



Interview with Jane Martin

Sustainability Meets Beautification on the Sidewalks of San Francisco

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1. Jane Martin, founding director of Plant*SF, whose name "Permeable Landscape as Neighbourhood Treasure" embodies the mutually reinforcing aspects of sustainability and beautification, with an emphasis on place-specific interventions (Photo: Niki Shelley).

“Caught standing knee-deep on the paved sidewalk with overflowed combined sewage up to my knees, I realised: ‘The ground beneath my feet was dry!’ The absurdity was profound.”

—Jane Martin

Compared to a decade ago the public sidewalks of San Francisco have definitely blossomed into more interesting, varied, and sustainable pockets of gardens and biodiversity, owing to the leadership of landscape designer and architect Jane Martin who pioneered and championed the typology. Named by San Francisco Museum of Modern Art as one of the Bay Area's leading experimental designers, Martin is the principal of Shift Design Studio, a San Francisco-certified green business specialising in building and landscape design. However, she also wears the hats of urban planner, artist, educator, and founder of a San Francisco-based nonprofit organisation that focuses on stormwater diversion through public space community planting projects. Founded in 2005, Plant*SF stands for “Permeable Landscape as Neighborhood Treasure in San Francisco”. She shares with *CITYGREEN* her inspiration, motivation, and journey of greening the sidewalks of San Francisco.

CG: CITYGREEN

JM: Jane Martin

CG: What's the background information on the city of San Francisco, leading to your current work on promoting landscapes in the sidewalks?

JM: Within the United States, San Francisco in California today is unique as an expansively proportioned western city with a dense population and an earnest, if relatively recent, commitment to environmental stewardship. The Ohlone people thrived through active management of the rich landscape before Spanish occupation in the

late 1700s. Expanded hastily during the gold rush of the 1840s, San Francisco developed as a street grid pattern overlaid on a hilly peninsula with chaparral vegetation. A 900-foot-high [275 metre] ridge splits the 7-mile-by-7-mile [11.3-kilometre-by-11.3-kilometre] city in two halves: one half stepping down in bluffs to the Pacific Ocean on the western side—with sand deposits extending hundreds of feet deep with a vast aquifer, and one half sloping down on the eastern side to the San Francisco Bay—with a varied geology that includes serpentine rock, clayey soils, and infilled former marshland.

Since 1938, fresh water has been delivered to the city from a snowpack-fed reservoir in Yosemite National Park in the Sierra Nevada Mountains over 160 miles [257 kilometres] via a gravity conveyance system. Located in the centre of the UNESCO-designated Golden Gate Biosphere Reserve, San Francisco also lies within an internationally recognised biodiversity hotspot, with numerous native and endemic species, and serves as an important stopover along the Pacific Flyway bird migration route. The Mediterranean climate, with distinct wet and dry seasons, allows for year-round growing and flowering of a wide variety of native and climate-adapted plants that thrive without irrigation.

Various conditions have proved challenging for city development. Dating from the early 1900s, prior to modern wastewater treatment and environmental regulation, a combined sewer system was established to transfer stormwater and building wastewater to adjacent waterways. By the time treatment plants were established, separating the two was deemed too costly and disruptive. The treatment of all of the combined sewage would result in a higher environmental stand-



- 2. York Street before and after gardening.
- 3. 5th Avenue before and after gardening.
- 4. Jerrold Avenue before and after gardening.

ard than if untreated separated stormwater carrying surface pollutants were allowed to enter waterways.

However, the city's continued development resulted in a dramatic increase in impervious surfaces. San Francisco's streets and sidewalks cover 25 percent of the city's land area—comprising paved open space that exceeds the area of all the city's parks combined [16 percent]. Many right-of-ways [public sidewalks] are excessively wide and the default material for excess areas is impervious concrete. Additionally, until recently, building roof runoff was required to be directed to the sewer. Correspondingly, runoff volumes increased, exceeding the system's capacity with alarming frequency. While overflows have been reduced significantly since the 1970s, they still occurred 31 times in the last year. So, when the system works well, it achieves a high standard of treatment, but when overloaded, combined sewage is not only ejected untreated into the ocean and bay, resulting in beach closures and marine wildlife exposure, but also backs up into streets, homes, and businesses, causing disruption, damage, and the attendant health hazards of E. Coli and Hepatitis A.

With the street pattern set at odds with the steep terrain, spectacular distant views result, and the much loved cable cars were invented to climb them. Less innovative however are the sewer lines, which, following the steep street slopes, direct water at high velocities to low-lying areas on its way to the water treatment plant. As pipes make 90-degree turns to follow the street grid, the force of the water can result in flow blockages and become weak spots, forcing manhole covers to lift dramatically with overflowing combined sewage.

Some negative consequences of development have been less visible. Last seen in the 1940s, the Xerces Blue is believed to be the first American butterfly species to become extinct as a result of loss of habitat caused by urban development—on the sandy dunes of the City's Sunset District. Development pressures continue in the present day though hilltops and canyons have been retained as natural areas.

Further challenging the city's infrastructure performance is a culture of individualism that spreads detrimentally to the determination of public space, whereby, for instance, the decision to plant and care for a street tree is left to each property owner, despite gross cost inefficiency and to the detriment of urban forest health. Likewise, a tolerance of littering, dumping, and property vandalism significantly detracts from the city's overall favourable pedestrian experience.

More people are living in cities than rural areas for the first time in history. This transition to higher density is not without its negative effects. Despite high ridership on excellent public transportation and the city's general walkability, many residents still choose to own cars for infrequent trips. Even without driving them, private automo-

biles are detrimental to the streetscape as they are stored not only on the kerbside but also often on sidewalks themselves. Given that San Francisco's uncommonly wide sidewalks are often equal in width to a driving lane, it is common for cars to even be driven on sidewalks—in direct conflict with children playing and all manners of pedestrians trying to pass.

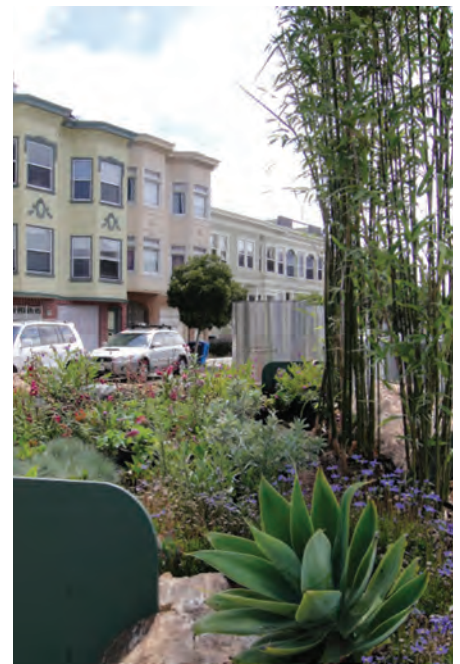
CG: Was there a specific incident that prompted you into action in 2003?

JM: In 2003, into this scene, and rather unaware of it, I undertook my first project in the public right-of-way. With little backyard space to garden and motivated to reduce sidewalk driving after nearly being hit by a car while walking out of my front door, I hazarded to guess that converting a portion of the 14.5-foot-wide [4.42-metre] sidewalk fronting my property to vegetated landscape could affect a positive change. What I didn't anticipate was how difficult the process—and how immediate the positive impacts—would be. Focused primarily on safety and beautification, I sought a permit from the city. At the time there was no mechanism expressly permitting sidewalk landscaping. I was directed to one that permits a private use of public space for private benefit. Technically in place to allow for the intrusion of steep driveways or steps over the property line into the public right-of-way, the Minor Sidewalk Encroachment Permit appropriately carried strict maximum square footage allowances, extensive neighbourhood notification, and hefty fees intended to discourage its use. Regardless, I navigated the process and received a square footage waiver to convert 40 percent of the area from excess concrete to garden. The demolition and installation process took only two days, so virtually overnight the physical condition of the sidewalk had changed from being neutralised by pavement to teeming with life. Bees, butterflies, hummingbirds, and insects were immediately attracted to the area, a surprisingly consistent outcome in all subsequent gardens regardless of location. Curious neighbours appeared quickly to ask how they too could “get to do that”. While I couldn't recommend the permitting experience, after realising the latent demand and potential for larger scale implementation, I was sufficiently motivated to help facilitate a permit overhaul.

CG: Tell us more about the founding of Plant*SF.

JM: To that end, I founded Plant*SF whose name, Permeable Landscape as Neighborhood Treasure, embodies the mutually reinforcing aspects of sustainability and beautification, with an emphasis on place-specific interventions. Plant*SF has non-profit (501c3) status as a Parks Partner of the San Francisco Parks Alliance.

Around the same time, a local parks group had determined that there were insufficient neighbourhood parks in the area and was soliciting input on where new ones could be located—at a time of very



5. Details such as permeable pavers, native species, and local rock mulch make the difference.

6. Surrounded by native *Juncus patens* grass, constructed planters retain fresh soil for fruiting apple trees on the now-depaved traffic islands. All soil from the Guerrero Park project was created by composting tree waste with manure from horses of the mounted police force.

7. The Guerrero Park re-used materials owned by the city. Salvaged from the Golden Gate Park compost yard, logs believed to be from four species of the initial tree planting in 1871 form raised planters.

8. Here a succulent topiary dinosaur sculpture "Trixie" on Valencia Street serves as a quiet commentary on the use of public space for the storage of personal automobiles.

9. The landscape design of Valencia Street emphasises abundance and specificity of place.

10. An *Agave attenuata* is featured in Guerrero Park among flowering climate-adapted perennials and a bamboo wind break in raised planters that elevate plants for ease of viewing.

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—Jane Martin

low property vacancy and extremely high land and development costs. While I couldn't offer an obvious solution for siting a destination park, by way of showing an initial example, I put forth the idea of “parks along the way”. The idea was met with a great deal of enthusiasm and support, in part because notably these improved spaces are much appreciated by seniors and those with mobility issues who have a harder time reaching destination parks. Toddlers also benefit tremendously from the richness of colour, texture, and fragrance that sidewalk gardens place right at their eye level.

CG: What are some landscaping guidelines that you have been promoting?

JM: It quickly became important to articulate the distinction between container gardening on an impermeable surface and removing the concrete to plant directly into the ground as *permeable landscaping*. It is common for urban dwellers to want to elevate the level of plantings, control soil conditions, and contain plants. Many people are surprised that just beneath a three-inch [eight-centimetre] layer of unreinforced concrete sidewalk is the earth itself. To the hands-on gardener, the myriad benefits of planting in soil at grade are quite evident. Containers are subject to moisture loss through exposure to wind and sun, meaning that watering is required even for the most drought-tolerant of plants. Limited soil depth restricts plants from reaching mature size. Nutrients are finite in contained soil and must be artificially replaced. In an urban setting, containers are often the target of vandalism, and require maintenance. By contrast, properly mulched in-ground plantings conserve water, reach mature size, benefit by self-enriching soil, and are very little meddled with. Importantly, down-slope at-grade planting areas have the ability to absorb rain runoff from adjacent pavements. They provide a path for the natural hydrological cycle to function. This reduces energy use of conveying and treating rainwater, recharges the aquifer, exposes soil to air, and increases the lifespan, canopy size, and stability of street trees.

CG: Was there any significant event that boosted the adoption of the permit process?

JM: A year after the initial garden was installed, an unfortunate event happened that brought focus and urgency to the planting cause. During rainfall, the garden, located in a low-lying area of the city, was the site of serious and repeated combined sewer backups. In February 2004, a fast-rushing river of black water [fecal water] that was two feet [61 centimetres] deep covered the garden and street. It came with great force into homes and businesses, floating cars, and trash cans in the street.

Caught standing knee-deep on the paved sidewalk with overflowed combined sewage up to my knees, I realised: “The ground beneath my feet was dry!” The absurdity was profound. In the weeks following the first major backup, two things happened: the garden thrived from the influx of “nutrients” and I was introduced to the leaders of city agencies responsible for the flooding. During a neighbourhood meeting to address damage and how to avoid future problems it became evident that the rainwater volume was the critical issue. City officials looked to the success of my garden as an example of what could be done in addition to hard-pipe solutions to alleviate this overloading. The mayor directed the Department of Public Works and Public Utilities Commission to collaborate with Plant*SF to create a Sidewalk Landscape Permit process.

Vetted from the perspectives of the permitting agency, end users, and project sponsors, and in place since 2006, this permit has seen an average of more than 200 applications per year citywide—sponsored by homeowners, neighbourhood associations, businesses, and schools, representing tens of thousands of square feet of excess pavement converted to gardens. Importantly, the Sidewalk Landscaping Permit recognises this sidewalk landscaping as a private use of public space for public benefit. Its streamlined design allows for property owners to easily initiate the process, maximises de-paving, and financially incentivises neighbours to work together. This benefits the installation with economy of scale and is more efficient for the inspectors. Plant*SF hosts a “How-To” section and references resources on its website. Since establishing the permit, the organisation's efforts are now directed towards providing demonstration projects throughout the city while encouraging city agencies to create a systemic approach to broad-scale implementation.

It has been Plant*SF's mission to demonstrate the benefits of sidewalk landscaping and to reduce the obstacles to achieving its implementation on a city-wide scale—making it the *expectation rather than the exception* within San Francisco's public space. Fortunately, this bottom-up approach is being met by concerted efforts within city government, which in turn is creating further opportunities for citizen participation and a culture of active environmental stewardship. Through the process, the role of the designer has been one of bridging the worlds of regulation and implementation.

CG: How are public agencies involved in this initiative?

JM: Since 2006, the San Francisco Public Utilities Commission Wastewater Division has been instrumental in collecting and analysing data to determine the appropriate role of low-impact design techniques

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such as permeable landscaping. This analysis assists in the strategic implementation, prioritisation, and validation of the investment. They have created aggressive guidelines and requirements for new development and worked with state and local regulating agencies to establish progressive programmes for water reclamation, recycled water, on-site diversion, grey-water reuse, and strategies to replenish local aquifers for emergency freshwater storage and future capacity.

In 2009, the San Francisco Planning Department commissioned me to design two projects in their Pavement to Parks pilot programme, P2P. Guerrero Park is a short-term intervention (of three to five years) that converted 9,000 square feet of excess roadway into a neighbourhood gathering space through the use of planters made of fallen trees. At Naples Green, 8,000 square feet of excess roadway was removed to create a permeable planted oasis. P2P has also pioneered the conversion of parking spaces to “parklets”. In 2012, I designed the first one, sponsored by a residence. Located on Valencia Street, it incorporates a multipurpose deck with large planters and custom furnishings. The planning department has been codifying and popularising more pedestrian-friendly sidewalk and streetscape design, including these alternate uses of the parking lane that increase civic and cultural opportunities. The Green Connections Plan outlines the development of streets and paths as vegetated corridors throughout the city while P2P establishes lively civic spaces in the place of excess roadways. There has even been a study commissioned to map out how the city may collectivise street tree installation and care.

An interagency Better Streets Plan documents a comprehensive standardisation of improved pedestrian, bicycle, and vehicle upgrades for all street types, including expectations for planting and stormwater diversion.


CG: What are some of the benefits that Plant*SF has brought to the city and its residents?

JM: The benefits of permeable landscaping are many. It reduces storm sewer loads; reduces potential for backups and flooding; creates habitat and forage for birds, butterflies, and other wildlife; introduces an abundance of colour and fragrance; provides potential for urban food production; beautifies the neighbourhood; creates opportunities for community interaction; deters crime; can sequester carbon; has been

shown to increase children’s school performance; increases property values; reduces global warming, by absorbing heat rather than reflecting it; increases oxygen production; and recharges ground water.

In addition to reducing stormwater overloads, sidewalk gardens make the city more sustainable by making the everyday experience of the street more enjoyable for all, thereby encouraging walking and socialising. By their very nature, cities are inherently more resource efficient than suburban and rural places. The more pleasant cities are to live in, the more viable they become for a broader spectrum of citizens.

CG: Do you think the model can be applied in other cities?

JM: Despite San Francisco’s inherent geographical and cultural challenges, significant efforts have been made to adapt and improve the city’s inherited infrastructures to suit the needs of its present and future citizenry. I, for one, believe this model can be applied conceptually, if not directly, to cities across the globe, by taking assessment of given conditions, giving special consideration to the specificity of place, engaging designers, ecologists, engineers, and bureaucrats, creating opportunities for direct stewardship by citizens, and by being open to shifting assumed patterns and habits. 

11. In Naples Green, rambling decomposed granite pathways are lined with colourful Anigozan-thus, Astelia, and Romneya coulteri along with fragrant Hummingbird Sage, Lavender, and Rosemary.

12. Detailing in Geurrero Park was intentionally simplified: sheets of painted plywood were inserted into chainsaw cuts in the logs to form sides of the raised planter.





13, 14. The residential parklet on Valencia Street employed a separate permit for each of three zones: parklet (in street), sidewalk landscape, and front yard.

Details of Planting Gardens Along San Francisco's Sidewalks

Text by Jane Martin

Often city-funded through grants targeted at neighbourhood beautification and at rewarding stormwater diversion, Plant*SF's demonstration gardens appear citywide in San Francisco's numerous micro-climates and varying conditions of pedestrian traffic, soil, sun, and wind. They serve as proving grounds for tailored plant palettes and a physical reference of the design guidelines and demonstrate the unique requirements of planting in public space. Through plant selection and design, the gardens seek to establish a distinct sense of place and endear visitors to the project with colour, texture, and fragrance.

The gardens also have a less visible, more sustainable role in permeable landscaping. Water that falls on impermeable surfaces runs downhill until it is absorbed by exposed soil or meets a catch basin, the entry point to the sewer system. Water is absorbed as soon as soil is exposed, regardless of the addition of plantings or other amenities. If there is no exposed ground between the point where water falls and the catch basin, 100 percent of that rainwater enters the sewer system. On the other hand, permeable landscaping is that which allows water and air to penetrate the soil. It may be populated with trees, plants, rocks or other natural or manmade materials. When permeable landscape is covered with impermeable surfaces (paving, sidewalks, buildings, etc.), water is diverted to major waterways, air cannot reach the soil, excess heat is generated, and plants cannot grow.

Reintroducing permeable landscape where it has been covered is extremely valuable to the health of cities and is easily and immediately achievable. It simply requires the removal of impermeable materials and replacement with soil, plant material, rock, or porous manmade materials.

Concrete Removal: Once permitted, concrete is professionally removed and disposed. San Francisco's Zero Waste policy requires all concrete to be recycled. It is converted into base rock and new concrete.

Soil: Native soil is retained and augmented with a planting mix. Most San Francisco native plants do not desire rich soil so amendments are avoided to help suppress nutrient-loving weeds.

Plant Selection and Placement:

Native and climate-adapted perennials, grasses, shrubs, and succulents are specified. Native species may be included as available for their critical role as hosts to local fauna. An emphasis is placed on colour and fragrance as well as habitat and forage of value to insects and birds. Proper plant placement design that takes potential trampling and mature sizes into consideration is essential. In the area of Northern California, rain appears only between October and April. Dormant during summer months, non-irrigated and native landscapes are often dry and brown in colour. Demonstration gardens offer lush alternatives to the more common dry garden appearance of xeriscaping. Thorny, poisonous, and similarly offensive plants are not permitted. Edibles are permitted where soil composition and control permits and harvesting are desired. Notably, lemon trees, fig trees, and artichokes have been used. Species are selected for natural abundance including self-propagation. When non-native species are used, care is taken to specify those that are not invasive. Plant lists are posted at www.PlantSF.org.

Mulch: A single layer of locally sourced 1.5-inch (3.8-centimetre) rock is used to retain soil and moisture. Since the selected plants do not rely on rich soil, rock is an effective low-maintenance option over wood chips, which degrade and need to be periodically replenished. Further, rocks are unpleasant underfoot to dogs, are easy to extract weeds from, and retain warmth into San Francisco's cool evenings.

Groundcover: *Fragaria* (native Beach and Wood Strawberry), *Polygonum paronychia* (native Dune Knotweed), and *Dymondia margaretae* (non-native Silver Carpet) are favourite groundcovers that provide colour, flower, and fruit (for birds) while being tolerant of abuse by dogs.

Edging / Protection: Many property owners desire small fences around garden plots, however these are omitted from Plant*SF projects as they are more of a nuisance and tripping hazard than effective at deterring dog traffic and the accumulation of trash. Properly selecting and placing plants is a more reliable approach, is less expensive, and does not require the ongoing maintenance of fences.

Permeable Pavers: Plant*SF projects use locally produced concrete unit pavers for driveways and paths within the garden. Made of concrete, they are configured with slight offsets to allow water to enter the soil below, while meeting accessibility standards. Set in fine gravel over a compacted rock base, a 90-degree herringbone pattern is used for strength.

Trees: Not all street trees perform environmental benefits equally. In San Francisco, a leafy canopy during the rainy season is optimal for stormwater desynchronisation—slowing down the rate of flow of rain into the sewer. Deciduous trees drop their leaves right before the autumn rains begin, often blocking the flow to the catch basins. Even though trees are not part of the native landscape, Plant*SF projects include as many as possible for their overwhelming benefits.

Decorative Rock: Strategically placed, large decorative rocks provide a target for dog marking while protecting vulnerable edges and corners from foot traffic. Local stone is selected to augment plantings.

Water: November is the optimal time for new sidewalk plantings in San Francisco—just after the most intense heat of the year and as winter rains begin. All Plant*SF projects are established by a brief period of hand watering, usually about three months in duration. Irrigation is neither required nor provided, thereby saving resources, effort, and energy.

Installation and Maintenance: Property owners are responsible for the installation and maintenance of sidewalk gardens. Plant*SF demonstration gardens are installed by volunteers in facilitated planting workshops that teach proper techniques to gardeners at all levels of experience. Material selections and plant placement are designed to be very low maintenance. Once established, light weeding, occasional pruning, and trash removal are the only tasks required.