ⁺ 1.9	⁺ 2.0 ⁺ 1.6 ⁺ 1
	+6.3 ⁺ 5	.3 +3.5 +2.7	+2.4 2.4	⁺ 2.8 ⁺ 3.5	⁺ 4.5 ⁺ 5.8	⁺ 5.8 ⁺ 6.9	⁺ 5.6 ⁺ 6.0	⁺ 5.1 ⁺ 3.4	⁺ 2.3 ⁺ 1.8	⁺ 1.5 ⁺ 1.2 ⁺ 1
	⁺ 7.5	· 9 +4.7 +2.7	⁺ 1/9 ⁺ 1.7	⁺ 1.8 2.0	⁺ 3.0 ⁺ 4.1	⁺ 5.4 ⁺ 6.8	⁺ 6.7 ⁺ 6.6	⁺ 5.2 ⁺ 3.4	⁺ 2.4 ⁺ 1.9	[†] 1.3 [†] 1.0 [†] 0
		.7 +5 +2.7	∜ [†] 1.5 [†] 1.1	⁺ 0.9 ⁺ 1.0	⁺ 1.3 ⁺ 1.8	⁺ 3.5 ⁺ 5.1	⁺ 6.3 ⁺ 6.6	⁺ 5.3 ⁺ 3.7	⁺ 2.6 ⁺ 1.3	⁺ 1.0 ⁺ 0.8 ⁺ 0
		.4 +4.6 +2.2	⁺ 1.2 ⁺ 0.8	⁺ 0, 6 ⁺ 0.5	⁺ 0.5					
		Lite								
V	[0]									

1/8"

SWITCHBRD: MDP1 Location: MEP 01-05-01 Supply From: ATS1	NEW Volts: 480/277 Wye Phases: 3	A.I.C. Rating: (7) FULLY RATED Mains Type: MLO	Branch Panel: H1 Location: MEP 01-03 Supply From: MDP1	5-01 Volts: 480/277 Wye Phases: 3	A.I.C. Rating: (7) FULLY RATED Mains Type: MLO
Mounting: SURFACE Enclosure: NEMA 1 Notes:	Wires: 4	Mains Rating: 2000 A	Mounting: SURFACE Enclosure: NEMA 1 Notes:	Wires: 4	Mains Rating: 225 A
Ext Load Name Cl $\frac{1}{3}$ T-1 (8) 30 5 T-1 (8) 30 7 9 CHILLER 1 (8) 30 11 13 30 30 15 T-2 (8) 17 17 17 17 17 19 21 T-4 (8) 17 25 27 H1 (8) 20 31 SPACE 33 SPACE 37 SPACE 33	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Vire P CB Load Name 3 250 T-3 (8) 3 300 CHILLER 2 (8) 3 400 H2 (8) SPACE SPACE <tr tbox<="" td=""> </tr>	CKT CKT Load Name 2 1 1 4 3 HWP-1 6 5 1 7 10 9 BP-1 12 11 1 14 13 SPACE 16 15 SPACE 18 17 SPACE 20 21 SPACE 22 21 SPACE 24 23 SPACE 26 25 SPACE 28 27 SPACE 30 29 SPACE 32 31 SPACE 34 33 SPACE 36 35 SPACE	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	P CB Load Name CKT 3 100 CHWP-1 2 4 6 6 1 20 Lighting 8 1 20 Lighting 10 1 20 CIRCULATION LIGHTING 10 1 20 CIRCULATION LIGHTING 12 1 20 PHARMACY LOBBY & CORRIDOR LTG 14 - - 16 1 1 20 PHARMACY & CIRCULATION 18 - - 20 22 SPACE 24 - - SPACE 26 SPACE 26 24 SPACE 28 22 SPACE 30 30 SPACE 32 32 SPACE 34 34 SPACE 36
39 SPACE	0 0 0 0 Total Load: 439825 VA 437321 VA 441329 VA Total Amps: 1589 A 1579 A 1595 A	SPACE SPACE	40 39 SPACE 42 41 SPACE	0 0 0 0 0 0 0 0 Total Load: 38957 VA 36527 VA 40500 VA Total Amps: 142 A 132 A 148 A	SPACE 40 SPACE 42
Load Classification	Connected Load Demand Factor Estimated De	mand Panel Totals	Load Classification	Connected Load Demand Factor Estimated Deman	d Panel Totals
Lighting Motor Other Power	2484 10 VA 100.00 % 2484 10 VA 17313 VA 125.00 % 21642 VA 18955 VA 100.00 % 18955 VA 69080 VA 100.00 % 69080 VA 652512 VA 100.00 % 652512 VA	A Total Conn. Load: 1318475 VA A Total Est. Demand: 1186873 VA A Total Conn. Current: 1586 A A Total Est. Demand 1428 A	Image: Clighting Motor Power	9790 VA 125.00 % 12238 VA 18955 VA 100.00% 18955 VA 87240 VA 100.00% 87240 VA	Total Conn. Load:115985 VATotal Est. Demand:118433 VATotal Conn. Current:140 ATotal Est. Demand142 A
Receptacle Heating Lighting - Exterior	240189 VA 52.08% 125095 V. 600 VA 0.01% 0 VA 2952 VA 125.00% 3690 VA	A			
(itchen Continuous	63483 VA 65.00% 41264 VA 4981 VA 125.00% 6226 VA				
			Branch Panel: H2 Location: ELEC 02-0	05-12 Volts: 480/277 Wye	A.I.C. Rating: (7) FULLY RATED
SWITCHBRD: MSBE	NEW		Supply From: MDP1 Mounting: SURFACE Enclosure: NEMA 1	Phases: 3 Wires: 4	Mains Type: MLO Mains Rating: 400 A
Location: MECHANICAL Supply From: GENERATOR Mounting: SURFACE	YARD Volts: 480/277 Wye Phases: 3 Wires: 4	A.I.C. Rating: (7) FULLY RATED Mains Type: MLO Mains Rating: 2000 A	Notes:		
Enclosure: NEMA 3R Notes:			CKT Load Name	CB P Wire A B C Wire	P CB Load Name CKT
			1 OPEN OPP LIGHTING 3 SHELL SPACE & CIRCULATION LTG 5 RECEPTION & BREAKROOM	20 1 #10 2949 208 #2 20 1 2590 208 #2 20 1 1984 208 #2	3 90 AHU-01 SINGLE POINT 2 4 6
KT Load Name C 1	CB P Wire A B C W 439 223	Vire P CB Load Name	CKT 7 SPACE 2 11 SPACE	0 144 #6 0 144 #6	3 60 AHU-02 SINGLE POINT 8 10 12
3 ATS1 (8) 20 7 2	2000 3 437 224 441 207	3 200 ATS2 (8)	4 13 SPACE 6 15 SPACE 8 17 SPACE	0 208 #2 0 208 #2	3 90 AHU-03 SINGLE POINT 14 16
9 11 400A SPACE 4	400 3 179 0 179 0 179 0	400A SPACE	0 17 SPACE 10 19 SPACE 12 21 SPACE	0 208 0 144 #6	18 20 3 60 AHU-04 SUPPLY FAN 22
13 15 17 400A SPACE	<u></u> <u>0 0 </u>	400A SPACE	14 23 SPACE 16 25 SPACE 18 27 SPACE	0 0 144 0 0	SPACE 26
	Total Load: 480130 VA 477733 VA 480090 VA Total Amps: 1735 A 1725 A 1734 A		27 SPACE 29 SPACE 31 SPACE	0 0 0 0	SPACE 28 SPACE 30 SPACE 32
Load Classification	Connected Load Demand Factor Estimated De	mand Panel Totals	33 SPACE 35 SPACE	0 0 0 0 0	SPACE 34 SPACE 36
lvac	248410 VA 100.00% 248410 V 37459 VA 125.00% 46823 V	A Total Conn. Load: 1437954 VA	37 SPACE 39 SPACE 41 SPACE	0 0 0 0 0 0	SPACE 38 SPACE 40 SPACE 42
Notor Dther	18955 VA 100.00% 18955 VA 69080 VA 100.00% 69080 VA	Total Est. Demand: 1313375 VA Total Conn. Current: 1730 A		Total Load: 73448 VA 73090 VA 72483 VA Total Amps: 265 A 264 A 262 A	
² ower Receptacle	689923 VA100.00%689923 V240189 VA52.08%125095 V	A Total Est. Demand 1580 A	Load Classification	Connected Load Demand Factor Estimated Deman	d Panel Totals
leating .ighting - Exterior Kitchen .ightinuous Continuous 4	600 VA 0.01% 0 VA 10898 VA 125.00% 13623 VA 63483 VA 65.00% 41264 VA 1981 VA 125.00% 6226 VA	A	Hvac Lighting	211498 VA 100.00% 211498 VA 7523 VA 125.00% 9404 VA	Total Conn. Load:219021 VATotal Est. Demand:220902 VATotal Conn. Current:263 ATotal Est. Demand266 A
Branch Panel: MSBN	NEW		Branch Danol: HE1		
Location: MECHANICAL Supply From: UTILITY TRANS Mounting: SURFACE	YARD Volts: 480/277 Wye SFORMER Phases: 3 Wires: 4	A.I.C. Rating: (7) FULLY RATED Mains Type: MLO Mains Rating: 2000 A	Location: MEP 01-03	5-01 Volts: 480/277 Wye Phases: 3	A.I.C. Rating: (7) FULLY RATED
Enclosure: NEMA 3R			Mounting: SURFACE Enclosure: NEMA 1 Notes:	Wires: 4	Mains Rating: 225 A
		fire D CD i i i i			
Load Name Cl 1 3 3 ATS2 (8)	P VVIRe A B C V 00 3 223 439	3 2000 ATS1 (8)	CK1 2 4 1	CB P Wire A B C Wire 7962 140 #8 #8 #8 140 <	PCBLoad NameCKT120MECHANICAL SHOP LIGHTING2
5 7 9 SPD 10	0 0 207 441 00 3 0 0	3 20 LCP PHASE LOSS CIRCUIT	6 3 HE2 (8) 8 5 7	100 3 2926 1994 #8 2841 1000 #8	1 20 PARKING LOT LIGHTING(10) 4 1 20 PARKING LOT LIGHTING(10) 6
			12 9 14 11	100 3 0 124 100 3 0 124	3 100 HE3 (8) 10 12
5 400A SPACE		400A SPACE	16 13 SPACE 18 15 EXTERIOR BUILDING LIGHTING(10) 17 DAPKING LIGHTING(10)	0 0 20 1 #8 2470 0 20 1 #8 2470 0	SPACE 14 SPACE 16
	Total Amps: 1670 A 1660 A 1670 A		2 17 PARKING LUT LIGHTING(10) 2 19 EXTERIOR BUILDING LIGHTING(10) 21 EMERGENCY LIGHTING(2)	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	SPACE 20 SPACE 20
ad Classification	Connected Load Demand Factor Estimated De 248410 VA 100.00% 248410 VA	Mand Panel Totals	23 Lighting - Exterior		SPACE 24 SPACE 26
ghting	2404 IU VA IUU.UU% 248410 V 37459 VA 125.00% 46823 V/ 18955 VA 100.00% 40055 V/	Total Conn. Load: 1383978 VA Total Eat. Domand: 1350300 V/4	27 29 31 SPACE		SPACE 28 SPACE 30 SPACE 30
Uther 2004	10900 VA 100.00% 18955 VA 69080 VA 100.00% 69080 VA 680923 VA 400.00% 600000 VA	Total Est. Demano: 1259399 VA Total Conn. Current: 1665 A Total Est. Demand 1545 A	33 SPACE 35 SPACE	0 0 0 0 0 0	SPACE 32 SPACE 34 SPACE 36
Ower Receptacle	009923 VA 100.00% 689923 VA 240189 VA 52.08% 125095 VA	A I Utal EST. Demand 1515 A	37 SPACE 39 SPACE	0 0 0 0 0	SPACE 38 SPACE 40
leating _ighting - Exterior	600 VA 0.01% 0 VA 10898 VA 125.00% 13623 VA	A	41 SPACE	0 0 Total Load: 22313 VA 22420 VA 20769 VA	SPACE 42
Sitchen 4	63483 VA65.00%41264 VA1981 VA125.00%6226 VA	A		Total Amps: 81 A 82 A 75 A	
			Load Classification Lighting	Connected LoadDemand FactorEstimated Demand20145 VA125.00%25182 VA	d Panel Totals
			Power Lighting - Exterior	37411 VA 100.00% 37411 VA 7946 VA 125.00% 9933 VA	Total Conn. Load:65503 VATotal Est. Demand:72525 VATotal Conn. Current:79 ATotal Est. Demand87 A

			Branch Panel: H1	NFW		
	Image: Notest and Second Sec	A.I.C. Rating: (7) FULLY RATED		01-05-01 Volts: 480/277 Wye	A.I.C. Rating: (7) FULLY RATED	
Mounting: SURFACE	Wires: 4	Mains Rating: 2000 A	Mounting: SURFA	ACE Wires: 4	Mains Rating: 225 A	
Notes:			Notes:			Notes
CKT Load Name	CB P Wire A B C	Wire P CB Load Name	CKT CKT Load Name	CB P Wire A B C	Wire P CB Load Name CKT	скт
1 3 T-1 (8) :	300 3 667 516 615 540	3 250 T-3 (8)	2 4 3 HWP-1	30 3 #10 6318 224 6318 224	#1 3 100 CHWP-1 2	1
5 7 2	<u>723</u> 723 723		6 5 8 7 10 PD 1	6633 210 6318 224 6633 210 6633 210 6633 210 6633 66318 66318 66318 66318 66318 66318 66318 66318 66318 66318 66318 66318 66318 6	6 1 20 Lighting 8	5
9 CHILLER 1 (8) 11 13	300 3 723723 723723 108 734	3 300 CHILLER 2 (8)	10 9 BP-1 12 11 11	30 3 #10 6633 1129 6633 2322	1 20 MEP & CIRCULATION LIGHTING 10 1 20 CIRCULATION LIGHTING 12 #10 1 20 PHARMACY LOBBY & CORRIDOR LTG 14	
15 15 17 17	175 3 493 730 557 724	3 400 H2 (8)	14 13 SFACE 16 15 SPACE 18 17 SPACE	0 3349 0 0 0 0 2780	1 20 PHARMACY & CIRCULATION 18	<u>15</u>
19 21 T-4 (8)	175 3 145 0	SPACE SPACE	20 19 SPACE 22 21 SPACE	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	20 22	19 21
23 25 27	<u> </u>	SPACE SPACE	24 23 SPACE 26 25 SPACE 22 SPACE SPACE	0 0 0 0 0	SPACE 24 SPACE 26	23
27 H1 (8) 29 31 SPACE	200 3 <u>365</u> 0 405 0	SPACE SPACE SPACE	28 27 SPACE 30 29 SPACE 32 31 SPACE		SPACE 28 SPACE 30 SPACE 30	27
33 SPACE 35 SPACE	0 0 0 0 0 0	SPACE	32 31 31 32 34 33 SPACE 36 35 SPACE	0 0 0	SPACE 34 SPACE 36	33
37 SPACE 39 SPACE	0 0 0 0 0 0	SPACE SPACE	38 37 SPACE 40 39 SPACE	0 0 0 0 0 0	SPACE 38 SPACE 40	37 39
41 SPACE	0 0 Total Load: 439825 VA 437321 VA 441329 VA Total Amman 4520 A 4570 A 4505 A	SPACE	42 41 SPACE	0 0 Total Load: 38957 VA 36527 VA 40500 VA	SPACE 42	41
	Total Amps: 1589 A 1579 A 1595 A			Total Amps: 142 A 132 A 148 A		_
Load Classification Hvac	Connected LoadDemand FactorEstimated D248410 VA100.00%248410	Demand Panel Totals VA	Load Classification Lighting	Connected LoadDemand FactorEstimated D9790 VA125.00%12238 V	emand Panel Totals /A	Load Lighti
_ighting Motor	17313 VA 125.00% 21642 V 18955 VA 100.00% 18955 V	VA Total Conn. Load: 1318475 VA VA Total Est. Demand: 1186873 VA	Motor Power	18955 VA 100.00% 18955 VA 87240 VA 100.00% 87240 VA	/A Total Conn. Load: 115985 VA /A Total Est. Demand: 118433 VA	
Other Power	69080 VA 100.00% 69080 V 652512 VA 100.00% 652512	VA Total Conn. Current: 1586 A VA Total Est. Demand 1428 A			Total Conn. Current: 140 A Total Est. Demand 142 A	-
Receptacle	240189 VA 52.08% 125095 600 VA 0.01% 0.VA	VA				
ighting - Exterior	2952 VA 125.00% 3690 V 63483 VA 65.00% 41264 V	/A				J [
Continuous	4981 VA 125.00% 6226 V	/A	Branch Banali U2] []
			Location: ELEC	02-05-12 Volts: 480/277 Wye	A.I.C. Rating: (7) FULLY RATED	
			Supply From: MDP1 Mounting: SURFA	ACE Wires: 4	Mains Type: MLO Mains Rating: 400 A	
	L YARD Volts: 480/277 Wve	A.I.C. Rating: (7) FULLY RATED	Enclosure: NEMA Notes:	.1	-	Note
Supply From: GENERATOR Mounting: SURFACE	Phases: 3 Wires: 4	Mains Type: MLO Mains Rating: 2000 A				
Enclosure: NEMA 3R		Many Rating. 2000 A				
0.03.			CKT Load Name	CB P Wire A B C 20 1 #10 2949 208 Image: Compare the second	Wire P CB Load Name CKT	скт
			3 SHELL SPACE & CIRCULATION LTO 5 RECEPTION & BREAKROOM	G 20 1 2540 260 20 1 2590 208 1984 208	#2 3 90 AHU-01 SINGLE POINT 2 4 6	
KT Load Name	CB P Wire A B C	Wire P CB Load Name	7 SPACE 9 SPACE	0 144 0 144 0 144	#6 3 60 AHU-02 SINGLE POINT 8	79
ATS1 (8)	2000 3 439 223 4437 224 441 207	3 200 ATS2 (8)	2 11 SPACE 4 13 SPACE 6 15 SPACE	0 208 0 208	#2 2 00 AHL 03 SINCLE DOINT 16	- <u>11</u> <u>13</u>
7 9 400A SPACE	400 3 179 0	400A SPACE	0 15 SPACE 8 17 SPACE 10 19 SPACE	0 144	#2 3 90 AHU-03 SINGLE POINT 16 18 20	15
11 13	0 0 179 0		12 21 SPACE 14 23 SPACE	0 144 0 144	#6 3 60 AHU-04 SUPPLY FAN 22 24 24 24	21 23
5 400A SPACE 7		400A SPACE	16 25 SPACE 18 27 SPACE	0 0 0 0 0 0	SPACE 26 SPACE 28	25
	Total Amps: 1735 A 1725 A 1734 A		31 SPACE 33 SPACE	0 0 0	SPACE 30 SPACE 32 SPACE 34	- <u>29</u> 31 33
oad Classification	Connected Load Demand Factor Estimated D	Demand Panel Totals	35 SPACE 37 SPACE	0 0 0	SPACE 36 SPACE 38	35 37
/ac ghting	248410 VA 100.00% 248410 VA 37459 VA 125.00% 46823 VA	VA Total Conn. Load: 1437954 VA	39 SPACE 41 SPACE	0 0 0 0 0	SPACE 40 SPACE 42	39 41
btor her	18955 VA 100.00% 18955 VA 69080 VA 100.00% 69080 VA	VA Total Est. Demand: 1313375 VA VA Total Conn. Current: 1730 A		Total Load: 73448 VA 73090 VA 72483 VA Total Amps: 265 A 264 A 262 A		
ower eceptacle	689923 VA 100.00% 689923 VA 240189 VA 52.08% 125095	VA Total Est. Demand 1580 A VA	Load Classification	Connected Load Demand Factor Estimated D	emand Panel Totals	Load
eating ghting - Exterior	600 VA 0.01% 0 VA 10898 VA 125.00% 13623 V	VA	Lighting	211498 VA 100.00% 211498 VA 7523 VA 125.00% 9404 VA	VA Total Conn. Load: 219021 VA	_ Lighti
ichen ontinuous	63483 VA 65.00% 41264 \ 4981 VA 125.00% 6226 VA	VA			Total Est. Demand: 220902 VA Total Conn. Current: 263 A	-
					Total Est. Demand 266 A	-
Branch Panel: MSBN	NFW					
	L YARD Volts: 480/277 Wye	A.I.C. Rating: (7) FULLY RATED	Branch Panel: HE	1 NEW		F
Supply From: UTILITY TRAN Mounting: SURFACE	NSFORMER Phases: 3 Wires: 4	Mains Type: MLO Mains Rating: 2000 A	Location: MEP 0 Supply From: ATS2	01-05-01 Volts: 480/277 Wye Phases: 3	A.I.C. Rating: (7) FULLY RATED Mains Type: MLO	
Enclosure: NEMA 3R tes:			Mounting: SURFA Enclosure: NEMA	ACE Wires: 4	Mains Rating: 225 A	
			Notes:			Notes
CT Load Name	CB P Wire A B C T 223 439	Wire P CB Load Name	CKT Load Name	CB P Wire A B C	Wire P CB Load Name CKT	скт
ATS2 (8)	200 3 224 437 441	3 2000 ATS1 (8)	4 6 3 HE2 (8)	100 3 7962 140	#8120MECHANICAL SHOP LIGHTING2#8120PARKING LOT LIGHTING(10)4	
SPD	100 3 0 0 0	3 20 LCP PHASE LOSS CIRCUIT	8 5 10 7 12	0 135 2841 1000	#8 1 20 PARKING LOT LIGHTING(10) 6 8 9 400 8 8	- <u>5</u> 7
400A SPACE		400A SPACE	12 9 HE4 (8) 14 11 11 16 13 SDACE	100 3 0 124 0 124 0 124	3 100 HE3 (8) 10 12	9
	Total Load: 462138 VA 459741 VA 462098 VA		18 13 SPACE 18 15 EXTERIOR BUILDING LIGHTING(10) 17 PARKING LOT LIGHTING(10)	0 0 0 0) 20 1 #8 2470 0 20 1 #8 1404 1076	SFACE 14 SPACE 16 #8 1 20 PARKING LOT LIGHTING(10) 18	13 15 17
	Total Amps: 1670 A 1660 A 1670 A		2 19 EXTERIOR BUILDING LIGHTING(10 21 EMERGENCY LIGHTING(2)	20 1 #8 684 0 2560 0	SPACE 20 SPACE 22	
	Connected Load Demand Factor Estimated D 248410 V/A 100 00% 248410	Demand Panel Totals	23 Lighting - Exterior		SPACE 24 SPACE 26	23
ad Classification	37459 VA 125.00% 46823 V	VA Total Conn. Load: 1383978 VA	27 29 31 SDACE		SPACE 28 SPACE 30 SPACE 30	-
ad Classification ac hting	10055 \/A 400 000/	va iotai Est. Demand: 1259399 VA	33 SPACE		SPACE 32 SPACE 34 SPACE 34	Load
ad Classification ac hting tor ner	18955 VA 100.00% 18955 VA 69080 VA 100.00% 69080 VA	VA Total Conn. Current: 1665 A				Othe
ad Classification ac hting tor her wer ceptacle	18955 VA 100.00% 18955 VA 69080 VA 100.00% 69080 VA 689923 VA 100.00% 689923 VA 240189 VA 52.08% 125095 VA	VA Total Conn. Current: 1665 A VA Total Est. Demand 1515 A VA Est. Demand 1515 A	35 SPACE 37 SPACE 39 SPACE	0 0 0 0 0	SPACE 38 SPACE 40	Dec
ad Classification ac hting tor ner wer ceptacle ating hting - Exterior	18955 VA 100.00% 18955 VA 69080 VA 100.00% 69080 VA 689923 VA 100.00% 689923 240189 VA 52.08% 125095 600 VA 0.01% 0 VA 10898 VA 125.00% 13623 VA	VA Total Conn. Current: 1665 A VA Total Est. Demand 1515 A VA VA VA VA VA VA VA	35 SPACE 37 SPACE 39 SPACE 41 SPACE	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 Total Load: 22313 VA 22420 VA 20769 VA 0	SPACE 38 SPACE 40 SPACE 42	_ Rec
vac yhting otor her wer cceptacle rating hting - Exterior chen ntinuous	18955 VA 100.00% 18955 VA 69080 VA 100.00% 69080 VA 689923 VA 100.00% 689923 240189 VA 52.08% 125095 600 VA 0.01% 0 VA 10898 VA 125.00% 13623 VA 63483 VA 65.00% 41264 VA 4981 VA 125.00% 6226 VA	VA Total Conn. Current: 1665 A VA Total Est. Demand 1515 A VA VA VA VA VA	35 SPACE 37 SPACE 39 SPACE 41 SPACE	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 <td> SPACE 38 SPACE 40 SPACE 42</td> <td></td>	SPACE 38 SPACE 40 SPACE 42	
oad Classification vac ighting lotor ther ower eceptacle eating ghting - Exterior itchen ontinuous	18955 VA 100.00% 18955 ' 69080 VA 100.00% 69080 ' 689923 VA 100.00% 689923 240189 VA 52.08% 125095 600 VA 0.01% 0 VA 10898 VA 125.00% 13623 \ 63483 VA 65.00% 41264 \ 4981 VA 125.00% 6226 VA	VA Total Conn. Current: 1665 A VA Total Est. Demand 1515 A VA	35 SPACE 37 SPACE 39 SPACE 41 SPACE Load Classification Lighting	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 Total Load: 22313 VA 22420 VA 20769 VA Total Amps: 81 A 82 A 75 A	SPACE 38 SPACE 40 SPACE 42 emand Panel Totals 42	_ Reci
Joad Classification Ivac ighting Motor Other Power Receptacle Ieating ighting - Exterior Citchen Continuous	18955 VA 100.00% 18955 '\ 69080 VA 100.00% 69080 '\ 689923 VA 100.00% 689923 240189 VA 52.08% 125095 600 VA 0.01% 0 VA 10898 VA 125.00% 13623 \ 63483 VA 65.00% 41264 \ 4981 VA 125.00% 6226 VA	VA Total Conn. Current: 1665 A VA Total Est. Demand 1515 A VA VA VA VA VA VA	35 SPACE 37 SPACE 39 SPACE 41 SPACE 41 SPACE Lighting Power Lighting - Exterior	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 Total Load: 22313 VA 22420 VA 20769 VA 75 A Total Amps: 81 A 82 A 75 A 20145 VA 125.00% 25182 V 25182 V 37411 VA 100.00% 37411 V 9933 V 7946 VA 125.00% 9933 V 9933 V	SPACE 38 SPACE 40 SPACE 42 emand Panel Totals 42 /A Total Conn. Load: 65503 VA A Total Est. Demand: 72525 VA	_ Rece

SWITCHRRD- MDD1		V			Branch Panel: H1		N		
Location: MEP 01-05-	01 Volts: 480/2	- 77 Wye A.I.C. R	ating: (7) FULLY RATED		Location: MEP 01-0	05-01 Volts: 480/2	77 Wye	A.I.C. Rating: (7) FULLY RATED	
Supply From: ATS1 Mounting: SURFACE	Phases: 3 Wires: 4	Mains Mains R	Type: MLO ating: 2000 A		Supply From: MDP1 Mounting: SURFACE	E Phases: 3 Wires: 4		Mains Type: MLO Mains Rating: 225 A	
Enclosure: NEMA 1			-		Enclosure: NEMA 1				
					110165.				
KT Load Name	CB P Wire A B 667 516	C Wire P CB	Load Name	CKT 2	CKT Load Name	CB P Wire A B 6318 224	C Wire P	CB Load Name	CKT
3 T-1 (8)	300 3 615 540	3 250 T-3 (a	3)	4	3 HWP-1 5	30 3 #10 6318 224	#1 3 6318 224	100 CHWP-1	4 6
CHILLER 1 (8)	300 3 723 723 723 723 723 723	3 300 CHIL	LER 2 (8)	8 10	7 9 BP-1	30 3 #10 6633 210 6633 1129	1	20 Lighting 20 MEP & CIRCULATION LIGHTING	8 10
	498 734	723 723		12 14	11 13 SPACE	0 3349	6633 2322 1 #10 1	20 CIRCULATION LIGHTING 20 PHARMACY LOBBY & CORRIDOR L	12 TG 14
5 T-2 (8)	175 3 493 730	3 400 H2 (8	3)	16 18	15SPACE17SPACE	0 0	0 2780 1	20 PHARMACY & CIRCULATION	16 18
 T-4 (8)	175 3 145 0 180 0	SPA0	DE DE	20	19 SPACE 21 SPACE	0 0			20
	389 0	111 0 SPA(DE DE	24	23 SPACE 25 SPACE	0 0	0 0	SPACE	24
H1 (8)	200 3 365 0	405 0 SPA(28	27 SPACE	0 0	0 0	SPACE	28
SPACE	0 0	SPA(32	31 SPACE	0 0		SPACE	32
SPACE SPACE		0 0 SPA(36	35 SPACE		0 0	SPACE	36
SPACE SPACE	0 0 0	SPA(40	37 SPACE 39 SPACE			SPACE	40
SPACE	Total Load: 439825 VA 437321 VA Total Amps: 1589 A 1579 A	0 0 SPAC 441329 VA 1595 A	JE	42		Total Load: 38957 VA 36527 VA Total Amps: 142 A 132 A	0 0 40500 VA 148 A	SPACE	42
d Classification	Connected Load Demand Factor	Estimated Demand	Panel Totals		Load Classification	Connected Load Demand Factor	Estimated Demand	Panel Totals	
	248410 VA 100.00%	248410 VA	Comm Lood: 1240475 \/A		Lighting	9790 VA 125.00%	12238 VA	Total Comp. Lond: 115095 \/A	
ining	17313 VA 125.00% 18955 VA 100.00%	∠1042 VA Total 18955 VA Total E	St. Demand: 1318475 VA		Power	10900 VA 100.00% 87240 VA 100.00%	87240 VA	Total Est. Demand: 115985 VA	
ner	69080 VA 100.00%	69080 VA Total Co	nn. Current: 1586 A					Total Conn. Current: 140 A	
ceptacle	240189 VA 52.08%	125095 VA	1420 A						
nting	600 VA 0.01% 2952 VA 125.00%	0 VA							
hen tinuous	63483 VA 65.00%	41264 VA							
inuous	4901 VA 125.00%	0220 VA			Branch Panel: H2	NEV	N		
					Location: ELEC 02- Supply From: MDP1	-05-12 Volts: 480/2 Phases: 3	77 Wye	A.I.C. Rating: (7) FULLY RATED Mains Type: MLO	
	NFV	V			Mounting: SURFACE	E Wires: 4		Mains Rating: 400 A	
Location: MECHANIC Supply From: GENERATC Mounting: SURFACE	AL YARD Volts: 480/2 DR Phases: 3 Wires: 4	77 Wye A.I.C. R Mains Mains R	ating: (7) FULLY RATED Type: MLO ating: 2000 A		Enclosure: NEMA 1 Notes:		1 1		
tes:							C. Wire P.	CB Load Name	CKT
					1 OPEN OPP LIGHTING 3 SHELL SPACE & CIRCUI ATION I TO	20 1 #10 2949 208 20 1 2590 208	#2 3	90 AHU-01 SINGLE POINT	2 4
					5 RECEPTION & BREAKROOM	20 1 200	1984 208 #2 3		6
Load Name	CB P Wire A B 430 223 10000 1000 1000	C Wire P CB	Load Name	CKT	9 SPACE	U 144 U 144 0 144	#6 3	60 AHU-02 SINGLE POINT	8 10
ATS1 (8)	2000 3 437 224	441 207 3 200 ATS2 (8)	4	13 SPACE	0 208	U 144		12 14
	400 3 179 0		ΡΔΩΕ	0 8 40	15 SPACE 17 SPACE	0 208 0 208	#2 3 0 208	90 AHU-03 SINGLE POINT	16
	400 3 179 0	179 0 400A S	FAGE	10 12	19SPACE21SPACE	0 144 0 144	#6 3	60 AHU-04 SUPPLY FAN	20 22
400A SPACE	0 0	400A S	PACE	14 16	23 SPACE 25 SPACE	0 0	0 144	SPACE	24 26
1	Total Load: 480130 VA 477733 VA	480090 VA		18	27 SPACE 29 SPACE	0 0 	0 0	SPACE	28 30
	Total Amps: 1735 A 1725 A	1734 A			31 SPACE 33 SPACE	0 0 0 0 0 0		SPACE SPACE	32
d Classification	Connected Load Demand Factor	Estimated Demand	Panel Totals		35 SPACE 37 SPACE	0 0	U 0	SPACE SPACE	36 38
ting	2404 10 VA 100.00% 37459 VA 125.00%	46823 VA Total	Conn. Load: 1437954 VA		39 SPACE 41 SPACE	0 0 	0 0	SPACE SPACE	40
or	18955 VA 100.00%	18955 VA Total E	st. Demand: 1313375 VA			Total Load: 73448 VA 73090 VA Total Amps: 265 A 264 A	72483 VA 262 A		
/er	689923 VA 100.00%	689923 VA Total Es	t. Demand 1580 A						
ceptacle	240189 VA 52.08% 600 VA 0.01%	125095 VA 0 VA			Load Classification Hvac	Connected LoadDemand Factor211498 VA100.00%	Estimated Demand 211498 VA	Panel Totals	
hting - Exterior	10898 VA 125.00%	13623 VA			Lighting	7523 VA 125.00%	9404 VA	Total Conn. Load: 219021 VA	
ntinuous	653483 VA 65.00% 4981 VA 125.00%	41264 VA 6226 VA						Total Est. Demand: 220902 VATotal Conn. Current:263 ATotal Est. Demand266 A	
Branch Panel: MSBN	N NEV	V]
	AL YARD Volts: 480/2	77 Wye A.I.C. R	ating: (7) FULLY RATED		Branch Panel: HE1		N 77 Wyo	AIC Pating (7) FULLY DATED	
Mounting: SURFACE	MINGFORMIER PRASES: 3 Wires: 4	Mains Mains R	אין אין אויעס אוועס. ating: 2000 A		Supply From: ATS2	VOITS: 480/2 Phases: 3	., , vvy c	Mains Type: MLO	
Enclosure: NEMA 3R es:					Mounting: SURFACE Enclosure: NEMA 1	⊨ Wires: 4		Mains Rating: 225 A	
					Notes:				
Load Name	CB P Wire A B 223 439	C Wire P CB	Load Name	CKT 2	CKT Load Name	CB P Wire A B	C Wire P	CB Load Name	скт
_ATS2 (8)	200 3 224 437	207 441 3 2000 ATS ²	(8)	4	1 3 HE2 (8)	100 3 7962 140 2926 1004	#8 1 #8 1	20 MECHANICAL SHOP LIGHTING 20 PARKING LOT LIGHTING(10)	2
SPD	100 3 0 0 0	3 20 I CP	PHASE LOSS CIRCUIT	8	5 7		2841 1000 #8 1	20 PARKING LOT LIGHTING(10)	
		0 0 LOP		12	9 11 HE4 (8)	100 3 0 135 0 124	3	100 HE3 (8)	o 10
400A SPACE	0 0	0 0 400A	SPACE	16	13 SPACE	0 0	U 124 	SPACE	12
	Total Load: 462138 VA 459741 VA	462098 VA		10	13 EXTERIOR BUILDING LIGHTING(10) 17 PARKING LOT LIGHTING(10)	20 1 #8 2470 0 20 1 #8	1494 1976 #8 1	20 PARKING LOT LIGHTING(10)	16
	Total Amps: 1670 A 1660 A	1670 A			2 19 EXTERIOR BUILDING LIGHTING(10) 21 EMERGENCY LIGHTING(2)			SPACE SPACE	20 22
Classification	Connected Load Demand Factor	Estimated Demand	Panel Totals		23 Lighting - Exterior		988 0	SPACE SPACE	24 26
; ing	248410 VA 100.00% 37459 VA 125.00%	46823 VA Total	Conn. Load: 1383978 VA		27 29		0	SPACE SPACE	28 30
r	18955 VA 100.00%	18955 VA Total E	ist. Demand: 1259399 VA		31 SPACE 33 SPACE	0 0 0 0 0		SPACE SPACE	32 34
۱ ۹۲	ออบอบ VA 100.00% 689923 VA 100.00%	оэихи VA Total Co 689923 VA Total Es	ann. Current: 1665 A at. Demand 1515 A		35 SPACE 37 SPACE		0 0	SPACE	36 38
eptacle	240189 VA 52.08%	125095 VA			39 SPACE	0 0 0		SPACE	40
ting - Exterior	10898 VA 0.01%	13623 VA			41 SPACE	Total Load: 22313 VA 22420 VA	0 0 20769 VA	- JOPALE	42
ien	63483 VA 65.00% 4981 VA 125.00%	41264 VA				Total Amps: 81 A 82 A	75 A		
					Load Classification	Connected Load Demand Factor	Estimated Demand	Panel Totals	
					Power	20145 VA 125.00% 37411 VA 100.00%	25182 VA 37411 VA	Total Conn. Load: 65503 VA	
					Lighting - Exterior	7946 VA 125.00%	9933 VA	Total Est. Demand: 72525 VA	

FEEDER FROM

UTILITY

1. TERMINATE GROUND ON ISOLATED GR 2. INSTALL LOCKING DEVICE FURNISHED PANELBOARD (LOCK-OFF FOR MAINTEN 3. INSTALL LOCKING DEVICE FURNISHED PANELBOARD (LOCK-ON FOR CRITICAL 4. GFI BREAKER FOR PERSONNEL PROTEC (5mA). 5. GFI BREAKER FOR EQUIPMENT PROTEC (30mA). 6. CONDUCTOR SIZE SHOWN IN PANEL SC HAS BEEN INCREASED FOR VOLTAGE I EQUIPMENT GROUND PROPORTIONALL REFERENCE GROUND WIRE SIZING CH 7. REFER TO ONE-LINE DIAGRAM FOR AVA FAULT CURRENT FOR INTERRUPT RATI 8. REFER TO ONE-LINE DIAGRAM FOR WIF 9. FACTORY WIRED TO LOAD. 10. THRU CONTROLLER. REFER TO LIGHTIN CONTROLLER DETAIL. 11. ADD CIRCUIT BREAKER TO EXISTING PA EQUIPMENT GROUN CONDUCTOR SIZING BRKR WIRE SIZE AMPS _____ 15-20 PHASE 12 10 8 GROUND 12 10 8 _____ 25-30 PHASE 10 8 6 GROUND 10 8 6 ³⁵⁻⁵⁰ PHASE 8 6 4 GROUND 10 8 4 60 PHASE 6 4 3 GROUND 10 6 6 70 PHASE 6 4 3 GROUND 8 4 4 80-90 PHASE 4 3 2 GROUND 8 6 4 _____ 100 PHASE 3 2 1 GROUND 8 6 4

PER NEC 250.122(B)

		BOAF	RD N		ES (#)
TEF INS PAN INS PAN GFI (5m	RMINATE GF TALL LOCKI VELBOARD (TALL LOCKI VELBOARD (BREAKER F A).	ROUND C NG DEVI (LOCK-O NG DEVI (LOCK-O FOR PER	DN ISOL CE FUR FF FOR CE FUR N FOR (SONNE	ATED G RNISHEE MAINTE RNISHEE CRITICA L PROT	ROUND WITH ENANCE WITH L LOAD ECTION) BUS. E).). I
(30r (30r HAS EQU REF FAL REF FAL COI 1. ADI	BREAKER F nA). NDUCTOR S BEEN INCE JIPMENT GE ERENCE G ER TO ONE JLT CURREN ER TO ONE TORY WIRE RU CONTRO NTROLLER I D CIRCUIT B	IZE SHC REASED ROUND F ROUND Y -LINE DI ST FOR I -LINE DI ED TO LC ILLER. RI DETAIL. REAKER	WN IN F FOR VC PROPOF WIRE SI AGRAM NTERRI AGRAM DAD. EFER TO	PANEL S DLTAGE RTIONAI IZING CI I FOR A UPT RA I FOR W O LIGHT	ECTION SCHEDU DROP. LY PEF HART. /AILABL TINGS. IRE SIZ 'ING PANEL.	JLE SIZE NEC. .E ES.
EC CON	QUIPM	ENT For	GR SIZ	oun Ing	IDIN CH/	IG ART
RKR			WIR	E SIZE		
E 00				•	•	
5-20	PHASE GROUND	12 12	10 10	8	6	4 4
25-30	PHASE GROUND PHASE GROUND	12 12 10 10	10 10 8 8	8 8 6 6	6 6 4 4	4 4 3 3
25-30 25-50	PHASE GROUND PHASE GROUND PHASE GROUND	12 12 10 10 8 10	10 10 8 8 8 6 8	8 8 6 6 4 4	6 6 4 4 4 3 4	4 4 3 3 2 4
25-30 35-50 60	PHASE GROUND PHASE GROUND PHASE GROUND	12 12 10 10 8 10 6 10	10 10 8 8 6 8 4 6	8 8 6 4 4 4 3 6	6 6 4 4 4 3 4 2 4	4 4 3 3 2 4 1 4
25-30 25-50 60 70	PHASE GROUND PHASE GROUND PHASE GROUND PHASE GROUND	12 12 10 10 8 10 6 10 6 8	10 10 8 8 8 6 8 4 6 4 6 4 4 4	8 8 6 4 4 4 3 6 3 4	6 6 4 4 4 3 4 2 4 2 3	4 4 3 3 2 4 1 4 1 2
25-30 35-50 60 70 30-90	PHASE GROUND PHASE GROUND PHASE GROUND PHASE GROUND PHASE GROUND	12 12 10 10 8 10 6 10 6 8 4 8	10 10 8 8 8 6 8 4 6 4 4 4 3 6	8 8 6 4 4 4 3 6 3 4 2 4	6 6 4 4 4 3 4 2 4 2 3 1 4	4 4 3 3 2 4 1 4 1 2 1/0 3
25-30 25-50 60 70 30-90 100	PHASE GROUND PHASE GROUND PHASE GROUND PHASE GROUND PHASE GROUND PHASE GROUND	12 12 10 10 8 10 6 10 6 8 4 8 4 8 3 8	10 10 8 8 8 6 8 4 6 4 4 4 3 6 2 6	8 8 6 4 4 4 3 6 3 4 2 4 2 4 1 4	6 6 4 4 4 3 4 2 4 2 3 1 4 2 3 1 4 1/0 4	4 4 3 3 2 4 1 4 1 2 1/0 3 2/0 3

C Notes	Srancn Panel: L4A Location: ELEC 02-05 Supply From: T4 Mounting: SURFACE Enclosure: NEMA 1	-12				P۲	Volts: nases: Wires:	120/2 3 4	V 08 Wyd	e			A I Ma	. I.C. Rating: (7) FU Mains Type: MCB ains Rating: 200 A	LLY RATED	
скт	Load Name	СВ	P	Wire		Δ		B			Wire	Р	СВ	Loa	d Name	CI
1	AHU-1 UV	15	1	Wile	462	1456					, vinc	•	15	MCU 01		
3	AHU-1 GFCI	15	1				360	1456				2	15			4
5	AHU-1 LIGHTING	15	1		000	1450			391	1456		2	15	MCU-02		E
/		15	1		232	1456	201	1/50					-			<u>}</u> م
9 11	AHU-2 GECI	15	1				291	1450	180	1456		2	15	MCU-03		
13	AHU-3 UV	15	1		462	1456				00			45	MOLLOS		1
15	AHU-3 GFCI	15	1				1200	1456				2	15	MCU-05		1
17	AHU-3 LIGHTING	15	1						391	1456		2	15	MCU-04		1
19	AHU-4 UV	15	1		232	1456	001	4070				-	10			2
21	AHU-4 LIGHTING	15	1				391	1976	100	1070	#10	2	25	MCU-06		2
23 25	SPARE	15 20	1		0	1456			180	1970						2
27	SECTOR 2 SERVICE	20	1		0	1400	1440	1456				2	15	MCU-07		2
29	ELEVATOR CAB LIGHTS	20	1						200	1976	#10	2	25	MOLLOR		3
31	SPARE	20	1		0	1976					#10	2	25			3
33	ROOF MAINTENANCE RECEPTACLE	20	1				1080	1456				2	15	MCU-09		3
35	SPARE	20	1		0	1076			0	1456		_				3
37	SPARE SDACE	20	1		0	1976	0	1076			#10	2	25	MCU-10		
41	SPACE						0	1970	0	0		1	20	SPARE		4
43	SPACE				0	1976			-	-	#40					4
45	SPACE						0	1976			#10	2	30	MCU-11		4
47	SPACE								0	0		1	20	SPARE		4
49	SPACE				0	0	0					1	20	SPARE		5
51							0	0	0	0		1	20	SPARE		5
55	SPACE				0	0			0	0				SPACE		5
57	SPACE						0	0						SPACE		5
59	SPACE								0	0				SPACE		6
61	SPACE				0	0								SPACE		6
63	SPACE						0	0	0	0				SPACE		6
65	SPACE				0	0			0	0				SPACE		6
69	SPACE				0	0	0	0						SPACE		7
71	SPACE								0	0				SPACE		7
73	SPACE				0	0								SPACE		7
75	SPACE						0	0						SPACE		7
77	SPACE								0	0				SPACE		7
/9	SPACE				0	0	0	0						SPACE		8
01 82	SPACE						0	0	0	0				SPACE		8 0
03	SFACE		 Fotal		1/50		1807		1111	ο 8 \/Δ				JFACE		0
		т	otal	Amps:	12	6 A	15	5 A	93	B A						
		-														
Load	Classification	Co	onne	cted Lo	bad	Dem	and Fa	actor	Estir	nated	Deman	d		Panel	Totals	
Hvac			361	92 VA		1	00.00%	%		36192	VA					
Power			20	0 VA		1	00.00%	%		200 \	/A			Total Conn. Load:	43784 VA	
Recep	otacle		44	40 VA		1	00.00%	%		4440	VA		7	otal Est. Demand:	44522 VA	
_ightir	ng - Exterior		29	52 VA		1	25.00%	%		3690	VA		Тс	tal Conn. Current:	122 A	
													Т	otal Est. Demand	124 A	
E	Branch Panel: HE4						ľ	NEV	V							

скт	Load Name	СВ	Р	Wire		4	E	3	((Wire	Р	СВ	Load Name	СК
1	SPARE	20	1		0	0						1	20	SPARE	2
3	SPARE	20	1				0	0				1	20	SPARE	4
5	SPARE	20	1						0	0		1	20	SPARE	6
7	SPARE	20	1		0	0						1	20	SPARE	8
9	SPACE						0	0						SPACE	10
11	SPACE								0	0				SPACE	12
13	SPACE				0	0								SPACE	14
15	SPACE						0	0						SPACE	16
17	SPACE								0	0				SPACE	18
19	SPACE				0	0								SPACE	20
21	SPACE						0	0						SPACE	22
23	SPACE								0	0				SPACE	24
25	SPACE				0	0								SPACE	26
27	SPACE						0	0						SPACE	28
29	SPACE								0	0				SPACE	30
31	SPACE				0	0								SPACE	32
33	SPACE						0	0						SPACE	34
35	SPACE						-		0	0				SPACE	36
37	SPACE				0	0			-	-				SPACE	38
39	SPACE						0	0						SPACE	40
41	SPACE								0	0				SPACE	42
••		т	otal	Load:	0	VA	0	VA	0	/A					
		Тс	otal	Amps:	0	А	0	А	0	A]				
	Classification	Co	nn 0	ctod L o	ad	Dom	and Er	otor	Ectin	natod	Doman	d		Papal Totals	
LUau		0	me		au	Demo			ESUI	lateu	Deman	u			
														Total Conn. Load: 0 VA	
													Т	otal Est. Demand: 0 VA	
													То	tal Conn. Current: 0 A	
-													Τα	otal Est. Demand 0 A	

Notes	Branch	Decation: ELEC 02 Location: ELEC 02 Supply From: Mounting: SURFAC Enclosure: NEMA 1	2-05-12 CE				Pr	Volts: nases: Wires:	NEV 120/2 3 4	N 08 Wye	2			A M	LI.C. Rating: (7) FU Mains Type: MCB ains Rating: 200 A	LLY RATED		 TERMINATE GROUND ON ISOLATED G INSTALL LOCKING DEVICE FURNISHEE PANELBOARD (LOCK-OFF FOR MAINTE INSTALL LOCKING DEVICE FURNISHEE PANELBOARD (LOCK-ON FOR CRITICA GFI BREAKER FOR PERSONNEL PROT (5mA). 				ES (#) ROUND BUS. D WITH ENANCE). D WITH AL LOAD). TECTION			
СКТ		Load Name	СВ	Р	Wire	4.450	A	I	B	C	;	Wire	P	СВ	Loa	d Name	скт	6. CC HA	DINEARER MA). NDUCTOR S BEEN INCONTRACTOR	SIZE SH		PANEL OLTAGE RTIONA)UL > { =R	
1 3	MCU-12		15	2		1456	500	1456	1456				1	20	EF-8		4	RE	FERENCE	GROUND	WIRE S	IZING C	HART.		
5	EF-7		15	1						528	1456		2	15	MCU-13		6	7. RE		IE-LINE L				3LE	
7	SPARE		20	1		0	0	0	0				1	20	SPARE		8	8. RE	FER TO ON	IE-LINE D	DIAGRAM	I FOR W	/IRE SIZ	IZE	
9	SPARE		20	1				0	0	0	0		1	20	SPARE		10	9. FA	CTORY WIF	RED TO L	OAD.				
13	SPARE		20	1		0	0			0	U		1	20	SPARE		14	10. TH	RU CONTR	OLLER. F	REFER T	O LIGH	TING		
15	SPARE		20	1		-	-	0	0				1	20	SPARE		16		D CIRCUIT	RREAKE		ISTING			
17	SPARE		20	1						0	0		1	20	SPARE		18								
19	SPARE		20	1		0	0		0				1	20	SPARE		20						ייסו		
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27	SPARE		20	1		-		0	0				1	20	SPARE		28								
29	SPARE		20	1						0	0		1	20	SPARE		30	BDKD							
31	SPARE		20	1		0	0	0	0				1	20	SPARE		32	AMPS WIRE SIZE							
33	SPARE		20	1				0	0	0	0		1	20	SPARE		34	,					1		
აე 37	SPACE					0	0			0	U				SPACE		38	15-20	PHASE	12	10	8	6		
39	SPACE					0	0	0	0						SPACE		40		GROUND	12	10	8	6		
41	SPACE									0	0				SPACE		42				_				
43	SPACE					0	0								SPACE		44	25-30	PHASE	10	8	6	4		
45	SPACE							0	0						SPACE		46		GROUND	10	8	6	4		
47	SPACE					-	-			0	0				SPACE		48	25 50						_	
49 51	SPACE					0	0	0	0						SPACE		50	35-50	PHASE	8	6	4	3		
53	SPACE							0	U	0	0				SPACE		52		GROUND	10	8	4	4		
55	SPACE					0	0			0	U		+		SPACE		56	60	DHVCE	6	4	3	2		
57	SPACE							0	0						SPACE		58		GROUND	10	6	6	4		
59	SPACE									0	0				SPACE		60						· ·		
61	SPACE					0	0								SPACE		62	70	PHASE	6	4	3	2		
63	SPACE							0	0		~				SPACE		64		GROUND	8	4	4	3		
00 67	SPACE					0	0			0	U				SPACE		00 88							_	
69	SPACE					0	0	0	0						SPACE		70	80-90	PHASE	4	3	2	1		
71	SPACE									0	0				SPACE		72		GROUND	8	6	4	4		
73	SPACE					0	0								SPACE		74				•	4	4.10	_	
75	SPACE							0	0						SPACE		76	100		3	2	1	1/0		
77	SPACE					-				0	0				SPACE		78		GROUND	ŏ	ю	4	4		
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83	SPACE							0	0	0	0				SPACE		84	L							
				Total	Load:	195	6 VA	291	2 VA	1984	I VA			1											
			т	otal	Amps:	16	δA	24	ΙA	17	А	L													
Load	Classificatio	on	Co	onne	cted Lo	ad	Dem	and Fa	actor	Estin	nated	Demai	nd		Panel	Totals									
Hvac				58	24 VA		1	00.00%	6	_	5824	VA													
Powe	r			10	28 VA		1	00.00%	6		1028	VA			Total Conn. Load:	6852 VA									
						Γ								1	Total Est. Demand:	6852 VA									
														Тс	otal Conn. Current:	19 A									

Project Manual

Bid Package 2 Addendum No.03 Volume 2 Divisions 27

Cherokee Nation WILMA P. MANKILLER HEALTH CENTER EXPANSION

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Feburary, 05 2020

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Cherokee Nation Information Technology

Network Construction Standards and Requirements

INTRODUCTION

The following Network Construction Standards and Requirements pertain to the requirements of the Cherokee Nation Information Technology Network Section. All preceding documentation is superseded by this document and shall be used until replaced.

This is our requirements that we require to be followed when designing, constructing, or refurbishing any building that requires a network to be installed or upgraded. If there are any questions please contact Cherokee Nation Information Technology Network Group.

PART 1 – GENERAL

- 1) SECTION REQUIREMENTS
 - a) Summary: Furnish and install complete with all accessories a Structured Cabling System (SCS). The SCS shall serve as a vehicle for transport of data, video and voice telephony signals throughout the network from designated demarcation points to outlets located at various desks, workstation and other locations as indicated on the contract drawings and described herein.
 - b) Submittals
 - i) Product Data
 - (1) Owner is providing a list of standard parts required for the contract. Any additional parts used the vendor/contractor will provide manufacture's catalog information showing dimensions, colors and configurations.
 - (2) Submittals shall include all items called for in PART 2 PRODUCTS of this document and the manufacturers cut sheets for the following:
 - (a) All balanced twisted pair cable.
 - (b) All connectors and required tooling.
 - (c) All termination system components for each cable type.
 - (d) All test equipment to be used for balanced twisted pair channels.
 - (3) A Performance Specification showing manufacturer's Guaranteed Published Channel Performance over the full swept frequency range.
 - (4) Technical data sheets shall include the physical specifications as well as the following electrical and transmission characteristics for balanced twisted pair channels:
 - (a) Mutual Capacitance
 - (b) Characteristic Impedance
 - (c) DC Resistance
 - (d) Insertion Loss (IL)
 - (e) Pair-to-Pair Near End Crosstalk (NEXT)
 - (f) Power Sum Near End Crosstalk (PSNEXT)
 - (g) ELFEXT (ELFEXT)
 - (h) Power Sum ELFEXT (PSELFEXT)
 - (i) Return Loss (RL)
 - (j) Propagation delay
 - (k) Delay Skew
 - ii) Samples

(1) Prior to installation, samples of cable and components shall be provided to the Owner, its

Consultants and Construction Manager for evaluation prior to Installation

- (a) Submit samples of each type of cable
 - (i) Three (3) 24" long samples of each type of cable, copper (6e & 6a) and fiber (SM & MM). For the copper, the sample cannot be from the same box/reel. Must take from three separate boxes/reels.
 - (ii) Three (3) samples of each connector.
 - (iii) One each 100ft terminated copper of the 6e & 6a cable in a bag for test reference and permanent storage in the Main Closet. Each should start at the lowest footage mark.
- iii) Manufacturer's Instructions
 - (1) Indicate application conditions and limitations of use stipulated by product testing agency specified under regulatory requirements.
 - (2) Include instructions for storage, handling, protection, examination, preparation, operation and installation of product.
- iv) Material Guarantee
 - (1) The wiring vendor/contractor (installer) shall guarantee at the time of the bid that all Category 6A and 6E cabling and components meet or exceed specifications (including installation) as referenced in 1.2.
 - (2) The successful wiring vendor/contractor (installer) will insure that all correct parts are ordered per Products Section of this document and installed in accordance with manufacturers design and installation guidelines. Vendor/contractor shall submit complete parts and part numbers to the Construction Manager prior to installation of equipment.
 - (3) Test Fiber optic cables upon receipt at Project site:
 - (a) Test optical fiber cable to determine the continuity of the strand end to end. Use optical loss test set.
 - (b) Test optical fiber cable while on reels. Use an optical time domain reflectometer to verify the cable length and locate cable defects, splices, and connector, including the loss value of each. Retain test data and include the record in final documentation.
- v) Quality Assurance
 - (1) For Cat 6a and 6e copper and Fiber optic the following will be provided:
 - (a) System:
 - (i) The successful Bidder shall warrant that all materials and equipment furnished within the channel, under the contract are new, in good working order, free from defects, and in conformance with the Structured Cabling SYSTEM specifications. All installed equipment must conform to the manufacturer's official published specifications. The warranty shall begin at the Structured Cabling System acceptance date and remain in effect for a period of twenty-five year from that date. The successful Bidder shall agree to repair, adjust, and/or replace (as determined by the Purchaser to be in its best interest) any defective equipment, materials, or other parts of the Structured Cabling System at the successful Bidder's sole cost. The Purchaser will incur no costs for service or replacement of parts within the channel during the warranty period of 25 years.
 - (ii) Selected vendor must provide a Structured Cabling System warranty for a minimum of 25 years. The Structured Cabling System warranty must guarantee the electrical performance to meet or exceed the requirements as outlined in documents TIA/EIA 568A and ISO DIS 11801 and offer a twenty five (25) year warranty within the Structured Cabling SYSTEM Channel, beginning at acceptance by the Purchaser. The warranty must include complete parts and labor replacement of defective products. The products must be warranted for a minimum of 20 years by the manufacturer. The Structured Cabling System warranty must have provisions for replacing the contracting

organization at no cost to the customer should the contractor lose his status as an authorized installer or otherwise not fulfill his obligation to the customer as outlined in the Structured Cabling System warranty program.

- (iii) The successful Bidder shall warrant and supply evidence that the installation of materials and hardware will be made in strict compliance with all applicable provisions of the National Electric Code, the rules and regulations of the Federal Communications Commission, and state and/or local codes or ordinances that may apply.
- (b) Application:
 - (i) Minimum twenty (20) year application assurance: The application assurance shall cover the failure of the wiring system to support the application which it was designed to support, as well as additional application(s) introduced in the future for a minimum twenty (20) year period.
- vi) Certifications
 - (1) The successful vendor/contractor shall meet the current year Panduit Business Partner Agreement – Panduit Certified Installer (and/or Addendum), and shall provide a copy of the PCI certificate before awarding contract.
 - (2) A copy of certification not less than 6 months from expiration for the vendors/installer Panduit Certified Copper and Fiber Technicians (PCT) shall be submitted upon awarding of contract before first cable is pulled and or installed.
 - (3) If the successful vendor/contractor subcontracts the job (and so on), then each awarded vendor/installer shall comply with the same certifications as above.

2) STANDARDS AND CODE COMPLIANCE REFERENCES

- a) The following industry standards are the basis for the structured cabling system described in this document:
 - i) TIA/EIA
 - (1) ANSI/TIA-568-C.0, Generic Telecommunications Cabling for Customer Premises, February 2009
 - (2) ANSI/TIA-568-C.1, Commercial Building Telecommunications Cabling Standard, February 2009
 - (3) ANSI/TIA-568-C.2, Balanced Twisted-Pair Telecommunications Cabling and Components
 - (4) Standards, August 2009
 - (5) ANSI/TIA-568-C.3, Optical Fiber Cabling Components Standard, June 2008.
 - (6) TIA/EIA569A Commercial Building Standard for Telecom Pathways and Spaces
 - (7) TIA/EIA606 Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
 - (8) TIA/EIA607 Commercial Building Grounding/Bonding Requirements
 - (9) TIA/EIA942 Telecommunications Infrastructure Standard for Data Centers
 - (10) IEEE Std 802.3(tm)-2008 Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications.
 - (1) IEEE Std 802.3(tm)-2008 Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications. IEEE 802.3bc-2009, Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications. Amendment 2: Ethernet Organizationally Specific Type, Length, Value (TLVs).
 - ii) NFPA70 National Electric Code (NEC) 2005
 - iii) ISO/IEC · ISO/IEC 11801 Generic Cabling for Customer Premises
 - iv) BICSI ITSIM, Chapter. 4, "Pulling Cable."

3) ADDITIONAL SUPPPORT

- a) Cherokee Nation Information Technology Network Construction Standards and Requirements this document.
- b) Notes, drawings and instructions from Owner as needed.
- c) Panduit Certification PLUSSM System Warranty Program, Panduit Warranty Guide.
- d) Successful vendor/contractor is invited to review an existing network to see how Owner would like to see how the network should look upon completion.
- 4) The most recent versions of all documents apply to this project. If there is a conflict between applicable documents, the order above (section 2 and 3) shall dictate the order of precedence in resolving the issue unless an enforceable local or national code is in effect.

PART 2 – PRODUCTS

- 1) SYSTEM REQUIREMEMNTS
 - a) Expansion Capability: Provide spare conductor pairs in telecommunication cables, positions in crossconnect and patch panels, terminal strips to accommodate 20 percent future increase in the number of workstations shown on Drawings. All components and cabling shall be capable of 10G Bandwidth speed throughout the entire system.

2) CABLE TRAY

- a) Installation:
 - i) Cable tray will be the Chatsworth part no. 10250-718, {Standard length is 9'11-1/2"}. Cable Tray shall be installed with side stringers facing up so that the ladder forms a U-shape.
 - ii) Cable Tray shall be secured to the structural ceiling, building truss system, wall, floor or the tops of equipment racks and/or cabinets using the manufacturer's recommended supports and appropriate installation hardware and methods as defined by local code or the authority having jurisdiction (AHJ). Cable Tray shall be supported every 5' or less in accordance with TIA-569-B. Cable Tray shall be supported within 2' of every splice and within 2' on both/all sides of every intersection. Support Cable Tray within 2' on both sides of every change in elevation. Cable tray support will use the Threaded Ceiling kit (11310-003) or a combination of Runway Support Bracket (11408-003) with 5/8 All-Thread Rod on the outside, Ceiling Support Bracket (11406- 002), Threaded Rod I-Beam Clamps (10557-003), or appropriate hex nuts, split lock washers and plain washers through the bottom chord of the joists. Cable Tray splices will be made in mid-span, not over a support, with the manufacturer's recommended splice hardware.
 - iii) Cable Tray shall be installed with a minimum clearance of 12" above the Cable Tray. Leave a minimum of 12" in between Cable Tray and ceiling/building truss structure. When located above an acoustical drop ceiling, leave a minimum of 3" clearance between the top of the drop ceiling tiles and the bottom of the Cable Tray.
 - iv) Connections between tray sections shall be with the Butt-Splice kit (11301-001). If a redirection of up or down is required to go over or under utilities, use the Butt Swivel Splice kit (1 0487 -001). For the up or down movement of tray do not exceed more than 30 degrees so the cable will lie on the tray. The use of cut up tray sections/pieces on joints shall not be used. Manufacture parts shall be used.
 - v) Intersections (T or X shaped) shall be made using the Junction Splice Kit (11308-001), with Cable Runway Corner Bracket (11595-715) added to create a radius for the cable to lay on when making turns. For an L-turn use the Cable Runway E-Bend (10822-709).
 - vi) The cable tray is offset the length of the room to accommodate the rack, for all the cable to come off the track within 4 feet of the left hand wall when standing in the doorway.

- vii)Cover the exposed ends of cable runway that do not terminate against a wall or the ceiling with Protective End Caps (10643-001) or an End Closing Kit (11700-709).
- The installer will provide touch-up paint color-matched to the finish on the Cable Tray and will viii) correct any minor cosmetic damage (chips, small scratches, etc.) resulting from normal handling during the installation process prior to delivery to the owner. If a component is cosmetically damaged to the extent that correction in the field is obvious against the factory finish, the component will be replaced with a new component finished from the factory. If a component is physically damaged due to mishandling or modification during the installation process, it shall not be used as part of the Cable Tray system. Paint listed in parts list.
- b) Grounding
 - i) Grounding will be in accordance with the Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications J-STD-607 -A. Within the telecommunications room/s and throughout the building, the Cable Tray shall be bonded together, electrically continuous, and bonded to the TGB. Cable Tray and turns shall be bonded across each splice with a bonding kit (40164-001 or 025). Cable Tray shall be bonded to the Telecommunications Grounding Buss bar (TGB) using an approved ground lug on the Cable Tray and a minimum #6 grounding wire. Remove paint from the Cable Tray where bonding/ground lugs contact the Cable Tray so that the lug will contact bare metal. Use antioxidant joint compound in between the bare metal on the Cable Tray and ground lug. Use antioxidant joint compound in between the bus bar and the ground lug. Verify continuity through the bonds at splices and intersections between individual Cable Tray sections and turns and through the bond to the TGB.
 - ii) The use of cut up tray sections/pieces on joints shall not be used as a grounding bond between the joints.

3) IT ROOM

- a) Server room shall be Air Conditioned with a separate unit on a separate thermostat.
- b) The HVAC shall be provided on a 24 hours-per-day, 365 days-per year basis. If a standby power source is available in the building, consideration should be given to connecting the HVAC system serving the telecommunications equipment room to the standby supply.
- c) The temperature and humidity shall be controlled to provide continuous operating ranges of 18deg C (64deg F) to 24 "C (75deg F) with 30% to 55% relative humidity. Humidification and dehumidification equipment may be required depending upon local environmental conditions
- d) A positive air pressure differential with respect to surrounding areas should be provided.
- e) Need 120v power receptacles on all walls with dedicated circuits. The rack vertical management will have twist lock and quad receptacles as request by the owner and Drawings.
- Wall 3/4" void free A-C grade (or better) plywood with 2 coats of fire retardant paint. f)
- g) Equipment not related to the support of the equipment room (e.g., piping, ductwork, pneumatic tubing, etc.) shall not be installed in; pass through, or enter the equipment room.

4) MOUNTING ELEMENTS

a) Use the following charts to reference which equipment will be used.

Line item	P/N	Description	Qty
1	4220W	Dell 42U enclosure, wide (4220W): 750mm wide x 1070mm deep	
2	PRV15	Panduit Vertical Cable manager	
3	CMR4P84	Panduit 4-Post rack	
4	PRD15	Panduit Dual hinged door	

Chart 1

5	PREP	Panduit End Panel	
6	RGRB19U	Panduit ground bar	
7	GB2B0312TPI-1	Panduit Telecommunications ground bar	
8	10250-724	Chatsworth Universal cable runway. Black – 24 Inch Wide	Reference
9	11301-702	Chatsworth Butt Splice Kit, 2" Stringer, Black	Reference
10	10724-724	Chatsworth Cable runway radius bend – 24inch Wide	Reference
11	11309-701	Chatsworth Foot kit, cable runway	Reference
12	11421-724	Chatsworth Wall angle support kit cable runway – 24inch Wide	Reference
13	31470-712	Chatsworth Cable runway standoff support kit	Reference
14	10506-702	Chatsworth Cable runway elevation kit	Reference
15	11302-701	Chatsworth Junction-splice kit	Reference
16	10723-724	Chatsworth Cable runway radius bend	Reference
17	11959-724	Chatsworth Corner Bracket 24 inch Radius.	Reference
18	11746-724	Chatsworth Triangular Supports Bracket, steel	Reference

Chart 2

Lino					
item	Qty	P/N	Description	Purpose	Notes
1		CJ6X88TGBU	Panduit Category 6A, RJ45, 10 Gb/s, 8-position, 8-wire universal module, Blue	Closet A Zone	
2		CJ6X88TGOR	Panduit Category 6A, RJ45, 10 Gb/s, 8-position, 8-wire universal module, Orange	Closet B Zone	
3		CJ6X88TGGR	Panduit Category 6A, RJ45, 10 Gb/s, 8-position, 8-wire universal module, Green	Closet C Zone	
4		CJ6X88TGRD	Panduit Category 6A, RJ45, 10 Gb/s, 8-position, 8-wire universal module, Red	Closet D Zone	
5		CJ6X88TGIW	Panduit Category 6A, RJ45, 10 Gb/s, 8-position, 8-wire universal module, Off White	Closet E Zone	
6		CJ688TGYL	Panduit Category 6, RJ45, 8-position, 8-wire universal module, Yellow	Camera Systems	
7		CJ688TGVL	Panduit Category 6, RJ45, 8-position, 8-wire universal module, Violet	Multimedia	
8		CJ6X88TGBU-24	Panduit Category 6A, RJ45, 10 Gb/s, 8-position, 8-wire universal module, Blue (24-Pk)	Closet A Zone	
9		CJ6X88TGOR-24	Panduit Category 6A, RJ45, 10 Gb/s, 8-position, 8-wire universal module, Orange (24-Pk)	Closet B Zone	
10		CJ6X88TGGR-24	Panduit Category 6A, RJ45, 10 Gb/s, 8-position, 8-wire universal module, Green (24-Pk)	Closet C Zone	
11		CJ6X88TGRD-24	Panduit Category 6A, RJ45, 10 Gb/s, 8-position, 8-wire universal module, Red (24-Pk)	Closet D Zone	
12		CI6X88TGIG-24	Panduit Category 6A, RI45, 10 Gb/s, 8-position, 8-wire universal module. Int Gray (24-Pk)	Closet E Zone	
13		CI688TGYL-24	Panduit Category 6, RI45, 8-nosition, 8-wire universal module, Yellow (24-Pk)	Camera Systems	
14		CI688TGVI 24	Panduit Category 6, RU5, 8 position, 8 wire universal module, Violet (24 Pk)	Multimedia	
15		PUR6004BU-UY	Panduit TX6000 Cat6 LITP riser coppar cable	Camera Systems and Multimedia	
15	50		Cat 6a 10Ch LTD patch aghla 7ft Plua	Closet A network room connection	
17	70		Cat 6a 10Ch UTD match aghla 14ft Dhua	Closet A network room connection	
17	70		Cat (a 100b UTP patch cable, 14h, Blue		
10	70		Cat of 100b UTP patch cable, 7h, Blue	Closet B network room connection	
19	70	UTP6A/OR	Cat 6a 10Gb UTP patch cable, /ft, Orange	Closet B network room connection	
20	50	UTP6A/GR	Cat 6a 10Gb UTP patch cable, /ft, Green	Closet C network room connection	
21	50	UTP6A7RD	Cat 6a 10Gb UTP patch cable, 7ft, Red	Closet D network room connection	
22	30	UTP6A7	Cat 6a 10Gb UTP patch cable, 7ft, Off White.	Closet E network room connection	
23	120	UTP6A5YL	Cat 6a 10Gb UTP patch cable, 5ft, Yellow	Security Cameras	
24	10	UTP6A3YL	Cat 6a 10Gb UTP patch cable, 3ft, Yellow	Security Cameras lamp posts	
25	30	UTP6A3VL	Cat 6a 10Gb UTP patch cable, 3ft, Violet	Multimedia	
26		Vendor specific	Panduit Mini-Com Snap -On Modular furniture faceplates	Modular Furniture	Check Panduit's catalog. Must have a label. Vendor
27		CHS2IW-X	Panduit Single gang faceplate frame accepts two 1/2 size module inserts or three 1/3 size module inserts.	Multimedia plates	For other colors replace suffix IW (Off White) with
29		CHB2IW-X	Panduit 1/2 Blank Insert	Multimedia plates	For other colors replace suffix IW (Off White) with
30		KWPY	Panduit Stainless steel phone plate	Wall phones	The cable is terminated and left in the wall box.
31		CFPL2IWY	Single gang, vertical faceplate accepts two Mini-Com modules	Network wall plates	For other colors replace suffix IW (Off White) with
32		CFPL3IWY	Single gang, vertical faceplate accepts three Mini-Com modules	Network wall plates	For other colors replace suffix IW (Off White) with
33		CFPL4IWY	Single gang, vertical faceplate accepts four Mini-Com modules	Network wall plates	For other colors replace suffix IW (Off White) with
31				Network wall plates	For other colors replace suffix IW (Off White) with
32		TTS-35RX0	Panduit Tak-Tape (10 PK)	All network binding	
33		FOOPRX24Y	Panduit Opti-Core 24-Fiber indoor interlocking armored cable	All Back bone	
34		EZDP44	Fire Barrier CBL Pathway Single EZ Path W/WPLT Series 44		+
35		KOESDZ-1	randart i wo-noie ESD port with 5/8 noie spacing		+
36		11310-003	Chatsworth Threaded Ceiling Kit, Cable Runway		

specific faceplate.
El (Electric Ivory), wh (white), IG (Int Gray) of BL (Black)
El (Electric Ivory), wH (write), IG (Int Gray) or BL (Black)
EI (Electric Ivory), WH (White), IG (Int Gray) or BL (Black)
EI (Electric Ivory), WH (White), IG (Int Gray) or BL (Black)
El (Electric Ivory), WH (White), IG (Int Gray) or BL (Black)
EI (Electric Ivory), WH (White), IG (Int Gray) or BL (Black)
EI (Electric Ivory), WH (White), IG (Int Gray) or BL (Black)

11421-712	Chatsworth Wall Angle Support Kit, Cable Runway		
10250-712	Chatsworth Universal Cable Runway – 12 inch wide		
10723-712	Chatsworth Cable Runway Radius Bend 90-Degree Outside Bend – 12 inch Wide		
10724-712	Chatsworth Cable Runway Radius Bend 90-Degree Inside Bend – 12 inch Wide		
11301-702	Chatsworth Butt-Splice Kit		
11298-701	Chatsworth Heavy Duty Junction-Splice Kit		
10642-001	Chatsworth Chatsworth Protective End Caps For Runway		
10622-010	Chatsworth Standard Busbar 4"Wx1/4"HxlO"L		
40164-001	Chatsworth #6AWG Ground Strap		
10250-718	Chatsworth Universal Cable Runway		
10723-718	Chatsworth Cable Runway Radius Bend 90 degree Outside Bend		
10724-718	Chatsworth Cable Runway Radius Bend 90 degree Inside Bend		
11421-718	Chatsworth Wall Angle Support Kit, Cable Runway		
11304-000	Chatsworth J-bolt Kit		
11301-001	Chatsworth Butt-Splice Kit		
10506-706	Chatsworth Cable Runway Elevation Kit 6"		
1201-701	Chatsworth Cable Runway Radius Drop Stringer		
12100-718	Chatsworth Cable Runway Radius Drop Cross Member		
JMDWB-1-X	Panduit Drop Wire brackets for J-hooks		
JMJH2-X20	Panduit J Hook		
FOPRX24Y	Panduit Opti-Core 24-Fiber 10gig indoor interlocking armored cable		
RGTBSG-C	Panduit Green thread-forming bonding screw, #12-24 x 1/2' (pkg 100)		
	11421-712 10250-712 10723-712 10724-712 11301-702 11298-701 10642-001 10642-001 10622-010 40164-001 10250-718 10723-718 10723-718 10724-718 11304-000 11301-001 10506-706 1201-701 12100-718 JMDWB-1-X JMJH2-X20 FOPRX24Y RGTBSG-C	11421-712Chatsworth Wall Angle Support Kit, Cable Runway10250-712Chatsworth Universal Cable Runway – 12 inch wide10723-712Chatsworth Cable Runway Radius Bend 90-Degree Outside Bend – 12 inch Wide10724-712Chatsworth Cable Runway Radius Bend 90-Degree Inside Bend – 12 inch Wide11301-702Chatsworth Cable Runway Radius Bend 90-Degree Inside Bend – 12 inch Wide11301-702Chatsworth Butt-Splice Kit11298-701Chatsworth Heavy Duty Junction-Splice Kit10622-010Chatsworth Heavy Duty Junction-Splice Kit10622-010Chatsworth Standard Busbar 4"Wx1/4"Hx10"L10622-010Chatsworth Standard Busbar 4"Wx1/4"Hx10"L10622-010Chatsworth Universal Cable Runway10723-718Chatsworth Cable Runway Radius Bend 90 degree Outside Bend10723-718Chatsworth Cable Runway Radius Bend 90 degree Inside Bend11304-000Chatsworth J-bolt Kit11304-000Chatsworth J-bolt Kit11304-000Chatsworth J-bolt Kit11304-000Chatsworth Cable Runway Radius Drop Stringer12100-718Chatsworth Cable Runway Radius Drop Stringer12100-718Chatsworth Cable Runway Radius Drop Cross Member12100-718Chatsworth Cable Runway Radius Drop Cross Member12100-718Panduit Opti-Core 24-Fiber 10gig indoor interlocking armored cable13000Panduit Opti-Core 24-Fiber 10gig indoor interlocking armored cable1300-718Panduit Opti-Core 24-Fiber 10gig indoor interlocking armored cable13000Panduit Opti-Core 24-Fiber 10gig indoor interlocking armored cable13000	111421-712Chatsworth Wall Angle Support Kit, Cable Runway110250-712Chatsworth Universal Cable Runway - 12 inch wide110723-712Chatsworth Cable Runway Radius Bend 90-Degree Outside Bend - 12 inch Wide110724-712Chatsworth Cable Runway Radius Bend 90-Degree Inside Bend - 12 inch Wide111301-702Chatsworth Cable Runway Radius Bend 90-Degree Inside Bend - 12 inch Wide111301-702Chatsworth Cable Runway Radius Bend 90-Degree Inside Bend - 12 inch Wide111301-702Chatsworth Cable Runway Radius Bend 90-Degree Inside Bend - 12 inch Wide111298-701Chatsworth Buts-Splice Kit111662-001Chatsworth Heavy Duty Junction-Splice Kit11062-001Chatsworth Chatsworth Protective End Caps For Runway11062-001Chatsworth Chatsworth Protective End Caps For Runway11062-001Chatsworth Cable Runway Radius Bend 90 degree Outside Bend110250-718Chatsworth Cable Runway Radius Bend 90 degree Outside Bend11072-718Chatsworth Cable Runway Radius Bend 90 degree Inside Bend111301-001Chatsworth Sub Kit111301-001Chatsworth But-Splice Kit111301-001Chatsworth Cable Runway Radius Drop Stringer111301-001Chatsworth Cable Runway Radius Drop Cross Member111301-001Chatsworth Cable Runway Radius Drop Cross Member111301-001Chatsworth Cable Runway Radius Drop Cross Member111301-001Chatsworth Cable Runway Radius Drop Cross Member </th

5) UNSHIELDED TWISTED-PAIR CABLING

- a) Backbone Fiber Cable:
 - i) Panduit Opti-Core 24-Fiber 10gig indoor interlocking armored cable, p/n FOPRX24Y
 - ii) Comply with TIA/EIA 568-B.1 & 3, and 598-B
 - iii) NFPA 70
- b) Horizontal Copper cable:
 - i) For Security Cameras and Multimedia:
 - (1) NO. 23 AWG, 100 ohm, four pair. Panduit PUR6004BU-UY
 - (2) Comply with TIA/EIA-568-B.2 and ANSI/TIA-568-C.2, Category 6e
 - (3) NFPA 70, types CMG and CMP
 - ii) For Main Network:
 - (1) NO. 23 AWG, 100 ohm, four pair. Panduit PUR6X04BU-UY
 - (2) Comply with TIA/EIA-568-B.2 and ANSI/TIA-568-C.2, Category 6A
 - (3) NFPA 70, types CMG and CMP
- c) Cable Connecting Hardware: Comply with TINEIA-568-B.2, IDC type, using modules designed for punch-down caps or tools.
 - i) IDC Terminal Block Modules: Integral with connector bodies, including plugs and jacks where indicated.
- d) Cross-Connect Panel: Modular array of IDC terminal blocks arranged to terminate building cables and permit interconnection between cables.
 - i) Number of Terminals per Field: One for each conductor in assigned cables plus 25 percent spare.
 - ii) Number of Jacks per Field: One for each four-pair UTP cable indicated.
- e) Jacks and Jack Assemblies: As referenced in Charts 1 and 2.
- f) Patch Cords: Factory made, four pair cables, to length as stated in parts reference, matching color to closet zone as referenced in Charts 1 and 2.

6) MULTIUSER TELECOMMUNICATIONS OUTLET ASSEMBLY

- a) Modular unit suitable for terminating single or multiple horizontal cables in one central location, providing an intermediary point between telecommunications closet and workstation.
 i) NRTL listed as complying with UL 50 and UL 1863.
 ii) Number of Terminals per Field: One for each conductor in assigned cables.
 iii) Number of Connectors per Field:

 (1) One for each four-pair UTP cable indicated.
 (2) One for each four-pair conductor group of indicated cables, plus 25 percent spare positions.
- b) Mounting: Owner furnished Modular Walls and Furniture: As provide by modular furniture manufacturer. Reference Charts 1 and 2.

7) WORKSTATION OUTLETS

- a) Jacks: 100-ohm, balanced, twisted-pair connector; four-pair, modular, RJ-45. Comply with TIAIEIA-568-B.1.
- b) Workstation Outlets: Single, dual, triple or quad jack connecter mounted in a single or multi-gang faceplate as shown in the prints.
 - i) Jacks will be the color of the Closet/ Zone they are in. See prints.
 - ii) Faceplate: Flush; high impact plastic; color determined by Architect and or Owner. Part numbers listed in Part Reference.
 - iii) Legend: Contractor printed labels showing Closet then cable number, i.e. A001, A002, B101, C125.

8) MULTIMEDIA OUTLET

a) Jacks: 100-ohm, balanced, twisted-pair connector; four-pair, modular, RJ-45. Comply with TIAIEIA-

568-B.1.

- b) Workstation Outlets: dual connecter mounted in a single faceplate as shown in the prints.
 - i) Jacks will be the color of Violet. See Charts 1 and 2.
 - ii) Faceplate: Flush; high impact plastic; color determined by Architect and or Owner. Part numbers listed in Charts 1 and 2 Part Reference.
- c) Legend: Contractor printed labels showing Closet, M (for MultiMedia) then cable number, i.e. AM01.

9) SECURITY CAMERA OUTLETS

- a) Jacks: 100-ohm, balanced, twisted-pair connector; four-pair, modular, RJ-45. Comply with TIAIEIA-568-B.1.
- b) Workstation Outlets: dual connecter mounted in a single faceplate as shown in the prints.
 - i) Jacks will be the color of Yellow. See Charts 1 and 2.
 - ii) Legend: Contractor printed labels showing Closet, S (for Security) then cable number, i.e. AS01.
 - iii) Outlets will be either in the following configurations according to drawings.
 - (1) If internal wall mount then terminated jack will be placed in the box with a blank faceplate, flush; high impact plastic; color determined by Architect and or Owner.
 - (2) If external wall mount then the terminated jack will be placed on or in the internal inside wall close to the camera mount in a single ganged box with:
 - (a) Faceplate: Flush; high impact plastic; color determined by Architect and or Owner. Part numbers listed in Charts 1 and 2 Part Reference.
 - (3) If ceiling mounted then the terminated jack will be place on top plate of the nearest wall in a single ganged box with:
 - (a) Faceplate: Flush; high impact plastic; color determined by Architect and or Owner. Part numbers listed in Charts 1 and 2 Part Reference.

10) GROUNDING AND BONDING

- a) Materials: Comply with NFPA 70, TINEIA-607, and UL 467.
- b) Reference Charts for what type of hardware is to be used in each Closet.
- c) Reference Manufacturer instructions on what and how grounding should be done if not referenced in this section.
- d) Reference drawings for location of hardware on equipment racks.
- e) Reference Part 2, section 2b), Cable Tray Grounding.

11) IDENTIFICATION PRODUCTS

- a) Reference Steps 7-9 above for labeling legend.
- b) Adhesive-Backed Cable Labels: Use a label-making machine or printer to construct adhesive-backed label tabs from plastic or paper strips. Labels shall be over laminating type in order to protect type-face information with clear Mylar film. Handwritten labels are prohibited
- c) Four-pair UTP cable shall have labels affixed directly to cable jacket:
 - i) Within 3 inches from jack all outlets listed in steps 8-10.
 - ii) Within 6 from jack at patch panels
 - iii) Within 6 from entry into blocks.
- d) Fiber Optic Cables:
 - i) Shall have labels affixed to a label carrier that protects the cable and allows the re-positioning and rotation of the identification label.
 - ii) Warning Label shall be affixed along the consistent distance apart identifying that the cable is an optical fiber.
- e) Wiring Block Labels: Cardboard-like strips or adhesive labels that slip inside or onto clear plastic designation strips or label holders located on protector panels and wiring blocks

 f) Telecommunications Outlet (TO) Labels/Workstations: Use a label-making machine to construct label tabs from plastic or paper strips or adhesive labels. Handwritten labels are unacceptable
 12) CONDUIT SIZING SCHEDULE

	SCHEDULE 1 - Max Number of Cables based upon allowable fill.				
SCHEDULE 0 – Conduit Trade Size	SCHEDULE 2 - Cable outside Diameter, mm (in), [a=Category 3, 6e] or [b=6A, 10Gig]				
	SCHEDULE 3 - 6.1	SCHEDULE 4 - 7.9	SCHEDULE 5 - 9.4	SCHEDULE 6	
	(2.4) [a]	(.31) [b]	(.37) [b]		
SCHEDULE 7 - 27	SCHEDULE 8 - 4	SCHEDULE 9 - 2	SCHEDULE 10-2	SCHEDULE 11	
(1 ")					
SCHEDULE 12 - 35	SCHEDULE 13-5	SCHEDULE 14-4	SCHEDULE 15 - 3	SCHEDULE 16	
(1-1/4")					
SCHEDULE 17 - 41	SCHEDULE 18-6	SCHEDULE 19-4	SCHEDULE 20 - 4	SCHEDULE 21	
(1-1/2")					

13) CONDUIT RUNS

- a) Conduits from any Telecommunication closet, cable tray, horizontal pathway is not allowed except in the following:
 - i) Conduit can be from the TO to the top of the wall with a minimum of 4 inches exposed. Preferred is1 foot above the wall with 90 degree bend so that the cable repair margin can be Velcro wrapped into the bend of the conduit. All exposed ends of conduits will have a EMT screw connector with plastic bushing to protect the cable from nicks.
 - A 2-inch conduit is required to each wall-mounted box that supports a multi-user telecommunications outlet assembly (MUTOA). A MUTOA is a special type of telecommunications outlets that can support up to 12 voice/data jacks. It is suitable for use in locations where there is a cluster of machines where each one is within 15 feet from the MUTOA.
 - iii) Flexible conduits such as metallic flexible conduit are not to be used as pathways for telecommunications cables to avoid sheath damage to the cables. Therefore, the use of flexible conduits as pathway for telecommunications cables must be avoided at all times.
 - iv) Minimize the amount of turns/curve in the conduit from the top of wall to the gang box. If under a window or opening, reroute conduit to place straight down next to window or opening.

14) TELECOMMUNICATIONS EQUIPMENT ROOM (T-E-R)

- a) A telecommunications equipment room (T-E-R) is where the entrance conduits terminate. It is usually located on the ground floor but may also be located in the basement. A T-E-R typically functions as the main cross-connect (MCC). It is the main telecommunications serving point for the building. It will contain telecommunications equipment, much of it mounted on 19" 4 post racks. Cables will be spliced and terminated on the walls. It is important that the entrance conduits stub up in the T-E-R as close to a corner as possible.
- b) When designing the T-E-R floor space1, allowance shall be made for non-uniform occupancy, throughout the building. The practice is to provide 0.07 m2 (0.75 ft') of equipment room space for every 10 m2 (100 ft') of work area space. The equipment room shall be designed to a minimum of 14 m2 (150 ft'). See section 8.2 of TIAIEIA-569 pg.72 for more information. In the case of smaller buildings see annex B.3 of the TIAIEIA-569.
- c) In certain buildings, the T-E-R will be further designated as a Node Room. A Node Room is used as a

cabling hub not just for that building but for other buildings in that neighborhood of the campus. A Node Room requires additional space, air conditioning, and additional entrance conduits. It may require 30 amp outlets. In some cases, where a Node Rooms is designated in a building, a separate TR on the same floor as the Node Room may be required.

- d) CN-NTD will advise FD&C and the architect in the initial planning stage if a Node Room has been designated, No water sprinklers may be installed in a Node Room. A separate fire suppression system, based on one of the approved replacements for Halon, must be installed in coordination with CN Risk Management
- e) A Node Room will house PBX telephone switching equipment, large wet- or dry-cell batteries, routers for campus wide area network (WAN), related local area network (LAN) switches, optical fiber cross connects and optical communications gear. Hence, it should be located so that it is accessible for the delivery of large equipment throughout its useful life. It must be at least 10' from a potential source of EMI (motors, transformers, photocopying equipment, etc.).

15) TELECOMMUNICATIONS ROOMS (TRS)

a) TRs are smaller than T-E-Rs. They are the cabling hubs for floors within a building. They also contain network electronics, typically mounted in 19" - 4 post racks. See table 7.2-1 of TIAIEIA. 569 pg. 66 for more information.

16) ELEVATOR PHONES

a) Elevator phones are cabled to each elevator equipment room. There must be at least one TO in the elevator equipment room that is cabled to the Main telecom room. There must be a dedicated number of jacks on the TO so to accommodate all elevators in the building. Recommend that there be one phone block dedicated to Safety and Security to be easily identified.

PART 3 – EXECUTION

1) INSTALLATION STANDARDS

- a) Reference Part 1 General,
 - i) Section 2) STANDARDS AND CODE COMPLIANCE REFERENCES
 - ii) Section 3) ADDITIONAL SUPPPORT
- b) The most recent versions of all documents apply to this project. If there is a conflict between applicable documents, the order above shall dictate the order of precedence in resolving the issue unless an enforceable local or national code is in effect.

2) APPLICATION OF MEDIA

- a) Backbone Cable for Data Service: 10Gig 24 fiber cable for runs between equipment rooms and wiring closet and for runs between closets.
- b) Backbone Cable for Multimedia Service: UTP Category 6e cable to be run from Closet "A" Multimedia panel to each of the other closet multimedia patch panels, i.e. A to B, A to C, A to D, A to E. The cable will be terminated as the last port on the patch panel, i.e 21, 22, 23, 24.
- c) Backbone Cable for Telecommunications to run from Telecom Entrance Room to each closet, terminated at the Telecom patch panel, reference locations on drawings.
- d) Horizontal Cable for Data Service: 10Gig UPT Category 6A cable for runs between wiring closets and workstation outlets.
- e) Horizontal Cable for Security Cameras:
 - i) UTP Category 6e cable for runs between wiring closets and equipment. Starting at port 1 on Security Camera patch panel.
 - ii) Fiber Optic 6-fiber cable for runs from closet to lamp posts in parking lot. Terminating in fiber box.

f) Horizontal cable for Multimedia Service: UTP Category 6e cable for runs between wiring closets and equipment. Starting at port 1 on Multimedia patch panel.

3) WORKMANSHIP

- a) Manufactured products, materials, equipment, and components shall be provided, conditioned, applied, installed, connected, and tested in accordance with the manufacturer's specifications and printed instructions.
- b) The installation of all system components shall be carried out under the direction of qualified personnel. Appearance shall be considered as important as mechanical and electrical efficiency. Workmanship shall meet or exceed industry standards. All work shall be performed in a high quality manner and the overall appearance shall be clean, neat and orderly.
- c) The vendor/contractor and subcontractor will have the following personnel on site during install:i) Supervisor for every 4 Panduit Certified Copper and Fiber Technicians (PCT)
 - (1) If the supervisor is a PCT, the supervisor can also have up to a maximum of 4 non-certified PCT's.
 - ii) A PCT can have up to a maximum of 4 non-certified PCT's.
 - iii) If subcontracted, each supervisor is responsible to the primary site vendor/contractor.
 - (1) Primary supervisor has no limit to subcontractor supervisor to manage.
 - (2) Primary supervisor will then have an assistant supervisor who will supervise as follows:
 - (a) If the assistant supervisor is a PCT, the supervisor can also have up to a maximum of 4 non-certified PCT's.
- d) Inspection
 - i) The Contractor must allow Owner, its Consultants, Construction Manager, CNIT, their agents and the manufacturer's agent to observe and evaluate workmanship and can have problems corrected or work halted until corrected.
 - ii) On-going inspections shall be performed during construction by the project manager Owner, its Consultants, Construction Manager, CNIT their agents. All work shall be performed in a high quality manner and the overall appearance shall be clean, neat and orderly.

4) INSTALLATION

- a) Comply with:
 - i) Reference Part 1 –General,
 - ii) Section 2) STANDARDS AND CODE COMPLIANCE REFERENCES
 - iii) Section 3) ADDITIONAL SUPPPORT
 - iv) The most recent versions of all documents apply to this project. If there is a conflict between applicable documents, the order above shall dictate the order of precedence in resolving the issue unless an enforceable local or national code is in effect.
- b) Wiring Method: Install cables in raceway and cable tray except within consoles, cabinets, desks, and counters. Conceal raceway and wiring except in unfinished spaces. Cable trays shall be as standardized by CNIT using ladder type cable trays.
- c) The path for the cable tray shall be clear of obstructions, such as HVAC ducts, large pipes and structural beams within the building. Use of enclosed tray and conduits is not allowed. Elevations of trays will be minimized as to not have a stair step effect. Where fire or smoke barriers are penetrated by the ladder tray, they shall be fire stopped to maintain the rating of the barrier. Alternatively, EZ- Path Systems may be used through the penetrations. The number of sleeves required depends on the number of cables and size of tray. Use 50% fill ratio to determine the number of sleeves. Two additional spare sleeves should be installed to accommodate future cable placement.
- d) Place cable trays above drop ceilings in corridors. Do not place them above offices, patient/treatment rooms or inaccessible spaces. There must be at least 4 inches of vertical space between the suspended ceiling tile and the bottom of the cable tray; 12 inches of vertical clearance from the top of the cable tray

to the true ceiling; and 2' total side clearance (i.e. if the cable tray is wall mounted and there is no clearance on one side, then minimum clearance on the other side should be 2'.

- e) It is desirable that the cable tray originates from the TR. If the TR is surrounded with smoke or fire rated walls then EZ-Path systems will be installed
- f) Access ceiling panels must be installed at 5-foot interval if cable tray is passing through a hard or solid ceiling. The panels should be within 1-1/2 feet from the cable tray. They shall not be mounted directly underneath the cable tray. Trays shall not change level or change direction if placed above a hard or solid ceiling.
- g) All metallic cable trays must be grounded but should not be used as grounding conductor for equipment.
- Wiring Method: Install cables in raceway and cable tray except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Use UL-listed plenum cable in environmental air spaces, including plenum ceilings. Conceal raceway and cables except in unfinished spaces.
- i) Wiring within Wiring Closets and Enclosures:
 - i) Install 3/4" void free A-C grade (or better) plywood with 2 coats of fire retardant paint on walls of equipment rooms and wiring closet from floor to ceiling.
 - ii) Mount patch panels, terminal strips, and other connecting hardware on floor-mounted racks. Reference drawings for placement.
- j) Horizontal Fiber Optic to the parking lot lampposts:
 - i) Pull will be from the rack mount fiber box designated for security systems to the lamppost.
 - ii) Terminate each fiber at rack end and mount into fiber box.
 - iii) At lamp post leave the equivalent of twice the pole height inside the base opening. Do not terminate cable. Seal cable with weather proof tape. Cable will be terminated and tested by owner.
- k) Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated cross-connects, patch panels, workstations or locations as indicated in the Drawings.
- 1) Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
- m) Lacing/tie wraps will be accomplished by Velcro strapping. The strap must be able be rotatable without slipping. NO WIRE TIES WILL BE USED ON ANY CABLE OR CABLE BUNDLES.
- n) Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
- o) Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii. Use lacing bars and distribution spools.
- p) Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
- q) Cold-Weather Installation: Bring cable to room temperature before de-reeling. Heat lamps shall not be used for heating.
- r) In the communications equipment room, install a 3-5 foot long service loop on each end of cable neatly stored inside the Vertical management.
- s) Pulling Cable: Comply with BICSI ITSIM, Chapter. 4, "Pulling Cable." Monitor cable pull tensions.
- t) Only anchor the cable bundles at the network room cable trays starting at the top when it comes down into the room down to the racks.
- u) When cable drops come off the tray it will go between the rungs. No cable will come over the top and bent over the edge. If the cable is to be pulled through the red iron the cable will go through the bottom of the cable tray between the rungs then up to the red iron. The only time cable will go over the edge of the cable tray is if another tray is connected at an angle to that tray and the cable is changing directions.

v) When the cable is installed there will be a minimum of 3ft of cable at drop location end for repair margin. If the drop is within 10ft of the cable tray, the repair margin can be anchored under the cable tray to one of the rungs. If more than 10ft then the repair margin will be anchored to the drops conduit above the wall. If there is not enough conduit then the margin can be anchored to the nearest red iron. Do not anchor to an electrical conduit. See drawings. When anchoring to the cable tray, wrap a plastic wire tie around the rung with the ratchet head below the rung. Then secure the repair margin to the wire tie with Velcro. See drawings:

- w) Separation from EMI Sources:
 - i) NO CONDUITS, POWER CABLE/CONDUCTORS OR EQUIPMENT SHALL BE LAID IN, THROUGH OR ACROSS THE TOP (WITHIN 12 INCHES) THE CABLE TRAY. IF CONDUITS, POWER CABLE/CONDUCTORS OR EQUIPMENT ARE UNDER THE TRAY, STEPS ii-vi BELOW WILL BE FOLLOWED.
 - ii) Comply with BICSI TDMM and TIA/EIA-5 69-A recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
 - iii) Separation between open communications cables, cables in nonmetallic raceways or fiber optic cable in armored cable and unshielded power conductors and electrical equipment shall be as follows:
 (1) Electrical Equipment Deting Leas Then 2 bVAs A minimum of Cinches
 - Electrical Equipment Rating Less Than 2 kVA: A minimum of 6 inches.
 Electrical Engineerat Parting between 2 and 5 kVA: A minimum of 12 inches.
 - (2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
 - (3) Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.
 - iv) Separation between communications cables in grounded metallic raceways/conduit and unshielded power lines or electrical equipment shall be as follows:
 - (1) Electrical Equipment Rating Less Than 2 kVA: A minimum of 6 inches.
 - (2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
 - (3) Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.
 - v) Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
 - (1) Electrical Equipment Rating Less Than 2 kVA: A minimum of 1 inch.
 - (2) Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
 - (3) Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.
 - vi) Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.
 - vii) Separation between Communications Cables and Fluorescent Fixtures:

- (1) A minimum of 6 inches if cable is running perpendicular (90deg) to the fixture.
- (2) A minimum of 2ft if running parallel to the fixture (including cable tray). If less than, reroute cable from another direction or have fixture moved.

5) GROUNDING

- a) Grounding will be in accordance with the Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications J-STD-607 -A. Within the telecommunications room, Cable Tray should be bonded together, electrically continuous, and bonded to the TGB. Cable Tray and turns shall be bonded across each splice with a bonding kit (40164-001 or 025). Cable Tray shall be bonded to the Telecommunications Grounding Busbar (TGB) using an approved ground lug on the Cable Tray and a minimum #6 grounding wire. Remove paint from the Cable Tray where bonding/ground lugs contact the Cable Tray so that the lug will contact bare metal. Use antioxidant joint compound in between the bare metal on the Cable Tray and ground lug. Use antioxidant joint compound in between the bus bar and the ground lug. Verify continuity through the bonds at splices and intersections between individual Cable Tray sections and turns and through the bond to the TGB.
- b) Reference NFPA 70 (latest Edition) Article 250 for other grounding requirements.
- c) Grounding of patch panels, fiber boxes or equipment brackets to the racks can be accomplished by one Panduit bonding screw (reference Charts 1 and 2) on each side securing the bracket to the rack. Use of antioxidant paste is required.

6) IDENTIFICATION

- a) Comply with TINEIA-606-A.
 - i) Administration class for this Project shall be Class 4.
 - ii) Color-code cross-connect and telecom fields. Apply colors to voice and data service backboards, connections, covers, and labels.
- b) Use logical and systematic designations for facility's architectural arrangement and nomenclature, and a consistent color-coded identification of individual conductors.
 - i) Jacks will be the color of the Closet/ Zone they are in. See Drawings.
 - (1) Closet "A" Blue
 - (2) Closet "B" Orange
 - (3) Closet "C" Green
 - (4) Closet "D" Red
 - (5) Closet "E" Off White
 - (6) Security Cameras Yellow
 - (7) Multimedia Violet
- c) Reference Part 2 Products, Section 12.
- d) Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet (4.5 m).
- e) Label each terminal strip and screw terminal in each cabinet, rack, or panel if applicable.
- f) Cable Schedule: Post in prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.
- g) Cabling Administration Drawings: Show building floor plans with cable administration-point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors. Follow convention of TIAIEIA-606-A. Furnish electronic record of all drawings, in software and format selected by Owner.

7) FIELD QUALITY CONTROL

- a) Perform the following field tests and inspections and prepare test reports following the Standards and Code Compliance References for the following:
 - i) Category 6a UTP Cabling Tests:
 - (1) Test instruments shall meet or exceed applicable requirements as defined in the TIA Cat 6A Standard. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration. Owner prefers that tester be the Fluke DTX-1800 as owner can except all test reports in the LinkWare file format. The tester will have current calibration sticker attached and a copy of sticker or calibration certificate attached to final documentation.
 - (2) Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 - (3) Wire-map test that reports open circuits, short circuits, crossed pairs, reversed pairs, split pairs, and improper terminations.
 - (4) Channel and permanent link tests for cable length, insertion loss, near-end crosstalk loss, power sum near-end crosstalk loss, equal-level far-end crosstalk loss, power sum equal level far-end crosstalk, return loss, propagation delay, and delay skew. Performance shall comply with guaranteed channel performance up to 500MHz.
 - (5) Alien Crosstalk will not be required.
 - ii) Category 6a UTP Cabling Tests:
 - (1) Test instruments shall meet or exceed applicable requirements as defined in the TIA Cat 6A Standard. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration. Owner prefers that tester be the Fluke DTX-1800 as owner can except all test reports in the LinkWare file format. The tester will have current calibration sticker attached and a copy of sticker or calibration certificate attached to final documentation.
 - (2) Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 - (3) Wire-map test that reports open circuits, short circuits, crossed pairs, reversed pairs, split pairs, and improper terminations.
 - (4) Channel and permanent link tests for cable length, insertion loss, near-end crosstalk loss, power sum near-end crosstalk loss, equal-level far-end crosstalk loss, power sum equal level far-end crosstalk, return loss, propagation delay, and delay skew. Performance shall comply with guaranteed channel performance up to 500 MHz.
 - iii) Back Bone Fiber Cable
 - (1) Test instruments shall meet or exceed applicable requirements. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration. Owner prefers that tester be the Fluke DTX-1800 as owner can except all test reports in the LinkWare file format. The tester will have current calibration sticker attached and copy of sticker or calibration certificate attached to final documentation.
 - (2) Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components. Inspect cabling terminations in communications equipment rooms for compliance with color-coding.
 - (3) Optical Fiber Cable Tests:
 - (a) Field-test instruments shall have the latest software and firmware installed.
 - (b) Link and channel test results from the OLTS and OTDR shall be recorded in the test instrument upon completion of each test for subsequent uploading to a PC in which the administrative documentation (reports) may be generated.

- (c) Fiber end-faces shall be inspected at 200X or 400X magnification. 200X magnification is suitable for inspecting multimode and singlemode fibers. 400X magnification may be used for detailed examination of singlemode fibers. Scratched, pitted or dirty connectors shall be diagnosed and corrected.
 - (i) If possible it is preferable that the end-face images be recorded in the memory of the test instrument for subsequent uploading to a PC and reporting.
- (d) Testing shall be performed on each cabling segment (connector to connector).
- (e) Testing shall be performed on each cabling channel (equipment to equipment) that is planned for use per the owner's instructions.
- (f) Testing of the cabling shall be performed using high-quality test cords of the same fiber type as the cabling under test. The test cords for OLTS testing shall be between 1 m and 5 m in length. The test cords for OTDR testing shall be approximately 100 m for the launch cable and at least 25 m for the receive cable.
- (g) Optical loss testing
 - (i) Backbone link
 - 1. Multimode backbone links shall be tested at 850 nm and 1300 nm in accordance with ANSI/EIA/TIA-526-14A, Method B, One Reference Jumper or the equivalent method.
 - 2. Link attenuation does not include any active devices or passive devices other than cable, connectors, and splices, i.e. link attenuation does not include such devices as optical bypass switches, couplers, repeaters, or optical amplifiers.
 - 3. Use the One Reference Jumper Method specified by ANSI/TIA/EIA-526-14A, Method B and ANSI/TIA/EIA-526-7, Method A. 1 or the equivalent method. The user shall follow the procedures established by these standards or application notes to accurately conduct performance testing.
- (h) OTDR Testing
 - (i) Backbone, horizontal and centralized links shall be tested at the appropriate operating wavelengths for anomalies and to ensure uniformity of cable attenuation and connector insertion loss.
 - (ii) Backbone multimode: 850 nm and 1300 nm
 - (iii)Each fiber link and channel shall be tested in one direction.
 - (iv)A launch cable shall be installed between the OTDR and the first link connection.
 - (v) A receive cable shall be installed after the last link connection.
- (i) Magnified Endface Inspection
 - (i) Fibers shall be inspected at 250X or 400X magnification. The 250X magnification is suitable for inspecting multimode and singlemode fibers.
 400X magnification may be used for detailed examination of singlemode fibers.
- (j) Length Measurement
 - (i) The length of each fiber shall be recorded.
- (ii) It is preferable that the optical length be measured using an OLTS or OTDR.
- (k) A Fail or Fail* result must be diagnosed corrected and retested.
 - (i) If not able to be corrected then remove, replace cabling and retest where test results indicate that they do not comply with specified requirements and the cost shall be borne by the installation contractor
 - (ii) If the results cannot be corrected then the installation contractor may bring in the manufacture's agent, technician or engineer and the cost shall be borne by the installation contractor. If determined that the problem cannot be corrected then under supervision of

the end-user, the representative shall repeat 100% removal, reinstallation and testing and the cost shall be borne by the installation contractor.

- iv) Horizontal Fiber Optic to the parking lot lampposts.
 - (1) Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components. Inspect cabling terminations in communications equipment rooms for compliance with color-coding.
 - (2) Visual light test connection with bright light or visible light.
 - (a) If not visible, terminate cable and test as an iii) Back Bone Fiber Cable to trouble shoot. If fail must be diagnosed corrected and retested.
 - (i) If not able to be corrected then remove, replace cabling and retest where test results indicate that they do not comply with specified requirements and the cost shall be borne by the installation contractor
 - (ii) If the results cannot be corrected then the installation contractor may bring in the manufacture's agent, technician or engineer and the cost shall be borne by the installation contractor. If determined that the problem cannot be corrected then under supervision of the end-user, the representative shall repeat 100% removal, reinstallation and testing and the cost shall be borne by the installation contractor.

(3) Cable will be final tested by Owner at a later date.

- v) Cable Samples, the 6a & 6e cable will be tested and added to documentation and warranty.
 (1) Use the samples to check verification of manufacturer recommendations for setting the testers.
- b) Trained technicians who have successfully attended an appropriate training program and have obtained a certificate as proof thereof shall execute the tests. Appropriate training programs include but are not limited to installation certification programs provided by BICSI or the ACP (Association of Cabling Professionals). A copy of the certification will be attached to final documentation.
- c) One hundred percent of the installed cabling links must pass the requirements of the standards mentioned above except as noted. Any failing link must be diagnosed and corrected. The corrective action shall be followed with a new test to prove that the corrected link meets the performance requirements. The final and passing result of the tests for all links shall be provided in the test results documentation.
- d) The tester interface adapters must be of high quality and the cable shall not show any twisting or kinking resulting from coiling and storing of the tester interface adapters. In order to deliver optimum accuracy, preference is given to a permanent link interface adapter for the tester that can be calibrated to extend the reference plane of the Return Loss measurement to the permanent link interface. The contractor shall provide proof that the interface has been calibrated within the period recommended by the Manufacturer. To ensure that normal handling on the job does not cause measurable Return Loss change, the adapter cord cable shall not be of twisted-pair construction.
- e) The Pass or Fail condition for the link-under-test is determined by the results of the required individual tests (detailed in Section I.2.2 of ANSI/TIA/EIA-568-B.2). Any Fail or Fail* result yields a Fail for the link-under-test. In order to achieve an overall Pass condition, the results for each individual test parameter must Pass or Pass*.
 - A Pass or Fail result for each parameter is determined by comparing the measured values with the specified test limits for that parameter. The test result of a parameter shall be marked with an asterisk (*) when the result is closer to the test limit than the accuracy of the field tester. The field tester manufacturer must provide documentation as an aid to interpret results marked with asterisks. To which extent '*' results shall determine approval or disapproval of the element under test shall be defined in the relevant detail specification, or agreed on as a part of a contractual specification.
 - ii) A Fail or Fail* result must be diagnosed corrected and retested.

- (1) If not able to be corrected then remove, replace cabling and retest where test results indicate that they do not comply with specified requirements and the cost shall be borne by the installation contractor
- (2) If the results cannot be corrected then the installation contractor may bring in the manufacture's agent, technician or engineer and the cost shall be borne by the installation contractor. If determined that the problem cannot be corrected then under supervision of the end-user, the representative shall repeat 100% removal, reinstallation and testing and the cost shall be borne by the installation contractor.
- f) Additional Requirements:
 - i) A representative of the end-user shall be invited to witness field testing. The representative shall be notified of the start date of the testing phase five business days before testing commences.
 - ii) At an agreed time a representative of the end-user will select a random sample of 10% of the installed links. The representative (or his authorized delegate) shall test these randomly selected links and the results are to be stored in a separate documentation that will be attached with final documentation (but does not have to be submitted for warranty). The results obtained shall be compared to the data provided by the installation contractor. If more than 3% of the sample results differ in terms of the pass/fail determination:
 - (1) The installation contractor under supervision of the end-user representative shall repeat 100% testing and the cost shall be borne by the installation contractor.
 - (2) If the results cannot be corrected then the installation contractor may bring in the manufacture's agent, technician or engineer and the cost shall be borne by the installation contractor. If determined that the problem cannot be corrected then under supervision of the end-user, the representative shall repeat 100% removal, reinstallation and testing and the cost shall be borne by the installation contractor.

8) TEST RESULTS DOCUMENTATION

- a) The test results/measurements shall be transferred into a WindowsTM-based database utility that allows for the maintenance, inspection and archiving of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered, i.e., "as saved in the tester" at the end of each test and that these results cannot be modified at a later time. The file format, CSV (comma separated value), does not provide adequate protection of these records and shall not be used. Owner prefers that the test results/measurements be in the LinkWare file format.
- b) The database for the completed job shall be stored and delivered on CD-ROM or DVD including the software tools required to view, inspect, and print any selection of test reports.
- c) A paper copy of the test results shall be provided that lists all the links that have been tested with the following summary information
 - i) The identification of the link in accordance with the naming convention defined in the overall system documentation
 - ii) The overall Pass/Fail evaluation of the link-under-test including the NEXT Headroom (overall worst case) number
 - iii) The date and time the test results were saved in the memory of the tester.
- d) General Information to be provided in the electronic data base with the test results information for each link:
 - i) The identification of the customer site as specified by the end-user
 - ii) The name of the personnel performing the test
 - iii) The identification of the link in accordance with the naming convention defined in the overall system documentation

- iv) The overall Pass/Fail evaluation of the link-under-test
- v) The name of the standard selected to execute the stored test results
- vi) The date and time the test results were saved in the memory of the tester
- vii) The brand name, model and serial number of the tester
- viii) The identification of the tester interface
- ix) The revision of the tester software and the revision of the test standards database in the tester
- x) The test results information must contain information on each of the required test parameters that are listed.
- e) For all copper (6a & 6e)
 - i) The cable type and the value of NVP used for length calculations
 - ii) In-link (In-Channel) detailed test results. The detailed test results data to be provided in the electronic database for must contain the following information:
 - iii) For each of the frequency-dependent test parameters, the value measured at every frequency during the test is stored. The PC-resident database program must be able to process the stored results to display and print a color graph of the measured parameters. The PC-resident software must also provide a summary numeric format in which some critical information is provided numerically as defined by the summary results (minimum numeric test results documentation) as outlined above for each of the test parameters.
 - (1) Length: Identify the wire-pair with the shortest electrical length, the value of the length rounded to the nearest 0.1 m (1) and the test limit value.
 - (2) Propagation delay: Identify the pair with the shortest propagation delay, the value measured in nanoseconds (ns) and the test limit value.
 - (3) Delay Skew: Identify the pair with the largest value for delay skew, the value calculated in nanoseconds (ns) and the test limit value.
 - (4) Insertion Loss (Attenuation): Minimum test results documentation as explained in Section B for the worst pair.
 - (5) Return Loss: Minimum test results documentation as explained in Section B for the worst pair as measured from each end of the link.
 - (6) NEXT, ACR-F: Minimum test results documentation as explained in Section B for the worst pair combination as measured from each end of the link.
 - (7) PS NEXT and PS ACR-F: Minimum test results documentation as explained in Section B for the worst pair as measured from each end of the link.
 - iv) Between-Link (Between-Channel) Test Results Data
 - v) A test report shall be provided for each disturbed link included in the Alien Crosstalk sample test. This test report must contain:
 - (1) PS ANEXT results at each frequency (See Table 1) for each wire pair in a victim link as well as the PS ANEXT results for the average of these four wire pairs. The worst case margin and the worst values shall be provided for each wire pair and the average of the four wire pairs. PS ANEXT shall be measured and tested from the end of the link or channel where all cables are terminated at a distribution panel. In case the cabling runs from panel to panel (data center) where the worst case PS ANEXT margin is less than 2 dB, the PS ANEXT test results for each disturbed link shall be collected and saved from both ends (both panels) of the disturbed link.

(2) PS AACR-F results at each frequency tested for each wire pair in a disturbed link as well as the PS AACR-F results for the average of the four wire pairs. The worst case margin and the worst values shall be provided for each wire pair and the average of the four wire pairs. PS AACR-F only needs to be measured and tested from one end of the link or channel.

f) Fiber tests:

- i) The fiber identification number.
- ii) The length for each optical fiber.
 - (1) Optionally the index of refraction used for length calculation when using a length capable OLTS.
- iii) Test results to include OLTS attenuation link and channel measurements at the appropriate wavelength(s) and the margin (difference between the measured attenuation and the test limit value).
- iv) Test results to include OTDR link and channel traces and event tables at the appropriate wavelength(s).
- v) The length for each optical fiber as calculated by the OTDR.
- vi) The overall Pass/Fail evaluation of the link-under-test for OLTS and OTDR measurements.
- vii) A picture or image of each fiber end-face if done.
- viii) A pass/fail status of the end-face based upon visual inspection.

9) CONSTRUCTION REVIEW

- c) The following shall be examined and shall comply satisfactorily in all instances.
 - i) Design documentation complete.
 - ii) All cables properly labeled, from end-to-end.
 - iii) All terminated cables been properly tested in accordance with the specifications for the specific category as well as tested for opens, shorts, polarity reversals, transposition and presence of AC and/or DC voltage.
 - iv) The cable type suitable for its pathway.
 - v) The cables bundled in parallel.
 - vi) The pathway manufacturer's guidelines been followed.
 - vii) All cable penetrations installed properly and fire stopped according to code.
 - viii) The Contractors avoided excessive cable bending.
 - ix) Potential EMI and RFI sources been considered.
 - x) Table Fill is correct.
 - xi) All hanging supports are within 1.5 meters (5 feet).
 - xii) Hanging cable exhibit some sag.
 - xiii) IDF room terminations are compatible with applications equipment.
 - xiv) Patch Panel instructions been followed:
 - (1) Jacket removal point
 - (2) Termination positions
 - (3) All pair terminations tight with minimal pair distortions
 - (4) Twists maintained up to Index Strip
 - xv) Modular Panel instructions been followed:
 - (1) Cable dressing first
 - (2) Jackets remain up to the Connecting Block
 - (3) All pair terminations tight and undistorted
 - (4) Twists maintained up to the Connecting Block

- xvi) Connectors are properly turned right side up in the Jack Panels without cables wrapped or twisted around the Mounting Collars.
- xvii) The correct outlet connectors have been used
- xviii) Outlets have been wired correctly (T568B)
- xix) The cable jacket maintained up to the Jack.
- xx) Identification markings uniform, permanent and readable.
- d) The Owner, its Consultants, Construction Manager, CNIT, and their agents will review and observe installation work to ensure compliance by the contractor with requirements of the Contract Documents.
- e) The contractor shall inspect and test completed communications installations to demonstrate specified performance levels including the following:
 - i) Furnish all instruments and personnel required for the inspections and tests.
 - ii) Perform tests in the presence of the Engineer and Owner when required.
 - iii) Demonstrate that the system components operate in accordance with the Contract Documents.
- f) Review, observation, assistance, and actions by the Owner, its Consultants, Construction Manager, CNIT, and their agents shall not be construed as undertaking supervisory control of the work or of methods and means employed by the contractor. The Owner, its Consultants, Construction Manager, CNIT, and their agents review and observation activities shall not relieve the contractor from the responsibilities of these Contract Documents.
- g) The fact that Owner, its Consultants, Construction Manager, CNIT, and their agents does not make early discovery of faulty or omitted work shall not bar the Owner from subsequently rejecting this work and withholding payment until the contractor makes the necessary corrections.
- h) Regardless of when discovery and rejection are made, and regardless of when the contractor is ordered to correct such work, the contractor shall have no claim against the Owner, its Consultants, Construction Manager, CNIT, and their agents for an increase in the Subcontract price, or for any payment on account of increased cost, damage, or loss.

10) DEFINITION OF ACCEPTANCE

- a) System acceptance shall be defined as that point in time when the following requirements have been fulfilled:
 - i) The complete system has successfully completed all testing requirements.
 - ii) All punch list items have been corrected and accepted.
 - iii) All submittals and documentation have been submitted, reviewed, and approved. Including:
 - (1) A list of the documentation showing what was submitted to Panduit for the CERTIFICATION PLUSSM SYSTEM WARRANTY PROGRAM according to the Panduit Warranty Guide.
 - (a) A copy of the E-form, or Fax is acceptable. Or
 - (b) If mailed, a copy of the package Tracking number is acceptable.
 - (2) Verification of delivery will be done by Owner, its Consultants, CNIT, and their agents with Panduit. If:
 - (a) Verified as delivered then acceptance can continue.
 - (b) Verified as NOT delivered, then the acceptance is not complete.