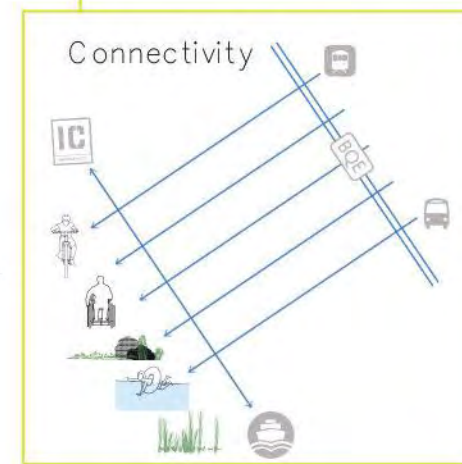
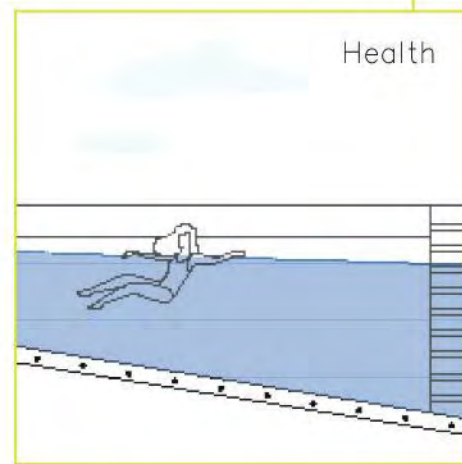


WATER FUTURES



This project is a health and wellness campus in Sunset Park centered around water culture.

The proximity of the NYU hospital offered a critical entry point to this project. The hospital is a leading trauma and stroke rehabilitation center, but lacks enough space to provide ample care to its surrounding district. The program proposes to expand and extend this hospital and supporting programs from 1st avenue out to the water through a network of landscaped and built features. The site retrofits and renovates existing industrial warehouses along the waterfront and new sustainable innovations collect, redirect, filter, and sequester water.

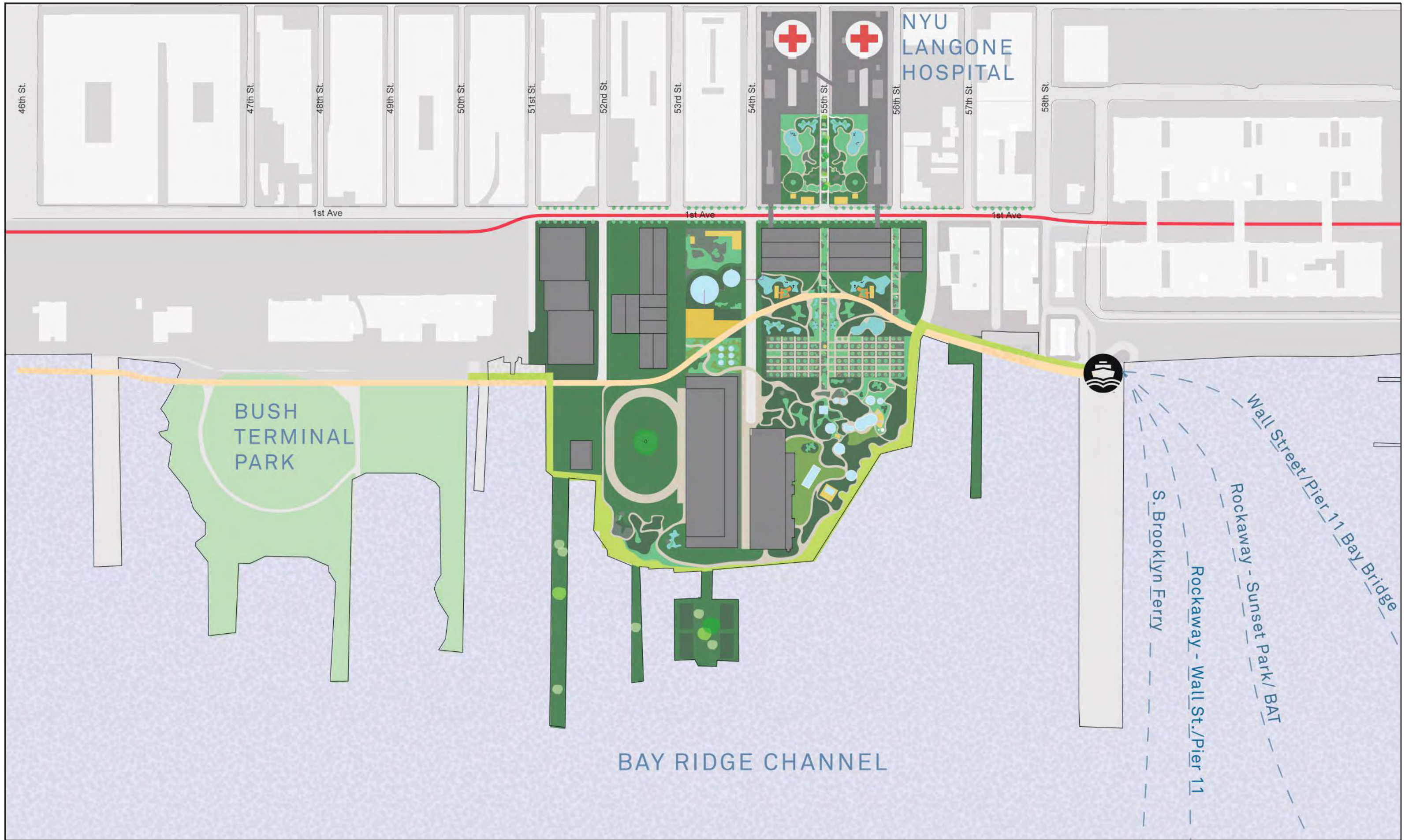


EX. CONDITIONS

AVERAGE INCOME

- High Asthma Rate (>9.5%)
- Long Commute Time (>45min)
- Industrial Zone
- > \$60,000
- \$60,000 - \$27,000
- < \$27,000







Almaty Medical Center, Kazakhstan, SOM



Taverny Medical Center, France



Svartsengi Geothermal Power Plant, Iceland



Christ Hospital, SOM



Psychological Medical Center, Spain



Hospital in Shanghai, Foster and Partners



Kaiser Permanente Oncology Center, CA



Kaiser Permanente Oncology Center, CA



St. Jude Children's Research Hospital Master Site & Facilities Plan, Tennessee, HKS



Buildings for Reuse

Buildings to Demo

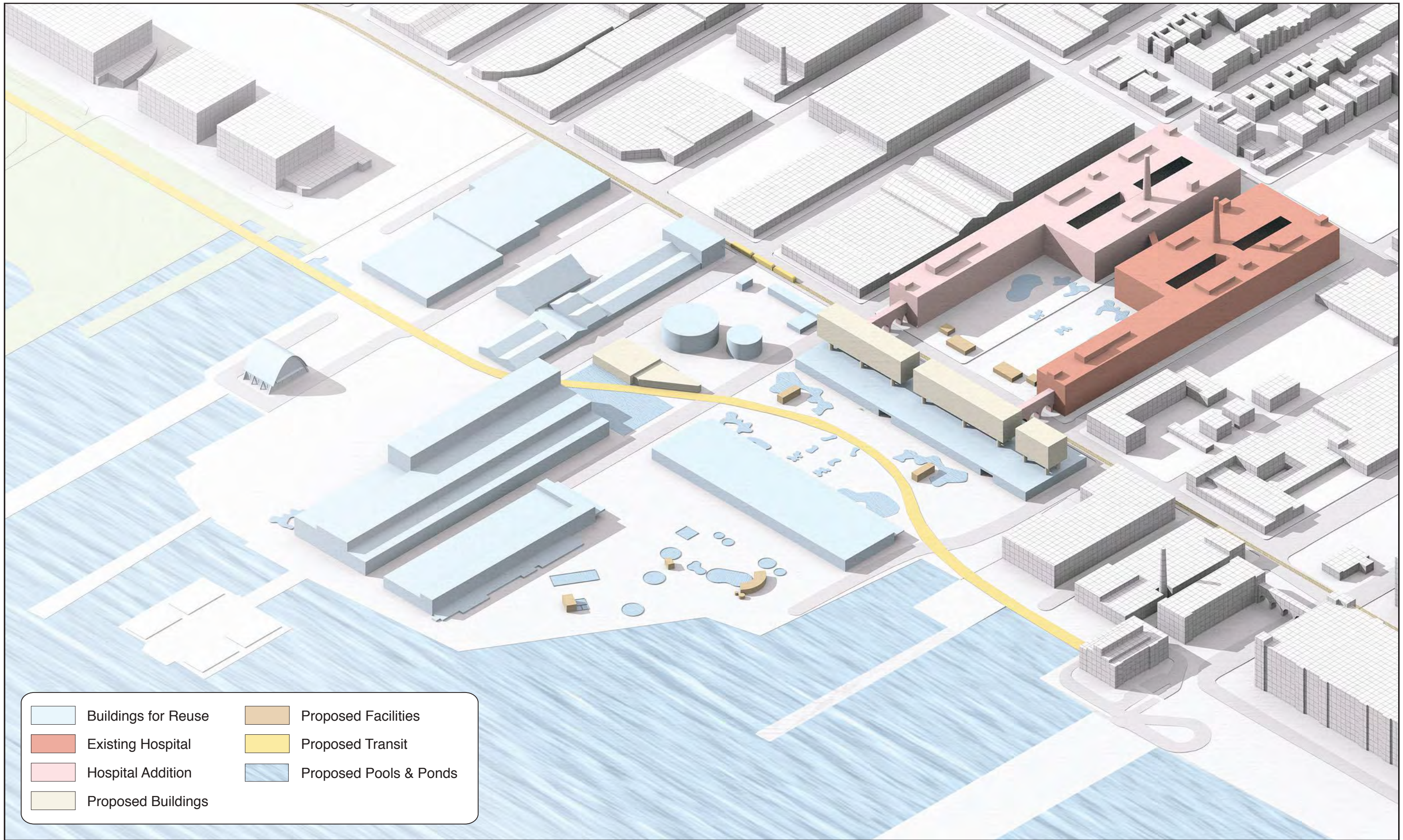





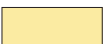
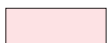


- Buildings for Reuse
- Existing Hospital
- Hospital Addition






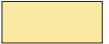



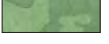


- Buildings for Reuse
- Proposed Facilities
- Existing Hospital
- Hospital Addition
- Proposed Buildings

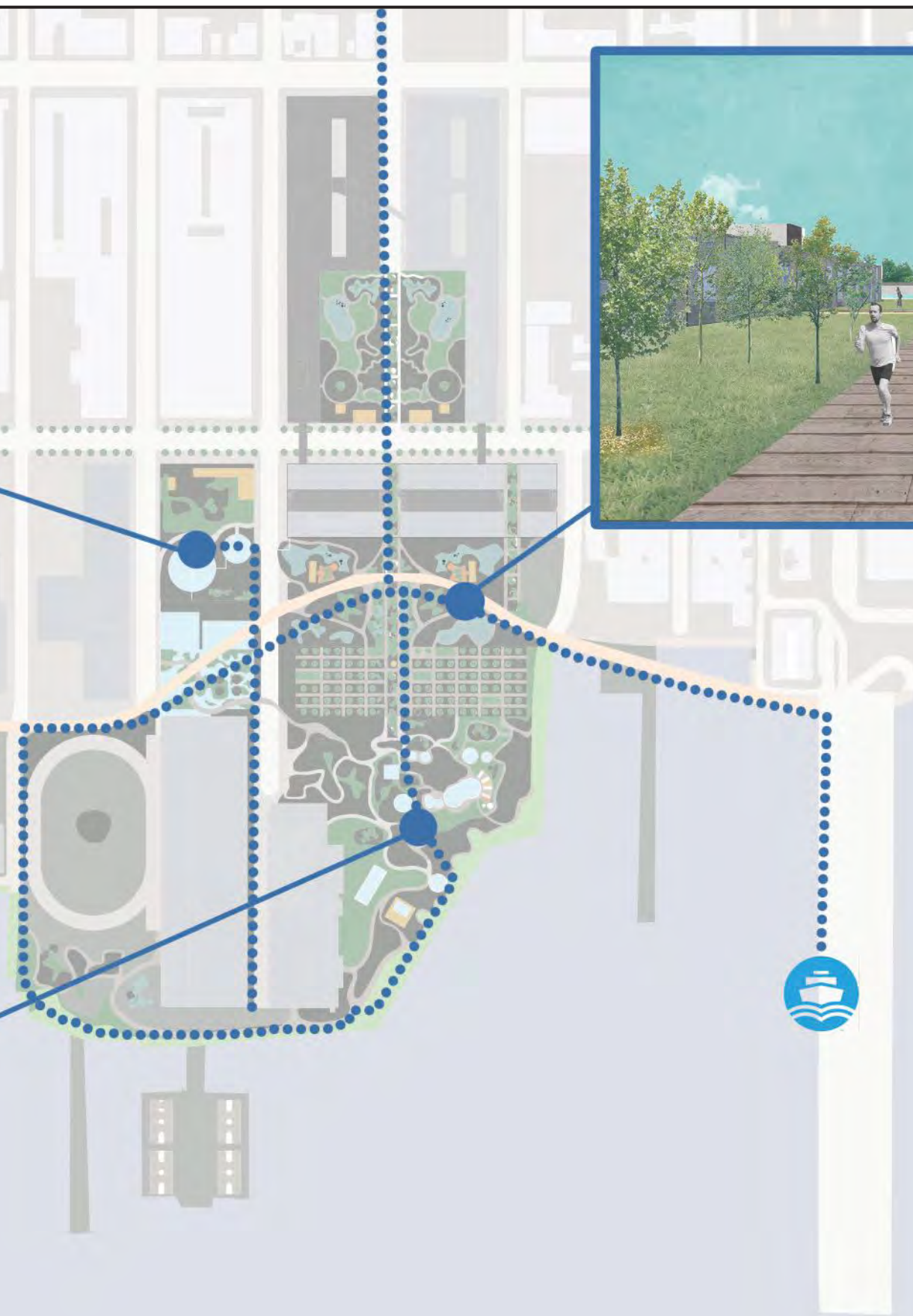
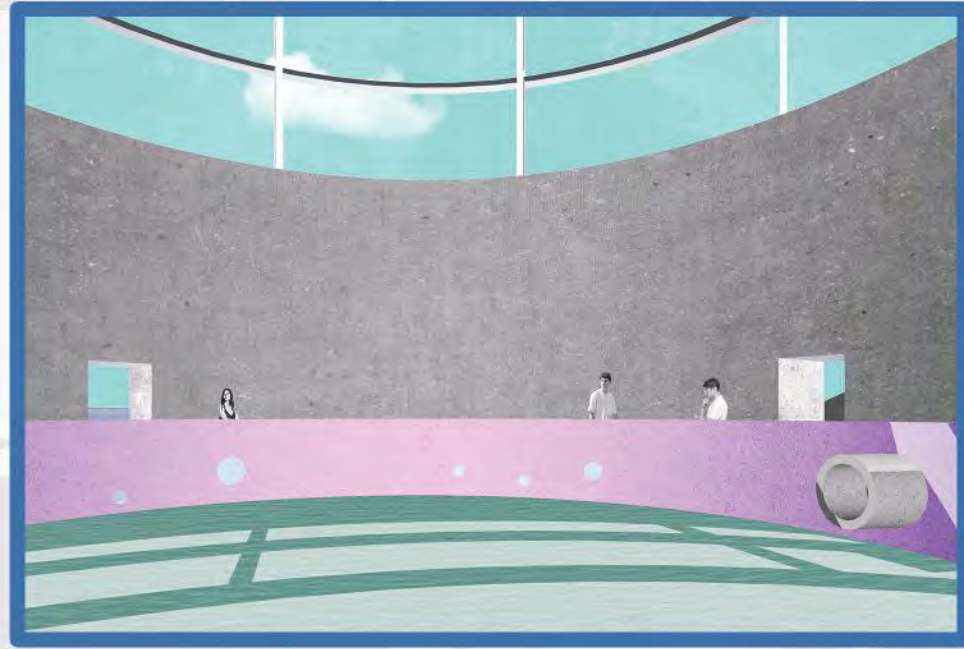


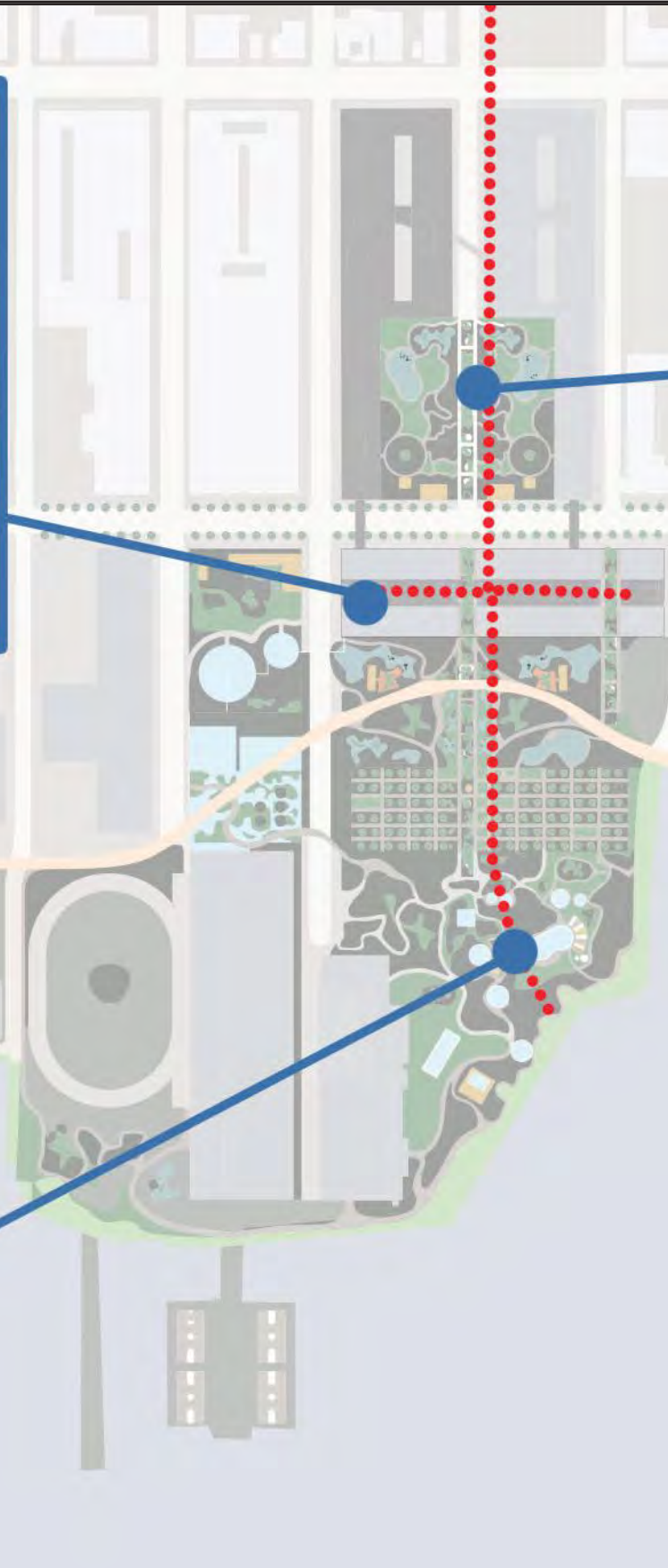
- | | | | |
|--|---------------------|---|------------------------|
|  | Buildings for Reuse |  | Proposed Facilities |
|  | Existing Hospital |  | Proposed Transit |
|  | Hospital Addition |  | Proposed Pools & Ponds |
|  | Proposed Buildings | | |

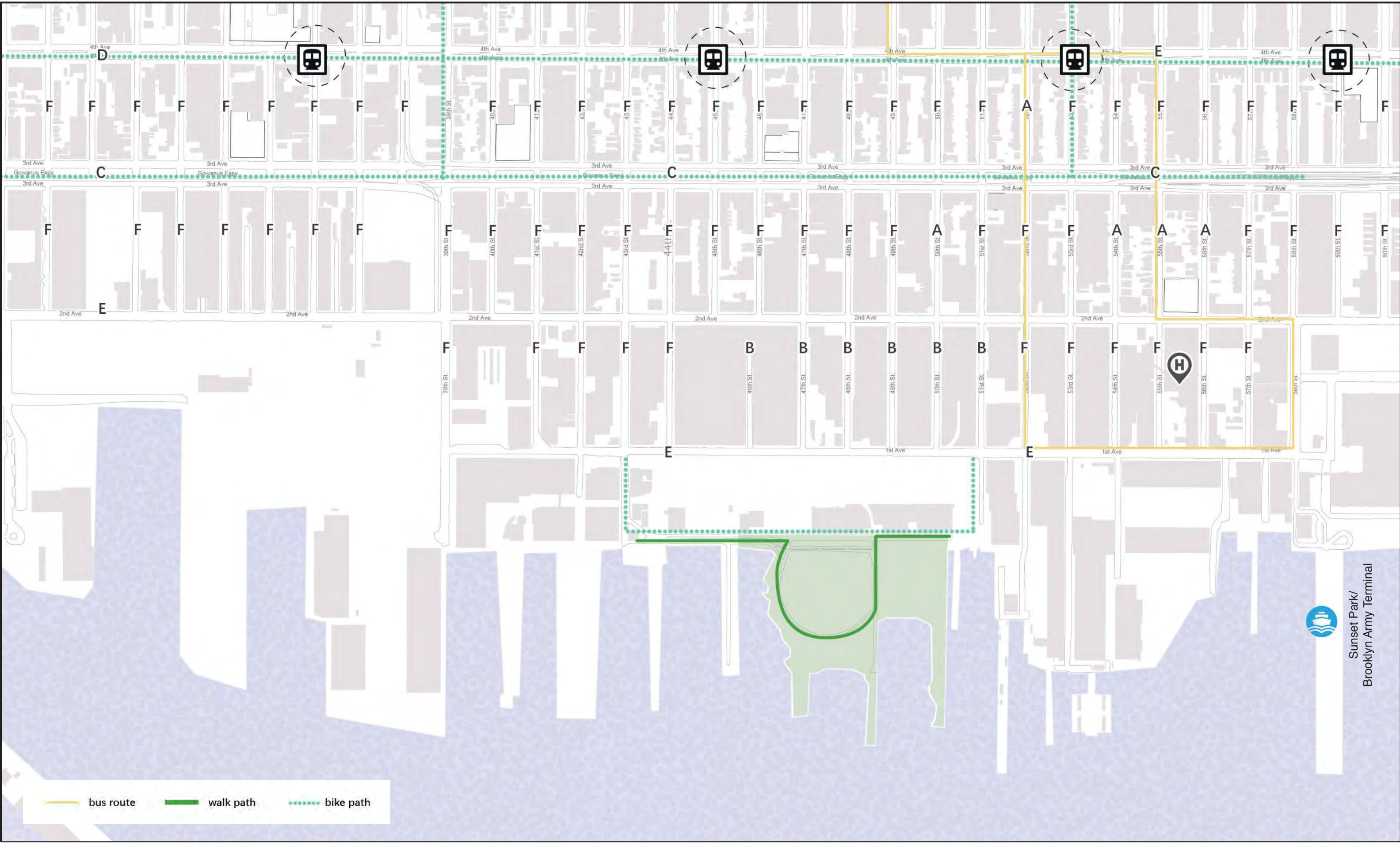


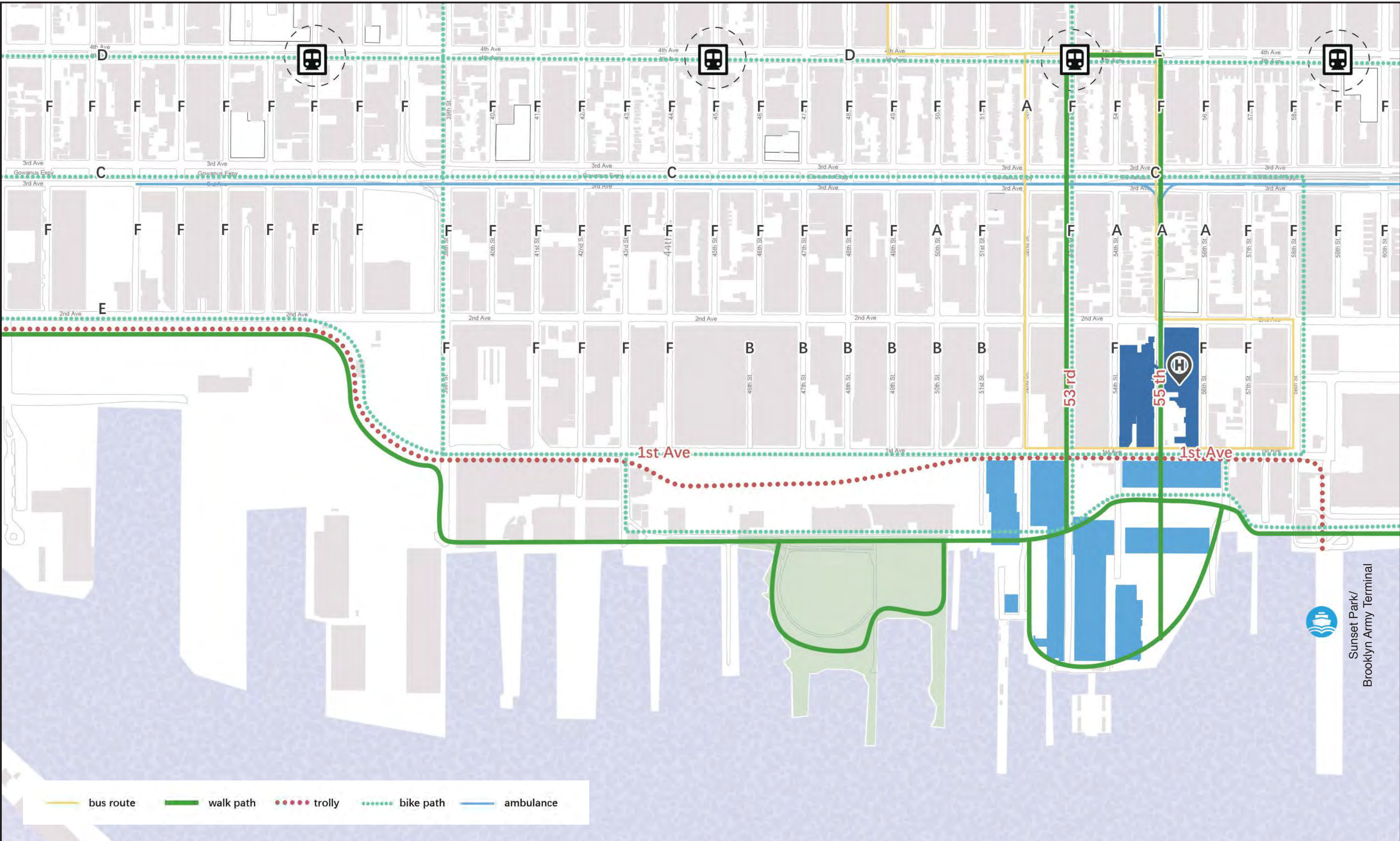
- | | | | |
|--|---------------------|---|------------------------|
|  | Buildings for Reuse |  | Proposed Facilities |
|  | Existing Hospital |  | Proposed Transit |
|  | Hospital Addition |  | Proposed Pools & Ponds |
|  | Proposed Buildings |  | Proposed Vegetation |







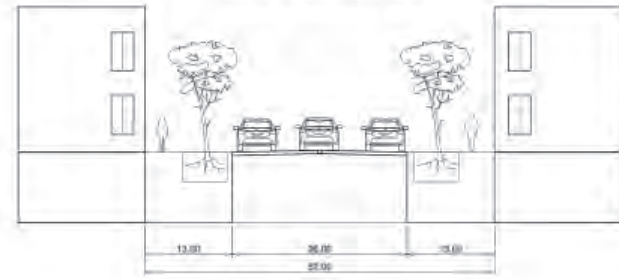




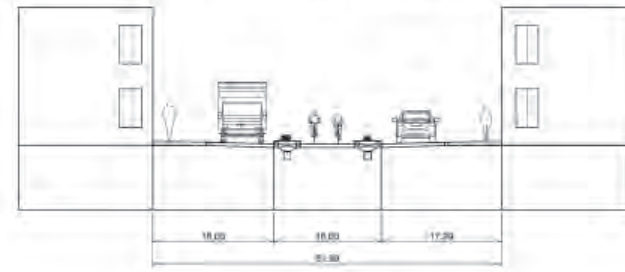
Sunset Park/
 Brooklyn Army Terminal

A

CURRENT

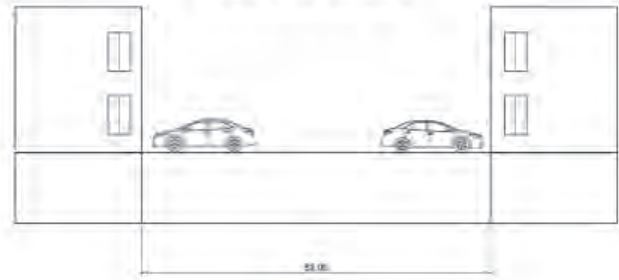


PROPOSED

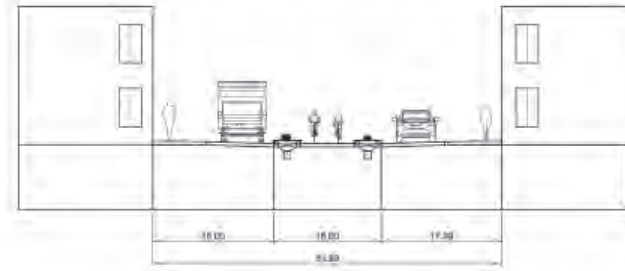


B

CURRENT

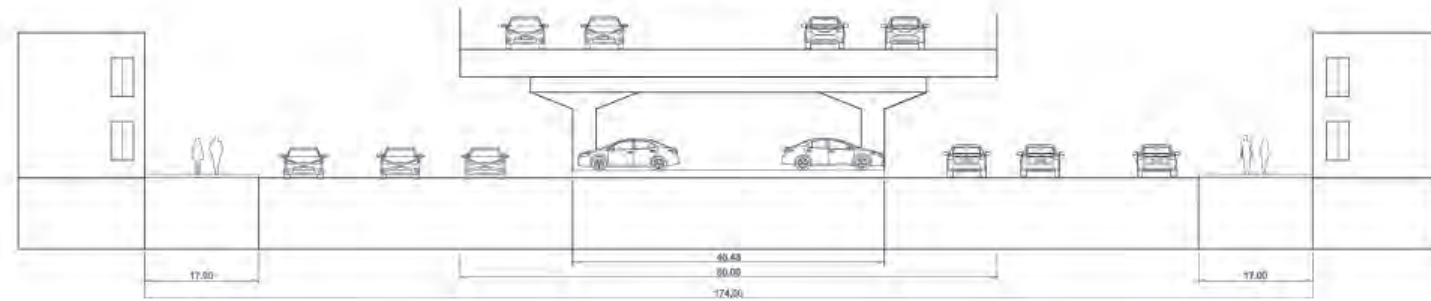


PROPOSED

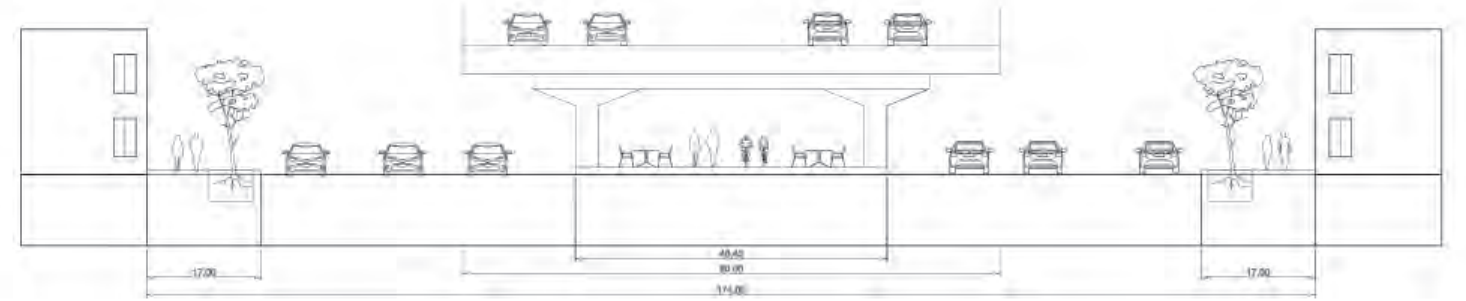


C

CURRENT

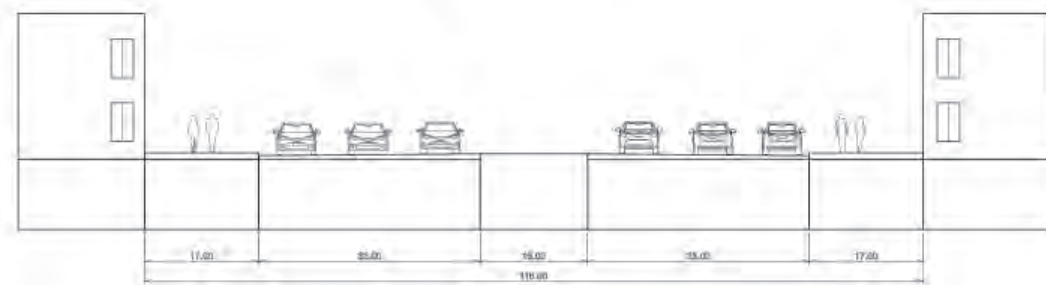


PROPOSED



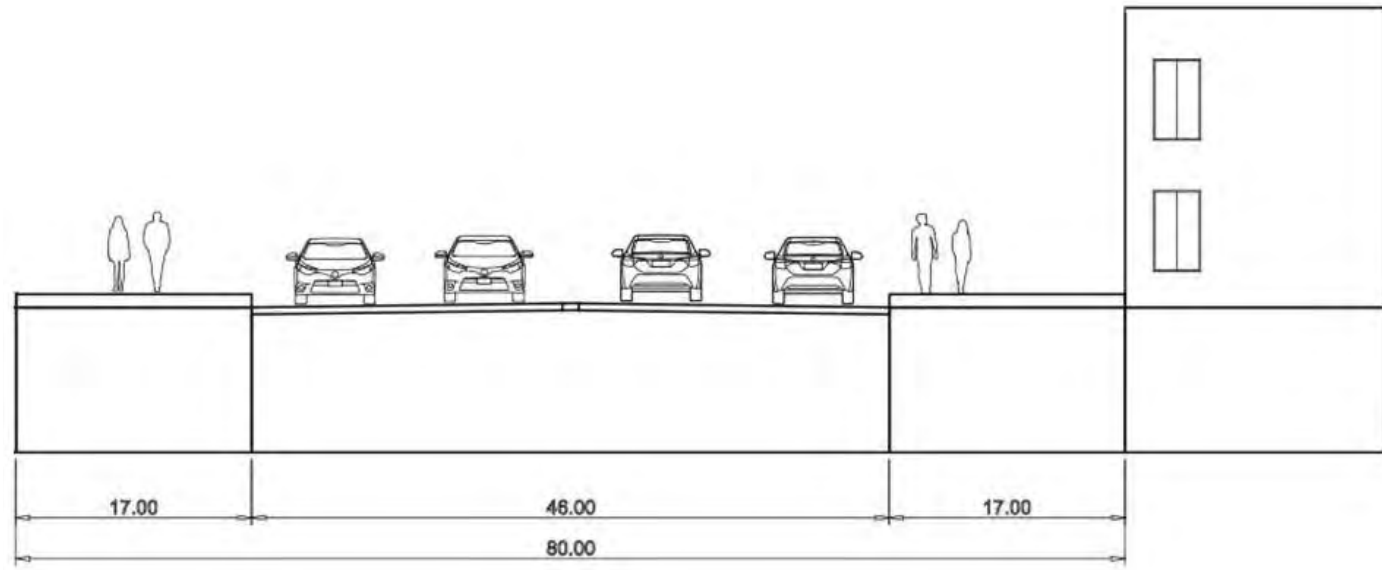
D

CURRENT

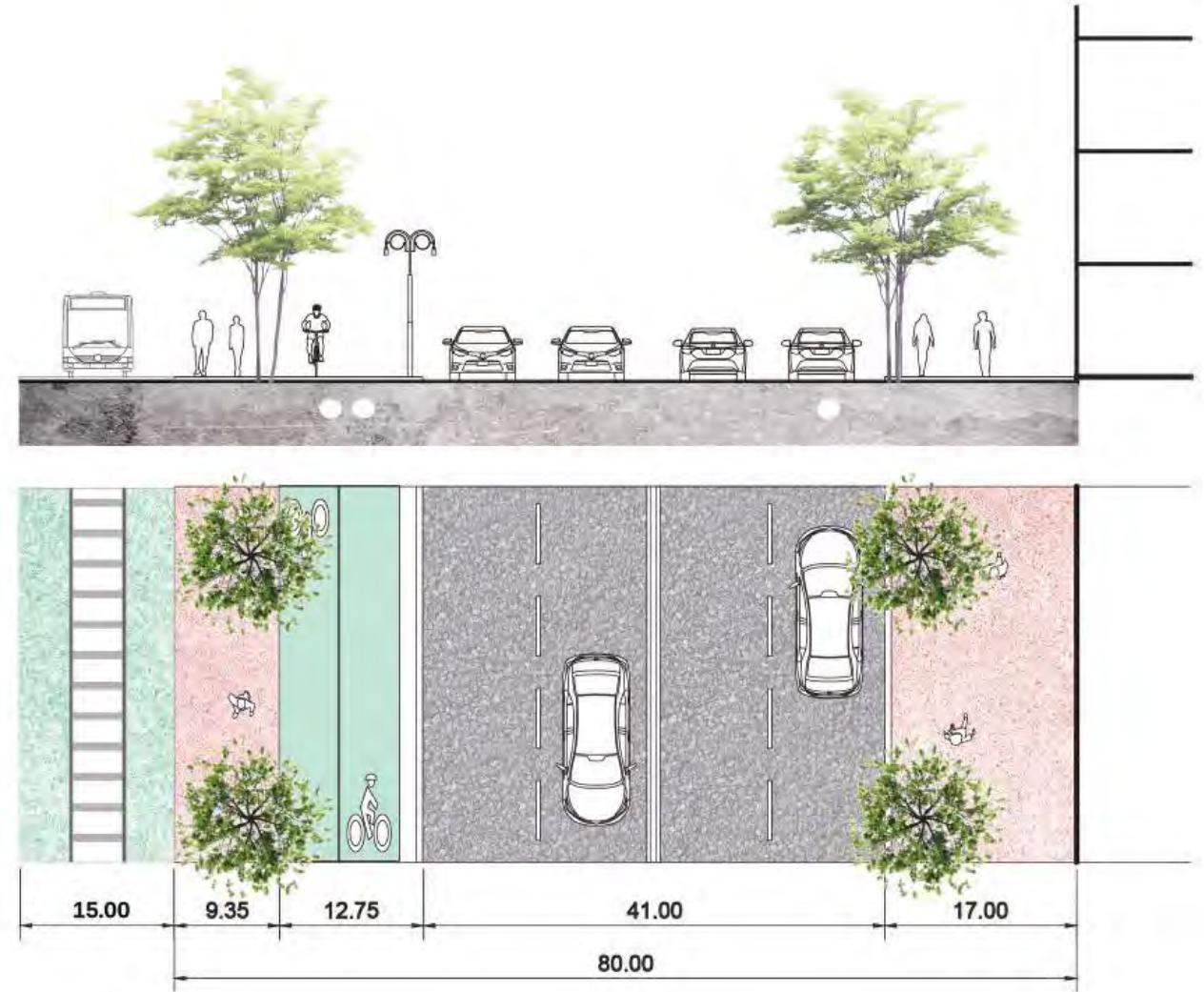


E

CURRENT



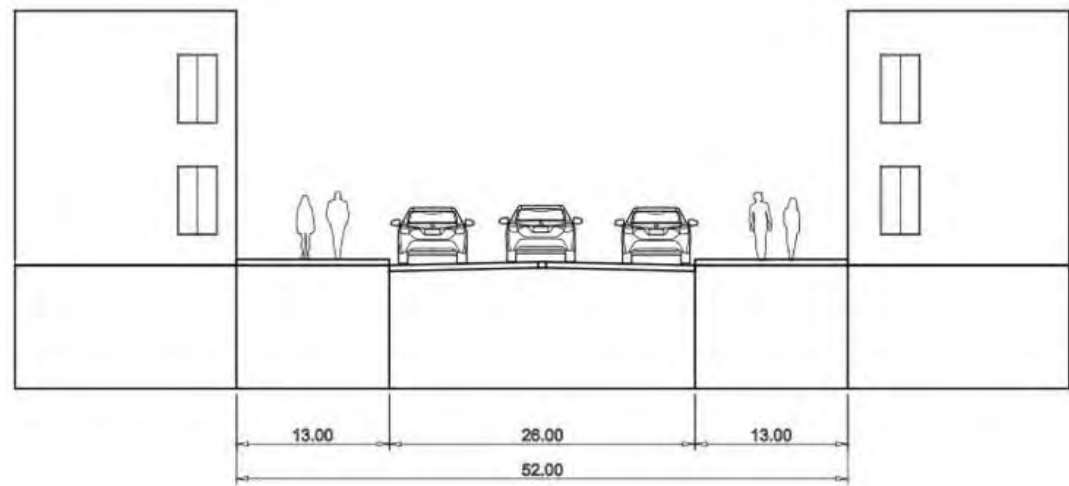
PROPOSED



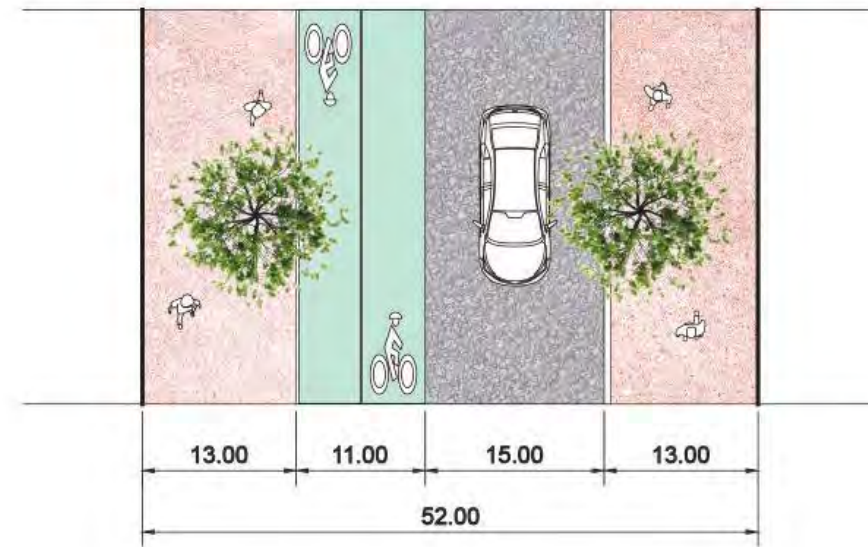
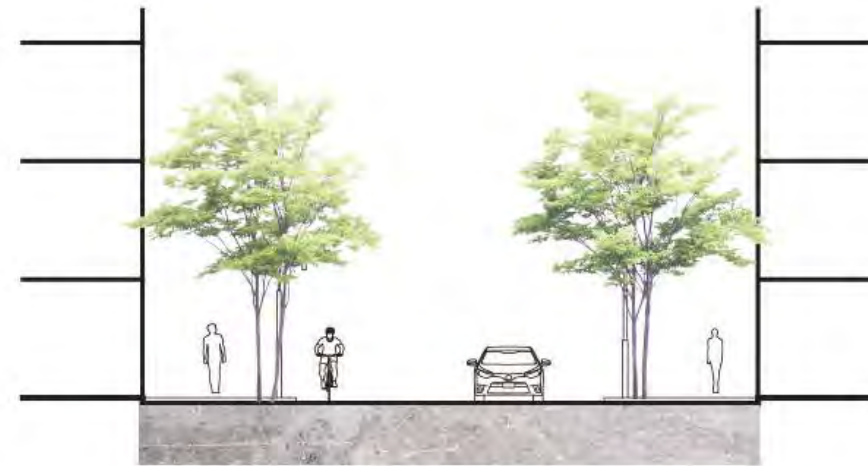
1st Ave

F

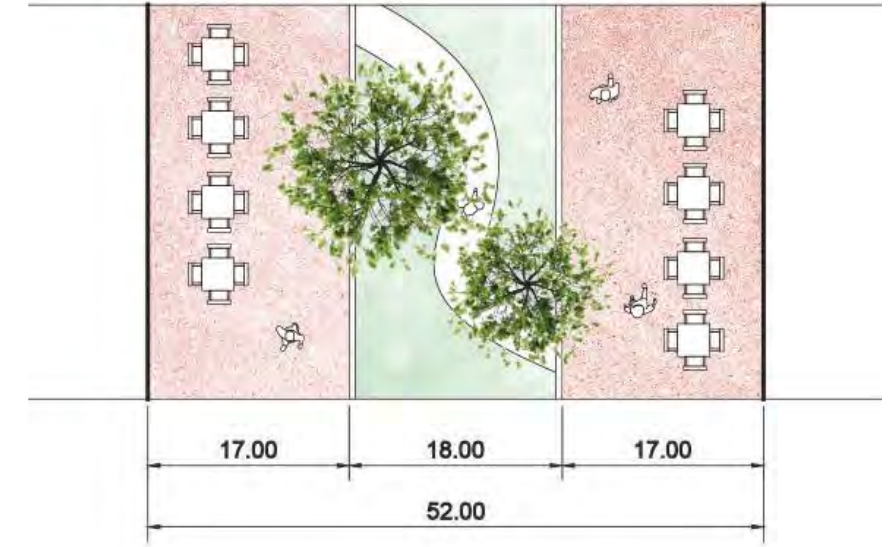
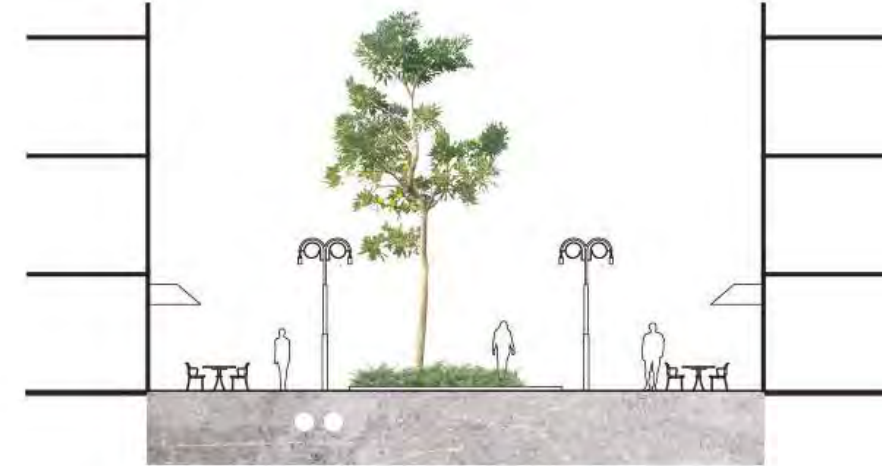
CURRENT



PROPOSED



53rd St



55th St



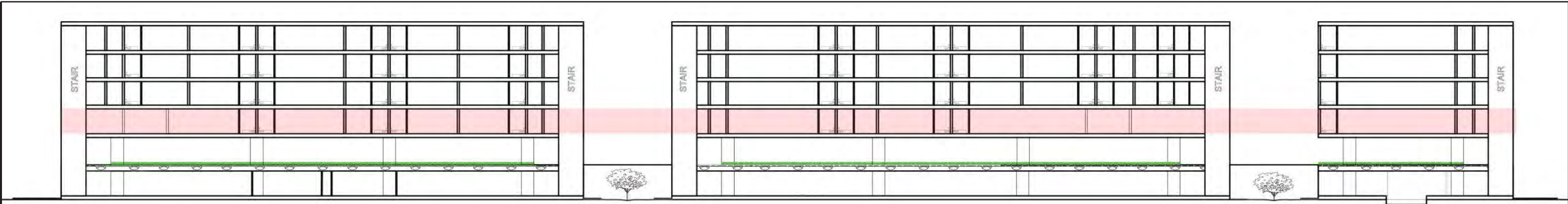


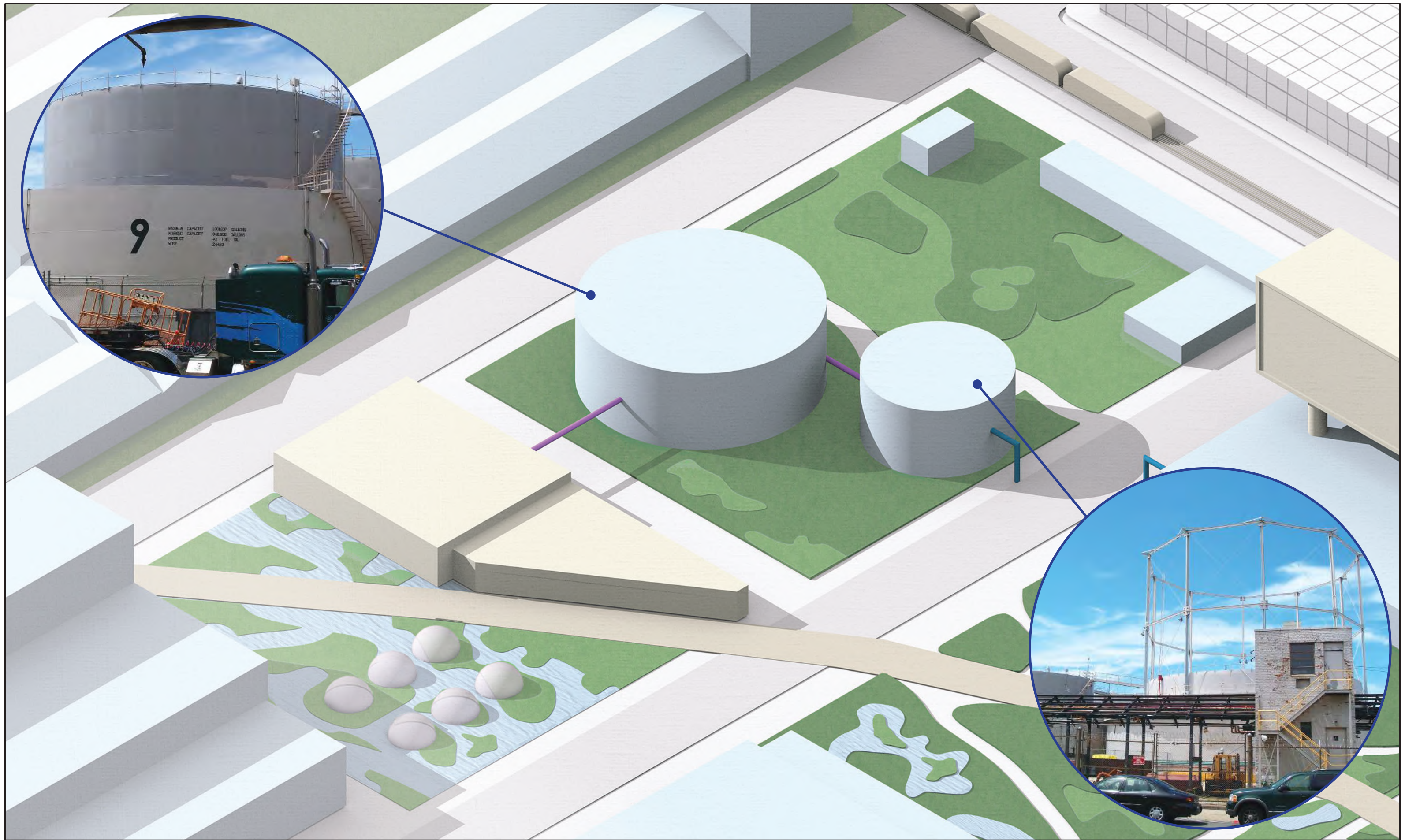


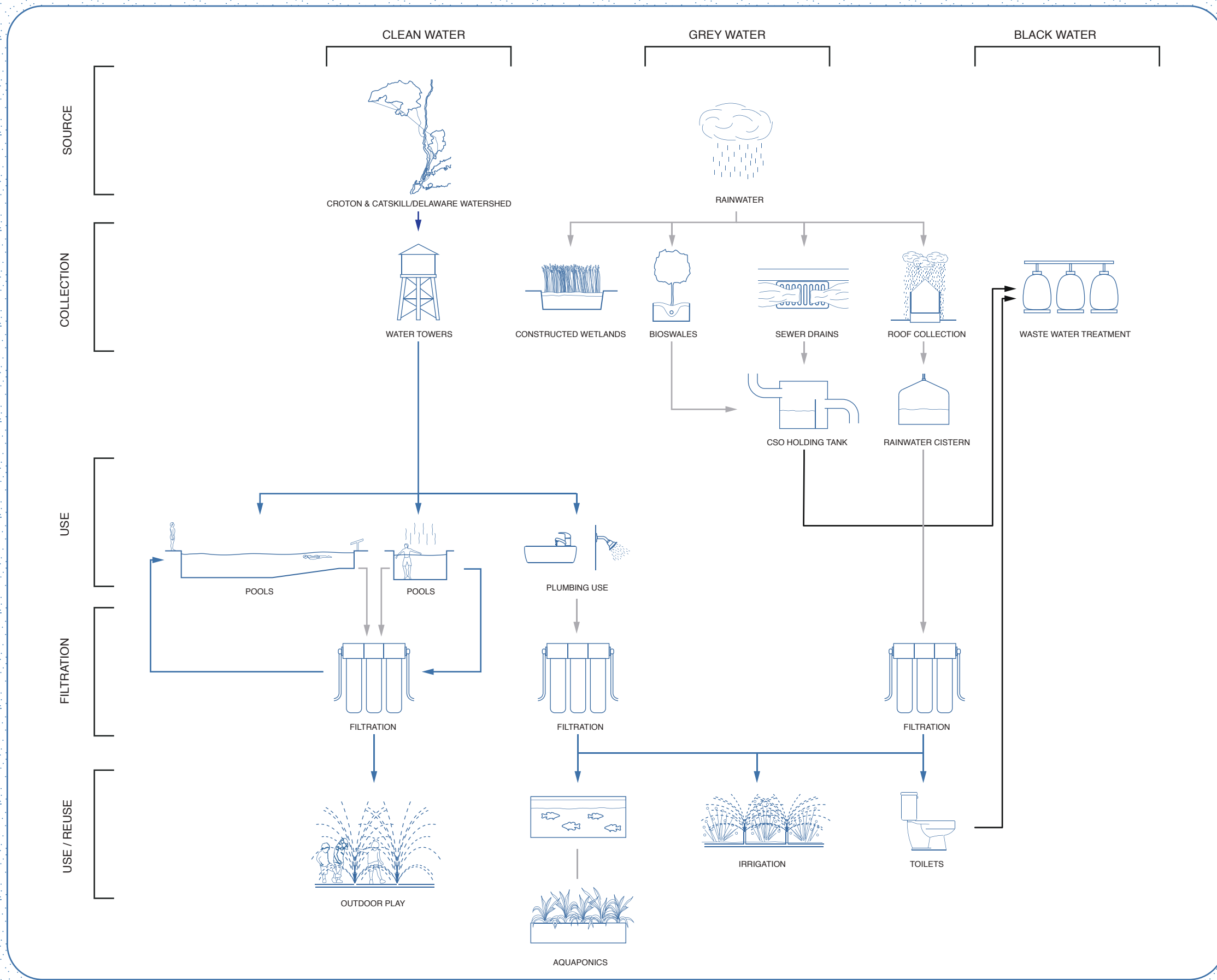






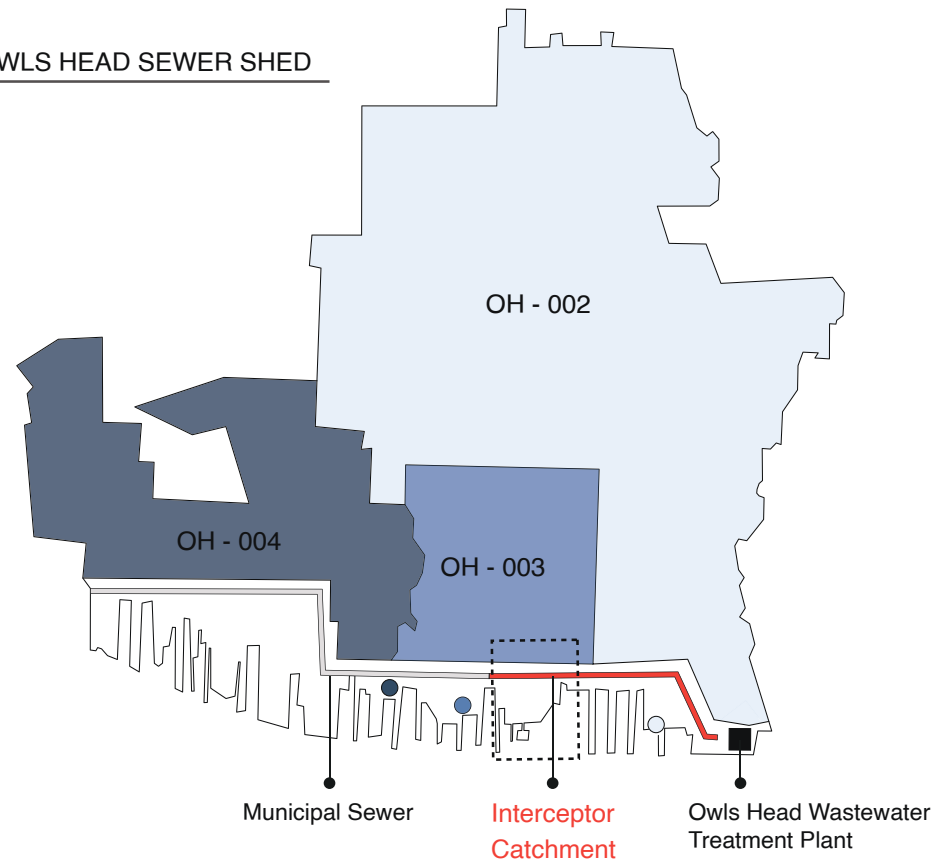








OWLS HEAD SEWER SHED



CSO DISCHARGE INTO NYC LOCAL WATERWAYS

IN NYC, AN AVERAGE OF...

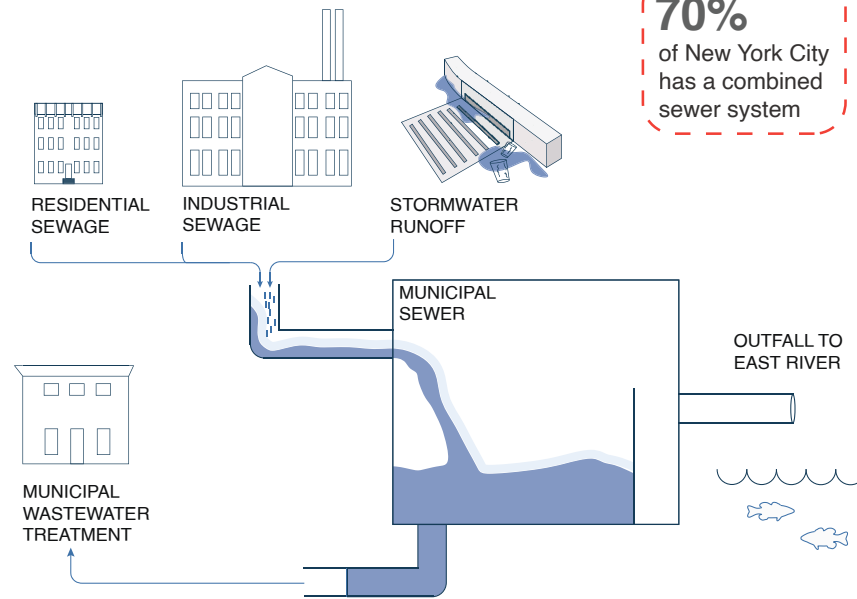


OWLS HEAD CSO OUTFALL SITES:

	Annual Events	Triggered by (in. of rainfall)	Volume (gallons/year)
OH-002	34	0.37"	363 million
OH-003	43	0.28"	255 million
OH-004	11	0.8"	3 million

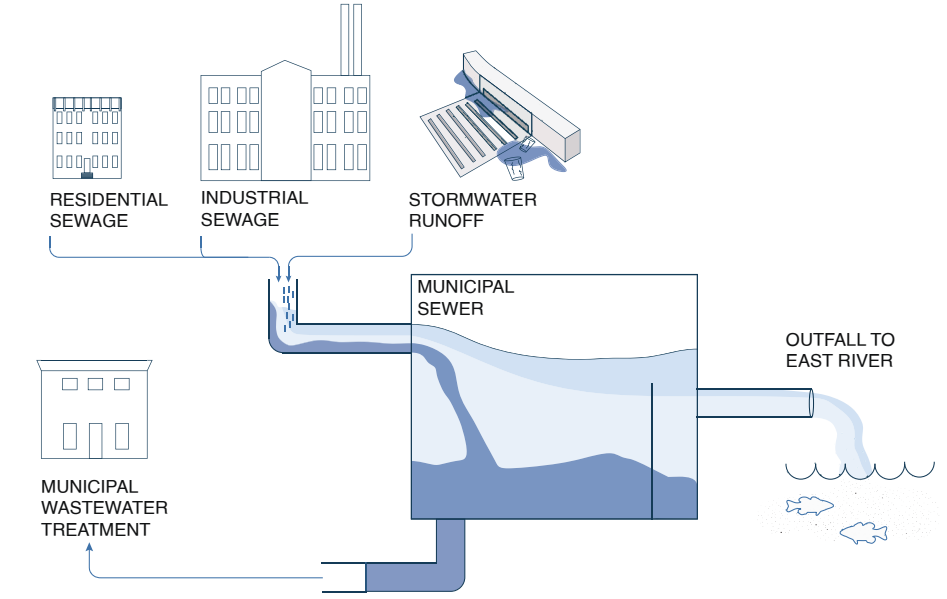
PROPOSAL FOR COMBINED SEWAGE OVERFLOW MITIGATION

NORMAL CONDITIONS

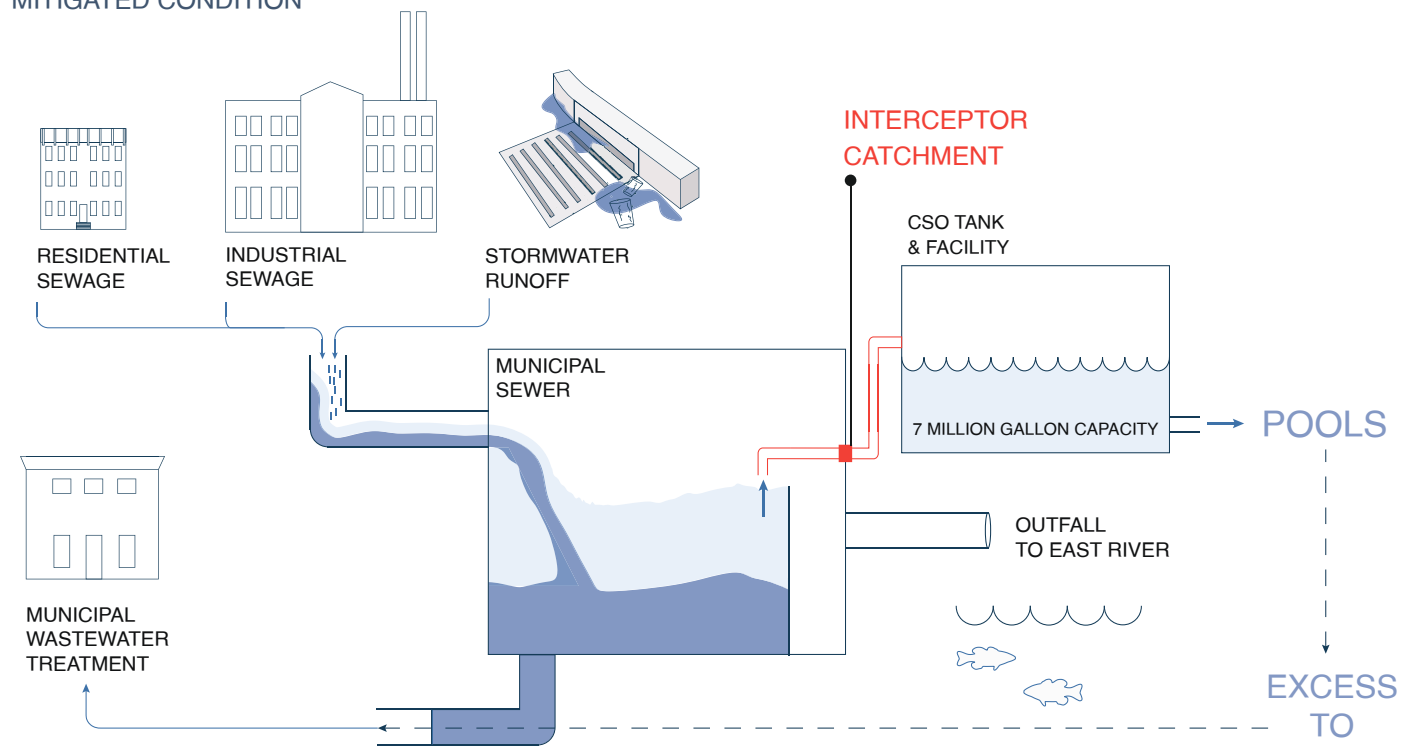


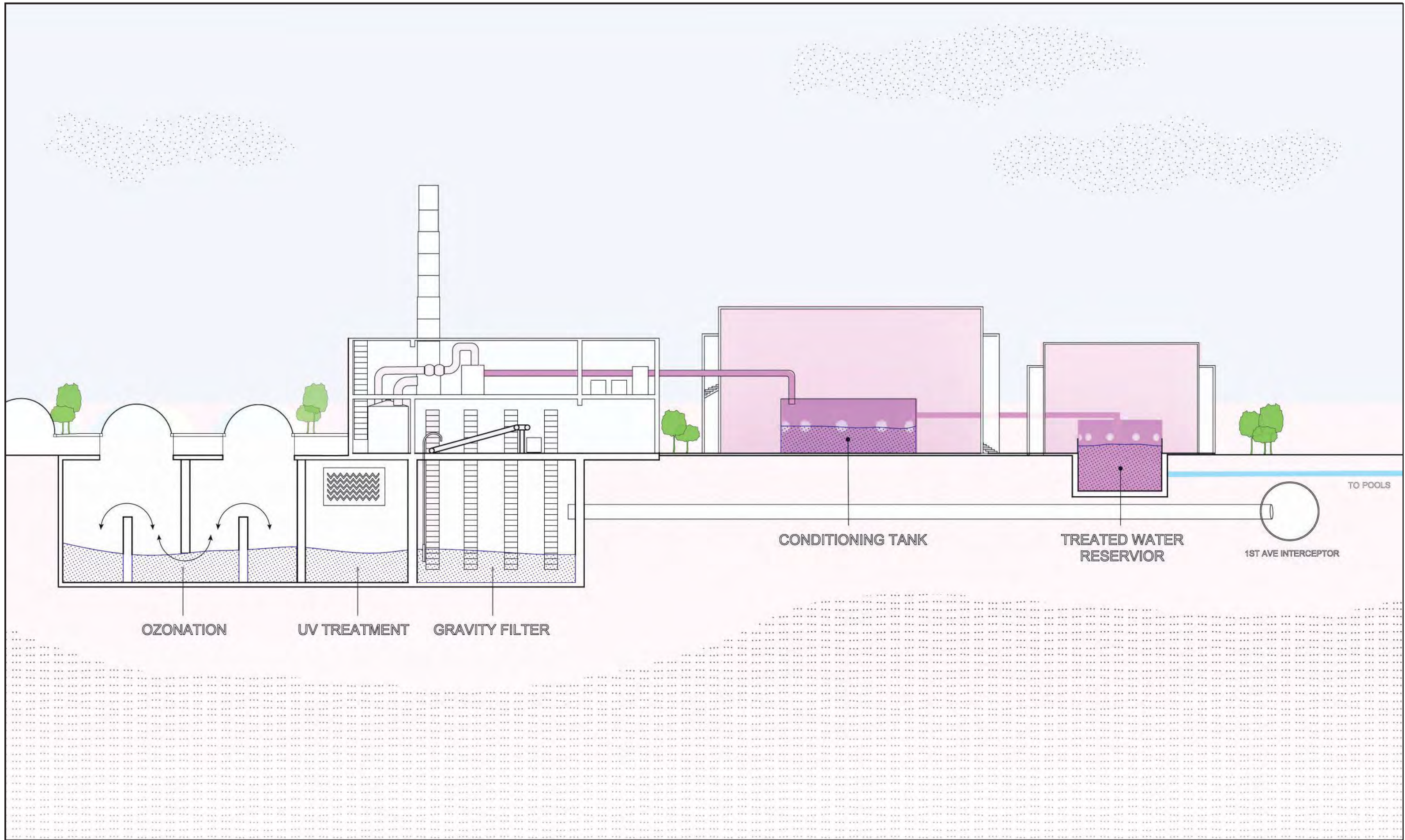
70%
of New York City
has a combined
sewer system

CURRENT OVERFLOW CONDITION



MITIGATED CONDITION





OZONATION

UV TREATMENT

GRAVITY FILTER

CONDITIONING TANK

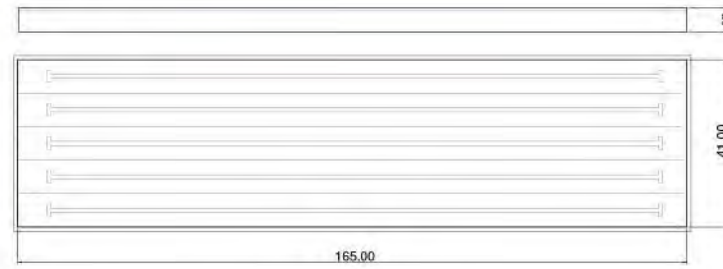
TREATED WATER RESERVIOR

1ST AVE INTERCEPTOR

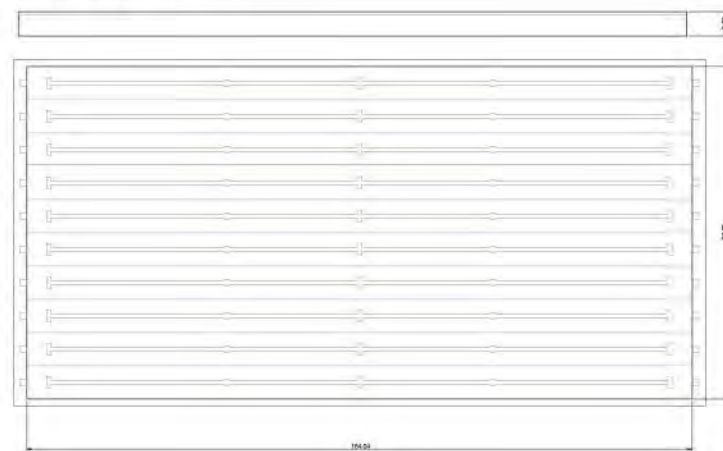
TO POOLS

POOL VOLUME AND OPERATING FACTORS

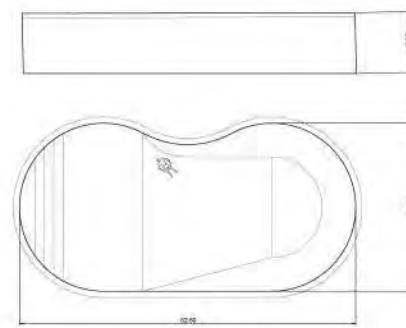
Olympic (1/2) lap pool
303,207 gallons



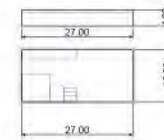
Olympic (full) lap pool
606,414.6 gallons



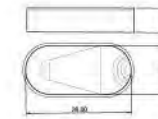
wave pool
384,887.45 gallons



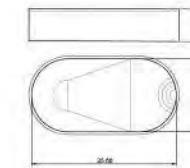
rehabilitation pool
10,084 gallons



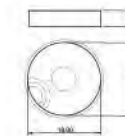
water sports pools
13,983.84 gallons



water sports pools
28,769.06 gallons



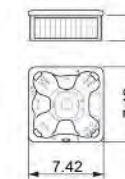
cold plunge pools
9,681.12 gallons



cold plunge pools
13,177.08 gallons



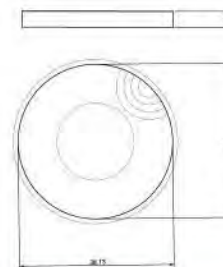
heat therapy pool
1,007.61 gallons



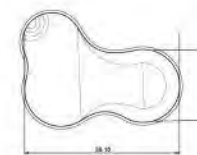
heat therapy pool
773.2 gallons



kiddie pool
43,442.44 gallons



kiddie pool
19,942.46 gallons



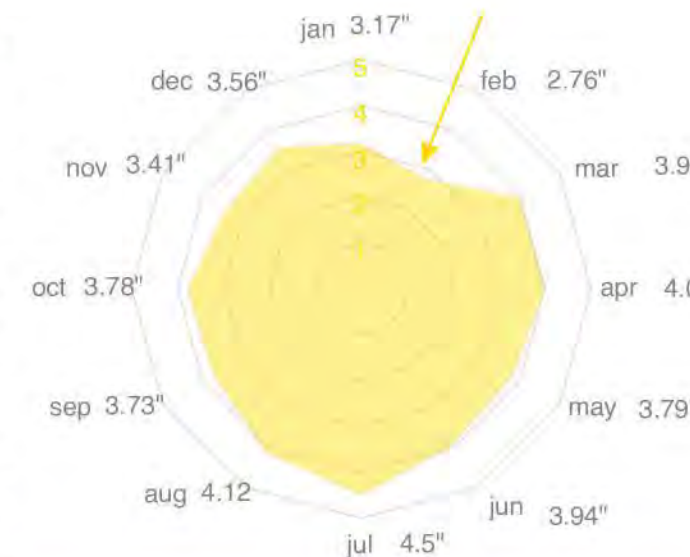
Treatment facility tanks are sized to reduce volume and frequency of CSOs by mitigating storm water runoff while meeting the water demands of our site.

Outfall per event

- OH-002 10 mil gal
- OH-003 5.9 mil gal
- OH-004 16.91 mil gal

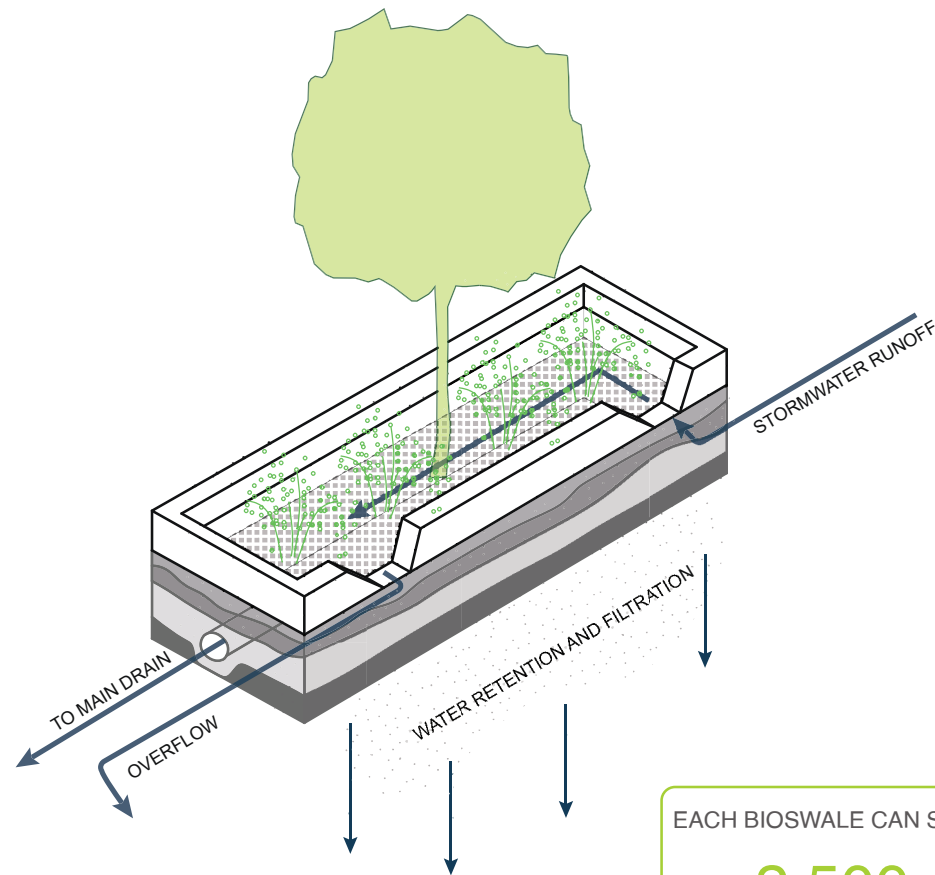
VOLUME OF RAINFALL PER MONTH

CATCHMENT AREA (ft ²) RAINFALL (ft) 7.48 gal/ft ³ = TOTAL RAINWATER (gal)				
Month	Average Rainfall (in)	Average Rainfall (ft)	Catchment Area (sqft)	Rainfall per month (gallons)
Jan	3.17	0.264166667	124,058,880.00	245,136,211.58
Feb	2.76	0.23	124,058,880.00	213,430,897.15
Mar	3.97	0.330833333	124,058,880.00	307,000,239.74
Apr	4	0.333333333	124,058,880.00	309,320,140.80
May	3.79	0.315833333	124,058,880.00	293,080,833.41
Jun	3.94	0.328333333	124,058,880.00	304,680,338.69
Jul	4.5	0.375	124,058,880.00	347,985,158.40
Aug	4.12	0.343333333	124,058,880.00	318,599,745.02
Sep	3.73	0.310833333	124,058,880.00	288,441,031.30
Oct	3.78	0.315	124,058,880.00	292,307,533.06
Nov	3.41	0.284166667	124,058,880.00	263,695,420.03
Dec	3.56	0.296666667	124,058,880.00	275,294,925.31



The **storage facility tank** is sized to make up for pool operating factors over dry months and for back up holding capacity in heavy rainfall events.

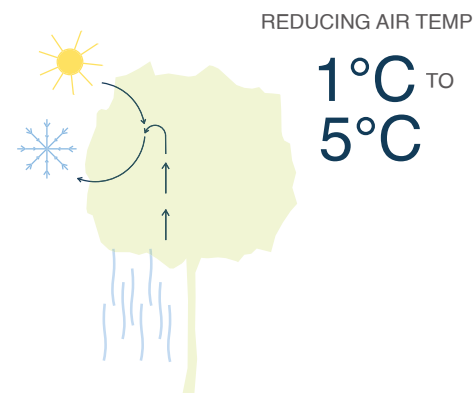
STORMWATER MITIGATION



EACH BIOSWALE CAN SOAK UP
2,500 GALLONS
 OF RAINWATER RUNOFF

URBAN HEAT ISLAND

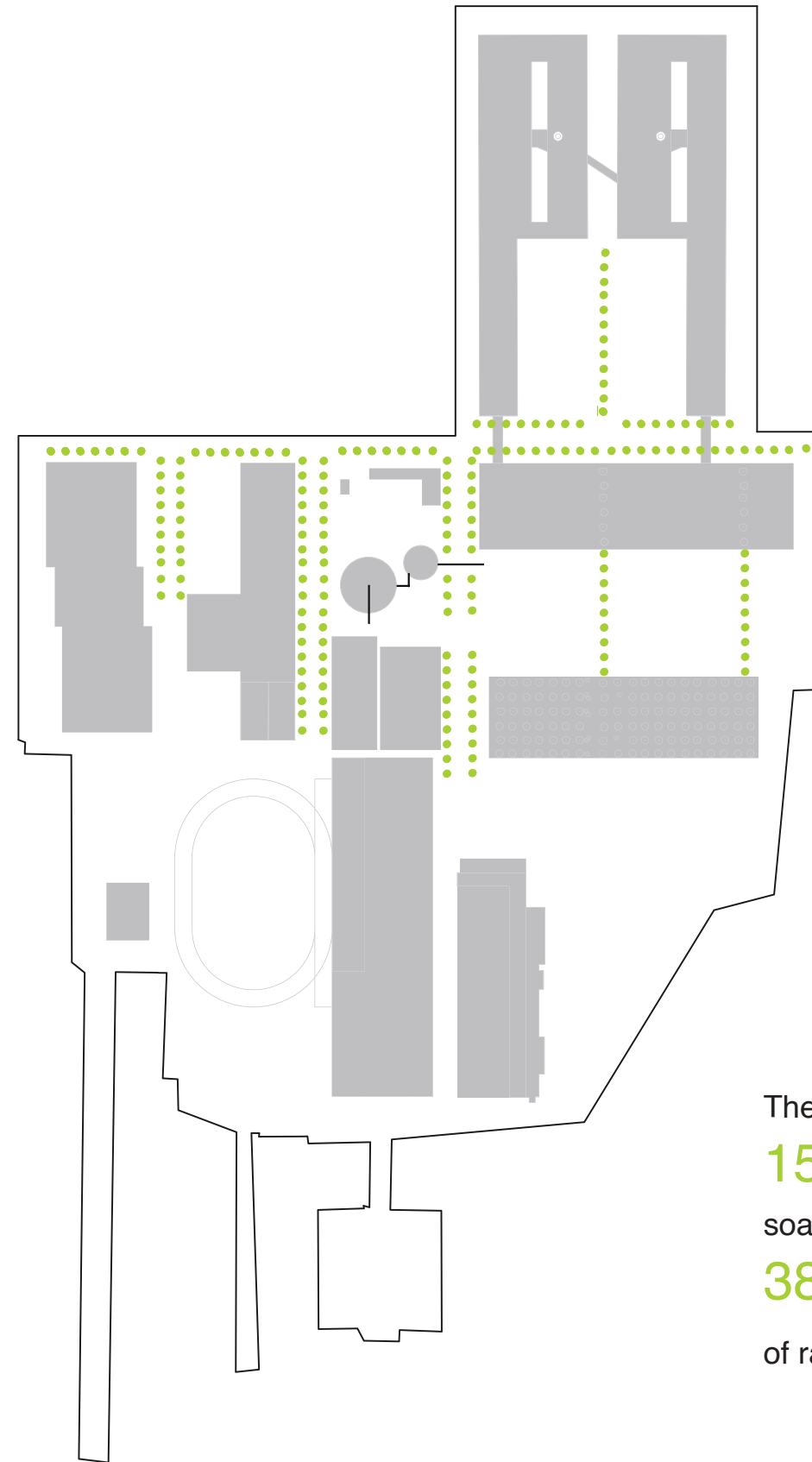
TREES COOL THE AIR THROUGH
 EVAPROTRANSPIRATION



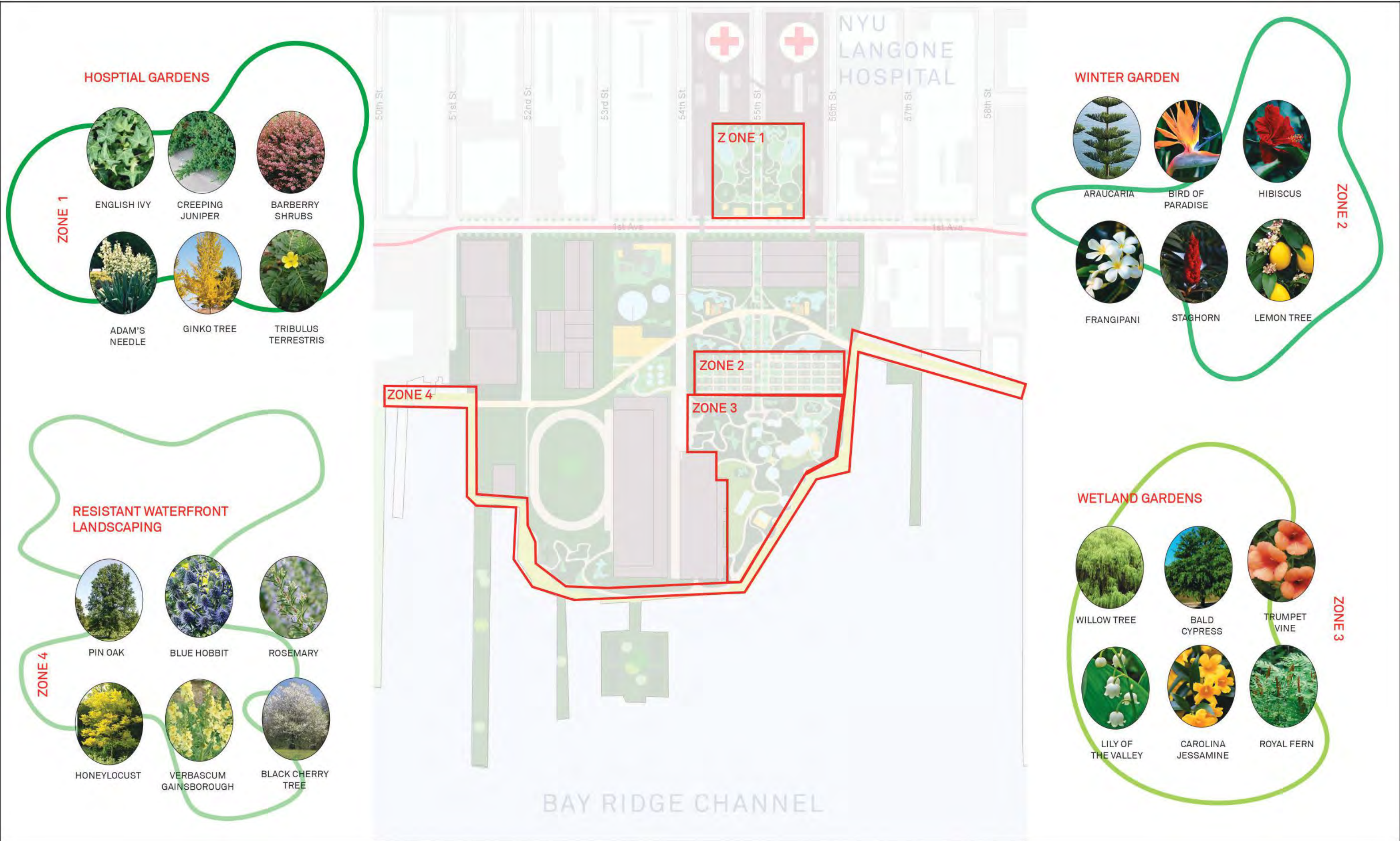
PM2.5 AND GASEOUS AIR

A MATURE TREE INTERCEPTS

.17 (KG/YR)
 OF AIRBORNE
 POLLUTANTS
 AND
 SEQUESTERS
3.63
 (TONS/YR.)
 OF CARBON
 EMISSIONS



The addition of
155 BIOSWALES
 soaks up
387,500 gallons
 of rainwater runoff per storm event



HOSPITAL GARDENS

ZONE 1



ENGLISH IVY

CREeping JUNIPER

BARBERRY SHRUBS

ADAM'S NEEDLE

GINKGO TREE

TRIBULUS TERRESTRIS

WINTER GARDEN

ZONE 2



ARAUCARIA

BIRD OF PARADISE

HIBISCUS

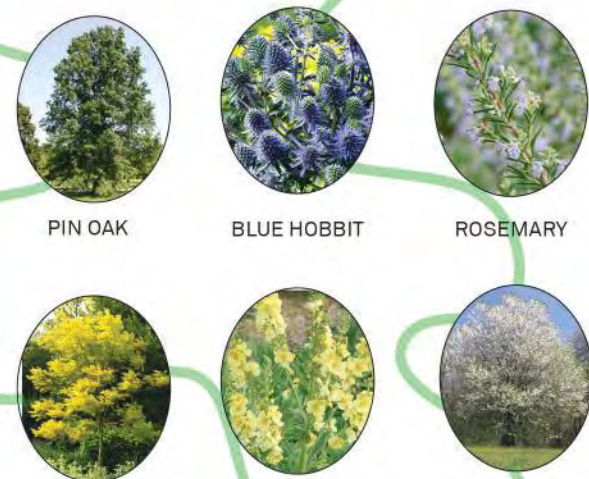
FRANGIPANI

STAGHORN

LEMON TREE

RESISTANT WATERFRONT LANDSCAPING

ZONE 4



PIN OAK

BLUE HOBBIT

ROSEMARY

HONEYLOCUST

VERBASCUM GAINSBOROUGH

BLACK CHERRY TREE

WETLAND GARDENS

ZONE 3



WILLOW TREE

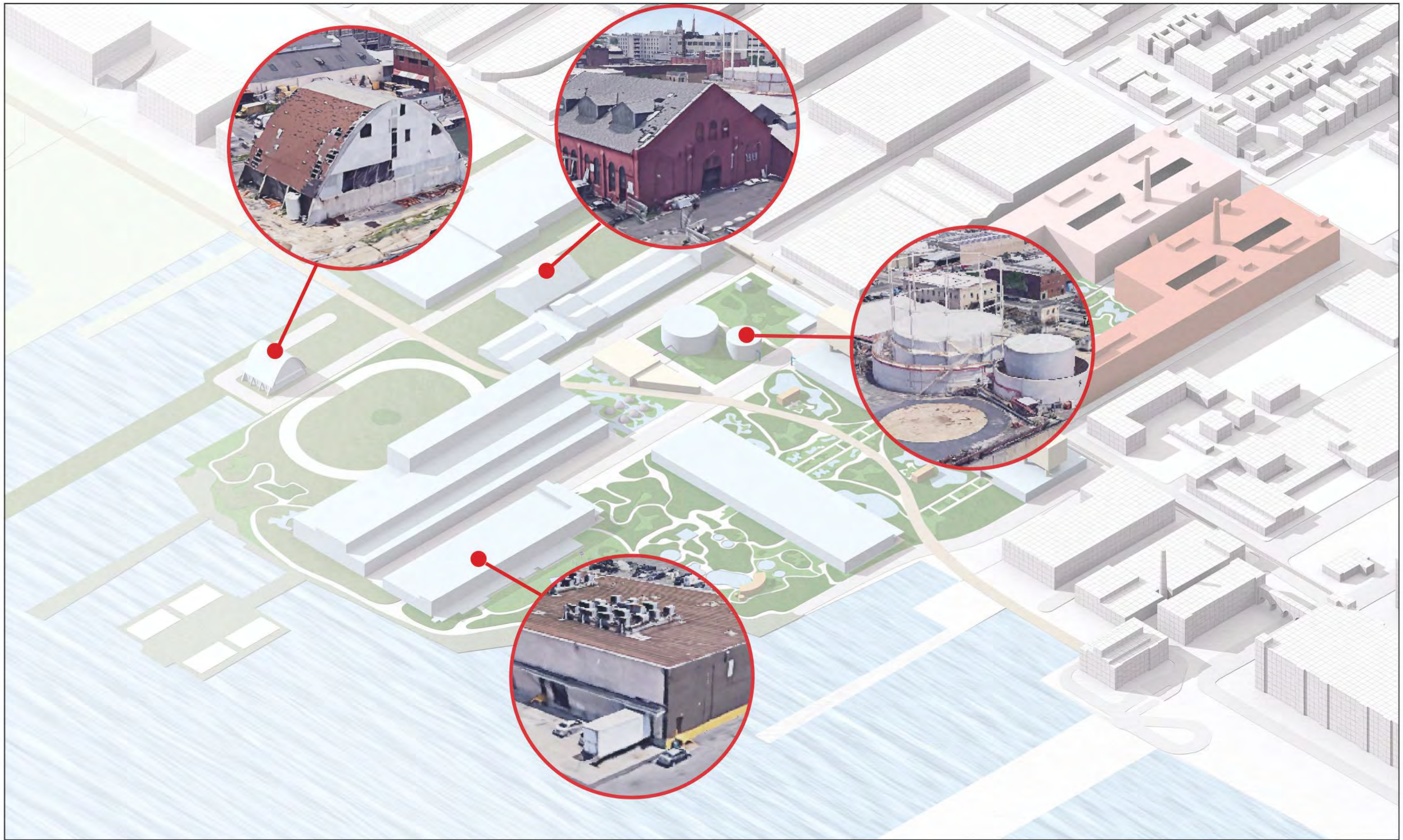
BALD CYPRESS

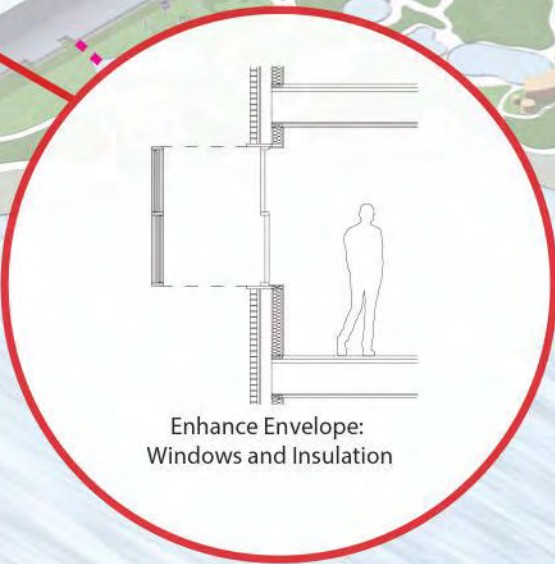
TRUMPET VINE

LILY OF THE VALLEY

CAROLINA JESSAMINE

ROYAL FERN





Embodied Energy in Daycare Building: 4,609,600 kg CO₂

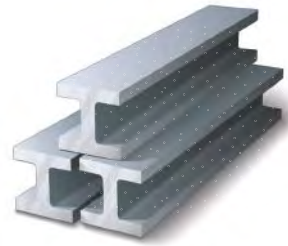
Carbon per kg: 1.0 kg CO₂
 Volume of Material: 11,100 ft³
 KG per Volume: 68 kg / ft³
 Total Weight: 754,800 kg



CONCRETE

754,800 KG OF EMBODIED CARBON

Carbon per kg: 2.7 kg CO₂
 Volume of Material: 800 ft³
 KG per Volume: 220 kg / ft³
 Total Weight: 176,000 kg



STEEL

475,200 KG OF EMBODIED CARBON

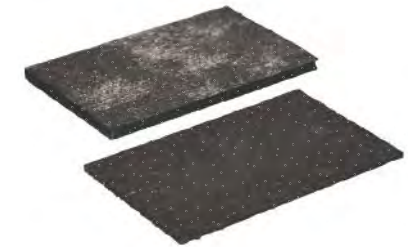
Carbon per kg: 11.5 kg CO₂
 Volume of Material: 2,900 ft²
 KG per Volume: 76 kg / ft²
 Total Weight: 220,400 kg



ALUMINUM

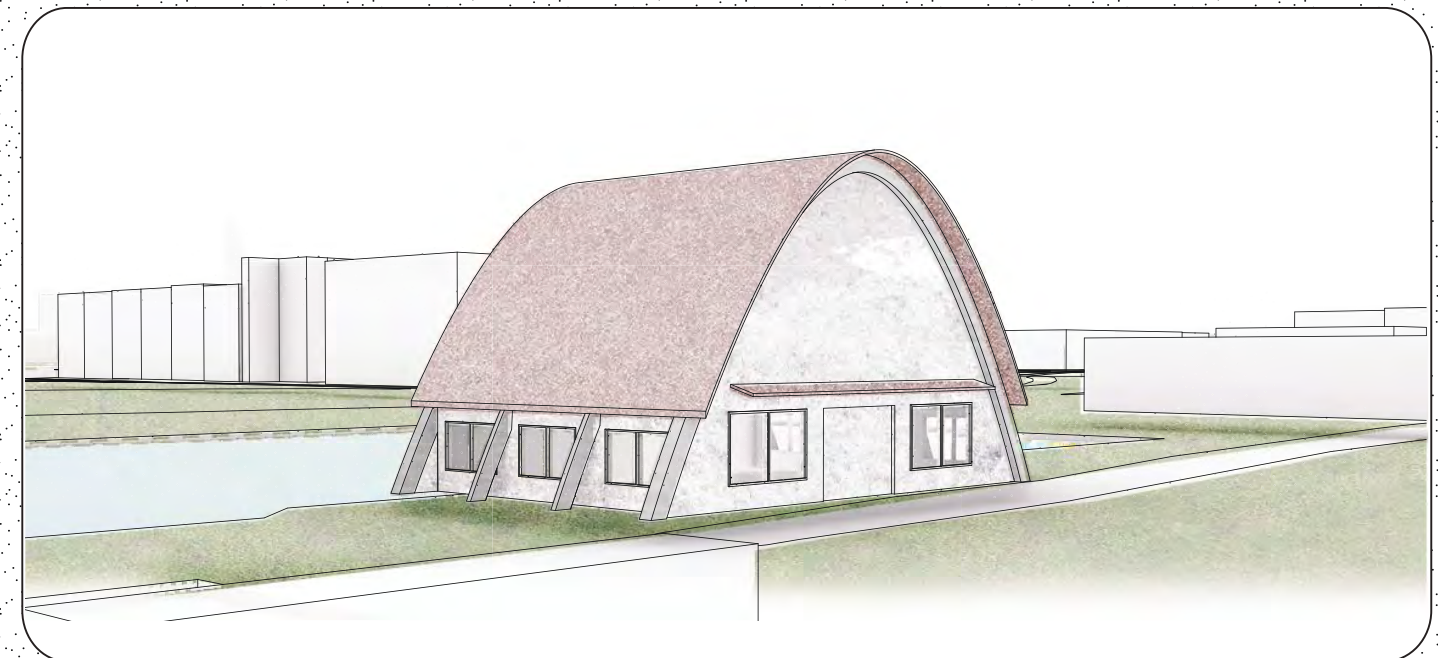
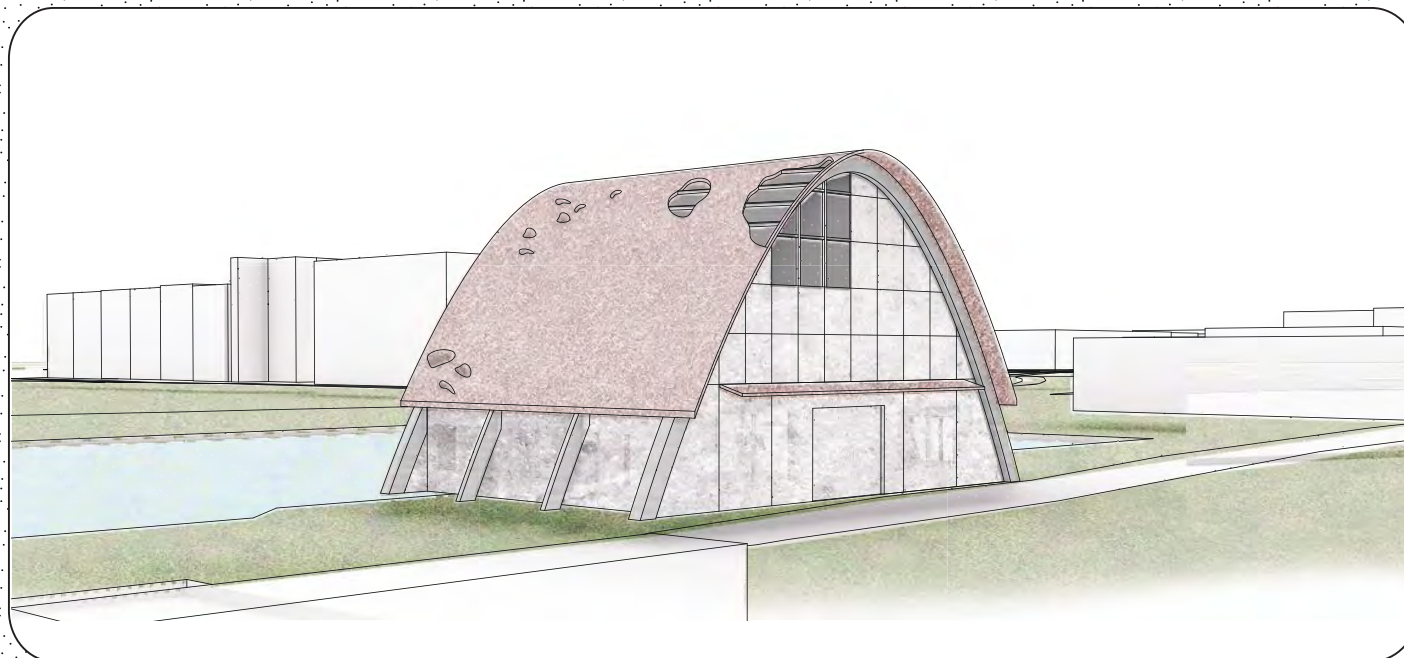
2,534,600 KG OF EMBODIED CARBON

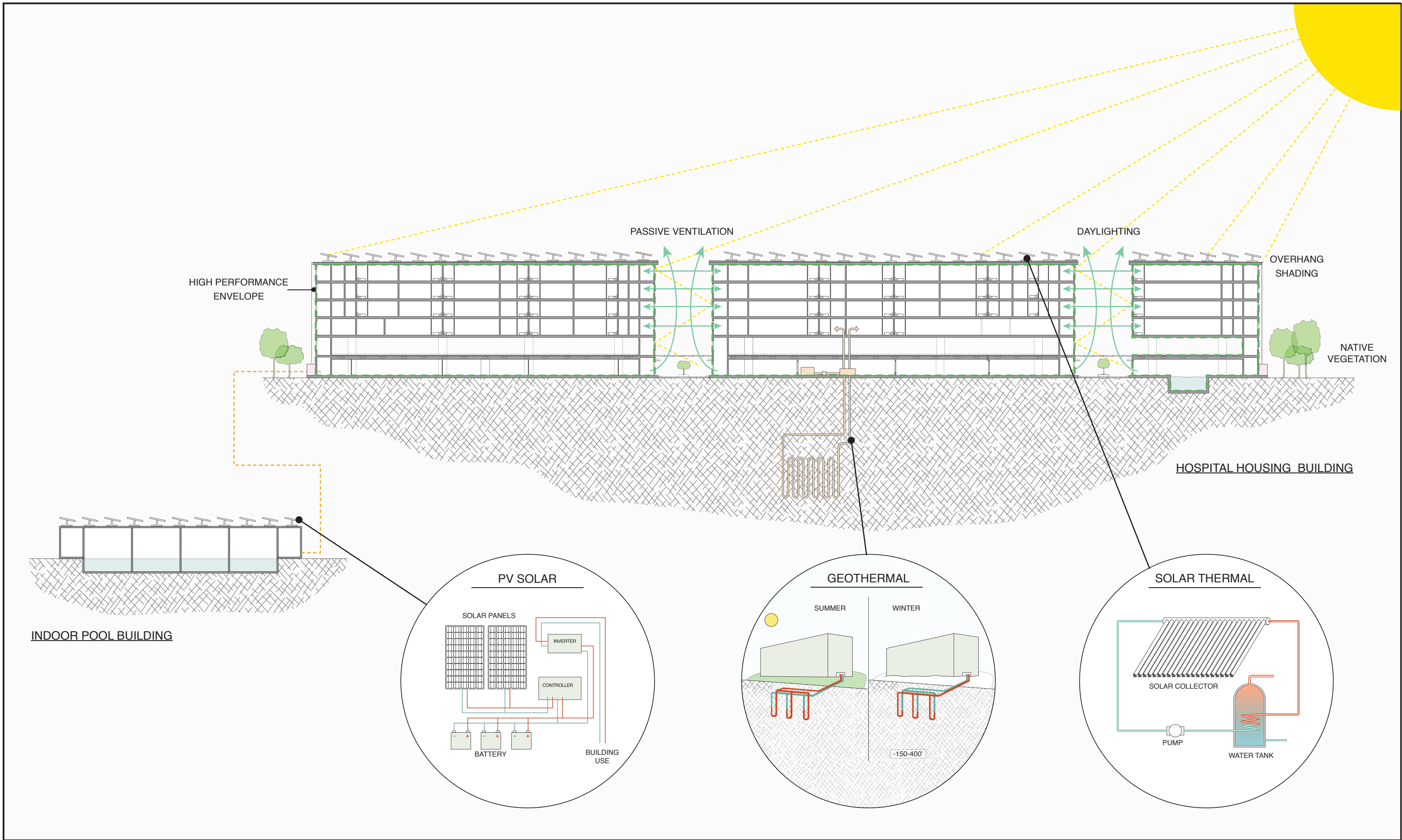
Carbon per kg: 2.6 kg CO₂
 Volume of Material: 5,000 ft³
 KG per Volume: 65 kg / ft³
 Total Weight: 325,000 kg



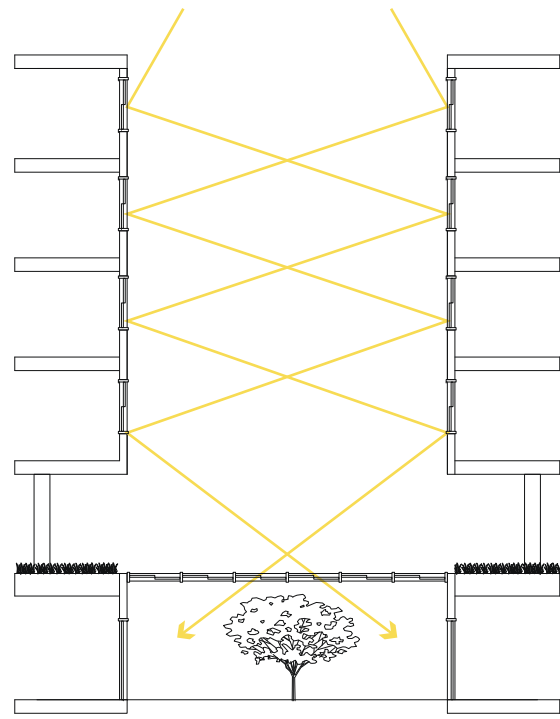
ASPHALT

845,000 KG OF EMBODIED CARBON

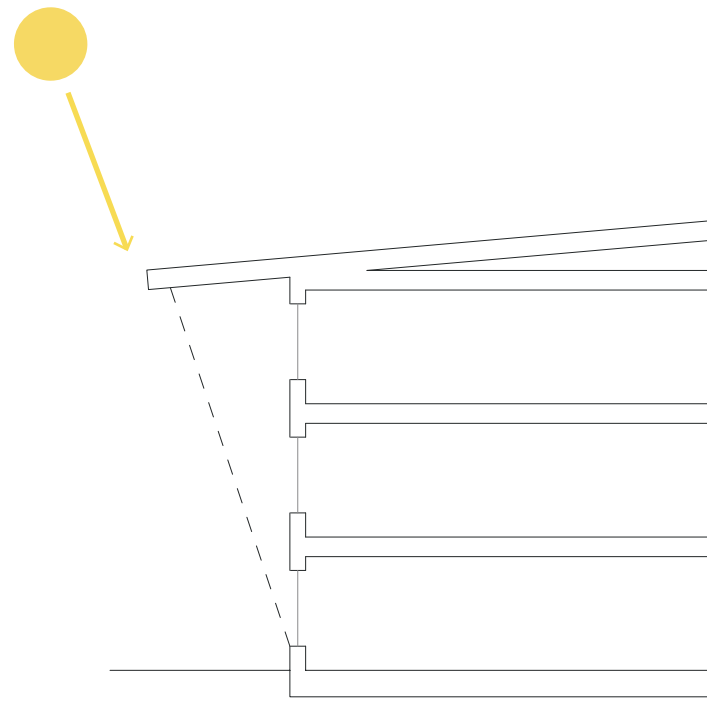




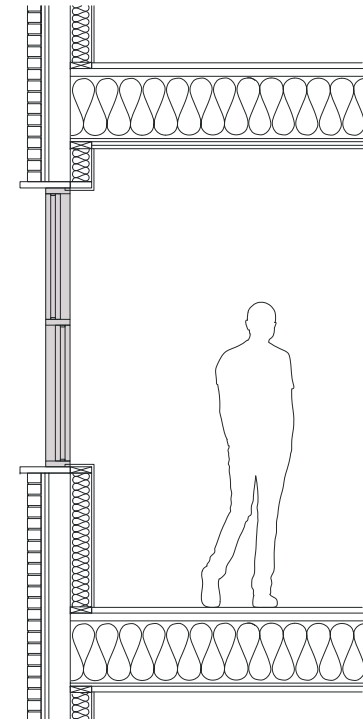
Strategies for Passive Design: ~20% Reduction in Energy Use



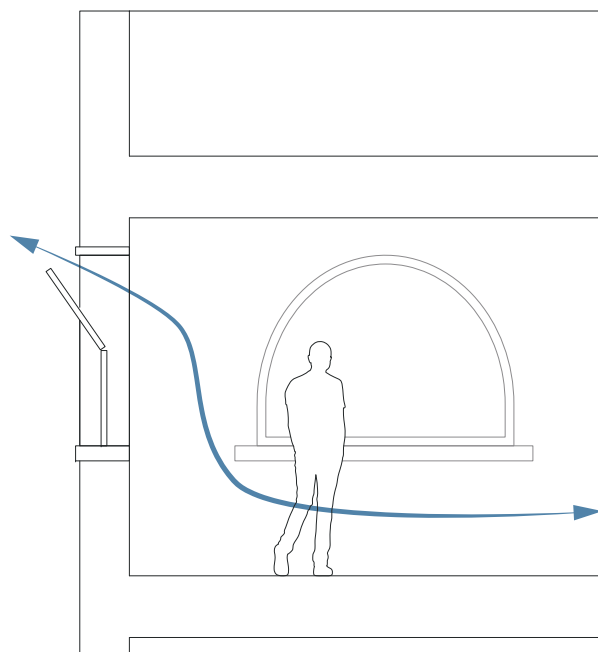
Daylighting



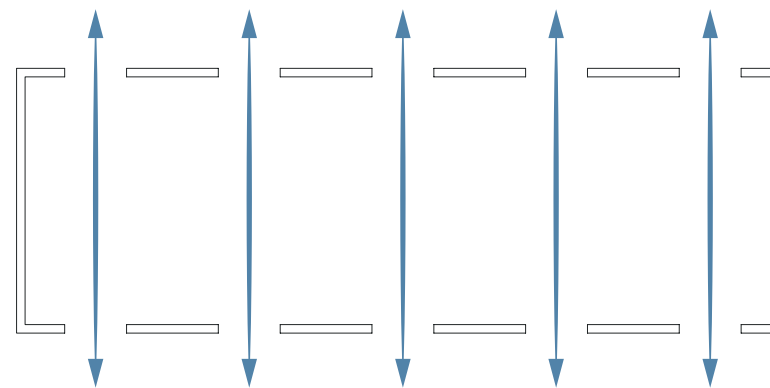
Shading from Building Overhangs



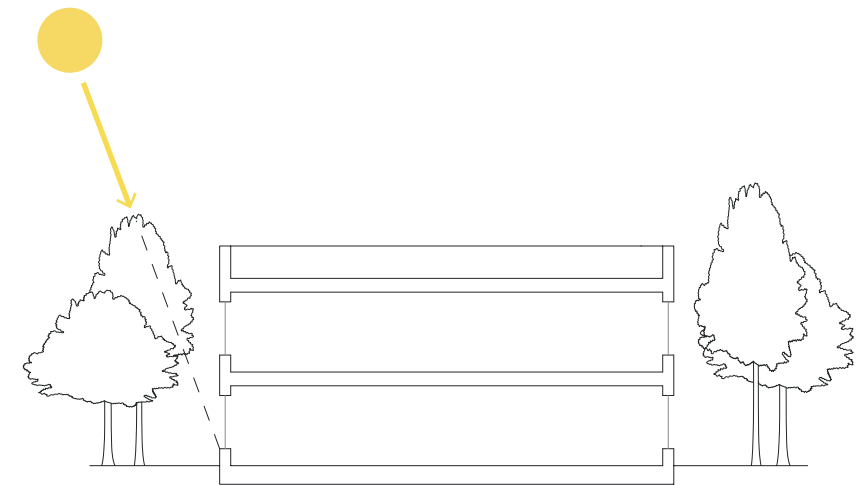
Continuous Insulation



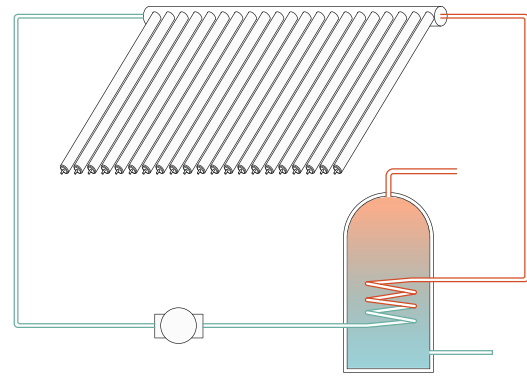
Ceiling Ventilation



Cross Ventilation



Shading from Vegetation



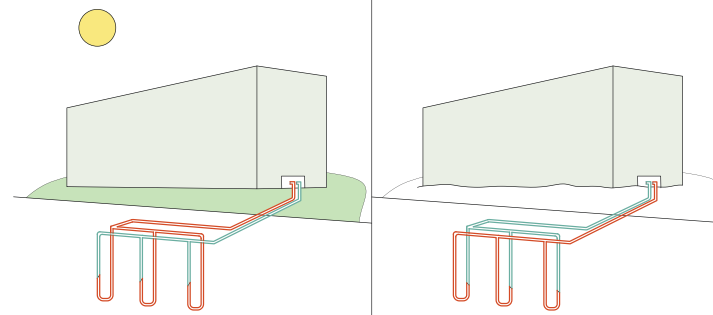
SOLAR THERMAL

Solar Thermal Area: 23,000.0 (ft2)

Energy Produced: 774.0 (Btu/ft2/day)

Energy Produced: 17,802,000.0 (Btu/day)

Energy Produced: 6,497,730.0 (kBtu/yr)



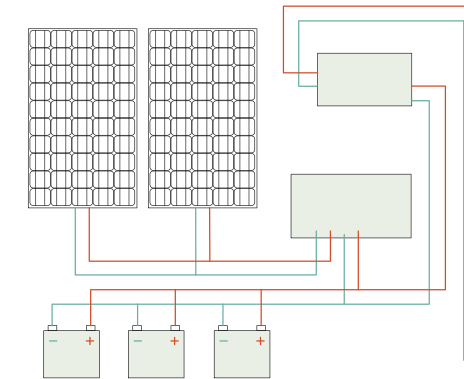
GEOTHERMAL

Building Area 176,000.0 (ft2)

Outdoor Design Temp: 15 / 92 *F*

Building Load: 4258 / 7318 (Btu/hr)

Reduction: 698,200.0 (kBtu/yr)



PV SOLAR

PV Solar Area: 6,350.0 (m2)

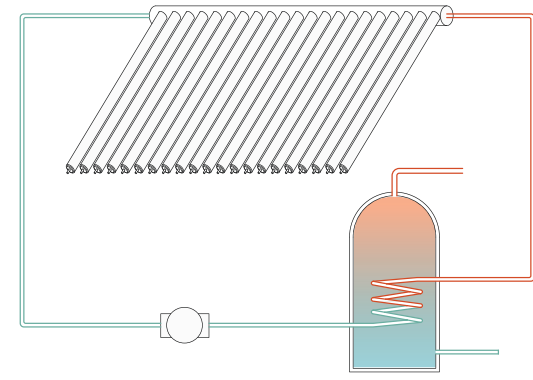
Solar Radiation: 5.3 (kWh / m2 / day)

Energy Produced: 5,035,662,519.7 (Btu/yr)

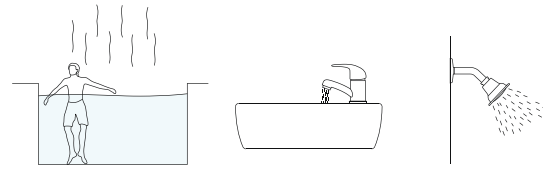
Energy Produced: 5,035,662.5 (kBtu/yr)

TOTAL BUILDING ENERGY DEMAND

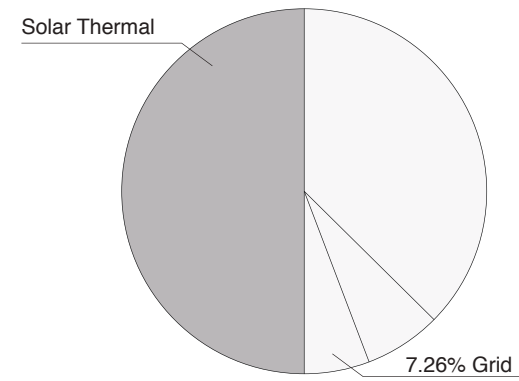
Program Type	Area (ft2)	EUI: CBECS (kBtu/ft2)	Energy Demand (kBtu)
Housing	96,000.0	89.6	8,601,600.0
Commerical (enclosed mall)	35,100.0	65.7	2,306,070.0
Pool	44,900.0	50.8	2,280,920.0
TOTAL	176,000.0		13,188,590.0



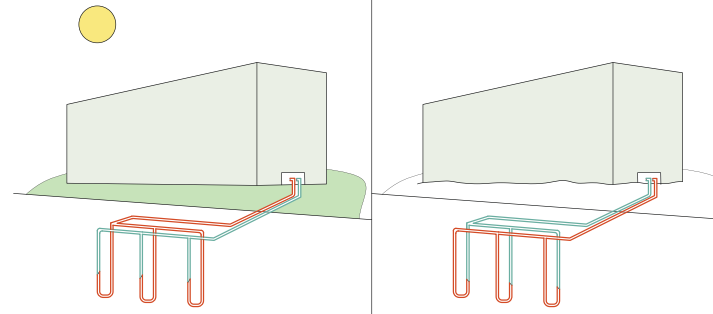
SOLAR THERMAL



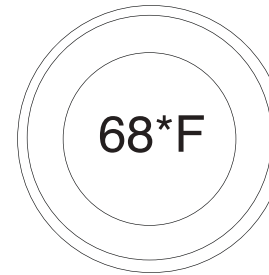
WATER HEATING



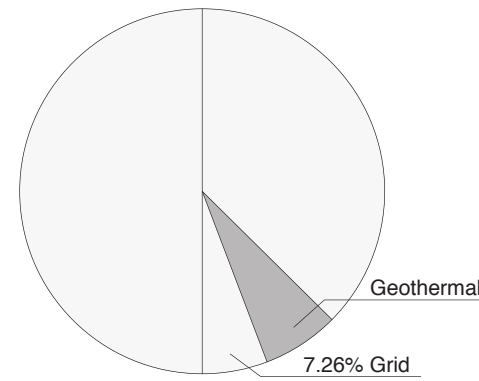
49.27% OF BUILDING ENERGY USE



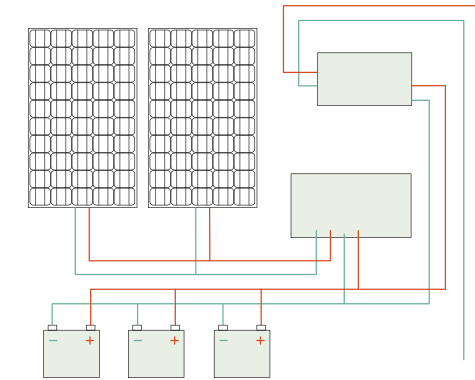
GEOTHERMAL



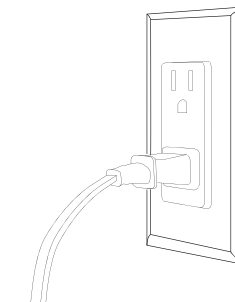
HEATING & COOLING



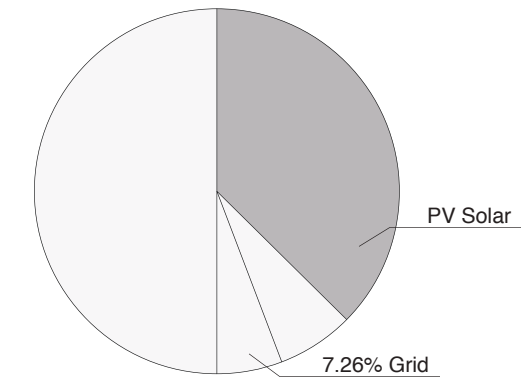
5.29% OF BUILDING ENERGY USE



PV SOLAR



BUILDING ELECTRICITY



38.18% OF BUILDING ENERGY USE

NOTES: Pie charts are intended to illustrate proportions of energy generated. Surpluses cannot necessarily cover deficits in other categories. In event of surplus, energy type will be distributed to site pools and buildings. In event of deficit, energy will be drawn from the city.







