

APPENDIX D: Air Quality Supporting Documentation

**Fresh Air Filtration and Indoor Air Quality Management Design Concepts:
Allied Consulting Engineering (April 12, 2018)**

Fresh Air Filtration and Indoor Air Quality Management Design Concepts

Assembly's Edge – Somerville Massachusetts

The Residential Building

The Massachusetts Mechanical Code requires that "Living Areas" in residential buildings other than single family and two-family dwelling units be provided with 0.35 air changes per hour of outdoor air or 15 CFM per person, whichever is greater, or approximately 40-60 CFM per apartment. The Massachusetts Energy Code requires that outdoor air units that operate continuously must utilize energy recovery. To meet this fresh air and energy recovery requirement, we propose to employ an Energy Recovery Ventilator (ERV) to recover heating or cooling energy from the building exhaust, including toilet exhaust and general exhaust to preheat or precool and pre-dehumidify the fresh air brought into the building by the outdoor air unit. The Energy Recovery Ventilator we have selected will have a MERV 16 filter. The MERV 16 filter was selected based on its commercial availability, as well as, its energy efficiency and its filtration efficiency on particulates in the 3-70 nanometer size. The fresh air will be heated or cooled and supplied via a galvanized sheetmetal duct system to the common corridors, amenity spaces and each individual apartment, thus assuring that all fresh air introduced into the building and apartments will be provided with highly filtered, clean, and healthful fresh air.

Each apartment will have a compressorized heating and cooling unit located within the apartment in a centralized location. Warm air or cool air will be supplied to the entire apartment via a ducted system within the apartment that utilizes galvanized sheetmetal ductwork to distribute air to each room within the apartment. The heating and cooling unit will be provided with a MERV 13 filter that will clean all of the air recirculated within the apartment. The average apartment will have a recirculated air quantity that results in more than six total air changes per hour with six passes through the high efficiency filter per hour. This high level of air changes coupled with the high efficiency of the filters will assure the highest level of air cleanliness, excellent indoor air quality and a healthful living environment. The fan of the unit will be allowed to run continuously during periods that heating or air conditioning is not required to assure the ability to maintain the indoor air quality year round.

In addition to the foregoing, all heated and cooled common areas, corridors, storage rooms, etc., will be provided with compressorized heating and cooling units equipped with MERV 13 filters.

The high level of filtration of the outdoor air, coupled with the filtered air recirculated within the apartment by the heating/cooling system, will assure that a very high level of particulate removal is achieved. The use of commercially available equipment and filters will assure that this indoor air quality is maintained throughout the life of the building.

The Hotel Building

The Massachusetts Mechanical Code requires that hotel “bedrooms/living rooms” be provided with 5 CFM per person + .06 CFM per sq.ft. of fresh air or approximately 20-40 CFM per hotel room. The Massachusetts Energy Code requires that outdoor air units that operate continuously must utilize energy recovery. To meet this fresh air and energy recovery requirement, we propose to employ an Energy Recovery Ventilator (ERV) to recovery heating or cooling energy from the building exhaust, including toilet exhaust and general exhaust to preheat or precool and pre-dehumidify the fresh air brought into the building by the outdoor air unit. The Energy Recovery Ventilator we have selected will have a MERV 16 filter. The MERV 16 filter was selected based on its commercial availability, as well as, its energy efficiency and its filtration efficiency on particulates in the 3-70 nanometer size. The fresh air will be heated or cooled and supplied via a galvanized sheetmetal duct system to the common corridors, amenity spaces and each individual hotel room, thus assuring that all fresh air introduced into the building will be provided with highly filtered, clean, and healthful fresh air.

Each hotel room or suite will have a compressorized heating and cooling unit located within that hotel room or suite in a centralized location. Warm air or cool air will be supplied to the entire hotel room or suite. The heating and cooling unit will be provided with a MERV 13 filter that will clean all of the air recirculated within the space. The average hotel room will have a recirculated air quantity that results in more than six total air changes per hour with six passes through the high efficiency filter per hour. This high level of air changes coupled with the high efficiency of the filters will assure the highest level of air cleanliness, excellent indoor air quality and a healthful living environment. The fan of the unit will be allowed to run continuously during periods that heating or air conditioning is not required to assure the ability to maintain the indoor air quality year round.

In addition to the foregoing, all heated and cooled common areas, lobby spaces, offices, corridors, dining rooms and back of house spaces (with the exception of mechanical rooms, laundry rooms, kitchens and similar specialized use spaces), etc., will be provided with compressorized heating and cooling units equipped with MERV 13 filters.

The high level of filtration of the outdoor air, coupled with the filtered air recirculated within the hotel room or suite by the heating/cooling system, will assure that a very high level of particulate removal is achieved. The use of commercially available equipment and filters will assure that this indoor air quality is maintained throughout the life of the building.