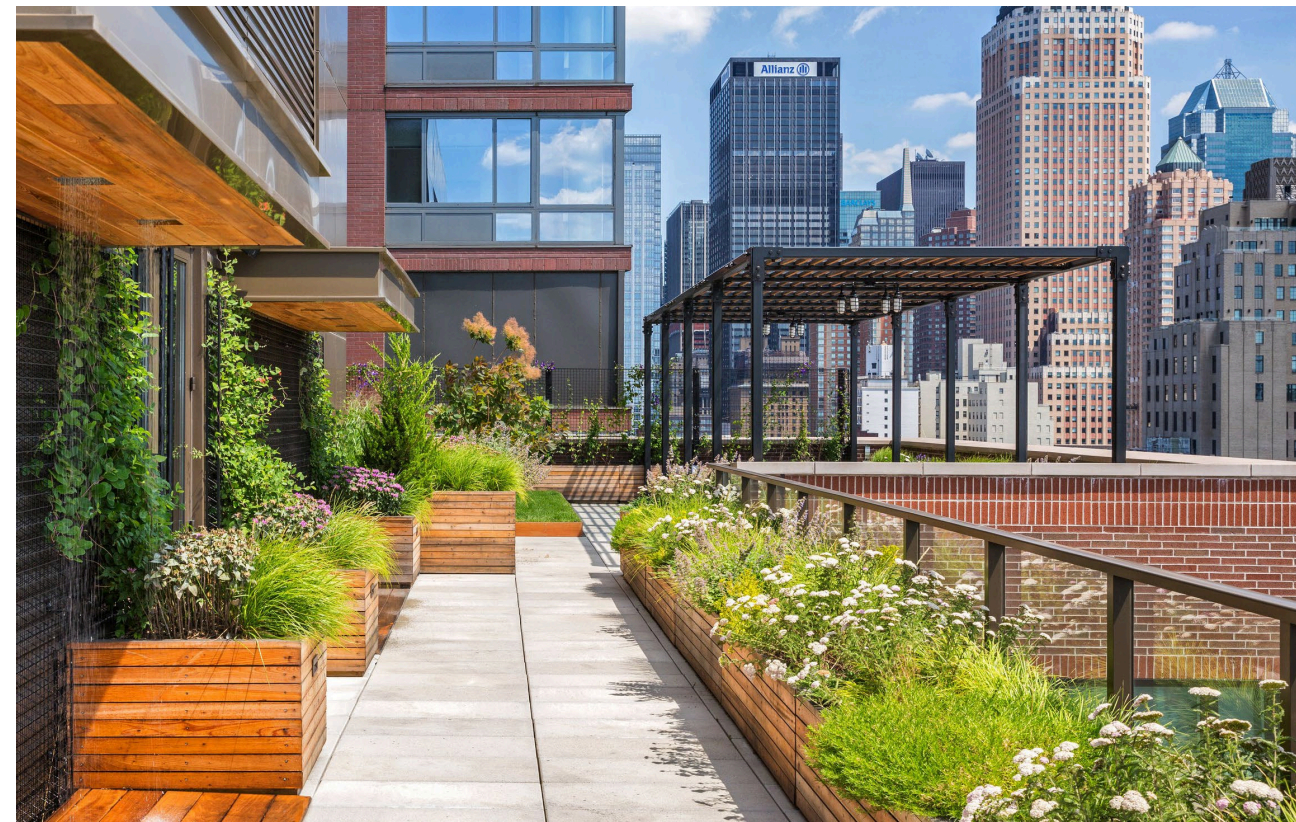


INTEGRATING PLAINS

CONNECTING FARGO THROUGH A GREEN ROOF SYSTEM

WHY GREEN ROOFS?



PROGRAM

How can green roofs be utilized to improve pedestrian connections
and incorporate microclimate design?

VANCOUVER CONVENTION CENTER

The Vancouver Convention Center was designed by PWL Partnership Landscape Architects Inc. in 2003-2010. It is a 2.4-hectare green roof, designed towards native plantings, animal attraction and stormwater detention, while reduce energy and the buildings footprint.



CHICAGO PLANT CONSERVATION SCIENCE CENTER

The Chicago Plant Conservation Science Center was designed by Edward Larrabee Barnes, Daniel Urban Kiley, and Booth Hansen Architects. It has a 16,000 sq. ft. green roof that is designed for research of different types of green roofs, they are monitored for plant climate effectiveness.



The ASLA headquarters was designed by Michael Van Valkenburgh Associates. It was completed in 2006 and consists of 6 different forms of green roof throughout the 3,300 sq. ft. rooftop. The goal was to show that landscape architects can play a key role in green roof design.

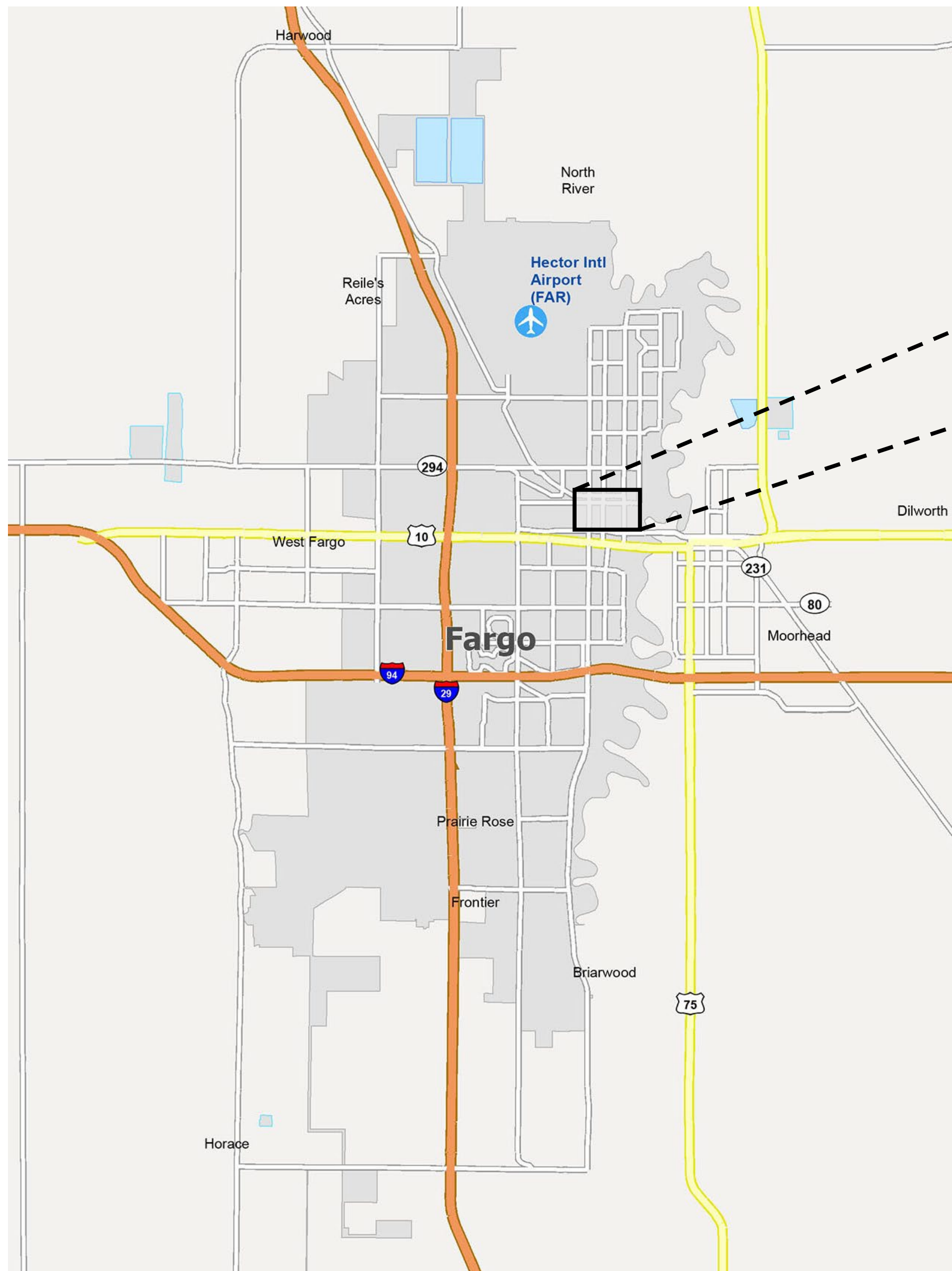
ASLA HEADQUARTERS



How can green roofs be utilized to improve pedestrian connections and incorporate microclimate design?

Design an arrangement of green roofs that extend along the skywalk system to create new green spaces in downtown while improving the usage of the skywalk system. A hopeful focus on implementing a network of green roof types, including extensive, semi-intensive, and intensive systems to create rooftops that have effective plant growth in minimal medium depths and different climate conditions than the surrounding area.

PRELIMINARY SITE LOCATION



LOCATION



PROJECT OBJECTIVES

ROOF TYPOLOGY

Which roofs have the capability for different green roofs?


PEDESTRIAN CONNECTIONS


How do pedestrians get to the green roofs and interact with them?

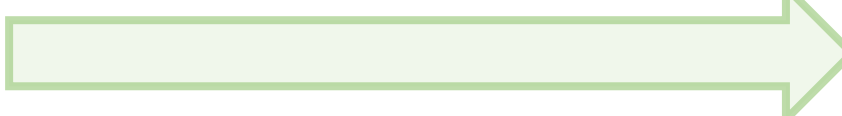
MICROCLIMATE DESIGN

Will the possible locations be adequate for growth?

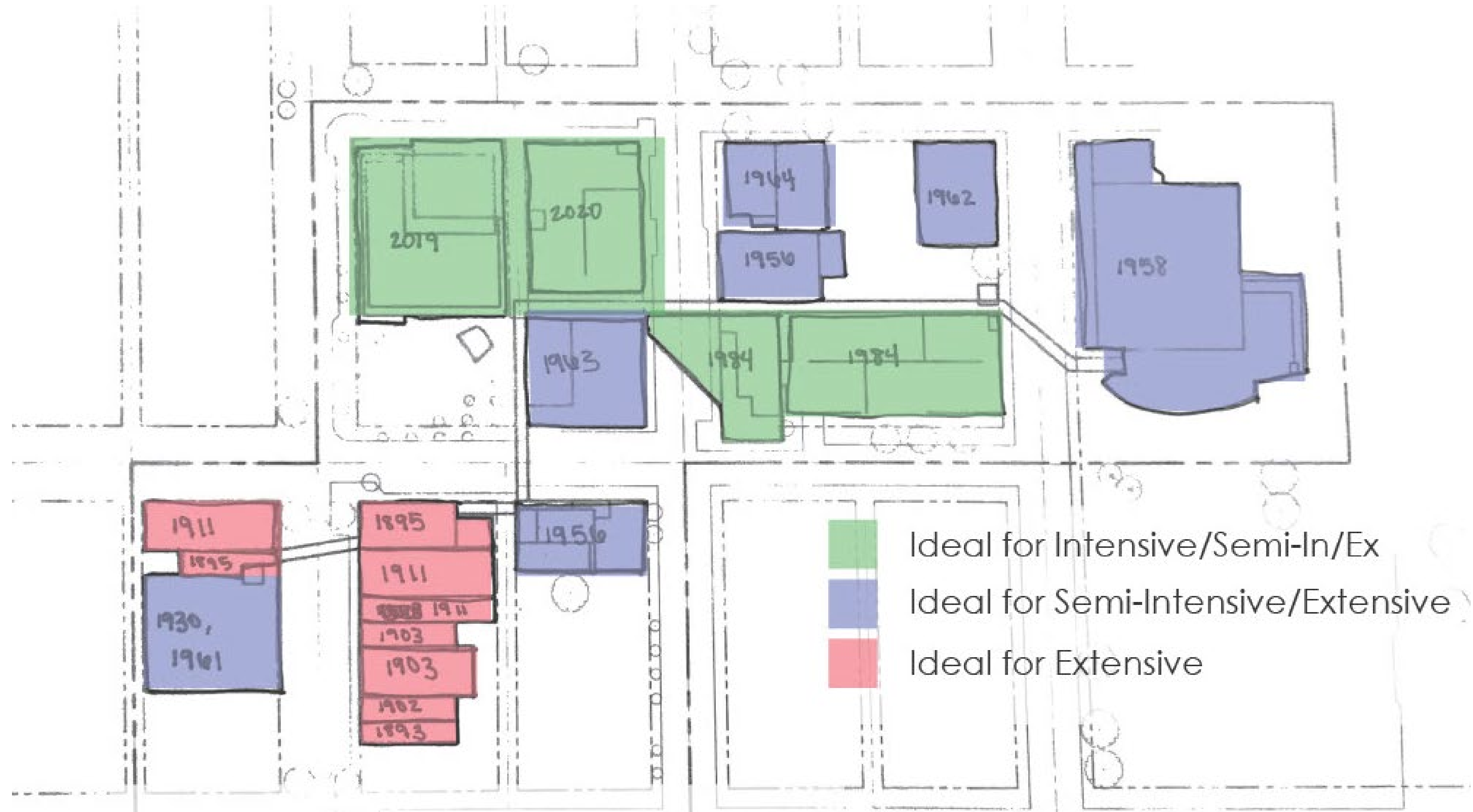
OBJECTIVES TO ANALYSIS

ROOF TYPOLOGY  Building Age
Building Rooftop Square Footage

PEDESTRIAN CONNECTIONS  Skywalk Entrance Points
Building Connections
Pedestrian- Street/Sidewalk Connections

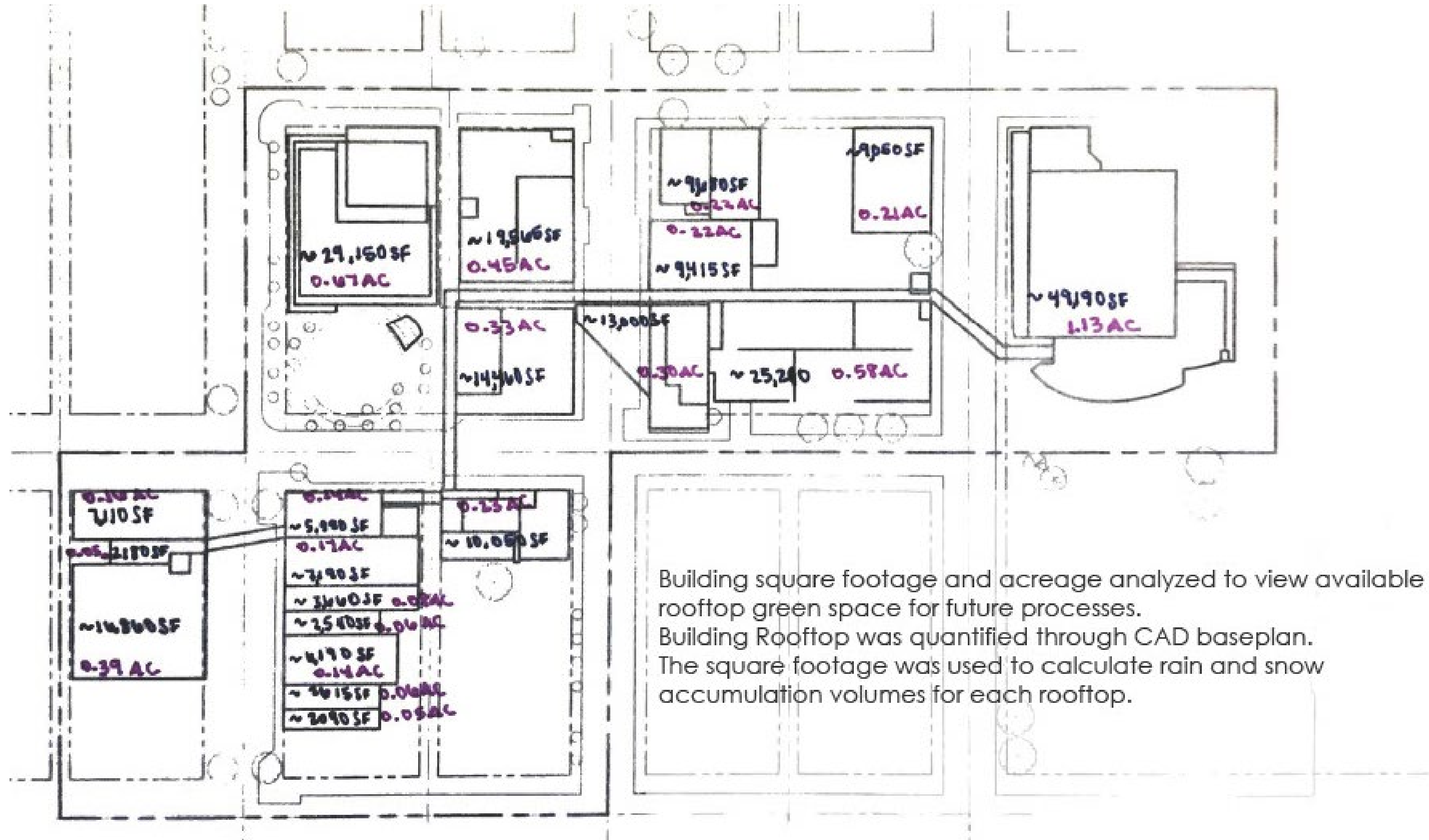
MICROCLIMATE DESIGN  Sun/Solar
Wind
Precipitation

BUILDING YEAR



ANALYSIS

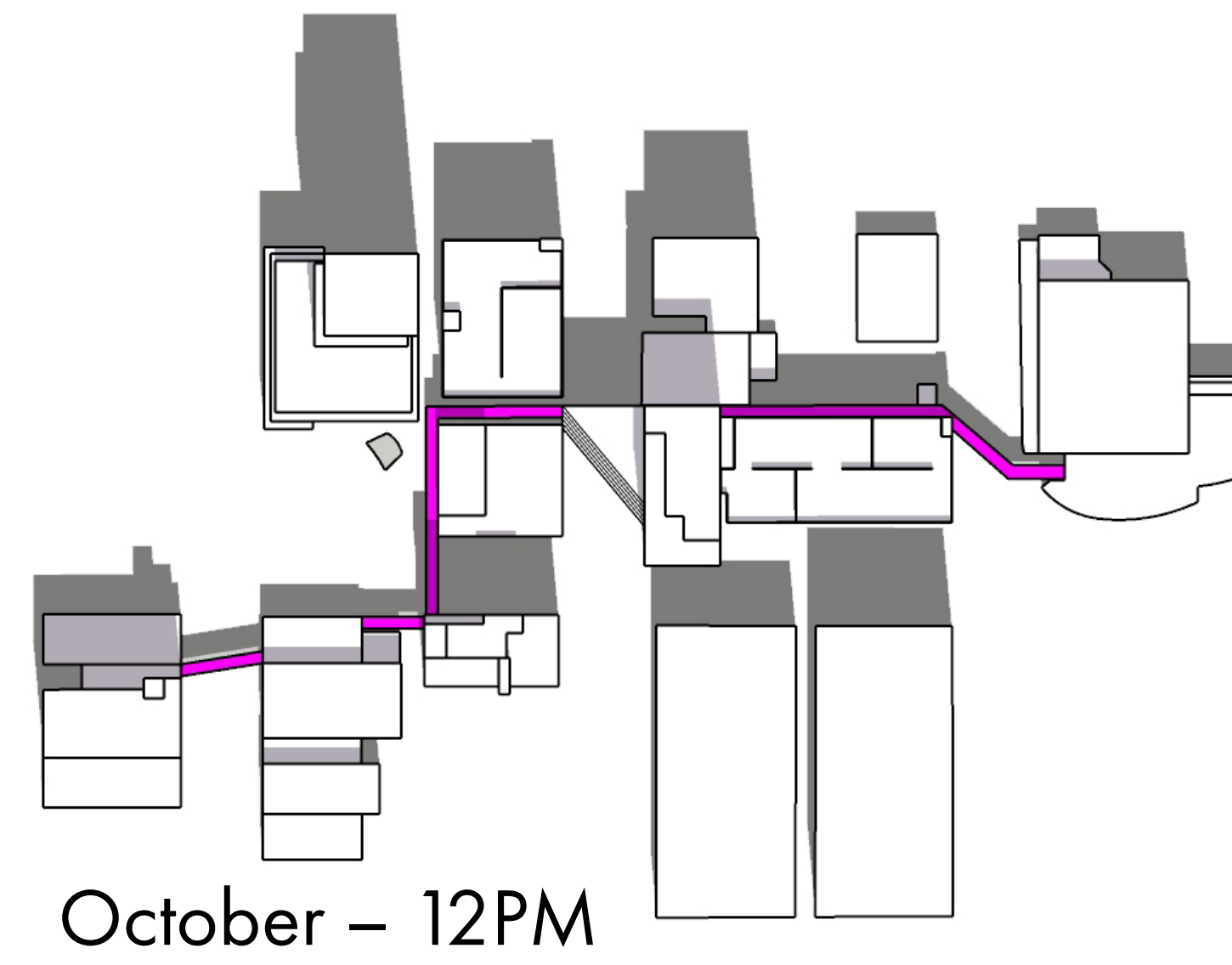
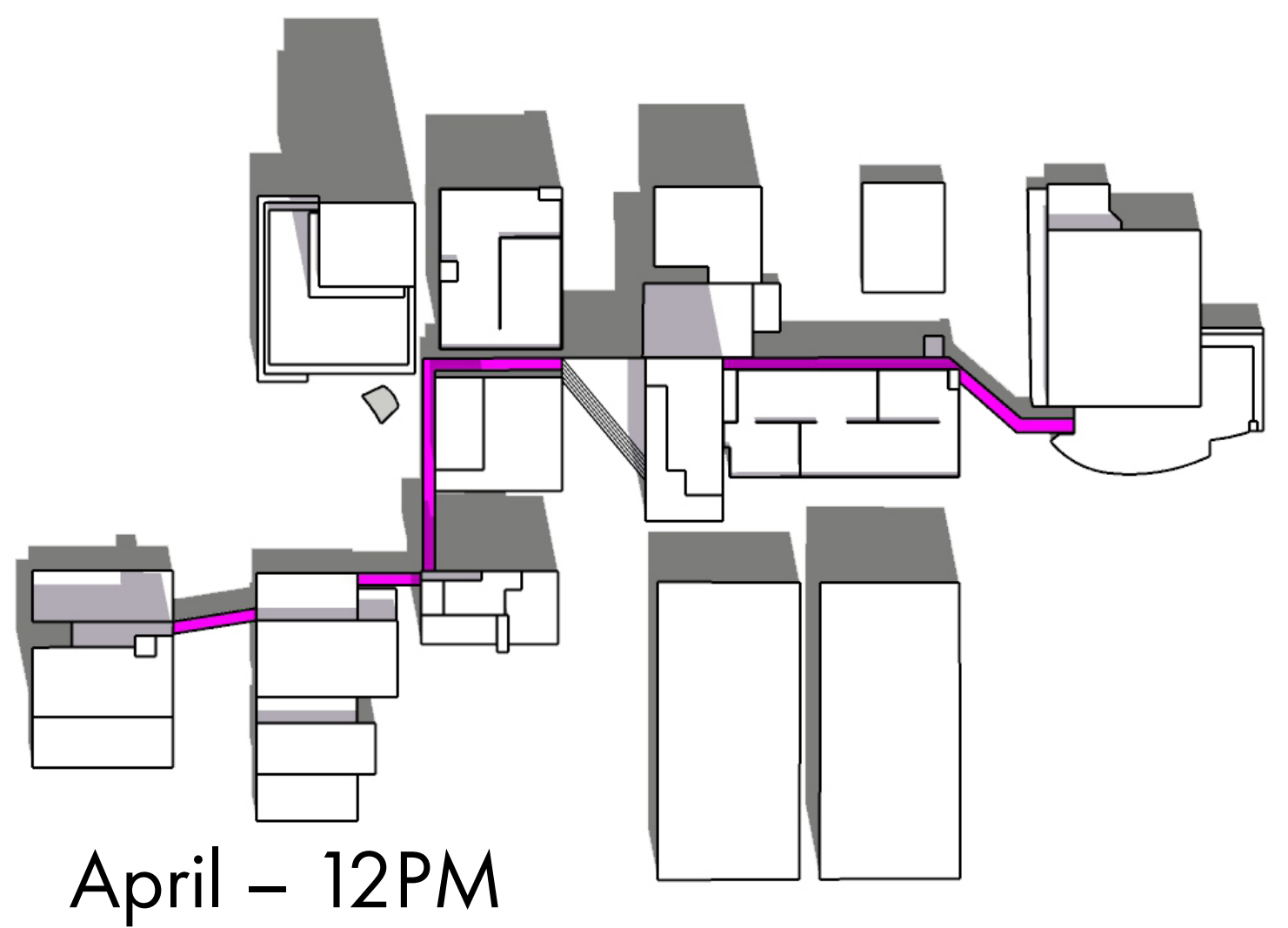
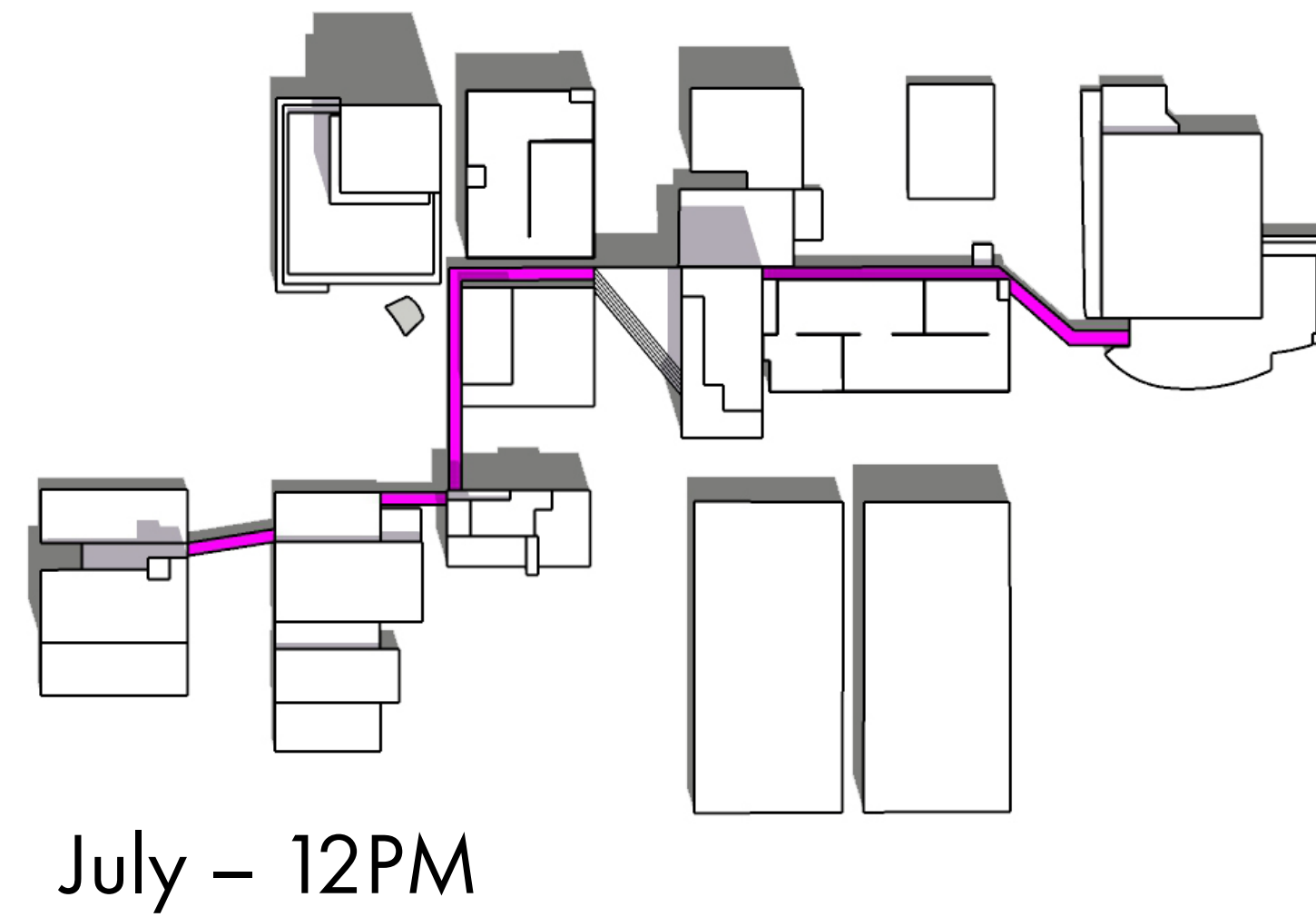
BUILDING SQUARE FOOTAGE



SKYWALK CONNECTIONS



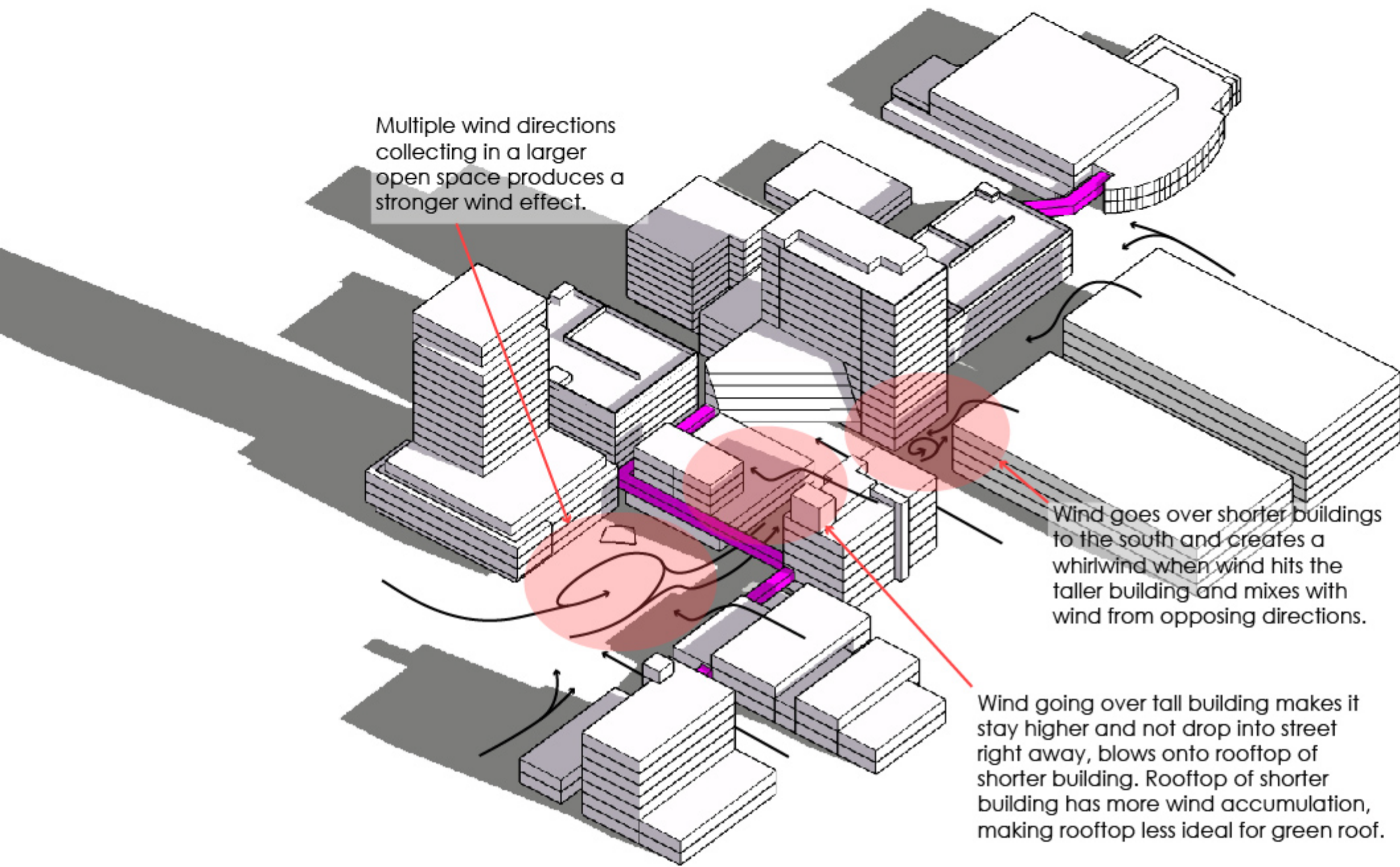
SUN/SOLAR



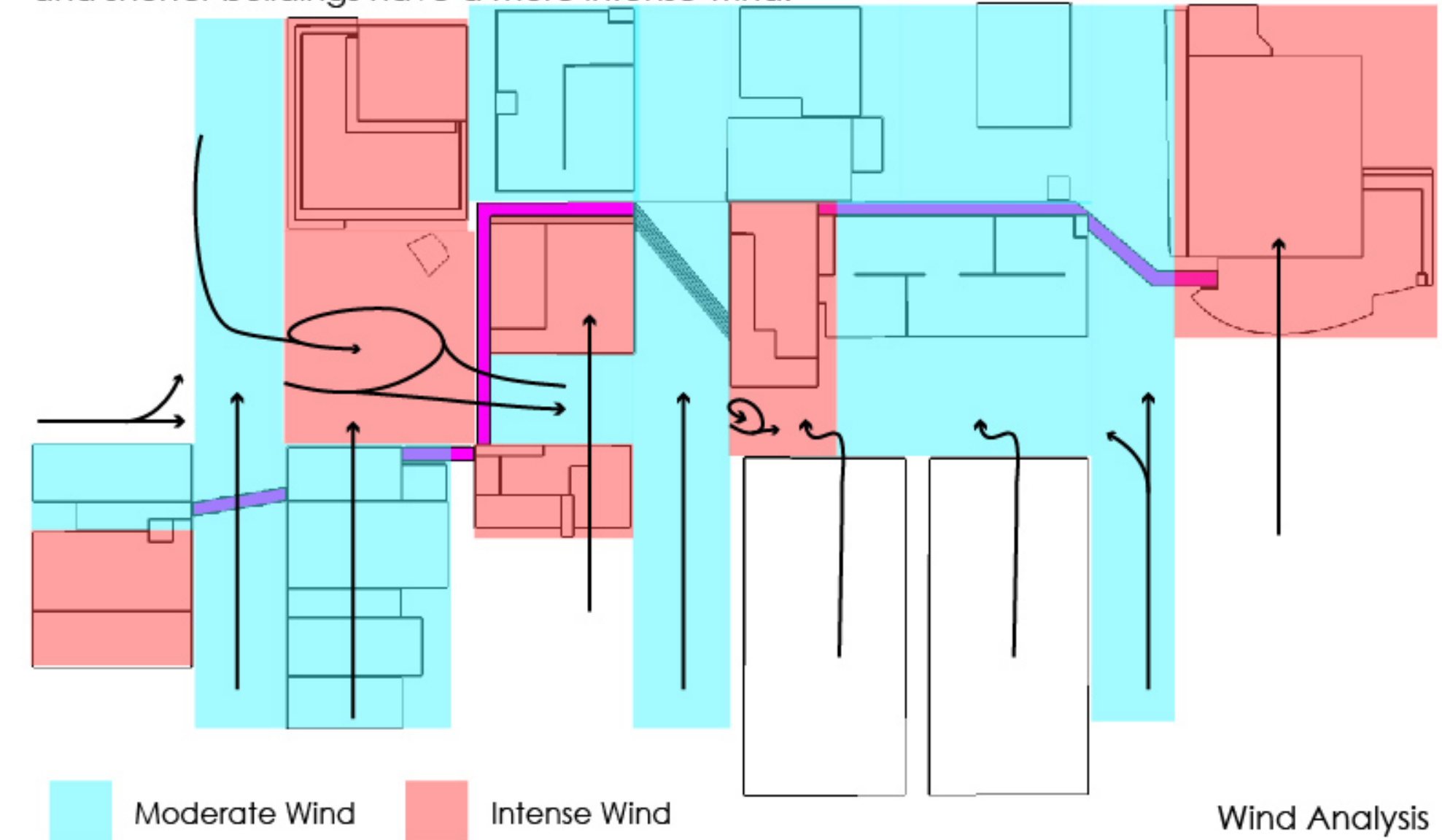
ANALYSIS

WIND

ANALYSIS



Short buildings or buildings blocked by taller buildings have a moderate wind intensity. Buildings that are taller and span above others get undisturbed direct wind making it more intense to the structure. Streets and buildings with large gapping between taller and shorter buildings have a more intense wind.



PRECIPITATION

ANALYSIS

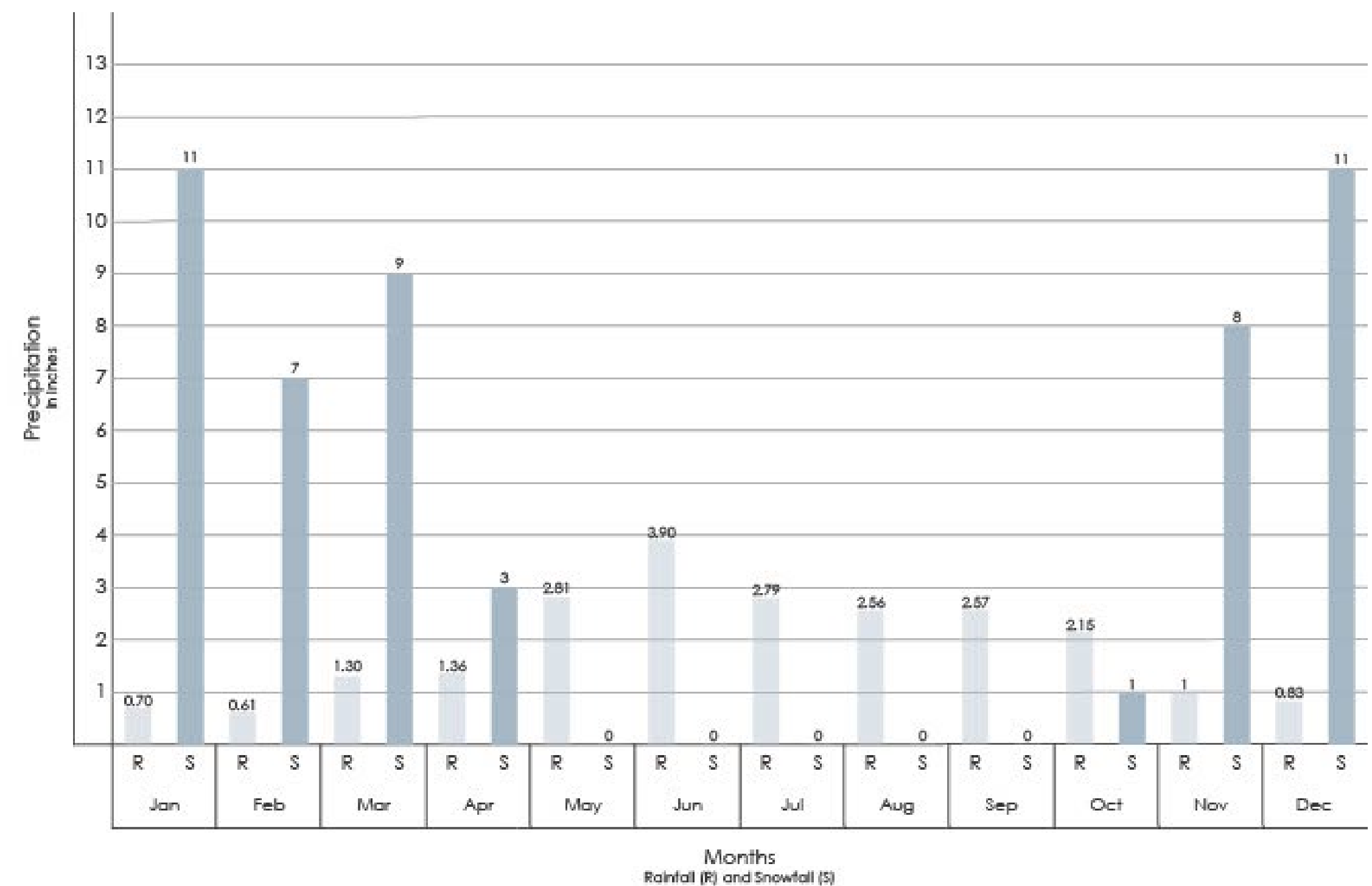
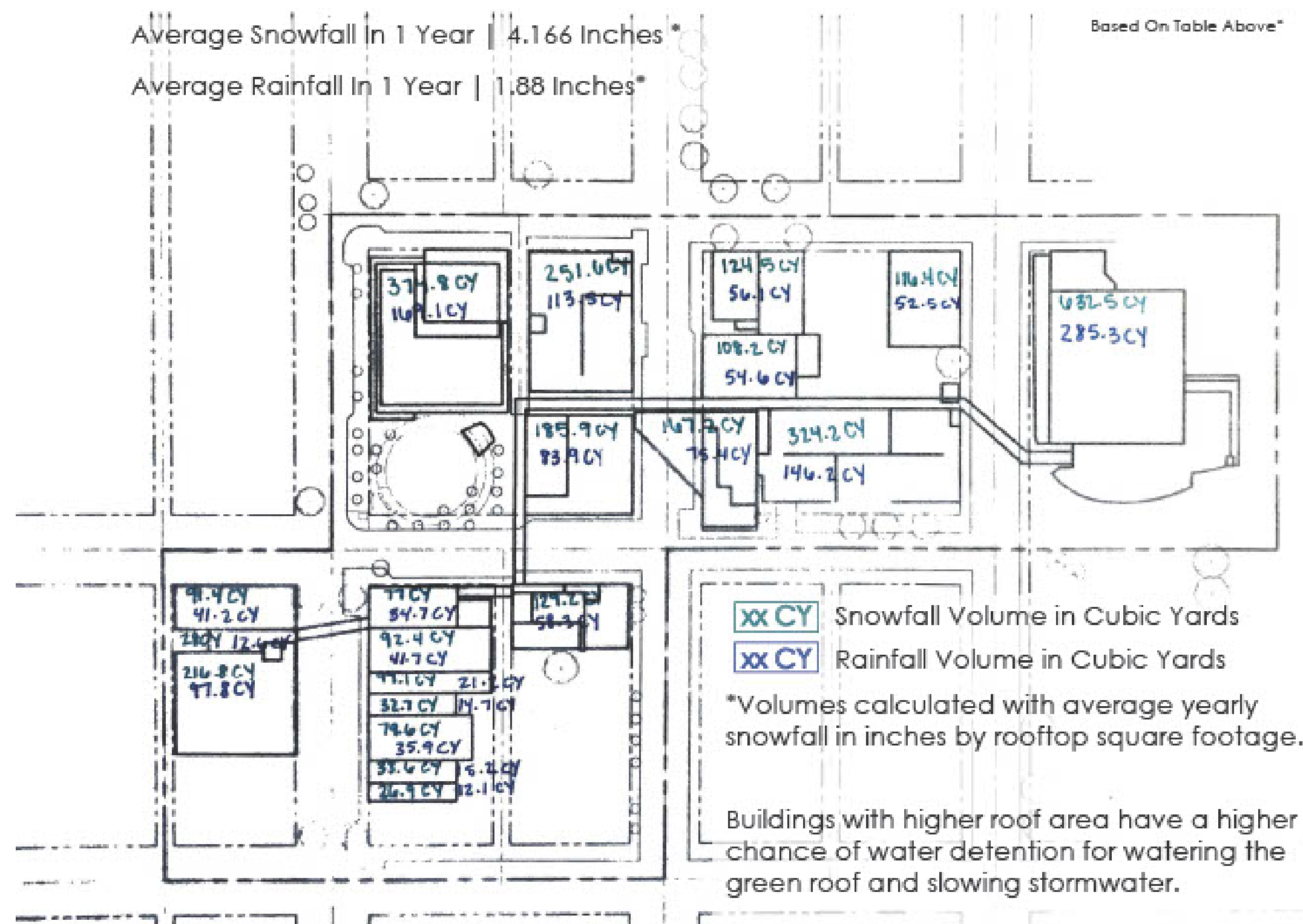


Table depicts monthly averages. High accumulation shows possible load of snow or rain on rooftop in one month span.

MASTERPLAN LOCATIONS

Ideal Green Roof Type

Intensive/Semi-Intensive/Extensive

Semi-Intensive/Extensive

Extensive

Wind

Intense

Moderate

Sun

Shaded (Most Often)

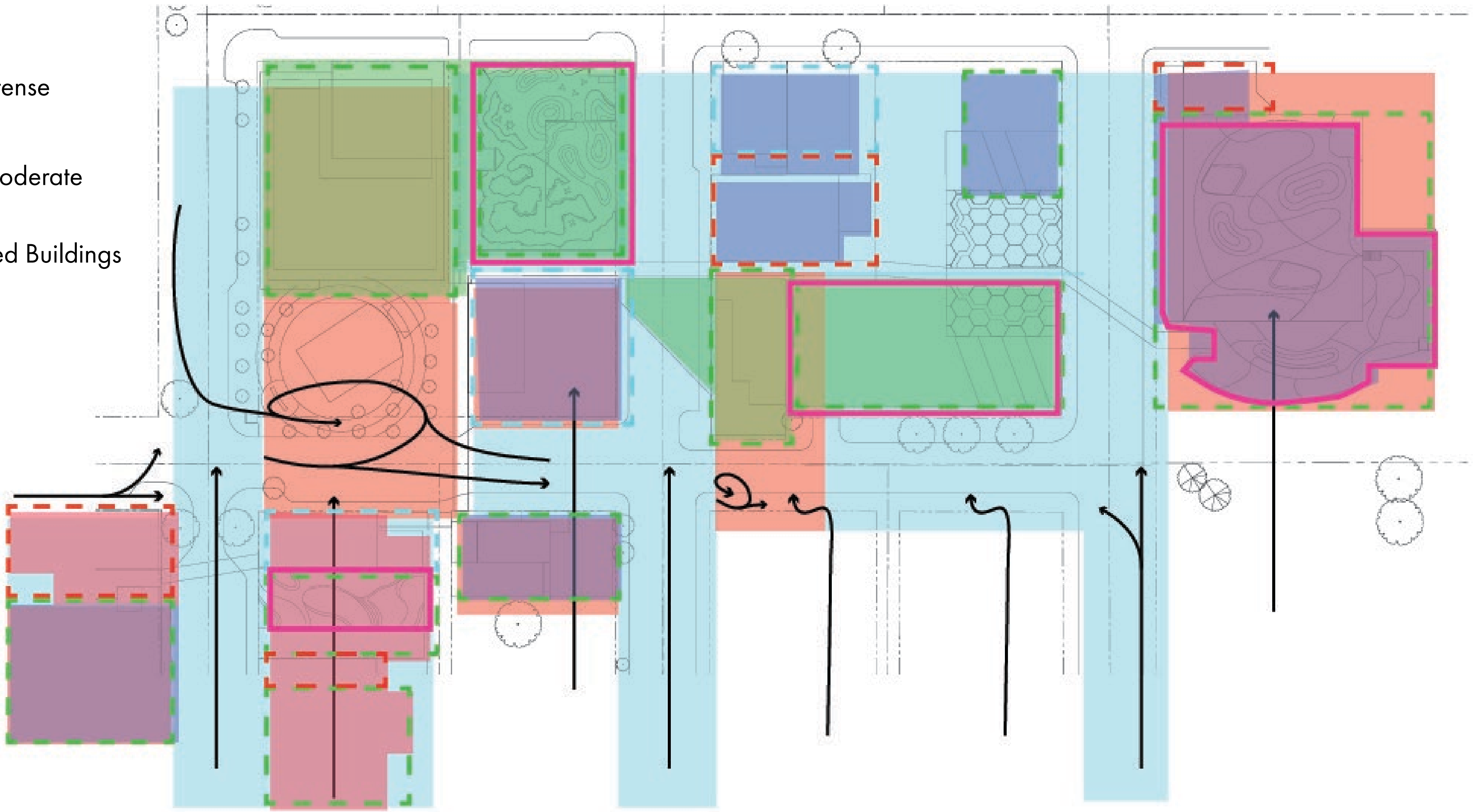
Shaded (Dormant Season)

Not Shaded

Selected Buildings



DESIGN DEVELOPMENT



PROGRAMMING ELEMENTS

TOPOGRAPHY/ RAISED PLANTER

20% ROOF SF

0 SF - 10,000 SF

40% ROOF SF

10,001 SF - 20,000 SF

60% ROOF SF

20,001 SF - 50,000 SF

SEATING AREAS

SMALL

1-2 PEOPLE

MEDIUM

3-9 PEOPLE

LARGE

10-15 PEOPLE

VIEWING POINTS

≥1 VIEWPOINT

0 SF - 10,000 SF

≥2 VIEWPOINT

10,001 SF - 20,000 SF

≥3 VIEWPOINT

20,001 SF - 50,000 SF

WALKING PATHS

MINOR PATHS

0 SF - 10,000 SF

MAJOR PATHS

15,000 SF - 50,000 SF

INSPIRATION



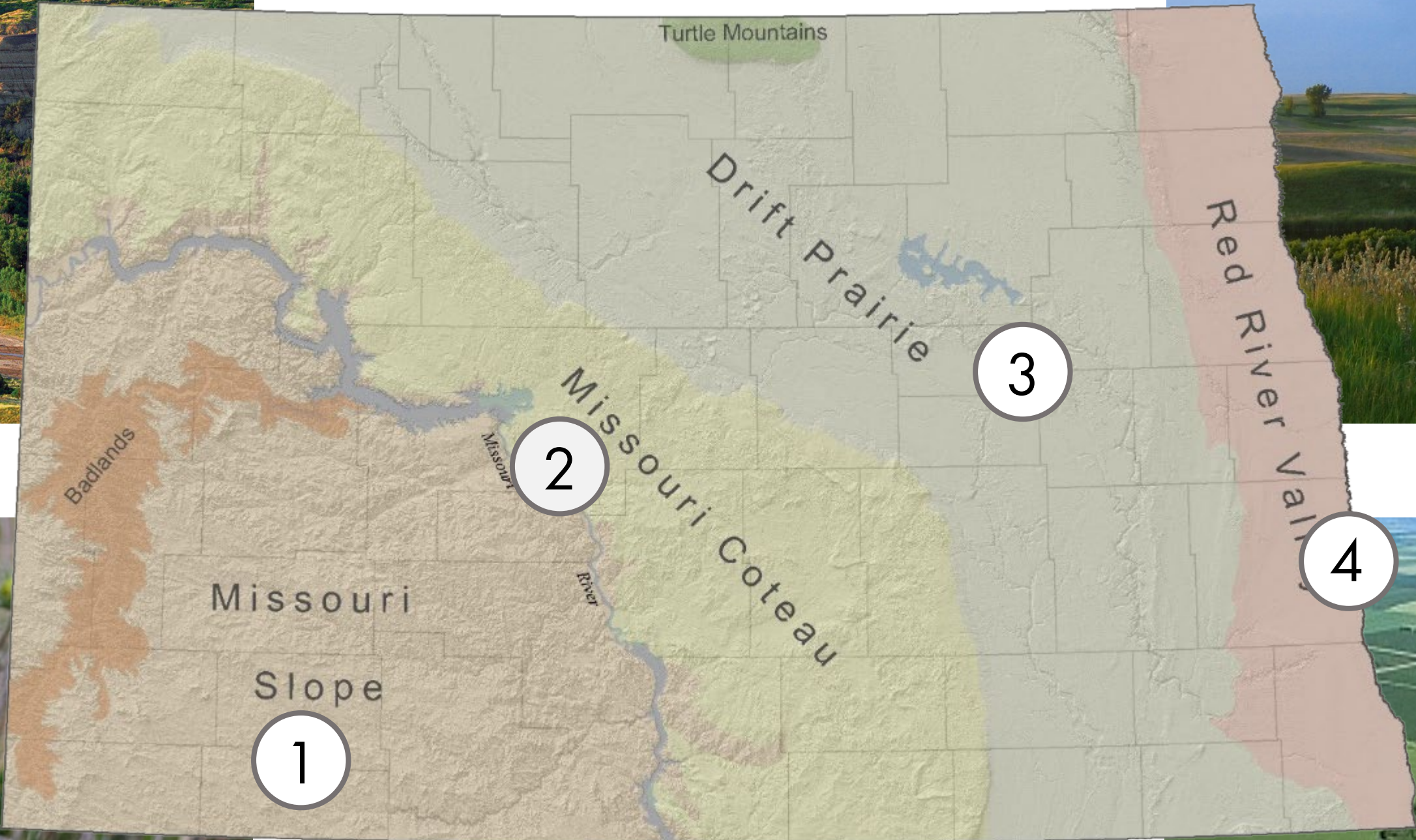
2



3



1

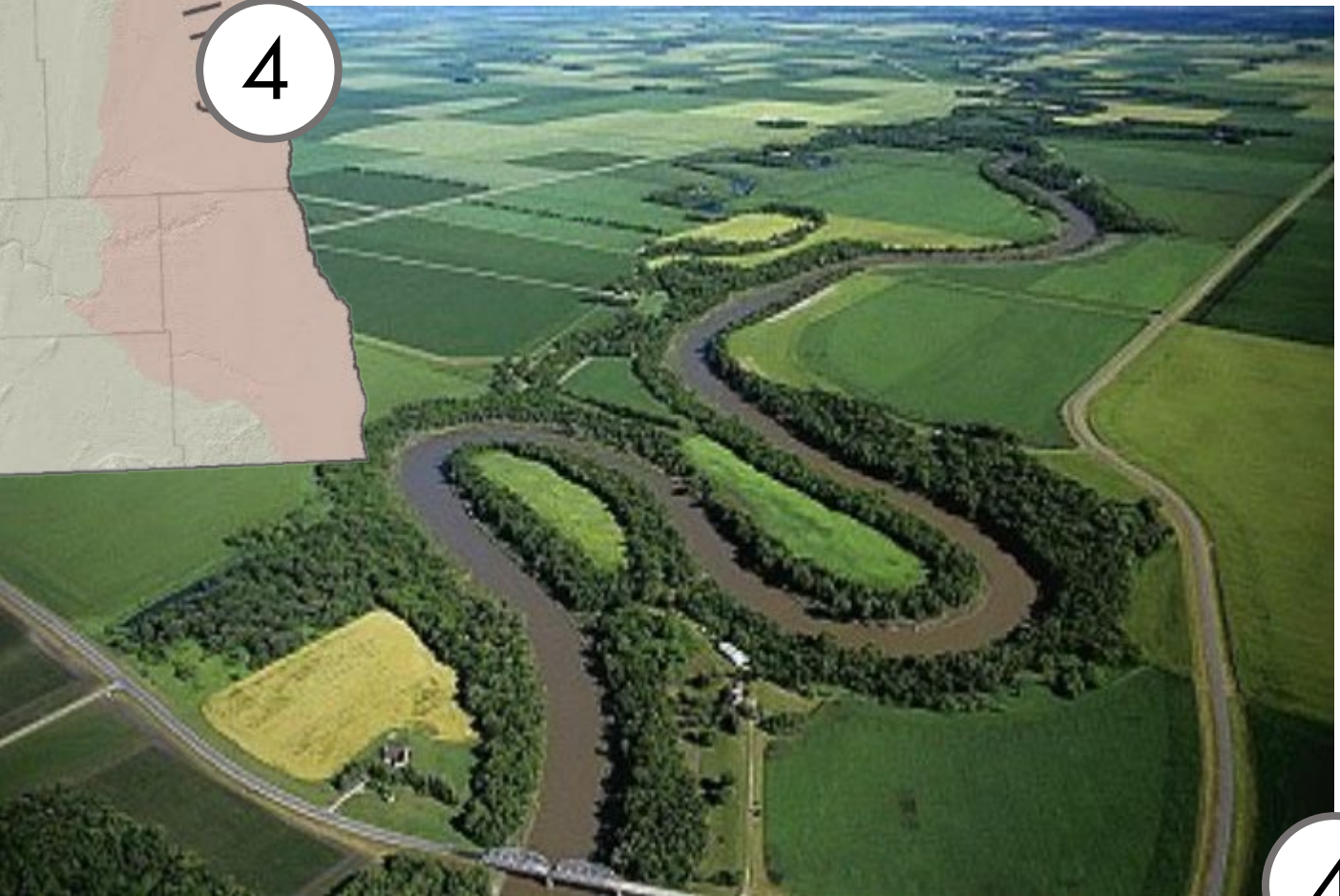


2

3

4

1

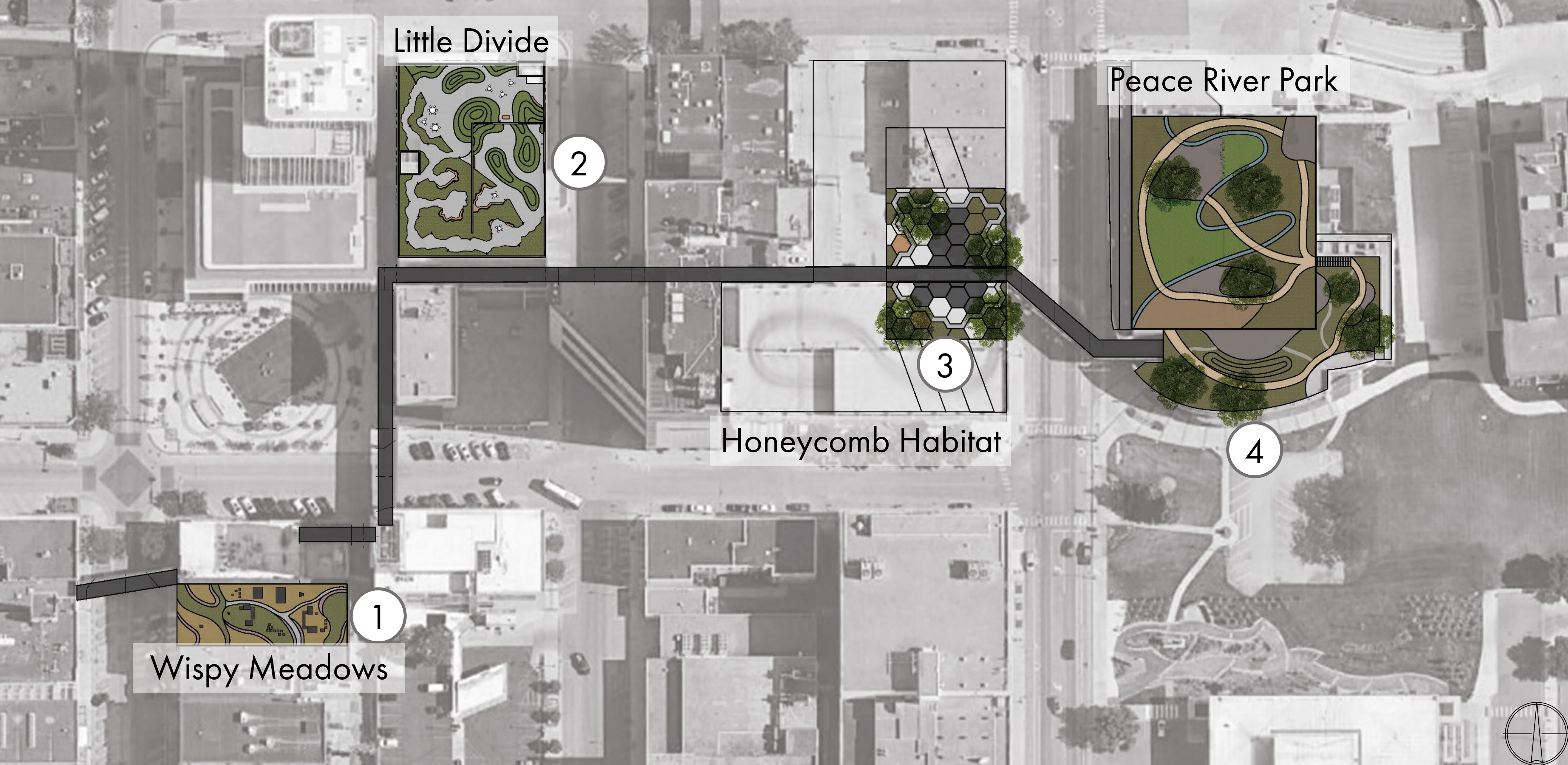


4

DESIGN DEVELOPMENT

MASTERPLAN

DESIGN DEVELOPMENT



1
Wispy Meadows

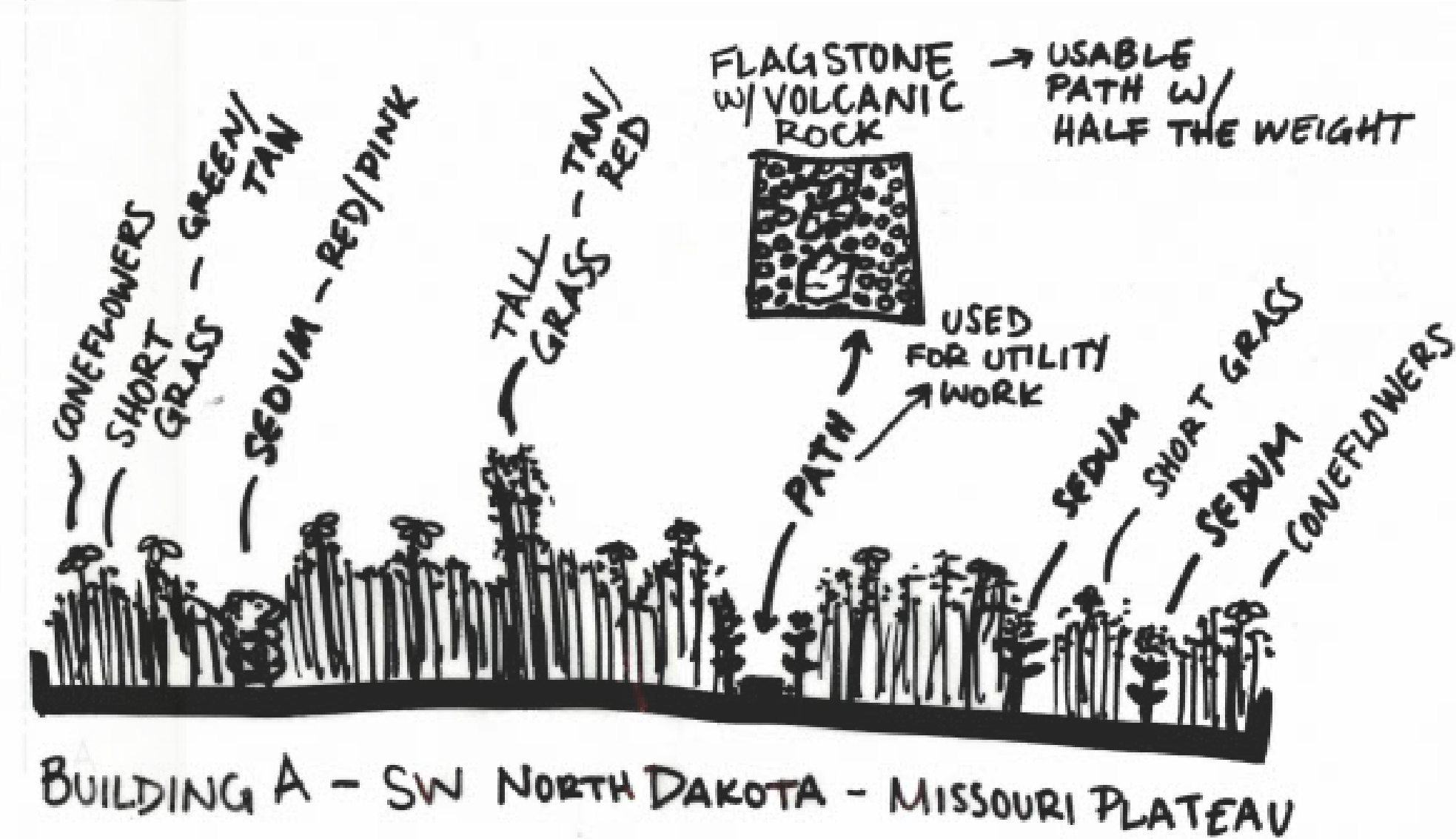
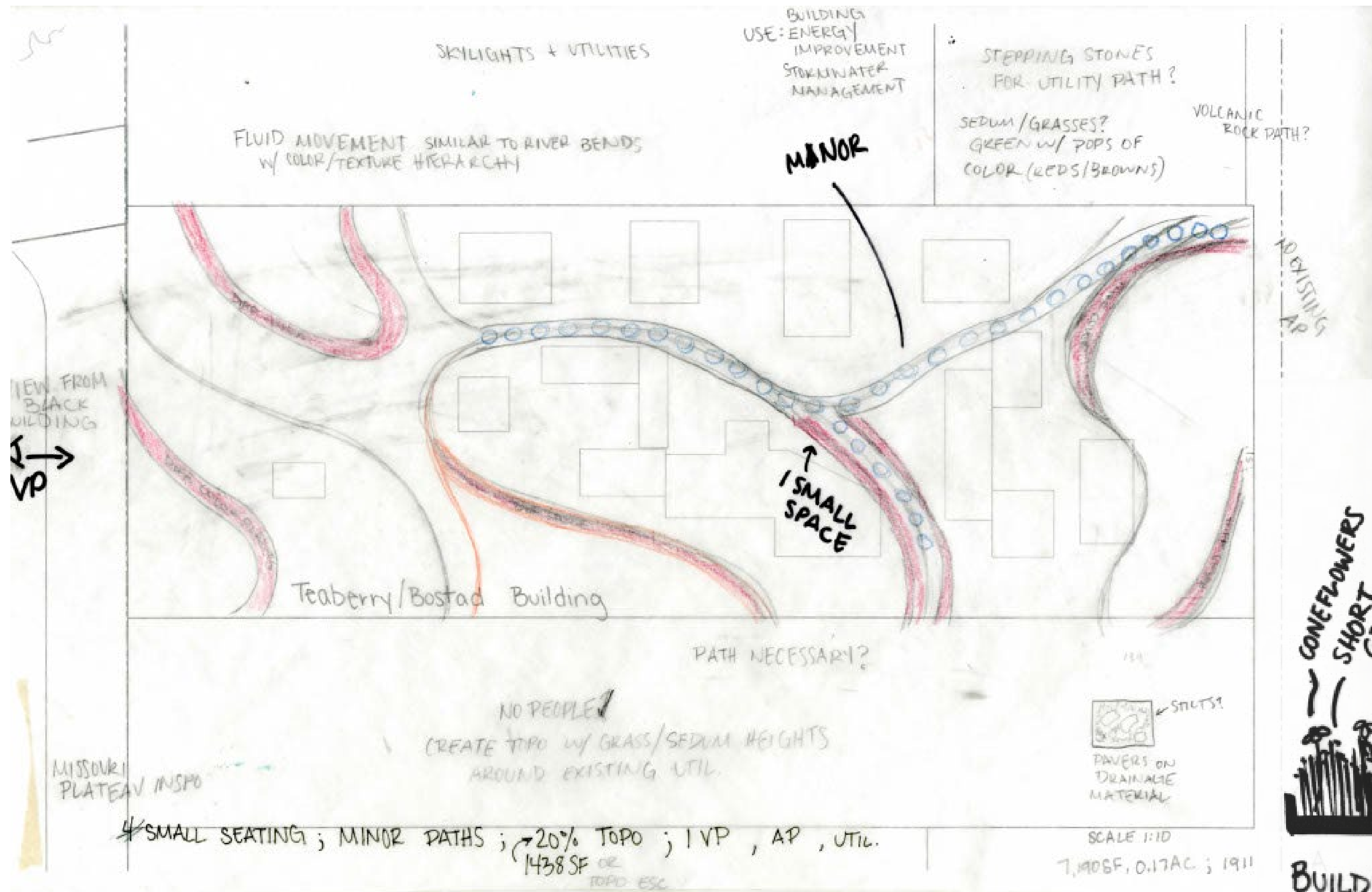
2
Little Divide

3
Honeycomb Habitat

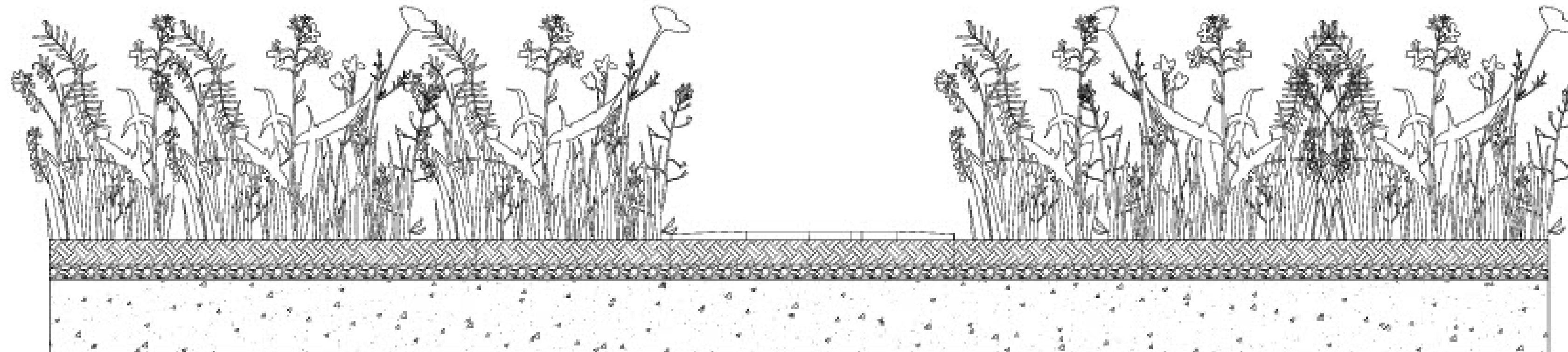
4
Peace River Park

WISPY MEADOWS

DESIGN DEVELOPMENT

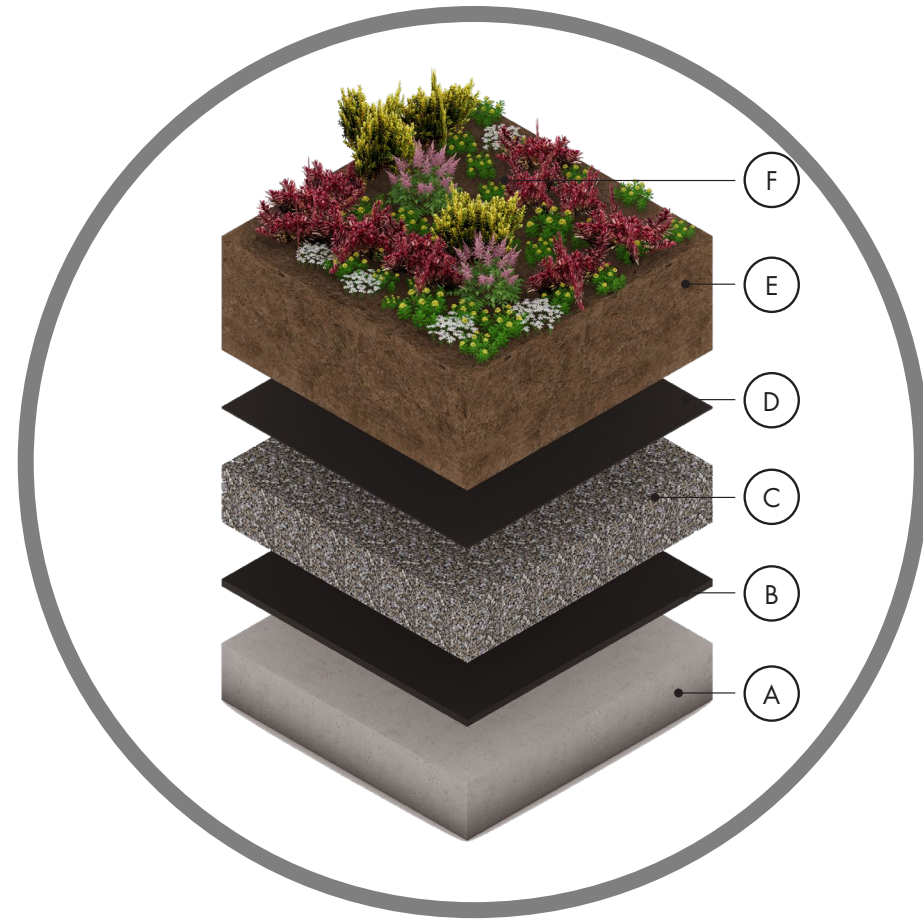


WISPY MEADOWS



DESIGN RESULTS

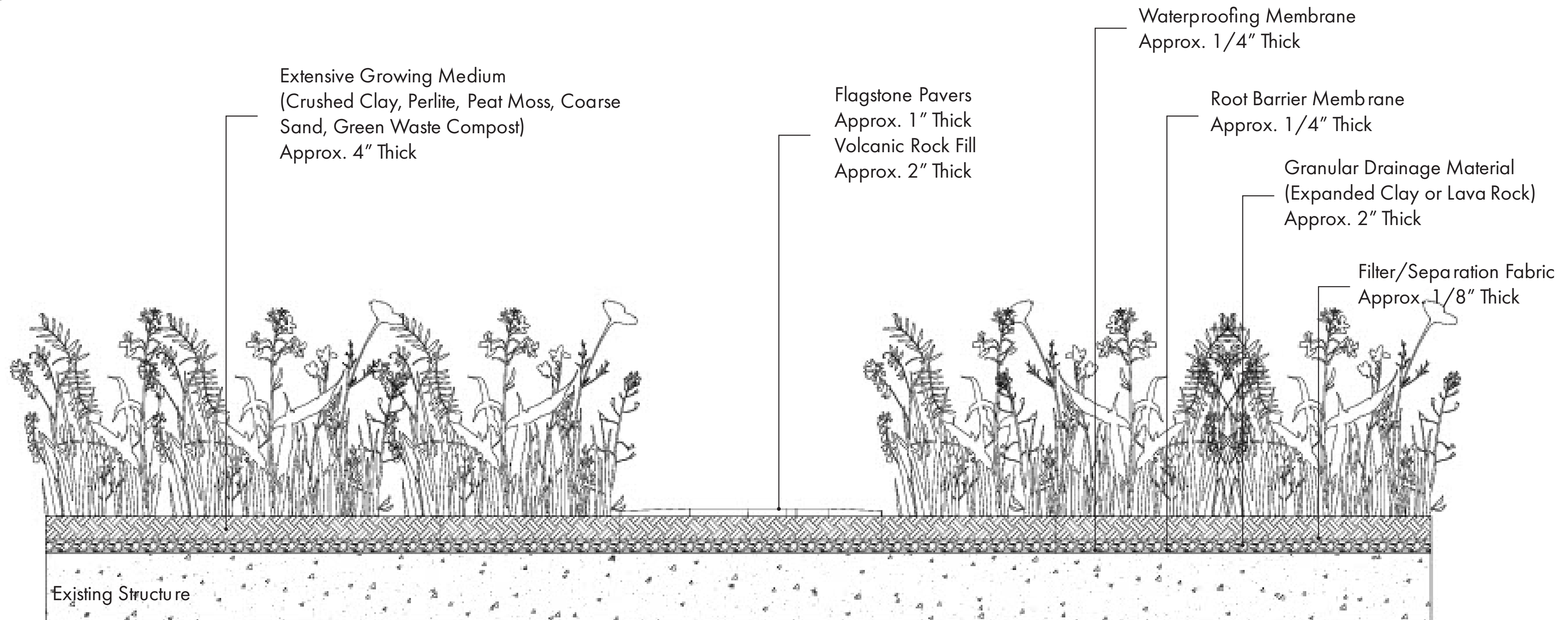
WISPY MEADOWS



Green Roof Typologies Key

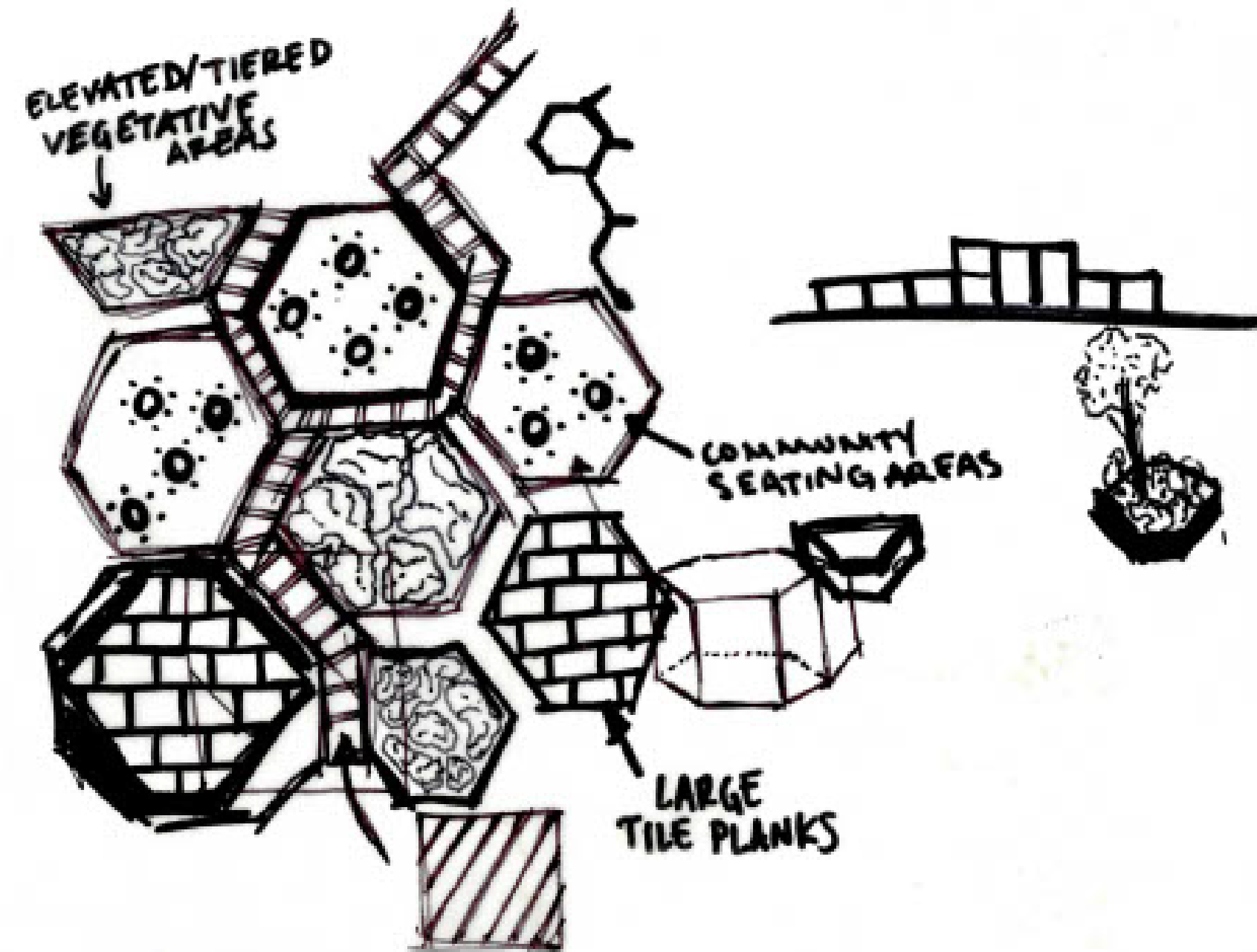
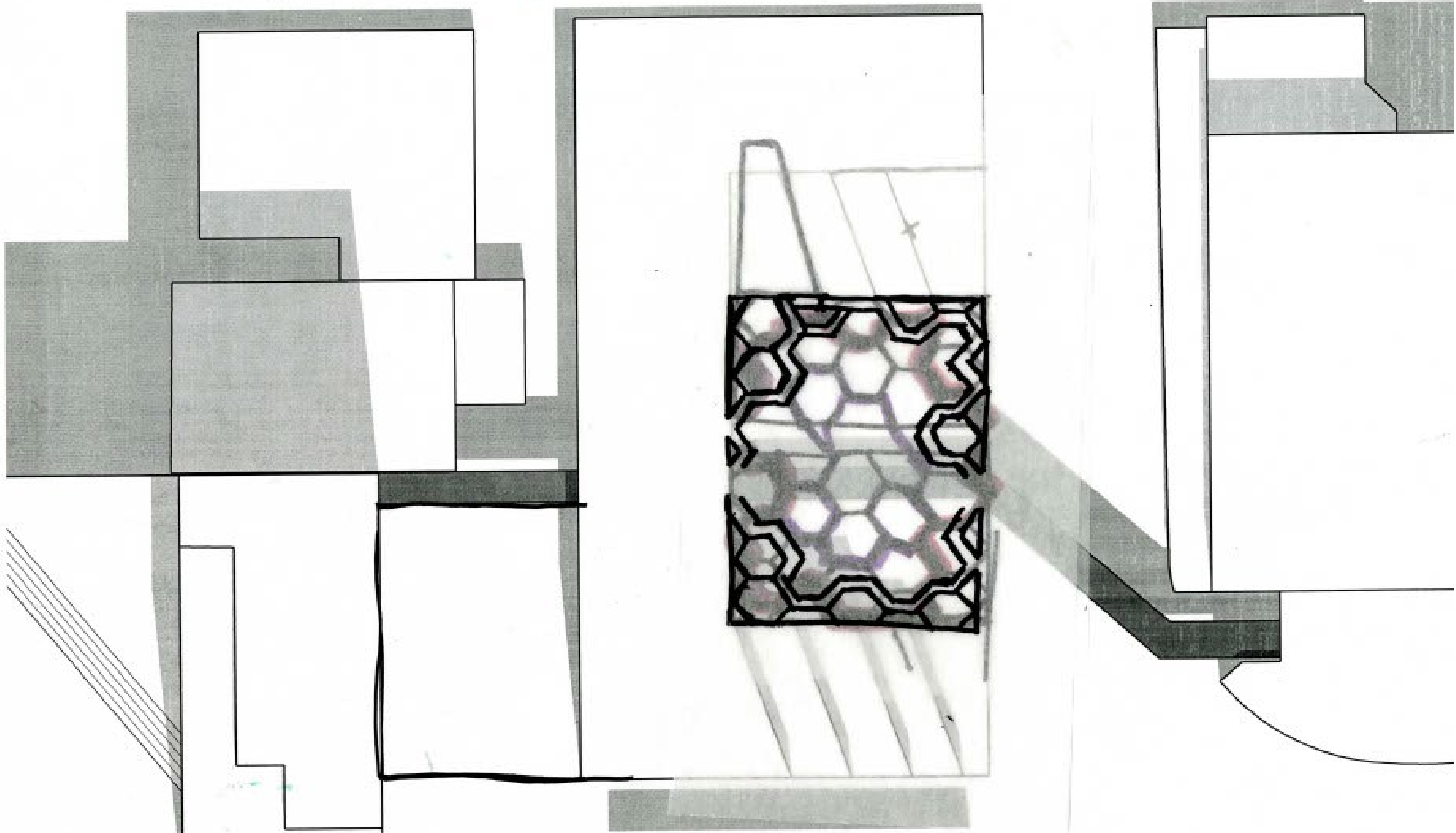
- | | | |
|---------------------------------|---|--|
| (A) Concrete Structure | (C) Granular Retention
2" - 6" Thick | (E) Soil Mixture
4" - 9" Thick |
| (B) Root Membrane
1/4" Thick | (D) Filter Fabric
1/8" Thick | (F) Extensive/Intensive
Planting Material |

DESIGN RESULTS



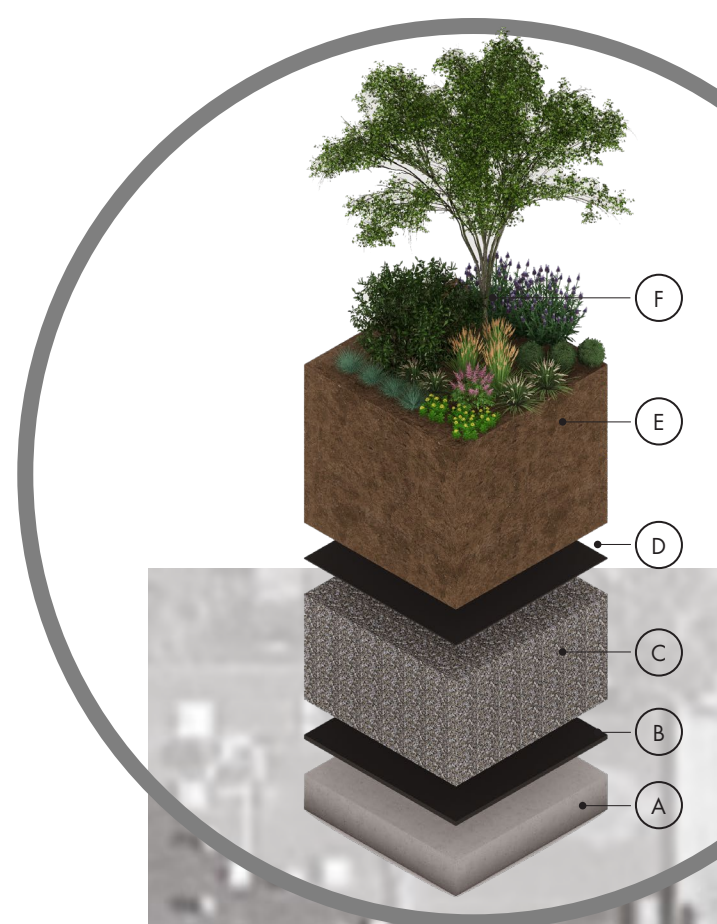
HONEYCOMB HABITAT

DESIGN DEVELOPMENT



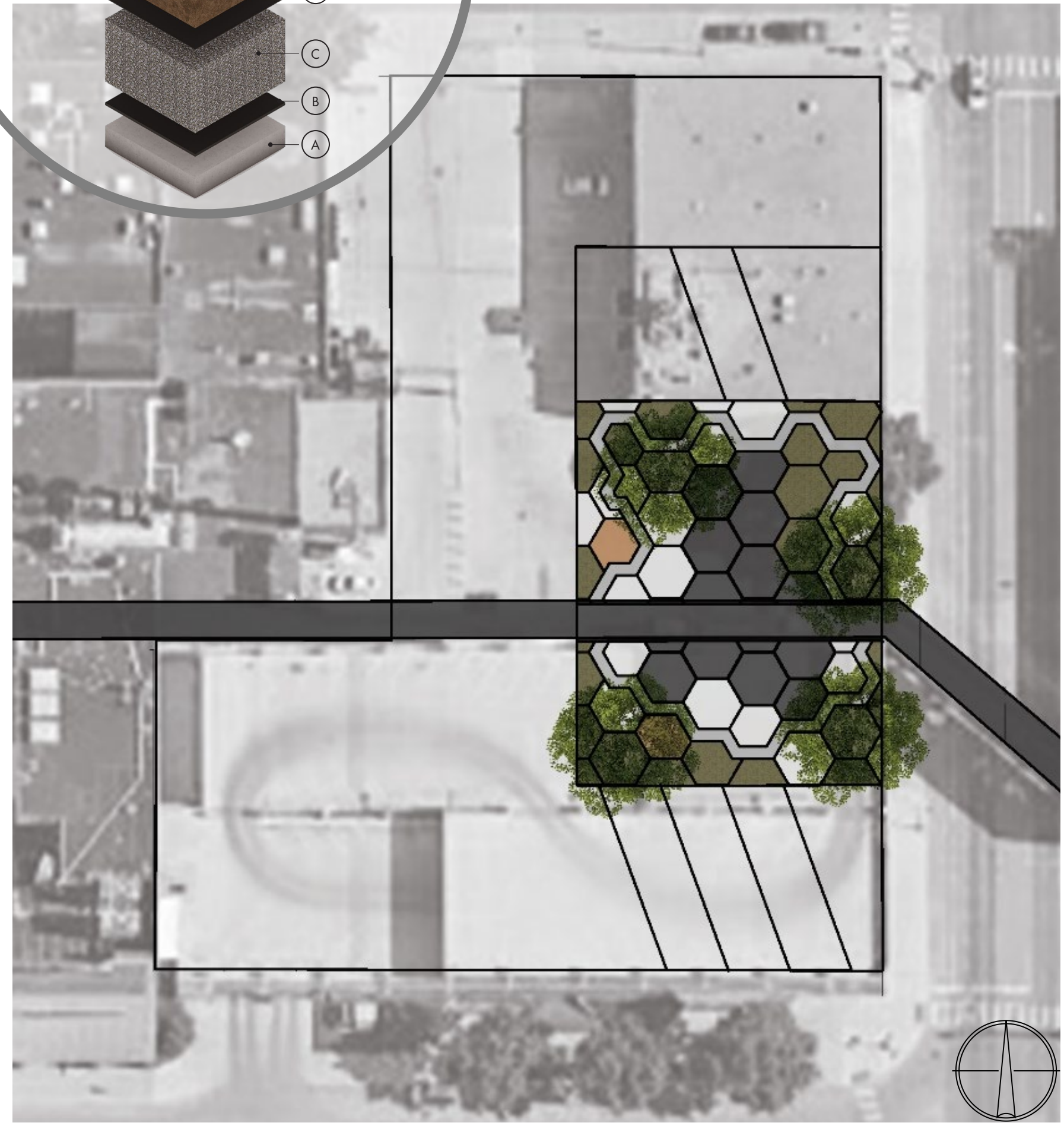
Green Roof Typologies Key

- (A) Concrete Structure
- (B) Root Membrane 1/4" Thick
- (C) Granular Retention 2" - 6" Thick
- (D) Filter Fabric 1/8" Thick
- (E) Soil Mixture 4" - 9" Thick
- (F) Extensive/Intensive Planting Material

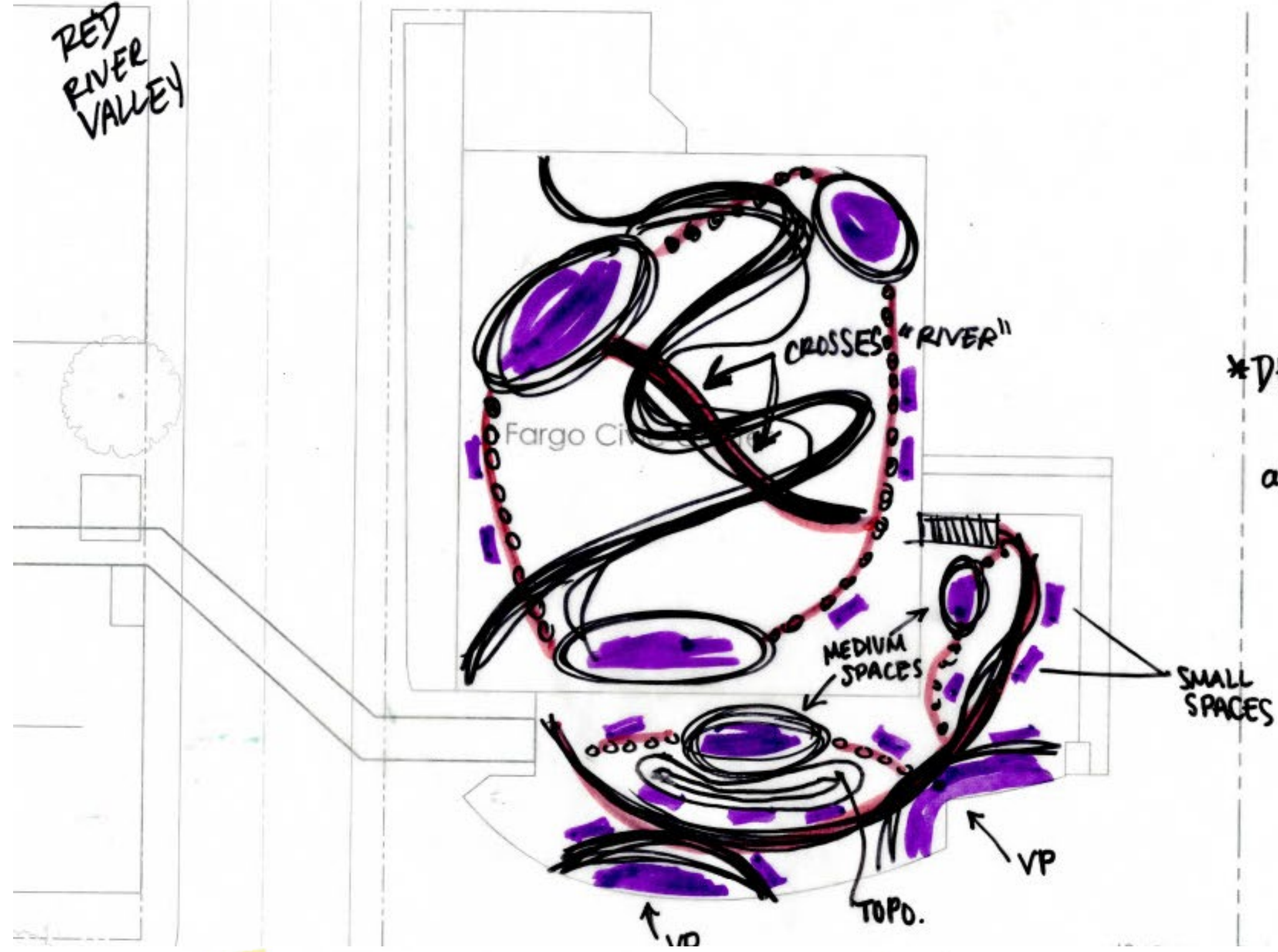


HONEYCOMB HABITAT

DESIGN RESULTS



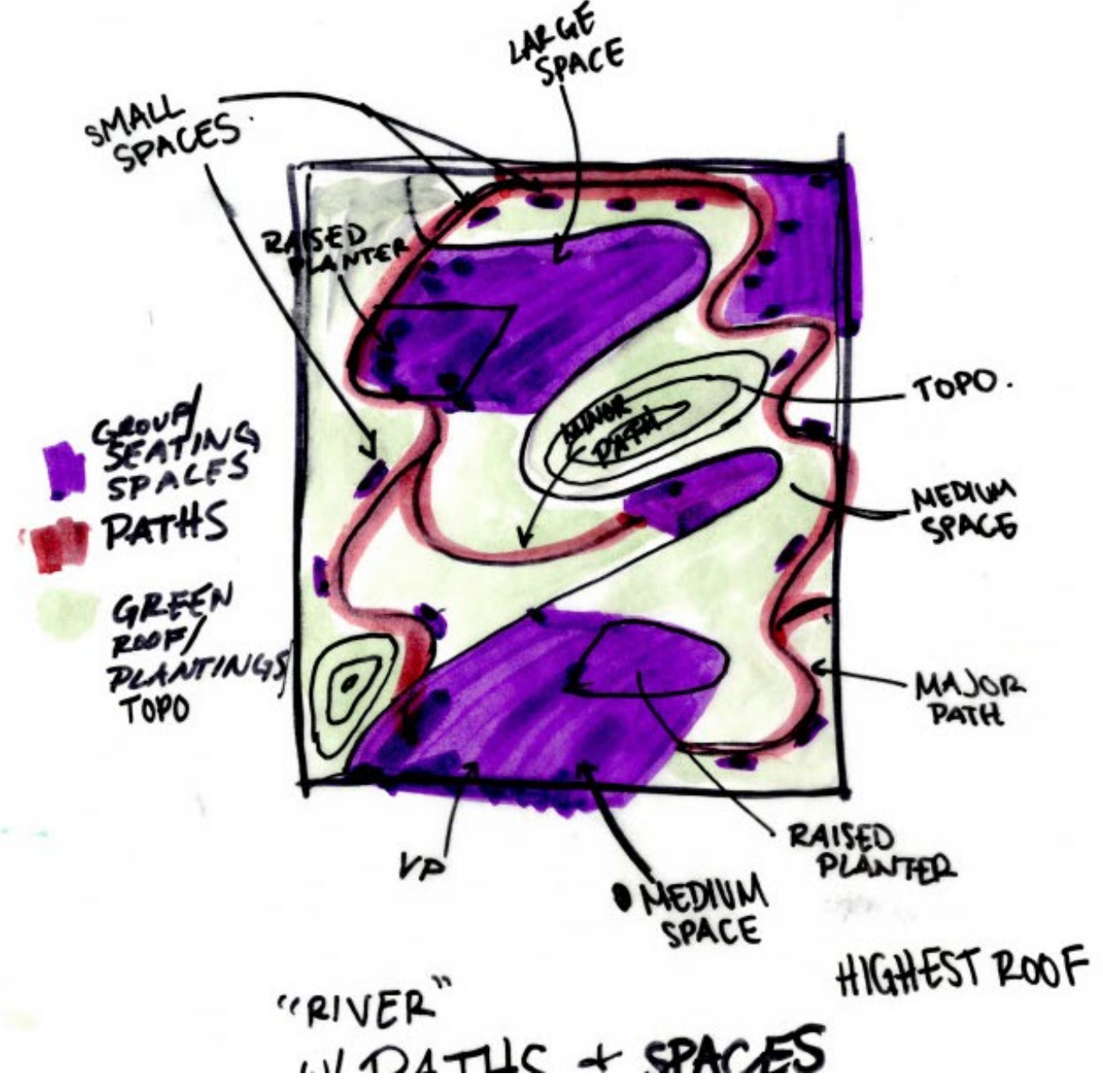
RED RIVER VALLEY



*DETENTION WATER as water feature

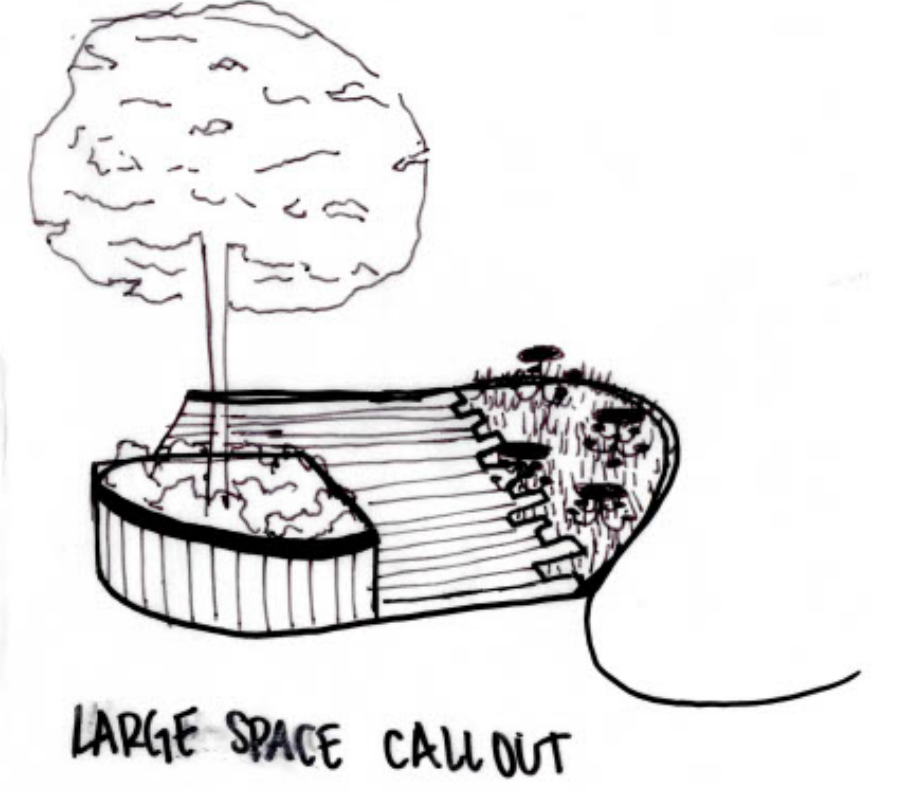
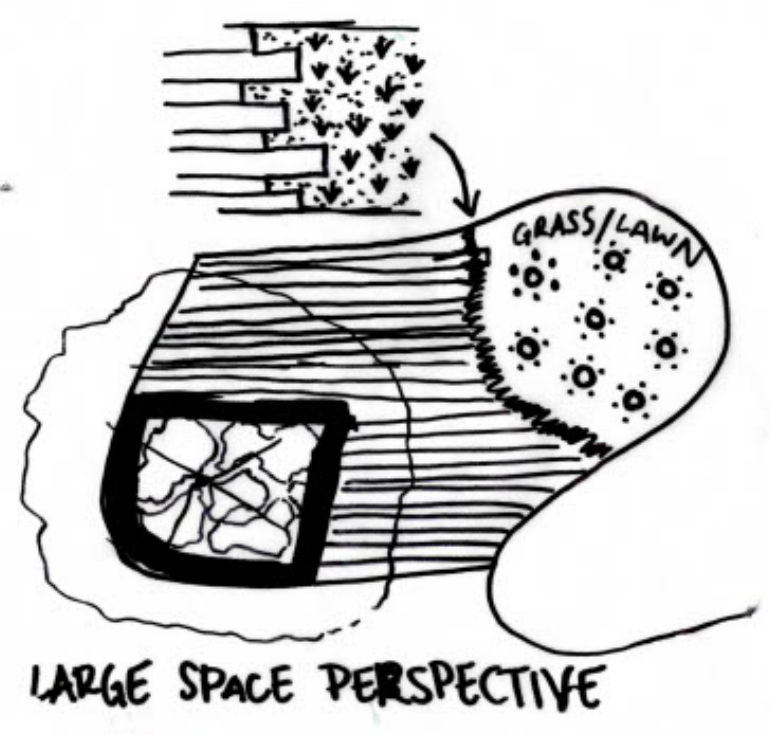
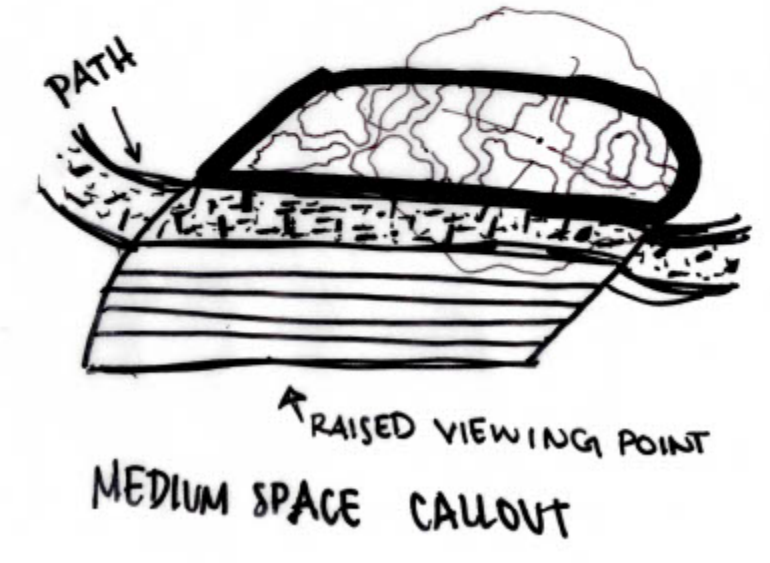
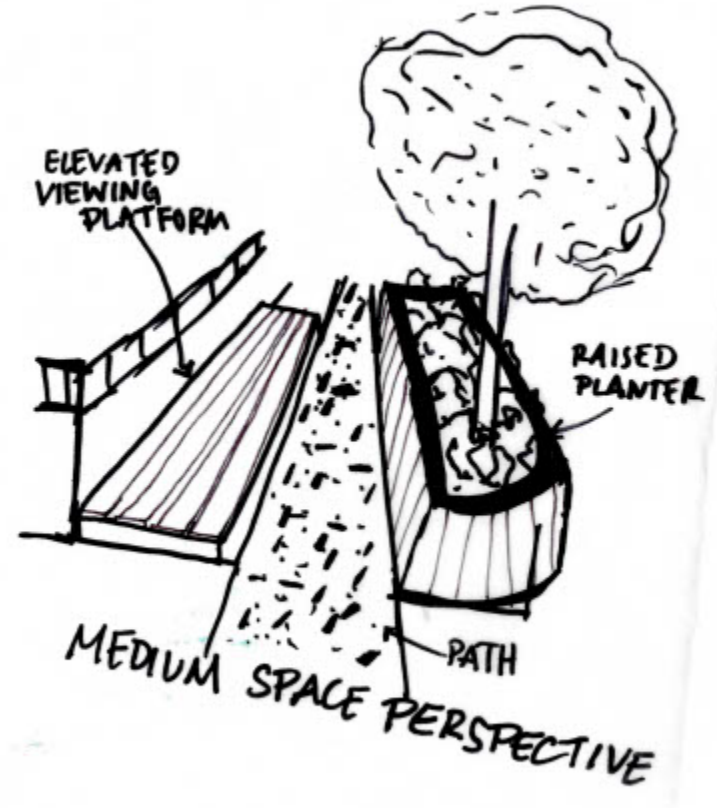
SCALE 1:30

PEACE RIVER PARK



"RIVER" IN PATRIC + SPACES

DESIGN DEVELOPMENT



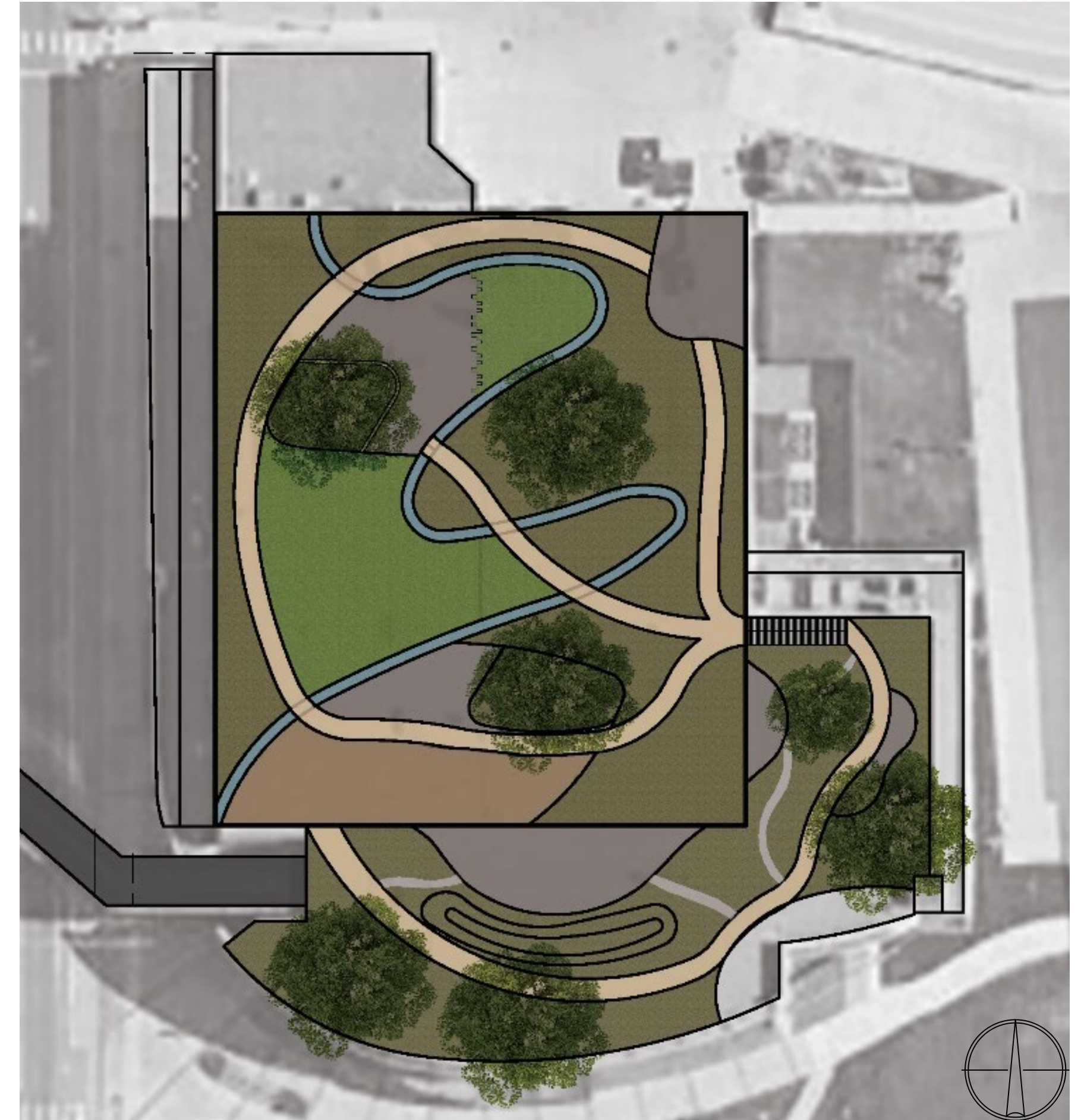
Green Roof Typologies Key

- (A) Concrete Structure
- (B) Root Membrane 1/4" Thick
- (C) Granular Retention 2" - 6" Thick
- (D) Filter Fabric 1/8" Thick
- (E) Soil Mixture 4" - 9" Thick
- (F) Extensive/Intensive Planting Material



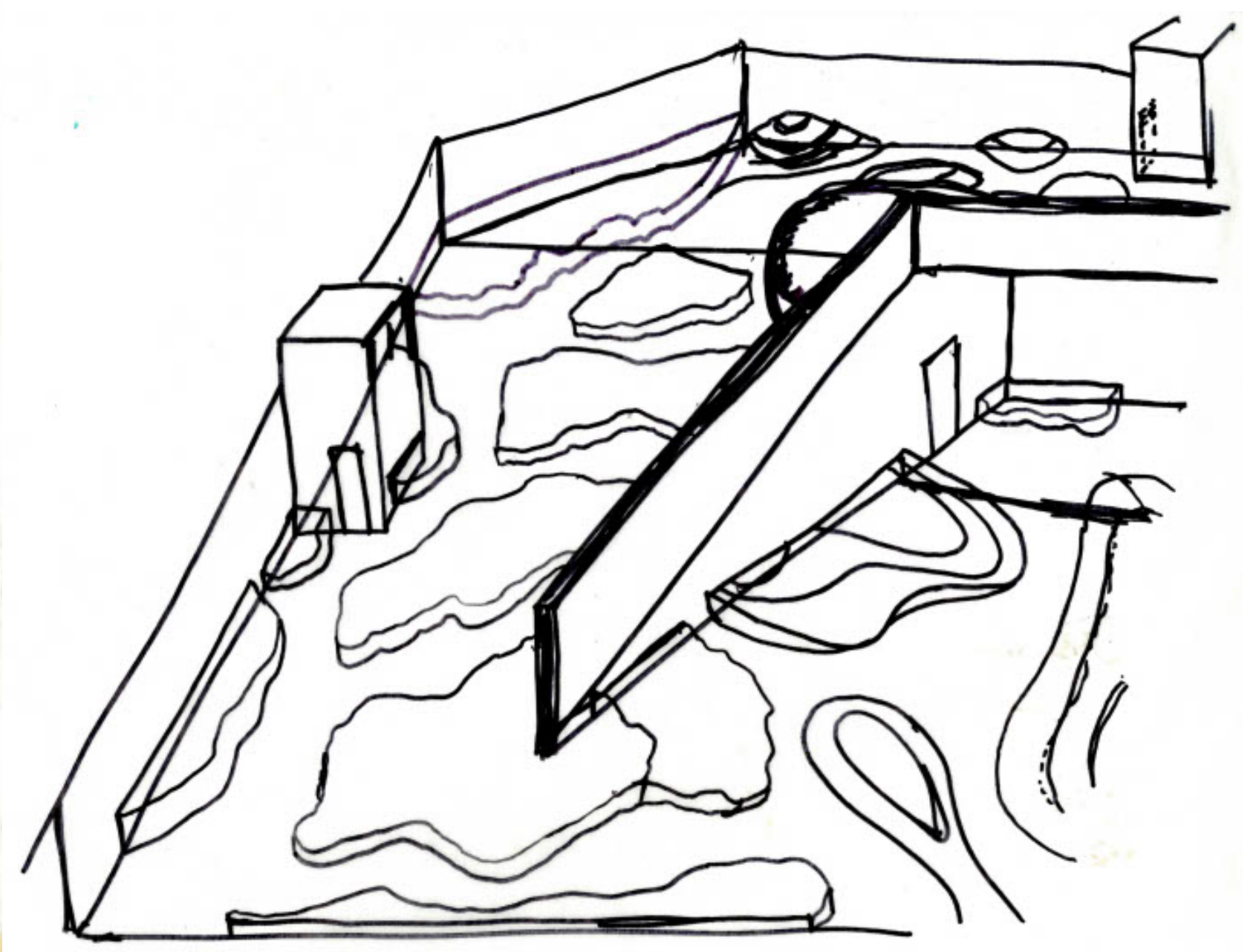
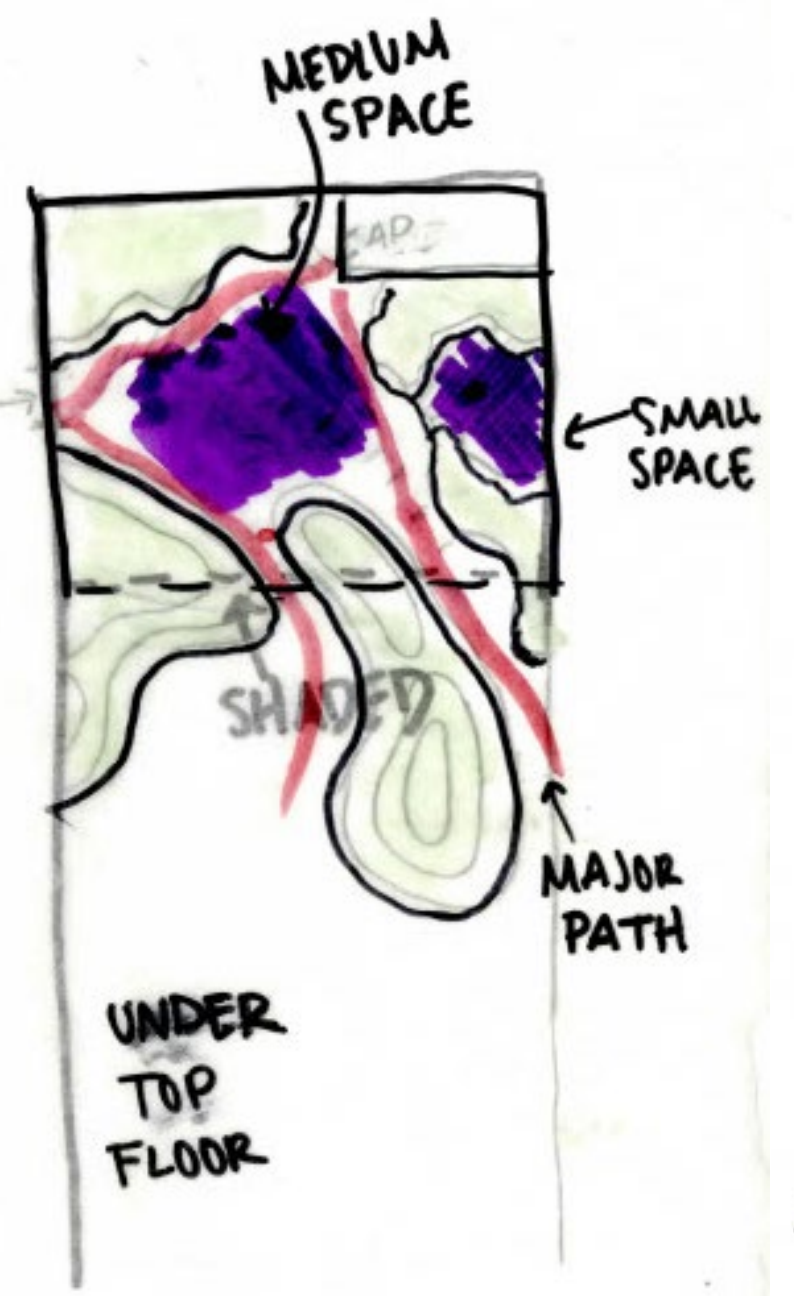
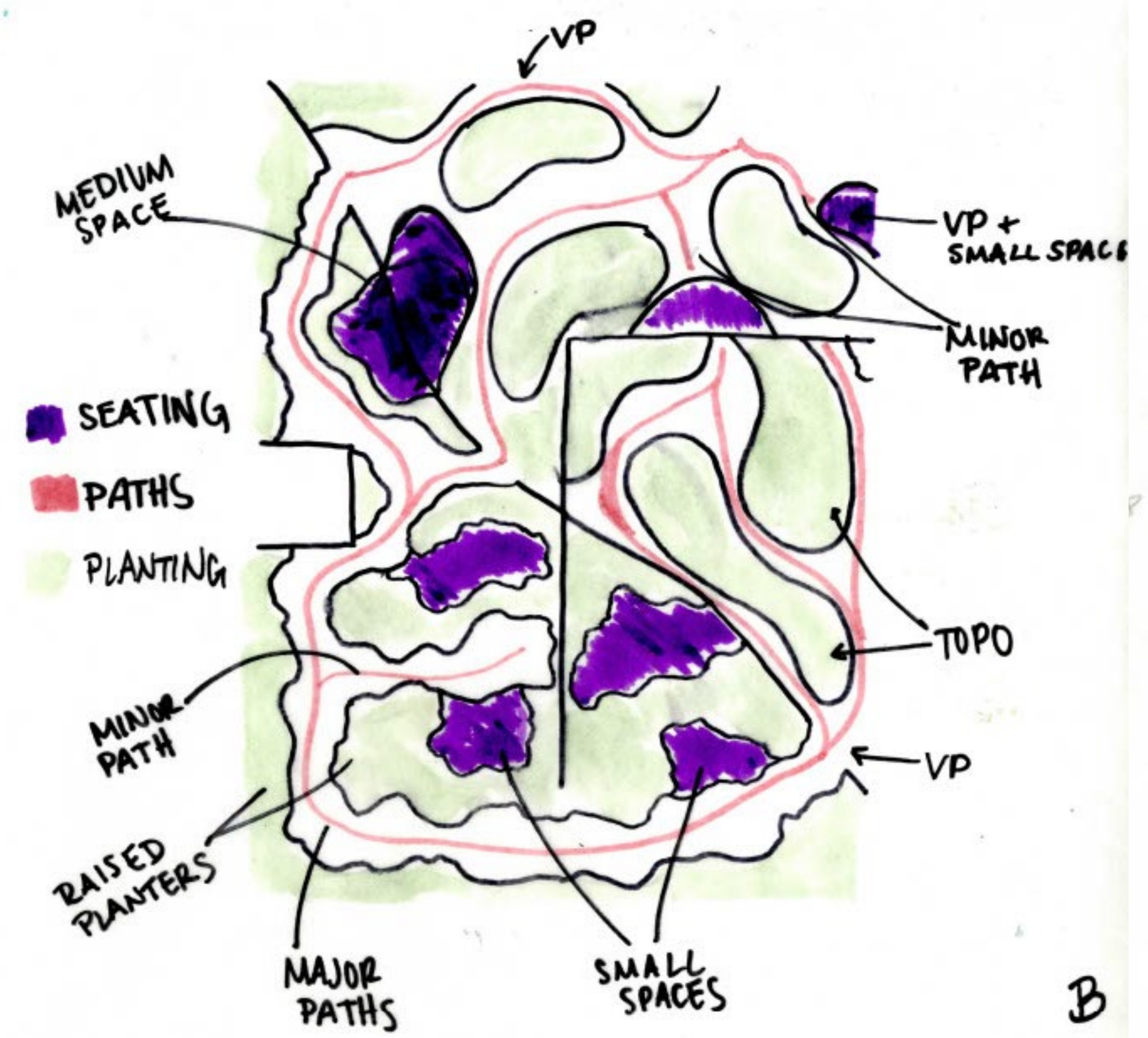
DESIGN RESULTS

PEACE RIVER PARK



LITTLE DIVIDE

DESIGN DEVELOPMENT

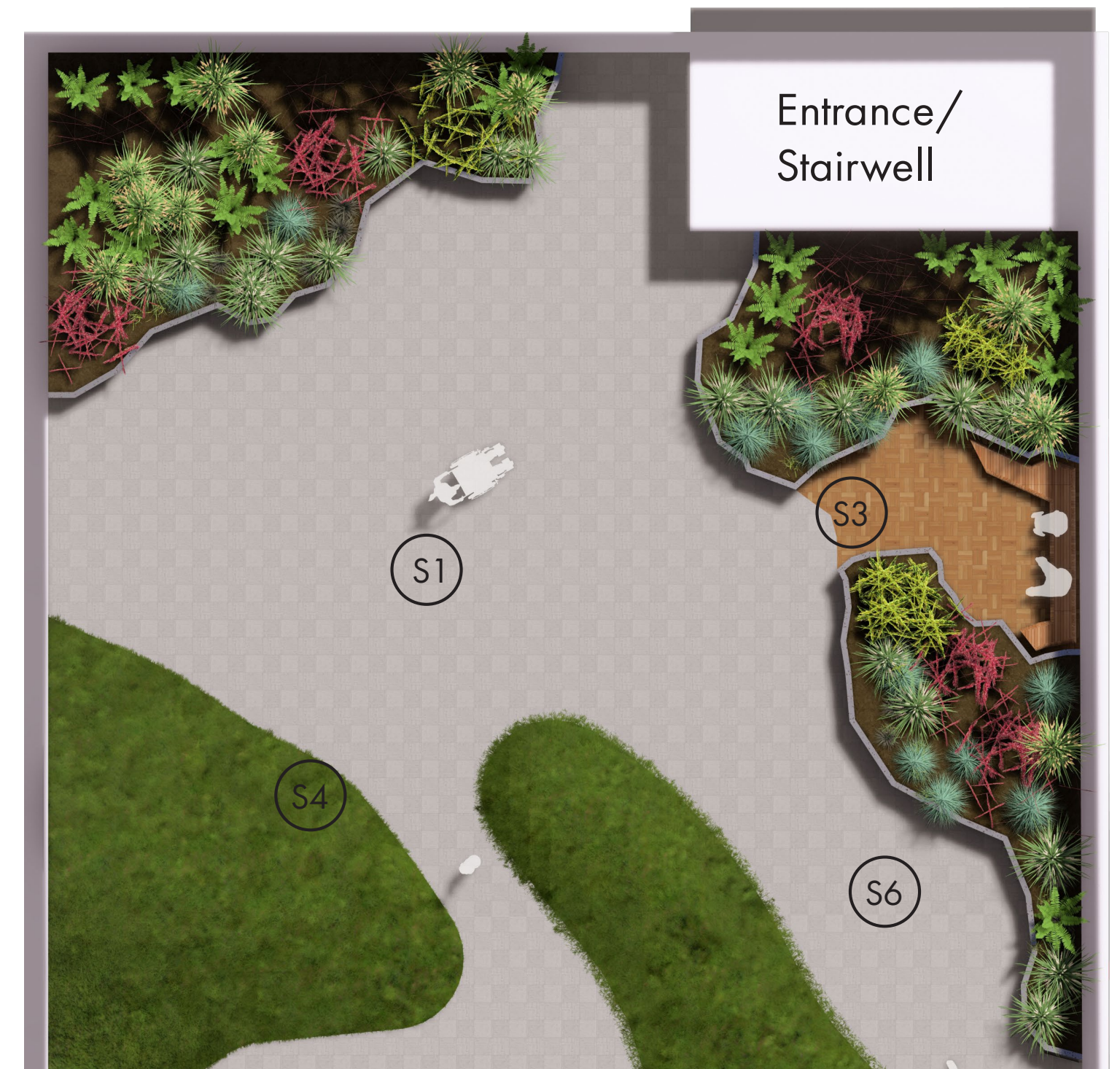




Key

- (S1) Large Gathering Space
- (S2) Medium Gathering Space
- (S3) Small Gathering Space
- (S4) Artificial Turf Mounds
- (S5) Major Path
- (S6) Minor Path
- (S7) Semi-Intensive Planter

LITTLE DIVIDE



Green Roof Typologies Key

(A) Concrete Structure

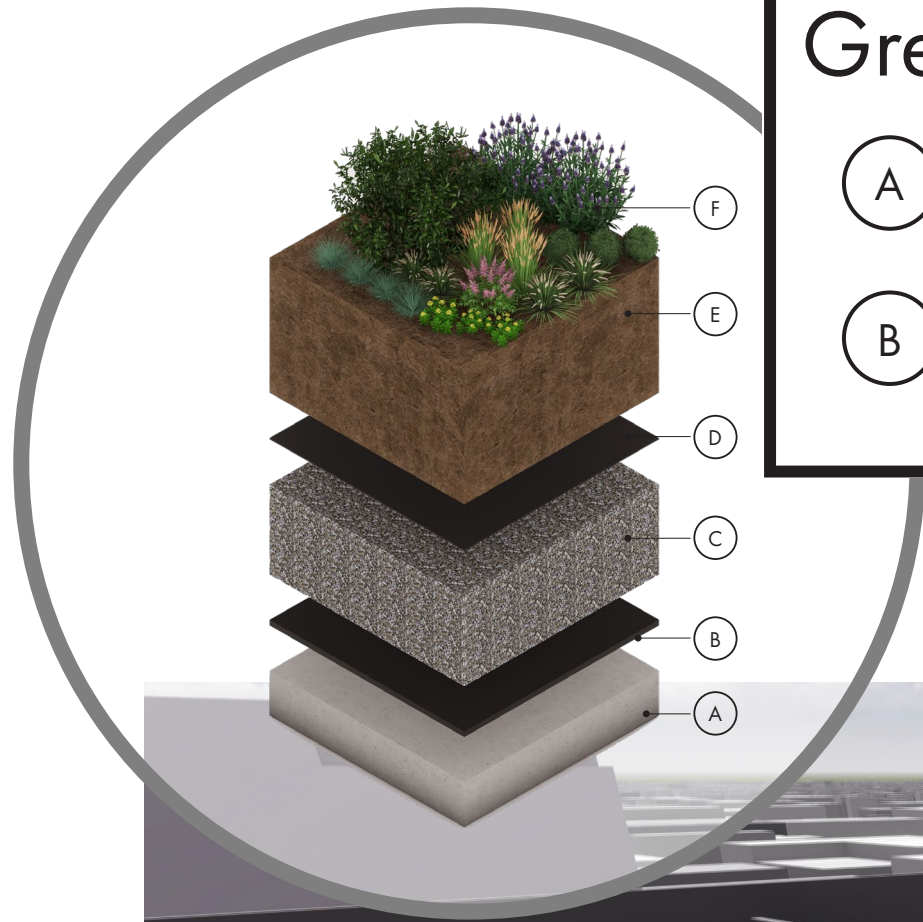
(C) Granular Retention
2" - 6" Thick

(E) Soil Mixture
4" - 9" Thick

(B) Root Membrane
1/4" Thick

(D) Filter Fabric
1/8" Thick

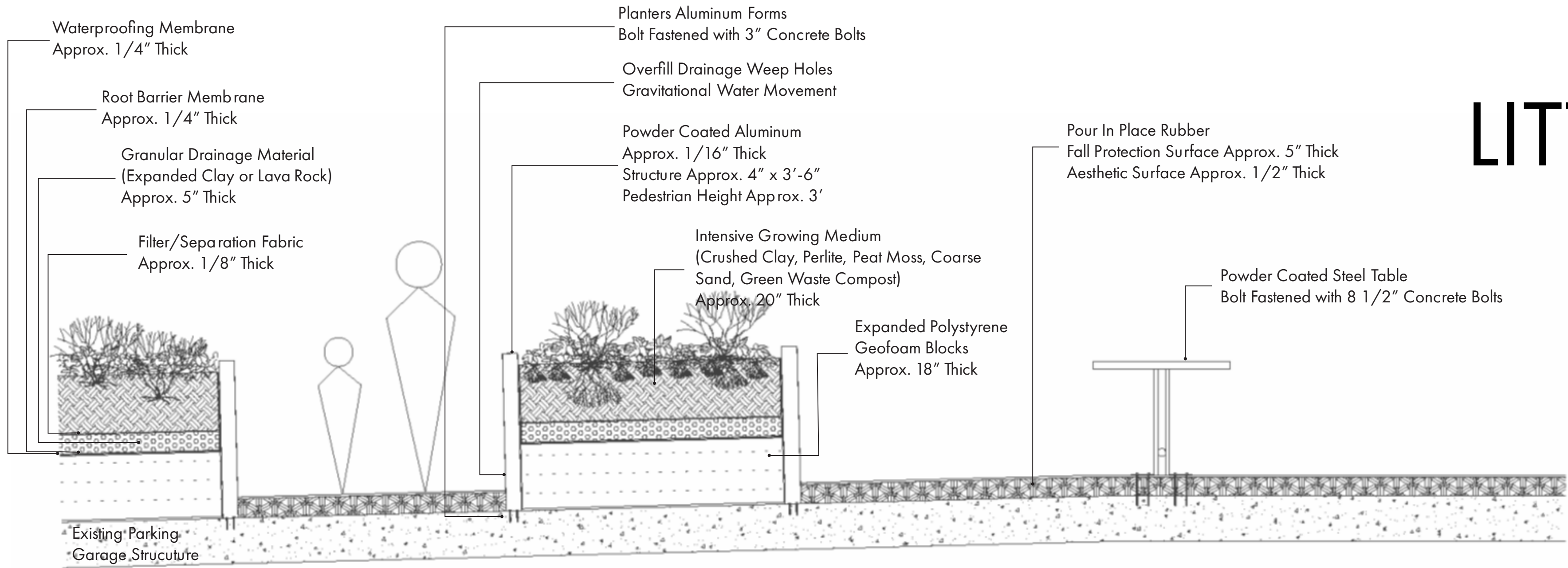
(F) Extensive/Intensive
Planting Material



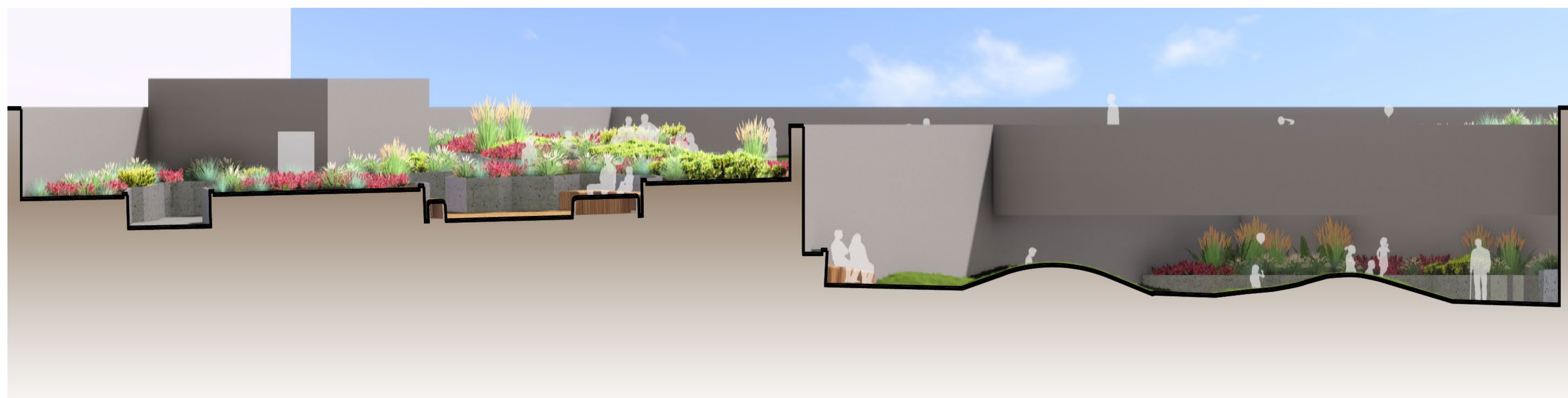
DESIGN RESULTS

LITTLE DIVIDE

LITTLE DIVIDE



DESIGN RESULTS



How can green roofs be utilized to improve pedestrian connections and incorporate microclimate design?

QUESTIONS?



THANK YOU!

