I L LONG
CONSTRUCTION CO., INC.
General Contractors Since 1932

Addendum No. 1

Project: North Carolina State University
Textiles Complex
Flex Factory Renovations
Raleigh, NC 27607

SCO ID #: 23-26253-01A
ILL #: 24-055

Construction Manager: I. L. Long Construction Co., Inc.
P.O. Box 4186
Winston-Salem, NC 27115

Date: June 17, 2025

The following modifications, additions, deletions, clarifications, and/or information are hereby made part of the Contract Documents and shall be fully binding. This addendum must be acknowledged as part of the Bid Form.

Item	Description

1. ****REVISED BID OPENING LOCATION****
Proposals for this project must be hand delivered to I.L. Long Construction Co. at the Wilson College of Textiles Building at NCSU, and on the Form of Proposal enclosed in the bid package manual.

Delivery Address: **NC State University**
Wilson College of Textiles Building
ROOM 2431C
1020 Main Campus Drive
RALEIGH, NC 27606

2. The Bid time for Bid Package 21A was left out in the original bid package. To confirm the bid opening times for all packages are below.

10:00am for Bid Packages 01A, 01B, 02A, 03A, 04A, 05A, 06A, 06B, 07A, 07B, 08A, 08D
2:00pm for Bid Packages 09A, 09B, 09C, 09D, 09G, 10A, 10B, 10C, 10D, 14A, 21A, 22A, 23A, 23B, 26A, 27A, & 28A

3. The bid form in the IL Long Bid Package must be turned in along with the HUB forms, Identification of HUB Certified / Minority Business Participation and Affidavit A or Affidavit B. These forms are attached.

4. Design Addendum 01 by Clearscapes dated June 16, 2025 – see attached
Includes revised drawings M002, M210, M300, E108, E109, E200, E201, E404, and E600

END OF ADDENDUM NO. 1

Identification of HUB Certified/ Minority Business Participation

I,_____,
(Name of Bidder)
do hereby certify that on this project, we will use the following HUB Certified/ minority business as construction subcontractors, vendors, suppliers or providers of professional services.

Firm Name, Address and Phone #	Work Type	*Minority Category	**HUB Certified (Y/N)

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

The total value of minority business contracting will be ($)_____.

State of North Carolina AFFIDAVIT A – Listing of Good Faith Efforts

County of _____

(Name of Bidder)

Affidavit of_____

I have made a good faith effort to comply under the following areas checked:

Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive. (1 NC Administrative Code 30 I.0101)

- ❑ **1 – (10 pts)** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.
- ❑ **2 --(10 pts)** Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.
- ❑ **3** – **(15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- ❑ **4 – (10 pts)** Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- ❑ **5** – **(10 pts)** Attended prebid meetings scheduled by the public owner.
- ❑ **6** – **(20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- ❑ **7 – (15 pts)** Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- ❑ **8** – **(25 pts)** Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- ❑ **9** – **(20 pts)** Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- ❑ **10** - **(20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:_____ Name of Authorized Officer:_____

Signature:_____

Title:_____

SEAL

State of_____, County of_____

Subscribed and sworn to before me this _____day of _____20____

Notary Public_____

My commission expires _____

State of North Carolina --AFFIDAVIT B-- Intent to Perform Contract with Own Workforce.

County of _____

Affidavit of _____
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the _____

_____ contract.
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement. The Bidder agrees to make a Good Faith Effort to utilize minority suppliers where possible.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____

SEAL

State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20___

Notary Public _____

My commission expires _____

State of North Carolina - AFFIDAVIT C - Portion of the Work to be Performed by HUB Certified/Minority Businesses

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the portion of the work to be executed by HUB certified/minority businesses as defined in GS143-128.2(g) and 128.4(a),(b),(e) is equal to or greater than 10% of the bidders total contract price, then the bidder must complete this affidavit.
This affidavit shall be provided by the apparent lowest responsible, responsive bidder within **72 hours** after notification of being low bidder.

Affidavit of _____ I do hereby certify that on the
(Name of Bidder)

_____
(Project Name)

Project ID#_____ Amount of Bid $_____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. Attach additional sheets if required

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:_____ Name of Authorized Officer:_____

SEAL

Signature:_____

Title:_____

State of _____, County of _____
Subscribed and sworn to before me this _____day of _____20____
Notary Public_____
My commission expires_____

State of North Carolina AFFIDAVIT D – Good Faith Efforts

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the goal of 10% participation by HUB Certified/ minority business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts:

Affidavit of _____ I do hereby certify that on the
(Name of Bidder)

_____
(Project Name)

Project ID#_____ Amount of Bid $_____

I will expend a minimum of _____% of the total dollar amount of the contract with HUB certified/ minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. (Attach additional sheets if required)

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

***Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

****** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

Examples of documentation that may be required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

A. Copies of solicitations for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.

B. Copies of quotes or responses received from each firm responding to the solicitation.

C. A telephone log of follow-up calls to each firm sent a solicitation.

D. For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.

E. Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.

F. Copy of pre-bid roster

G. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.

H. Letter detailing reasons for rejection of minority business due to lack of qualification.

I. Letter documenting proposed assistance offered to minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:_____ Name of Authorized Officer:_____

Signature:_____

Title:_____

SEAL

State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public_____

My commission expires _____

CLEARSCAPES
ARCHITECTURE + ART

ADDENDUM 01

Project: NCSU – Textiles Complex – Flex Factory Renovations

SCO ID#: 23-26253-01A

NCSU Project ID: 202220031

Date: June 16, 2025

The following **(48)** items modify, add to, or delete from the contract documents, plans, and specifications for this project. Please acknowledge receipt of this addendum in your proposal. Failure to do so may result in the disqualification of your bid.

RFI No. 001 *Is there an asbestos survey?*
Response: No.

RFI No. 002 *It appears there is exposed duct in several occupied spaces such as the Innovation Lab and Senior Design Lab. I have been unable to find a specification for insulation of this ductwork. Please confirm if exposed duct in these spaces is to be insulated, and if so how?*
Response: All exposed ducts shall be insulated with a mineral fiber blanket with thermal insulation R-value of R-8. Provide a field applied woven fiber jacket and paint. Color to be selected by architect.

RFI No. 003 *Specification section 233113, 3.6 B indicates exposed galvanized spiral duct should have welded joints. This is unusual, please confirm with the engineers that this duct should be welded.*
Response: All reference to welded joints shall be replaced with flanged joints.

RFI No. 004 *I don't see any specs for the data cabling. Do you know if the data cabling is going out to bid or is owner provided?*
Response: Data cabling is owner provided by NCSU Comtech.

RFI No. 005 *We could not find piping specifications for the steam piping?*
Response: Refer to the Steam and Condensate piping specification section 232213 issued in this addendum.

RFI No. 006 *Detail 1/M402 shows that there is a pre-heat coil and a re-heat coil, but the equipment schedule only shows 1 heating coil in AHU-1?*
Response: Equipment schedule indicates both pre-heat and re-heat coil data.

RFI No. 007 *The steam piping going to AHU-1 is labeled as HPS (high pressure steam), is this correct and if so, what is the steam pressure, the heating coil on the AHU-1 schedule is only rated for 10psi?*
Response: Provide steam pressure reducing station as indicated in the revised sheets M002, M210, M300.

RFI No. 008 *Is there another time that a walk-thru would be possible?*
Response: No.

RFI No. 009 *The drawings call out glass type GL-2 as follows:*
Response: Refer to response of RFI No. 010.

RFI No. 010 *GL-2: ACOUSTIC GLASS UNIT -1/4" SINGLE PANE LAMINATED GLASS OR INSULATED DOUBLE GLAZED UNIT TO PROVIDE MIN. STC 40*

In order to achieve and STC 40 we would need to use an impact rated aluminum storefront system with 1-5/16" glazing. I want to make that achieving the STC 40 is required due to the added cost over and above non-impact rated storefront. Please advise.
Response: Contractor may provide DIRTT, or similar demountable wall systems, laminated double pane glass wall system to achieve an STC rating of 40. Finish to match drawings and specifications.

RFI No. 011 *Alternate 01 specifies a Nana Wall SL45 system. The specs state that the STC must be 35 for this system. The SL45 system cannot meet an STC35. Please advise if a lower STC is acceptable. If STC35 must be met, please provide a spec for a different system that can meet or exceed STC35.*
Response: The NanaWall SL45 system is tested to provide an STC rating of 34 – this STC 34 rating is acceptable.

RFI No. 012 *The basis of design for the storefront framing/doors is Kawneer, YKK, or EFCO per spec section 084113. None of these companies make interior storefront doors that will meet STC 39, as is required per the excerpt below. If STC 39 is required at acoustic door 1103C, please provide a spec for the door manufacturer & model #. If this is not a requirement, please confirm a standard aluminum storefront door by one of the manufacturers listed about is acceptable.*
Response: Per specification section 084113, the typical sound transmission class for storefront and doors is a minimum of 35. The contractor may assume the glass make-up varies from the method detailed in the drawings and specifications to achieve the desired STC rating.

RFI No. 013 *There is no section in the specifications for steam and condensate heating piping. It is listed on the table of contents as section 232213. We request specification for steam and condensate heating piping.*
Response: Refer to the Steam and Condensate piping specification section 232213 issued in this addendum.

RFI No. 014 *Section 233113 - 3.6 DUCT SCHEDULE calls for exposed square and round duct to have welded joints. Please confirm, whether or not, welded joints are required for exposed, galvanized ductwork.*
Response: All reference to welded joints shall be replaced with flanged joints.

RFI No. 015 *Section 230701 – 3.9 does not describe the insulation required for indoor, exposed ductwork. We request specification for insulation of indoor, exposed ductwork.*
Response: All exposed ducts shall be insulated with a mineral fiber blanket with thermal insulation R-value of R-8. Provide a field applied woven fiber jacket and paint. Color to be selected by architect.

RFI No. 016 *There are no specifications calling for double wall ductwork. Please confirm that there is no double wall ductwork on this project.*
Response: There is no double wall ductwork.

RFI No. 017 *Re: Low Voltage Wiring:*

a. *Upon review of bid package BP08A - Passage Door Assemblies and the issued "Low-Voltage Responsibility Matrix", it does not appear 08A bidders are responsible for any of the low voltage wiring associated with the electrified hardware provided by this bid package. Please confirm all low voltage wiring of electrified hardware provide under 08A is in fact by others.*
Response: The low voltage is to be included in the Electrical Bid Package.

b. *Reference attached "riser diagram". One of the biggest items we see is in regards to the delineation of responsibility when it comes to low voltage wiring on electrified openings. I've attached C&B's standard operating procedure in regards to this matter. This can be modified but helps visualize the issue. Please advise if this low voltage responsibility diagram is what*

Clearscapes Architecture intend to implement on this project. If different, please advise where the door suppliers stops and the electrician starts.
Response: Refer to sheet E503. The door hardware contractor is responsible for connecting electric locks to power stubbed at the door hinge, provided up to that point by the electrical / low-voltage contractor.

RFI No. 018 *Aluminum Door Hardware:*

a. *Please confirm which bid package will include hardware for Aluminum Doors.*

Response: The low voltage is to be included in the Electrical Bid Package BP26A

RFI No. 019 *Door Protection:*

a. *Reference specification 08113-2 -1.7 A1. States to "protect" scope. Please advise on suitable method of protection. Typically, we advise against any type of excessive protection (i.e. cardboard over doors) as it cost lots of money to supply / install / remove and doesn't always help against damage from heavier equipment. It ends up being much cheaper to replace some doors due to damage rather than protecting every door on the project.*

Response: The BP08A contractor will have to make the decision as to whether to protect or cover each door or not protecting and taking the risk of replacing doors that might be damaged during shipping or other times.

RFI No. 020 *Mockups:*

a. *Specification section 014339 references mockups being required - please confirm BP08A does not require mockups of any kind.*

Response: Mockups are not required for the doors, frames and hardware scope of work.

RFI No. 021 *Painted Signage:*

a. *Specification 08113HM 1.2 Summary B. Section 101473 - Painted Signage, is this part of the BP08A scope of work - or work to be done by others. If required in BP08A please verify which doors are to have painted signage.*

Response: The painted signage is to be included in the Signage bid package BP10A.

RFI No. 021 *Generic:*

a. *Please verify if BP08A needs to include installation of hollow metal frames.*

Response: The hollow metal frames are to be installed by the BP08A contractor.

RFI No. 022 *Generic:*

b. *Access Door 1210B - confirm this is outside of 08A scope of work.*

Response: This access door is to be furnished and installed by the BP09A contractor.

RFI No. 023 *Generic:*

c. *1103D - note states "new acoustic door in existing frame" is the existing to remain door frame sound rated? - if so, what is the current rating? If not we suggest replacing the frame with a sound rated frame to achieve complete sound rating required.*

Response: Assume full replacement of door and frame to achieve sound rating.

RFI No. 024 *Generic:*

d. *Sound rating for 1103D is not stated - please clarify.*

Response: Door 1103D should achieve a minimum rating of STC 40. The same STC rating should be assumed for other hollow-metal doors indicated with an acoustic seal in the project.

RFI No. 025 *Generic:*

e. *1201F - clarify both frame and door are to be existing to remain - new hardware only.*

Response: There is no door in the project tagged 1201F. The door tagged 1210F is existing to remain with new hardware only.

RFI No. 026 *Generic:*

f. There mention of lead lining in hollow metal scope - there are no clear notations on the Architectural sheets - call out any openings that require lead line and the required thickness.

Response: There are no lead lining the hollow metal frames.

RFI No. 027 *Keying:*

a. Clarify if NCSU Shop will be cutting their own keys for permanent cores and only require blanks.

Response: NCSU Lock Shop will be cutting their own keys for permanent cores and only require blanks.

RFI No. 028 *Keying:*

b. Construction core requirements - are construction cores needed for this project?

Response: Yes.

RFI No. 029 *Alternates:*

a. Confirm for BP08A scope the only alternates that are applicable to scope are alternates G-04 and G-05.

Response: Confirmed.

RFI No. 030 *Which bid package(s) are the solid surface and wood tread/risers in at the reception stair?*

Response: The solid surface and wood tread / risers at the reception stair is furnished and installed by the BP06B contractor.

RFI No. 031 *The following question is from a Metal Storage Shelving bidder for the Bid Package 010D: Does this package just include the 02 & 03 shelving? The drawings say "BY OWNER/NC STATE" so just wanted to confirm what's included.*

Response: The Metal Storage Shelving BP010D contractor is to furnish and install the Shelving 01: B.O.D. Knape & Vogt 82/182 Series as identified in the Shelving System Key on drawing A213. The 02 & 03 shelving is furnished and installed by the Owner.

RFI No. 032 *Our supplier is requesting clarification on the Buzzitile (M1LG & M1XL). Can you please clarify if it needs to be flat or 3D pattern?*

Response: BuzziTile is an owner provided product, refer to drawing notes on sheets A211 and A212.

RFI No. 033 *Can you please provide the specs for the perforated metal ceilings that are specified on A111 & A112?*

Response: This project contains no perforated metal ceilings. The perforated metal ceiling symbol in the reflected ceiling plan legend should be disregarded.

RFI No. 034 *Scope item #2 specifies exterior light gauge metal framing, but there is none on the drawings. Can you confirm this?*

Response: There is no exterior metal framing on this project.

RFI No. 035 *Can you please specify where the support framing will be for the exterior metal cornices? I do not see it on the drawings.*

Response: There are no exterior metal cornices on this project.

RFI No. 036 *Can you confirm the re-staining of the concrete areas in Alternate 02 are in the concrete bid package, and not the carpet or resilient?*
Response: The restaining of existing concrete in Alternate No. 2 is furnished and installed by the BP09G Paintings / Coatings contractor.

RFI No. 037 *We have E600 Point by point lighting page which doesn't match E200 courtyard lighting plan. Are we missing an alternate page or is E600 not accurate.*
Response: Refer to the revised sheet E600 issued in this addendum.

RFI No. 038 *Do we have enough parking for our team, or do we need to consider parking passes?*
Response: Parking is addressed in the General Scope Item 27 in I.L. Long Construction's Bid Package Manual.

RFI No. 039 *Please clarify what we need to include for temporary power and lighting?*
Response: See General Scope Item Nos. 6 & 7 in I.L. Long Construction's Bid Package Manual.

RFI No. 040 *See attached sheets. Confirm marked up G007 is where panel 2EP is located. Page E108, do we have an overall plan showing note 1&2 location?*
Response: Refer to the revised sheets E108 and E109 issued in this addendum.

RFI No. 041 *Is there a specification for the emergency light to apply to Unit Price E2?*
Response: Refer to specification section 265100.

RFI No. 042 *Same question for the exit light for Unit Price E3?*
Response: Refer to specification section 265100.

RFI No. 043 *Referencing drawing E200. What controls light fixtures type L7 & L8, on/off?*
Response: Refer to the revised sheet E200 issued in this addendum for the switch location.

RFI No. 044 *Referencing drawings E200 & A111, detail 2/A111. Are we to provide type L8 lighting on both sides of the I-beam as shown per detail 2/A111?*
Response: Fixture L8 should be provided on both sides of the I-Beam as detailed in drawing 2/A111.

RFI No. 045 *See picture attached. There is no panel C26. How should we feed the L8 fixtures.*
Response: Refer to the revised sheet E200 issued in this addendum.

RFI No. 046 *See panel schedule attached. We cannot locate the highlighted circuits on the drawings.*
Response: Refer to the revised sheets E201 and E404 issued in this addendum for the updated panelboard schedule.

RFI No. 047 *Will there be a bid bond required for this project?*
Response: Bid Bonds are not required.

RFI No. 048 *Are we to include performance and payment bond?*
Response: For each bid, include the cost for 100% Payment & Performance Bonds for any proposed bid value of $500,000.00 or more.

End of Addendum 01

SECTION 232213 - STEAM AND CONDENSATE HEATING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following for LP and HP steam and condensate piping:

1. Pipe and fittings.
2. Strainers.
3. Safety valves.
4. Pressure-reducing valves.
5. Steam traps.
6. Thermostatic air vents and vacuum breakers.

1.2 DEFINITIONS

A. HP Systems: High-pressure piping operating at more than 70 psig as required by ASME B31.1.

B. MP Systems: Pressure operating between 15 and 60 psig as required by ASME B31.1.

C. LP Systems: Low-pressure piping operating at 15 psig (104 kPa) or less as required by ASME B31.9.

1.3 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressures and temperatures:

1. HP Steam Piping: 250 psig
2. MP Steam Piping: 150 psig
3. LP Steam Piping: 150 psig
4. Condensate Piping: 150psig.
5. Air-Vent and Vacuum-Breaker Piping: Equal to pressure of the piping system to which it is attached.
6. Safety-Valve-Inlet and -Outlet Piping: Equal to pressure of the piping system to which it is attached.

1.4 SUBMITTALS

A. Product Data: For each type of the following:

1. RTRP and RTRF with adhesive.
2. Pressure-reducing and safety valve.
3. Steam trap.
4. Air vent and vacuum breaker.

B. Shop Drawings: Detail, 1/4 inch equals 1 scale, flash tank assemblies and fabrication of pipe anchors, hangers, pipe, multiple pipes, alignment guides, and expansion joints and loops and their attachment to the building structure. Detail locations of anchors, alignment guides, and expansion joints and loops.

C. Qualification Data: For Installer.

D. Welding certificates.

E. Field quality-control test reports.

F. Operation and Maintenance Data: For valves, safety valves, pressure-reducing valves, steam traps, air vents, vacuum breakers, and meters to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:

B. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code - Steel."

C. Pipe Welding: Qualify processes and operators according to the following:

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

D. ASME Compliance: Comply with ASME B31.1, "Power Piping for materials, products, and installation. Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp flash tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

PART 2 - PRODUCTS

2.1 STEEL PIPE AND FITTINGS

A. Steel Pipe: ASTM A 53/A 53M, black steel, plain ends, Type, Grade, and Schedule as indicated in Part 3 piping applications articles.

B. Malleable-Iron Threaded Fittings: ASME B16.3; Classes 150 and 300 as indicated in Part 3 piping applications articles.

C. Malleable-Iron Unions: ASME B16.39; Classes 150, 250, and 300 as indicated in Part 3 piping applications articles.

D. Wrought-Steel Fittings: ASTM A 234/A 234M, wall thickness to match adjoining pipe.

E. Wrought-Steel Flanges and Flanged Fittings: ASME B16.5, including bolts, nuts, and gaskets of the following material group, end connections, and facings:

1. Material Group: 1.1.
2. End Connections: Butt welding.
3. Facings: Raised face.

F. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M, black steel of same Type, Grade, and Schedule as pipe in which installed.

G. Stainless-Steel Bellows, Flexible Connectors:

1. Body: Stainless-steel bellows with woven, flexible, bronze, wire-reinforced, protective jacket.
2. End Connections: Threaded or flanged to match equipment connected.
3. Performance: Capable of 3/4-inch (20-mm) misalignment.
4. CWP Rating: 150-psig (1035-kPa).
5. Maximum Operating Temperature: 250 deg F (121 deg C).

2.2 JOINING MATERIALS

A. Pipe-Flange Gasket Materials: Flexitallic style CG gaskets for all flanged joints.

1. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.

a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

B. Flange Bolts and Nuts: ASTM A 307B, carbon steel, unless otherwise indicated.

C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

D. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for joining copper with copper; or BAg-1, silver alloy for joining copper with bronze or steel.

E. Welding Filler Metals: Comply with AWS D10.12 (AWS D10.12M) for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

F. Welding Materials: Comply with Section II, Part C, of ASME Boiler and Pressure Vessel Code for welding materials appropriate for wall thickness and for chemical analysis of pipe being welded.

2.3 DIELECTRIC FITTINGS

A. Dielectric Unions: Not Permitted

B. Dielectric Flanges:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Capitol Manufacturing Company.
    b. Central Plastics Company.
    c. Watts Water Technologies, Inc.

2. Factory-fabricated companion-flange assembly, for 150- or 300-psig (1035- or 2070-kPa) minimum working pressure as required to suit system pressures.

C. Dielectric-Flange Kits:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Advance Products & Systems, Inc.
    b. Calpico, Inc.
    c. Central Plastics Company.
    d. Pipeline Seal and Insulator, Inc.

2. Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
3. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig (1035- or 2070-kPa) minimum working pressure as required to suit system pressures.

2.4 VALVES

A. Gate, Globe, Check, Ball, and Butterfly Valves: Comply with requirements specified in Division 23 Section "General-Duty Valves for HVAC Piping."

2.5 STRAINERS

A. Y-Pattern Strainers:

1. Body: ASTM A 126, Class B cast iron, with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for strainers NPS 2 (DN 50) and smaller; flanged ends for strainers NPS 2-1/2 (DN 65) and larger.
3. Strainer Screen: Stainless-steel, 20 mesh strainer, and perforated stainless-steel basket with 50 percent free area.
4. Tapped blowoff plug.
5. CWP Rating: 250-psig (1725-kPa) working steam pressure.

2.6 FLASH TANKS

A. Shop or factory fabricated of welded steel according to ASME Boiler and Pressure Vessel Code, for 150-psig (1035-kPa) rating; and bearing ASME label. Fabricate with tappings for low-pressure steam and condensate outlets, high-pressure condensate inlet, air vent, safety valve, and legs.

2.7 SAFETY VALVES

A. Brass Safety Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Armstrong International, Inc.
    b. Kunkle Valve; a Tyco International Ltd. Company.
    c. Spirax Sarco, Inc.
    d. Watts Water Technologies, Inc.
    e. Watson McDaniel

2. Disc Material: Forged copper alloy.
3. End Connections: Threaded inlet and outlet.
4. Spring: Fully enclosed steel spring with adjustable pressure range and positive shutoff, factory set and sealed.
5. Pressure Class: 250.
6. Drip-Pan Elbow: Cast iron and having threaded inlet and outlet with threads complying with ASME B1.20.1.
7. Size and Capacity: As required for equipment according to ASME Boiler and Pressure Vessel Code.

B. Cast-Iron Safety Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Armstrong International, Inc.
    b. Kunkle Valve; a Tyco International Ltd. Company.
    c. Spirax Sarco, Inc.
    d. Watts Water Technologies, Inc.
    e. Watson McDaniel

2. Disc Material: Forged copper alloy with bronze nozzle.
3. End Connections: Raised-face flanged inlet and threaded or flanged outlet connections.
4. Spring: Fully enclosed cadmium-plated steel spring with adjustable pressure range and positive shutoff, factory set and sealed.
5. Pressure Class: 250.

6. Drip-Pan Elbow: Cast iron and having threaded inlet, outlet, and drain, with threads complying with ASME B1.20.1.
7. Exhaust Head: Cast iron and having threaded inlet and drain, with threads complying with ASME B1.20.1.
8. Size and Capacity: As required for equipment according to ASME Boiler and Pressure Vessel Code.

2.8 PRESSURE-REDUCING VALVES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Armstrong International, Inc.
2. Hoffman Specialty; Division of ITT Industries.
3. Leslie Controls, Inc.
4. Spence Engineering Company, Inc.
5. Spirax Sarco, Inc.
6. Watson McDaniel

B. Size, Capacity, and Pressure Rating: Factory set for inlet and outlet pressures indicated.

C. Description: Pilot-actuated, diaphragm type, with adjustable pressure range and positive shutoff.

D. Body: Steel.

E. End Connections: Threaded connections for valves NPS 2 (DN 50) and smaller and flanged connections for valves NPS 2-1/2 (DN 65) and larger.

F. Trim: Hardened stainless steel.

G. Head and Seat: Replaceable, main head stem guide fitted with flushing and pressure-arresting device cover over pilot diaphragm.

H. Gaskets: Non-asbestos materials.

2.9 STEAM TRAPS

A. Inverted Bucket Traps:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Armstrong International, Inc.
b. Barnes & Jones, Inc.
c. Dunham-Bush, Inc.
d. Hoffman Specialty; Division of ITT Industries.
e. Spirax Sarco, Inc.

f. Sterling.
g. Watson Mc Daniel

2. Body and Cap: Cast iron.
3. End Connections: Threaded.
4. Head and Seat: Stainless steel.
5. Valve Retainer, Lever, and Guide Pin Assembly: Stainless steel.
6. Bucket: Brass or stainless steel.
7. Strainer: Integral stainless-steel inlet strainer within the trap body.
8. Air Vent: Stainless-steel thermostatic vent.
9. Pressure Rating: 250 psig (1725 kPa).

2.10 THERMOSTATIC AIR VENTS AND VACUUM BREAKERS

A. Thermostatic Air Vents:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Armstrong International, Inc.
b. Barnes & Jones, Inc.
c. Dunham-Bush, Inc.
d. Hoffman Specialty; Division of ITT Industries.
e. Spirax Sarco, Inc.
f. Sterling.
g. Watson McDaniel

2. Body: Cast iron, bronze or stainless steel.
3. End Connections: Threaded.
4. Float, Valve, and Seat: Stainless steel.
5. Thermostatic Element: Phosphor bronze bellows in a stainless-steel cage.
6. Pressure Rating: 300 psig (2068 kPa)
7. Maximum Temperature Rating: 350 deg F (177 deg C)

B. Vacuum Breakers:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Armstrong International, Inc.
b. Dunham-Bush, Inc.
c. Hoffman Specialty; Division of ITT Industries.
d. Johnson Corporation (The).
e. Spirax Sarco, Inc.
f. Watson McDaniel

2. Body: Cast iron, bronze, or stainless steel.

3. End Connections: Threaded.
4. Sealing Ball, Retainer, Spring, and Screen: Stainless steel.
5. O-ring Seal: EPR.
6. Pressure Rating: 300 psig (2068 kPa)
7. Maximum Temperature Rating: 350 deg F (177 deg C).

PART 3 - EXECUTION

3.1 LP STEAM PIPING APPLICATIONS (15PSI AND LOWER)

A. LP Steam Piping above grade: Schedule 40 steel pipe; Class 250, malleable-iron fittings; malleable-iron flanges and flange fittings; and threaded joints.

B. Condensate piping above grade, shall be the following:

1. Schedule 80 steel pipe; Class 250, malleable-iron fittings; malleable-iron flanges and flange fittings; and threaded joints.

3.2 MP AND HP STEAM PIPING APPLICATIONS (> 15PSI)

A. HP Steam Piping, Schedule 80, Type E, Grade B, steel pipe; Class 300 wrought-steel fittings, flanges, and flange fittings; and welded and flanged joints.

B. Condensate piping above grade, NPS 2 and smaller, shall be the following:

1. Schedule 80, Type S, Grade B, steel pipe; Class 300 cast-iron fittings; and threaded joints.

3.3 ANCILLARY PIPING APPLICATIONS

A. Air-Vent Piping:

1. Inlet: Same as service where installed.
2. Outlet: Type K (A) annealed-temper copper tubing with soldered or flared joints.

B. Vacuum-Breaker Piping: Outlet, same as service where installed.

C. Safety-Valve-Inlet and -Outlet Piping: Same materials and joining methods as for piping specified for the service in which safety valve is installed.

3.4 VALVE APPLICATIONS

A. Install shutoff duty valves at branch connections to steam supply mains, at steam supply connections to equipment, and at the outlet of steam traps.

B. Install safety valves on pressure-reducing stations and elsewhere as required by ASME Boiler and Pressure Vessel Code. Install safety-valve discharge piping, without valves, to nearest floor drain or as indicated on Drawings. Comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1, for installation requirements.

3.5 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Use indicated piping locations and arrangements if such were used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping free of sags and bends.

G. Install fittings for changes in direction and branch connections.

H. Install piping to allow application of insulation.

I. Select system components with pressure rating equal to or greater than system operating pressure.

J. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.

K. Install drains, consisting of a tee fitting, NPS 3/4 (DN 20) full port-ball valve, and short NPS 3/4 (DN 20) threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.

L. Install steam supply piping at a minimum uniform grade of 0.2 percent downward in direction of steam flow.

M. Install condensate return piping at a minimum uniform grade of 0.4 percent downward in direction of condensate flow.

N. Reduce pipe sizes using eccentric reducer fitting installed with level side down.

O. Install branch connections to mains using tee fittings in main pipe, with the branch connected to top of main pipe.

P. Install valves according to Division 23 Section "General-Duty Valves for HVAC Piping."

Q. Install unions in piping, NPS 2 (DN 50) and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.

R. Install flanges in piping, NPS 2-1/2 (DN 65) and larger, at final connections of equipment and elsewhere as indicated.

S. Install strainers on supply side of control valves, pressure-reducing valves, traps, and elsewhere as indicated. Install NPS 3/4 (DN 20) nipple and full port ball valve in blowdown connection of strainers NPS 2 (DN 50) and larger. Match size of strainer blowoff connection for strainers smaller than NPS 2 (DN 50).

T. Identify piping as specified in Division 23 Section "Identification for HVAC Piping and Equipment."

U. Install drip legs at low points and natural drainage points such as ends of mains, bottoms of risers, and ahead of pressure regulators, and control valves.

1. On straight runs with no natural drainage points, install drip legs at intervals not exceeding 300 feet (90 m).
2. Size drip legs same size as main. In steam mains NPS 6 (DN 150) and larger, drip leg size can be reduced, but to no less than NPS 4 (DN 100).

3.6 STEAM-TRAP INSTALLATION

A. Install steam traps in accessible locations as close as possible to connected equipment.

B. Install full-port ball valve, strainer, and union upstream from trap; install union, check valve, and full-port ball valve downstream from trap unless otherwise indicated.

3.7 PRESSURE-REDUCING VALVE INSTALLATION

A. Install pressure-reducing valves in accessible location for maintenance and inspection.

B. Install bypass piping around pressure-reducing valves, with globe valve equal in size to area of pressure-reducing valve seat ring, unless otherwise indicated.

C. Install gate valves on both sides of pressure-reducing valves.

D. Install unions or flanges on both sides of pressure-reducing valves having threaded- or flanged-end connections respectively.

E. Install pressure gages on low-pressure side of pressure-reducing valves after the bypass connection according to Division 23 Section "Meters and Gages for HVAC Piping."

F. Install strainers upstream for pressure-reducing valve.

G. Install safety valve downstream from pressure-reducing valve station.

3.8 HANGERS AND SUPPORTS

A. Install hangers and supports according to Division 23 Section "Hangers and Supports for HVAC Piping and Equipment." Comply with requirements below for maximum spacing.

B. Install the following pipe attachments:

1. Adjustable steel clevis hangers for individual horizontal piping less than 20 feet (6 m) long.
2. Adjustable roller hangers and spring hangers for individual horizontal piping 20 feet (6 m) or longer.
3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet (6 m) or longer, supported on a trapeze.
4. Spring hangers to support vertical runs.

C. Install hangers with the following maximum spacing and minimum rod sizes:

1. NPS 3/4 (DN 20): Maximum span, 9 feet (2.7 m); minimum rod size, 1/4 inch (6.4 mm).
2. NPS 1 (DN 25): Maximum span, 9 feet (2.7 m); minimum rod size, 1/4 inch (6.4 mm).
3. NPS 1-1/2 (DN 40): Maximum span, 12 feet (3.7 m); minimum rod size, 3/8 inch (10 mm).
4. NPS 2 (DN 50): Maximum span, 13 feet (4 m); minimum rod size, 3/8 inch (10 mm).
5. NPS 2-1/2 (DN 65): Maximum span, 14 feet (4.3 m); minimum rod size, 3/8 inch (10 mm).
6. NPS 3 (DN 80): Maximum span, 15 feet (4.6 m); minimum rod size, 3/8 inch (10 mm).
7. NPS 4 (DN 100): Maximum span, 17 feet (5.2 m); minimum rod size, 1/2 inch (13 mm).
8. NPS 6 (DN 150): Maximum span, 21 feet (6.4 m); minimum rod size, 1/2 inch (13 mm).
9. NPS 8 (DN 200): Maximum span, 24 feet (7.3 m); minimum rod size, 5/8 inch (16 mm).
10. NPS 10 (DN 250): Maximum span, 26 feet (8 m); minimum rod size, 3/4 inch (19 mm).
11. NPS 12 (DN 300): Maximum span, 30 feet (9.1 m); minimum rod size, 7/8 inch (22 mm).
12. NPS 14 (DN 350): Maximum span, 32 feet (9.8 m); minimum rod size, 1 inch (25 mm).

D. Install hangers for drawn-temper copper piping with the following maximum spacing and minimum rod sizes:

1. NPS 1/2 (DN 15): Maximum span, 4 feet (1.2 m); minimum rod size, 1/4 inch (6.4 mm).
2. NPS 3/4 (DN 20): Maximum span, 5 feet (1.5 m); minimum rod size, 1/4 inch (6.4 mm).
3. NPS 1 (DN 25): Maximum span, 6 feet (1.8 m); minimum rod size, 1/4 inch (6.4 mm).
4. NPS 1-1/2 (DN 40): Maximum span, 8 feet (2.4 m); minimum rod size, 3/8 inch (10 mm).
5. NPS 2 (DN 50): Maximum span, 8 feet (2.4 m); minimum rod size, 3/8 inch (10 mm).
6. NPS 2-1/2 (DN 65): Maximum span, 9 feet (2.7 m); minimum rod size, 3/8 inch (10 mm).
7. NPS 3 (DN 80): Maximum span, 10 feet (3 m); minimum rod size, 3/8 inch (10 mm).

E. Support vertical runs at roof, at each floor, and at 10-foot (3-m) intervals between floors.

F. Fiberglass Piping Hanger Spacing: Space hangers according to pipe manufacturer's written instructions for service conditions. Avoid point loading. Space and install hangers with the fewest practical rigid anchor points.

3.9 PIPE JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube ends. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12 (AWS D10.12M), using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.10 TERMINAL EQUIPMENT CONNECTIONS

A. Size for supply and return piping connections shall be the same as or larger than equipment connections.

B. Install traps and control valves in accessible locations close to connected equipment.

C. Install bypass piping with globe valve around control valve. If parallel control valves are installed, only one bypass is required.

D. Install vacuum breakers downstream from control valve, close to coil inlet connection.

E. Install a drip leg at coil outlet.

3.11 FIELD QUALITY CONTROL

A. Prepare steam and condensate piping according ASME B31.9, "Building Services Piping," and as follows:

1. Leave joints, including welds, uninsulated and exposed for examination during test.
2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
3. Flush system with clean water. Clean strainers.
4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.

B. Perform the following tests on steam and condensate piping:

1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.
2. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the working pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed 90 percent of specified minimum yield strength.
3. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.

C. Prepare written report of testing.

END OF SECTION 232213

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AIR HANDLER SCHEDULE

GENERAL INFORMATION					SUPPLY FAN				COOLING COIL										HEATING COIL								ELECTRICAL DATA				NOTES
TAG	SERVICE	MANUFACTURER	MODEL	SIZE	SUPPLY AIRFLOW	OUTSIDE AIRFLOW	ESP	MOTOR SIZE	ENTERING AIR		LEAVING AIR		COIL CAPACITIES (MBH)		FACE VELOCITY MAXIMUM	CHILLED WATER			PRESSURE DROP - FT/H20	MINIMUM FACE (SQFT)	STEAM PRESS (PSIG.)	PREHEAT			REHEAT							
									DB	WB	DB	WB	SENSIBLE	TOTAL		GPM	EWT	LWT				MBH	EAT	#/HR	MBH	EAT	#/HR	V/PH	FLA	MCA	MOCP	
AHU-1	FLEX SPACE	TRANE	CSAA	14	7300	3000	3.0	10 HP	75.1	65.5	55.0	54.5	161.8	247.5	550	41	42	54	3.86	12.5	10	256	36	269	237	65	250	480/3	14.65	18.15	30	ALL

NOTES:
1. PROVIDE TRANE, DAIKIN, OR CARRIER
2. PROVIDE WITH MERV 13 FILTER AND EXTRA SET OF FILTERS.
3. CONTRACTOR IS TO VERIFY IN SHOP DRAWING PROCESS THE SIZE OF UNIT, NEEDS TO FIT IN SPACE.

VAV BOX SCHEDULE - ELECTRIC REHEAT

GENERAL INFORMATION							ELECTRIC HEATING		NOTES
TAG	SERVICE	SYSTEM	MANUFACTURER/ MODEL	SIZE	MAX AIRFLOW	MINIMUM AIRFLOW	POWER		
							VOLTS	KW	
VVE-1	FLEX MEETING	AHU-1	TRANE/VCEF	8	800	175	480/3ϕ	2	ALL

NOTES:
1. PROVIDE TRANE, PRICE, OR TITUS.
2. DIV. 23 CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING CONTROL POWER TO BOX FROM NEAREST CONTROL CIRCUIT. REFER TO E-SHEETS.

DUAL DUCT TERMINAL UNITS

GENERAL INFORMATION			COOLING SECTION			HEATING SECTION			NOTES
TAG	SERVICE	MANUFACTURER/ MODEL	CFM RANGE	INLET DIA.	STATIC PRESS.	CFM RANGE	INLET DIA.	STATIC PRESS.	
DDB-1	MEZZ UPPER OFFICES	TRANE / VVD08	600-900	8	0.24	350-900	8	0.24	ALL
DDB-2	BELOW MEZZ WORK SPACE	TRANE / VVD08	600-900	8	0.24	350-900	8	024	ALL

NOTES:
1. PROVIDE TRANE, PRICE, OR TITUS.
2. DIV. 23 CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING CONTROL POWER TO BOX FROM NEAREST CONTROL CIRCUIT. REFER TO E-SHEETS.

AIR DISTRIBUTION SCHEDULE

TAG	*MANUFACTURER/MODEL		FACE SIZE	MOUNT	MATERIAL	FINISH	DAMPER	TYPE	NC	NOTES
S1	PRICE	RCD	10	DUCT	STEEL	WHITE	NONE	CONE	< 20	ALL
S2	PRICE	540	16X6	SIDEWALL	STEEL	WHITE	FACE	LOUVERED	< 20	ALL
S3	PRICE	HCD	18X6	DUCT	STEEL	WHITE	FACE	DRUM	<20	ALL
S4	PRICE	SPD	24X24	ACT	STEEL	WHITE	FACE	PLAQUE	< 20	ALL
										ALL
R1	PRICE	510	42X20	SIDEWALL	STEEL	WHITE	NONE	LOUVERED	< 20	ALL
R2	PRICE	510	18X14	SIDEWALL	STEEL	WHITE	NONE	LOUVERED	< 20	ALL
R3	PRICE	80	24x24	LAY-IN	STEEL	WHITE	NONE	EGG CRATE	< 20	ALL
R4	PRICE	80	48X48	SIDEWALL	STEEL	WHITE	NONE	LOUVERED	<20	ALL

NOTES:
1. PROVIDE PRICE, TITUS, OR NAILOR.
2. REFER TO PLANS FOR NECK SIZE.

LOUVER SCHEDULE

TAG	SERVICE	*MANUFACTURER/MODEL		CFM	DIMENSIONS (W X H)	MIN. FREE AREA (FT^2)	MAX STATIC PRESSURE	NOTES
L-1	AHU- OA	GREENHECK	ESD-435	7300	4'-0" X 3'-0"	6.0	0.15"	ALL

NOTES:
1. PROVIDE GREENHECK, JEDCO OR ZORO.
2. INTAKE LOUVER MUST COMPLY WITH TABLE 401.5 IN THE 2018 NORTH CAROLINA MECHANICAL CODE.

STEAM PRESSURE STATION (SPRV-15)

1

PRESSURE REDUCING VALVE SCHEDULE

TAG	*MANUFACTURER/MODEL	SIZE	INLET PRESSURE	REDUCED PRESSURE	STEAM FLOW	NOTES
V1	SARCO	25P	1"	90 PSI	20 PSI	493 LB/HR	ALL
V2	SARCO	25P	1"	90 PSI	20 PSI	493 LB/HR	ALL

PROVIDE SPIRAX-SARCO, SPENCE, ARMSTRONG, HOFFMAN SPECIALTY AND LESLIE
NOTES:
1. INSTALL NOISE ATTENUATION DEVICE WHERE NOISE EXCEEDS 85dB.
2. INSTALL VALVE BODIES CONSTRUCTED OF CAST STEEL.
3. PROVIDE INSULATING COVERS.

SAFETY RELIEF VALVE SCHEDULE

TAG	*MANUFACTURER/MODEL	SIZE	SET PRESSURE	RELIEF CAPACITY	NOTES
V3	SARCO	6000-H-2	1.5"MPTX2"FPT	25 PSI	800 LB/HR	ALL

*PROVIDE SPIRAX-SARCO, SPENCE, ARMSTRONG, HOFFMAN SPECIALTY AND LESLIE
NOTES:
1. ROUTE 3" SAFETY RELIEF PIPING TO BUILDING EXTERIOR.
2. RELIEF CAPACITY SHALL BE GREATER THAN MAXIMUM CAPACITY OF SUPPLIED STEAM PRESSURE REDUCING VALVES. SEE STEAM PRESSURE REDUCING VALVE SCHEDULE.

NC STATE UNIVERSITY
Environmental Health & Public Safety
Radiation Safety
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March 28, 2025

Mr. Victor Bird, PE
Sigma Engineered Solutions PC
5909 Falls of Neuse Road, Suite 101
Raleigh, NC 27609

RE: State Construction Office Request for Additional Information; 23-26253-01A NCSU FD

Dear Sir -

We are replying to a question received from your office via email on 3/10/2025 regarding potentially hazardous exhaust from a proposed project under review (REF: 23-26253-01A NCSU FD). The question/comment states, "The project should verify with a professional knowledgeable about the process (preferably the NCSU EH&S Office) that with the snorkel exhaust not functioning, the limits of 510.2 of the NCMC are not exceeded."

Under NCMC 510.2 'Where required' it states "Exception: Laboratories, as defined in Section 510.1, except where the concentrations listed in Item 1 are exceeded -or- a vapor, gas, fume, mist, or dust with a health hazard rating of 1,2,3 or 4 is present in concentrations exceeding 1 percent of the median lethal concentration of the substance for acute inhalation toxicity."

The answer to this question is in three parts:

1. **Processes with minimal airborne hazards** - The proposed initial processes to be undertaken in this space are in the area of textile processing (sewing, embroidery, fabric printing, seam sealing, yarn spinning), 3-D printing, heat pressing fabrics and heat transfer of sublimation inks, and laser cutting. The available SDS for the various inks and 3-D filament materials to be used all have an NFPA health hazard rating of 1 or less. The only higher inhalation hazard stems from the proposed use of solder, with an NFPA health hazard rating of 2, but the risk from this use will be managed as discussed below.

2. **Engineered Controls** - Both a fume home and snorkel exhaust will be available in this space to control any hazardous airborne point emissions. These controls will have required periodic surveillance and QA testing. If either ventilation exhaust mode becomes inoperable or otherwise unavailable, then any potentially hazardous processes that require the use of these controls would be suspended.

3. **Safety Plan Review** - All proposed and future R&D activities to be performed in this space are required to be reviewed via the NCSU EHS laboratory Safety Plan process. This process reviews all laboratory hazards and requires that appropriate controls and SOP's be available to manage them. If an inhalation hazard is to be present (e.g. during soldering processes), then fume hoods or exhaust snorkels would be required to be available, operable, and used.

Based on this, we have determined that the ventilation controls as proposed for this project are consistent with the NCSU Laboratory Ventilation Management Program and are adequate to manage and mitigate the envisioned airborne hazards.

Please let me know if you require any additional information.

Sincerely,

Scott Lassell
Interim Research Safety Manager
Radiation Safety Officer

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CONSULTANTS

Structural

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MEP Engineer

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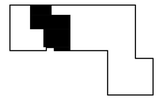
KEY PLAN



SEALS

DocuSigned by:
7A8BE2781E4B42A...
NORTH CAROLINA REGISTERED SEAL 034319 ENGINEER BRENT HAINES
6/13/2025

BID DOCUMENTS
04.25.2025

PROJECT

NCSU-TEXTILES COMPLEX-FLEX FACTORY RENOVATIONS

1020 MAIN CAMPUS DRIVE
RALEIGH, NC 27606

SCO ID# 23-26253-01A
NCSU PROJECT ID: 202220031
FACILITY ID: 700

REVISIONS

No.	Description	Date
1	ADDENDUM 001	6/13/25

PROJECT DATA

DATE: 04.25.2025
DRAWN:
CHECKED:
PROJECT NO: 2021_0140
PRINTING: BID DOCUMENTS

SHEET DATA

MECHANICAL SCHEDULES

SHEET NO.

M002

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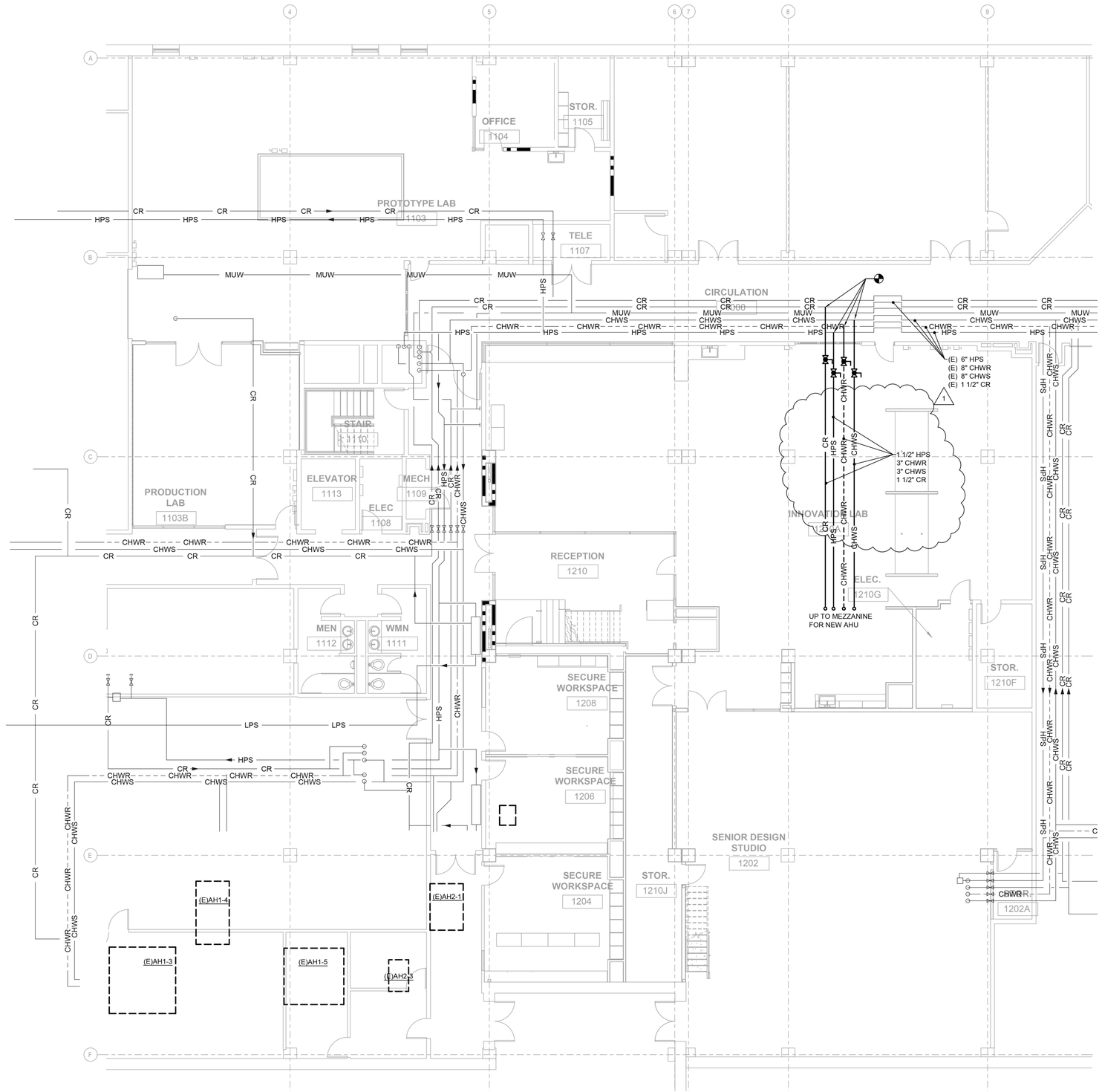

1 MECHANICAL PIPING - NEW WORK
1/8" = 1'-0"

PARTITION LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- EXISTING WALL TO BE DEMOLISHED
- UNRATED WALL
- PARTITION TYPE (##)
- 1-HOUR FIRE BARRIER
- 2-HOUR FIRE BARRIER

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KEY PLAN

SEALS

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7A8CEE781E4B42C...
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034319
ENGINEER
BRENT HANKS
6/13/2025

BID DOCUMENTS
04.25.2025

PROJECT

NCSU-TEXTILES COMPLEX-FLEX FACTORY RENOVATIONS

1020 MAIN CAMPUS DRIVE
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PROJECT DATA

DATE: 04.25.2025
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SHEET DATA

MECHANICAL NEW WORK PLAN PIPING

SHEET NO.

M210

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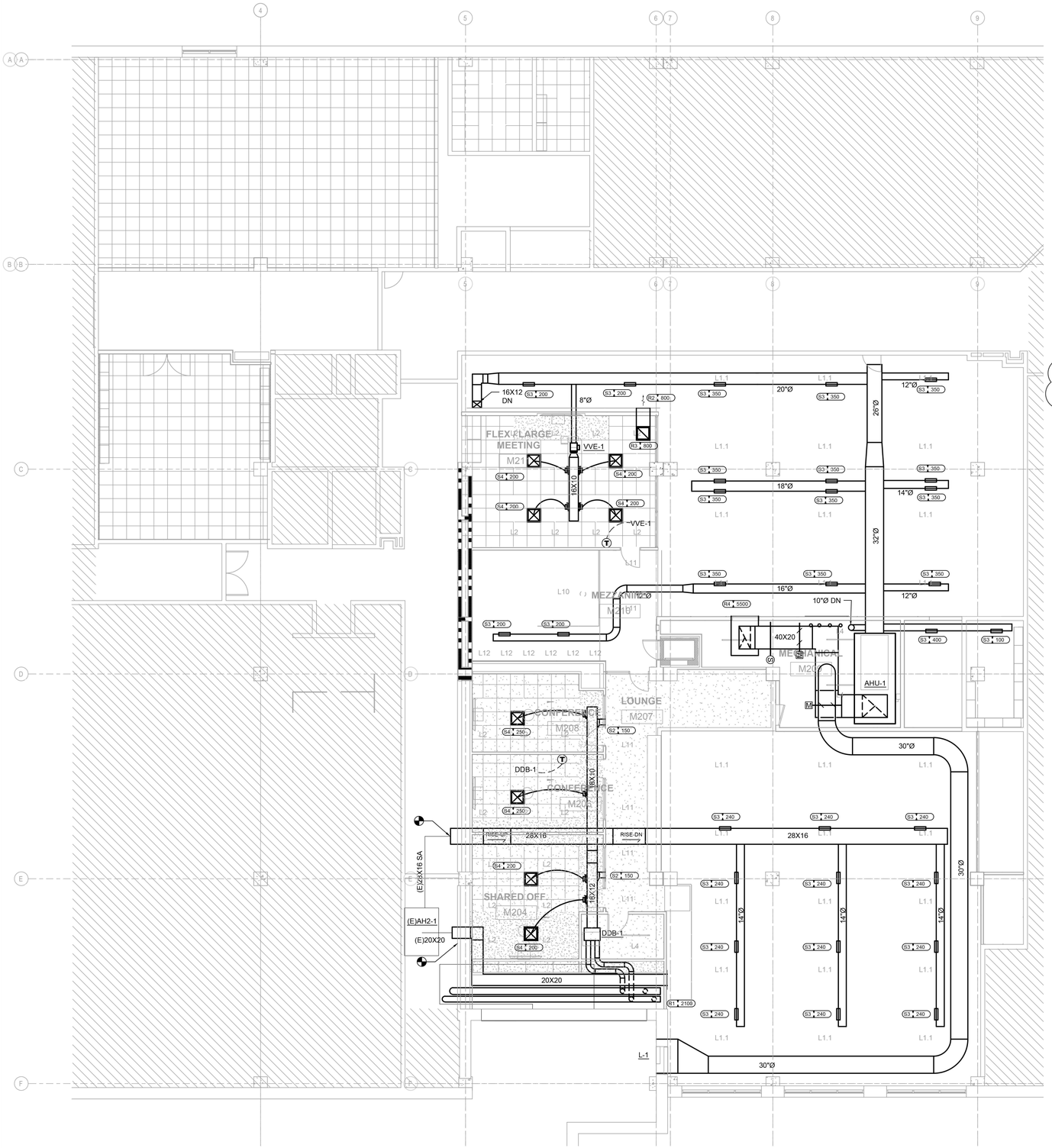
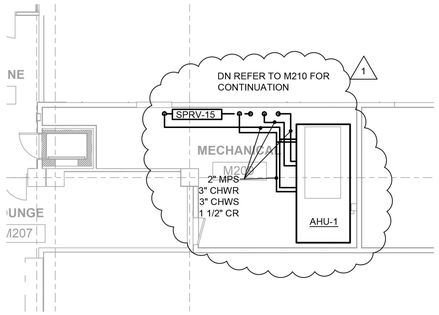
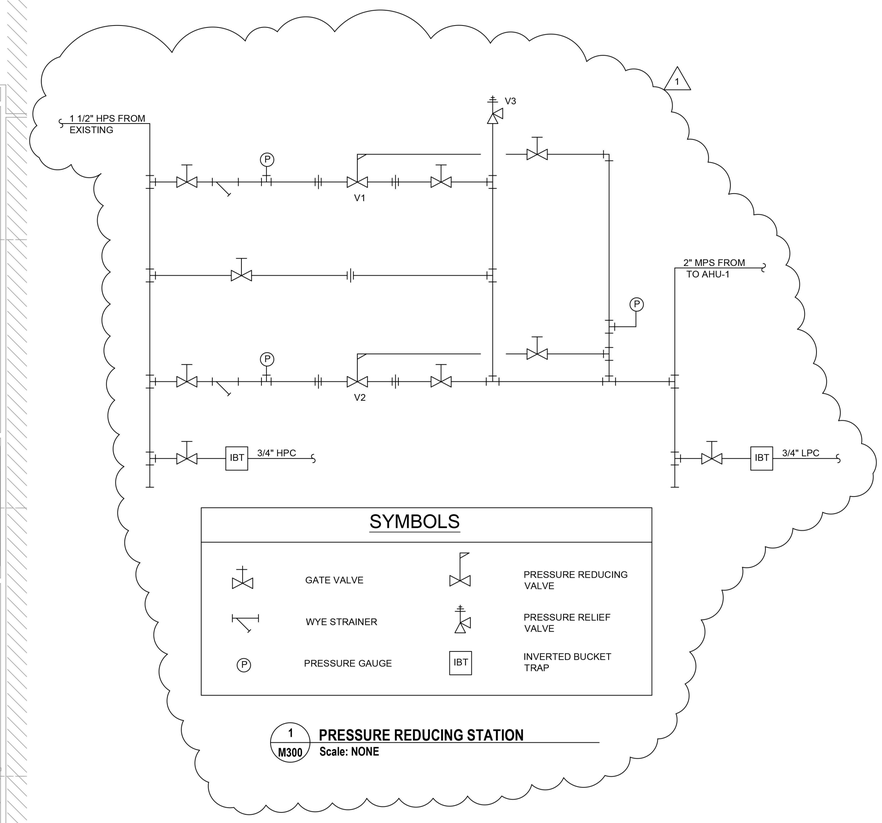


1 MECHANICAL DUCTWORK - NEW WORK - MEZZANINE
1/8" = 1'-0"



2 MECHANICAL PIPING - NEW WORK - MEZZANINE
1/8" = 1'-0"



1 M300 **PRESSURE REDUCING STATION**
Scale: NONE

PARTITION LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- EXISTING WALL TO BE DEMOLISHED
- UNRATED WALL
- PARTITION TYPE (##)
- 1-HOUR FIRE BARRIER
- 2-HOUR FIRE BARRIER

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KEY PLAN

SEALS

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PROFESSIONAL ENGINEER
781E4B42...
SEAL 034319
ENGINEER BRENT HANKS
6/13/2025

BID DOCUMENTS
04.25.2025

PROJECT

NCSU-TEXTILES COMPLEX-FLEX FACTORY RENOVATIONS

1020 MAIN CAMPUS DRIVE
RALEIGH, NC 27606

SCO ID# 23-26253-01A
NCSU PROJECT ID: 202220031
FACILITY ID: 700

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SHEET DATA

MEZZANINE MECHANICAL DUCTWORK

SHEET NO.

M300

1 FLOOR PLAN - ENTRY LEVEL AREA 1
1/8" = 1'-0"

GENERAL NOTES:

1. REFER TO DRAWING E001 FOR ELECTRICAL SYMBOLS, ABBREVIATIONS, AND ADDITIONAL GENERAL NOTES.
2. HATCH AREAS NOT IN SCOPE OF WORK.

KEYED NOTES:

1. EXISTING FIRE ALARM SPEAKER AND AMPERIFER CABINETS TO REMAIN AND BE REUSED.
2. NEW FIRE ALARM AMPLIFIER CABINET AND AUDIO TRANSFORMER CABINET.
3. REFER TO DRAWING E109 FOR LOCATION OF PANEL 2EP.

MODIFIED PANEL "2EL"

PANEL TYPE: NEHB
BUS SIZE: 225A
VOLTAGE: 480Y/277V
MCB or MLO: MLO
MOUNTING: SURFACE
MINIMUM AIC: 10,000

CKT	LOAD SERVED	TRIP	POLE	WIRE	GND	CONDUIT	kVA	kVA PER PHASE A	kVA PER PHASE B	kVA PER PHASE C	kVA	CONDUIT	GND	WIRE	POLE	TRIP	LOAD SERVED	CKT
1	LIGHTS	20	1				4.20	7.56			3.36				1	20	LIGHTS	2
3	LIGHTS	20	1				3.72		7.44		3.72				1	20	LIGHTS	4
5	LIGHTS	20	1				3.48			6.48	3.00				1	20	LIGHTS	6
7	LIGHTS	20	1				3.48	3.48							1	20	SPARE	8
9	LIGHTS	20	1				3.24		3.24						1	20	SPACE	10
11	SPARE	20	1							0.00							SPARE	12
13	SPARE							0.00									SPACE	14
15	SPACE								0.00								SPACE	16
17	SPACE									0.00							SPACE	18
19	SPACE							0.00									SPACE	20
21	SPACE								0.00								SPACE	22
23	SPACE									0.00							SPACE	24
25	SPACE							0.00									SPACE	26
27	SPACE								0.00								SPACE	28
29	SPACE									0.00							SPACE	30
31	SPACE							0.00									SPACE	32
33	SPACE								0.00								SPACE	34
35	SPACE									0.00							SPACE	36
37	SPACE							2.88			2.88							38
39	SPACE								1.08		1.08				3	15	PANEL 2EP	40
41	SPACE									2.88	2.88							42

TOTALS: 13.92 | 11.76 | 9.36

	CONNECTED LOAD (KVA)	DF	DEMAND LOAD (KVA)
LIGHTS	28.20	125%	35.25
FIRST 10K RECEPTS		100%	
REMAINDER RECEPT		50%	
LARGEST MOTOR		125%	
MOTOR		100%	
ELEVATOR		100%	
KITCHEN		65%	
EVCS		125%	
MISC	6.84	100%	6.84
TOTAL (KVA)	35.04		42.09
TOTAL AMPS	42		51

NOTES
L-PROVIDE WITH LOCK OUT CLIP
PL-PROVIDE WITH PADLOCKABLE BREAKER
G-GFCI PROTECTED
A-AFCI PROTECTED
GF-GFPE PROTECTED
S- SHUNT TRIP
~-PHASE/NEUTRAL

EXISTING PANEL "2EP"

PANEL TYPE: NQOD
BUS SIZE: 100A
VOLTAGE: 208/120V
MCB or MLO: 40A
MOUNTING: SURFACE
MINIMUM AIC: 10,000

CKT	LOAD SERVED	TRIP	POLE	WIRE	GND	CONDUIT	kVA	kVA PER PHASE A	kVA PER PHASE B	kVA PER PHASE C	kVA	CONDUIT	GND	WIRE	POLE	TRIP	LOAD SERVED	CKT
1	TELE RACK 4TH FLOOR	20	1				0.54	1.08			0.54				1	20	TELE RACK 3Z	2
3	TELE RACK 2TH FLOOR	20	1				0.54		1.08		0.54				1	20	TELE RACK 3E	4
5	TELE RACK 3TH FLOOR	20	1				0.54			1.08	0.54				1	20	TELE RACK 3C	6
7	SPARE	20	1					0.60			0.60				1	20	FIRE ALARM TEST ROOM	8
9	SPARE	20	1						0.00								SPACE	10
11	FANAC PS/8	20	1				0.90			1.80	0.90				1	20	FANAC PS 4,5,6,7	12
13	SPACE							0.60			0.60				1	20	FA/AMPLIFIER/EXPANDER	14
15	SPACE								0.00								SPACE	16
17	SPACE									0.00							SPACE	18
19	SPACE							0.00									SPACE	20
21	SPACE								0.00								SPACE	22
23	SPACE									0.00							SPACE	24
25	SPACE							0.00									SPACE	26
27	SPACE								0.00								SPACE	28
29	SPACE									0.00							SPACE	30

TOTALS: 2.28 | 1.08 | 2.88

	CONNECTED LOAD (KVA)	DF	DEMAND LOAD (KVA)
EXISTING LOAD			
FIRST 10K RECEPTS			
REMAINDER RECEPT			
LARGEST MOTOR			
MOTOR			
ELEVATOR			
KITCHEN			
EVCS			
MISC			
TOTAL (KVA)	0.00		0.00
TOTAL AMPS	0		0

NOTES
L-PROVIDE WITH LOCK OUT CLIP
PL-PROVIDE WITH PADLOCKABLE BREAKER
G-GFCI PROTECTED
A-AFCI PROTECTED
GF-GFPE PROTECTED
S- SHUNT TRIP
~-PHASE/NEUTRAL

MODIFIED PANEL "2EP"

PANEL TYPE: NQOD
BUS SIZE: 100A
VOLTAGE: 208/120V
MCB or MLO: 40A
MOUNTING: SURFACE
MINIMUM AIC: 10,000

CKT	LOAD SERVED	TRIP	POLE	WIRE	GND	CONDUIT	kVA	kVA PER PHASE A	kVA PER PHASE B	kVA PER PHASE C	kVA	CONDUIT	GND	WIRE	POLE	TRIP	LOAD SERVED	CKT
1	TELE RACK 4TH FLOOR	20	1				0.54	1.08			0.54				1	20	TELE RACK 3Z	2
3	TELE RACK 2TH FLOOR	20	1				0.54		1.08		0.54				1	20	TELE RACK 3E	4
5	TELE RACK 3TH FLOOR	20	1				0.54			1.08	0.54				1	20	TELE RACK 3C	6
7	SPARE	20	1					0.60			0.60				1	20	FIRE ALARM TEST ROOM	8
9	SPARE	20	1						0.00								SPACE	10
11	FANAC PS/8	20L	1				0.90			1.80	0.90				1	20L	FANAC PS 4,5,6,7	12
13	**APPLIFIER AND AUDIO TRANFORMER**	**20AL**	**1**	**#10**	**#10**	**3/4"**	**0.60**	1.20			0.60				1	20L	F/A/AMPLIFIER/EXPANDER	14
15	SPACE								0.00								SPACE	16
17	SPACE									0.00							SPACE	18
19	SPACE							0.00									SPACE	20
21	SPACE								0.00								SPACE	22
23	SPACE									0.00							SPACE	24
25	SPACE							0.00									SPACE	26
27	SPACE								0.00								SPACE	28
29	SPACE									0.00							SPACE	30

TOTALS: 2.88 | 1.08 | 2.88

	CONNECTED LOAD (KVA)	DF	DEMAND LOAD (KVA)
EXISTING LOAD		125%	
FIRST 10K RECEPTS		100%	
REMAINDER RECEPT		50%	
LARGEST MOTOR		125%	
MOTOR		100%	
ELEVATOR		100%	
KITCHEN		65%	
EVCS		125%	
MISC	6.84	100%	6.84
TOTAL (KVA)	6.84		6.84
TOTAL AMPS	19		19

NOTES
L-PROVIDE WITH LOCK OUT CLIP
PL-PROVIDE WITH PADLOCKABLE BREAKER
G-GFCI PROTECTED
A-AFCI PROTECTED
GF-GFPE PROTECTED
S- SHUNT TRIP
~-PHASE/NEUTRAL
N-NEW CIRCUIT BREAKER

RATED WALL LEGEND

2 HOUR RATED WALL

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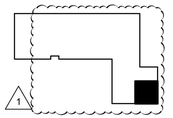
KEY PLAN



SEALS

BID DOCUMENTS
04.25.2025

PROJECT

NCSU-TEXTILES COMPLEX-FLEX FACTORY RENOVATIONS

1020 MAIN CAMPUS DRIVE
RALEIGH, NC 27606

SCO ID# 23-26253-01A
NCSU PROJECT ID: 202220031
FACILITY ID: 700

REVISIONS

No.	Description	Date
1	ADDENDUM 001	6/13/25

PROJECT DATA

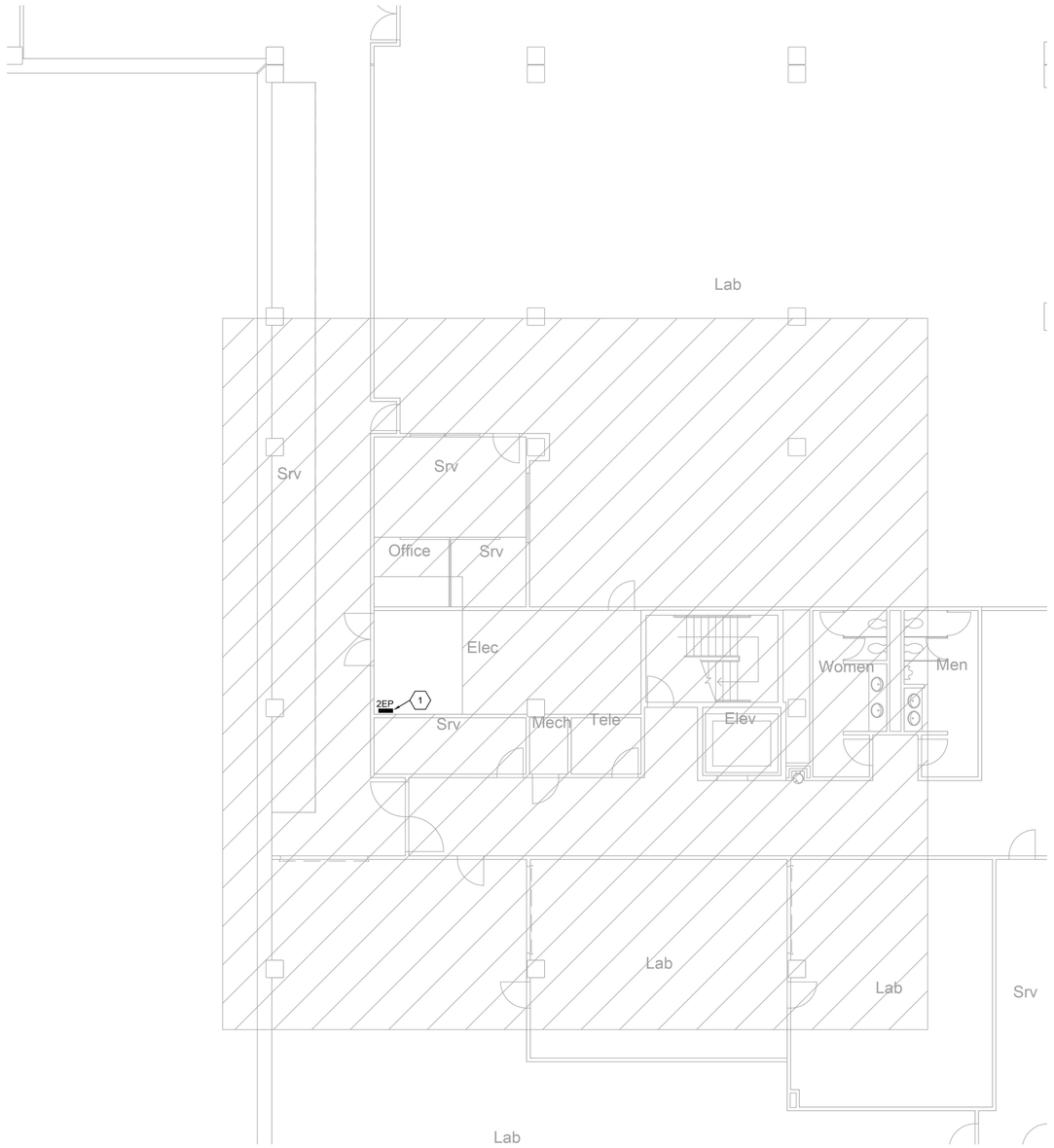
DATE: 04.25.2025
DRAWN: MP
CHECKED: RDA
PROJECT NO: 2021_0140
PRINTING: BID DOCUMENTS

SHEET DATA

ELECTRICAL FLOOR PLAN - ENTRY LEVEL SEGMENT 4

SHEET NO.

E108



1 FLOOR PLAN - ENTRY LEVEL AREA 1
1/8" = 1'-0"

GENERAL NOTES:

1. REFER TO DRAWING E001 FOR ELECTRICAL SYMBOLS, ABBREVIATIONS, AND ADDITIONAL GENERAL NOTES.
2. HATCH AREAS NOT IN SCOPE OF WORK.

KEYED NOTES:

1 EXISTING EMERGENCY PANELBOARD TO REMAIN AND BE MODIFIED. REFER TO PANELBOARD SCHEDULE FOR ADDITIONAL INFORMATION.

RATED WALL LEGEND
2 HOUR RATED WALL

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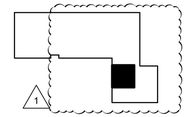
KEY PLAN



SEALS

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04.25.2025

PROJECT

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1020 MAIN CAMPUS DRIVE
RALEIGH, NC 27606

SCO ID# 23-26253-01A
NCSU PROJECT ID: 202220031
FACILITY ID: 700

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No.	Description	Date
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PROJECT DATA

DATE: 04.25.2025
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PROJECT NO: 2021_0140
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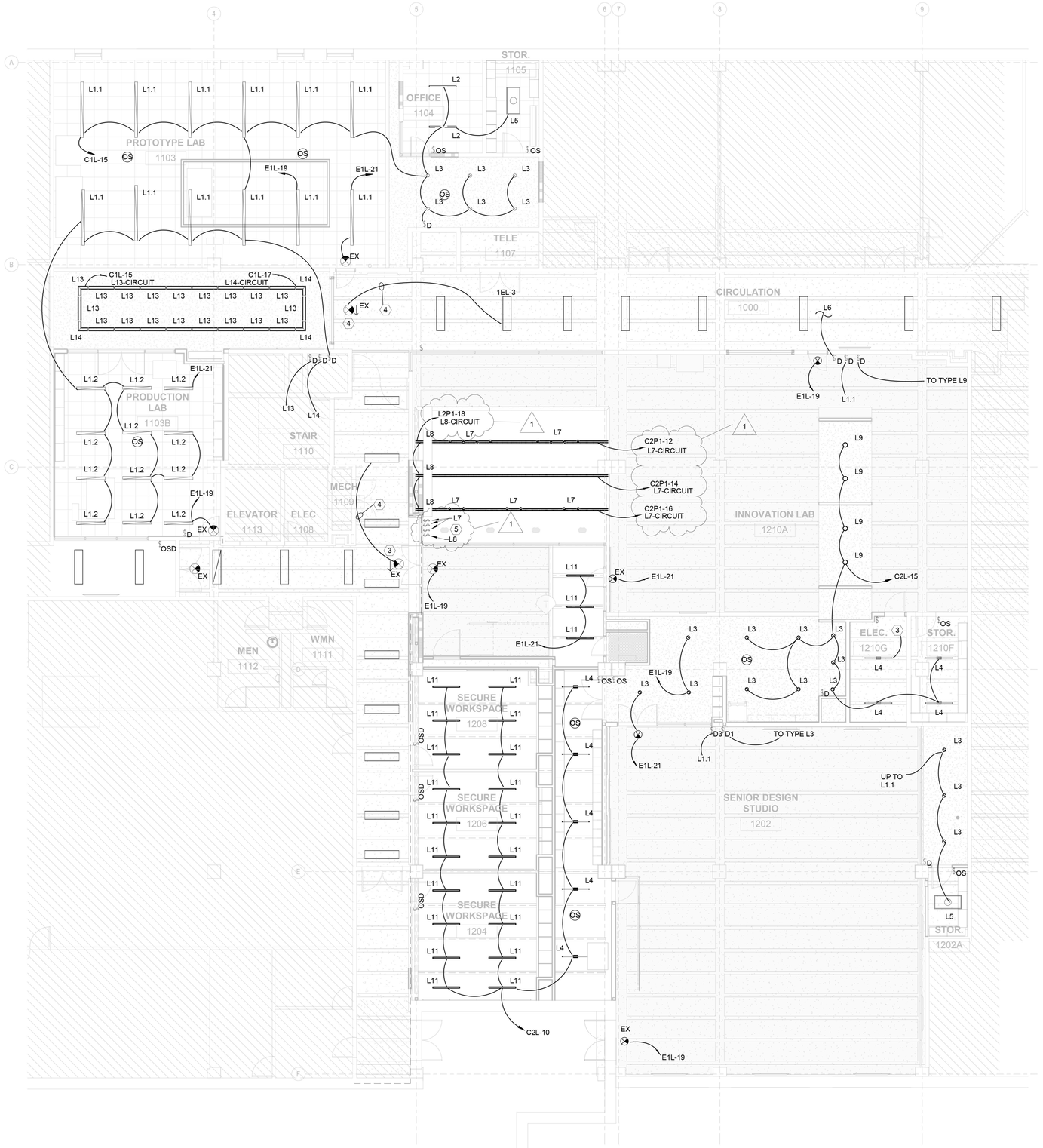
SHEET DATA

ELECTRICAL FLOOR PLAN - COURTYARD LEVEL SEGMENT 4

SHEET NO.

E109



1 ELECTRICAL LIGHTING PLAN - COURTYARD LEVEL
1/8" = 1'-0"

GENERAL NOTES:

1. REFERENCE SHEET E001 FOR LEGEND, SCHEDULES, ABBREVIATIONS AND ADDITIONAL GENERAL NOTES.

KEYED NOTES:

1. NEW EXIT SIGN RECONNECT / REWORK CIRCUIT FROM DEMOLITION NOTES TO NEW FIXTURE.
2. PROVIDE EMERGENCY LIGHT CIRCUIT TO FIXTURE SHOWN IN DRAWING E202.
3. NEW EXIT LIGHT LOCATION FROM DEMOLITION. EXTEND EXISTING CIRCUIT FROM DEMOLITION TO NEW EXIT LIGHT.
4. PROVIDE 2#12 AWG, 1#12 GND, IN 3/4" CONDUIT FORM EXISTING EMERGENCY LIGHT TO NEW EXIT SIGN LOCATION.
5. SWITCH FOR TRACK AND TYPE L8 LIGHTS. LABEL SWITCH FOR FIXTURE IT CONTROLS. EXAMPLE "CENTER TRACK".

PARTITION LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- EXISTING WALL TO BE DEMOLISHED
- UNRATED WALL
- #.# PARTITION TYPE
- 1-HOUR FIRE BARRIER
- 2-HOUR FIRE BARRIER

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KEY PLAN

SEALS

NORTH CAROLINA PROFESSIONAL SEAL 19658 ENGINEER REGINALD D. ADAMS

BID DOCUMENTS
04.25.2025

PROJECT

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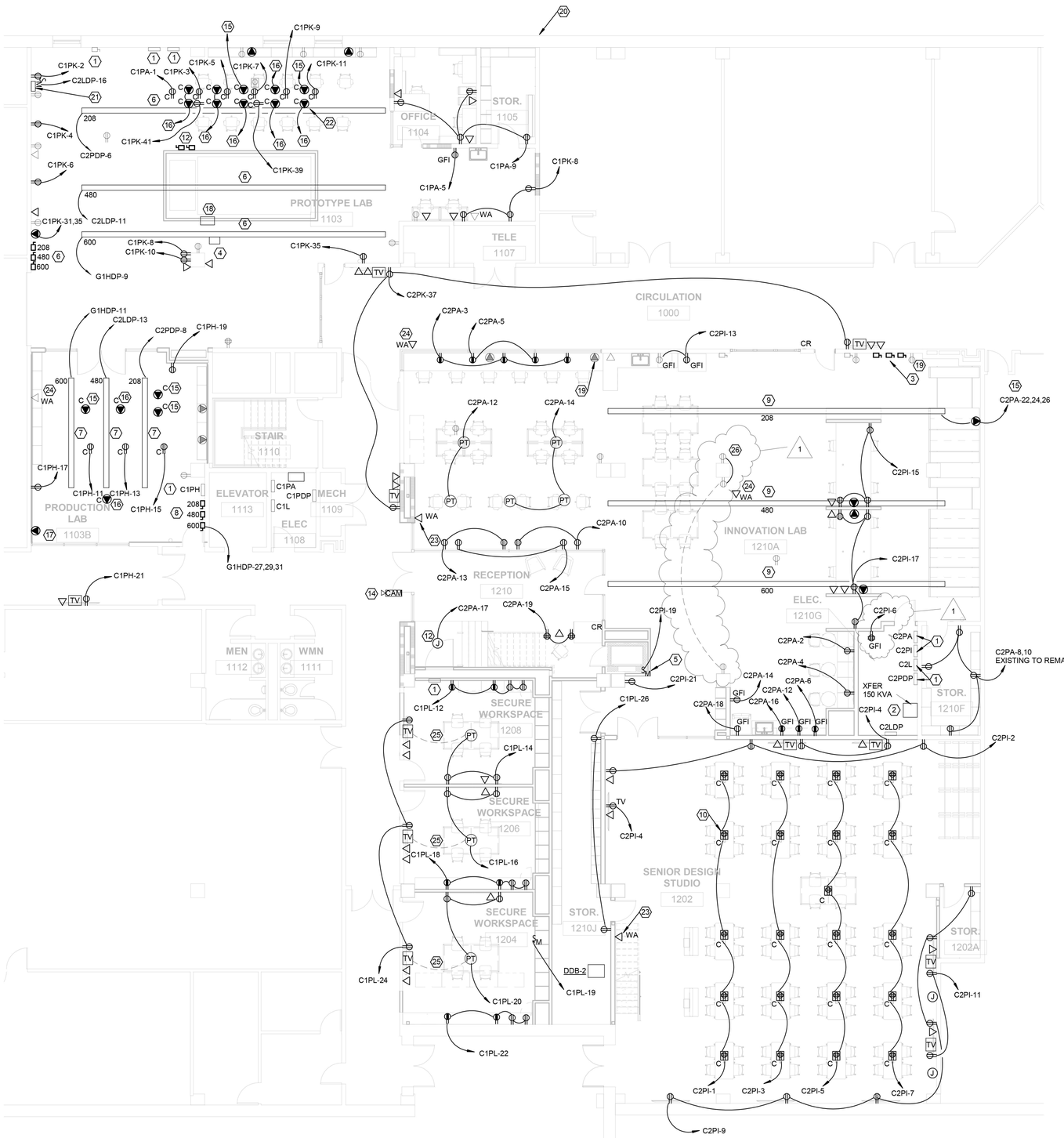
SHEET DATA

ELECTRICAL LIGHTING NEW WORK PLAN

SHEET NO.

E200



1 ELECTRICAL POWER NEW WORK PLAN - COURTYARD LEVEL
1/8" = 1'-0"

GENERAL NOTES:

1. REFERENCE SHEET E001 FOR LEGEND, SCHEDULES, ABBREVIATIONS AND ADDITIONAL GENERAL NOTES.
2. ANY TELECOM WORK IS TO BE COORDINATED WITH NCSU COMTECH.

KEYED NOTES:

1. EXISTING PANELBOARD TO REMAIN AND BE MODIFIED. REFER TO PANELBOARD SCHEDULE FOR MODIFICATION INFORMATION.
2. EXISTING TRANSFORMER TO REMAIN.
3. EXISTING BUSDUCT DISCONNECT SWITCHES TO REMAIN.
4. EXISTING EQUIPMENT EXHAUST FAN TO BE RELOCATED.
5. MOTOR RATED SWITCH FOR WHEELCHAIR LIFT.
6. RELOCATED BUSDUCT AND DISCONNECT SWITCHES FROM DEMOLITION KEYED NOTE 11.
7. RELOCATED BUSDUCT FROM DEMOLITION KEYED NOTE 12.
8. NEW 208, 480 AND 600 VOLT DISCONNECT SWITCH FOR RELOCATED BUSDUCT.
9. EXISTING BUSDUCT REMAINING FROM DEMOLITION KEYED NOTE 10.
10. CEILING HUNG 120V DUPLEX RECEPTACLE. REFER TO DETAIL 4/E501 FOR ADDITIONAL MOUNTING INFORMATION. TYPICAL ALL 120V CEILING MOUNTED RECEPTACLES.
11. LOCATION AND TYPE OF WIRELESS BY NCSU COMTECH. CONTRACTOR TO PROVIDE STANDARD DATA OUTLET. ALL WIRELESS LOCATIONS ARE TO BE COORDINATED WITH NCSU COMTECH BEFORE STARTING ANY ROUGH-IN WORK.
12. EXISTING EQUIPMENT DISCONNECT SWITCH AND CIRCUIT TO REMAIN. DISCONNECT AND CIRCUIT TO BE PROTECTED DURING CONSTRUCTION.
13. JUNCTION BOX FOR DESK LIGHT. COORDINATE CONNECTION POINT WITH DESK INSTALLATION BEFORE STARTING ANY ROUGH-IN WORK.
14. LOCATION OF CAMERA FROM DEMOLITION NOTE 26 SHEET E201. COORDINATE RELOCATION AND RECONNECTION TO SECURITY SYSTEM WITH SECURITY CONTRACTOR.
15. PROVIDE 208V 20 AMP 3 POLE BUSDUCT DISCONNECT SWITCH AND CONDUIT TO 208V BUSDUCT. PROVIDE 3#10 AWG, 1#10 GND IN 3/4" CONDUIT TO 20AMP TWIST LOCK PLUG. COORDINATE PLUG CONFIGURATION WITH EQUIPMENT SHOP DRAWING.
16. PROVIDE 208V 20 AMP 1 PHASE BUSDUCT DISCONNECT SWITCH AND CONDUIT TO 208V BUSDUCT. PROVIDE 2#10 AWG, 1#10 GND IN 3/4" CONDUIT TO 20AMP TWIST LOCK PLUG. COORDINATE PLUG CONFIGURATION WITH EQUIPMENT SHOP DRAWING.
17. PROVIDE 480V 40 AMP 3 PHASE BUSDUCT DISCONNECT SWITCH AND CONDUIT TO 480V BUSDUCT. PROVIDE 3#8 AWG, 1#10 GND IN 3/4" CONDUIT TO 20AMP TWIST LOCK PLUG. COORDINATE PLUG CONFIGURATION WITH EQUIPMENT SHOP DRAWING.
18. EXISTING POWER FAN DISCONNECT AND CIRCUIT TO BE REWORKED TO ABOVE. COORDINATE RELOCATION WITH DIVISION 23.
19. EXISTING RECEPTACLE FEED FROM BUSS DUCT TO REMAIN.
20. EXISTING RECEPTACLE AND DATA IN THESE ROOMS ARE EXISTING TO REMAIN.
21. NEW VFD FOR FAN F1C-B. COORDINATE LOCATION AND CONNECTION WITH DIVISION 23. REFER TO DRAWING E107 FOR FAN LOCATION.
22. CEILING HUNG SPECIAL TYPE RECEPTACLE. REFER TO DETAIL 4/E501 FOR ADDITIONAL INFORMATION. TYPICAL ALL SPECIAL CEILING HUNG RECEPTACLES.
23. NEW WIRELESS DATA LOCATION. COORDINATE CONNECTION WITH NCSU COMTECH DEPARTMENT.
24. EXISTING WIRELESS LOCATION TO BE RECONNECTED. COORDINATE RECONNECTION WITH NCSU COMTECH DEPARTMENT.
25. PROVIDE 1" CONDUIT FROM POKE THRU TO TV OUTLET IN WALL.
26. PROVIDE 2#12, 1#12 GND IN 3/4" CONDUIT TO EXISTING RECEPTACLE.

PARTITION LEGEND

- EXISTING CONSTRUCTION TO REMAIN
- EXISTING WALL TO BE DEMOLISHED
- UNRATED WALL
- #.# PARTITION TYPE
- 1-HOUR FIRE BARRIER
- 2-HOUR FIRE BARRIER

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KEY PLAN

SEALS

NORTH CAROLINA PROFESSIONAL SEAL 19658 ENGINEER REGINALD D. ADAMS

BID DOCUMENTS
04.25.2025

PROJECT
NCSU-TEXTILES COMPLEX-FLEX FACTORY RENOVATIONS
1020 MAIN CAMPUS DRIVE
RALEIGH, NC 27606

SCO ID# 23-26253-01A
NCSU PROJECT ID: 202220031
FACILITY ID: 700

REVISIONS

No.	Description	Date
1	ADDENDUM 001	6/13/25

PROJECT DATA

DATE: 04.25.2025
DRAWN: MP
CHECKED: RDA
PROJECT NO: 2021_0140
PRINTING: BID DOCUMENTS

SHEET DATA
ELECTRICAL POWER NEW WORK PLAN

SHEET NO.
E201

EXISTING PANEL "C1PJ"

PANEL TYPE: NQOD
BUS SIZE: 400A
VOLTAGE: 208Y/120
MCB or MLO:
MOUNTING: SURFACE
MINIMUM AIC: 10,000

CKT	LOAD SERVED	TRIP	POLE	WIRE	GND	CONDUIT	kVA	kVA PER PHASE A	B	C	kVA	CONDUIT	GND	WIRE	POLE	TRIP	LOAD SERVED	CKT
1	RECEPTACLE	20	1				0.36	0.90			0.54				1	20	RECEPTACLE	2
3	RECEPTACLE	20	1				0.36		0.90		0.54				1	20	RECEPTACLE	4
5	RECEPTACLE	20	1				0.36			1.08	0.72				1	20	RECEPTACLE TELCOM	6
7	PROATIX	50	2				3.00	3.36			0.36				1	20	RECEPTACLE	8
9							3.00		3.00						1	20	SPARE	10
11	SPACE									0.00						20	SPACE	12
13								0.00										14
15	SPARE	20	2						0.00						3	20	SPARE	16
17										0.00								18
19								0.00							1	20	SPARE	20
21	SPARE	20	2						0.00						1	20	SPARE	22
23										0.00					1	20	SPARE	24
25	A/C TELL COMM ROOM	20	1				1.20	2.20			1.00							26
27	TELECOM RECEPTACLES	20	1				0.54		1.54		1.00				3	20	208 V RECEPTACLE 1102	28
29										1.00	1.00							30
31	SPARE	50	3					0.60			0.60				2	15	208V 1PH RECEPTACLE BELOW EXHAUST HOOD OFF	32
33									0.60		0.60							34
35										0.00								36
37							0.36			0.36					1	20	RECEPTACLES RM 1102	38
39								0.36			0.36				1	20	RECEPTACLES RM 1102	40
41									0.36	0.36					1	20	RECEPTACLES RM 1102	42

TOTAL'S: 7.42 6.40 2.44

NOTE
THERE ARE NO MODIFICATION TO THIS PANEL

	CONNECTED LOAD (KVA)	DF	DEMAND LOAD (KVA)
LIGHTING	0.00	125%	0.00
FIRST 10K RECEPTS	10.00	100%	10.00
REMAINDER RECEPT	0.26	50%	0.13
LARGEST MOTOR		125%	0.00
MOTOR		100%	0.00
ELEVATOR		100%	0.00
KITCHEN		65%	0.00
EXISTING LOAD		125%	0.00
MISC	6.00	100%	6.00
TOTAL (KVA)	16.26		16.13
TOTAL AMPS	45		45

NOTES
L-PROVIDE WITH LOCK OUT CLIP
PL-PROVIDE WITH PADLOCKABLE BREAKER
G-GFCI PROTECTED
A-AFCI PROTECTED
GF-GFPE PROTECTED
S- SHUNT TRIP
* - PHASE/NEUTRAL

MODIFIED PANEL "C1PDP"

PANEL TYPE: HCW
BUS SIZE: 800A
VOLTAGE: 280Y/120
MCB: 800
MOUNTING: SURFACE
MINIMUM AIC: 42,000

CKT	LOAD SERVED	TRIP	POLE	WIRE	GND	CONDUIT	kVA	kVA PER PHASE A	B	C	kVA	CONDUIT	GND	WIRE	POLE	TRIP	LOAD SERVED	CKT
							20.36	20.36										
1	PNL C2PJ C1PK	400	3				18.98		18.98									2
							13.94			13.94								
							2.76	6.26			3.50							
3	PANEL C1PA	150	3				3.30		5.80		2.50				3	100	PANEL C1PB	4
							2.10			5.50	3.40							
							4.50	8.50			4.00							
5	PANEL C1PC	150	3				5.24		9.89		4.65				3	100	PANEL C1PD	6
							5.34			9.88	4.54							
							6.86	10.40			3.54							
7	PANEL C1PH	150	3				6.32		9.97		3.65				3	150	PANEL C1PE	8
							3.26			6.90	3.64							
							6.30	9.50			3.20							
9	PANEL C1PG	150	3				6.50		9.70		3.20				3	150	PANEL C1PF	10
							6.54			9.69	3.15							
							4.00	4.00									SPACE	
11	PANEL C1PL	150	3				3.65		3.65								SPACE	12
							4.50			4.50							SPACE	
								0.00									SPACE	
13	BUSWAY OC102	400	3						0.00								SPACE	14
										0.00							SPACE	

TOTAL'S: 59.02 57.99 50.46

THERE ARE NO MODIFICATIONS TO THIS PANEL. PANEL SHOWS UPDATED LOAD CALCULATIONS FOR MODIFIED DOWNSTREAM PANELBOARD.

	CONNECTED LOAD (KVA)	DF	DEMAND LOAD (KVA)
LIGHTING		125%	0.00
FIRST 10K RECEPTS	10.00	100%	10.00
REMAINDER RECEPT	125.07	50%	62.54
LARGEST MOTOR		125%	0.00
MOTOR		100%	0.00
ELEVATOR		100%	0.00
KITCHEN		65%	0.00
EVCS		125%	0.00
MISC	32.40	100%	32.40
TOTAL (KVA)	167.47		104.94
TOTAL AMPS	465		291

NOTES
L-PROVIDE WITH LOCK OUT CLIP
PL-PROVIDE WITH PADLOCKABLE BREAKER
G-GFCI PROTECTED
A-AFCI PROTECTED
GF-GFPE PROTECTED
S- SHUNT TRIP
H-HACR BREAKER
N-NEW CIRCUIT BREAKER
* - PHASE/NEUTRAL

EXISTING PANEL "C2PI"

PANEL TYPE: NQOD
BUS SIZE: 125A
VOLTAGE: 208Y/120
MCB 110amp
MOUNTING: SURFACE
MINIMUM AIC: 10,000

CKT	LOAD SERVED	TRIP	POLE	WIRE	GND	CONDUIT	kVA	kVA PER PHASE A	B	C	kVA	CONDUIT	GND	WIRE	POLE	TRIP	LOAD SERVED	CKT
1	PLUGMOLD	20	1					0.00							1	20	RECEPTACLE	2
3	PLUGMOLD	20	1						0.00						1	20	RECEPTACLE	4
5	PLUGMOLD	20	1							0.00					1	20	RECEPTACLE	6
7	PLUGMOLD	20	1					0.00							1	20	RECEPTACLE	8
9	PLUGMOLD	20	1						0.00						1	20	RECEPTACLE	10
11	PLUGMOLD	20	1							0.00					1	20	RECEPTACLE	12
13	PROJECTOR	20	1					0.00							1	20	RECEPTACLE	14
15	SPACE								0.00						1	20	CEILING RECEPTCLE	16
17	SPACE									0.00					1	20	CEILING RECEPTCLE	18
19	SPACE							0.00							1	20	CEILING RECEPTCLE	20
21	SPACE								0.00						1	20	MICROWAVE & COUNTER	22
23	SPACE									0.00					1	20	RECEPTACES BREAKROOM	24
25	SPACE							0.00										26
27	SPACE								0.00						2	70	PANEL C2PD NOT IN RENOVATION	28
29	SPACE									0.00								30

TOTAL'S: 0.00 0.00 0.00

	CONNECTED LOAD (KVA)	DF	DEMAND LOAD (KVA)
LIGHTING		125%	0.00
FIRST 10K RECEPTS			
REMAINDER RECEPT			
LARGEST MOTOR			
MOTOR			
ELEVATOR			
KITCHEN			
EXISTING LOAD			
MISC			
TOTAL (KVA)	0.00		0.00
TOTAL AMPS	0		0

NOTES
L-PROVIDE WITH LOCK OUT CLIP
PL-PROVIDE WITH PADLOCKABLE BREAKER
G-GFCI PROTECTED
A-AFCI PROTECTED
GF-GFPE PROTECTED
S- SHUNT TRIP
* - PHASE/NEUTRAL

MODIFIED PANEL "C2PI"

PANEL TYPE: NQOD
BUS SIZE: 125A
VOLTAGE: 208Y/120
MCB 110amp
MOUNTING: SURFACE
MINIMUM AIC: 10,000

CKT	LOAD SERVED	TRIP	POLE	WIRE	GND	CONDUIT	kVA	kVA PER PHASE A	B	C	kVA	CONDUIT	GND	WIRE	POLE	TRIP	LOAD SERVED	CKT
1	CEILING RECEPTACLE 1202	20	1	#10*	#10	3/4"	0.36	0.90			0.54	3/4"	#12	#12*	1	20	WALL RECEPTACLE 1202	2
3	CEILING RECEPTACLE 1202	20	1	#10*	#10	3/4"	0.36		0.90		0.54	3/4"	#12	#12*	1	20	TV OUTLETS 1202	4
5	CEILING RECEPTACLE 1202	20	1	#10*	#10	3/4"	0.36			0.72	0.36	3/4"	#10	#10*	1	20	RECEPTACLES 1210G	6
7	CEILING RECEPTACLE 1202	20	1	#10*	#10	3/4"	0.36	0.72			0.36	3/4"	#10	#10*	1	20	RECEPTACLES 1204	8
9	WALL RECEPTACLE 1202	20	1	#10*	#10	3/4"	0.36		0.90		0.54	3/4"	#10	#10*	1	20	RECEPTACLES 1204	10
11	TV OUTLETS 1202	20	1	#10*	#10	3/4"	0.45			2.13	1.68	3/4"	#10	#10*	1	20	TRACK 1204	12
13	CEILING RECEPTACLE 1210A	20N	1	#10*	#10	3/4"	0.36	2.04			1.68	3/4"	#10	#10*	1	20	TRACK 1204	14
15	CEILING RECEPTACLE 1210A	20N	1	#10*	#10	3/4"	0.36		2.04		1.68	3/4"	#10	#10*	1	20	TRACK 1204	16
17	CEILING RECEPTACLE 1210A	20N	2	#10*	#11	3/4"	0.36			1.04	0.68	3/4"	#10	#10*	1	20	TYPE LB ROOM 1210A	18
19	WHEEL CHAIR	30N	1	#10*	#10	3/4"	1.90	1.90							1	20	SPARE	20
21	WHEEL CHAIR RECEPTACLE	20N	1	#10*	#10	3/4"	0.36		0.36						1	20	SPARE	22
23	SPACE									0.00					1	20	SPARE	24
25	SPACE							5.62			5.62							26
27	SPACE								5.34		5.34				2	70	PANEL C2PD NOT IN RENOVATION	28
29	SPACE									5.55	5.55							30

TOTAL'S: 11.18 9.54 9.44

	CONNECTED LOAD (KVA)	DF	DEMAND LOAD (KVA)
LIGHTING	5.04	125%	6.30
FIRST 10K RECEPTS	10.00	100%	10.00
REMAINDER RECEPT	12.54	50%	6.27
LARGEST MOTOR		125%	0.00
MOTOR		100%	0.00
ELEVATOR		100%	0.00
KITCHEN		65%	0.00
EXISTING LOAD		125%	0.00
MISC	1.90	100%	1.90
TOTAL (KVA)	29.48		24.47
TOTAL AMPS	82		68

NOTES
L-PROVIDE WITH LOCK OUT CLIP
PL-PROVIDE WITH PADLOCKABLE BREAKER
G-GFCI PROTECTED
A-AFCI PROTECTED
GF-GFPE PROTECTED
S- SHUNT TRIP
N-NEW CIRCUIT BREAKER
* - PHASE/NEUTRAL

EXISTING PANEL "C2PA"

PANEL TYPE: NQOD
BUS SIZE: 100A
VOLTAGE: 208Y/120
MLO:
MOUNTING: SURFACE
MINIMUM AIC: 10,000

CKT	LOAD SERVED	TRIP	POLE	WIRE	GND	CONDUIT	kVA	kVA PER PHASE A	B	C	kVA	CONDUIT	GND	WIRE	POLE	TRIP	LOAD SERVED	CKT
1	WATER COOLER	20	1					0.00							1	20	RECEPTACLE	2
3	RECEPTACLE	20	1						0.00						1	20	RECEPTACLE	4
5	RECEPTACLE	20	1							0.00					1	20	RECEPTACLE	6
7	RECEPTACLE	20	1					0.00							1	20	EXISTING STORAGE	8
9	RECEPTACLE	20	1						0.00						1	20	EXISTING STORAGE	10
11	RECEPTACLE	20	1							0.00					1	20	PLUGMOLD	12
13	RECEPTACLE	20	1					0.00							1	20	PLUGMOLD	14
15	RECEPTACLE	20	1						0.00						1	20	PLUGMOLD	16
17	MOTOR TEST CONTROL 1206	20	1							0.00					1	20	RECEPTACLE	18
19	SPARE	20	1					0.00							1	20	RECEPTACLE	20
21	UNIT HEATER	15	1						0.00								SPACE	22
23	SPARE	20	1							0.00							SPACE	24
25	SPARE	20	1					0.00									SPACE	26
27	SPARE	20	1						0.00						1	20	EXISTING	28
29	IRRIGATION	20	1							0.00							SPACE	30

TOTAL'S: 0.00 0.00 0.00

	CONNECTED LOAD (KVA)	DF	DEMAND LOAD (KVA)
LIGHTING		125%	0.00
FIRST 10K RECEPTS			
REMAINDER RECEPT			
LARGEST MOTOR			
MOTOR			
ELEVATOR			
KITCHEN			
EXISTING LOAD			
MISC			
TOTAL (KVA)	0.00		0.00
TOTAL AMPS	0		0

NOTES
L-PROVIDE WITH LOCK OUT CLIP
PL-PROVIDE WITH PADLOCKABLE BREAKER
G-GFCI PROTECTED
A-AFCI PROTECTED
GF-GFPE PROTECTED
S- SHUNT TRIP
* - PHASE/NEUTRAL

MODIFIED PANEL "C2PA"

PANEL TYPE: NQOD
BUS SIZE: 100A
VOLTAGE: 208Y/120
MLO:
MOUNTING: SURFACE
MINIMUM AIC: 10,000

CKT	LOAD SERVED	TRIP	POLE	WIRE	GND	CONDUIT	kVA	kVA PER PHASE A	B	C	kVA	CONDUIT	GND	WIRE	POLE	TRIP	LOAD SERVED	CKT
1	WATER COOLER	20	1				0.36	0.54			0.18	3/4"	#12	#12*	1	20	BREAK AREA RECEPTACLE	2
3	RECEPTACLE 1204	20	1	#10*	#10	3/4"	0.54		0.72		0.18	3/4"	#12	#12*	1	20	BREAK AREA RECEPTACLE	4
5	RECEPTACLE 1204	20	1	#10*	#10	3/4"	0.36			0.54	0.18	3/4"	#12	#12*	1	20	BREAK AREA RECEPTACLE	6
7	FLOOR RECEPTACLE 1204	20	1	#10*	#10	3/4"	0.36	0.90			0.54				1	20	EXISTING STORAGE	8
9	FLOOR RECEPTACLE 1204	20	1	#10*	#10	3/4"	0.54		1.08		0.54				1	20	EXISTING STORAGE	10
11	RECEPTACLE 1204	20	1	#10*	#10	3/4"	0.36			0.54	0.18	3/4"	#12	#12*	1	20	BREAK AREA RECEPTACLE	12
13	RECEPTACLE 1204	20	1	#10*	#10	3/4"	0.36	0.54			0.18	3/4"	#12	#12*	1	20	BREAK AREA RECEPTACLE	14
15	RECEPTACLE 1204	20	1	#10*	#10	3/4"	0.36		0.54		0.18	3/4"	#12	#12*	1	20	BREAK AREA RECEPTACLE	16
17	SIGN 1200	20	1	#10*	#10	3/4"	0.60			0.78	0.18	3/4"	#12	#12*	1	20	BREAK AREA RECEPTACLE	18
19	RECEPTCLE 1205	20	1	#10*	#10	3/4"	0.36	0.36							1	20	RECEPTACLE	20
21	UNIT HEATER	20	1				1.25		1.25								SPACE	22
23	SPARE	20	1							0.00							SPACE	24
25	SPARE	20	1				0.00										SPACE	26
27	SPARE	20	1					1.00		1.00					1	20	EXISTING	28
29	IRRIGATION	20	1				0.65		0.65								SPACE	30

TOTAL'S: 2.34 4.59 2.51

	CONNECTED LOAD (KVA)	DF	DEMAND LOAD (KVA)
LIGHTING		125%	0.00
FIRST 10K RECEPTS	6.18	100%	10.00
REMAINDER RECEPT		50%	0.00
LARGEST MOTOR		125%	0.00
MOTOR		100%	0.00
ELEVATOR		100%	0.00
KITCHEN		65%	0.00
EXISTING LOAD		125%	0.00
MISC	3.26	100%	3.26
TOTAL (KVA)	9.44		13.26
TOTAL AMPS	26		37

NOTES
L-PROVIDE WITH LOCK OUT CLIP
PL-PROVIDE WITH PADLOCKABLE BREAKER
G-GFCI PROTECTED
A-AFCI PROTECTED
GF-GFPE PROTECTED
S- SHUNT TRIP
* - PHASE/NEUTRAL

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KEY PLAN

SEALS

NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER SEAL 049638 ENGINEERING
6/13/2025

BID DOCUMENTS
04.25.2025

PROJECT

NCSU-TEXTILES COMPLEX-FLEX FACTORY RENOVATIONS

1020 MAIN CAMPUS DRIVE
RALEIGH, NC 27606

SCO ID# 23-26253-01A
NCSU PROJECT ID: 202220031
FACILITY ID: 700

REVISIONS

No.	Description	Date
1	ADDENDUM 001	6/13/25

PROJECT DATA

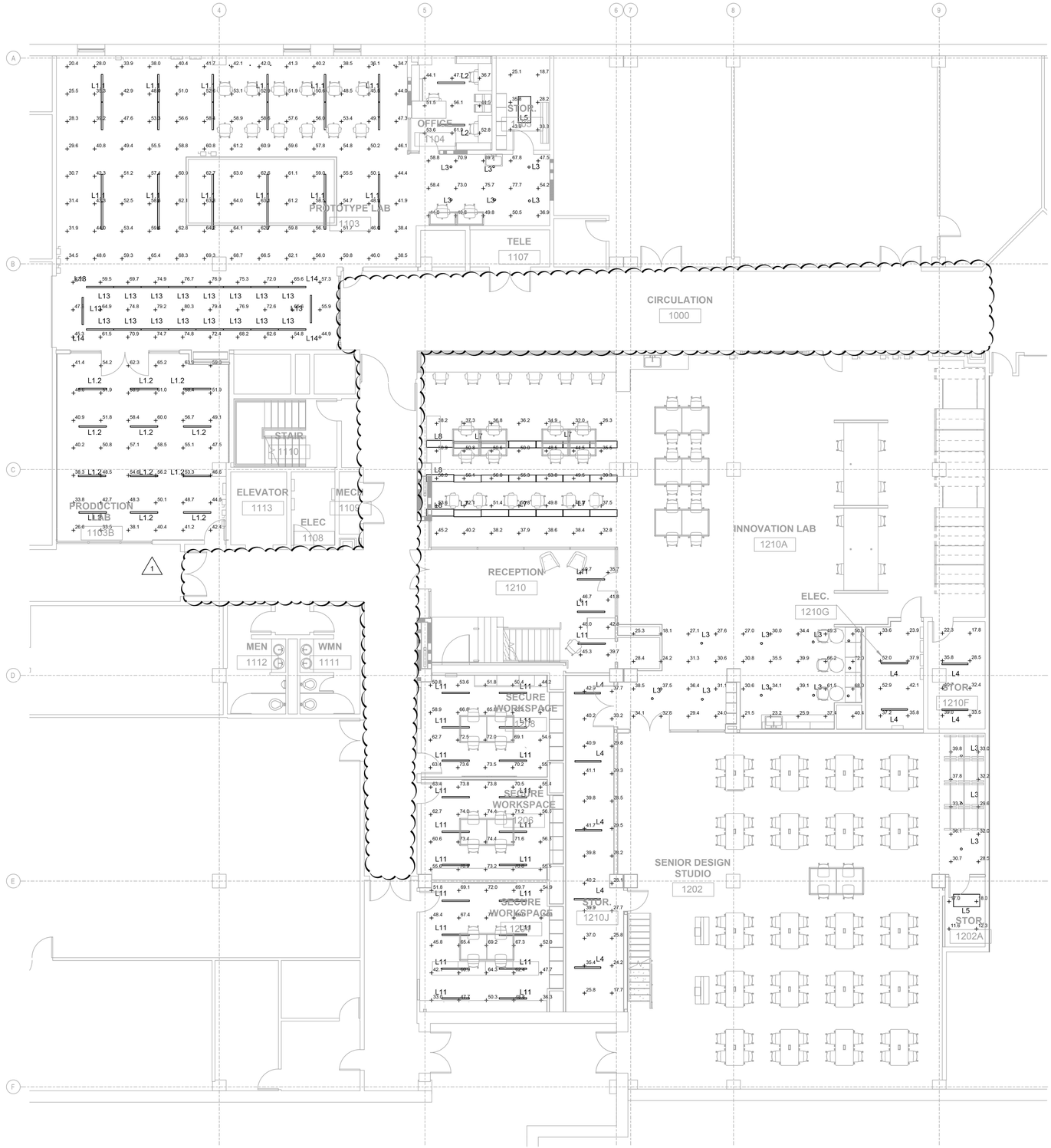
DATE: 04.25.2025
DRAWN: MP
CHECKED: RDA
PROJECT NO: 2021_0140
PRINTING: BID DOCUMENTS

SHEET DATA

ELECTRICAL PANELBOARD SCHEDULES C2PI, C2PA

SHEET NO.

E404



1 COURTYARD POINT BY POINT
1/8" = 1'-0"

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KEY PLAN

SEALS

NORTH CAROLINA PROFESSIONAL SEAL 019638 ENGINEER RICHARD D. ADAMS
6/13/25

BID DOCUMENTS
04.25.2025

PROJECT

NCSU-TEXTILES COMPLEX-FLEX FACTORY RENOVATIONS

1020 MAIN CAMPUS DRIVE
RALEIGH, NC 27606

SCO ID# 23-26253-01A
NCSU PROJECT ID: 202220031
FACILITY ID: 700

REVISIONS

No.	Description	Date
1	ADDENDUM 001	6/13/25

PROJECT DATA

DATE: 04.25.2025
DRAWN:
CHECKED:
PROJECT NO: 2021_0140
PRINTING: BID DOCUMENTS

SHEET DATA

COURTYARD POINT BY POINT

SHEET NO.

E600