Trees for People

URBAN FORESTRY IN LANCASTER, PA

CITY OF LANCASTER

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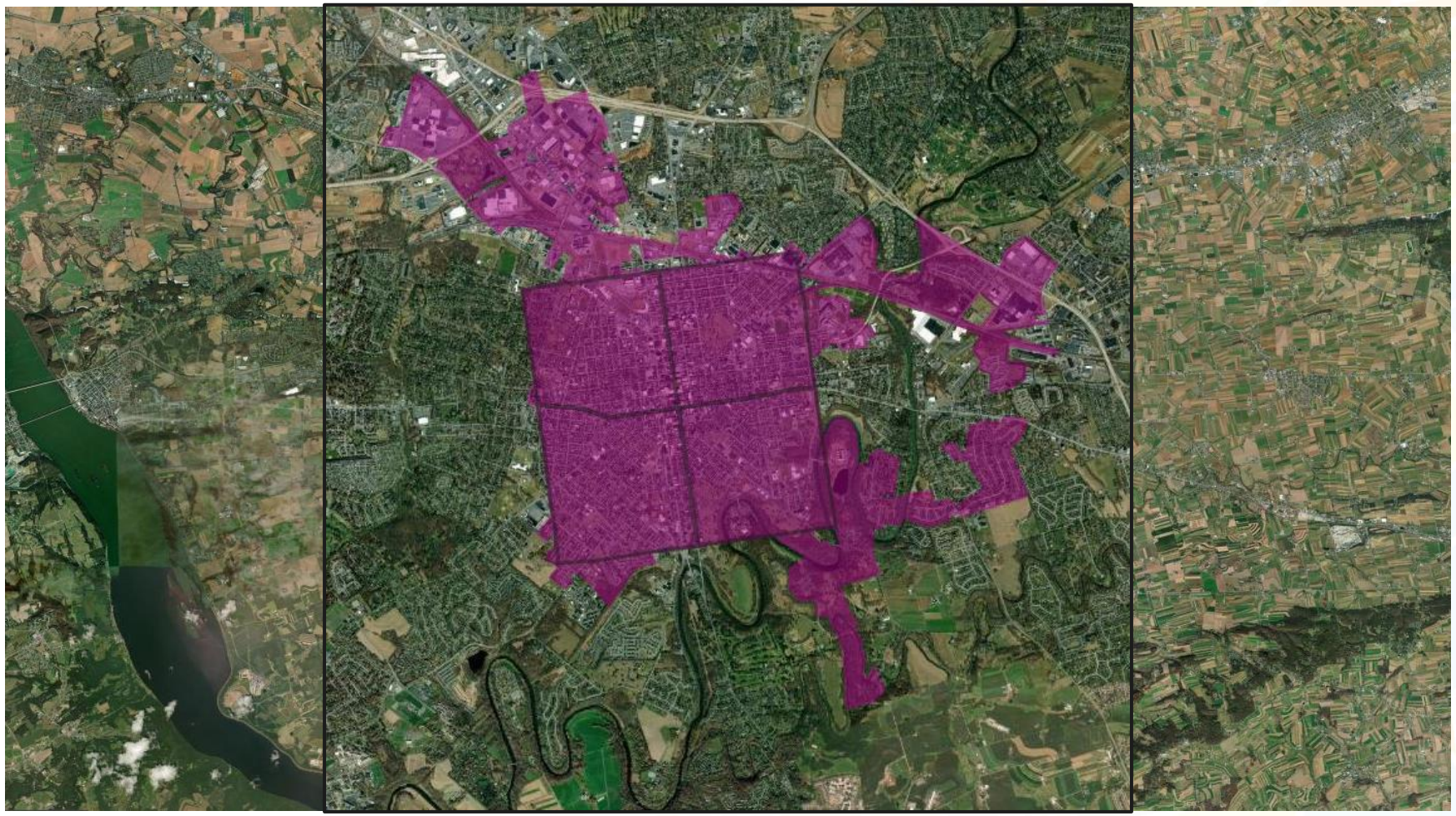
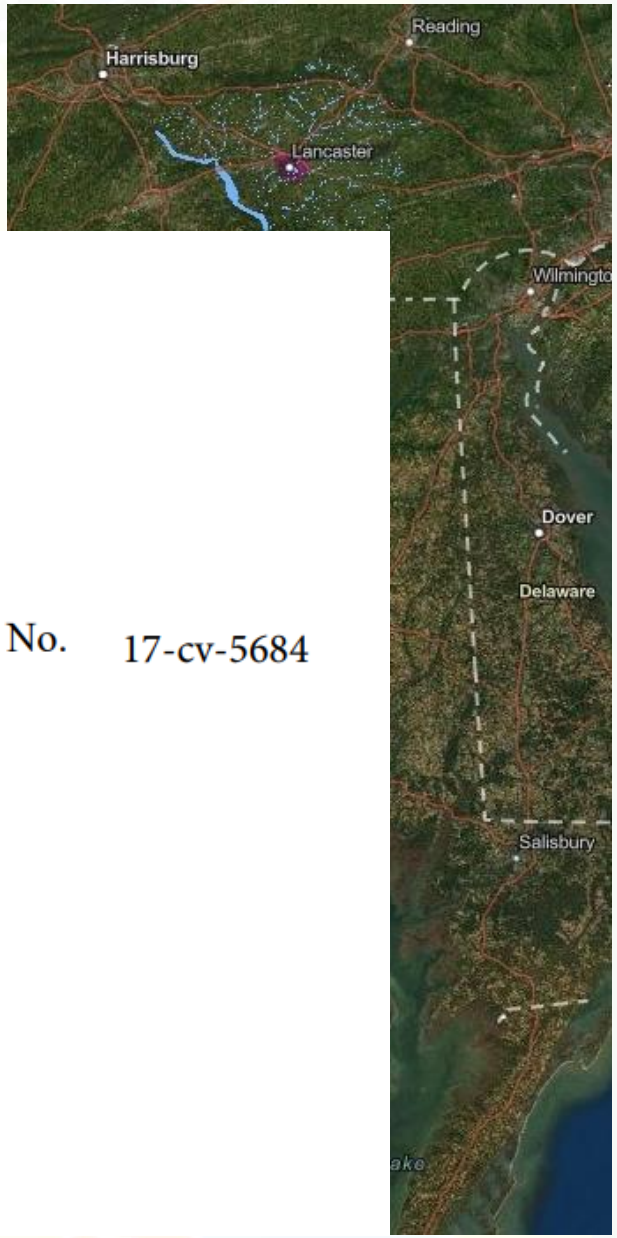
Context: Location



Context: Demographics

- 2021 Population: 61,382 (2026 Projection: 62,460)
- **Population Density: up to 38,255 persons per square mile**
- Median Age: 33 years old (Fastest growth: Adults over 65 years old)
- Race
  - Minority residents: 39% (County: 9%; State: 18%)
  - White, non-Hispanic: 61% (County: 91%; State: 82%)
- Median Household Income: $44,400 (County: $67,230; State: $62,720)
  - Minority: $40,187
  - White: $55,970

Context: Environment



IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA

UNITED STATES OF AMERICA,		
and		
COMMONWEALTH OF PENNSYLVANIA, DEPARTMENT OF ENVIRONMENTAL PROTECTION	Civil Action No.	17-cv-5684
	Judge	
Plaintiffs,		
v.		
CITY OF LANCASTER, PENNSYLVANIA,		
Defendant.		

Context: Environment

- “Environment” in urban contexts
- Natural versus anthropogenic elements

- **Lines begin to blur….**

Policy & Planning: Climate Action Plan

Vision Statement:

The City of Lancaster **EQUITABLY** implements innovative, collaborative and fiscally responsible strategies to reduce greenhouse gas emissions and build resilience to the impacts of climate change.

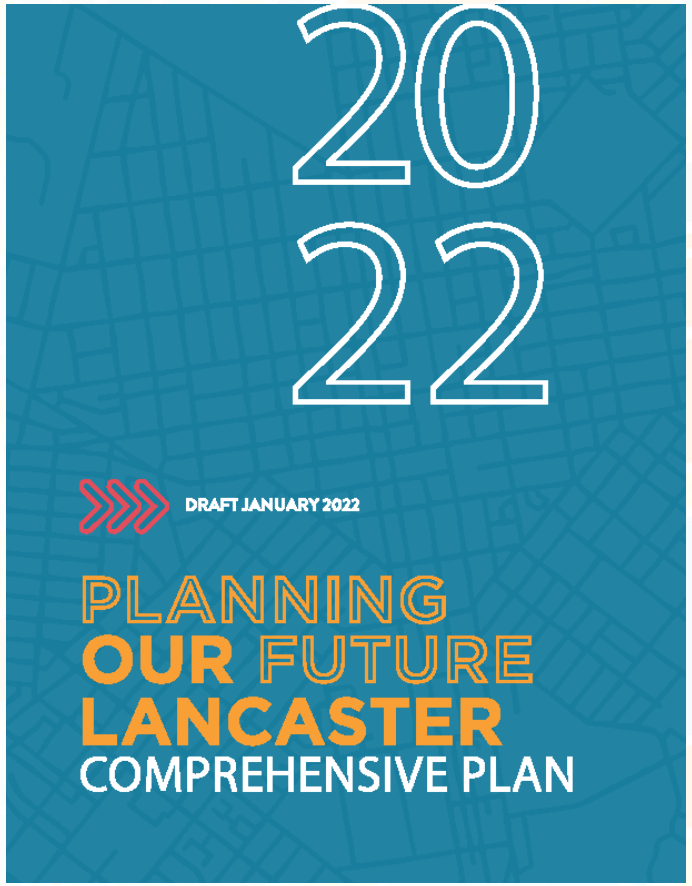
Vision Statement

The City of Lancaster equitably implements innovative, collaborative and fiscally responsible strategies to reduce greenhouse gas emissions and build resilience to the impacts of climate change.

	Goals	2025	2035	2050
Energy	Transition to renewable energy sources from a mix of on-site or off-site options.	100%	100%	100%
	Reduce municipal energy consumption through energy efficiency improvements.	25%	40%	50%
	All new construction of municipal facilities to be built to highest efficiency standards (IECC), and a percentage of renewable energy sourced, with a progressive goal of carbon neutral/net zero buildings.	Highest efficiency standards	Carbon neutral	Carbon neutral
Vehicle Fleet	Reduce fuel emissions through reduced vehicle miles traveled, when possible, across the municipal fleet.	15% reduction of VMT	20% reduction of VMT	30% reduction of VMT
	Reduce fuel emissions through cleaner fuel technologies, when possible, across the municipal fleet.	10% reduction of VMT	25% reduction of VMT	100% reduction of VMT
Waste	Divert the amount of landfill waste contributed by municipal facilities that cannot be transferred to energy, including construction debris, some organics and wastewater-produced biosolids.	25% diversion of waste to landfill	70% diversion of waste to landfill	Zero waste in municipal facilities
Water	Reduce water consumption on city properties.			
Storm-water	Reduce stormwater entering into the system through conservation, green infrastructure and technology.			
Building Culture of Sustainability	Reduce excess energy and water consumption by City employees.			
	Reduce the emissions impact of City employees travel to and from work.			
	Reduce upstream and downstream emissions by assessing citywide purchasing practices.			
	Establish community-wide connections to municipal climate action, designed to encourage broad-based community support and action.			
Carbon Offsets	Strategically employ carbon offsets to progressively reach carbon neutrality associated with municipal operations.	1% of emissions	10% of emissions	19% of emissions

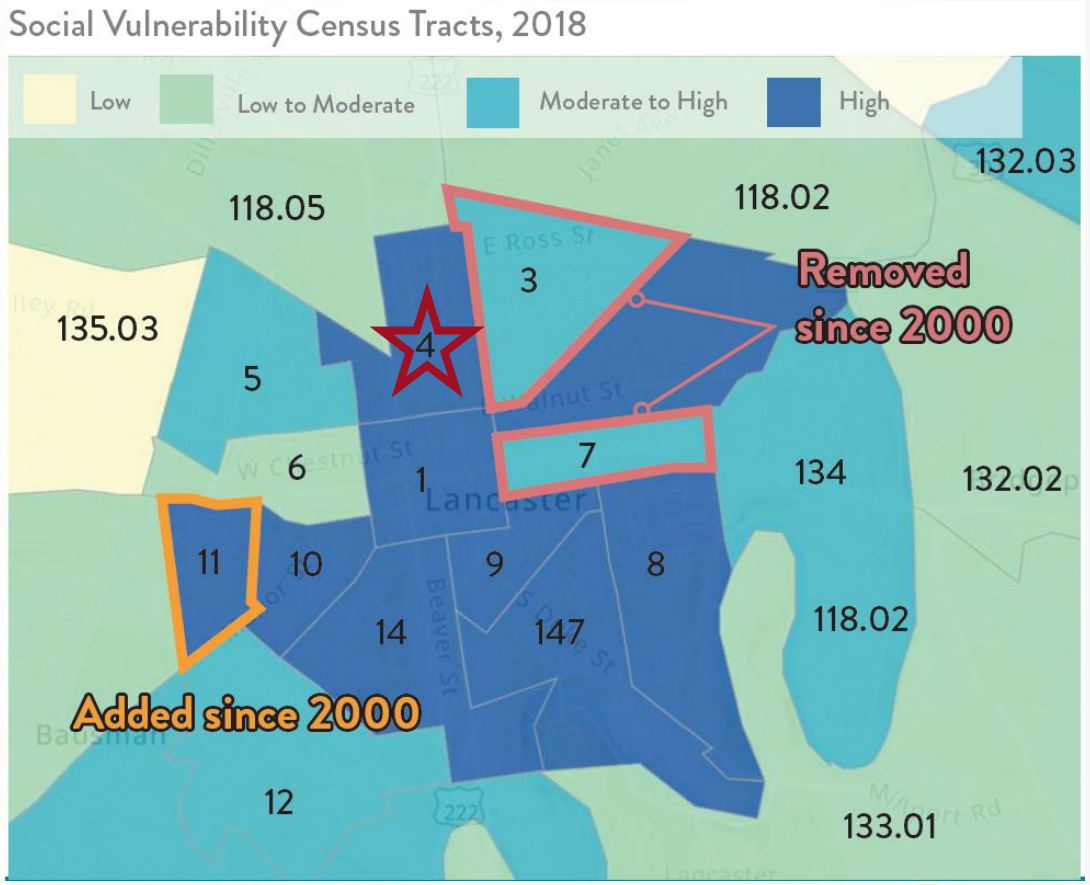
Policy & Planning: Environmental Justice

- “The majority of Lancaster City is categorized as a potential environmental justice area based on the definition provided by the Pennsylvania Department of Environmental Protection.”
  - PA DEP considers any census tract where 20% or more individuals live in poverty and/or 30% or more of the population identifies as a minority.



Policy & Planning: Social Vulnerability

- Social vulnerability is the increased susceptibility to disaster of certain low-income, minority, and other disadvantaged populations.
- Factors considered include:
  - Unemployment
  - Minority status
  - Disability



Urban Forest Action

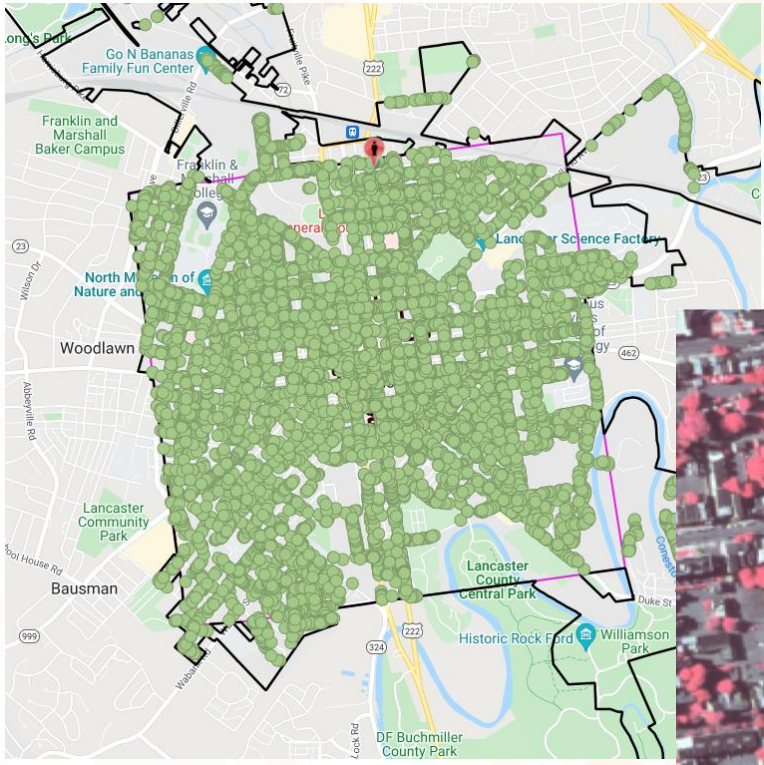
- “Trees for People: An Action Plan for Lancaster City’s Urban Forest” drafted and released October 2020
  - 32 action items identified via prioritization matrix
  - First holistic identification of ESS provision of urban forest elements

- “All people, regardless of socioeconomic or racial background, should be guaranteed access to trees and the green spaces where trees are often found. *Trees are for all people, and all people need trees.*”

- First action item fulfilled: Urban Forester hired

Urban Forest Action

- Baseline data collection
  - Complete street tree and park tree inventories
    - Tree ID
    - Condition
    - Ecosystem service provision
  - Urban Tree Canopy analysis
    - Total coverage
    - Impervious surface cover
    - Allocation
    - Equity
    - Ecosystem service provision



Urban Forest Action

- Identification of hindrances:
  - Property owner responsibility for planting, care, removal, sidewalk and curb
  - Narrow streets
  - Competing infrastructure
  - Community buy-in

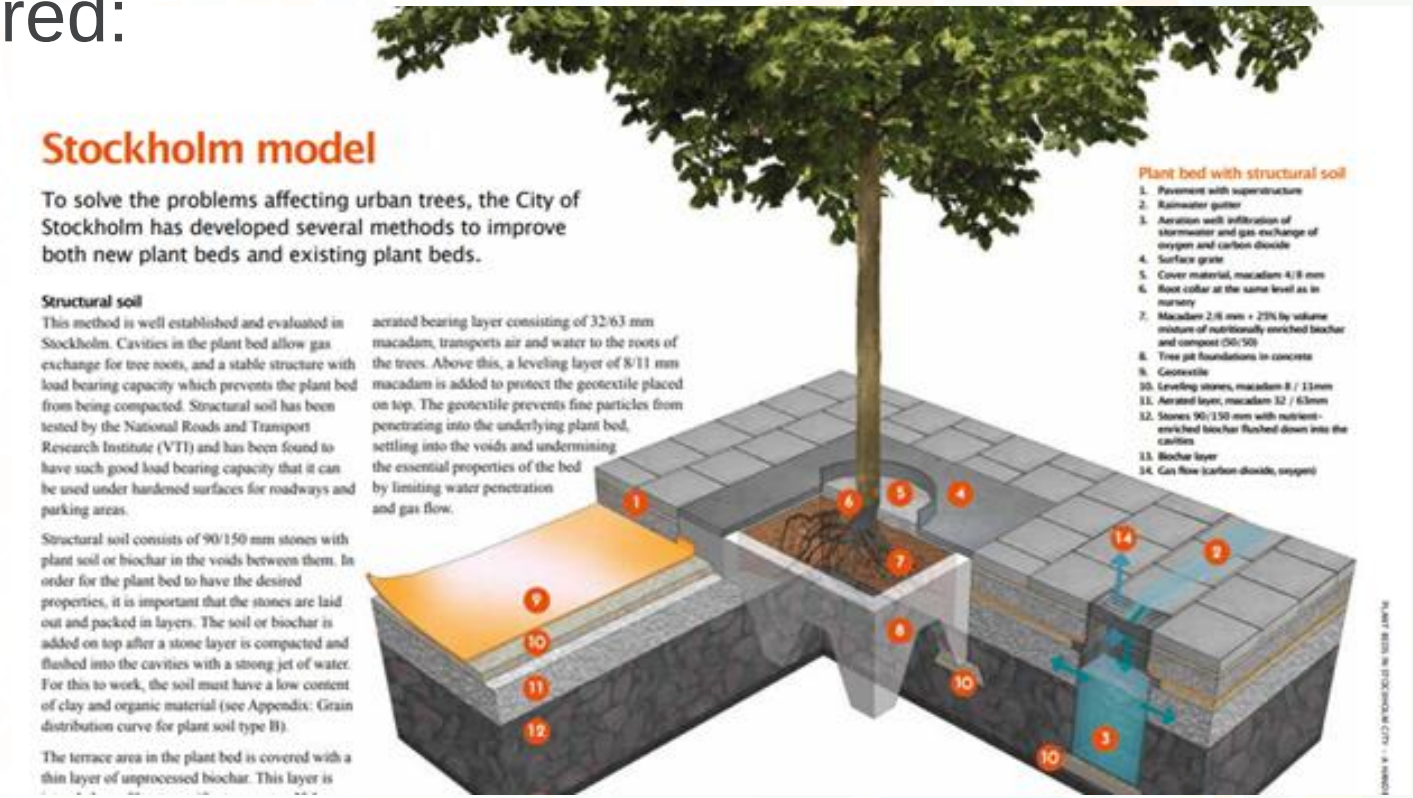
- Ultimately, those least served by urban forest elements are most burdened by lack of ecosystem service provision *and yet are* least supportive of inclusion on their property

Urban Forest Action

- Goals:
  - Increased canopy cover and tree numbers (Plant more trees)
  - Adequate tree protection (Maintain mature canopy)
  - Full adoption of urban forest management (Limiting limitations)
  - Community support and pride (Outreach, education, and burden alleviation)
- Near-future Actions:
  - Urban forest “reset”
  - Street Tree Assistance Program
  - Ordinance and “Tree Manual” updates
  - Urban Forest Master Plan

Urban Forest Action

- Initiatives being considered:
  - Stockholm Model
  - Biochar Structural Soils
  - ARPA Fund use
  - Adopt-It Programming
  - 3-30-300 Rule



Stockholm model

To solve the problems affecting urban trees, the City of Stockholm has developed several methods to improve both new plant beds and existing plant beds.

Structural soil

This method is well established and evaluated in Stockholm. Cavities in the plant bed allow gas exchange for tree roots, and a stable structure with load bearing capacity which prevents the plant bed from being compacted. Structural soil has been tested by the National Roads and Transport Research Institute (VTI) and has been found to have such good load bearing capacity that it can be used under hardened surfaces for roadways and parking areas.

Structural soil consists of 90/150 mm stones with plant soil or biochar in the voids between them. In order for the plant bed to have the desired properties, it is important that the stones are laid out and packed in layers. The soil or biochar is added on top after a stone layer is compacted and flushed into the cavities with a strong jet of water. For this to work, the soil must have a low content of clay and organic material (see Appendix: Grain distribution curve for plant soil type B).

The terrace area in the plant bed is covered with a thin layer of unprocessed biochar. This layer is

aerated bearing layer consisting of 32/63 mm macadam, transports air and water to the roots of the trees. Above this, a leveling layer of 8/11 mm macadam is added to protect the geotextile placed on top. The geotextile prevents fine particles from penetrating into the underlying plant bed, settling into the voids and undermining the essential properties of the bed by limiting water penetration and gas flow.

Plant bed with structural soil

1. Pavement with superstructure
2. Rainwater gutter
3. Aeration well: infiltration of stormwater and gas exchange of oxygen and carbon dioxide
4. Surface grate
5. Cover material, macadam 4/8 mm
6. Root collar at the same level as in nursery
7. Macadam 2/6 mm + 25% by volume mixture of nutritionally enriched biochar and compost (50/50)
8. Tree pit foundations in concrete
9. Geotextile
10. Leveling stones, macadam 8 / 11mm
11. Aerated layer, macadam 32 / 63mm
12. Stones 90/150 mm with nutrient-enriched biochar flushed down into the cavities
13. Biochar layer
14. Gas flow (carbon dioxide, oxygen)

Questions

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