



THE RESILIENCE OF MOTORWAY INFRASTRUCTURES TO THE PHENOMENON OF CLIMATE CHANGE

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CLIMATE CHANGE STUDY CENTRE

The CCSC was established with the aim of:

Providing useful information on the state of the art of "resilience" issues and maintenance management of the roadside vegetation in the road and motorway sector;

Promoting the exchange of good practices between experts in the field and end users;

Proposing project initiatives aimed at the implementation of good practices and research and development activities on issues relevant to the project.



VISION and the idea of strength:

Climate change in the form of increasingly frequent extreme weather events has a strong impact on transport infrastructures and their efficiency.

It is essential to intervene with *new, complete and multidisciplinary tools* in order to guarantee the conservation of transport infrastructures and enhance its resilience to climate change.



PREMISES BEHIND THE PROJECT

Several *effects of climate change* have already been observed on soil and vegetation, such as anticipation of flowering periods, lengthening of the growing season, changes in natural cycles of plants, and uncontrolled spread of invasive alien species.

These effects produce, and will produce in the future, a great impact on the state of health of infrastructure networks.



Uncontrolled growth of invasive plant species on transport infrastructures

CCSC'S FIRST PILOT STUDY

The CCSC's first *pilot study* consists of an analysis of three sections of motorway operated by CAV (Concessioni Autostradali Venete) in North Eastern Italy.



OBJECTIVE OF THE STUDY

The simulation of an optimal scenario through the application of Kassandra will allow to hypothesize a series of *sustainable environmental mitigation and compensation measures*, and to *identify the best intervention to be adopted*.

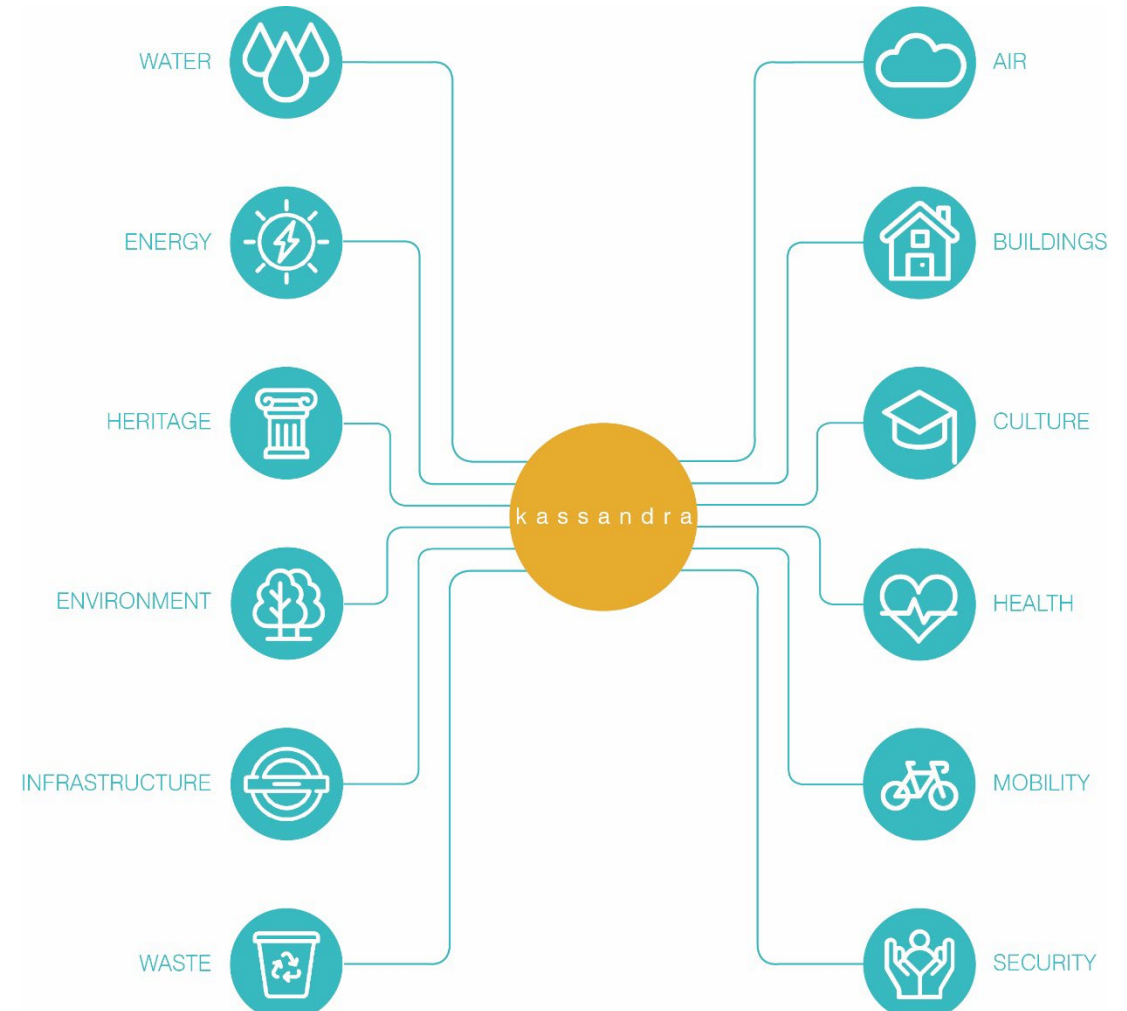
This will allow for the optimization, both technically and economically, of the infrastructure and roadside vegetation maintenance and management plans, increasing the period of full efficiency of each infrastructure.



WHAT IS KASSANDRA?

Kassandra is the first **Integrated Decision Support System (IDSS)** that facilitates the creation, development and management of a truly **resilient** urban environment.

With Kassandra it will be possible to improve city planning and resource management, with the aim of enhancing the natural and built environment and the **quality of life** of its inhabitants.



The analysis of Cassandra is based on **twelve main parameters** and **hundreds of sub-parameters**, and the relationship between them.



PILOT STUDY

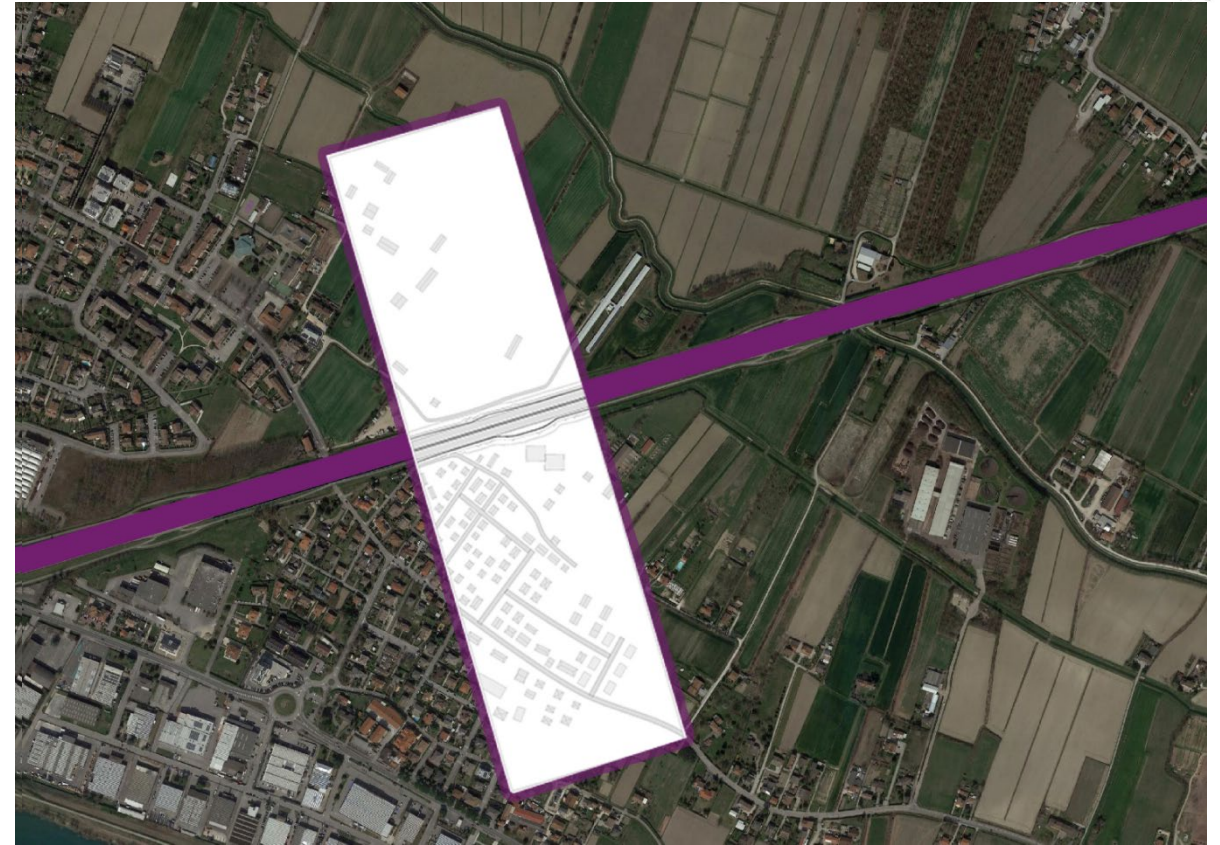
The study analyzes the current condition of the sites and identifies initially an overall *resilience index* based on Cassandra's methodology, and subsequently proposes different scenarios based on the alteration of the above-mentioned parameters.



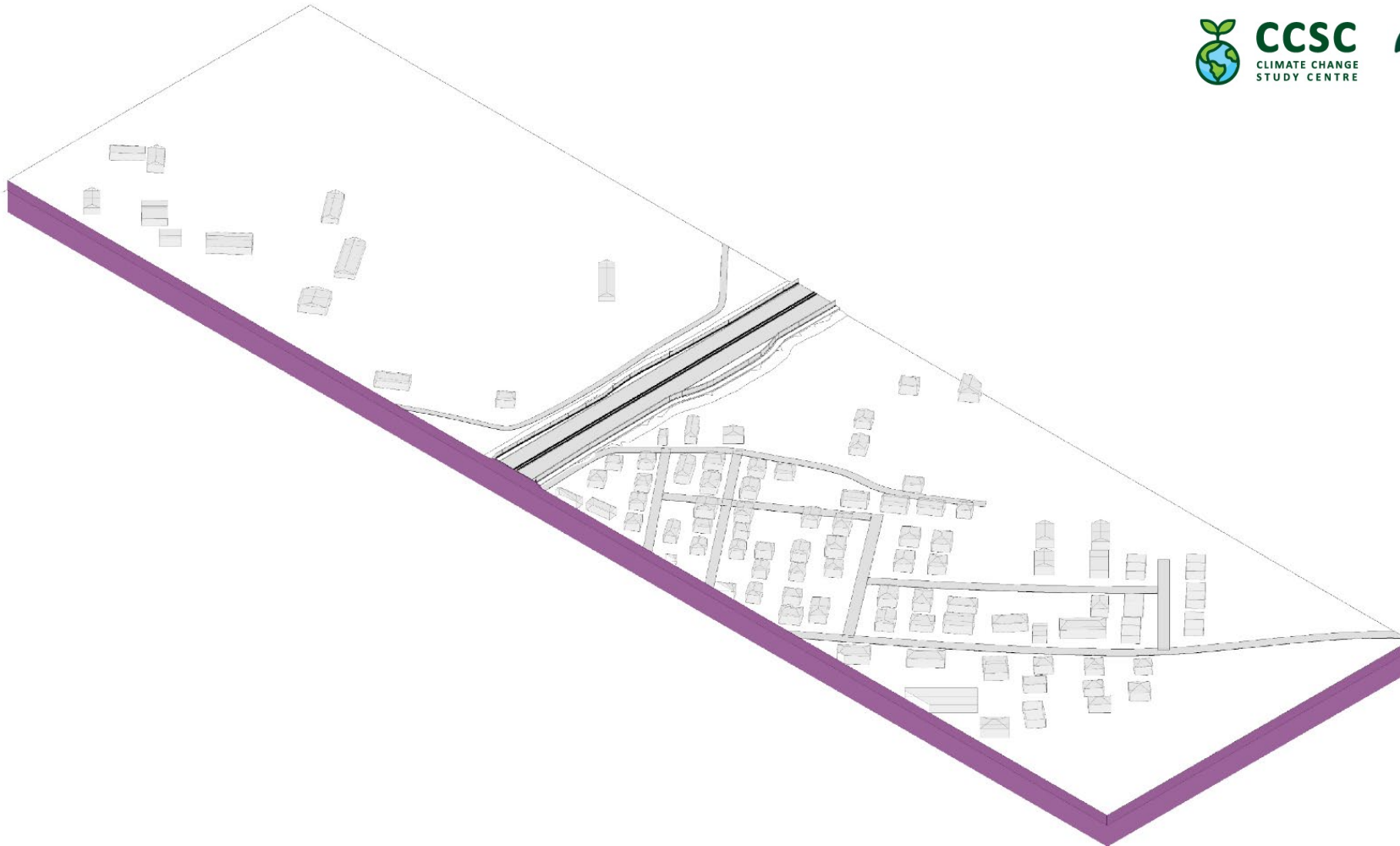
PILOT STUDY AREA

The brief was to study **three sections** of motorways operated by CAV, which are representative of typical issues that are present throughout the network.

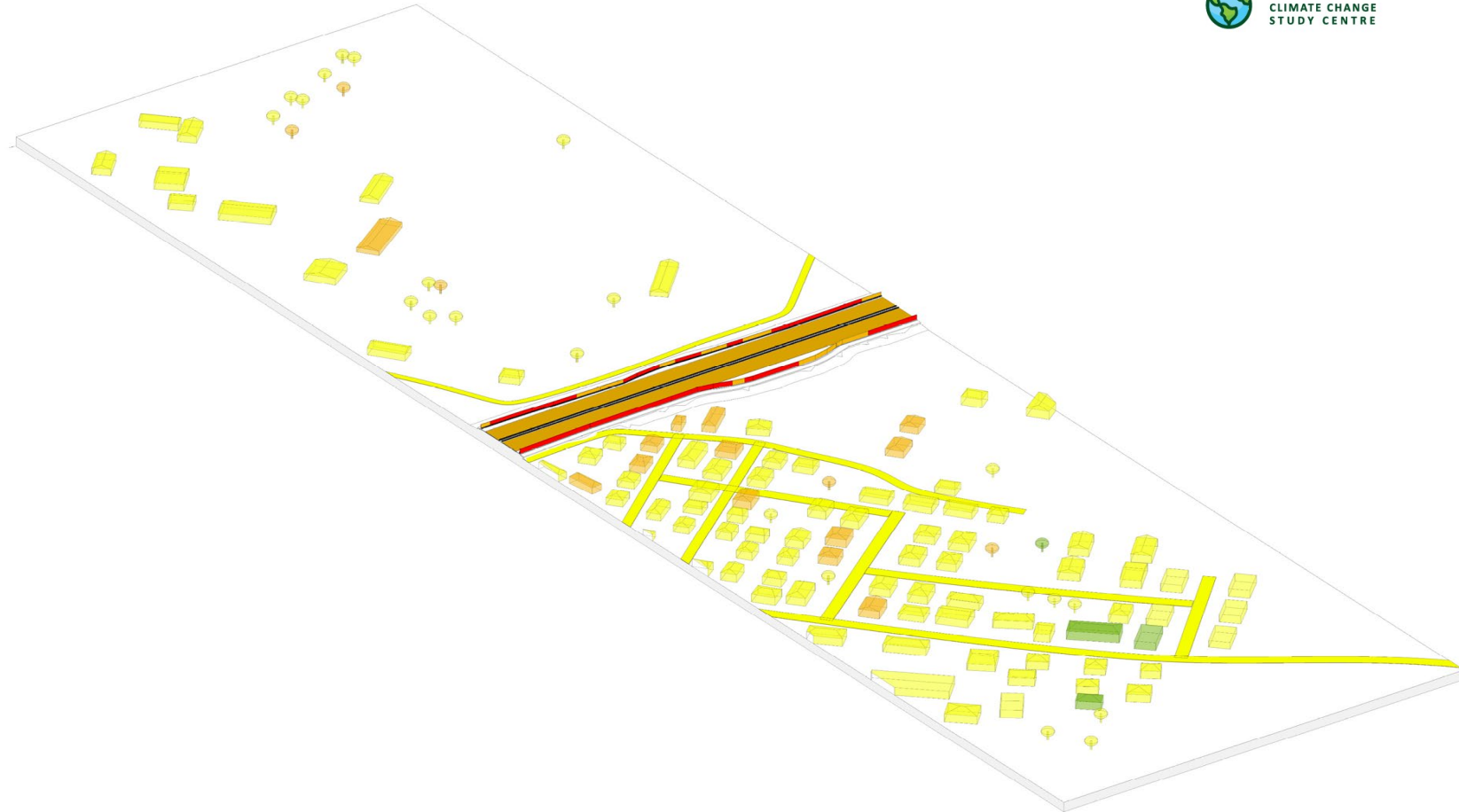
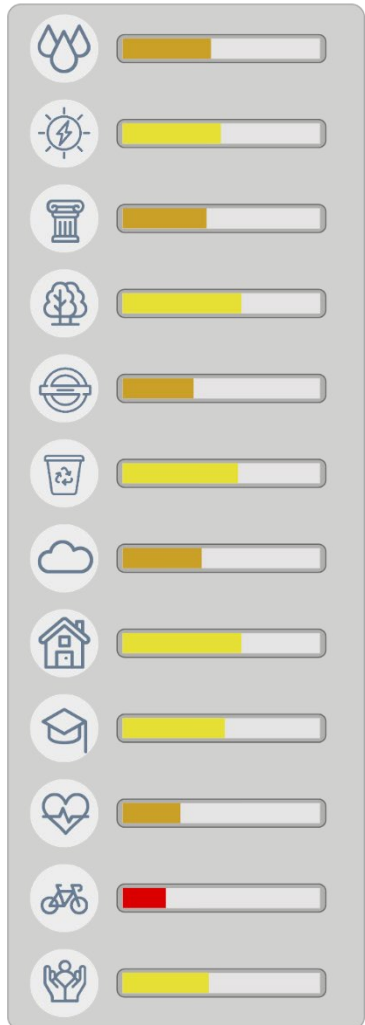
The study area of this example consists of a section of **300m** of motorway and a **500m** strip either side that encompasses agricultural land and, crucially, **inhabited areas**.



DIGITAL TWIN



CURRENT CONDITION RESILIENCE INDEX – 54%





Thank you!



Valerio Molinari

Company's Majority Shareholder
ECOGEST SPA

Mark Cannata

Architect and Co-founder
KASSANDRA Srls



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