TOWN OF WAYLAND
WAYLAND PUBLIC SCHOOLS

Space and Ventilation Study for School Building Reopening

DRAFT
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INTRODUCTION & SUMMARY

TBA Architects and Norian Siani Engineering were contracted by the Town of Wayland Public Schools to provide an assessment of existing school building facilities and systems, to document their current state, and evaluate how they compare to the guidelines released by the Commonwealth of Massachusetts for the reopening of public schools. This study yields recommendations for modifications that can be implemented in the short and long term as part of efforts to provide the parents, students, teachers, and other users the data to see that the work has been done to ensure that Wayland schools meet the guidelines set by the Commonwealth and inform their decisions about physically returning to school facilities.

Preparing the schools for re-occupancy is an ongoing multifaceted task of which this study is a part. All of the data in this report is to inform this ongoing planning process and document that the buildings are suitable for re-occupancy based on the Commonwealth's guidelines. Herein we provide documentation and analysis in two key areas of **occupiable space and ventilation**; areas discussed in the Department of Elementary and Secondary Education's (DESE) documents released over the past five weeks. Commentary focuses on the immediate goal of meeting the guidelines for reopening amidst the COVID-19 pandemic and then set the groundwork for future modifications and continued maintenance. Recommendations are categorized in degrees of time and scope:

- Tier 1 – includes data gathering, analysis and recommendations leading to repair and maintenance work to ensure guidelines for occupancy are met.
- Tier 2 – Upgrades and modifications to existing equipment per best practices.
- Tier 3 – Longer term planning for ongoing maintenance and replacement of systems.

Thank you to the town personnel, Ms. Louise Miller and Mr. Ben Keefe and his staff, for the dedication and concern as well as assistance in providing us the information to do this work.

We performed review of available documents including as-built drawings, photographs, documents from previous project experience with Wayland Public Schools, survey information gathered with the help of Wayland schools staff, current building code and other regulations, and recently released guidance from the Commonwealth and industry agencies in response to the COVID-19 pandemic. Existing conditions data has been gathered and analyzed for the assessment the first phase of study. On-site confirmation, evaluation, testing, balancing, consulting and further recommendations will follow over the coming weeks.

The assessment of existing facilities and systems shows that the school buildings do or will meet the guidelines set forth and are suitable for re-occupancy based on implementation of the recommendations on room capacity and ventilation and filtration adjustments. Rooms can be laid out to meet both the three and six foot separation requirements; circulation can be organized to limit cohort interaction; and ventilation systems can be provided with upgraded filtration and increased outdoor air supply.

Space – Room Data Inventory and Analysis: We provide documentation of the existing floor plans through colorized space use plans with room names, numbers; openings for access and ventilation; determine available areas and occupancies based on the three and six foot distancing scenarios from the Department of Elementary and Secondary Education (DESE); and, provide recommendations for other purposes and layouts.

1. Existing space use plans

   a. Color coded for quick reference of adjacencies
   b. Room names and numbers
   c. Existing room dimensions and areas.
2. Room capacity tabulations based on DESE guidelines. The tables included provide a formulaic approach developed to determine the minimum occupancy of classrooms and other potentially occupied spaces. The actual number of desks may vary from room to room even if the area is the same due to room proportion and shape. DESE only gives the physical separation guidelines and example classroom layouts. The schools' staff have tested layouts in model classrooms at certain schools and found that they can be laid out with sufficient distances and accommodate at least half of the district's typical class size.
3. Openings for ventilation and circulation.
4. Recommendations when alternate uses of spaces and adjacencies should be considered.

Ventilation Inventory and Analysis: The study outlines the base systems present at each building, provides descriptions of different mitigation strategies, detailed descriptions and recommendations for strategies that should be implemented for each different type of equipment and a discussion of further work to be completed and strategies to be considered. We provide documentation of existing mechanical systems and methods of ventilation; comparing these systems to the referenced guidelines; and provide recommendations for modification of systems for adjusted ventilation and filtration.

1. Provide a brief description of each school describing which HVAC systems are present in the school. (At this point in time it will be general and not room by room.)
2. Provide a written description for each different system type present at each school. Descriptions include the following:
   a. Description of equipment and how it operates.
   b. Information about typical setup regarding ventilation air. (eg: Typically set up between x% and y% outside air.)
   c. Information about filtration including current information on filtration used (information provided by the Town of Wayland, information on expected maximum level of filtration that can be provided.)
   d. Recommendations on what modifications should be considered for each typical piece of equipment or system to mitigate risk of virus spread. Pros and cons of recommendations.
   e. Other thoughts and recommendations.

REFERENCED GUIDELINES & STANDARDS

The analysis we provide and the recommendations we make are done referencing the documents made available by the Commonwealth and industry groups as of the end of July regarding research of COVID-19 and guidelines for reopening schools. Specifically, the following documents have been used in preparation of this report:

1. Massachusetts Department of Elementary and Secondary Education's *Initial Fall School Reopening Guidance* issued on June 25, 2020
2. *Fall Reopening FAQ* issued on July 10, 2020 and the *Fall Reopening Facilities and Operations Guidance* dated July 22, 2020. This report focuses on documentation and recommendations in response to section 1 'Preparing spaces' and section 2 'Making systems and other space use modifications' in particular 'Ventilation and HVAC' systems.
3. Determining Building Readiness and Operations for Existing Facilities to Reoccupy After Shut Down due to Pandemic, ASHRAE (American Society of Heating, Refrigerating and Air Conditioning Engineers) Epidemic Task Force Schools& Universities, updated July 17, 2020.

The guidance from DESE begins with setting this goal:

> "Our goal for the fall is to safely bring back as many students as possible to in-person school settings, to maximize learning and address our students' holistic needs. With the information provided in this (DESE) memo, districts and schools should begin planning for a fall return that includes multiple possibilities, with a focus first and foremost on getting our students back into school buildings."

With the goal of ensuring that the school facilities meet the guidelines set forth by DESE to reopen we set about providing information and recommendations on space, capacity and ventilation to assist the Town of Wayland in planning and implementation. This is part of the Town's holistic plan to reoccupy buildings and must be coupled with the strategies below. From the onset of the pandemic the tenets of handwashing, physical separation, and vigilance in carrying out essential tasks via face coverings and frequent cleansing have been espoused and should continue to be the primary tactics. Recommendations for space use and capacity and operation of ventilation systems are important parts of the whole plan but not the only line of defense.

Under the topic of *Health and safety requirement and related guidance for in-person learning* DESE states that a physical distance of six feet should be the goal with a minimum of three feet.

- Schools should be organized and operated to allow for these at all times (with exceptions for necessary close contact);
- that classrooms be arranged with desks facing the same direction and six feet, but a minimum of three feet separation from edge of seat to edge of seat (clarified, July 10th FAQ);
- space shall be considered for teachers;
- alternative uses for certain spaces (such as libraries, cafeterias and auditoriums) be found to accommodate the recommended distances;
- and potential use of outdoor spaces be identified.

They also state that cohorts of students be made that will remain with each other throughout the day with no limitations on size as long as the distancing can be maintained and that travel through the school be limited. Further, schools are to designate a COVID-19 medical waiting room separate from the medical suite in the event of a suspected case of the coronavirus.

TBA has prepared a space inventory and developed formulas for determining capacity of rooms with the square footage per occupant based on the following table and diagrams. These diagrams and formulas were developed by TBA based on years of school design experience and the need to process data to establish a minimum capacity from which to work. All spaces should be laid out to determine the actual occupancy as much is dependent upon the room proportion, shape, door, and window locations. The recently published guidelines and our sample testing of the website lead us to believe our work has been considered similarly to the parametric design tool referenced in DESE's July 22nd memorandum. The tool is available on the web and can be consulted in a future phase of requested. Appendices A through C in the same DESE memorandum contain sample layouts of various spaces.

For the room data tables we used the unit values shown in the table below. The State building code calculates the capacity of a school based on core classroom capacity and most other areas considered as business/office use. In school construction and renovation projects, the Massachusetts School Building Authority's guidelines are generally used to size rooms and used to determine adequate utilization of schools. This number often aligns closely with the caps school districts place on their own class sizes and is why we use it to indicate what the max capacity of the room might have been. The area per occupant noted for DESE's three and six foot distances are determined by TBA based on standard desk and chair sizes, taking the separation width from edge of chair to edge of chair and separation length from back of chair in occupied position to the next occupied desk. In the case of non-classroom spaces we use the more stringent of code requirement or code value modified with a six foot separation of occupants.

	MA Bldg Code	MSBA standard	DESE 3' distance	DESE 6' distance
Classrooms	20 sf/occupant	35 sf/student	30 sf/student	60 sf/student
Teacher			120 sf/teacher*	120 sf/teacher*
Assembly	5 to 15 sf/occ.		9 or 15 sf/occ min.	36 sf/occ
Office	100 sf/occ.		100 sf/occ.	100 sf/occ.

*desk and space around. DESE diagrams show full 6' across teaching wall of room.

The space and room data tables in the appendix document and compute the following (all based of off the available as-built documents):

- Room Names & Numbers
- Room Area in Net Square Feet
- Room Dimensions
- Openings
- Number of occupants at MSBA standards and at 3' and 6' physical separation guidelines
- Other potential room uses and recommendations

DESE also requires that each school designate a COVID-19 related waiting space.

> "In order to minimize transmission of COVID-19, schools must ensure they have an isolated space available for students displaying COVID-19 symptoms. Our initial requirements and related guidance are as follows: Schools are required to designate a COVID-19 related waiting space that is separate from the nurse's office or other space where routine medical care is provided."

Further clarification was provided in the *Fall Reopening Facilities and Operations Guide* that indicates the intent of this space is as a waiting area where there is separation from the rest of the school and persons can wait to be picked up from the school.

> "Medical waiting room. Purpose: This is a separate space from the nurse's office or the regular space for providing medical care. It may be located near a nurse's or other health related office. The medical waiting room will be used when a student presenting COVID-19 symptoms needs to be separated. From a facilities perspective, every effort should be made to find a self-contained space, ideally near an exit/entrance and with a dedicated bathroom."

In this study we note spaces that have potential of being used for such a purpose and intend to made further recommendations based on subsequent building walkthroughs, coordination with the district's overall plan and ventilation study results. Alternatives to using existing spaces for this purpose that can be considered are:

1. Leasing a temporary trailer with bathroom to be placed outside the building. This would provide separation, access to bathroom directly and separate ventilation system.
2. Construction of a waiting room and possibly bathroom inside a space that the school does not anticipate using while under COVID-19 guidelines. A 'room within a room" would have the separation required and separate ventilation. Location at an existing exterior door would be preferred.

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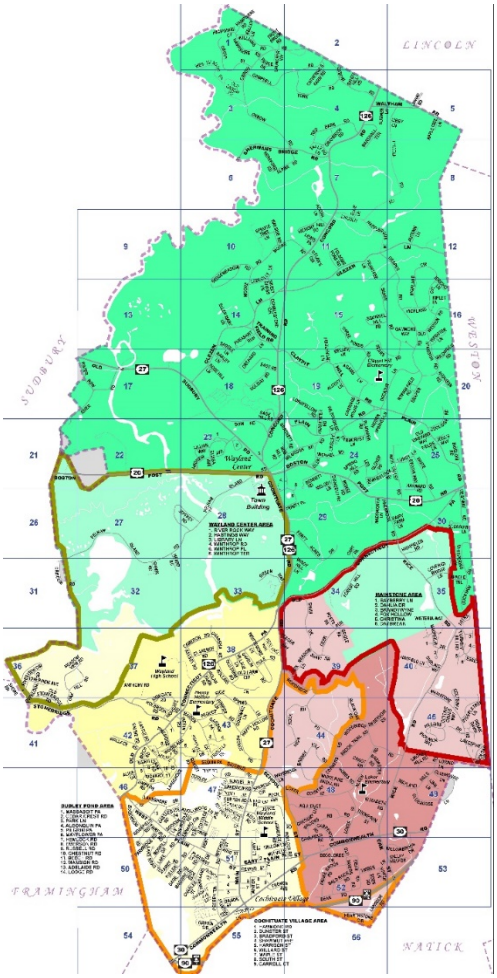
SCHOOL SPACE & ROOM DATA NARRATIVES

For each school building we offer a narrative describing the existing layout, circulation, entrance and exit configuration, and nurse's office. These focus on DESE's *Health and safety requirement and related guidance for in-person learning* topic areas that should be addressed prior to occupancy. The Town of Wayland has asked for all of the public school facilities to be studied and described in similar ways. At each building the classrooms need to be laid out in a manner that satisfies the distances appropriate to the Town's selected mode of reopening; circulation paths need to identified and made clear to occupants; medical waiting areas designated; entrance and exit strategies defined; and space uses needing alternate locations or configurations identified. It is anticipated that the Town will provide building specific plans and we will participate in this process in the coming weeks.

In general, we recommend classrooms should be cleared of furniture and items other than desks and rearranged; other spaces should be identified for use in teaching; circulation patterns should be identified and coordinated. In the inventory and calculation tables we include suggestions for how to do these in each of the six school buildings. We note internal and windowless spaces in the tables in the appendix and recommend that alternate locations be found for any occupied uses in them.

Included in the study are the following school buildings:

- The Children's Way Preschool at 41 Cochituate Rd.
- Loker Elementary School at 47 Loker St.
- Claypit Hill Elementary School at 40 Adams Ln.
- Happy Hollow Elementary School at 63 Pequot Rd.
- Wayland Middle School at 201 Main St.
- Wayland High School at 264 Old Connecticut Path



THE CHILDREN'S WAY (PRESCHOOL)

Located on the second floor of the Town Building, the Children's Way Preschool serves the Town's early childhood education needs. It is accessed from the rear of the building through an entrance adjacent to the gymnasium and with elevator and stair access to the second floor. Five classrooms, associated bathrooms and storage rooms, an office and meeting spaces are all located on the second floor encompassing 4,070 nsf (occupiable spaces, no corridors or bathrooms). Each of the rooms has independent access from the corridors and windows to the outside. The corridors range from five to eight feet wide allowing for passage of two parties while maintaining three feet of distance in all areas except at stairs and elevators. Movement of children should be coordinated when going in and out of the building to avoid crossing and mixing of foot traffic.

Operation of the preschool can be done independent of the rest of the Town Building and the spaces are already configured to allow groups to remain independent of one another for most of the day. Classrooms in preschool do not operate as in grade schools, so occupancy is not determined by spacing of desks. DESE has provided separate guidelines for early childhood (*Fall Reopening Facilities and Operations Guidance*) that recommend marking six foot by six foot areas (36 nsf) to indicate safe learning distances by making washable and movable surfaces to allow children to play in dedicated areas rather than at desks as well as marking distanced areas on the floor. The occupancy we note for classrooms is inclusive of all occupants, students and teachers.

There is no dedicated nurse or nurse's office at the preschool. A room needs to be designated the "waiting room" in the event of a suspected case of COVID-19. Either the Speech Rm or small Meeting Rm could function as this space. There are two staff bathrooms accessed from the corridor that are available for use outside the classrooms. The Town could also designate another space outside the preschool floor, but within the Town Building.

Parking and drop off are via the parking lot and access road at the rear of the Town Building. There is a playground and greenspace available for outside play and education.

LOKER ELEMENTARY SCHOOL

The Loker Elementary School is a single-story multilevel school located in the southeast of the Town. The school was built in 1957 and added to in 1963 with modular classrooms and a gym added in 1999. The kitchen and adjacent spaces were renovated in 2018 to create a consolidated food service area with dedicated servery line. Its gross area is 47,100 gsf (includes all rooms, service spaces, corridors and walls) and net floor area is approximately 33,407 nsf (occupiable spaces, no corridors or bathrooms).

The Loker Elementary School is organized as a Kindergarten through 5th school with 20 full size classrooms and separate music, art, computer, and special education rooms. There are also separate cafeteria, gymnasium and auditorium spaces. Classrooms range from the largest two at 1200 and 1360 nsf to 860 sf at the smallest and most around 880 to 900 nsf. In this range, most rooms would allow for a full-sized class of students to occupy the rooms at a three foot separation and about a half of the students at six feet.

All classrooms have independent door access to and from the exterior and are easily accessed directly from corridors, except one that appears to have internal access via the library. Any spaces that are accessed through other spaces will require subdivision and possible interruption of the intervening space. The main entrance, under canopy, is into a lobby with corridors running in three distinct directions to various spaces and immediate access to the auditorium and cafeteria. The only apparent landlocked (no exterior wall) spaces are copy and storage rooms. One corridor has four classroom and an art room but most classrooms are accessed via a long corridor directly across from the main doors. This corridor runs continuously in a "c" path all the way to the gymnasium at the far end with the library about 2/3rds of the way along. This corridor wraps around the parking lot and bus loop area and the spaces including the gym can be used for access avoiding all of the population having to travel the full length internally. LOOK FOR COPY AND STORAGE ROOMS

Corridors are consistent in width (two variations) with those to classrooms allowing for passage of two single file groups while maintaining three feet of separation. The corridor to the gym and modular classrooms is sloped which has not yet been checked for compliance with current MAAB regulations. There is also a level change between the 1957 and 1963 wings which is shown in the plans as a flight of steps which wouldn't allow accessible interior access to the library, gym and nine classrooms. The

auditorium has a sloping floor in the seating area with floor level access at the rear of the space and directly to the stage.

Loker has a dedicated nurse's office with direct access to a toilet room. A room needs to be designated the "waiting room" in the event of a suspected case of COVID-19. However, there is no separate room with direct access to the nurse's office or the toilet room. There are small rooms adjacent (but accessed separately) to the nurse's office that are also adjacent to a toilet room that could be used as the "waiting room" access to the exterior is via the corridor.

CLAYPIT HILL ELEMENTARY SCHOOL

The Claypit Hill Elementary school is a single-story multilevel school. The school was built in 1957 and added to in 1962 and 1973 and modular classrooms were added in 1999. Additionally, the gymnasium was partially rebuilt around the same time. Its gross area is 63,900 gsf (includes all rooms, service spaces, corridors and walls) and net floor area is approximately 46,600 nsf (occupiable spaces, no corridors or bathrooms). The school is geographically centrally located within the Town but is the most northerly located with parking lot and bus loop.

The Claypit Hill Elementary School is organized as a Kindergarten through 5th grade school with 26 full size classrooms and separate music, computer, special education, and art rooms. Four classrooms are modular and were added along with a full-size rebuilt gymnasium with stage. The resultant mix of classroom sizes has a few large rooms averaging 1150 nsf per room, most averaging 900 to 950 nsf and rooms in the modulars averaging 830 nsf. Most rooms would allow for a full-sized class of students to occupy the rooms at a three foot separation and about half of the students at six feet. Consideration needs to be given to how to occupy the smaller rooms – perhaps relocating those classes to the library, gym, or swapping locations with resource rooms. Grades could easily be organized in pods, keeping cohorts together and making circulation plans that are simpler to follow.

There are several spaces that are internal and without windows or doors directly to the exterior. They are primarily located at in the center of the 1962 addition and comprise seven rooms having specific uses and totaling approximately 2000 nsf.

Access to the classrooms could be provided both internally and externally with most classrooms having direct door access to the exterior. This allows for greater physical separation and reduces clustering or crossing of foot traffic. The main entrance, under canopy, is into a lobby with corridors running in four distinct directions to various spaces and immediate or short walk access to the auditorium, gym and cafeteria. The library is most distant but can be reached from exterior doors at either end of the adjacent corridor. Most classrooms are accessed via a long corridor directly across from the main doors.

Corridors vary in width with most allowing for passage of two single file groups while maintaining three feet of separation. A few corridors are too narrow for more than one group at a time – namely the

corridors to the gym and along the short end of the library. Six classrooms and a resource room are accessed by traveling through the library. The library should be reorganized to allow for ample space to access the classrooms. Multiple levels are accessed by ramps which have not yet been checked for compliance with current MAAB regulations. The modular classrooms have ramp access, but the music practice rooms and the stage do not.

A room needs to be designated the "waiting room" in the event of a suspected case of COVID-19. The health office is a separate space but does not have an attached bathroom. A toilet room is adjacent and accessed independently off the corridor. Adjacent to the health office is a teacher's lounge which has direct access to the exterior. There is also a door from the corridor to the exterior next to the health office.

HAPPY HOLLOW ELEMENTARY SCHOOL

The Happy Hollow Elementary school, is a single-story building with a single level change at the gymnasium/auditorium. The school was built in 1954 and added to in 1965 and 1974 with modulars added in 1998. Renovations to the teachers work rooms were made in 2017 to allow the creation of a dedicated medical suite. Its gross area is 49,450 gsf (includes all rooms, service spaces, corridors and walls) and net floor area is approximately 34,000 nsf (occupiable spaces, no corridors or bathrooms). The school is located in the southwest of town.

The Happy Hollow Elementary School is organized as a Kindergarten through 5th grade school. The school comprises 19 classrooms varying in size from kindergarten ranging from a low of 750 nsf in the modulars to a high of 1300 nsf. The average classroom is over 900 square feet. Many of the classrooms have long and narrow proportioned which are more challenging for desks arranged in lines. Most rooms would allow for a full-sized class of students to occupy the rooms at a three-foot separation and about half of the students at six feet.

Happy Hollow has very few internal spaces, most of them being small offices and storage rooms retrofitted over the years. Consideration needs to be given to how to occupy the small modular classrooms – perhaps relocating those classes to the library, gym, or swapping locations with resource rooms. Grades could easily be organized in pods, keeping cohorts together and making circulation plans that are simpler to follow.

There is an open air courtyard in the center of the building. This courtyard and the two direct connections from the corridor can be used for outside teaching and can be integrated into a one-way circulation system.

Entrance to the school is via a small lobby with corridors straight ahead and to the right. Circulation operates in a circle with one spur leading to the modular classrooms. The corridor can be accessed from the exterior in three locations and accessed from the courtyard at two locations. All corridors are similar in width and would allow passage of two single file lines while maintaining three feet of separation. The looping corridor provides ideal opportunity for one way foot traffic around the school. Access to the classrooms could be provided both internally and externally with most classrooms having direct door

access to the exterior. This allows for greater physical separation and reduces clustering or crossing of foot traffic.

Happy Hollow has a dedicated nurse's office with attached accessible restroom along the corridor with the gym and cafeteria. There are no other spaces connected to the nurse's office. A room needs to be designated the "waiting room" in the event of a suspected case of COVID-19. Adjacent to the nurse's office is a work room/conference room which is accessed from the same corridor. Also adjacent is a staff bathroom off the corridor. Both have close proximity to the lobby for exiting.

Of all the schools, the Happy Hollow has the smallest bus loop and limited amount of parking. The bus loop is shared with the visitor and some staff parking and runs along the front of the building. Currently the parking available requires parking on grass and along the street. There are three parking areas that should be coordinated to have staff park as close to the entrance serving their space to minimize crossing of paths.

WAYLAND MIDDLE SCHOOL

Located in the far south of town, the single middle school serves all of the Town's students in grades six through eight. Following up to six years at three separate elementary schools rising sixth graders have to navigate a new building with a newly combined group of students. Originally built in 1962, renovated in 1993 and renovated and expanded in 2000 the middle school shows many of the same characteristics of the elementary schools with both interior and exterior renovations updating its appearance. Its gross area is 119,600 gsf (includes all rooms, service spaces, corridors and walls) and net floor area is approximately 89,900 nsf (occupiable spaces, no corridors or bathrooms). There is full perimeter access and is served by combination parking lot and bus and drop of loops on two sides.

There are 31 core classroom spaces organized in pods around four study hall spaces. All four of the study hall spaces are open to the corridors and appear to be subdivided to create shared classrooms. Core classrooms range in size from as small as 530 nsf to 880 nsf with most between 750 and 850 nsf. The larger rooms would allow a full class size at three feet physical separation. At a six foot separation most rooms would accommodate half of the students. Pods provide the ability to create smaller cohorts that remain together throughout the day. There are also eight dedicated science classrooms; music and chorus rooms; two art rooms; a library and media center; tech education center; a dedicated auditorium, cafeteria and gymnasium spaces. Science classrooms are around 1,100 nsf but contain fixed furniture that dictates a difference spacing per DESE's guidelines for reopening.

The building is organized in three bars connected by two parallel corridors and two cross corridors. The main entrance is at the north side with doors at the end of each corridor. Doors are also available from many of the classrooms and the study halls directly to the exterior. However, there are a great deal more interior spaces without windows or direct exterior access, including the library, several classrooms, offices and special education spaces. Art rooms are internal as well while the music rooms and cafeteria have courtyard access. Courtyard facing rooms offer the opportunity for increased ventilation and for use of spaces for teaching. Spaces with doors to the exterior perimeter provide opportunity for separation of access and limiting crossings of students in the corridors. Corridors are of sufficient width to allow single file lines passing while maintaining three feet of separation, however the corridor configuration offers the ability to create one-way traffic throughout the school.

Adjacent to the main office, but not directly connected is the health suite containing a waiting area two bathrooms an exam room and resting room. A room needs to be designated the "waiting room" in the event of a suspected case of COVID-19. There are a few small rooms accessed from the corridor but adjacent to the nurse's office that could be designated as this space. It may be possible to use one of several small offices along the corridor adjacent to the nurse, though none have dedicated bathrooms attached.

WAYLAND HIGH SCHOOL

Wayland High School is a sprawling campus of two separate buildings serving as the single high school for the Town's ninth through twelfth grade population. It is located in the west of town along Old Connecticut Path. The academic building is two stories and contains classrooms, science rooms, lecture hall, and a library. The net floor area of all buildings is approximately 124,500 nsf (occupiable spaces, no corridors or bathrooms). Both the north and south buildings were built in 2010. A single-story building to the north houses the administrative and guidance offices, fine and theatre arts, music, vocational shops, auditorium, gym, cafeteria, and a large fieldhouse. Waycam TV studio is also housed here but operates independent of the high school. The fieldhouse building likely dates to the 1960s but was renovated in 2010.

The academic building is organized on two floors with four pods of eight classrooms and three science classrooms at the perimeter and a cluster of internal workspaces and specialized classrooms. Two pods share a floor and a central two-story library. Science classrooms are in each pod but contain fixed furniture that dictates a difference spacing per DESE's guidelines for reopening. All rooms at the perimeter have windows but no independent exterior access. Internal rooms include special education, resource rooms, and labs of varying sizes. Pods provide the opportunity to keep smaller cohorts in smaller areas limiting potential to spread the virus.

Each wing is accessed from the center entry and a circular corridor. There are three stairwells on the west side and two on the east side. The configuration should be used to create one way circulation both around each floor and in the stairwells. Corridors are approximately eight feet wide.

Spaces in the north building are strung along two parallel corridors running east to west. There are four distinct zones to the building, described below. With multiple doorways and a simple corridor system, one way traffic can be created, but given the campus structure the nearest exterior door should be utilized to limit interior movement and crossing of foot traffic.

Administrative and guidance offices are located at the east end of the building are accessed via a lobby. Offices ring the perimeter with conference rooms and storage internal. The medical suite is internal (no exterior windows or doors) and can be accessed via a vestibule at the north side of the building and

corridor that runs to the cafeteria. Moving west the dining commons (cafeteria) is next and can be accessed directly from the exterior or via the administration lobby to the east and corridor from the west. Passage to the auditorium is via corridor on the north and south sides of the building and exterior doors directly across the corridor. Specialized shop spaces, fine and theatre arts classrooms are at the west end of the building and only accessed via corridor. The field house to the north is accessed from the exterior directly or via a covered walkway and vestibules from the shop/arts end of the building. The space use and configuration of this building will likely make regular occupancy difficult. Alternate uses should be identified for the auditorium and fieldhouse to allow some reduced capacity use which would spread the population around the campus.

The nurse's office at the High School is located in the administration building and is comprised of internal spaces adjacent to the main office. It has a nurses office, an exam room, two resting areas, and a bathroom. All are accessed through a single space. A room needs to be designated the "waiting room" in the event of a suspected case of COVID-19. There are no nearby spaces that have connecting bathrooms but there are several offices nearby that could be designated for this purpose. Alternatively, there are small rooms at the west end of the building that are adjacent to bathrooms accessed off the corridor or some portion of the fieldhouse could be used with access to bathrooms and directly to the exterior.

Parking lots and drop off loops run along the east side of the complex. Drives and walkways surround the building. There is ample exterior space that can be utilized and multiple entrances/exits that can help limit interior movement.

MECHANICAL SYSTEMS INTRODUCTION

The HVAC system of a building is only one small part of a complete strategy to address COVID-19 concerns. Regardless of the HVAC systems that are present at the school and how they are operated and/or modified, the systems cannot single handedly eliminate the risk of contracting COVID-19 when occupying a building. The following study outlines the base systems present at each building, provides descriptions of different strategies to implement prior to occupancy and while occupancy is ongoing, detailed descriptions and recommendations for strategies that should be implemented for each different type of equipment, and a discussion of further work to be completed and strategies to be considered.

This report is based on best current practices and the most recently available research for reducing risk of airborne transmission of COVID-19 as of the end of July 2020. Specifically, the following documents have been used in preparation of this report:

1. Determining Building Readiness and Operations for Existing Facilities to Reoccupy After Shut Down due to Pandemic, ASHRAE Epidemic Task Force Schools& Universities Updated 7/17/20.
2. Initial Fall School Reopening Guidance, Massachusetts Department of Elementary and Secondary Education dated June 25, 2020
3. Fall Reopening Facilities and Operations Guidance, Massachusetts Department of Elementary and Secondary Education dated July 22, 2020

In addition to the standards referenced above a number of other standards and documents were used. It should be noted that new research and information is coming out continually. It is likely that this research will backup many of the statements and recommendations in this report but it is also possible that new research will mean that some of the recommendations need to be updated and/or changed. Addressing this type of situation requires continual attention to the latest research and flexibility to change course when and if necessary.

In addition to the Massachusetts Department of Elementary and Secondary Education standards which contain a number of valuable recommendations, the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) has as published standards for reopening school buildings. ASHRAE has long been the most authoritative entity regarding HVAC system design for the building industry. Their study work and publications are considered the industry standard. The ASHRAE epidemic task force has issued a document outlining recommendations for reoccupying school buildings. (See Appendix HVAC-3, which contains this document for reference.)

It should be understood that no HVAC system can eliminate 100% of the risk that a virus is spread by the HVAC system. On the other hand, certain things can be done to reduce the risk of this happening. Some of these things are inexpensive and relatively easy to implement while others are expensive and/or time consuming to implement. As building systems experts, we will provide information on enhancements to the HVAC systems for reducing risk and recommendations regarding in which order to pursue these different upgrades. It also should be noted that as each additional enhancement is pursued there are diminishing returns for the money spent.

EXECUTIVE SUMMARY

MINIMUM STANDARDS

In relation to the ventilation system, at a minimum and in accordance to DESE standards, the school district needs to do the following:

1. Confirm all equipment is fully operational, operating on proper occupancy schedules, cleaned and maintained.
2. Operate equipment in occupied mode for a minimum of one week prior to start of school.
3. Operate equipment in occupied mode for a minimum of 2 hours before the start of each school/work day and until all occupants leave the building.
4. Where and when possible open windows in all occupied areas.

RECOMMENDED FURTHER UPGRADES

We recommend that the school also implement the following additional recommendations:

1. Implement a preventive maintenance plan to ensure equipment remains operational and filters are changed regularly.
2. Increase ventilation rates to the maximum extent possible.
3. Increase filtration efficiencies (MERV ratings) to the maximum extent possible.
4. Implement a control monitoring program including setting up specific trend logs and alarms.

ENHANCEMENTS TO FURTHER IMPROVE SYSTEMS WHICH COULD BE CONSIDERED

If the district wants to implement additional enhancements, we would recommend they consider the following. The district may also decide to implement some of these items if specific areas or rooms have specific issues that mean the recommended upgrades above cannot be implemented. (These items have been listed in the order we would recommend pursuing them. There are diminishing returns regarding how effective each additional strategy will be as they are combined together, and since budgets are not unlimited, a decision has to be made of how many, if any, of these strategies should be implemented.):

1. Consider adding CO_2 sensors to the DDC system as a method to confirm that ventilation air is operational and appropriate. Add trend logging of multiple data points in all or representative student spaces and alarm on elevated CO_2 levels.
2. Consider installing ultra violet light type "c" (UVc) equipment either as standalone devices or integrated into the HVAC systems.
3. Consider installing standalone HEPA filtration systems in classrooms.
4. Consider installing humidifiers in classrooms.
5. Consider installing bi-polar ionization (BPI) equipment in classrooms or integrated into the HVAC systems.

SUMMARY OF MECHANICAL SYSTEMS

The following is a summary of the mechanical systems at each of the Wayland public school buildings: (See Appendix HVAC-1 for a room by room detailed summary of HVAC equipment serving room with details on current equipment setup, occupancy, etc.)

The Children's Way Preschool at 41 Cochituate Rd.

1. Classrooms and some offices are served by unit ventilators and associated common exhaust fans. In addition, some rooms have supplemental heating convectors.
2. One classroom has AC provided by a wall hung ductless mini-split heat pump fan coil.
3. Corridors are served by fan coil units (FCUs).
4. Bathrooms and similar spaces are served by convectors and associated common exhaust fans.
5. Miscellaneous other systems are also present.

Loker Elementary School at 47 Loker St.

The following mechanical systems are present at the Loker Elementary School:

1. Classrooms and some offices are served by unit ventilators and associated common exhaust fans. In addition, some rooms have supplemental heating convectors.
2. Auditorium, Cafeteria/Gym are served by roof top units (RTU)
3. Corridors are served by cabinet unit heater and common exhaust fans.
4. Bathrooms and similar spaces are served by convectors and associated common exhaust fans.
5. Offices with exterior windows are served by convectors with ventilation provided by operable windows.
6. Miscellaneous other systems are also present.

Claypit Hill Elementary School at 40 Adams Ln.

The following mechanical systems are present at the Claypit Hill Elementary School:

1. Classrooms, computer room, media center, staff work room, cafeteria and teachers' room and some offices are served by unit ventilators and associated common exhaust fans. In addition some rooms have supplemental heating convectors.
2. Gym, is served by a ducted heating and ventilating unit (H&V)
3. Auditorium, Lunch and Playroom roof top units
4. Corridors are served by cabinet unit heater and common exhaust fans.
5. Bathrooms and similar spaces are served by convectors and associated common exhaust fans.
6. Offices with exterior windows are served by convectors with ventilation provided by operable windows.
7. Miscellaneous other systems are also present.

Happy Hollow Elementary School at 63 Pequot Rd.

The following mechanical systems are present at the Happy Hollow Elementary School:

1. Classrooms, cafeteria and teachers' room are served by unit ventilators and associated common exhaust fans. In addition, some rooms have supplemental heating convectors.
2. Auditorium/Gym is served by a ducted heating and ventilating unit (H&V)
3. Corridors are served by cabinet unit heater and common exhaust fans.
4. Locker rooms, bathrooms and similar spaces are served by convectors and associated common exhaust fans.
5. Miscellaneous other systems are also present.

Wayland Middle School at 201 Main St.

1. Classrooms and interior offices are served by unit ventilators and associated common exhaust fans. In addition, some rooms have supplemental heating convectors.
2. Offices with exterior windows are served by convectors with ventilation provided by operable windows.
3. Corridors are served by cabinet unit heater and common exhaust fans.
4. Art Room and Adjacent areas are served by a VAV roof top unit (RTU).
5. Auditorium, Cafeteria, Tech Education, Gym, Library are served by roof top units (RTU).
6. Locker room is served by a ducted air handling unit (AHU).
7. Miscellaneous other systems are also present.

Wayland High School at 264 Old Connecticut Path

1. Classrooms, library, auditorium and cafe and corridors are displacement air systems which either are or can be setup to provide 100% outside air.
2. Offices are chilled beam systems with induction units.
3. Field House is served by H&V unit
4. Corridors are served by cabinet unit heater and common exhaust fans.
5. Miscellaneous other systems are also present.

VENTILATION AND INDOOR AIR QUALITY DISCUSSION

The heating air conditioning and ventilation (HVAC) systems are the primary systems that make a building comfortable to occupy and maintain air quality. Each building's set of HVAC systems provides three basic functions; ventilation to provide incoming outside air for occupancy with exhaust to provide pressure balance and remove contaminants & odors, heating and air conditioning. Most often the systems that provide the fresh air also serve to heat and sometimes cool the space as well as tempering the incoming outside air. Ventilation flow rates are specified by code at varying levels for different types of spaces and occupancies. Ventilation systems must adequately heat the incoming outside fresh air for comfort and often cooling (A/C) is also a part of ventilation systems but not typical for these schools other than the middle and high school. Ventilation systems typically include fans, heating coils (sometimes cooling coils) and filters for filtering the mix of incoming outside air and inside air that is being returned from the spaces. Exhaust systems typically include fans, ducts and grilles. Though modern HVAC system design often now uses dedicated outside air systems (DOAS) in which no building return air is mixed into the outside air stream with the exception of the high school these schools do not include this HVAC approach.

It should be noted that the HVAC system for each building and space is designed to maintain indoor air quality based on normal school operation. The systems are not designed to provide room by room isolation, filtration that removes all particulate matter, or for pathogen control. In hospitals and similar health care settings HVAC systems are designed to very different standards and different design approaches and equipment are used to achieve these more rigorous requirements and design standards. Although the equipment present in the schools can be configured to reduce the risk of virus transfer, they cannot be easily modified to eliminate the risk of distributing viruses.

It is important to understand that the HVAC system is important but other strategies and procedures are more important when it comes to avoiding the spread of COVID-19. The primary goal of all stake holders needs to be to keep pathogens out of the schools as much as possible and to devise programs and procedures to identify sick and contagious people as soon as possible and remove them from the school setting.

Preventive Maintenance and Equipment Failure

The most important aspect of maintaining good indoor air quality at the school buildings is ongoing maintenance and upkeep. Even the very best HVAC systems cannot do what they are designed to do if they are not operating correctly, cleaned regularly, appropriately controlled and kept in good operating condition. In a time with extreme focus on indoor air quality this becomes even more important. It is not acceptable to wait for equipment to fail and then to fix it, because during the time it takes to realize the equipment has failed the air quality in the space will be degraded and risk will increase.

To help reduce issues with maintenance and equipment failure a detailed preventive maintenance plan needs to be developed and implemented. The ASHRAE school reopening document in Appendix HVAC-3 has check lists intended to help with a preventive maintenance plan. At a minimum a preventive maintenance plan should include the following:

1. Check equipment for function and proper operation on a regular basis.
2. Perform equipment specific preventive maintenance procedures including items such as: inspecting, tightening and replacing belts; tightening shives, lubricating moving parts, etc.
3. Check and replace filters on a regular basis, confirm proper filter fit, etc.

During the development of the preventive maintenance plan the interval between when these tasks need to be performed should be defined. Numerous factors will contribute to determine these intervals including: age of equipment, type of equipment, areas served by equipment, etc.

The Town may or may not have sufficient staff and skills to perform the required preventive maintenance. If the staff is not available, it may be necessary to retain a maintenance contractor to perform these duties. Regardless, detailed logs should be kept of the maintenance performed on the equipment and these logs should be reviewed regularly by management personnel or their designee to ensure all maintenance is being performed.

Ventilation

A critical aspect of maintaining good indoor air quality is to provide adequate ventilation air to the space. During building occupancy CO_2 from human respiration as well as other airborne contaminants build up in the air and need to be removed from the environment. This is typically done through dilution, using the supply of outside air to the space and matching exhaust. There are competing aspects regarding the quantity of outside air provided to a building because the more outside air that is supplied to the building the higher the building operating cost is. This is especially true in the Massachusetts climate because the vast majority of time a building is occupied, the outside air needs to either be heated or cooled. To minimize operating costs, HVAC systems are generally designed to bring in the code minimum allowed quantities of outside air to minimize operating costs while controlling the levels of contaminants in the air.

The current code for ventilation of schools in Massachusetts is 2015 International Mechanical Code which requires the following ventilation rates (Ventilation rates are defined in cubic feet per minute (CFM)):

1. PreK-8 years old: 10 cfm per person and 0.12 CFM/sq.ft.
2. 9 years old and above: 10 cfm per person and 0.18 cfm/sq.ft.

Both the ASHRAE reopening guidelines and the MDESE reopening standards recommend considering ways to increase indoor air quality above code minimums to help dilute any COVID-19 concentrations in the spaces. Current best practice would be to increase airflows to a minimum of 150% of code minimums or the maximum that the equipment is capable of providing while maintaining comfort conditions and equipment function. Higher levels will provide more dilution but will also increase building operating costs. The 150% of code minimum can likely be achieved with a large portion of the HVAC equipment and systems throughout the district however there will be a significant operating cost impact to this change.

It should be noted that ventilation is provided on a per person basis thus a reduction in occupant density is equivalent to increasing ventilation airflow rates. Current plans are for reduced occupancy and thus an increase in ventilation air per person is caused by this change.

Filtration

Another critical aspect of maintaining indoor air quality in a building is filtration. Typically, all air that passes through a piece of HVAC equipment is filtered. The level of filtration provided is specific to different pieces of equipment. ASHRAE standard 52.2 defines filter efficiency standards for HVAC equipment. The following table provided information about particle size and filtration at different filter efficiency (MERV Ratings).

Table 12-1 Minimum Efficiency Reporting Value (MERV) Parameters

Standard 52.2 Minimum Efficiency Reporting Value (MERV)	Composite Average Particle Size Efficiency, % in Size Range, µm			
	Range 1 0.30 to 1.0	Range 2 1.0 to 3.0	Range 3 3.0 to 10.0	Average Arrestance, %
1	N/A	N/A	$E_3 < 20$	$A_{avg} < 65$
2	N/A	N/A	$E_3 < 20$	$65 \le A_{avg}$
3	N/A	N/A	$E_3 < 20$	$70 \le A_{avg}$
4	N/A	N/A	$E_3 < 20$	$75 \le A_{avg}$
5	N/A	N/A	$20 \le E_3$	N/A
6	N/A	N/A	$35 \le E_3$	N/A
7	N/A	N/A	$50 \le E_3$	N/A
8	N/A	$20 \le E_2$	$70 \le E_3$	N/A
9	N/A	$35 \le E_2$	$75 \le E_3$	N/A
10	N/A	$50 \le E_2$	$80 \le E_3$	N/A
11	$20 < E_1$	$65 < E_2$	$85 < E_3$	N/A
12	$35 \le E_1$	$80 \le E_2$	$90 \le E_3$	N/A
13	$50 \le E_1$	$85 \le E_2$	$90 \le E_3$	N/A
14	$75 \le E_1$	$90 \le E_2$	$95 \le E_3$	N/A
15	$85 \le E_1$	$90 \le E_2$	$95 \le E_3$	N/A
16	$95 \le E_1$	$95 \le E_2$	$95 \le E_3$	N/A

It should be noted that as particles get smaller than 0.30 um the efficiency of filters actually goes back up, thus the 50% efficiency of MERV 13 filters at 0.30 to1.0 um should be thought of as a minimum efficiency.

Although a lot is still unknown about the COVID-19 virus transfer it is generally accepted that upgrading filters to the highest possible MERV rating is a reasonable strategy. ASHRAE recommends that where possible non health care buildings upgrade filtration to at least MERV 13 with MERV 14 being better. That being said, only certain equipment is capable of handling filters with this high a MERV rating because higher MERV rated filters increase pressure drop in the system which results in reduced airflows.

MERV 13 filters will filter out a minimum of 75% of all particulates and specifically 50% of particles in the 0.3 to 1.0 micron range, 85% in the 1.0 to 3.0 micron range and 90% in the 3.0 to 10 micron range. The COVID-19 virus is approximately 0.1 micron and there is no definitive data about the size distribution of particles that distribute COVID-19 through the air. Acknowledging the large amount of unknows it is generally accepted that the majority of COVID-19 particles in the air are larger than 0.3 micron and thus are filtered out by the MERV 13 filters.

The team is still in the process of determining what equipment can be retrofitted with MERV 13 filtration and what equipment is not capable of increased filtration. To determine this each typical piece of equipment needs to be reviewed to confirm that the filters can physically fit and needs to be tested to determine the effect on quantity of ventilation air and quantity of total airflow. This will allow the team to confirm outside air flow quantities are maintained and to understand the effect on overall system heating and cooling performance when implementing this change. See equipment specific descriptions for further discussion on this subject.

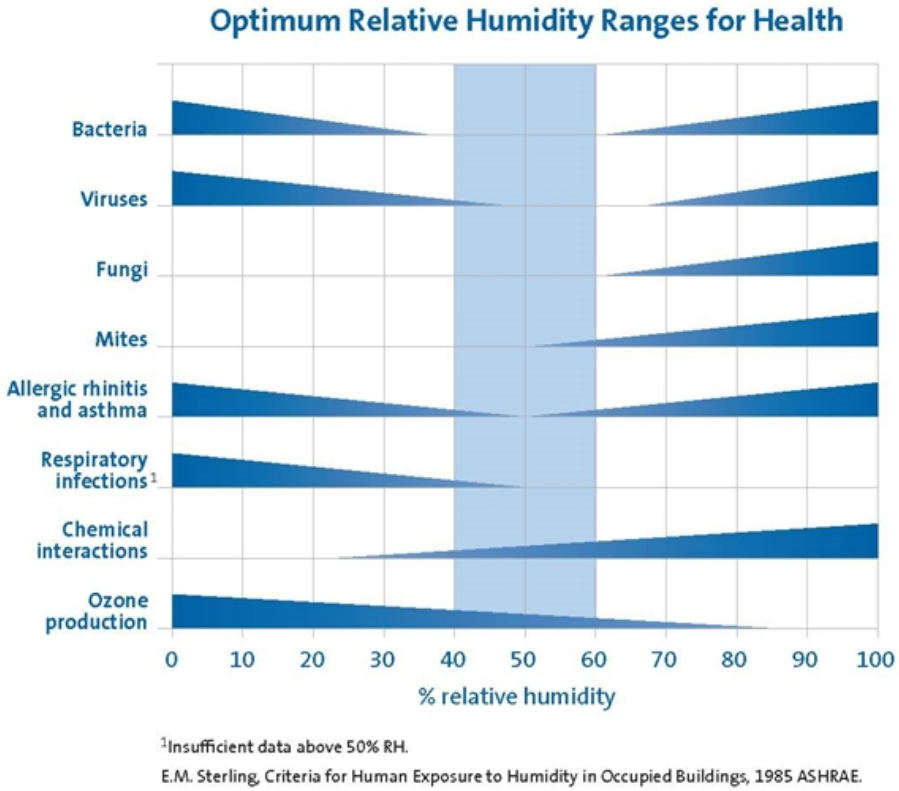
Another critical issue with regard to filters is proper fit and installation. Loose fitting filters allow air to bypass the filter which seriously reduces the filtration effectiveness. All filters need to be inspected for proper fit; edges and joints in the filters should be taped and sealed to minimize bypass. This is as

important has having higher MERV rated filters because all particles in the air that bypass a filter returns back to the room.

It is critical to understand the relationship between filtration and ventilation. Filtration provides a benefit for all systems, however when we are specifically discussing COVID-19, the higher the percentage of outside air (OA) a system provides, as a total of OA mixed with return air from the room, the less air is recirculated from and back to the room thereby making the efficiency of the filter a less critical element of the system. For systems that provide 100% outside air the level of filtration has no effect on the quantity of virus particles in the air because there is no room air recirculated back to the room through the system.

Relative Humidity

Another critical aspect to indoor air quality is relative humidity. Specifically, many viruses survive better at lower relative humidity levels. The following graph provides general information on different indoor contaminants and their prevalence at different relative humidity levels. The optimal range for indoor RH is 40% to 60% as indicated with the light blue line.



One of the roles of air conditioning in a building is to remove moisture from the air thereby reducing relative humidity levels. Thus, where there is air conditioning in the building we speculate that it would be operating within the optimal range much of the time that the systems are in cooling mode. (Below 60% RH.) However, the schools do not have equipment to control the relative humidity in a space during heating mode and thus RH levels are typically below the optimal range during the heating season.

In the absences of COVID-19 specific research, which is ongoing, it is fair to assume that COVID-19 exhibits similar properties to other viruses and will survive better at lower relative humidity levels.

Humidification is not traditionally installed in school setting and does have some notable disadvantages. These disadvantages include risk of mold growth if not properly controlled and maintained and are expensive to both purchase and to operate.

One strategy that could be considered would be to add standalone humidifiers to classrooms or to integrate humidification into HVAC equipment for which equipment mounted humidification is practical. Although this will reduce risk, the disadvantages listed above likely make it impractical. We would only recommend this be considered after a number of other strategies are implemented. See conclusions and recommendations section at the end of this report for further recommendations.

Ultra Violet Light (UVc) Disinfection

Another strategy is the use of ultra violet light to kill viruses. The entire wave length of ultra violet light kills or inactivates microorganisms. However, UVc energy (Wavelengths from 200 to 280 nm) is the most effective at this. Under optimum conditions and depending upon the light intensity, residence time and other factors, UVc can have a kill ratio for microorganisms of 90%. Although if this technology is being retrofit into existing HVAC systems, we will likely not be able to achieve optimum conditions and efficiencies due to physical constraints. UVc is a well understood technology with a long history of successful implementation under real world conditions. It is commonly used in health care applications and with the current pandemic other industries are starting to deploy this technology as well.

UVc can be deployed in a number of different configurations including both retrofit into existing HVAC systems or as a standalone technology.

It should be noted that UVc can be hazardous to skin and eyes so it is critical that this technology be properly deployed to avoid harm to building occupants and maintenance personnel. It is also important to understand that UVc can damage filters and gaskets so this needs to be considered when it is integrated into HVAC equipment.

Bipolar Ionization (BPI) and other more novel technologies:

BPI involves high voltage electrodes that create ions in the air that react with airborne contaminants including viruses. These systems are getting a lot of press lately but the effectiveness of this technology is not as clear as the methods listed above. There is data indicating that this technology is very effective at reducing airborne particulates including viruses. However, rigorous, peer-reviewed scientific studies do not currently exist. ASHRAE has taken 'no position' on this technology stating that they have no solid scientific test data one way or the other. Lawrence Berkley Labs has the world's best test facilities for the science of aerosolized contaminants within the built environment and is currently designing and performing a number of related tests.

There are also other technologies involving ozone, far UVc as well as numerous other technologies that hold promise but there is currently not sufficient scientific evidence of effectiveness and/or safety to recommend them. For these reasons we do not recommend pursuing these technologies at this time unless all other possible strategies have already been implemented and there is still interest and budget to further mitigate risk.

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EQUIPMENT SPECIFIC RECOMMENDATIONS

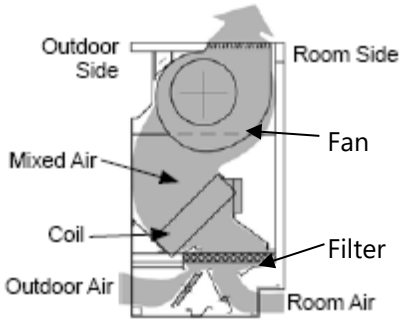
The following descriptions provide a brief overview of specific pieces of HVAC equipment, information on how the equipment operates and potential modifications which could be made to the equipment. The recommendations are based on ASHRAE Epidemic Task Force recommendations for reopening schools dated 7/17/20 as well as other ASHRAE specific recommendations and industry best practices. (See Appendix HVAC-3 for details.)

At the end of this section we have proved additional recommendations for standalone equipment that could be added to any space. We recommend pursuing the options described for each piece of building equipment before pursuing the standalone options.

Unit Ventilators

A unit ventilator (UV) is a self-contained heating and ventilation unit traditionally installed in classrooms. The units are typically installed on the outside wall of a classroom below the windows and are integrated within a string of cabinets. Outside air is brought into the UV through an opening in the outside wall and is mixed with recirculated room air. The air then travels through a filter, through the heating-coil and is distributed to the room. The UV operates in conjunction with a room exhaust system (fan) which draws an equal amount of exhaust air out of the room to balance the outside air supply. Unit ventilators also are available in ceiling mounted horizontal versions and concealed versions which are different in appearance but operate similarly. Some of the unit ventilators throughout the buildings are equipped with air conditioning in which case a second coil is included within the UV.

Typical Floor Mounted Unit Ventilator



Main Components of Unit Ventilator

Advantages:

1. Fresh outside air dilutes the recirculated air helping to reduce contaminants in the overall room volume.
2. The unit ventilator is dedicated to serving only a single room and therefore only air from that room is recirculated to that room. Thus, there is reduced concern of contaminants from adjacent spaces affecting the air quality within the room.
3. A traditional vertical unit ventilator brings room return air in from floor level and supplies conditioned air vertically upward in front of the windows. This air flow pattern encourages air within the room to flow down and away from occupants.

Disadvantages:

1. Unit ventilators traditionally have relatively weak fan motors and therefore more efficient filters reduce the unit's ability to move air. Installing higher MERV rated filtration will reduce overall airflow which reduces the heating and cooling capacity of the equipment.

2. Unit ventilators typically recirculate a significant portion of the room air and thus distribute any contamination present in the air to the entire room.

Ventilation Setup and Operation
Unit ventilators are typically setup to bring in a fixed amount of outside air during occupancy based on the original assumption regarding room occupancy and the code in force at the time of installation. The ventilation air flow is typically in the range of 25% to 35% of the total unit flow rate. During unoccupied (night and weekend) mode the outside air damper closes and the unit cycles on a call for heating. During these times it recirculates 100% room air.

Either a dedicated exhaust fan or a central exhaust fan is coupled with the UV to exhaust an air quantity from the room equal to the incoming outside air. It is important in this type of system that the incoming air and exhaust air quantities are balanced, or the systems can force air to travel between rooms.

The quantity of outside air can be increased for this type of system by further opening the outside air damper in the UV and increasing the flow rate of the exhaust system. This will reduce the quantity of recirculating air to each room and thus further help dilute contaminant buildup in the room air. (A full analysis of the specific unit ventilator equipment as well as building central equipment will be required to determine maximum amount of outside air that could be brought into each room while maintaining acceptable indoor conditions.) If the amount of outside air was increased a testing and balancing (T&B) contractor would need to be retained to confirm proper equipment setup after this change. Supplemental electric heating equipment could also be considered to allow for further increase of the outside air percentage.

Filtration
Unit ventilators are typically supplied with low efficiency filters. (MERV 8 or lower is common.) In past years the school department has used MERV 8 filters at all unit ventilators.

Installing higher MERV rated filter will reduce overall air flows which would reduce the quantity of outside air unless the equipment damper settings are revised at the same time that a higher MERV rated filter is installed. The reduced airflows may or may not be a problem in heating mode if the units are properly setup. Even if the improved filtration reduces the UV capacity to a point that there is insufficient heating capacity, supplemental electric heat could be considered to help address this issue.

It is unlikely that unit ventilators which have air conditioning could operate in air conditioning mode with MERV 13 filter due to the lowered air flow rates and chance of moisture freezing on the cooling coil causing the unit not to operate.

Recommended Modifications
Immediate Recommendations: (The following recommendations should be implemented immediately and prior to occupancy of the school.)

1. Confirm proper operation of unit ventilator and ensure dampers open and close based on commands from the HVAC controls.
2. Confirm proper operation of the building exhaust fans.
3. Confirm proper scheduling of all equipment and modify control schedule such that the unit ventilators and associated exhaust fans operate continuously during occupied mode and outside

air dampers open for a minimum of 2 hrs prior to occupancy each school day to flush the room with fresh air. Continue to purge the room with fresh air until all occupants have left the building including janitorial staff.

4. Install new filters of existing efficiency immediately prior to start of school year. Confirm filters fit properly and seal any gaps to avoid leakage. Inspect filters regularly and replace as needed.
5. Ensure that no equipment, books or materials are stored on top of or in front of the UVs or the exhaust grilles. Inspect regularly to confirm supply and exhaust grilles are not blocked.
6. Develop preventive maintenance plan to ensure continued operation of equipment and regular filter replacement.
7. Operate all equipment in occupied mode with all outside air dampers open for one week prior to the start of the school year.
8. Have testing and balancing contractor spot check equipment in each school to confirm proper operation of equipment. If spot heck finds issues with equipment further analyze school to confirm all equipment is operating correctly.

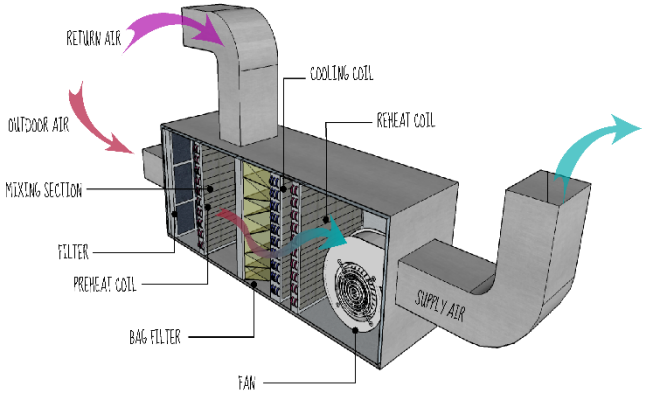
Potential Modifications to further reduce risk: (These recommendations have significant upfront costs and will significantly increase operating costs. The recommendations below also assume the town would consider disabling or severely impacting air conditioning function within classrooms with unit ventilator systems. If the owner is not willing to impact air conditioning function within these areas then it is unlikely increased fresh air quantities or increased filter efficiency can be implemented. These recommendations can be implemented individually or together.)

1. Prior to the start of the school year adjust the unit ventilators to provide 100% outside air with no recirculating air. Adjust or replace exhaust fans to maximize airflow out of the exhaust system to offset building pressure which will be increased due to the larger amount of outside air. If there is not enough pressure relief, strategically open windows to allow for additional pressure relief. This strategy can be employed until temperatures drop to a point that indoor temperatures can't be maintained. (When a unit ventilator is in 100% outside air mode the level of filtration is of minimal concern, in relation to COVID-19 because there is no recirculated air to filter. This would cause an increase in pollen and other outdoor contaminants within the classrooms.)
2. While not only providing maximum ventilation air to the building for the start of the school year, Item #1 above also allows time to determine the maximum amount of outside air that can be provided to the school while maintaining indoor temperatures. In addition, this gives time to test the unit ventilators with higher MERV rated filters, rebalance equipment to operate with the higher MERV rated filters and acquire and install sufficient numbers of filters to install within the equipment.

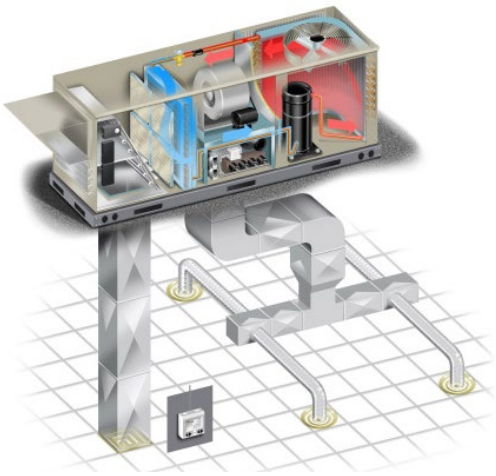
Air Handling Units (AHUs)

This type of equipment includes AHUs, Heating and Ventilation (H&V) Units and Roof Top Units (RTUs). Although there are differences between these pieces of equipment and there are specific reasons that different pieces of equipment are used, for the discussion of indoor air quality they are all essentially the same and we will refer to all of this equipment as AHUs.

An air handling unit is a unit that typically contains a filter section, heating and or cooling section and fan section. It also may or may not contain a mixing box section to mix return air with outside air. Depending upon the size and style of the unit these sections can all be built into a single enclosure or they can be modular components connected together.



Typical Air Handling Unit (AHU)
[Not all AHU equipment contain all of the sections indicated in this graphic.]



Roof Top Unit (RTU)

Advantages:

1. Fresh outside air dilutes the recirculated air helping to reduce contaminants in the overall room volume
2. AHUs typically have more powerful motors than unit ventilators and typically there is more space to install filters, therefore more efficient filters may be possible without significant reductions in system function or capacity.

Disadvantages:

1. AHUs often serve multiple rooms and areas thus contaminants from one space can be distributed to other spaces.
2. AHU systems traditionally supply and return air at the ceiling of a space which is a less optimal air path than high supply and low return.
3. AHUs typically recirculate a significant portion of the room air and thus distribute any contamination present in the air to the entire area or set of rooms they serve.

Ventilation Setup and Operation

Air Handling Units are typically setup to bring in a fixed amount of outside air during occupancy based on the original assumption regarding occupancy of the area served and the code in force at the time of installation. The ventilation outside air flow rate is typically in the range of 25% to 35% of the total unit flow rate. During unoccupied (Night and weekend) mode the outside air damper typically closes and the unit cycles on a call for heating. During these times it recirculates 100% room air.

Either a gravity relief damper (some roof top units), dedicated exhaust fan or a central exhaust fan is coupled with the AHU to exhaust an air quantity from the space approximately equal to the incoming outside air. This is required to provide proper pressure balance in the building and exhaust contaminants.

The quantity of outside air can be increased for this type of system by further opening the outside air damper and increasing the flow rate of the exhaust system. This will reduce the quantity of recirculating air to each room and thus further help dilute contaminant buildup in the room air. (A full analysis of the specific equipment as well as building central equipment will be required to determine maximum amount of outside air that could be brought into each room while maintaining acceptable indoor conditions.) If the amount of outside air was increased a testing and balancing (T&B) contractor would need to be retained to confirm proper equipment setup after this change. Supplemental electric heating equipment could also be considered to allow a further increase of the outside air percentage when the existing equipment doesn't have enough heating capacity to handle the higher flow rates of cold outside air.

Filtration

AHUs are supplied with a wide variety filter efficiencies depending upon the original design intent. Some of the units may already be designed for MERV 13 filters while other units may be designed with MERV 8 or lower efficiency filters. (See spreadsheets cataloging specific piece of equipment for details.)

Installing higher MERV rated filters may reduce overall air flows unless there is extra available static pressure (fan horsepower) within the fan system. If airflows are reduced the quantity of outside air would also be reduced unless the equipment damper settings are revised at the same time that a higher MERV rated filter is installed. Reduced airflows may or may not be a problem in heating mode if the units are properly setup. Even if the improved filtration reduces the AHU capacity to a point that there is insufficient heating capacity, supplemental electric heat could be considered to help address this issue.

Although some units may not currently be designed for MERV 13 filters they may be able to be retrofitted for higher efficiency filters either simply through resetting up the equipment, modifying fan sheaves, or through modifications of ductwork to allow for bigger filter racks, thicker filters, etc.

Recommended Modifications

Immediate Recommendations: (The following recommendations should be implemented immediately and prior to occupancy of the school.)

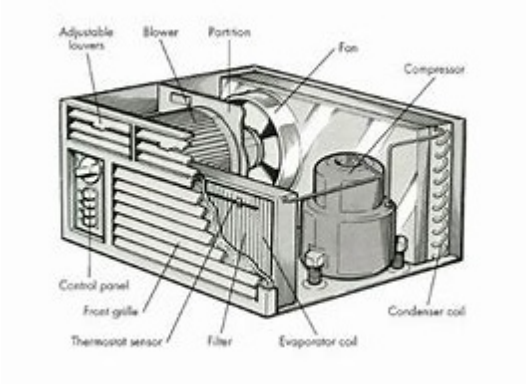
1. Confirm proper operation of AHUs and ensure dampers open and close based on commands from the HVAC controls.
2. Confirm proper operation of the associated exhaust fans.
3. Confirm proper scheduling of all equipment and modify control schedule such that the AHUs and associated exhaust fans operate continuously during occupied mode and outside air dampers open for a minimum of 2 hrs prior to occupancy each school day to flush the room with fresh air. Continue to purge the room with fresh air until all occupants have left the building including janitorial staff.
4. Install new filters of existing efficiency immediately prior to start of school year. Confirm filters fit properly and seal any gaps to avoid leakage. Inspect filters regularly and replace as needed.
5. Develop preventive maintenance plan to ensure continued operation of equipment and regular filter replacement.
6. Operate all equipment in occupied mode with all outside air dampers open for one week prior to the start of the school year.
7. Have testing and balancing contractor spot check equipment in each school to confirm proper operation of equipment. If spot check finds issues with equipment further analyze school to confirm all equipment is operating correctly.

Potential Modifications to further reduce risk: (These recommendations may have significant upfront costs and may significantly increase operating costs. They also will take longer to implement than the recommendations above and it is unlikely they could be achieved district wide prior to the start of school in September. The recommendations below also assume the owner would consider disabling or severely impacting air conditioning function where present. If the Town is not willing to impact air conditioning function within these areas then it is unlikely increased fresh air quantities can be implemented. These recommendations can be implemented individually or together)

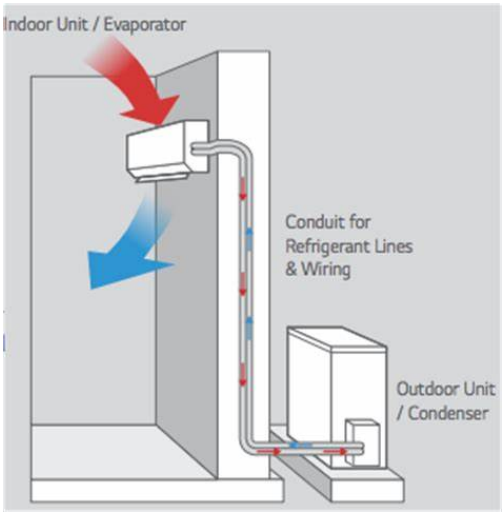
1. Prior to the start of the school year adjust the AHU's outside air damper to provide 100% outside air with no recirculating air. (More modern AHU equipment may already be configured for this setup through "economizer cooling" functions.) Adjust or replace exhaust fans to maximize airflow out of the exhaust system to offset building pressure which will be increased due to the larger amount of outside air. If there is not enough pressure relief, strategically open windows to allow for additional pressure relief. This strategy can be employed until temperatures drop to a point that indoor temperatures can't be maintained. (When an AHU in 100% outside air mode the level of filtration is of minimal concern, in relation to COVID-19 because there is no recirculated air to filter. This would cause an increase in pollen and other outdoor contaminants within the classrooms.)
2. While not only providing maximum ventilation air to the building for the start of the school year, Item #1 above also allows time to determine the maximum amount of outside air that can be provided to the school while maintaining indoor temperatures. In addition, this gives time to test the AHUs with higher MERV rated filters, modify equipment as required to accommodate filters, rebalance equipment to operate with the higher MERV rated filters and acquire and install sufficient numbers of filters to install within the equipment.

Unitary AC units

This type of equipment includes mini-split units and through window air conditioning units. The units primarily provide air tempering and some humidity control in the summer. They do not provide any significant level on filtration and typically do not provide significant ventilation.



Typical Window Air Conditioner



Mini-Split Heat Pump and/or AC Unit

Advantages:

1. None

Disadvantages:

1. Unitary AC units do very little to improve indoor air quality. In spaces with single occupancy such as offices we would not discourage their use but in spaces occupied by multiple people we would not recommend operating these units.

Ventilation Setup and Operation

These units do not typically provide ventilation air.

Filtration

These units typically have very low efficiency filters. They typically recirculate 100% of room air. They cannot be retrofitted with better filtration and hence they will distribute any contaminants in the room air.

Recommended Modifications

Immediate Recommendations: (The following recommendations should be implemented immediately and prior to occupancy of the school.)

1. Except in single occupancy locations these units should be turned off.
2. Where equipment will be used develop filter and equipment cleaning procedure.

Displacement Air System

A displacement air system relies on a roof top unit with energy recovery wheel which provides 100% outside air to each space. (For general roof top unit description see above.) The air is supplied low on the wall of the space at very low velocities. Air is exhausted from the room at the ceiling.

The roof top unit contains a filter section, natural gas heating section, DX cooling section, Energy recovery wheel and supply and exhaust fan sections.

Advantages

1. Since the RTU provide 100% outside air to each space the concerns about recirculation air are eliminated.
2. Due to the system design the systems likely already provide in excess of 150% of the code minimum outside air for ventilation.

Disadvantages

1. The RTUs have energy wheel type ERVs. There is a potential for the energy wheel to become contaminated with viruses that are present in the air stream.

Ventilation Setup and Operation

The RTUs are setup to bring in 100% outside air some of or all of the time. For units that don't always provide 100% outside air (Café, Auditorium, and Library) the controls for these units should be overridden such that the units provide 100% outside air all of the time.

At current flow rates these units likely already provide in excess of 150% of the code minimum outside air and thus on modification is necessary.

Filtration
Since these units are already set up to be 100% outside air the requirement for filtration is significantly less important than for units with significant amounts of recirculation air. The units are currently running MERV 8 filters. When the school is re-commissioned they should explore if MERV 13 filters can be implemented for these units which would help with reduction of pollens and other outside contaminants.

Recommended Modifications
Immediate Recommendations: (The following recommendations should be implemented immediately and prior to occupancy of the school.)

1. Confirm proper operation of roof top units through a preventive maintenance inspection.
2. Confirm proper scheduling of all equipment and modify control schedule such that the units operate continuously during occupied mode and a minimum of 2 hrs prior to occupancy each school day to flush the rooms with fresh air. Continue to purge the room with fresh air until all occupants have left the building including janitorial staff.
3. Install new filters of existing efficiency immediately prior to start of school year. Confirm filters fit properly and seal any gaps to avoid leakage. Inspect filters regularly and replace as needed.
4. Ensure that no equipment, books or materials block supply air diffusers or the exhaust grilles. Inspect regularly to confirm supply and exhaust grilles are not blocked.
5. Develop preventive maintenance plan to ensure continued operation of equipment and regular filter replacement.
6. Operate all equipment in occupied mode with all outside air dampers open for one week prior to the start of the school year.
7. Have testing and balancing contractor spot check equipment in each school to confirm proper operation of equipment. If spot check finds issues with equipment further analyze school to confirm all equipment is operating correctly.

Potential Modifications to further reduce risk: (These recommendations have significant upfront costs and will significantly increase operating costs. The recommendations below also assume the town would consider disabling or severely impacting air conditioning function within classrooms with unit ventilator systems. If the owner is not willing to impact air conditioning function within these areas then it is unlikely increased fresh air quantities or increased filter efficiency can be implemented. These recommendations can be implemented individually or together.)

1. Prior to the start of the school year turn off ERV. This strategy can be employed until temperatures drop to a point that indoor temperatures can't be maintained.
2. Item #1 above also allows time to determine how to ensure that the energy recovery wheel does not contaminate the incoming air stream. It is likely that UV disinfection and/or additional filtration will be employed to deal with this issue.

Chilled Beam with Induction Units
A chilled beam system with induction units relies on a roof top unit with energy recovery wheel which provides 100% outside air to each space. (For general roof top unit description see above.) The air is supplied to ceiling induction units which mix the 100% outside air with air from that room and distribute the mixed air to the room. Air is exhausted from the room at the ceiling.

The roof top unit contains a filter section, natural gas heating section, DX cooling section, Energy recovery wheel and supply and exhaust fan sections.

Advantages

1. Since the RTU provide 100% outside air to each space the concerns about recirculation air from one space to another is eliminated.

Disadvantages

1. The RTUs have energy wheel type ERVs. There is a potential for the energy wheel to become contaminated with viruses that are present in the air stream.

Control Systems

Each school has a direct digital control (DDC) system. These systems are computer-based systems and have a number of advantages over traditional stand-alone control systems. One of the biggest advantages is the ability to trend log the status of equipment and interior conditions (eg: room temperatures, CO2 levels, damper positions, valve position, fan status, etc.). A trend log is a continuous record ('log') over time for any sensor or device or group of sensors and devices that is a part of the DDC system. This also includes the set points that are programmed for different times such as temperature, CO_2 or damper position. Trend log data can be stored for long periods of time (months or years) and when needed can be formatted and displayed in a graphical form or table. We recommend that the owner consider implementing the following trend log:

1. Equipment occupied mode trend log: Depending upon available control points this log would include a report of when the equipment went into and out of occupied mode along with indoor temperature, CO_2 levels, damper position end switch activated, etc.) This would ideally provide a trend log record for each room and its function and performance.

In addition the district should set alarms for all available CO_2 sensors present at the school. Since CO_2 levels are an indication of ventilation air quantities these alarms could be used to confirm that the ventilation system is operational. Rising or elevated CO_2 levels would be an indication that the ventilation system is not operating correctly.

If the owner wanted to take the CO_2 alarm idea further they could consider installing additional CO_2 sensor which would be a relatively low cost device that could be added.

Standalone options to further improve indoor air quality:

To further improve indoor air quality in areas beyond the recommendations above, the owner could also consider adding any of the following free standing or built-in equipment:

1. UVc integrated into existing HVAC equipment or as stand-alone units.
2. Standalone HEPA filtration unit. These can be built into the space or provided as portable floor mounted equipment.
3. Standalone Humidifier Units.

For additional details see sample product cuts in Appendix HVAC-2.

RECOMMENDATIONS FOR MEDICAL WAITING ROOM

According to School reopening guidance dated June 25, 2020 and updated and supplemented on July 22, 2020, schools must ensure they have an separate space available, separate from the nurse's office or other space where routine medical care is provided, for students displaying COVID-19 symptoms. The minimum requirement for this space is that it have a window and exhaust directly to outside. This guideline further states that schools should consider options to increase ventilation and improve filtration in this area.

ASHRAE has provided further guidance on what form this space should take. (See guideline in Appendix HVAC-3 for details.)

Further study of how to the best provide this space and what reasonable accommodations can be provide will be provided in the coming weeks.

CONCLUSIONS AND RECOMMENDATIONS,

MINIMUM STANDARDS

In relation to the ventilation system, at a minimum and in accordance to DESE standards, the school district needs to do the following:

1. Perform ASHRAE summer check list 1 and startup check list 2 for each building. (See Appendix HVAC-3 for checklists.) We recommend that checklists for each school are fully filled out and saved as documentation that this work was completed.
2. Where and when possible open windows in all occupied areas.
3. Develop preventive maintenance plan to ensure continued operation of equipment and regular filter replacement. Determine if this plan will be implemented by town staff or an independent contractor. At a minimum this plan should include check lists for specific equipment recommended by ASHRAE. (See Appendix HVAC-3 for details.)
4. Confirm proper scheduling of all equipment and modify control schedule such that the AHUs and associated exhaust fans operate continuously during occupied mode and outside air dampers open for a minimum of 2 hrs prior to occupancy each school day to flush the room with fresh air. Continue to purge the room with fresh air until all occupants have left the building including janitorial staff.
5. Operate all equipment in occupied mode with all outside air dampers open for one week prior to the start of the school year. We recommend that this be done longer than one week so that if/when issues are found there is time to repair the equipment. Setup trend logging to allow for documentation that equipment is operational.
6. Have testing and balancing contractor spot check equipment in each school to confirm proper operation of equipment. If spot checks find issues with equipment, further analyze school systems to confirm all equipment is operating correctly.
7. Once testing and analysis is completed, replace filters in all equipment with the selected filters.
8. Once testing and analysis is complete adjust ventilation air to selected levels.
9. Where and when possible, open windows.
10. Implement a control monitoring program with trend logs, alarms.

RECOMMENDED FURTHER UPGRADES

We recommend that the school also implement the following additional recommendations:

1. Implement a preventive maintenance plan to ensure equipment remains operational and filters are changed regularly.

2. Increase ventilation rates to the maximum extent possible.
3. Increase filtration efficiencies (MERV ratings) to the maximum extent possible.
4. Implement a control monitoring program including setting up specific trend logs and alarms.

ENHANCEMENTS TO FURTHER IMPROVE SYSTEMS WHICH COULD BE CONCIDERED
If the district wants to implement additional enhancements, we would recommend they consider the following. The district may also decide to implement some of these items if specific areas or rooms have specific issues that mean the recommended upgrades above cannot be implemented. (These items have been listed in the order we would recommend pursuing them. There are diminishing cost benefit and efficiency returns with respect to each additional strategy as they are combined together, and since budgets are not unlimited a decision has to be made of how many, if any, of these strategies should be implemented.):

1. Consider adding CO_2 sensors to the DDC system as a method to confirm that ventilation air is operational and appropriate. Add trend logging of multiple data points in all or representative student spaces and alarm on elevated CO_2 levels.
2. Consider installing ultra violet light type "c" (UVc) equipment either as standalone devices or integrated into the HVAC systems.
3. Consider installing standalone HEPA filtration systems in classrooms.
4. Consider installing humidifiers in classrooms.
5. Consider installing bi-polar ionization (BPI) equipment in classrooms or integrated into the HVAC systems.

ONGOING WORK
Preparing the schools for re-occupancy is an ongoing task. Once plans are finalized additional work will be required. Toward that end a balancing contractor has already been retained and will start work in early August. The initial task they will be working on is assisting with determining what filters can be installed in different equipment and the resulting airflows so that a decision can be made about filtration at each piece of equipment

The following work is also ongoing by different members of the team:

1. Review of existing equipment to confirm proper operation.
2. Preparation of preventive maintenance plan for all equipment.
3. Numerous other items

Appendix List
Appendix HVAC-1: Spreadsheets of Specific Equipment
Appendix HVAC-2: Sample Product Cuts
Appendix HVAC-3: ASHRAE School Reopening

Definitions

Air Handling Unit (AHU) – An AHU is a piece of HVAC equipment that contains a fan, heating and possible cooling coils, and filters.

CFM – Cubic feet per minute

DX Cooling – Direct Expansion cooling consisting of a coil, liquid and suction piping and associated condensing unit.

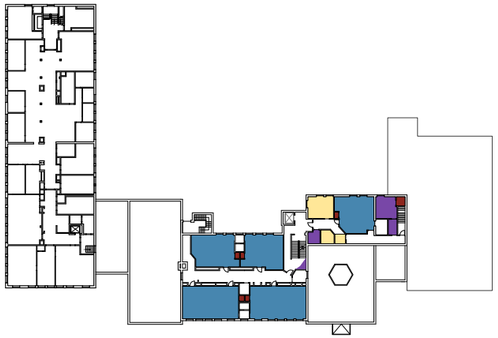
Roof Top Unit (RTU) – Roof mounted unit similar to AHU unit but is mounted on the roof of the building.

Unit Ventilator (UV) – A unit ventilator is an HVAC unit typically used in classroom. It provides heating and ventilation and sometimes cooling. It also filters outside and return air.

UVc – Ultraviolet germicidal light (wavelengths from 200 to 280 nm)

SPACE LEGEND

- RESTROOMS
- STORAGE
- ADMINISTRATION
- HEALTH & PE
- CLASSROOM
- SPECIAL ED.



Town Hall Second Floor Plan *(NTS)*

Yr Built	1999
Yr Reno / Addition	1999
Net Square Feet (NSF)	4,070
Grade Level	Pre-K (2.9-5 yrs)

Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Number of students that can be assigned 6 foot distance
		36 nsf/occupant (6'x6' marked)
209	Classroom 1	22
207	Classroom 2	22
204	Classroom 3	17
206	Classroom 4	16
M07	Classroom 5	16
M03	Office	2
M04	Conference	1
M05	Speech	2
M06	Waiting	
M08	P.T.	1
M10	O.T.	1
Mezz.	Reading Nook	1

1/16" = 1' on original

0 4' 8' 16' 32'

Wayland Public Schools Reopening Study	41 Cochituate Road Wayland, MA 01778	A-1	Children's Way Preschool Floor Plan	NORTH	DRAFT Aug. 17, 2020 NOT FOR CONSTRUCTION TBA PROJECT #1350.1	TBA ARCHITECTS, INC. ARCHITECTURE PLANNING PROJECT MANAGEMENT 43 BRADFORD STREET, CONCORD MA. 01742 TEL (781)893-5828 www.tbaarchitects.com

Town of Wayland - Wayland Public Schools

School Name	**The Children's Way Preschool**
Yr Built	1999
Yr Reno / Addition	1999
Net Square Feet (NSF)	4,070
Grade Level	Pre-K (2.9-5 yrs)

Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Rm Area (Net SF)	Dimension (FT)		Windows		Exterior Doors	Number of Students (traditional learning model)	Number of Educators	Number of students that can be assigned 3 foot distance	Number of occupants that can be assigned 6 foot distance	Recommendations	Cleaning
			L	W	Y/N	Operable	Y/N	35 sf/occupant per MSBA	(include in occupants)	N/A	36 nsf/occupant (6'x6' marked)		
209	Classroom 1	808	37.17	22.33	Y	Y	N	23			22	1,2,7	4,5
207	Classroom 2	791	36.92	21.42	Y	Y	N	23			22	1,2,7	4,5
204	Classroom 3	603	31.83	21.92	Y	Y	N	17			17	1,2,7	4,5
206	Classroom 4	579	28.25	23.58	Y	Y	N	17			16	1,2,7	4,5
M07	Classroom 5	572	26.75	24.83	Y	Y	N	16			16	1,2,7	4,5
M03	Office	251	17.5	15.17	Y	Y	N	2	1		2	2,7	4,5
M04	Conference	67	9.25	7.92	N		N	1	1		1	1,2,7	4,5
M05	Speech	75	9	8.75	N		N	5	1		2	2,7	4,5
M06	Waiting	43	6.92	6.25	Y	Y	Y	2	1			2,7	4,5
M08	P.T.	199	15.25	14	Y	Y	N	6	1		1	1,2,7	4,5
M10	O.T.	60	10.75	5.75	N		N	2	1		1	1,2,7	4,5
Mezz.	Reading Nook	22	7.33	4.75	N	N	N	1	1		1	1,2,7	4,5

Notes:

1 Remove unused desks
2 Remove unused accessory furnishings
3 Relocate or swap locations with another space
4 Daily disinfection
5 Regular wiping of surfaces following movement
6 Enter or exit room through independent exterior door
7 Refer to ventilation recommendations

SPACE LEGEND

- RESTROOMS
- STORAGE
- ADMINISTRATION
- FOOD SERVICE
- MEDIA
- ART & MUSIC
- HEALTH & PE
- CLASSROOM
- WORKROOM
- SPECIAL ED.

Yr Built	1957
Yr Reno / Addition	1963; 1999
Net Square Feet (NSF)	33,407
Grade Level	K-5

Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Number of students that can be assigned 3 foot distance	Number of students that can be assigned 6 foot distance
		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher
1	Classroom	41	21
2	Classroom	39	19
3	Classroom	26	13
4	Classroom	26	13
5	Classroom	26	13
6	Classroom	26	13
7	Classroom	26	13
8	Classroom	26	13
9	Classroom	26	13
10	Classroom	26	13
11	Classroom	26	13
12	Classroom	26	13
13	Classroom	25	13
14A	Classroom	25	12
15	Classroom	26	13
16	Classroom	21	11
17	Classroom	28	14
18	Computer Classroom	29	14
19	Classroom	29	15
20	Classroom	25	12
21	Classroom	25	12
	Art	27	13
	Conference	18	8
	Guidance	1	1
	Principal	2	2
	Auditorium	107	45
	Conference	11	5
	Speech	2	1
	Library		
	Staff	42	17
	P.E. Office	2	2
	Gym	328	82
	Cafeteria		66
	Kitchen		
	Office	1	1
	Receiving		
	Staff Dining	10	5
	Vestibule	0	0
	OT. PT.	3	2
	Office/Nurse	6	6

1" = 50' on original

5' 25'
0 15' 50' 100'

Wayland Public Schools Reopening Study	47 Loker St. Wayland, MA 01778	A-2	Loker Elementary School Floor Plan	NORTH	DRAFT Aug. 17, 2020 NOT FOR CONSTRUCTION TBA PROJECT #1350.1

TBA ARCHITECTS, INC.
ARCHITECTURE
PLANNING
PROJECT MANAGEMENT
43 BRADFORD STREET, CONCORD MA. 01742
TEL (781)893-5828
www.tbaarchitects.com

Town of Wayland - Wayland Public Schools

School Name	**Loker Elementary School**
Yr Built	1957
Yr Reno / Addition	1963; 1999
Net Square Feet (NSF)	33,407
Grade Level	K-5

6'x4.5' 8'x7.5'

Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Rm Area (Net SF)	Dimension (FT)		Windows		Exterior Doors	Number of Students (traditional learning model)	Number of Educators	Number of students that can be assigned 3 foot distance	Number of students that can be assigned 6 foot distance	Recommendations	Cleaning
			L	W	Y/N	Operable	Y/N	35 sf/occupant per MSBA		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher		
1	Classroom	1357	41.08	36.75	Y	Y	Y	39	1	41	21	1,2,6,7	4,5
2	Classroom	1282	36.75	36.5	Y	Y	Y	37	1	39	19	1,2,6,7	4,5
3	Classroom	902	36.75	26.17	Y	Y	Y	26	1	26	13	1,2,6,7	4,5
4	Classroom	909	36.75	26.17	Y	Y	Y	26	1	26	13	1,2,6,7	4,5
5	Classroom	886	34	26.17	Y	Y	Y	25	1	26	13	1,2,6,7	4,5
6	Classroom	886	34	26.17	Y	Y	Y	25	1	26	13	1,2,6,7	4,5
7	Classroom	886	34	26.17	Y	Y	Y	25	1	26	13	1,2,6,7	4,5
8	Classroom	886	34	26.17	Y	Y	Y	25	1	26	13	1,2,6,7	4,5
9	Classroom	886	34	26.17	Y	Y	Y	25	1	26	13	1,2,6,7	4,5
10	Classroom	886	34	26.17	Y	Y	Y	25	1	26	13	1,2,6,7	4,5
11	Classroom	886	34	26.17	Y	Y	Y	25	1	26	13	1,2,6,7	4,5
12	Classroom	886	34	26.17	Y	Y	Y	25	1	26	13	1,2,6,7	4,5
13	Classroom	874	25.67	17.33	Y	Y	Y	25	1	25	13	1,2,6,7	4,5
14A	Classroom	867	34.17	25.67	Y	Y	Y	25	1	25	12	1,2,6,7	4,5
15	Classroom	894	32.83	27.5	Y	Y	Y	26	1	26	13	1,2,6,7	4,5
16	Classroom	758	32.83	23.5	Y	Y	N	22	1	21	11	1,2,7	4,5
17	Classroom	948	32.83	28.33	Y	Y	Y	27	1	28	14	1,2,6,7	4,5
18	Computer Classroom	978	36.08	27.75	Y	Y	N	28	1	29	14	1,2,7	4,5
19	Classroom	992	36.08	27.92	Y	Y	Y	28	1	29	15	1,2,6,7	4,5
20	Classroom	868	40.08	39.58	N		N	25	1	25	12	1,2,7	4,5
21	Classroom	868	40.08	39.58	N		N	25	1	25	12	1,2,7	4,5
	Art	924	38.08	26	N		Y	26	1	27	13	1,2,6,7	4,5
	Conference	275	26	11.58	Y	Y	N	18		18	8	2	4,5
	Guidance	124	15.92	8	N		N	1		1	1	2	4,5
	Principal	153	16.5	9.83	N		N	2		2	2	2	4,5
	Auditorium	1610	54.08	37.33	N		N	230	1	107	45	7	4,5
	Conference	165	20.92	9.67	Y	Y	N	11		11	5	2	4,5
	Speech	165	20.92	9.67	Y	Y	N	5	1	2	1	1,2	4,5
	Library	1930	51.75	38	Y	Y	N					7	4,5
	Staff	627	26.5	24.25	Y	Y	N	42		42	17	2	4,5
	P.E. Office	201	19.75	18.67	N		N	2		2	2		4,5
	Gym	2949	75.58	71.67	N		Y	590	1	328	82	2,6,7	4,5
	Cafeteria	2380	52.83	45.83	N		N	159	1		66	2,3,7	4,5
	Kitchen	771	44.33	17.75	N		N						4,5
	Custodian Office	61	12	9	N		N	1		1	1	2	4,5

Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Rm Area (Net SF)	Dimension (FT)		Windows		Exterior Doors	Number of Students (traditional learning model)	Number of Educators	Number of students that can be assigned 3 foot distance	Number of students that can be assigned 6 foot distance	Recommendations	Cleaning
			L	W	Y/N	Operable	Y/N	35 sf/occupant per MSBA		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher		
	Receiving	162	18.83	9.08	N		N						4,5
	Staff Dining	411	23.92	17.75	N		Y	12	1	10	5	1,2,6,7	4,5
	Vestibule	106	11.75	9.5	N		N	3	2	0	0	2	4,5
	OT. PT.	215	19.08	12.75	N		N	6	3	3	2	2	4,5
	Office/Nurse	593	36.75	19.08	N		N	6		6	6	2	4,5

Notes:

1 Remove unused desks
2 Remove unused accessory furnishings
3 Relocate or swap locations with another space
4 Daily disinfection
5 Regular wiping of surfaces following movement
6 Enter or exit room through independent exterior door
7 Refer to ventilation recommendations

SPACE LEGEND

- RESTROOMS
- STORAGE
- ADMINISTRATION
- FOOD SERVICE
- MEDIA
- ART & MUSIC
- HEALTH & PE
- CLASSROOM
- WORKROOM
- SPECIAL ED.

Year Built	1957
Year Renovated / Addition	1962; 1973; 1999
Net Square Feet (NSF)	46,611
Grade Level	K-5

Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Number of students that can be assigned 3 foot distance	Number of students that can be assigned 6 foot distance
		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher
1	3rd Grade Classroom	23	11
2	3rd Grade Classroom	23	11
3	3rd Grade Classroom	23	11
4	3rd Grade Classroom	23	11
101	Art	27	14
102	1st Grade Classroom	36	18
103	1st Grade Classroom	36	18
104	1st Grade Classroom	32	16
105	1st Grade Classroom	31	16
106	Special Education	11	5
107	2nd Grade Classroom	26	13
108	2nd Grade Classroom	26	13
109	2nd Grade Classroom	26	13
110	OT/PT Room	26	13
111	Special Education	26	13
112	2rd Grade Classroom	26	13
113	1st Grade Classroom	26	13
114	2nd Grade Classroom	17	9
116	Classroom	13	6
117	Classroom	13	6
118	Classroom	13	6
119	Classroom	13	6
120	4th Grade Classroom	24	12
121	4th Grade Classroom	26	13
122	3rd Grade Classroom	26	13
123	3rd Grade Classroom	26	13
125	4th Grade Classroom	28	14
127	5th Grade Room	25	13
128	5th Grade Room	28	14
129	5th Grade Room	28	14
130	Resource Room	21	10
	Tech Office	2	1
	Computer Lab	14	7
	Media Center	30	15
	Special Education	11	5
	Speech	4	2
	Office	2	2
	Office	1	1
	Office	1	1
	Office	1	1
	Library		
	Resource Room	27	14
	Technology Lab	25	13
	Gym	608	152
	Practice		
	Practice		
	Office	1	1
	Music	34	15
	SOAR	3	2
	BASE	10	5
	Guidance	2	2
	Receiving		
	Cafeteria		63
	Kitchen		
	Lounge	27	11
	Health	2	2
	Principal	4	4
	Main Office	4	4
	ELL	10	5
	Conference	12	5
	Copy Room	1	1

1" = 50' on original

5' 25'
0 15' 50' 100'

Wayland Public Schools Reopening Study	40 Adams Ln. Wayland, MA 01778	A-3	Claypit Hill Elementary School Floor Plan	NORTH	DRAFT Aug. 17, 2020 NOT FOR CONSTRUCTION TBA PROJECT #1350.1

TBA ARCHITECTS, INC.
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Town of Wayland - Wayland Public Schools

School Name	**Claypit Hill Elementary School**
Year Built	1957
Year Renovated / Addition	1962; 1973; 1999
Net Square Feet (NSF)	46,611
Grade Level	K-5

6'x4.5' 8'x7.5'

Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Rm Area (Net SF)	Dimension (FT)		Windows		Exterior Doors	Number of Students (traditional learning model)	Number of Educators	Number of students that can be assigned 3 foot distance	Number of students that can be assigned 6 foot distance	Recommendations	Cleaning
			L	W	Y/N	Operable	Y/N	35 sf/occupant per MSBA		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher		
1	3rd Grade Classroom	806	30	27.75	N		N	23	1	23	11	1,2,3,7	4,5
2	3rd Grade Classroom	806	30	27.75	Y	Y	N	23	1	23	11	1,2,3,7	4,5
3	3rd Grade Classroom	806	30	27.75	N		N	23	1	23	11	1,2,3,7	4,5
4	3rd Grade Classroom	806	30	27.75	Y	Y	N	23	1	23	11	1,2,3,7	4,5
101	Art	935	37.75	26.58	N		Y	27	1	27	14	2,6,7	4,5
102	1st Grade Classroom	1187	52.17	27.33	Y	Y	Y	34	1	36	18	1,2,6,7	4,5
103	1st Grade Classroom	1194	52.17	27.33	Y	Y	Y	34	1	36	18	1,2,6,7	4,5
104	1st Grade Classroom	1091	37.08	34.25	Y	Y	Y	31	1	32	16	1,2,6,7	4,5
105	1st Grade Classroom	1058	37.92	37.08	Y	Y	Y	30	1	31	16	1,2,6,7	4,5
106	Special Education	436	31.42	14.25	Y	Y	N	12	1	11	5	1,2	4,5
107	2nd Grade Classroom	907	33.75	27.08	N		N	26	1	26	13	1,2	4,5
108	2nd Grade Classroom	914	34	27.08	Y	Y	Y	26	1	26	13	1,2,6,7	4,5
109	2nd Grade Classroom	899	34	26.75	N		N	26	1	26	13	1,2	4,5
110	OT/PT Room	905	34	26.75	Y	Y	Y	26	1	26	13	1,2,6,7	4,5
111	Special Education	899	34	26.75	N		N	26	1	26	13	1,2	4,5
112	2rd Grade Classroom	905	34	26.75	Y	Y	Y	26	1	26	13	1,2,6,7	4,5
113	1st Grade Classroom	899	34	26.75	N		N	26	1	26	13	1,2	4,5
114	2nd Grade Classroom	635	34	26.75	Y	Y	Y	18	1	17	9	1,2,6,7	4,5
116	Classroom	502	28.01	17.92	Y	Y	Y	14	1	13	6	1,2,6,7	4,5
117	Classroom	502	28.01	17.92	Y	Y	Y	14	1	13	6	1,2,6,7	4,5
118	Classroom	502	28.01	17.92	Y	Y	N	14	1	13	6	1,2,6,7	4,5
119	Classroom	502	28.01	17.92	Y	Y	Y	14	1	13	6	1,2,6,7	4,5
120	4th Grade Classroom	836	34	26.83	Y	Y	Y	24	1	24	12	1,2,6,7	4,5
121	4th Grade Classroom	897	34	26.83	Y	Y	N	26	1	26	13	1,2	4,5
122	3rd Grade Classroom	897	34	26.83	Y	Y	N	26	1	26	13	1,2	4,5
123	3rd Grade Classroom	897	34	26.83	Y	Y	Y	26	1	26	13	1,2,6,7	4,5
125	4th Grade Classroom	955	33.42	29.25	Y	Y	N	27	1	28	14	1,2	4,5
127	5th Grade Room	879	33.42	27.08	Y	Y	Y	25	1	25	13	1,2,6,7	4,5
128	5th Grade Room	946	32.33	29.67	Y	Y	N	27	1	28	14	1,2	4,5
129	5th Grade Room	973	33.25	29.58	Y	Y	N	28	1	28	14	1,2	4,5
130	Resource Room	735	29.67	22.17	Y	Y	Y	21	1	21	10	1,2,3,6,7	4,5
	Tech Office	183	19.58	9.5	N		N	5		2	1	3,7	4,5
	Computer Lab	532	25.83	20.92	N		N	15	1	14	7	2	4,5
	Media Center	1005	34.83	29.5	N		N	29	1	30	15	2,3	4,5
	Special Education	439	25.5	17.67	N		N	13	1	11	5	1,2	4,5

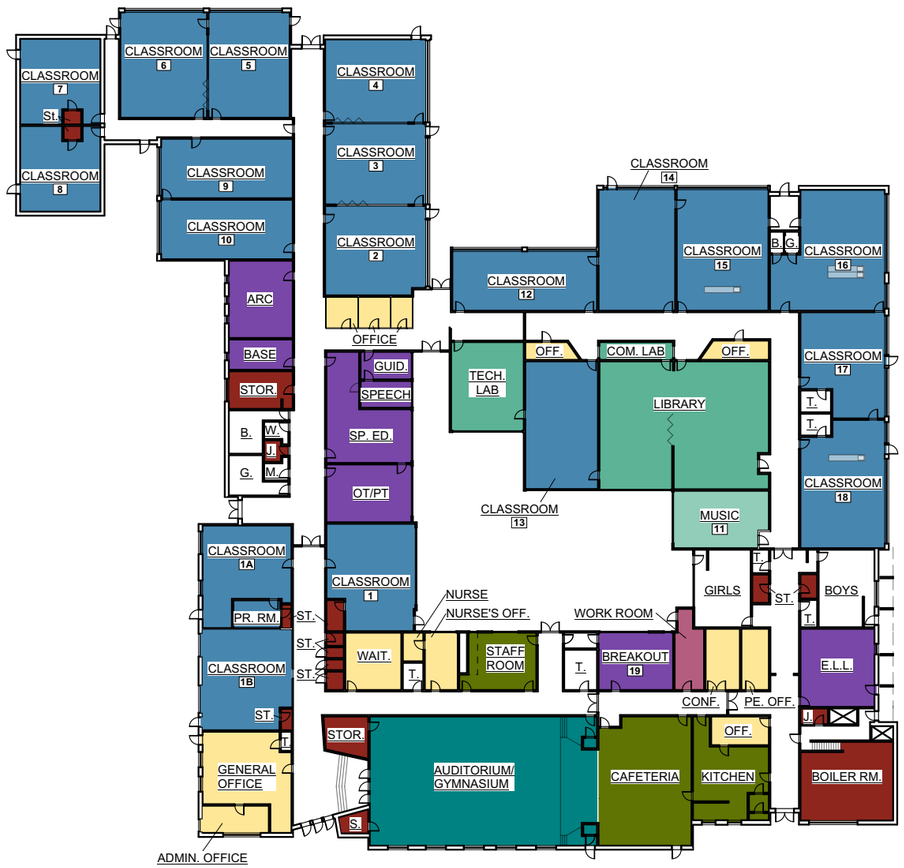
Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Rm Area (Net SF)	Dimension (FT)		Windows		Exterior Doors	Number of Students (traditional learning model)	Number of Educators	Number of students that can be assigned 3 foot distance	Number of students that can be assigned 6 foot distance	Recommendations	Cleaning
			L	W	Y/N	Operable	Y/N	35 sf/occupant per MSBA		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher		
	Speech	252	16.33	15.83	N		N	7	1	4	2	1,2	4,5
	Office	201	23.67	11.58	N		N	2		2	2	7	4,5
	Office	144	16.33	9	N		N	1		1	1	7	4,5
	Office	60	8.5	7.08	N		N	1		1	1	7	4,5
	Office	80	9.42	8.5	N		N	1		1	1	7	4,5
	Library	2112	55.92	37.75	N		N		1			2	4,5
	Resource Room	936	33.08	28.83	Y	Y	N	27	1	27	14	1,2	4,5
	Technology Lab	874	33.08	27.17	Y	Y	Y	25	1	25	13	1,2,6,7	4,5
	Gym	5472	79.17	75.33	N		Y	1094	1	608	152	2,6,7	4,5
	Practice	207	15.08	14.5	Y	Y	Y					3	4,5
	Practice	286	23.58	15.08	Y	Y	N					3	4,5
	Office	90	12.75	7.25	N		N	1		1	1	7	4,5
	Music	1147	41.08	37.08	N		Y	33	1	34	15	1,2,3,6,7	4,5
	SOAR	215	20.33	11.25	N		N	6	1	3	2	7	4,5
	BASE	413	37.08	11.17	N		N	12	1	10	5	3,7	4,5
	Guidance	241	26	9.75	N		N	2		2	2	3,7	4,5
	Receiving	511	31	19.5	N		N		1				4,5
	Cafeteria	2265	52.83	43.58	N		N	151	1		63	2,3,7	4,5
	Kitchen	689	29.33	25.67	Y	Y	N						4,5
	Lounge	401	23.17	17.75	Y	Y	Y	27		27	11	6	4,5
	Health	216	17.5	12.83	Y	Y	N	2		2	2	7	4,5
	Principal	352	20.08	18	Y	Y	N	4		4	4	7	4,5
	Main Office	440	28.58	18	Y	Y	N	4		4	4	7	4,5
	ELL	415	25.67	16.5	Y	Y	N	12	1	10	5	1,2	4,5
	Conference	186	16.33	11.5	N		N	12		12	5	7	4,5
	Copy Room	136	16.08	8.5	N		N	1		1	1		4,5

Notes:

1 Remove unused desks
2 Remove unused accessory furnishings
3 Relocate or swap locations with another space
4 Daily disinfection
5 Regular wiping of surfaces following movement
6 Enter or exit room through independent exterior door
7 Refer to ventilation recommendations

SPACE LEGEND

- STORAGE
- ADMINISTRATION
- DINING/ FOOD SERVICE
- MEDIA
- ART & MUSIC
- HEALTH & PE
- CLASSROOM
- SPECIAL ED.
- WORKROOM



Year Built	1954
Year Renovated / Addition	1965; 1974; 1998
Net Square Feet (NSF)	34,075
Grade Level	K-5

Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Number of students that can be assigned 3 foot distance	Number of students that can be assigned 6 foot distance
		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher
1	Classroom	29	14
1A	Classroom	23	12
1B	Classroom	28	14
2	Classroom	28	14
3	Classroom	25	13
4	Classroom	26	13
5	Classroom	27	14
6	Classroom	29	15
7	Classroom	20	10
8	Classroom	20	10
9	Classroom	25	12
10	Classroom	25	12
11	Music Room	15	8
12	Classroom	28	14
13	Classroom	30	15
14	Classroom	30	15
15	Classroom	37	19
16	Classroom	40	20
17	Classroom	26	13
18	Classroom	34	17
19	Breakout	12	6
	Library		
	Technology Lab	20	9
	Office	1	1
	Computer Lab	1	1
	Office	1	1
	Office	1	1
	Office	1	1
	Office	1	1
	ARC	14	7
	BASE	2	2
	Guidance	2	2
	Speech	2	2
	Special Ed.	20	10
	OT/PT	14	7
	Practice Room	1	1
	General Office	8	8
	Admin. Office	2	2
	Nurse	2	2
	Nurse's Office	2	2
	Waiting Room	4	4
	Staff Room	30	12
	Workroom	2	2
	Conference Room	15	6
	P.E. Office	2	2
	Auditorium/Gym	355	89
	Cafeteria		35
	Kitchen		
	Office	2	2
	E.L.L.	17	9

1" = 50' on original

5' 25'
0 15' 50' 100'

Wayland Public Schools Reopening Study	63 Pequot Rd. Wayland, MA 01778	A-4	Happy Hollow School Floor Plan	NORTH	DRAFT Aug. 17, 2020 NOT FOR CONSTRUCTION TBA PROJECT #1350.1

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Town of Wayland - Wayland Public Schools

School Name	**Happy Hollow**
Year Built	1954
Year Renovated / Addition	1965; 1974; 1998
Net Square Feet (NSF)	34,075
Grade Level	K-5

6'x4.5' 8'x7.5'

Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Rm Area (Net SF)	Dimension (FT)		Windows		Exterior Doors	Number of Students (traditional learning model)	Number of Educators	Number of students that can be assigned 3 foot distance	Number of students that can be assigned 6 foot distance	Recommendations	Cleaning
			L	W	Y/N	Operable	Y/N	35 sf/occupant per MSBA		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher		
1	Classroom	976	35.42	29.83	Y	Y	Y	28	1	29	14	1,2,6,7	4,5
1A	Classroom	814	33.86	22.81	Y	Y	Y	23	1	23	12	1,2,6,7	4,5
1B	Classroom	959	32.35	30.25	Y	Y	Y	27	1	28	14	1,2,6,7	4,5
2	Classroom	968	33.25	29.5	Y	Y	Y	28	1	28	14	1,2,6,7	4,5
3	Classroom	882	33.21	26.57	Y	Y	Y	25	1	25	13	1,2,6,7	4,5
4	Classroom	908	33.21	27.34	Y	Y	Y	26	1	26	13	1,2,6,7	4,5
5	Classroom	931	34.77	26.79	Y	Y	Y	27	1	27	14	1,2,6,7	4,5
6	Classroom	994	34.77	28.59	Y	Y	Y	28	1	29	15	1,2,6,7	4,5
7	Classroom	714	28.25	26.5	N	N	Y	20	1	20	10	1,2,6,7	4,5
8	Classroom	714	28.25	26.5	N	N	Y	20	1	20	10	1,2,6,7	4,5
9	Classroom	864	44.08	20.17	Y	Y	N	25	1	25	12	1,2,6,7	4,5
10	Classroom	865	44.33	19.92	Y	Y	N	25	1	25	12	1,2,7	4,5
11	Music Room	575	31.48	18.95	Y	Y	N	16	1	15	8	1,2,6,7	4,5
12	Classroom	957	47.79	20.05	Y	Y	N	27	1	28	14	1,2,6,7	4,5
13	Classroom	1014	42.5	24.5	Y	Y	N	29	1	30	15	1,2,7	4,5
14	Classroom	1028	40.83	25.75	Y	Y	Y	29	1	30	15	1,2,6,7	4,5
15	Classroom	1232	40.83	30.75	Y	Y	N	35	1	37	19	1,2,7	4,5
16	Classroom	1322	38.5	41.17	Y	Y	N	38	1	40	20	1,2,7	4,5
17	Classroom	896	35.6	28.67	Y	Y	Y	26	1	26	13	1,2,6,7	4,5
18	Classroom	1145	42.58	28.72	Y	Y	Y	33	1	34	17	1,2,6,7	4,5
19	Breakout	466	24.61	18.97	Y	Y	N	13	1	12	6	2,7	4,5
	Library	2333	55.9	42.2	Y	Y	N		1			1,2,7	4,5
	Technology Lab	708	29.75	24.25	Y	Y	N	20	1	20	9	1,2,7	4,5
	Office	131	22.81	6.35	N		N	1		1	1	2	4,5
	Computer Lab	142	24.23	5.85	N		N	1		1	1	2	4,5
	Office	93	18	5.85	N		N	1		1	1	2	4,5
	Office	72	10.35	7	N		N	1		1	1	2	4,5
	Office	107	10.45	10.35	N		N	1		1	1	2	4,5
	Office	107	10.45	10.22	N		N	1		1	1	2	4,5
	ARC	543	25.48	22.01	Y	Y	N	16	1	14	7	1,2,6,7	4,5
	BASE	213	22.01	9.99	Y	Y	N	2		2	2	2	4,5
	Guidance	156	17	9.58	Y	Y	N	2		2	2	2,7	4,5
	Speech	151	17	9.11	Y	Y	N	2		2	2	2,7	4,5
	Special Ed.	706	36.91	28.5	Y	Y	N	20	1	20	10	2,7	4,5
	OT/PT	540	28.5	19.33	Y		N	15	1	14	7	2,7	4,5

Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Rm Area (Net SF)	Dimension (FT)		Windows		Exterior Doors	Number of Students (traditional learning model)	Number of Educators	Number of students that can be assigned 3 foot distance	Number of students that can be assigned 6 foot distance	Recommendations	Cleaning
			L	W	Y/N	Operable	Y/N	35 sf/occupant per MSBA		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher		
	Practice Room	143	15.7	9.42	N		N	1		1	1	3,7	4,5
	General Office	751	33.36	30	Y	Y	Y	8		8	8	2	4,5
	Admin. Office	208	22.5	9.92	Y	Y	N	2		2	2	2	4,5
	Nurse	208	22.5	9.92	N		N	2		2	2	2	4,5
	Nurse's Office	209	19.41	11.12	Y	Y	N	2		2	2	7	4,5
	Waiting Room	350	19.16	18.47	N		N	4		4	4	7	4,5
	Staff Room	444	25.68	19.41	Y	Y	N	30		30	12	2,7	4,5
	Workroom	228	26.76	9.7	N		Y	2		2	2	2	4,5
	Conference Room	230	20.45	11.32	N		N	15		15	6	2,7	4,5
	P.E. Office	184	20.45	9.06	N		N	2		2	2	2,7	4,5
	Auditorium/Gym	3193	74.98	42.59	Y	Y	Y	639		355	89	2,7	4,5
	Cafeteria	1277	42.58	30.67	Y		N	85			35	2,7	4,5
	Kitchen	608	35	25.5	Y		N					2,7	4,5
	Office	181	19.29	9.69	N		N	2		2	2	2	4,5
	E.L.L.	635	25.79	25.34	Y	Y	Y	18	1	17	9	2,7	4,5

Notes:

1 Remove unused desks
2 Remove unused accessory furnishings
3 Relocate or swap locations with another space
4 Daily disinfection
5 Regular wiping of surfaces following movement
6 Enter room through independent exterior door
7 Refer to ventilation recommendations

SPACE LEGEND

- RESTROOMS
- STORAGE
- ADMINISTRATION
- FOOD SERVICE
- MEDIA
- ART & MUSIC
- HEALTH & PE
- PERFORMING ARTS
- STUDY HALL
- CLASSROOMS
- SCIENCE
- WORKROOM
- SPECIAL ED.
- VOCATIONAL

Yr Built	1963
Yr Reno / Addition	2000
Net Square Feet (NSF)	89,941
Grade Level : 6-9	Gr 6-9

Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Number of students that can be assigned 3 foot distance 30 nsf/occupant, less 120 teacher space	Number of students that can be assigned 6 foot distance 60 nsf/occupant, less 120 sf for teacher
101	Classroom	22	11
102	Classroom	21	11
103	Classroom	21	11
104	Classroom	21	11
106	Classroom	22	11
107	Classroom	21	11
108	Classroom	21	11
109	Classroom	14	7
110	Classroom	21	11
111	Classroom	21	11
112	Classroom	21	11
113	Classroom	23	12
114	Science Room	25	17
115	Science Room	25	17
116	Science Room	25	17
117	Science Room	25	17
118	Science Room	25	17
121	Classroom	25	12
122	Breakroom	57	24
123	Classroom	17	11
124	Classroom	21	11
126	Classroom	19	12
128	Classroom	20	10
129	Classroom	19	12
130	Classroom	25	13
131	Classroom	19	13
*132	Classroom	21	11
*133	Special Education	18	11
134	Classroom	25	13
135	Computer	20	13
136	Classroom	25	12
137	Classroom	17	10
138	Classroom	18	9
140	Classroom	19	13
142	Classroom	21	11
143	Science Room	27	18
144	Science Room	30	21
145	Science Room	18	11
146	Classroom	21	11
148	Classroom	19	13
150	Classroom	22	11
213	*Chorus	21	11
214	*Music	23	15
217	Classroom	42	21
243	Office	2	2
301	Math Center	4	2
302	Science Prep.	4	4
303	Office	2	2
304	Office	2	2
305	Office	2	2
306	Office	1	1
307	Metco	10	5
308	Metco Office	2	2
309	Principal's Office	2	2
310	Office	2	2
311	Office	2	2
316	Office	1	1
318	Waiting Room	1	1
324	Office	1	1
325	Office	1	1
326	Office	1	1
331	Office	1	1
334	Special Education	15	7
	Main Office	7	7
	Nurse	4	4
	Nurse's Exam Room	1	1
	Workroom	2	2
*	*Office	1	1
*	*Office	1	1
	Study Hall	55	28
	Study Hall	56	28
	Head End Room		
	Study Hall	51	26
	Library		
	Study Hall	51	26
	OT. PT.	2	1
	Dark Room	1	1
	Office	1	1
	Office	1	1
	Office	1	1
	Courtyard 1		37
	Courtyard 2		74
	Science Prep.	3	3
	Study Hall	14	7
	Cafeteria		126
	Café Stage		
	Control Room	1	1
	Auditorium	282	141
	Stage	73	33
	Theater Office	2	2
	Tech. Ed.	82	37
	Tech Ed. Office	1	1
	Kitchen		
	Gymnasium	1005	251
	Girls' Locker Room		
	Girls' Coach	1	1
	Boys' Locker Room		
	Boys' Coach	1	1

** needs verification*

1" = 50' on original

0 5' 15' 25' 50' 100'

Wayland Public Schools Reopening Study	201 Main St. Wayland, MA 01778	A-5	Wayland Middle School Floor Plan	NORTH	DRAFT Aug. 17, 2020 NOT FOR CONSTRUCTION TBA PROJECT #1350.1

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Town of Wayland - Wayland Public Schools

School Name	**Wayland Middle School**
Yr Built	1963
Yr Reno / Addition : 2000	2000
Net Square Feet (NSF) :	89,941
Grade Level : 6-9	Gr 6-9

6'x4.5' 8'x7.5'

Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Rm Area (Net SF)	Dimension (FT)		Windows		Exterior Doors	Number of Students (traditional learning model)	Number of Educators	Number of students that can be assigned 3 foot distance	Number of students that can be assigned 6 foot distance	Recommendations	Cleaning	Notes
			L	W	Y/N	Operable	Y/N	35 sf/occupant per MSBA		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher			
101	Classroom	767	32	25	Y	Y	N	22	1	22	11	1,2,7	4,5	
102	Classroom	759	32	24.75	Y	Y	N	22	1	21	11	1,2,7	4,5	
103	Classroom	759	32	24.92	Y	Y	N	22	1	21	11	1,2,7	4,5	
104	Classroom	757	31.75	24.83	Y	Y	N	22	1	21	11	1,2,7	4,5	
106	Classroom	781	32.92	35.25	Y	Y	N	22	1	22	11	1,2,7	4,5	
107	Classroom	762	25.08	31.67	Y	Y	N	22	1	21	11	1,2,7	4,5	
108	Classroom	754	24.75	31.67	Y	Y	N	22	1	21	11	1,2,7	4,5	
109	Classroom	537	30.67	29.08	Y	Y	Y	15	1	14	7	1,2,3,6,7	4,5	
110	Classroom	763	31.92	24.92	Y	Y	N	22	1	21	11	1,2,7	4,5	
111	Classroom	755	31.92	24.75	Y	Y	N	22	1	21	11	1,2,7	4,5	
112	Classroom	761	31.92	24.33	N		N	22	1	21	11	1,2,7	4,5	
113	Classroom	811	32.67	25.25	N		N	23	1	23	12	1,2,7	4,5	
114	Science Room	1136	38.5	29.33	Y	Y	Y	25	1	25	17	1,2,6,7	4,5	
115	Science Room	1136	38.5	29.5	Y	Y	Y	25	1	25	17	1,2,6,7	4,5	
116	Science Room	1130	38.5	29.33	Y	Y	Y	25	1	25	17	1,2,6,7	4,5	
117	Science Room	1135	38.5	29.5	Y	Y	Y	25	1	25	17	1,2,6,7	4,5	
118	Science Room	1130	38.5	29.33	Y	Y	Y	25	1	25	17	1,2,6,7	4,5	
121	Classroom	869	29.58	29.33	Y	Y	Y	25	1	25	12	1,2,6,7	4,5	
122	Breakroom	860	29.33	29.33	Y	Y	Y	57		57	24	1,2,6,7	4,5	
123	Classroom	778	30.58	25.42	Y	Y	Y	17	1	17	11	1,2,6,7	4,5	
124	Classroom	753	25.67	29.33	N		N	22	1	21	11	1,2,7	4,5	
126	Classroom	869	29.58	29.33	N		N	19	1	19	12	1,2,7	4,5	
128	Classroom	726	28.58	25.42	Y	Y	Y	21	1	20	10	1,2,6,7	4,5	
129	Classroom	858	28	29.5	Y	Y	N	19	1	19	12	1,2,7	4,5	
130	Classroom	877	30.42	28.83	N		N	25	1	25	13	1,2,3,7	4,5	
131	Classroom	876	29.67	29.5	N		N	19	1	19	13	1,2,7	4,5	
*132	Classroom	754	29.67	25.42	Y	Y	Y	22	1	21	11	1,2,6,7	4,5	
*133	Special Education	809	27.42	29.5	Y	Y	Y	18	1	18	11	1,2,6,7	4,5	
134	Classroom	872	30.42	28.67	N		N	25	1	25	13	1,2,3,7	4,5	
135	Computer	880	29.5	29.83	N		N	20	1	20	13	1,2,7	4,5	
136	Classroom	869	29.42	29.5	N		N	25	1	25	12	1,2,7	4,5	
137	Classroom	748	29.42	25.42	Y	Y	Y	17	1	17	10	1,2,6,7	4,5	
138	Classroom	653	25.58	25.42	Y	Interior	N	19	1	18	9	1,2,3,7	4,5	
140	Classroom	875	29.83	29.33	Y	Interior	N	19	1	19	13	1,2,3,7	4,5	
142	Classroom	754	29.67	25.42	Y	Y	Y	22	1	21	11	1,2,6,7	4,5	

Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Rm Area (Net SF)	Dimension (FT)		Windows		Exterior Doors	Number of Students (traditional learning model)	Number of Educators	Number of students that can be assigned 3 foot distance	Number of students that can be assigned 6 foot distance	Recommendations	Cleaning	Notes
			L	W	Y/N	Operable	Y/N	35 sf/occupant per MSBA		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher			
143	Science Room	1194	44.5	26.83	Y	Y	Y	27	1	27	18	1,2,6,7	4,5	
144	Science Room	1372	44.5	13.17	Y	Y	Y	30	1	30	21	1,2,6,7	4,5	
145	Science Room	803	33.08	24.33	Y	Y	Y	18	1	18	11	1,2,6,7	4,5	
146	Classroom	756	29.67	25.42	Y	Y	Y	22	1	21	11	1,2,6,7	4,5	
148	Classroom	871	29.67	29.33	Y	Y	Y	19	1	19	13	1,2,6,7	4,5	
150	Classroom	780	30.67	25.42	Y	Y	Y	22	1	22	11	1,2,6,7	4,5	
213	*Chorus	753	28.92	28.25	N		N	22	1	21	11	12,3,7	4,5	
214	*Music	1020	43.33	39.75	Y	Y	N	23	1	23	15	12,3,7	4,5	
217	Classroom	1372	49	31.75	Y	Y	N	39	1	42	21	1,2,7	4,5	
243	Office	168	13.75	12.25	Y	Y	N	2		2	2	7		
301	Math Center	254	21.25	12	Y	Y	N	7	1	4	2	1,2,7	4,5	
302	Science Prep.	361	16.08	22.42	N		N	4		4	4	1,2,7	4,5	
303	Office	248	16	15.5	N		N	2		2	2	7	4,5	
304	Office	248	16	15.5	N		N	2		2	2	7	4,5	
305	Office	248	16	15.5	N		N	2		2	2	7	4,5	
306	Office	64	9.83	6.5	N		N	1		1	1	7	4,5	
307	Metco	419	16.08	26.08	N		N	12	1	10	5	1,2,7	4,5	
308	Metco Office	185	16.08	29.5	N		N	2		2	2	1,2,7	4,5	
309	Principal's Office	231	14.33	16.17	Y	Y	N	2		2	2	7	4,5	
310	Office	232	14.33	16.17	Y	Y	N	2		2	2	7	4,5	
311	Office	232	14.33	16.17	Y	Y	N	2		2	2	7	4,5	
316	Office	64	7.25	8.83	Y	Y	N	1		1	1	7	4,5	
318	Waiting Room	88	8.5	10.33	N		N	1		1	1	7	4,5	
324	Office	104	9	12	N		N	1		1	1	7	4,5	
325	Office	71	7.92	9	N		N	1		1	1	7	4,5	
326	Office	113	14.25	7.92	N		N	1		1	1	7		
331	Office	148	20.5	7.25	N		N	1		1	1	7		
334	Special Education	556	28.67	19.42	N		N	16	1	15	7	1,2,7	4,5	
	Main Office	706	10	52.25	Y	Interior	N	7		7	7	7	4,5	
	Nurse	355	22.58	19.58	N		N	4		4	4	7	4,5	
	Nurse's Exam Room	95	8.67	10.92	N		N	1		1	1	7	4,5	
	Workroom	234	24.75	9.42	Y	Y	N	2		2	2	7	4,5	
*	*Office	142	10	14.17	N		N	1		1	1	7	4,5	
*	*Office	148	10	14.75	N		N	1		1	1	7	4,5	
	Study Hall	1777	60	29.5	Y	Y	Y	51	1	55	28	1,2,3,6,7	4,5	Shared Space
	Study Hall	1788	60.58	29.5	Y	Y	Y	51	1	56	28	1,2,3,6,7	4,5	Shared Space
	Head End Room	326	14.08	23.17	N		N						4,5	
	Study Hall	1650	56	29.5	Y	Y	Y	47	1	51	26	1,2,3,6,7	4,5	Shared Space
	Library	2859	79	48	Y	Y	Y					1,2,7	4,5	
	Study Hall	1658	56.25	29.5	Y	Y	Y	47	1	51	26	1,2,3,6,7	4,5	Shared Space
	OT. PT.	191	16.58	11.5	N		N	5	1	2	1	1,2,7	4,5	

Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Rm Area (Net SF)	Dimension (FT)		Windows		Exterior Doors	Number of Students (traditional learning model)	Number of Educators	Number of students that can be assigned 3 foot distance	Number of students that can be assigned 6 foot distance	Recommendations	Cleaning	Notes
			L	W	Y/N	Operable	Y/N	35 sf/occupant per MSBA		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher			
	Dark Room	83	11	7.58	N		N	1		1	1	7	4,5	
	Office	67	9	7.42	N		N	1		1	1	7	4,5	
	Office	67	9	7.42	N		N	1		1	1	7	4,5	
	Office	67	9	7.42	N		N	1		1	1	7	4,5	
	Courtyard 1	2317	79.67	29.08	Y	Y	Y	66	1		37		4,5	Outdoor Space
	Courtyard 2	4579	77.58	59	Y	Y	Y	131	1		74		4,5	Outdoor Space
	Science Prep.	280	16	17.5	N		N	3		3	3	1,2,7	4,5	
	Study Hall	527	21.5	21.33	Y	Y	Y	15	1	14	7	1,2,3,6,7	4,5	
	Cafeteria	4545	78.92	59.17	Y	Y	Y	303			126	1,2,6,7	4,5	
	Café Stage	1412	48.5	25	N		N						4,5	
	Control Room	98	16.92	6.08	Y	Interior	N	1		1	1	7	4,5	
	Auditorium	4051	67	60	N		N	563		282	141	7	4,5	563 Total Seats
	Stage	2321	34.83	77.67	N		Y	66		73	33	6,7	4,5	
	Theater Office	207	23.83	11.83	N		N	2		2	2	7		
	Tech. Ed.	2579	79.42	40.17	Y	Y	Y	74	1	82	37	1,2,6.7	4,5	
	Tech Ed. Office	146	13.5	10.83	Y	Interior	N	1		1	1	7	4,5	
	Kitchen	190	32.08	29.58	N		N						4,5	
	Gymnasium	9046	130.33	69.42	N		Y	1809	1	1005	251	2,6,7	4,5	
	Girls' Locker Room	1861	55.25	43.17	N		N					3	4,5	
	Girls' Coach	82	9.17	8.75	Y	Interior	N	1		1	1	3,7	4,5	
	Boys' Locker Room	1137	42.6	24	N		N					3	4,5	
	Boys' Coach	82	10.17	8	Y	Interior	N	1		1	1	3,7	4,5	

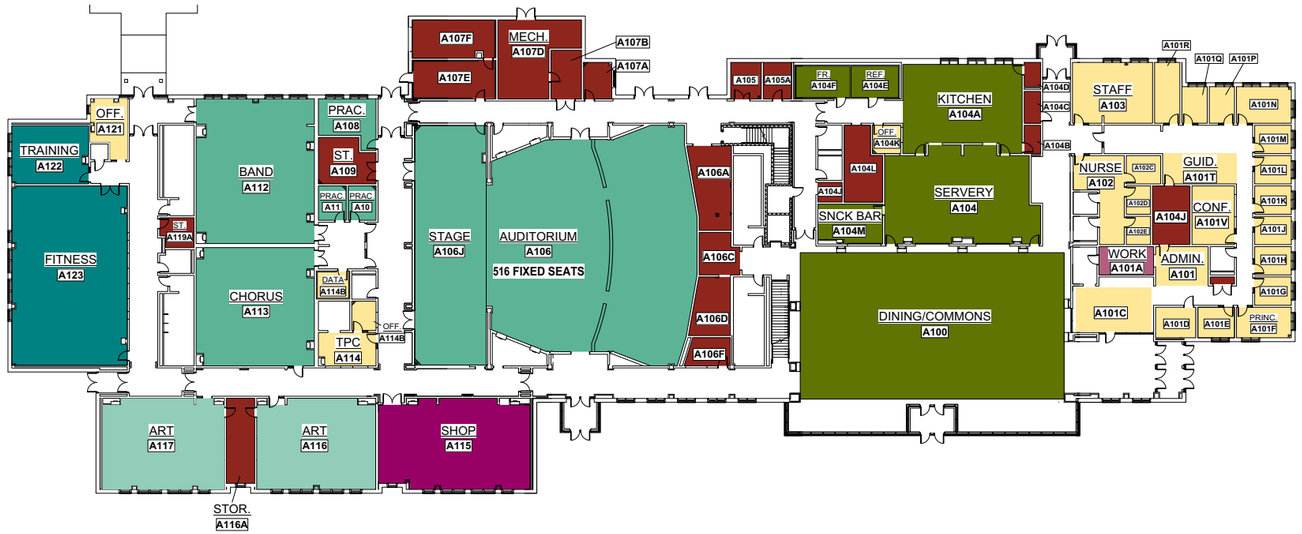
Notes:

1 Remove unused desks
2 Remove unused accessory furnishings
3 Relocate or swap locations with another space
4 Dailing disinfection
5 Regular wiping of surfaces following movement
6 Enter room through independent exterior door
7 Refer to ventilation recommendations

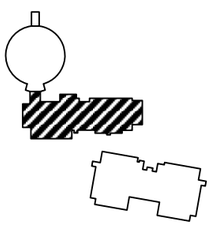
SPACE LEGEND

- RESTROOMS
- STORAGE
- ADMINISTRATION
- FOOD SERVICE
- MEDIA
- ART & MUSIC
- HEALTH & PE
- CLASSROOM
- WORKROOM
- SPECIAL ED.
- VOCATIONAL

Yr Built	2010
Yr Reno / Addition	n/a
Net Square Feet (NSF)	124,508
Grade Level	Gr 9-12



Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Number of students that can be assigned 3 foot distance	Number of students that can be assigned 6 foot distance
		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher
A100	Dining/Commons		151
A101	Administration	5	5
A101A	Work	2	2
A101D	Data	1	1
A101E	A.P. Office	1	1
A101F	Principal's Office	2	2
A101H	Office	1	1
*A101J	Record	2	2
*A101J	Office	1	1
A101K	Office	1	1
A101L	Office	1	1
A101M	Office	1	1
A101N	Conference	14	6
A101P	Office	1	1
A101Q	Office	1	1
A101R	Office	2	2
A101T	Guidance Center	6	6
A101V	Conference	18	8
A102	Nurse	3	3
A102C	Exam	1	1
A102D	COT	1	1
A102E	COT	1	1
A103	Staff	35	15
A104	Servery		
A104A	Kitchen		
A104K	Office	1	1
A104M	Snack Bar	3	3
A106	Auditorium	172	103
A106F	School Store	1	1
A106H	Sound	1	1
A106J	Stage	19	19
A108	Practice	3	3
A110	Practice	1	1
A111	Practice	1	1
A112	Band	57	28
A113	Choral	46	23
A114	TPC	4	2
A114A	Office	1	1
A115	Shop	44	22
A116	Art	34	17
A117	Art	35	18
A121	A.D. Office	2	2
A122	Training	12	6
A123	Fitness	71	35



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Wayland Public Schools
Reopening Study

264 Old Connecticut Path,
Wayland, MA 01778

A-6.0

Wayland High School
Building A First Floor Plan

NORTH

DRAFT Aug. 17, 2020
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TBA PROJECT
#1350.1

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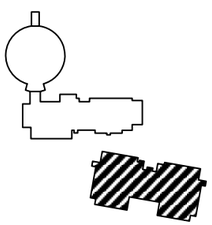
- VOCATIONAL

Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Number of students that can be assigned 3 foot distance	Number of students that can be assigned 6 foot distance
		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher
B101	Library		
B101A	Office	1	1
B101B	Office	1	1
B101C	Conference	15	6
B101D	Conference	18	8
B101F	ACAD Center	20	10
B101G	Library Stacks		
B101H	Library Office	1	1
B101J	Library Work Room	5	2

B102	Science Lab	35	18
B102A	Science Prep	2	2
B103	Science Lab	35	18
B103A	Science Prep	3	3
B104	Science Lab	36	18
B105	Classroom	24	12
B106	Classroom	24	12
B107	Classroom	24	12
B108	Classroom	24	12
B109	Classroom	24	12
B110	Classroom	24	12
B111	Classroom	25	12
B112	SLC	24	12
B113	Tech.	8	4
B113A	Head End		
B114	Computer Lab	25	12
B115	TPC	12	6
B115B	Copy	3	3
B116	Conference	19	8
B117	SPED CR	12	6
B123	SPED CR	11	6
B124	Sp.Ed. Recep.	3	3
B124A	Psych. Off.	1	1
B124B	SPED Off.	1	1
B124C	Conference	22	9
B124D	Conference	11	5
B124E	Test	2	2
B125	TPC	14	8
B125B	Copy	1	1
B126	Science Lab	35	17
B126A	Science Prep	3	3
B127	Science Lab	35	17
B128	Classroom	24	12
B129	Classroom	24	12
B130	Classroom	24	12
B131	Classroom	24	12
B132	Classroom	24	12
B133	Classroom	24	12
B134	Classroom	24	12
B135	SLC	24	12
B136	SPED CR	28	14
B142	SPED CR	11	6
B143	TPC	12	6
B143B	Copy	3	3
B144	Conference	19	8
B145	SPED CR	12	6



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Wayland Public Schools Reopening Study	264 Old Connecticut Path, Wayland, MA 01778	A-6.1	Wayland High School Building B First Floor Plan

NORTH

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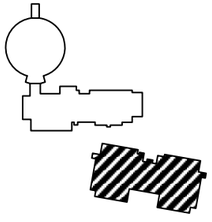
- VOCATIONAL

Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Number of students that can be assigned 3 foot distance	Number of students that can be assigned 6 foot distance
		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher
B202	Science Lab	35	17
B202A	Science Prep.	2	2
B203	Science Lab	35	18
B203A	Science Prep.	3	3
B204	Science Lab	35	18
B205	Classroom	24	12
B206	Classroom	24	12
B207	Classroom	24	12
B208	Classroom	24	12
B209	Classroom	24	12
B210	Classroom	24	12
B211	Classroom	24	12
B212	Classroom	19	9
B213	Classroom	31	15
B214	Classroom	31	15
B215	TPC	12	6
B215B	Copy	2	2
B216	Conference	19	8
B217	Sp. Ed. Classroom	11	6
B223	Sp. Ed. Classroom	11	6
B224	Video	16	7
B224A	Edit	1	1
B224B	Edit	2	1
B225	Lab	32	14
B226	Science Lab	35	17
B226A	Science Prep.	3	3
B227	Science Lab	35	17
B228	Classroom	24	12
B229	Classroom	24	12
B230	Classroom	24	12
B231	Classroom	24	12
B232	Classroom	24	12
B233	Classroom	24	12
B234	Classroom	24	12
B235A	Classroom	19	10
B236	Lecture	36	22
B242	Sp. Ed.	11	6
B243	TPC	12	6
B243B	Copy	2	2
B244	Conference	19	8



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Wayland Public Schools Reopening Study	264 Old Connecticut Path, Wayland, MA 01778	A-6.2	Wayland High School Building B Second Floor Plan	NORTH	DRAFT Aug. 17, 2020 NOT FOR CONSTRUCTION TBA PROJECT #1350.1

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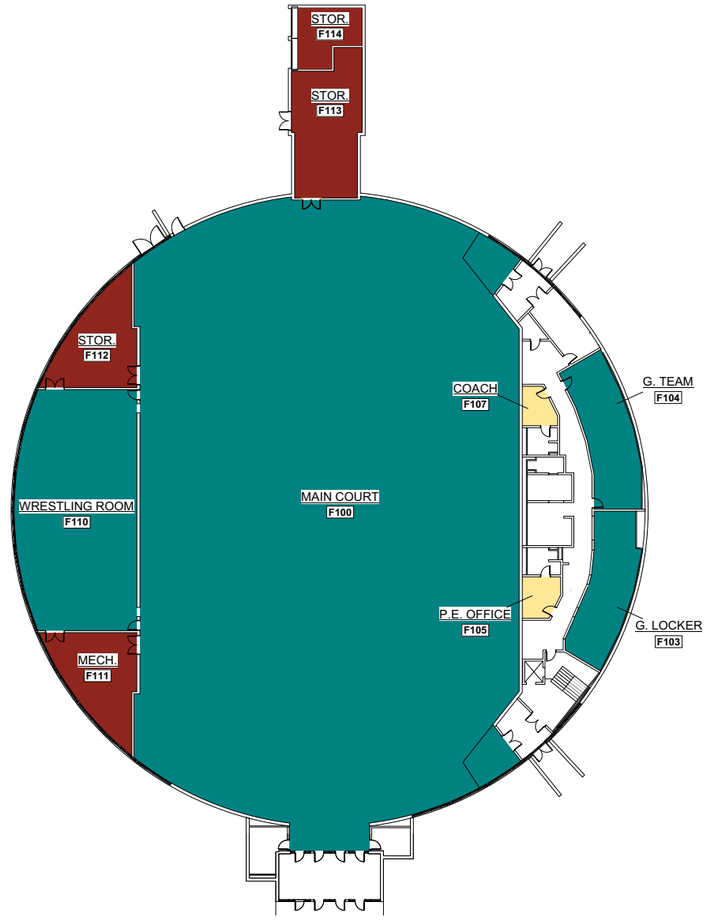
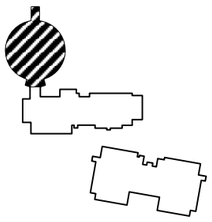
Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Number of students that can be assigned 3 foot distance	Number of students that can be assigned 6 foot distance
		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher
F100	Main Court	2714	679
F105	P.E. Office	2	2
F107	Coach	1	1
F110	Wrestling Room	320	80





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Wayland Public Schools Reopening Study	264 Old Connecticut Path, Wayland, MA 01778	A-6.3	Wayland High School Field House Building Floor Plan	NORTH	DRAFT Aug. 17, 2020 NOT FOR CONSTRUCTION TBA PROJECT #1350.1

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Town of Wayland - Wayland Public Schools

School Name	**Wayland High School**
Yr Built	2010
Yr Reno / Addition	n/a
Net Square Feet (NSF)	124,508
Grade Level	Gr 9-12

6'x4.5' 8'x7.5'

Room #	Room Name / Use (Classroom, Conference Room, Office, Etc)	Rm Area (Net SF)	Dimension (FT)		Windows		Exterior Doors	Number of Students (traditional learning model)	Number of Educators	Number of students that can be assigned 3 foot distance	Number of students that can be assigned 6 foot distance	Recommendations	Cleaning
			L	W	Y/N	Operable	Y/N	35 sf/occupant per MSBA		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher		
Building A													
A100	Dining/Commons	5418	61.92	92.83	Y		Y	361			151	6,7	4,5
A101	Administration	453	19.33	17.33	N		N	5		5	5	7	4,5
A101A	Work	168	9.33	18	N		N	2		2	2	7	4,5
A101D	Data	118	12.58	9.42	N		N	1		1	1		4,5
A101E	A.P. Office	121	12.08	10.08	Y		N	1		1	1	7	4,5
A101F	Principal's Office	182	18.08	10.08	Y		N	2		2	2	7	4,5
A101H	Office	113	12.08	9.33	Y		N	1		1	1	7	4,5
*A101J	Record	238	19.33	12.33	N		N	2		2	2		4,5
*A101J	Office	113	12.08	9.33	Y		N	1		1	1	7	4,5
A101K	Office	113	12.08	9.33	Y		N	1		1	1	7	4,5
A101L	Office	113	12.08	9.33	Y		N	1		1	1	7	4,5
A101M	Office	113	12.08	9.33	Y		N	1		1	1	7	4,5
A101N	Conference	217	18.08	12.08	Y		N	14		14	6	2,7	4,5
A101P	Office	100	12.08	8.33	Y		N	1		1	1	7	4,5
A101Q	Office	102	12.08	8.33	Y		N	1		1	1	7	4,5
A101R	Office	167	20.08	8.33	Y		N	2		2	2	7	4,5
A101T	Guidance Center	575	19.33	29.67	N		N	6		6	6	2,7	4,5
A101V	Conference	271	19.33	14	Y	Interior	N	18		18	8	2,3,7	4,5
A102	Nurse	338	29.33	16.83	N		N	3		3	3	7	4,5
A102C	Exam	106	11.33	9.33	N		N	1		1	1	7	4,5
A102D	COT	75	9.33	8	N		N	1		1	1	7	4,5
A102E	COT	75	9.33	8	N		N	1		1	1	7	4,5
A103	Staff	528	26.33	20.08	Y		N	35		35	15	2,7	4,5
A104	Servery	1491	28.92	47.67	N		N					7	4,5
A104A	Kitchen	1264	25.92	39.33	Y		N					7	4,5
A104K	Office	87	9.33	9.33	Y	Interior	N	1		1	1	3,7	4,5
A104M	Snack Bar	268	21.33	13.17	Y		N	3		3	3	7	4,5
A106	Auditorium	4719	79.33	69.5	N		N	516	1	172	103	7	4,5
A106F	School Store	129	15.25	9.33	Y	Interior	N	1		1	1	3,7	4,5
A106H	Sound	128	7.5	18	N		N	1		1	1		4,5
A106J	Stage	1863	79	23.58	N		Y	19		19	19	7	4,5
A108	Practice	254	19	17.08	Y		N	3		3	3	7	4,5
A110	Practice	104	11.33	9.17	N		N	1		1	1	7	4,5
A111	Practice	104	11.33	9.17	N		N	1		1	1	7	4,5

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			L	W	Y/N	Operable	Y/N	35 sf/occupant per MSBA		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher		
A112	Band	1815	47.75	39	Y		N	52	1	57	28	2,7	4,5
A113	Choral	1486	39	39	N		N	42	1	46	23	2,7	4,5
A114	TPC	305	19	11	Y	Interior	N	4	1	4	2	2,3,7	4,5
A114A	Office	77	9.67	8	N		N	1		1	1	7	4,5
A115	Shop	1431	50.08	30.08	Y		N	41	1	44	22	2,7	4,5
A116	Art	1154	39.25	30.08	Y		N	33	1	34	17	2,7	4,5
A117	Art	1177	40.08	30.08	Y		N	34	1	35	18	2,7	4,5
A121	A.D. Office	198	20	12.25	Y		N	2		2	2	7	4,5
A122	Training	478	25.33	19.17	Y		N	14	1	12	6	2,7	4,5
A123	Fitness	2237	59.17	38.08	Y		N	64	1	71	35	2,7	4,5
Building B - First Floor													
B101	Library	4378	80	54.5	Y	Interior	N					2,3,7	4,5
B101A	Office	117	12.5	9.33	Y	Interior	N	1		1	1	3,7	4,5
B101B	Office	117	12.5	9.33	Y	Interior	N	1		1	1	3,7	4,5
B101C	Conference	218	19.5	11.17	Y	Interior	N	15		15	6	2,3,7	4,5
B101D	Conference	273	21.42	17.33	Y	Interior	N	18		18	8	2,3,7	4,5
B101F	ACAD Center	732	28.33	25.92	Y		N	21	1	20	10	2,3,7	4,5
B101G	Library Stacks	561	25.17	22.5	N		N					7	4,5
B101H	Library Office	92	9.83	9.33	N		N	1		1	1	7	4,5
B101J	Library Work Room	283	15.75	25.5	N		N	8	1	5	2	7	4,5
B102	Science Lab	1174	42.67	36.75	Y		N	34	1	35	18	2,7	4,5
B102A	Science Prep	178	19.75	9.33	N		N	2		2	2	2,7	4,5
B103	Science Lab	1174	42.67	36.75	Y		N	34	1	35	18	2,7	4,5
B103A	Science Prep	257	27.5	9.33	N		N	3		3	3	2,7	4,5
B104	Science Lab	1185	43.08	37	Y		N	34	1	36	18	2.7	4,5
B105	Classroom	847	37.5	30.08	Y		N	24	1	24	12	1,2,7	4,5
B106	Classroom	852	37.5	30.25	Y		N	24	1	24	12	1,2,7	4,5
B107	Classroom	847	37.5	30.08	Y		N	24	1	24	12	1,2,7	4,5
B108	Classroom	847	37.5	30.08	Y		N	24	1	24	12	1,2,7	4,5
B109	Classroom	847	37.5	30.25	Y		N	24	1	24	12	1,2,7	4,5
B110	Classroom	847	37.5	30.25	Y		N	24	1	24	12	1,2,7	4,5
B111	Classroom	862	37.5	30.58	Y		N	25	1	25	12	1,2,7	4,5
B112	SLC	851	33.33	25.67	N		N	24	1	24	12	1,2,7	4,5
B113	Tech.	368	26.33	19.42	N		N	11	1	8	4	1,2,7	4,5
B113A	Head End	220	24	9.17	Y	Interior	N						4,5
B114	Computer Lab	857	39.17	30.25	Y	Interior	N	24	1	25	12	2,7	4,5
B115	TPC	870	38.33	31.08	Y	Interior	N	12	1	12	6	2,7	4,5
B115B	Copy	300	27.5	18.42	Y	Interior	N	3		3	3	2,7	4,5
B116	Conference	284	26.08	16.25	N		N	19		19	8	2,7	4,5
B117	SPED CR	489	28.42	23.25	Y		N	14	1	12	6	2,7	4,5
B123	SPED CR	461	26.42	23.42	Y		N	13	1	11	6	2,7	4,5

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			L	W	Y/N	Operable	Y/N	35 sf/occupant per MSBA		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher		
B124	Sp.Ed. Recep.	266	25.08	10.58	Y		N	3		3	3	2,7	4,5
B124A	Psych. Off.	136	15.08	12.17	Y		N	1		1	1	2,7	4,5
B124B	SPED Off.	138	15.33	12.33	Y		N	1		1	1	2,7	4,5
B124C	Conference	325	22.92	20.58	Y		N	22		22	9	2,7	4,5
B124D	Conference	169	18.08	9.33	N		N	11		11	5	2,7	4,5
B124E	Test	171	19.33	12.5	N		N	2		2	2	2,7	4,5
B125	TPC	681	41.33	27.33	Y		N	14	1	14	8	2,7	4,5
B125B	Copy	146	17.08	11.42	N		N	1		1	1	2,7	4,5
B126	Science Lab	1165	42.25	36.58	Y		N	33	1	35	17	2,7	4,5
B126A	Science Prep	251	28.75	14	Y		N	3		3	3	2,7	4,5
B127	Science Lab	1165	41.92	36.58	Y		N	33	1	35	17	2,7	4,5
B128	Classroom	847	37.58	30.08	Y		N	24	1	24	12	1,2,7	4,5
B129	Classroom	852	37.5	30.25	Y		N	24	1	24	12	1,2,7	4,5
B130	Classroom	852	37.5	30.25	Y		N	24	1	24	12	1,2,7	4,5
B131	Classroom	847	37.5	30.08	Y		N	24	1	24	12	1,2,7	4,5
B132	Classroom	852	37.5	30.25	Y		N	24	1	24	12	1,2,7	4,5
B133	Classroom	852	37.5	30.25	Y		N	24	1	24	12	1,2,7	4,5
B134	Classroom	847	37.5	30.08	Y		N	24	1	24	12	1,2,7	4,5
B135	SLC	851	33.33	25.67	Y		N	24	1	24	12	1,2,7	4,5
B136	SPED CR	970	45.67	29.75	N		N	28	1	28	14	1,2,7	4,5
B142	SPED CR	461	27.08	22.92	Y	Interior	N	13	1	11	6	1,2,3,7	4,5
B143	TPC	876	38.75	30.5	Y	Interior	N	12	1	12	6	2,3,7	4,5
B143B	Copy	300	26.25	21.42	N		N	3		3	3	2,7	4,5
B144	Conference	284	27.08	15.25	N		N	19		19	8	2,7	4,5
B145	SPED CR	490	27.92	23.33	Y	Interior	N	14	1	12	6	2,3,7	4,5
Building B Second Floor - Area C													
B202	Science Lab	1167	42.58	36.58	Y		N	33	1	35	17	2,7	4,5
B202A	Science Prep.	178	21.08	12.67	N		N	2		2	2	2,7	4,5
B203	Science Lab	1173	42.17	36.75	Y		N	34	1	35	18	2,7	4,5
B203A	Science Prep.	251	28.75	14	Y		N	3		3	3	2,7	4,5
B204	Science Lab	1173	42.17	36.75	Y		N	34	1	35	18	2,7	4,5
B205	Classroom	847	37.5	30.08	Y		N	24	1	24	12	1,2,7	4,5
B206	Classroom	852	37.5	30.25	Y		N	24	1	24	12	1,2,7	4,5
B207	Classroom	847	37.5	30.08	Y		N	24	1	24	12	1,2,7	4,5
B208	Classroom	847	37.5	30.08	Y		N	24	1	24	12	1,2,7	4,5
B209	Classroom	852	37.5	30.25	Y		N	24	1	24	12	1,2,7	4,5
B210	Classroom	852	37.5	30.25	Y		N	24	1	24	12	1,2,7	4,5
B211	Classroom	852	37.5	30.25	Y		N	24	1	24	12	1,2,7	4,5
B212	Classroom	688	31.08	30.17	Y		N	20	1	19	9	1,2,7	4,5
B213	Classroom	1044	45.33	31.33	N		N	30	1	31	15	1,2,7	4,5
B214	Classroom	1048	45.17	31.67	N		N	30	1	31	15	1,2,7	4,5

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			L	W	Y/N	Operable	Y/N	35 sf/occupant per MSBA		30 nsf/occupant, less 120 teacher space	60 nsf/occupant, less 120 sf for teacher		
B215	TPC	870	38.33	31.08	Y	Interior	N	12	1	12	6	2,3,7	4,5
B215B	Copy	245	26.25	14.25	N		N	2		2	2	2,7	4,5
B216	Conference	284	26.08	16.25	N		N	19		19	8	2,7	4,5
B217	Sp. Ed. Classroom	461	28.6	23.25	Y	Interior	N	13	1	11	6	1,2,3,7	4,5
B223	Sp. Ed. Classroom	461	28.6	23.25	Y	Interior	N	13	1	11	6	1,2,3,7	4,5
B224	Video	590	30.75	25.67	Y		N	17	1	16	7	2,7	4,5
B224A	Edit	160	15.17	14.25	Y		N	5	1	1	1	2,7	4,5
B224B	Edit	193	16	12.08	Y	Interior	N	6	1	2	1	2,3,7	4,5
B225	Lab	1080	42.75	34.67	Y		N	31	1	32	14	2,7	4,5
B226	Science Lab	1165	42.25	36.58	Y		N	33	1	35	17	2,7	4,5
B226A	Science Prep.	251	28.75	14	Y		N	3		3	3	2,7	4,5
B227	Science Lab	1165	41.92	36.58	Y		N	33	1	35	17	2,7	4,5
B228	Classroom	847	37.5	30.08	Y		N	24	1	24	12	1,2,7	4,5
B229	Classroom	852	37.5	30.25	Y		N	24	1	24	12	1,2,7	4,5
B230	Classroom	847	37.5	30.08	Y		N	24	1	24	12	1,2,7	4,5
B231	Classroom	852	37.5	30.25	Y		N	24	1	24	12	1,2,7	4,5
B232	Classroom	852	37.5	30.25	Y		N	24	1	24	12	1,2,7	4,5
B233	Classroom	852	37.5	30.25	Y		N	24	1	24	12	1,2,7	4,5
B234	Classroom	847	37.5	30.08	Y		N	24	1	24	12	1,2,7	4,5
B235A	Classroom	697	31.42	29.33	Y		N	20	1	19	10	1,2,7	4,5
B236	Lecture	2043	53.83	49.58	Y	Interior	N	108	1	36	22	3,7	4,5
B242	Sp. Ed.	461	27.08	22.92	Y	Interior	N	13	1	11	6	1,2,3,7	4,5
B243	TPC	870	38.75	30.5	Y	Interior	N	12	1	12	6	2,3,7	4,5
B243B	Copy	245	26.25	24.25	N		N	2		2	2	2,7	4,5
B244	Conference	284	27.08	15.25	N		N	19		19	8	2,7	4,5
Field House													
F100	Main Court	24430	215	127.58	Y		Y	4886		2714	679	7	4,5
F105	P.E. Office	158	13.67	12.67	N		N	2		2	2	7	4,5
F107	Coach	128	13	11.67	N		N	1		1	1	7	4,5
F110	Wrestling Room	2879	79.5	40.5	Y		N	576		320	80	7	4,5

Notes:

1 Remove unused desks
2 Remove unused accessory furnishings
3 Relocate or swap locations with another space
4 Daily disinfection
5 Regular wiping of surfaces following movement
6 Enter or exit room through independent exterior door
7 Refer to ventilation recommendations

ASHRAE EPIDEMIC TASK FORCE

SCHOOLS & UNIVERSITIES | Updated 7-17-2020

Introduction

Protecting the health, safety and welfare of the world's students from the spread of SARS-Cov-2 (the virus that causes COVID-19 disease) is essential to protecting the health, safety and welfare of the entire population.

ASHRAE's position is that "Transmission of SARS-CoV-2 through the air is sufficiently likely that airborne exposure to the virus should be controlled. Changes to building operations, including the operation of heating, ventilating, and air-conditioning [HVAC] systems, can reduce airborne exposures."

There is broad variation of complexity, flexibility, and age in HVAC equipment, systems, controls and Building Automation Systems (BAS) in educational facilities.

This guidance has been formulated to help designers retrofit and plan for the improvement of indoor air quality and to slow the transmission of viruses via the HVAC systems. The underlying effort of the designer should be to increase outside air to the spaces and treat return air. The designer should also be concerned with mechanical filtration of the supply air and maintaining indoor comfort as defined by the design temperature and relative humidity.

This guidance should be applied to each unique climate zone, unique school building and HVAC system. All retrofits and modifications must not contradict ASHRAE 62.1 guidelines and must continue to or exceed the standards and codes adopted by local jurisdictions. The designer needs to work closely with the local school system to work in conjunction with new operational protocols and school operations.

The following is meant to provide practical information and checklists to school district and university campus environmental health managers, facility managers, administrators, technicians, and service providers to prepare educational buildings to resume occupancy. This information describes how the HVAC systems should be operating to help minimize the chance of spreading SARS-Cov-2 and how to practically check/verify that operation.

Determining Building Readiness and Operations for Existing Facilities to Reoccupy After Shut-Down due to Pandemic

These recommendations and strategies are organized in order from simple first steps, more involved next steps and then more long-term improvements

1. Create a District or Campus Health and Safety Committee that includes all stakeholders (environmental health and safety, administration, education staff, operations staff, local healthcare providers, etc.)

2. Develop policies for staff and contractor PPE requirements for completing work at facilities that follow local authority, CDC, and OSHA guidelines for the proper use of Personal Protective Equipment (PPE).

3. Where semi-annual / annual scheduled maintenance on the equipment can be performed safely, do not defer this maintenance cycle.

4. Where worker safety could be at risk, defer semi-annual/ annual maintenance on the equipment up to 60 days until worker safety can be accomplished.

5. During the summer period before occupancy perform Checklist No. 1 Summer Checklist for Fall Start of Classes.

6. Operate all HVAC in occupied mode for a minimum of one week prior to occupancy.

7. During the week prior to occupancy perform Checklist No. 2 Startup Checklist for HVAC Systems Prior to Occupancy.

Checklist No. 1:
Summer Checklist for Fall Start of Classes

- ❑ Review design guidance for potential system modifications to comply with this guidance.
- ❑ Review air distribution conditions of existing spaces (look for covered diffusers, blocked return grilles, overly closed supply diffusers/registers and return/exhaust grilles creating short cycling, possible measurements of airflows by commissioning or balancing professionals, possible review of overall system configuration by design professional, etc.)
- ❑ Review existing Indoor Air Quality issues, if any, records of documents and investigate current status of complaint and address any deficiencies identified, if possible.
- ❑ General inspection of spaces to identify any potential concerns for water leaks or mold growth that could negatively impact occupant health.
- ❑ Check all lavatories and sinks for correct operation and ensure soap dispensers are functional and adequate supply of soap is available to allow for proper handwashing.
- ❑ Coordinate with local utilities to identify when buildings will be restarted, identify when systems will be operated (if different than prior operations) and identify that demands may increase (primarily electric but gas may apply as well for some facilities).
- ❑ Consider completing preventative and deferred maintenance projects not directly related to pandemic, but potentially improving facility IEQ:
  - ❑ Clean/disinfect building surfaces, focusing on high touch surfaces – secure spaces from access once cleaning is complete.
  - ❑ Consider asbestos abatement work if applicable.
  - ❑ Consider lead paint abatement work if applicable.
  - ❑ Consider access improvements, including repairs to walkways and ramps, ADA upgrades, handrail repairs, etc.
  - ❑ Consider grounds work including improvement of water drainage away from buildings, planting of native plants or trees to help control water penetration into ground and shading of facilities to reduce cooling load.
- ❑ Review control sequences to verify systems are operating according to this guidance to maintain required ventilation, temperature and humidity conditions to occupied areas.

Checklist No. 2:

Startup Checklist for HVAC Systems Prior to Occupancy

- ❑ Maintain proper indoor air temperature and humidity to maintain human comfort, reduce potential for spread of airborne pathogens and limit potential for mold growth in building structure and finishes (refer to ASHRAE Standard 55, recommended temperature ranges of 68-78 degrees F dry bulb depending on operating condition and other factors, recommend limiting maximum RH to 60%). Consider consulting with a local professional engineer to determine appropriate minimum RH levels based on local climate conditions, type of construction and age of the building under consideration. Recommend minimum RH of 40% if appropriate for building. Consider the addition of humidification equipment only when reviewed by a design professional to verify minimum RH set points will not adversely impact building or occupants by contributing to condensation and possible biological growth in building envelope.
- ❑ Trend and monitor temperature and humidity levels in each space to the extent possible and within the capability of BAS, portable data loggers and handheld instruments.
- ❑ Verify proper separation between outdoor air intakes and exhaust discharge outlets to prevent/limit re-entrainment of potentially contaminated exhaust air (generally minimum of 10-foot separation - comply with local code requirements).
- ❑ Consider having airflows and building pressurization measured/balanced by a qualified Testing, Adjusting and Balancing (TAB) service provider.
- ❑ Consider having airflows and system capacities reviewed by design professionals to determine if additional ventilation can be provided without adversely impacting equipment performance and building Indoor Environmental Quality (IEQ).
- ❑ Measure building pressure relative to the outdoors. Adjust building air flows to prevent negative pressure differential.
- ❑ Verify coil velocities and coil and unit discharge air temperatures required to maintain desired indoor conditions and to avoid moisture carry over from cooling coils.
- ❑ Review outdoor airflow rates compared to the most current version of ASHRAE Standard 62.1 or current state-adopted code requirements.

Checklist No. 2 Continued:

Startup Checklist for HVAC Systems Prior to Occupancy

- **Filtration in all mechanical equipment:**
  - ❑ Verify filters are installed correctly.
  - ❑ Develop standards for frequency of filter replacement and type of filters to be utilized.
  - ❑ Select filtration levels (MERV ratings) that are maximized for equipment capabilities, use MERV 13 if equipment allows, while assuring the pressure drop is less than the fans capability. See Filtration Upgrades.

❑ **If Demand-Controlled Ventilation (DCV) systems using Carbon Dioxide (CO2) sensors are installed, operate systems to maintain maximum CO2 concentrations of 800-1,000 Parts Per Million (ppm) in occupied spaces:**
  - ❑ Trend and monitor levels continuously if controls system is capable of doing so (use portable data loggers and handheld instruments and document readings where needed to demonstrate compliance with District or Campus requirements).
  - ❑ Consider adjusting to maximize outdoor air or disabling operation of DCV if it will not adversely impact operation of overall system (Temporary recommendation while operating under infectious disease crisis).

❑ **Perform initial air flush of all spaces prior to occupants re-entering building:**
  - ❑ Mechanical systems should operate in occupied mode for minimum period of one week prior to students returning (may be completed at same time as teachers start returning to building) while assuring the outside air dampers are open.

❑ **Domestic water systems shall be prepared for use:**
  - ❑ Systems should be flushed to remove potential contaminants from stagnant equipment, piping, fixtures, etc.
  - ❑ Domestic cold-water systems should be flushed with all fixtures on a branch of piping opened simultaneously for a minimum period of five minutes – preferred approach is to have all building fixtures open at same time if possible – if not, care should be taken to ensure flow rate is adequate to flush piping mains and branch lines.
  - ❑ Domestic hot water systems should be flushed with all fixtures on a branch of piping opened simultaneously for a minimum period of 15 minutes – preferred approach is to have all building fixtures open at same time if possible – if not, care should be taken to ensure flow rate is adequate to flush piping mains and branch lines.
  - ❑ Reference Standard 188 and Guideline 12 (available read-only on website)

Equipment and System Specific Checks and Verifications During the Academic Year

Cleaning and Air Flush: Daily

- ❑ Daily flush prior to occupancy: Mechanical Systems should be operated in occupied mode (including normal or peak outside air rate introduced to each space) for minimum period of 2 hours prior to occupants re-entering building.

- ❑ Cleaning:
  - ❑ All areas that have been occupied after previous cleaning efforts should be re-cleaned.
  - ❑ All restrooms should be thoroughly cleaned.
  - ❑ All food preparation areas should be thoroughly cleaned.
  - ❑ Any spaces not previously cleaned should have all accessible surfaces properly cleaned.

Boilers: Monthly

- ❑ For systems with Steam Boilers, develop a schedule that provides minimum supervision on-site.

- ❑ Perform chemical testing of system water. Verify water treatment target levels are being maintained.

- ❑ For systems using fuel oil:
  - ❑ Check fuel pump for proper operation.
  - ❑ Inspect fuel filter; clean and verify proper operation.

- ❑ For systems using natural gas:
  - ❑ Check gas pressure, gas valve operation, and combustion fan operation.
  - ❑ Check for evidence of leakage of fuel supply, heat transfer fluid, and flue gas.

- ❑ Verify proper operation of safety devices per manufacturer’s recommendations.

Equipment and System Specific Checks and Verifications During the Academic Year Continued

Chilled Water, Hot Water and Condenser Water Systems: Monthly

- ❑ Perform chemical testing of system water. Verify water treatment target levels are being maintained.
- ❑ Check the control system and devices for evidence of improper operation.
- ❑ Verify control valves operate properly.
- ❑ Check variable-frequency drives for proper operation.

Air Cooled Chillers: Monthly

- ❑ Check the refrigerant system for evidence of leaks.
- ❑ Check and clean fan blades and fan housing.
- ❑ Check coil fins and check for damage.
- ❑ Check for proper evaporator fluid flow and for fluid leaks.

Water Cooled Chillers: Monthly

- ❑ Check the refrigerant system for evidence of leaks.
- ❑ Check for proper evaporator and condenser fluid flow and for fluid leaks.
- ❑ Check compressor oil level and/or pressure on refrigerant systems having oil level and/or pressure measurement means.

Equipment and System Specific Checks and Verifications During the Academic Year Continued

Cooling Towers and Evaporative-Cooled Devices Monthly

- ❑ Perform chemical testing of system water. Verify water treatment target levels are being maintained.
- ❑ Check chemical injector device for proper operation.
- ❑ Check conductivity and other sensors for proper readings.
- ❑ Check the water system ultraviolet lamp, replace bulbs as needed (if applicable).
- ❑ Check the control system and devices for evidence of improper operation.
- ❑ Check variable frequency drive for proper operation.
- ❑ Check for proper condenser water flow and for leaks.
- ❑ Check for proper damper operation.
- ❑ Inspect pumps and associated electrical components for leaks and normal operation.
- ❑ Verify control valves operate properly.

Steam Distribution Systems: Monthly

- ❑ Perform chemical testing of system condensate and feed water.
- ❑ Check piping for leaks.
- ❑ Check steam traps and condensate return units for proper operation.
- ❑ Check safety devices per manufacturer’s recommendations.
- ❑ Verify control valves operate properly.

Equipment and System Specific Checks and Verifications During the Academic Year Continued

HVAC Water Distribution Systems: Monthly

- ❑ Perform chemical testing of system water. Verify water treatment target levels are being maintained.
- ❑ Check for proper fluid flow and for fluid leaks. If necessary, vent air from system high points and
- ❑ verify backflow preventers and pressure regulating valves on makeup water lines are functioning properly.
- ❑ Check expansion tanks and bladder type compression tanks have not become waterlogged.
- ❑ Verify control valves operate properly.

Pumps: Annually

- ❑ Inspect pumps and associated electrical components for proper operation.
- ❑ Check variable-frequency drive for proper operation.
- ❑ Check the control system and devices for evidence of improper operation.

Equipment and System Specific Checks and Verifications During the Academic Year Continued

Air Handling Units: Monthly

- ❑ Check for particulate accumulation on filters, replace filter as needed.
- ❑ Check ultraviolet lamp, replace bulbs as needed (if applicable).
- ❑ Check P-trap on drain pan.
- ❑ Check the control system and devices for evidence of improper operation.
- ❑ Check variable-frequency drive for proper operation.
- ❑ Check drain pans for cleanliness and proper slope.
- ❑ Verify control dampers operate properly.
- ❑ Confirm AHU is bringing in outdoor air and removing exhaust air as intended.
- ❑ Verify filters are installed correctly.
- ❑ Follow filter replacement policy.
- ❑ Review condition of cooling coils in air handling equipment – if issues with condensate drainage are identified or biological growth is identified, corrective action should be taken to clean or repair.

Equipment and System Specific Checks and Verifications During the Academic Year Continued

Roof Top Units: Monthly

- ❑ Check for particulate accumulation on outside air intake screens and filters. Replace filter as needed.
- ❑ Check ultraviolet lamp, replace bulbs as needed (if applicable).
- ❑ Check P-trap.
- ❑ Check drain pans for cleanliness and proper slope.
- ❑ Check the control system and devices for evidence of improper operation.
- ❑ Check variable frequency drive for proper operation.
- ❑ Check refrigerant system for leaks.
- ❑ Check for evidence of leaks on gas heat section heat-exchanger surfaces.
- ❑ For fans with belt drives, inspect belts and adjust as necessary.
- ❑ Verify control dampers operate properly.

Equipment and System Specific Checks and Verifications During the Academic Year Continued

Unitary and Single Zone Equipment (For example: Wall Hung Units, Unit Ventilators, Mini-Splits, Packaged Terminal Air Conditioners, Water-Source Heat Pumps, Fan Coil Units)**:**

Monthly

- ❑ Check for particulate accumulation on filters, replace filter as needed.
- ❑ Check P-trap.
- ❑ Check drain pans for cleanliness and proper slope.
- ❑ Check the control system and devices for evidence of improper operation.
- ❑ Verify control dampers operate properly.

New/Modified Facility Design Recommendations

Introduction

This guidance has been formulated to help designers retrofit and plan for the improvement of indoor air quality and to slow the transmission of viruses via the HVAC systems. The underlying effort of the designer should be to increase outside air to the spaces, treat return air and or supply air to spaces via mechanical filtration and maintain indoor comfort as defined by the design temperature and relative humidity.

This guidance should be applied to each unique climate zone, unique school building and HVAC system. All retrofits and modifications must not contradict ASHRAE 62.1 guidelines and must continue to meet or exceed applicable codes and standards. The designer needs to work closely with the local school system to work in conjunctions with new operational protocols and school operations.

Nurse office suite design should follow health care facilities design practices as described in standards such as ASHRAE Standard 170 and other applicable guidelines and design information.

Designer Guidelines – General School

Temperature and Humidity Design Criteria

1. **Winter classroom design guidelines 72 F/40- 50% RH**
   - 40- 50% RH in winter is primary guidance via humidifiers/active humidification (central or local, depending on the classroom/space system). The humidity minimum, humidifier, and sensor location should be made after consultation with your ASHRAE professional regarding the envelope design due to the potential for condensation within the building envelope.
2. **Summer classroom design guidelines 75 F/50%-60% RH**
   Designing to 50% RH in summer is primary guidance, depending on the classroom system.

Ventilation Design Criteria/Guideline

- Follow current ASHRAE 62 standard or local ventilation standards for minimum outside air requirements.
- For remodeling an existing AHU, increase outside air to maximum allowable per Air Handling Unit (AHU) without compromising indoor thermal comfort for learning environment (due to severe thermal outdoor air conditions) or space IAQ due to poor outdoor ambient conditions (pollution).
- For Dedicated Outdoor Air Systems (DOAS) that are being replaced, size unit capacity for at least 150% of code minimum flow.
- During the Pandemic, disable any Demand Control Ventilation (DCV) and introduce the maximum possible OA flow 24/7 until further notice (including DOAS).
- Apply and utilize outdoor air quality sensors or reliable web-based data for outdoor pollution information as part of the new ventilation operation.

Designer Guidelines – General School Continued

Filtration Design Criteria/ Guideline

1. **Follow 2019 ASHRAE- Applications Handbook, chapter 8, table 7 for minimum Filtration Efficiency**
   - Apply the highest Minimum Efficiency Reporting Value (MERV) applicable for the HVAC units (local, central and DOAS). HEPA or MERV 13 is recommended minimum if equipment can accommodate pressure drop and MERV 14 is preferred.
2. **Introduce portable, all electric HEPA/UV Machines in each classroom**
   - Guideline minimum of 2 Air rotations/hour
   - Ensure flow patterns maximize mixing of air in classrooms

Operation and Scheduling Guideline for Existing AHUs during the Pandemic

1. **Cooling and Heating equipment- Change the start of operation hours (e.g. change 6 am start to 4 am) and run DOAS**
   - Cooling and Heating systems (Local, central)- Goal is to create a thermal lag and minimize HVAC operations when occupied
   - DOAS Systems - Run DOAS units two hours before and after occupancy.
2. **Exhaust fans- Turn on when DOAS is running**
   - Only applies to school days not weekend operations
   - Goal is to flush the building with OA and positively pressurize the building
3. **Dedicated Outdoor Air Systems (DOAS) – Create "Minimum Transmission Sequence of Operation"**
   - DOAS Systems - Run DOAS units two hours before and after occupancy as part of new DOAS sequence of Operation
   - For DOAS units equipped with active, thermally operated desiccant dehumidifier, consult the manufacturer for safe operation.
   - For new installations, designer should designate a "Purge/Flush" mode for operations to minimize the virus transmission via HVAC systems.
4. **Energy Recovery Systems**
   - Many air handling system types (central air handling units, DOAS units, terminal systems, etc.) include Energy Recovery Ventilation (ERV) systems (these can include energy recovery wheels, plate-type heat exchangers, heat pipes, run around loops, etc.)
   - Some types or configurations for energy recovery systems allow for exhaust air transfer from the exhaust airstream to the supply airstream, while others do not – depending on system configuration this may be cause for concern
   - A document focused on operational considerations for energy recovery systems for many system types and configurations is available here.

Designer Guidelines – General School Continued

4. AHU's (SZ and VAV) and Packaged Rooftop units (PSZ, PVAV)

- During the Pandemic, increase Filtration to that recommended in the Filtration Upgrade section below.
- For existing units, an increase in filtration efficiency may reduce airflow capacity. Compensate for loss of capacity in winter with portable plug in elec. Heaters or higher discharge temps.
- Compensate for loss of capacity in summer with lower discharge temps off of AHU – recommend 52 F (this is mainly for VAV units where supply air temperature is controlled and due to additional pressure drop associated with higher efficiency filters).
- Check and fix economizer dampers and controls and maximize the economizer operation when possible (favorable outdoor conditions and outdoor air pollution).
- Check, fix and modify control sequences in VAV systems to avoid outdoor air flow /minimum OA air flow shortage.
- In VAV systems maximize the total supply air flow in each VAV terminal when the system is in full economizer mode.
- Minimize the unit air recirculation to minimize zones cross contamination thru the return air system.
- Install UV/C lights, ionization in AHU's – UV min 1500 microwatts/cm^2 when possible. UV/C lights a destructive to filter media. Ensure no UV lights shall shine on filters.
- Install Humidifiers in AHUs and Packaged rooftop units if possible.
- Install duct mounted humidifiers at classrooms as an alternate.

5. Local HVAC units (Fan Coils, WSHP, GSHP, Mini Split, VRF, Unit Ventilators, Radiators/baseboards)

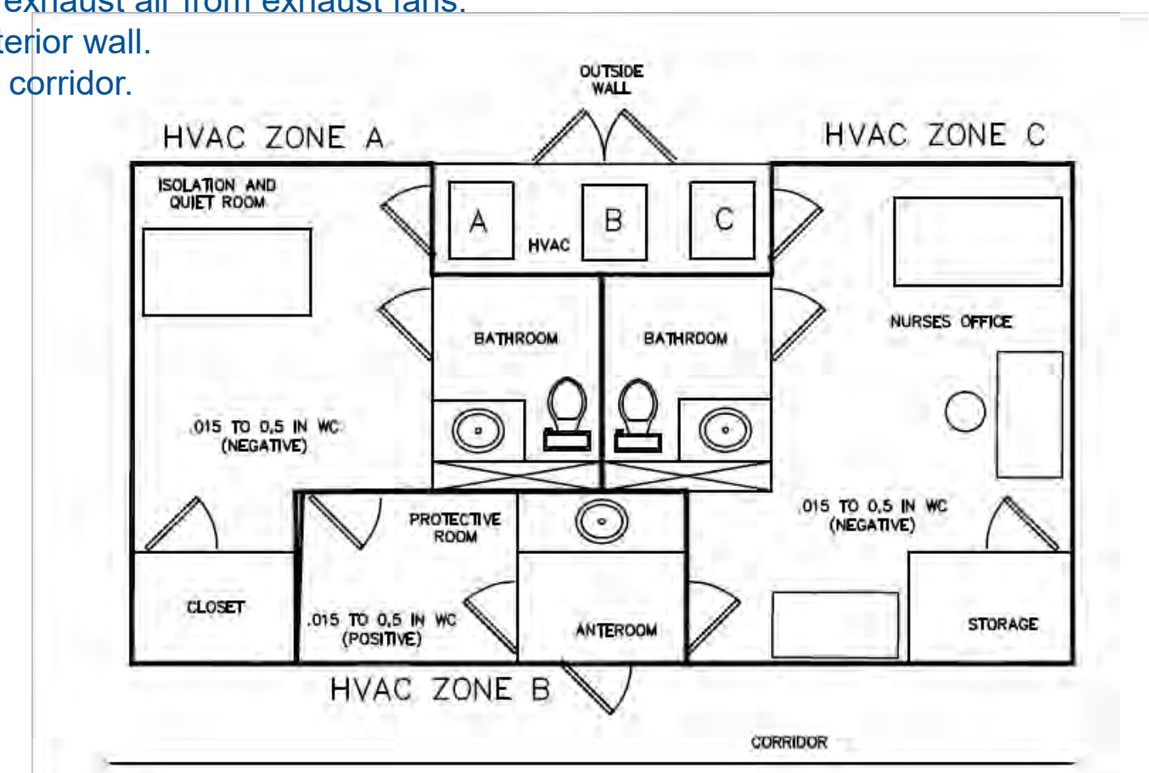
- Increase Filtration to the maximum MERV suggested by the manufacturer.
- Compensate for loss of capacity in winter with portable plug in electric heaters or higher discharge temps.
- Hydronic /Electric radiators / baseboard can remain operational.
- Check unit ventilators for proper amounts of OA and operation.
- Install Portable humidifiers in each classroom for local humidity control.

6. Space Air Flow

- Ensure airflow patterns in classrooms are adjusted to minimize occupant exposure to particles.
- Recommended guidance is to provide lowest possible particulate concentration anywhere in the space.

Nurses Office – General Requirements

- Treat as Isolation rooms – 1 bed per building – follow ASHRAE 170 and 2019 ASHRAE Handbook Chapter 9.
- If retrofits are not possible recommend temporary nurse's station trailers.
- Dedicated bathrooms.
- The nurse station will include Anteroom/Protective Equipment Room.
- Normal non-isolation nursing office.
- Provisions for Biohazard waste.
- Two (2) modes of operation, (1) "Isolation Mode and (2) "Normal Mode"
- For "Isolation mode" design Dedicated HVAC system.
- For the "Normal Mode" the HVAC system can be (supplementary) standard HVAC system (VRF +DOAS, Fan coils, WSHP/GSHP, DOAS etc) with current design practices (ASHRAE 62.1, ASHRAE 90.1and local codes etc).
- The HVAC operation will be "Isolation mode" OR "Normal Mode".
- Follow CDC guidelines for supply air return air paths, do not mix isolation room air with any other spaces. Directly exhaust isolation rooms. Follow design guidelines for location of OA intakes and exhaust air from exhaust fans.
- Recommend locations of nurse's office HVAC on an exterior wall.
- Maintain pressure relationship for room, ante room and corridor.



Note: Systems A, B, and C are the Dedicated "Isolation Mode "systems, each system is individually operated and controlled. The Supplementary HVAC systems for "Normal mode" are not shown.

Nurses Office – General Requirements Continued

Temperature and Humidity Design Criteria- Isolation Mode

- Winter Nurse Station design guidelines 72 F/50-55% RH
- Summer Nurse Station design guidelines 72 F/50%-60% RH

Ventilation Design Criteria/Guideline- Isolation Mode

- 100 % OA system
- Design for a maximum of 10 Air Changes per Hour (ACH), can operate at 6 ACH

Filtration Design Criteria/ Guideline- Isolation Mode

- Follow ASHRAE 170, table 6.4 – Protective Environment (PE) room filter guidelines
  - Two filter banks, MERV 7 and HEPA (MERV 14 for existing HVAC that is unable to support HEPA)

Space Pressurization Design Criteria/ Guideline- Isolation Mode

- Follow ASHRAE 170, section 7.2 and other related sections for space pressure requirements
  - Isolation Room and Nurse office will be Negative Pressure (- 0.015” to – 0.5” W.C)
  - Protective Room will be Positive Pressure ((+ 0.015” to + 0.5” W.C)
  - Given the small size of the systems serving the Nurse Station in Isolation Mode, it is suggested considering Constant Volume, hard balanced air system.

Space Air Distribution/Diffusion Design Criteria/ Guideline- Isolation Mode

- Follow ASHRAE 170, Table 6.7.2 – PE Group E non-aspirating (for additional information refer to 2017 ASHRAE – Fundamentals, chapter 20).

Nurses Office – General Requirements Continued

General Design Parameters- Isolation Mode

- Follow ASHRAE 170, Table 7-1
  - Treat as PE anteroom and combination AII/PE.
  - ACH = 10.
  - Exhaust directly to outdoors
  - No air re-circulation
  - All should be under negative pressure.
  - PE rooms with respective to adjacent rooms should be under positive pressure.
- Follow ASHRAE 170, section 7.2.1.
  - Infection Control Risk Assessment (ICRA) is to be performed for new construction and renovations of nurse facilities.
  - Refer to guidance on ICRA for renovations and creating a CX plan and well as phasing the construction.
- Follow ASHRAE 170, Section 6.8.2 which refers to energy recovery.
  - No energy recovery for airborne infectious isolation rooms.
  - Refer to section 6.8.2 exception for cases where Energy Recovery can be applied.

Operation and Scheduling Guideline

- **Isolation Mode (Dedicated 100 % OA systems)**
  - Cooling, Heating, Humidification, Dehumidification, Ventilation – run 2 hours before and after occupancy
  - Exhaust fans – run when ventilation is on
- **Normal Mode (Supplementary HVAC systems)**
  - Cooling, Heating, Ventilation - per normal school schedule(occupied/unoccupied)
  - Exhaust fans - per normal school schedule (occupied/unoccupied), might be **OFF** during unoccupied hours

Filtration Upgrades

Introduction

The focus of this section is to provide instructions for educational facility managers to increase their filtration efficiency in existing air systems on a temporary basis during the pandemic. The presentation focuses on filtration basics for a facility manager, an information gathering phase, a data analytics and review phase and lastly a series of implementation and considerations an educational facility manager may address. Refer to the section on Filtration/Disinfection under the COVID-19.

This guidance has been formulated to help designers and facility managers to retrofit and plan for the improvement of indoor air quality and to slow the transmission of virus via the HVAC systems. The underlying effort of the designer should be to increase outside air to the spaces, treat return air and or supply air to spaces via mechanical filtration or treating the air and maintain indoor comfort as defined by temperature and relative humidity.

The guidance should be applied to each unique climate zone, unique school building and HVAC system. All retrofits and modifications must not contradict ASHRAE 62.1 guidelines and must continue to meet code. The designer needs to work closely with the local school system to work in conjunctions with new operational protocols and school operations.

Filtration Basics

Key Terminology for Filtration

- **Arrestance** – A measure of the ability of an air filtration device to remove synthetic dust from the air. The arrestance describes how well an air filter removes larger particles - such as dirt, lint, hair and dust.

- **Atmospheric Dust Spot Efficiency** - The ability of a filter to remove atmospheric dust from the air and designated as a percentage.

- **MERV Rating** - Minimum Efficiency Reporting Values, or MERVs, report a filter's ability to capture particles between 0.3 and 10 microns (µm).
- Particle Size Range – This is the composite particle size efficiency percentage within a range of particle size. The three ranges used in Std 52.2 are E1 - (0.3-1.0 µm), E2 - (1.0-3.0 µm), and E3 – (3.0-10.0 µm).

Mechanical Air Filters

- Consist of media with porous structures of fibers or stretched membrane material to remove particles from airstreams. Filters range in size but the typical depths of filters are 1”, 2”, 4” and 12-15”.
- Some filters have a static electrical charge applied to the media to increase particle removal.
- The fraction of particles removed from air passing through a filter is termed “filter efficiency” and is provided by the Minimum Efficiency Reporting Value (MERV) under standard conditions.
  - MERV ranges from 1 to 16; higher MERV = higher efficiency
  - MERV ≥13 (or ISO equivalent) are efficient at capturing airborne viruses
- Generally, particles with an aerodynamic diameter around 0.3 µm are most penetrating; efficiency increases above and below this particle size.
- Overall effectiveness of reducing particle concentrations depends on several factors:
  - Filter efficiency
  - Airflow rate through the filter
  - Size of the particles
  - Location of the filter in the HVAC system or room air cleaner

Filtration Basics Continued

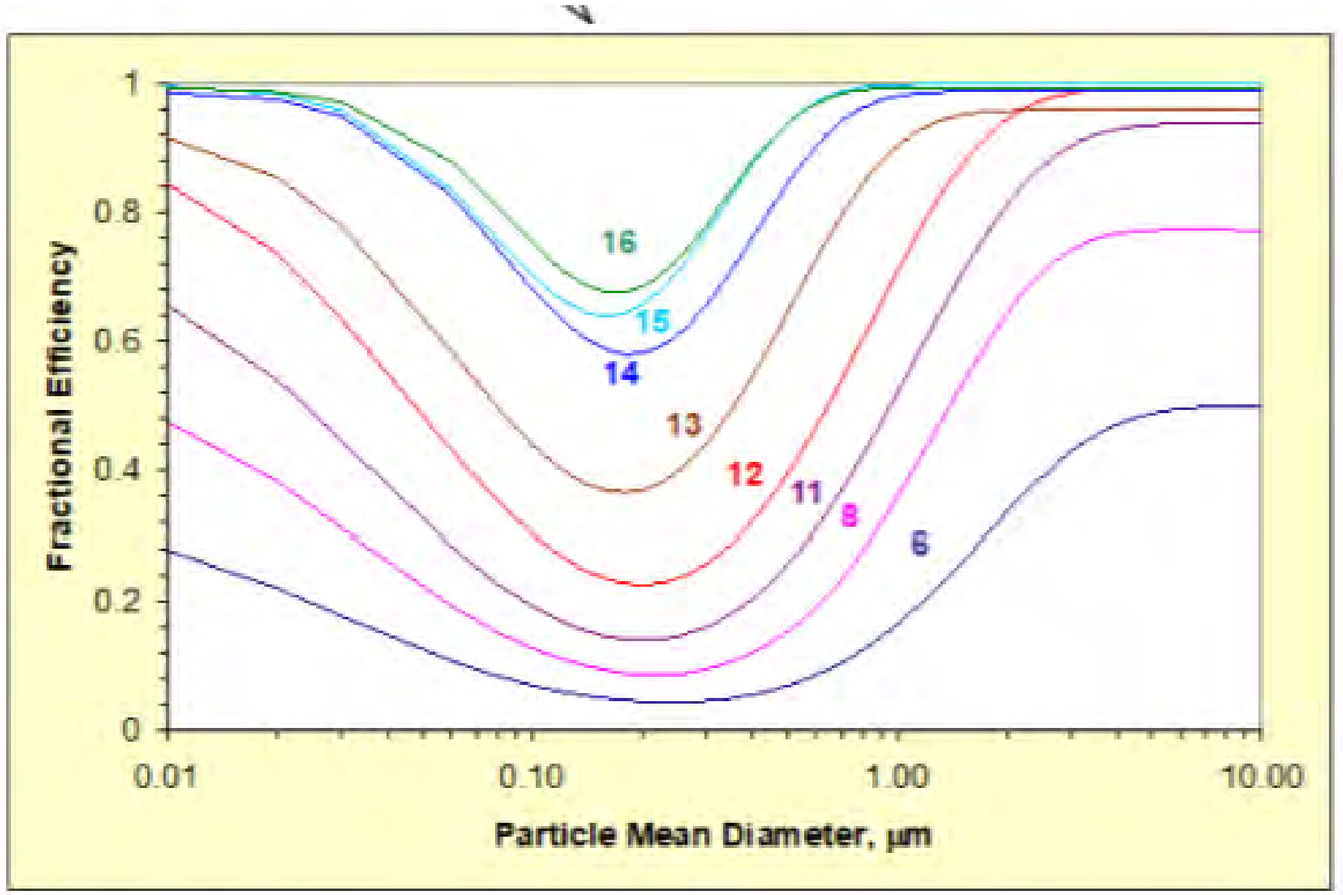
ASHRAE Standard 52.2-2017 -- Minimum Efficiency Reporting Value (MERV)

Table 12-1 Minimum Efficiency Reporting Value (MERV) Parameters

Standard 52.2 Minimum Efficiency Reporting Value (MERV)	Composite Average Particle Size Efficiency, % in Size Range, µm			
	Range 1 0.30 to 1.0	Range 2 1.0 to 3.0	Range 3 3.0 to 10.0	Average Arrestance, %
1	N/A	N/A	$E_3 < 20$	$A_{avg} < 65$
2	N/A	N/A	$E_3 < 20$	$65 \le A_{avg}$
3	N/A	N/A	$E_3 < 20$	$70 \le A_{avg}$
4	N/A	N/A	$E_3 < 20$	$75 \le A_{avg}$
5	N/A	N/A	$20 \le E_3$	N/A
6	N/A	N/A	$35 \le E_3$	N/A
7	N/A	N/A	$50 \le E_3$	N/A
8	N/A	$20 \le E_2$	$70 \le E_3$	N/A
9	N/A	$35 \le E_2$	$75 \le E_3$	N/A
10	N/A	$50 \le E_2$	$80 \le E_3$	N/A
11	$20 \le E_1$	$65 \le E_2$	$85 \le E_3$	N/A
12	$35 \le E_1$	$80 \le E_2$	$90 \le E_3$	N/A
13	$50 \le E_1$	$85 \le E_2$	$90 \le E_3$	N/A
14	$75 \le E_1$	$90 \le E_2$	$95 \le E_3$	N/A
15	$85 \le E_1$	$90 \le E_2$	$95 \le E_3$	N/A
16	$95 \le E_1$	$95 \le E_2$	$95 \le E_3$	N/A

Filtration Target Level

Target Level for Filtration for Schools is MERV 13 or higher.
This minimum target will on average remove a minimum of 75% of particle size of 0.3-1.0 µm.



Information Gathering Stage

Data Collection Stage – Can be done by any staff

- Determine if the Building was LEED or CHPS Certified.
- Determine the current size, depth and quantity of filters in equipment. Make a list by piece of equipment.
- Determine if there are one or two filter banks.
- Document MERV rating of existing filters installed. May need to review previous filter orders.
- Determine the area of filter banks. This can also be determined by quantity of filters broken down by size of filter.
- Collect Original Design Drawings if available.
- Gather equipment shop drawings or Operation and Maintenance Manuals.
- Record the Model or Serial number of the air handling equipment.
- Determine the type of motor that is used in the equipment.
- Determine if the equipment served from a Variable Frequency Drive.

Record all Data Collected

Data Analysis & Review

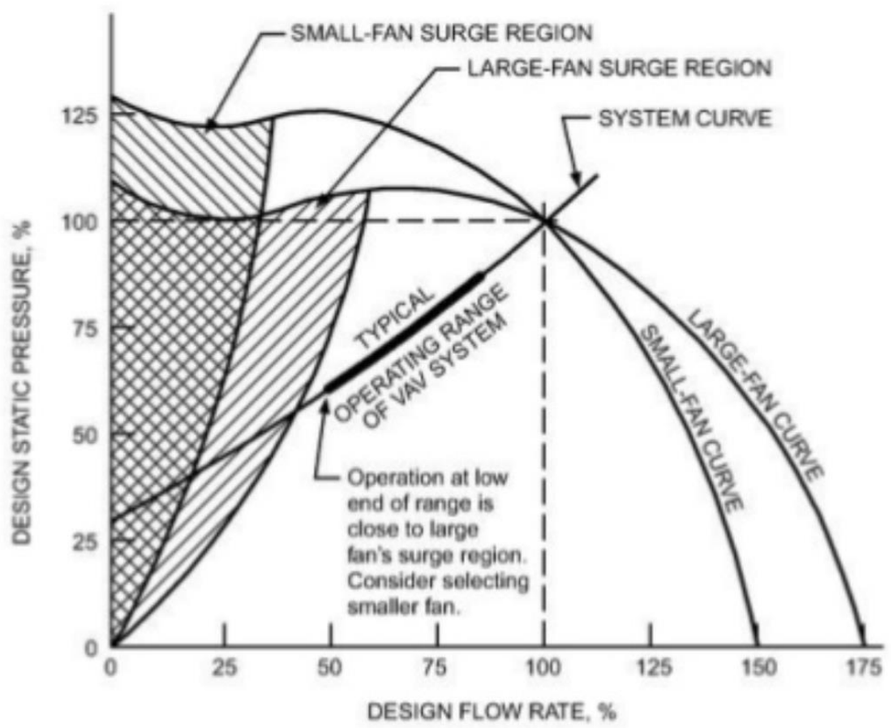
The following are steps for Data Analysis:

- If the project is a LEED or CHPS project then the filters should already be designed for MERV 13. If MERV 13 is not in place, change filters to MERV 13.
- If the existing filters and filter bank are 2” or thicker install a MERV 13 Filter. Determine if a 1” rack can be refitted with a larger rack.
- If filter racks can accept a minimum MERV 13 filter but were not part of the original design, the following analysis can be completed by internal staff or a consulting engineer:
  - Provide Information previously gathered in the Gathering Stage to individual completing additional analysis.
  - Calculate the velocity of the existing filter bank to determine existing filter pressure drop when clean.
  - Typical Velocity is between 300-500 fpm.
  - Determine the initial and final pressure drop for the filters in the original system design.
  - Calculate the increase in filter pressure drop after installing the new MERV 13 filters. Remember the final pressure drop of any filter is an operational choice.
  - Review the original design and equipment shop drawings to determine available External Static Pressure for equipment.
  - Determine the effect of additional external static pressure on the fan.

Data Analysis & Review Continued

Motors and Fan Curves

- Determine if the fan speed can be increased to compensate for the additional pressure drop while maintaining the required airflow.
- Determine if the speed increase exceeds the fan maximum tip speed.
- Determine if the speed increase exceeds the maximum motor power.
- Fan airflow is reduced with increase in filter restriction. This may lead to DX low suction pressures which causes faults in cooling or DX high pressure trips in heating with HP's. Electric heat elements must have sufficient airflow to operate.
- A constant cfm ECM fan will be noisier with restriction. Could increase noise in space and have a negative impact to the acoustics of the space.
- Be aware of fan surge under increased static pressure and low flow rate.



Data Analysis & Review Continued

Fan laws are relatively straightforward:
Q = FLOW
P = PRESSURE
PWR = HORSEPOWER
RPM = FAN SPEED

$$Q_2 = Q_1 \frac{RPM_2}{RPM_1} \qquad P_2 = P_1\left(\frac{RPM_2}{RPM_1}\right)^2 \qquad PWR_2 = PWR_1\left(\frac{RPM_2}{RPM_1}\right)^3$$

Fan performance

Minimum CFM

Table 8: Standard PSC static motor

Unit Size	Speed	Factory Wired	Nominal cfm	External Static Pressure (in. w.c.)													
				0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75
007	High	Yes	300	410	400	390	380	360	350	330	320	310	290	270	250		
009	High	Yes	300	410	400	390	380	360	350	330	320	310	290	270	250		

Implementation & Considerations

What are the next steps?

- If MERV 13 filters are installed in the existing equipment then order additional filters for future filter changes.
- Filter Rack Maintenance and Replacement:
  - If filter rack is damaged then repair rack,
  - Ensure filter rack is sealed to prevent bypass of unfiltered air,
  - Review seal installation procedures with maintenance and operations staff,
  - Replace and Upgrade Rack if possible, to accept a filter with a higher MERV rating.
- Consider changing out motor to increase static pressure available, but this may require significant electrical modifications.
- Adjust the Variable Frequency Drives to address increase in static pressure for filters.

Implementation & Considerations Continued

If MERV 13 Filters cannot be installed consider the following:

- Increase the filtration in the unit to the maximum available
- Provide a recirculation fan filtration unit and duct into the return of units
- Provide a HEPA filtration unit which re-circulates air within the space
- Consider Air Ionization system or static charge on filters
- Consider UV treatment but review location to avoid impacts of liners and other internal components
- Refer to ASHRAE Filtration and Disinfection system section for additional information
- Consider alternate filter locations in return duct or grille but consider static pressure drop implications and relationship with outside air dampers

Additional Considerations:

- Install a pressure gauge on units to assist in determining filter change frequency
- Document motor amperages before and after filter changes, alarm points in BAS may need to be updated
- Filter change frequency may increase due to seasonal and atmospheric considerations at different sites (such as Pollen Season)
- There will be an increase in fan energy used to overcome additional pressure drop from filters
- With an increase pressure drop for filtration there will be less airflow to heat and cool the spaces during peak design days
- Additional supplementary heaters or cooling devices may be required

Implementation & Considerations Continued

HVAC System Maintenance and Filter Replacement during the COVID-19 Pandemic:

- For HVAC systems suspected to be contaminated with SARS-CoV-2, it is not necessary to suspend HVAC system maintenance, including filter changes but additional safety precautions are warranted
- The risks associated with handling filters contaminated with coronaviruses in ventilation systems under field-use conditions have not been evaluated
- Workers performing maintenance and/or replacing filters on any ventilation system with the potential for viral contamination should wear appropriate personal protective equipment (PPE)
- When feasible, filters can be disinfected with a 10% bleach solution or another appropriate disinfectant, approved for use against SARS-CoV-2, before removal. Filters (disinfected or not) can be bagged and disposed of in regular trash, or applicable local health and safety standards
- When maintenance tasks are completed, maintenance personnel should immediately wash their hands with soap and water or use an alcohol-based hand sanitizer.

Operation of Occupied Facilities

1. Measure/Trend all information possible, including temperature (dry bulb), relative humidity, carbon dioxide concentration, zone population, etc. - may be done with central Building Automation System (BAS) if available - mobile/handheld devices may be used if central monitoring not available.
2. Follow up on temperature control, humidity control or elevated carbon dioxide concentration issues observed to address cause(s).
3. Document any unusual observations other than those that can be recorded by control systems.
4. Share pertinent information between all appropriate groups: Maintenance, Energy, Environmental Health & Safety, Building Managers, Administration, etc.
5. Create reporting methodology for tracking and reporting of critical infections. Develop policies for use of drinking fountains/water coolers.
6. Develop policies for lockers or storage spaces.
7. Develop maintenance policies for new/added equipment such as local air cleaners, humidifiers, additional filtration in mechanical equipment, etc.

Controlling Infection Outbreaks in School Facilities

1. Identify symptoms in Student.
2. Provide PPE and remove suspect individual – relocate to nursing or isolation space.
3. **a.** A K-12 Facility should develop a policy to isolate the student near the nurse's office in a room described in this guidance, inform parents and release symptomatic student according to that policy.
   b. Higher education facilities should isolate that student at the Student Health Facility in a room described in this guidance until that student can either safely travel home or be transported to a medical facility, if necessary.
4. Notify appropriate individuals (either parents or students) about possible contact.
5. Develop protocol to handle quarantine of other individuals who may have been exposed, wash/sanitize belongings and impacted spaces, look at potential for spread to adjacent spaces or other building areas through mechanical systems or other means.
6. Develop protocol to handle air cleaning for space prior to re-occupying (ozone, local HEPA filtration, combination unit with filtration and UV, similar technologies).
7. Report/track incident through defined policies.

Higher Education Facilities

Student Health Facilities

Screen patients entering clinic in waiting area

- ❑ Establish physical barrier in waiting room for screening
- ❑ Require face mask and hand sanitation from a sanitizer dispenser
- ❑ Increase ventilation rate six ACH clean air
- ❑ Create at least one isolation exam room in waiting area (can be temporary)
- ❑ Add non-woven fabrics for seating
- ❑ Use laminate or solid surface casework to improve cleaning
- ❑ Remove carpet for flooring

Student Health Facilities

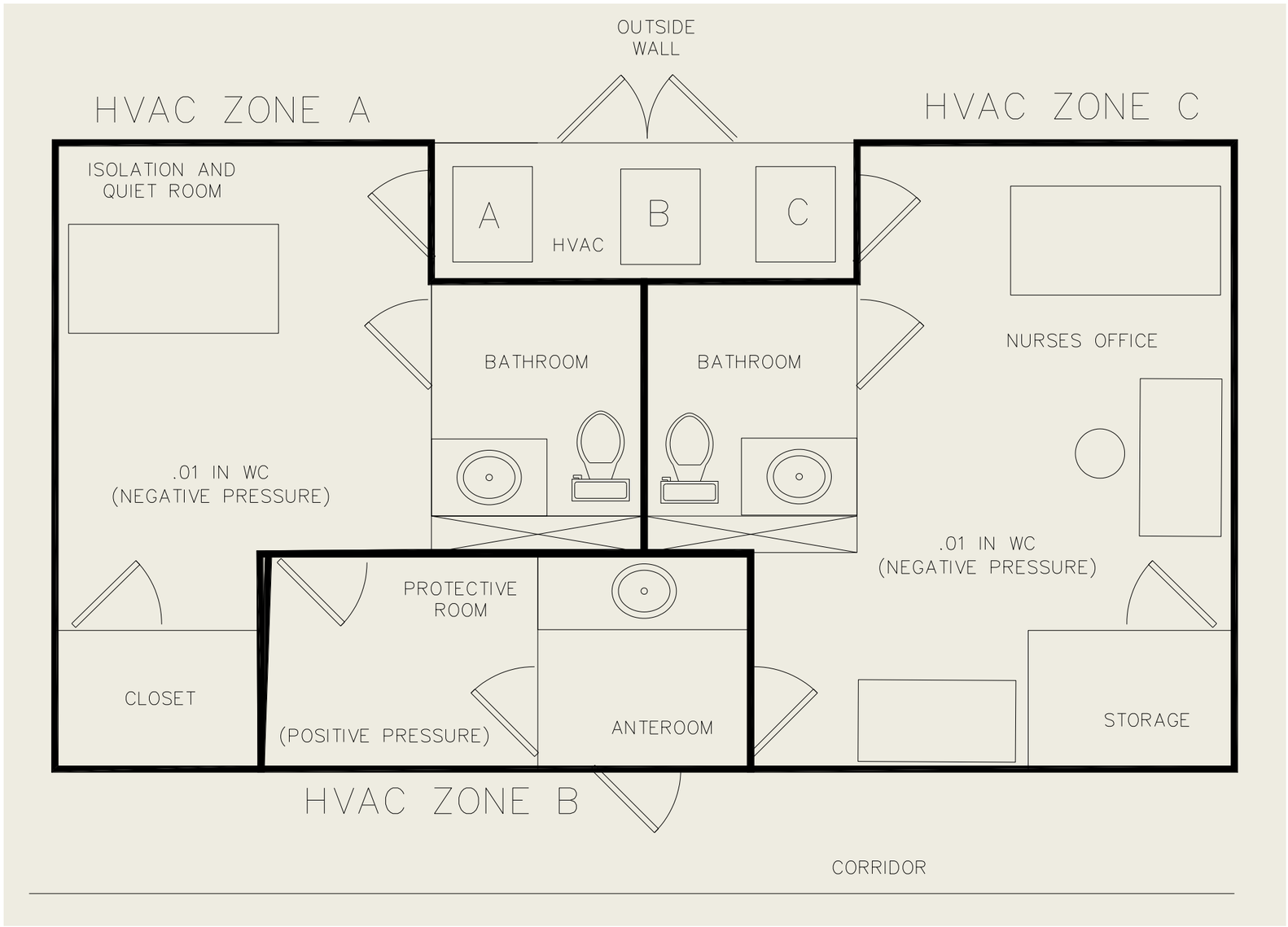
Temporary Isolation Rooms during Pandemic in addition to waiting room

- Isolation rooms – Follow ANSI/ASHRAE/ASHE Standard 170
  - Negative Pressure to 0.01 inches of water
  - Twelve air changes (HEPA recirculation allowed)
  - All air exhausted to outdoors (exhaust grill above exam table)
- Provide minimum two isolation rooms (conduct risk assessment)
- Dedicated HVAC capable of 100% OA
- Anteroom/Protective Equipment Room
- Normal non-isolation nurses office can become iso-room
- Include Biohazard waste storage in anteroom and iso-room for PPE

Student Health Facilities

Temporary Isolation Rooms during Pandemic in addition to waiting room: Design Concepts

See layout suggestion here, can be modified as needed



Laboratories (NFPA 45 type lab)

Before Student Occupation during Pandemic

- ❑ Verify space has one-pass air or maximum OA capable for lab operating requirements
- ❑ Screen occupants upon entry
- ❑ Require face mask and hand sanitation
- ❑ Modify workstations to comply with social distancing
- ❑ Install hand sanitizer dispenser in entryway
- ❑ Verify all fume hoods and bio-safety cabinets are up-to-date on certification
- ❑ Conduct smoke tests in all spaces to verify airflow patterns

Athletics Facilities

- ❑ Move activities outdoors if possible
- ❑ Limit occupancy to maintain social distancing guidelines and avoid unnecessary occupants
  - ❑ Increase outdoor air ventilation rates
  - ❑ Increase rates as high as possible
- ❑ Maintain minimal comfort conditions
- ❑ Avoid use of locker rooms but if necessary Increase airflow in locker rooms and keep negative
- ❑ Verify all locker room exhaust flows exceed ANSI/ASHRAE Standard 62.1

Residence Halls

- ❑ Consider reducing occupancy in rooms, suites and common areas
- ❑ Consider HEPA/UVC portables
- ❑ Install hand sanitizer dispenser in common areas
- ❑ Use non-woven fabrics for seating
- ❑ Use laminate or solid surface casework
- ❑ Cover or remove carpet for flooring
- ❑ Verify exhaust air flow in all restrooms and laundries
  - ❑ Minimum 1.0 cfm/sf
- ❑ Verify all outdoor air flows are well distributed (> 0.16 cfm/sf)
- ❑ Replace filters with MERV 13 or higher where ever possible
- ❑ Refer to the Filtration and Disinfection Guidance
- ❑ This guidance assumes no COVID-19 cases are housed

Large Assemblies, Lecture, Theater

- ❑ Limit occupancy to maintain social distancing guidelines
- ❑ Increase outdoor air ventilation rates
- ❑ Replace all filters with MERV 13 or higher
- ❑ Verify exhaust airflows in all toilets and locker rooms
  - ❑ Minimum 1.0 cfm/sf
- ❑ Verify exhaust airflows from all concession stands
  - ❑ Minimum 0.7 cfm/sf
- ❑ Provide additional outdoor air and/or HEPA filter units in rehearsal rooms and green rooms
- ❑ Disable demand control ventilation control

Initial Fall School Reopening Guidance

Jeffrey C. Riley
Commissioner

June 25, 2020

MASSACHUSETTS DEPARTMENT OF
ELEMENTARY AND SECONDARY
EDUCATION

Opening Letter from Commissioner Jeffrey C. Riley

June 25, 2020

Dear Fellow Educators, School Administrators, Parents, and Community Members,

After a spring unlike any before, I write to you about our plans for the fall with the wellbeing of our students, teachers, staff, and communities firmly in mind. It is sobering to think of the sickness and fatalities caused by COVID-19 in our state, in our nation, and around the world. It is also distressing to witness the murder of George Floyd and others and know that this is a reflection not of a single incident, but a long history of inequity. Through the lens of these two issues, we look at how to best open our schools this fall.

After weeks of discussion with many stakeholders, including our members of our Return-to-School Working Group, infectious disease physicians, pediatricians, and other public health experts; a thorough review of the medical literature; and evaluating what works best for our students, we want to start the school year with as many of our students as possible returning to in-person settings—safely. If the current positive public health metrics hold, we believe that when we follow critical health requirements, we can safely return to in-person school this fall with plans in place to protect all members of our educational community.

Part of our responsibility as educators, administrators, and parents is to do all that we can to help our children in this difficult time. As we all know, there is no substitute for the attention and engagement that is only possible with in-person learning. We can mitigate the risks associated with COVID-19 for in-person school programs and prevent the significant consequences of keeping students out of school and isolated. It will take all of us working together to make this successful.

In the memo that follows, DESE is providing initial guidance for school reopening this fall that prioritizes getting our students back to school in person—safely, following a comprehensive set of health and safety requirements. At the same time, DESE is requiring each district and school to also plan for remote learning and a hybrid school model, a combination of in-person and remote learning, should local conditions change this fall or winter.

The fall reopening guidance comes from a place of deep care and concern, with a focus on translating the public health data and evidence into practical application for school settings. We also acknowledge that it will likely elicit many new questions. We intend to address the most common questions in a running series of FAQs, along with additional specific topical guidance throughout the summer.

I look forward to hearing from you and working together to plan for our children's individual and collective success in the school year ahead.

Jeffrey C. Riley
Commissioner of Elementary and Secondary Education

MEMORANDUM

To: Superintendents, Charter School Leaders, Assistant Superintendents, Leaders of Special Education Schools, and Collaborative Leaders
Fr: Jeffrey C. Riley, Commissioner
Date: June 25, 2020
Re: DESE Initial Fall School Reopening Memo

With this memo, we are providing districts and schools with initial guidance on reopening for the fall. In this guidance, we:

- **Clearly state our goal for this fall: the safe return of as many students as possible to in-person school settings, to maximize learning and address our students' holistic needs.** If the current positive public health metrics hold, we believe that by following critical health requirements, we can safely return to in-person school.
- **Provide a clear set of health and safety requirements for in-person learning this fall, grounded in the most up-to-date scientific literature and discussions with expert medical advisors**. While subject to revision as the COVID-19 pandemic evolves and more scientific evidence becomes available, these requirements will serve as an initial planning blueprint for the in-person return of students and staff this fall.
- **Require districts and schools to prepare a reopening plan that addresses three possible learning models for this fall**: in-person learning with new safety requirements, a hybrid of in-person and remote learning, and the continuation of remote learning (to ensure continuity of learning throughout the school year, even if circumstances change). Schools will also need a focused plan for special student populations. Districts and schools will be required to submit a comprehensive reopening plan to the Department of Elementary and Secondary Education (DESE) in August that addresses these three models. More information will follow shortly.
- **Outline the future guidance and other supports that DESE will provide in the coming weeks.**

This initial fall memo is one of several updates you will receive from us about fall reopening, with more information to come in July. Districts and schools have already received initial supplies guidance and also two documents for summer school planning – initial summer school guidance and guidance on summer 2020 special education services. Earlier this spring, we also provided initial and then more comprehensive guidance on remote learning.

Developing this initial fall memo required us to draw on the perspectives of both the educational *and* medical communities. To that end, this guidance reflects weeks of intensive conversations with education stakeholders, including our Return-to-School Working Group, and collaboration with infectious disease physicians, pediatricians and public health experts from the Massachusetts General Brigham Health System and the Massachusetts chapter of American Academy of Pediatrics. Our process has included a close review of guidelines from the Centers for Disease Control (CDC) and World Health Organization (WHO), as well as available medical literature on COVID-19 related to children and school settings. Finally, we consulted with the MA COVID-19 Command Center's Medical Advisory Board, comprised of physicians and other

health experts, which carefully reviewed the health and safety requirements for in-person learning outlined in this document.

Background and context

On March 17, 2020, all elementary and secondary public and private schools in the Commonwealth were ordered to cease in-person instruction, as part of the statewide plan to combat the COVID-19 pandemic and rapidly reduce the transmission of the novel coronavirus. This closure was later extended to last through the end of the 2019-20 school year.

We are currently in Phase 2 of Reopening Massachusetts, and more businesses are able to resume operations with restrictions and capacity limitations. We are optimistic that with our collective continued vigilance (wearing masks, hand washing/sanitizing, staying home when sick), Massachusetts will continue to progress through subsequent reopening phases.

The virus has had different impacts on communities across the state; several cities and towns were impacted significantly, while others have had few infections and no reported fatalities. Over the past several weeks, Massachusetts has seen rates of infections, hospitalizations and fatalities fall steadily, even as the virus remains a significant concern in several communities. As we all know, the COVID-19 context in Massachusetts is not static, and we will continue to monitor the situation closely.

At the same time, other countries have taken steps to reopen schools, which has provided the medical community with an opportunity to study the impacts of the virus in school settings and on children, providing valuable data and strategies that have been effective in reducing the risk of infection and transmission.

In our discussions with infectious disease physicians and other health experts, we have used both local and international data, trends, and case studies to inform our initial guidance for the fall.

Our goal for this fall

Our goal for the fall is to safely bring back as many students as possible to in-person school settings, to maximize learning and address our students' holistic needs. With the information provided in this memo, districts and schools should begin planning for a fall return that includes multiple possibilities, with a focus first and foremost on getting our students back into school buildings.

There is a clear consensus from both education and medical groups: we must keep in mind not only the risks associated with COVID-19 for in-person school programs, but also the known challenges and consequences of keeping students out of school. While remote learning has improved over the course of the school closures, there is no substitute for in-person instruction when it comes to the quality of students' academic learning. In-person school plays an equally important role in our ability to support students' social-emotional needs, including their mental and physical health, and in mitigating the impacts of trauma. We also recognize how disruptive

school closures have been to families trying to maintain regular work schedules and manage household needs, including childcare, while also facilitating remote learning.

Moreover, in light of recent events and a national movement to fight for racial justice, it is even more critical that our students are able to quickly return to robust learning opportunities and a supportive school environment, through which we can engage in meaningful discussions on anti-racism, provide mental health supports, and help to prepare our young people to bring about the changes our world desperately needs.

In discussions with infectious disease physicians, other medical advisers, and the COVID-19 Command Center's Medical Advisory Board, we were heartened to learn that – based on current data and research – the medical community supports the return of our students to in-person learning, with appropriate health and safety guardrails in place. **With adherence to a comprehensive set of critical health and safety requirements, we can bring our students, staff, and families safely back to school.**

Most of us are now quite familiar with the critical health and safety practices that reduce the risk of transmission of COVID-19. These include rigorous hygiene and handwashing, use of masks/face coverings, physical distancing, reducing interaction between groups, staying home when sick, protecting those most vulnerable to the disease, and expanding testing and tracing capabilities, among others.

However, what can often get lost in long lists of practices is that it is not one mitigation strategy, but a *combination* of all these strategies taken together that will substantially reduce the risk of transmission. **In other words, establishing a culture of health and safety in our schools that focuses on regularly enforcing these important practices is more important than any one measure.**

Contextual factors

We recognize that several critical factors affect our ability to bring students back to in-person school settings this fall.

Financial resources. For planning purposes, districts and schools should assume a "level service plus" budget in order to bring students back in person; in other words, additional funds on top of their projected budgets to manage additional costs associated with health and safety preparations. We also recognize that "level service plus" must include additional resources targeted to our historically under-resourced communities. While schools and districts, through the city or town in which they are located, have already received federal CARES Act funds to support COVID-19 related purchases such as health and safety supplies/PPE, technology, and facilities upgrades, **the Commonwealth is making additional funding sources available directly to schools and districts to support reopening.**

To date, the following federal grants have been available to cities and towns for educational expenses related to COVID-19:

- $193.8 million from the Elementary and Secondary School Emergency Relief (ESSER) Fund to districts, largely based on the Title I formula.
- A portion of the $502 million from the Coronavirus Relief Fund (CvRF) already allocated to cities and towns, of which a meaningful amount of submitted costs are related to education.
- Up to $15 million in competitive federal funds for which the Executive Office of Education (EOE) and DESE have applied.

In addition to the above funds, the Commonwealth is making available:

- **An additional $202 million from the CvRF for a new grant round to support school reopening.** Of the $202 million, $182 million will be formula grants ($225 per pupil), and $20 million will be available at the Commissioner's discretion for distribution to districts with unmet needs. In accordance with federal rules, these funds must be spent by December 30, 2020 for COVID-19 related expenses. Outside of Boston and Plymouth County, funds will be made available to cities, towns, regional school districts, and charter schools. Boston and Plymouth County are administering CvRF funds separately.
- **$25 million available for remote learning technology grants** through which the Commonwealth will provide a state match, based on each district's relative wealth per Chapter 70, for their remote learning needs.

While school and district budgets remain uncertain, these additional resources will support schools and districts to provide a healthy and safe environment for in-person learning in the fall.

Cold/flu season. Flu season is another critical factor that could pose significant challenges for schools and students. Not only do flu symptoms closely mirror COVID-19 symptoms, but managing both a bad flu season and ongoing presence of COVID-19 could be highly disruptive for our educational institutions and healthcare system. It is essential that the educational and public health communities, as well as cities and towns, work closely together to ensure as many children and adults as possible receive flu vaccines this fall. Given the high priority of flu vaccinations, particularly this year, the administration will work with these key stakeholders and others on a strategy to enhance flu vaccination coverage in Massachusetts, particularly among school aged children. More guidance will be coming from the Department of Public Health.

Trajectory of COVID-19. All guidance in this document is based on the best information we have as of mid-June. We will carefully monitor the data in the coming weeks and months. Districts and schools must be prepared to be flexible and ready to pivot if circumstances change significantly. For this reason, districts and schools must plan not only for in-person learning, but also hybrid learning models (in which students learn in-person for some of the time and remotely for some of the time), and also full remote learning. Remote learning may be a necessary option in the fall for some students who are unable to return to school due to underlying medical conditions and potentially for all students if COVID-19 forces widespread school closures in the future.

Supporting educators and staff

Our educators and staff are essential to our success as a Commonwealth in preparing for a safe and successful fall reopening. We recognize that educators have been concerned about the challenges of remote learning and student learning loss during school closures this spring, and many educators have been balancing their teaching duties with their own family and personal needs. Some have felt the devastating impact of the virus personally.

We also know educators are eager to teach their students in person again, and that staff members are concerned about the health and safety of their students as well as their own health and safety. We are committed to supporting you with guidance and training as we prepare for fall reopening.

Based on the combination of health and safety requirements and rigorous protocols that we are putting in place for the fall, we believe the risk of transmission in schools is likely lower than the risk of transmission in many other settings. Furthermore, based on available data and effective implementation of critical health and safety practices, the rate of in-school transmissions has been low.[1] [2] [3] [4]

We recognize that planning for reopening in this "new normal" will not be easy; we also know that planning is not nearly as important – nor as difficult – as execution. To have a successful school year, we will all have to be problem-solvers, flexible and responsive to data, and willing to course-correct as necessary. It is also important to acknowledge that there will be COVID-19 positive cases in schools, and we will have protocols to help you determine the appropriate next steps when this happens to keep the school community safe.

Educators and other staff who are at higher risk of severe illness from COVID-19 will want to consult with their health care providers about whether and under what circumstances a return to in-person school settings would be medically inadvisable. We will provide guidance to support districts in working with their educators and staff on critical reopening issues, including those who are at higher risk of severe illness from COVID-19.

Recognizing the special role of families

Families, in consultation with their medical providers, will ultimately make the decision as to whether their children will attend in-person instruction, or whether their children will continue with remote learning. Districts should engage regularly and substantively with families in their primary language to ensure that they have accurate and up-to-date information to make informed decisions about whether an in-person return is best for their children. This also means that all districts will need to have a remote learning program in place for students who are unable to return to in-person school.

Families also play a critical role in supporting the new culture of health and safety that each school must establish. Most importantly, families can help mitigate the transmission of COVID-19 in their school communities by checking their children daily for any COVID-19 symptoms and keeping them home from school if they are sick or have had close contact with a person

diagnosed with COVID-19. Families can also contribute by supporting the use of masks in school and on the bus, arranging alternate transportation whenever possible, communicating with teachers, school leaders and local authorities, and continuing to follow state guidance on health and safety outside of school. DESE will provide further guidance and resources for families.

Emerging implications from the medical literature

This section summarizes some of the emerging themes and implications from the medical literature on childhood susceptibility to and transmission of COVID-19 as of mid-June 2020. Because COVID-19 is a novel disease, this literature is growing rapidly, and new information is emerging almost every day. Our guidance will continue to evolve as the science develops.

At this time, the evidence suggests schools have not played a significant role in COVID-19 transmission and that children, particularly younger children, are less likely than adults to be infected with COVID-19. Furthermore, if they become infected, it appears children may be less likely to transmit COVID-19 to others. Based on these initial findings, the health and safety requirements throughout this guidance, as well as considering the key features of school programming at different grade spans, the current evidence supports a safe in-person return to school with implementation details varying for elementary schools (including pre-kindergarten programs), middle schools, and high schools.

- **Schools do not appear to have played a major role in COVID-19 transmission.** In a review of COVID clusters, only 4% (8 of 210) involved school transmission.[5] In a case study from New South Wales Australia, after 18 cases were found in schools (12 in high schools and 6 in primary schools), only 0.3% of student contacts were infected (1 in 695 individuals in 10 high schools and 1 in 168 individuals in primary schools). No teachers or staff were infected.[6] Additional studies are included in Appendix A.
- **In general, rates of COVID-19 infection are lower for children than for adults.** Based on an analysis of data from six countries, children under 20 are half as susceptible to COVID-19 infection than adults.[7] Furthermore, although children under the age of 18 make up 22% of the U.S. population, they account for less than 2% of all cases of COVID-19.[8] In Massachusetts, children under the age of 19 were about four times less likely than the population at large to be diagnosed with COVID-19.[9] Children are more likely to be asymptomatic, however, which underscores the importance of health behaviors for everyone (masks/face coverings, distancing, handwashing, surface cleaning).[10] Additional studies are included in Appendix A.
- **If exposed, children may be less likely to become infected with COVID-19.** A meta-analysis of studies from several countries found that children were only 44% as likely as adults to become infected after exposure (note: pre-print study).[11] In China, in households with COVID-19 exposure, children under the age of 18 were infected at a rate of 4% compared with 17% for adults.[12] Additional studies are included in Appendix A.
- **If infected, it appears children may be less likely to infect others with COVID-19.** Most transmissions are from adults to children, rather than vice versa; this is different from some other respiratory viruses (note: pre-print study).[13] In a U.S. study of 15 households, 73% of transmissions were from adult to child (the remaining were child-to-child or child-to adult).[14] Additional studies are included in Appendix A.

Health and safety requirements and related guidance for in-person learning

The health and safety of students and staff are our top priority when making the decision to reopen schools for in-person learning in the fall. The following health and safety requirements have been developed in collaboration with infectious disease physicians, pediatricians and public health experts from the Massachusetts General Brigham Health System and the Massachusetts chapter of American Academy of Pediatrics. Our process has included a thorough review of guidelines from the Centers for Disease Control (CDC) and World Health Organization (WHO), as well as available medical literature on COVID-19 related to children and school settings. Finally, the MA COVID-19 Command Center Medical Advisory Board, made up of physicians and other health experts, has carefully reviewed the health and safety requirements for in-person learning outlined in this section.

At this time, these are the health and safety practices that will enable the safe reopening of schools for in-person learning this fall. These requirements will be modified as needed during the summer and into the fall. In addition to required practices, we have also included guidance on best practices where applicable.

As general background, COVID-19 spreads when people are in relatively close proximity, through respiratory droplets generated through coughing, sneezing, or talking to an infected person. Among the most effective preventive measures – when used consistently and in combination – are masks/face coverings, physical distancing, handwashing, and cleaning frequently touched surfaces.[15]

Masks/face coverings: As the primary route of transmission for COVID-19 is respiratory,[16] [17] [18] masks or face coverings are among the most critical components of risk reduction.[19] [20] [21] Masks/face coverings protect the general public against COVID-19 infection,[22] with a recent retrospective study estimating near 80% effectiveness in reducing COVID-19 transmission, especially when worn prior to symptom onset.[23] In the United States, states advising face masks/face coverings be worn in public saw a decline in their COVID-19 growth rates,[24] and community-wide mask/face covering usage contributed to control of COVID-19 in Hong Kong.[25] **At this time, our initial requirements and related guidance are as follows:**

- **Students in grade 2 and above are required to wear a mask/face covering that covers their nose and mouth.** Students in kindergarten and grade 1 should be encouraged to wear a mask/face covering.[26] Face shields may be an option for those students with medical, behavioral, or other challenges who are unable to wear masks/face coverings. Transparent masks may be the best option for both teachers and students in classes for deaf and hard of hearing students. They may also be useful for teachers and younger students who rely on visual / facial cues.
- **Adults, including educators and staff, are required to wear masks/face coverings.**
- **Exceptions to mask/face covering requirements** must be made for those for whom it is not possible due to medical conditions, disability impact, or other health or safety factors.
- **Mask breaks should occur** throughout the day.[27] Breaks should occur when students can be six feet apart and ideally outside or at least with the windows open. Further guidance on mask breaks including duration and frequency will be forthcoming, as well as more information about properly removing and putting on masks.

- **Masks/face coverings should be provided by the student/family**, but extra disposable face masks should be made available by the school for students who need them. Reusable masks/face coverings provided by families should be washed by families daily. Districts and schools with families experiencing financial hardship and unable to afford masks/face coverings should endeavor to provide masks for students through grant funds described earlier in this document.
- **Masks/face coverings are required to be worn by everyone on the bus during school bus transportation.**
- **Transparent face coverings provide the opportunity for more visual cues** and should be especially considered as an alternative for younger students, students who are deaf and hard of hearing, and their teachers.

Physical distancing: Physical distancing is another important practice that helps mitigate transmission of the virus. While the U.S. federal CDC has recommended maintaining a physical distance of six feet between individuals,[28] the World Health Organization's guidance states approximately three feet.[29] There is no precise threshold for safety; indeed, studies suggest that physical distancing of three feet or more leads to reduced transmission, with additional distance providing additional protection. [30] [31] For instance, in a study of household transmission in China, keeping at least three feet of distance was associated with one-fourth the number of transmissions.[32] It is important to note that six feet distancing is emphasized in public health advisories especially when no mask/face covering is worn.

We encourage districts and schools to aim for six feet of distance between individuals where feasible. **At the same time, a minimum physical distance of three feet has been established *when combined with the other measures outlined in this list of safety requirements.*** Because of the reduced susceptibility in children and lower apparent rates of transmission, establishing a minimum physical distance of three feet is informed by evidence and balances the lower risk of COVID-19 transmission and the overarching benefits of in-person school.

In preparing this document, we have reviewed the physical distance guidance for many other states and countries. In addition to the WHO, several other countries including Denmark, France, China, and Hong Kong recommend one meter (approximately three feet) distance in schools.[33] [34] [35] [36] The United Kingdom is also changing its guidance to one meter of distance beginning July 4, replacing previous guidance of two meters.[37]

Finally, this guidance is for fall reopening and is predicated on the Commonwealth continuing to progress through the phases of reopening with low COVID-19 public health metrics.[38] It will be critical to continue to take into account the community context of COVID-19 prevalence into the fall and winter. Where the community prevalence of COVID-19 is of concern, increased distancing will need to be considered.

Our initial requirements and related guidance are as follows:

- **Distancing requirements:** As reviewed and advised by the Massachusetts COVID-19 Command Center Medical Advisory Group, schools should aim for a physical distance of six feet when feasible, and three feet is the minimum distance allowed.[39] Schools should

seek to maximize physical distance among individuals within their physical and operational constraints.

- **Classroom and facility configuration:** To the extent possible, aim for desks to be spaced six feet apart (but no fewer than three feet apart) and facing the same direction.[40] Again, schools should seek to maximize physical distance between desks within their physical and operational constraints.
- Alternative spaces in the school (e.g., cafeteria, library, and auditorium) should be repurposed to increase the amount of available space to accommodate the maximum distance possible.
    - In these larger spaces, establishing consistent cohorts/classes with separation between the cohorts/classes provides another option to maximize these spaces safely.
- **Additional safety precautions are required for school nurses and/or any staff supporting students with disabilities in close proximity, when distance is not possible:** These precautions must include eye protection (e.g., face shield or goggles) and a mask/face covering. Precautions may also include gloves and disposable gowns or washable outer layer of clothing depending on duration of contact and especially if the individual may come into close contact with bodily fluids.

Student groups: To minimize the number of students who would potentially be exposed in the event of a COVID-19 event, to the extent feasible, elementary schools should aim to keep students in the same group throughout the day and middle and high schools are encouraged to minimize mixing student groups to the extent feasible. **Our initial requirements and related guidance are as follows:**

- **Cohorts:** Schools should divide students into small groups that remain with each other throughout the day, with smaller cohort sizes preferred. Schools should look for ways to isolate cohorts of students and prevent inter-group contact to the extent feasible.
- **Capacity:** There are no required maximums on cohort or group sizes, so long as schools adhere to the physical distancing requirements above. (This guidance for the fall will replace previous summer guidance at the start of the school year, assuming positive health metrics hold.)

Screening upon entry: Checking for symptoms each morning by families and caregivers is critical and will serve as the primary screening mechanism for COVID-19 symptoms.[41] Schools should provide information to families in their primary language to support them in conducting this symptom check and families should not send their children to school if they exhibit COVID-19 symptoms. We will be providing a checklist of symptoms and other guides to districts and schools to help families and students.

- **Screening procedures are not required at the point of entry to the school.** However, school staff (as well as bus drivers) should observe students throughout the day and refer students who may be symptomatic to the school healthcare point of contact.
- **As noted in previous guidance, temperature checks are not recommended** as screening for all students due to the high likelihood of potential false positive and false negative results.[42]

Hand hygiene: Handwashing and hand sanitizing: Handwashing removes pathogens from the surface of the hands. While handwashing with soap and water is the best option, alcohol-based hand sanitizer (at least 60 percent ethanol or at least 70 percent isopropanol) may be utilized when handwashing is not available.[43] [44] As has always been the case, handwashing should be used whenever hands are visibly soiled and after using the bathroom.[45] **Our initial requirements and related guidance are as follows:**

- Students and staff are required to exercise hand hygiene (handwashing or sanitizing) upon arrival to school, before eating, before putting on and taking off masks, and before dismissal.
- **Handwashing:** When handwashing, individuals should use soap and water to wash all surfaces of their hands for at least 20 seconds, wait for visible lather, rinse thoroughly, and dry with an individual disposable towel.[46]
- **Hand sanitizing**: If handwashing is not feasible, hand sanitizer with at least 60 percent ethanol or at least 70 percent isopropanol content can be used.[47] Hand sanitizer should be applied to all surfaces of the hands and in sufficient quantity that it takes 20 seconds of rubbing hands together for the sanitizer to dry. Hand sanitizer should be placed at key locations (e.g., building entrances, cafeteria, classrooms).

COVID-19 related isolation space: In order to minimize transmission of COVID-19, schools must ensure they have an isolated space available for students displaying COVID-19 symptoms. **Our initial requirements and related guidance are as follows:**

- **Schools are required to designate a COVID-19 related isolation space that is separate from the nurse's office or other space where routine medical care is provided**. A student who shows COVID-19 symptoms during the school day should be moved to the specific room pre-designated for medical-related isolation until they can be picked up by a family member.[48] More information about steps to safely discharge students will be provided in future guidance.

COVID-19 testing in schools: At this time, in-school testing is not recommended. Students' families should discuss testing with their health care provider. As the accuracy of point-of-care testing develops, this guidance may change.

Vaccines: Districts and schools should work with parents to ensure that students are current on all standard vaccinations before they return to in-person school. In addition, health providers strongly recommend all students and staff get their regular flu vaccine.[49] Whereas for COVID-19 it appears children are less likely to be infected with and to transmit COVID-19, this is not the case for influenza, where children are frequent transmitters.[50] [51] [52] [53] Therefore, ensuring all students, teachers, and staff receive the seasonal flu vaccine is an extremely high priority. The Department of Public Health will be issuing updated guidance regarding vaccines for schools and parents.

Health and safety/PPE supplies: Per the initial supply guidance issued by DESE, schools should have an inventory of standard healthcare supplies (e.g., masks and gloves). Use of additional supplies may be optional based on type of tasks performed (e.g., teachers do not need to wear gloves while teaching but may need to during necessary contact with students, such as

when providing physical support to students with disabilities). All districts are eligible for federal CARES Act funds to support these purchases.

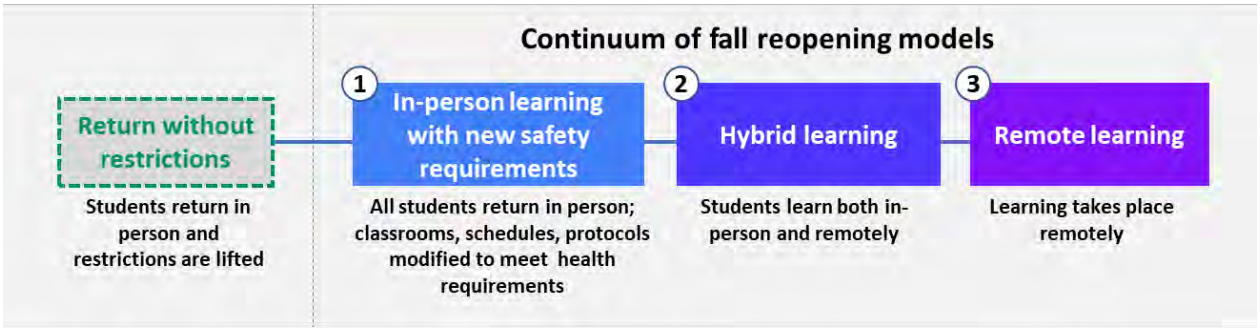
Additional health and safety protocols: Other protocols, such as facilities cleaning, are described later in this document.

District and school fall reopening plans

In this section, we describe the plans we are requiring all districts and schools to create to effectively prepare for fall reopening. This section also offers recommendations on reopening models to support districts and schools in preparing these plans.

Components of district/school fall reopening plans

Each district and school will need to plan for three possibilities on the continuum of reopening: 1) in-person learning with new safety requirements; 2) a hybrid of in-person and remote learning; and 3) remote learning. In addition, all districts/schools will also need a focused plan for serving special student populations across each of these models.



1. In-person learning with new safety requirements: **For the fall, the box in light blue represents our goal to get as many students as possible back into schools for in-person learning—safely.** In this model, all students return in person to school settings that are appropriately modified to accommodate the health and safety requirements outlined above. Examples of modifications could include altered classroom configurations, setting up additional learning spaces, and schedule changes.

2. Hybrid learning: **In addition, all districts/schools must create a plan for a hybrid model in the event they are unable to bring all students back to school under the health and safety requirements despite their best efforts, or in case of COVID-19 related circumstances.** A hybrid model means that students would alternate between in-person and remote learning. For instance, students could switch between in-person and remote learning on alternating weeks or days of the week.

3. Remote learning: **All districts and schools are required to have a plan for operating a remote learning program.** This model must be available for individual students who cannot yet return in-person, and for all students in the event of future classroom or school closures due to

COVID-19. Additional guidance on statewide support and resources for remote learning will be provided in the coming weeks.

Plan for special populations: Finally, across each of these models, all districts and schools need a plan for how special populations, including students with disabilities and English learners, will receive necessary services and accommodations.

Plan development and submission

Districts and schools will be required to submit their comprehensive fall reopening plans (all three models) to DESE in August. In addition, districts and schools will need to post their plans on their websites and complete an attestation to affirm that their fall reopening plans meet the health and safety guidelines established in this and updated guidance documents. We will issue further guidance, including whether any portions of the plans will require approval by DESE (for instance, plans for students with disabilities or others).

In creating their plans, districts and schools should first prioritize developing an in-person learning model with new safety requirements. DESE staff will establish multiple communications channels with superintendents and other school stakeholders to monitor how planning for an in-person return to school is progressing. We recognize the importance of equity in this process and will be available to support districts and schools in troubleshooting challenges that may arise.

Recommendations from DESE on reopening models

The model recommendations below assume key contextual factors that are not within our collective control. This includes an assumption of "level service plus" district and school budgets based on current projections, which include additional costs that may come with modifying class sizes, staffing, transportation, facilities, etc. We also recognize that "level service plus" must include additional resources targeted to historically under-resourced communities. The trajectory of the virus and availability of testing and treatments are other critical contextual factors. We will continue to monitor these and other factors and issue updated guidance as needed.

<u>In-person learning with new safety requirements:</u>

Learning time: Districts and schools should plan for an in-person return to school five days per week if feasible.

Utilizing alternative school spaces: Districts and schools should consider using their libraries, cafeterias, auditoriums, and other appropriate available spaces to set up additional classrooms to accommodate more students, reduce class size, and/or enable additional distancing while adhering to the health and safety guidelines. Teachers may also hold classes outdoors when feasible.

Utilizing external facility spaces: Schools should consider engaging community partners to find spaces outside the school[54] (e.g., libraries, community centers) to set up additional classrooms[55]

to accommodate more students, reduce class size, and/or enable additional distancing while adhering to the health and safety guidelines.

Staffing alternatives to consider for reducing class sizes: Specialist teachers and other educators such as instructional coaches, reading specialists, and others who have appropriate certifications may be enlisted to serve as additional core teachers to reduce class sizes in schools.

Reducing the mixing of student groups: When in classrooms, all students should have assigned seating. At the elementary school level, students should be restricted to their grade level class to the greatest extent possible. At the middle school level, students should remain with their cohort throughout the day to the extent feasible.

High schools could also consider ways to cohort or cluster students, though we recognize this is more challenging at the high school level:

- **Placing students in cohorts.** When grouping students into cohorts, a school should consider ways to keep families/siblings together (e.g., grouping students alphabetically, while recognizing that some siblings may have different last names).
- **Limiting travel within a school.** High schools may try to group students into clusters in the school (a "school within a school") to try to reduce interactions with other groups when students move to their next class.

Hybrid learning models:

When planning for a hybrid learning model, we recommend that districts and schools use an A/B cohort model that isolates two distinct cohorts of students who attend school in-person on either different weeks, different days of the week, or half days each day. For instance, Cohort A would attend school in-person from Monday – Friday of Week 1, while Cohort B learns at home remotely. In Week 2, Cohort B would attend in-person school and Cohort A would engage in remote learning at home.

Additional recommendations for hybrid models include:

High-needs students should be prioritized for full-time in-person learning when feasible. That is, even if most students are not in school each day, schools should consider setting up small programs that would run daily for one or more cohorts of high-needs students, including students with disabilities and English learners who are most in need of in-person services.

Students who do not have internet and/or computer access at home should come into the school and/or to a local partner or community organization, with appropriate supervision, to complete their remote learning school days.

Initial fall reopening planning steps

This section provides a checklist of key actions districts and schools should take in the coming weeks to plan for all three fall reopening models. This list focuses on establishing processes and

communication structures; future guidance will have more details about concrete operational planning.[56] Please see Appendix B and C of this document for initial operational guidance for the fall in a few areas (facilities, operations, and special education).

Point person and teams:

- ✓ **Name a COVID-19 response leader.** If you have not done so already, name a COVID-19 Response Leader for each school and for the district. The COVID-19 response leaders should coordinate with key district and school personnel on planning efforts over the summer and be a key part of the implementation as schools open.
- ✓ **Establish planning and implementation teams at the district and school levels** to work intensively over the summer on all issues related to school reopening in the fall. Planning and implementation teams should include COVID-19 response leaders, district leaders, school administrators, general and special education teaching staff, school nurses, custodial staff, as well as parents and other local officials and organizations as appropriate. These teams should cover the following essential domains:
    - **Teaching and learning**, including plans for in-person learning, hybrid learning, and remote learning, including technology needs and training.
    - **Student supports**, including addressing mental health and trauma.
    - **Special education, English learners,** and other special student populations.
    - **Personnel and staffing**, including managing staff assignments, supporting staff with high risk medical conditions, addressing the need for possible additional staff to assist with instruction, possible additional needs for tutors, and ways to provide additional support including recruitment of volunteers as needed.
    - **Facilities and operations**, including cleaning and sanitation, classroom and building set-up and flow, and food services.
    - **Transportation**, including bus transportation capacity and safety protocols, management of increased traffic flow from families who decide to drop off/pick up their children, promotion of alternatives such as walking and biking.
    - **Additional topics** should be addressed as appropriate to the school and the district.

Communication plans and structures:

- ✓ **Develop and begin implementing this summer a plan for communicating more intensively with students, families, staff, and the community.** This plan should include both two-way proactive communication (e.g., providing information and receiving feedback) and emergency communication. Consider creating and practicing communication systems with parents, students, all staff, facility and/or grounds management, and emergency medical services. Ensure translation of any information published by the school into the primary language spoken by the parent/guardian and make interpretation services available for two-way communication.
- ✓ **Establish connections and a process to work with local boards of health** so that all parties are up to date on various statewide and local guidance and plans (e.g., health and safety updates, COVID-19 testing availability, availability of flu vaccines, etc.).

Family survey:

- ✓ **Develop a family survey to support school reopening planning and scheduling**. Districts should consider surveying families multiple times throughout the summer and potentially into the school year. Districts and schools can use the survey to help determine:
    - Children who will return to school in the fall in-person
    - Children who will continue remote learning and for what reasons
    - Children who need internet/technology access, and/or other technical support or one-on-one guidance
    - Children who will need bus transportation
    - Families who are planning to use alternate transportation (e.g., drop off and pick up their children, have their children walk or bike)
    - Families who will need food assistance and other essential services

Planning for training:

- ✓ **Build in time in the fall calendar for training sessions** for staff, students, and families. Training should include health and safety topics (such as the use of safety supplies/PPE, visual screening for symptoms, and health and hygiene practices) and educational topics (such as strengthening remote learning). More guidance will be forthcoming.
- ✓ **Special education:** Ensure additional training time for educators who will provide direct physical support to students with disabilities on the use of the additional protective supplies they will need, including disposable gowns, face shields, etc.

Timing and topics for additional guidance

As districts and schools begin planning in earnest for fall reopening, DESE is committed to supporting you. In the coming weeks, we will issue more guidance on a variety of topics for the fall. We will also continue to update our guidance based on evolving medical information and contextual factors.

Below is list of additional topics on which DESE intends to issue guidance:

- **Fall reopening checklist**, including operations, teaching and learning, student supports, training, and communications needs.
- **Process for handling a COVID-19 positive case in the school community,** including when a school or classroom would need to shut down.
- **Remote learning resources.** We are actively exploring how best to support districts and schools with improving remote learning.
- **Facilities and operations**, including entry and exit procedures, cleaning and ventilation, procurement, food distribution, and signage.
- **Transportation**, including bus scheduling options, addressing bus capacity, and alternative modes of transportation, and operational considerations.
- **Guidance for special programs and student supports**, including special education, English learner education, and other programs and supports.

- **Athletics, extracurriculars, and electives.**
- **Key policies**, including academic calendar considerations.

Supplemental guidance for vocational high schools and programs will also be forthcoming.

Appendix A: Details on medical literature review and emerging implications

This section summarizes some of the emerging themes and implications from the medical literature on childhood susceptibility to and transmission of COVID-19 to date. This is a point-in-time summary as of mid-June 2020.

The evidence suggests that children, particularly younger children, are less likely than adults to be infected with COVID-19. Furthermore, if infected, children may be less likely to transmit COVID-19 to others.

Based on these themes, the health and safety recommendations throughout this guidance, as well as considering the key features of school programming at different grade spans, we believe the evidence supports a safe in-person return to school with implementation varying for elementary, middle school, and high school.

Because COVID-19 is a novel disease, this literature is growing rapidly with new information emerging almost every day. Our guidance will continue to evolve as the science develops.

Schools do not appear to have played a major role in COVID-19 transmission.

- In a review of COVID-19 clusters, only 4% (8 of 210) involved school transmission.[57]
- In a case study from Ireland, after six school cases involving three students ages 10-15 and three adults, there were no confirmed transmissions despite there being over 1,000 school contacts of these individuals (students and staff).[58]
- In a case study from New South Wales Australia, after 18 cases were found in schools (12 in high schools and 6 in primary schools), only 0.3% of student contacts were infected (1 in 695 individuals in 10 high schools and 1 in 168 individuals in primary schools). No teachers or staff were infected.[59]
- One infected student (9 years old) in the French Alps attended three schools while symptomatic; none of 112 contacts became infected.[60]

In general, rates of COVID-19 infection are lower for children than for adults.

- Based on data from six countries, children under 20 are half as susceptible to COVID-19 infection than adults.[61] However, this study also found infection in children to be more likely to be asymptomatic, which underscores the importance of health behaviors for everyone (masks/face coverings, distancing, handwashing, surface cleaning).
- Although children under the age of 18 make up 22% of the U.S. population, they account for less than 2% of all cases of COVID-19.[62]
- In a South Korea study, children under 20 only accounted for 6.2% of all positive cases.[63]
- After an outbreak in Italy, no children under 10 were infected and children 11-20 were infected at half the overall rate.[64] (Note: pre-print study; has not yet been peer-reviewed)
- In a Chicago study, only 1% of COVID-19 cases in Chicago were in children 0-17.[65]
- In Massachusetts, children under the age of 19 were about four times less likely than the population at large to be diagnosed with COVID-19.[66]

If exposed, children may be less likely to become infected with COVID-19.

- In China, in households with COVID-19 exposure, children under the age of 18 were infected at a rate of 4% compared with 17% for adults.[67]

- In another study from China, exposed children less than 19 years of age became infected at a rate of 5.3%, vs. 13.7% for 20-59 and 17.7% for 60+.[68] (Note: pre-print study; has not yet been peer-reviewed)
- In one study from Japan, 7.2% of exposed male children ages 0-19 and 3.8% of exposed female children tested positive for COVID-19, compared to 22.2% of exposed males ages 20-59 and 21.9% of exposed females ages 20-59.[69] (Note: pre-print study; has not yet been peer-reviewed)
- In NYC, in households with at least one COVID-19 case, prevalence of infection for children 5-≤18 was 31.9% vs. overall prevalence 52.5%.[70]
- A meta-analysis of studies from several countries found that children were only 44% as likely as adults to become infected after exposure.[71] (Note: pre-print study; has not yet been peer-reviewed)
- A study in Israel found that children 5-17 were 61% less likely to have positive COVID-19 tests compared with adults in the same household.[72]

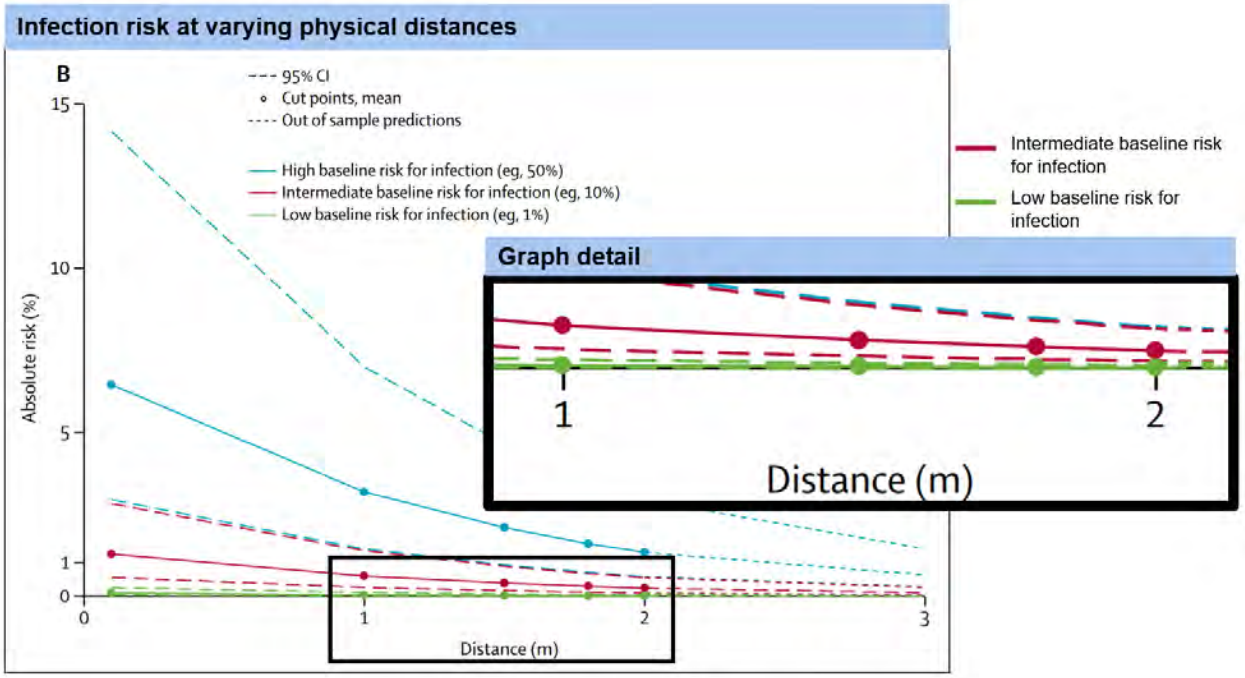
If infected, children may be less likely to infect others with COVID-19.

- Analysis of clusters of patients with COVID-19 indicates that most transmissions are from adults to children, rather than vice versa. This is different from some other respiratory viruses.[73] (Note: pre-print study; has not yet been peer-reviewed)
- In a study from China, only 5% of household clusters were found to have a child <20 as the index patient.[74] (Note: pre-print study; has not yet been peer-reviewed)
- In Switzerland, a study of household clusters found that only 8% had a child as the index case. In nearly 80% of the cases, the child got COVID-19 from an adult family member.[75]
- In a Chicago study, for 15 households where data was available, 73% of transmissions were from adult to child (the remaining 27% was due to two child-to-child and two child-to adult transmissions).[76]

Risk of infection at varying physical distances

Key finding: in intermediate- and low-risk settings, the risk of infection is similar at one meter (approximately three feet) and two meters (approximately six feet) distances. Experts suggest schools would be considered low to intermediate risk, especially with additional protections (e.g., masks), and that the risk of infection in these settings at both one meter and two meters is low.

Note: the risk of infection at various physical distances was modeled based on a meta-analysis of data from a group of coronaviruses (COVID-19, MERS, SARS). These are estimates of the risk by type of setting, not the risk to different types of individuals.



Source: Chu, D.K., Akl, E.A., Duda S., Solo K., Yaacoub S., Schunemann H.J. et al. (2020) Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis. *The Lancet*.

Appendix B: Initial list of facilities and operations guidance

The considerations below are not exhaustive but can be used to support districts and schools with early operational planning in these areas.

Cleaning and supplies: Prepare for frequent cleaning and sanitization of facilities and surfaces, especially high-touch surfaces (e.g., doorknobs, hand rails).[77] [78] Please refer to the federal guidance related to cleaning of facilities for more information regarding appropriate cleaning supplies, protocols, and frequency (e.g., wear appropriate protection such as gloves, wash hands often, follow instructions on all cleaning products, handle waste properly).[79] [80] Provide hand sanitizing at key locations in the building (e.g., entryways, bathrooms, classrooms). Install signage and equipment to enable effective health and safety procedures, as defined in the Commonwealth's guidance on required safety supplies for reopening schools.

Facility management: Prepare an "medical isolation room" for students/staff who exhibit COVID-19 symptoms during the school day.[81] Consider removing large furniture (e.g., refrigerator, couches) from classrooms to maximize space available for student desks, and ensure desks are spaced according to the physical distancing guidance and facing in same direction, to reduce the transmission of droplets. Where physical distancing is difficult to implement (e.g., office space, reception desks), consider installing barriers or changing the configuration to support student/staff health and safety.[82] Repurpose communal spaces (e.g., cafeteria, library) to provide additional classroom spaces. If feasible, redesign hallways to be one-way to avoid crowding or restrict usage where distancing is not possible. Establish procedures for student entry and dismissal from the building.

Capacity: Evaluate classroom capacity on a case-by-case basis, based on the maximum capacity consistent with health and safety guidelines (e.g., distancing). Remember to include adequate space for the teachers. For the overall facility, plan for traffic, drop off, and pick up (e.g., staggered pickup/dismissal as needed).

Ventilation: Consider ways to increase facility ventilation (e.g., open windows through fall, perform an HVAC inspection)[83]. Ensure that proper maintenance protocols are followed in terms of changing filters, etc.

Food: Prepare to hold breakfast and/or lunch in classrooms, instead of the cafeteria or common areas.[84] As it is assumed that masks/face coverings will not be worn during meals, in order to achieve six feet of physical distance between individuals, consider ways to conduct breakfast and lunch (e.g., stagger time, build in other breaks, etc.). If serving food in the cafeteria, develop staggered schedules that minimize mixing of cohorts and enforce physical distancing protocols. Adjust food preparation and service procedures to minimize shared items (i.e. serving utensils), maintain physical distance, and support compliance with health and safety. For students continuing with remote learning, provide school meals as needed for days they are not in the school building.

Appendix C: Initial Fall Special Education Guidance

Due to the health and safety requirements that will be in place when school resumes, special education services may be provided differently during the 2020-21 school year as compared to previous years. As stated in the U.S. Department of Education's March 21 Supplemental Fact sheet, "School districts must provide a free and appropriate public education (FAPE) consistent with the need to protect the health and safety of students with disabilities and those individuals providing education, specialized instruction, and related services to these students." While further guidance is forthcoming, the topics listed below are meant to support school and district special education leaders in their initial plans for the new school year.

Promoting Inclusive Services and the Least Restrictive Environment
When determining classroom setups to accommodate physical distancing requirements, schools and districts should factor in the additional special educators and related service providers who will need to enter the classroom to provide services for students with disabilities in the least restrictive environment.

Staffing, Specialized Safety Supplies/PPE and Training
Schools and districts should follow the directions for staffing, specialized safety supplies/PPE and training described in DESE's Guidance on Summer 2020 Special Education Services as they prepare for this fall.

Considerations for Specific Populations of Students
Special considerations must be given for students with high risk medical conditions, students who are deaf or hard of hearing, and preschool-age students. Additional directions can be found in DESE's Guidance on Summer 2020 Special Education Services.

Considerations for Preschool-Age Students
Preschool-age students with disabilities are particularly in need of in-person services so that they can develop the socialization, motor, and communication skills that are vitally important at this age. Schools and districts should prioritize in-person instruction for this age group but should also be prepared to adjust to remote services if necessary.

Delivery of IEP Services
Students must receive all services pursuant to their IEPs through in-person or remote instruction, with an emphasis on providing in-person instruction to this particularly vulnerable population of students whenever possible. In particular, DESE recommends that schools and districts make additional provisions to provide as much in-person instruction as possible for students with moderate to severe disabilities (e.g., maintaining full-time in-person instruction for students in substantially separate classrooms even if the rest of the school is in a hybrid model of instruction). When providing remote services, schools and districts should continue to follow the directions provided in DESE's Coronavirus/COVID-19 Frequently Asked Questions for Schools and Districts Regarding Special Education (Updated May 15, 2020).

Monitoring Student Progress
Schools and districts must continue to issue Progress Reports at least as often as report cards or progress reports are provided for students without disabilities. Educators and service providers

must collect data, whether in-person or remotely, and use these data to monitor each student's progress and develop Progress Reports.

Transition Services
Although in-person participation in community-based programs and inclusive concurrent enrollment programs at institutions of higher education may be limited at this time, schools and districts should make efforts to develop plans collaboratively with community-based providers, colleges, parents/guardians, and students so that students can access as much programming as possible.

Initial Evaluations, Reevaluations, and IEP Team Meetings
Schools and districts should continue to follow the directions on meeting special education timelines as described in DESE's Implementation of Special Education Timelines During the COVID-19 State of Emergency.

Communication with Families
Educators and service providers must communicate with parents and guardians to discuss the provision of IEP services during this challenging time. Ongoing communication will help educators, related service providers, and parents/guardians develop a comprehensive plan for students to receive high quality individualized instruction and related services.

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Department of Elementary & Secondary Education

Fall Reopening Frequently Asked Questions, as of July 10, 2020

Frequently Asked Questions – All Audiences

1. **What is the overall goal for K-12 education in academic school year 2020-21?**
   Our goal is the safe return of as many students as possible to in-person school settings, to maximize learning and address our students' holistic needs.

2. **Why are DESE and the medical community recommending in-person learning?**
   After weeks of discussion with many stakeholders, including members of our Return-to-School Working Group, infectious disease physicians, pediatricians, and other public health experts, and given low transmission rates of COVID-19 in the state, there is a clear consensus that in-person learning is the preferred model. While remote learning has improved over the course of the school closures, there is no substitute for in-person instruction when it comes to the quality of students' academic learning. In-person school plays an equally important role in supporting students' social-emotional needs, including their mental and physical health, and mitigating the impacts of trauma.

3. **What safety measures will be in place for students and staff?** It is important to note that the American Academy of Pediatrics has affirmed that children, particularly younger children, are less likely than adults to be infected with COVID-19. Furthermore, if they become infected, it appears children may not have the same transmission potential as adults. The health and safety requirements for school reopening use a combination of strategies that, taken together, will substantially reduce the risk of transmission of COVID-19 in schools. This combination approach includes masks/face coverings, physical distancing, handwashing/sanitizing, and staying home when sick.

4. **What are the guidelines for safe distancing requirements between students?**
   Medical experts advising DESE have stated the greater the physical distancing the better, but that the minimum acceptable distance is three feet, when in combination with face coverings and other measures. Establishing a minimum physical distance of three feet between students when face coverings are worn is informed by evidence and substantiated by guidance from the American Academy of Pediatrics and the World Health Organization.

5. **Who needs to wear a mask or face covering, and when do they have to be worn?**
   Students in second grade and above, and adults, including educators and staff, are required to wear a mask/face covering that covers their nose and mouth at all times, except for designated breaks, which should occur throughout the day. Breaks should occur when students can be six feet apart and ideally outside or at least with the windows open. Students in kindergarten and grade 1 are strongly encouraged to wear masks or face shields. Masks/face coverings must be worn by everyone on the bus during school bus transportation. Teachers and parents should reinforce mask-wearing.

6. **Are there exceptions to wearing masks or face coverings?**
   Exceptions to mask/face covering requirements must be made for those for whom it is not possible due to medical conditions, disability impact, or other health or safety factors. Face shields may be an option for students with medical or behavioral challenges who are unable to wear masks/face coverings.

7. **Can parents send children to school without a mask/face covering if they do not have access to one?**
   Masks/face coverings should be provided by the student/family, but schools should make available face masks for students who need them.

Superintendent/Principal Frequently Asked Questions

Health and Safety

1. **When, if ever, should students and staff be tested for COVID-19? Is there routine testing?**
   Current Massachusetts Department of Public Health guidance states that anyone who shows any COVID-19 symptoms, even if mild, should be tested. Medical experts recommend close contacts of those who test positive also get tested.

2. **What are the health and safety guidelines for teachers?**
   All adults, including educators and staff, are required to wear a mask/face covering that covers their nose and mouth at all times, except for designated breaks, which should occur throughout the day. Allow adequate space for teachers to ensure safe physical distance from students.

Facilities and Operations

3. **Is ten students the maximum number in one class in the fall (as provided in the Initial Summer School Guidance issued on June 4, 2020)?**
   No, our guidance has evolved since the *Initial Summer School Guidance*. For the fall, there are no required maximums on cohort or group sizes, so long as schools adhere to physical distancing requirements.

4. **How do we measure how many desks can fit into a classroom?**
   When masks are worn, three feet is the minimum distance allowed from "seat edge" to "seat edge." Desks should face in the same direction. There is no maximum number for group size, so long as schools adhere to the physical distancing requirements. Six feet of physical distance is required between students who are not wearing face coverings, e.g., when eating or taking a mask break. Please see guidance about unmasked kindergarten and first grade students below.

5. **Can students in kindergarten and first grade who are unmasked sit together on the rug?**
   Students in kindergarten and first grade should be encouraged to wear a mask/face covering, or a face shield if masks are not tolerated. Schools should aim to keep kindergarten and first grade students six feet apart but lesser distances are acceptable (but no less than three feet). This is permissible given the lower susceptibility of the age group. Schools should consider reconfiguring space to discourage prolonged close contact and encourage activities that allow children to spread out. Programs may design their own strategies to implement this recommendation – such as spacing chairs at tables, designing games and group activities where children may engage in play that can be spaced apart (for example, by using visual cues, like hula hoops or tape on the floor), and increasing outdoor time.

6. **When students are in the cafeteria or in classrooms or other spaces to eat, what is the space requirement?**
   During meals, because masks are not worn, six feet of physical distancing is required. To provide adequate distancing, there may need to be multiple meal breaks for smaller cohorts of students or enable some students to eat in the classroom and some in other spaces as feasible (e.g., cafeteria, hallways if permitted, etc.).

7. **Do we have to keep classroom windows open?**
   To increase facility ventilation, we encourage schools to keep classroom windows open, if feasible, as much as possible throughout the school year.

8. **Can we use our cafeteria for meals if we provide adequate spacing in lines and at tables?**
   Students must be six feet apart in the cafeteria or any eating space, as it is assumed that masks/face coverings will not be worn during meals. If the cafeteria cannot provide adequate spacing, consider alternative ways (e.g., stagger meal times, have students eat in classrooms instead of the cafeteria, or use common areas) to promote physical distancing during meals. If serving food in the cafeteria, develop staggered schedules that minimize mixing of cohorts, enforce six feet physical distancing protocols, adjust food preparation and service procedures to minimize shared items, and support compliance with health and safety. It is preferred for those without masks not to sit facing each other.

Models of Learning

9. **Do districts need to create three plans or just the plan they intend to start with this fall?**
   DESE is requiring districts to develop one plan that addresses all three models for learning (in-person, hybrid, and remote) this school year. The plan should prioritize getting as many students back to school in-person safely as possible, following a comprehensive set of health and safety requirements. The plan should also describe how the district would implement a remote learning and hybrid school model (a combination of in-person and remote learning). Across each of these models, the district or school also needs to address how special populations, including students with disabilities and English language learners, will receive necessary services and accommodations.

10. **When are school and district plans for reopening due? Will there be a template to submit the plan?**
    Districts and schools will be required to submit a reopening plan to DESE by July 31 that addresses the three models outlined in the previous question. A template will be distributed the week of July 13.

Resources

11. **What is a "level service plus" budget?**
    A "level service plus" budget includes additional funds on top of a district's projected budget to manage additional costs associated with health and safety preparations. While the FY21 budget is still being developed by the Legislature, the Commonwealth is making additional funding sources available directly to schools and districts to support reopening.

12. **What federal funding is available to assist districts and schools?**
    To date, the following federal grants have been made available to cities and towns for educational expenses related to COVID-19:
    a. $193.8M from the Elementary and Secondary School Emergency Relief (ESSER) Fund to districts, largely based on the Title I formula
    b. A portion of the $502M from the Coronavirus Relief Fund (CvRF) already allocated
    c. Additional $202M from CvRF ($225 per pupil) to support school reopening, specifically
    d. $25M for remote learning technology grants from CvRF and ESSER

    Moreover, the Executive Office of Education (EOE) and DESE applied for additional competitive federal grants and are waiting determination.

Policies

13. **Is DESE mandating changes to school days/calendar changes?**
    DESE reserves the right to do so, but not at this time. Please move forward with planning accordingly.

14. **Will there be changes to assessment requirements (MCAS)?**
    Not at this time beyond decisions already made. Please move forward with planning accordingly.

15. **What should educators and other staff who are at increased risk of severe illness from COVID-19 do when the school re-opens?**
    Educators and other staff who are at increased risk of severe illness from COVID-19 will want to consult with their health care providers about whether and under what circumstances a return to in-person school settings would be medically inadvisable.

16. **How is the guidance different for private schools?**
    This guidance applies to all public elementary and secondary schools in Massachusetts, including charter schools. Private, independent, and parochial schools may use DESE documents as a guide.

17. **What can a district do to avoid disruptions that occur if parents change their mind about whether their child will attend school remotely or in-person?**
    Many superintendents have surveyed parents/caregivers about their intention to return to school. It is recommended that districts and parents/caregivers continue to be in close communication. When parents/caregivers communicate early that a child is returning to school, it allows for more thoughtful planning by their child's school. More information may follow.

18. **Should Pre-K classes follow DESE guidance or EEC guidance?**
    In general, public preschools should follow DESE guidance. However, if public preschools enroll children whose families receive subsidies administered by EEC, they should seek guidance from their EEC regional office.

19. **Are school districts responsible for students who are choosing remote learning?**
    Yes, school districts are responsible for students who are engaging in remote learning. Remote learning models shall include the following requirements: (1) procedures for all students to participate in remote learning, including a system for tracking attendance and participation; (2) remote academic work shall be aligned to state standards; (3) a policy for issuing grades for students' remote academic work; and (4) teachers and administrators shall regularly communicate with students' parents and guardians, including providing interpretation and translation services to limited English proficient parents and guardians, consistent with 603 CMR 27.08.

20. **What do I do if I have other questions not answered here?**
    District/school-based personnel may email reopeningk12@mass.gov.

Frequently Asked Questions by Parents

Models of Learning

1. **Can parents choose whether to send their children to school or keep them learning remotely?**
   Parents/caregivers can choose to send their children to in-person school or keep them at home learning remotely. In-school attendance is highly encouraged to promote student academic progress because there is no substitute for the attention and engagement possible with in-person learning.

2. **If my child starts the school year remotely can I send them back to in-person learning?**
   Yes, parents can choose to send their children back to school to in-person learning if they started the year remotely. Parents and school districts are highly encouraged to be in close communication about any

changes. When parents/caregivers communicate early that a child is returning to school, it allows for more thoughtful planning by their child's school. More information may follow.

3. **What is the difference between homeschooling and remote learning?**
   Remote learning means learning provided by the school district that happens outside of the traditional classroom because the student and teacher are separated by distance. Remote learning may be synchronous or asynchronous. Remote learning may include but is not limited to online learning (603 CMR 27.08). Parents may also choose to homeschool their children, a type of private education. For a child of compulsory school age, the homeschooling program must be approved in advance by the superintendent or school committee of the district of residence.

Health and Safety

4. **After in-person instruction resumes, does a student need to submit a doctor's note if they need to be out for personal health reasons?**
   State law dictates that school committees set local attendance policy. Given the current health crisis, DESE does not recommend requiring a physician's note for attendance-related purposes for personal health reasons. If the student's parents/caregivers are seeking home or hospital educational services, the regular home/hospital process (http://www.doe.mass.edu/prs/ta/hhep-qa.html) must be followed, including the completion of the Physician's Affirmation of Need for Temporary Home or Hospital Education for Medically Necessary Reasons, which requires a physician's signature. Additional requirements for return will be in place for a student or staff who has tested positive for COVID-19.

5. **What is the proper handwashing technique?**
   When handwashing, individuals should use soap and water to wash all surfaces of their hands for at least 20 seconds, wait for visible lather, rinse thoroughly, and dry with an individual disposable towel.

6. **What is the proper hand sanitizing technique?**
   Hand sanitizer should be applied to all surfaces of the hands and in sufficient quantity that it takes 20 seconds of rubbing hands together for the sanitizer to dry. Hand sanitizer with at least 60 percent ethanol or at least 70 percent isopropanol content can be used.

7. **Is hand sanitizing an acceptable replacement for handwashing? Is handwashing (not hand sanitizing) necessary?**
   While handwashing with soap and water is the best option, alcohol-based hand sanitizer (at least 60 percent ethanol or at least 70 percent isopropanol) may be utilized when handwashing is not available. As has always been the case, hands should be washed whenever hands are visibly soiled and after using the bathroom.

8. **What do I do if I have other questions not answered here?**
   Parents/caregivers may email questions to COVID19K12ParentInfo@mass.gov.

Fall Reopening Facilities and Operations Guidance

July 22, 2020

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Introduction

As a supplement to *DESE's Initial Fall School Reopening Guidance*, we are providing districts and schools with this guidance on **facilities and operations** for reopening this fall.

As stated in our *Initial Fall Reopening Guidance*, our goal is to promote the **safe** in-person return of as many students as possible in a school setting. For students and staff to return to school, schools and districts will need to prepare their facilities and adapt operating procedures to adhere to medically-advised health and safety requirements. Additionally, districts should follow federal, state, and local safety requirements applicable to school buildings.

As we continually review the medical and science literature, various reports and articles, and information from the Centers for Disease Control (CDC), World Health Organization (WHO), and other countries and states, ***it is clear that it is not a single action, but the combination of actions that minimize risk, mitigate the virus's transmission, and help create safe environments.***

This Facilities and Operations Guidance provides additional details and considerations for school facilities and grounds, as well as operational protocols based on the most recent information we have about COVID-19 and related mitigation practices. As the knowledge and research related to COVID-19 continues to evolve, this Facilities and Operations Guidance will be updated as appropriate.

This guidance begins with a summary of the critical health and safety requirements, followed by communications guidance. It then provides information in three main sections, followed by examples of classroom, lab, and other space planning diagrams. The three sections are:

1. Preparing spaces,
2. Making systems and other space-use modifications, and
3. Developing operational protocols

Support for schools and districts

To support districts and schools in implementing this Facilities and Operations Guidance, DESE is providing the following assistance:

Financial resources:

To date, the following federal grants have been available to cities and towns for educational expenses related to COVID-19:

- $193.8 million from the Elementary and Secondary School Emergency Relief (ESSER) Fund to districts, largely based on the Title I formula.
- A portion of the $502 million from the Coronavirus Relief Fund (CvRF) already allocated to cities and towns

In addition to the above funds, the Commonwealth is making available:

- **$202 million from the CvRF to support school reopening.** Of the $202 million, $182 million will be formula grants ($225 per pupil), and $20 million will be available at the Commissioner's discretion for distribution to districts with unmet needs.
- **$25 million available for remote learning technology grants** to match local amounts that districts plan to spend by the beginning of the school year.

While school and district budgets remain uncertain, these additional resources will help schools and districts provide a healthy and safe environment for in-person learning in the fall.

Technical assistance, including with ventilation/HVAC systems:

For help with general questions about the information in this Facilities and Operations Guidance, please contact:

- **Russell Johnston**: Senior Associate Commissioner, Russell.Johnston@mass.gov, 781-605-4958
- **Erin McMahon:** Fall Reopening Implementation Lead, Erin.K.Mcmahon@mass.gov, 781-873-9023

For help with questions about ventilation and HVAC systems, please contact: **Matt Deninger**, Acting Chief Strategy and Research Officer, at Matthew.J.Deninger@mass.gov or 781-338-3117.

Waivers for student learning time requirements:

For changes in scheduling related to the use of spaces, including staggered schedules and mealtime scheduling, schools and districts may require flexibilities with student learning time requirements in order to enable more students to return to school in-person. If so, districts should contact Russell Johnston (russell.johnston@mass.gov) or Erin McMahon (erin.k.mcmahon@mass.gov) to request a waiver from student learning time requirements. More information on waiver requests will be forthcoming.

Critical health and safety requirements for facilities

Developed in consultation with pediatricians, infectious disease physicians, other medical advisers, and the COVID-19 Command Center's Medical Advisory Board, and including a review of CDC and WHO guidance, the health and safety standards and requirements below will enable students and staff to safely return to school this fall. These requirements will need to be supported by adjustments to how school facilities are used and how they operate. More details on implementation practices and considerations follow in this document.

- **Masks:** Masks are one of the most important tools to prevent transmission of the virus. From a facilities and operations perspective, it is important to consider how to best support adherence to masking, including putting up signs with reminders to wear masks and how to remove them safely, having a supply of masks for staff and students who may need them, safely disposing of soiled or unusable masks, and identifying spaces that are appropriate for mask breaks. ***Masks covering the nose and mouth*** are to be worn by students (required for grade 2 students and up and strongly encouraged for kindergarten and grade 1), staff, visitors, and vendors. Exceptions for meals, mask breaks, and medical exemptions are permitted.

- **Handwashing and hand sanitizing:** Enabling good hand hygiene practices is another key tool to mitigate transmission of the virus. From a facilities and operations perspective, enabling good hand hygiene practices spans from student and staff arrival at school until their departure. This includes providing handwashing or sanitizing stations (touchless if feasible) in commonly used areas (e.g., entries and exits, classrooms, bathrooms, eating areas, stairwell exits, etc.), ensuring sufficient supplies to accommodate frequent hand washing, and having hand sanitizer readily accessible.

- **Physical distancing:** Physical distancing is a critical component in mitigating the transmission of the virus. Schools should aim for a physical distance of 6 feet when feasible; 3 feet is the minimum distance allowed. During meals, mask breaks, and other times when masks are not worn, 6 feet is the minimum distance allowed. From a facilities and operations perspective, it is important to understand how these minimum requirements will affect space layouts and movement protocols.

- **Creating cohorts wherever possible:** Directly related to physical distancing is the idea of creating cohorts (e.g. self-contained groups) of students wherever possible and limiting the cohort from interaction with others. Examples of cohorts could include an elementary school class, students on a bus, or groups of older students with similar schedules. By grouping students and staff into cohorts, interaction will be limited. This means that if there is a positive COVID-19 case in the school, fewer individuals will have interacted with that person. Cohorts should be used to the extent feasible for classes, transportation, mask breaks, meals, recess, and extra-curriculars. **To assist with establishing cohorts, all students should have assigned seating** in each class and to the extent feasible for

meals and other activities. Washable mats could be used for early elementary and preschool students to define individual spaces for children.

- **School cleaning and disinfecting:** From a facilities perspective, schools should update cleaning and disinfecting protocols, obtain additional supplies, and train staff appropriately. Cleaning and disinfecting should occur at least daily for shared spaces and furniture. For high-touch surfaces (e.g., door handles, light switches, handrails), cleaning and disinfecting should occur multiple times per day between uses.

- **Ventilation:** Schools should work to increase outdoor air ventilation instead of using recirculated air and increase air filtration as much as possible for the ventilation and filtration system.

- **Movement protocols within facilities:** Develop clear movement protocols to avoid crowding, maintain cohorts, and minimize unnecessary person-to-person interactions. These protocols should include a plan for arrival and dismissal times, transitions between classes, and bathroom breaks, as well as outlining one-way movement pathways for hallways and cafeterias.

Communicating facilities-related changes

Schools should develop a comprehensive approach to communications with educators, staff, students, families, and other community members.

While strong communication is always important, the ever-changing circumstances related to COVID-19 make an effective, multi-faceted communication plan essential to districts. We have highlighted some initial communication topics below for facilities, but each district should identify additional topics as needed:

- **Summary of major facility changes** (e.g., installation of additional handwashing and hand sanitizing stations, installation of barriers, configuration of classroom desks) to promote a healthy and safe return to school
- **Guidance for health and safety protocols** expected from students and staff (e.g., frequent handwashing, maintaining physical distance, following one-way directions in hallways, limiting use of bathrooms during high-traffic periods etc.). Create and use visual cues and posters to communicate, especially with younger students.
- **Food services and distribution** changes to emphasize individually packaged foods and use of disposable cups or water bottles, as well as changes in remote meal offerings from spring and summer programs
- **Visitor protocols** for parents and guardians
- **Arrival and dismissal protocols** related to pick-up and drop-off
- **Medical waiting room procedures** in case a student experiences COVID-19 symptoms

Informing students, families, and staff to ensure alignment and adherence to guidance

Districts should develop a series of information sessions for staff, students, and families to share information on new school protocols and roles and responsibilities and to answer questions. . To help with the development of this information, DESE will provide reference materials and examples as we are able, including some best practice examples. Below, we have highlighted some initial topics that should be shared:

- All health and safety protocols (e.g., wearing masks, hand hygiene, shared items, transitions, medical waiting room)
- Proper use of masks and other PPE
- Facility operations changes, including hallway movement, locker use
- Proper cleaning and disinfecting procedures
- Food services and distribution procedures
- Arrival and dismissal procedures

Facilities and operations planning checklist

Each district and school should develop a facilities and operations plan to ensure effective implementation of health and safety guidance. This plan should include the following key areas:

- ☐ **Prepare spaces in the facilities:** Develop plans to prepare the following spaces prior to the start of the school year.
  - ☐ Student learning spaces
  - ☐ Staff office set-up
  - ☐ Mask break spaces
  - ☐ Student eating areas
  - ☐ Medical waiting room
  - ☐ Entry and exit points
  - ☐ Storage and disposal of unnecessary furniture or other items
- ☐ **Make modifications to facilities and building systems as feasible:** Develop plans to ensure set-up of additional fixtures and appropriate modifications to the existing physical infrastructure.
  - ☐ Handwashing and hand sanitizing stations
  - ☐ Ventilation and HVAC systems
  - ☐ Hallways
  - ☐ Bathrooms
  - ☐ Water fountains
  - ☐ Lockers
  - ☐ Signage throughout the building
- ☐ **Develop operational protocols:** Develop operations plans to align all staff, families, students, and visitors on expected healthy behaviors and precautions.
  - ☐ Cleaning and disinfecting
  - ☐ Food preparation and distribution
  - ☐ Movement in the facility
  - ☐ Arrival and dismissal of students
  - ☐ Sharing items
  - ☐ Visitor and volunteer engagement
  - ☐ Using the medical waiting room
- ☐ **Develop communication protocols**
- ☐ **Inform students, families, staff, and visitors to ensure alignment and adherence to guidance**

Preparing spaces

Learning spaces

We acknowledge that districts and schools face individual constraints and each school building presents unique features and layouts (i.e., furniture, storage, classroom size and shape). To inform this guidance, we conducted classroom visits and set up model classrooms to derive options for districts to consider. Further examples and details are in Appendix A.

- **Space inventory:** Create a list of all classrooms, large spaces (such as auditoriums or libraries), and additional spaces that could be used for student activities, including outdoor areas, certain corridors, etc.
- **Measure spaces:** Know the dimensions of each space. If available, obtain building plans to understand square footage. These plans might be available from your district offices or the architectural and engineering firms that worked on the building. If the dimensions are not available on the building plans or if those are difficult to work with, you may need to manually measure spaces. This will only have to be done once for those classrooms and spaces that are the same size and can help with assessing different space use variations.
- **Clear spaces:** Clear classrooms and other spaces in the school building (auditorium, library, etc.) of any non-essential items or furniture to maximize available space. Keep only what is truly essential in each room, as every additional item that remains could displace a student. As it is recommended to limit shared items or supplies between individuals, consider what items may no longer be used in the class and what items may now need to be available on an individual basis.
- **Outdoor spaces:** As feasible, consider the use of outdoor spaces for classes, breaks, meals, and other activities. Some jurisdictions have considered tents, platforms, and other not-permanent structures in spaces adjacent to buildings, such as courtyards, play areas and parking lots.
- **'Off campus' spaces:** Review community and municipal spaces with local stakeholders to determine if other buildings are available to provide additional classroom space.
- **Design to maximize space:** Map out each space to optimize for student learning, based on the sample diagrams and parametric tool in Appendix A. The medically-advised minimum distance allowed is 3 feet from seat edge to seat edge. Desks should face in the same direction. There is no maximum number for group size, so long as schools adhere to the physical distancing requirements. Six feet of physical distance is required when people are not wearing masks (e.g. eating or mask breaks). All students should have assigned seating in each class and, to the extent feasible, for eating, mask breaks, and other activities.
- **Reconfigure spaces:** Consider using temporary walls or dividers to break up large areas into smaller classrooms, separate cohorts for meals, or structure other activities. In elementary and preschool classrooms, the classroom and "stations" can be set up to create natural physical distancing. Some jurisdictions are considering installing temporary floor-to-ceiling walls to maximize cohorts in larger spaces. Be mindful that temporary barriers may not block sound as well as permanent walls.

- **Fire code and safety:** Throughout planning, schools and districts should be aware of their fire code and building safety guidelines as they work to maximize space within buildings. Ensure that desks are not blocking means of egress in the event of an emergency and that desks are adequately spaced from radiators or other heating or cooling elements. Avoid obstructing means of egress if you are storing items in hallways. If appropriate, consider propping open doors to improve air circulation and reduce the number of times people touch door handles.
- **Plexiglass barriers: There are pros and cons to the use of plexiglass barriers.** In general, we do not recommend setting up plexiglass barriers in regular classrooms, since they represent an additional high-risk surface to clean and disinfect. However, barrier use is permitted if classroom furniture cannot be replaced and if required physical distancing cannot be achieved without the use of barriers, such as in shared table or laboratory settings where there is limited capacity and desks are often heavy or immovable. *Additional considerations for barrier use in laboratory spaces can be found in Appendix B.*

Considerations for early childhood and younger elementary classrooms:

- Remove all soft and cloth-based materials, such as rugs, pillows, stuffed animals, and dress-up clothing. Children can bring their own stuffed animal, but it cannot be shared.
- In lieu of forcing young children to sit continuously at desks, consider making laminated mats with children's pictures. Washable mats, plastic trays, and other items which can be easily cleaned can be used to define space for each student.
- **Learning centers**: Instead of having different small groups of children (three to four, depending on space available) rotate among different learning spaces as they engage in different activities, consider having each small cohort remain in one location and have materials for the next "center" brought to them.
- **Marking spaces:** Consider marking spaces with footprints facing the correct direction the children's feet would be pointing to indicate one way in and one way out.

Staff office spaces

- **Reconfigure spaces**: Rearrange furniture to support physical distancing, with staff desks facing in the same direction when possible.
- **Staff break rooms**: Rearrange furniture to support physical distancing and consider adjusting staff schedules to limit the number of individuals in the room at one time.
- **Barrier use**: Consider setting up barriers (e.g., plexiglass shielding) in high traffic areas or areas where physical distancing between staff cannot be achieved. Design the cleaning schedule to ensure proper cleaning and disinfecting of barriers by custodial staff.[1]

Spaces for mask breaks

- **Purpose:** It is recommended that students have at least two mask breaks per day (e.g. mealtime and recess). If additional mask breaks are scheduled, identify what spaces (ideally outdoors) will be used.
- **Requirements:** Spaces for mask breaks must allow students to be at least 6 feet apart. Consider using tape or other markers to identify where students should be to maintain 6 feet of separation. Hand washing facilities or hand sanitizer must be available upon entering and leaving this space. Provide napkins or paper towels for masks to be set on (inside face up) when removed. Consider adding signage in mask break areas on how to properly put on and take off masks. As mask wearing is recommended for children younger than second grade, it is important to note that these students may need additional mask breaks during the day.

Medical waiting room

- **Purpose:** This is a separate space from the nurse's office or the regular space for providing medical care. It may be located near a nurse's or other health related office. The medical waiting room will be used when a student presenting COVID-19 symptoms needs to be separated. From a facilities perspective, every effort should be made to find a self-contained space, ideally near an exit/entrance and with a dedicated bathroom.
- **Staffing:** When occupied, the medical waiting room should always be monitored by appropriate staff.
- **Masks required**: Masks are always strictly required in this space, even for students in kindergarten and grade 1. The individual supervising this space must always maintain 6 feet of physical distance, remain masked, and wear a face shield or goggles. Be sure to have face shields or appropriate goggles available to staff. Personal protective equipment guidance recommends that nurses or other staff in this area be equipped with N-95 masks. If a student is unable to wear a mask, there should be no other students in this room.
- **Hand hygiene:** Hand washing facilities or hand sanitizer needs to be used when entering and leaving the space, as well as before and after eating.
- **Food/drink:** If any food or drink must be consumed before the student is picked up, the individual should be walked outside to consume food or drink if possible (because mask will have to be taken off for eating). If not possible to go outside, one student can consume food or drink at a time in the medical waiting room, but, again, only if all others remain at least 6 feet away.
- **Ventilation:** When possible, this space should have windows that open and exhaust directly into the outdoors. Depending upon the facility, other options should be explored to increase ventilation to this area and/or otherwise improve the air filtration.
- **Size:** This space should be large enough to accommodate several individuals at least 6 feet apart. All people in the COVID-19 waiting room must be as far apart as possible and no less than 6 feet apart, even when masked.

Entry and exit points

- **Arrival to school:**
    - Prioritize overall safety considerations, (e.g. child welfare, preventing intruders

and weapons) in planning school arrival/exit.
    - As practical, consider assigning multiple entry points or staggering arrival times to avoid crowding in entry areas.
    - Post appropriate signage and reminders about the health and safety requirements that everyone needs to follow. [2]
    - Ensure hand washing or sanitization is available upon entry, as well as appropriate disposal containers.
    - Ensure that all students, staff, and visitors, with noted exceptions for medical needs, are wearing masks covering their nose and mouth.
    - Ensure that additional masks are available at the entry as may be necessary.
    - Consider having staff monitor entry to ensure everyone properly disinfects their hands and is wearing masks.
    - While there are no screening procedures required at the point of entry, school staff should observe students throughout the day and refer students who may be symptomatic to the school healthcare point of contact.[3]
- **Limit contact with doors**: If allowed by school safety guidelines, consider keeping doors propped open during entry/exit times if constantly monitored. Consider installing touchless doors as feasible.
- **Dismissal from school:** Consider designating multiple exit points, staggering dismissal times, and monitoring handwashing or hand sanitization upon exit. Before students are dismissed, confirm they have gathered all personal belongings before leaving, especially those that require cleaning at home. *Additional details on pick-up and drop-off protocols can be found in the Transportation Guidance.*

Recess

- **Hand hygiene:** Hand washing facilities or hand sanitizer needs to be used upon entering and leaving recess space.
- **Cohorting:** Consider designating outdoor spaces to separate cohorts and support physical distancing while still providing recess opportunities.[4]
- **Cleaning and disinfecting:** When possible, clean and disinfect high-touch surfaces made of plastic or metal between cohort use.
- **Masking:** If students are outdoors and maintain a distance of at least 6 feet, consider using recess as an unmasked time. Otherwise, monitor for adherence to masking requirements and at least 3 feet of distancing.
- **Activities:** Playgrounds can be used with staff monitoring to ensure physical distancing and masking. Consider whether the number of staff at recess will need to be increased. Additional staff may be needed during high-risk times (the beginning and end of recess) and in high-risk locations (enclosed or small, hard-to-see places on fixed equipment, or anywhere with high child density).[5]

Storage and disposal

- **Storage of furniture and other items:** Given the critical need for space and in order to move furniture and non-essential items, districts may need to use storage pods or other spaces in the community. Districts could also consider renting storage space temporarily.

- **Storage for cleaning supplies:** Adequate storage space should be allocated for cleaning supplies and disinfectants, and it should be accessible only to staff. More information on storing cleaning supplies and disinfectants is available in this EPA resource.

2. Making systems and other space use modifications

Handwashing and hand sanitizing stations

Handwashing removes pathogens from the surface of the hands. While handwashing with soap and water is the best option, alcohol-based hand sanitizer (at least 60 percent ethanol or at least 70 percent isopropanol) may be utilized when handwashing is not available.[6] [7]

Provide handwashing or hand sanitizing stations in the following common areas and ensure there are enough supplies (soap and sanitizer) at all times to accommodate frequent hand washing and sanitizing:

- All entries and exits
- In bathrooms
- In classrooms
- In libraries and shared activity spaces
- Next to meal distribution and consumption areas
- Next to water fountains that require touch to operate
- Next to mask break areas (if additional mask break areas are identified)

Given the importance of maximizing handwashing and sanitization stations, it may be permissible to have students within 3 feet of distance for a brief period of time (20 seconds) during hand washing as long as masks are worn and students are not directly facing one another. This will permit all sinks in a bathroom to be used even if closer than 3 feet apart, for example.

Ventilation and HVAC systems

Appropriate mask usage remains the best defense against all forms of respiratory transmission. Schools can further mitigate airborne transmission by increasing outdoor air ventilation or filtering air that is recirculating within a room or building. From a facilities and operations perspective, it is important to determine the best approach for each school site given differences in ventilation capabilities.

While there have been many schools built over the past decade with similar building plans and operating systems, most schools have different ventilation and HVAC systems and capabilities. From a facilities perspective, this means it is important to understand the opportunities and challenges unique to your building.

- For buildings that have facility-wide HVAC systems, it is likely that you will also have a contact or contract with experts to help maximize ventilation and filtration.
- For other buildings, this guidance is meant to provide you with direction and to answer key questions.

- If you have specific questions about ventilation and HVAC, please contact Matt Deninger at Matthew.J.Deninger@mass.gov or 781-338-3117.

Prepare ventilation systems

- **Clean ventilation system:** Ensure the school ventilation system is properly cleaned.
- **Run HVAC systems**: Operate HVAC systems with outside air dampers open for a minimum period of one week prior to reopening schools.
- **Consider upgrading filters**: In buildings with mechanical ventilation systems, consider upgrading filters to increased efficiency ratings.[8] Schools that are not able to upgrade filters may explore alternative ways to improve ventilation (e.g., through open windows), if appropriate for their system.

Increase outdoor air ventilation

- **Adjust HVAC settings**: Some mechanical ventilation systems can forcibly bring outdoor air inside and then distribute that fresh air to different areas of the building. If possible with the site's HVAC system, adjust settings to increase the flow of outdoor air. If your system can do this, evaluate the impact of adjusting windows or doors manually, as they may negatively impact the system itself.
- **Open windows or doors (when appropriate and safe)**: For facilities without the above HVAC capability, evaluate the options to open windows and doors when safe to do so, as well as the feasibility of increasing outdoor air intake with fan boxes in windows.
- **Prevent or minimize air recirculation**: Facilities staff should evaluate how to eliminate or minimize air recirculation in their HVAC systems to the extent possible.[9]
- **Maintain ventilation for longer hours**: If possible, schools should leave ventilation systems running longer than normal. Ideally, ventilation systems would run continuously, but it is recommended they run at least two hours before and after school, as there may still be individuals in the building (students or staff).[10]

Indoor spaces without windows

- For any spaces without windows that may be used for student activities, special attention must be made to ensure that there are adequate HVAC capabilities for the space.
- Otherwise, indoor spaces without windows and adequate HVAC should not be used or only used as may be appropriate for storage or similar uses.

Hallways

- **Create standard routes:** Outline a plan for hallway use to minimize congestion. When possible, make hallways one-directional to prevent students from directly passing each other. This is especially important for small hallways. Ensure that stairwells are also properly marked and one-directional. Staff should reinforce these directions, adherence to physical distancing, and masking. Schools should test emergency evacuation protocols and carefully communicate any relevant changes.

- **Close off certain hallways:** Consider closing off hallways or areas that are too narrow for proper physical distancing and unable to be one-directional.
- **Stagger class transitions:** Develop a plan for transitions between classes to avoid crowding in hallways. Consider dismissing students grade-by-grade or according to other cohort models. Consider identifying facility monitors or class monitors to ensure students wear masks, maintain distance, and do not linger in the hallway.

Bathrooms

- **Hand dryers:** Consider replacing hand dryers with disposable towels, as hand dryers increase the flow of air particles in the bathroom.[11] [12] [13]
- **Touchless technology:** Place a trash can and paper towels by the bathroom door to allow students and staff to avoid touching door handles directly. If possible, consider installing touchless technology in the bathroom equipment (e.g. hand soap, paper towel dispensers, automatic doors).
- **Ventilation:** When feasible, open windows in bathrooms that do not pose a safety or privacy risk and if not against HVAC system standards.
- **Bathroom use:** Consider not allowing students to use the bathroom during transition times, and otherwise using a bathroom sign out system to reduce the number of students in bathrooms at one time. Ensure that students use their own writing instruments for the sign out log.

Lockers

- **Limit usage:** Consider suspending the use of lockers. If lockers are needed, stagger access times and monitor students for masking and physical distancing.
- **Shared lockers:** Sharing lockers is not recommended but is allowed if access can be staggered and there is a minimum of 3 feet separating the lockers used at one time.

Signage

Ensure clear and age-appropriate signage is posted in highly visible locations throughout school property, reminding students and staff to follow proper health and safety protocols. Example signage on how to wear masks and reminders to wash hands are provided by both the DPH and CDC. Signage should be translated into a language understood by each student. Signage should be posted in the following key areas (non-exhaustive):

- **By handwashing and hand sanitizing stations**: To remind individuals of the proper way to clean and sanitize hands
- **In bathrooms**: To remind individuals to properly clean and sanitize hands, utilize no-touch solutions as much as possible
- **By entry/exits**: To remind students to wear masks and maintain physical distance
- **By eating areas**: Use markers to map out entry/exit flow for students, to space out lines for students picking up their meals, and to identify distancing between students as they eat. Post signs to remind students to avoid sharing food, utensils, and drinks
- **By mask break areas**: To remind individuals to maintain 6 feet of physical distance and

to follow correct mask removal procedure

- **In classrooms**: To remind individuals of physical distancing, reduce sharing of items, and keep masks on
- **Around playgrounds**: To encourage physical distancing while outside and maintain cleaning and disinfecting of high-touch areas
- **In hallways**: Use well-marked lines on the floor to encourage physical distancing and indicate direction of travel, especially in small hallways. Include signage to encourage healthy behaviors (e.g., wearing of masks)
- **Next to frequently shared equipment:** Post signs to remind students and staff to wipe down frequently shared equipment (e.g., computers and keyboards) before and after use
- **Areas where queueing may occur**: Use well-marked lines on the floor to encourage physical distancing
- **By closed areas**: Mark off closed areas

3. Developing operational protocols

School cleaning and disinfecting

Although it is not the main way the virus spreads, it may be possible for an individual to get COVID-19 by touching an object that is contaminated and then touching their own mouth, nose or possibly eyes.[14] Ensure facilities are properly cleaned and disinfected each day following the guidelines below:

- **Frequency:** Cleaning and disinfecting should occur at least daily for shared spaces and furniture. For high-touch surfaces (e.g., door handles, light switches, water fountains, toilet seats) cleaning and disinfecting should occur three to four times per day and/or between uses.
    - **Desks:** Desks should be cleaned at least daily. For situations when cohorts of students move between classrooms or where meals are eaten at desks, cleaning of desks must take place between classes and before and after meals. Cleaning of desks can be done by students or custodial staff. Carefully choose disinfectant solutions that require a short dwell or drying time and are appropriate with food surfaces.
    - **Electronics**: Consider putting a flat, wipeable cover on electronics that are difficult to clean (e.g., keyboards). Follow manufacturer's instruction to determine the appropriate disinfectant solution and how to properly clean and disinfect. If there is no guidance, use alcohol-based wipes or sprays containing at least 60 percent ethanol or 70 percent isopropanol.[15] If shared, electronics must be cleaned between use by students or custodial staff.
    - **Outdoor play areas:** High-touch surfaces made of plastic or metal should be cleaned and disinfected at least daily or between use by custodial staff.
- **Responsibility:** Dedicated custodial staff should handle all disinfection requiring chemicals for facilities (e.g., classrooms, bathrooms, mask break areas) and high-touch

objects (e.g., door handles, light switches, water fountains). For other surfaces, determine cleaning responsibility on a case-by-case basis. For shared and high-touch items such as desks, cleaning responsibility may be shared by students, if the task is age appropriate and safe.

- **Disinfectant solutions**: To select the proper disinfectant, review the suggested list on the EPA website. Consider using an alcohol solution with at least 60 percent ethanol or 70 percent isopropanol, a diluted bleach solution (if prepared daily to ensure efficacy), or an EPA-approved disinfectant unless otherwise instructed by the manufacturer's instructions. When selecting a disinfectant solution, consider the dwell time, which surfaces are used as eating surfaces, and the potential risk of triggering asthma symptoms for sensitive individuals.
- **Mask disposal:** If a reusable mask breaks and needs to be thrown out or if a single-use mask needs to be disposed of, it should be placed into the nearest trash can by the individual who wore the mask. The individual should immediately put on a new mask after washing their hands.

Shared items

- **Limit sharing**: Sharing materials is discouraged, but when shared, they must be cleaned before being used by other students.[16]
    - To the extent possible, limit sharing of electronic devices, toys, games, learning aids, art material and other items that are difficult to clean or disinfect.[17] Limit the use of supplies and equipment to one group of children at a time, and clean and disinfect items between uses.
    - Library books may be checked out if students clean their hands before and after use and if students only select books from the shelves, instead of the return area.[18] Books and other paper-based materials are not considered a high risk for transmission and do not need additional cleaning procedures.[19]
    - Identify and develop new classroom protocols that reduce passing supplies or items between students.
- **Hand hygiene**: Frequent hand washing or sanitizing, including before and after using shared materials, is an important control strategy that should be reinforced when objects and materials will be shared.
- **Purchase additional items:** Consider what supplies might need to be available on an individual basis, and purchase additional items to minimize sharing (e.g., assigning each student their own art supplies), as feasible.
- **Storage**: Keep each student's belongings separated from others' and in individually labeled containers, cubbies, or areas. Similar to locker usage, make sure to stagger access to these areas to maintain physical distancing if used. Additional guidance on sharing protocols is forthcoming.

Food service operations

Eating areas for students: As students will be unmasked to eat, there is a strict requirement of 6 feet of physical distance between each student. Based on current CDC recommendations, it is

preferable for students to eat in classroom spaces. This may not be feasible for all sites, given classroom sizes, room scheduling, and physical distancing requirements. Schools may need to explore alternative options for students to eat their meals. Our prioritized recommendation includes the following options.[20]

- **Eating in the classroom:** Based on CDC recommendations, it is preferable for students to eat in classroom spaces. Meals can be delivered to classrooms, or students can bring food back from the cafeteria to eat. Schools may consider having half of the class take an outdoor mask break or recess time while the other half eats and then switching these groups to enable 6 feet of distancing. Additional staff may be needed to supervise, as the students are in two separate spaces in this model. The desks and other surfaces that students are using for meals should be cleaned between groups. Cleaning includes using an approved EPA disinfectant on these surfaces and then appropriately disposing of the materials used to wipe down the surfaces. Custodial staff or students may perform this surface cleaning, if appropriate.
- **Eating in the cafeteria:** If a single large lunchroom is to be used for eating (and is not utilized for classroom space), clearly mark spaces where cohorts and students can sit. Students must maintain 6 feet of distance when unmasked unless plexiglass barriers are used to separate students. Ensure that students do not mingle with other cohorts. The tables and other surfaces that students are using for meals should be cleaned between groups. Cleaning includes using an approved EPA disinfectant and then appropriately disposing of the materials used to wipe down the surfaces. Custodial staff or students may perform this surface cleaning, if appropriate. *Please refer to Appendix C for further details and considerations on utilizing cafeteria space.*
- **Eating in alternative spaces:** Outdoor meal consumption can be an effective way to ensure physical distancing, weather permitting. Consider other available spaces as well that will not obstruct egress or create other fire code issues. For example, use of hallways for mealtime may be possible depending on hallway width. Half of the students could eat their lunch in the classroom, with strict 6 foot distancing in place. The other half could eat in the hallway on benches or chairs, with 6 feet of distance between each student. The benches and other surfaces that students are using for meals should be cleaned between groups. Cleaning includes using an approved EPA disinfectant and then appropriately disposing of the materials used to wipe down the surfaces. Custodial staff or students may perform this surface cleaning, if appropriate.

Food preparation and serving space and related protocols

- **Evaluate kitchen workstations:** Modify stations for physical distancing. If the kitchen is small, consider moving workstations into larger areas. Face workstations in the same direction or against the wall.
- **Stagger service staff**: For large food service staff, consider having the staff work in cohort-based schedules to reduce opportunities for transmission.
- **Ensure food continuity**: Consider methods for ensuring continuity of food service operations if food service staff become sick. This could include setting up coverage from other schools within the district or purchasing a supply of shelf-stable meals.
- **Receiving deliveries**: Work with kitchen staff and vendors to determine safer ways to

handle deliveries given COVID-19 considerations. Mark entrances where deliveries will be handled, and schedule deliveries in a way that reduces crowding. If the vendor plans to drop deliveries outside and reduce the number of visitors inside the building, consider investing in dollies or assisting kitchen staff with moving deliveries to avoid workplace injuries.

- **Ensure food safety training**: Ensure that food service staff and substitutes have food safety training. Review current food safety plans and revise as needed. Free web-based food safety resources include:
    - John Stalker Institute Food Allergy Resources
    - Breakfast in the Classroom operational and safety protocols
    - School Food Service Safety Precautions for School Nutrition Professionals
    - Massachusetts Food Safety and Education Safe Bag Lunches:
    - CDC Food and Coronavirus

Preparation and distribution

- **Health and safety requirements:** Adjust food preparation and service procedures to minimize shared items (i.e. serving utensils), maintain physical distance, and comply with health and safety regulations.[21] Detailed guidance on safe food preparation can be found in Massachusetts' Safety Standards and Checklist: Restaurants.
- **Individually packaged meals:** Adjust food offerings to provide individually packaged, to-go style lunches, instead of buffet style served directly to students. Consider developing non-contact pre-payment systems for schools when offering individually packaged meals, if feasible. Consider establishing incentives for prepayment of meals.
- **Schedule and distribution:** Establish a meal serving schedule and distribution process that limits interactions between classrooms and contamination of food items or meal distribution areas. For instance, schools may schedule classroom deliveries or set times for each classroom to pick up their meals from a central location. Meal distribution should limit high-touch surfaces and exclude buffet style serving. If meals are delivered to the classroom, consider how students can pre-order meals to ensure the correct number of meals are delivered to the class each day. Consider how to return meal service materials (i.e. carts, trays) to a central location each day.[22]
- **Special dietary accommodations:** Ensure new menus offer meal accommodations for special dietary needs. Ensure these meals are clearly marked and transported without risk for cross-contamination to alternative points of service. Communicate special dietary accommodations to staff distributing meals to ensure student safety and privacy.
- **Non-essential food distribution:** Consider closing non-essential food distribution, such as school stores or vending machines to limit eating or food preparation outside of set breakfast and lunch times. Discontinue the use of any self-service food or beverage distribution in the cafeteria.

Meal consumption

- **Masks**: Ensure proper removal and placement of masks before eating. Masks should be removed by handing the ties or back/ear areas of the mask once seated. Do not touch the outside or inside of the part covering the face. While eating, masks should be placed on a napkin, paper towel, or other container on the table, with the inside of the mask facing up. Masks should be put back on before leaving the seat. More information is available here.

- **Distancing:** Individuals must be at least 6 feet apart at all times when masks are removed.
- **Hand hygiene:** Individuals must properly wash or sanitize hands before and after eating.
- **Water fountain usage**: Schools must provide potable water to students during mealtimes. Touchless or motion activated fountains are preferred for reusable water bottles, but other fountains, water jugs, or coolers can be used with single-use cups if students wash hands or use hand sanitizer before and after fountain use. **Water fountains cannot be used for direct consumption.** High-touch surfaces on water fountains, jugs or coolers should be cleaned multiple times a day. Schools may also consider providing disposable water bottles during mealtimes.
- **Food allergies:** Stay informed of student needs, including food allergies or any needed feeding assistance to enable safe meal service and clean up.
- **Food waste removal:** Work with nutrition and facilities staff to determine protocols for waste management. Additional garbage cans may be needed to accommodate food waste, especially if classroom spaces are used for meals. Consider how normal cleaning procedures and schedules may be affected by new processes. Consider how students can support clean-up, such as cleaning their own eating area after the meal, if age appropriate and safe to do so.

Meals for remote learners: Schools must continue to offer meals to eligible students who are learning remotely from home. Begin planning how to operate lunch, breakfast, and/or snack programs (as applicable) for students who will not be attending in-person school five days a week. *Additional guidance will be provided by DESE's Office for Food and Nutrition Programs.*

- **Communication:** Communicate with families on how remote meal processes will be different from this past spring.
- **Delivery Methods:** Begin planning for drive-through, delivery, curb-side pick-up, or end of school day take-home meals (as appropriate) for students who are not attending in-person school five days a week. Meal distribution methods utilized this past spring, including parent pick-up, can be continued, including providing meals to cover multiple days.

Visitors and volunteers

- **Reduce outside visitors or volunteers**: No outside visitors and volunteers are recommended, except for contracted service providers for the purpose of special education, required support services, or program monitoring as authorized by the school or district. Assign a staff member to enforce this protocol.
- **Single entry/exit**: Designate a single entry and exit point for all visitors and volunteers to be visually screened and logged in. For visitors who need to enter, they should first gain approval, be briefed on school COVID-19 policies, and verify they do not have symptoms. Ensure that these individuals all are wearing masks covering their nose and mouth at all times and are aware of any other health and safety protocols for the school.

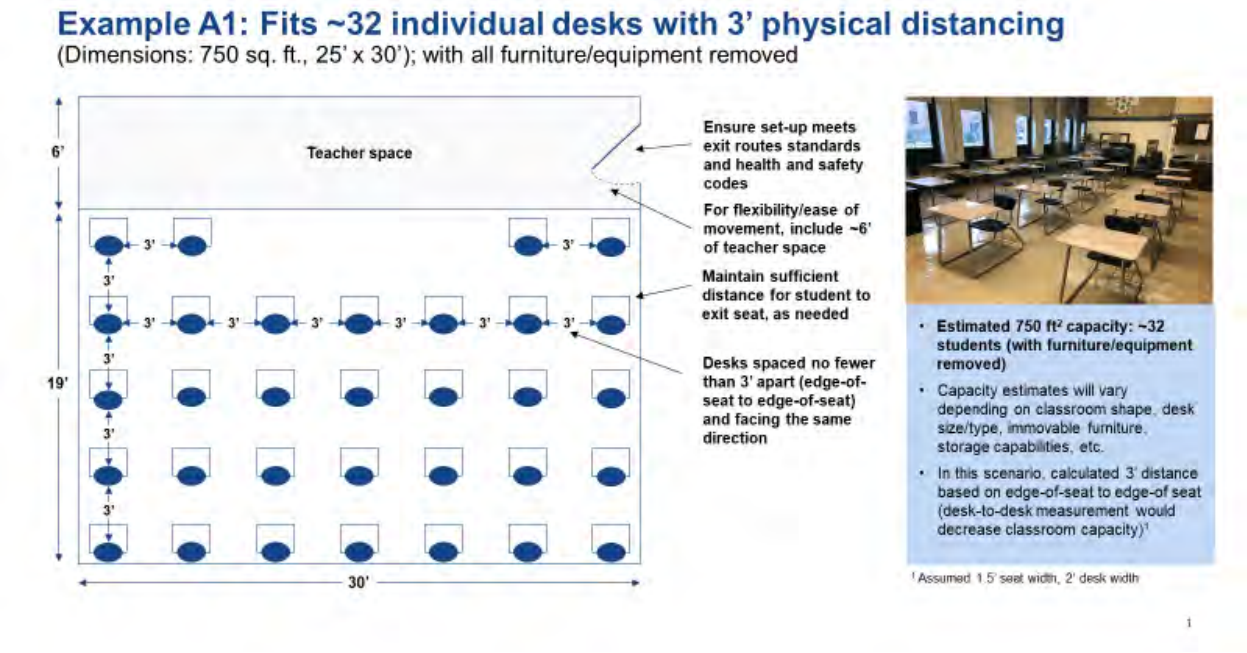
- **Track visitor log**: A log of all visitors must be kept and maintained for 30 days, with the date, contact phone number, arrival/departure times, and areas visited within the building for each visit.
- **Minimize parent/family visits** and require them to occur only in the school office and/or outside spaces, if appropriate.
    - Visitors necessary for drop off or pick up must wear masks.
    - Schools should encourage only one guardian to visit a building when possible and continue to utilize virtual communication options with families (e.g., for parent-teacher conferences). [23]
    - It is recommended that the same adult drop off and pick up the child each day if it necessary that they enter the building.
- **Restrict visitor time**: Schools can also consider restricting visitor access to limited times when classes are in session (i.e., at times when there will not be many people in the hallways). [24]

Appendix A: Maximizing school space

The diagrams below outline best practices for classroom setup in order to maximize capacity while adhering to health and safety requirements. We have included sample classroom diagrams, based on common desk dimensions and several classroom tours, that outline important considerations such as health and safety codes, teacher movement, and immovable furniture or equipment. We encourage schools to physically measure each classroom in addition to using this parametric tool to make sure that space is being maximized to the extent possible.

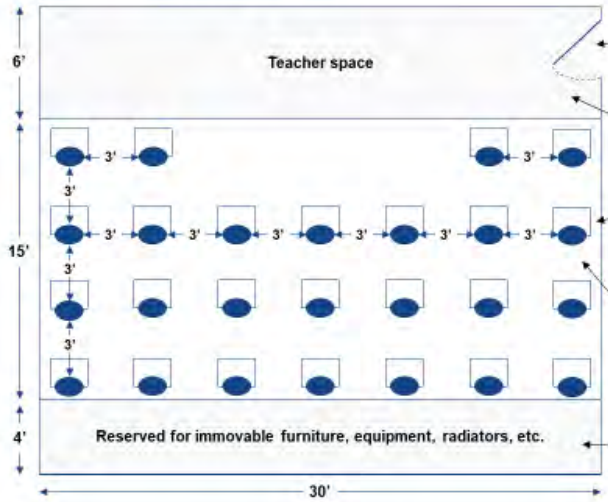
Best Practices for Classroom Setup:

- **Physical distancing:** With masks, 3 feet is the minimum physical distancing. For planning purposes, this distance refers to the distance between seat edges. Spaces where masks are not worn (e.g. eating and mask break areas), 6 feet is the minimum physical distancing.
- **Teacher space:** Allow adequate **space for teachers** to ensure safe physical distance from students.
- **Furniture:** Consider **removing non-essential furniture** from classrooms. Explore **storage options** in advance.
- **Communal areas:** Consider **repurposing communal areas** for additional classrooms.
- **Other constraints:** When estimating capacity, consider additional constraints that reduce usable desk space (e.g., emergency fire egress, radiators, immovable furniture, desk/furniture size and type, camera angles for synchronous learning).



Example A2: Fits ~25 individual desks with 3' physical distancing

(Dimensions: 750 sq. ft., 25' x 30')



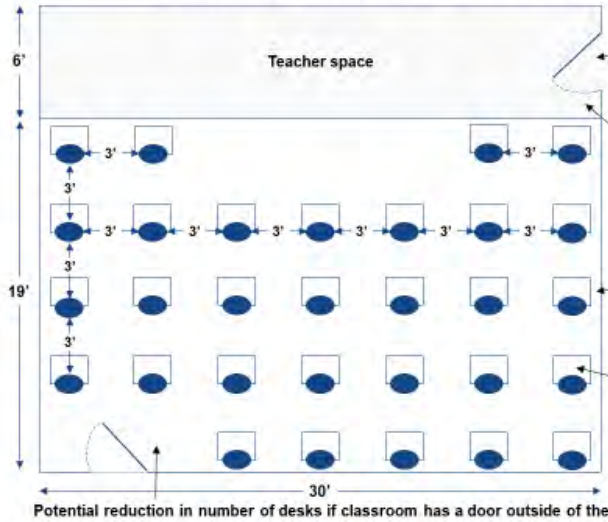
- **Estimated 750 ft² capacity: ~25 students**
- Capacity estimates will vary depending on classroom shape, desk size/type, immovable furniture, storage capabilities, etc.
- In this scenario, calculated 3' distance based on edge-of-seat to edge-of seat (desk-to-desk measurement would decrease classroom capacity)[1]

[1] Assumed 1.5' seat width, 2' desk width

2

Example A3: Fits ~30 individual desks with 3' physical distancing

(Dimensions: 750 sq. ft., 25' x 30'); with all furniture/equipment removed



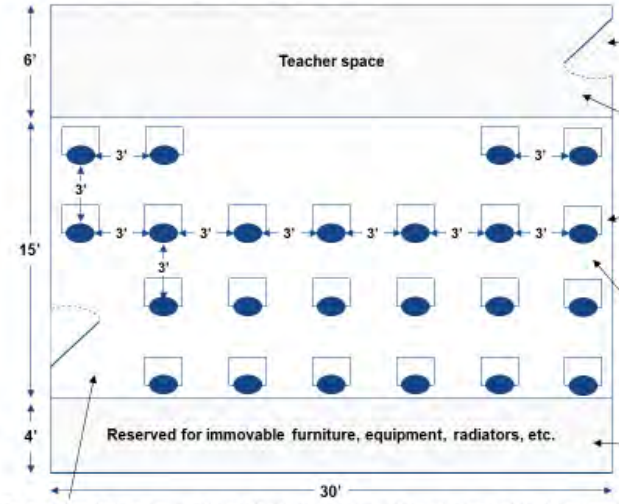
- **Estimated 750 ft² capacity: ~30 students (with furniture/equipment removed)**
- Capacity estimates will vary depending on classroom shape, desk size/type, immovable furniture, storage capabilities, etc.
- In this scenario, calculated 3' distance based on edge-of-seat to edge-of seat (desk-to-desk measurement would decrease classroom capacity)[1]

[1] Assumed 1.5' seat width, 2' desk width

3

Example A4: Fits ~23 individual desks with 3' physical distancing

(Dimensions: 750 sq. ft., 25' x 30')



Ensure set-up meets exit routes standards and health and safety codes

For flexibility/ease of movement, include ~6' of teacher space

Maintain sufficient distance for student to exit seat, as needed

Desks spaced no fewer than 3' apart (edge-of-seat to edge-of-seat) and facing the same direction

Large furniture ideally removed or relocated to maximize available space for student desks

Potential reduction in number of desks if classroom has a door outside of the teacher space

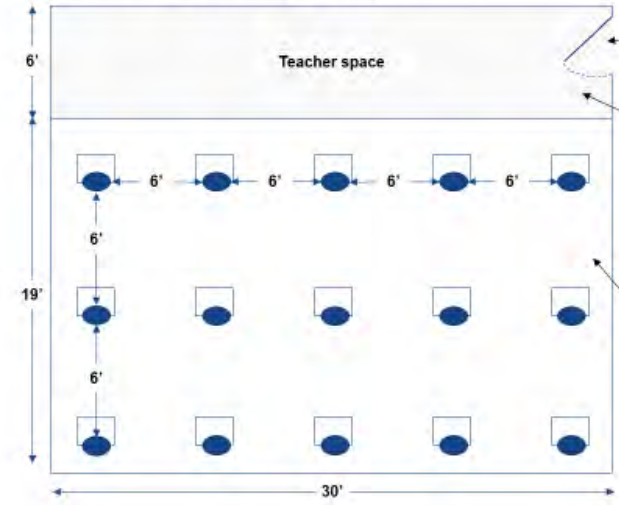
- **Estimated 750 ft² capacity: ~23 students**
- Capacity estimates will vary depending on classroom shape, desk size/type, immovable furniture, storage capabilities, etc.
- In this scenario, calculated 3' distance based on edge-of-seat to edge-of seat (desk-to-desk measurement would decrease classroom capacity)[1]

[1] Assumed 1.5' seat width, 2' desk width

4

Example A5: Fits ~15 students with 6' physical distancing

(Dimensions: 750 sq. ft., 25' x 30')



Ensure set-up meets exit routes standards and health and safety codes

For flexibility/ease of movement, include ~6' of teacher space

Desks spaced no fewer than 6' apart (edge-of-seat to edge-of-seat) and facing the same direction

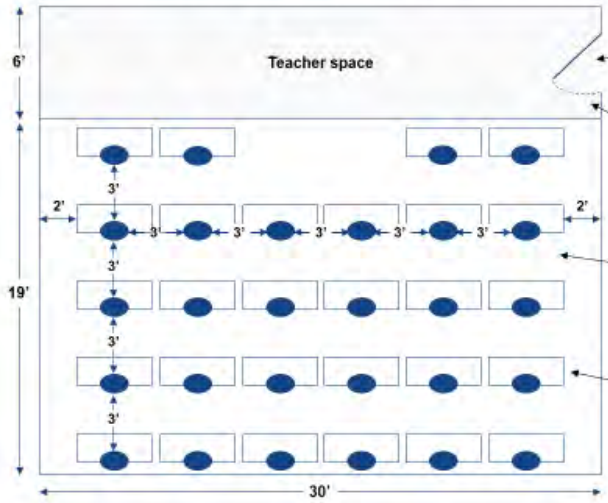
- **Estimated 750 ft² capacity: ~15 students**
- Capacity estimates will vary depending on classroom shape, desk size/type, immovable furniture, storage capabilities, etc.
- In this scenario, calculated 6' distance based on edge-of-seat to edge-of seat (desk-to-desk measurement would decrease classroom capacity)[1]

[1] Assumed 1.5' seat width, 2' desk width

5

Example B1: Fits ~28 4' dual desks with 3' physical distancing

(Dimensions: 750 sq. ft., 25' x 30'); with all furniture/equipment removed

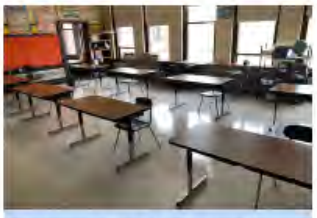


Ensure set-up meets exit routes standards and health and safety codes

For flexibility/ease of movement, include ~6' of teacher space

Desks spaced no fewer than 3' apart and facing the same direction

4' desks intended for two students can only accommodate one under distancing requirements



- **Estimated 750 ft² capacity: ~28 students (with furniture/equipment removed)**
- Capacity estimates will vary depending on classroom shape, desk size/type, immovable furniture, storage capabilities, etc.
- In this scenario, calculated 3' distance based on edge-of-seat to edge-of seat (desk-to-desk measurement would decrease classroom capacity)[1]

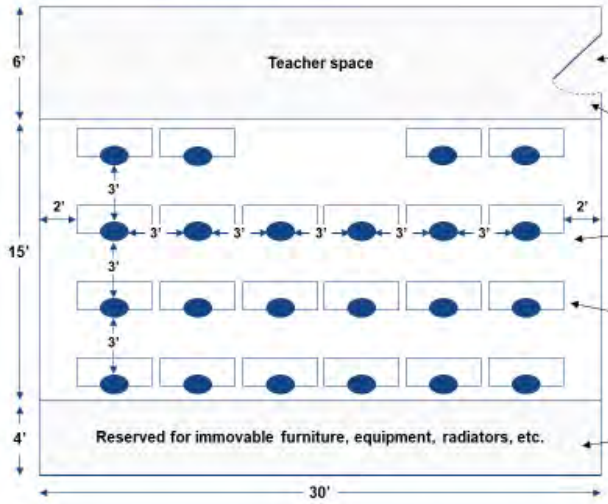
[1] Assumed 1.5' seat width, 4' desk width

6

Ex

Example B2: Fits ~22 4' dual desks with 3' physical distancing

(Dimensions: 750 sq. ft., 25' x 30')



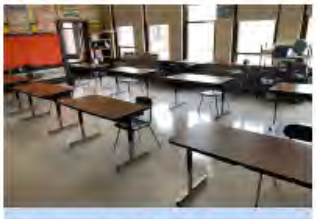
Ensure set-up meets exit routes standards and health and safety codes

For flexibility/ease of movement, include ~6' of teacher space

Desks spaced no fewer than 3' apart and facing the same direction

4' desks intended for two students can only accommodate one under distancing requirements

Large furniture ideally removed or relocated to maximize available space for student desks



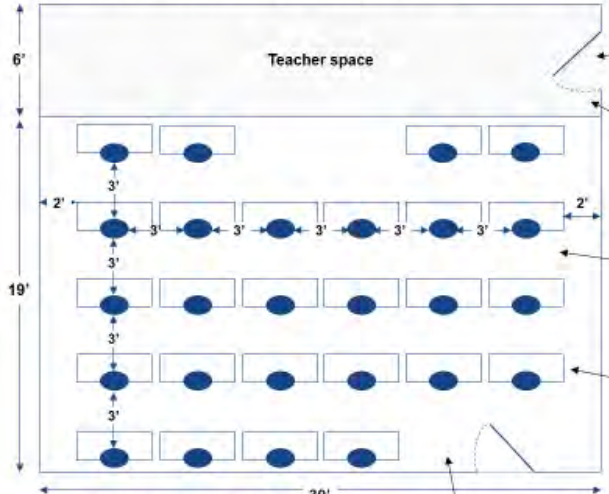
- **Estimated 750 ft² capacity: ~22 students**
- Capacity estimates will vary depending on classroom shape, desk size/type, immovable furniture, storage capabilities, etc.
- In this scenario, calculated 3' distance based on edge-of-seat to edge-of seat (desk-to-desk measurement would decrease classroom capacity)[1]

[1] Assumed 1.5' seat width, 4' desk width

7

Example B3: Fits ~26 4' dual desks with 3' physical distancing

(Dimensions: 750 sq. ft., 25' x 30'); with all furniture/equipment removed



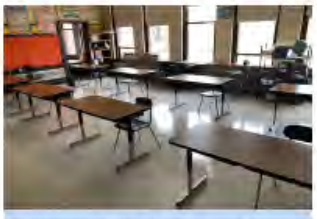
Ensure set-up meets exit routes standards and health and safety codes

For flexibility/ease of movement, include ~6' of teacher space

Desks spaced no fewer than 3' apart and facing the same direction

4' desks intended for two students can only accommodate one under distancing requirements

Potential reduction in number of desks if classroom has a door outside of the teacher space



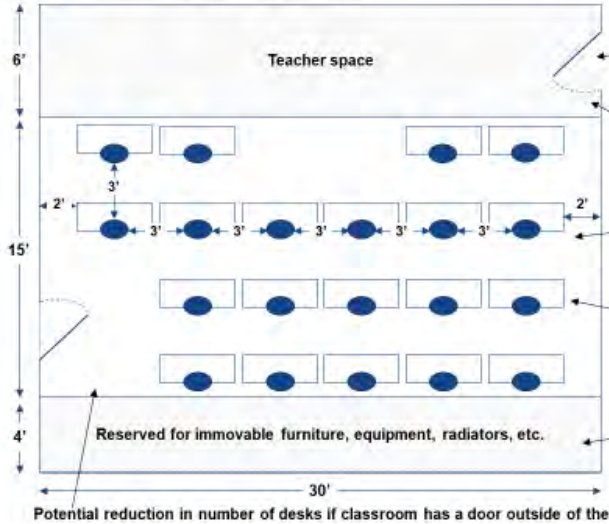
- **Estimated 750 ft² capacity: ~26 students (with furniture/equipment removed)**
- Capacity estimates will vary depending on classroom shape, desk size/type, immovable furniture, storage capabilities, etc.
- In this scenario, calculated 3' distance based on edge-of-seat to edge-of seat (desk-to-desk measurement would decrease classroom capacity)[1]

[1] Assumed 1.5' seat width, 4' desk width

8

Example B4: Fits ~20 4' dual desks with 3' physical distancing

(Dimensions: 750 sq. ft., 25' x 30')



Ensure set-up meets exit routes standards and health and safety codes

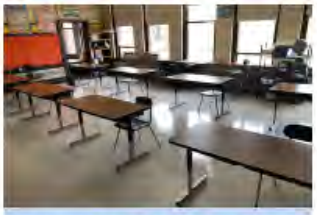
For flexibility/ease of movement, include ~6' of teacher space

Desks spaced no fewer than 3' apart and facing the same direction

4' desks intended for two students can only accommodate one under distancing requirements

Large furniture ideally removed or relocated to maximize available space for student desks

Potential reduction in number of desks if classroom has a door outside of the teacher space



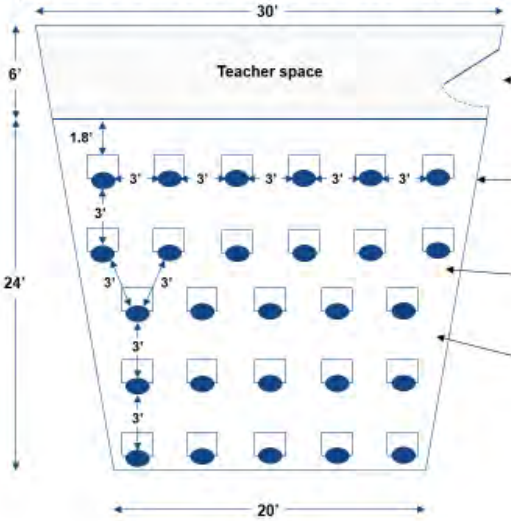
- **Estimated 750 ft² capacity: ~20 students**
- Capacity estimates will vary depending on classroom shape, desk size/type, immovable furniture, storage capabilities, etc.
- In this scenario, calculated 3' distance based on edge-of-seat to edge-of seat (desk-to-desk measurement would decrease classroom capacity)[1]

[1] Assumed 1.5' seat width, 4' desk width

9

Example C1: Fits ~27 individual desks with 3' physical distancing

(Dimensions: 750 sq. ft., 30' at widest / 20 at narrowest x 30')



Ensure set-up meets exit routes standards and health and safety codes

For flexibility/ease of movement, include ~6' of teacher space

Desks spaced no fewer than 3' apart (edge-of-seat to edge-of-seat) and facing the same direction

Isometric desk arrangements may be optimal for non-rectangular classrooms

Could increase desk spacing if desks shifted out to walls

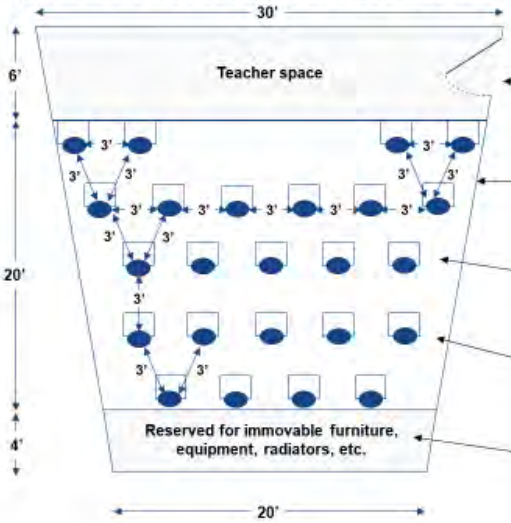
- **Estimated 750 ft² capacity: ~27 students**
- Capacity estimates will vary depending on classroom shape, desk size/type, immovable furniture, storage capabilities, etc.
- In this scenario, calculated 3' distance based on edge-of-seat to edge-of-seat (desk-to-desk measurement would decrease classroom capacity)[1]

[1] Assumed 1.5' seat width, 2' desk width

10

Example C2: Fits ~24 individual desks with 3' physical distancing

(Dimensions: 750 sq. ft., 30' at widest / 20 at narrowest x 30')



Ensure set-up meets exit routes standards and health and safety codes

For flexibility/ease of movement, include ~6' of teacher space

Isometric desk arrangements may be optimal for non-rectangular classrooms

Desks spaced no fewer than 3' apart (edge-of-seat to edge-of-seat) and facing the same direction

Could increase desk spacing if desks shifted out to walls

Large furniture ideally removed or relocated to maximize available space for student desks

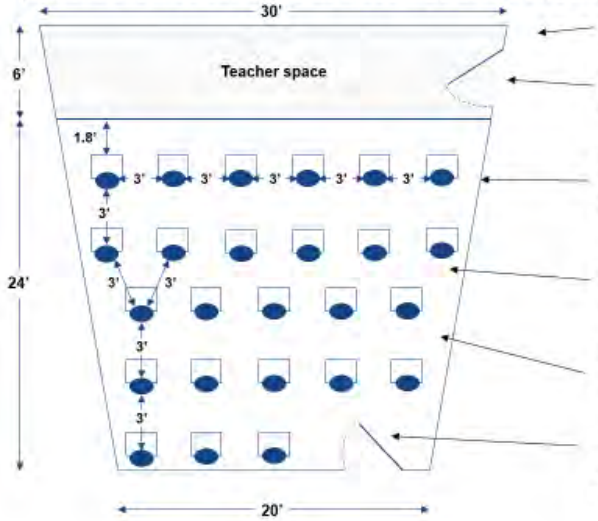
- **Estimated 750 ft² capacity: ~24 students**
- Capacity estimates will vary depending on classroom shape, desk size/type, immovable furniture, storage capabilities, etc.
- In this scenario, calculated 3' distance based on edge-of-seat to edge-of-seat (desk-to-desk measurement would decrease classroom capacity)[1]

[1] Assumed 1.5' seat width, 2' desk width

11

Example C1: Fits ~25 individual desks with 3' physical distancing

(Dimensions: 750 sq. ft., 30' at widest / 20 at narrowest x 30')



Ensure set-up meets exit routes standards and health and safety codes

For flexibility/ease of movement, include ~6' of teacher space

Desks spaced no fewer than 3' apart (edge-of-seat to edge-of-seat) and facing the same direction

Isometric desk arrangements may be optimal for non-rectangular classrooms

Could increase desk spacing if desks shifted out to walls

Potential reduction in number of desks if classroom has a door outside of the teacher space

- **Estimated 750 ft² capacity: ~25 students**
- Capacity estimates will vary depending on classroom shape, desk size/type, immovable furniture, storage capabilities, etc.
- In this scenario, calculated 3' distance based on edge-of-seat to edge-of-seat (desk-to-desk measurement would decrease classroom capacity)[1]

[1] Assumed 1.5' seat width, 2' desk width

12

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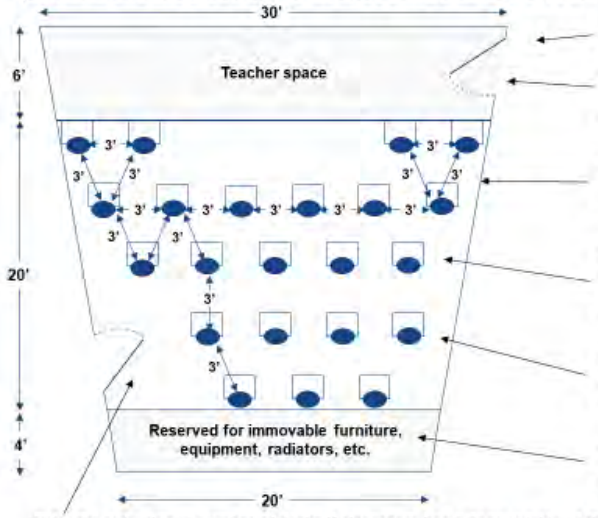
Example C2: Fits ~22 individual desks with 3' physical distancing

(Dimensions: 750 sq. ft., 30' at widest / 20 at narrowest x 30')



Ensure set-up meets exit routes standards and health and safety codes

For flexibility/ease of movement, include ~6' of teacher space

Isometric desk arrangements may be optimal for non-rectangular classrooms

Desks spaced no fewer than 3' apart (edge-of-seat to edge-of-seat) and facing the same direction

Could increase desk spacing if desks shifted out to walls

Large furniture ideally removed or relocated to maximize available space for student desks

Potential reduction in number of desks if classroom has a door outside of the teacher space

- **Estimated 750 ft² capacity: ~22 students**
- Capacity estimates will vary depending on classroom shape, desk size/type, immovable furniture, storage capabilities, etc.
- In this scenario, calculated 3' distance based on edge-of-seat to edge-of-seat (desk-to-desk measurement would decrease classroom capacity)[1]

[1] Assumed 1.5' seat width, 2' desk width

13

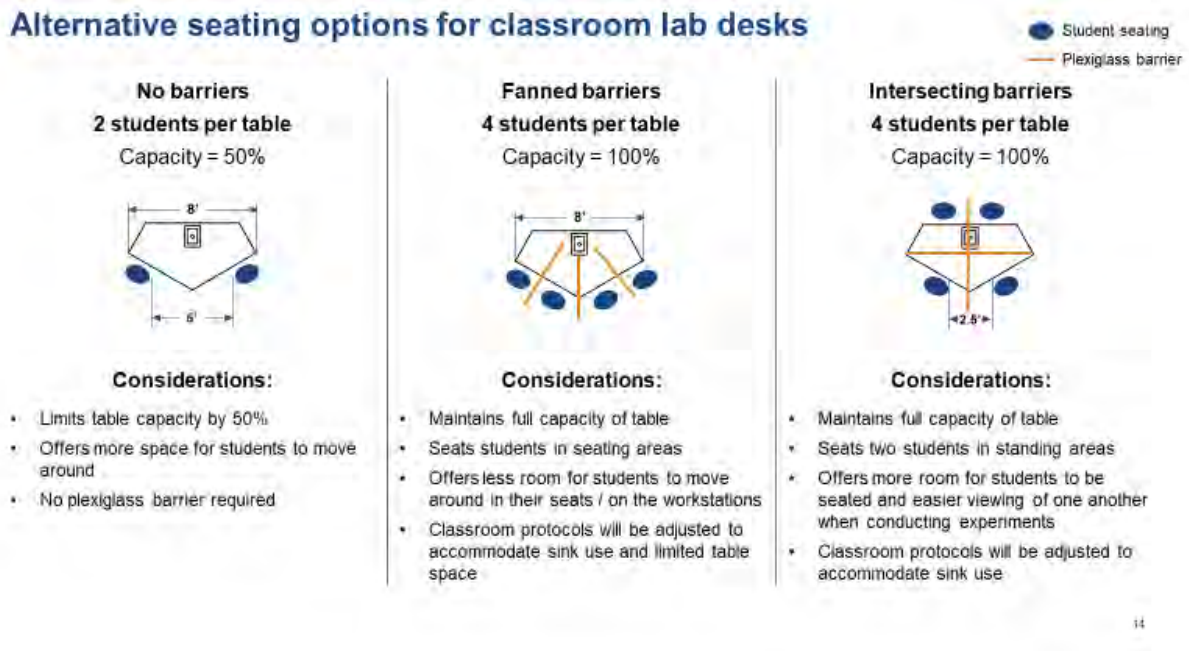
DRAFT for discussion only

Appendix B: Laboratory seating

The diagrams below outline options for laboratory seating in order to maximize capacity while adhering to health and safety requirements. Use the following guidelines and considerations when developing laboratory seating layouts. Work closely with teachers and administrators to comply with fire and safety codes and adjust curriculums as necessary to accommodate capacity and physical changes.

Plexiglass barriers:

- Usage: Barriers should only be used in laboratory settings where desks are unable to be moved or cannot be replaced with moveable desks.
- Height: Barriers should be tall enough to extend beyond a student's standing height
- Width: Barriers should extend at least one foot past the edge of the table and abide by fire and safety regulations
- Cleaning: Barriers should be properly cleaned between uses
- Rubber edges: Consider use of rubber edges to avoid risk of injury when plexiglass extends beyond tables
- Classroom protocols: Make sure that plexiglass barrier use is aligned to safety procedures and consider adjusting classroom experiments to avoid potential fire hazards

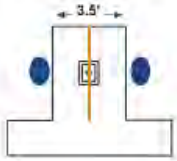


Alternative seating options for perimeter lab desks

Student seating
Plexiglass barrier

2 students per table

Capacity = 50%

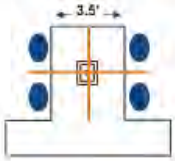


Considerations:

- Barrier usage enables students to face one another in this seating option
- Offers more space for students to move around
- Reduces total plexiglass usage
- Classroom protocols will be adjusted to accommodate sink use

4 students per table

Capacity = 100%



Considerations:

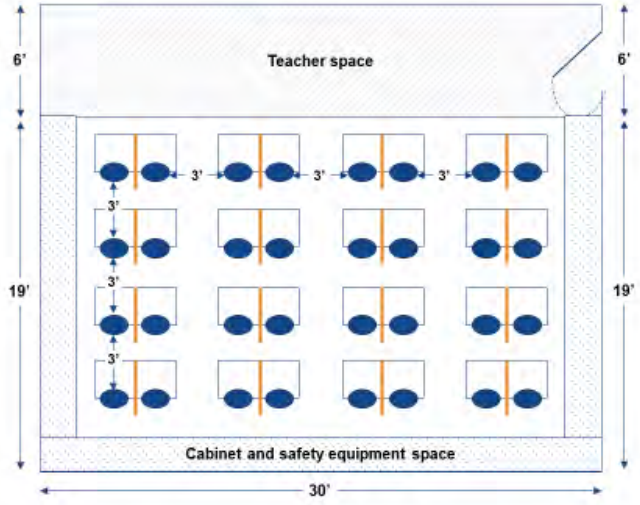
- Barrier usage enables students to face one another in this seating option, and be side-by-side
- Maintains full capacity of table
- Reduces room for students to move around
- Classroom protocols will be adjusted to accommodate sink use

15

Alternative seating options for movable lab desks

(Dimensions: 750 sq. ft., 25' x 30'; laboratory safety equipment space included but not pictured)

Student seating
Plexiglass barrier



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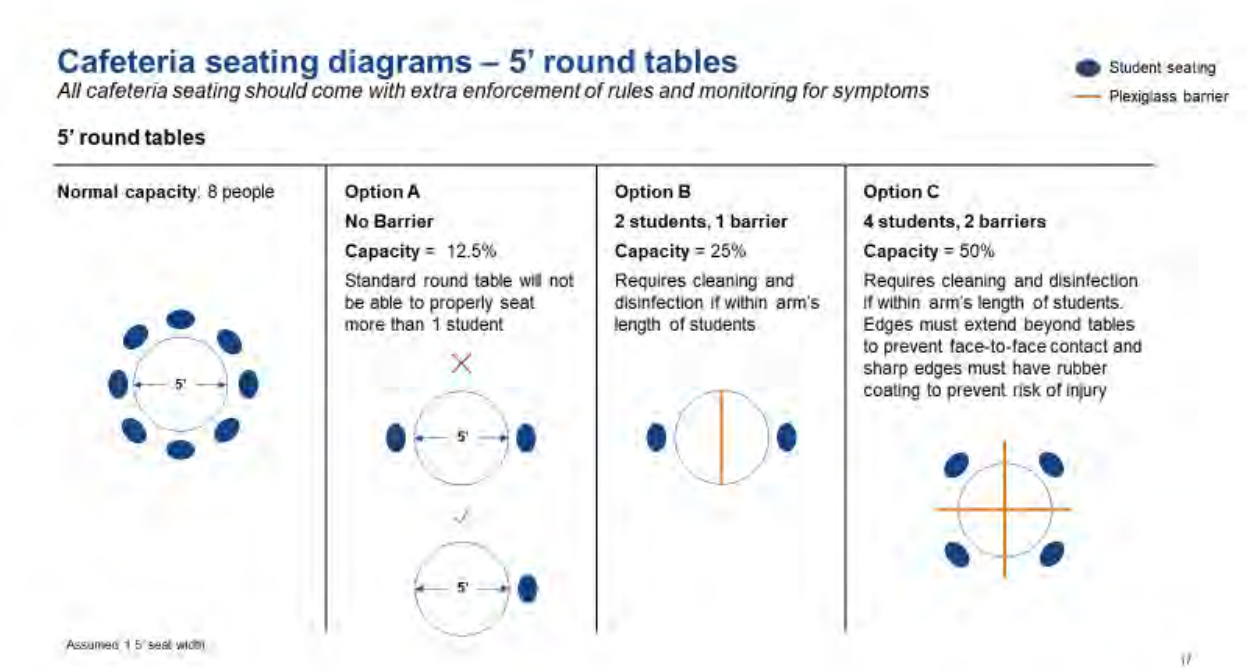
Appendix C: Cafeteria seating

The diagrams below outline options for cafeteria seating based on four common cafeteria tables. Use the following guidelines and considerations to determine the most feasible way to utilize cafeteria space (e.g., for classrooms or for eating). Work closely with facility departments to comply with fire and safety codes.

Considerations for plexiglass barriers:

- Usage: Barriers may be used to increase cafeteria capacity during meals.
- Height: Barriers should be tall enough to extend beyond a student's standing height
- Width: Barriers should extend at least one foot past the edge of the table and abide by fire and safety regulations
- Cleaning: Barriers should be properly cleaned between uses
- Rubber edges: Consider use of rubber edges to avoid risk of injury when plexiglass extends beyond tables
- Classroom protocols: Make sure that plexiglass barrier use is aligned to safety procedures and consider adjusting classroom experiments to avoid potential fire hazards



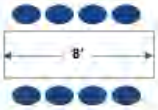
Cafeteria seating diagrams – 8' rectangular tables

All cafeteria seating should come with extra enforcement of rules and monitoring for symptoms

Student seating

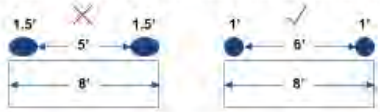
8' rectangular tables

Normal capacity: 8 people



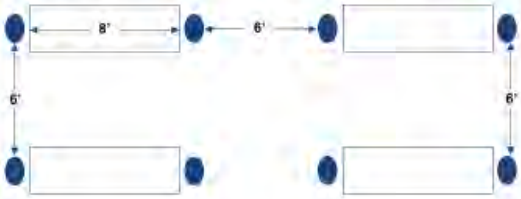
Assumed 1.5' seat width

Option A 1' seating space: 8' tables will not be able to accommodate 2 students seated in the same direction unless assumed seat width is reduced to 1' (instead of 1.5')



Capacity = 25%

Option B Distanced face-to-face seating (no barriers): To fit more students on a table, it may be for students to sit face-to-face 8' apart, while maintaining 6' of distance in other directions



Capacity = 25%

Additional considerations:

Students will be directly facing one another and must refrain from shouting, singing, sneezing, or coughing

May require chairs if benches are not built on short ends

18

Cafeteria seating diagrams – 8' rectangular tables

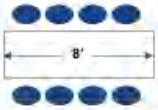
All cafeteria seating should come with extra enforcement of rules and monitoring for symptoms

Student seating

Plexiglass barrier

8' rectangular tables

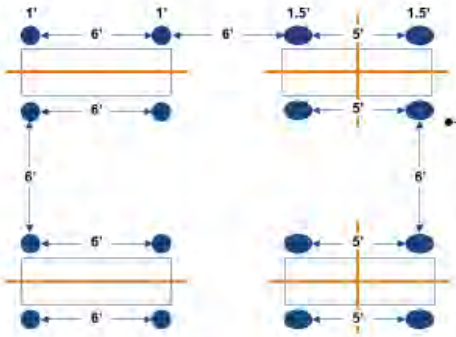
Normal capacity: 8 people



Assumed 1.5' seat width

Option C Barriers: Adding a horizontal barrier allows students to sit face-to-face on opposite sides of the table. If students require more than 1' of seating space, consider adding a vertical barrier that extends beyond the table and includes necessary rubber coating to prevent risk of injury. Barriers will require cleaning and disinfection between uses if within arm's length of students.

Capacity = 50%



Additional considerations:

Tables will require further spacing than Option B to meet 6 feet distance requirements

18

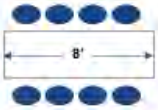
Cafeteria seating diagrams – 8’ rectangular tables

All cafeteria seating should come with extra enforcement of rules and monitoring for symptoms

Student seating
Plexiglass barrier

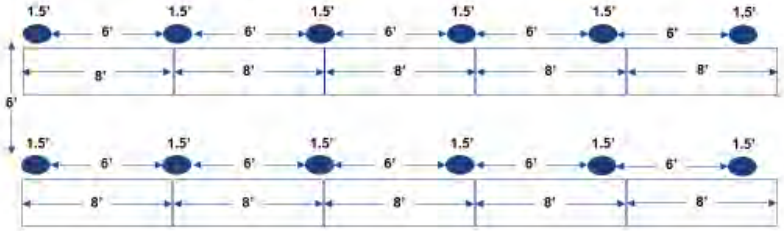
8’ rectangular tables

Normal capacity: 8 people



Option D Combine Tables: Depending on the cafeteria layout, consider placing 8’ next to each other to allow distanced seating to occur with adequate individual space.

Capacity = 19%



Assumed 1.5’ seat width

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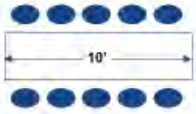
Cafeteria seating diagrams – 10’ and 12’ rectangular tables

All cafeteria seating should come with extra enforcement of rules and monitoring for symptoms

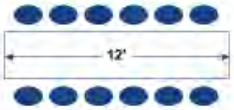
Student seating

10’ and 12’ rectangular tables

Normal capacity: 10 people



Normal capacity: 12 people



Option A No Barrier: Without barriers, two students may be seated at a time

Capacity = 20%

Capacity = 17%

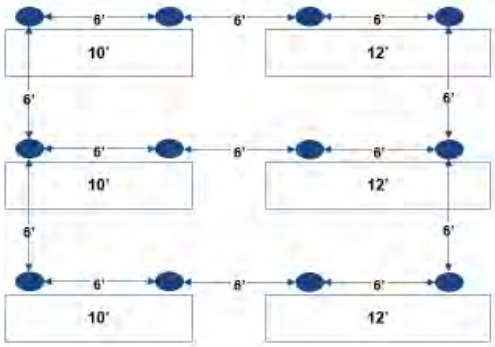


Table spacing: Ensure that 6 feet distance is still maintained between students sitting at other tables

Student seating: Both 10’ and 12’ cafeteria tables may seat 2 students maximum spaced 6 feet apart. All students should sit on the same side of the table and face the same direction

Assumed 1.5’ seat width

21

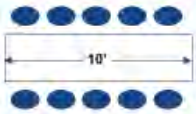
Cafeteria seating diagrams – 10’ and 12’ rectangular tables

All cafeteria seating should come with extra enforcement of rules and monitoring for symptoms

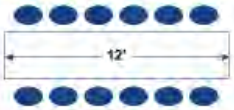
Student seating
Plexiglass barrier

10’ and 12’ rectangular tables

Normal capacity: 10 people



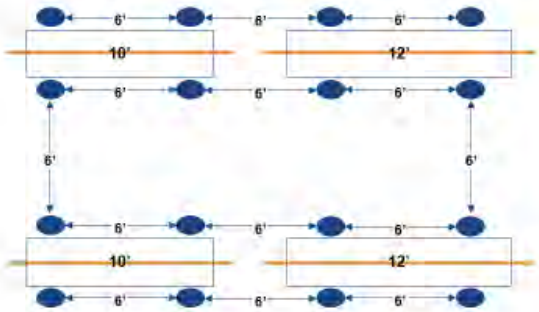
Normal capacity: 12 people



Assumed 1.5’ seat width

Option B Horizontal Barrier: Adding a horizontal barrier allows students to sit face-to-face on opposite sides of the table. Barriers will require cleaning and disinfection between uses if within arm’s length of students.

Capacity = 40% **Capacity** = 33%



Student seating: Both 10’ and 12’ cafeteria tables may seat 2 students maximum spaced 6 feet apart

Table spacing: Ensure that 6 feet distance is still maintained between students sitting at other tables

Additional considerations:

Tables will require further spacing than Option A to meet 6 feet distance requirements

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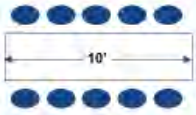
Cafeteria seating diagrams – 10’ and 12’ rectangular tables

All cafeteria seating should come with extra enforcement of rules and monitoring for symptoms

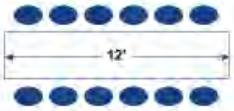
Student seating
Plexiglass barrier

10’ and 12’ rectangular tables

Normal capacity: 10 people



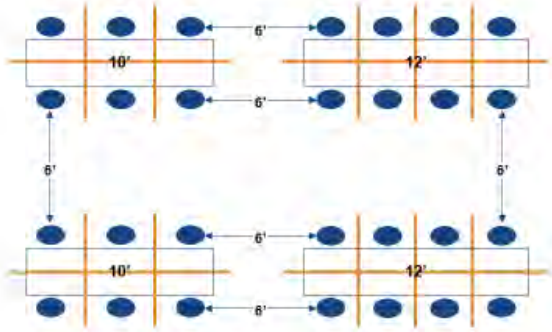
Normal capacity: 12 people



Assumed 1.5’ seat width

Option C Horizontal & Vertical Barriers: Adding vertical barriers that extends beyond the table and includes necessary rubber coating to prevent risk of injury will further increase table capacity. Barriers will require cleaning and disinfection between uses if within arm’s length of students.

Capacity = 60% **Capacity** = 67%



Student seating: Both 10’ and 12’ cafeteria tables may seat 2 students maximum spaced 6 feet apart

Table spacing: Ensure that 6 feet distance is still maintained between students sitting at other tables

Additional considerations:

Tables will require further spacing than Option A to meet 6 feet distance requirements

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[1] HSPH. (2020). Schools for Health: Risk Reductions Strategies for Reopening Schools. Available at https://schools.forhealth.org/wp-content/uploads/sites/19/2020/06/Harvard-Healthy-Buildings-Program-Schools-For-Health-Reopening-Covid19-June2020.pdf
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[12] Best, E., Parnell, P., Couturier, J., Barbut, F., Le Bozec, A., Arnoldo, L., Madia, A., Brusaferro, S., and Wilcox, M.H. (2018). Environmental contamination of bacteria in hospital washrooms according to hand-drying method: a multi-centre study. *Journal of Hospital Infection*, 2018,100. Available at https://pubmed.ncbi.nlm.nih.gov/30006281/;
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[16] Melnick, H., & Darling-Hammond, L. (with Leung, M., Yun, C., Schachner, A., Plasencia, S., & Ondrasek, N.). (2020). Reopening schools in the context of COVID-19: Health and safety guidelines from other countries (policy brief). Available at https://learningpolicyinstitute.org/product/reopening-schools-covid-19-brief
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[18] Melnick, H., & Darling-Hammond, L. (with Leung, M., Yun, C., Schachner, A., Plasencia, S., & Ondrasek, N.). (2020). Reopening schools in the context of COVID-19: Health and safety guidelines from other countries (policy brief). Available at https://learningpolicyinstitute.org/product/reopening-schools-covid-19-brief
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[23] HSPH. (2020). Schools for Health: Risk Reductions Strategies for Reopening Schools. Available at https://schools.forhealth.org/wp-content/uploads/sites/19/2020/06/Harvard-Healthy-Buildings-Program-Schools-For-Health-Reopening-Covid19-June2020.pdf
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NORIAN / SIANI ENGINEERING, INC.
43 Bradford Street, Concord, MA 01742 • Tel: 781-398-2250

August 1, 2020

Arthur Unobskey, Superintendent
Wayland Public School
41 Cochituate Road
Wayland MA 01778

RE: WAYLAND MIDDLE SCHOOL – ROOMS 101-118

Dear Mr. Unobskey:

It is our understanding that on Monday August 2, 2020 students and teachers will be occupying a portion of the Wayland Middle School at 201 Main St. Wayland MA for a program similar in nature to typical classroom activities. This will specifically occur in rooms 101 through 118. The rooms will be occupied with a maximum of 12 students and teachers.

These rooms are served by unit ventilators and associated exhaust fans which constitute the ventilation system for the rooms. It has been reported that Town of Wayland skilled maintenance personnel have inspected the unit ventilators and associated exhaust fans and confirmed proper operation of the equipment. In addition, they have replaced filters within the unit ventilators with MERV 8 filters. (These filters match the filters efficiency and associated pressure drop for the equipment as originally configured.)

In addition, Town personnel have reported that they will confirm operation of all unit ventilators and exhaust fans prior to occupancy of the building each morning. This will be done through a combination of visual inspection of the equipment and monitoring of the building controls system.

Norian/Siani Engineering has reviewed the original design plans for the building and the ventilation rates for these rooms. As designed, the system far exceeds International Mechanical Code minimum ventilation requirements to occupy these rooms with 12 students and teachers.

In my opinion, in relation to the HVAC system, the Town has met the minimum requirements outlined by the Massachusetts Department of Elementary and Secondary Education in the June 25, 2020 Initial Fall School Re-Opening Guidance. Please note, NSE has not been asked to render an opinion on other areas of the school.

Should you have any thoughts or questions you would like to discuss, please call.

Sincerely,
for NORIAN/SIANI ENGINEERING, INC.

Matthew A. Bean P.E.

MAB/mab

NORIAN / SIANI ENGINEERING, INC.
43 Bradford Street, Concord, MA 01742 • Tel: 781-398-2250

TESTING SCOPE

Date: ***August 7, 2020*** ***DRAFT***

Project: ***WAYLAND SCHOOLS VENTILATION TESTING***
CLAYPIT ELEMENTARY SCHOOL

Test 2 Unit Ventilators as follows:

1) Record Room number, Unit Ventilator (UV) model number, etc.
2) Confirm current setup of UV with MERV 8 filter. (Ensure windows are closed and classroom door is closed and exhaust fan is on) At a minimum document the following:
   a) With clean filter:
      i) Unit Ventilator: Total Airflow (CFM)
      ii) Unit Ventilator: Return Airflow (CFM)
      iii) Unit Ventilator: Outside Airflow (CFM)
      iv) Room Exhaust grille cfm (CFM)
      v) Room exhaust fan total (CFM)
   b) With filter blocked to simulate loading:
      i) Unit Ventilator: Total Airflow (CFM)
      ii) Unit Ventilator: Return Airflow (CFM)
      iii) Unit Ventilator: Outside Airflow (CFM)
3) With MERV 13 filter installed. (Ensure windows are closed and classroom door is closed and exhaust fan is on) At a minimum document the following:
   a) With clean filter:
      i) Unit Ventilator: Total Airflow (CFM)
      ii) Unit Ventilator: Return Airflow (CFM)
      iii) Unit Ventilator: Outside Airflow (CFM)
      iv) Room Exhaust grille cfm (CFM)
   b) With filter blocked to simulate loading:
      i) Unit Ventilator: Total Airflow (CFM)
      ii) Unit Ventilator: Return Airflow (CFM)
      iii) Unit Ventilator: Outside Airflow (CFM)
4) With MERV 13 filter installed, open OA damper to 100% and close return air damper completely. (Ensure windows are closed and classroom door is closed and exhaust fan is on) At a minimum document the following:
   a) With clean filter:
      i) Unit Ventilator: Total Airflow (CFM)
      ii) Room Exhaust grille cfm (CFM)
   b) With filter blocked to simulate loading:
      i) Unit Ventilator: Total Airflow (CFM)
5) With MERV 13 filter installed, Set OA damper for XX CFM (150% of code ventilation rate when occupied at 6 ft spacing with blockage for dirty filter.) (Ensure windows are closed and classroom door is closed and exhaust fan is on) At a minimum document the following (Leave UV in this Condition):

a) Unit Ventilator: Total Airflow (CFM)
b) Unit Ventilator: Return Airflow (CFM)
c) Unit Ventilator: Outside Airflow (CFM)
d) Room Exhaust grille cfm (CFM)

Test One Roof Top Unit Serving a Modular Class Room

1) Record Room number, Roof Top Unit (RTU) model number, etc.
2) Confirm current setup of RTU with MERV 8 filter. (Ensure windows are closed and class-room door is closed and exhaust fan is on) At a minimum document the following:
   a) With clean filter:
      i) RTU: Total Airflow (CFM)
      ii) RTU: Return Airflow (CFM)
      iii) RTU: Outside Airflow (CFM)
      iv) Room Exhaust grille cfm (CFM)
      v) Room exhaust fan total (CFM)
   b) With filter blocked to simulate loading:
      i) RTU: Total Airflow (CFM)
      ii) RTU: Return Airflow (CFM)
      iii) RTU: Outside Airflow (CFM)
3) With MERV 13 filter installed. (Ensure windows are closed and classroom door is closed and exhaust fan is on) At a minimum document the following:
   a) With clean filter:
      i) RTU: Total Airflow (CFM)
      ii) RTU: Return Airflow (CFM)
      iii) RTU: Outside Airflow (CFM)
      iv) Room Exhaust grille cfm (CFM)
   b) With filter blocked to simulate loading:
      i) RTU: Total Airflow (CFM)
      ii) RTU: Return Airflow (CFM)
      iii) RTU: Outside Airflow (CFM)
4) With MERV 13 filter installed, open OA damper to 100% and close return air damper completely. (Ensure windows are closed and classroom door is closed and exhaust fan is on) At a minimum document the following:
   a) With clean filter:
      i) RTU: Total Airflow (CFM)
      ii) Room Exhaust grille cfm (CFM)
   b) With filter blocked to simulate loading:
      i) RTU: Total Airflow (CFM)
5) With MERV 13 filter installed, Set OA damper for 300 CFM (150% of code ventilation rate when occupied at 6 ft spacing with blockage for dirty filter.) (Ensure windows are closed and classroom door is closed and exhaust fan is on) At a minimum document the following (Leave UV in this Condition):
   a) RTU: Total Airflow (CFM)
   b) RTU: Return Airflow (CFM)
   c) RTU: Outside Airflow (CFM)
   d) Room Exhaust grille cfm (CFM)

NORIAN / SIANI ENGINEERING, INC.
43 Bradford Street, Concord, MA 01742 • Tel: 781-398-2250

Date: August 13, 2020 DRAFT
Location: Claypit School

RECOMMENDED SCOPE

At a minimum the contractor shall provide the following preventive maintenance:

Unit Ventilators with AC

Prior to the start of the school year provide the following scope of work:

1. Vacuum clean unit ventilator. Brush clean unit ventilator coils.
2. Inspect OA and RA dampers function, confirm fully seal when in closed condition, open when commanded from controls, etc.
3. If drain pan is present clean and disinfect drain pain. Provide biocide tablet at drain pan.
4. Oil fan shaft bearing.
5. Inspect UV controls and confirm proper operation. (Confirm alarms are properly logged on DDC system. Confirm commands from DDC system cause valves to open, dampers to open, etc.)
6. Inspect hydronic valving confirm proper operation.
7. Inspect freeze stat and confirm proper operation.
8. Install new filter. Tape joints and edges to eliminate bypass of filter.
9. Provide written report and/or check list, on a per unit basis, indicating all work performed, issues and confirmation that unit is fully operational or statement of what needs to be done to make unit operational.

Every 50 to 60 calendar days (Inspection shall occur not less than 50 calendar days from prior inspection and not more than 60 calendar days from prior inspection.)

1. Vacuum clean unit ventilator. Brush clean unit ventilator coils.
2. Install new filter. Tape joints and edges to eliminate bypass of filter.
3. Provide written report and/or check list, on a per unit basis, indicating all work performed, issues and confirmation that unit is fully operational or statement of what needs to be done to make unit operational.

Unit Ventilators without AC

Prior to the start of the school year provide the following scope of work:

1. Vacuum clean unit ventilator. Brush clean unit ventilator coils.
2. Inspect OA and RA dampers function, confirm fully seal when in closed condition, open when commanded from controls, etc.
3. Oil fan shaft bearing.
4. Inspect UV controls and confirm proper operation. (Confirm alarms are properly logged on DDC system. Confirm commands from DDC system cause valves to open, dampers to open, etc.)
5. Inspect hydronic valving confirm proper operation.
6. Inspect freeze stat and confirm proper operation.
7. Install new filter. Tape joints and edges to eliminate bypass of filter.
8. Provide written report and/or check list, on a per unit basis, indicating all work performed, issues and confirmation that unit is fully operational or statement of what needs to be done to make unit operational.

Every 50 to 60 calendar days (Inspection shall occur not less than 50 calendar days from prior inspection and not more than 60 calendar days from prior inspection.)

1. Vacuum clean unit ventilator. Brush clean unit ventilator coils.

2. Install new filter. Tape joints and edges to eliminate bypass of filter.
3. Provide written report and/or check list, on a per unit basis, indicating all work performed, issues and confirmation that unit is fully operational or statement of what needs to be done to make unit operational.

Gas Fired RTU with AC

Prior to the start of the school year provide the following scope of work:

1. Remove and inspect air filters. If filters are of the washable type then vacuum the filter and rinse with soap and water. Otherwise, replace air filters. Tape joints and edges to eliminate bypass of filter.
2. Clean all air intakes. Inspect screens for damage and replace if necessary.
3. Inspect OA and RA dampers function, confirm fully seal when in closed condition, open when commanded from controls, etc.
4. Oil fan shaft bearing and check locking collar tightness.
5. Check bolt tightness for compressor mounting, and fan motor.
6. Inspect belts for wear, proper tension, and pulley alignment.
7. Inspect the heat exchanger for rust or cracks. Inspect burners, igniter, and combustion section. Check the gas pressure and test for leaks.
8. Check the refrigerant lines for leaks, and test refrigerant charge.
9. Clean condenser coils.
10. Clean and disinfect drain pain. Provide biocide tablet at drain pan. Inspect condensate drain for damage or clogs.
11. Check fan motor amperage.
12. Provide written report and/or check list, on a per unit basis, indicating all work performed, issues and confirmation that unit is fully operational or statement of what needs to be done to make unit operational.

Every 50 to 60 calendar days (Inspection shall occur not less than 50 calendar days from prior inspection and not more than 60 calendar days from prior inspection.)

1. Remove and inspect air filters. If filters are of the washable type then vacuum the filter and rinse with soap and water. Otherwise, replace air filters. Tape joints and edges to eliminate bypass of filter.
2. Clean all air intakes. Inspect screens for damage and replace if necessary.
3. Inspect belts for wear, proper tension, and pulley alignment.
4. Oil fan shaft bearing and check locking collar tightness.
5. Clean condenser coils.
6. Clean and disinfect drain pain. Provide biocide tablet at drain pan. Inspect condensate drain for damage or clogs.
7. Provide written report and/or check list, on a per unit basis, indicating all work performed, issues and confirmation that unit is fully operational or statement of what needs to be done to make unit operational.

Gas Fired RTU without AC

Prior to the start of the school year provide the following scope of work:

1. Remove and inspect air filters. If filters are of the washable type then vacuum the filter and rinse with soap and water. Otherwise, replace air filters. Tape joints and edges to eliminate bypass of filter.
2. Clean all air intakes. Inspect screens for damage and replace if necessary.

3. Inspect OA and RA dampers function, confirm fully seal when in closed condition, open when commanded from controls, etc.
4. Oil fan shaft bearing and check locking collar tightness.
5. Check bolt tightness for compressor mounting, and fan motor.
6. Inspect belts for wear, proper tension, and pulley alignment.
7. Inspect the heat exchanger for rust or cracks. Inspect burners, igniter, and combustion section. Check the gas pressure and test for leaks.
8. Check fan motor amperage.
9. Provide written report and/or check list, on a per unit basis, indicating all work performed, issues and confirmation that unit is fully operational or statement of what needs to be done to make unit operational.

Every 50 to 60 calendar days (Inspection shall occur not less than 50 calendar days from prior inspection and not more than 60 calendar days from prior inspection.)

1. Remove and inspect air filters. If filters are of the washable type then vacuum the filter and rinse with soap and water. Otherwise, replace air filters. Tape joints and edges to eliminate bypass of filter.
2. Clean all air intakes. Inspect screens for damage and replace if necessary.
3. Inspect belts for wear, proper tension, and pulley alignment.
4. Oil fan shaft bearing and check locking collar tightness.
5. Provide written report and/or check list, on a per unit basis, indicating all work performed, issues and confirmation that unit is fully operational or statement of what needs to be done to make unit operational.

Roof Mounted Exhaust Fan

Prior to the start of the school year provide the following scope of work:

1. Clean the motor housing.
2. For belt-drive fans, inspect belts for wear, proper tension, and pulley alignment.
3. Check all fasteners for proper tightness.
4. Lubricate bearings where applicable.
5. Provide written report and/or check list, on a per unit basis, indicating all work performed, issues and confirmation that unit is fully operational or statement of what needs to be done to make unit operational.

Every 50 to 60 calendar days (Inspection shall occur not less than 50 calendar days from prior inspection and not more than 60 calendar days from prior inspection.)

1. Clean the motor housing.
2. For belt-drive fans, inspect belts for wear, proper tension, and pulley alignment.
3. Provide written report and/or check list, on a per unit basis, indicating all work performed, issues and confirmation that unit is fully operational or statement of what needs to be done to make unit operational.

Cabinet Unit Heater

Prior to the start of the school year provide the following scope of work:

1. Vacuum clean the cabinet unit heater. Brush clean hydronic fin tube.
2. Oil fan shaft bearing.
3. Inspect hydronic valving confirm proper operation.
4. Install new filter. Tape joints and edges to eliminate bypass of filter.

5. Provide written report and/or check list, on a per unit basis, indicating all work performed, issues and confirmation that unit is fully operational or statement of what needs to be done to make unit operational.

Every 50 to 60 calendar days (Inspection shall occur not less than 50 calendar days from prior inspection and not more than 60 calendar days from prior inspection.)

1. Vacuum clean the cabinet unit heater. Brush clean hydronic fin tube.
2. Install new filter. Tape joints and edges to eliminate bypass of filter.
3. Provide written report and/or check list, on a per unit basis, indicating all work performed, issues and confirmation that unit is fully operational or statement of what needs to be done to make unit operational.

Fin Tube Radiation

Prior to the start of the school year provide the following scope of work:

1. Vacuum enclosure. Brush clean hydronic fin tube.
2. Inspect hydronic valving confirm proper operation.
3. Provide written report and/or check list, on a per unit basis, indicating all work performed, issues and confirmation that unit is fully operational or statement of what needs to be done to make unit operational.

Every 50 to 60 calendar days (Inspection shall occur not less than 50 calendar days from prior inspection and not more than 60 calendar days from prior inspection.)

1. Vacuum enclosure. Brush clean hydronic fin tube.
2. Provide written report and/or check list, on a per unit basis, indicating all work performed, issues and confirmation that unit is fully operational or statement of what needs to be done to make unit operational.

H&V Unit

Prior to the start of the school year provide the following scope of work:

1. Vacuum clean unit. Brush clean hydronic coil.
2. Inspect OA and RA dampers function, confirm fully seal when in closed condition, open when commanded from controls, etc.
3. Oil fan shaft bearing.
4. Inspect H&V controls and confirm proper operation. (Confirm alarms are properly logged on DDC system. Confirm commands from DDC system cause valves to open, dampers to open, etc.)
5. Inspect hydronic valving confirm proper operation.
6. Inspect freeze stat and confirm proper operation.
7. Install new filter. Tape joints and edges to eliminate bypass of filter.
8. Provide written report and/or check list, on a per unit basis, indicating all work performed, issues and confirmation that unit is fully operational or statement of what needs to be done to make unit operational.

Every 50 to 60 calendar days (Inspection shall occur not less than 50 calendar days from prior inspection and not more than 60 calendar days from prior inspection.)

1. Vacuum clean unit. Brush clean hydronic coil.
2. Install new filter. Tape joints and edges to eliminate bypass of filter.
3. Provide written report and/or check list, on a per unit basis, indicating all work performed, issues and confirmation that unit is fully operational or statement of what needs to be done to make unit operational.