

Addendum



DATE: 05/31/2022

615 Woodside Drive, Englewood, Ohio 45322

T 937.836.8898 F 937.832.3696

PROJECT: Washington Township Fire Station 41

www.app-arch.com

PROJECT ADDRESS: 716 East Franklin Street
Centerville, Ohio 45458

ADDENDUM NO. 3

RECEIPT OF THIS ADDENDUM MUST BE NOTED ON THE FORM OF PROPOSAL

TO ALL BIDDERS:

This addendum supplements and amends the original Plans and Specifications and shall be taken into account in preparing proposals and shall become part of the Contract Documents.

GENERAL ITEMS:

Refer to Addendum No. 1 & 2 for items G1-G3

ITEM G4 PRE-BID MEETING NOTES

1. Refer to attached notes and sign-in sheets.

ARCHITECTURAL SPECIFICATIONS:

Refer to Addendum No. 1 for items AS1-AS3.

Refer to Addendum No. 2 for items AS4-10

ITEM AS11 SECTION – 00 4113 – BID FORM

1. Replace the existing specifications section of the project manual.
2. Refer to the attached for Section 00 4113 BID FORM – STIPULATED SUM (REVISED – ADDENDUM NO. 3) to be used for bid submission.

ITEM AS12 SECTION 01 2300 – ALTERNATES

1. Modify Section 3.1.D to add Alternate H-1 – VFD (Supply and Return Fan Arrays).
2. Refer to the revised attached Section 01 2300.

ITEM AS13 SECTION 09 5426 SUSPENDED WOOD CEILINGS

1. Part 2 – Products 2.1 A. Add to list of Acceptable manufacturers:
 - a. Linea Ceiling & Wall Systems
 - b. Rulon International

HVAC SPECIFICATIONS:

Refer to Addendum No. 1 for item HS1

Refer to Addendum No. 2 for item HS2

ITEM HS3 SECTION 23 0950 VARIABLE FREQUENCY MOTOR CONTROLLERS

1. Added Specification Section. Refer to attached specification.

ITEM HS4 SECTION 23 7413 PACKAGED, OUTDOOR, AIR HANDLING UNIT

1. Modified Section, 1.1, 2.4, 2.5 and 2.8. Refer to attached specification.

PLUMBING DRAWINGS:

Refer to Addendum No. 1 for item P1

Refer to Addendum No. 2 for items P2-P4

ITEM P5 SHEET P0.1

1. Plumbing Fixture Schedule – Add “WH1” per attached drawing.

ITEM P6 SHEET P1.1

1. Change “HB1” on north and south side of apparatus bay to “WH1” per attached drawing.

HVAC DRAWINGS:

Refer to Addendum No. 1 for items H1-H4

Refer to Addendum No. 2 for items H5-H6

ITEM H7 SHEET H0.3

1. Air Handling Unit AHU-1 Schedule. Add Note 3. Provide alternate price for direct drive plenum fans with VFD (Supply and return fan arrays). See specifications.

ITEM H8 SHEET H1.2

1. Refer to attached drawing for domestic hot water heater flue/combustion air modifications.

SUBSTITUTION REQUESTS:

Refer to addendum No. 1 for substitution requests SR1-SR2

Refer to addendum No. 2 for substitution requests SR3-SR4

- ITEM SR5 SUSPENDED WOOD CEILINGS – LINEA CEILING AND WALL SYSTEMS
1. Accepted
 2. Refer to item AS13 and the attached SR5.

END OF ADDENDUM NO. 3

- ATTACHMENTS:**
- Pre-Bid Meeting Notes & Sign-In Sheets (4 pages)
 - Specifications
 - 00 4413 BID FORM – STIPULATED SUM (REVISED)
 - 01 2300 ALTERNATES (REVISED)
 - 23 0950 VARIABLE FREQUENCY MOTOR CONTROLLERS
 - 23 7413 PACKAGED, OUTDOOR, AIR HANDLING UNIT
 - Drawing sheets
 - P0.1, P1.1, H0.3, H1.2
 - Substitution Requests
 - SR5 – Linea-Plank

Pre-Bid Agenda (REBID)

DATE: May 24, 2022

615 Woodside Drive, Englewood, Ohio 45322

T 937.836.8898 F 937.832.3696

PROJECT: Washington Township Fire Station 41

www.app-arch.com

SIGN-IN & INTRODUCTIONS: Owner – App Architecture

Scott Kujawa – Fire Chief

Nick Bergman – Deputy Fire Chief

Tim Bement – App Architecture, Principal in Charge

Curt Sparks – App Architecture, Project Manager

Brenda Lynn – App Architecture, Construction Administrator

Jezerinac Geers & Associates – Structural Engineer

Nauman & Zelinski, LLC – PME Engineers

Choice One Engineering – Civil Engineer

Yellow Springs Design – Landscape Architect

GENERAL SCOPE OF PROJECT:

- Single Prime Contract covering all branches of Work.
- Budget = \$7,104,600
- REBID bidding documents include all of the drawings/spec/addenda 1 & 2 from original bid
 - Plan to issue Addendum #3 this week with changes
 - substitution requests, VE & mechanical alternate
 - H-1: deduct alternate for direct drive plenum fans and a VFD in the air handling unit versus the base bid ECM fans.
- Review the Alternates
 - A-1: all concrete paving & curbs, eliminating all asphalt
 - A-2: 4 High Speed Overhead Doors in lieu of 4 Folding Doors
 - A-3: PVC Roof in lieu of EPDM Roof
 - E-1: Provide Photovoltaic System. – panels, connection, mounting, roofing
 - Allowance – Yard Sign - \$15,000
 - Unit Prices – 6 Unit Prices for site work

BID REQUIREMENTS:

- Bid due date – Tuesday, June 7, 2022; 2:00 pm.
- Deliver 3 copies of bids to Washington Twp Fire Department at 8320 McEwen Road.
- Use bid forms provided in the Project Manual.
 - Located after the geotechnical report
 - Required forms are in the Instructions to Bidders
 - Including an introductory letter with references
- Bid Bond and Performance & Payment Bond required.
- Use of local subcontractors and suppliers is encouraged.

- Last day for questions is Tuesday, May 31st, end of the day.
 - Submit questions to Curt Sparks at curt.sparks@app-arch.com

SUPPLEMENTARY CONDITIONS:

- Permits, Owner submitting and paying for the general building permit; all other permit costs are the responsibility of the GC.
 - Permit reviewed and waiting on a zoning item
- Owner is sales tax exempt.
- Payment of “Prevailing Wages” is required. Included in the Project Manual.
- General Conditions Statement regarding material price increases:

§ 15.1.5.1 If the cost of any particular material increases from the bid amount by 10% or greater after the Contract is executed due to the COVID-19 pandemic or any other infectious diseases, epidemic or pandemic (whether foreseeable or unforeseeable) including without limitation any governmental action, disruption in the supply of labor or materials or other impact related thereto, then Contractor shall be entitled to a reasonable adjustment to the Contract Sum to take the price escalation into account for such amounts in excess of 10%. For clarity and by way of example, if the materials increase by 15%, the Contractor shall be entitled to an adjustment of only the 5% above the 10% threshold, not the entire 15% increase. Contractor shall be entitled to such an increase only if it complies with the notice provisions in Article 15. Failure to do so will result in a waiver of any claim to such increased costs.

- Award – immediately. Plan to present low bidder at the June 13th Township Meeting for approval and then notify contractor on June 14th.
- We will work with the low GC to get this project moving as quickly as possible.
 - App and design team will review submittals as expediently as possible.
 - But we expect GC/subs to order materials right away to mitigate material procurement delays later in the project.
 - Owner will allow for billing of Stored Materials if submitted with proper certification – insurance certificates, photos, etc.
 - Storage options – your warehouse, sub’s warehouse, rented warehouse space, rented pod units, owner has fenced storage near jobsite or possibly a minimal amount of storage in conditioned space available.

TEMPORARY FACILITIES:

- Utilities – by the GC.
- Field offices, storage trailers by the GC.
- Temporary toilets by the GC.
- Organization and use of site to be determined by the GC.

REVIEW DRAWINGS AND SPECS

- Retention Basin, ODOT #2 (rip rap) from excavated materials but add Unit Cost for extra if needed to be brought into site.
- Storm Shelter (this room doubles as an enlarged restroom within the living quarters).
- Solar System is a Bid Alternate E-1, entire system is defined in the EC scope of work.

CONTRACTOR QUESTIONS:

Direct all bid questions, by email, to App Architecture. (Curt Sparks)

Site visit today after the pre-bid to view existing conditions. Contractors can visit the site at any time. All necessary clarifications will be made by Addendum. Addendum #3 will be issued this week.

Pre-Bid Sign-In Sheet



DATE: May 24, 2022

PROJECT: Washington Township Fire Station 41

Name	Company	Address	Communication Numbers
Scott Kujawa	Washington Twp	8320 McEwen Road Dayton, Ohio 45458	Phone: 937-433-3083 Mobile: E-Mail: Scott.Kujawa@washingtontwp.org
Nick Bergman NAM	Washington Twp	8320 McEwen Road Dayton, Ohio 45458	Phone: 937-433-3083 Mobile: E-Mail: Nick.Bergman@washingtontwp.org
Amber Renfrow 	Washington Twp	8200 McEwen Road Dayton, Ohio 45458	Phone: 937-432-2709 Mobile: E-Mail: Amber.Renfrow@washingtontwp.org
Tim Bement	App Architecture	615 Woodside Drive Englewood, Ohio 45322	Phone: 937-836-8898 Mobile: E-Mail: tim.bement@app-arch.com
Curt Sparks	App Architecture	615 Woodside Drive Englewood, Ohio 45322	Phone: 937-836-8898 Mobile: E-Mail: curt.sparks@app-arch.com
Brenda Lynn 	App Architecture	615 Woodside Drive Englewood, Ohio 45322	Phone: 937-836-8898 Mobile: E-Mail: brenda.lynn@app-arch.com
			Phone: Mobile: E-Mail:
			Phone: Mobile: E-Mail:

Pre-Bid Sign-In Sheet



DATE: May 24, 2022

PROJECT: Washington Township Fire Station 41

Name	Company	Address	Communication Numbers
CHRIS ROBINSON	BURMBACH CONST	3520 STRT 49 ARCADUM, OH	Phone: 937-692-5107 Mobile: 937-423-3981 E-Mail: Chris@burmbachconstruction.com
Brian Bailey	Graybach	2416 Central Pkwy Cincinnati, OH, 45214	Phone: (513) -871 -4822 Mobile: " E-Mail: brian.bailey@graybach.com
Suryja Prakash Grewal	Wise construction	1705 Greenher Road Dayton 95417	Phone: 937-603-1835 Mobile: E-Mail: spg@wiseconstructionco.com
Jeff Mayse	Wise construction	-	Phone: 937 - 541 - 1693 Mobile: E-Mail:
Andrew Conn	Tricon Inc.	11160 Kenwood Rd. Cincinnati, OH	Phone: 513-520-0104 Mobile: E-Mail: andrew@triconus.com
CHAS HINKEL	Dayton Bullgas	1741 THOMAS PARK PKWY CENTRALVILLE OH	Phone: 937-439-2728 Mobile: E-Mail: CHAS@DAYTONBULLGAS.COM
Tyler Pouchot	K+T Construction	275 Conover Dr Franklin, OH 45005	Phone: 937-790-1020 Mobile: E-Mail: tyle@ktconstructioninc.com
CHRIS JONES	Tricon Inc.	11160 Kenwood Rd Cincinnati OH	Phone: 937-620-2729 Mobile: E-Mail: CHRIS@TRICON US . COM

**DOCUMENT 00 4113 - BID FORM - STIPULATED SUM
(REVISED – ADDENDUM NO. 3)**

_____, 20 ____

SUBMITTED BY:

_____(Name of Bidder)

To:
Washington Township
8320 McEwen Road
Dayton, Ohio 45458

We, the undersigned having familiarized ourselves with the local conditions affecting the cost of the work, and with all Bidding Documents, prepared by App Architecture, 615 Woodside Drive, Englewood, Ohio 45322, dated March 22, 2022, hereby propose to furnish all labor, equipment, utilities, and transportation, to furnish and deliver all materials, and to perform and supervise all work required for the construction of the project entitled:

WASHINGTON TOWNSHIP
FIRE STATION 41

ITEM #1 – ALL WORK – FIRE STATION 41

BASE BID: All labor and material, for the sum of:

_____ Dollars (sum in words)

\$ _____.

Completion Time from Notice to Proceed _____ Calendar Days.

ALTERNATE A-1: Provide all labor and material to provide all concrete paving and curbs, eliminating all asphalt.

If Alternate A-1 is accepted, revise Base Bid as follows:

All labor and material, for the sum of: **ADD or DEDUCT** (circle one)

_____ Dollars (sum in words)

\$ _____.

If this alternate is accepted, add/subtract (circle one) _____ calendar days to/from the Base Bid Completion Time.

ALTERNATE A-2: Provide all labor and material to provide 4 High Speed Overhead Doors in lieu of 4 Folding Doors.

If Alternate A-2 is accepted, revise Base Bid as follows:

All labor and material, for the sum of: **ADD or DEDUCT** (circle one)

_____ Dollars (sum in words)

\$ _____.

If this alternate is accepted, add/subtract (circle one) _____ calendar days to/from the Base Bid Completion Time.

ALTERNATE A-3: Provide PVC Roofing Membrane in lieu of base bid EPDM Roofing.

If Alternate A-3 is accepted, revise Base Bid as follows:

All labor and material, for the sum of: **ADD or DEDUCT** (circle one)

_____ Dollars (sum in words)

\$ _____.

If this alternate is accepted, add/subtract (circle one) _____ calendar days to/from the Base Bid Completion Time.

ALTERNATE H-1: Provide direct drive plenum fans with VFD (Supply and Return Fan Arrays).

If Alternate H-1 is accepted, revise Base Bid as follows:

All labor and material, for the sum of: **ADD or DEDUCT** (circle one)

_____ Dollars (sum in words)

\$ _____.

If this alternate is accepted, add/subtract (circle one) _____ calendar days to/from the Base Bid Completion Time.

ALTERNATE E-1: Provide all labor and material to provide complete Photovoltaic System.

If Alternate E-1 is accepted, ADD to Base Bid as follows:

All labor and material, for the sum of:

_____ Dollars (sum in words)
\$ _____.

If this alternate is accepted, add/subtract (circle one) _____ calendar days to/from the Base Bid Completion Time.

ALLOWANCES

Bidder has included the following Allowances in the Contract Sum:

Allowance No. 1: Yard Sign TOTAL AMOUNT INCLUDED: \$ _____

UNIT PRICES

Unit Price Item	Total Price per Unit	Unit of Measure
Unit Price No. 1: Removal of unsatisfactory soil and replacement with satisfactory soil material.	\$	
Unit Price No. 2: Mass rock excavation and replacement with satisfactory soil material.	\$	
Unit Price No. 3: Removal of unsatisfactory soil and replacement with low-strength concrete (1sm).	\$	
Unit Price No. 4 - Provide and place lime for the purpose of drying wet soil.	\$	
Unit Price No. 5 - Provide and place 304 gravel.	\$	
Unit Price No.6 – Provide and place rip rap.	\$	

STATEMENT BY BIDDER: The receipt of the following:

FIRM NAME: _____

BY: _____

Addenda to the Contract Documents (drawings and specifications) is hereafter acknowledged.

Addendum No. _____, dated _____

Date of Commencement of the Project shall be 30 days after bid is awarded.

NOTE A: It is understood and agreed by the undersigned that the Owner reserves the right to reject any or all bids, or to accept the bid which will promote the best interest of the Owner.

NOTE B: It is agreed that the BID shall be irrevocable for a period of sixty (60) days after the date of submission.

FIRM NAME: _____

BY: _____

TITLE: _____

OFFICIAL ADDRESS: _____

One copy of each of the following documents must accompany each copy of this Bid Form:

1. Contract Bond
2. Certificate As To Interest
3. Personal Property Tax Affidavit
4. Non-Collusion Affidavit

5. Equal Employment Opportunity Affidavit
6. Compliance with The Federal Immigration and Nationality Act
7. Subcontractor List

Three complete copies of the Bid Form and all items listed above must be submitted.

END OF DOCUMENT 00 4113

SECTION 01 2300 – ALTERNATES (*REVISED – ADDENDUM NO. 3*)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include, as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation, whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other Work of the Contract.
- C. Schedule: A Part 3 "Schedule of Alternates" Article is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. A-1: Concrete Paving

1. Base Bid: Provide concrete and asphalt paving and curbs as indicated on Drawings.
2. Alternate: Provide concrete and integral rolled curb in lieu of asphalt and rolled curb as indicated on Drawings.

B. Alternate No. A-2: High Speed Overhead Doors

1. Base Bid: Provide Folding Doors at Openings B01 through B04.
2. Alternate: In lieu of Folding Doors, provide High Speed Overhead Doors at Openings B01 through B04, refer to Specification 08 3323.13 "Overhead Rapid Coiling Doors". Minor adjustments may be required to the location of bollards and electric but quantities will not change.

C. Alternate No. A-3: PVC Roofing

1. Base Bid: Provide EPDM Roofing as specified.
2. Alternate: Alternate roofing material per Specification Section 07 5419 Polyvinyl-Chloride Roofing.

D. Alternate No. H-1: VFD (Supply and Return Fan Arrays)

1. Base Bid: Provide supply and return fan arrays as specified.
2. Alternate: Provide direct drive plenum fans with VFD (Supply and Return Fan Arrays).

E. Alternate No. E-1: Photovoltaic System.

1. Base Bid: No work.
2. Alternate: Provide all labor and material to install a complete solar photovoltaic system, as indicated on Drawing ES0.1, ES0.2, ES0.3, ES1.3, ES2.3 and as specified in Section on the Drawings. Include additional walk pads on the roof as indicated on the Roof Plan.

END OF SECTION 01 2300

SECTION 23 0950 – VARIABLE-FREQUENCY MOTOR CONTROLLERS (VFD's)

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes solid-state, pulse-width modulated (PWM), variable frequency controllers (VFD's) for speed control of three-phase, squirrel-cage induction motors.**
- B. VFD's shall be furnished where noted on the drawings or in the specifications. Provide a VFD for each motor except for supply or return fan wall applications where a single VFD is acceptable when so noted in the AH unit schedule.**
- C. VFD's shall be furnished by the HVAC contractor to the Electrical Contractor who will mount the VFD and shall install power wiring required for the installation.**

1.2 SUBMITTALS

- A. Product Data: For each type of VFD.**
- B. Shop Drawings: For each VFD.**
 - 1. Include wiring diagrams.**
 - 2. Indicate all accessories required for interface with building automation system for proper operation and control of the motor each drive serves.**
- C. Field quality-control test reports.**
- D. Operation and maintenance data.**
- E. Indicate on the VFD submittals that they have been reviewed and coordinated with the direct digital control system to ensure that all necessary components and accessories are included for proper motor operation and control sequence.**

1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100.**
- B. Comply with NFPA 70.**
- C. Comply with IEEE Standard 519, Special Applications for Line Notching and Distortion. The manufacturer shall include any additional equipment to meet this requirement, including, AC line filter(s) of the RLC type and/or isolation transformer, or both to meet full compliance.**

1.4 COORDINATION

- A. Coordinate features, accessories, inputs/outputs and functions of each VFD and each installed unit with ratings and characteristics of supply circuit, motor, required control sequence, and duty cycle of motor and load.**

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:**
 - 1. ABB (ACH 550 Series).**
 - 2. Yaskawa (Z1000 Series).**
 - 3. Square D (“S-Flex” Series).**
- B. All variable frequency drives required for the HVAC systems shall be from a single manufacturer.**

2.2 VARIABLE FREQUENCY CONTROLLERS

- A. Description: NEMA ICS 2, IGBT, PWM, VFD; listed and labeled as a complete unit and arranged to provide variable speed of an NEMA MG 1, Design B, 3-phase induction motor by adjusting output voltage and frequency.**
 - 1. Provide unit suitable for operation of premium-efficiency motor as defined by NEMA MG 1.**
- B. Design and Rating: Match load type such as fans, blowers, and pumps; and type of connection used between motor and load such as direct or through a power-transmission connection.**
- C. Output Rating: 3-phase; 6 to 60 Hz.**
- D. Unit Operating Requirements:**
 - 1. Input ac voltage tolerance of plus or minus 10 percent.**
 - 2. Input frequency tolerance of 60 Hz, plus or minus 6 percent.**
 - 3. Minimum Efficiency: 96 percent at 60 Hz, full load.**
 - 4. Minimum Displacement Primary-Side Power Factor: 96 percent.**
 - 5. Overload Capability: 1.1 times the base load current for 60 seconds; 150 percent peak.**
 - 6. Starting Torque: 100 percent of rated torque or as indicated.**
 - 7. Speed Regulation: Plus or minus 1 percent.**
- E. Isolated control interface to allow controller to follow control signal over an 11:1 speed range with input signal type as coordinated with temperature control contractor as applicable.**

1. *Electrical Signal: 4 to 20 mA at 24 V or 0-10 VDC.*

F. *Internal Adjustability Capabilities:*

1. *Minimum Speed: 10 percent of maximum rpm.*
2. *Maximum Speed: 100 percent of maximum rpm.*
3. *Acceleration: 1 to a minimum of 600 seconds.*
4. *Deceleration: 1 to a minimum of 600 seconds.*
5. *Current Limit: 50 to a minimum of 110 percent of maximum rating.*

G. *Self-Protection and Reliability Features:*

1. *Input transient protection by means of surge suppressors.*
2. *Under- and overvoltage trips; inverter overtemperature, overload, and overcurrent trips.*
3. *Motor Overload Relay: Adjustable and capable of NEMA ICS 2, 150 percent of rated current.*
4. *Notch filter to prevent operation of the controller-motor-load combination at a natural frequency of the combination.*
5. *Instantaneous line-to-line and line-to-ground overcurrent trips.*
6. *Loss-of-phase protection.*
7. *Reverse-phase protection.*
8. *Short-circuit protection.*
9. *Motor overtemperature fault.*
10. *Power loss ride-thru (2 seconds).*

H. *Automatic Reset/Restart: Attempts no less than three and no more than five restarts after controller fault or on return of power after an interruption and before shutting down for manual reset or fault correction. Bidirectional autospeed search shall be capable of starting into rotating loads spinning in either direction and returning motor to set speed in proper direction, without damage to controller, motor, or load.*

I. *Power-Interruption Protection: To prevent motor from re-energizing after a power interruption until motor has stopped.*

J. *Torque Boost: Automatically varies starting and continuous torque to at least 1.5 times the minimum torque to ensure high-starting torque and increased torque at slow speeds.*

K. *Motor Temperature Compensation at Slow Speeds: Adjustable current fall-back based on output frequency for temperature protection of self-cooled, fan-ventilated motors at slow speeds.*

L. *Input Line Conditioning: As required to comply with IEEE 519.*

M. *VFD Output Filtering: As required to comply with IEEE 519.*

N. *Face-Mounted Operator Station: Start-stop and auto-manual selector switches with manual speed control.*

O. *Indicating Devices: Meter(s) or digital readout device(s) and selector switch, mounted on face of controller and connected to indicate the following controller parameters:*

- 1. *Output frequency (Hz).***
- 2. *Motor speed (rpm/Hz/percent, selectable).***
- 3. *Motor status (running, stop, fault).***
- 4. *Motor current (amperes).***
- 5. *Motor torque (percent).***
- 6. *Elapsed Time Meter (hrs)***
- 7. *Fault or alarming status (code).***
- 8. *PID feedback signal (percent).***
- 9. *DC-link voltage (VDC).***
- 10. *Set-point frequency (Hz).***
- 11. *Motor output voltage (V).***
- 12. *KW.***

P. *Control Signal Interface:*

- 1. *Electric Input Signal Interface: A minimum of 2 analog inputs (0 to 10 V or 0/4-20 mA) and 6 programmable digital inputs.***
- 2. *Remote Signal Inputs: Capability to accept any of the following speed-setting input signals from the DDC control systems:***
 - a. *0 to 10-V dc***
 - b. *4-20 mA.***
 - c. *Potentiometer using up/down digital inputs.***
 - d. *Fixed frequencies using digital inputs.***
 - e. *RS485.***
 - f. *Keypad display for local hand operation.***
- 3. *Output Signal Interface:***
 - a. *A minimum of 1 analog output signal (0/4-20 mA), which can be programmed to any of the following:***
 - 1) *Output frequency (Hz).***
 - 2) *Output current (load).***
 - 3) *DC-link voltage (VDC).***
 - 4) *Motor torque (percent).***
 - 5) *Motor speed (rpm).***
 - 6) *Set-point frequency (Hz).***
- 4. *Remote Indication Interface: A minimum of 2 dry circuit relay outputs (120-V ac, 1 A) for remote indication of any available programmable setting.***
- 5. *Embedded communications protocol and interface communications card for LonWorks, BACnet or Ethernet/IP, as required by the temperature control contractor for the direct digital control system provided.***

- Q. Communications: Provide an RS485 interface allowing VFD to be used with an external system within a multidrop LAN configuration. Interface shall allow all parameter settings of VFD to be programmed via the direct digital control system. Provide capability for VFD to retain these settings within the nonvolatile memory.*
- R. Drive enclosure shall incorporate an integral motor circuit protector circuit breaker or disconnect switch.*
- S. Manual Bypass: Not required except where noted otherwise on the drawings*
- T. Isolating Switch: Provide load break switch arranged to isolate VFD from supply source with lock-out provisions.*
- U. Remote Indicating Circuit Terminals: Mode selection, controller status, and controller fault.*

2.3 MULTIPLE MOTOR CONTROL

- A. Where plans/schedules indicate a single VFD for control of multiple motors, the VFD shall be Manufacturer's Model/Series designed for multiple motor application and shall be sized appropriately for the sum of motors Full Load Amps (Horsepower) to be started/controlled simultaneously. The VFD shall include, within its enclosure:
 - 1. Separate, adjustable electronic overload or thermal overload protection for each individual motor to be controlled.*
 - 2. Separate, integral motor circuit protector or disconnect switch for each individual motor to be controlled.*
 - 3. Separate power terminals for each individual motor to be controlled.**

2.4 ACCESSORIES

- A. Historical Logging Information and Displays:
 - 1. Real-time clock with current time and date.*
 - 2. Running log of total power versus time.*
 - 3. Total run time.*
 - 4. Fault log, maintaining last four faults with time and date stamp for each.**

2.5 FACTORY FINISHES

- A. Finish: Manufacturer's standard paint applied to VFD (NEMA 1 enclosure) before shipping.*

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Select features of each VFD to coordinate with ratings and characteristics of supply circuit and motor; required control sequence; and duty cycle of motor, controller, and load.***
- B. Select horsepower rating of controllers to suit motor controlled.***
- C. Provide complete wiring diagrams for use in interfacing with the equipment. Include these diagrams with the shop drawings.***

3.2 INSTALLATION

- A. VFD's will be furnished by the HVAC contractor and turned over to the Electrical contractor for mounting.***

3.3 IDENTIFICATION

- A. Identify VFD's, components, and control wiring according to Division 26 Section "Identification for Electrical Systems."***

3.4 CONTROL WIRING INSTALLATION

- A. Power wiring between the electrical distribution panel and the VFD as well as the wiring between the VFD and motor shall be installed by the Electrical Contractor.***
- B. Control wiring shall be provided by the temperature control subcontractor.***
- C. Bundle, train, and support wiring in enclosures.***

3.5 FIELD QUALITY CONTROL

- A. Prepare for equipment start up as follows:***
 - 1. Test insulation resistance for each supply and feeder circuit. Ensure that leads are not connected to VFD when meggar testing so as not to damage equipment components.***
 - 2. Test continuity of each circuit.***
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to perform the following for equipment start-up:***
 - 1. Inspect controllers, wiring, components, connections, and equipment installation. Ensure that all accessories, components, motor control parameters and programming capabilities are available and set for the required control sequence and are coordinated.***

2. *Coordinate the Manufacturer's Field Service Rep site visit to ensure all interested parties are present for equipment startup and verification of all control and setup parameters.*

3.6 DEMONSTRATION AND INSTRUCTION

- A. *Demonstrate the operation of the variable frequency drive to the Owner's representative and provide complete instruction and training for the equipment. Demonstration shall include the use of bypass switch where provided, interface and control strategies and basic troubleshooting.*

END OF SECTION

This page left intentionally blank.

SECTION 23 7413 – PACKAGED, OUTDOOR, AIR HANDLING UNIT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes packaged, outdoor, central-station air-handling units (rooftop units) with the following components and accessories:
 - 1. Direct-expansion cooling.
 - 2. ***Gas-heating coils.***
 - 3. ***Hot Gas Reheat***
 - 4. Roof curbs.

1.2 SUBMITTALS

- A. Product Data: Include manufacturer's technical data for each RTU, including rated capacities, dimensions, required clearances, characteristics, furnished specialties, and accessories.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Wiring Diagrams: Power, signal, and control wiring.
- C. Operation and maintenance data.
- D. Warranty.

1.3 QUALITY ASSURANCE

- A. ARI Compliance:
 - 1. Comply with ARI 210/240 and ARI 340/360 for testing and rating energy efficiencies.
 - 2. Comply with ARI 270 for testing and rating sound performance.
 - 3. Comply with ARI 1060 for testing and rating of energy recovery module.
- B. ASHRAE Compliance:
 - 1. Comply with ASHRAE 15 for refrigerant system safety.
 - 2. Comply with ASHRAE 33 for methods of testing cooling and heating coils.
 - 3. Comply with applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."
- C. ASHRAE/IESNA 90.1 Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

- D. NFPA Compliance: Comply with NFPA 90A and NFPA 90B.
- E. UL Compliance: Comply with UL 1995.
- F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- G. Motors 1 HP and larger shall be “premium efficiency” series motor.

1.4 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace components of units that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period for Compressors: Manufacturer's standard, but not less than five (5) years from date of Substantial Completion.
 - 2. Warranty Period for Gas Furnace Heat Exchangers: Manufacturer's standard, but not less than ten (10) years from date of Substantial Completion.
 - 3. Warranty Period for Solid-State Ignition Modules: Manufacturer's standard, but not less than three (3) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Daikin
 - 2. AAON, Inc.
 - 3. Carrier Corporation.
 - 4. Trane; American Standard Companies, Inc.
 - 5. York

2.2 CASING

- A. Exterior Casing Material: Galvanized steel with factory-painted finish, with pitched roof panels and knockouts with grommet seals for electrical and piping connections and lifting lugs. Panels shall be easily removable for servicing all components.
- B. The casing interior shall be insulated with 1” thick 1-½ lb. density neoprene coated fiberglass.
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

2.3 FANS

- A. Indoor air circulating fan shall be airfoil type with (ECM) electronically commutated motor. See fan duty and HP requirements listed on the drawings.
- B. Condenser fan shall be low noise blade design. Fan blade design shall be a dynamic profile for low tip speed. Fan blade shall be of a composite material. Fan to have wire guards for protection.

2.4 COILS

- A. Supply-Air Refrigerant Coil:
 - 1. Aluminum plate fin and seamless copper tube in steel casing with equalizing-type vertical distributor.
 - 2. Polymer strip shall prevent all copper coil from contacting steel coil frame or condensate pan.
 - 3. Coil Split: Interlaced.
 - 4. Condensate Drain Pan: Stainless steel formed with pitch and drain connections complying with ASHRAE 62.1.
- B. Outdoor-Air Refrigerant Coil:
 - 1. Outdoor coils shall be cast aluminum, micro-channel coils. Plate fins shall be protected and brazed between adjoining flat tubes such that they shall not extend outside the tubes. A sub-cooling coil shall be an integral part of the main outdoor air coil. Each outdoor air coil shall be factory leak tested with high-pressure air under water.
 - 2. Polymer strip shall prevent all copper coil from contacting steel coil frame or condensate pan.
 - 3. Outdoor air coils shall be protected from incidental contact to coil fins by a coil guard. Coil guard shall be constructed of cross wire welded steel with PVC coating.

~~C. Electric-Resistance Heating:~~

- ~~1. Open Heating Elements: Resistance wire of 80 percent nickel and 20 percent chromium, supported and insulated by floating ceramic bushings recessed into casing openings, fastened to supporting brackets, and mounted in galvanized steel frame. Terminate elements in stainless steel machine-staked terminals secured with stainless steel hardware.~~
- ~~2. Overtemperature Protection: Disk-type, automatically reset, thermal cutout, safety device; serviceable through terminal box.~~
- ~~3. Overcurrent Protection: Manual reset thermal cutouts, factory wired in each heater stage.~~
- ~~4. Control Panel: Unit mounted with disconnecting means and overcurrent protection. Include the following controls:
 - ~~a. Magnetic contactors.~~
 - ~~b. SCR Controller: Pilot lights operate on load ratio, a minimum of five steps.~~
 - ~~c. Time-delay relay.~~
 - ~~d. Airflow proving switch.~~~~

2.5 REFRIGERANT CIRCUIT COMPONENTS

- A. ***Compressor: The unit shall have scroll compressors. One of the compressors shall be an inverter compressor providing proportional control. The unit controller shall control the speed of the compressor to maintain the discharge air temperature. The inverter compressor shall have a separate oil pump and an oil separator for each compressor that routes oil back to the compressor instead of through the discharge line.***
- B. Refrigeration Specialties:
1. Refrigerant: R -410A.
 2. ***Pressure transducers shall be provided for the suction pressure and head pressure. Temperature sensor shall be provided for the suction temperature and the refrigerant discharge temperature of the compressors. All of the above devices shall be an input to the unit controller and the values be displayed at the unit controller.***
 3. ***Refrigerant circuit shall have a bypass valve between the suction and discharge refrigerant lines for low head pressure compressor starting and increased compressor reliability. When there is a call for mechanical cooling the bypass valve shall open to equalizing the suction and discharge pressures. When pressures are equalized the bypass valve shall close and the compressor shall be allowed to start.***
 4. Expansion valve with replaceable thermostatic element.
 5. Refrigerant filter/dryer.
 6. Manual-reset high-pressure safety switch.
 7. Automatic-reset low-pressure safety switch.
 8. Minimum off-time relay.
 9. Automatic-reset compressor motor thermal overload.
 10. Brass service valves installed in compressor suction and liquid lines.

2.6 HOT GAS REHEAT

- A. Unit shall be equipped with a fully modulating hot gas reheat coil with hot gas coming from the unit condenser
- B. Hot gas reheat coil shall be a Micro Channel design. The aluminum tube shall be a micro channel design with high efficiency aluminum fins. Fins shall be brazed to the tubing for a direct bond. The capacity of the reheat coil shall allow for a 20°F temperature rise at all operating conditions.
- C. The modulating hot gas reheat systems shall allow for independent control of the cooling coil leaving air temperature and the reheat coil leaving air temperature. The cooling coil and reheat coil leaving air temperature setpoints shall be adjustable through the unit controller. During the dehumidification cycle the unit shall be capable of 100% of the cooling capacity. The hot gas reheat coil shall provide discharge temperature control within +/- 2°F.
- D. Each coil shall be factory leak tested with high-pressure air under water.

2.7 AIR FILTRATION

- A. Minimum arrestance according to ASHRAE 52.1, and a minimum efficiency reporting value (MERV) according to ASHRAE 52.2.
 - 1. Pleated: 2” thick disposable type with cardboard frame, 30% efficiency similar to Farr “30/30”.

2.8 ***GAS FURNACE***

- A. ***Description: Factory assembled, piped, and wired; complying with ANSI Z21.47 and NFPA 54.***
 - 1. ***CSA Approval: Designed and certified by and bearing label of CSA.***
- B. ***Burners: Stainless Steel***
 - 1. ***Fuel: Natural gas.***
 - 2. ***Ignition: Electronically controlled electric spark or hot-surface igniter with flame sensor.***
- C. ***Heat-Exchanger and Drain Pan: Stainless steel.***
- D. ***Power Vent: Integral, motorized centrifugal fan interlocked with gas valve.***
- E. ***Safety Controls:***
 - 1. ***Gas Control Valve: Modulating.***
 - 2. ***Gas Train: Single-body, regulated, redundant, 24-V ac gas valve assembly containing pilot solenoid valve, pilot filter, pressure regulator, pilot shutoff, and manual shutoff.***

2.9 ELECTRICAL POWER CONNECTION

- A. Provide for single connection of power to unit with unit-mounted disconnect switch accessible from outside unit and control-circuit transformer with built-in overcurrent protection.

2.10 CONTROLS

- A. Control equipment and sequence of operation are specified in Division 23 Section "Direct Digital Control System"

2.11 ACCESSORIES

- A. Duplex, 115-V, ground-fault-interrupter outlet with 15-A overcurrent protection. Include transformer if required. Outlet shall be energized even if the unit main disconnect is open.
- B. Filter differential pressure switch with sensor tubing on either side of filter. Set for final filter pressure loss.

- C. Coil guards of painted, galvanized-steel wire.

2.12 ROOF CURBS

- A. Roof curb for each roof mounted unit shall be furnished with the unit, fabricated of steel with insulation, wood nailer, counterflashing, cant strip and seals for a watertight installation.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. The roof curb shall be set in place, shimmed level and secured. After the roofing contractor applies the roofing membrane to the curb, the unit shall be set in place and the installation completed.
- B. Provide condensate drainage piping from the drain pan with a 4" deep trap and cleanout.
- C. The Electrical Contractor will provide power wiring thru a fused disconnect switch to one set of power terminals in each unit. All other power and control wiring required for the completion of the systems shall be furnished and installed by the HVAC Contractor. All wiring shall be furnished and installed by the HVAC Contractor. All wiring shall be run in ½" and larger conduit in accordance with applicable provisions of the Electrical Specifications.

END OF SECTION 23 7413

PLUMBING FIXTURE SCHEDULE

ITEM	FIXTURE DESCRIPTION	FIXTURE	SERVICES				MTG. HGT.	TRIM REQUIREMENTS						NOTES
			H.W.	C.W.	SAN.	VENT		SUPPLY	STOPS	WASTE	TRAP	CARRIERS	ACCESSORIES	
W1	WATER CLOSET/ VIT. CHINA/ FLOOR SET/ MANUAL FLUSH VALVE/ DUAL FLUSH 1.6 GPF/ ELONGATED BOWL/ 16 1/2" RIM HEIGHT/ 1,000 MG MAP SCORE/ OPEN FRONT SEAT WITH LID...	AM. STANDARD # 3043.001	--	1"	4"	2"	--	SLOAN # WES 111-1.6/1.1	UNIT	UNIT	INTEGRAL	--	SEAT BEMIS # 1950SS	
W2	WATER CLOSET/ VIT. CHINA/ FLOOR SET/ TANK TYPE/ HANDLE ON RIGHT/ 1.6 GPF/ ELONGATED BOWL/ 16 1/2" RIM HEIGHT/ 1,000 MG MAP SCORE/ OPEN FRONT SEAT WITH LID...	AM. STANDARD # 211CA.105	--	1/2"	4"	2"	--	UNIT	MCGUIRE # LFBV2166	UNIT	INTEGRAL	--	SEAT BEMIS # 1950SS	
L1	LAVATORY/ SOLID SURFACE/ INTEGRAL WITH COUNTERTOP/ SINGLE LEVER CAST BRASS FAUCET/ 0.5 GPM/ ACCESSIBLE	BY OTHERS	1/2"	1/2"	1 1/4"	1 1/2"	--	AM. STANDARD # 6114.116	MCGUIRE # LFBV2165	WITH TRAP	MCGUIRE # PW2150WC	--	POWERS # LFE480	
L2	LAVATORY/ VIT. CHINA/ WALL HUNG/ SINGLE LEVER CAST BRASS FAUCET/ 0.5 GPM/ ACCESSIBLE	AM. STANDARD # 0355.012	1/2"	1/2"	1 1/4"	1 1/2"	34" TO RIM	AM. STANDARD # 6114.116	MCGUIRE # LFBV2165	WITH TRAP	MCGUIRE # PW2150WC	J.R. SMITH # 0710	POWERS # LFE480	
S1	SINK/ UNDERMOUNT/ SINGLE BOWL/ 30 1/2" x 16" x 10" DEEP BOWL W/ BOTTOM GRID/ SINGLE LEVER FAUCET W/ PULL DOWN SPRAY W/ COIL/ DISPOSAL	ELKAY # EFRU311610TC	1/2"	1/2"	(2) 1 1/2"	1 1/2"	--	AM. STANDARD # 4332.350	MCGUIRE # LFBV2165	MCGUIRE # 151A	MCGUIRE # 8912 & # 111	--	INSINKERATOR # ESSENTIAL XTR	
S2	SINK/ ST. ST./ INTEGRAL W/ C/ TOP/ DOUBLE BOWL/ SINGLE LEVER FAUCET W/ PULL DOWN SPRAY W/ COIL/ BASKET STRAINER/ EMERG. DRENCH HOSE WITH MIXING VALVE	BY OTHERS	(2) 1/2"	(2) 1/2"	(2) 1 1/2"	1 1/2"	--	AM. STANDARD # 4332.350	MCGUIRE # LFBV2165 (2 SETS REQ'D)	MCGUIRE # 151A	MCGUIRE # 8912 & # 111	--	GUARDIAN # G5022-HG & G3600LF	
S3	SINK/ ST. ST./ UNDERMOUNT/ SINGLE BOWL/ GOOSENECK & LEVER HANDLE FAUCET/	ELKAY # ELUH1212	1/2"	1/2"	1 1/2"	1 1/2"	--	AM. STANDARD # 7074.550	MCGUIRE # LFBV2165	MCGUIRE # 151A	MCGUIRE # 8912	--	--	
S4	SINK ST. ST. DROP-IN/ SINGLE BOWL/ SINGLE LEVER FAUCET WITH SIDE SPRAY	ELKAY # LR2219	1/2"	1/2"	1 1/2"	1 1/2"	--	AM. STANDARD # 7074.040	MCGUIRE # LFBV2165	MCGUIRE # 151A	MCGUIRE # 8912	--	--	
SH1	SHOWER/ STALL BY OTHERS/ TRENCH DRAIN STYLE/ MIXING VALVE WITH FIXED HEAD AND HAND HELD ON SLIDE BAR/ DIVERTER VALVE IN WALL	BY OTHERS	1/2"	1/2"	2"	1 1/2"	VALVE 42" HEAD 86"	POWERS # E710-M-2-N-Y-W	UNIT	UNIT	SAME AS SANITARY PIPING	--	--	
SH2	SHOWER/ STALL BY OTHERS/ CENTER DRAIN STYLE/ MIXING VALVE WITH FIXED HEAD AND HAND HELD ON SLIDE BAR/ DIVERTER VALVE IN WALL	BY OTHERS	1/2"	1/2"	2"	1 1/2"	VALVE 42" HEAD 86"	POWERS # E710-M-2-N-Y-W	UNIT	UNIT	SAME AS SANITARY PIPING	--	--	
M1	MOP SINK/ FLOOR SET/ 24" SQ. 10" DEEP/ MOLDED STONE/ ST. ST. CAPS/ ST. ST. WALL PANELS WALL MOUNTED FAUCET WITH INTEGRAL CHECK STOPS	FIAT # MSB2424	1/2"	1/2"	3"	1 1/2"	36" FAUCET	AM. STANDARD # 8354.112	UNIT	UNIT	SAME AS SANITARY PIPING	--	FIAT # E-88-AA (2 REQ'D), # MSG2424 (2 REQ'D)	
WB1	WASHER UTILITY CONNECTION BOX/ 1/4 TURN BALL VALVES WITH WATER HAMMER ARRESTOR	OATEY # 38540	3/4"	3/4"	2"	1 1/2"	30"	UNIT	BALL VALVES ABOVE CEILING	UNIT	SAME AS SANITARY PIPING	--	--	
WB2	ICE MAKER CONNECTION BOX/ 1/4 TURN BALL VALVE/ 6" ST. ST. HOSE	OATEY # 38623	--	1/2"	-	-	24"	UNIT	BALL VALVE ABOVE CEILING	--	--	--	--	
WH1	WALL HYDRANT/ ENCASED/ NON-FREEZE/ ANTI-SIPHON/ AUTOMATIC DRAINING/ 1/2 TURN CERAMIC DISC/ WALL CLAMP	ZURN # Z1320XL-EZ-WC	--	1/2"	-	-	APPROX. 20"							

EQUALS
 AMERICAN STANDARD CHINA - KOHLER, ZURN, SLOAN
 AMERICAN STANDARD FAUCETS - KOHLER, ZURN, CHICAGO
 SLOAN FLUSH VALVES - ZURN
 ELKAY SINKS - JUST, ADVANCED TABCO
 MCGUIRE - WATTS, BRASS CRAFT
 MCGUIRE "PROWRAP" - TRUEBRO "LAV GUARD", PLUMBEREX "PROEXTREME"

NOTES:
 1.

GENERAL LEGEND

EC	ELECTRICAL CONTRACTOR.
FC	FIRE SUPPRESSION CONTRACTOR.
GC	GENERAL CONTRACTOR.
HC	HVAC CONTRACTOR.
PC	PLUMBING CONTRACTOR
TC	TEMPERATURE CONTROLS CONTRACTOR
NIC	NOT IN CONTRACT.
AFF	ABOVE FINISHED FLOOR - TO BOTTOM OF ITEM UNLESS INDICATED OTHERWISE IN DRAWING.
(E)	EXISTING.
ES	EQUIPMENT SUPPLIER.
3	NOTE SYMBOL - APPLIES ONLY TO SHEET ON WHICH IS SHOWN.
2	DETAIL NOTE SYMBOL - APPLIES ONLY TO DETAIL ON WHICH IS SHOWN.
H-1	EQUIPMENT REFERENCE SYMBOL. ELECTRICAL CONNECTION REQUIRED.
123	ROOM NUMBER.
B P2	DETAIL SYMBOL DETAIL "B" SHOWN ON SHEET P2.
1 P3.1	SECTION SYMBOL SECTION "1" DESIGNATION, SHOWN ON SHEET P3.1.
FD1	CONNECTION, NEW TO EXISTING. UP TO SYMBOL UP TO "FD1", SHOWN ON FLOOR ABOVE

PLUMBING LEGEND

---	SANITARY DRAIN
ST	STORM DRAIN
SST	SECONDARY STORM DRAIN
---	VENT
---	COLD WATER
---	HOT WATER
---	HOT WATER RETURN
G	NATURAL GAS
A	COMPRESSED AIR
C.O.	CLEAN OUT
+	SHUT-OFF VALVE, SEE SCHEDULE FOR TYPE
+	CHECK VALVE
+	BALANCING VALVE
+	VALVE ON RISER
+	UNION
R	REGULATOR
P	PRESSURE GAUGE
T	TEMPERATURE GAUGE
+	CONNECTION, BOTTOM
+	CONNECTION, TOP
+	DIRECTION OF FLOW
+	CAP
V.R.	VENT RISER
V.T.R.	VENT THRU ROOF
S.S.	SOIL STACK
V.S.	VENT STACK
D.S.	DOWNSPOUT (STORM)
S.D.S.	SECONDARY DOWNSPOUT (STORM)
S.S.O.	SECONDARY STORM OUTLET

GENERAL NOTES - PLUMBING

- ALL WORK SHALL BE IN ACCORDANCE WITH THE 2017 VERSION OF THE OHIO BUILDING AND PLUMBING CODES, INCLUDING REFERENCED CODES AND STANDARDS.
- OBTAIN A PLUMBING PERMIT AND SECURE INSPECTION AND APPROVAL OF THE CODE OFFICIAL.
- COORDINATE EACH ROUGH-IN INSTALLATION REQUIREMENTS AND LOCATIONS WITH OTHER TRADES, ACTUAL EQUIPMENT OR CABINETS PROVIDED AND FIELD CONDITIONS BEFORE PERFORMING WORK.
- REFER TO ARCHITECTURAL CODE PLANS FOR LOCATIONS OF FIRE WALLS AND SMOKE PARTITIONS. IN SMOKE PARTITIONS FILL SPACE AROUND PENETRATIONS WITH AN APPROVED MATERIAL TO LIMIT THE FREE PASSAGE OF SMOKE. IN FIRE WALLS SEAL ALL PENETRATIONS WITH AN APPROVED FIRE STOPPING PRODUCT, SEE SPECIFICATIONS.
- REFER TO DIAGRAMS, DETAILS, AND SCHEDULES FOR PIPING AND PIPE SIZES NOT SHOWN ON PLAN OR ON DIAGRAMS.
- ALL PIPING IS ABOVE THE CEILING (AT THE CEILING IN EXPOSED STRUCTURE AREAS) UNLESS OTHERWISE INDICATED ON PLAN.
- ALL EQUIPMENT AND MATERIAL REQUIRED FOR COMPLETE AND FUNCTIONAL PLUMBING SYSTEMS ARE INCLUDED IN THE CONTRACT. THE WORK SCOPE IN THE PROJECT MANUAL DEFINES THE FINAL CONTRACTUAL RESPONSIBILITY TO PROVIDE SUPPORTING EQUIPMENT, MATERIALS, FINISHING, UTILITY COST, ETC (EXAMPLES: CONCRETE PADS, PAINTING, TEMPORARY ELECTRIC/GAS COSTS) FOR PRECEDENCE OVER OTHER SPECIFICATION SECTIONS OR DRAWING REQUIREMENTS.

PLUMBING INDEX OF DRAWINGS

SHEET	DRAWING TITLE
P0.1	LEGENDS AND SCHEDULES
P0.2	MATERIAL SCHEDULES
P0.3	MATERIAL SCHEDULES
P1.0F	UNDERFLOOR PIPING
P1.1	FIRST FLOOR
P1.2	UPPER APPARATUS BAY AND MEZZANINE PLAN
P1.3	ROOF PLAN
P2.1	ENLARGED FIRST FLOOR
P3.1	DETAILS
P3.2	DETAILS
P4.1	SOIL, WASTE AND VENT DIAGRAMS

SEISMIC REQUIREMENTS

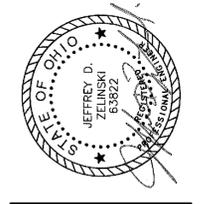
THIS PROJECT HAS SEISMIC REQUIREMENTS. REFER TO DRAWING H5.1

DRAIN SCHEDULE

TAG	DESCRIPTION	MANUFACTURER	MODEL NUMBER	OUTLET SIZE	FEATURES						STRAINER/GRATE						NOTES	
					ANCHOR FLANGE	FLASHING CLAMP	UNDERDECK CLAMP	DEB/ DRAINAGE	SEDIMENT BUCKET	TOP/STRAINER SIZE	FLAT	DOME	OPEN (NO GRATE)	HALF OPEN	ADJUSTABLE	FUNNEL		
FD1	FLOOR DRAIN/ CAST IRON BODY/ NICKEL BRONZE TOP/ ADJUSTABLE	ZURN	# ZN415-B7	3"	•						7" DIA	•						
FD2	FLOOR DRAIN/ CAST IRON BODY AND TOP/ MEDIUM DUTY/ LOOSE GRATE	ZURN	# Z550	3"	•						9" DIA	•						
FD3	FLOOR DRAIN/ PVC BODY/ APPROX 6" DEEP/ HALF TOP PVC FLAT/ FLAT GRATE/ FLAT STRAINER IN BOTTOM/...	SOIUX CHIEF	# 8614P26	4"	•						11" SQ.	•						
FD4	FLOOR DRAIN/ PVC BODY/ APPROX 6" DEEP/ NO TOP GRATE/ FLAT GRATE IN BOTTOM/ MEDIUM DUTY	SOIUX CHIEF	# 86134PX6	3"	•						11" SQ.	•						
FD5	FLOOR DRAIN/ CAST IRON BODY AND TOP/ MEDIUM DUTY/ LOOSE GRATE/ OVAL FUNNEL	ZURN	# Z550 & # Z329	3"	•						9" DIA.	•						
ID1	TRENCH DRAIN/ HDPE CONSTRUCTION/ HEAVY DUTY DUCTILE IRON SLOTTED GRATE	POLY CAST	# DG0700AA W/ # DG0675HD GRATE & # DA0642BH LOCK	3"	•						6" WIDE 40± LONG	•						
RD	ROOF DRAIN/ CAST IRON BODY/ POLY DOME/ STATIC EXTENSION/ TOP MOUNT DECK PLATE	ZURN	# Z100-E-DP	SIZE AS NOTED	•						12 5/16" DIA. (3", 4") 15 7/8" (6")	•						
SRD	SECONDARY ROOF DRAIN/ CAST IRON BODY/ POLY DOME/ STATIC EXTENSION/ TOP MOUNT DECK PLATE/ 2" EXTERIOR DAM	ZURN	# Z100-E-DP-89	SIZE AS NOTED	•						12 5/16" DIA. (3", 4") 15 7/8" (6")	•						
RD2	ROOF DRAIN/ SET IN BUILT-IN GUTTER/ CAST IRON BODY/ POLY DOME/ TOP MOUNT DECK PLATE	ZURN	# Z125-DP	4"	•						7 1/2" DIA	•						1.
SRD2	ROOF DRAIN/ SET IN BUILT-IN GUTTER/ CAST IRON BODY/ POLY DOME/ 2" EXTERNAL DAM/ TOP MOUNT...	ZURN	# Z125-89-DP	4"	•						7 1/2" DIA	•						
SSO	SECONDARY STORM OUTLET/ POWDER COATED ALLUMIN	ZURN	# ZF199	SIZE AS NOTED														
FCO	EXTRA HEAVY DUTY CLEANOUT/ FLOOR SET/ NICKEL-BRONZE TOP/ CAST IRON BODY/ MIP THREADED CONNECTION/ ABS PLUG	ZURN	# ZN1400-K	SAME AS PIPE UP TO 4"	•							•						
DT1	DRAIN TROUGH W/ LINT TRAP/ 48"X18"X12"HI/ POLYPROPYLENE/ PVC FILTER/ 4" SIDE INLET/ 4" OUTLET IN FRONT. RECESS FLUSH WITH FLOOR.	H-M COMPANY	(513) 281-3832	4" W/ FCO														

NOTES
 1. ROOF DECK PLATE WILL NEED TO BE CUT IN ORDER TO SET IN GUTTER. SEE DETAIL C3 SHEET A5.02.

APP Architecture
 creative focused design
 615 Woodside Drive, Englewood, Ohio 45322
 T 937.836.8698 F 937.832.3696
 www.app-arch.com



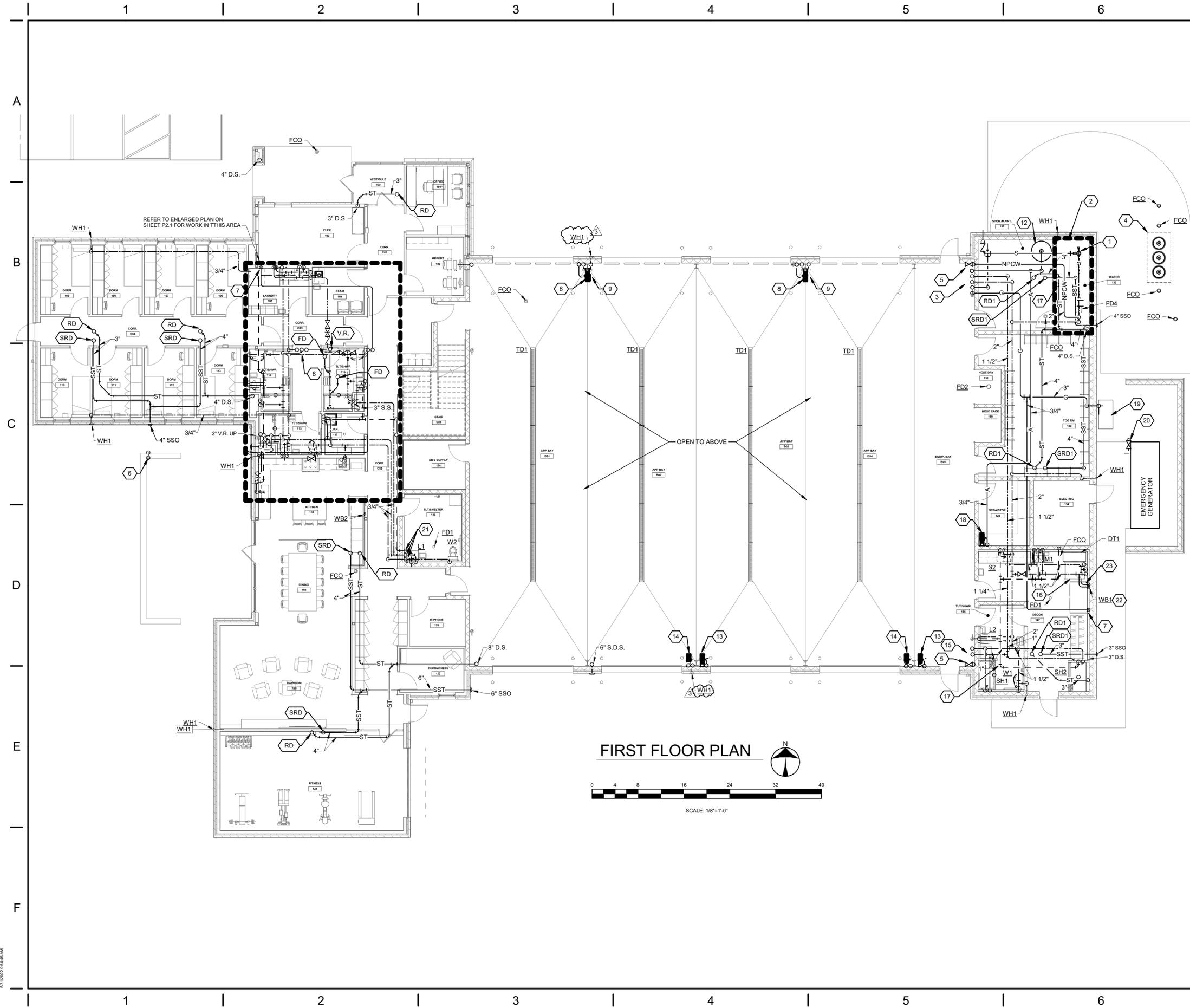
NAUMAN & ZELINSKI LLC.
 204 S. Ludlow Street Suite 400 Dayton, Ohio 45402
 Phone: (937) 233-3821 Fax: (937) 233-3849

Washington Township
Fire Station 41
 716 East Franklin Street, Centerville, Ohio 45458

ISSUE

NO.	DATE	DESCRIPTION
3	03/22/22	FOR CONSTRUCTION
	05/27/22	ADDENDUM NO. 3

DATE 3/22/2022
 JOB NO. 3952.00
 DRAWN DEG
 CHECKED JDZ
 COPYRIGHT © 2022 - App Architecture, Inc.
 TITLE
LEGENDS AND SCHEDULES
 SHEET NO.
P0.1



CONSTRUCTION NOTES

- 6" COMBINED WATER SERVICE BY FIRE SUPPRESSION CONTRACTOR.
- REFER TO ENLARGED WATER SERVICE PLAN AND ELEVATION ON SHEET P2.1 FOR ADDITIONAL WORK IN THIS AREA.
- RISERS UP TO APPARATUS BAY STRUCTURE 2" NON-POTABLE WATER (UP AND DOWN), 1" COMPRESSED AIR, 1 1/2" DOMESTIC HOT WATER, 3" DOMESTIC COLD WATER, 4" SPRINKLER (BY F.S.C.), AND 3" GAS. SEE SHEET P2.1 FOR CONTINUATION.
- OIL INTERCEPTOR BELOW GRADE. SEE UNDERFLOOR PIPING PLAN SHEET P1.0 AND DETAIL SHEET P3.2.
- 2" NON-POTABLE VALVE WITH 2" NTS THREADED OUTLET. MOUNT APPROX 36" A.F.F.
- GAS SUPPLY BOX FOR GRILL. MOUNT 18" A.F.F. BURNABY # G0101, SS-50-B1 OR APPROVED EQUAL. GAS PIPING TO ENTER BOX FROM BELOW AND RUN THRU WALL IN A SLEEVE AND DROP 3/4" NATURAL GAS TO BELOW GROUND USING ANODELESS RISER. SEE UNDERFLOOR PLAN FOR CONTINUATION.
- GAS SUPPLY BOX GATEY # 37563. MOUNT APPROX. 1'-6" A.F.F.
- AIR HOSE REEL WITH MOUNTING BRACKET AND 50 LF OF 3/8" 300 PSI HOSE. REELCRAFT # 5650 OLP. MOUNT TO COLUMN APPROXIMATELY 9'-0" TO CENTER OF HOSE REEL.
- HOSE REEL WITH MOUNTING BRACKET AND 50 LF OF 3/4" 250 PSI HOSE. REELCRAFT # GC3050 OLP. MOUNT TO COLUMN APPROXIMATELY 6'-0" TO CENTER OF HOSE REEL. FURNISH EXPOSED FAUCET BODY CENTRAL BRASS # 1380-L MOUNTED 36" A.F.F. CONNECT HOT AND COLD WATER FROM ABOVE TO FAUCET INLET AND PIPE DISCHARGE TO INLET OF HOSE REEL.
- COMMERCIAL EXTRACTOR/WASHER. VALVE AND CONNECT 1" COLD AND 1" HOT WATER. PIPE 3" DISCHARGE TO TOP OF DRAIN TROUGH. PROVIDE A PDI 1/8" WATER HAMMER ARRESTOR ON BOTH COLD AND HOT WATER SUPPLIES.
- DRAIN TROUGH WITH LINT TRAP 48"X18"X12" H. H-M COMPANY OR APPROVED EQUAL. PROVIDE 3" SIDE INLET FOR COMMERCIAL WASHER AND ADJACENT FRONT LOAD WASHER. RECESS FLUSH WITH FLOOR.
- AIR COMPRESSOR. SEE DETAIL SHEET P3.2.
- AIR HOSE REEL WITH MOUNTING BRACKET AND 50 LF OF 3/8" 300 PSI HOSE. REELCRAFT # 5650 OLP. MOUNT TO WALL APPROXIMATELY 9'-0" TO CENTER OF HOSE REEL.
- HOSE REEL WITH MOUNTING BRACKET AND 50 LF OF 3/4" 250 PSI HOSE. REELCRAFT # GC3050 OLP. MOUNT TO COLUMN APPROXIMATELY 9'-0" TO CENTER OF HOSE REEL. FURNISH EXPOSED FAUCET BODY CENTRAL BRASS # 1380-L MOUNTED 36" A.F.F. CONNECT HOT AND COLD WATER FROM ABOVE TO FAUCET INLET AND PIPE DISCHARGE TO INLET OF HOSE REEL.
- RISERS UP TO APPARATUS BAY STRUCTURE 2" NON-POTABLE WATER (FROM ABOVE), 1" DOMESTIC HOT WATER, AND 1" DOMESTIC COLD WATER. SEE SHEET P2.1 FOR CONTINUATION.
- COMMERCIAL EXTRACTOR/WASHER. VALVE AND CONNECT 1" COLD AND 1" HOT WATER. PROVIDE A PDI 1/8" WATER HAMMER ARRESTOR ON BOTH COLD AND HOT WATER SUPPLIES. PIPE 3" DISCHARGE TO DRAIN TROUGH/LINT TRAP (SEE DIAGRAM).
- 3" VENT THRU ROOF.
- AIR HOSE REEL WITH MOUNTING BRACKET AND 50 LF OF 3/8" 300 PSI HOSE. REELCRAFT # 5650 OLP. MOUNT TO WALL APPROXIMATELY 6'-6" TO CENTER OF HOSE REEL.
- NATURAL GAS SERVICE REGULATOR AND METER SETTING. SEE DETAIL SHEET P3.2.
- 1 1/4" NATURAL GAS TO EMERGENCY GENERATOR FROM BELOW GROUND. RISER OUT OF GRADE USING ANODELESS RISER. SEE UNDERFLOOR PLAN FOR CONTINUATION. SEE GAS CONNECTION DETAILS.
- OFFSET PIPING FOR STORM SHELTER SHIELDING (SEE STORM SHELTER NOTE). COORDINATE CLOSELY WITH THEIR TRADES.
- SUPPLY ONLY.
- 3" STANDPIPE 18" A.F.F.

STORM SHELTER NOTES

PENETRATIONS THROUGH THE STORM SHELTER ENVELOPE LARGER THAN 3 1/2 SQUARE INCHES IN AREA FOR RECTANGULAR OPENINGS OR 2 1/16" IN DIAMETER SHALL BE PROVIDED WITH AN OPENING PROTECTIVE DEVICE. REFER TO STRUCTURAL DRAWINGS FOR DETAILS OF PROTECTIVE DEVICES.

WATER NOTE
SHELTER CAPACITY IS 16 PEOPLE. ONE WATER CLOSET IS REQUIRED. THE LAVATORY IS NOT REQUIRED. HAND SANITIZER WILL BE STORED BY THE OWNER.
BASED ON 3 WATER CLOSET USES PER 8 HOUR PERIOD (FROM L.E.D.), IN A 2 HOUR PERIOD THAT WOULD EQUAL 3/4 USES PER PERSON. FOR 16 PEOPLE, 12 FLUSHES WOULD BE REQUIRED. THE WATER CLOSET TANK WILL BE FILLED UPON ENTRY INTO THE SHELTER, SO ENOUGH WATER FOR 11 FLUSHES IS REQUIRED TO BE STORED IN THE SHELTER. AT 1.6 GALLONS PER FLUSH THAT WILL REQUIRE 17.6 GALLONS MINIMUM BE STORED FOR WATER CLOSET USAGE. ADDITIONAL POTABLE WATER SHALL BE STORED FOR DRINKING. INCLUDE THESE REQUIREMENTS IN THE OWNER'S INSTRUCTIONS.

APP Architecture
creative focused design
615 Woodside Drive, Englewood, Ohio 45322
T 937.836.8898 F 937.832.3696
www.app-arch.com



NAUMAN & ZELINSKI LLC.
204 S. Ludlow Street Suite #100 Dayton, Ohio 45402
Phone: 937.233.3817 Fax: 937.233.3849

Washington Township
Fire Station 41
716 East Franklin Street, Centerville, Ohio 45458

ISSUE		
NO.	DATE	DESCRIPTION
1	03/22/22	FOR CONSTRUCTION
2	04/22/22	ADDENDUM NO. 2
3	05/27/22	ADDENDUM NO. 3

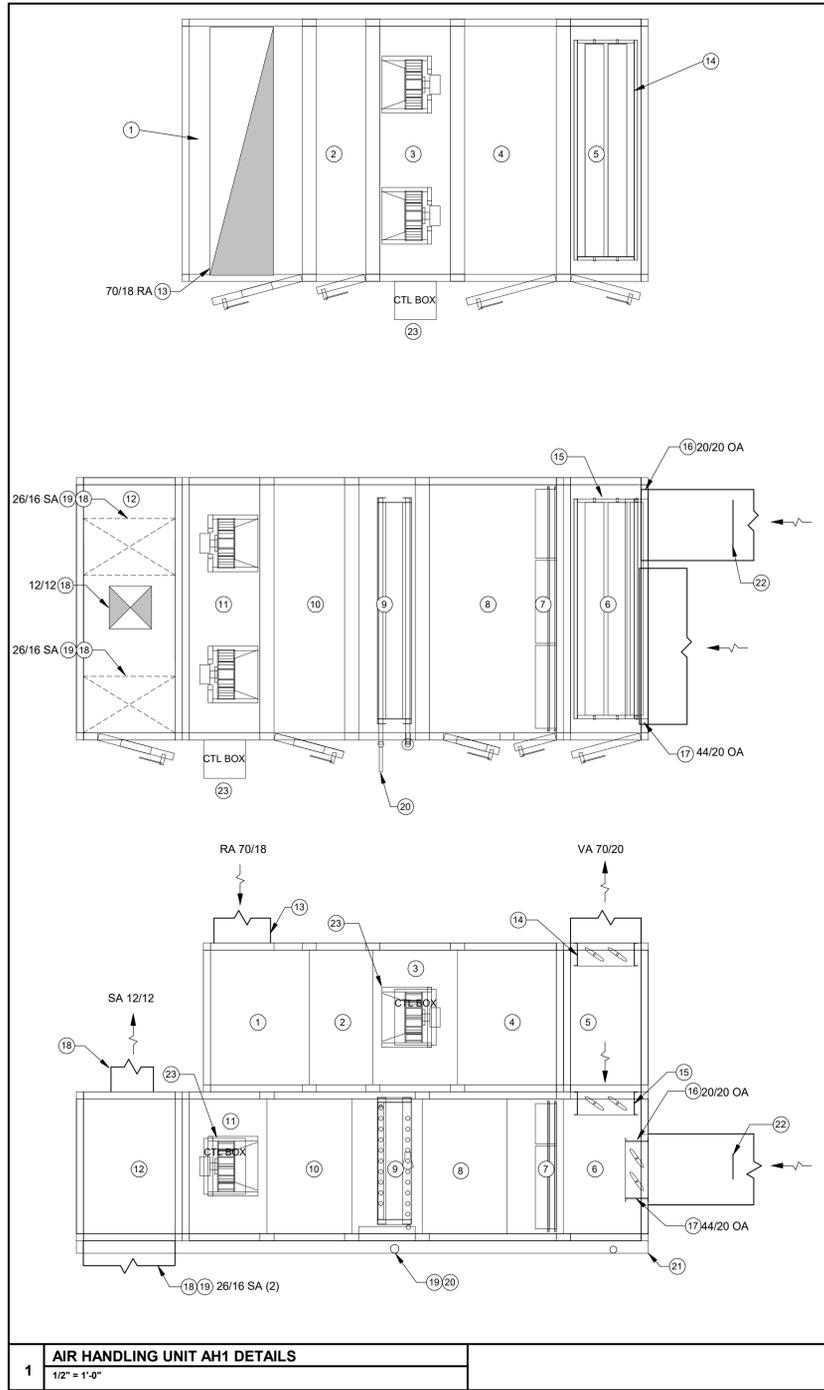
DATE	3/22/2022
JOB NO.	3952.00
DRAWN	DEG
CHECKED	JDZ
COPYRIGHT © 2022 - App Architecture, Inc.	
TITLE	FIRST FLOOR

SHEET NO.
P1.1

5/11/2022 9:54:45 AM

AIR HANDLING UNIT - AHU-1	
UNIT TAG	AHU-1
BASIS OF DESIGN	DAIKIN CAH014
SERVICE	LIVING QUARTERS
DESCRIPTION	VARIABLE VOLUME MULTI ZONE
MOUNTING	CURB & RAIL
EVAPORATOR FAN - QPAC ECM FAN ARRAY	
NO. FANS	2
AIRFLOW (CFM)	6000
ESP. (" W.G.)	2"
FAN SIZE (EA)	3000 (2) - 14"
MOTOR HP/V-PH (EA)	5HP 208V/3PH
MIN. OUTSIDE AIR - CFM%	1500-25%
VARIABLE FREQUENCY DRIVE	YES
ELECTRIC	
CIRCUIT SIZE MCA (SUPPLY FANS)	22.6 A
CIRCUIT SIZE MOCP (SUPPLY FANS)	30 A
VOLTAGE/PHASE	208V/3ø
FILTER	
PRE-FILTER TYPE	MERV-8 PREFILTER 2" PANEL 14 FT ² - 03" A.F.D (INITIAL)
FINAL FILTER TYPE	MERV-13 FILTER 4" RIGID CARTRIDGE 14 FT ² - 0.5" A.F.D (INITIAL)
RELIEF FAN - QPAC ECM FAN ARRAY	
NO. FANS	2
TOTAL AIRFLOW (CFM)	5000
ESP. (" W.G.)	1"
CFM - FAN SIZE (EA)	2500 - 14" (2)
MOTOR HP/V-PH (EA)	2.5 HP 208V/3PH
INTEGRATED DRIVE	YES (2)
ELECTRIC	
CIRCUIT SIZE MCA (RETURN FANS)	11.5 A
CIRCUIT SIZE MOCP (RETURN FANS)	15 A
VOLTAGE/PHASE	208V/3ø
COOLING - BASED ON 95/76 (DB/WB) O.A. & 78 DB, 50% RH R.A.	
TOTAL (MBH)	281
SENSIBLE (MBH)	173
ENTER. AIR (DB/WB)	81/68
SUPPLY AIR (DB/WB)	53/52
MAX AP DROP (INCHES WG)	0.5
EER	
PHYSICAL UNIT DATA	
LENGTH	174"
WIDTH	74"
HEIGHT - NOT INCLUDING CURB	84"
MAX UNIT OP. WEIGHT (LBS)	4500

- NOTES:
- REFER TO PLAN AND ELEVATION DRAWINGS FOR COMPONENTS AND ARRANGEMENT.
 - PROVIDE ADDITIONAL 120V/1Ø CIRCUIT TO POWER LIGHTS BY E.C.
 - PROVIDE ALTERNATE PRICE FOR DIRECT DRIVE PLENUM FANS WITH VFD (SUPPLY AND RETURN FAN ARRAYS). SEE SPECIFICATION.

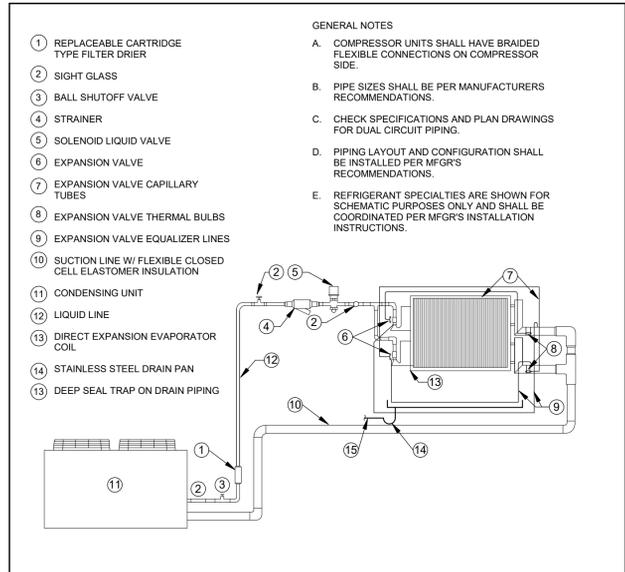


CONDENSING UNIT SCHEDULE													
BASIS OF DESIGN: DAIKIN RCS 025D													
UNIT	COOLING CAPACITY MBH @ 90°F	TYPE	REFRIGERANT		ELECTRICAL			DIMENSIONS			UNIT WEIGHT (LBS)	MODEL NO.	NOTES
			FACTORY CHARGE (LBS)	ADDITIONAL CHARGE (LBS)	V/PH	MCA	MOCP	WIDTH (IN)	DEPTH (IN)	HEIGHT (IN)			
CU-1	284	410A	2	17	208V/3PH	125	175	99	58	56	2000	RCS 025D	

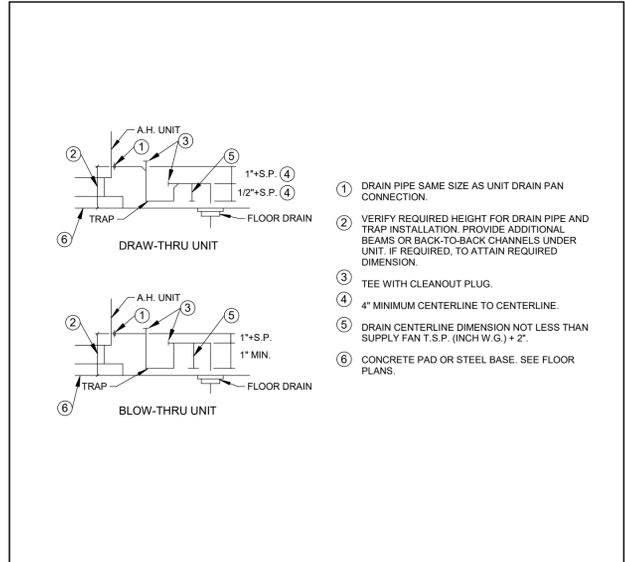
NOTES:

- MIXING BOX SECTION WITH ACCESS DOOR AND INTERIOR LIGHTING.
- ACCESS SECTION WITH ACCESS DOOR AND INTERIOR LIGHTING.
- RETURN AIR ECM FAN ARRAY SECTION.
- ACCESS SECTION WITH INTERIOR LIGHTING.
- MIXING BOX SECTION WITH ACCESS DOOR.
- MIXING BOX SECTION WITH ACCESS DOOR.
- FILTER SECTION WITH ACCESS DOOR.
- ACCESS SECTION WITH ACCESS DOOR AND INTERIOR LIGHTING.
- COOLING COIL.
- ACCESS SECTION WITH ACCESS DOOR AND INTERIOR LIGHTING.
- SUPPLY AIR FAN ARRAY SECTION.
- DISCHARGE PLENUM WITH ACCESS DOOR AND INTERIOR LIGHTING.
- RETURN AIR DUCT. SIZE AS NOTED
- VENT AIR DAMPER. THERMALLY INSULATED
- RETURN AIR DAMPER.
- MINIMUM OUTSIDE AIR DAMPER. THERMALLY INSULATED
- ECONOMIZER OUTSIDE AIR DAMPER. THERMALLY INSULATED.
- SUPPLY AIR DUCT. SIZE AS NOTED.
- PROVIDE GALVANIZED STEEL SAFETY GRATING OVER DUCT OPENING.
- 0.75" CONDENSATE PIPE TO FLOOR DRAIN.
- 6" BASE RAIL.
- TAMCO EBTRON AIR-IQ2 AIRFLOW MEASUREMENT STATION. MIN. 24" CLEARANCE FROM OA DAMPER.
- FAN ARRAY CONTROL BOX.

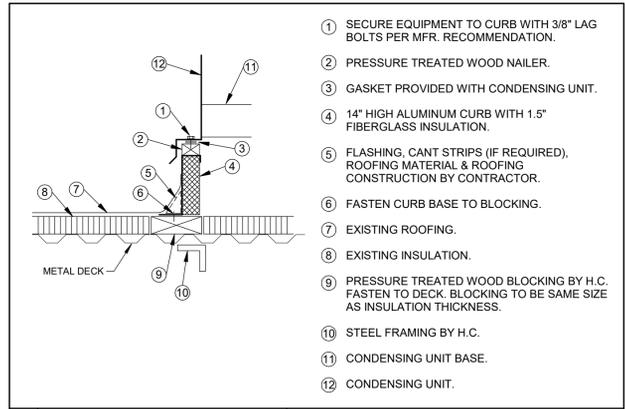
1 AIR HANDLING UNIT AH1 DETAILS
1/2" = 1'-0"



2 REFRIGERANT PIPING DETAIL
N.T.S.



3 COOLING COIL CONDENSATE PIPING
N.T.S.

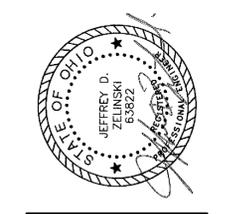


4 CONDENSING UNIT ROOF CURB
N.T.S.

- GENERAL NOTES
- COMPRESSOR UNITS SHALL HAVE BRAIDED FLEXIBLE CONNECTIONS ON COMPRESSOR SIDE.
 - PIPE SIZES SHALL BE PER MANUFACTURERS RECOMMENDATIONS.
 - CHECK SPECIFICATIONS AND PLAN DRAWINGS FOR DUAL CIRCUIT PIPING.
 - PIPING LAYOUT AND CONFIGURATION SHALL BE INSTALLED PER MFG'S RECOMMENDATIONS.
 - REFRIGERANT SPECIALTIES ARE SHOWN FOR SCHEMATIC PURPOSES ONLY AND SHALL BE COORDINATED PER MFG'S INSTALLATION INSTRUCTIONS.

APP Architecture
creative focused design

615 Woodside Drive, Englewood, Ohio 45322
T 937.836.8698 F 937.832.3696
www.app-arch.com



NAUMAN & ZELINSKI LLC.
204 S. Ludlow Street Suite 400 Dayton, Ohio 45402
Phone: 937.233.3817 Fax: 937.233.3849

Washington Township
Fire Station 41
716 East Franklin Street, Centerville, Ohio 45458

ISSUE		
NO.	DATE	DESCRIPTION
1	03/22/22	FOR CONSTRUCTION
3	04/14/22	ADDENDUM NO. 1
	05/27/22	ADDENDUM NO. 3

DATE	3/22/2022
JOB NO.	3952.00
DRAWN	RS
CHECKED	JDZ
COPYRIGHT © 2022 - App Architecture, Inc.	

TITLE
AHU SCHEDULE AND DETAILS

SHEET NO.
H0.3



SUBSTITUTION REQUEST FORM

615 Woodside Drive, Englewood, Ohio 45322

T 937.836.8898 F 937.832.3696

www.app-arch.com

DATE: 05/19/2022

TIME: 8:55 A.M.

REQUEST NO.:

PROJECT: WASHINGTON TOWNSHIP FIRE STATION 41
CENTERVILLE, OHIO

PROPOSED SUBSTITUTION: Linea Ceiling and Wall Systems

REQUEST AUTHOR: Liam Patridge **REQUIRED REPLY DATE:** 05/22

REPLY: Linea Plank with Flexible Backer is approved as an alternate to the
basis of design for Specification Section 09 5426 SUSPENDED WOOD
CEILINGS. This will be included in Addendum No. 3.

REPLY AUTHOR:  **REPLY DATE:** 05/31/2022
Brenda S. Lynn



ATTACHMENTS:

ACTION REQUIRED:

DISTRIBUTION:

END OF SECTION 01 2500

This page left blank intentionally

LINEA PLANK

LINEA Plank is a customizable panelized linear wood slat / wood blade system designed for interior and exterior wall and ceiling installations. LINEA Plank is composed of multiple wood slats oriented flat to the mounting surface. LINEA Plank is available in a wide variety of solid wood or real wood veneer options, comes in standard or custom sizes, standard or custom spacing configurations and in standard, custom or simulated finishes. When combined with acoustical insulation, When combined with LINEA PET Backer or acoustical insulation, LINEA Plank can achieve exceptionally high acoustic performance.

SPECIFICATION *-example*

Type:	LINEA Plank
Panel Size:	12" W, 3'-10" (less 1" for reveal)
Finishes:	Natural Clear, Custom Stained or Tinted Clear Finishes in <i>Matte, Satin or Semi-Gloss Sheen</i>
Assembly:	Wood Backer, Flexible Backer or LINEA PET Backer.
Fire Rating:	Class A per ASTM E-84 (USA) and CAN/ULC S102 (Canada)
Fabric Backer:	Optional-See Technical Data for info.



Linea Plank

FEATURES | BENEFITS

- Available in a wide variety of solid wood and wood veneers
- Standard or custom configurations, slat sizes, spacing, colors and low VOC finishes.
- Easily installed with Wood Backers, Flexible Backers for radius applications or LINEA PET Backer available in multiple colors. Some restrictions may apply.
- Ideal for Interior or covered Exterior applications
- Class A Fire Rated per ASTM-84 and CAN/ULC S102 is standard.
- FSC Certified and other responsibly harvested wood options available, including PEFC
- Designed for seismic and non-seismic areas
- Can be customized to reduce field cutting
- Can be manufactured for easy downward accessibility where required.
- Available with LINEA Textured Face or MicroPerforations for additional acoustical performance



**Product information is subject to change without notice.*

LINEA Plank				Blade Profiles & Reveal Options					
				USA (in)			Metric (mm)		
Blades / Panel	Panel Width	Nominal	Substrate	Depth	Width	Reveal	Depth	Width	Reveal
4	18" (457mm)	1 x 4	V	3/4	3-3/4	3/4	19	95	19
4	12" (305mm)	1 x 3	SW	5/8	2-1/4	3/4	16	57	19
4	12" (305mm)	1 x 3	HW & V	3/4	2-1/4	3/4	19	57	19
3	12" (305mm)	1 x 4	SW	5/8	3-1/4	3/4	16	82	19
3	12" (305mm)	1 x 4	HW & V	3/4	3-1/4	3/4	19	82	19
2	12" (305mm)	1 x 6	SW	5/8	5-1/4	3/4	16	133	19
2	12" (305mm)	1 x 6	HW & V	3/4	5-1/4	3/4	19	133	19
Tapered Plank									
2	12" (305mm)	Taper	Veneer	3/4	3-1/4 - 7-1/4	3/4	19	82 - 184	19
4	24" (610mm)	Taper	Veneer	3/4	3-1/4 - 7-1/4	3/4	19	82 - 184	19

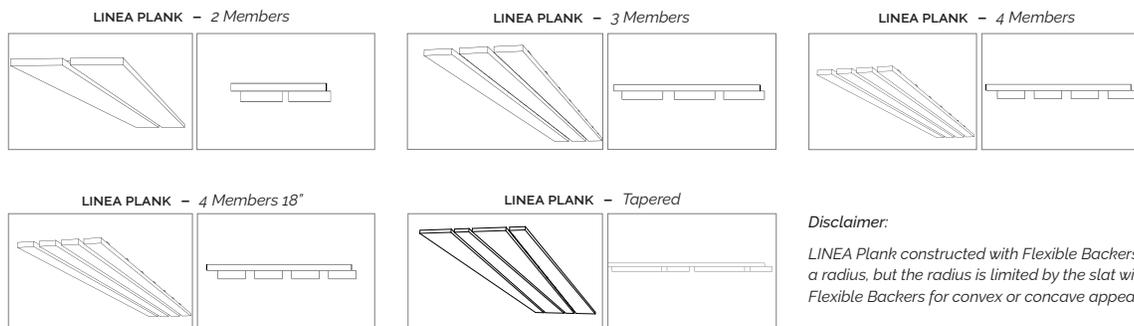
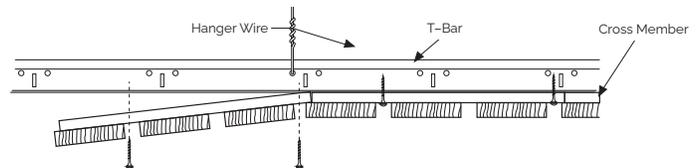
SW–Softwood; **HW**–Hardwood; **V**–Veneer

Solid, Softwoods are milled to 5/8" or 11/16" thickness. Solid Hardwoods are milled to 11/16" or 3/4" thickness

Nominal Sizes are not actual and are milled less than noted size.
Slat thickness and depth may vary between Softwoods, Hardwoods and Veneer

Additional thickness, depth and blades /LF options are available. **Contact a LINEA representative for more details**

Section Detail and Assembly Options



Disclaimer:

LINEA Plank constructed with Flexible Backers can achieve a radius, but the radius is limited by the slat width chosen. Flexible Backers for convex or concave appearance.

Wood Species *See our species sheet for more options.

Common Solid Wood Species



Suggested Exterior Wood Species



Common Wood Veneer Species



Simulated Finishes



Available With:

LINEA Textured Face



*Product information is subject to change without notice.

PHYSICAL DATA



WOOD SELECTIONS

Wood Species <i>Interior</i>	LINEA Plank may be specified in a wide variety of solid woods as well as natural or engineered wood veneers pressed on composite MDF or Particleboard core with matching edge banding.
Wood Species <i>Exterior</i>	LINEA Plank may be specified in Western Hemlock, Douglas Fir, Western Red Cedar or Alaskan Yellow Cedar. Vertical Grain is recommended for structural stability. LINEA Plank should be not be installed in locations in direct contact with rain, snow, standing water or prolonged direct sunlight. Soffits, overhangs and other covered spaces are ideal. Veneer/composite materials are not suitable for exterior environments.



FINISHES

Finishes <i>Interior</i>	LINEA Plank for interior applications are factory finished smooth in a Clear 10 ⁺ matte sheen in either a solvent-based or low voc water-based coating depending on customer specifications. Tinted clear finishes, custom stains and painted finishes are also available. Sheen options include matte, satin, or semi-gloss.
Finishes <i>Exterior</i>	LINEA Plank (solid wood only) for exterior applications are factory finished smooth in a Clear 10 ⁺ matte sheen low voc water-based coating. Tinted clear or custom stains are also available. Sheen options include matte, satin, or semi-gloss. <i>Contact LINEA for more information.</i>
Surface Texture	Surface appearance as smooth or LINEA Textured Face. Texture options include: Fine, Medium, or Coarse
Fabric Backer	Optional factory-attached Fabric Backer is available for LINEA Plank products upon request. Unevenness in the Fabric Backer is NOT considered a manufacturing defect and may be further magnified by lighting conditions on site. Lighting conditions are the responsibility of the Design Consultant and should be considered when specifying.
Antibacterial	LINEA offers an Antibacterial Coating for interior wood product installations where cleanliness and hygiene are of the utmost importance. The coating has been specially formulated to provide excellent object/surface protection levels and deliver extraordinarily high physical/chemical resistance. Furthermore, the presence of active metals boosts durability and protects the coating film from bacterial attack and the effects will last over time.



PANEL SIZES

Panel Sizes	LINEA Plank panels are manufactured and sold as 12" wide and in 12" increments from 3' - 8' long (less 1" for reveal). Some solid wood or veneer/composite products may be available oversized up to 10'. Panels less than 4' long should be avoided wherever possible. <i>Contact LINEA for details</i>
Tolerances	LINEA panels are built in accordance with CISCA dimensional tolerances.



TECHNICAL DATA

Fire Rating <i>Solid Wood</i>	FX Lumberguard or FX Lumberguard XT chemical fire retardants are factory applied to all LINEA Plank wood slats prior to further finishing to achieve a Class A Fire Rating when tested to ASTM E-84 (USA) and CAN/ULC S102 (Canada). When site cutting is required, FX Lumberguard can be re-applied to the cut locations and re-sealed to bring the panel back into conformance. Other typically applied chemical fire retardants or intumescent finishes may be used in lieu of FX Lumberguard to achieve Class A Fire Rating. In some cases, the specifying consultant may need to file an Alternate Solution with local authorities for approval. LINEA suggests consulting with local building code consultants during the specifying stage to avoid any potential issues related to Fire Rating.
Fire Rating <i>Veneer/Composite</i>	LINEA Plank panels with real wood or engineered wood veneers are laminated to Class A Fire Rated Composite MDF or Particle Board cores. The combination of Wood Veneer and Finish is less than 1mm thick (0.5mm in most cases) and therefore should not be considered significant to the overall rating.
Acoustics	LINEA Plank panels without additional acoustic insulation, will act as a sound diffuser and should be considered acoustically transparent. When paired with acoustical insulation, duct liner, or LINEA PET Backer, the panels can achieve high sound absorption.
Seismic	LINEA Plank panels are engineered for applications in all seismic areas when installed <i>per LINEA installation instructions.</i>
Installation	LINEA Plank panels are fixed via direct screw attachment or with other installation clip methods. Local building codes should be consulted in order to determine additional seismic requirements.
Warranty	1 Year Warranty on all LINEA panel products. <i>Contact LINEA for details.</i>



SHIPPING AND SITE CONDITIONS

Shipping	LINEA products are carefully packaged and shipped in palletized wooden crates.
Site Conditions	Wood products are hygroscopic in nature and must be stored, installed & maintained in a controlled building environment. Temperature range should be maintained between 60°-90° F (15°-32° C). Relative Humidity range should be kept within a minimum 25%—max. 55% (not to exceed 20% RH from peaks to valleys). <i>Failure to maintain site conditions will void the LINEA warranty</i>

*Product information is subject to change without notice.



ACOUSTICS

LINEA PLANK panels can achieve medium to high NRC and SAA Ratings

LINEA PLANK	E-400 – NRC/SAA	TYPE A – NRC/SAA
2 Slats per 12"	0.50 / 0.52	0.70 / 0.72
3 Slats per 12"	0.60 / 0.62	0.70 / 0.74
4 Slats per 12"	0.70 / 0.71	0.70 / 0.74

Test Results Disclaimer: Test results achieved by 3rd party, NVLAP accredited laboratory testing and in accordance with ASTM C423; Mounting per ASTM E795: Type E-400 and Type A; and achieved with 1-1/2" thick, 2 lb/ft³ acoustical infill. Results in field may differ from test lab results due to the varying and unique environmental characteristics of each space and location.



Pattern Considerations



Reveals (1") can be **Symmetrical** giving a linear appearance or **Staggered** to minimize joint layout



Disclaimers

Appearance

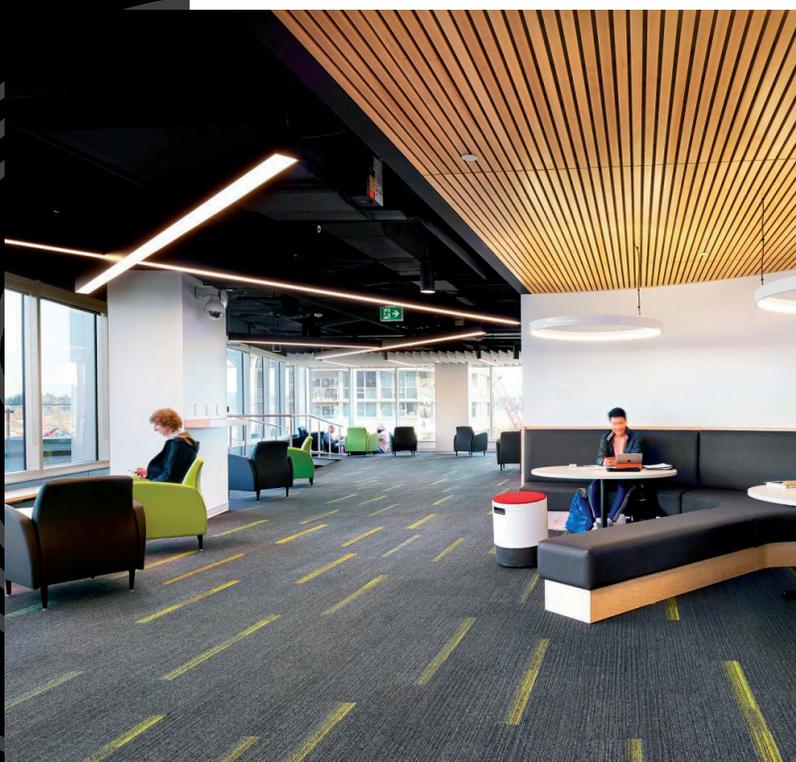
Variation among wood slat appearance may occur due to the natural characteristics of real wood and wood grain. Variation may be reduced, but not eliminated by using custom stains, tinted clear finishes or engineered wood veneers.

Fire Performance

Individual product components (*wood, fabric, metal, finish*) comply with Class A fire retardant testing. ASTM E-84 and CAN/ULC S-102 submittal data is based on supplier tests. Product assembly testing has not been completed due to assemblies varying on a project-by-project basis. To exceed today's changing codes and environmental requirements, Linea recommends sprinkling both the ceiling and the plenum (concealed space) in lieu of using chemical fire retardants. Linea recommends the specifier consult a fire protection engineer, NFPA 13, and local codes for assistance where fire suppression and automatic fire detection systems are present.

Acoustics

A selection of standard LINEA Plank panels have been lab tested per ASTM C423 for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method. This test method covers the measurement of sound absorption in a reverberation room by measuring decay rate. Due to assemblies varying on a project-by-project basis, not all configurations have been tested.



LEED®

Linea products can contribute towards LEED certification

- MR-2.1 | 2.2 Construction Waste Management
- MR-3.1 | 3.2 Materials Reuse
- MR-4.1 | 4.2 Recycled Content
- MR-5.1 | 5.2 Regional Materials (*location dependent*)
- MR-7.0 Wood available as FSC Certified, upon request
- EQ-3.1 | 3.2 Construction IAQ Management Plan
- EQ-4.1 | 4.2 | 4.4 Low emitting materials



mindfulmaterials.com

*Product information is subject to change without notice.

T 604-776-2265 sales@lineaceilings.com lineaceilings.com 2320 Peardonville Road, Abbotsford, BC Canada V2T 6J8