GDI ENGINEERING

GDI ENGINEERING
INNOVATING SOLUTIONS

# Badminton Court

## Sport & Recreation

## McKinney, Texas

**SCHEDULE No. 2**
**FAN SCHEDULE**

| TAG | EF-01 | EF-02 |
|---|---|---|
| LOCATION | MEN RESTROOM | WOMEN RESTROOM |
| SELECTED FLOW (CFM) | 300 | 450 |
| SELECTED PRESSURE DROP (IN. H2O) | 0.28" | 0.26" |
| ELECTRICAL (V / PH / HZ) | 115 / 1 / 60 | 115 / 1 / 60 |
| FULL LOAD AMPS | 1.7 A | 3.3 A |
| MOTOR SPEED | 1000 RPM | 1070 RPM |
| FAN TYPE | DIRECT DRIVE CABINET FAN | DIRECT DRIVE CABINET FAN |
| MANUFACTURER | GREENHECK OR EQUAL | GREENHECK OR EQUAL |
| MODEL | CSP-A410 | CSP-A510 |
| WEIGHT | 36 lbs | 36 lbs |
| DIMENSIONS HxWxL | 15" x 18" x 14" | 15" x 18" x 14" |

NOTES:
1. PROVIDE UL LISTING.
2. PROVIDE ENERGY STAR COMPLIANCE.
3. INTERLOCK WITH OCCUPANCY SENSOR.
4. PROVIDE MOTOR WITH THERMAL OVERLOADS.

**SCHEDULE No. 3**
**AIR OUTLETS**

| TAG | DESCRIPTION | MANUFACTURER | MODEL | SIZE | MOUNTING |
|---|---|---|---|---|---|
| S1 | SUPPLY OUTLET - DRUM LOUVER - SEE NOTES 5 & 7 | TITUS OR EQUAL | DL | 26" x 4" | DUCT MOUNTED - SEE NOTE 4. |
| S2 | SUPPLY SQUARE DIFFUSER | TITUS OR EQUAL | TDC-AA | 24" x 24" | CEILING WITH PLENUM BOX & ROUND INLET. |
| R1 | RETURN GRILL - $\frac{3}{4}$" BAR SPACING - 0° BLADE DEFLECTION | TITUS OR EQUAL | 350-ZRS | W: 20" x H: 42" | DUCT MOUNTED. |
| E1 | EXHAUST GRILL - $\frac{3}{4}$" BAR SPACING - 0° BLADE DEFLECTION | TITUS OR EQUAL | 55FS-NT | 6" x 6" | CEILING WITH ROUND INLET. |
| D1 | 4" DRAINABLE BLADE EXHAUST AIR LOUVER | GREENHECK OR EQUAL | FDS-402-16x16 | 16" x 16" | DUCT MOUNTED. |
| D2 | 4" DRAINABLE BLADE EXHAUST AIR LOUVER | GREENHECK OR EQUAL | FDS-402-18x18 | 18" x 18" | DUCT MOUNTED. |

NOTES:
1. COORDINATE FINISH, COLOR, BORDER AND EXACT LOCATION WITH THE OWNER PRIOR TO ORDERING.
2. PROVIDE OPPOSED BLADE DAMPER ACCESSIBLE THROUGH DIFFUSER FACE FOR GYP BD. CEILING INSTALLATIONS.
3. PROVIDE DUCT TRANSITIONS AS REQUIRED.
4. LOUVER SUB-MODEL TO BE SELECTED BASED ON THE CONNECTED DUCT WHETHER ROUND OR RECTANGULAR.
5. S1 SHOULD HAVE LENGTH OF THROW, HORIZONTAL AND VERTICAL AIR DIRECTION ADJUSTMENTS BY MEANS OF ROTATING DRUM AND PIVOTED BLADES.
6. R1 BLADES SHOULD BE PARALLEL TO THE SHORTER DIMENSION / HORIZONTAL BLADES.
7. DURING COMMISSIONING, ADJUST THE AIR OUTLETS DIRECTION OF THE FLOW TO OBTAIN < 40 FPM AT WITHINT THE COURTS' SPACES.

**VENTILATION LOAD CALCULATION**
IMC 2021 TABLE 403.3.1.1

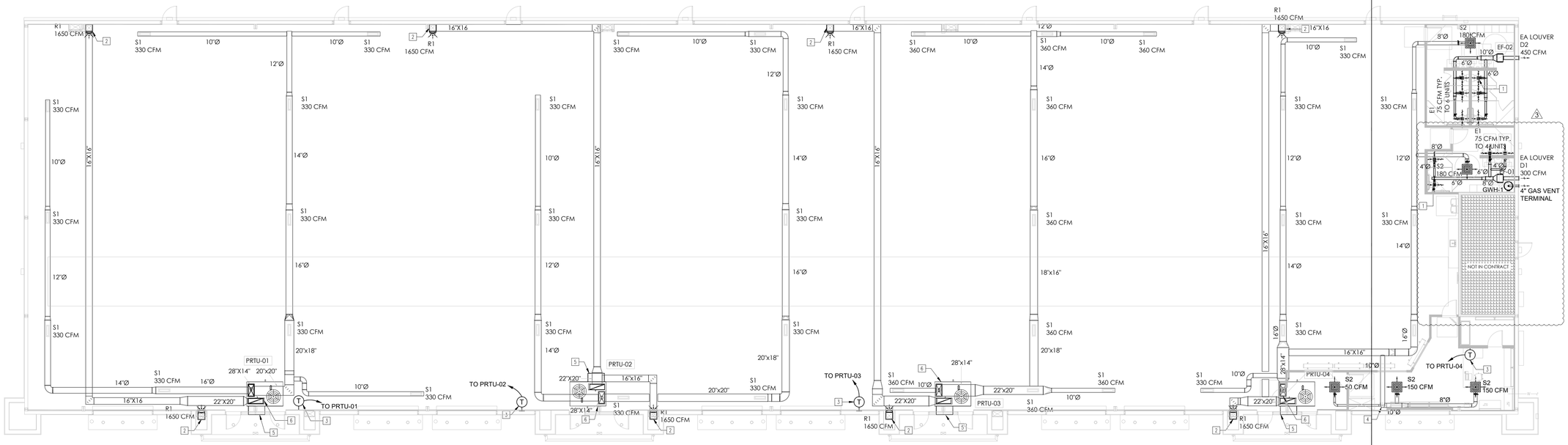
| ROOM N° | ROOM NAME | IMC OCCUPANCY CLASS | AREA (ft²) Az | Ra CFM/ft² | Az x Ra CFM | Pz Pers. / 1000ft² | Pers. | | Rp CFM/Pers. | Rp x Pz CFM | Vbz CALC. CFM | CORRECTED CFM AFTER Ez | SOURCE OF OA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 101 | VESTIBULE | MAIN ENTRY LOBBIES | 100 | 0.06 | 6 | 10 | 1 | | 5 | 5 | 11 | 14 | RTU-4 |
| 102 | STORAGE | STORAGE ROOMS | 60 | 0.12 | 7.2 | - | - | | - | - | 7.2 | 9 | RTU-4 |
| 103 | PRO SHOP | SALES | 402 | 0.12 | 48 | 15 | 6 | | 7.5 | 45 | 93 | 116 | RTU-4 |
| 106 | BADMINTON COURT | GYM, STADIUM, ARENA (PLAY AREA) | 22,328 | 0.30 | 6,699 | - | - | | - | - | 6,699 | 6,699 | RTU-1 TO 4 |
| **TOTAL BUILDING VENTILATION REQUIRED (CFM)** | | | | | | | | | | | **6,810** | **6,838** | |

**NOTES:**

1. WHERE * IS MENTIONED, THE OCCUPANTS LOAD IN THE ARCHITECTURAL SET IS CONSIDERED AS IT IS HIGHER THAN THE Pz RATE.

2. SYSTEM VENTILATION EFFICIENCY Ev IS 1.0 FOR THE BADMINTON COURT SINCE THE SUPPLY AIR IS AT 14' ABOVE THE FLOOR LEVEL AND THE RETURN IS AT 2' ABOVE THE FINISH FLOOR LEVEL. RESULTS AFTER Ev ARE INDICATED SHOWN UNDER CORRECTED CFM. FOR OTHER ROOMS, Ev IS CONSIDERED 0.8 SINCE CEILING SUPPLY & RETURN OUTLETS ARE USED.

3. TOILETS REQUIRE EXHAUST AIR AT A RATE OF 50CFM PER URINAL / WC.

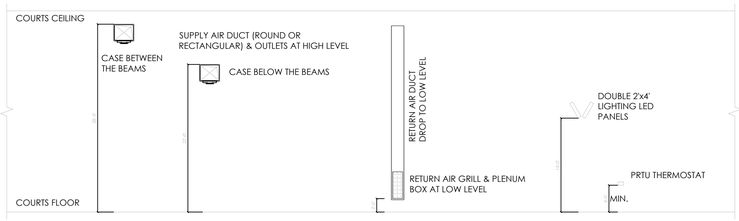



**SCHEDULE No. 1**
**PACKAGED ROOFTOP UNIT - ELECTRIC COOLING / GAS HEAT**

| TAG | PRTU-01 TO PRTU-04 |
|---|---|
| LOCATION | ROOF |
| MANUFACTURER | CARRIER OR EQUAL |
| MODEL | 48HDD11G2M5A2B0A0 |
| COOLING STAGES / ID FAN STAGES | 2 / 2 |
| NOMINAL CAPACITY (TONS) | 10 |
| NET COOLING CAPACITY (MBH) | 111 |
| EER / IEER | 12.0 / 14.3 |
| SELECTED SUPPLY AIR FLOW (CFM) | 3380 |
| OUTDOOR AIR FLOW (CFM) | 1710 |
| GAS HEAT | LOW |
| GAS INPUT - STAGE 1 / STAGE 2 (MBH) | 120 / 180 |
| HEAT OUTPUT - STAGE 1 / STAGE 2 (MBH) | 98 / 148 |
| TEMPERATURE RISE (°F) | 25 - 65 |
| THERMAL EFFICIENCY | 82% |
| MCA | 49 |
| MOCP (A) | 60 |
| VOLTS / PH / Hz | 208-230 / 3 / 60 |
| SOUND RATING (dB) | 87 |
| BASE DIMENSIONS | 88 $\frac{1}{8}$" x 59 $\frac{1}{2}$" |
| WEIGHT WITH ACCESSORIES (lb) | 1455 |

NOTES:
1. RTU SHALL HAVE A FACTORY INSTALLED MOTORIZED ECONOMIZER WITH BAROMETRIC RELIEF DAMPER AND CO2 SENSOR IN THE RETURN DUCT TO ADJUST THE OA % AND TO ALLOW FREE COOLING.
2. OUTDOOR COIL SHOULD HAVE FACTORY INSTALLED LOUVERED HAIL GUARD.
3. PROVIDE REMOTE FILTER STATUS INDICATOR.
4. PROVIDE GAS REGULATOR AS REQUIRED BY THE CODE AND THE MANUFACTURER.
5. PROVIDE FACTORY SUPPLIED ROOF CURBS, VALIDATE THE ROOF CURB HEIGHT WITH THE OWNER PRIOR TO ORDER.
6. PROVIDE FACTORY INSTALLED SMOKE DETECTOR AT THE SUPPLY AIR OUTLET OF THE ROOFTOP UNITS - INTERLOCK WITH FIRE ALARM.

TYPICAL LIGHTS & A/C DEVICES MOUNTING HEIGHTS




MECHANICAL KEYED NOTES:

1. INTERMITTENT FLOW 75 CFM CEILING MOUNTED EXHAUST GRILLS WITH 5" DUCT CONNECTION TO THE BRANCH MAIN DUCT.
2. 24" x 14" RETURN AIR DUCT DROP TO BELOW - PROVIDE RETURN AIR GRILL / BOTTOM OF GRILL TO BE AT + 2' ABOVE FINISH FLOOR LEVEL - PROVIDE MECHANICAL PROTECTION FOR DUCTS AT FLOOR LEVEL. GRILLS ARE 22"x42" (WIDTH x HEIGHT).
3. ROOFTOP THERMOSTAT WITH MECHANICAL TRANSPARENT VENTILATED ENCLOSURE - ENCLOSURE TO BE SUITABLE FOR THERMOSTATS OPERATIONAL FEATURES & TO PROTECT THE THERMOSTATS FROM POSSIBLE MECHANICAL DAMAGE - MOUNT AT + 48" ABOVE FINISH FLOOR LEVEL MIN.
4. DUCT DROP FROM HIGH LEVEL TO MEZZANINE LEVEL, SUPPORT THE DUCT TO THE STEEL MEMBERS - SEE STEEL BUILDING DETAILS FOR APPROVED SUPPORT TYPES.
5. PACKAGED ROOFTOP UNITS ECONOMIZER.
6. SUPPLY & RETURN AIR DUCTS FROM ROOFTOP UNIT - SEE MANUFACTURER'S DATA FOR FINAL DUCT CONNECTION. PROVIDE PLENUM BOX BELOW THE ROOFTOP WHERE NEEDED TO CONNECTION THE DUCTWORK WITH THE CURB DUCTS. - SEE STEEL STRUCTURE LAYOUTS FOR INSTALLATION REQUIREMENTS.

1650 CORPORATE DRIVE
MCKINNEY, TEXAS 75069

# MECHANICAL LAYOUT & SCHEDULES.

Drawen By: Z.H
Scale: 3/32"= 1'-0"
Date: 09.01.2023
PROJ.NO.:

M 2.00

SHEET NO.

## Air System Sizing Summary for Whole Building

Project Name: 2.2.559 McKinney Badminton Center
Prepared by: TLO
04/24/2023
10:55PM

Air System Name ..... **Whole Building**
Equipment Class ..... **PKG ROOF**
Air System Type ..... **SZCAV**

Number of zones ..... **1**
Floor Area ..... **23500.0** ft²
Location ..... **Dallas, Texas**

### Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone CFM Sizing ..... **Sum of space airflow rates**
Space CFM Sizing ..... **Individual peak space loads**

### Central Cooling Coil Sizing Data

Total coil load ..... **40.8** Tons
Total coil load ..... **489.0** MBH
Sensible coil load ..... **388.7** MBH
CFM/Ton at Jul 1400 ..... **12907** CFM
Max block CFM ..... **12907** CFM
Sum of peak zone CFM ..... **12907** CFM
Sensible heat ratio ..... **0.795**
CFM/Ton ..... **316.7**
ft²/Ton ..... **576.6**
BTU/(hr·ft²) ..... **20.8**
Water flow @ 10.0 °F rise ..... **N/A**

Load occurs at ..... **Jul 1400**
OA DB / WB ..... **99.4 / 73.8** °F
Entering DB / WB ..... **89.0 / 73.0** °F
Leaving DB / WB ..... **60.5 / 58.8** °F
Coil ADP ..... **57.4** °F
Bypass Factor ..... **0.100**
Resulting RH ..... **57** %
Design supply temp. ..... **56.0** °F
Zone T-stat Check ..... **1 of 1** OK
Max zone temperature deviation ..... **0.0** °F

### Central Heating Coil Sizing Data

Max coil load ..... **463.9** MBH
Coil CFM at Des Htg ..... **12907** CFM
Max coil CFM ..... **12907** CFM
Water flow @ 20.0 °F drop ..... **N/A**

Load occurs at ..... **Des Htg**
BTU/(hr·ft²) ..... **19.7**
Ent. DB / Lvg DB ..... **41.6 / 75.6** °F

### Supply Fan Sizing Data

Actual max CFM ..... **12907** CFM
Standard CFM ..... **12631** CFM
Actual max CFM/ft² ..... **0.55** CFM/ft²

Fan motor BHP ..... **1.06** BHP
Fan motor kW ..... **0.84** kW
Fan static ..... **0.30** in wg

### Outdoor Ventilation Air Data

Design airflow CFM ..... **6837** CFM
CFM/ft² ..... **0.29** CFM/ft²

CFM/person ..... **88.80** CFM/person



## Zone Sizing Summary for Whole Building

Project Name: 2.2.559 McKinney Badminton Center
Prepared by: TLO
04/24/2023
10:55PM

### Air System Information

Air System Name ..... **Whole Building**
Equipment Class ..... **PKG ROOF**
Air System Type ..... **SZCAV**

Number of zones ..... **1**
Floor Area ..... **23500.0** ft²
Location ..... **Dallas, Texas**

### Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone CFM Sizing ..... **Sum of space airflow rates**
Space CFM Sizing ..... **Individual peak space loads**

### Zone Terminal Sizing Data

| Zone Name | Design Supply Airflow (CFM) | Minimum Supply Airflow (CFM) | Zone CFM/ft² | Reheat Coil Load (MBH) | Reheat Coil Water gpm @ 20.0 °F | Zone Htg Unit Coil Load (MBH) | Zone Htg Unit Water gpm @ 20.0 °F | Mixing Box Fan Airflow (CFM) |
|---|---|---|---|---|---|---|---|---|
| Zone 1 | 12907 | 12907 | 0.55 | 0.0 | - | 0.0 | - | 0 |

### Zone Peak Sensible Loads

| Zone Name | Zone Cooling Sensible (MBH) | Time of Peak Sensible Cooling Load | Zone Heating Load (MBH) | Zone Floor Area (ft²) |
|---|---|---|---|---|
| Zone 1 | 231.3 | Jul 1400 | 83.2 | 23500.0 |

### Space Loads and Airflows

| Zone Name / Space Name | Mult. | Cooling Sensible (MBH) | Time of Peak Sensible Load | Air Flow (CFM) | Heating Load (MBH) | Floor Area (ft²) | Space CFM/ft² |
|---|---|---|---|---|---|---|---|
| *Zone 1* | | | | | | | |
| Badminton Court | 1 | 221.7 | Jul 1400 | 12341 | 80.6 | 22328.0 | 0.55 |
| Proshop & Storage | 1 | 4.3 | Sep 1200 | 240 | 1.2 | 462.0 | 0.52 |
| Restrooms (M&W) | 1 | 4.9 | Jul 0900 | 275 | 1.2 | 610.0 | 0.45 |
| Vestibule | 1 | 0.9 | Sep 1300 | 51 | 0.3 | 100.0 | 0.51 |



## Air System Design Load Summary for Whole Building

Project Name: 2.2.559 McKinney Badminton Center
Prepared by: TLO
04/24/2023
10:55PM

| | DESIGN COOLING | | | DESIGN HEATING | | |
|---|---|---|---|---|---|---|
| | COOLING DATA AT Jul 1400 | | | HEATING DATA AT DES HTG | | |
| | COOLING OA DB / WB 99.4 °F / 73.8 °F | | | HEATING OA DB / WB 17.0 °F / 13.9 °F | | |
| ZONE LOADS | Details | Sensible (BTU/hr) | Latent (BTU/hr) | Details | Sensible (BTU/hr) | Latent (BTU/hr) |
| Window & Skylight Solar Loads | 0 ft² | 0 | - | 0 ft² | - | - |
| Wall Transmission | 22673 ft² | 28497 | - | 22673 ft² | 38741 | - |
| Roof Transmission | 24117 ft² | 58883 | - | 24117 ft² | 36326 | - |
| Window Transmission | 0 ft² | 0 | - | 0 ft² | 0 | - |
| Skylight Transmission | 0 ft² | 0 | - | 0 ft² | 0 | - |
| Door Loads | 0 ft² | 0 | - | 0 ft² | 0 | - |
| Floor Transmission | 23500 ft² | 0 | - | 23500 ft² | 0 | - |
| Partitions | 0 ft² | 0 | - | 0 ft² | 0 | - |
| Ceiling | 0 ft² | 0 | - | 0 ft² | 0 | - |
| Overhead Lighting | 23500 W | 80180 | - | 0 | 0 | - |
| Task Lighting | 0 W | 0 | - | 0 | 0 | - |
| Electric Equipment | 0 W | 0 | - | 0 | 0 | - |
| People | 77 | 48624 | 72425 | 0 | 0 | 0 |
| Infiltration | - | 0 | 0 | - | 0 | 0 |
| Miscellaneous | - | 0 | 0 | - | 0 | 0 |
| Safety Factor | 7% / 7% | 15133 | 5070 | 8% | 6165 | 0 |
| **>> Total Zone Loads** | - | **231318** | **77495** | - | **83232** | **0** |
| Zone Conditioning | - | 214723 | 77495 | - | 83974 | 0 |
| Plenum Wall Load | 0% | 0 | - | 0 | 0 | - |
| Plenum Roof Load | 0% | 0 | - | 0 | 0 | - |
| Plenum Lighting Load | 0% | 0 | - | 0 | 0 | - |
| Return Fan Load | 12907 CFM | 0 | - | 12907 CFM | 0 | - |
| Ventilation Load | 6837 CFM | 159509 | 22883 | 6837 CFM | 378605 | 0 |
| Supply Fan Load | 12907 CFM | 2870 | - | 12907 CFM | -2870 | - |
| Space Fan Coil Fans | - | 0 | - | - | 0 | - |
| Duct Heat Gain / Loss | 5% | 11566 | - | 5% | 4162 | - |
| **>> Total System Loads** | - | **388668** | **100378** | - | **463870** | **0** |
| Central Cooling Coil | - | 388668 | 100369 | - | 0 | 0 |
| Central Heating Coil | - | 0 | - | - | 463870 | - |
| **>> Total Conditioning** | - | **388668** | **100369** | - | **463870** | **0** |

**Key:** Positive values are clg loads / Negative values are htg loads | Positive values are htg loads / Negative values are clg loads



## System Psychrometrics for Whole Building

Project Name: 2.2.559 McKinney Badminton Center
Prepared by: TLO
04/24/2023
10:55PM

**July DESIGN COOLING DAY, 1400**

### TABLE 1: SYSTEM DATA

| Component | Location | Dry-Bulb Temp (°F) | Specific Humidity (lb/lb) | Airflow (CFM) | CO2 Level (ppm) | Sensible Heat (BTU/hr) | Latent Heat (BTU/hr) |
|---|---|---|---|---|---|---|---|
| Ventilation Air | Inlet | 99.4 | 0.01244 | 6837 | 400 | 159509 | 22883 |
| Vent - Return Mixing | Outlet | 89.0 | 0.01210 | 12907 | 631 | - | - |
| Central Cooling Coil | Outlet | 60.5 | 0.01043 | 12907 | 631 | 388668 | 100369 |
| Central Heating Coil | Outlet | 60.5 | 0.01043 | 12907 | 631 | 0 | - |
| Supply Fan | Outlet | 60.7 | 0.01043 | 12907 | 631 | 2870 | - |
| Cold Supply Duct | Outlet | 61.6 | 0.01043 | 12907 | 631 | - | - |
| Zone Air | - | 77.3 | 0.01172 | 12907 | 891 | 214723 | 77495 |
| Return Plenum | Outlet | 77.3 | 0.01172 | 12907 | 891 | 0 | - |

*Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 1.051 BTU/(hr-CFM-F)*
*Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4645.1 BTU/(hr-CFM)*
*Site Altitude = 597.0 ft*

### TABLE 2: ZONE DATA

| Zone Name | Zone Sensible Load (BTU/hr) | T-stat Mode | Zone Cond (BTU/hr) | Zone Temp (°F) | Zone Airflow (CFM) | CO2 Level (ppm) | Terminal Heating Coil (BTU/hr) | Zone Heating Unit (BTU/hr) |
|---|---|---|---|---|---|---|---|---|
| Zone 1 | 231318 | Cooling | 214723 | 77.3 | 12907 | 891 | 0 | 0 |



## System Psychrometrics for Whole Building

Project Name: 2.2.559 McKinney Badminton Center
Prepared by: TLO
04/24/2023
10:55PM

**WINTER DESIGN HEATING**

### TABLE 1: SYSTEM DATA

| Component | Location | Dry-Bulb Temp (°F) | Specific Humidity (lb/lb) | Airflow (CFM) | CO2 Level (ppm) | Sensible Heat (BTU/hr) | Latent Heat (BTU/hr) |
|---|---|---|---|---|---|---|---|
| Ventilation Air | Inlet | 17.0 | 0.00094 | 6837 | 400 | -378605 | 0 |
| Vent - Return Mixing | Outlet | 41.6 | 0.00094 | 12907 | 404 | - | - |
| Central Cooling Coil | Outlet | 41.6 | 0.00094 | 12907 | 404 | 0 | 0 |
| Central Heating Coil | Outlet | 75.9 | 0.00094 | 12907 | 404 | 463870 | - |
| Supply Fan | Outlet | 75.9 | 0.00094 | 12907 | 404 | 2870 | - |
| Cold Supply Duct | Outlet | 75.5 | 0.00094 | 12907 | 404 | - | - |
| Zone Air | - | 69.4 | 0.00094 | 12907 | 409 | -83974 | 0 |
| Return Plenum | Outlet | 69.4 | 0.00094 | 12907 | 409 | 0 | - |

*Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 1.057 BTU/(hr-CFM-F)*
*Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4645.1 BTU/(hr-CFM)*
*Site Altitude = 597.0 ft*

### TABLE 2: ZONE DATA

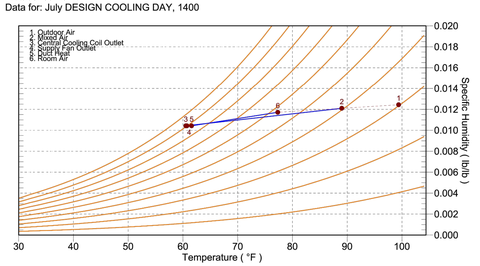
| Zone Name | Zone Sensible Load (BTU/hr) | T-stat Mode | Zone Cond (BTU/hr) | Zone Temp (°F) | Zone Airflow (CFM) | CO2 Level (ppm) | Terminal Heating Coil (BTU/hr) | Zone Heating Unit (BTU/hr) |
|---|---|---|---|---|---|---|---|---|
| Zone 1 | -83232 | Heating | -83974 | 69.4 | 12907 | 409 | 0 | 0 |



## System Psychrometrics for Whole Building

Project Name: 2.2.559 McKinney Badminton Center
Prepared by: TLO
04/24/2023
10:55PM

Location: Dallas, Texas
Altitude: 597.0 ft.
Data for: July DESIGN COOLING DAY, 1400

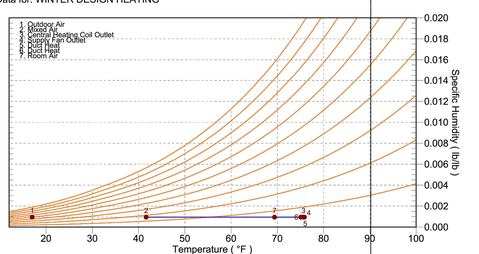





## System Psychrometrics for Whole Building

Project Name: 2.2.559 McKinney Badminton Center
Prepared by: TLO
04/24/2023
10:55PM

Location: Dallas, Texas
Altitude: 597.0 ft.
Data for: WINTER DESIGN HEATING






1650 CORPORATE DRIVE
MCKINNEY, TEXAS 75069

# HEAT LOAD CALCULATION.

Drawen By: Z.H
Scale: NTS
Date: 09.01.2023
PROJ.NO.:

M 4.00

SHEET NO.

KEYED NOTES:

1. 16 LIGHTS SWITCHES, ONE FOR EACH BADMINTON COURT LOCATED NEAR THE SHOP REGISTER. THE LIGHTS SHOULD BE ALL CONNECTED TO OCCUPANCY SENSORS.
2. ELECTRICAL SUB-PANEL WITH 3' WORK CLEARANCE AROUND THE PANEL.
3. CEILING JUNCTION BOX FOR EXHAUST FAN TO BE CONTROLLED BY TIMER SWITCH
4. WALL MOUNTED JUNCTION BOX FOR GAS WATER HEATER
5. NEMA-3R DISCONNECT SWITCH FOR RTU

**GENERAL NOTES:**

1. ALL WORK SHALL BE DONE IN COMPLIANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AND ALL APPLICABLE LOCAL CODES.

2. FOR ALL CONDUITS: UNDERGROUND CONDUIT TO BE GALVANIZED RIGID CONDUIT AT A MINIMUM DEPTH OF 12" BELOW GRADE; ABOVE GROUND CONDUIT SHALL BE RIGID ALUMINUM WITH ALL CONNECTIONS, FITTINGS AND BOXES TO BE THREADED AND SURFACE MOUNTED.

3. WIRE TO BE COPPER TYPE THWN - GEOTROL, MINIMUM NO. 12 AWG, EXCEPT AS NOTED. WIRING IN LIGHT FIXTURES SHALL BE TEMPERATURE RATED PER NEC REQUIREMENTS.

4. VERIFY EXACT REQUIREMENTS FOR ELECTRICAL EQUIPMENT WITH OWNER FOR THIS PROJECT. IN THE CASE OF A DISCREPANCY BETWEEN THE ACTUAL SELECTION OF EQUIPMENT AND THESE DRAWINGS, ADVISE THE OWNER BEFORE WORK BEGINS.

5. FIELD VERIFY ROUGH-IN LOCATIONS FOR ALL LIGHTS AND EQUIPMENT BEFORE INSTALLATION.

6. CONTRACTOR SHALL FURNISH A FILE SYSTEM FOR ALL EQUIPMENT AND MAINTENANCE OF EACH PIECE OF EQUIPMENT.

7. ALL ELECTRICAL CIRCUITS HAVE TO BE MARKED AS TO WHAT EACH CONTROLS. CONTRACTOR HAVE TO FURNISH PHONE CONTACTS FOR WARRANTY SHOULD CONTRACTOR NOT BE LIABLE.

8. SEALING: WHERE PORTIONS OF INTERIOR RACEWAY ARE EXPOSED TO WIDELY DIFFERENT TEMPERATURES, CIRCULATION OF AIR FROM WARMER TO A COLDER SECTION SHALL BE PREVENTED. CONTRACTOR MUST COMPLY WITH ARTICLE 300-7 (a) N.E.C.

9. WHERE MORE THAN "ONE" SERVICE IS PERMITTED AS SET OUT IN ARTICLE 230-2 N.E.C. A PERMANENT "PLAQUE" OR DIRECTORY SHALL BE INSTALLED AT EACH SERVICE EQUIPMENT LOCATION DENOTING ALL OTHER SERVICES ON OR IN THE BUILDING AND THE AREA SERVED BY EACH. CONTRACTOR MUST COMPLY WITH ART. 230-2(e) N.E.C.

**NOTES ON ENERGY CODE:**

1. CONTRACTOR TO INSURE INSTALLATION OF "INDEPENDENT CONTROLS". SWITCH/ OCCUPANCY SENSORS) TO SWITCHES, DIMMER, OR OCCUPANCY SENSOR IN EACH SPACE PROVIDING A UNIFORM ILLUMINATION PATTERN.

2. CONTRACTOR TO INSURE INSTALLATION OF "PHOTOCELL ASTRONOMICAL SWITCH ON EXTERIOR LIGHTING".

3. TANDEM WIRED ONE-LAMP AND THREE-LAMP BALLASTED LUMINARIES.

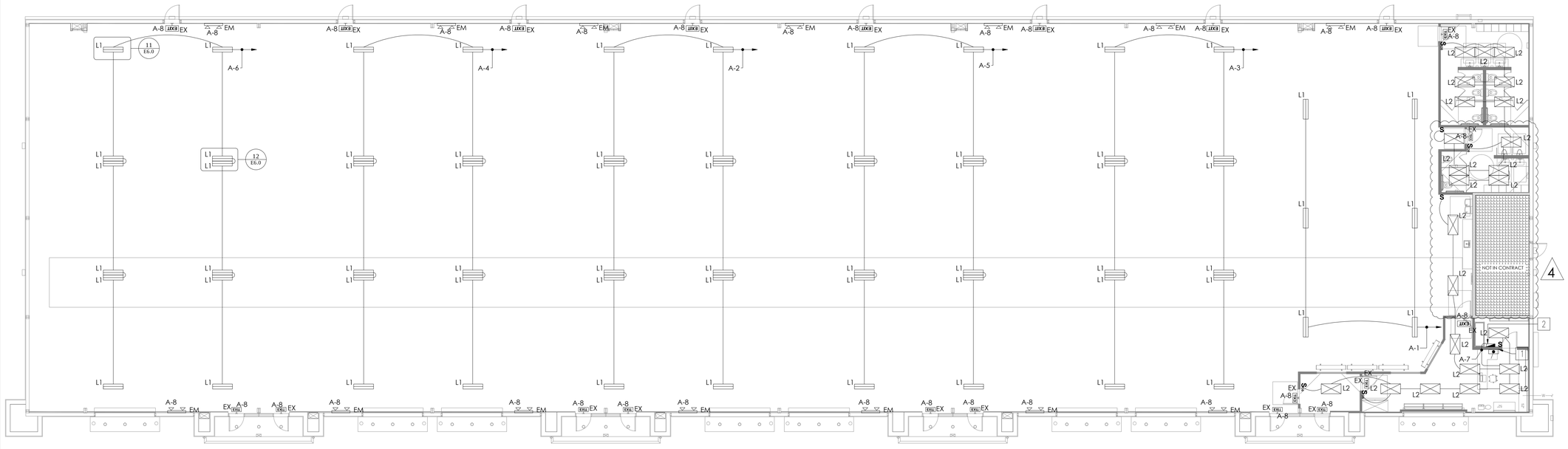
4. CONTRACTOR TO INSURE ALL "EXIT" SIGNS TO HAVE BATTERY BACK-UP IN CASE OF POWER FAILURE AS REQUIRED BY N.E.C. STANDARDS, ARTICLE 700.

5. CONTRACTOR TO INSURE ALL JOINTS AND PENETRATION ARE CAULKED CASKETED, WEATHER-STRIPPED OR OTHERWISE SEALED.

6. ALL WINDOWS, DOORS AND SKYLIGHTS ARE TO BE CERTIFIED AS "MEETING LEAKAGE REQUIREMENTS"

7. COMPONENT R-VALUE AND U-FACTOR TO BE LABELED AS "CERTIFIED".

8. FIXTURE CONTROL TYPE AS FOLLOWS:
   - 8.1 OCCUPANCY SENSORS.
   - 8.2 LIGHTING PHOTOCELL CONTROLLED.
   - 8.3 ON/OFF SWITCH.




| Lighting Fixture Schedule: | | | | | | | | Total (W) | 10,122.80 |
|---|---|---|---|---|---|---|---|---|---|
| Symbol | Number | Type | Make | Model | Wattage | Unit | Description | Quantity | Subtotal (W) |
| | L1 | Lighting 4-ft x 2-ft | I-BEAM® IBE-LITHONIA LIGHTING | IBE L48 18000LM SD080 MD MVOLT GZ10 50K 80CRI DWH | 136 | W | HIGH BAY LED LIGHT | 66.00 | 8,976.00 |
| | L2 | Lighting 4-ft x 2-ft | CPX-LED PANEL LITHONIA LIGHTING | CPX 2X4 4000LM 50K M2 | 38.9 | W | 2x4 FT Recessed flat Panel | 25.00 | 972.50 |
| | EM | Emergency with Battery | Lithonia | EU2C M6 | 5.6 | W | Wall mounted emergency light. Dual LED heads with test switch indicator. 120-277V/60Hz. WITH 90 MINUTES BACK UP BATTERY | 15.00 | 84.00 |
| EXIT | EX | Exit Sign | Lithonia | LHQM LED R M6 | 4.3 | W | LED Exit/Unit Combo Red Letters, White. Equipped test switch and status indicator.120/277V, 60Hz. WITH 90 MINUTES BACK UP BATTERY | 21.00 | 90.30 |

1650 CORPORATE DRIVE
MCKINNEY, TEXAS 75069

# LIGHTING LAYOUT

Drawen By: A.B | Scale: 3/32" = 1'
Date: 07.03.2023 | PROJ.NO.:

E 3.0

SHEET NO.

KEYED NOTES:

1. 16 LIGHTS SWITCHES, ONE FOR EACH BADMINTON COURT LOCATED NEAR THE SHOP REGISTER. THE LIGHTS SHOULD BE ALL CONNECTED TO OCCUPANCY SENSORS.
2. ELECTRICAL SUB-PANEL WITH 3' WORK CLEARANCE AROUND THE PANEL.
3. CEILING JUNCTION BOX FOR EXHAUST FAN TO BE CONTROLLED BY TIMER SWITCH
4. WALL MOUNTED JUNCTION BOX FOR GAS WATER HEATER
5. NEMA-3R DISCONNECT SWITCH FOR RTU

**GENERAL NOTES:**

1. ALL WORK SHALL BE DONE IN COMPLIANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AND ALL APPLICABLE LOCAL CODES.

2. SERVICE SHALL BE FROM EXISTING MDB.

3. FOR ALL CONDUITS: UNDERGROUND CONDUIT TO BE GALVANIZED RIGID CONDUIT AT A MINIMUM DEPTH OF 12" BELOW GRADE; ABOVE GROUND CONDUIT SHALL BE RIGID ALUMINUM WITH ALL CONNECTIONS, FITTINGS AND BOXES TO BE THREADED AND SURFACE MOUNTED.

4. BACK FILL AROUND ALL CONDUIT SHALL BE A MINIMUM OF 4" CLEAN FRESHWATER SAND ACCEPTABLE TO OWNERS ENGINEER.

5. WIRE TO BE COPPER TYPE THWN - GEOTROL, MINIMUM NO. 12 AWG, EXCEPT AS NOTED. WIRING IN LIGHT FIXTURES SHALL BE TEMPERATURE RATED PER NEC REQUIREMENTS.

6. ELECTRICAL CIRCUIT IDENTIFICATION - IDENTIFY ALL BREAKERS AS TO USE. IDENTIFICATION SHALL BE TYPED ON CARDS SUPPLIED WITH PANELS AND INSTALLED ON DOORS WITH PLASTIC COVERS.

7. VERIFY EXACT REQUIREMENTS FOR ELECTRICAL EQUIPMENT WITH OWNER FOR THIS PROJECT. IN THE CASE OF A DISCREPANCY BETWEEN THE ACTUAL SELECTION OF EQUIPMENT AND THESE DRAWINGS, ADVISE THE OWNER BEFORE WORK BEGINS.

8. FIELD VERIFY ROUGH-IN LOCATIONS FOR ALL LIGHTS AND EQUIPMENT BEFORE INSTALLATION.

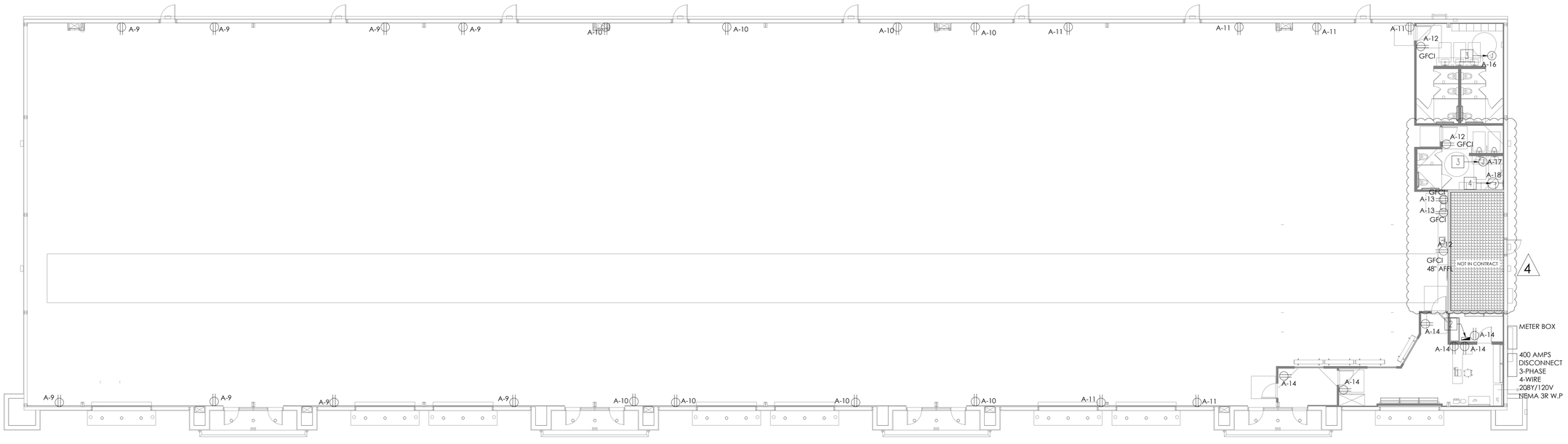
9. POWER OUTLETS SHALL BE INSTALLED AT 15" A.F.F. TO BOTTOM OF OUTLET IN ALL PUBLIC AREAS. LIGHT SWITCHES SHALL BE INSTALLED AT 48" A.F.F. TO TOP OF SWITCHES IN ALL PUBLIC AREAS.

10. CONTRACTOR SHALL FURNISH A FILE SYSTEM FOR ALL EQUIPMENT AND MAINTENANCE OF EACH PIECE OF EQUIPMENT.

11. ALL ELECTRICAL CIRCUITS HAVE TO BE MARKED AS TO WHAT EACH CONTROLS. CONTRACTOR HAVE TO FURNISH PHONE CONTACTS FOR WARRANTY SHOULD CONTRACTOR NOT BE LIABLE.

12. SEALING: WHERE PORTIONS OF INTERIOR RACEWAY ARE EXPOSED TO WIDELY DIFFERENT TEMPERATURES, CIRCULATION OF AIR FROM WARMER TO A COLDER SECTION SHALL BE PREVENTED. CONTRACTOR MUST COMPLY WITH ARTICLE 300-7 (a) N.E.C.

13. WHERE MORE THAN "ONE" SERVICE IS PERMITTED AS SET OUT IN ARTICLE 230-2 N.E.C. A PERMANENT "PLAQUE" OR DIRECTORY SHALL BE INSTALLED AT EACH SERVICE EQUIPMENT LOCATION DENOTING ALL OTHER SERVICES ON OR IN THE BUILDING AND THE AREA SERVED BY EACH. CONTRACTOR MUST COMPLY WITH ART. 230-2(e) N.E.C.



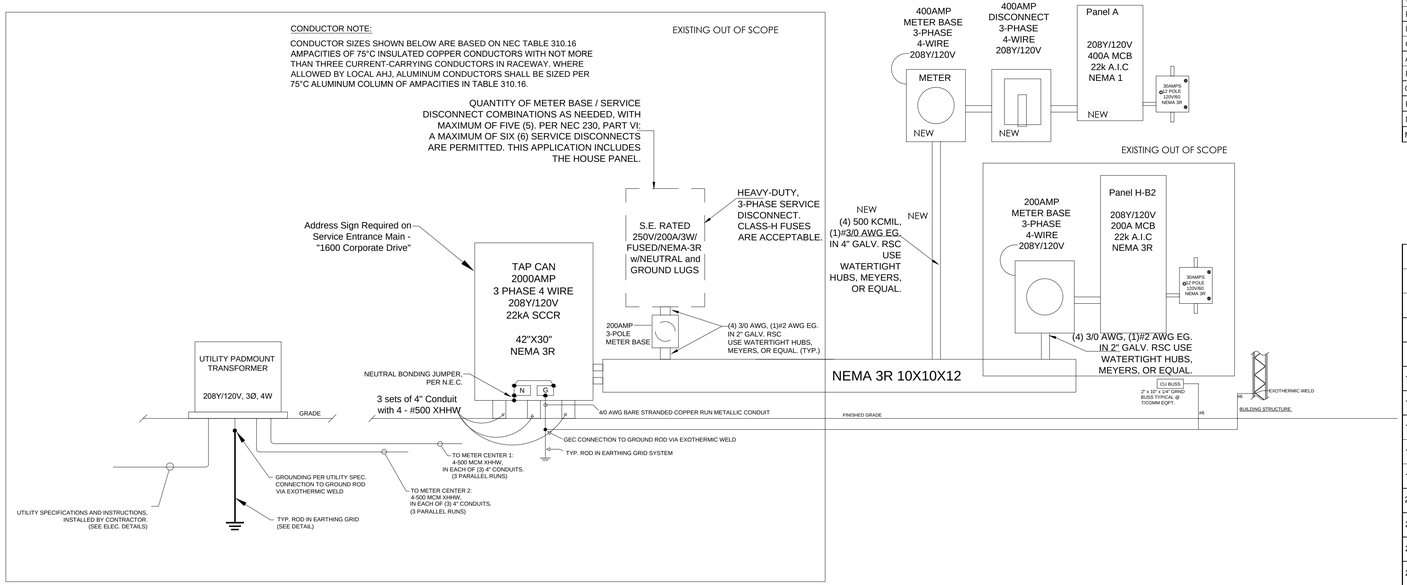

1650 CORPORATE DRIVE
MCKINNEY, TEXAS 75069

POWER LAYOUT
MAIN FLOOR

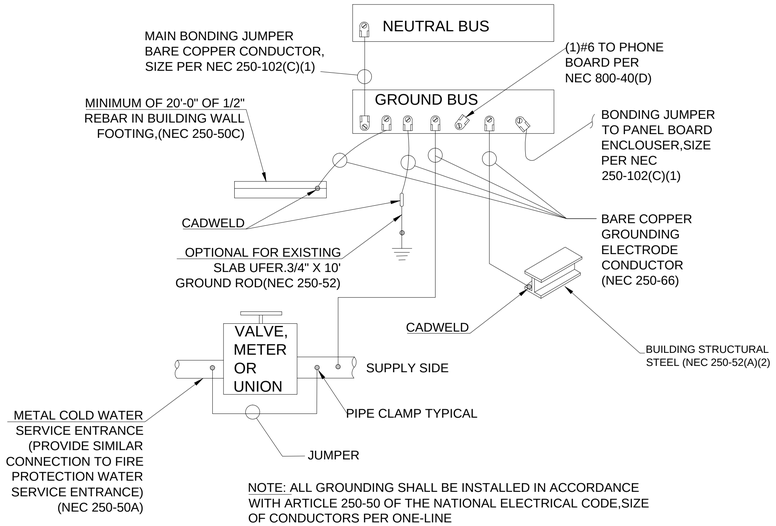
| | |
|---|---|
| Drawen By: A.B | Scale: 3/32" = 1' |
| Date: 07.03.2023 | PROJ.NO.: |

E 4.0

SHEET NO.




1 E-5.0 **SINGLE LINE DIAGRAM**
SCALE NTS




NOTE: ALL GROUNDING SHALL BE INSTALLED IN ACCORDANCE WITH ARTICLE 250-50 OF THE NATIONAL ELECTRICAL CODE,SIZE OF CONDUCTORS PER ONE-LINE

2 E-5.0 **GROUNDING DETAIL**
SCALE NTS

**Location: CORRIDOR**

| * | LOAD SUMMARY | CL | DF | CONNECTED LOAD A | B | C | DEMAND TOTAL |
|---|---|---|---|---|---|---|---|
| L | Lighting | 8.36 | 1.25 | 1.83 | 3.26 | 3.26 | 10.45 |
| R | Convenience Recept | 8.06 | 1.00 | 2.84 | 3.60 | 1.62 | 8.06 |
| H | Heating (Space) | | 1.25 | | | | |
| C | Cooling | | 1.00 | | | | |
| A | HVAC | 70.56 | 1.00 | 23.52 | 23.52 | 23.52 | 70.56 |
| P | Process | | 1.00 | | | | |
| O | Other Continuous | | 1.25 | | | | |
| K | Kitchen | | 6.00 | | | | |
| N | Noncontinuous | 0.81 | 1.00 | | 0.20 | 0.60 | 0.81 |
| M | Motor | | 1.00 | | | | |
| | Total | **87.79** | | 28.19 | 30.59 | 29.01 | 89.88 |

| | |
|---|---|
| Total Demand Load (KVA) | 89.88 |
| Total Demand Current (A) | 249.48 |
| Min. Feeder Ampacity (A) | 299.37 |

**PANEL A**
PANELBOARD DESIGNATION

| | |
|---|---|
| SYSTEM VOLTAGE | 208/120V, 3Φ, 4W |
| BUS SIZE | 400 |
| SYSTEM TYPE | NORMAL |
| FEEDER PROT | 400A-3P C/B Bus Plug |
| CONDUCTOR SIZE | 500-kcmil - #3/0G CU |
| CONDUCTOR/PHASE | 1 |
| MAINS | 400A MCB |
| SCCR | FULLY RATED |
| MCB RATING | 80% |
| GROUND FAULT | NO |
| FEEDER LENGTH (FT) | 50 |
| FEEDER V. DROP (%) | 0.430 |
| FAULT CURRENT | |
| KAIC RATING | 22 |
| ENCLOSURE | TYPE 3R |

| | DESCRIPTION | * | WIRE | GRD | CB | KVA | A | B | C | KVA | CB | WIRE | GRD | DESCRIPTION | * | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | LIGHTING BADMINTON COURT | L | 2x 12 AWG | - #12G | 20A-1P | 0.82 | 1.63 | | | 0.82 | 20A-1P | 2x 12 AWG | - #12G | LIGHTING BADMINTON COURT | L | 2 |
| 3 | LIGHTING BADMINTON COURT | L | 2x 12 AWG | - #12G | 20A-1P | 1.63 | | 3.26 | | 1.63 | 20A-1P | 2x 12 AWG | - #12G | LIGHTING BADMINTON COURT | L | 4 |
| 5 | LIGHTING BADMINTON COURT | L | 2x 12 AWG | - #12G | 20A-1P | 1.63 | | | 3.26 | 1.63 | 20A-1P | 2x 12 AWG | - #12G | LIGHTING BADMINTON COURT | L | 6 |
| 7 | RECEPTACLES LOUNGE | R | 2x 12 AWG | - #12G | 20A-1P | 1.26 | 1.46 | | | 0.20 | 15A-1P | 2x 14 AWG | - #14G | EMERGENCY AND EXT LIGHTS | L | 8 |
| 9 | RECEPTACLES BADMINTON COURT | R | 2x 12 AWG | - #12G | 20A-1P | 1.44 | | 2.88 | | 1.44 | 20A-1P | 2x 12 AWG | - #12G | RECEPTACLES BADMINTON COURT | R | 10 |
| 11 | RECEPTACLES BADMINTON COURT | R | 2x 12 AWG | - #12G | 20A-1P | 1.08 | | | 1.62 | 0.54 | 20A-1P | 2x 12 AWG | - #12G | GFCI RECEPTACLES | R | 12 |
| 13 | DRINKING FOUNTAIN | R | 2x 12 AWG | - #12G | 20A-1P | 0.50 | 1.58 | | | 1.08 | 20A-1P | 2x 12 AWG | - #12G | RECEPTACLES OFFICE | R | 14 |
| 15 | RECEPTACLES ROOF | R | 2x 12 AWG | - #12G | 20A-1P | 0.72 | | 0.92 | | 0.20 | 15A-1P | 2x 14 AWG | - #14G | EXHAUST FAN-EF01 | N | 16 |
| 17 | EXHAUST FAN EF-02 | N | 2x 14 AWG | - #14G | 15A-1P | 0.20 | | | 0.60 | 0.40 | 15A-1P | 2x 14 AWG | - #14G | GAS WATER HEATER | N | 18 |
| 19 | | A | | | | 5.88 | 11.76 | | | 5.88 | | | | | A | 20 |
| 21 | RTU-01 | A | 4x 6 AWG | - #6G | 60A-3P | 5.88 | | 11.76 | | 5.88 | 60A-3P | 4x 6 AWG | - #6G | RTU-02 | A | 22 |
| 23 | | A | | | | 5.88 | | | 11.76 | 5.88 | | | | | A | 24 |
| 25 | | A | | | | 5.88 | 11.76 | | | 5.88 | | | | | A | 26 |
| 27 | RTU-03 | A | 4x 6 AWG | - #6G | 60A-3P | 5.88 | | 11.76 | | 5.88 | 60A-3P | 4x 6 AWG | - #6G | RTU-04 | A | 28 |
| 29 | | A | | | | 5.88 | | | 11.76 | 5.88 | | | | | A | 30 |
| 31 | SPACE | | | | | | | | | | | | | SPACE | K | 32 |
| 33 | SPACE | | | | | | | | | | | | | SPACE | K | 34 |
| 35 | SPACE | | | | | | | | | | | | | SPACE | | 36 |
| 37 | SPACE | | | | | | | | | | | | | SPACE | | 38 |
| 39 | SPACE | | | | | | | | | | | | | SPACE | | 40 |
| 41 | SPACE | | | | | | | | | | | | | SPACE | | 42 |
| | | | (KVA) | | | | | | | | | | | | | |
| | | | | | | **Total Connected Load** | 28.19 | 30.59 | 29.01 | | | | | | | |

CORPORATE CENTRAL, McKINNEY, TEXAS

**FAULT CURRENT CALCULATIONS**

DATE 11/14/2022

| | |
|---|---|
| **TRANSFORMER KVA RATING** | 225 |
| **IMPED (%Z)** | 3.50 |
| **VOLTAGE** | 208 |
| **PHASE** | 3 |
| **SEC. FLA OF TRANSFORMER** | 625.28 |
| **Isca AT X-FMR SECONDARY** | 17,865.08 |

| FROM | TO | LENGTH | FC @ PREV NODE | FEEDER SIZE | # SETS | FROM TABLE COND Z | CALC "f" | CALC "M" | Isca | MTR CONTRIB | TOTAL Isca |
|---|---|---|---|---|---|---|---|---|---|---|---|
| XFMR | MC-A | 30 | 17,865 | 500 | 3 | 20,000 | 0.074 | 0.931 | 16,630 | 175 | **16,805** |
| MC1 | A | 15 | 16,805 | 500 | 1 | 10,638 | 0.197 | 0.835 | 14,038 | 0 | **14,038** |
| MC1 | T PANEL | 35 | 16,805 | 3/0 | 1 | 10,638 | 0.460 | 0.685 | 11,511 | 0 | **11,511** |
| XFMR | MC-B | 160 | 17,865 | 500 | 3 | 20,000 | 0.396 | 0.716 | 12,795 | 175 | **12,970** |
| MC2 | H-B2 | 15 | 12,970 | 3/0 | 1 | 10,638 | 0.152 | 0.868 | 11,258 | 0 | **11,258** |
| MC2 | T PANEL | 70 | 12,970 | 3/0 | 1 | 10,638 | 0.710 | 0.585 | 7,586 | 0 | **7,586** |

NOTES:
1. All calculations are based on "Impedance Point-to-Point" fault current calculation method.
2. Transformer calculation assumes infinite bus on primary side.
3. Transformer size is for calculations only - Actual size determined by Utility. Contractor shall verify size with utility, and notify Engineer if actual size is larger than KVA size shown in this table. Adjustments to equipment ratings may be necessary.
4. "T PANEL" is the closest Tenant Panel to a Meter Center.
5. Panel calculations are for shortest estimated feeder lengths. Panels with longer feeder length will have lower Isca.
6. Panels may be series-rated based on interrupting rating of upstream feeder circuit breaker at meter base, and service main. Series-Rated panels shall contain a main device that is of the same manufacturer as the upstream feeder device, and is certified by the manufacturer to have been tested as a series rated system.
7. Where applicable, Service Main Device shall be 22kA AIC, minimum.

1650 CORPORATE DRIVE
MCKINNEY, TEXAS 75069

PANEL BOARDS SCHEDULE & GROUNDING SCHEME.

Drawen By: A.B | Scale: NTS
Date: 07.03.2023 | PROJ.NO.:

E 5.0

SHEET NO.

| Plumbing Fixtures Schedule | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Fixture ID | Fixture | Manufacturer | Model | SW | V | CW | HW | Description |
| WC | Water Closet - Flush Tank | American Standard | Townsend Vormax | 3" | 2" | 1/2" | - | High Efficiency, Ultra Low Consuption (1.28 GPF) Meets EPA WaterSense |
| LAV | Lavatory | American Standard | 495221 "OVALYN" | 2" | 1-1/2" | 1/2" | 1/2" | UNDER COUNTER LAVATORY, 3 HOLES - 4" CENTERS MOUNTING. |
| LVF | Commercial Lavatory Faucet | American Standard | Paradigm | - | - | 1/2" | 1/2" | Lead-Free: Faucet contains <0.25% Total Lead content. Flow Rate: 1.5 GPM @ 60 PSI. |
| TMV | Thermostatic Mixing Valve | Leonard | LF-170 | - | - | 1/2" | 1/2" | IPS CONNECTIONS. MATERIALS: BRONZE BODY, LOCKED TEMPERATURE AND ADJUSTMENT CAP (VANDAL RESISTANT) - 0.25 TO 5 GPM |
| UR | Urinal - Flush Tank | American Standard | Afwal Millenium | 2" | 1-1/2" | 1/2" | - | High Efficiency, Ultra Low Consuption (1.1 to 1.6 GPF) Meets Definition of HET (High Efficiency Toilet) |
| DF | Drinking Fountain | Elkay | LVRCGRNTL8WSK | 2" | 1-1/2" | 1/2" | - | Bottle Filling Station & Bi-Level High Efficiency Vandal-Resistant Cooler Filtered Refrigerated Stainless |

## DRAINAGE KEYED NOTES:

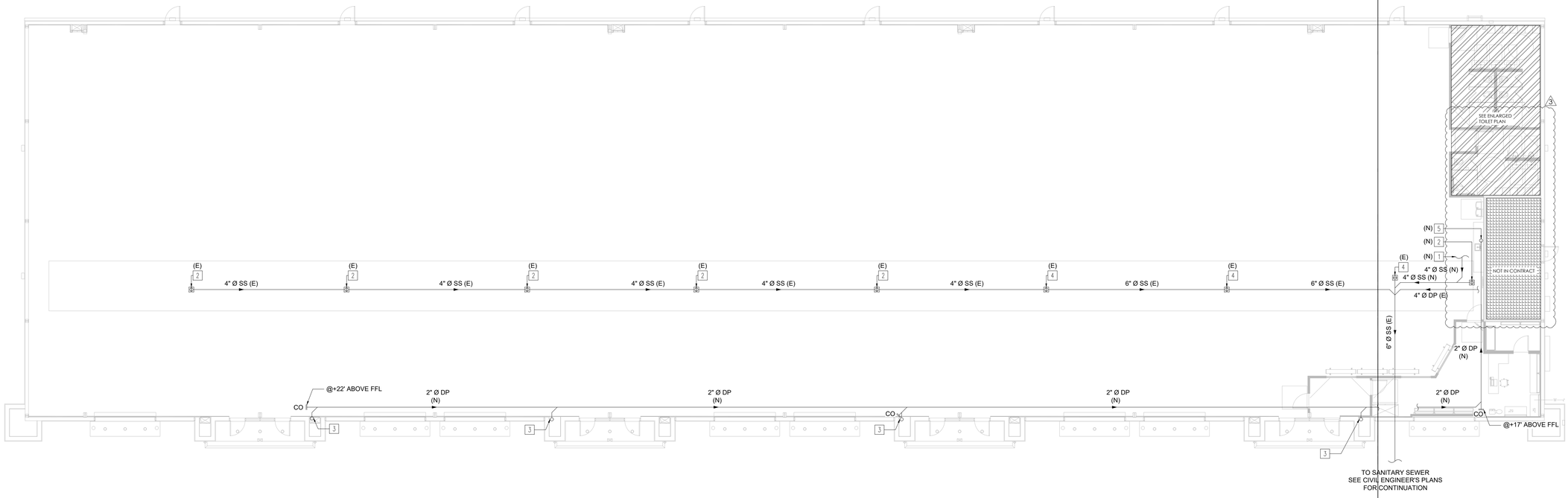
1 — SEE ENLARGED TOILET PLAN FOR CONTINUATION.

2 — 4" FLOOR CLEAN-OUT.

3 — CONDENSATE PIPE DROP FROM ROOFTOP UNIT AT ROOF LEVEL - PROVIDE TRAPPED INDIRECT WASTE CONNECTION.

4 — 6" FLOOR CLEAN-OUT.

5 — CONDENSATE PIPE DROP TO LAVATORY TRAP - PROVIDE CLEAN OUT AT HIGH LEVEL BEFORE VERTICAL PIPE TAKE-OFF.




1650 CORPORATE DRIVE
MCKINNEY, TEXAS 75069

# BUILDING PLUMBING LAYOUT

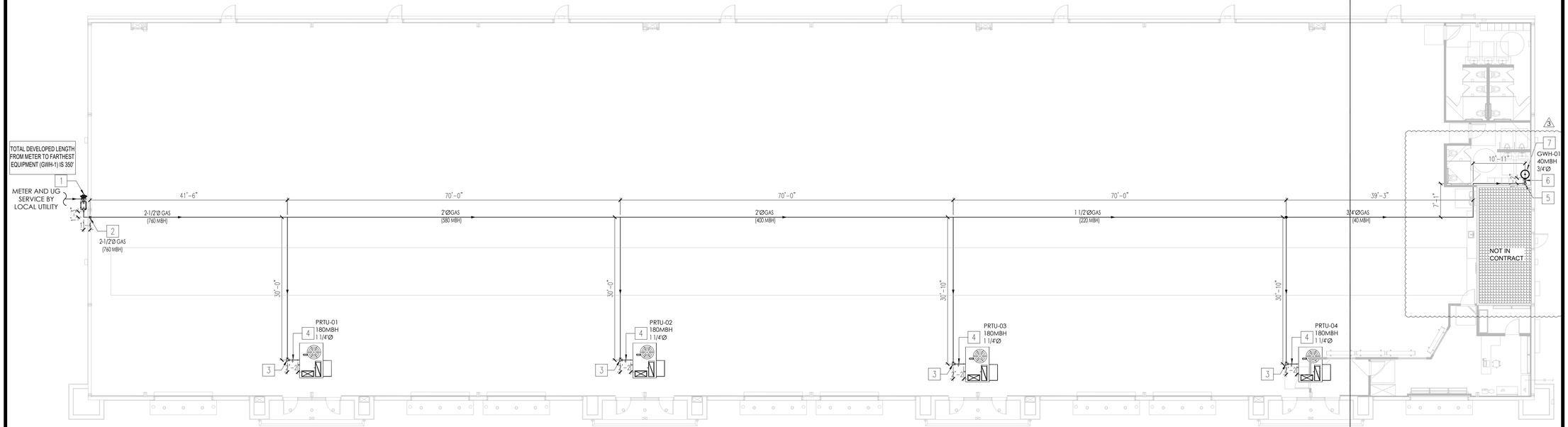
| | |
|---|---|
| Drawen By: Z.H | Scale: 3/32 "=1' -0" |
| Date: 09.01.2023 | PROJ.NO.: |

# P2.00

SHEET NO.

GENERAL NOTES:

1. PRIOR TO PERFORMING WORK, CONTRACTOR TO COORDINATE EXACT PIPE SIZES, INVERT ELEVATIONS, PRESSURES FOR LOCATIONS OF ANY SEWER, WATER PIPING AND WATER METER WITH CIVIL UTILITIES DRAWINGS, AND ANY OTHER ENGINEER AS APPLICABLE.
2. PRIOR TO PERFORMING WORK, CONTRACTOR TO COORDINATE PIPE ROUTING WITH ALL OTHER TRADES AND EXISTING FIELD CONDITIONS.
3. REFER TO MECHANICAL PLANS FOR PLUMBING SPECIFICATION OF MATERIAL, INSULATION AND INSTALLATION REQUIREMENTS.
4. CONTRACTOR IS RESPONSIBLE FOR ROUGH-IN COORDINATION AND LOCATIONS. REFER TO ARCHITECTURAL PLANS FOR LOCATIONS AND FIXTURES.
5. CONTRACTOR IS RESPONSIBLE FOR ANY REQUIRED CUTTING AND PATCHING.
6. ALL NOTCHING, BORING, AND CUTTING OF HOLES IN WALL STUDS AND FLOOR JOISTS SHALL BE PERFORMED BASED ON THE LATEST ADOPTED AND APPROVED EDITION OF THE BUILDING CODE.
7. ALL GAS PIPING SHALL BE INSTALLED ON INTERIOR SIDE OF THE BUILDING WALL INSULATION.
8. ALL CONDENSATE DRAIN PIPING SHALL BE SLOPED AT $\frac{1}{4}$" PER FOOT AND PROVIDE ACCESSIBLE CLEANOUTS AT ALL CHANGES OF DIRECTION.
9. VENTS THAT TERMINATE AT THE ROOF SHALL BE A MINIMUM OF 10' FROM ANY FRESH AIR INTAKE.
10. REFER TO THE PLUMBING DIAGRAMS FOR GUIDANCE OF INSTALLATION INTENT. CONTRACTOR IS TO PROVIDE ALL COMPONENTS NECESSARY TO MEET THE DESIGN INTENT, WHETHER SHOWN IN DIAGRAM OR NOT.




GAS KEYED NOTES:

1. GAS METER TO BE SUPPLIED BY SERVICE PROVIDER.
2. RISER PIPE FROM WATER METER LEVEL TO BUILDING CEILING.
3. RISER PIPE FROM CEILING LEVEL TO ABOVE ROOF, PROVIDE WATER STOP CEILING PENETRATION AS PER APPLICABLE CODES; COORDINATE WITH THE ARCHITECT, ROOFING CONTRACTOR AND OWNER FOR EXECUTION DETAIL AND FINAL POSITION OF THIS PENETRATION.
4. GAS CONNECTION TO PACKAGED ROOFTOP UNIT, PROVIDE DIRT LEG, ISOLATION VALVE, AND GAS REGULATOR.
5. PIPE DROP FROM BUILDING CEILING LEVEL TO MEZZANINE FLOOR LEVEL.
6. GAS CONNECTION TO GAS WATER HEATER, PROVIDE DIRT LEG, ISOLATION VALVE, AND GAS REGULATOR.
7. GAS WATER HEATER COMBUSTION AIR IS PROVIDED FROM THE LARGE BUILDING VOLUME AS THE MEZZANINE IS OPEN TO THE COURTS AREA. VENT TO OUTDOORS IS SHOWN IN THE MECHANICAL LAYOUT.

GAS PIPES MATERIAL:

1. UNDERGROUND GAS PIPES IN PE PLASTIC.
2. ABOVE GROUND GAS PIPES IN SCHEDULE 40 STEEL.
3. TERMINATION TO APPLIANCES / EQUIPMENT IN CORRUGATES STAINLESS STEEL PIPES.
4. PROVIDE GROUNDING / BONDING AS REQUIRED BY THE CODE.
5. PIPING MATERIAL MUST COMPLY TO THE ONES SPECIFIED IN CODE / SEE CODE CHECK IN PREVIOUS SHEET FOR DETAILS.

**IFGC 2021 - 415.1 INTERVAL OF SUPPORT**
PIPING SHALL BE SUPPORTED AT INTERVALS NOT EXCEEDING THE SPACING SPECIFIED IN TABLE 415.1. SPACING OF SUPPORTS FOR CSST SHALL BE IN ACCORDANCE WITH THE CSST MANUFACTURER'S INSTRUCTIONS.

**TABLE 415.1 / SUPPORT OF PIPING**

| STEEL PIPE, NOMINAL SIZE OF PIPE (INCHES) | SPACING OF SUPPROTS (FEET) | NOMINAL SIZE OF TUBING (SMOOTH-WALL) (inch O.D.) | SPACING OF SUPPROTS (FEET) |
|---|---|---|---|
| 1/2 | 6 | 1/2 | 4 |
| 3/4 OR 1 | 8 | 3/4 OR 1 | 6 |
| 1 1/4 OR LARGER HORIZONTAL | 10 | 1 1/4 OR LARGER HORIZONTAL | 8 |
| 1 1/4 OR LARGER VERTICAL | EVERY FLOOR LEVEL | 1 1/4 OR LARGER VERTICAL | EVERY FLOOR LEVEL |

**PIPE WORK REQUIREMENT - IFGC 2021:**

**401.1.1 UTILITY PIPING SYSTEMS LOCATED WITHIN BUILDINGS**

UTILITY SERVICE PIPING LOCATED WITHIN BUILDINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE STRUCTURAL SAFETY AND FIRE PROTECTION PROVISIONS OF THE INTERNATIONAL BUILDING CODE.

**401.5 IDENTIFICATION**

FOR OTHER THAN STEEL PIPE, EXPOSED PIPING SHALL BE IDENTIFIED BY A YELLOW LABEL MARKED "GAS" IN BLACK LETTERS. THE MARKING SHALL BE SPACED AT INTERVALS NOT EXCEEDING 5 FEET (1524 MM). THE MARKING SHALL NOT BE REQUIRED ON PIPE LOCATED IN THE SAME ROOM AS THE APPLIANCE SERVED.

**401.7 PIPING METER IDENTIFICATION**

PIPING FROM MULTIPLE METER INSTALLATIONS SHALL BE MARKED WITH AN APPROVED PERMANENT IDENTIFICATION BY THE INSTALLER SO THAT THE PIPING SYSTEM SUPPLIED BY EACH METER IS READILY IDENTIFIABLE.

**401.9 IDENTIFICATION**

EACH LENGTH OF PIPE AND TUBING AND EACH PIPE FITTING, UTILIZED IN A FUEL GAS SYSTEM, SHALL BEAR THE IDENTIFICATION OF THE MANUFACTURER.

EXCEPTIONS:
1. STEEL PIPE SECTIONS THAT ARE 2 FEET (610 MM) AND LESS IN LENGTH AND ARE CUT FROM LONGER SECTIONS OF PIPE.
2. STEEL PIPE FITTINGS 2 INCHES AND LESS IN SIZE.
3. WHERE IDENTIFICATION IS PROVIDED ON THE PRODUCT PACKAGING OR CRATING.
4. WHERE OTHER APPROVED DOCUMENTATION IS PROVIDED.

1650 CORPORATE DRIVE
MCKINNEY, TEXAS 75069

GAS LAYOUT .

Drawen By: Z.H | Scale: 3/32 "=1' -0"
Date: 09.01.2023 | PROJ.NO.:

P4.00

SHEET NO.

**IFGC 2021 - TABLE 402.4(2)**

| SCHEDULE 40 METALLIC PIPE | |
|---|---|
| Gas | Natural |
| Inlet Pressure | Less than 2 psi |
| Pressure Drop | 0.5 in. w.c. |
| Specific Gravity | 0.6 |

| PIPE SIZE (inch) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nom inal | 1/2 | 3/4 | 1 | 1 1/4 | 1 1/2 | 2 | 2 1/2 | 3 | 4 | 5 | 6 | 8 | 10 | 12 |
| Actual ID | 0.622 | 0.824 | 1.049 | 1.38 | 1.61 | 2.067 | 2.469 | 3.068 | 4.026 | 5.047 | 6.065 | 7.981 | 10.02 | 11.938 |
| Length (ft) | Capacity in Cubic Feet of Gas Per Hour | | | | | | | | | | | | | |
| 10 | 172 | 360 | 678 | 1,380 | 2,090 | 4,020 | 6,400 | 11,300 | 23,100 | 41,800 | 67,600 | 139,000 | 252,000 | 399,000 |
| 20 | 118 | 247 | 466 | 957 | 1,430 | 2,760 | 4,400 | 7,780 | 15,900 | 28,700 | 46,500 | 95,500 | 173,000 | 271,000 |
| 30 | 95 | 199 | 374 | 768 | 1,150 | 2,220 | 3,530 | 6,200 | 12,700 | 23,000 | 37,300 | 76,700 | 139,000 | 220,000 |
| 40 | 81 | 170 | 320 | 657 | 985 | 1,900 | 3,020 | 5,350 | 10,900 | 19,700 | 31,900 | 65,600 | 119,000 | 189,000 |
| 50 | 72 | 151 | 284 | 583 | 873 | 1,680 | 2,680 | 4,740 | 9,660 | 17,500 | 28,300 | 58,200 | 106,000 | 167,000 |
| 60 | 65 | 137 | 257 | 528 | 791 | 1,520 | 2,430 | 4,290 | 8,760 | 15,800 | 25,600 | 52,700 | 95,700 | 152,000 |
| 70 | 60 | 126 | 237 | 486 | 728 | 1,400 | 2,230 | 3,950 | 8,050 | 14,600 | 23,600 | 48,500 | 88,100 | 139,000 |
| 80 | 56 | 117 | 220 | 452 | 677 | 1,300 | 2,080 | 3,670 | 7,480 | 13,500 | 22,000 | 45,100 | 81,900 | 130,000 |
| 90 | 52 | 110 | 207 | 424 | 635 | 1,220 | 1,950 | 3,450 | 7,030 | 12,700 | 20,600 | 42,300 | 76,900 | 122,000 |
| 100 | 50 | 104 | 195 | 400 | 600 | 1,150 | 1,840 | 3,260 | 6,640 | 12,000 | 19,500 | 40,000 | 72,600 | 115,000 |
| 125 | 44 | 92 | 173 | 355 | 532 | 1,020 | 1,630 | 2,890 | 5,890 | 10,600 | 17,200 | 35,400 | 64,300 | 102,000 |
| 150 | 40 | 83 | 157 | 322 | 482 | 929 | 1,480 | 2,619 | 5,330 | 9,650 | 15,600 | 32,100 | 58,500 | 92,500 |
| 175 | 37 | 77 | 144 | 296 | 443 | 854 | 1,360 | 2,410 | 4,910 | 8,880 | 14,400 | 29,500 | 53,600 | 84,900 |
| 200 | 34 | 71 | 134 | 275 | 412 | 794 | 1,270 | 2,240 | 4,560 | 8,250 | 13,400 | 27,500 | 49,900 | 79,000 |
| 250 | 30 | 63 | 119 | 244 | 365 | 704 | 1,120 | 1,980 | 4,050 | 7,320 | 11,900 | 24,300 | 44,200 | 70,000 |
| 300 | 27 | 57 | 108 | 221 | 331 | 638 | 1,020 | 1,800 | 3,670 | 6,630 | 10,700 | 22,100 | 40,100 | 63,400 |
| 350 | 25 | 53 | 99 | 203 | 305 | 587 | 935 | 1,650 | 3,370 | 6,100 | 9,880 | 20,300 | 36,900 | 58,400 |
| 400 | 23 | 49 | 92 | 189 | 283 | 546 | 870 | 1,540 | 3,140 | 5,680 | 9,190 | 18,900 | 34,300 | 54,300 |
| 450 | 22 | 46 | 86 | 177 | 266 | 512 | 816 | 1,440 | 2,940 | 5,330 | 8,620 | 17,700 | 32,200 | 50,900 |
| 500 | 21 | 43 | 82 | 168 | 251 | 484 | 771 | 1,360 | 2,780 | 5,030 | 8,150 | 16,700 | 30,400 | 48,100 |
| 550 | 20 | 41 | 78 | 159 | 239 | 459 | 732 | 1,290 | 2,640 | 4,780 | 7,740 | 15,900 | 28,900 | 45,700 |
| 600 | 19 | 39 | 74 | 152 | 228 | 438 | 699 | 1,240 | 2,520 | 4,560 | 7,380 | 15,200 | 27,500 | 43,600 |
| 650 | 18 | 38 | 71 | 145 | 218 | 420 | 669 | 1,180 | 2,410 | 4,360 | 7,070 | 14,500 | 26,400 | 41,800 |
| 700 | 17 | 36 | 68 | 140 | 209 | 403 | 643 | 1,140 | 2,320 | 4,190 | 6,790 | 14,000 | 25,300 | 40,100 |
| 750 | 17 | 35 | 66 | 135 | 202 | 389 | 619 | 1,090 | 2,230 | 4,040 | 6,540 | 13,400 | 24,400 | 38,600 |
| 800 | 16 | 34 | 63 | 130 | 195 | 375 | 598 | 1,060 | 2,160 | 3,900 | 6,320 | 13,000 | 23,600 | 37,300 |
| 850 | 16 | 33 | 61 | 126 | 189 | 363 | 579 | 1,020 | 2,090 | 3,780 | 6,110 | 12,600 | 22,800 | 36,100 |
| 900 | 15 | 32 | 59 | 122 | 183 | 352 | 561 | 992 | 2,020 | 3,660 | 5,930 | 12,200 | 22,100 | 35,000 |
| 950 | 15 | 31 | 58 | 118 | 178 | 342 | 545 | 963 | 1,960 | 3,550 | 5,760 | 11,800 | 21,500 | 34,000 |
| 1,000 | 14 | 30 | 56 | 115 | 173 | 333 | 530 | 937 | 1,910 | 3,460 | 5,600 | 11,500 | 20,900 | 33,100 |
| 1,100 | 14 | 28 | 53 | 109 | 164 | 316 | 503 | 890 | 1,810 | 3,280 | 5,320 | 10,900 | 19,800 | 31,400 |
| 1,200 | 13 | 27 | 51 | 104 | 156 | 301 | 480 | 849 | 1,730 | 3,130 | 5,070 | 10,400 | 18,900 | 30,000 |
| 1,300 | 12 | 26 | 49 | 100 | 150 | 289 | 460 | 813 | 1,660 | 3,000 | 4,860 | 9,960 | 18,100 | 28,700 |
| 1,400 | 12 | 25 | 47 | 96 | 144 | 277 | 442 | 781 | 1,590 | 2,880 | 4,670 | 9,590 | 17,400 | 27,600 |
| 1,500 | 11 | 24 | 45 | 93 | 139 | 267 | 426 | 752 | 1,530 | 2,780 | 4,500 | 9,240 | 16,800 | 26,600 |
| 1,600 | 11 | 23 | 44 | 89 | 134 | 258 | 411 | 727 | 1,480 | 2,680 | 4,340 | 8,920 | 16,200 | 25,700 |
| 1,700 | 11 | 22 | 42 | 86 | 130 | 250 | 398 | 703 | 1,430 | 2,590 | 4,200 | 8,630 | 15,700 | 24,800 |
| 1,800 | 10 | 22 | 41 | 84 | 126 | 242 | 386 | 682 | 1,390 | 2,520 | 4,070 | 8,370 | 15,200 | 24,100 |
| 1,900 | 10 | 21 | 40 | 81 | 122 | 235 | 375 | 662 | 1,350 | 2,440 | 3,960 | 8,130 | 14,800 | 23,400 |
| 2,000 | NA | 20 | 39 | 79 | 119 | 229 | 364 | 644 | 1,310 | 2,380 | 3,850 | 7,910 | 14,400 | 22,700 |

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa, 1-inch water column = 0.2488 kPa, 1 British thermal unit per hour = 0.2931 W, 1 cubic foot per hour = 0.0283 m3/h, 1 degree = 0.01745 rad.

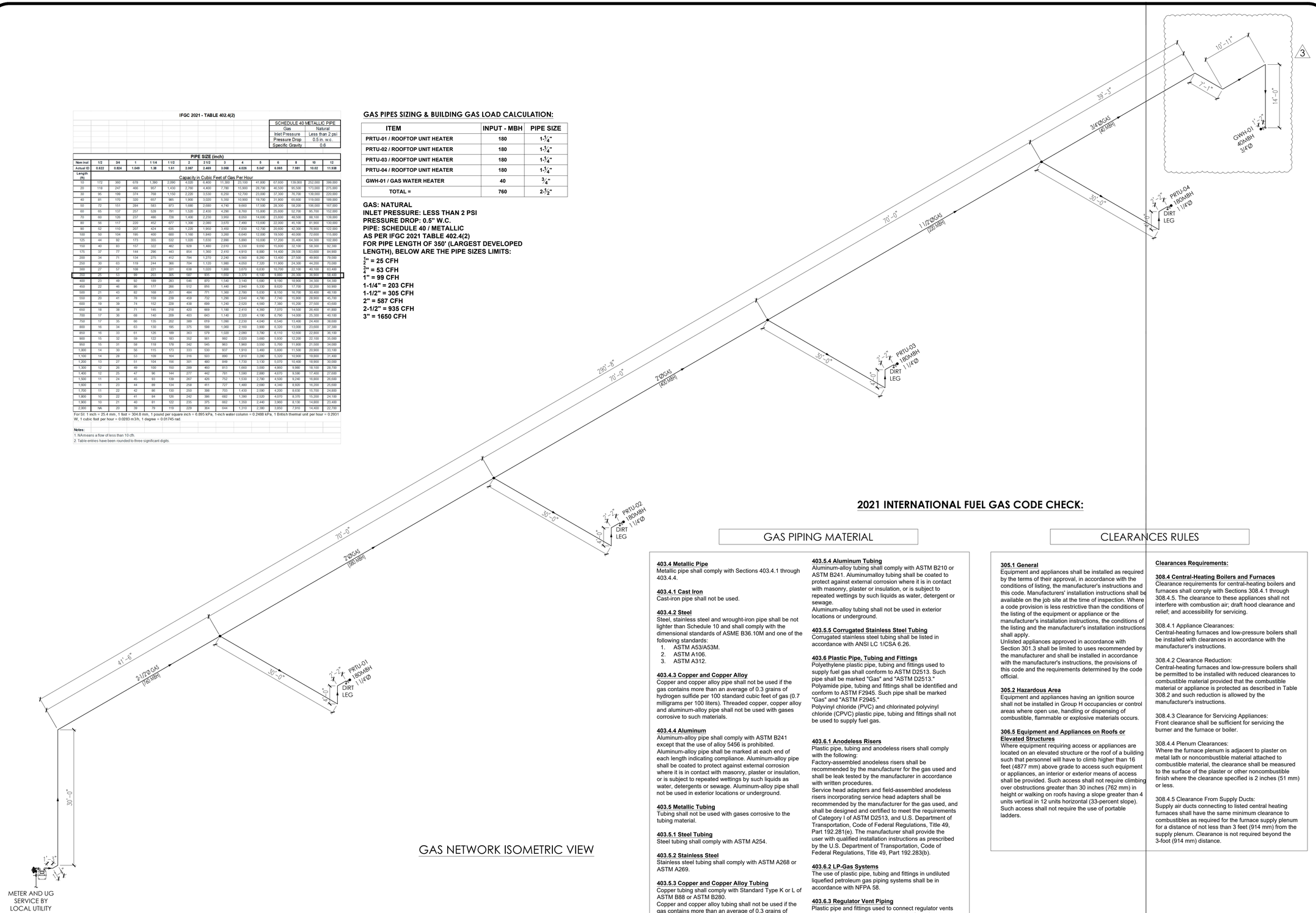
**Notes:**

1. NAmeans a flow of less than 10 cfh.
2. Table entries have been rounded to three significant digits.

## GAS PIPES SIZING & BUILDING GAS LOAD CALCULATION:

| ITEM | INPUT - MBH | PIPE SIZE |
|---|---|---|
| PRTU-01 / ROOFTOP UNIT HEATER | 180 | 1-1/4" |
| PRTU-02 / ROOFTOP UNIT HEATER | 180 | 1-1/4" |
| PRTU-03 / ROOFTOP UNIT HEATER | 180 | 1-1/4" |
| PRTU-04 / ROOFTOP UNIT HEATER | 180 | 1-1/4" |
| GWH-01 / GAS WATER HEATER | 40 | 3/4" |
| TOTAL = | 760 | 2-1/2" |

**GAS: NATURAL**
**INLET PRESSURE: LESS THAN 2 PSI**
**PRESSURE DROP: 0.5" W.C.**
**PIPE: SCHEDULE 40 / METALLIC**
**AS PER IFGC 2021 TABLE 402.4(2)**
**FOR PIPE LENGTH OF 350' (LARGEST DEVELOPED LENGTH), BELOW ARE THE PIPE SIZES LIMITS:**
**1/2" = 25 CFH**
**3/4" = 53 CFH**
**1" = 99 CFH**
**1-1/4" = 203 CFH**
**1-1/2" = 305 CFH**
**2" = 587 CFH**
**2-1/2" = 935 CFH**
**3" = 1650 CFH**




GAS NETWORK ISOMETRIC VIEW

## 2021 INTERNATIONAL FUEL GAS CODE CHECK:

### GAS PIPING MATERIAL

**403.4 Metallic Pipe**
Metallic pipe shall comply with Sections 403.4.1 through 403.4.4.

**403.4.1 Cast Iron**
Cast-iron pipe shall not be used.

**403.4.2 Steel**
Steel, stainless steel and wrought-iron pipe shall be not lighter than Schedule 10 and shall comply with the dimensional standards of ASME B36.10M and one of the following standards:
1. ASTM A53/A53M.
2. ASTM A106.
3. ASTM A312.

**403.4.3 Copper and Copper Alloy**
Copper and copper alloy pipe shall not be used if the gas contains more than an average of 0.3 grains of hydrogen sulfide per 100 standard cubic feet of gas (0.7 milligrams per 100 liters). Threaded copper, copper alloy and aluminum-alloy pipe shall not be used with gases corrosive to such materials.

**403.4.4 Aluminum**
Aluminum-alloy pipe shall comply with ASTM B241 except that the use of alloy 5456 is prohibited. Aluminum-alloy pipe shall be marked at each end of each length indicating compliance. Aluminum-alloy pipe shall be coated to protect against external corrosion where it is in contact with masonry, plaster or insulation, or is subject to repeated wettings by such liquids as water, detergents or sewage. Aluminum-alloy pipe shall not be used in exterior locations or underground.

**403.5 Metallic Tubing**
Tubing shall not be used with gases corrosive to the tubing material.

**403.5.1 Steel Tubing**
Steel tubing shall comply with ASTM A254.

**403.5.2 Stainless Steel**
Stainless steel tubing shall comply with ASTM A268 or ASTM A269.

**403.5.3 Copper and Copper Alloy Tubing**
Copper tubing shall comply with Standard Type K or L of ASTM B88 or ASTM B280.
Copper and copper alloy tubing shall not be used if the gas contains more than an average of 0.3 grains of hydrogen sulfide per 100 standard cubic feet of gas (0.7 milligrams per 100 liters).

**403.5.4 Aluminum Tubing**
Aluminum-alloy tubing shall comply with ASTM B210 or ASTM B241. Aluminumalloy tubing shall be coated to protect against external corrosion where it is in contact with masonry, plaster or insulation, or is subject to repeated wettings by such liquids as water, detergent or sewage.
Aluminum-alloy tubing shall not be used in exterior locations or underground.

**403.5.5 Corrugated Stainless Steel Tubing**
Corrugated stainless steel tubing shall be listed in accordance with ANSI LC 1/CSA 6.26.

**403.6 Plastic Pipe, Tubing and Fittings**
Polyethylene plastic pipe, tubing and fittings used to supply fuel gas shall conform to ASTM D2513. Such pipe shall be marked "Gas" and "ASTM D2513."
Polyamide pipe, tubing and fittings shall be identified and conform to ASTM F2945. Such pipe shall be marked "Gas" and "ASTM F2945."
Polyvinyl chloride (PVC) and chlorinated polyvinyl chloride (CPVC) plastic pipe, tubing and fittings shall not be used to supply fuel gas.

**403.6.1 Anodeless Risers**
Plastic pipe, tubing and anodeless risers shall comply with the following:
Factory-assembled anodeless risers shall be recommended by the manufacturer for the gas used and shall be leak tested by the manufacturer in accordance with written procedures.
Service head adapters and field-assembled anodeless risers incorporating service head adapters shall be recommended by the manufacturer for the gas used, and shall be designed and certified to meet the requirements of Category I of ASTM D2513, and U.S. Department of Transportation, Code of Federal Regulations, Title 49, Part 192.281(e). The manufacturer shall provide the user with qualified installation instructions as prescribed by the U.S. Department of Transportation, Code of Federal Regulations, Title 49, Part 192.283(b).

**403.6.2 LP-Gas Systems**
The use of plastic pipe, tubing and fittings in undiluted liquefied petroleum gas piping systems shall be in accordance with NFPA 58.

**403.6.3 Regulator Vent Piping**
Plastic pipe and fittings used to connect regulator vents to remote vent terminations shall be PVC conforming to ANSI/UL 651. PVC vent piping shall not be installed indoors.

### CLEARANCES RULES

**305.1 General**
Equipment and appliances shall be installed as required by the terms of their approval, in accordance with the conditions of listing, the manufacturer's instructions and this code. Manufacturers' installation instructions shall be available on the job site at the time of inspection. Where a code provision is less restrictive than the conditions of the listing of the equipment or appliance or the manufacturer's installation instructions, the conditions of the listing and the manufacturer's installation instructions shall apply.
Unlisted appliances approved in accordance with Section 301.3 shall be limited to uses recommended by the manufacturer and shall be installed in accordance with the manufacturer's instructions, the provisions of this code and the requirements determined by the code official.

**305.2 Hazardous Area**
Equipment and appliances having an ignition source shall not be installed in Group H occupancies or control areas where open use, handling or dispensing of combustible, flammable or explosive materials occurs.

**306.5 Equipment and Appliances on Roofs or Elevated Structures**
Where equipment requiring access or appliances are located on an elevated structure or the roof of a building such that personnel will have to climb higher than 16 feet (4877 mm) above grade to access such equipment or appliances, an interior or exterior means of access shall be provided. Such access shall not require climbing over obstructions greater than 30 inches (762 mm) in height or walking on roofs having a slope greater than 4 units vertical in 12 units horizontal (33-percent slope). Such access shall not require the use of portable ladders.

**Clearances Requirements:**

**308.4 Central-Heating Boilers and Furnaces**
Clearance requirements for central-heating boilers and furnaces shall comply with Sections 308.4.1 through 308.4.5. The clearance to these appliances shall not interfere with combustion air; draft hood clearance and relief; and accessibility for servicing.

308.4.1 Appliance Clearances:
Central-heating furnaces and low-pressure boilers shall be installed with clearances in accordance with the manufacturer's instructions.

308.4.2 Clearance Reduction:
Central-heating furnaces and low-pressure boilers shall be permitted to be installed with reduced clearances to combustible material provided that the combustible material or appliance is protected as described in Table 308.2 and such reduction is allowed by the manufacturer's instructions.

308.4.3 Clearance for Servicing Appliances:
Front clearance shall be sufficient for servicing the burner and the furnace or boiler.

308.4.4 Plenum Clearances:
Where the furnace plenum is adjacent to plaster on metal lath or noncombustible material attached to combustible material, the clearance shall be measured to the surface of the plaster or other noncombustible finish where the clearance specified is 2 inches (51 mm) or less.

308.4.5 Clearance From Supply Ducts:
Supply air ducts connecting to listed central heating furnaces shall have the same minimum clearance to combustibles as required for the furnace supply plenum for a distance of not less than 3 feet (914 mm) from the supply plenum. Clearance is not required beyond the 3-foot (914 mm) distance.

1650 CORPORATE DRIVE
MCKINNEY, TEXAS 75069

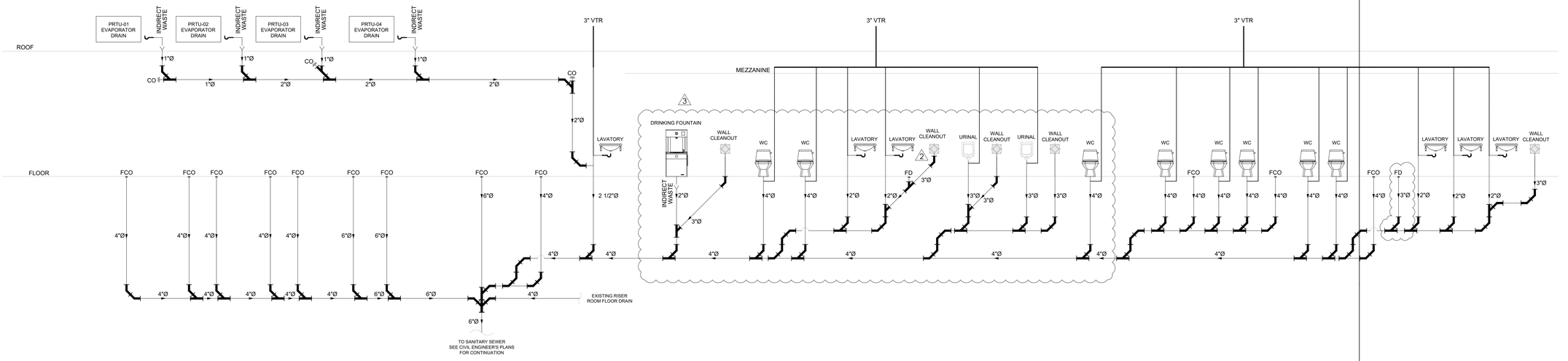
GAS RISER DIAGRAM.

Drawen By: Z.H | Scale: NTS

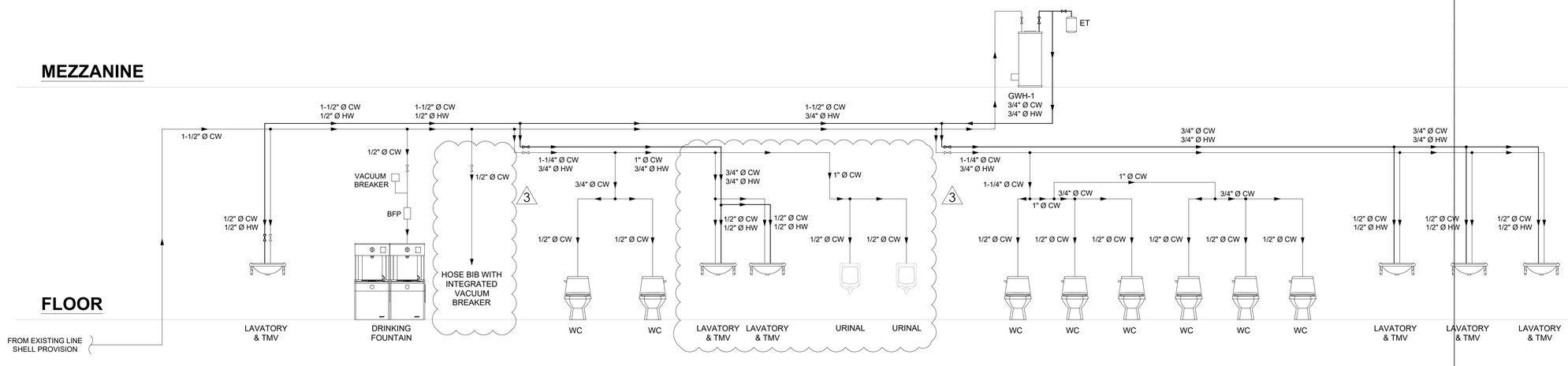
Date: 09.01.2023 | PROJ.NO.:

P5.00

SHEET NO.




## DRAINAGE RISER DIAGRAM - NTS




## WATER SUPPLY RISER DIAGRAM - NTS

1650 CORPORATE DRIVE
MCKINNEY, TEXAS 75069

PLUMBING RISER DIAGRAM

| | |
|---|---|
| Drawen By: Z.H | Scale: NTS |
| Date: 09.01.2023 | PROJ.NO.: |

P6.00

SHEET NO.