



POWELL & CO

CONSTRUCTION

draperGROUP
home of innovation

Jeremy and Alex Frankpitt Sunnylands Broiler Breeder Farm

16th March 2022

Exhaust Air to Bio-Filtration System

A First in a Commercial Breeder Farm



Powell & CO busy with construction



POWELL & CO

CONSTRUCTION

- **Four House Broiler Breeder Farm**
 - 54m x 28m per house
- **Unique bio-filtration construction**
 - 45m x 4m per house



draperGROUP
home of innovation

- **Draper AVI-AIR ventilation**
- **Feinhage nests & feeders**
- **Landmeco male feeders**
- **Lubing egg conveyors**

Key Metrics – Breeder Farm

- No. of Birds = 9,000♀ & 900♂
- House dimensions = 54 m x 28 m
- Stocking = 6 ♀/m²
- Feeder space = 17 cm/♀
- Chain speed = 36 m/min
- Nest space = 80 ♀/m²
- Landmeco male feeder



Bio-Filter Plenum

- Air enters via intake on the left
- Central partition to separate house air spaces
- Steel and concrete construction to the weight of a wet bio-filter and Bob-cat
- Washable floors
- Easy access



Bio-Filter Exhaust Plenum Under Construction



Bio-Filter System – Under Construction



Wet Bark as the Bio-filter

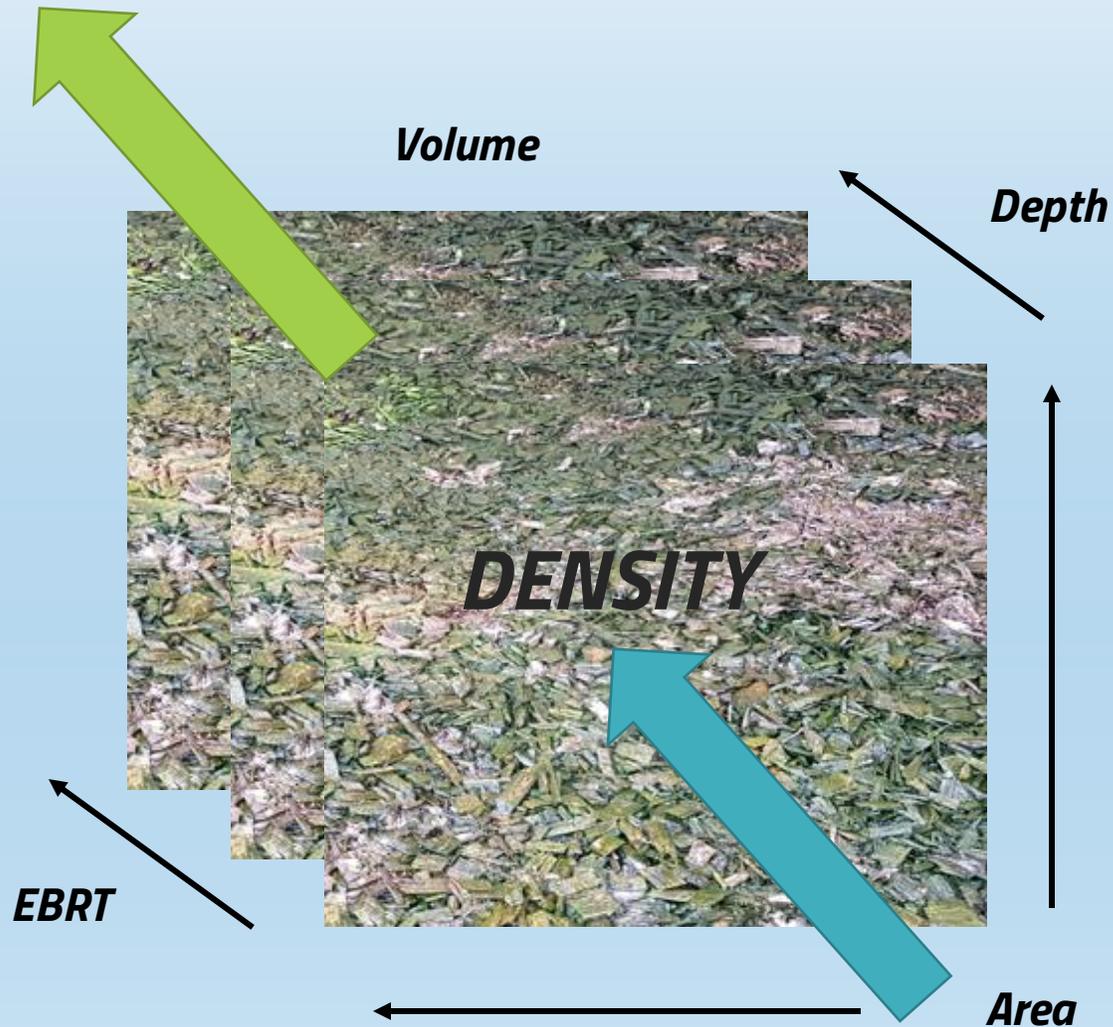
Microbial action reduces odour and ammonia



How a Biofilter works

- **Controls Volatile Organic Compounds (VOC) that cause odour**
- **Biofilters are made up of a bed of organic materials, such as wood barks**
- **They absorb a variety of odorous and noxious gases into a biofilm**
- **They are biodegraded by microorganisms into simpler and less toxic compounds like carbon dioxide, water and salts and use the energy and nutrients to grow and reproduce**

How a Simple Biofilter works



IMPORTANT DESIGN FEATURES

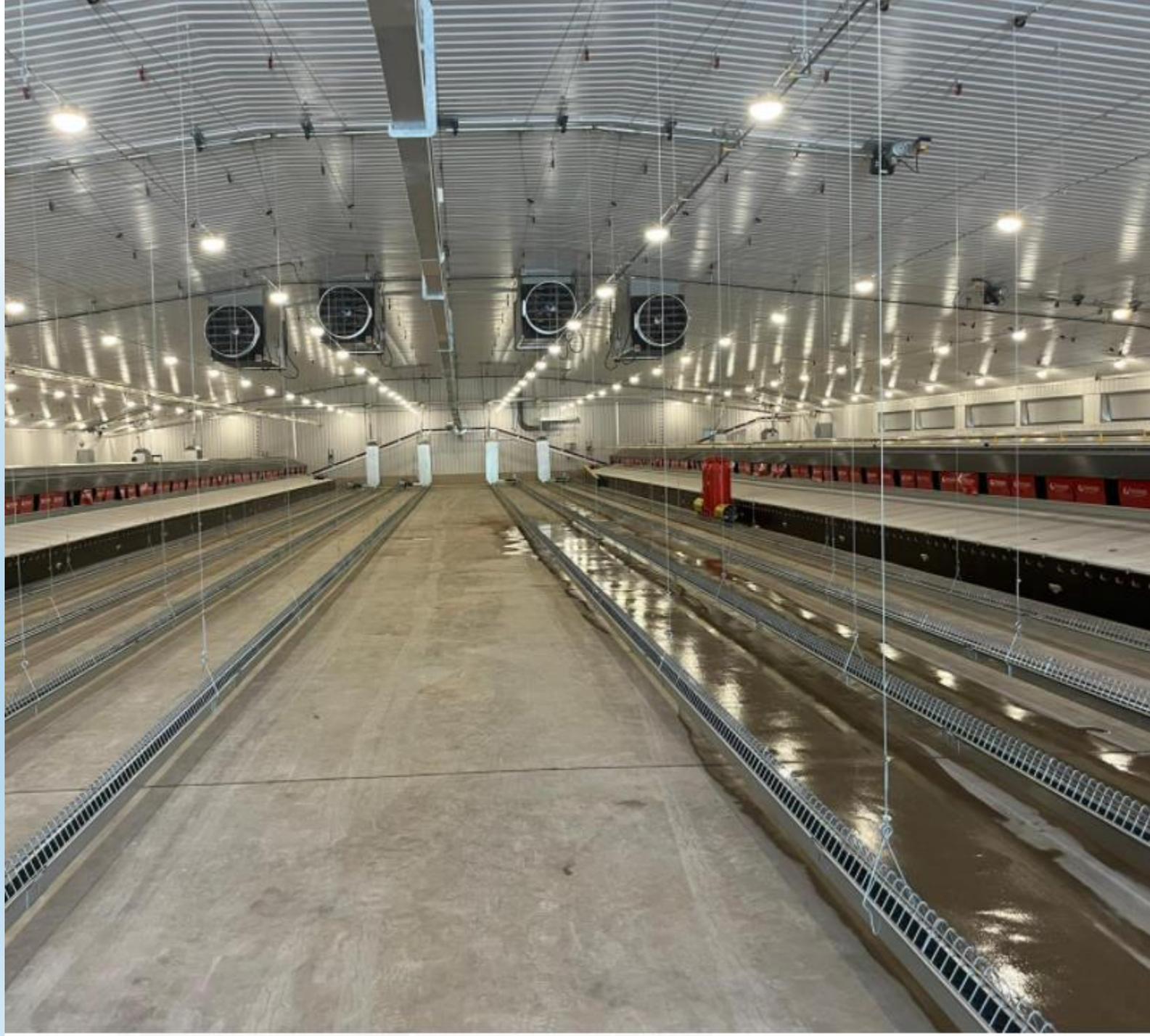
- **Surface area vs Depth**
 - More depth = more resistance to air
- **Empty Bed Residence Time (EBRT)**
 - Time for air to pass through the system
 - The longer the better
- **Density of the filter material**
 - Greater density = more resistance
 - Greater density = better filtration
- **Keeping the filter damp**

Some Key Metrics - Biofilter

- MXVR = 147,200 m³/hr
- Temperature lift = 2.25 °C
- 1 air change per = 2.8 mins
- Biofilter = 180 m²/room
- Bark depth = 25 cm
- Air thru biofilter = 0.25 m/s
- Residence time = 3-5 s
- Pressure (50% void) = 50 Pa

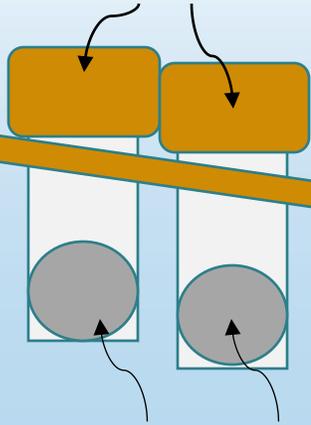


- 4 x draperAVI-AIR units
- Positive pressure to bio-filter
- 147,000 m³/hr
- Full recirculation to full ventilation
- Zone Control
- Variable speed EC fans



Ventilation system and bio-filter

Fresh air intakes



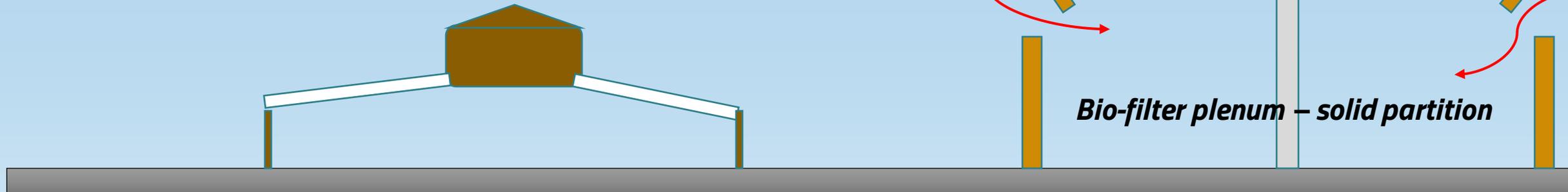
Variable speed intake and recirculation fans

Exhaust air to bio-filter plenum

Spray system for wetting the biofilter

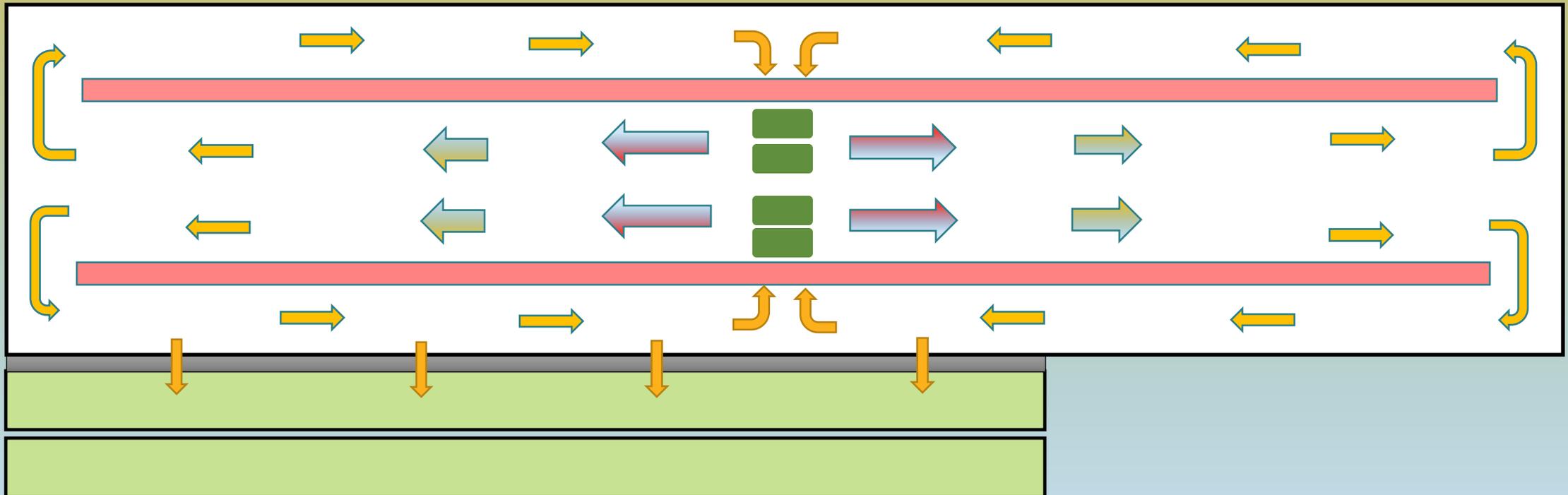
Clean air via bio-filter

Bio-filter plenum – solid partition



Air Mixing

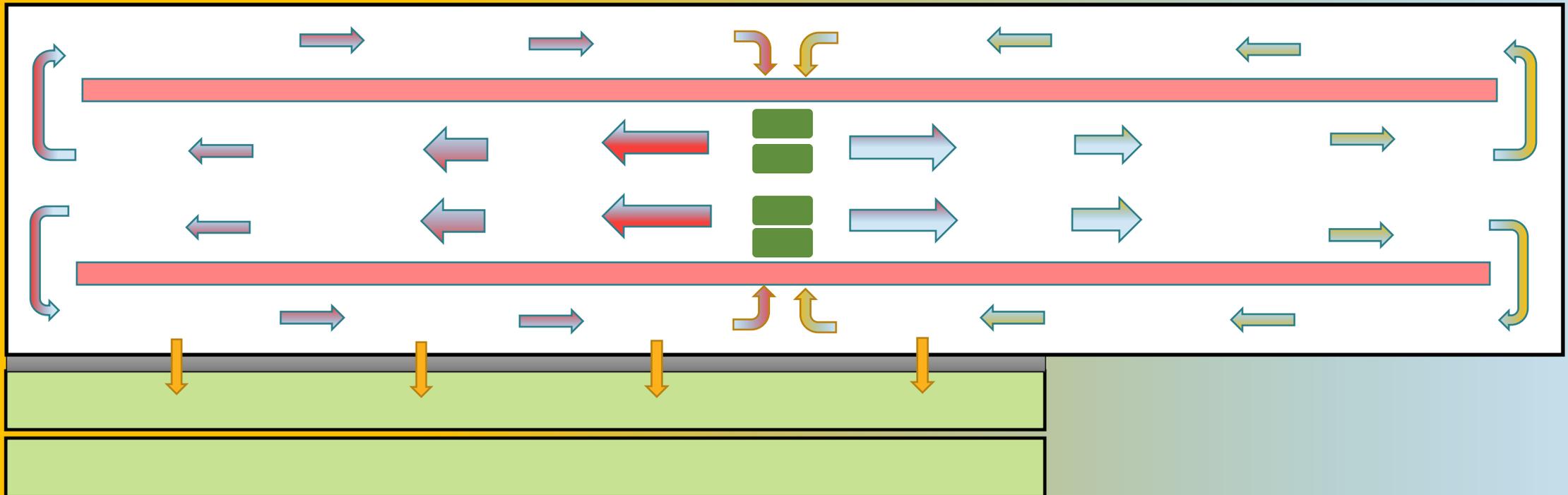
Positive Pressure Exhaust to Biofilter



ZONE CONTROL

Warm up

Cool down



Variable Fan Speed High Floor Air Speeds at Max Vent

