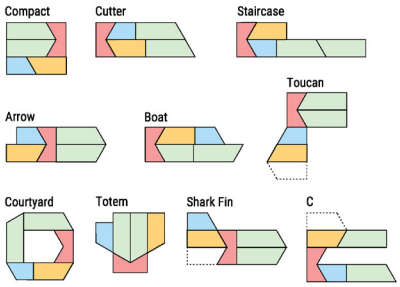


Loose Parts

> *In any environment, both the degree of inventiveness and creativity, and the possibility of discovery, are directly proportional to the number and kind of variables in it.*
> Simon Nicholson.

In his theory of "loose parts", Simon Nicholson defines them as those variables or elements that anyone can play, experiment, discover, invent and have fun.

These variables according to Nicholson can be materials and shapes; smells and other physical phenomena, such as electricity, magnetism and gravity; media such as gases and fluids; sounds, music, motion; chemical interactions, cooking and fire; and other humans, and animals, plants, words, concepts and ideas.

Madrid's Producer District challenge is faced as an opportunity to fill these urban voids through a program that gives back to the inhabitants of the city, adults and kids, not only their relationship with nature but also their inventiveness and creativity and their desire to play, experiment, interact and discover.

The minimum garden

A set of five parts are designed to cover the basic needs of a minimum water-sufficient urban market garden. With these parts the community can play and adapt them to different places and needs, enabling a basic structure for farming in the city and at the same time enhancing their own inventiveness and creativity.

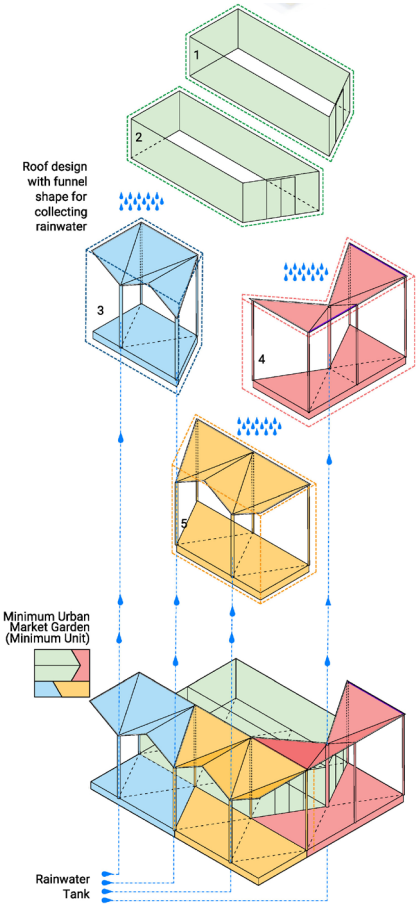
- These parts are designed in a way that the minimum unit can be water sufficient and provide several variables depending on the type of the market garden and its water needs.

- Playing is key when it comes to watering by means of a pumping system that offers different game formats for emptying the accumulated rainwater tanks. This system involves young and old in the care of the vegetable patches that can be done in a playful way while creating an intergenerational community.

- Maintaining the forms of those parts, but changing their program, new spaces equally minimal but flexible and adaptable appear. These are classrooms, grocery shops, restaurants and public spaces.

- Playing is the protagonist in the composition of the pieces for creating public spaces, where certain supports allow younger and older to play with the earth, climb or build their own caves.

All these elements are understood as the "loose parts" with which the community can play, get involved and experiment with movement, materials and forms, physical phenomena, different media such as water, and of course the plants in the garden.



Design Criteria

In addition to proposing a structure that enhances the inventiveness and creativity of its users the project responds to the following design criteria:

1. Versatility and adaptability, being inspired in a composition game that starting from some basic parts with a peculiar geometry, offers different forms of grouping that can be adapted to the different sites.
2. Customization for each operation that allows co-design by the users conserving the characteristic image of the initial system.
3. Conceptual modularity that facilitates optimisation of manufacture, transport and assembly, as the proposed parts are repeated and made up of common elements that facilitate their function and can be assembled in place.
4. The proposed structure is also multi-purposed, as it offers the possibility to adapt with simple changes of organisation between its parts.

Other important design criteria is the economy and sustainability:

1. The minimum unit is water sufficient using rainwater for watering as the best option for plants.
2. Seasonal cycles are considered when it comes to water saving for using during summer months.
3. Playing and exercising is associated with energy production and watering in addition to helping in the involvement and socialization of the community.
4. Solar panels are placed when extra power is needed and day cycles are considered for sunning of the gardens and energy saving.
5. Eco-friendly and durable materials are chosen for the construction.

Finally accessibility is a core design criteria for the minimum unit, the raised garden beds in the gardens and the other services.

Water Sufficiency and Pumping System

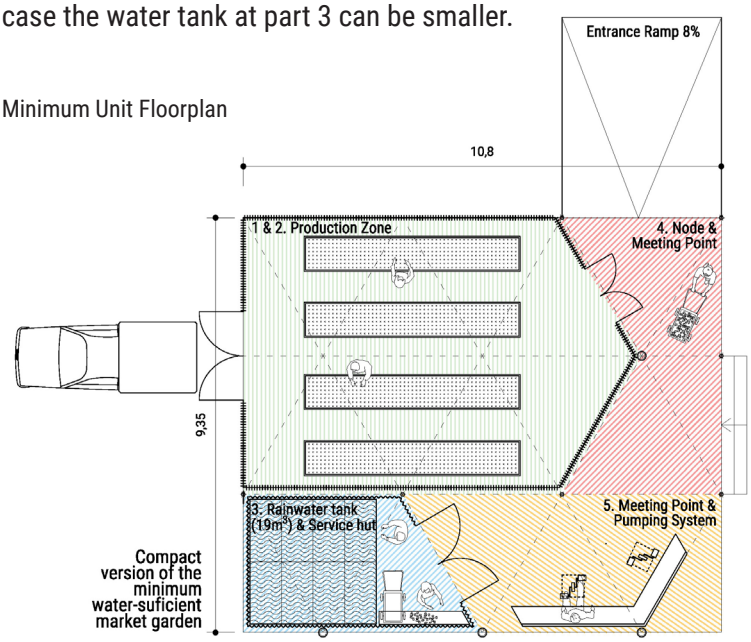
What is special about the proposal of a minimum urban market garden is its water-sufficiency. Its roof has the possibility to collect the rainwater that the vegetable patches need to be watered. This water is stored in a tank and unless extreme drought the minimum unit can always be productive without burdening the city's water resources system. Moreover, rainwater is the best option for plants, because it penetrates deeper into the earth than drinking water and carries nutrients to deep areas of the roots.

More detailed, the minimum water-sufficient market garden is made up of five pieces that compactly occupy a 10.8 x 9.35 m rectangle, although they can be combined in other ways to better adapt to different contexts. The water collected in the roofs of parts 3, 4 and 5, (see belllow) is stored in the tank at part 3, and covers the water needs of 15 m^2 garden beds at parts 1 and 2.

Pumping for watering with accumulated rainwater can be done manually, without the need for electrical energy, since a series of games associated with this work is proposed. While the tanks are full of water, the pumping would only be necessary for the watering to be done at a higher speed or if the water level in the tank is lower than that of the raised garden beds (see diagram).

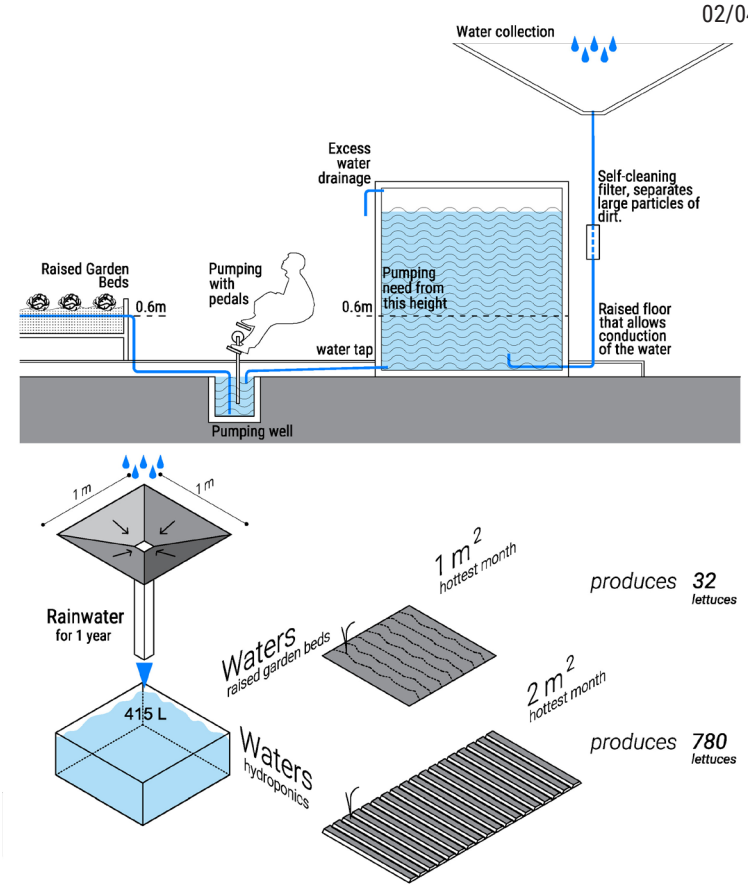
When hydroponic farming is used, part of the water collection roof is replaced by solar panels since this type of farming requires less water but more energy for the water to flow. In this case the water tank at part 3 can be smaller.

Minimum Unit Floorplan



Water Needs Calculus

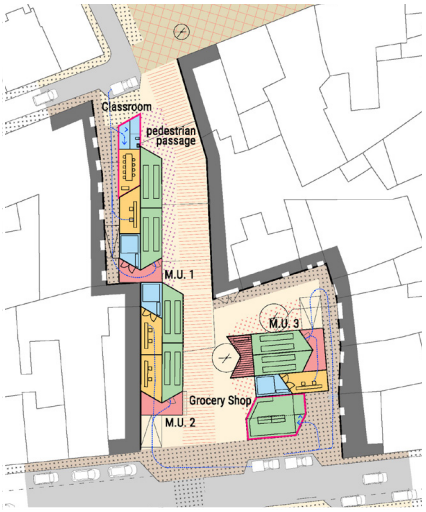
The water needs of the minimum urban market garden have been calculated for the Madrid region, considering the rainfall per square meter and the water needs of a 15 m^2 vegetable patch. According to the data, in Madrid it rains 415 liters per square meter per year. This can water 1 m^2 of vegetable patch during one of the hottest months of the year. To have a water-sufficient 15 m^2 vegetable patch for at least the three hottest months of the year, we need to collect water in a surface of 3x15=45 m^2 per year. These 45 m^2 are the total area of the roof of the minimum unit, that shaped as a funnel leads the water to the tank which can accumulate up to 18,000 liters (necessary to water a 15m2/ vegetable patch during the 3 hottest months of the year). In the case of hydroponics, half the water is needed for the same square meter of farming, so part of the roof is replaced by solar panels as previously mentioned.



A game in every place

The proposal is a game without a specific place, made up of "loose parts" that respond to autonomous conditions. However, the groupings of these parts allow the relationships with their surroundings to be unique and singular, capable of responding to the heterogeneous spatial, urban and landscape situations that arise. They also respond to different situations of management and production of the market gardens that can vary according to the location and dimensions of the sites.

FUENCARRAL. The small neighborhood prototype



Fuencarral Site

Given the situation of a consolidated urban environment, it is proposed to incorporate 3 minimum water-sufficient vegetable gardens that serve as a reference on what can happen in other places. In addition, a grocery shop and a classroom are incorporated. The composition of the pieces allows to maintain the current condition of a pedestrian connection, respecting the current entrances to houses and adding a small urban meeting place. The intervention can work as a neighborhood pilot project that can unify and raise awareness of citizens regarding production and consumption of proximity and care for the environment.

In San Blas F and G sites a larger intervention is proposed that gives the opportunity to reorganize and improve the neighborhood at an urban level and enhance its now wasted qualities, such as wide streets, inter-block gardens and low density. In this case,

community gardens are proposed as an experiment which can lead to a larger project with increased production that prioritizes a social inclusion and a solidarity focus.

SAN BLAS F. A productive solution for the wasted urban fabric.

It is proposed to group the blocks, that are now hypertrophied by vehicular traffic, in a super-block. The resulting public space at the southeast end of this super-block is a large boulevard with urban vegetable gardens that respects the interblock pedestrian crossings. The parts are articulated and composed to respond to the peculiarities of urban geometric encounters so far not resolved. Nine minimum units of water-sufficient gardens, and three additional service units, a classroom, a grocery-shop and a restaurant with their respective toilets are placed. Several public spaces are also created along the boulevard and extra non-water-sufficient vegetable-patches can be added to increase the production, if considered.

San Blas G. A cohesion community garden.

This space between housing blocks is occupied by 8 minimum units of water sufficient gardens which can easily create synergies with the neighborhood as they are practically located in an interior with considerable dimensions but without any specific program at the moment.

The gardens are placed so they respect the entrances to the houses and the permeability of the site. The vegetable patches are located distanced from the buildings, for better sunlight, and respecting the existing trees. An entrance, located to the east corner between calle Alberique and calle Alconera (calle Braceros), is proposed just for vehicles that serve the gardens and need to load and unload goods.

The proposal is capable of settling on hard ground without the need for landslides, while the raised garden beds do not require a site with natural soil and are more comfortable to work with, and accessible for people with reduced mobility.

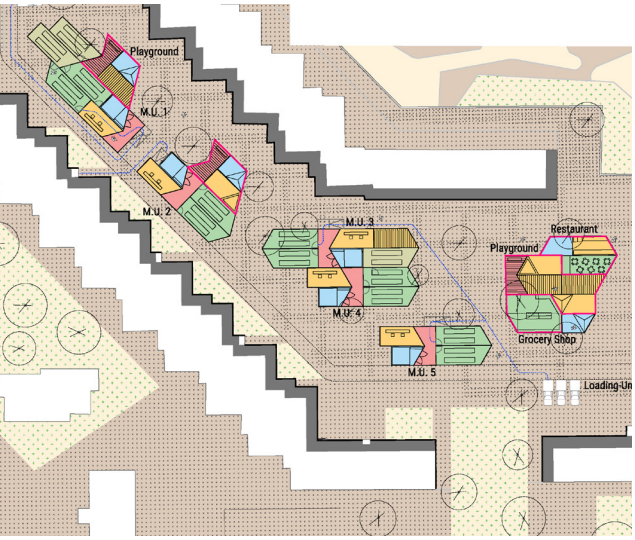
In the middle of the intervention, a space-node is placed with different support services such as restaurant and grocery shop, as well as a public meeting space with playground and shade that is also replicated on more occasions throughout the site.

LAS ROSAS. A productive park.

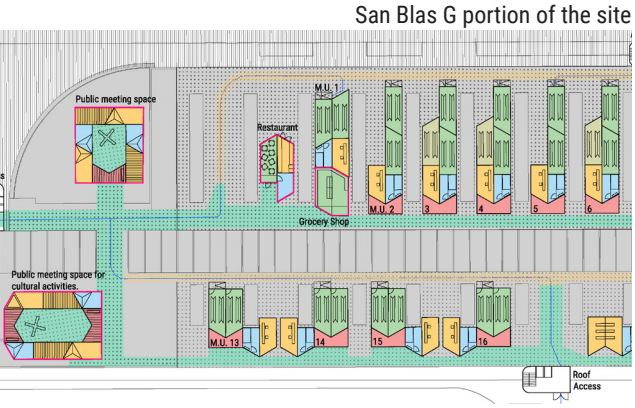
Las Rosas, being the largest of the proposed sites, can become an important productive node. In its case the challenge is to keep the community active and involved in a project of such dimensions. For this reason, a landscape approach is made, creating an urban-productive park that one can visit regardless of whether or not they are directly involved in the gardens. These are organized in clusters that can be managed by smaller groups such as neighborhood associations or small companies, independently and with different purposes (production, community, social inclusion, solidarity) but also prepared so that there is a flow of knowledge and collaboration between them.

Ten farming clusters, seven with raised garden beds and three with hydroponics are installed. Each cluster is made up of a minimum of four and a maximum of five water-sufficient units to which extra vegetable patches have been incorporated. This decision is made given the dimensions of the site but assuming that these extra patches do not have to respond annually to the water autonomy.

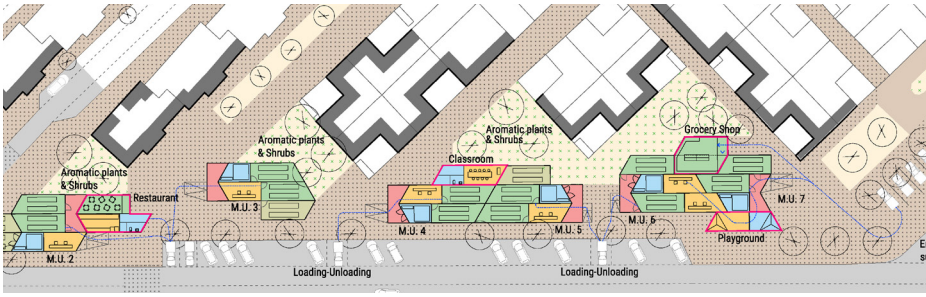
These clusters are distributed along a network of pedestrian and cycling paths that run through the site from north to south and



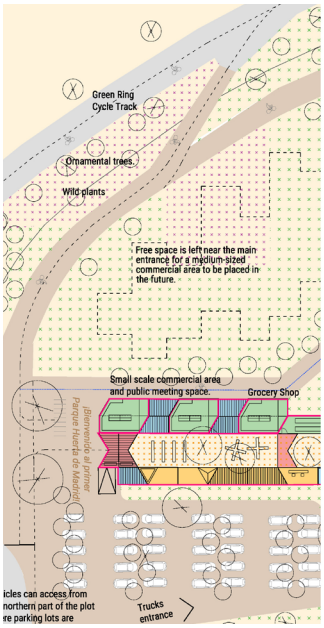
San Blas G portion of the site

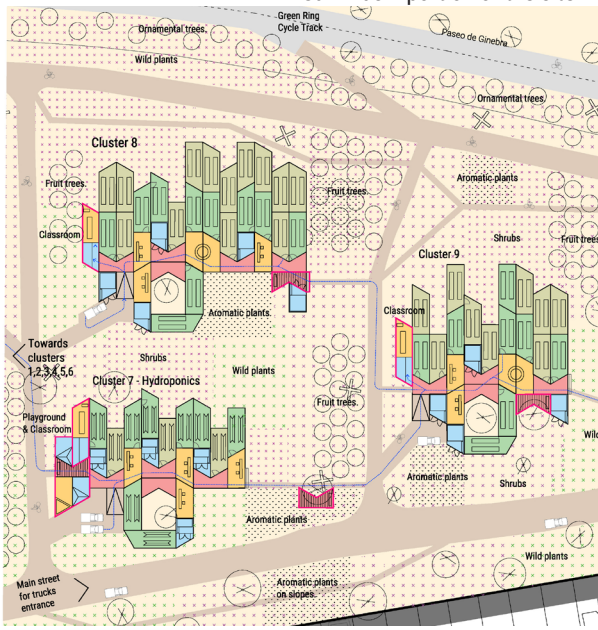


IFEMA portion of the site



San Blas F portion of the site





Las Rosas portion of the site

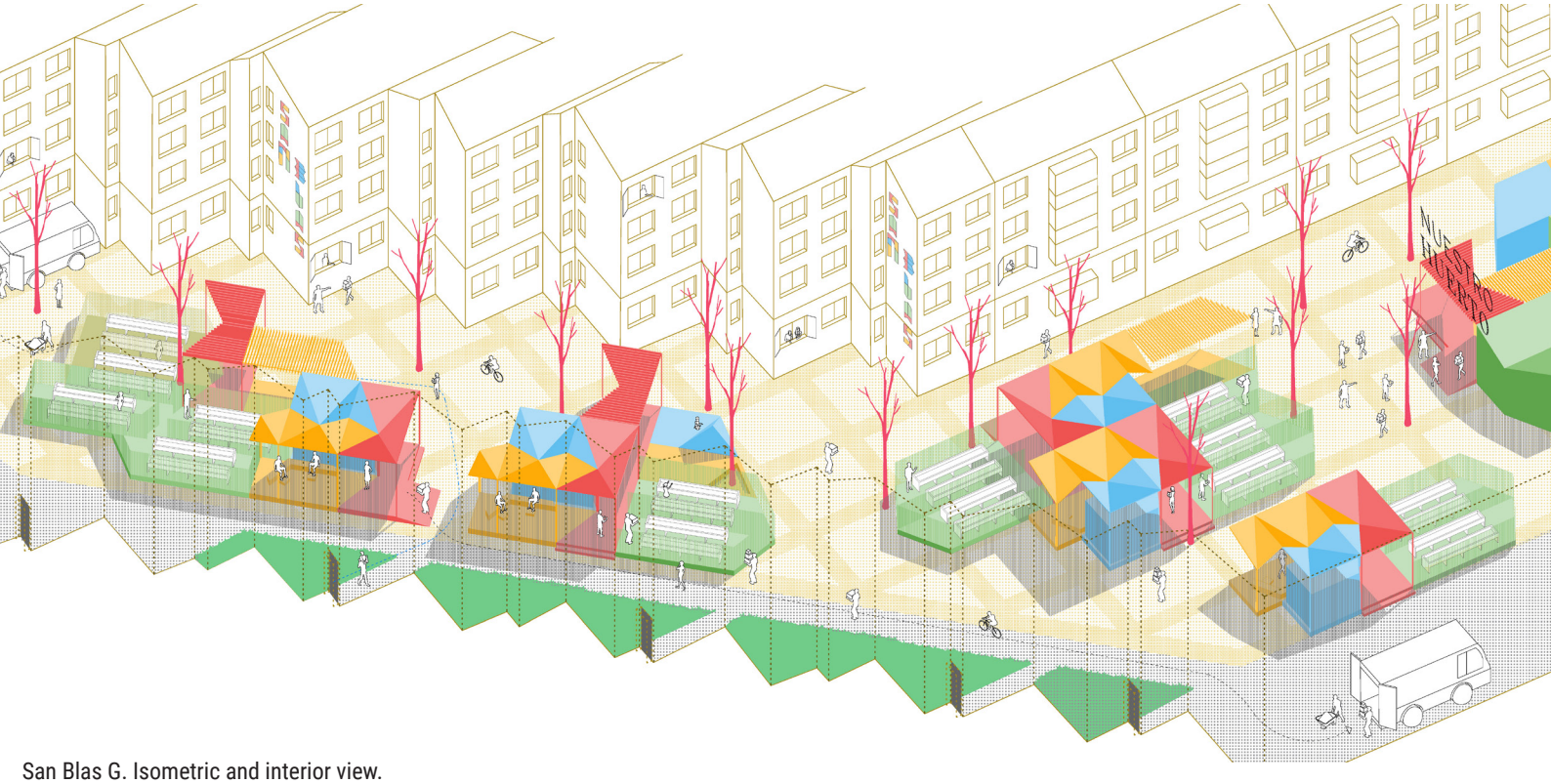
east to west. The variable and permeable structure of the clusters allows pedestrians to pass through them creating an important node over the path network. The area is accessible also by bike from the Green Ring Cycle Track at the eastern part of the site. Both in the north and in the south public spaces with cultural and commercial activities are proposed that are easily accessed from a greater number of passersby.

In addition to a heterogeneity of farming types, a landscaped environment is proposed that favors the corridors of aromatic plants and shrubs. Between the different clusters, space is left for planting fruit trees and on the periphery of the site the ornamental trees are enriched in order to isolate the area from noise and pollution. Some areas are left for wild plants to grow so they can increase biodiversity and create a less artificial landscape.

IFEMA. Productive Roof

Hydroponic farming is proposed for the roofs of the installation pavilion of the IFEMA fair precinct. This type of farming is less heavy to be placed on a roof both due to the absence of soil and its reduced water needs. 24 minimum water-sufficient units are located over the roof of this pavilion which may reach an important yearly production, for example of 14.400 lettuces (or similar numbers of other vegetables). This kind of production in such a reduced space could convert IFEMA roofs, and other roofs of the city, into important productive nodes that could provide quality and proximity food to the city of Madrid without burdening the city's water resources system.

IFEMA, being the most theoretical case, is an optimal urban agriculture experiment with which a very high production could be achieved in a reduced space and with hardly any water consumption. It would require higher technical knowledge but it could become an important pilot project for the city of Madrid that, given its location, at the city's fair precinct, could serve as a local, national and international example for other places and cities.



San Blas G. Isometric and interior view.