Microclimate & Human Comfort
Using Deep, Rapid Analysis to Inform Design

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RWDI
19th November 2018
Vertical Neighbourhoods Summit
Toronto, ON
Toronto Is …

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comfortable</td>
<td>30%</td>
</tr>
<tr>
<td>Too Wet</td>
<td>4%</td>
</tr>
<tr>
<td>Too Hot</td>
<td>29%</td>
</tr>
<tr>
<td>Too Cold</td>
<td>37%</td>
</tr>
</tbody>
</table>
Toronto Could Be …

<table>
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<tr>
<th>Condition</th>
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- **Passive Condition Controls**
  - Comfortable: 74%
  - Too Wet: 0%
  - Too Hot: 3%
  - Too Cold: 23%

- **Management**
  - Rain Protection
  - Wind & Sun Management
Thermal Comfort in Toronto

- Cold Stress
- No Thermal Stress
- Heat Stress
Thermal Comfort in Toronto

The graph depicts the temperature conditions in Toronto throughout the year, categorized into three stress levels:

- **Cold Stress**: Represented by blue shades.
- **No Thermal Stress**: Represented by green shades.
- **Heat Stress**: Represented by red shades.

The x-axis represents the months from January to December, while the y-axis represents the hours from 00:00 to 24:00. The intensity and color of the bars indicate the level of thermal stress at each hour and month.
Thermal Comfort in Toronto

Opening 21 days earlier

Closing 24 days later

Cold Stress
No Thermal Stress
Heat Stress
Master-planning Hierarchy

- Neighbourhood & Street Orientation
- Massing Manipulation
- Canopies & Landscaping
- Active Measures
Master-planning Hierarchy

- Neighbourhood & Street Orientation
- Massing Manipulation
- Canopies & Landscaping
- Active Measures
  
  - General Design Focus
  - Operational

Impact
Flexibility
Flat Façade

Façade with 6m deep podium

Façade with 12m deep podium
307 Lakeshore
Rating Thermal Comfort

Spring Mornings

Winter Midday

Summer Midday

Summer Afternoon

Percentage of Time Conditions are Comfortable (%)
Raincoat

Partisans
Evaluating Impact
Simulation Results

Open Raincoat Configuration

Raincoat Closed at the Ends, Open at Certain Locations