Josiah Quincy & Boston Arts academy
Mitigation:

Two site strategies:

1. Use building to shield open space from highway
2. Create indoor atrium space with clean air
Figure 52: The “green lung” concept is shown with an atrium full of vegetation and trees. The building is shown incorporating plants and natural light throughout. A pedestrian bridge is shown connecting the school building to the rest of Chinatown.
Josiah Quincy Upper School & Boston Arts Academy  Chinatown, Boston

Building a Green Lung
• Atrium divides two schools
• Provides “outdoor” common space

Tactics Utilized:
• Air Inlet locations
• Filtration
• Tight envelop
• Vegetation in atrium
• Decking over highway

Ventilation and Filtration with Atrium

Conditioned Atrium  Tight Exterior Envelope

Filtered Air Intakes

Interior open space inspired by Ford Foundation Building

Drawings by Giamportone Design
### Chinatown Neighborhood Mitigation Strategies

- Increase highway decking
- Expand vent system to reduce end-of-tunnel plume

*Figure 51: Natural and powered ventilation and filtering could be integrated into buildings as well as stand-alone ventilation shafts.*

*Drawings by Giampontone Design*
Josiah Quincy Upper School & Boston Arts Academy Chinatown, Boston
Chinatown Neighborhood Decking diagram
Josiah Quincy Upper School & Boston Arts Academy Chinatown, Boston
Josiah Quincy Upper School & Boston Arts Academy Chinatown, Boston
Josiah Quincy Upper School & Boston Arts Academy  Chinatown, Boston
Josiah Quincy Upper School & Boston Arts Academy  Chinatown, Boston

Program Distribution
For Air Quality
Josiah Quincy Upper School & Boston Arts Academy Chinatown, Boston

HVAC Design
Supply Air Intake Location

• Centralized Fresh Air Intake at rooftop level

• MERV 14 filter at RTU
### HVAC Classroom System Options

<table>
<thead>
<tr>
<th>HVAC System 1</th>
<th>HVAC System 2</th>
<th>HVAC System 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rooftop Air Handling Unit</td>
<td>Room air</td>
<td>VAV Box</td>
</tr>
<tr>
<td>Supply air</td>
<td>Return</td>
<td>Perimeter Radiation</td>
</tr>
<tr>
<td>Room air</td>
<td>Conditioned recirc. air</td>
<td></td>
</tr>
<tr>
<td>Conditioned mixed air</td>
<td>Supply air (constant volume)</td>
<td></td>
</tr>
<tr>
<td>Perimeter Radiation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Comparisons

<table>
<thead>
<tr>
<th>Comparisons</th>
<th>Active Chilled Beam (induction unit)</th>
<th>Displacement w/ Passive Chilled Beams</th>
<th>Displacement, Full AC w/ VAV Boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duct/Chase &amp; RTU Size</td>
<td>100%</td>
<td>80-90%</td>
<td>200%</td>
</tr>
<tr>
<td>Air Quality</td>
<td>+</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>First Cost ($)</td>
<td>+</td>
<td>base</td>
<td>-</td>
</tr>
<tr>
<td>Operational Cost ($)</td>
<td>-</td>
<td>base</td>
<td>++</td>
</tr>
<tr>
<td>Energy Use</td>
<td>-</td>
<td>base</td>
<td>++</td>
</tr>
<tr>
<td>Life Cycle Cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remarks</td>
<td>Induction unit utilize only primary air volume to heat and cool spaces, reducing the RTU sizing and ductwork sizing.</td>
<td>Temp. control by chilled or hot water via radiant panels &amp; radiators. Displacement system has some cooling capacity but not enough for full cooling.</td>
<td>Full AC displacement ventilation stratifies the space load by adjusting the variable air volume box.</td>
</tr>
</tbody>
</table>

*analysis in progress...*
Question 5: What are the differences across the scenarios for the 39% WWR set?

**Note:** This comparison set looks more closely at the scenario options for the 39% WWR.

**Bottom Line:** The dimming controls + interior screen controls (column 4) appear beneficial to incorporate because they are providing a 3% increase in savings in total energy and a 7% increase in savings in peak demand reduction. Taking a closer look at where the savings are coming from, there is an additional 10% savings in cooling and 15% savings in lighting.