WESTHAVEN
URBAN DESIGN

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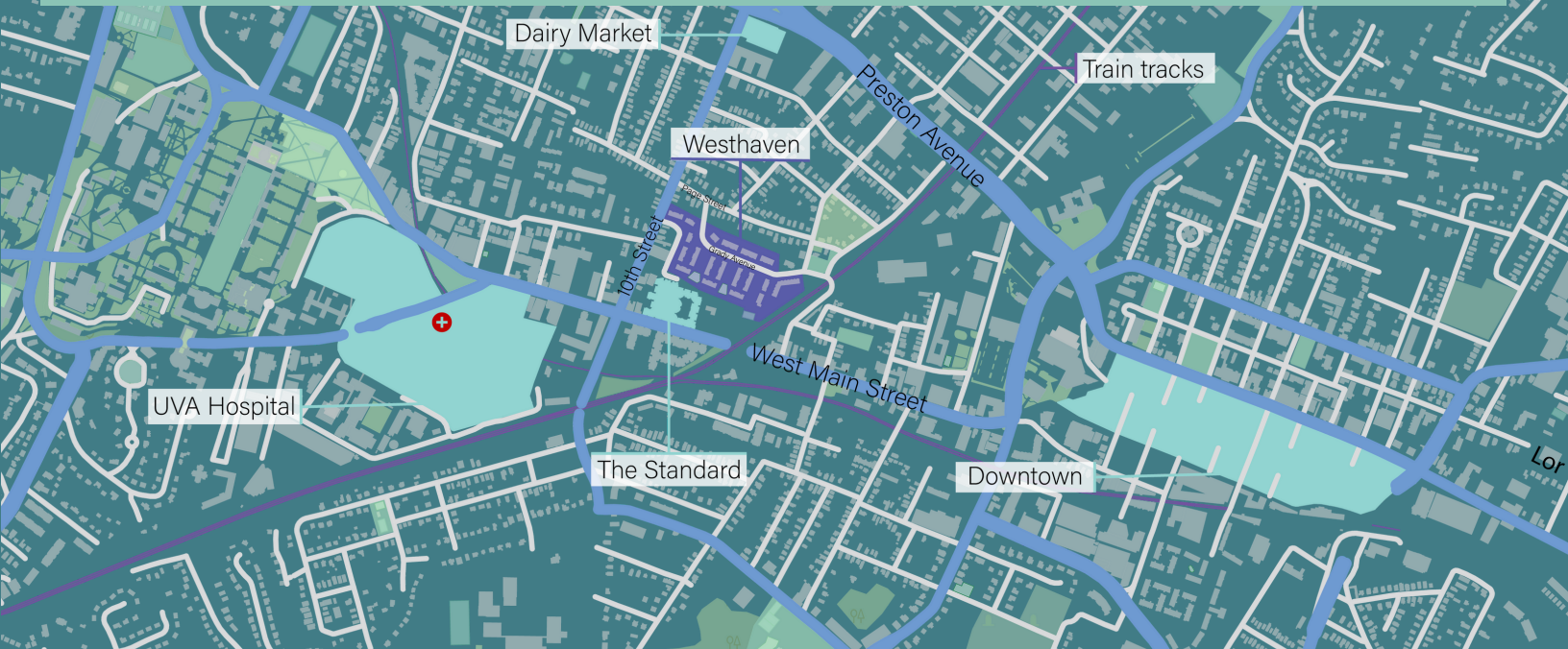
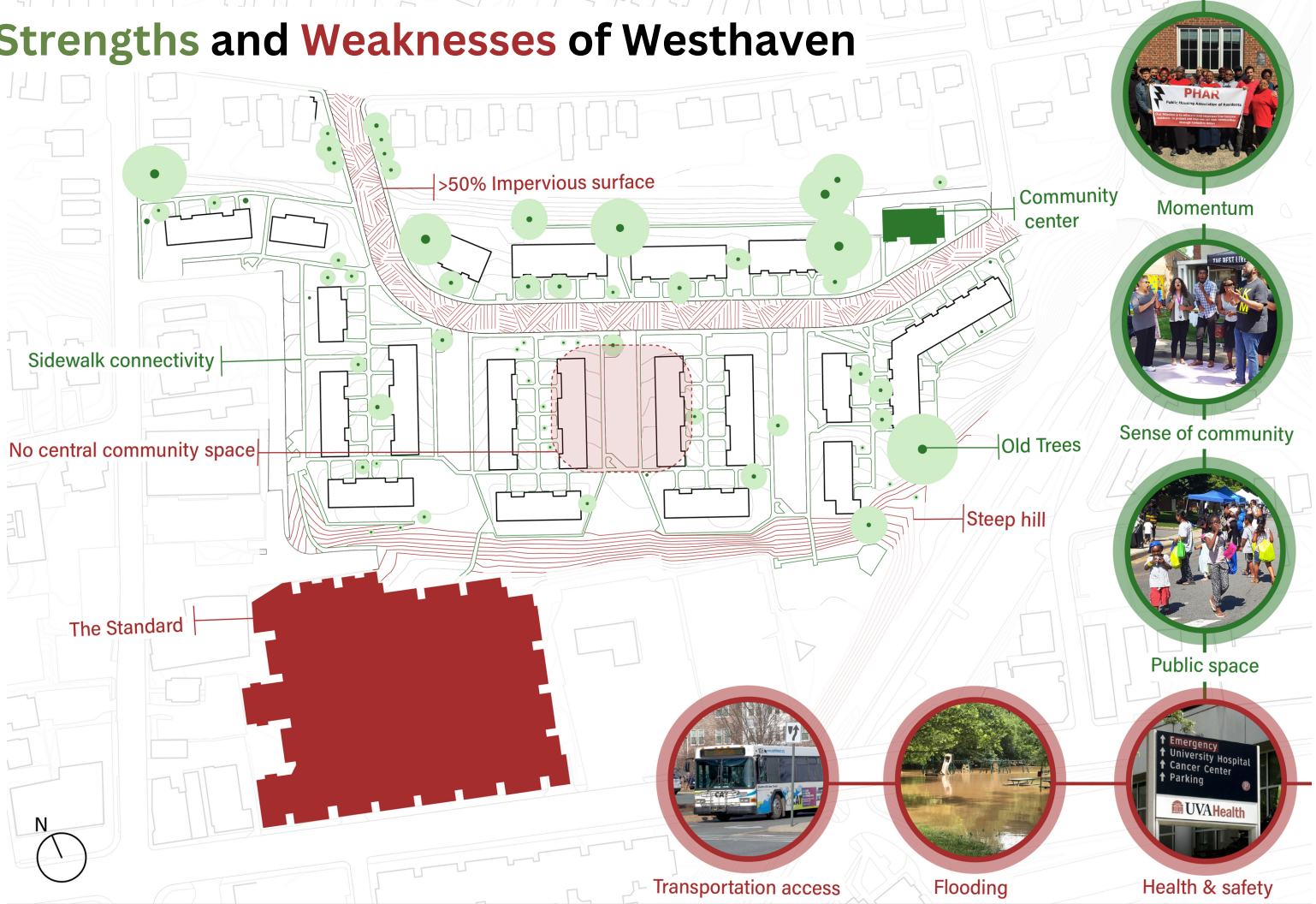


INTRODUCTION

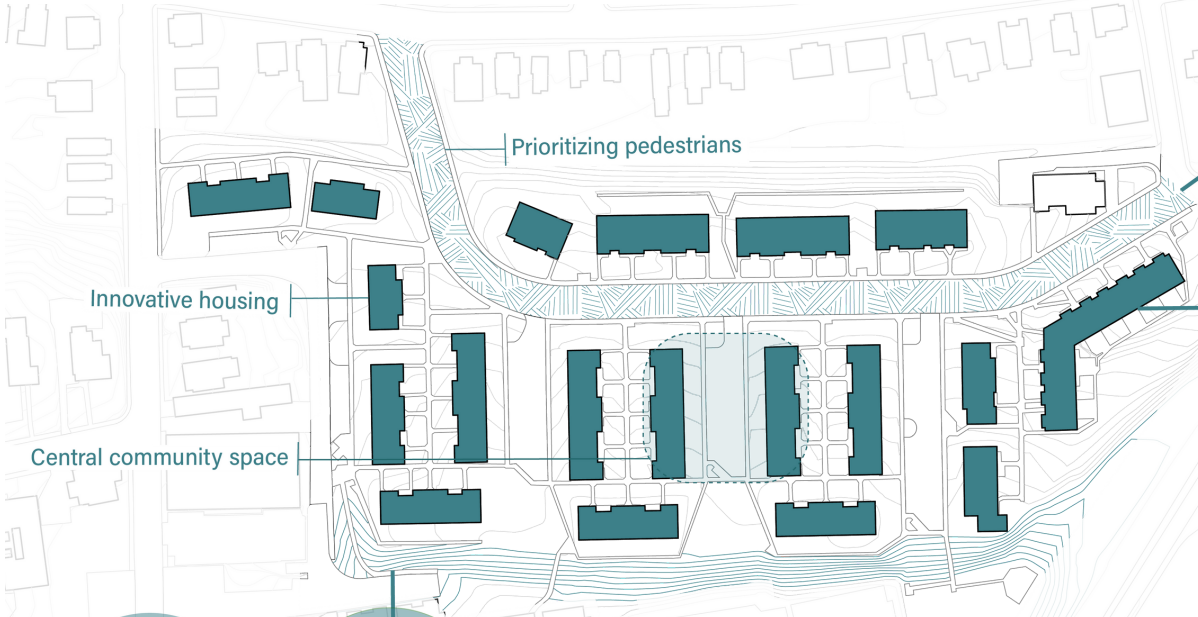
The purpose of our booklet is to provide some design inspiration for Westhaven residents to consider. In the booklet, we include an analysis of Westhaven’s existing conditions, touching on the strengths and weaknesses of its current design and cataloging some of the environmental conditions that affect the community. Throughout the booklet, we’ve included a few conceptual designs the community can take into account when reviewing designs from the architect selected for Westhaven's redevelopment.

CONTENT

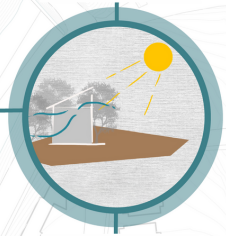
Strengths and Weaknesses of Westhaven



Opportunities and Threats of Westhaven



Play Streets



Passive Design

Add Native Plants

Terraced land model

Contour swales

Funding Uncertainty

Ignoring Resident Needs

Climate Change

Increasing Density

N

PASSIVE DESIGN

/pásɪv/ /dɪzájn/

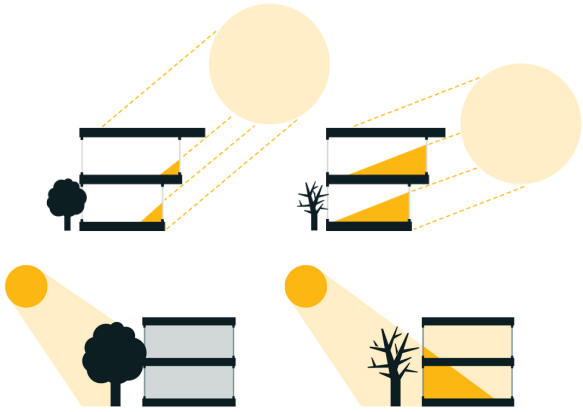
noun

Considering the local climate and natural elements of the environment in the design of buildings.

Create a more livable, comfortable, healthy, and resilient housing space through passive design elements

Passive Design

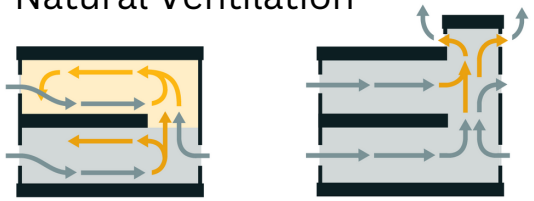
1 Passive Cooling and Heating



Positioning of trees can help provide natural shade in the summer and allow light and warmth to enter in the winter

2 Natural Lighting

3 Natural Ventilation



Warm air gets trapped in the second floor

Warm air can escape and pull cool air in

4 Alleviate the mold problem

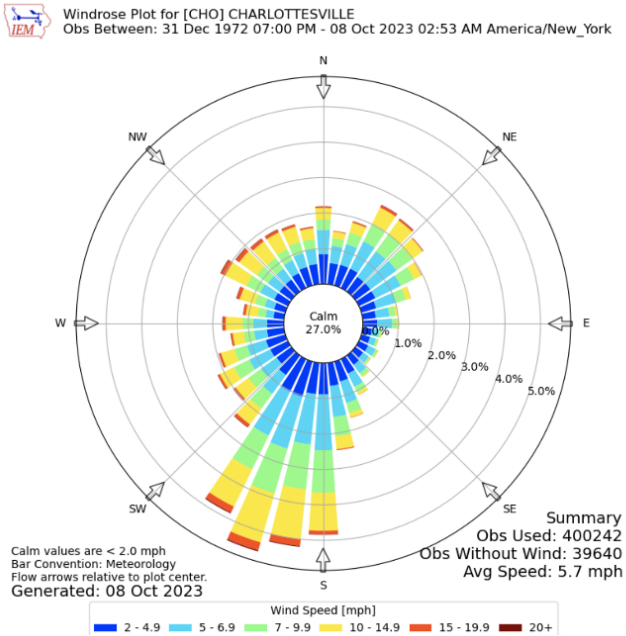
Direct sunlight and good ventilation can help to alleviate the mold problem

5 Energy efficient and Resilience

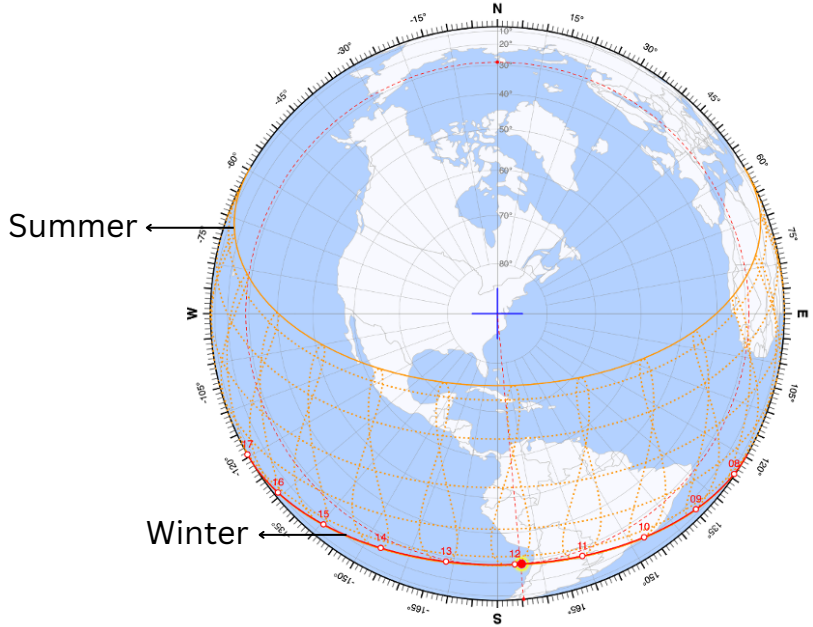
Increases energy efficiency of buildings, reduces energy consumption, cost and over-reliance on energy. A foundation for resilient, self-regulating buildings in the face of increasing global temperatures.

Charlottesville Sun and Wind Analysis

Windrose Chart

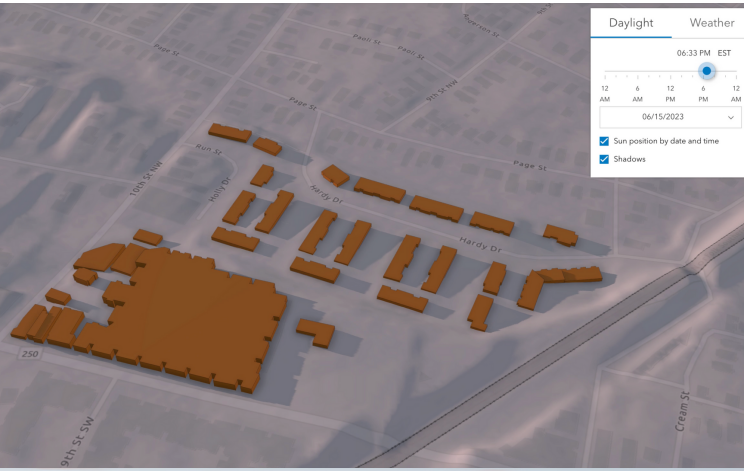


Sun Path Chart



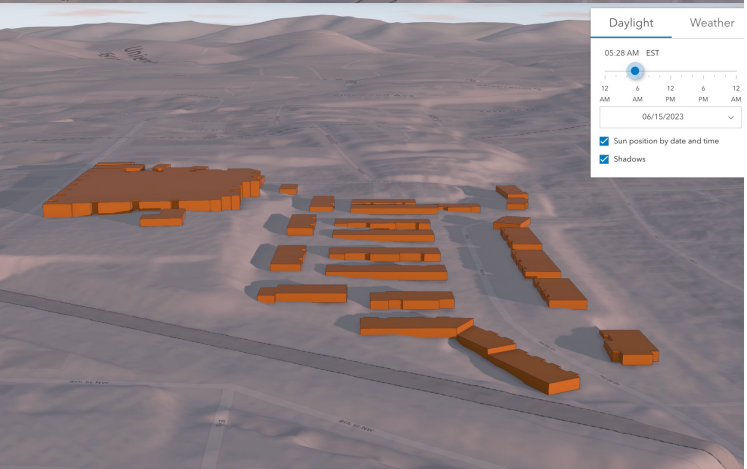
The wind and sun mostly comes from the south side in Charlottesville. With regards to Westhaven, this is exactly where the hill is situated which blocks off natural sun and wind.

Summer Solstice



View 1

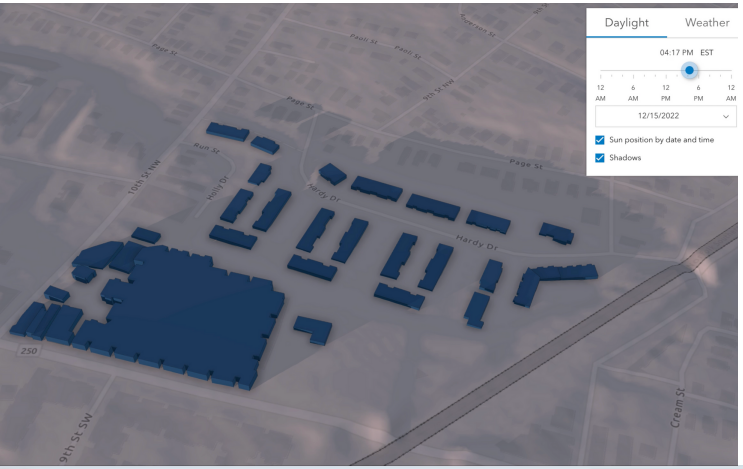
During summer, the shadow of the hill and The Standard does not fall on Westhaven and cannot provide passive cooling effects



View 2

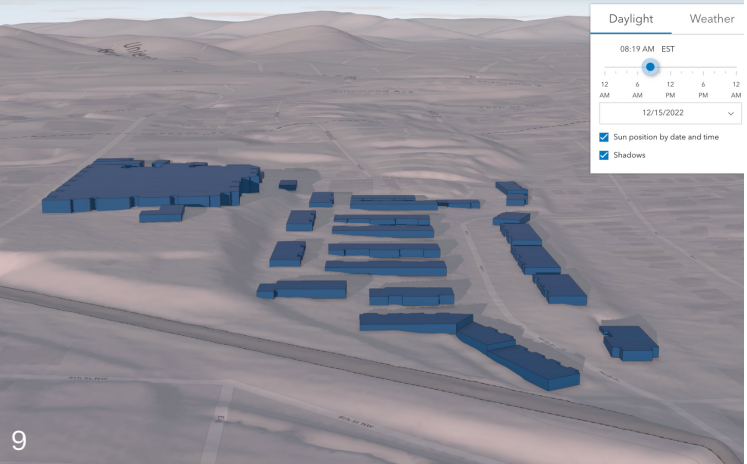
This is an opportunity for more trees to be planted on the south side of buildings to provide greenery and shade which can help provide natural cooling effects

Winter Solstice



View 1

During the winter, the shadow of the hill and The Standard falls largely on Westhaven which prevents passive heating



View 2

Many buildings in Westhaven have east-west facing windows which are not ideal. North-south facing windows can better catch the wind and sunlight during winter and allow for better ventilation and cooling effects during summer

GREEN INFRASTRUCTURE

/grēn/ /ˈinfrəˌstrək(t)SHəR/

noun

methods of managing stormwater runoff in a way that protects, restores, or mimics the natural water cycle

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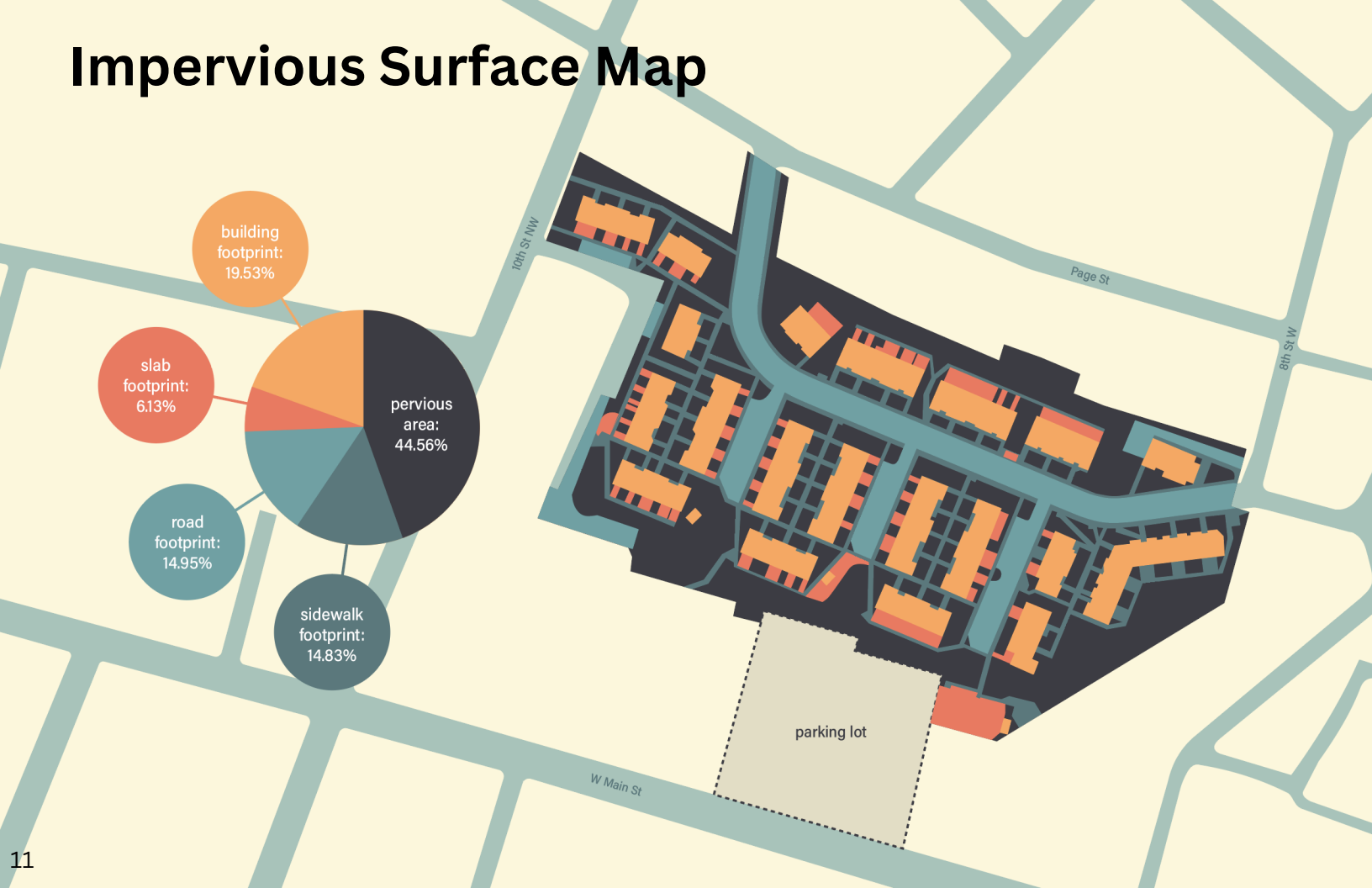
Green infrastructure decreases demand on drainage systems, filters runoff and reduce pollutants, and reduces flooding and erosion

Impervious Surface Map



Critical Slopes and Water Flow

In Charlottesville, **critical slopes** are defined as any slope that:

- has a grade of 25% or higher
- is within 200 ft of a waterway
- has a horizontal run of at least 20 ft
- has an area of at least 6,000 sq ft

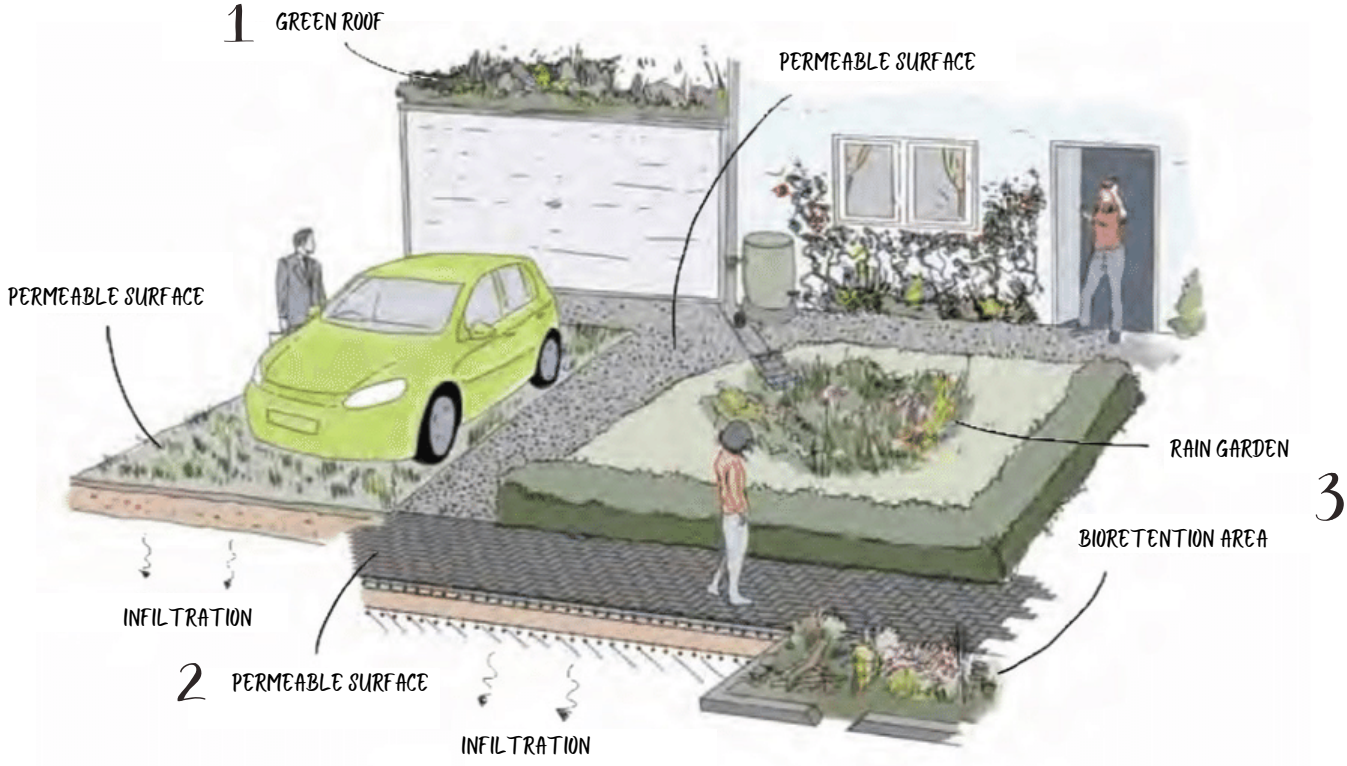
Contour lines connect points of equal elevation. Each line on this map represents an elevation that is two feet above or below its adjacent line. Contour lines that are close together indicate rapidly changing elevation, or a steeper slope.

key

- high water flow
- medium water flow
- low water flow
- contour lines
- critical slopes
- road area

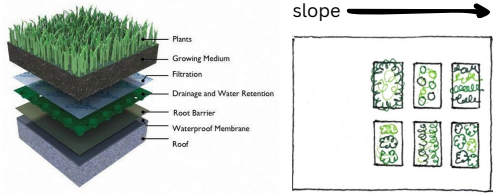
Green Infrastructure

Examples of water efficient urban design



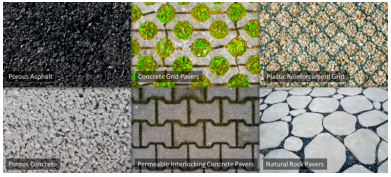
1 Green Roofs

Landscaping on the tops of buildings can reduce the **urban heat island effect** and **stormwater runoff**. In Westhaven, it can be especially useful on the roof of the community center, where anyone who occupies the space can choose to be involved.



2 Permeable Surfaces

Permeable surfaces are porous materials that allow water to seep into the ground, such as grass, gravel, and sand.



Advantages:

- Reduces costs for drainage systems
- Reduces stormwater runoff
- More sustainable than traditional methods
- Lowers CO_2 emissions from power plants
- Lowers urban heat island effect
- Filters pollutants

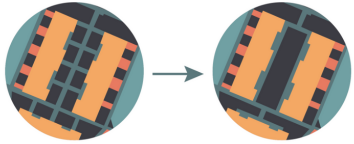
Disadvantages:

- More expensive to install
- Requires more maintenance to avoid waterlogging
- Not a good fit for all soil types (especially clay)
- Not strong enough for heavy-trafficked areas

3 Rain Gardens and Bioretention Areas

Rain gardens are a type of bioretention practice where landscaped depressions are formed to collect, hold, filter, and slowly release stormwater into the ground.

If sidewalks in Westhaven are organized around a central courtyard instead of having a separate path to each individual door, there will be more permeable surface and room for rain gardens without compromising access to homes.



Contour Swales

Similar to rain gardens, **swales** are shallow channels in the ground that hold water and release it into the ground slowly to avoid overwhelming the **groundwater recharge** process. Water in Westhaven gathers at the base of the hill and consequently floods homes. Including terraced swales along contour lines with native plants would be an effective way to mitigate the abundance of stormwater.

Benefits of swales: stormwater management, cleaner air, carbon sequestration, improved biological habitat, aesthetic value

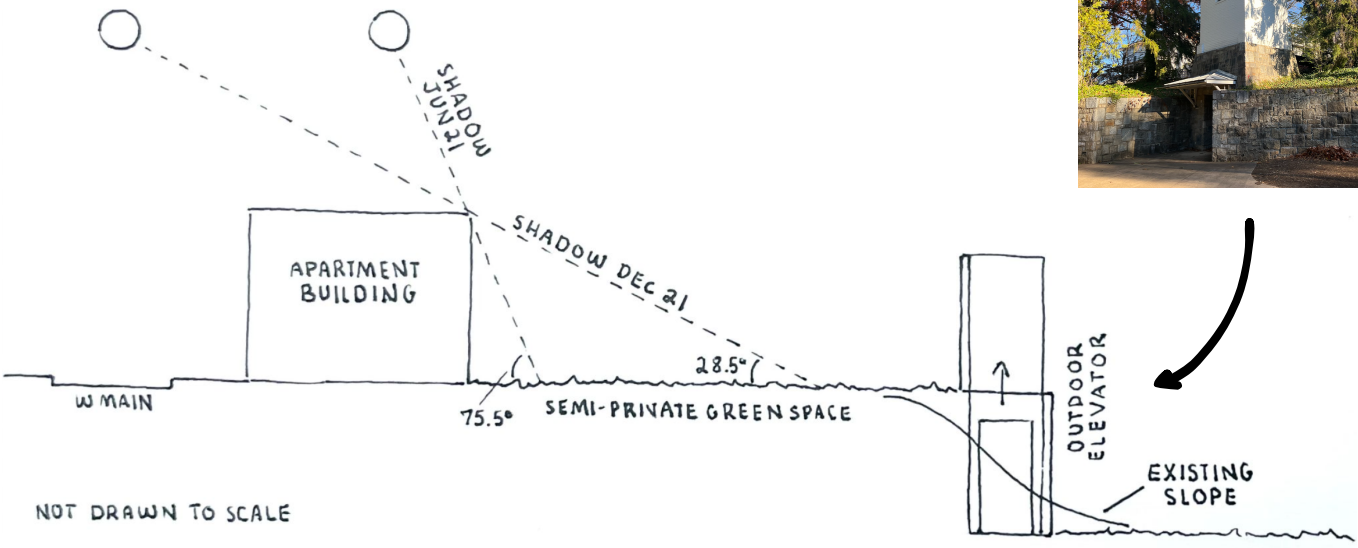
Virginia Bluebells

Wild Geranium

Dogwood

Benefits of native plants: offers food and habitat for local wildlife, maintains soil health, increases soil stability of terraces, conserves water, requires less maintenance

Semi-Private Green Space



With creative freedom to redesign the parking lot at the southern edge of the neighborhood, Westhaven has the opportunity to create **semi-private** green space. This can be done by constructing several housing units along the frontage of W Main St and leaving open space behind it. The open space will (1) increase the neighborhood's pervious surface and (2) allow Westhaven residents to gather in an outdoor space that is designed specifically for them. An outdoor elevator can be installed to ease this transition between the lower and higher elevations.

HOUSING TYPOLOGY

/ˈhouziNG/ /tīˈpäləjē/

noun

A classification that defines the type of housing based on the layout, number of rooms, division of areas, among other factors.

Increase density at least twice the current while still preserving the community & neighborhood feel - done through balcony space, and green elements.

EXISTING CONDITIONS

ITEMS TO ADDRESS

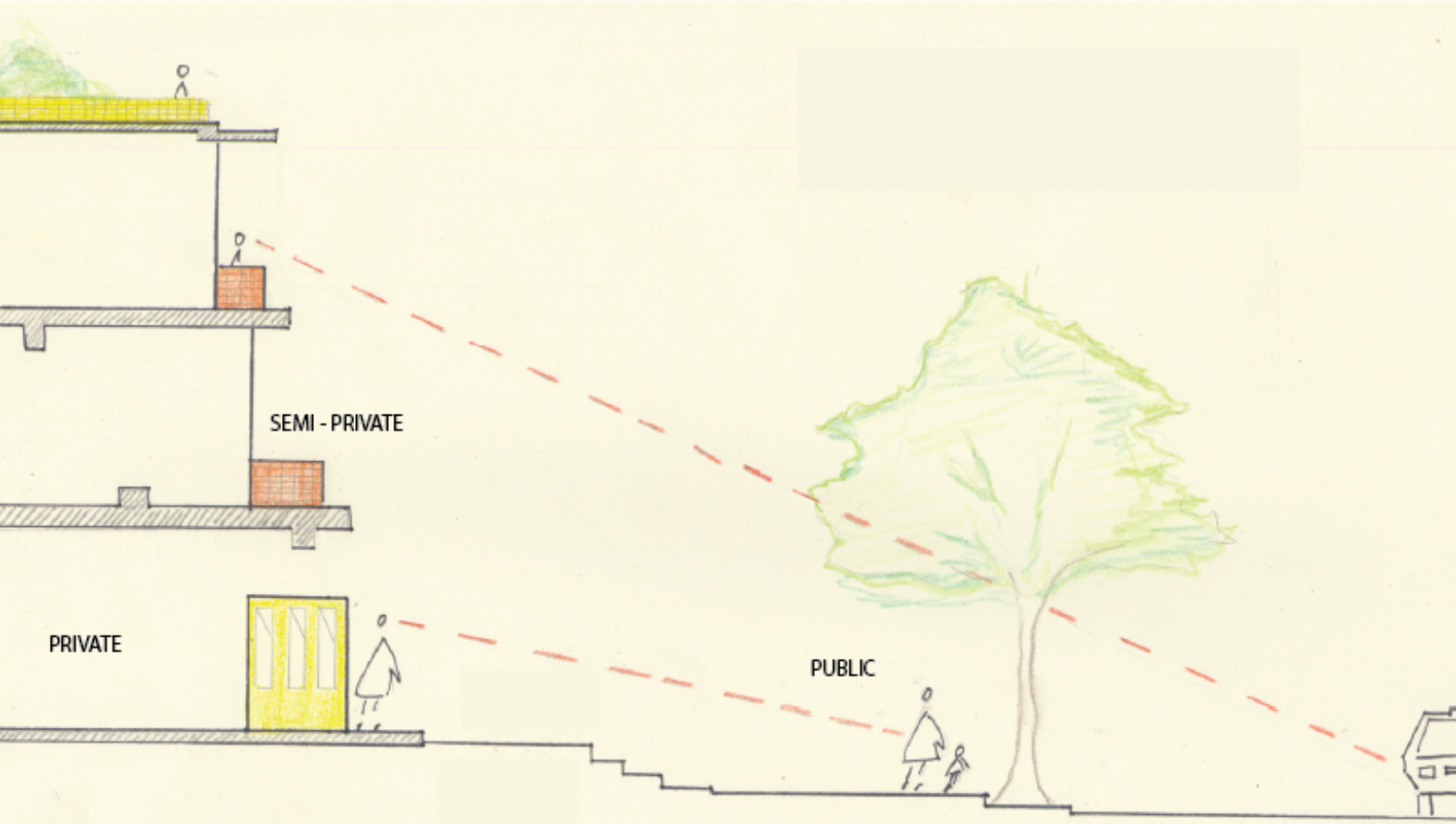
awkward space in-between units

pitched roof = not optimal for gardens

optimal balcony on 2nd story

awkward step / doesn't clearly define boundary

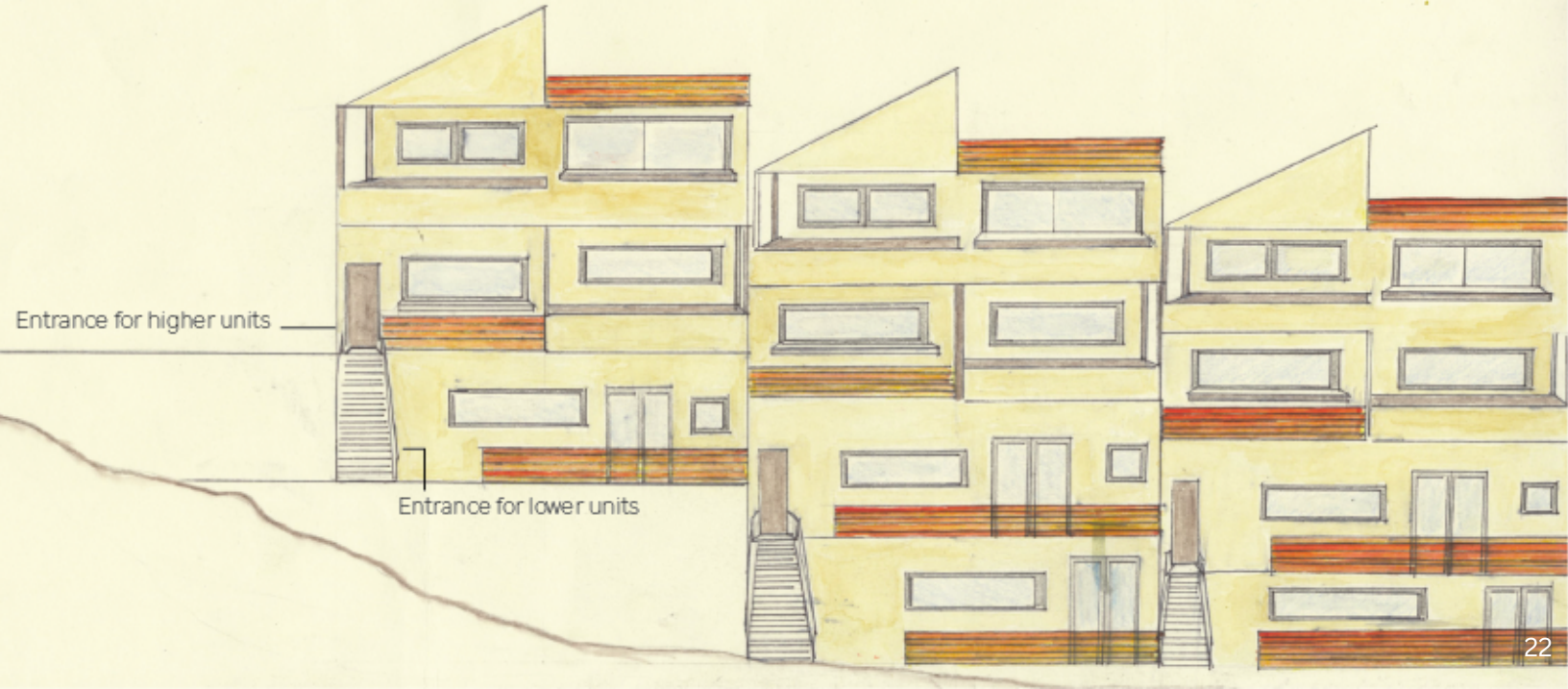
unused green space in-between units



EYES ON THE STREET"

HOUSING TYPOLOGY I

HOUSING TYPOLOGY II



PUBLIC SPACE

/pʌblɪk/ /sbɛ́js/

noun

Places generally open and accessible to everyone. Includes roads, parks, shared community spaces.

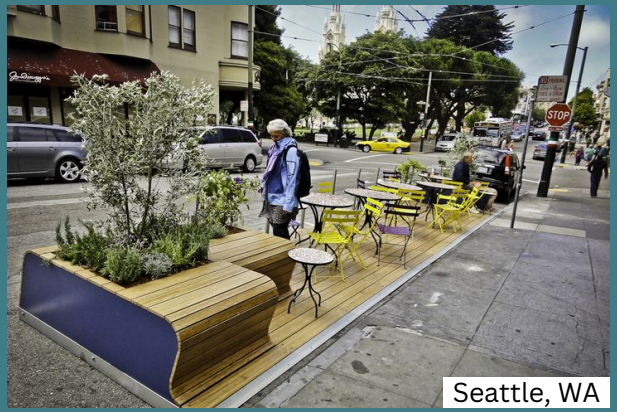
Public space can define the character of a neighborhood. How can we maximize public space to meet resident needs with potentially twice the density?

What makes good public space?

Well-used public spaces are characterized by:

- Appealing aesthetic qualities
- Amenities for different age groups
- Maintenance and cleanliness
- Opportunities for social interaction
- Safety and good lighting
- The presence of nature
- Proximity to home and other important destinations

Domino Park, Brooklyn



Seattle, WA

Why de-emphasize driving?

Cars play a huge role in the lives of most Americans- many cities like Charlottesville are designed to support driving as the main mode of transportation. However, promoting non-car mobility has many benefits:

- Increased safety
- More room for green space
- Improved health
- Better for the environment
- Increased social interaction
- Increased access for those who don't/can't drive

Many cities across the country (pictured) have already implemented **pedestrian-friendly** designs or **programming**.


San Francisco, CA


New York City


Westhaven

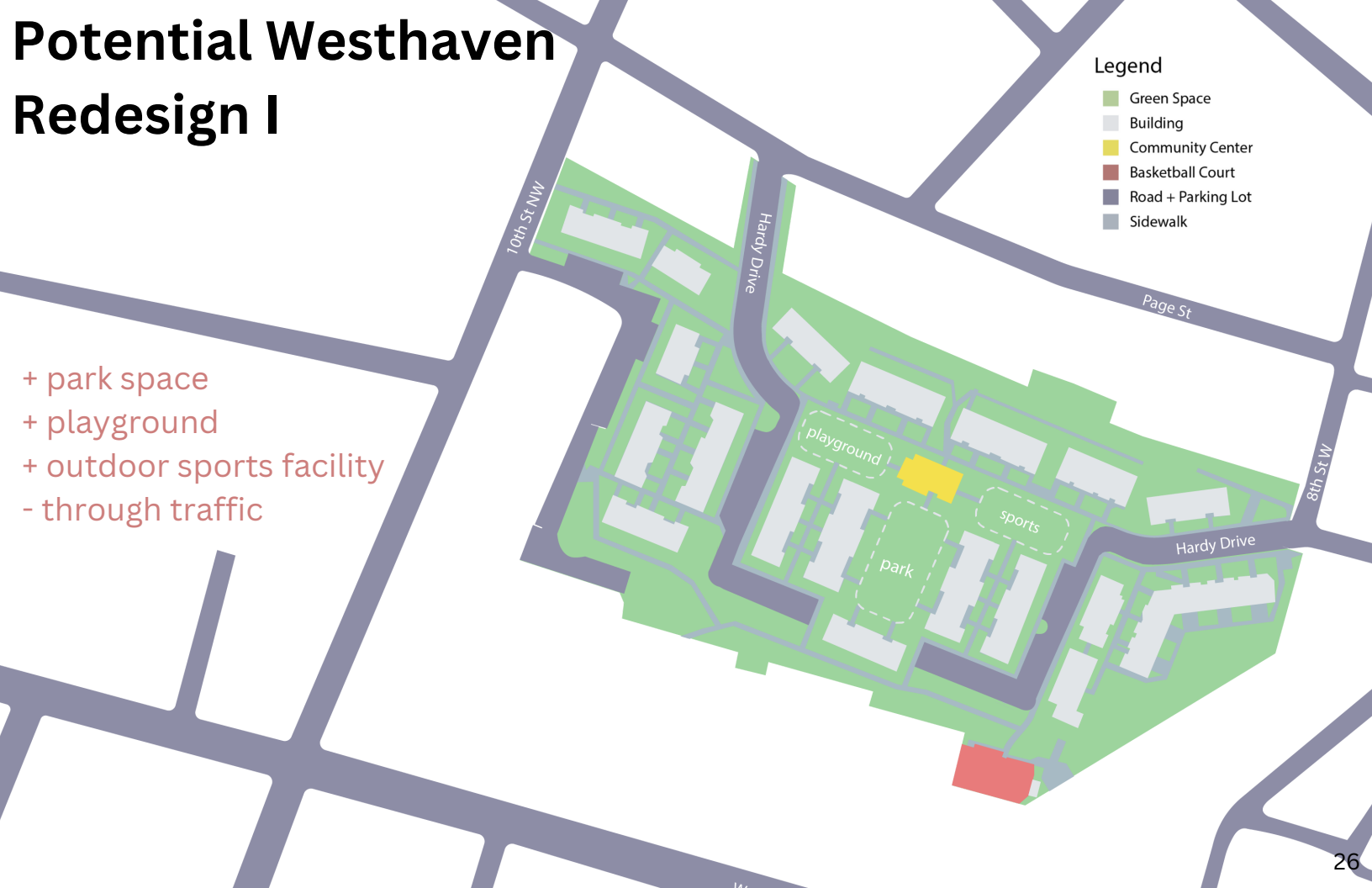

San Antonio, TX

Philadelphia, PA

Charlottesville Downtown Mall


Stamford, CT

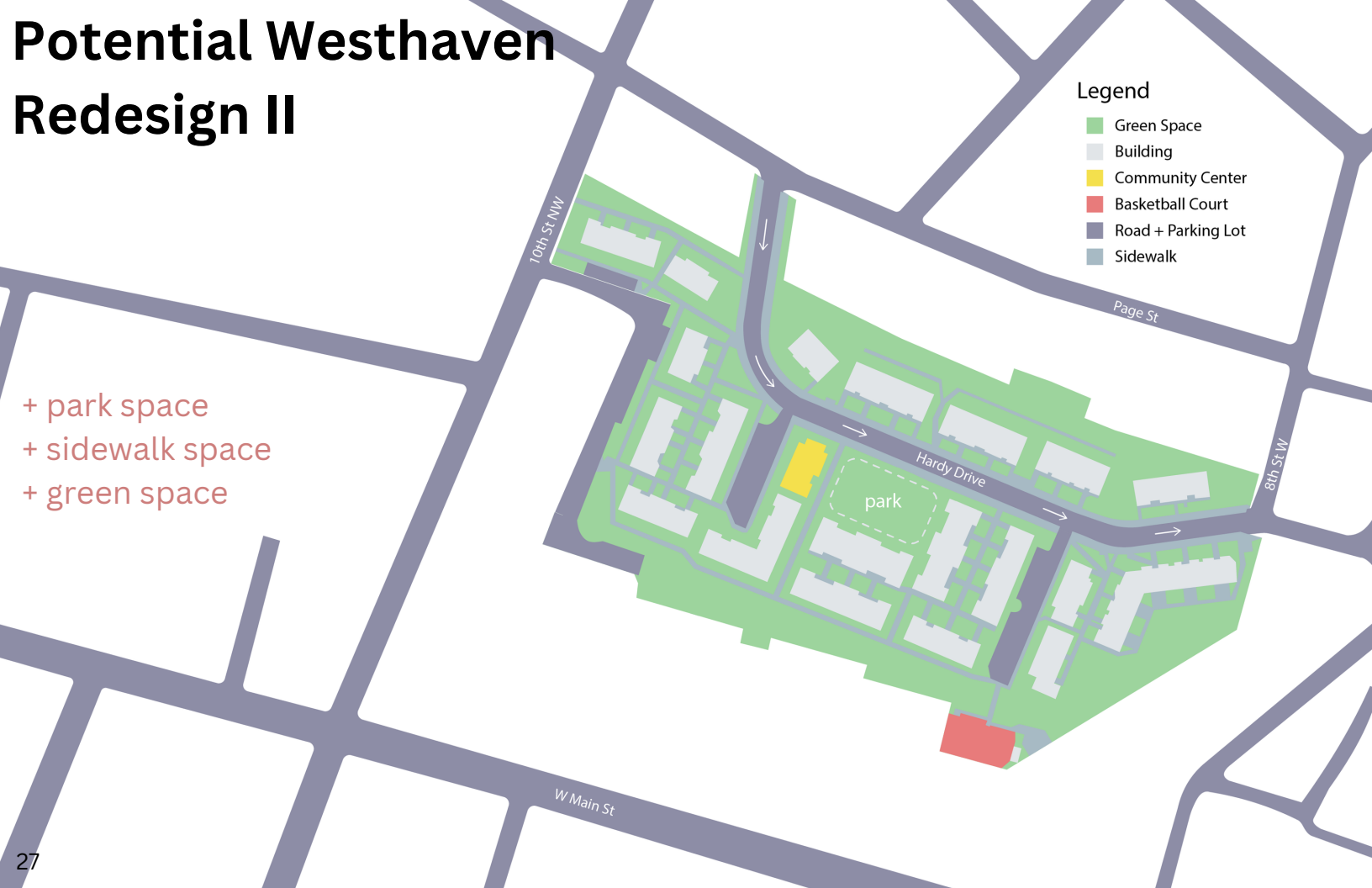
Potential Westhaven Redesign I



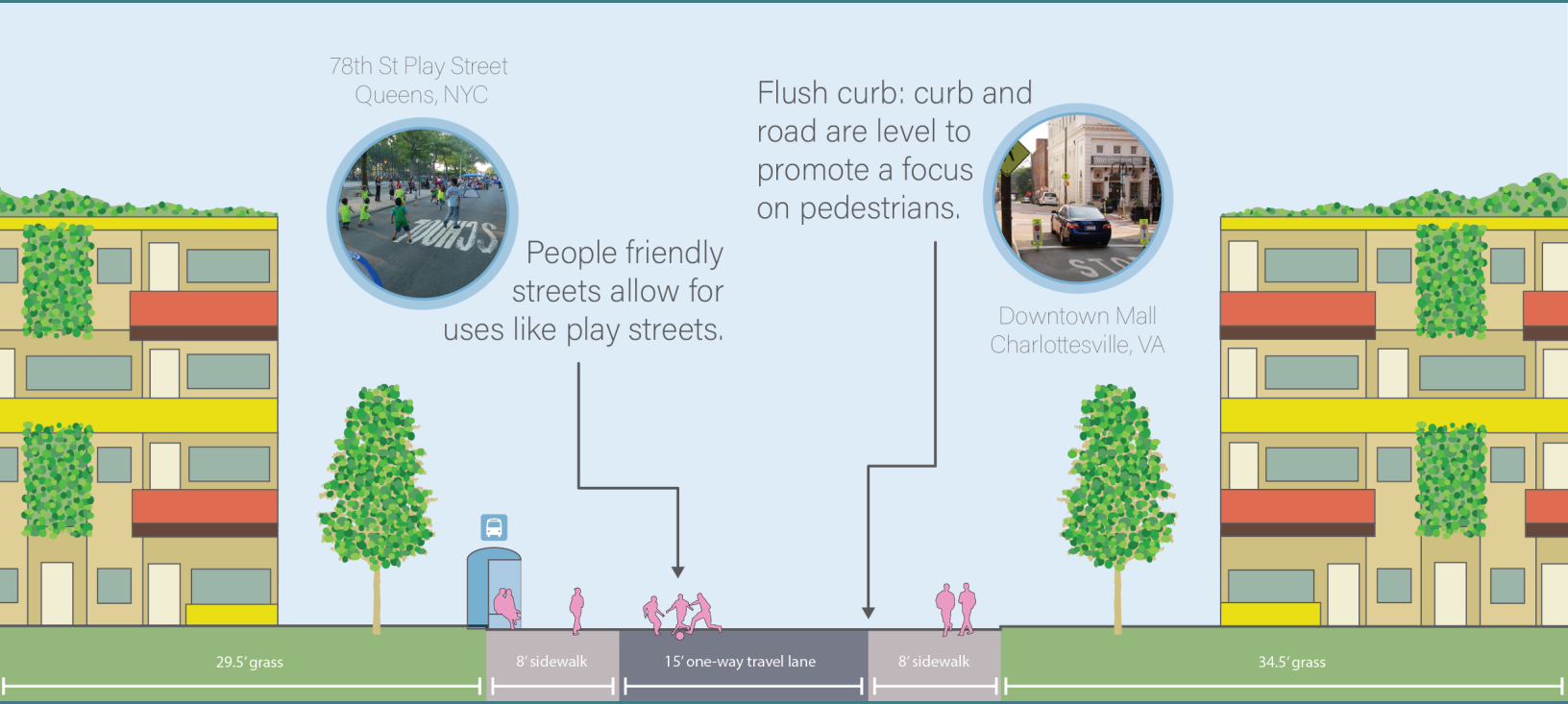
+ park space
+ playground
+ outdoor sports facility
- through traffic

Potential Westhaven Redesign II

+ park space
+ sidewalk space
+ green space



One-way Street Section

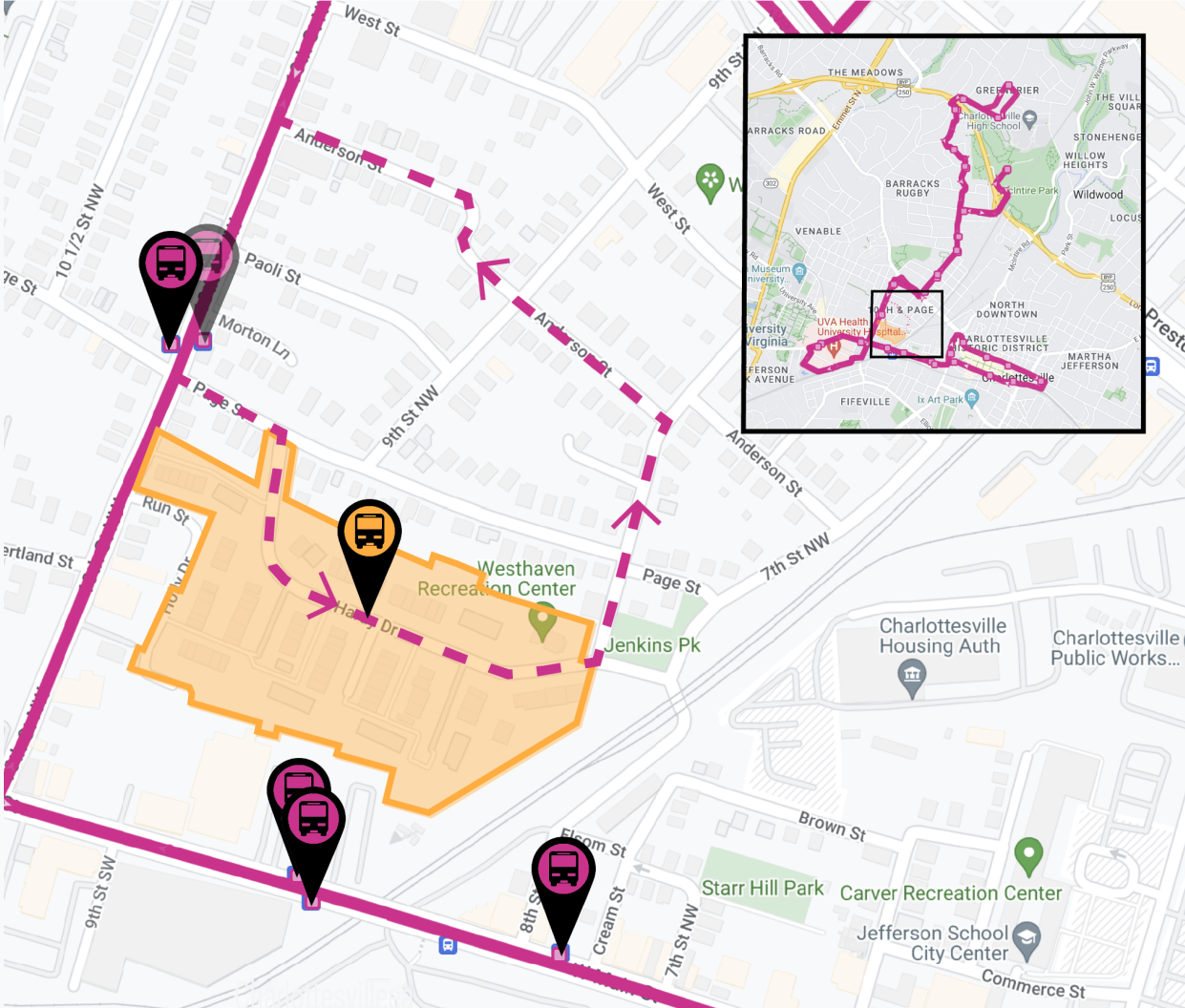


Route 9 Bus Change

Because our one-way Hardy Drive design involves reduced parking, we propose this alteration to CAT Route 9 to provide a transit option closer to residents and allow for lower reliance on cars.

Legend

- New bus stop
- Rt. 9 addition
- Removed bus stop
- Current Rt. 9
- Westhaven
- Current bus stop



Bringing It All Together

+ central public spaces
+ buildings oriented for passive heating/cooling
+ contour swales for flood mitigation

Glossary

Bioretention	the process in which contaminants are removed from stormwater runoff before it seeps into the ground
Contour Lines	lines on topographic maps that connect points of equal elevation
Critical Slopes	hills with a slope that exceeds the maximum angle that soil can stand unsupported
Green Infrastructure	methods of managing stormwater runoff in a way that protects, restores, or mimics the natural water cycle
Green Roof	landscaping on the tops of buildings that slows and filters water
Groundwater Recharge	a hydrologic process where water percolates into the ground
Housing Typology	a classification that defines the type of housing based on the layout, number of rooms, division of areas, among other factors

Impervious Surface	mostly artificial materials that don't allow water to seep into the ground
Passive Design	considering the local climate and natural elements of the environment in the design of buildings
Pedestrian-friendly	describing characteristics that promote the safety and comfort of pedestrians
Permeable Surface	porous material that allows stormwater to flow through
Play Street	neighbor-led short road closures, creating a safe space for children to play freely together on their doorstep
Programming	activities or events organized to benefit members of a community
Rain Garden	landscaped depressions are formed to collect, hold, filter, and slowly release stormwater into the ground
Semi-private	publically accessible but has some degree of privacy

Glossary, *continued*

Street Section	a diagram showing the street from a horizontal view, with width measurements
Stormwater Runoff	water that carries contaminants across impervious surfaces after a storm and causes flooding
Swales	shallow channels that spread stormwater and increase infiltration
SWOT Analysis	(strengths, weaknesses, opportunities, and threats) an analysis technique frequently used in urban planning to assess existing conditions
Urban Heat Island Effect	warmth in urbanized areas caused by structures and infrastructure that absorb and re-remit the sun's heat
Windrose Chart	graphical chart that symbolizes the speed and direction of wind at a specific location

References

10 things to remember when designing rooftop gardens - RTF. (n.d.-a). https://www.re-thinkingthefuture.com/design-studio-portfolios/a3835-10-things-to-remember-when-designing-rooftop-gardens/

Akrherz@iastate.edu, D. H. (n.d.). IEM :: Site wind roses. Iowa Environmental Mesonet. https://mesonet.agron.iastate.edu/sites/windrose.phtml?network=VA_ASOS&station=CHO

Amy Frearson |20 October 2021 Leave a comment. (2022, February 3). House built from 100 different biomaterials at Dutch Design Week. Dezeen. https://www.dezeen.com/2021/10/20/biomaterials-house-dutch-design-week-biobased-creations/

Critical slopes. Cvillepedia. (n.d.). https://www.cvillepedia.org/Critical_Slopes#:~:text=The%20Charlottesville%20City%20Council%20adopted,6%2C000%20square%20feet%20or%20more

Dr.A.J.Marsh. (n.d.). PD: 2d sun-path. https://drajmarsh.bitbucket.io/sunpath2d.html

Engels, J. (2015, July 30). How to build a Swale on contour successfully. The Permaculture Research Institute. https://www.permaculturenews.org/2015/07/24/how-to-build-a-swale-on-contour-successfully/

Green Infrastructure and Stormwater Management. Global Designing Cities Initiative. (2022, October 25). https://globaldesigningcities.org/publication/global-street-design-guide/utilities-and-infrastructure/green-infrastructure-stormwater-management/

Oso Apartments. Canopy / architecture + design. (2021, May 21). https://canopy-chicago.com/work/case-studies/oso-apartments-test-3/

Porous pavements: What are the main 4 pros and cons?. Insightssuccess Media and Technology Pvt. Ltd. (2022, December 26). https://insightssuccess.com/porous-pavements-what-are-the-main-4-pros-and-cons/

Stormwater Best Management Practice. U.S. Environmental Protection Agency. (n.d.). https://www.epa.gov/system/files/documents/2021-11/bmp-bioretention-rain-gardens.pdf

Stormwater Management: What Stormwater Management Is and Why It Is Important. (n.d.-b). https://extensionpublications.unl.edu/assets/pdf/g2238.pdf

Sustainable home design. Passive Solar Strategy. (n.d.). https://www.theupstudio.com/sustainablehomedesign/passivesolar.html

Sustainable Use of Water in Urban Design. ResearchGate. (n.d.-b). https://www.researchgate.net/publication/311976762_Sustainable_Use_of_Water_in_Urban_Design

The Case for Healthy Places. (2016). Project for Public Spaces Inc. https://assets-global.website-files.com/581110f944272e4a11871c01/5f1063db7fd2ac4eb8658343_5a626855e27c0000017efc24_Healthy-Places-PPS.pdf

References

Virginia native plants. Gardenia. (n.d.). https://www.gardenia.net/native-plants/virginia

https://insights.grcglobalgroup.com/the-impact-of-pedestrian-friendly-urban-planning-on-communities/