



Using a green wall to reduce heat stress in a school playground

Summary

- 't Vierschip is a school in Arnemuiden village, in the municipality of Middelburg.
- The large area of hard surfaces contributes to heat stress, a risk for the children, so a green wall was installed to mitigate this.
- It will contribute to the city-wide climate resilience strategy by reducing heat stress



Location: Arnemuiden

Arnemuiden is a village within the municipality of Middelburg, in the Netherlands. It covers 1.28 km², of which 1.25 km² is land, and the remainder is water. There is a population of just over 5000 and about 1,985 households with most residents aged 45 years or older. The average air temperature difference between the urban and surrounding areas at Arnemuiden is 0.8 - 1.0 °C.

Description of the site 't Vierschip

The school 't Vierschip' is the only public primary school in Arnemuiden and is located in the Brakenburg II district. There are 130 pupils (2021-2022) and 126 of these live in the village.

The decision-making journey

The local authority, Middelburg, has a policy to increase green infrastructure in school playgrounds across the city as children under 12 are at risk in hot weather. The Cool Towns project has enabled this to be one of the first schools to see this implemented.

- Why was this school selected?
 - The director was open to the idea of greening the playground.
 - The school team engaged themselves to keep an eye on the wall (for the best result on the long term, every green wall needs a ‘caretaker’)
 - Walls are oriented to the south.
- Why was a green wall selected as the most appropriate intervention?
 - There are already some trees on the playground
 - The horizontal space is used for playing
 - The vertical space was available and welcoming to install a green wall because those walls are oriented to the South and when the sun shines, the temperature can rise considerably in the building.
- How were teachers and pupils involved?
 - The pupils and teachers were involved in the planting of the wall (see YouTube video by Middelburg)
 - There were also ideas on vertical gardening courses for pupils in smaller separate walls, but those ideas didn’t come to fruition due to practical reasons.
- How were the plants chosen?
 - Based on past experience by the installer.
 - GreenTecStyle has developed a positive list of tried plants with 130+ perennial plants, based on our experience in past projects.

The plan is contributing to the city’s green initiatives, therefore political support is good for this project.

Implementation

- Due to Covid there was a delay in starting this project
- The implementation of the green wall went smoothly, and no problems have been encountered

Concerns raised during the public consultation:	Reactions after completion
<ul style="list-style-type: none"> • No concerns raised 	<p>Positive reactions from the children and teachers because the pupils helped with planting.</p>

Reflection: what went well/what could have gone better?

This was a great opportunity to involve the children in the planting and this will be considered in future projects.

Indicative costs: please note that costs have been rounded and, while accurate at the time of implementation, can only be used as an indication of cost.

Capital Cost	€	£=1-16€
GTS textile composite	2,500	2,164
Aluminium structure	2,800	2,424
Fertigation unit	2,600	2,251
Installation of Greentecstyle facade system, 5.1 x 2.9m. by Central Park Concepts	1,200	1,039
Drainage gutter: Delivery and installation in the pavement of 5 m1 drainage gutter with hydroblob	625	541
Sprinkler box: setting up irrigation system (water and electricity supplied by the school)	500	433
Planting medium (DAKTUINSUBSTRAAT INTENSIEF)	barely used	
Plants <i>Carex morrowii; Geranium macrorrhizum; Heuchera palace purple; Anemone honorine jobert; Galium odoratum; Sedum herbstfreude; Pennisetum little bunny; Lythrum salicaria; Hakonecloa marca; Liriope muscari; Helleboris niger (replaced at the school for toxicity concerns).</i>	750	649
Total	705 €/m ²	£649/m ²

Maintenance Costs	€	£
The school are carrying out pruning, watering and replacing plants when needed.	350	303
Total annual cost	350	303

Lessons Learnt

- It is a labour intensive process to come to a successful intervention. Always unexpected things happen. Start in time.
- An independent body/ organisation(such as local- or regional authority) have to facilitate the process to come to a decision what intervention will be realized.
- Involve the stakeholders in the design. > creates support for the final design.
- Involve as much as possible young people and children in the realization of the pilots.
- Explain the added value and extra benefits for the different targetgroups/stakeholders. Make clear what is in it for them.
- A good participation process /decision-making –process gives great satisfaction, support and a sense of ownership of the design by inhabitants and other stakeholders. Continuity guaranteed.
- Not all colleagues are yet aware of the importance of preventing heat stress. Involve as much as possible the other colleagues in the implementation of the interventions at an early stage so that they also become enthusiastic.
- It is an integrated process.
- Gives insight into the future management and maintenance costs.

MEASURE OF SUCCESS	EVIDENCE
reduction of PET value (baseline vs result values, comparison with reference point)	3.2°C
size of the area (m ²) with improved heat resilience (the total area that benefits from the measures approximate this by using the same approach used for the initial estimation in the application form)	About 50 m ²
number of daily users benefitting from the intervention (if relevant/available: are there specific times of day or the year when there is heavy use?)	There are 130 pupils and 17 teachers. These will benefit most from the intervention, especially on days with high temperatures.
co-benefits achieved (e.g. biodiversity, pollution reduction, economic benefits, influence on property value, long-term savings, aesthetic improvement, psychological impact etc.)	Biodiversity, pollution reduction, aesthetic improvement, psychological impact.
other results observed	Providing a good example for the children. Education about nature will have a positive effect on future behaviour

Technical and financial specifications

Greentecstyle facade system supplied by Sioen Industries.

<https://greentecstyle.eco/en>

Central Park Concepts

References

<https://www.middelburg.nl/vergroening-zusterplein>

[Onze school - 't Vierschip](#)

<https://allecijfers.nl/wijk/arnemuiden-middelburg/>

<https://www.klimaat-effectatlas.nl/nl/>