

# Miami

## Strategic tree placement and a people-friendly streetscape

### THE CHALLENGE

The city of Miami needs more green, open spaces, as well as an enhanced tree canopy and advanced stormwater management to protect its growing population from the impacts of climate change.

**Many US street designs prioritise vehicles** and include stormwater infrastructure that is engineered without regard for natural systems or downstream impacts. As a result of significant concrete surface areas these designs can also influence urban heat island impact. Stormwater runoff continues to impact the city's streets and flood private properties. Mitigating this runoff will reduce vulnerability for other "downstream" neighborhoods in low lying areas.

In addition to stormwater issues, the City of Miami has many deficient tree canopy zones. This significantly increases the impact of urban heat island effect throughout its different neighborhoods. With adequate space for natural elements along with porous paving systems, **trees can provide natural cooling environments, more comfortable public spaces and capture significant amounts of rainwater during significant weather events.**

Miami's project aims to address the city's vulnerability to stormwater and urban heat island impacts (which exacerbates high temperatures and can lead to severe health impacts) while improving mobility through a shared civic space.

### KEY FACTS & FIGURES

- Miami population: 470,914.<sup>1</sup>
- In 2050, the temperature of Miami is expected to increase by 1.34 degrees.<sup>2</sup>
- Miami has a mainly tropical monsoon climate and a drier season in winter.<sup>3</sup>
- Miami has an average elevation of 6 feet NAVD.

<sup>1</sup> *American Factfinder, Profile of General Population and Housing Characteristics: 2010*. US Census Bureau. Archived from the original on March 5, 2014. Retrieved October 21, 2011.

<sup>2</sup> Bastin, J.F. et al., *Understanding Climate Change from a global analysis of city analogues*, PLOS, 2019, <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0217592>

<sup>3</sup> *'Weather: Miami, Florida'*. Weatherbase. Retrieved March 30, 2015.

- Miami's geographic location and low-lying topography makes it vulnerable to flooding and storm surges.<sup>4</sup>
- Miami has seen an increase in urban flooding.<sup>5</sup>

## THE SOLUTION

### Wynwood living street – a reimagined streetscape

The project in Miami is called the NW 3rd AVE Woonerf, a **shared pedestrian friendly streetscape that aims to encourage alternate modes of transit**. The shared streets are intended to function like linear parkways, offering green spaces to accommodate pedestrians and cyclists with limited vehicular traffic.

The pilot project design began in May 2018 using in-depth analysis and extensive public outreach involving community stakeholders, business owners and surrounding residents. Research was undertaken to see how the street tied into the region's overall hydrology network and how its landscape design could mitigate future heavy rain events downstream. The project proposes strategic tree placement along the street. The porous pavement and phytoremediation in the root zone of trees, alongside the connected structural soil zones under the street, would capture and detain stormwater to prevent downstream flooding. It would also assist in increasing green spaces creating a cooler urban streetscape. **The new green infrastructure system would store and treat approximately 1,000 gallons of water per tree.**

Monitoring the performance of these systems will leverage the city's investment in the project and enable a feedback loop to improve sustainable and resilient streetscape standards that can adapt to and mitigate climate change. A robust sensor network would monitor the performance of the streetscape design on flood mitigation and heat island effects.

The total carbon savings will also be assessed against traditional treatment and baseline stormwater impacts. Overall, the project is expected to have a positive effect on carbon and greenhouse gas emissions.

## THE BENEFITS

The new vegetation further reduces flood risks and the shady canopy contributes to cooling, thus reducing the urban heat island effect. The interweaving tree roots prevent the trees from toppling in the wind, and the canopy provides natural habitats and enhances biodiversity.

The reduction in vehicles and increase in pedestrians and cyclists will have a positive impact on air pollution and greenhouse gas emissions. The project will also make the urban streetscape a place to integrate civic space and resilient infrastructure. The new green, open space will provide public gathering places to foster community action and spark interest in climate solutions.

<sup>4</sup> Miami Beach Rising Above, [retrieved December 17, 2019, http://www.mbrisingabove.com/climate-science/sea-level-rise/](http://www.mbrisingabove.com/climate-science/sea-level-rise/).

<sup>5</sup> Miami Beach Rising Above, [retrieved December 17, 2019, http://www.mbrisingabove.com/climate-science/sea-level-rise/](http://www.mbrisingabove.com/climate-science/sea-level-rise/).

## PROJECT LEADERS

The project is led by David Snow, the chief of urban design in the City of Miami's Planning Department and executed in partnership with Local Office Landscape and Urban Design (LOLA), a science-driven design practice that prioritises ecology and metrics as design drivers. Community stakeholders, business owners and residents were involved with the pilot project.

The City has collaborated with many different agencies and stakeholders to create the proposed pedestrian friendly sustainable streetscape.

The urban heat island impacts will be monitored in partnership with the Urban Systems Lab at the New School. Water impacts will be studied in partnership with the Sea Level Solutions Centre and Florida International University.

## CLIMATHON AWARDS

Run by Europe's Largest public-private partnership, EIT Climate KIC in partnership with Crowther Lab, the Climathon Global Awards called for cities around the world to engage in climate action and find new systems level solutions to tackle the worsening climate crisis.

With a vision to transform 100 cities into carbon neutral areas by 2030, the awards challenged cities with tackling major issues including air pollution, efficiency mobility and energy systems, and creating sustainable local economies. With a strong focus on 'systemic innovation', the most successful solutions must encompass both domestic and international governance, policy and the financial and market structures that influence behaviour.

The most visionary innovators have been chosen to attend the Climathon Global Awards Ceremony on 31 January in Paris during the ChangeNOW summit, where all finalists have the chance to win funding and expert support to make their ideas a reality.