

OPPDRAGSNUMMER 256261

**STRANDVEIEN 1**

## 1.16 - Vindanalyse

# Wind comfort analysis Strandveien, Lillestrøm



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**Revision history**

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## Bibliography

# 1. Conclusions and Recommendations

- **An installation of a windshield solution on both of the terraces between the tallest buildings is recommended. Also in the park separating the two northern and the two southern buildings, some sort of wind shield is recommended, this concerns the areas closest to the river.**

The wind conditions around the four buildings have been analyzed for a complete year- and for a March-September normal period. The results show that the wind speed exceeds 5 m/s during 6 - 15 % of the time. This level is considered as unpleasant for short-term sitting.

The wind comfort level will most probably improve to tolerable if a windshield solution, such as trees, planks or similar, is installed in the areas. An adequate solution should be further investigated.

- **Along the pedestrian path of the river the wind is considered tolerable for strolling. This was not included in the assignment, therefore no further comments on this is given in the report.**

## 2. Methodology

The main objective of this analysis is to conclude on the wind comfort level in the outdoor areas of the Strandveien project, specifically around the four highest planned buildings close to the river. The methodology used to simulate the wind comfort is described in the following sections.

### 2.1 Simulation model and input data

The modeling of the flow characteristics has been conducted based on a Computational Fluid Dynamics (CFD) model available through the UrbaWind64 software. The calculation has been performed for a height of 1.5 m above the ground or above the planned terraces. The data described in the table below have been used as input to the model calculations.

Input data	Description	Source
Buildings in the project area	3D drawing in STL format	Sweco Norge AS
Neighbor buildings	3D drawing in STL format	Sweco Norge AS
Terrain elevation	Extracted from 3D surface data provided by Google earth via SketchUp. The terrain elevation data cover an area of 2 km x 2 km centered on the project area.	Google Earth
Climatology	Modelled wind speed and direction data for the grid point with coordinates 59.96° N 11.03°E for the period 1993 – 2016.	ConWx Mesoscale Data

## 2.2 The Davenport wind comfort criterion

- Wind comfort in different environments is typically assessed based on the Davenport comfort criterion.
- The Davenport comfort criterion has been defined by Davenport (1972) [1] for different pedestrian activities as presented in the table below.
- This criterion gives the maximum percentage of time during which the perceived wind speed may exceed 5 m/s during a normal wind year.

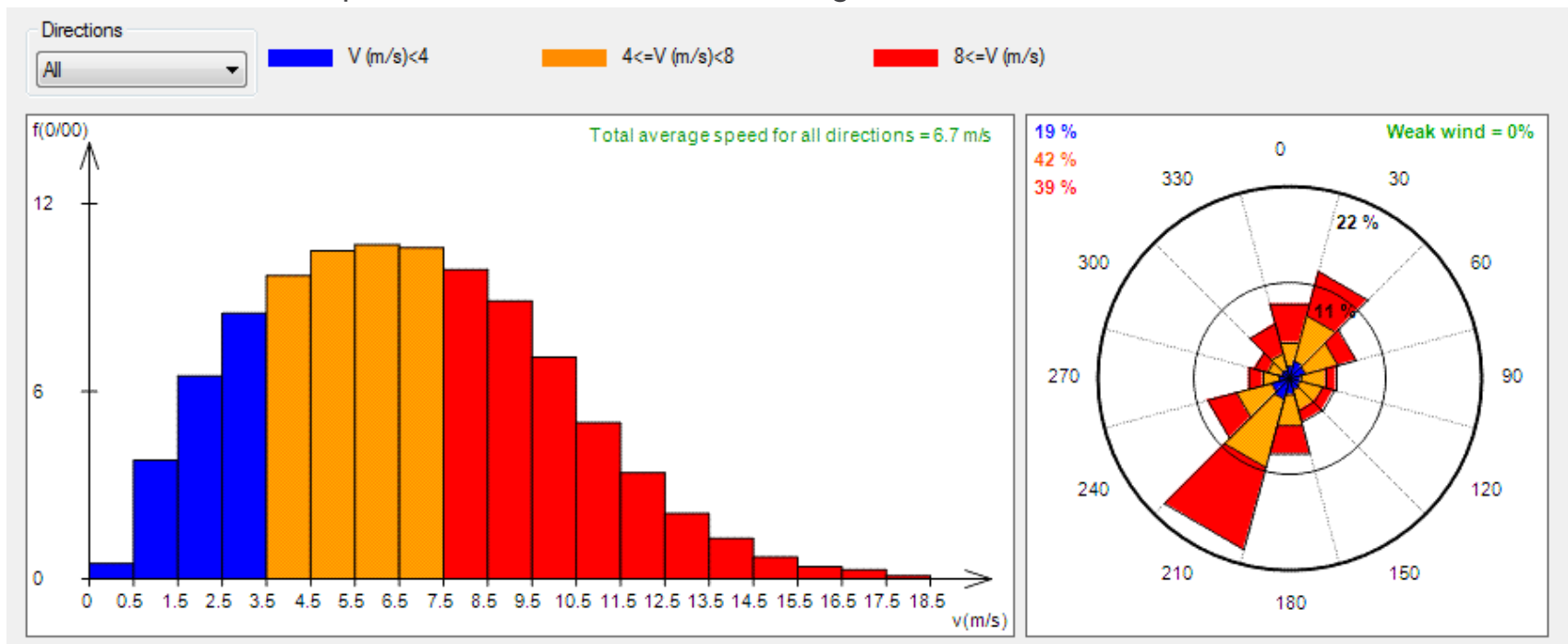
Activity	Davenport criterion		
	Tolerable	Unpleasant	Harmful
<b>Cycling, walking fast</b>	43 %	50 %	53 %
<b>Strolling</b>	23 %	34 %	53 %
<b>Sitting for a short period of time</b>	6 %	15 %	53 %
<b>Sitting for a long period of time</b>	0,1 %	3 %	53 %



### 3. Results

#### 3.1 Long-term wind conditions at the site – Complete year

- Predominant wind directions are southwest and northeast.
- The mean wind speed is 6.7 m/s at 150 m above ground level.

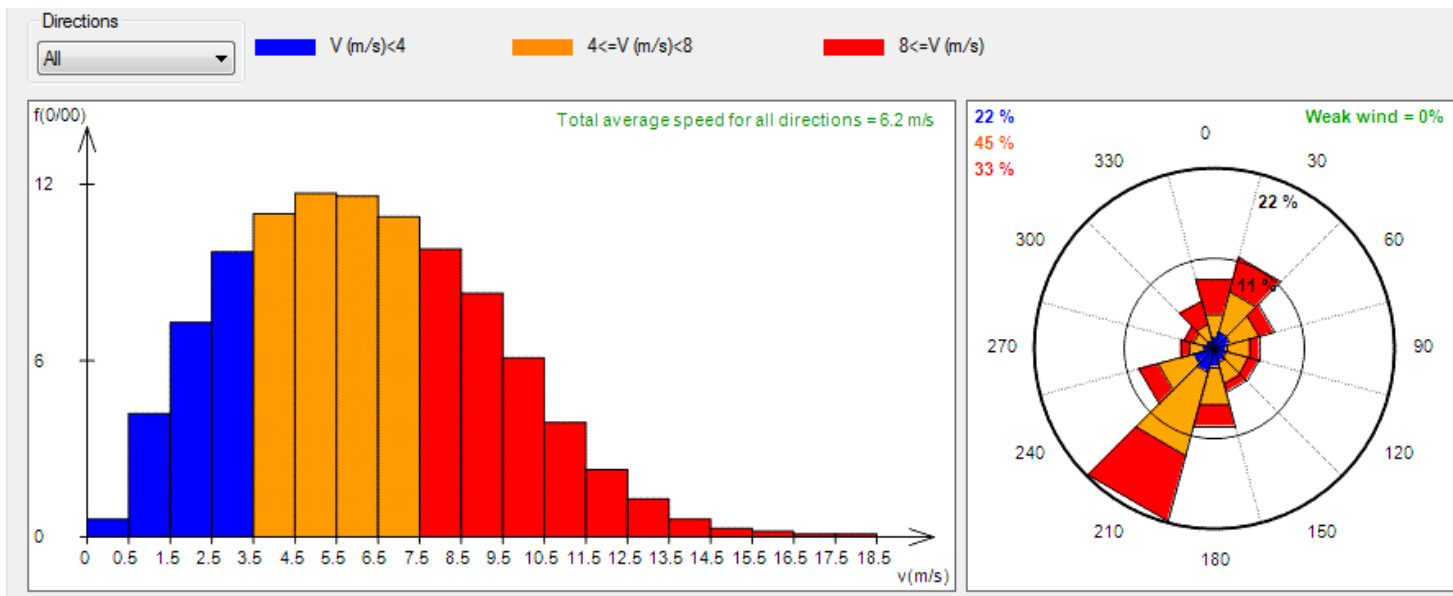


Wind speed histogram

Wind speed rose

### 3.2 Long-term wind conditions at the site – March to September period

- The predominant wind direction, southwest, is more frequent during March to September as compared to during a complete year. Northeasterly wind are just as frequent for this period.
- The mean wind speed is 6.2 m/s at 150 m above ground level.

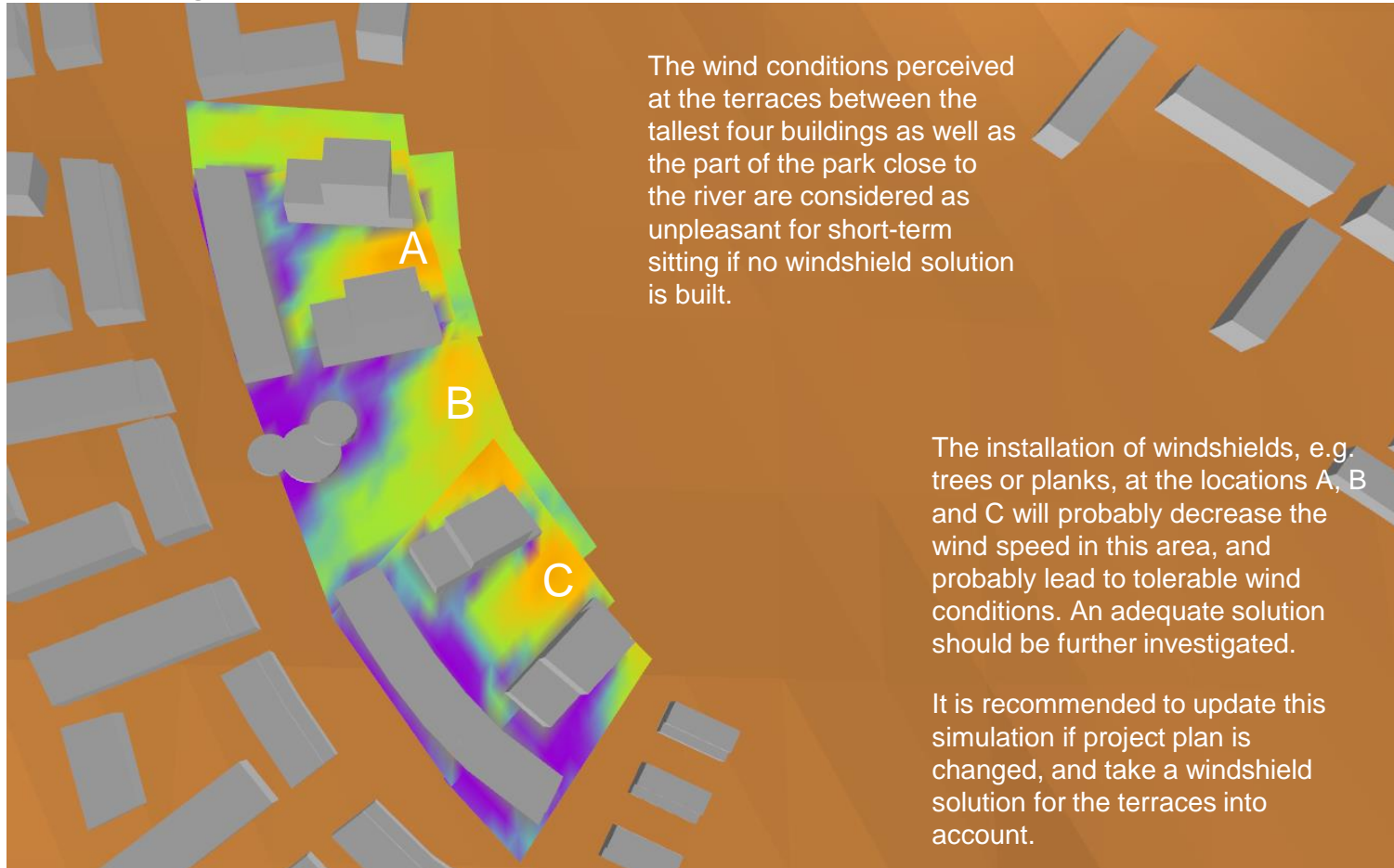


Wind speed histogram

Wind speed rose

### 3.3 Wind comfort for short-term sitting activities

#### 3.3.1 During a normal March to September period



Percentage of time (%) when the perceived wind speed exceeds 5 m/s

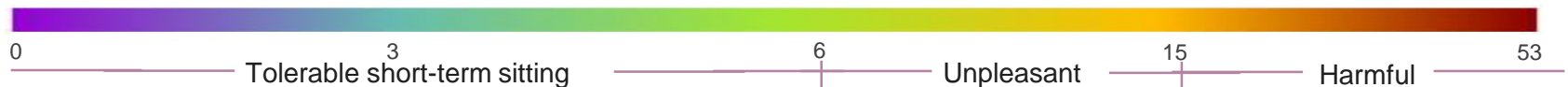


### 3.3 Wind comfort for short-term sitting activities

#### 3.3.2 During a normal year



Percentage of time (%) when the perceived wind speed exceeds 5 m/s



## Bibliography

[1] Davenport, A. G. An approach to human comfort criteria for environmental wind conditions, Proc. CIB/WMO Colloquium Teaching the Teachers, Swedish National Building Institute, Stockholm, 1972