



THE SCHOOL DISTRICT OF
PHILADELPHIA

BOARD OF EDUCATION
Office of Capital Programs
440 North Broad Street, 3rd Floor – Suite 371
Philadelphia, PA 19130

TELEPHONE: (215) 400-4730

Addendum No. 2

Subject: James Rhoads Elementary School Major Renovation
SDP Contracts No B-040C, B-041C, B-042C, B-043C of 2019/20

Location: Lewis C. Cassidy Academics Plus School
6523 Lansdowne Avenue
Philadelphia, PA 19151

This Addendum, dated May 15, 2020, shall modify and become part of the Bid Documents. Any items not mentioned herein, or affected by, shall remain strictly in accordance with the original document.

1. BIDS ARE DUE BY 2:00 PM ON TUESDAY, JUNE 16, 2020.

2. BID SUBMISSION AND BID OPENING PROCEDURE:

Due to restrictions in place for COVID-19 by Governor Wolf's "stay at home" order including practicing personal distancing the School District has decided to conduct the opening of the bids virtually through a live stream until further notice.

Bidders are required to comply with social distancing and other CDC and Department of Health mitigation measures when delivering bids.

Fully executed original copies of the complete required bid proposals will be delivered to the address below.

Proposals will be received at:

The School District of
Philadelphia Office of Capital Programs
15th Street Entrance (15th and Hamilton)
440 N. Broad Street Philadelphia, PA 19130-4015

From 1:00 p.m. to 2:00 p.m. on Tuesday, June 16, 2020.

All proposals received will be opened and read aloud by live video stream at 2:30 p.m.

The link to the live bids can be found
at <https://www.philasd.org/capitalprograms/programsservices/construction/construction-bids/>
(If not available when this Addendum is issued, it will be made available prior to the bid opening.)

Addendum No. 2 (cont'd)

3. COVID-19 PRECAUTIONS:

Contractors must conform to the requirements of the attached COVID-19 PRECAUTIONS PLAN in the performance of the work.

4. VIRTUAL SITE VISIT:

FOR REFERENCE TO EXISTING BUILDING CONDITIONS, BIDDERS SHALL REVIEW THE VIRTUAL SITE VISIT INFORMATION, WHICH SHOULD BE AVAILABLE ON WEDNESDAY, MAY 20, 2020.

A link will be provided on the website when the site visit information becomes available

It will be organized by work area and consist of files or folders containing video and photos. For each work area file or folder will be a Photo Key Plan which should be consulted. The Photo Key Plan shows where the video and photos are taken within the work area.

5. CHANGES TO DRAWINGS

Drawing: A-003a – PHASING PLAN

Revisions:

- a. Delete current “A-003a – PHASING PLAN” sheet in its entirety and replace with new “A-003a – PHASING PLAN” attached to this addendum. Reissued in Addendum #2.

Drawing: A-003b – PHASING PLAN

Revisions:

- a. Delete current “A-003b – PHASING PLAN” sheet in its entirety and replace with new “A-003b – PHASING PLAN” attached to this addendum. Reissued in Addendum #2.

Drawing: S-103 – HVAC DUNNAGE & SUPPORT PLAN AND DETAILS

Revisions:

- a. ADD structural sketch “SK-1” to drawing sheet “S-103 – HVAC DUNNAGE & SUPPORT PLAN AND DETAILS” attached to this addendum. Reissued in Addendum #2.

6. CHANGES TO SPECIFICATIONS

Section: 23 0900 – HVAC SYSTEM CONTROL

Revisions:

Delete current “Section 23 0900 – HVAC SYSTEM CONTROL” specification in its entirety and replace with new “Section 23 0900 – HVAC SYSTEM CONTROL” attached to this addendum. Reissued in Addendum #2.

Section: 28 8220 – UNIT VENTILATORS

Revisions:

“Section 23 8220 – Unit Ventilators”, Part 2 – Products, 2.1 Manufacturer, B. Other Acceptable Manufacturers: ADD “4. Modine.”.

Addendum No. 2 (cont'd)

End of Addendum No. 2

Attachments:

COVID-19 PRECAUTIONS PLAN, 5/01/20, (Rev. 1) 37 pages

Drawing A-003 (a) Phasing Plan

Drawings A-003 (b) Phasing Plan

Section 23 900 HVAC SYSTEM CONTROLS, 20 pages

COVID-19 PRECAUTIONS PLAN

Dated May 1, 2020, 37 pages (Rev 1)



THE SCHOOL DISTRICT OF PHILADELPHIA
OFFICE OF CAPITAL PROGRAMS
440 N. BROAD STREET, 3RD FLOOR
PHILADELPHIA, PENNSYLVANIA 19130-4015

Memo

To:
From:
CC:
Date:
RE: COVID-19 Precautions Plan -

The School District of Philadelphia will begin to allow contractors at the above project(s) to resume work under the following guidelines. All guidelines must be adhered to by all contractors.

1. General Jobsite

- a. Each contractor must designate a "Pandemic Safety Officer" for each project or work site. The primary responsibility of the Pandemic Safety Officer will be to convey, implement, and enforce the requirements of this guidance for the protection of all personnel at the site.
- b. The Pandemic Safety Officer must obtain a COVID-19 training certificate from one of the training sources designated by the Department of Licenses and Inspections on its website. The certificate must be posted at the jobsite.
- c. Each contractor must submit a written COVID-19 Safety Plan for their work location containing site specific details for the implementation of this guidance to be shared with all employees and the School District and implemented and enforced by the Pandemic Safety Officer. A copy of the COVID-19 Safety Plan must be kept at the jobsite and shall be produced upon request.
- d. The Pandemic Safety Officer on site must monitor for signs of illness. It is critical that individuals NOT report to work while they are experiencing any illness. If someone is showing signs of any illness, they must leave immediately.
- e. All deliveries and delivery personnel are subject to the same criteria and guidelines.
- f. School District personnel are subject to the same criteria and guidelines.
- g. Anyone that enters a district building or site is required to wear a mask or scarf to cover their nose and mouth to ensure the protection of themselves and others.
- h. Enclosed projects may not permit more than four persons on job sites of 2,000 square feet or less.
- i. One additional person is allowed for each additional 500 square feet of enclosed area over 2,000 square feet.

2. Pre-entry Screening

- a. Prior to entering the project, the designated person from each contractor will be required to screen employees and delivery personnel with the following:
 - i. “As a precaution and in an effort to help prevent the spread of COVID-19 we are conducting a pre-entry screening.” If they answer yes to any of the following questions, they should be asked to leave the jobsite immediately.
 1. Have you been in close contact with a person that has shown signs/symptoms, or been diagnosed with COVID-19?
 2. Has anyone in your household been in close contact with a person that is in the process of being tested, has shown signs/symptoms, or been diagnosed with COVID-19?
 3. Have you been medically directed to self-quarantine due to possible exposure to COVID-19?
 4. Are you having trouble breathing or having you had flu-like systems within the past 72 hours, including: fever, dry cough, shortness of breath, sore throat, body aches, chills, loss of taste or smell, or fatigue?

3. Toolbox Safety Meeting

- a. The designated employee must have a toolbox talk on the first day of work. These guidelines should be reviewed with all employees.
- b. Example:
<https://gbca.com/wp-content/uploads/2020/03/GBCA-Safety-Toolbox-Talk-Corona-virus-1.pdf>
- c. Remember to follow social distancing guidelines. More than one meeting might be required to cover all employees.

4. Social Distancing

- a. Require social distancing unless the safety of the public or workers require deviation (e.g. drywalling, team lifting).
- b. Limit contact with others. Direct employees to increase personal space (to at least 6 feet, where possible).
- c. Take breaks and lunches in shifts to reduce the size of the group to less than 10 people.
- d. Avoid trade stacking. Communicate with each prime to evaluate schedule and sequencing of work.
- e. Do not share tools. When sharing is necessary, wipe down with proper disinfectant first.

5. Increased Cleaning Procedures (Lead Contractor)

- a. The School District of Philadelphia will provide, at a minimum, hand washing locations with hot water, soap, and paper towels on each floor that work is being completed. The designated employee is to encourage the use of these locations frequently.
- b. The prime contractor will sanitize all hand washing locations, restroom locations, break/lunch locations, and high touch/traffic areas at least twice per day. The

School District will provide proper EPA approved cleaning products and gloves.
The Building Engineer will provide spray bottles of premixed product and wipes.

6. Reporting a Suspected or Confirmed Case

- a. If an employee or delivery personnel report a suspected or confirmed case to the Pandemic Safety Officer, the following steps must be taken.
 - i. The Pandemic Safety Officer must immediately send the person home and notify the Construction Project Manager and Construction Inspector.
 - ii. This notification will trigger the District's COVID-19 emergency response (see attached).
 - iii. The building will be closed to all construction activities for at least 48 hours. Contractors are to safe off all construction activities and notify the Construction Project Manager and Construction Inspector when everyone has safely exited the building.
 - iv. The building will be aired out for the first 24 hours.
 - v. District facilities staff will perform all disinfecting activities.
- b. The Pandemic Safety Officer must follow the guidelines outlined in the "Order of the Secretary of the Pennsylvania Department of Health Directing Public Safety Measures for Businesses Permitted to Maintain In-person Operations" and enforceable as of 8:00 pm on April 19, 2020. (see attached)
- c. The contractors must implement temperature screening before an employee enters the business, prior to the start of each shift or, for employees who do not work shifts, before the employee starts work, and send employees home that have an elevated temperature or fever of 100.4 degrees Fahrenheit or higher. Ensure employees practice social distancing while waiting to have temperatures screened.
- d. This screening must continue for a minimum of 14 days or until the case is determined to be tested as negative.

7. Asbestos, Lead Based Paint, and Mold Abatement

- a. An Asbestos Abatement Contractor can have more than 4 persons on an enclosed jobsite less than 2,000 sf only if proper PPE utilized in pre-cleaning, abatement activities, and final cleaning activities are worn." Contractors will immediately limit their staff when these activities do not require more than four persons.
- b. Containments under negative pressure (-0.02" wc) must remain under negative pressure. If this is not feasible, steps outlined in the City of Philadelphia Asbestos Control Regulations shall apply.
- c. Abatement contractors are the only ones permitted to enter an active containment, therefore, the District will provide the instructions and materials to disinfect the active containment.
- d. Lead based paint abatement and mold remediation activities will follow the same procedures (as applicable to each trade) as outlined above.

8. Compliance

- a. District Construction Project Managers and Inspectors will monitor for compliance, along with state and local inspectors as necessary.

- b. For example, the requirement for daily health screening is monitored each day by comparing the completed screening question sheet with the daily log of workers on site.
- c. Daily review with each Pandemic Safety Officer will be completed by the Construction Inspectors and noted in daily construction reports.
- d. The Construction Inspector will complete the COVID-19 checklist daily.
- e. Failure to comply will result in a request for corrective action, referral to federal, state, and local regulators, and increased monitoring. If non-compliance continues, it could be a basis for contract termination.

Attachments:

Guidance for Businesses in the Construction Industry Permitted to Operate During the COVID-19 Disaster Emergency, Issued 04-23-20

Order of the Secretary of the Pennsylvania Department of Health Directing Public Safety Measures for Businesses Permitted to Maintain In-person Operations, Enforceable as of 8:00 pm on April 19, 2020

Frequently Asked Questions: Order of the Secretary of the Pennsylvania Department of Health Directing Public Health Safety Measures for Businesses Permitted to Maintain In-person Operation, Updated May 1, 2020

Authorization for the Conduct of Certain Construction Activity Currently Prohibited by the March 22, 2020 Emergency Order Temporarily Prohibiting Operation of Non-Essential Business and Individual Activity to Prevent the Spread of 2019 Novel Coronavirus (Covid-19), Issued by the City of Philadelphia, April 29, 2020

COVID-19 Office of Facilities Management & Services and Office of Capital Programs Coordinated Emergency Response Plan, Issued 05-01-2020

Office of Capital Programs Construction Unit COVID-19 Checklist, Issued 05-01-2020

COVID-19 Precautions Plan Compliance Agreement, Issued 05-01-2020

GUIDANCE FOR BUSINESSES IN THE CONSTRUCTION INDUSTRY PERMITTED TO OPERATE DURING THE COVID-19 DISASTER EMERGENCY

INTENT

The virus that causes Coronavirus 2019 Disease (“COVID-19”) is easily transmitted, especially in group settings, and it is essential that the spread of the virus be slowed to safeguard public health and safety. Previously, the Governor and Secretary of Health ordered most construction projects to cease unless they were supporting life-sustaining businesses or activities. Recognizing that the construction industry is vital to Pennsylvania’s economy, construction activities may resume in accordance with this guidance.

Businesses in the Commonwealth that have been permitted to maintain in-person operations during the disaster emergency, other than health care providers, must take several precautions to protect their employees, their employees’ families, and members of their communities. Businesses that are permitted to maintain in-person operations are those authorized under the [Governor’s and Secretary’s Non-Life Sustaining Business Closure Orders](#), an exemption from those orders, or subsequent applicable order from the Governor and Secretary. All businesses (especially those that were originally closed and later permitted to re-open a portion of their operations) must review these guidelines and commit to ensuring the health and safety of their employees and the public, including construction businesses currently conducting in-person operations and those now able to resume activities.

BUSINESSES SUBJECT TO THIS GUIDANCE

Beginning May 1, 2020, all businesses in the construction industry in the Commonwealth, including those in new construction, renovation, and repair, as well as land subdivision and design-related field activities, are [permitted to maintain in-person operations](#) pursuant to the Governor’s and Secretary of Health’s April 20, 2020 amendments to the Business Closure Orders so long as their activities strictly adhere to this guidance. Construction projects previously granted an exemption to continue in-person operations may continue operations but must adhere to this guidance.

Prior to May 1, all businesses in the construction industry should continue to follow existing Administration orders and guidance, and may continue to maintain in-person operations to the extent authorized by any existing exemptions.

POLICY

It is the policy of the Administration to ensure that all businesses in the construction industry subject to this guidance conduct operations in the manner best designed to prevent or mitigate the spread of COVID-19 and ensure the safety of the employers, employees and the public as a whole.

All construction businesses authorized to conduct in-person operations in the Commonwealth must adhere to requirements of this guidance, as well as all applicable business and building safety orders issued by the Secretary of Health.

Local political units may elect to impose more stringent requirements than those contained in this guidance. In such instances, businesses must adhere to the more stringent requirements.

ALL CONSTRUCTION ACTIVITIES

All businesses and employees in the construction industry must do the following:

- Follow all applicable provisions of the [Order](#) of the Secretary of Health providing for business safety measures, issued April 15, 2020, including but not limited to provisions requiring that every person present at a work site wear masks/face coverings, and provisions requiring the establishment of protocols for execution upon discovery that the business has been exposed to a person who is a probable or confirmed case of COVID-19.
- Follow all applicable provisions of the [Order](#) of the Secretary of Health providing for building safety measures, issued April 5, 2020.
- Follow other applicable [Department of Health](#) (DOH) and Centers for Disease Control and Prevention (CDC) [guidance](#).
- Require social distancing (6-foot minimum distance between workers) unless the safety of the public or workers require deviation (e.g. drywalling, team lifting).
- Provide hand wash stations at appropriate locations on the site such as building entrances, break areas, food truck areas, offices, trailers, and job site egress areas.
- Implement cleaning or sanitizing protocols at all construction sites and projects. Identify and regularly clean and disinfect areas that are at high risk for transmission (requirements to clean common areas and regularly trafficked spaces periodically).
- Ensure all gatherings are limited to no more than 10 people, maintaining 6-foot social distancing, when required to meet, even when conducted outside.
- Use virtual meetings, and disseminate information electronically to the extent feasible.
- Stagger shifts, breaks, work areas and/or stacking of trades where feasible to minimize workers on site.
- Limit tool sharing and sanitize tools if they must be shared.
- Employ jobsite screening based on CDC guidance to determine if employees should work. Prohibit from working any employees with any symptoms of COVID-19. Encourage sick employees to stay home.
- Prohibit unnecessary visitors to any project or work site, and limit supplier deliveries.
- Limit access to enclosed spaces to the extent feasible.
- Ensure workers are traveling to and from the job site separately. Wherever possible employees should not share a vehicle.
- Identify a “Pandemic Safety Officer” for each project or work site, or, if a large-scale construction project, then for each contractor at the site. The primary responsibility of the Pandemic Safety Officer will be to convey, implement, and enforce the social distancing and other requirements of this guidance for the protection of employees, suppliers, and other personnel at the site.

RESIDENTIAL CONSTRUCTION

The Uniform Construction Code (34 Pa. Code § 401.1) defines residential buildings as “detached one-family and two-family dwellings and townhouses which are not more than three stories above grade plane in height with a separate means of egress and their accessory structures.”

- All residential construction projects including new construction, renovation, and repair are authorized to conduct in-person operations; however, such projects may not permit more than four persons on the job site at any time inclusive of employees of both prime and sub contractors, but not inclusive of delivery persons, code inspectors, or similar persons who require temporary access to the site and are not directly engaged in the construction activity.

NON-RESIDENTIAL OR COMMERCIAL CONSTRUCTION

The Uniform Construction Code (34 Pa. Code § 401.1) defines “Commercial construction” as “a building, structure or facility that is not a residential building.” This definition includes multi-unit housing and student housing.

- All commercial construction projects including new construction, renovation, and repair are authorized to conduct in-person operations; however, enclosed projects or portions of enclosed projects, may not permit more than four persons on job sites of 2,000 square feet or less, and
- One additional person is allowed for each additional 500 square feet of enclosed area over 2,000 square feet. These numbers are inclusive of employees of both prime and sub contractors, but not inclusive of delivery persons, code inspectors, or similar persons who require temporary access to the site and are not directly engaged in the construction activity. Enclosed square footage shall include all areas under roof that are under active construction at the time.
- Commercial construction firms, including particularly those managing large-scale construction projects, should consider strongly establishing a written Safety Plan for each work location containing site specific details for the implementation of this guidance to be shared with all employees and implemented and enforced by the designated Pandemic Safety Officer.

PUBLIC CONSTRUCTION

Elected political subdivisions (or “local political units” as described in the Governor’s guidance), and other public entities should continue to use best judgment in exercising their authority to conduct critical construction projects. All construction decisions should appropriately balance public health and safety while ensuring the continued safety of critical infrastructure. When possible, local political units and public entities should postpone non-essential projects and only proceed with essential projects when they can implement appropriate social distancing and cleaning/disinfecting protocols, and should adhere to this guidance on all construction projects.

Local political units and public entities should officially communicate to contractors whether their specific project will be resumed. Notwithstanding any general authorization to resume construction activities, contractors should not resume work on public construction projects until directed to do so by the applicable governmental unit.

Certain commonwealth agencies and independent commissions have already issued guidance for critical or essential projects that are continuing. Those specific agency or commission directives should be followed unless there is a direct conflict with these guidelines, in which case these guidelines control. Contractors working on public construction projects must follow construction restart or resumption plans established by that agency or commission.

INSPECTIONS AND APPRAISALS

Beginning May 1, 2020, in-person inspection and appraisals related to construction financing loans, and UCC building code plan review and inspection services may be conducted as necessary for all construction projects authorized under this guidance.

QUESTIONS AND FURTHER GUIDANCE

Businesses that have questions about whether this guidance applies to them may email the Department of Labor and Industry at RA-LIBOIS-BUILDINGS@pa.gov.

Answers to frequently asked questions involving application of the Employee Safety Order is available [here](#).

Businesses in the construction industry may wish to refer to PennDOT's COVID-19 Guidance for Restarting Construction Projects which provided a process for restarting construction projects that were suspended in response to COVID-19 mitigation. The guidance is available [here](#).

Help is available for people who are struggling with their mental or emotional health or feeling anxious or overly stressed contact the Crisis Text Line by texting PA to 741-741.

ENFORCEMENT

Enforcement actions against violators of the Governor's and Secretary of Health's Orders Closing Businesses That Are Not Life Sustaining commenced on March 23, 2020, and is ongoing.

Law enforcement officers should refer to Enforcement Guidance available online [here](#).

ADDITIONAL INFORMATION

For the most up-to-date, reliable information, please continue to refer to the Commonwealth of Pennsylvania's website for Responding to COVID-19 in Pennsylvania: <https://www.pa.gov/guides/responding-to-covid-19/>.



Order of the Secretary of the Pennsylvania Department of Health Directing Public Health Safety Measures for Businesses Permitted to Maintain In-person Operations

The 2019 novel coronavirus (COVID-19) is a contagious disease that is rapidly spreading from person to person in the Commonwealth of Pennsylvania. COVID-19 can be transmitted from people who are infected with the virus even if they are asymptomatic or their symptoms are mild, such as a cough. Additionally, exposure is possible by touching a surface or object that has the virus on it and then touching one's mouth, nose, or eyes.

COVID-19 is a threat to the public's health, for which the Secretary of Health may order general control measures, including, but not limited to, closure, isolation, and quarantine. This authority is granted to the Secretary of Health pursuant to Pennsylvania law. *See* Section 5 of the Disease Prevention and Control Law, 35 P.S. §§ 521.1, 521.5; sections 2102 and 2106 of the Administrative Code of 1929, 71 P.S. §§ 532, 536; and the Department of Health's (Department's) regulations at 28 Pa. Code §§ 27.60-27.68 (relating to disease control measures; isolation; quarantine; movement of persons subject to isolation or quarantine; and release from isolation and quarantine). Particularly, the Secretary has the authority to take any disease control measure appropriate to protect the public from the spread of infectious disease. *See* 35 P.S. § 521.5; 71 P.S. §§ 532(a), 1402(a); 28 Pa. Code § 28.60.

Recognizing that certain life-sustaining businesses in the Commonwealth must remain open despite the need for strong mitigation to slow the spread of the virus, I am ordering certain actions to be taken by employers and their employees to protect their health and lives, the health and lives of their families, and the health and lives of the residents of the Commonwealth who depend upon their services. Special consideration is required to protect not only customers, but the workers needed to run and operate these establishments.

As cleaning, disinfecting, and other maintenance and security services performed by building service employees are critical to protecting the public health by reducing COVID-19 infection in the Commonwealth, I previously directed building safety measures in an Order that went into effect at 12:01 a.m. on April 6, 2020. Similarly, based upon the manner of COVID-19's continued and extensive spread in the Commonwealth and in the world, and its danger to Pennsylvanians, I have determined that an additional appropriate disease control measure is the further direction of safety measures for all employees and visitors at life-sustaining businesses that have remained open during the COVID-19 disaster emergency.

Accordingly, on this date, April 15, 2020, to protect the public from the spread of COVID-19, I hereby order:

- A. A business that is authorized to maintain in-person operations, other than health care providers, pursuant to the Orders that the Governor and I issued on March 19, 2020, as subsequently amended, shall implement, as applicable, the following social distancing, mitigation, and cleaning protocols:
- (1) in addition to maintaining pre-existing cleaning protocols established in the business, as specified in paragraph (2) below, clean and disinfect high-touch areas routinely in accordance with guidelines issued by the Centers for Disease Control and Prevention (CDC), in spaces that are accessible to customers, tenants, or other individuals;
 - (2) maintain pre-existing cleaning protocols established by the business for all other areas of the building;
 - (3) establish protocols for execution upon discovery that the business has been exposed to a person who is a probable or confirmed case of COVID-19, including:
 - a. close off areas visited by the person who is a probable or confirmed case of COVID-19. Open outside doors and windows and use ventilation fans to increase air circulation in the area. Wait a minimum of 24 hours, or as long as practical, before beginning cleaning and disinfection. Cleaning staff should clean and disinfect all areas such as offices, bathrooms, common areas including but not limited to employee break rooms, conference or training rooms and dining facilities, shared electronic equipment like tablets, touch screens, keyboards, remote controls, and ATM machines used by the ill person, focusing especially on frequently touched areas;
 - b. identify employees that were in close contact (within about 6 feet for about 10 minutes) with a person with a probable or confirmed case of COVID-19 from the period 48 hours before symptom onset to the time at which the patient isolated;
 - i. If the employee remains asymptomatic, the person should adhere to the practices set out by the CDC in its April 8, 2020 Interim Guidance for Implementing Safety Practice for Critical Infrastructure Workers Who May Have Had Exposure to a Person with Suspected or Confirmed COVID-19;
 - ii. If the employee becomes sick during the work day, the person should be sent home immediately. Surfaces in the employee's workspace should be cleaned and disinfected. Information on other employees who had contact with the ill employee during the time the employee had symptoms

and 48 hours prior to symptoms should be compiled. Others at the workplace with close contact within 6 feet of the employee during this time would be considered exposed;

- iii. Promptly notify employees who were close contacts of any known exposure to COVID-19 at the business premises, consistent with applicable confidentiality laws;
 - iv. ensure that the business has a sufficient number of employees to perform the above protocols effectively and timely;
- c. implement temperature screening before an employee enters the business, prior to the start of each shift or, for employees who do not work shifts, before the employee starts work, and send employees home that have an elevated temperature or fever of 100.4 degrees Fahrenheit or higher. Ensure employees practice social distancing while waiting to have temperatures screened;
 - d. employees who have symptoms (*i.e.*, fever, cough, or shortness of breath) should notify their supervisor and stay home;
 - e. sick employees should follow CDC-recommended steps. Employees should not return to work until the CDC criteria to discontinue home isolation are met, in consultation with healthcare providers and state and local health departments. Employers are encouraged to implement liberal paid time off for employees who do not return to work as set forth above.
- (4) stagger work start and stop times for employees when practicable to prevent gatherings of large groups entering or leaving the premises at the same time;
 - (5) provide sufficient amount of space for employees to have breaks and meals while maintaining a social distance of 6 feet, while arranging seating to have employees facing forward and not across from each other in eating and break settings;
 - (6) stagger employee break times to reduce the number of employees on break at any given time so that appropriate social distancing of at least 6 feet may be followed;
 - (7) limit persons in employee common areas (such as locker or break rooms, dining facilities, training or conference rooms) at any one time to the number of employees that can maintain a social distance of 6 feet;

- (8) conduct meetings and trainings virtually (*i.e.*, by phone or through the internet). If a meeting must be held in person, limit the meeting to the fewest number of employees possible, not to exceed 10 employees at one time, and maintain a social distance of 6 feet;
- (9) provide employees access to regular handwashing with soap, hand sanitizer, and disinfectant wipes and ensure that common areas (including but not limited to break rooms, locker rooms, dining facilities, rest rooms, conference or training rooms) are cleaned on a regular basis, including between any shifts;
- (10) provide masks for employees to wear during their time at the business, and make it a mandatory requirement to wear masks while on the work site, except to the extent an employee is using break time to eat or drink, in accordance with the guidance from the Department of Health and the CDC. Employers may approve masks obtained or made by employees in accordance with Department of Health guidance;
- (11) ensure that the facility has a sufficient number of employees to perform all measures listed effectively and in a manner that ensures the safety of the public and employees;
- (12) ensure that the facility has a sufficient number of personnel to control access, maintain order, and enforce social distancing of at least 6 feet;
- (13) prohibit non-essential visitors from entering the premises of the business; and
- (14) ensure that all employees are made aware of these required procedures by communicating them, either orally or in writing, in their native or preferred language, as well as in English or by a methodology that allows them to understand.

B. In addition to the above, the following measures apply to businesses, other than health care providers, that serve the public within a building or a defined area:

- (1) where feasible, businesses should conduct business with the public by appointment only and to the extent that this is not feasible, businesses must limit occupancy to no greater than 50% of the number stated on the applicable certificate of occupancy at any given time, as necessary to reduce crowding in the business, and must maintain a social distance of 6 feet at check-out and counter lines, and must place signage throughout each site to mandate social distancing for both customers and employees;

- (2) based on the building size and number of employees, alter hours of business so that the business has sufficient time to clean or to restock or both;
- (3) install shields or other barriers at registers and check-out areas to physically separate cashiers and customers or take other measures to ensure social distancing of customers from check-out personnel, or close lines to maintain a social distance between of 6 feet between lines;
- (4) encourage use of online ordering by providing delivery or pick-up options;
- (5) designate a specific time for high-risk and elderly persons to use the business at least once every week if there is a continuing in-person customer-facing component;
- (6) require all customers to wear masks while on premises, and deny entry to individuals not wearing masks, unless the business is providing medication, medical supplies, or food, in which case the business must provide alternative methods of pick-up or delivery of such goods; however, individuals who cannot wear a mask due to a medical condition (including children under the age of 2 years per CDC guidance) may enter the premises and are not required to provide documentation of such medical condition;
- (7) in businesses with multiple check-out lines, only use every other register, or fewer. After every hour, rotate customers and employees to the previously closed registers. Clean the previously open registers and the surrounding area, including credit card machines, following each rotation;
- (8) schedule handwashing breaks for employees at least every hour; and
- (9) where carts and handbaskets are available for customers' use, assign an employee to wipe down carts and handbaskets before they become available to each customer entering the premises.

This Order shall take effect immediately and be enforceable as of 8:00 p.m. on April 19, 2020.



Rachel Levine, MD
Secretary of Health

Frequently Asked Questions:

Updated May 1, 2020

Order of the Secretary of the Pennsylvania Department of Health Directing Public Health Safety Measures for Businesses Permitted to Maintain In-Person Operation

Recognizing that certain life-sustaining businesses in the Commonwealth must remain open despite the need for strong mitigation to slow the spread of the 2019 Corona virus (COVID-19), the Secretary of Health has ordered certain actions to be taken by employers and the employees of life-sustaining businesses (employees) to protect their health and lives, the health and lives of their families, and the health and lives of the residents of the Commonwealth who depend upon their services.

Q. What sort of situations would mandate a 24-hour wait time, and what sort of situations would allow for a lesser wait time to disinfect surfaces?

A. All businesses are ordered to wait a minimum of 24 hours, or as long as practical, before beginning cleaning and disinfection.

Q. Often employees notify management of their pending or confirmed COVID-19 case several days after they have been in the office or business. If the virus is not expected to live for several days on hard surfaces, do businesses still need to do additional cleaning?

A. According to the CDC, if more than 7 days have passed since the person who is sick visited the business or facility, enhanced cleaning and disinfection is not necessary. However, the business should continue routine cleaning. If the person who is sick was onsite at the business or facility within 7 days, then the work site should be cleaned and disinfected.

Q. The Order calls for 50% occupancy, every other register and cleaning every hour. If our business adheres to the social distancing and best practices mentioned in the Order, can we open additional registers if they are less than 6 feet away?

A. The Department of Health (Department) recommends that businesses take as many precautions as possible to ensure employee safety. Disease transmission between employees is likely when working closely together. [The U.S. Department of Labor Occupational Health and Safety Administration \(OSHA\)](#) provides similar recommendations for or businesses in regard to social distancing, including the “every other register” recommendation. However, if all other public health practices have been implemented, including limiting in-person shopping, limiting the number of customers to reduce crowding, installing shields or barriers, performing regular

cleaning and designating a specific shopping time for high risk individuals, then a business may consider opening checkout lanes that are next to each other.

Q. The Order provides for an employee being sent home immediately if they get sick during the work day if exposed to the person who was a probable or confirmed case, and also provides for the cleaning and disinfecting of the surfaces in that employee's workspace, but why does it not mandate a 24 hour waiting period in that case?

A. All life-sustaining businesses are ordered to wait a minimum of 24 hours, or as long as practical, before beginning cleaning and disinfection.

Q. What type of cleaning is required?

A. Facilities must clean and disinfect all spaces, especially commonly used rooms and shared electronic equipment. The Centers for Disease Control and Prevention (CDC) has [established guidance](#) on appropriate cleaning. Businesses should also refer to the Secretary's April 6, 2020 Order Directing Building Safety Measures.

Q. Can a life-sustaining business use a third-party vendor or third-party service for cleaning?

A. Yes, businesses can use an established or new vendor to comply with cleaning requirements.

Q. Certain areas of our facility should never be unmanned even for cleaning. In that situation, if the client is in compliance with CDC Guidelines, would they be allowed to continue to man this critical equipment?

A. Yes. An employer should consider the safety of its facility and employees when making the best decision possible.

Q. If a facility is regulated by the FDA and can't comply because it cannot open up doors and windows in a clean room environment, what should it do?

A. The business should follow FDA regulations and should consider the safety of its facility and employees while complying while making the best decision possible.

Q. Does an entire facility need to be shut down in order to do appropriate cleaning?

A. No. Businesses with a campus of multiple facilities or a building with multiple offices only need to close and clean the area of the building where an individual with a suspected or confirmed positive case of COVID-19 has worked. However, businesses should be mindful of bathrooms, breakrooms, building lobbies and other frequently visited areas.

Q. Who is responsible for cleaning costs?

A. The business, unless the lease or other agreement establishes this as a responsibility of the landlord

Q. Is the Commonwealth dictating a particular mask?

A. No. Employers may approve masks obtained or made by employees in accordance with the Department's [guidance](#). Customers may utilize masks obtained or made in accordance with the Department's [guidance](#). Scarves, bandanas, or other face covering will also suffice in place of a mask.

Q. Are there recommendations on where employers can purchase masks for employees?

A. Employers do not need to purchase masks from any specific vendor, but are required to provide masks to employees to wear during business hours. Homemade masks and masks owned by employees are allowable. The Department has published [guidance](#) on how to make cloth masks. Additionally, the Department of Community and Economic Development has created a [Business-2-Business Directory](#), which identifies potential vendors of masks and other Personal Protective Equipment (PPE).

Q. Would a disposable face shield suffice in lieu of a mask?

A. A disposable face shield would suffice in lieu of a mask. Employers may approve masks obtained or made by employees in accordance with guidance on homemade masks found on the Department's website.

Q. Does this Order apply to essential workers who are outdoors, and heavy physical activity is part of their job description, such as employee of solid waste companies and landscaping?

A. Yes. However, an employee does not need to wear a mask if it impedes their vision, if they have a medical condition, or if it would create an unsafe condition in which to operate equipment or execute a task.

Q. Do banks and financial institutions need to comply with the masking requirement if there are associated security concerns with face coverings?

A. Yes. Bank employees should wear masks at all times. Customers can be asked to remove their masks to reveal their face and then recover their face after the bank employee has identified the customer. This should take place within a minimum distance of six feet.

Q. Is it acceptable for workers to remove facial coverings for operations where it would be unsafe to keep in place or to be in compliance with safety requirements?

A. Yes. An employee does not need to wear a mask if it impedes their vision, if they have a medical condition, or if it would create an unsafe condition in which to operate equipment or execute a task.

Q: What should employers do when an employee says they have anxiety and any mouth, nose covering can lead to panic attacks or other medical conditions?

A. An employee does not need to wear a mask if it impedes their vision, if they have a medical condition, or if it would create an unsafe condition in which to operate equipment or execute a task.

Q. Are masks required while driving for work?

A. If the person is driving alone throughout the trip, no mask is needed in the vehicle, however, should they need to travel through a toll-booth or other drive thru they should be wearing a mask.

Q. Does someone working in a personal office need a mask at all times?

A. Employees isolated in their personal office space, when unshared with any other colleagues, do not need to wear a mask. However, when the employee leaves their individual office or has invited a colleague into their office, they must wear a mask. Additionally, one cannot wear a mask while eating or drinking. At those times, social distancing techniques should be applied.

Q. What about orders that were placed by an employer for masks but will not arrive for some time. How should businesses comply until then?

A. Employers may approve masks obtained or made by employees in accordance with guidance on homemade masks found on the Department's [website](#).

Q. Are masks required by transit operators, bus drivers or others who operate a vehicle?

A. Yes. However, an employee does not need to wear a mask if it impedes their vision, if they have a medical condition, or if it would create an unsafe condition in which to operate equipment or execute a task.

Q. The Order references CDC guidance on masking, which requires masking only when employees cannot maintain social distancing?

A. The Governor and Secretary of Health have chosen to employ safety measures beyond the CDC. Employees must wear masks at all times except when isolated from others in a private space or when it adversely affects their health.

Q. Which body is responsible for ensuring these actions have been taken at a specific workplace?

A. The Department does not dictate the employer's business structure. The employer is responsible for taking the necessary steps to implement the Secretary's Order **for employees. State enforcement agencies have been directed to begin enforcement of the Order with additional education for and warnings to non-compliant businesses, before moving progressively to more significant enforcement steps if warranted.**

Q. Is there any plan to get this information into the hands of workers so they can ask their employer to take the necessary steps to protect them?

A. The Secretary's Order and [the Department's FAQs](#) are available to the public on the Department's website. Employers are encouraged to share this information with their employees.

Q. Is there a code enforcement hotline for employees to call?

A. No. Complaints will only be taken online. **A webform for employees to submit complaints is available on the Department's [website](#).**

Q. Will there be a waiver process or exceptions?

A. This Order applies to life-sustaining businesses that remain open and already includes limited exceptions related to medical conditions and to occupational safety.

Q. Where can employees report violations?

A. A [webform](#) for employees to report violations.

Q. If the customer refuses to wear a mask will they be turned away or will the customer be refused service?

A. Yes, with the exception of businesses that provide medication, medical supplies, or food, which must offer another means for the customer to purchase goods if the customer is unable to wear a mask. Those means could include home delivery or contactless curbside pick-up.

However, individuals who cannot wear a mask due to a medical condition (including children under the age of 2 years per CDC guidance) may enter the premises and **are not required to provide documentation of such medical condition.**

If the customer is refused service, and if the business is not able to provide a mask, the business should consider providing information on mask making, distributing “how to” flyers, or sharing locations where a mask can be purchased. Additionally, businesses should advise the customer of the Secretary’s Order; tell the customer that only those who cannot wear a mask due to a medical conditions may enter the premises without a mask; and advise the customer that almost any face covering would be acceptable. If a customer is belligerent or aggressive, there is no expectation that an employee should force a customer to comply or put themselves in a dangerous situation.

Q. What if someone does not come in with a mask and the business cannot offer an alternative means of serving the customer?

A. Businesses should consider providing masks to their customers or offering resources to customers for information on how to make masks. Consider sharing mask making on social media, distributing “how to” flyers, or sharing locations where masks can be purchased. Customers can also be reminded to wear a scarf or bandana as a mask.

However, individuals who cannot wear a mask due to a medical condition (including children under the age of 2 years per CDC guidance) may enter the premises and are not required to provide documentation of such medical condition.

Q. How do businesses avoid confrontation with customers who do not wear a mask?

A. Businesses should consider how they would deal with a customer who came into their business without a shirt or shoes. Businesses should consider giving customers resources on how to make their own mask or provide a mask.

Additionally, businesses should advise customers of the Secretary’s Order; tell the customer that only persons who cannot wear a mask due to a medical condition do not have to comply with requirement to wear a mask; and advise the customer that almost any face covering would be acceptable. If a customer is belligerent or aggressive, there is no expectation that an employee should force a customer to comply or put themselves in a dangerous situation.

Q. As a manager, how do I handle an employee that refuses to wear a mask? Does this Order mean I can refuse them entry?

A. All employees of life-sustaining businesses, with the exception of those with a medical condition or in the case of safety issues or while sequestered alone in a room, must wear a mask in the workplace. The Department does not dictate to employers how they should manage their workforce if employees refuse to comply with the Secretary's Order.

Q. Are building security desks required to have shields or barriers to separate guard staff?

A. This is not a requirement of the Secretary's Order. However, businesses should consider how much interaction their security staff have with customers or employees. If security staff have significant interactions, the Department recommends having a barrier.

Q. What are the social distancing guidelines for elevator usage?

A. Businesses should use their best judgment based on the square footage of the elevator. The Department recommends that business allow as few people as possible while also being mindful of crowds gathering while waiting for the elevator.

Q. An elevated temperature is just one symptom. Is an elevated temperature enough to send an employee home?

A. Yes, an elevated temperature should prompt sending the employee home. While an elevated temperature is just one symptom, employees should be monitoring for other symptoms as well and should be encouraged to stay home if exhibiting any of those symptoms.

Q. Where should temperature screenings take place?

A. It is best to do screenings as close to the door of a facility or outside, if possible. Businesses should consider taking the temperature of employees in their car as they enter parking lots/garages or inside of a building lobby. If taking temperatures inside, remember to clean high touch surfaces frequently.

Q. Does the Order require the temperature screening of employees who do not physically enter the building?

A. No, it is not required of employees who are working from home or have no contact with other employees, but is recommended.

Q. Is a building owner or management company required to take the temperatures of tenants?

A. Employers are responsible for taking the temperature or implementing a self-screen policy for their employees. The building owner is not required to screen tenants.

Q. If an employee tests positive in a leased facility, what requirements are there in terms of notifying other entities that may occupy leased space?

A. Tenants should notify the building owner that one of their employees has tested positive without sharing personal details. It is recommended that owners notify other tenants that someone within the building has tested positive without sharing personal details and should follow this protocol if one of their employees who works in the building tests positive. Building owners should ensure that common spaces within the building are cleaned according to guidelines.

Q. If an employee tests positive in a leased facility, how does a business go about implementing temperature checks for staff that work in that leased facility, but do not work for the business. Ex/ Cleaning staff.

A. The employer is responsible for implementing temperature screenings or implementing self-screening policies of their employees. In the example, the employer of the cleaning staff is responsible for instituting a temperature screening policy. It is recommended that the employer notify the owner of the leased facility of the presence in the leased facility of an employee who tests positive.

Q. Following an exposure the Order says that “employees” must be screened. Does this mean that essential non-employees, such as contractors and delivery persons do not need to be screened?

A. Non-employees are not subject to temperature checks; these employees should have temperature checks or self-screening policies put in place by their own employer. *If, however, a contractor is physically present in a business as if he or she were an employee and has similar physical contact with employees as if he or she were an employee, the employer should temperature check that contractor.*

Q. If an employer discovers an employee with a confirmed case of COVID-19 has come into the business, does the Order require the employer to institute a temperature check for that person to return to work following their leave period OR does it require temperature screenings of all employees following the first confirmed case?

A. Businesses should implement temperature screening or a self-screen policy for all employees *before they physically enter the worksite* upon discovery that the business has been exposed to

a person who is a case of COVID-19. This would include a temperature screening for the employee with a confirmed case when that employee returns to work after the quarantine period.

Q. The Order provides guidelines for a person with a probable or confirmed case of COVID19. What is considered “probable”?

A. A person is considered to have a probable case of COVID-19 if a person has symptoms (i.e., fever, cough, shortness of breath) and exposure to a high-risk situation, or if the person has a positive antibody test and either symptoms or high-risk exposure.

Q. Do employees need to produce a doctor’s note when diagnosed with or suspected to have COVID-19?

A. The Department does not dictate the employer’s medical leave policy.

Q. Can temperature checks be done through self-screening? (i.e., employees told to take temp at home?)

The Order requires that businesses check the temperature upon discovery that the business has been exposed to a person who is a probable or confirmed COVID-19 case. However, the Department recommends that employers check the temperature and or symptoms of all employees at the beginning of each shift, particularly in those areas of the Commonwealth with high positive case numbers. This can be done in several ways:

If thermometers can be procured:

- **Employers** may take their employees’ temperatures on site utilizing best practices.
- **Employees** may **self-screen** taking their temperature at home with business-provided thermometers or their own personal thermometer.

If thermometers cannot be procured:

- **Employers** may ask their employees to conduct a questionnaire-based screening at the worksite utilizing the Department approved screening tool or equivalent.
- **Employees** may **self-screen** by conducting a questionnaire-based screening at their home utilizing the Department approved screening tool or equivalent.

If utilizing **self-screening**, businesses **must** also establish a policy for employees to report their temperature or symptoms to the employer on a daily basis. This policy should include a provision that would not allow employees with symptoms to come onto the worksite.

Additionally, businesses should consider paid leave policies that incentivize workers to stay home when reporting symptoms, including a temperature of 100.4 F or higher. This would alleviate the potential of employees lying to avoid losing pay, or potentially losing jobs.

Daily self-screening is encouraged even if the employee is not scheduled to enter the worksite. For example, if an employee is off for the weekend, performing a self-screening is not required but a matter of good public health.

Q. Is it required that a medical professional administer the temperature screenings?

A. No.

Q. In the event there is a positive test, is there an end date for temperature screening? How long must temperature checks be conducted?

A. Temperature checks and or self-screenings should be conducted for at least 14 days after an exposure. However, the Department recommends that employers, particularly those in areas of the Commonwealth with high positive case numbers, continue to conduct temperature checks as a matter of routine even after that 14 day period.

Q. Do businesses have the authority to issue temperature checks for customers/the general public at a facility?

A. Businesses that are concerned that testing customers would create legal issues should check with their legal counsel.

Q. Is the Order retroactive? If there was a positive case in the building 2 weeks ago, do we now need to do temperature screening?

A. The Secretary's Order is not retroactive. The Department does, however, recommend screening under these circumstances, particularly in those areas of the Commonwealth with high positive case numbers.

Q. If someone arrives at work in one location and is temperature screened, then drives to another work facility, does the person have to temperature screen again?

A. The Secretary's Order does not require an employer to conduct temperature screenings in more than one location under the circumstances described; however, the Department recommends such temperature screenings and or symptom screens be conducted, particularly in those areas of the Commonwealth with high positive case numbers.

Q. If someone begins their workday in another state and drives into Pennsylvania, do they have to temperature check once they get to their work destination in Pennsylvania?

A. The Secretary's Order is only intended to address temperature screening at the employee's starting workplace. If the person was temperature checked at their starting workplace they do not need to be rescreened; however, such screening is recommended, particularly in areas of the Commonwealth with high positive case numbers.

Q. Does the temperature-taking provision only apply after an employer is aware of a potential or actual exposure?

A. The Secretary's Order is only intended to address the circumstances after an employer becomes aware of a potential or actual exposure. The Department recommends temperature screenings be conducted, at all times, however, particularly in those areas of the Commonwealth with high positive case numbers.

Q. Is the temperature provision applicable to an entire facility/campus or can it be limited to specific at-risk buildings or sections of a buildings?

A. **Businesses with a campus of multiple facilities or a building with multiple offices only need to screen employees from the area of the building where an individual with a suspected or confirmed positive case of COVID-19 has worked. However, businesses should be mindful of bathrooms, breakrooms, building lobbies and other frequently visited areas.** The Department recommends temperature screenings be conducted, at all times, however, particularly in those areas of the Commonwealth with high positive case numbers.

Please review the responses above for practices with respect to temperature screening at home.

Q. Do all employees who work in a building need to have their temperatures checked even if they weren't exposed to the individual?

A. **Businesses within a large building of multiple offices only need to screen employees from the area of the building where an individual with a suspected or confirmed positive case of COVID-19 has worked. For example, if the COVID positive person works on a single floor of a building only that floor would need to be screened.**

However, businesses should be mindful of bathrooms, breakrooms, building lobbies and other frequently visited areas. The Department recommends temperature screenings be conducted, at all times, however, particularly in those areas of the Commonwealth with high positive case numbers.

Q. Is there any specific guidance regarding the sourcing/procurement of thermometers?

A. No. Employers should use regular supply opportunities or visit DCED [Business-2-Business](#) portal.

Q. If social distancing can be maintained, can there be an exemption to the mandatory mask requirement?

A. No. Employees of life-sustaining businesses that work in group settings are at risk. Masks should be worn at all times. An employee does not need to wear a mask if it impedes their vision, if they have a medical condition, or if it would create an unsafe condition in which to operate equipment or execute a task.

Q. The Order notes that essential businesses must limit occupancy to no greater than 50% of their certified occupancy. Can you please clarify whether this applies to Funeral Homes? Previous guidance issued in SRN-2020-09 says Funeral Homes are strongly encouraged to limit any services to 10 or fewer people. Does the new Order supersede the State Registrar Notice (SRN) and permit Funeral Homes to allow 50% of their occupancy for viewings?

A. Funeral Homes should follow the guidance from the SRN.

Q. If a company is staggering breaks, but not staggering shift start/stop times, would they then be required to implement those as well?

A. Employers should take all possible steps to encourage social distancing, including staggering shift start/stop times, as well as staggering breaks.

Q. What restrictions are applied to health care workers?

A. The Secretary's Order does not apply to health care workers. The Department has issued guidance for health care workers and health care settings through its Health Alert Network.

Q. Are there any considerations being given to allow compliance as long as businesses are showing they are working aggressively toward achieving compliance?

A. The Governor and the Secretary believe strongly that these provisions will protect employees and save lives. Life-sustaining businesses should take all necessary steps to comply by 8 p.m. Sunday April 19, 2020.

Q. Do retailers need to designate specific shopping time for high-risk persons?

A. The Department recommends that businesses take as many precautions as possible to ensure customer safety including special shopping hours at least once a week. However, if all other public health practices have been implemented, including limiting in person shopping, limiting the number of customers to reduce crowding, installing shields or barriers, performing regular cleaning and only opening every other register, then a business may consider if designated shopping times are necessary. Businesses should keep in mind that six feet is the recommended distance of separation. Infection is more likely to happen when customers and staff are in proximity.

Transportation:

Q: Does the Order apply to airports and freight rail operators?

A. Airports are regulated by the FAA. Freight rail operators are regulated by the FRA. Airports and Freight rail operators should therefore follow guidance from those federal regulators.

Q. Does the Order require transit riders to wear masks? What about riders participating in the Medical Assistance Transportation Program?

A. Transit riders should wear masks unless there is a medical reason that prevents them from wearing a mask, or unless they are unable to provide themselves with a mask or a suitable option (bandanna, scarf, etc.) because of economic reasons. A transit company that is able to provide masks for its customers should make every attempt to do so.

Q. Do these restrictions apply to local governments and courthouses?

A. Local political units were not required to suspend in-person operations under the business closure orders issued by the Governor and the Secretary on March 19, 2020. However, they were advised to curtail in-person operations to the extent practicable and to follow COVID-19 mitigation guidance provided by the Department and the CDC. Similarly, local political units are not required to follow the Secretary's Employee Safety Order; however, they are advised to implement the protocols that it outlines to the extent practicable. All decisions should appropriately balance public safety while ensuring the continued delivery of critical infrastructure services and functions.

Q. Do the provisions of the Order apply to state employees?

A. No, the Commonwealth is not a business that is directly covered by the Secretary's Order; however, Governor Wolf has chosen to implement the practices outlined in the Order where possible as an example for the other employers and employees in the Commonwealth.

Q. Does the new Order apply to a manufacturing operation that is closed to the public, and in compliance with all CDC Guidelines?

A. Yes. The wearing of masks is intended to benefit employees as well as the public.

Q. With veterinarian workers not being characterized as health care workers how can they continue to function with social distancing?

A. Veterinary offices should comply with all aspects of the Secretary's Order while attempting to utilize social distancing. It is understood that some veterinary procedures require close contact. Veterinarians should take proper precautions when interacting with customers and colleagues. Veterinarians should also consider limiting their in-person practice to urgent or emergency visits, and forgo elective procedures.

Q. Out of which funds available to the Governor will he be reimbursing employees or employers for the costs associated with complying this new Order?

A. Employees and employers will not be reimbursed. The Governor expects everyone to comply with the Secretary's Order to the best of their ability.



CITY OF PHILADELPHIA
OFFICE OF THE MAYOR
DEPARTMENT OF PUBLIC HEALTH

**AUTHORIZATION FOR THE CONDUCT OF CERTAIN CONSTRUCTION
ACTIVITY CURRENTLY PROHIBITED BY THE MARCH 22, 2020
EMERGENCY ORDER TEMPORARILY PROHIBITING OPERATION OF
NON-ESSENTIAL BUSINESSES AND INDIVIDUAL ACTIVITY TO PREVENT
THE SPREAD OF 2019 NOVEL CORONAVIRUS (COVID -19)**

WHEREAS, on March 6, 2020, in response to the 2019 novel coronavirus disease, COVID-19, the Governor of Pennsylvania issued a Proclamation of Disaster Emergency; and

WHEREAS, on March 11, 2020, the World Health Organization declared the COVID-19 outbreak a pandemic, or global epidemic; and

WHEREAS, on March 12, 2020, the City's Board of Health by emergency regulation added COVID-19 to the City's list of reportable and quarantinable diseases; and

WHEREAS, on March 16, 2020, the Governor of Pennsylvania announced that the Commonwealth of Pennsylvania is imposing mitigation efforts to curtail the spread of COVID-19 uniformly across the Commonwealth, calling upon nonessential businesses (excluding business such as grocery stores and medical facilities) to close beginning at midnight Tuesday March 17, 2020; and

WHEREAS, on March 17, 2020, the Mayor and the Commissioner of the Department of Public Health ("Health Commissioner") jointly issued an Emergency Order prohibiting operation of non-essential businesses to prevent the spread of COVID-19; and

WHEREAS, on March 19, 2020, the Governor and the Secretary of the Pennsylvania Department of Public Health issued orders requiring all non-life-sustaining businesses to close across the Commonwealth, to help stop the spread of the virus and the Governor and Secretary updated the aforementioned orders and list of life-sustaining and non-life sustaining businesses on March 20, 2020 and, again, on March 21, 2020; and

WHEREAS, on March 22, 2020, the Mayor and the Health Commissioner jointly issued an Emergency Order Temporarily Prohibiting Operation of Non-Essential Businesses and Congregation of Persons to Prevent the Spread of COVID-19, which superseded the

Emergency Order issued by the Mayor and Health Commissioner dated March 17, 2020, which prohibited, *inter alia*, most construction work in Philadelphia (the “March 22, 2020 Prohibition on Non-Essential Business”); and

WHEREAS, on March 23, 2020, the Governor of Pennsylvania issued a Stay at Home Order that applies to Philadelphia and numerous surrounding counties; and

WHEREAS, on March 26, 2020, the Board of Health approved an Emergency Regulation Governing the Control and Prevention of COVID-19, which adopted the Mayor and the Health Commissioner’s March 22, 2020 Emergency Order and expressly authorized the Health Commissioner to issue such additional orders as the Health Commissioner determines are necessary or appropriate control or prevention measures to limit the spread of COVID-19; and

WHEREAS, on April 15, 2020, the Secretary of Health of the Commonwealth of Pennsylvania issued an Order requiring comprehensive safety measures to be employed in all businesses maintaining physical operations, including standards for cleaning and disinfecting high-touch areas, establishing protocols for businesses exposed to probable or confirmed cases of COVID-19, limiting the numbers of employees on the premises and ensuring access to protective and sanitary equipment and supplies; and

WHEREAS, on April 20, 2020, the Governor and the Secretary of Health of the Commonwealth issued amendments to their March 19, 2020 orders concerning the closure of business that are not life sustaining to authorize, *inter alia*, “limited construction activity” that would be authorized to commence in-person operations beginning on May 8, 2020, provided such activity followed strict guidance related to mitigation measures described by the federal Centers for Disease Control and Prevention and the requirements of the Pennsylvania Secretary of Health’s April 15, 2020, Order “Directing Public Health Safety Measures for Business Permitted to Maintain In-person Operations;” and

WHEREAS, on April 23, 2020, the Governor issued a document entitled “Guidance for Businesses in the Construction Industry Permitted to Operate During the COVID-19 Disaster Emergency,” which stated that, absent the establishment or maintenance of more stringent requirement by local governments, such limited construction activity could begin on May 1, 2020, which provided additional detail regarding safety and mitigation measures required to be followed in connection with such construction activity; and

WHEREAS, COVID-19 can cause severe disease and death, particularly in older adult and other vulnerable populations; and

WHEREAS, pursuant to authority set forth in The Philadelphia Code and inherent authority set forth in The Philadelphia Home Rule Charter, the Mayor has broad authority to set forth limitations on public activities during a state of national health emergency; and

WHEREAS, Sections 6-205 and 6-206 of The Philadelphia Code provide that the Department of Public Health may by order forbid the congregation of persons when necessary to prevent the further spread of a communicable and quarantinable disease and may take such other measures as are necessary to prevent the spread of such disease; and

WHEREAS, scientific evidence shows that preventing close contact of individuals is an effective way to mitigate the spread of communicable diseases like COVID-19; and

WHEREAS, the Mayor and the Health Commissioner have determined that, in order to allow limited economic activity to protect existing construction sites, and protect jobs and investment in the City, construction activity may resume in the City with strict limitations appropriate to the situation and the need to limit the spread of COVID-19 on the bases outlined in this Order;

NOW, THEREFORE, James F. Kenney, Mayor of the City of Philadelphia, and Dr. Thomas A. Farley, Health Commissioner of the City of Philadelphia, pursuant to all authority granted under the Philadelphia Home Rule Charter, The Philadelphia Code, the Regulations of the Board of Health of the City of Philadelphia and applicable state law, hereby **ORDER** as follows:

Section 1. Scope.

A. This Order pertains to projects for which a building or demolition permit was issued by the City of Philadelphia on or before March 20, 2020.

B. The lifting of restrictions pertaining to projects for which building or demolition permits were or will be issued after March 20, 2020, shall be addressed in subsequent Orders and construction activity in connection with such projects shall not take place until such restrictions are lifted, except that projects for which the City issued permits after March 20, 2020 to abate emergencies are not restricted and may continue in accordance with applicable orders and guidance.

C. No work shall be performed under this Order on the interior of residential structures, except for emergency repairs as defined in Section 1.G.1(iii) of the City's March 22, 2020 Prohibition on Non-Essential Business. In multi-family buildings or portions thereof, no work is permitted within any occupied dwelling unit or within any shared

common area, except emergency repairs as defined in Section 1.G.1(iii) of the City's March 22, 2020 Prohibition on Non-Essential Business.

D. The following types of construction work remain prohibited, unless authorized in writing by the Commissioner of the Department of Licenses and Inspections:

- underpinning work;
- demolition of an attached structure; and
- projects that require the support of an existing party wall.

Section 2. Periods of Authorized Work.

Work authorized under this Order may begin on May 1, 2020 at 7 a.m. All work allowed under this Order must take place between 7 a.m. and 5 p.m. on Mondays through Fridays. No work may be performed on Saturdays or Sundays, or before 7 a.m. or after 5 p.m. on a weekday, except in an emergency situation.

Section 3. Safety and Mitigation Requirements.

All work performed under this Order must be performed in strict adherence to the following safety requirements.

A. All work must conform to requirements of the Order of the Secretary of the Pennsylvania Department of Health Directing Public Health Safety Measures for Businesses Permitted to Maintain In-person Operations issued on April 15, 2020, including but not limited to requirements to:

- provide masks for employees to wear during their time at the work site, and make it a mandatory requirement to wear masks while on the work site;
- provide sufficient amount of space for employees to have breaks and meals while maintaining a social distance of six (6) feet;
- establish protocols to execute upon discovery that workers have been exposed to a person who is a probable or confirmed case of COVID-19; and
- provide employees access to regular hand washing with soap, hand sanitizer, and disinfectant wipes, and ensure that common areas are cleaned on a regular basis.

B. All work must conform to any applicable provisions of the April 5, 2020, Order of the Pennsylvania Secretary of Health providing for building safety measures.

C. All work must follow all applicable guidance of the Centers for Disease Control, particularly the April 8, 2020 Interim Guidance for Implementing Safety Practice for Critical Infrastructure Workers Who May Have Had Exposure to a Person with Suspected or Confirmed COVID-19.

D. All work must follow all aspects of the Governor's April 23, 2020 "Guidance for Businesses in the Construction Industry Permitted to Operate During the COVID-19 Disaster Emergency," including but not limited to the following requirements that shall be strictly followed:

- Implementing cleaning and sanitizing protocols at all construction sites and projects, including regular and periodic cleaning and disinfecting of areas that are at high risk for transmission, such as common areas and regularly trafficked spaces (sites are encouraged to engage cleaning companies trained in disinfection protocols to address communicable diseases);
- Requiring social distancing (six-foot minimum distance between workers) while working, unless the safety of the public or workers require deviation;
- No more than four (4) persons per dwelling unit may work at a site for the construction or renovation of a one or two-family dwelling;
- No more than four (4) persons may work at a commercial site or portion thereof that is enclosed and less than 2,000 square feet; one additional worker is allowed for each additional 500 square feet of enclosed area over 2,000 square feet;
- All other construction must adhere to the limitations on numbers of workers at a particular location set forth in the Governor's Guidance;
- Employ jobsite screening based on CDC guidance to determine if workers should work;
- Prohibit employees with COVID-19 symptoms from working and requiring all sick workers to stay home;
- Limit tool sharing and sanitize tools if they must be shared; and
- Ensuring, when feasible, that workers travel to and from the site separately.

E. The Site Safety Manager at each job site, who may also be the "Pandemic Safety Officer" as required under the Governor's Guidance, must obtain a COVID-19 training certificate from one of the training sources designated by the Department of Licenses and Inspections on its website. Such officers shall convey, implement and enforce

the masking, social distancing, sanitization, and other requirements of this Order and its incorporated orders and guidance.

F. A COVID-19 Safety Plan must be maintained at each job site that outlines the site’s plans for complying with all applicable orders and guidance, educating workers on safety precautions, and measures to mitigate the risk of spreading COVID-19. Said Plan shall be produced upon request by the Department of Licenses and Inspections.

G. Failure to allow the use of sick or other applicable leave time by any worker under The Philadelphia Code or any other provision of state or federal law that allows for the use of such time in connection with the activities allowed under this Order shall constitute a violation of the requirements of this Order.

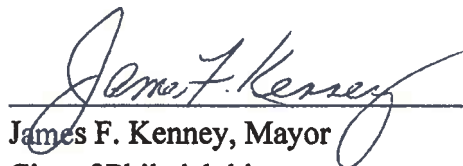
Section 4. Adherence to Limitations of this Order.

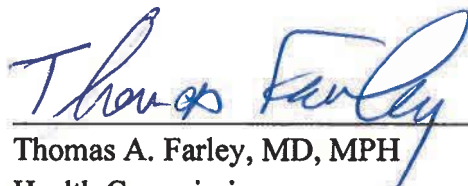
Violations of the requirements of this Order, including any of the safety or mitigation requirements set forth in Section 3, shall be strictly enforced and may lead to the issuance of violation notices, stop work orders, the imposition of fines, the revocation or suspension of licenses, and any other remedies available under law.

Section 5. No Vested Rights.

Work based on permits for which a right of appeal has not expired because of the extension of appeal rights due to the emergency shall proceed at the builder’s own risk and not be subject to a claim of vested rights or any other similar claim.

Date: April 29, 2020


James F. Kenney, Mayor
City of Philadelphia


Thomas A. Farley, MD, MPH
Health Commissioner
City of Philadelphia

COVID-19 Office of Facilities Management & Services and Office of Capital Programs
Coordinated Emergency Response Plan

If anyone within the **facilities unit** is notified of a suspected or confirmed COVID-19 case, the following steps are taken:

1. FAC (or facilities staff) is notified that someone has a suspected or confirmed COVID-19 case, they immediately notify Tim Holman.
2. Construction Site:
 - a. Tim Holman will notify Ralph Carp, Jim Creedon, and Jessica Binda.
 - b. Tim Holman will close the building and initiates the emergency response (listed below).
 - c. Tim Holman will send a notification to the district's COVID-19 hotline, covid19info@philasd.org.
 - d. Jessica Binda will notify Ahmed Sultan and the Construction Project Manager.
 - e. The Construction Project Manager will notify the Construction Inspector and contractors on site that the building is closed for at least 48 hours. Follow up instructions will be provided within 36 hours.
 - f. The Construction Inspector will go to the school the following morning to ensure no contractors attempt to enter the building.
3. Feeding Site:
 - a. Tim Holman will notify Ralph Carp, Jim Creedon, and Wayne Grasela.
 - b. Tim Holman will close the building and initiate the emergency response (listed below).
 - c. Tim Holman will send a notification to the district's COVID-19 hotline, covid19info@philasd.org.
4. Tim Holman initiates the emergency response:
 - a. For the first 24 hours, the building will be aired out if feasible. Windows will be opened.
 - b. After the first 24 hours, an evaluation will be made on next steps, regarding disinfection.
 - c. Tim Holman will notify Ralph Carp, Jim Creedon, and Wayne Grasela and/or Jessica Binda that the building is ready to reoccupy.
 - d. Jessica Binda will notify the Construction Project Manager to inform the Construction Inspector and contractors on site that the building is open the next business day.
 - e. After the emergency response procedure is complete, the contractors will be required to take the temperatures of all their employees prior to entering the building.



If anyone within the **construction unit** (employee or contractor) is notified of a suspected or confirmed COVID-19 case, the following steps are taken:

1. Project Manager (or construction staff) is notified that someone has a suspected or confirmed COVID-19 case, they immediately notify Jessica Binda.
2. Construction Site:
 - a. Jessica Binda will notify Ahmed Sultan, Jim Creedon, and Tim Holman.
 - b. Tim Holman will close the building and initiate the emergency response (listed below).
 - c. Jessica Binda will send a notification to the district's COVID-19 hotline, covid19info@philasd.org.
 - d. Tim Holman will notify Ralph Carp.
 - e. The Construction Project Manager will notify the Construction Inspector and contractors on site that the building is closed for at least 48 hours. Follow up instructions will be provided within 36 hours.
 - f. The Construction Inspector will go to the school the following morning to ensure no contractors attempt to enter the building.
3. Feeding Site:
 - a. Jessica Binda will notify Ahmed Sultan, Ralph Carp, Tim Holman, and Wayne Grasela.
 - b. Tim Holman will close the building and initiate the emergency response (listed below).
 - c. Jessica Binda will send a notification to the district's COVID-19 hotline, covid19info@philasd.org.
4. Tim Holman initiates the emergency response:
 - a. For the first 24 hours, the building will be aired out, if feasible. Windows will be opened.
 - b. After the first 24 hours, the entire building will be sanitized.
 - c. Tim Holman will notify Ralph Carp, Jim Creedon, and Wayne Grasela and/or Jessica Binda that the building is ready to reoccupy.
 - d. Jessica Binda will notify the Construction Project Manager to inform the Construction Inspector and contractors on site that the building is open the next business day.
 - e. After the emergency response procedure is complete, the contractors will be required to take the temperatures of all their employees prior to entering the building.



THE SCHOOL DISTRICT OF PHILADELPHIA
OFFICE OF CAPITAL PROGRAMS
440 N. BROAD STREET, 3RD FLOOR
PHILADELPHIA, PENNSYLVANIA 19130-4015

COVID-19 Construction Inspector Checklist

General Job Site

- Pandemic Safety Officer is on site.
 - General Contractor
 - Mechanical Contractor
 - Electrical Contractor
 - Plumbing Contractor
- COVID-19 training certificate is available on site.
 - General Contractor
 - Mechanical Contractor
 - Electrical Contractor
 - Plumbing Contractor
- The written COVID-19 Safety Plan is available on site.
 - General Contractor
 - Mechanical Contractor
 - Electrical Contractor
 - Plumbing Contractor

Pre-entry Screening

- Pre-entry screening is being performed.
 - General Contractor
 - Mechanical Contractor
 - Electrical Contractor
 - Plumbing Contractor
- Have any contractors reported of any pre-entry screening failures (yes or no)?
 - General Contractor _____
 - Mechanical Contractor _____
 - Electrical Contractor _____
 - Plumbing Contractor _____

Personal Protective Equipment

- All contractors are wearing a mask or scarf to cover their nose and mouth.
- To the extent possible, contractors are implementing social distancing (6 feet).
- Contractors are avoiding trade stacking.
- Increased cleaning procedures are being completed by the lead contractor twice a day.
 - Restrooms are disinfected.
 - Break areas are disinfected.
 - High touch/traffic areas are disinfected.

Suspected or Confirmed Case

- Have you been notified of a suspected or confirmed case on site? (yes or no)
 - General Contractor _____
 - Mechanical Contractor _____
 - Electrical Contractor _____
 - Plumbing Contractor _____
- If yes, has the case been reported to your supervisors? (yes or no) _____
- If a suspected or confirmed case has been reported in the last 14 days, are temperature screening procedures taking place? (yes or no)
 - General Contractor _____
 - Mechanical Contractor _____
 - Electrical Contractor _____
 - Plumbing Contractor _____

Please provide any additional comments below:

Name: _____

Project: _____

Date: _____



THE SCHOOL DISTRICT OF
PHILADELPHIA

As of the date noted below, I am an authorized representative of the Prime Contractor and acknowledge that I have read and understand the School District of Philadelphia's COVID-19 Precautions Plan, dated May 1, 2020. My company will utilize best efforts to comply with the plan.

Prime Contractor Company Name:

Prime Contractor's Authorized Representative:

Representative's Signature:

Date:



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2	5/15/2020	ADDENDUM #2
1	3/6/2020	100% BID SET
NO.	DATE	REVISION

GENERAL SITE NOTES:

- CONTRACTOR ENTRANCES INTO SCHOOL PER PHASE / SHIFT. REFERENCE PHASING DATES AND SHIFT HOURS PER PHASE. ALL EXITS TO REMAIN CLEAR AT ALL TIMES OF MATERIALS.
- DELIVERY ACCESS LOCATIONS - COORDINATE ALLOWABLE DELIVERY TIMES WITH SCHOOL OPERATIONAL HOURS INCLUDING BUT NOT LIMITED TO TRASH REMOVAL, DISTRICT USES, DISTRICT DELIVERIES ETC. - REFERENCE SPECIFICATIONS.
- CONTRACTOR STAGING AREA - ALL MATERIALS / TRAILERS ARE TO BE FENCED AS SHOWN.
- TEMPORARY TRASH CONTAINER LOCATION - MAINTAIN CLEAR PATH FOR PICKUP.
- EXISTING PLAYGROUND AREA FOR STUDENTS - COORDINATE ALL ACTIVITIES IN THIS AREA - MAINTAIN CLEAR / CLEAN AREA FOR DISTRICT USE.
- NO CONTRACTORS ALLOWED IN STAFF PARKING LOT AT ANYTIME.
- MAINTAIN OPEN STREET ACTIVITY AROUND ENTIRE SITE AT ALL TIMES - RESIDENTIAL AREA SURROUNDING THE ENTIRE SITE.
- LOCATION OF NEW ELECTRIC SERVICE TRANSFORMER - COORDINATE WITH EXACT LOCATION WITH EC DRAWINGS. REFERENCE A-111 FOR ADDITIONAL INFORMATION FOR THE TRANSFORMER ENCLOSURE.

STAGING AREA SHALL BE CONFIRMED WITH THE SCHOOL DISTRICT OF PHILADELPHIA BUILDING ADMINISTRATION AND CONSTRUCTION MANAGEMENT TEAM. SDP RESERVES ALL RIGHTS TO CHANGE / MODIFY THE STAGING AREA AS SHOWN ON THIS PLAN.

START OF STAGING SHALL START ONCE NTP IS ISSUED - COORDINATE EXACT TIMING WITH SDP AND BUILDING ADMINISTRATION.

GENERAL NOTES FOR PHASING PLANS:

- REFERENCE ALL SPECIFICATIONS AND DRAWING DOCUMENTS FOR EXACT SCOPE OF THE PROJECT - PHASING PLANS ARE GENERALIZED SCOPE BREAKDOWN OF THE MAJOR COMPONENTS.
- PHASES 2, 3, 4, 5 and 7 ARE SECOND SHIFT WORKING HOURS.
- ELECTRICAL CONTRACTOR TO VERIFY WITH DISTRICT WITH EXACT TIMING OF THE NEW SERVICE SHUTDOWN PRIOR TO WORK.
- CONTRACTOR OPTION TO START WINDOW REPLACEMENT PRIOR TO SUMMER 2021 - COORDINATE EXACT AREA WITH DISTRICT PRIOR TO STARTING WORK (PHASE 4 THROUGH PHASE 7).
- ALL CONTRACTORS TO COORDINATE WITH EACH PRIME PRIOR TO START OF EACH PHASED AREA.
- ALL STAGING AND PHASING AREAS COULD BE MODIFIED WITHOUT NOTICE AND COST TO THE DISTRICT.
- PHASING DATES ARE TARGET DATES THAT IS THE CONTRACTORS RESPONSIBILITY TO SUBSTANTIALLY COMPLETE WORK LISTED PER PHASE.

1 SITE PLAN / STAGING

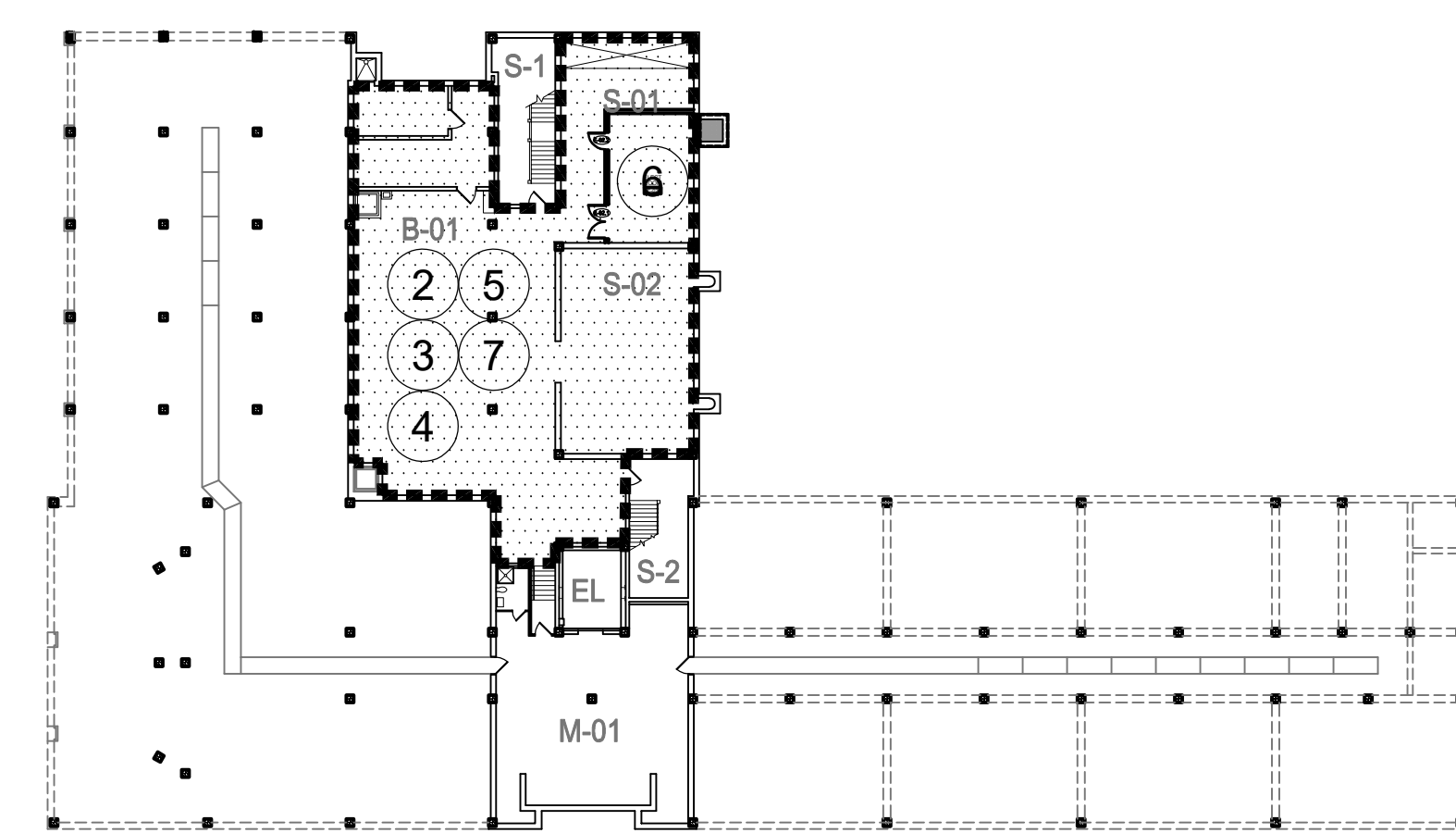
A-003a SCALE: 1/32" = 1'-0"



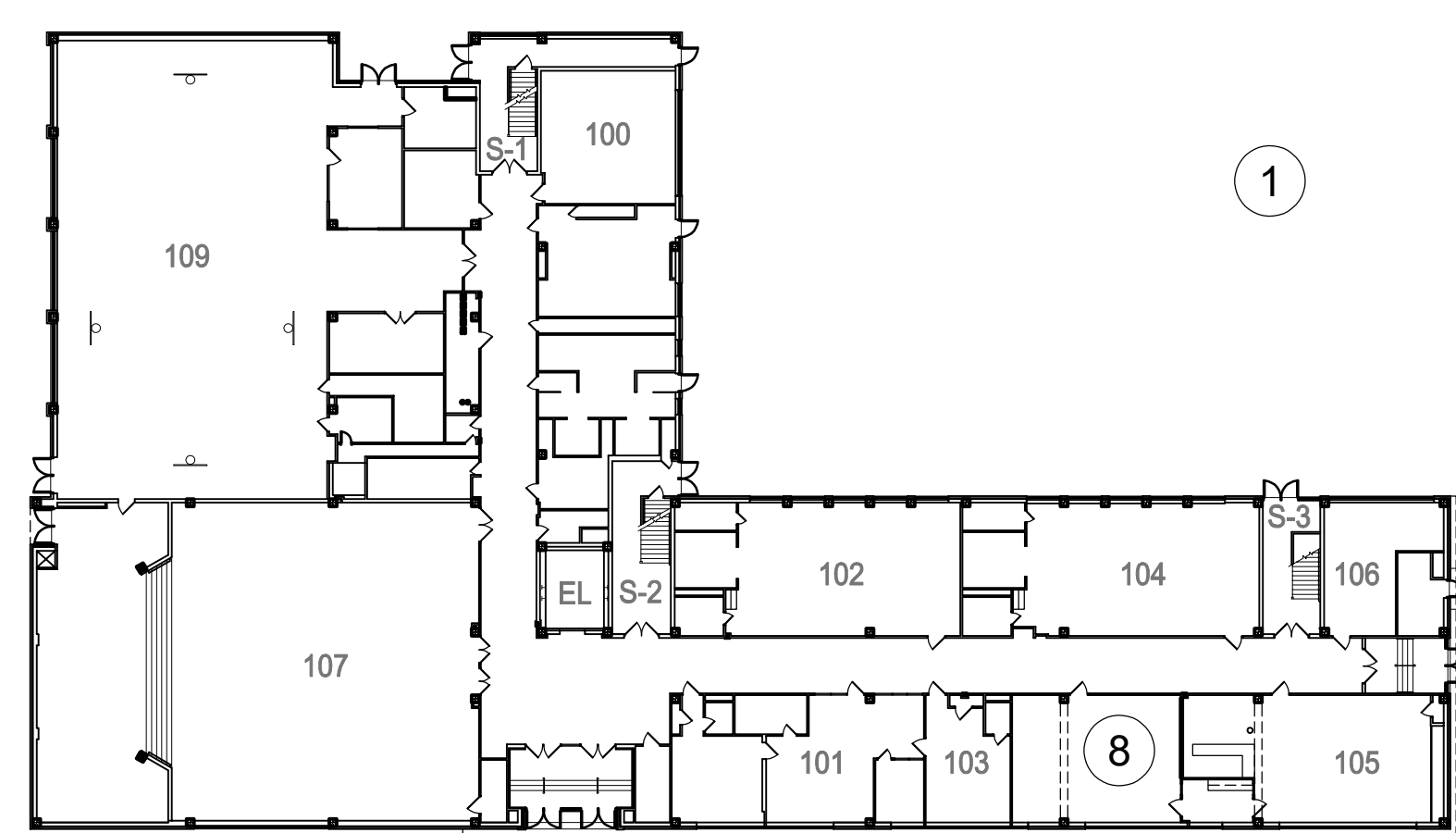
PHASE 1 : OCTOBER 5, 2020 THROUGH MARCH 19, 2021 (24 WEEKS)

- FIRST SHIFT**
- CONTRACTORS STAGE SITE - COORDINATE WITH DISTRICT ON EXACT LAYOUT
 - BOILER ROOM ABATEMENT - COORDINATE WITH ENVIRONMENTAL SPECIFICATIONS
 - BOILER ROOM EQUIPMENT DEMOLITION - COORDINATE WITH ALL PRIMES
 - BOILER ROOM FLOOR DEMOLITION (PARTIAL) - COORDINATE WITH ALL PRIMES & ENVIRONMENTAL
 - BOILER ROOM EQUIPMENT INSTALL (NEW WORK) - COORDINATE WITH ALL PRIMES
 - ELECTRICAL SERVICE ROOM CONSTRUCTION - COORDINATE WITH ALL PRIMES
 - ELECTRICAL LIGHTING REPLACEMENT IN BOILER AREAS
 - CONSTRUCT TEMPORARY WALL IN IMC - COORDINATE TIMING WITH WINTER BREAK.

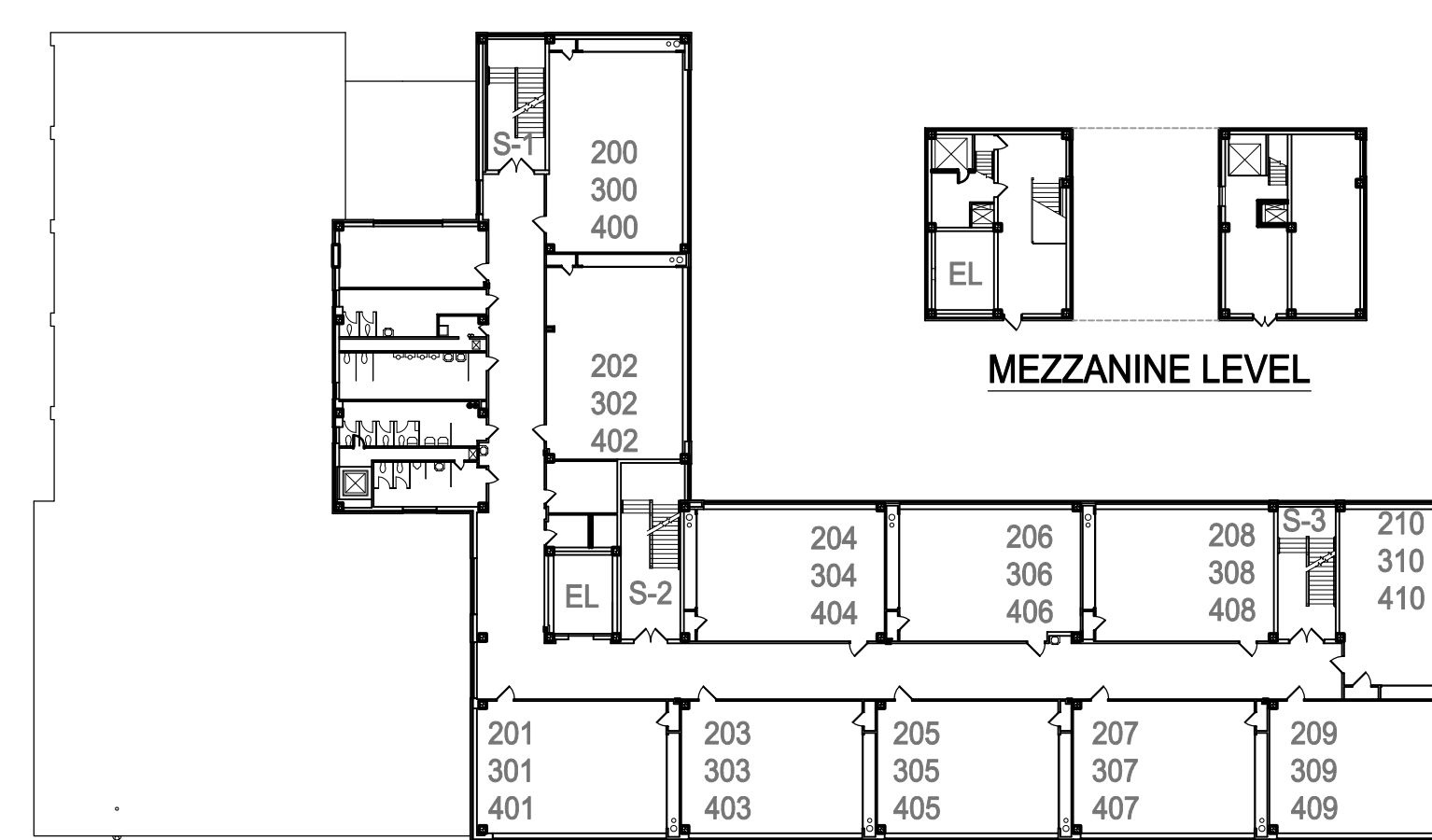
KEY:



BOILER ROOM PLAN - LOWER LEVEL



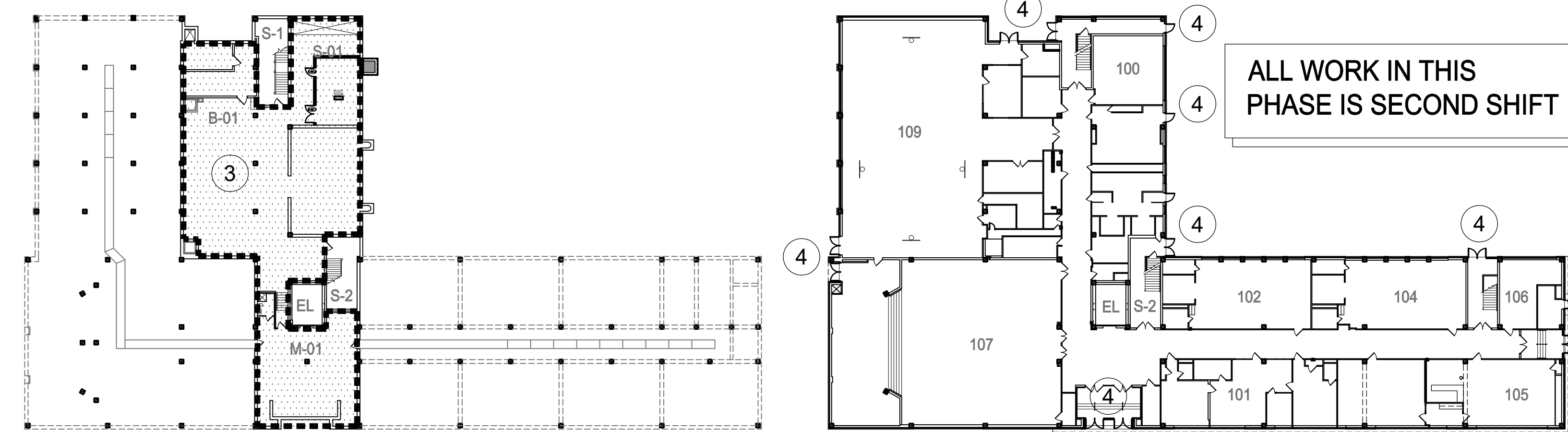
6 FIRST FLOOR PLAN - MAIN LEVEL



SECOND THROUGH FOURTH FLOOR PLAN - UPPER LEVELS

2 PHASE 1 - KEY PLAN AND NOTES

A-003a SCALE: 1/32" = 1'-0"



BOILER ROOM PLAN - LOWER LEVEL

FIRST FLOOR PLAN - MAIN LEVEL

SECOND THROUGH FOURTH FLOOR PLAN - UPPER LEVELS

PHASE 2 : MARCH 22, 2021 THROUGH APRIL 9, 2021 (3 WEEKS)

- DEMOLISH EXISTING UNIT VENTILATOR AND PREP FOR NEW WORK; NEW WORK INCLUDES BUT NOT LIMITED TO THE FOLLOWING: NEW CONCRETE BASE / INSTALL OF NEW U.V. / POWERING OF UNITS / RE-INSTALL CASEWORK (IF APPLICABLE TO CLASSROOM) AND WALL PAINTING.
(NOTE: WINDOW REPLACEMENT IN FUTURE PHASES)
- PHASE 3 INCLUDES THE FOLLOWING CLASSROOMS: ROOM 209, 309, 409
- BOILER ROOM WORK ON GOING (FROM PHASE 1)
- CONTRACTOR OPTION TO START EXTERIOR DOOR FRAME/DOOR REPLACEMENT.

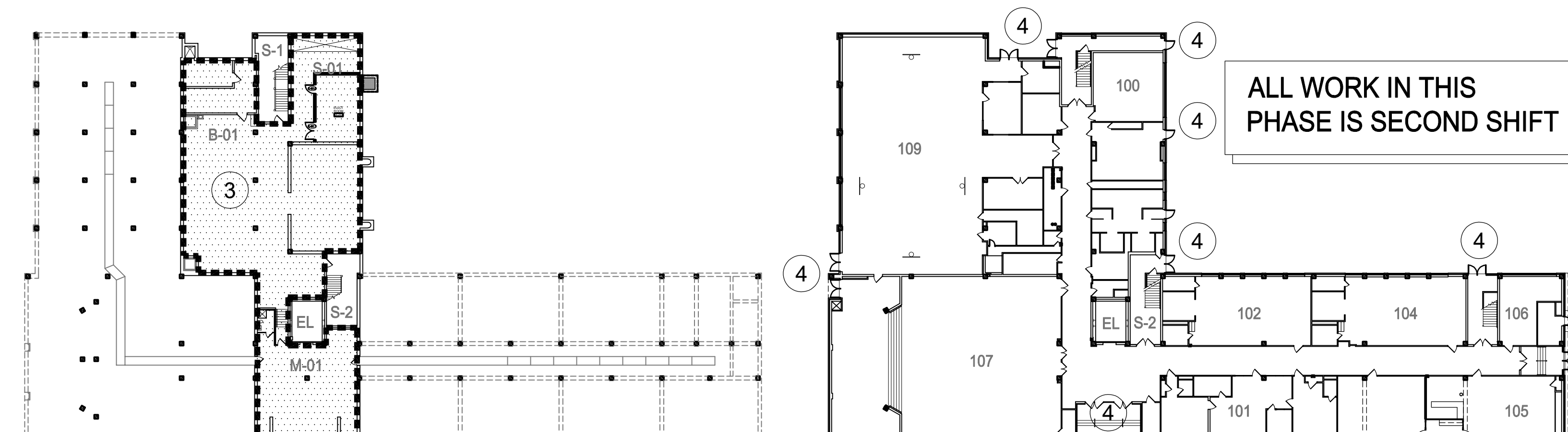
KEY:



GENERAL NOTE: RENOVATION PHASES 2 THROUGH 5 INCLUDE 3 CLASSROOMS / 3 WEEKS LONG. CONTRACTORS WILL HAVE FULL ACCESS OF THOSE ROOMS AS NOTE IN PHASE FOR THOSE 3 WEEKS FOR STORED MATERIALS / EQUIPMENT. NO ACCESS DURING THE DAY HOURS - ALL WORK WITHIN PHASES 2 THROUGH 5 ARE SECOND SHIFT WORKING HOURS.

3 PHASE 2 - KEY PLAN AND NOTES

A-003a SCALE: 1/32" = 1'-0"



BOILER ROOM PLAN - LOWER LEVEL

FIRST FLOOR PLAN - MAIN LEVEL

SECOND THROUGH FOURTH FLOOR PLAN - UPPER LEVELS

PHASE 3 : APRIL 12, 2021 THROUGH APRIL 30, 2021 (3 WEEKS)

- DEMOLISH EXISTING UNIT VENTILATOR AND PREP FOR NEW WORK; NEW WORK INCLUDES BUT NOT LIMITED TO THE FOLLOWING: NEW CONCRETE BASE / INSTALL OF NEW U.V. / POWERING OF UNITS / RE-INSTALL CASEWORK (IF APPLICABLE TO CLASSROOM) AND WALL PAINTING.
(NOTE: WINDOW REPLACEMENT IN FUTURE PHASES)
- PHASE 3 INCLUDES THE FOLLOWING CLASSROOMS: ROOM 210, 310, 410
- BOILER ROOM WORK ON GOING (FROM PHASE 1)
- CONTRACTOR OPTION TO START EXTERIOR DOOR FRAME/DOOR REPLACEMENT.

KEY:



GENERAL NOTE: RENOVATION PHASES 2 THROUGH 5 INCLUDE 3 CLASSROOMS / 3 WEEKS LONG. CONTRACTORS WILL HAVE FULL ACCESS OF THOSE ROOMS AS NOTE IN PHASE FOR THOSE 3 WEEKS FOR STORED MATERIALS / EQUIPMENT. NO ACCESS DURING THE DAY HOURS - ALL WORK WITHIN PHASES 2 THROUGH 5 ARE SECOND SHIFT WORKING HOURS.

4 PHASE 3 - KEY PLAN AND NOTES

A-003a SCALE: 1/32" = 1'-0"





ARCHITECT:
GODHALL KANE O'ROURKE ARCHITECTS, LLC
300 BROOKSIDE AVENUE - BLDG. 18 - SUITE 1150
AMBLER, PA, 19002
Phone: 215.646.2003
Email: JOE@GKORARCHITECTS.COM
Attn: JOSEPH MESSMER

MECHANICAL / PLUMBING ENGINEER:
CONSOLIDATED ENGINEERS
1022 JAMES DRIVE
LEESPORT, PA 19533
Phone: 610.916.1600
Fax: 610.916.1610
Email: ADAMM@CEMEC.COM
Attn: ADAM MOSER

ELECTRICAL ENGINEER:
FSQUARED CONSULTING ENGINEERS
699 W. GERMANTOWN PIKE, SUITE 300
PLYMOUTH MEETING, PA 19462
Phone: 484.539.9459
Email: GOPI.PATEL@FSQUAREDENG.COM
Attn: GOPI PATEL

STRUCTURAL ENGINEER:
DRUHY ENGINEERING, INC.
ONE EAST BROAD STREET, SUITE 310
BETHLEHEM, PA 18018
Phone: 610.865.3000
Email: PMG@DRUHY.COM
Attn: PETER M. GARLAND

100% BID SET SUBMISSION - 3.6.2020

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2	5/15/2020 ADDENDUM #2	
1	3/6/2020 100% BID SET	
NO.	DATE	REVISION

SCHOOL & LOCATION
JAMES RHOADS ELEMENTARY SCHOOL
4901 PARRISH STREET, PHILADELPHIA, PA 19139

PROJECT TITLE
JAMES RHOADS E.S. MAJOR RENOVATION

DRAWING TITLE
PHASING PLAN

DRAWING SCALE AS NOTED	
LOCATION NO.	
DRAWN BY JRM	CHECKED BY KRG
GC - B-040 C	OF 2019 / 20
MC - B-041 C	OF 2019 / 20
PC - B-042 C	OF 2019 / 20
EC - B-043 C	OF 2019 / 20

DRAWING NO.
A - 003b

SHEET 4 OF 77

PHASE 4 : MAY 3, 2021 THROUGH MAY 21, 2021 (3 WEEKS)

- DEMOLISH EXISTING UNIT VENTILATOR AND PREP FOR NEW WORK; NEW WORK INCLUDES BUT NOT LIMITED TO THE FOLLOWING: NEW CONCRETE BASE / INSTALL OF NEW U.V. / POWERING OF UNITS / RE-INSTALL CASEWORK (IF APPLICABLE TO CLASSROOM) AND WALL PAINTING.
(NOTE: WINDOW REPLACEMENT IN FUTURE PHASES)
- PHASE 3 INCLUDES THE FOLLOWING CLASSROOMS: ROOM 208, 308, 408
- BOILER ROOM WORK ON GOING (FROM PHASE 1)
- CONTRACTOR OPTION TO START EXTERIOR DOOR FRAME/DOOR REPLACEMENT.

GENERAL NOTE: RENOVATION PHASES 2 THROUGH 5 INCLUDE 3 CLASSROOMS / 3 WEEKS LONG. CONTRACTORS WILL HAVE FULL ACCESS OF THOSE ROOMS AS NOTE IN PHASE FOR THOSE 3 WEEKS FOR STORED MATERIALS / EQUIPMENT. NO ACCESS DURING THE DAY HOURS - ALL WORK WITHIN PHASES 2 THROUGH 5 ARE SECOND SHIFT WORKING HOURS.

KEY:

AREA BEING RENOVATED (hatched pattern) COMPLETED CONSTRUCTION (solid grey)

PHASE 5 : MAY 24, 2021 THROUGH JUNE 11, 2021 (3 WEEKS)

- DEMOLISH EXISTING UNIT VENTILATOR AND PREP FOR NEW WORK; NEW WORK INCLUDES BUT NOT LIMITED TO THE FOLLOWING: NEW CONCRETE BASE / INSTALL OF NEW U.V. / POWERING OF UNITS / RE-INSTALL CASEWORK (IF APPLICABLE TO CLASSROOM) AND WALL PAINTING.
(NOTE: WINDOW REPLACEMENT IN FUTURE PHASES)
- PHASE 3 INCLUDES THE FOLLOWING CLASSROOMS: ROOM 207, 307, 407
- BOILER ROOM WORK ON GOING (FROM PHASE 1)
- CONTRACTOR OPTION TO START EXTERIOR DOOR FRAME/DOOR REPLACEMENT.

GENERAL NOTE: RENOVATION PHASES 2 THROUGH 5 INCLUDE 3 CLASSROOMS / 3 WEEKS LONG. CONTRACTORS WILL HAVE FULL ACCESS OF THOSE ROOMS AS NOTE IN PHASE FOR THOSE 3 WEEKS FOR STORED MATERIALS / EQUIPMENT. NO ACCESS DURING THE DAY HOURS - ALL WORK WITHIN PHASES 2 THROUGH 5 ARE SECOND SHIFT WORKING HOURS.

KEY:

AREA BEING RENOVATED (hatched pattern) COMPLETED CONSTRUCTION (solid grey)

PHASE 6 : JUNE 14, 2021 THROUGH AUGUST 6, 2021 (8 WEEKS)
SUBSTANTIAL COMPLETION OF PROJECT **FIRST SHIFT**

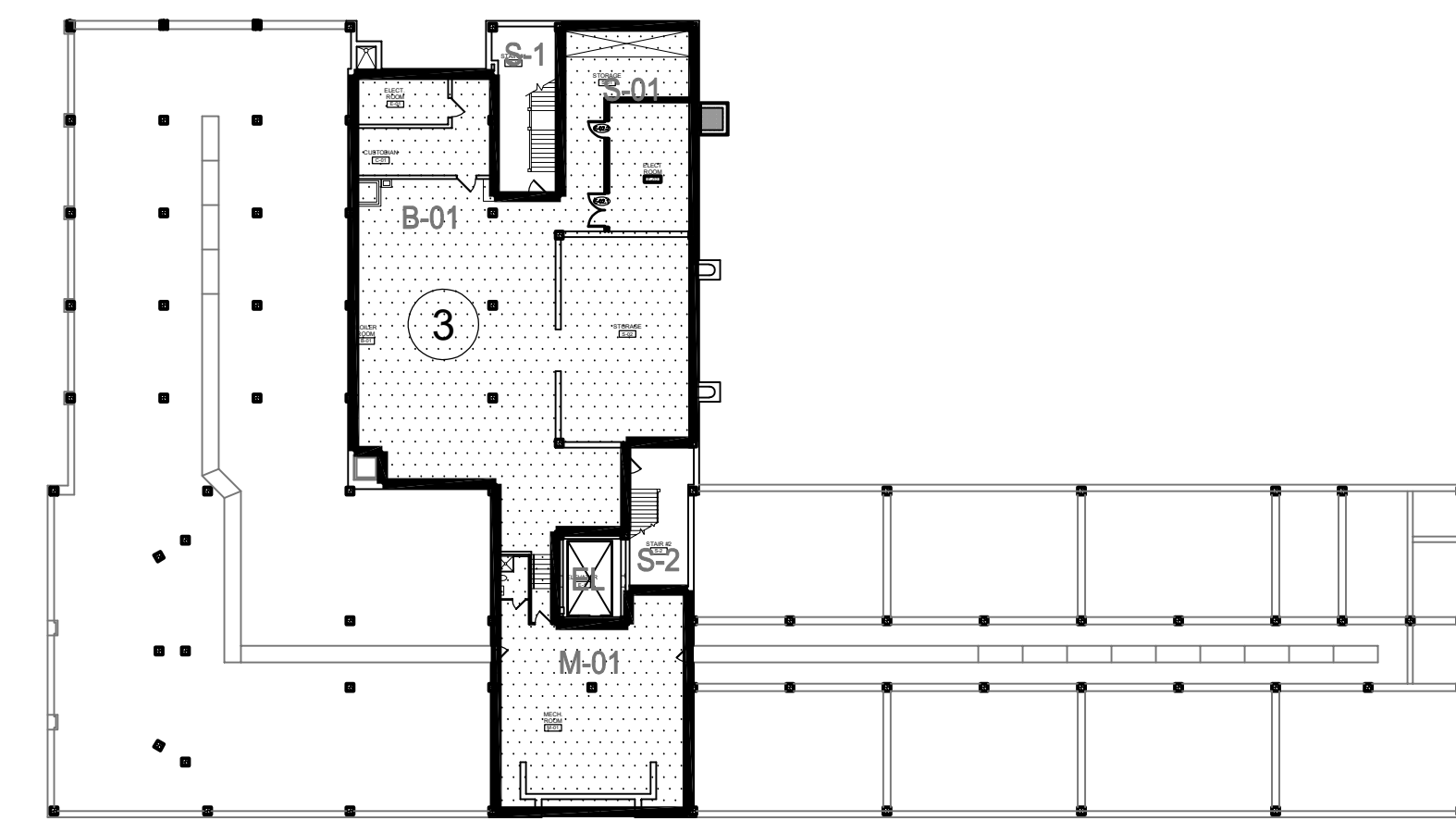
- HVAC REPLACEMENT IN ALL REMAINING CLASSROOMS / OFFICES / SPACES - INCLUDING ALL TESTING AND BALANCING OF SYSTEM.
- RENOVATE AUDITORIUM / STAGE (GC,MC,EC,PC)
- REPLACEMENT OF NEW ELECTRICAL SERVICE & SWITCHOVER / ALL REMAINING PANEL WORK.
- REPLACEMENT OF FIRE ALARM SYSTEM
- ELEVATOR MODERNIZATION
- OIL TANK REMOVAL - COORDINATE WITH ENVIRONMENTAL SPECIFICATIONS / WINDOW REPLACEMENT
- CLASSROOM WINDOW REPLACEMENT IN CONJUNCTION WITH MASONRY REPAIRS (SILLS/FLASHING)
- HVAC EQUIPMENT SWITCHOVER / DEMOLISH REMAINING EQUIPMENT (REMAINING FLOORING INCLUDED)
- CHILLER SUPPORTS / EQUIPMENT INSTALL
- REMOVE TEMPORARY WALL IN IMC AND REPLACE CEILING / LIGHTING

PHASE 7 : AUGUST 9, 2021 THROUGH OCTOBER 1, 2021 (8 WEEKS)
FINAL COMPLETION OF PROJECT

- ALL PAPERWORK - O/M & WARRANTIES
- PUNCHLIST
- SITE CLEAN OUT / DEMOBILIZE
- FULL BUILDING TURNOVER TO DISTRICT

KEY:

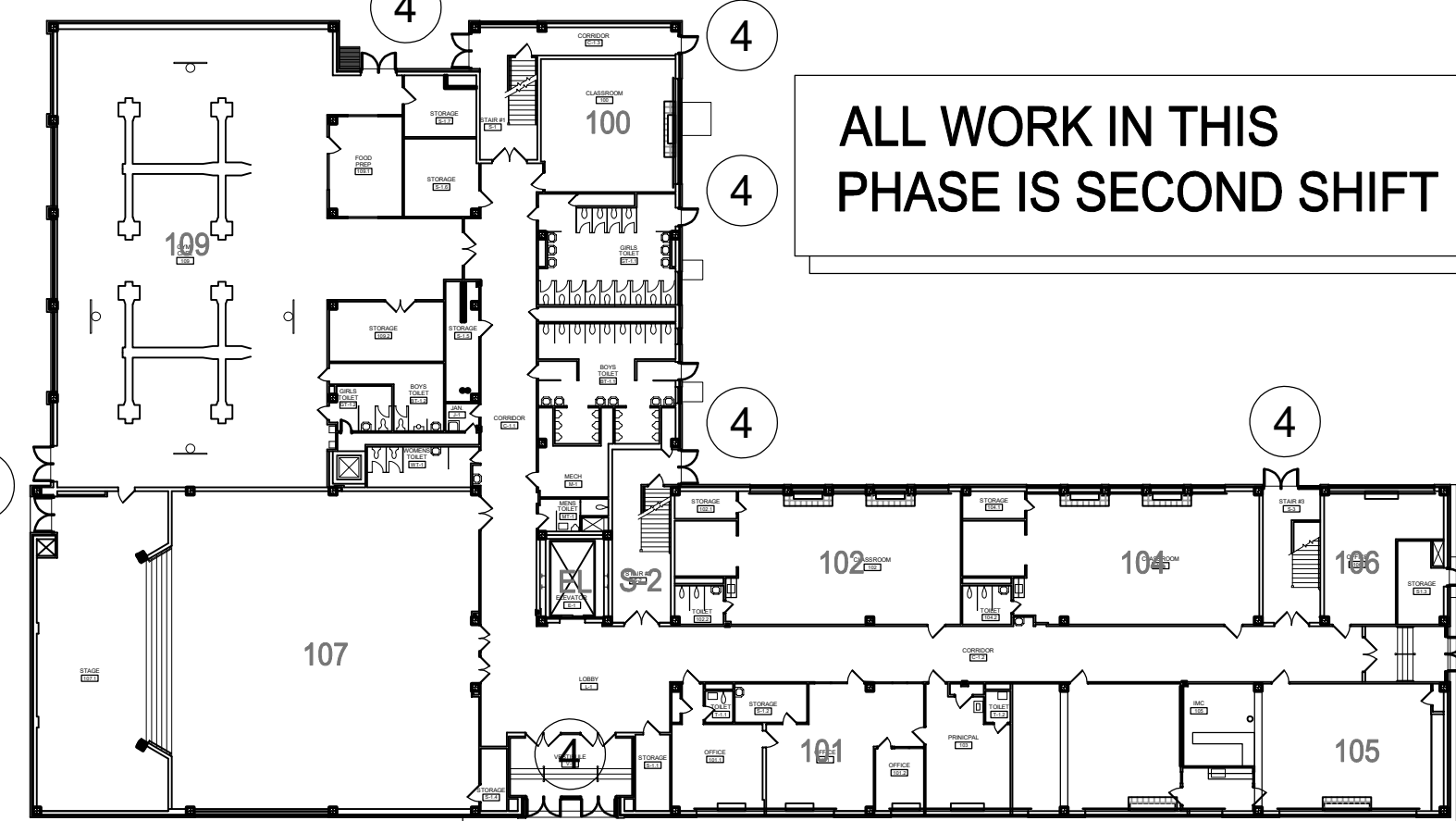
AREA BEING RENOVATED (hatched pattern) COMPLETED CONSTRUCTION (solid grey)



BOILER ROOM PLAN - LOWER LEVEL

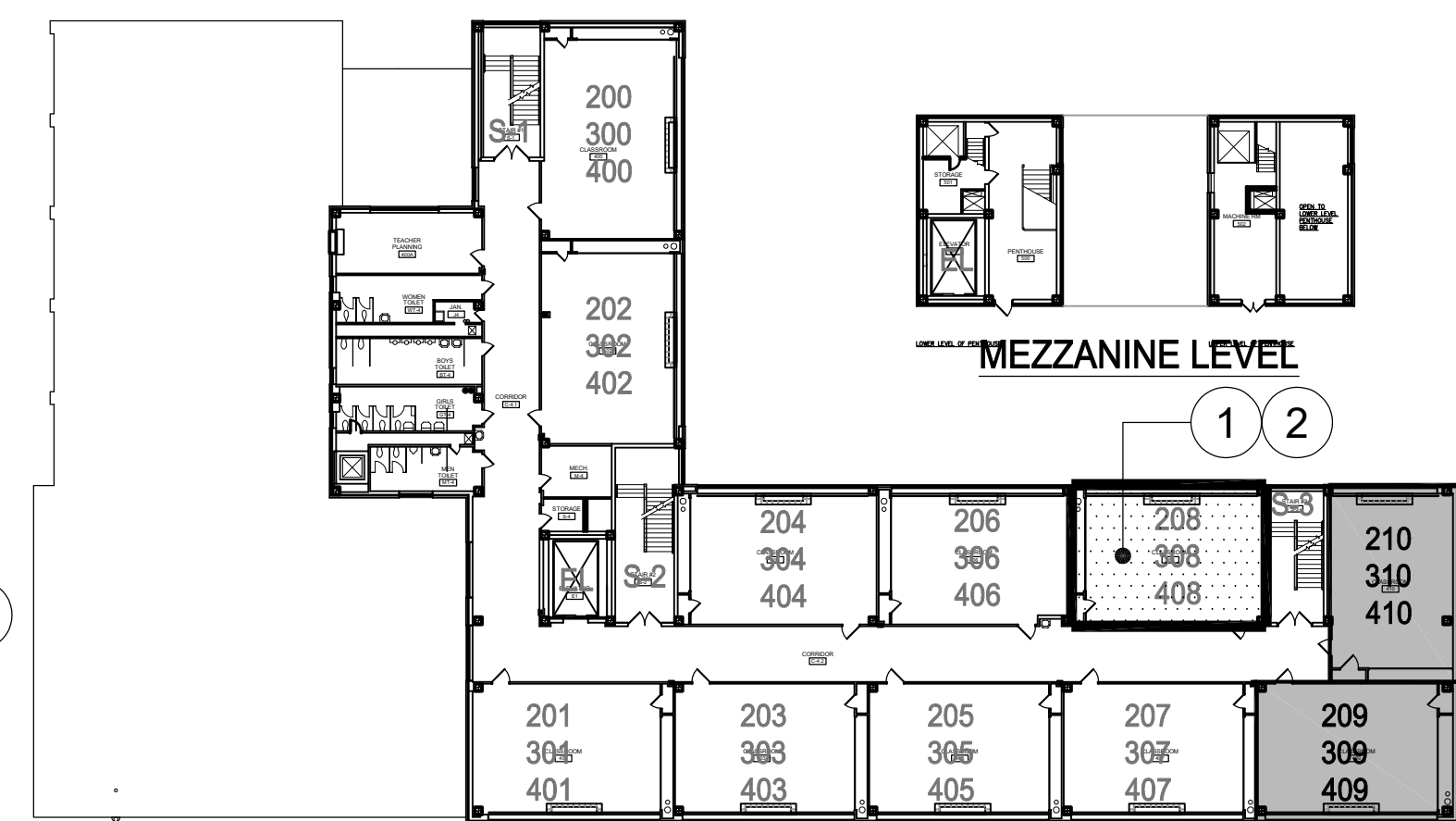
1 PHASE 4 - KEY PLAN AND NOTES

A-003b SCALE: 1/32" = 1'-0"

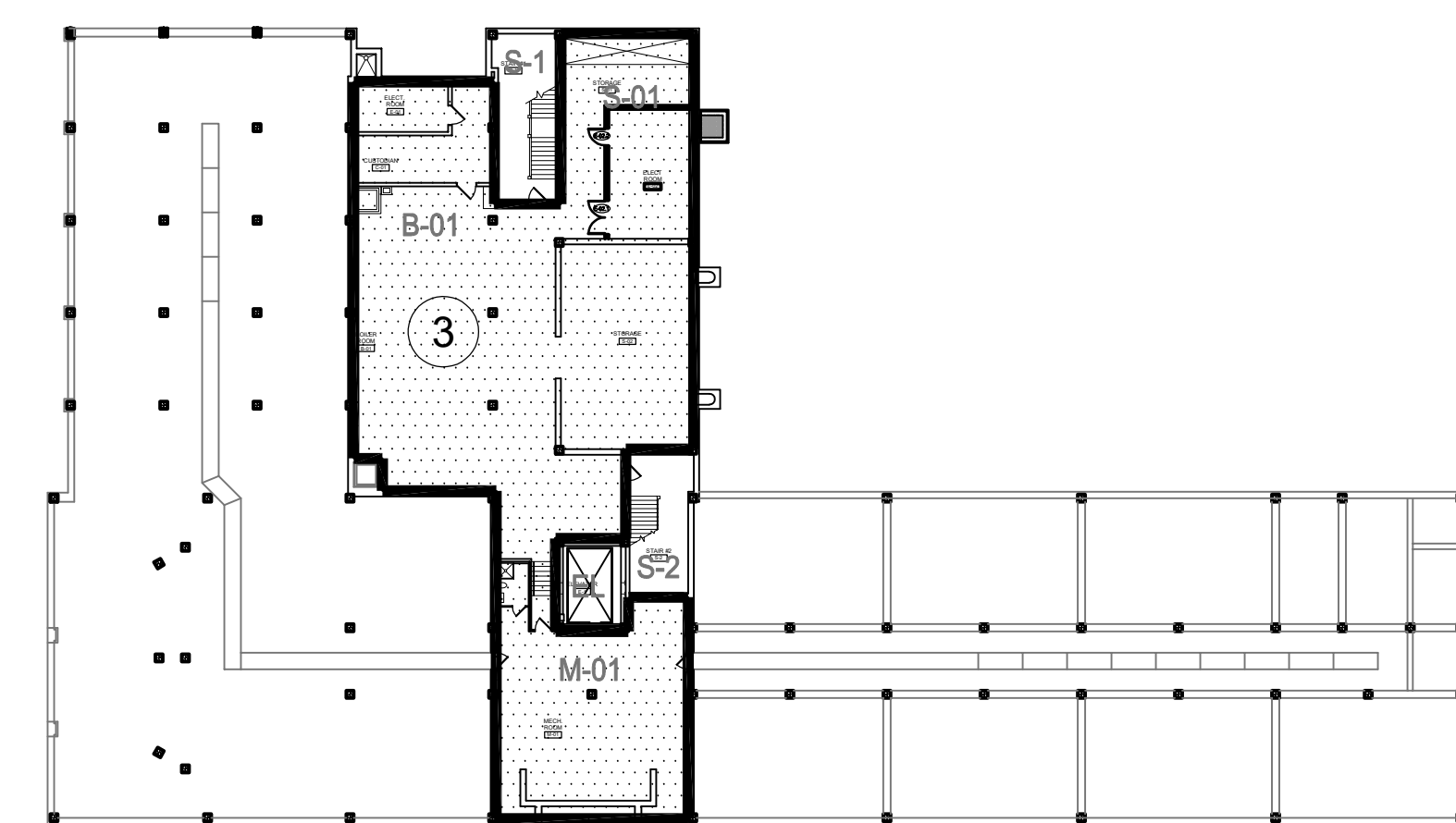


FIRST FLOOR PLAN - MAIN LEVEL

ALL WORK IN THIS PHASE IS SECOND SHIFT



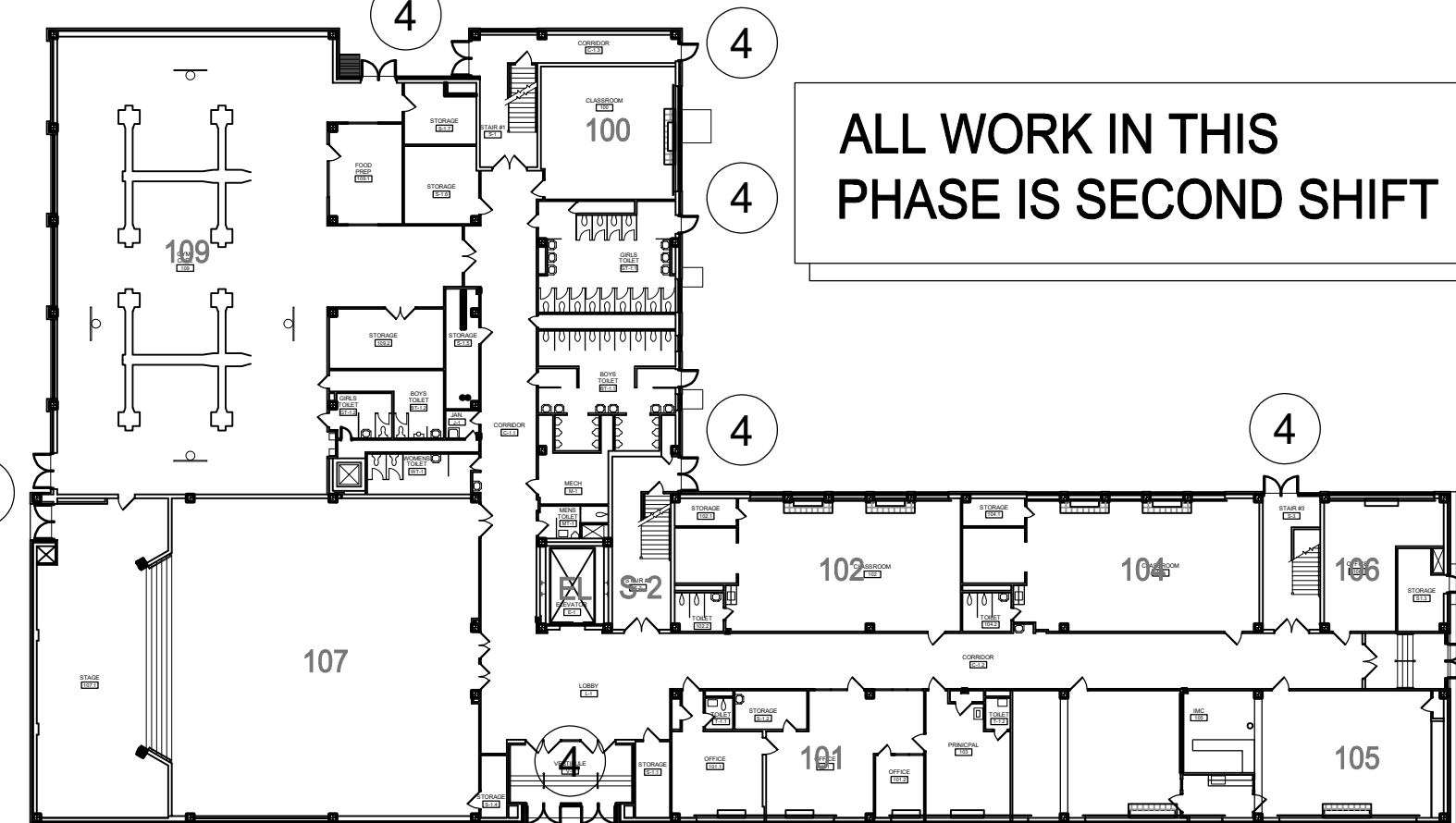
SECOND THROUGH FOURTH FLOOR PLAN - UPPER LEVELS



BOILER ROOM PLAN - LOWER LEVEL

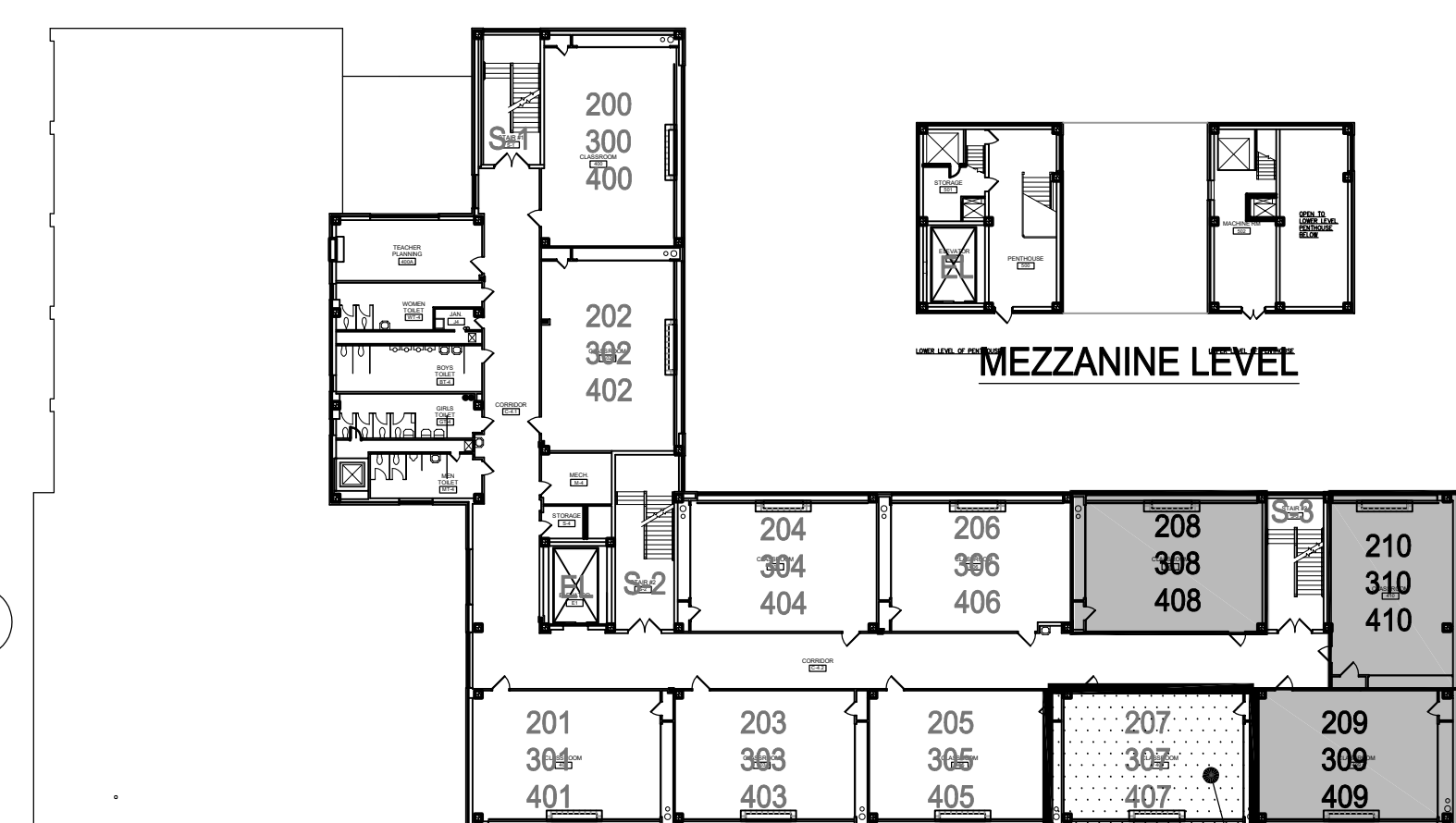
2 PHASE 5 - KEY PLAN AND NOTES

A-003b SCALE: 1/32" = 1'-0"

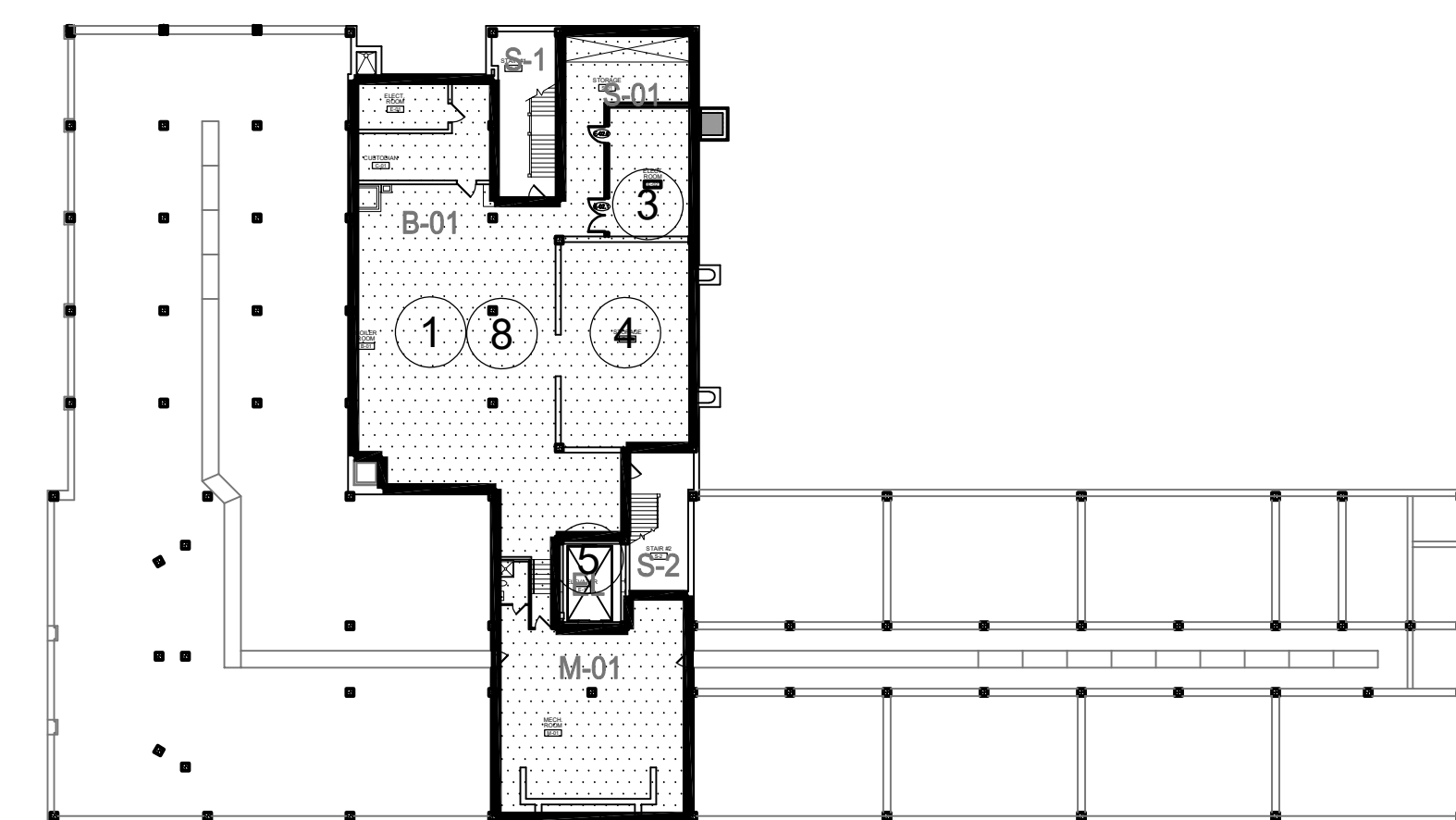


FIRST FLOOR PLAN - MAIN LEVEL

ALL WORK IN THIS PHASE IS SECOND SHIFT



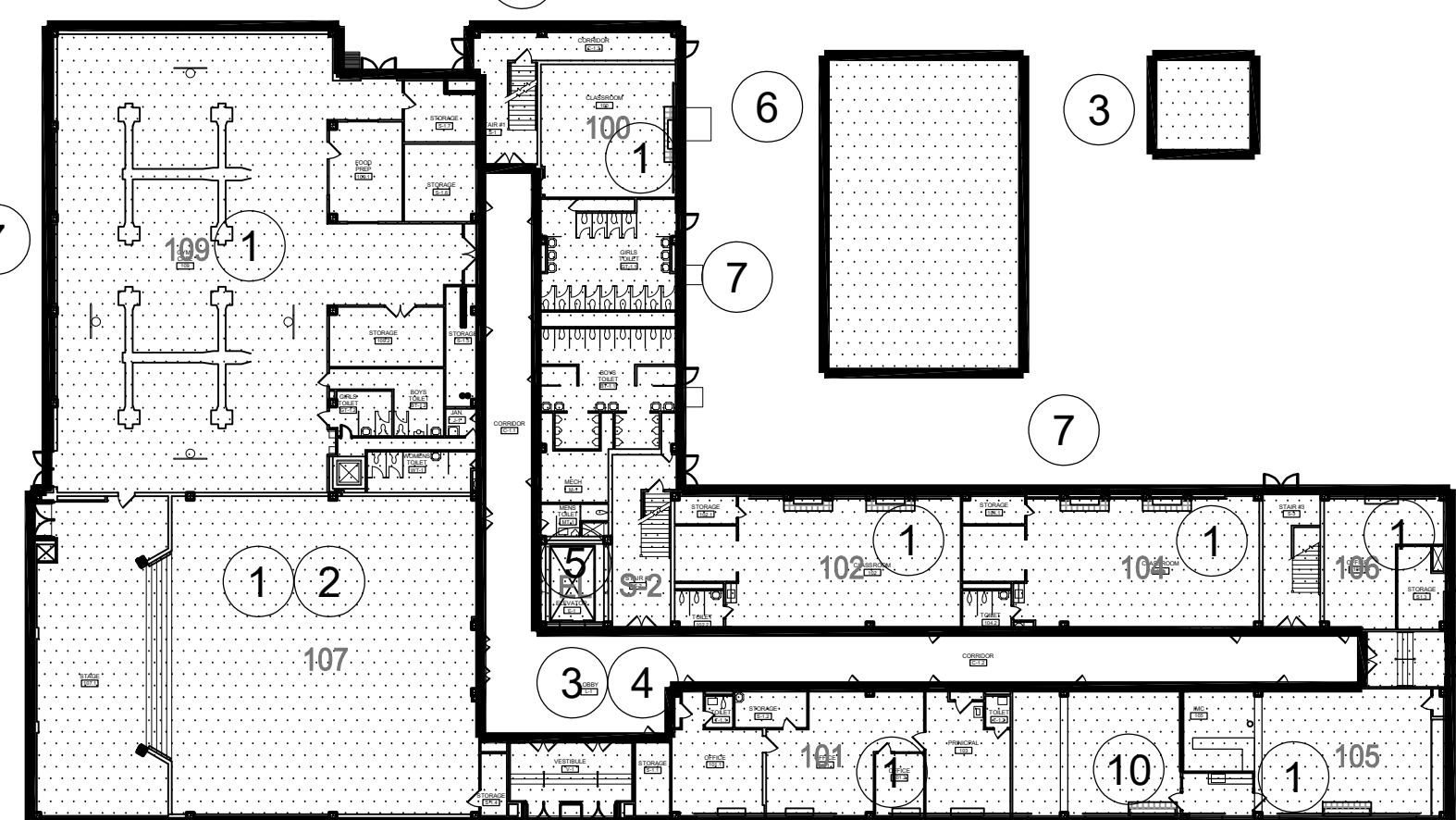
SECOND THROUGH FOURTH FLOOR PLAN - UPPER LEVELS



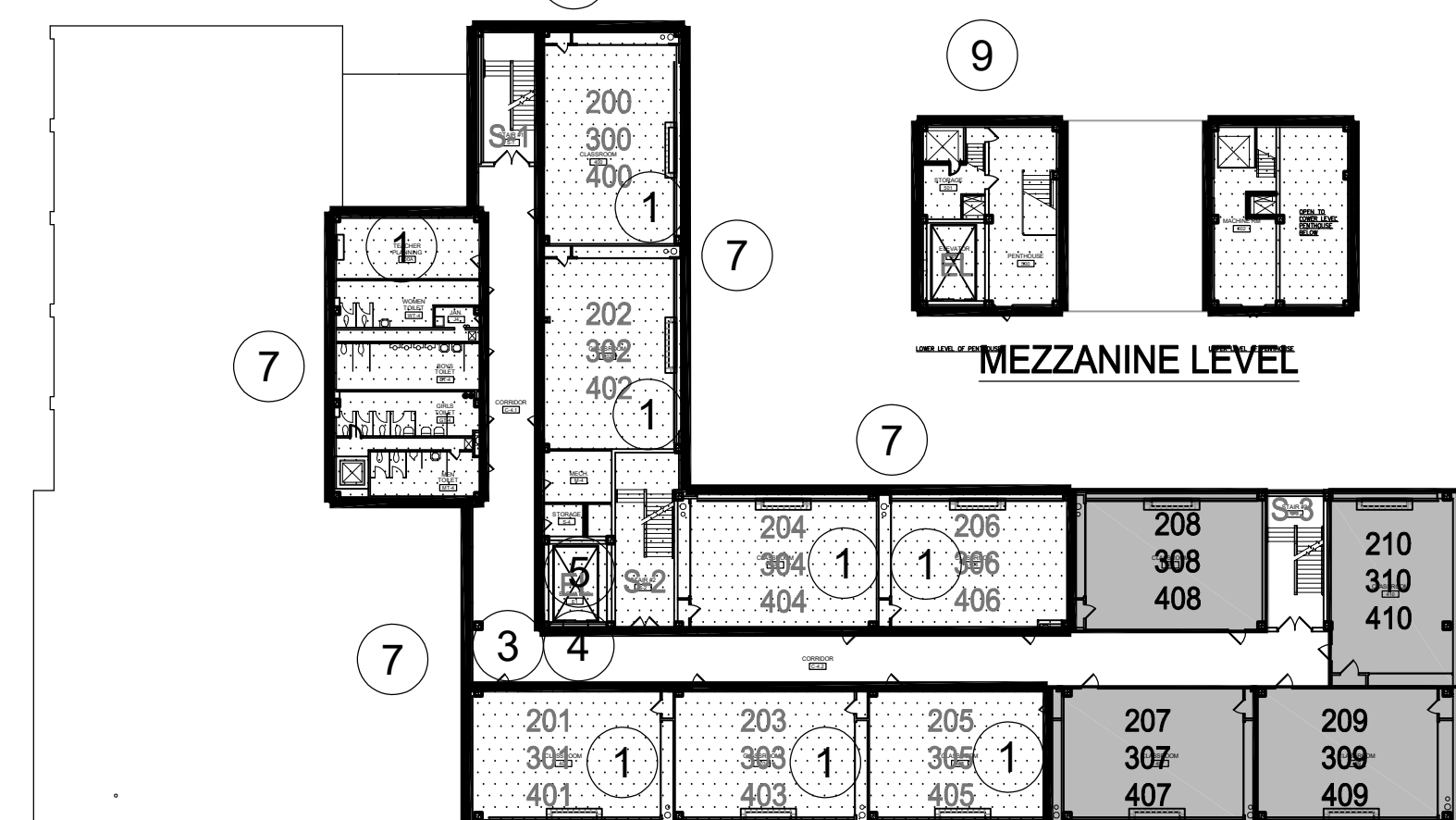
BOILER ROOM PLAN - LOWER LEVEL

3 PHASE 6 - KEY PLAN AND NOTES

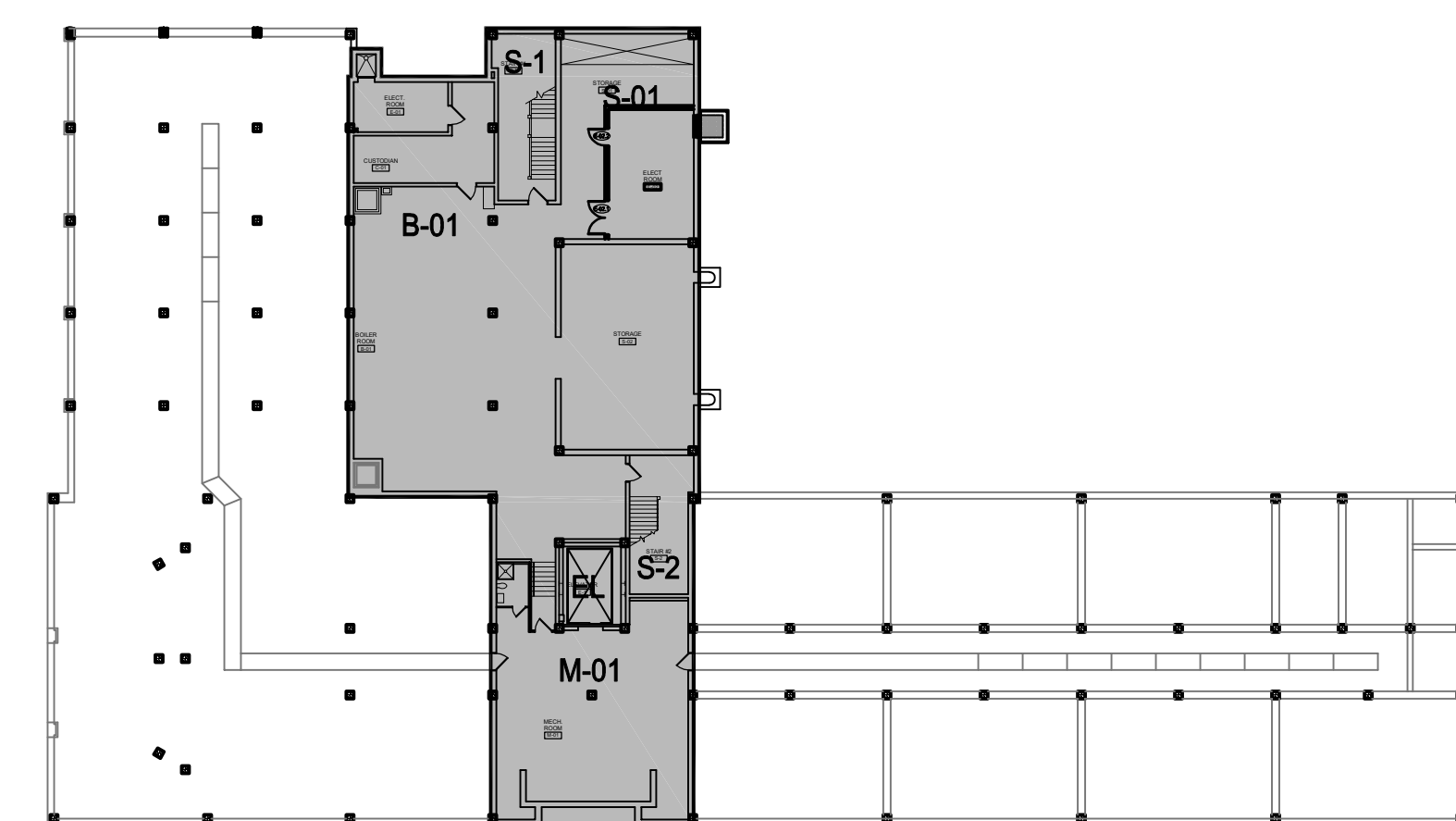
A-003b SCALE: 1/32" = 1'-0"



FIRST FLOOR PLAN - MAIN LEVEL



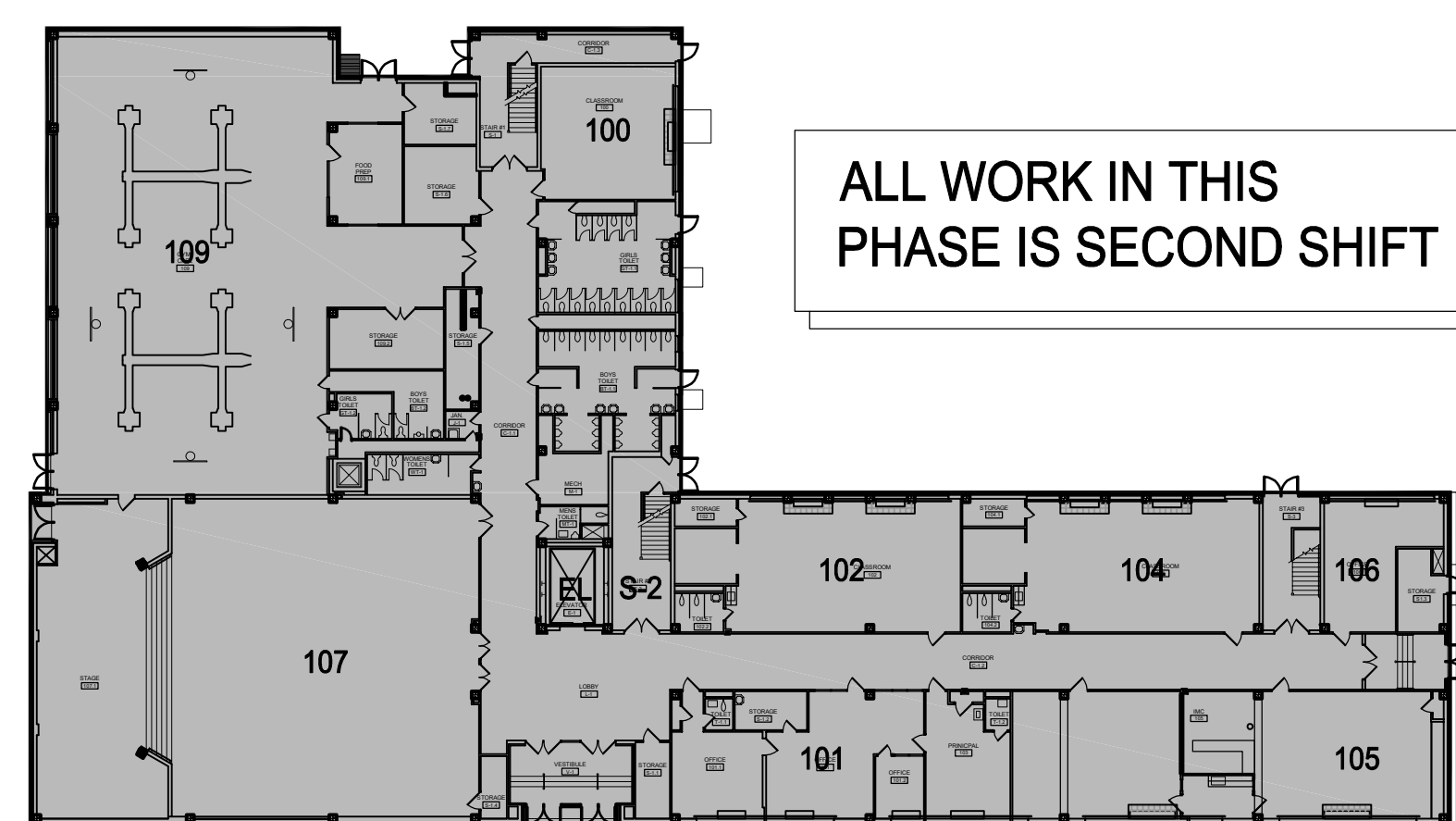
SECOND THROUGH FOURTH FLOOR PLAN - UPPER LEVELS



BOILER ROOM PLAN - LOWER LEVEL

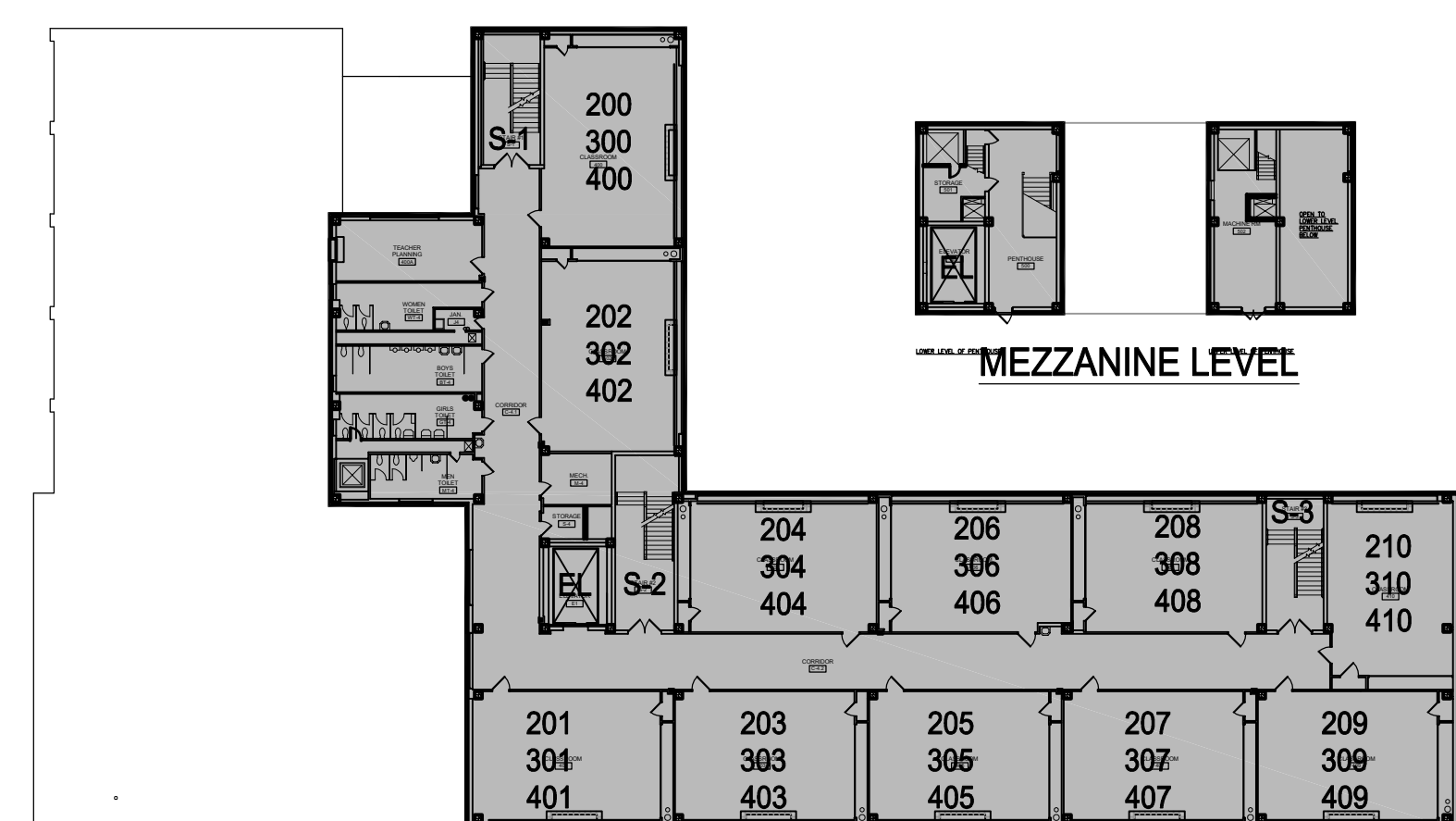
4 PHASE 7 - KEY PLAN AND NOTES

A-003b SCALE: 1/32" = 1'-0"



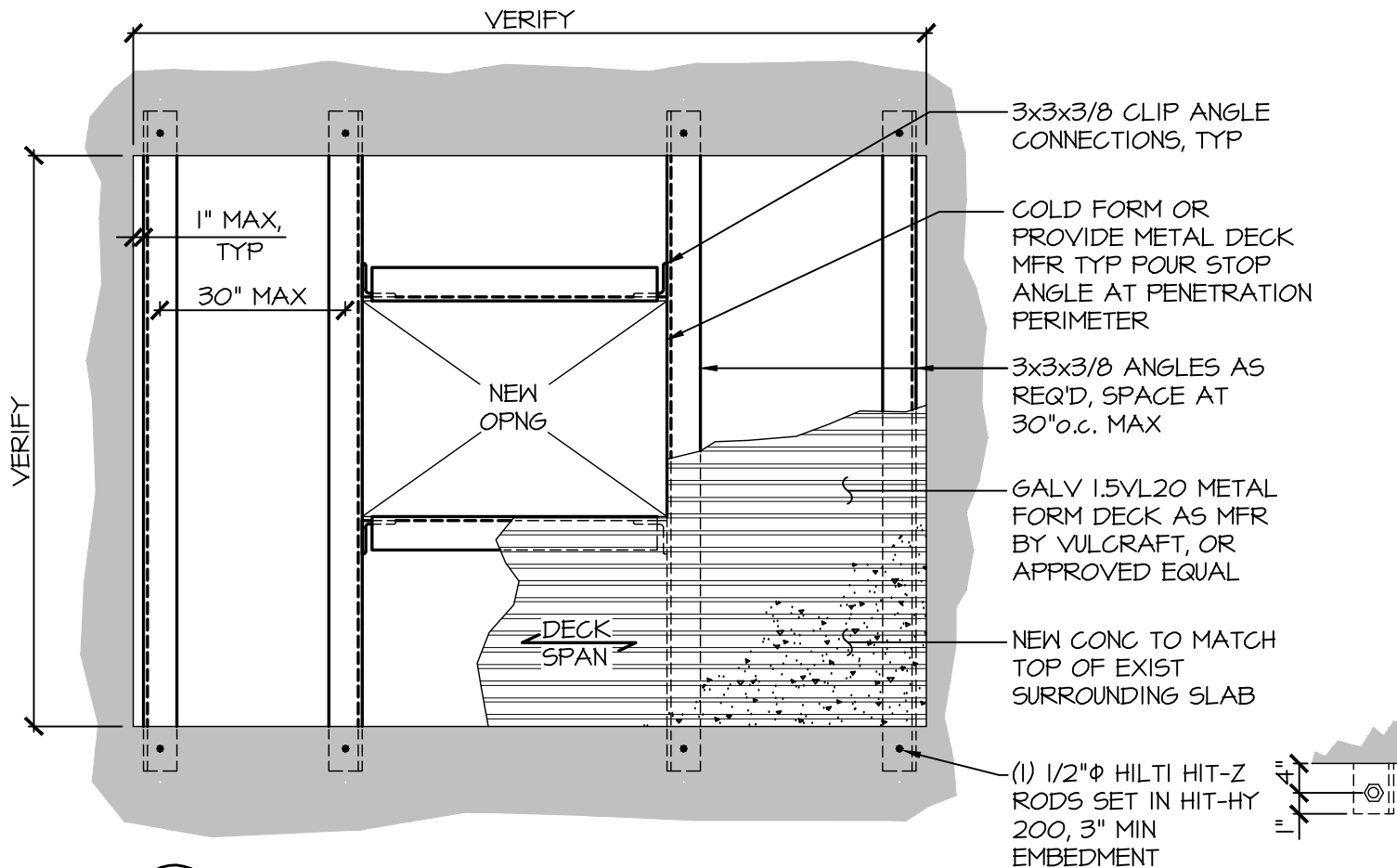
FIRST FLOOR PLAN - MAIN LEVEL

ALL WORK IN THIS PHASE IS SECOND SHIFT



SECOND THROUGH FOURTH FLOOR PLAN - UPPER LEVELS





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S103

FLOOR OPENING INFIL DETAIL

SCALE: NONE

1. MECHANICAL CONTRACTOR TO COORD LOCATIONS OF DUCT PENETRATIONS WITH EXISTING FLOOR OPENINGS. SET FRAMING AS REQ'D FOR NEW SLAB PLACEMENT AND SUPPORT AROUND DUCT OPENING.
2. CONTACT ENGINEER IF CONDITIONS VARY AND DO NOT ALLOW INSTALLATION OF ANGLE FRAMING AS SHOWN ABOVE
3. SET 6x6-W2.9xW2.9 WWF AT (-) 2" FROM TOP OF SLAB
4. CUT DECK TO FIT TIGHT. SEAL EDGES TO CONTROL CONCRETE RUN-OFF

JAMES RHOADS E.S.	
PHILADELPHIA	PA
MAJOR RENOVATIONS	
FLOOR SLAB OPENING INFILL	
AT NEW H.V.A.C. PENETRATIONS	

DHUY Engineering, Inc.
 CONSULTING ENGINEERS: Project Management | Facilities Engineering
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SECTION 23 0900 - HVAC SYSTEM CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Refer to other HVAC Specification Sections which describe the requirements of the HVAC system components.

1.2 SUMMARY

- A. This Section includes direct digital control (DDC) equipment for control of HVAC systems and various other systems. Refer to all Division 23 specification sections for controls that may be provided with the associated equipment. Provide all required controls and accessories to accomplish the method of control as indicated in Section 230905, Sequence of Operation. The following HVAC equipment shall be controlled:
 - 1. Boiler(s) systems.
 - 2. Hydronic pumps.
 - 3. Chiller.
 - 4. Air handling units.
 - 5. Unit ventilators.
 - 6. Fan Coil units
 - 7. Convectors, cabinet heaters and other terminal heating units.
 - 8. Variable frequency drives.
- B. The contractor will be required to participate in the Start-Up as well as the Testing, Adjusting, Balancing and Commissioning of the HVAC System. Refer to other HVAC specifications for the work required by the controls sub-contractor.
- C. The contractor shall furnish and install a fully integrated building automation system, incorporating direct digital control (DDC) for energy management, equipment monitoring and control, and subsystems as specified. Provide a complete and fully operational system. The system shall allow the Owner to have access through the internet with password security to suite the Owner's needs. The installation of the control system shall be performed under the direct supervision of the controls manufacturer with the shop drawings, flow diagrams, bill of materials, component designation or identification number and sequence of operation all bearing the name of the manufacturer.
- D. System shall use the BACnet protocol for communication to the operator workstation or web server and for communication between control modules. I/O points, schedules, setpoints, trends and alarms specified in 23 09 93 – "Sequence of Operations for HVAC Controls" shall be BACnet objects.
- E. The contractor shall be responsible for all control and power wiring for a complete and operable system. All wiring shall be done in accordance with all local and national codes. The installation must be done by personnel directly employed by the manufacturer/supplier.

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- F. All existing controls, both pneumatic and electronic, are to remain operational during construction. Provide the following to accommodate the phased construction schedule:
1. Temporary control and power wiring where needed.
 2. Temporary extensions to the existing pneumatic tubing where required.
 3. Remove control system components (i.e. wiring, pneumatic tubing, actuators) as phasing allows.
 4. Where existing pneumatic controls are to remain, verify the tubing and other system components are fully functional. Repair or replace components as required.
 5. Cap existing pneumatic tubing as needed.
 6. As construction phasing progresses provide extensions to the control system as needed and remove existing components that are no longer required.

1.3 SEQUENCE OF OPERATION

- A. Refer to Section 230905 for “Sequence of Operation” information.

1.4 DEFINITIONS

- A. DDC: Direct digital control.
B. BMS: Building Management System.
C. BAS: Building Automation System.
D. EMS: Energy Management System.

1.5 SUBMITTALS

- A. Product Data: Include manufacturer's technical literature for each control device. Indicate dimensions, capacities, performance characteristics, electrical characteristics, finishes for materials, and installation and startup instructions for each type of product indicated.
1. DDC System Hardware: Bill of materials of equipment indicating quantity, manufacturer, and model number. Include technical data for operator workstation equipment, interface equipment, control units, transducers/transmitters, sensors, actuators, valves, relays/switches, control panels, and operator interface equipment.
 2. Control System Software: Include technical data for operating system software, operator interface, color graphics, and other third-party applications.
 3. Controlled Systems: Instrumentation list with element name, type of device, manufacturer, model number, and product data. Include written description of sequence of operation including schematic diagram.
- 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. Bill of materials of equipment indicating quantity, manufacturer, and model number.
 2. Schematic flow diagrams showing fans, pumps, coils, dampers, valves, and control devices.

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3. Wiring Diagrams: Power, signal, and control wiring.
 4. Details of control panel faces, including controls, instruments, and labeling.
 5. Written description of sequence of operation.
 6. Schedule of dampers including size, leakage, and flow characteristics.
 7. Schedule of valves including flow characteristics
 8. DDC System Hardware.
 - a. Wiring diagrams for control units with termination numbers.
 - b. Schematic diagrams and floor plans for field sensors and control hardware.
 - c. Schematic diagrams for control, communication, and power wiring, showing trunk data conductors and wiring between operator workstation and control unit locations.
 9. Controlled Systems:
 - a. Schematic diagrams of each controlled system with control points labeled and control elements graphically shown, with wiring.
 - b. Scaled drawings showing mounting, routing, and wiring of elements including bases and special construction.
 - c. Written description of sequence of operation including schematic diagram.
 - d. Points list.
- C. Data Communications Protocol Certificates: Certify that each proposed DDC system component complies with ASHRAE 135.
- D. Software and Firmware Operational Documentation: Include the following:
1. Software operating and upgrade manuals.
 2. Program Software Backup: On a magnetic media or compact disc, complete with data files.
 3. Device address list.
 4. Software license required by and installed for the workstations and control systems.
 5. All system and software development tools are to allow the owner to independently maintain the system.
 6. Software Tools - All software tools needed for full functional use, including programming of BCs, BACnet controllers, network management and expansion, and graphical user interface development, of the BAS described within these specifications, shall be provided to the owner or his designated agent. Any licensing required by the manufacturer now and into the future, including changes to the licensee of the software tools, and the addition of hardware corresponding to the licenses, shall be provided to allow for a complete and operational system for both normal day to day operation and servicing shall be provided. Any such changes to the designated license holders shall be made by the manufacturer upon written request by the owner or his agent. Any cost associated with the license changes shall be identified within the BAS submittals.
- E. Operation and Maintenance Data: For HVAC instrumentation and control system to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1, include the following:

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1. Interconnection wiring diagrams with identified and numbered system components and devices.
2. Keyboard illustrations and step-by-step procedures indexed for each operator function.
3. Inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.
4. Calibration records and list of set points.

1.6 SYSTEM PERFORMANCE

- A. System shall have an open architecture utilizing the data infrastructure of fiber optic cables and/or copper cables to communicate between field panels.
- B. System shall log events for report trends, alarm conditions, etc through the Niagara software.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Automatic control system manufacturer's authorized representative who is trained and approved for installation of system components required for this Project.
- B. 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.
- C. UL listed to Standards UL864 (Fire), UL2017 (Signaling Systems), UL916 (Energy Management Systems), UL1017 (Security), UL1610 (Central Station) and UL 294 (Access Control).

1.8 CODES AND STANDARDS

- A. Meet the requirements of all applicable standards and codes, except when more detailed or stringent requirements are indicated by the Contract Documents, including requirements of this Section.
- B. Underwriters Laboratories: Products shall be UL-916-PAZX listed.
- C. Federal Communications Commission -- Part J.
- D. ASHRAE/ANSI 135-2016 (BACnet) - (System Level Devices) - Building Controllers shall conform to the listed version of the BACnet specification in order to improve interoperability with various building system manufacturers' control systems and devices.
- E. ASHRAE/ANSI 135-2016 (BACnet) - (Unit Level Devices) - Unit Controllers shall conform to the listed version of the BACnet specification in order to improve interoperability with various building system manufacturers' control systems and devices.

1.9 DELIVERY, STORAGE, AND HANDLING

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- A. Factory-Mounted Components: Where control devices specified in this Section are indicated to be factory mounted on equipment, arrange for shipping of control devices to equipment manufacturer.
- B. System Software: Update to latest version of software at Project completion.

1.10 COORDINATION

- A. Coordinate location of thermostats, humidistats, and other exposed control sensors with plans and room details before installation.

1.11 WARRANTY

- A. The BMS supplier/installer shall warrant all work per the following:
 - 1. All controls systems labor and materials shall be warranted to be free from defects for a period of twenty-four (24) months after the date of substantial completion. Control system failures during the warranty period shall be adjusted, repaired, or replaced at no charge to the Owner. The BMS manufacturer/installer shall respond to the Owner's request for warranty service within 24 hours of the initiated call.
 - 2. At the end of the final start-up/testing, if equipment and systems are operating satisfactorily to the Owner and Engineer, the Owner shall sign certificates certifying that the BMS is operational, and has been tested and accepted in accordance with the terms of this specification. The date of Owner's acceptance shall be the start of the warranty period.
 - 3. Operator workstation software, project specific software, graphics, database, and firmware updates shall be provided to the Owner at no charge during the warranty period. Written authorization by the Owner must be granted prior to the installation of these updates.
 - 4. The BMS manufacturer shall provide a web-accessible Users Network for the proposed System and give the Owner free access to question/answer forum, user tips, upgrades, and training schedules for a one year period of time correlating with the warranty period.

PART 2 - PRODUCTS

2.1 BMS INSTALLER/SUPPLIER QUALIFICATIONS

- A. Subject to compliance with requirements provide a control system, with products manufactured and installed by one of the following:
 - 1. EcoSave Automation – Basis of Design.
 - 2. Siemens. Corporate Branch Office.
 - 3. Johnson Controls. Corporate Branch Office.
- B. The Installer must be an authorized factory direct representative in good standing with the manufacturer of the proposed hardware and software components. Provide a letter

dated within the last 6 months, from the manufacture certifying that the System Integrator is an authorized factory direct representative.

- C. The installer shall have had experience with a minimum of three (3) similar projects. The projects shall be similar in size and scope and must be totally complete and operational.

2.2 COMMUNICATIONS

- A. Control products, communication media, connectors, repeaters, hubs, and routers shall comprise a BACnet internetwork. Controller and operator interface communication shall conform to ANSI/ASHRAE Standard 135, BACnet.

2.3 DDC EQUIPMENT

- A. Operator Workstation(s): Provide one PC-based workstation. The location of the workstation is to be determined by the owner. The workstation will be used for communications with the control system and shall be capable of monitoring, adjusting, trending, alarming and reporting functions. The Operator Workstation or server shall conform to the BACnet Operator Workstation (B-OWS) or BACnet Advanced Workstation (B-AWS) device profile as specified in ASHRAE/ANSI 135 BACnet Annex L. At a minimum the PC and associated equipment shall have the following:

1. i.7 quad core processor with four 3.0 GHz minimum.
2. 16GB DDR SDRAM memory.
3. Hard drive 512 GB M.2 solid state.
4. ASC keyboard with 3 button mouse and wheel.
5. (4) Integrated USB ports.
6. Graphics card as required.
7. 24" LED Monitor.
8. DVD/CD-ROM Read/Write Drive: 48x24x48.
9. Uninterruptible Power Supply with the required capability.
10. Operating System: Microsoft Windows 10 with high-speed Internet access.
11. Printer: High Speed Laser Color with minimum 20 ppm.

- B. Portable Operator Workstation: provide a portable hand held communications device to allow communication with the system via the internet or with a plug-in connection.

- C. Control Units: Modular, comprising processor board with programmable, nonvolatile, random-access memory; local operator access and display panel; integral interface equipment; and backup power source.

1. Units monitor or control each I/O point; process information; execute commands from other control units, devices, and operator stations; and download from or upload to operator workstation or diagnostic terminal unit.
2. Stand-alone mode control functions operate regardless of network status. Functions include the following:
 - a. Global communications.
 - b. Discrete/digital, analog, and pulse I/O.

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- c. Monitoring, controlling, or addressing data points.
 - d. Software applications, scheduling, and alarm processing.
 - e. Testing and developing control algorithms without disrupting field hardware and controlled environment.
3. Standard Application Programs:
- a. Electric Control Programs: Demand limiting, duty cycling, automatic time scheduling, start/stop time optimization, night setback/setup, on-off control with differential sequencing, staggered start, anti-short cycling, PID control, DDC with fine tuning, and trend logging.
 - b. HVAC Control Programs: Optimal run time, supply-air reset, and enthalpy switchover.
 - c. Chiller Control Programs: Control function of condenser-water reset, chilled-water reset, and equipment sequencing.
 - d. Programming Application Features: Include trend point; alarm processing and messaging; weekly, monthly, and annual scheduling; energy calculations; run-time totalization; and security access.
 - e. Remote communications.
 - f. Maintenance management.
 - g. Units of Measure: Inch-pound and SI (metric).
4. Local operator interface provides for download from or upload to operator workstation or diagnostic terminal unit.
5. ASHRAE 135 Compliance: Control units shall use ASHRAE 135 protocol and communicate using ISO 8802-3 (Ethernet) datalink/physical layer protocol.
6. BACnet Compliance:
- a. Provide an adequate number of Building Controllers (BC), Advanced Application Controllers (AAC), Application Specific Controllers (ASC), Smart Actuators (SA), and Smart Sensors (SS) as required to achieve performance specified in Section 23 09 23 Article 1.9 (System Performance). Every device in the system which executes control logic and directly controls HVAC equipment must conform to a standard BACnet Device profile as specified in ANSI/ASHRAE 135, BACnet Annex L. Unless otherwise specified, hardwired actuators and sensors may be used in lieu of BACnet Smart Actuators and Smart Sensors.
 - b. Building Controllers (BCs). Each BC shall conform to BACnet Building Controller (B-BC) device profile as specified in ANSI/ASHRAE 135, BACnet Annex L, and shall be listed as a certified B-BC in the BACnet Testing Laboratories (BTL) Product Listing.
 - c. Advanced Application Controllers (AACs). Each AAC shall conform to BACnet Advanced Application Controller (B-AAC) device profile as specified in ANSI/ASHRAE 135, BACnet Annex L and shall be listed as a certified B-AAC in the BACnet Testing Laboratories (BTL) Product Listing.
 - d. Application Specific Controllers (ASCs). Each ASC shall conform to BACnet Application Specific Controller (B-ASC) device profile as specified in ANSI/ASHRAE 135, BACnet Annex L and shall be listed as a certified B-ASC in the BACnet Testing Laboratories (BTL) Product Listing.
 - e. Smart Sensors (SSs). Each SS shall conform to BACnet Smart Sensor (B-SS) device profile as specified in ANSI/ASHRAE 135, BACnet Annex L

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and shall be listed as a certified B-SS in the BACnet Testing Laboratories (BTL) Product Listing.

- f. BACnet Communication.
 - 1) Each BC shall reside on or be connected to a BACnet network using ISO 8802-3 (Ethernet) Data Link/Physical layer protocol and BACnet/IP addressing.
 - 2) BACnet routing shall be performed by BCs or other BACnet device routers as necessary to connect BCs to networks of AACs and ASCs.
 - 3) Each AAC shall reside on a BACnet network using ISO 8802-3 (Ethernet) Data Link/Physical layer protocol with BACnet/IP addressing, or it shall reside on a BACnet network using the ARCNET or MS/TP Data Link/Physical layer protocol.
 - 4) Each ASC shall reside on a BACnet network using the ARCNET or MS/TP Data Link/Physical layer protocol.
 - 5) Each SA shall reside on a BACnet network using the ARCNET or MS/TP Data Link/Physical layer protocol.
 - 6) Each SS shall reside on a BACnet network using ISO 8802-3 (Ethernet) Data Link/Physical layer protocol with BACnet/IP addressing, or it shall reside on a BACnet network using ARCNET or MS/TP Data Link/Physical layer protocol.

- D. Local Control Units: Modular, comprising processor board with electronically programmable, nonvolatile, read-only memory; and backup power source.
 - 1. Units monitor or control each I/O point, process information, and download from or upload to operator workstation or diagnostic terminal unit.
 - 2. Stand-alone mode control functions operate regardless of network status. Functions include the following:
 - a. Global communications.
 - b. Discrete/digital, analog, and pulse I/O.
 - c. Monitoring, controlling, or addressing data points.
 - 3. Local operator interface provides for download from or upload to operator workstation or diagnostic terminal unit.
 - 4. ASHRAE 135 Compliance: Control units shall use ASHRAE 135 protocol and communicate using ISO 8802-3 (Ethernet) datalink/physical layer protocol.

- E. I/O Interface: Hardwired inputs and outputs may tie into system through controllers. Protect points so that shorting will cause no damage to controllers.
 - 1. Binary Inputs: Allow monitoring of on-off signals without external power.
 - 2. Pulse Accumulation Inputs: Accept up to 10 pulses per second.
 - 3. Analog Inputs: Allow monitoring of low-voltage (0- to 10-V dc), current (4 to 20 mA), or resistance signals.
 - 4. Binary Outputs: Provide on-off or pulsed low-voltage signal, selectable for normally open or normally closed operation with three-position (on-off-auto) override switches and status lights.

5. Analog Outputs: Provide modulating signal, either low voltage (0- to 10-V dc) or current (4 to 20 mA) with status lights, two-position auto-manual switch, and manually adjustable potentiometer].
 6. Tri-State Outputs: Provide two coordinated binary outputs for control of three-point, floating-type electronic actuators.
 7. Universal I/Os: Provide software selectable binary or analog outputs.
- F. Power Supplies: Transformers with Class 2 current-limiting type or overcurrent protection; limit connected loads to 80 percent of rated capacity. DC power supply shall match output current and voltage requirements and be full-wave rectifier type with the following:
1. Output ripple of 5.0 mV maximum peak to peak.
 2. Combined 1 percent line and load regulation with 100-mic.sec. response time for 50 percent load changes.
 3. Built-in overvoltage and overcurrent protection and be able to withstand 150 percent overload for at least 3 seconds without failure.
- G. Power Line Filtering: Internal or external transient voltage and surge suppression for workstations or controllers with the following:
1. Minimum dielectric strength of 1000 V.
 2. Maximum response time of 10 nanoseconds.
 3. Minimum transverse-mode noise attenuation of 65 dB.
 4. Minimum common-mode noise attenuation of 150 dB at 40 to 100 Hz.

2.4 BUILDING CONTROLLERS

- A. There shall be one or more independent, standalone microprocessor based System Controllers to manage the global strategies described in Application and Control Software section.
- B. The System Controller shall have sufficient memory to support its operating system, database, and programming requirements.
- C. The controller shall provide a USB communications port for connection to a PC.
- D. The operating system of the Controller shall manage the input and output communications signals to allow distributed controllers to share real and virtual point information and allow central monitoring and alarms.
- E. All System Controllers shall have a real time clock.
- F. Data shall be shared between networked System Controllers.
- G. The System Controller shall continually check the status of its processor and memory circuits. If an abnormal operation is detected, the controller shall:
 1. Assume a predetermined failure mode.
 2. Generate an alarm notification.
 3. Create a retrievable file of the state of all applicable memory locations at the time of the failure.
 4. Automatically reset the System Controller to return to a normal operating mode.

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- H. Environment. Controller hardware shall be suitable for the anticipated ambient conditions. Controller used in conditioned ambient shall be mounted in an enclosure, and shall be rated for operation at -40° F to 122° F.
- I. Clock Synchronization.
 - 1. All System Controllers shall be able to synchronize with a NTP server for automatic time synchronization.
 - 2. All System Controllers shall be able to accept a BACnet time synchronization command for automatic time synchronization.
 - 3. All System Controllers shall automatically adjust for daylight savings time if applicable.
- J. Serviceability
 - 1. Provide diagnostic LEDs for power, communications, and processor.
 - 2. The System Controller shall have a display on the main board that indicates the current operating mode of the controller.
 - 3. All wiring connections shall be made to field removable, modular terminal connectors.
 - 4. The System controller shall utilize standard DIN mounting methods for installation and replacement.
- K. Memory. The System Controller shall maintain all BIOS and programming information indefinitely without power to the System controller.
- L. Immunity to power and noise. Controller shall be able to operate at 90% to 110% of nominal voltage rating and shall perform an orderly shut-down below 80% nominal voltage.
- M. Uninterruptible Power Supply: 1.5kVA. Provide 30 mins of backup power after loss of power.
- N. BACnet Test Labs (BTL) Listing. Each System Controller shall be listed as a Building Controller (B-BC) by the BACnet Test Labs with a minimum BACnet Protocol Revision of 14.

2.5 UNITARY CONTROLLERS

- A. Unitized, capable of stand-alone operation with sufficient memory to support its operating system, database, and programming requirements, and with sufficient I/O capacity for the application.
 - 1. Configuration: Local keypad and display; diagnostic LEDs for power, communication, and processor; wiring termination to terminal strip or card connected with ribbon cable; memory with bios; and 72 hour battery backup.
 - 2. Operating System: Manage I/O communication to allow distributed controllers to share real and virtual object information and allow central monitoring and alarms. Perform scheduling with real-time clock. Perform automatic system diagnostics; monitor system and report failures.
 - 3. ASHRAE 135 Compliance: Communicate using read (execute and initiate) and write (execute and initiate) property services defined in ASHRAE 135. Reside on network using MS/TP datalink/physical layer protocol and have service communication port for connection to diagnostic terminal unit.

4. BACnet Compliance: Communicate using EIA/CEA 709.1 datalink/physical layer protocol using LonTalk protocol.
5. Enclosure: Waterproof rated for operation at 40 to 150 deg F.

2.6 PROGRAMMABLE CONTROLLERS (PC)

- A. Performance – Each PC shall have a minimum of 64K of Non-volatile Flash memory for control applications and 128K non-volatile flash memory for storage with an 8 bit processor. The PC shall have a minimum ambient operating temperature range of -0°C to 70°C or 32°F to 158°F.
- B. Inputs – Analog inputs shall have the following minimum level of performance: 16-bit A to D resolution; allow monitoring of platinum 100 ohms, platinum 1000 ohm, nickel 1000 ohms, thermistor 10K type II, thermistor 10K type III, voltage input 0-10VDC, current input 4-20mA, digital input, pulsed input minimum 2 Hz.
- C. Outputs – Outputs shall be either software configurable to be either analog or digital or dedicated digital only – Analog outputs shall be selectable as voltage of 0-10 VDC (linear) or 4-20mA or Digital outputs shall be 0-12 VDC (off/on), floating or PWM. Outputs shall have an adjustable range of 2 seconds to 15 minutes. Output Resolution shall be a minimum 8 bits digital/analog converter. All individual outputs and power supply shall be protected by an auto reset fuse. There shall be an LED status indicator on each of the outputs.
- D. Programmable Controller Features:
 1. Provide an onboard network communication jack.
 2. The PC shall be provided with a diagnostic indicator lights for power and network communication of transmit and receive along with a light indication position for each output.
 3. Hand/Off/Auto Switches – For all controllers applied to an AHU, Chiller, Pumps, Cooling Tower or Boiler, provide for the manual override and adjustment of all Analog and Digital outputs through a three-position switch giving the selection of Hand, Off and Auto (HOA). A HOA shall be provided for each separate digital and analog output from the controller and be an integral part of the controller. HOA switches external from the controller shall not be accepted. For the Analog outputs the Hand position of the switch shall provide for the adjustment of the output signal through a linear scaled potentiometer. The position of the HOA shall be monitored and an alarm shall be delivered to the Graphical User Interface should the switch be in an Off or Hand position. An indicating LED shall be provided on the controller for each HOA indicating position of the switch. For all Analog outputs, the indicating LED shall provide a linear indication of the position of the Potentiometer through a variation in the intensity of the indicator LED and be provided as a numerical value that can be viewed at the Graphical User Interface.
 4. Enclosures – Provide for a plastic enclosure with a separate back plate with terminals such that the electronic portion of the controller can be easily removed for ease of installation and servicing.
- E. Fan-Speed Controllers: Solid-state model providing field-adjustable proportional control of motor speed from maximum to minimum of 55 percent and on-off action below minimum fan speed. Controller shall briefly apply full voltage, when motor is started, to rapidly bring motor up to minimum speed. Equip with filtered circuit to eliminate radio interference.

2.7 ELECTRONIC SENSORS

- A. Description: Vibration and corrosion resistant; for wall, immersion, or duct mounting as required.
- B. Pressure Transmitters/Transducers:
 - 1. Static-Pressure Transmitter: Non-directional sensor with suitable range for expected input, and temperature compensated.
 - a. Accuracy: 2 percent of full scale with repeatability of 0.5 percent.
 - b. Output: 4 to 20 mA.
 - c. Building Static-Pressure Range: 0- to 0.25-inch wg.
 - d. Duct Static-Pressure Range: 0- to 5-inch wg.
 - 2. Water Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum 150-psig operating pressure.
 - 3. Water Differential-Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum 150-psig operating pressure and tested to 300-psig.
 - 4. Differential-Pressure Switch (Air or Water): Snap acting, with pilot-duty rating and with suitable scale range and differential.
 - 5. Pressure Transmitters: Direct acting for gas, liquid, or steam service; range suitable for system.

2.8 ROOM TEMPERATURE SENSORS

- A. Room Temperature Sensor: sensor shall be of the resistance/thermistor type. Accuracy shall be +/- 5 degrees F. Room sensors shall be recessed wall box mounting and provided with the following:
 - 1. Override pushbutton, which can be programmed in the system to a maximum number of minutes of override.
 - 2. LCD display to indicate sensed values
 - 3. Setpoints warmer/cooler adjustment, which can be programmed in the system to a maximum number of +/- degrees of adjustment
 - 4. Temperature sensing
 - 5. CO2 sensing where required.

2.9 STATUS SENSORS

- A. Status Inputs for Fans: Differential-pressure switch with pilot-duty rating and with adjustable range of 0- to 5-inch wg.
- B. Status Inputs for Pumps: Differential-pressure switch with pilot-duty rating and with adjustable pressure-differential range of 8 to 60 psig, piped across pump.
- C. Status Inputs for Electric Motors: Comply with ISA 50.00.01, current-sensing fixed- or split-core transformers with self-powered transmitter, adjustable and suitable for 175 percent of rated motor current.

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- D. Voltage Transmitter (100- to 600-V ac): Comply with ISA 50.00.01, single-loop, self-powered transmitter, adjustable, with suitable range and 1 percent full-scale accuracy.
- E. Power Monitor: 3-phase type with disconnect/shorting switch assembly, listed voltage and current transformers, with pulse kilowatt hour output and 4- to 20-mA kW output, with maximum 2 percent error at 1.0 power factor and 2.5 percent error at 0.5 power factor.
- F. Current Switches: Self-powered, solid-state with adjustable trip current, selected to match current and system output requirements.
- G. Electronic Valve/Damper Position Indicator: Visual scale indicating percent of travel and 2- to 10-V dc, feedback signal.
- H. Water-Flow Switches: Bellows-actuated mercury or snap-acting type with pilot-duty rating, stainless-steel or bronze paddle, with appropriate range and differential adjustment, in NEMA 250, Type 1 enclosure.

2.10 CO2 SENSOR

- A. Carbon Dioxide sensors shall measure CO₂ in PPM in a range of 0-2000 ppm. Accuracy shall be +/- 3% of reading with stability within 5% over 5 years. Sensors shall be duct or space mounted as indicated in the sequence of operation.

2.11 ACTUATORS

- A. Provide actuators for all motorized hydronic control valves and motorized control dampers.
- B. Actuators for hydronic valves shall be capable of closing against system pump head. Actuators for control dampers shall produce sufficient power and torque to close off against the maximum system pressures encountered. Actuators shall be sized to close off against the fan shutoff pressure as a minimum requirement.
- C. Modulating valves and dampers: provide proportional modulating control capable of positioning the valve or damper at all points across the full range of operation with continuous control action. The sensor, controller and control device (damper, valve, etc.) shall act as one unit to maintain a constant and precise control of the controlled medium. Actuator drives proportional to input signal and modulates throughout its angle of rotation.
- D. Two-position valves and damper: provide two-position actuators only where indicated.
- E. Electric Motors: Size to operate with sufficient reserve power to provide smooth modulating action or two-position action.
 - 1. Permanent Split-Capacitor or Shaded-Pole Type: Gear trains completely oil immersed and sealed. Equip spring-return motors with integral spiral-spring mechanism in housings designed for easy removal for service or adjustment of limit switches, auxiliary switches, or feedback potentiometer.
 - 2. Non-spring Return Motors for Valves Larger than NPS 2-1/2: Size for running torque of 150 in. x lbf and breakaway torque of 300 in. x lbf.
 - 3. Spring-Return Motors for Valves Larger than NPS 2-1/2: Size for running and breakaway torque of 150 in. x lbf.
 - 4. Non-spring Return Motors for Dampers Larger than 25 Sq. Ft.: Size for running torque of 150 in. x lbf and breakaway torque of 300 in. x lbf.

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5. Spring-Return Motors for Dampers Larger Than 25 Sq. Ft. Size for running and breakaway torque of 150 in. x lbf.
- F. Electronic Actuators: Direct-coupled type designed for minimum 60,000 full-stroke cycles at rated torque.
1. Provide full modulating damper and valves actuators unless otherwise noted.
 2. Valves: Size for torque required for valve close off at maximum pump differential pressure.
 3. Dampers: Size for running torque calculated as follows:
 - a. Opposed-Blade Damper with Edge Seals: 5 inch-lb/sq. ft. of damper.
 - b. Opposed-Blade Damper without Edge Seals: 3 inch-lb/sq. ft. of damper.
 - c. Dampers with 2- to 3-Inch wg of Pressure Drop or Face Velocities of 1000 to 2500 fpm: Increase running torque by 1.5.
 4. Coupling: V-bolt and V-shaped, toothed cradle.
 5. Overload Protection: Electronic overload or digital rotation-sensing circuitry.
 6. Fail-Safe Operation: Mechanical, spring-return mechanism. Provide external, manual gear release on non-spring return actuators.
 7. Power Requirements (Modulating): Maximum 10 VA at 24-V ac or 8 W at 24-V dc.

2.12 CONTROL VALVES

- A. Control Valves: Factory fabricated, of type, body material, and pressure class based on maximum pressure and temperature rating of piping system, unless otherwise indicated. Heating system control valves are to fail in the closed position and chilled water system fails are to fail in the last position.
- B. Hydronic system globe valves shall have the following characteristics:
1. NPS 2 and Smaller: Class 125 bronze body, bronze trim, rising stem, renewable composition disc, and screwed ends with back seating capacity repackable under pressure.
 2. NPS 2-1/2 and Larger: Class 125 iron body, bronze trim, rising stem, plug-type disc, flanged ends, and renewable seat and disc.
 3. Internal Construction: Replaceable plugs and stainless-steel or brass seats.
 - a. Single-Seated Valves: Cage trim provides seating and guiding surfaces for plug on top and bottom.
 - b. Double-Seated Valves: Balanced plug; cage trim provides seating and guiding surfaces for plugs on top and bottom.
 4. Sizing: 3-psig maximum pressure drop at design flow rate.
 5. Flow Characteristics: Two-way valves shall have equal percentage characteristics; three-way valves shall have linear characteristics.
 6. Close-Off (Differential) Pressure Rating: Combination of actuator and trim shall provide minimum close-off pressure rating of 150 percent of total system (pump) head for two-way valves and 100 percent of pressure differential across valve or 100 percent of total system (pump) head.
- C. Butterfly Valves: 150-psig maximum pressure differential, ASTM A 126 cast-iron or ASTM A 536 ductile-iron body and bonnet, extended neck, stainless-steel stem, field-replaceable EPDM or Buna N sleeve and stem seals.

1. Sizing: 1-psig maximum pressure drop at design flow rate.
- D. Terminal Unit Control Valves: Bronze body, bronze trim, two or three ports, replaceable plugs and seats, and union and threaded ends.
1. Rating: Class 125 for service at 125 psig and 250 deg F operating conditions.
 2. Sizing: 3-psig maximum pressure drop at design flow rate, to close against pump shutoff head.
 3. Flow Characteristics: Two-way valves shall have equal percentage characteristics; three-way valves shall have linear characteristics.

2.13 DAMPERS

- A. Dampers: AMCA-rated, opposed blade design; 0.108-inch minimum thick, galvanized-steel frames with holes for duct mounting; damper blades shall not be less than 0.064-inch thick galvanized steel with maximum blade width of 8 inches and length of 48 inches.
1. Edge Seals: Use inflatable blade edging or replaceable rubber blade seals and spring-loaded stainless-steel side seals, rated for leakage at less than 10 cfm per sq. ft. of damper area, at differential pressure of 4-inch wg when damper is held by torque of 50 in. x lbf; when tested according to AMCA 500D.

2.14 PRESSURE TRANSDUCERS

- A. Transducer shall have linear output signal. Zero and span shall be field adjustable. Sensor accuracy shall be 1 percent of full scale with repeatability/long-term stability of 0.25 percent.
- B. Transducer sensing elements shall withstand continuous operating conditions of positive or negative pressure 50% greater than calibrated span without damage.
- C. Water pressure transducer shall have stainless steel diaphragm construction, proof pressure of 150 psi minimum. Transducer shall be complete with 4 to 20 mA output, required mounting brackets, and block and bleed valves.
- D. Water differential pressure transducer shall have stainless steel diaphragm construction, proof pressure of 150 psi minimum. Over-range limit (differential pressure) and maximum static pressure shall be 300 psi. Transducer shall be complete with 4 to 20 mA output, required mounting brackets, and five-valve manifold.

2.15 ELECTROMAGNETIC FLOW METERS

- A. Provide an ONICON Model F-3500 Insertion Electromagnetic Flow Meter (or FB-3500 for Bi-directional flow applications), complete with all installation hardware necessary to enable insertion and removal of the meter without system shutdown. The flow meter shall be hand-insertable up to 400 psi. For installations in non-metallic pipe, install grounding rings or probes. Materials of construction for wetted metal components shall be 316 SS. The flow meter shall average velocity readings from two sets of diametrically opposed electrodes. Each flow meter shall be individually wet-calibrated against a primary volumetric standard that is accurate to within 0.1% and traceable to NIST*. A certificate of calibration shall be provided with each flow meter. Accuracy shall be within $\pm 1\%$ of rate from 2-20 ft/s. Overall turndown shall exceed 100:1.

- B. Output signals shall be completely isolated and shall consist of the following: (1) analog output; 4-20mA, 0-10V, or 0-5V jumper selectable, (1) scalable dry contact output for totalization, and (1) high resolution frequency output for use with peripheral devices such as an ONICON display module or Btu meter. FB-3500 for Bi-directional applications shall provide additional contact outputs for direction and flow totalization in each direction. Each flow meter shall be covered by the manufacturer's two-year warranty.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Electrical Power:

1. Verify that power supply is available to the operator workstation, all actuators, valves and all other components of the HVAC Control System. Where required, provide low and/or line voltage power from the nearest electrical panel.
2. Unless noted otherwise, line voltage power for system equipment shall be derived from the nearest electrical panel, and shall not be common with other HVAC, plumbing, electrical or architectural equipment. Unless noted otherwise, low voltage power shall be derived from transformers/drivers associated with the system equipment only, and shall not be connected to control power transformers associated with other HVAC equipment (i.e. air handling units, chillers, etc.). System equipment may share transformers/drivers with other system equipment, provided the transformers/drivers are sized to handle the total load.
3. Control panels for equipment being fed from the emergency generator, including, but not limited to boilers, heating pumps, selected air handling and terminal equipment, etc., power shall be derived from the nearest 120/208 volt normal/emergency panel. Verify equipment that is connected to emergency power with the Electrical Contractor.
4. Install all power wiring and cable per the National Electric Code and applicable Division 26 Sections. Install raceways, boxes, cabinets according to Division 26 Sections.
5. Connect manual-reset limit controls independent of manual-control switch positions. Automatic duct heater resets may be connected in interlock circuit of power controllers.
6. Connect hand-off-auto selector switches to override automatic interlock controls when switch is in hand position on all equipment except variable air volume air handling units.

B. Communication wiring:

1. All control and interlock wiring shall comply with national and local electrical codes, and Division 26 of this specification.
2. All low-voltage wiring shall meet NEC Class 2 requirements. Low-voltage power circuits shall be subfused when required to meet Class 2 current limit.
3. All communication wiring will be in raceway or EMT
4. Do not install Class 2 wiring in raceways containing Class 1 wiring. Boxes and panels containing high-voltage wiring and equipment may not be used for low-voltage wiring except for the purpose of interfacing the two (e.g. relays and transformers).

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5. Do not install wiring in raceway containing tubing.
 6. Where Class 2 wiring is run exposed, wiring is to be run parallel along a surface or perpendicular to it and neatly tied at 3 m (10 ft) intervals.
- C. Install software in control units and operator workstation(s). Implement all features of programs to specified requirements and as appropriate to sequence of operation.
- D. Connect and configure equipment and software to achieve sequence of operation specified.
- E. Verify location of thermostats, humidistats, and other exposed control sensors with Drawings and room details before installation. Install devices 48 inches above the floor.
1. Install averaging elements in ducts and plenums in crossing or zigzag pattern.
- F. Install guards on thermostats/sensors in the following locations:
1. Entrances.
 2. Public areas.
 3. All Gymnasiums.
 4. Locker Rooms
 5. Where indicated.
- G. Install damper motors on outside of duct in warm areas, not in locations exposed to outdoor temperatures.
- H. Furnish and Install hydronic instrument wells, valves, and other accessories where required.
- I. Install refrigerant instrument wells, valves, and other accessories where required.
- J. Space Sensor(s):
1. Verify location of thermostats, humidistats, and other control sensors with Drawings and room details before installation. Mount sensors in occupied spaces to match mounting height of light switches unless otherwise indicated on Drawings. Mounting height shall comply with codes and accessibility requirements.
 2. Conceal assembly in an electrical box of sufficient size to house sensor and transmitter, if provided.
 3. Install electrical box with a faceplate to match sensor cover if sensor cover does not completely cover electrical box.
 4. In finished areas, recess electrical box within wall.
 5. In unfinished areas, electrical box may be surface mounted if electrical light switches are surface mounted.
 6. Align electrical box with other electrical devices such as visual alarms and light switches located in the vicinity to provide a neat and well-thought-out arrangement. Where possible, align in both horizontal and vertical axis.

3.2 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust all control system components. Report results in writing to the owner's representative.

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- B. Perform the following field tests and inspections and prepare test reports:
1. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation. Remove and replace malfunctioning units and retest.
 2. Test and adjust controls and safeties.
 3. Test calibration of electronic controllers by disconnecting input sensors and stimulating operation with compatible signal generator.
 4. Test each point through its full operating range to verify that safety and operating control set points are as required.
 5. Test each control loop to verify stable mode of operation and compliance with sequence of operation. Adjust PID actions.
 6. Test each system for compliance with sequence of operation.
 7. Test software and hardware interlocks.
- C. DDC Verification:
1. Verify that instruments are installed before calibration, testing, and loop or leak checks.
 2. Check instruments for proper location and accessibility.
 3. Check instrument installation for direction of flow, elevation, orientation, insertion depth, and other applicable considerations.
 4. Check instrument tubing for proper fittings, slope, material, and support.
 5. Check installation of air supply for each instrument.
 6. Check flow instruments. Inspect tag number and line and bore size, and verify that inlet side is identified and that meters are installed correctly.
 7. Check pressure instruments, piping slope, installation of valve manifold, and self-contained pressure regulators.
 8. Check temperature instruments and material and length of sensing elements.
 9. Check control valves. Verify that they are in correct direction.
 10. Check air-operated dampers. Verify that pressure gages are provided and that proper blade alignment, either parallel or opposed, has been provided.
 11. Check DDC system as follows:
 - a. Verify that DDC controller power supply is from emergency power supply, if applicable.
 - b. Verify that wires at control panels are tagged with their service designation and approved tagging system.
 - c. Verify that spare I/O capacity has been provided.
 - d. Verify that DDC controllers are protected from power supply surges.
- D. Replace damaged or malfunctioning controls and equipment and repeat testing procedures.

3.3 ADJUSTING

- A. Calibrating and Adjusting:
1. Calibrate instruments.
 2. Make three-point calibration test for both linearity and accuracy for each analog instrument.
 3. Calibrate equipment and procedures using manufacturer's written recommendations and instruction manuals. Use test equipment with accuracy at least double that of instrument being calibrated.
 4. Control System Inputs and Outputs:
 - a. Check analog inputs at 0, 50, and 100 percent of span.
 - b. Check analog outputs using milliampere meter at 0, 50, and 100 percent output.
 - c. Check digital inputs using jumper wire.
 - d. Check digital outputs using ohmmeter to test for contact making or breaking.
 - e. Check resistance temperature inputs at 0, 50, and 100 percent of span using a precision-resistant source.
 5. Flow:
 - a. Set differential pressure flow transmitters for 0 and 100 percent values with 3-point calibration accomplished at 50, 90, and 100 percent of span.
 - b. Manually operate flow switches to verify that they make or break contact.
 6. Pressure:
 - a. Calibrate pressure transmitters at 0, 50, and 100 percent of span.
 - b. Calibrate pressure switches to make or break contacts, with adjustable differential set at minimum.
 7. Temperature:
 - a. Calibrate resistance temperature transmitters at 0, 50, and 100 percent of span using a precision-resistance source.
 - b. Calibrate temperature switches to make or break contacts.
 8. Stroke and adjust control valves and dampers without positioners, following the manufacturer's recommended procedure, so that valve or damper is 100 percent open and closed.
 9. Stroke and adjust control valves and dampers with positioners, following manufacturer's recommended procedure, so that valve and damper is 0, 50, and 100 percent closed.
 10. Provide diagnostic and test instruments for calibration and adjustment of system.
 11. Provide written description of procedures and equipment for calibrating each type of instrument. Submit procedures review and approval before initiating startup procedures.
- B. Adjust initial temperature and humidity set points.

3.4 DEMONSTRATION AND ON-SITE ASSISTANCE

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- A. Pre-installation demonstration: the Controls Manufacturer/Installer shall provide a complete demonstration of the proposed control system software architecture prior to final programming of the software. This demonstration is required to have the owner's representative agree on the system architecture. The method and location of the demonstration shall be acceptable to the owner. The Controls Manufacturer/Installer will be required to make any changes in the proposed system architecture, if desired by the owner's representative.
- B. Provide all training that may be required by the Owner after Phase I, after substantial completion and again at nine months after substantial completion.
- C. Post installation demonstration: provide documented (paper or electronic) proof of testing prior to scheduling post-installation demonstration. Documentation to provide proof of testing/verification of all system inputs and outputs, including verification of analog input values (temp, CO2, etc.) with independent handheld NIST calibrated device. Post installation testing will engage a factory-authorized service representative to train the Owner's maintenance personnel to adjust, operate, and maintain HVAC instrumentation and controls.
- D. On-site assistance: during the warranty period, the Controls Manufacturer/Installer shall provide additional on-site assistance for training and re-programming, when requested by the owner. This on-site assistance shall be for a period of 8 hours for each visit, with a total of 4 visits.

END OF SECTION 23 0900