Welcome to a CalPoly Presentation :
MPWSP Conceptual Architectural Desalination Plant Master Plan

On May 17th, we presented two conceptual approaches to the Desalination Plant architecture.

In that meeting, the Board asked us to combine features of both concepts and follow the design goals for the project:

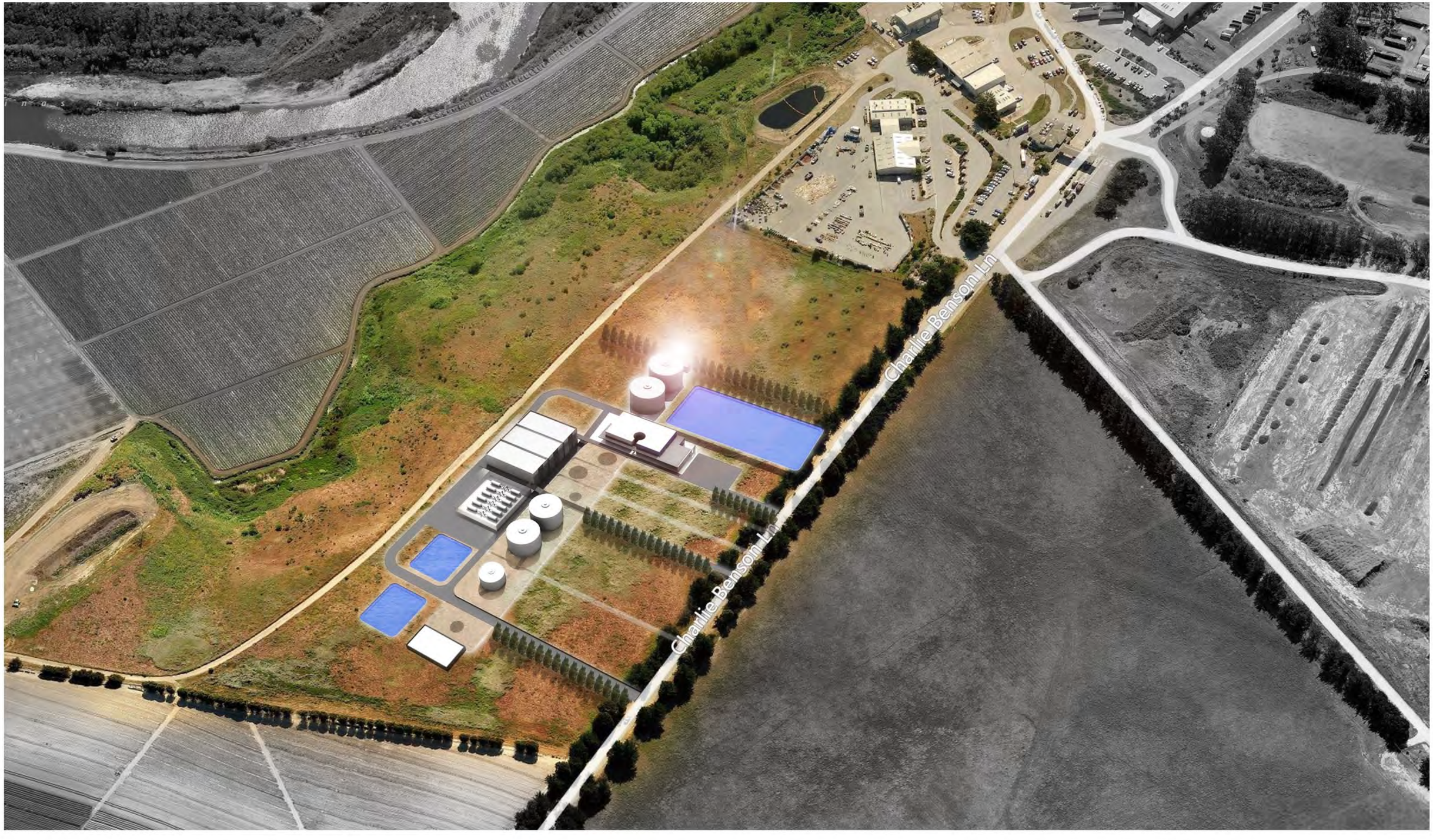
Engineering: Excellence above all.

Sustainability: Efficiently applied.

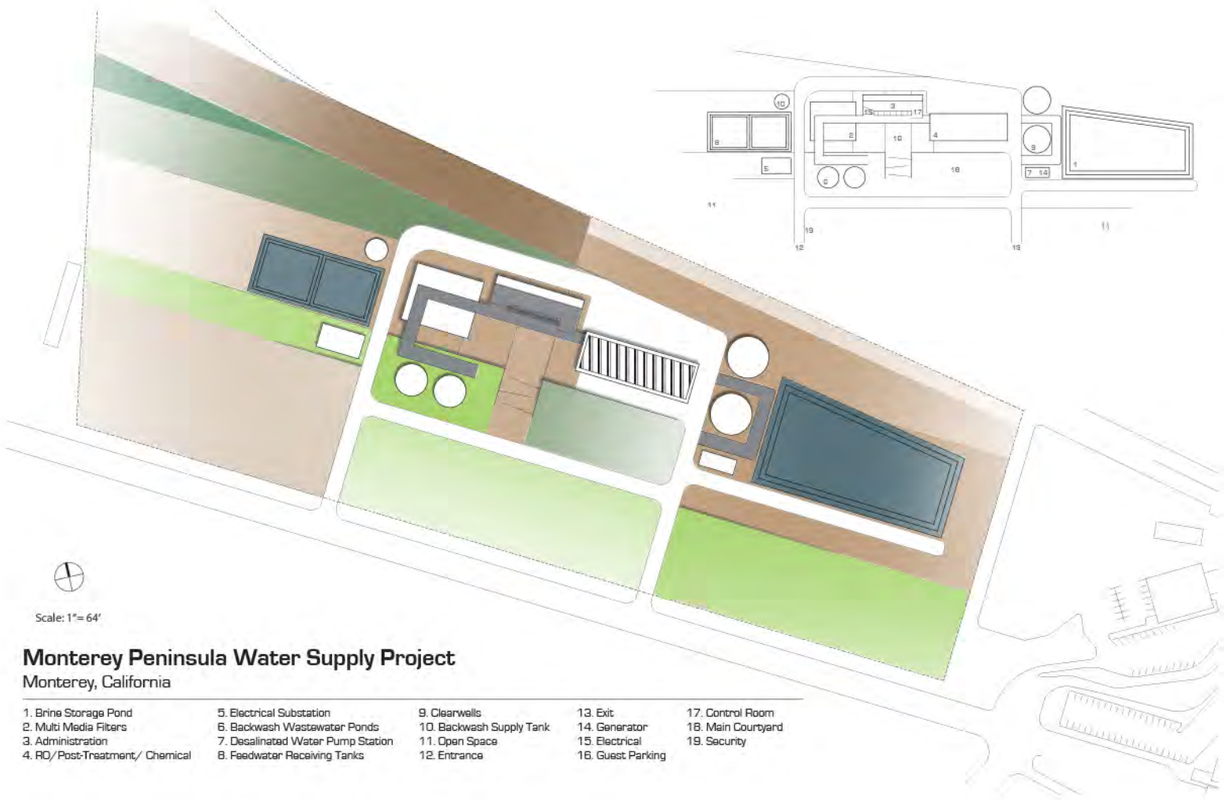
Education: Water is finite.

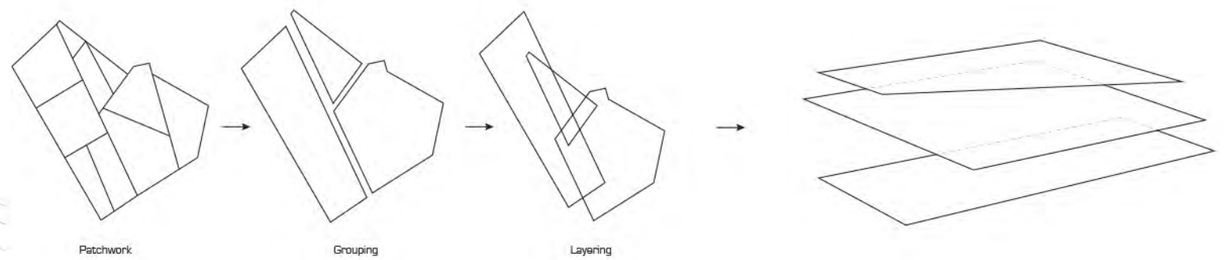
We made 5 major changes:

1. Merged the concepts.
2. Addressed concerns regarding costs:
   Reducing the amount of construction.
3. Folded the contours of the site.
4. Moved the buildings to reduce the cut and fill.
5. Changed the observation path of the educational tours.

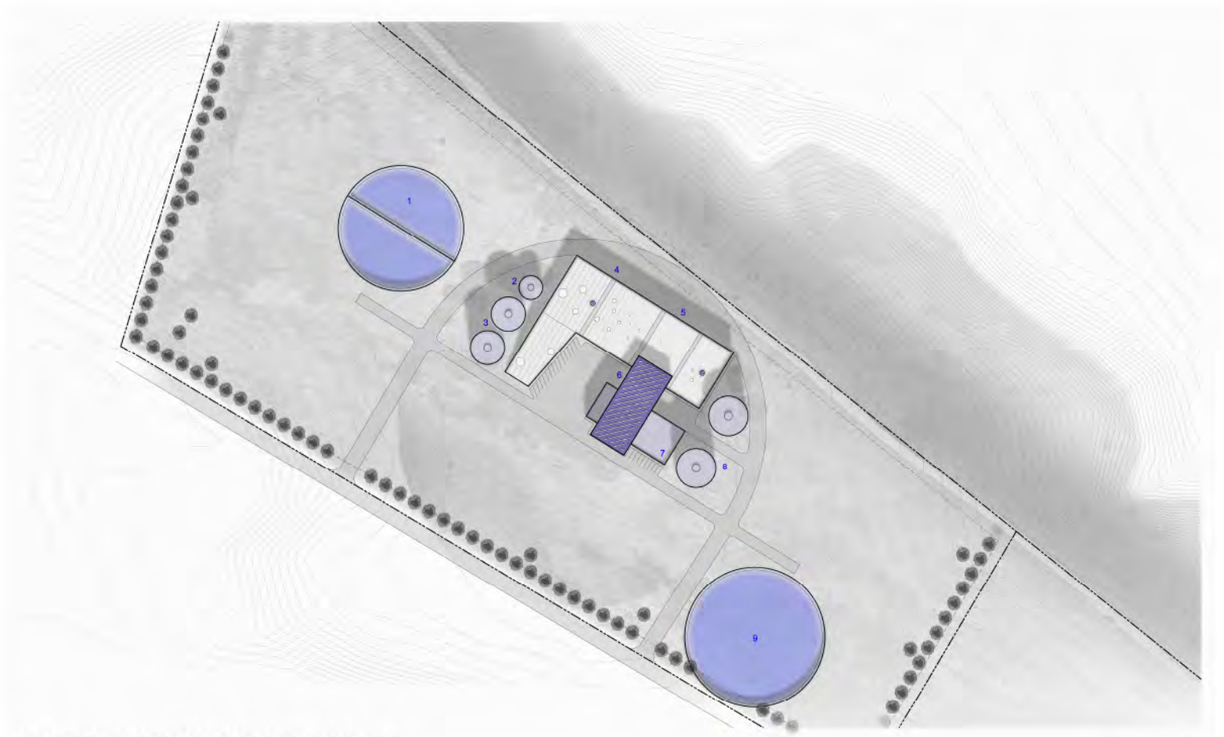

Charlie Benson Ln
Charlie Benson Ln

Agricultural Patchwork





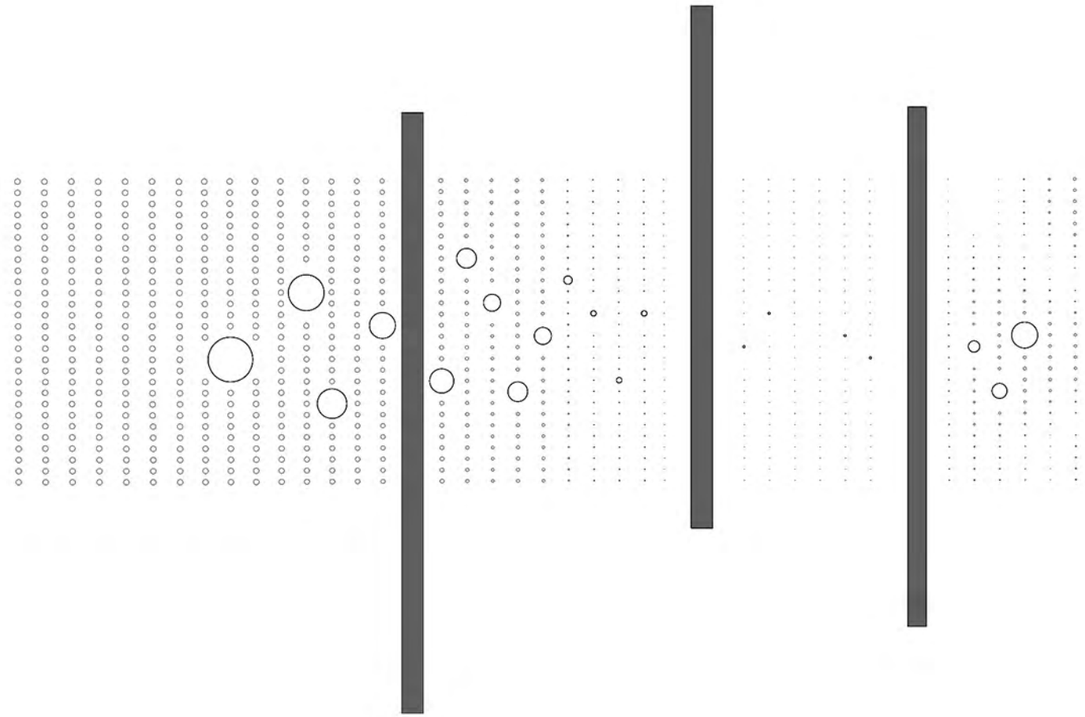
Desalting at the Molecular Level



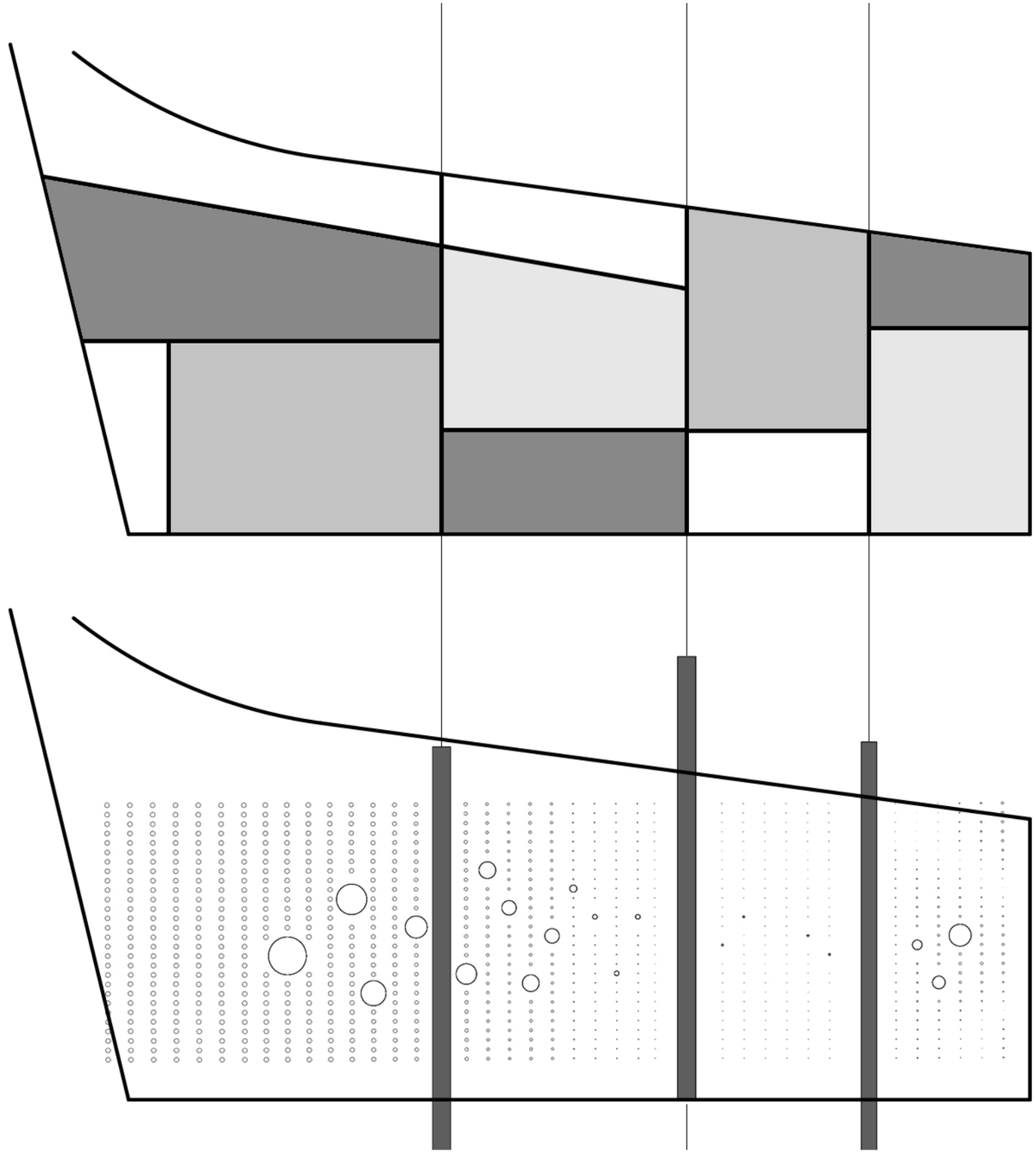
MPWSP DESALINIZATION PLANT SITE PLAN

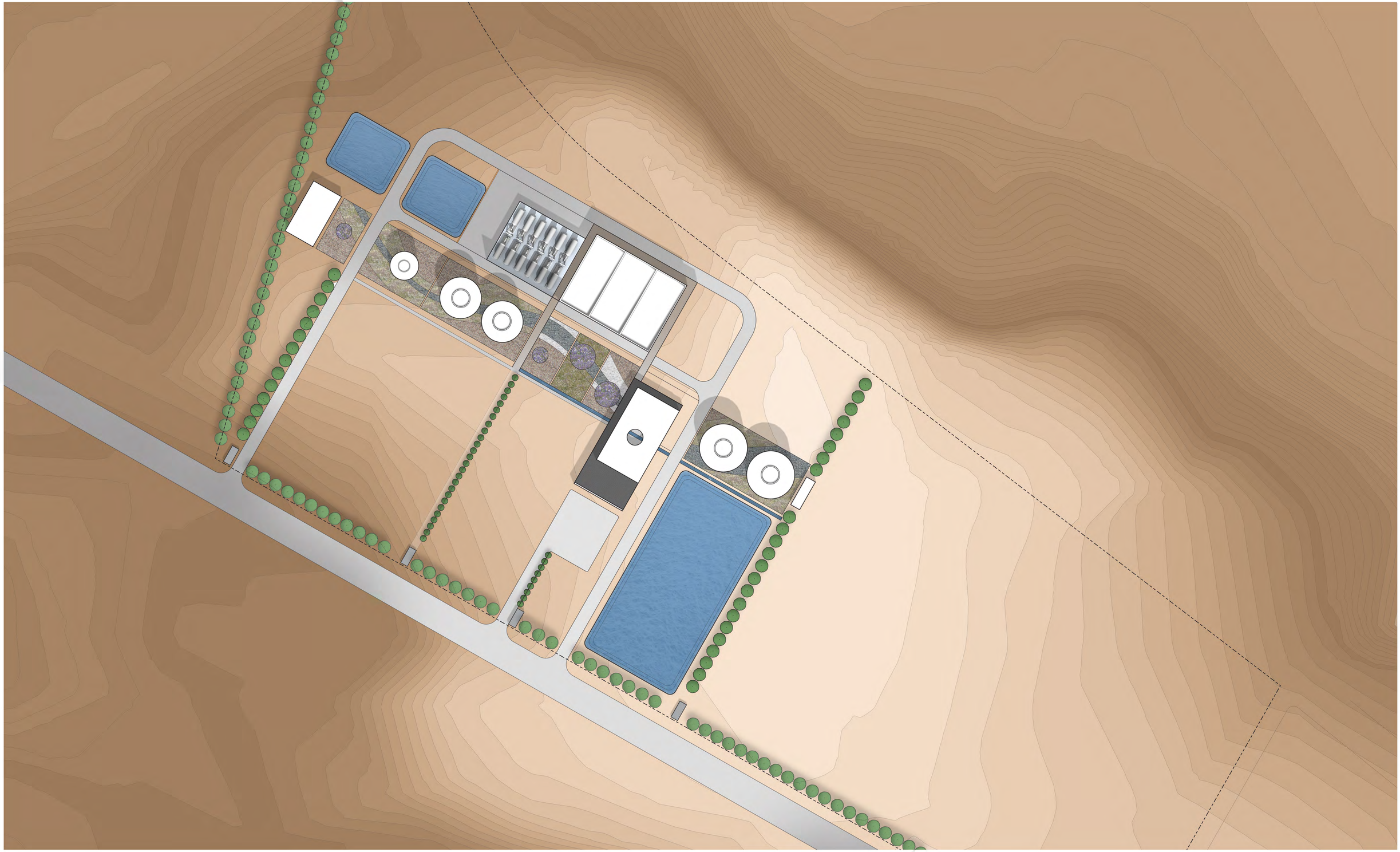
1. Back Wash Ponds
2. Back Wash Tank
3. Salt Water Tanks
4. Media Filtration
5. R.O. / Post Treatment
6. Administration
7. Lobby / Maintenance / Electrical
8. Clear Water Tanks
9. Brine Pond

SCALE: 1/64"= 1'-0"



Combining Concepts

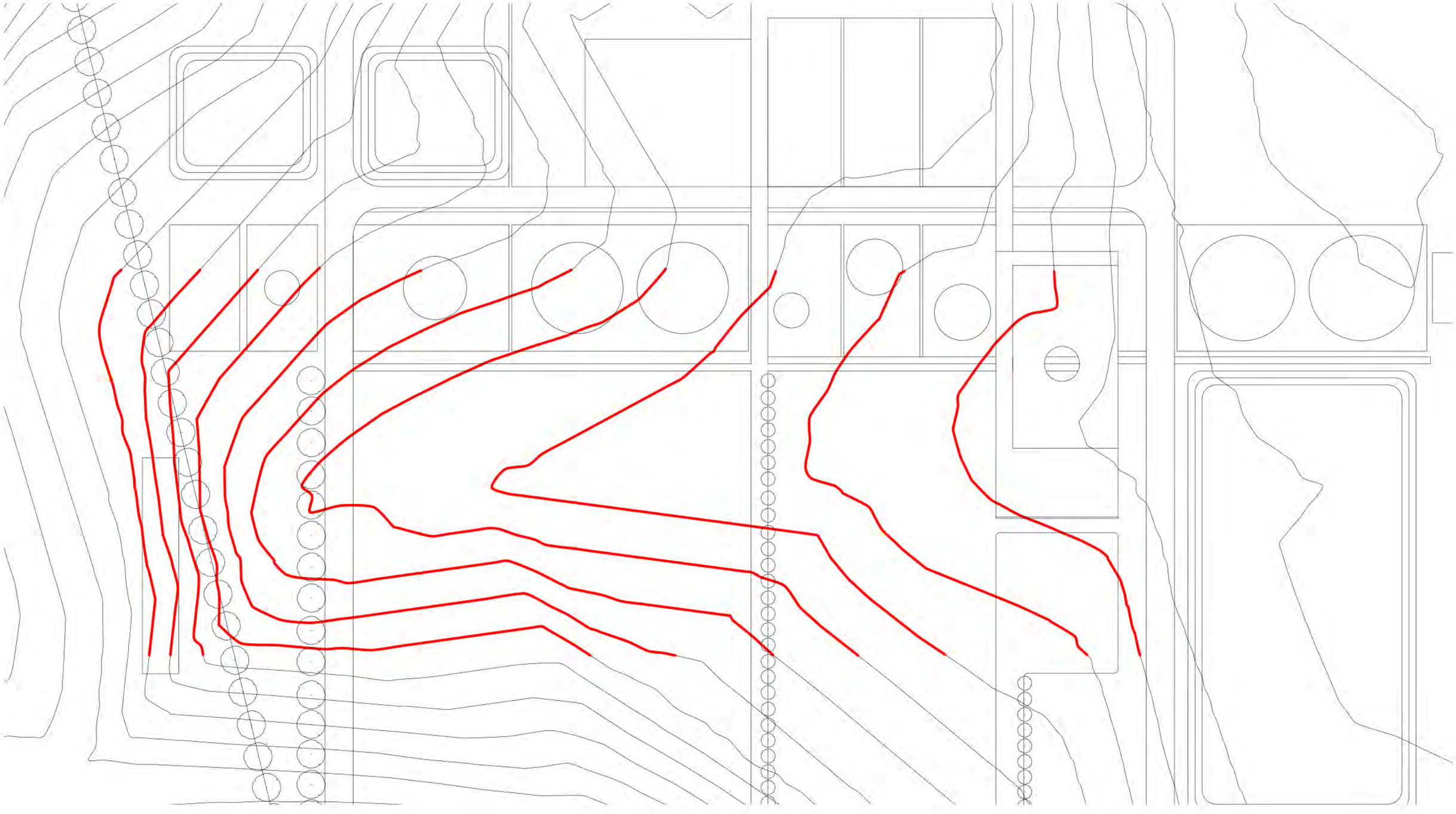




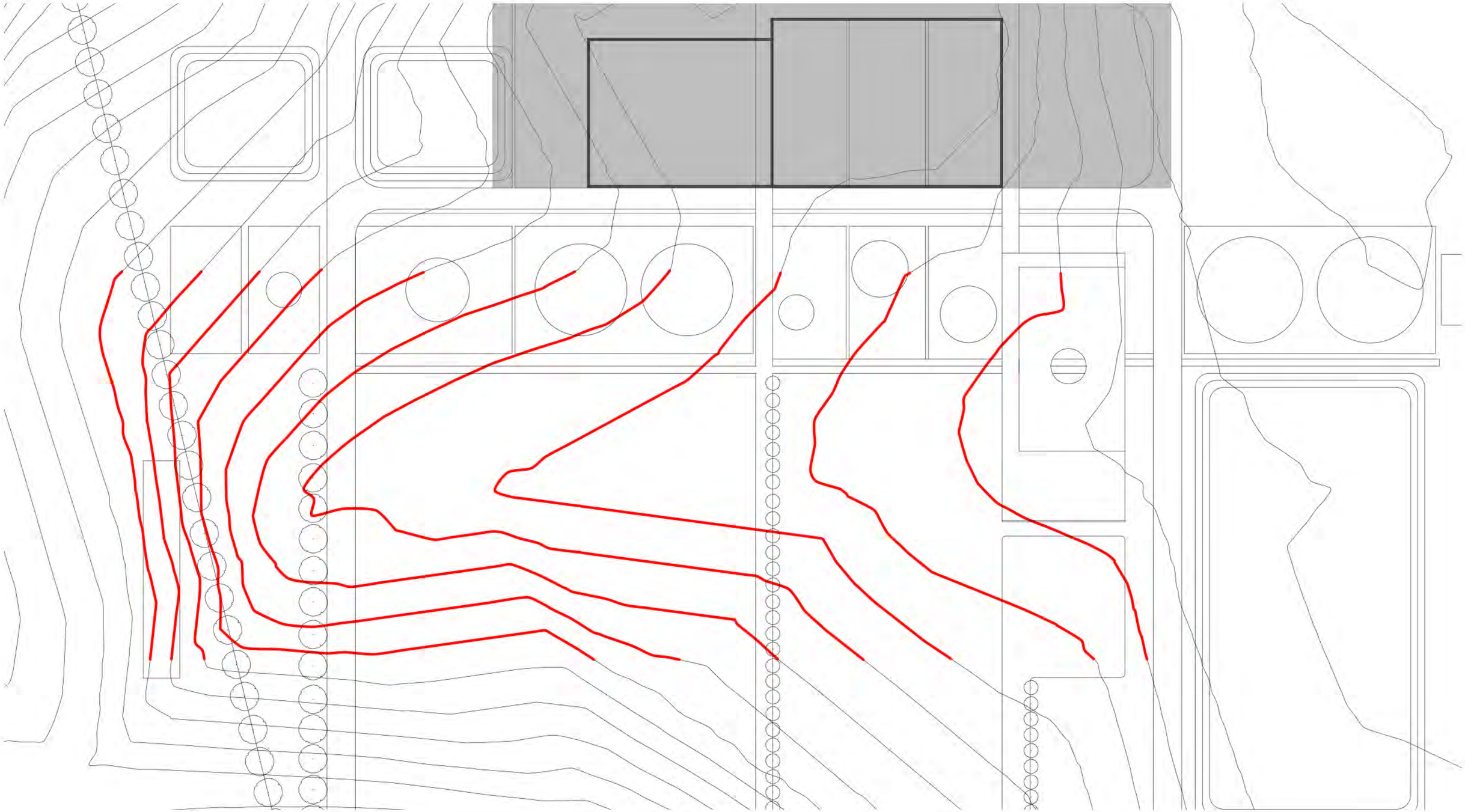
MPWSP Desalination Plant

Scale: 1”= 64’

Site Placement



Site Placement



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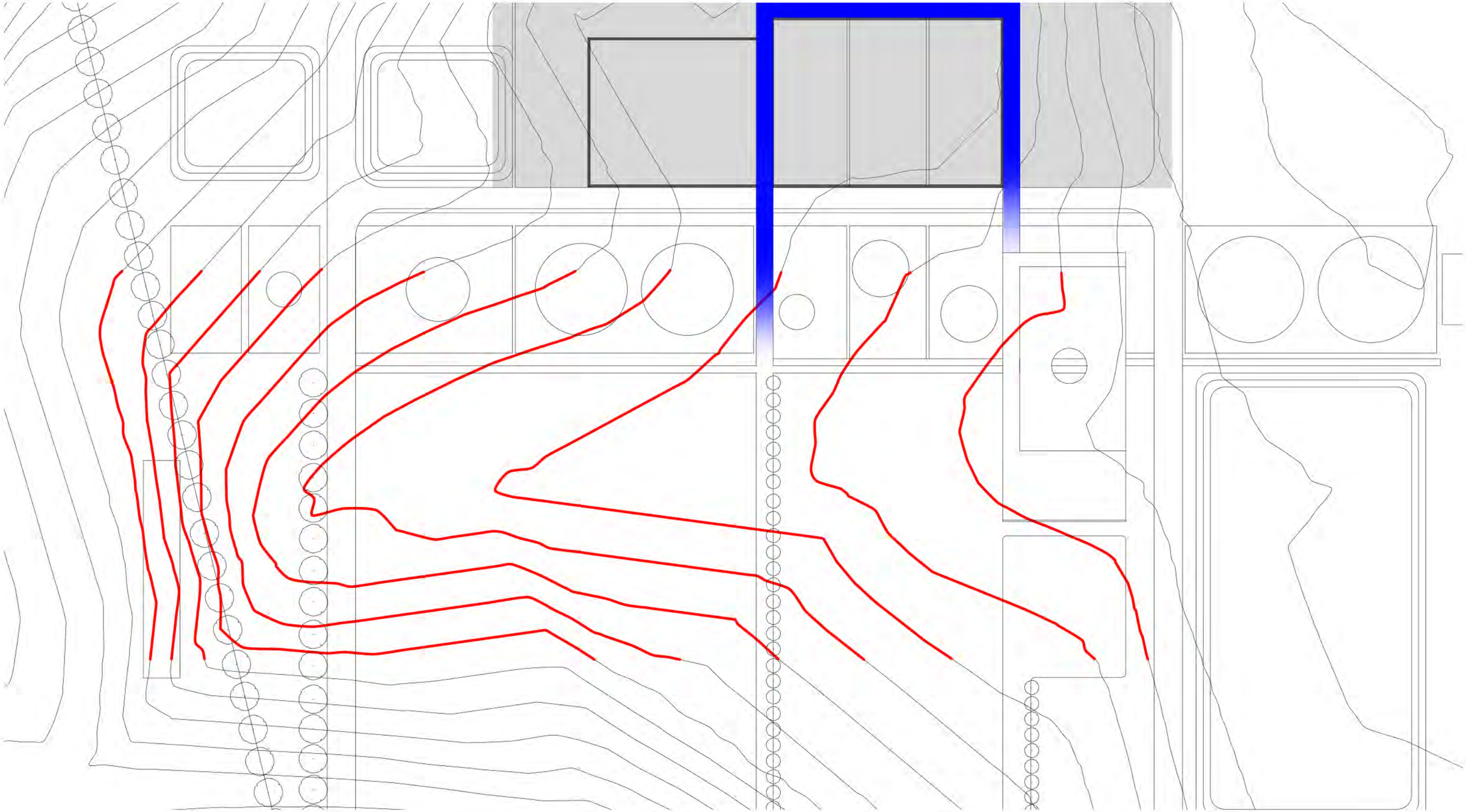
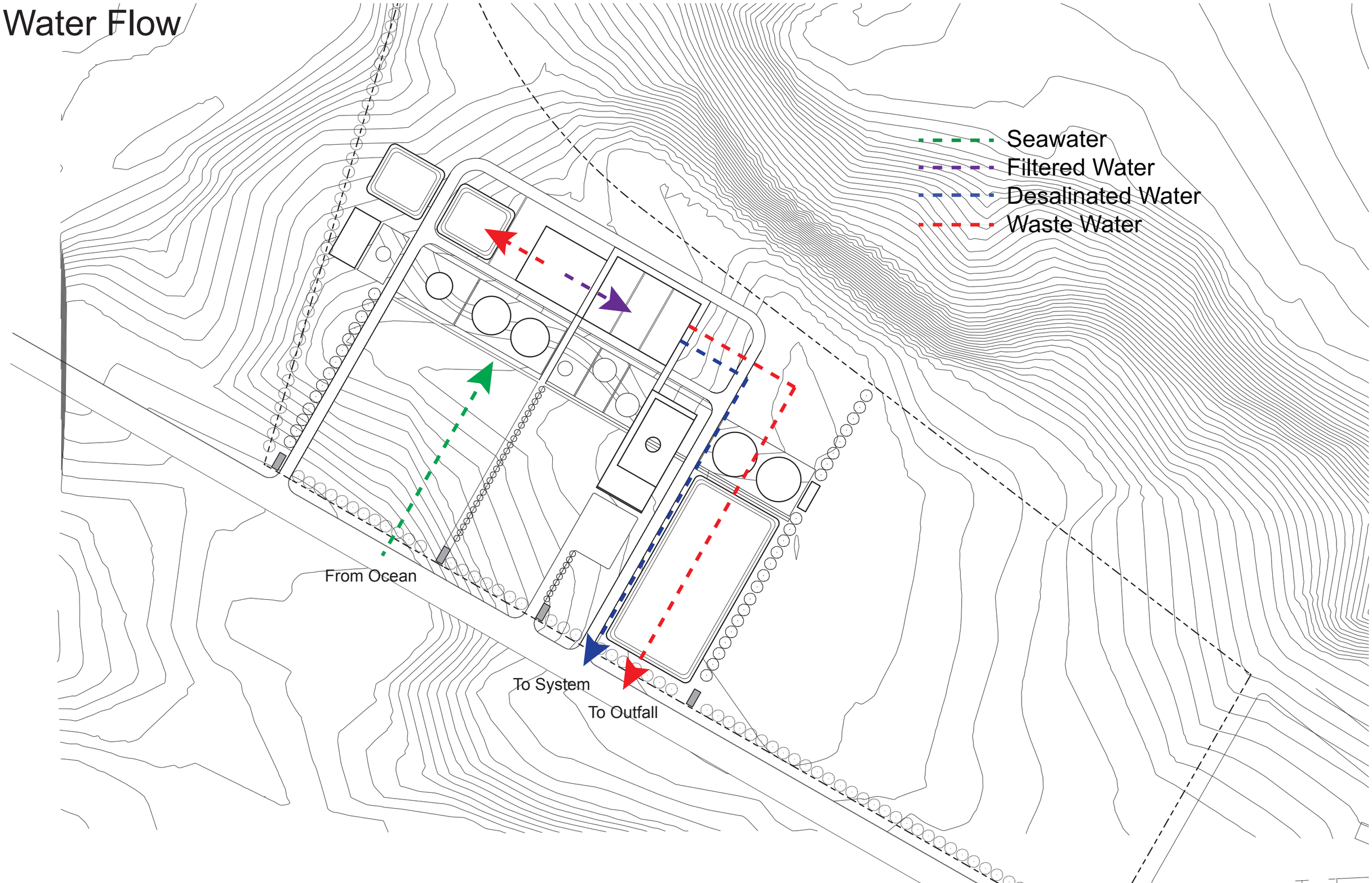
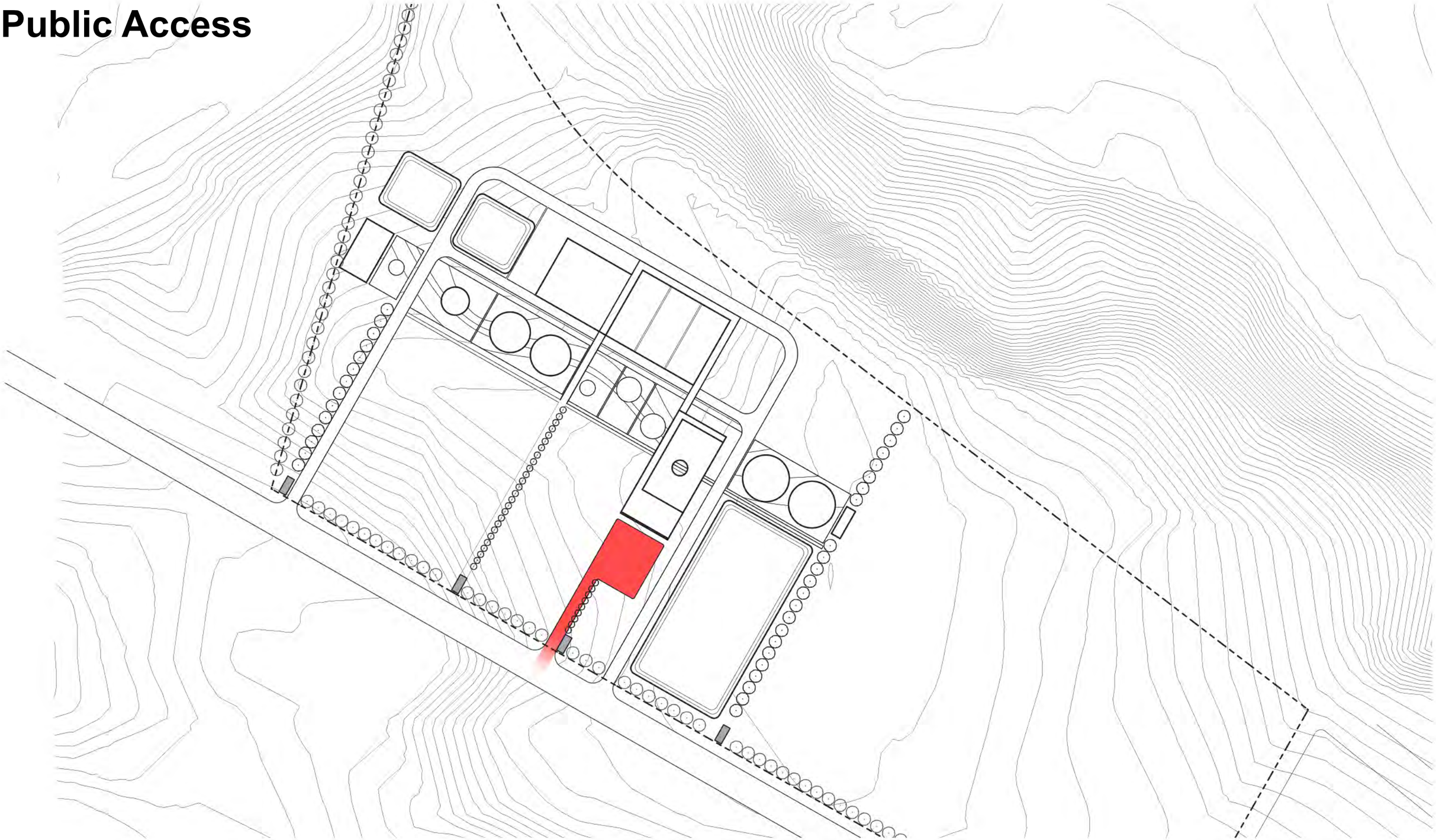


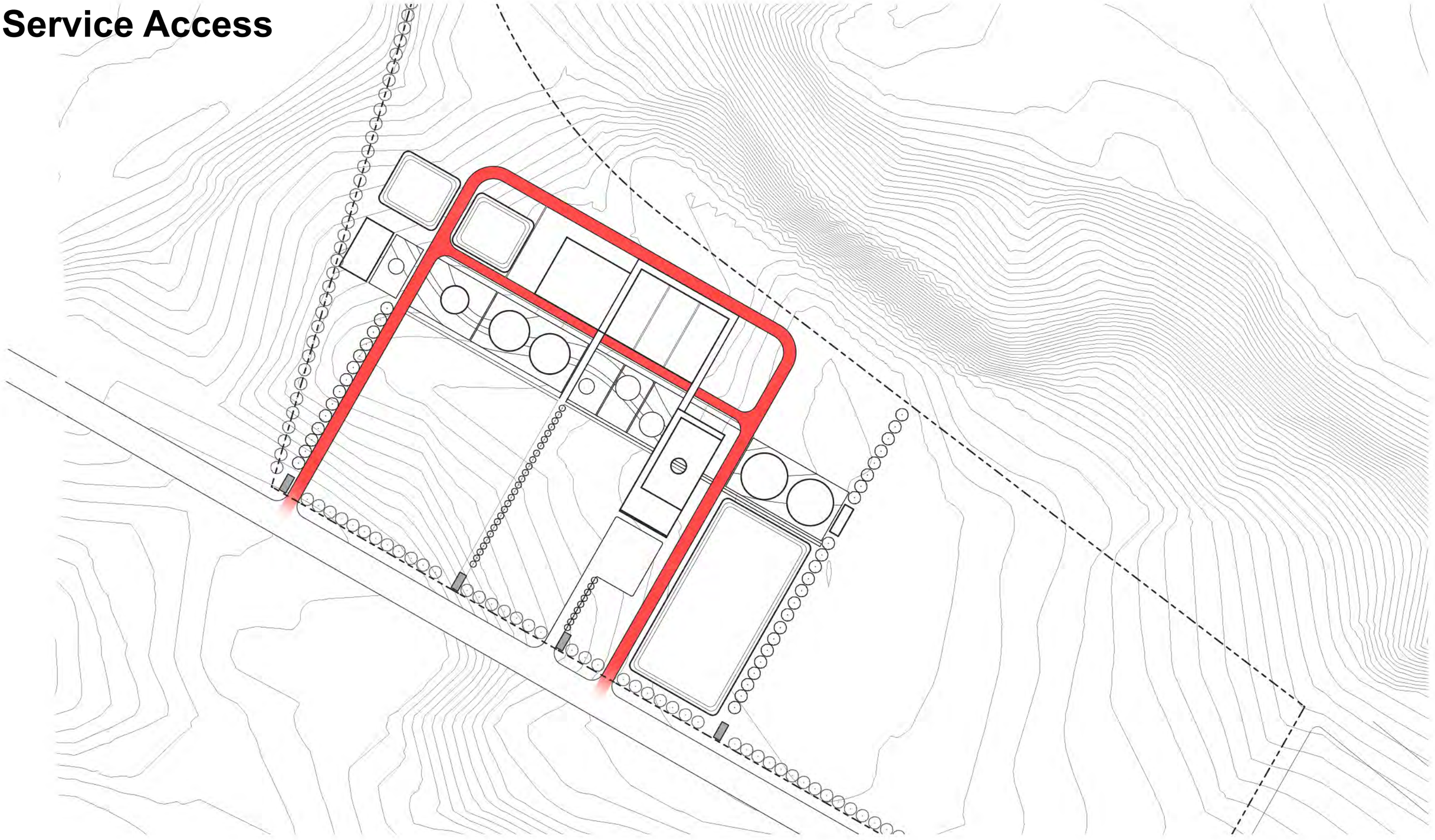
Water Flow


Seawater
Filtered Water
Desalinated Water
Waste Water
From Ocean
To System
To Outfall

Public Access



Service Access



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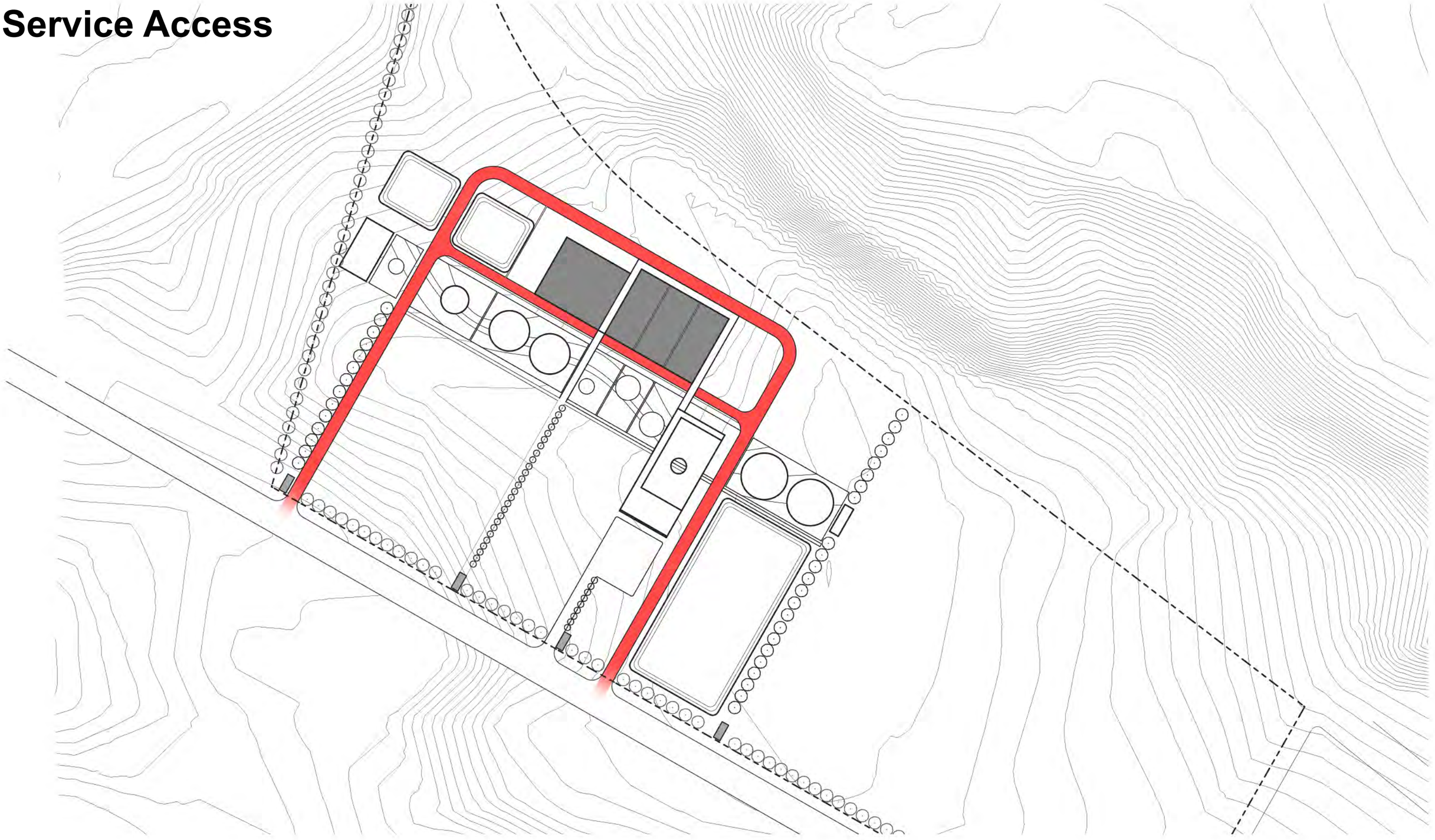
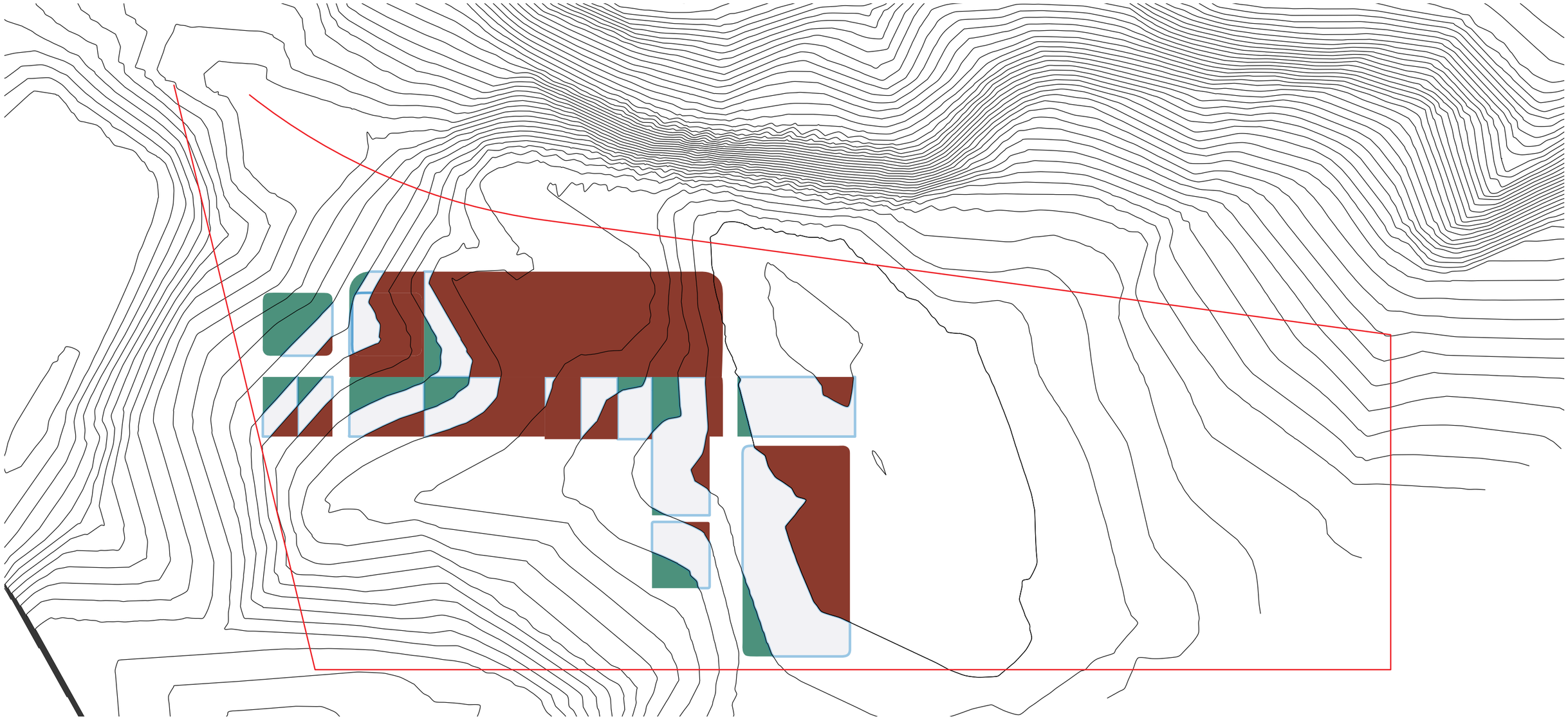


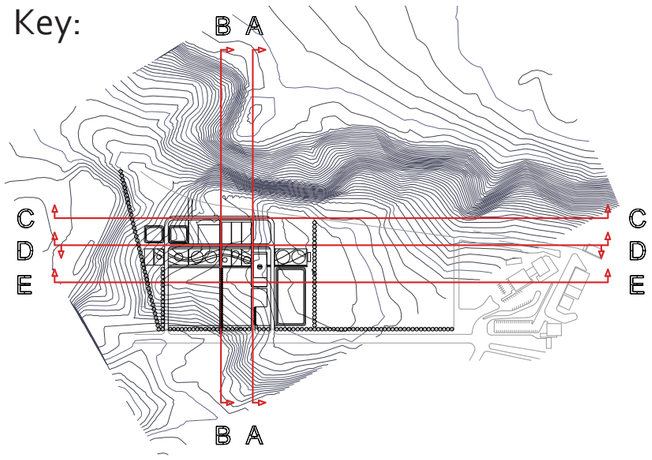
Disturbed Soil - Cut and Fill

Cut and Fill Plan:



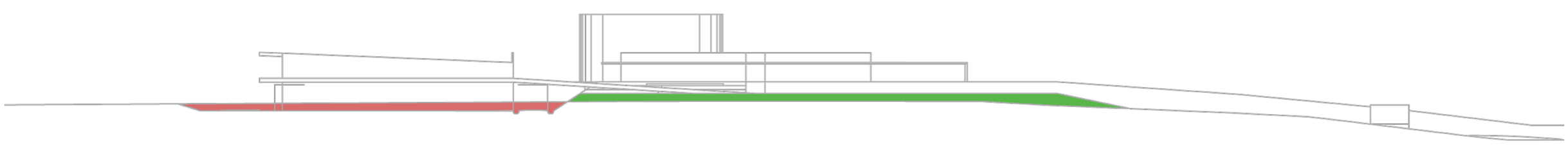
Disturbed Soil - Cut and Fill

Key:



Section A (East)

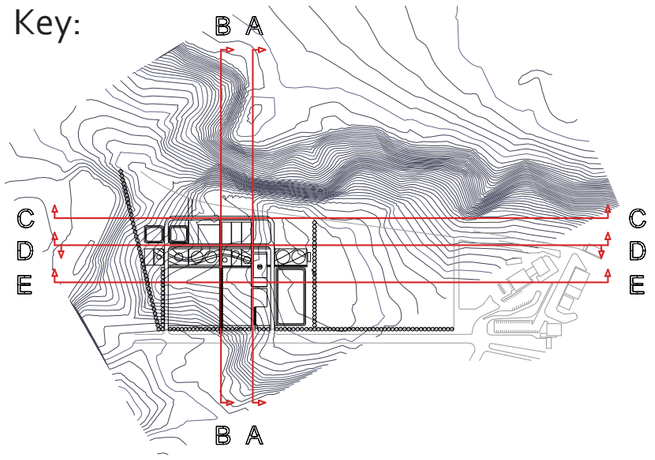
Section B (East)



Section D (North)

Sections

Key:



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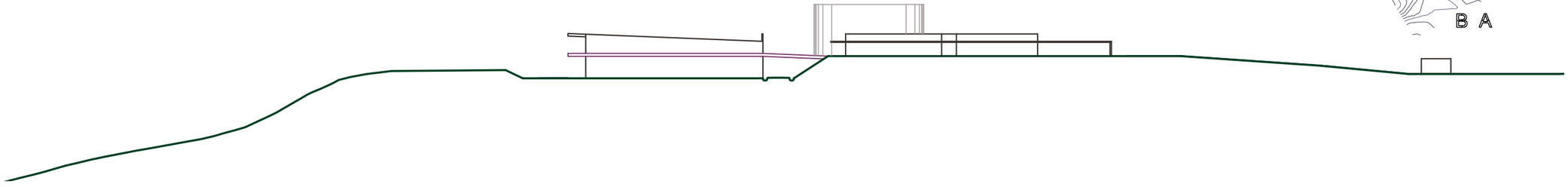

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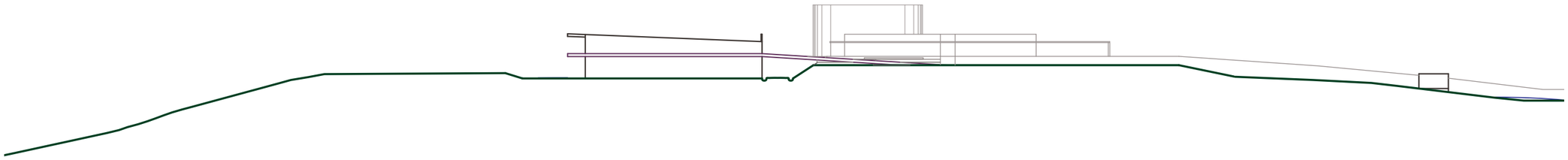
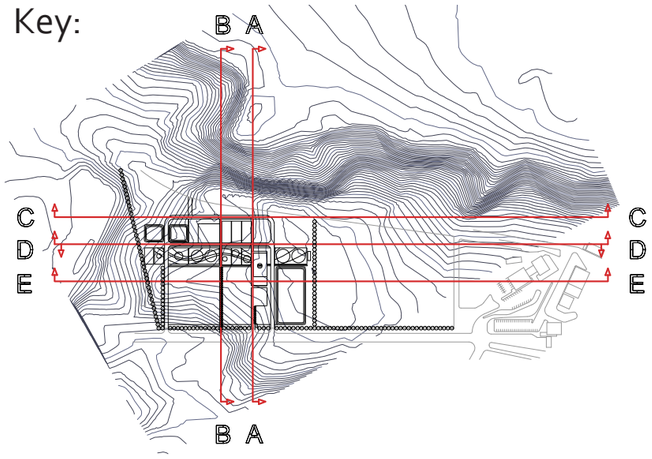


Section C (North)

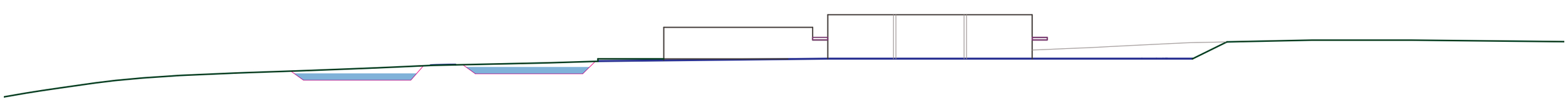
Sections

Key:

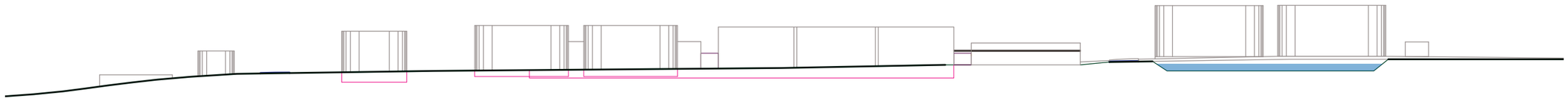


Section D (South)

Section D (North)



Section E (North)



Sections

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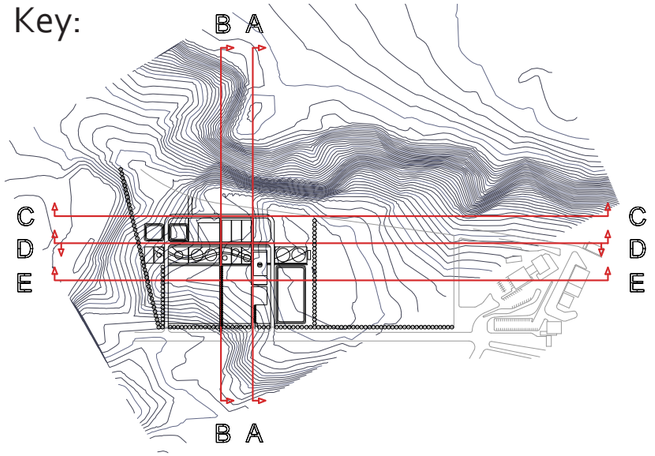
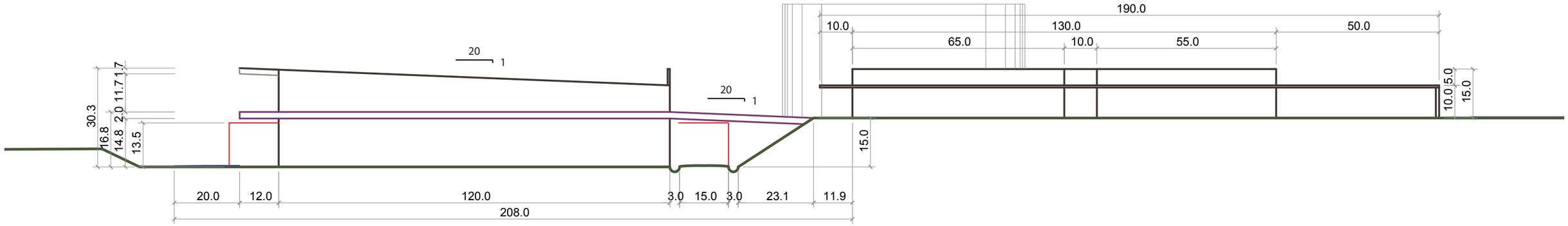
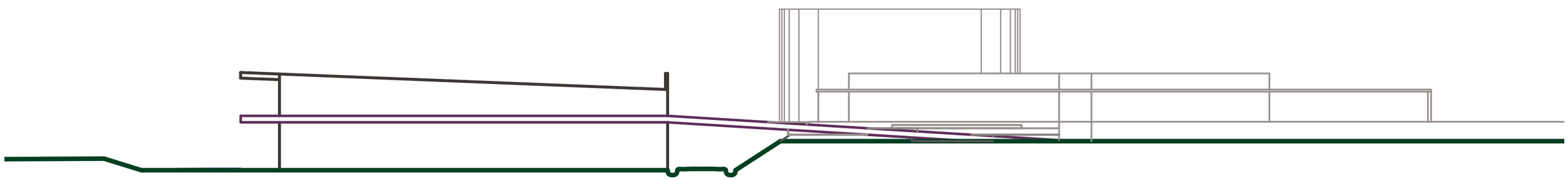
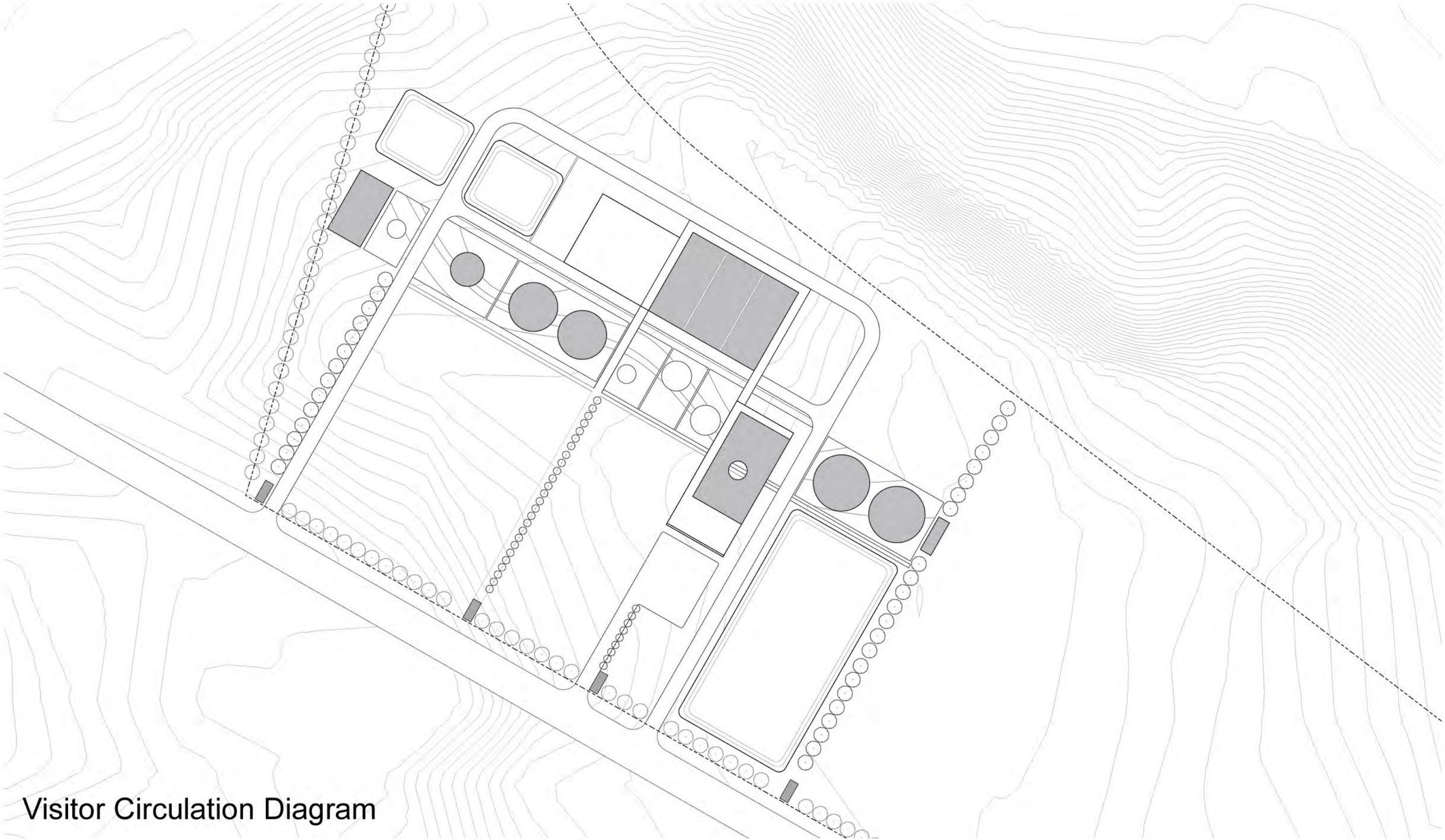


Section A (East) with Dimensions

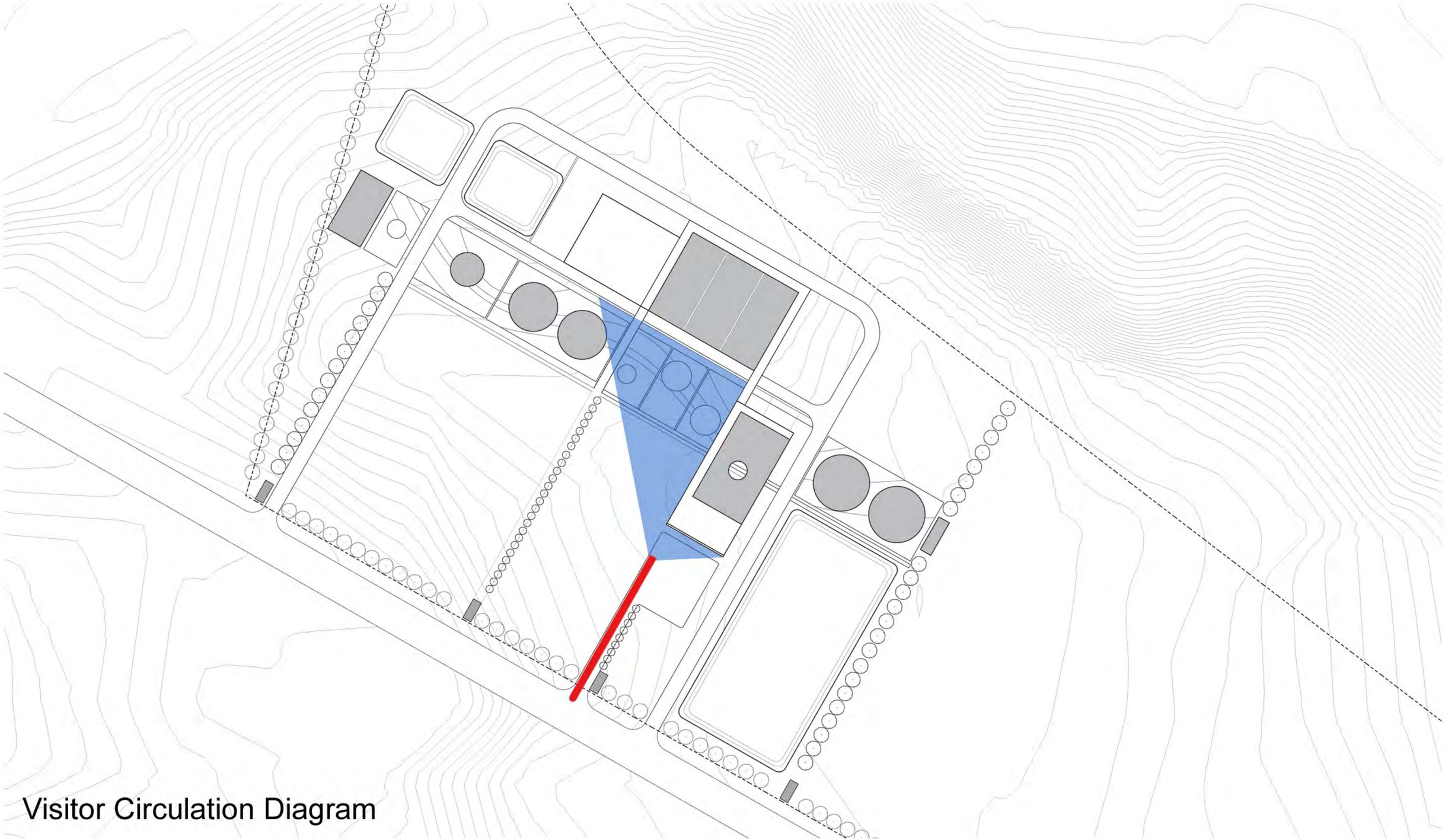


Section D (North)

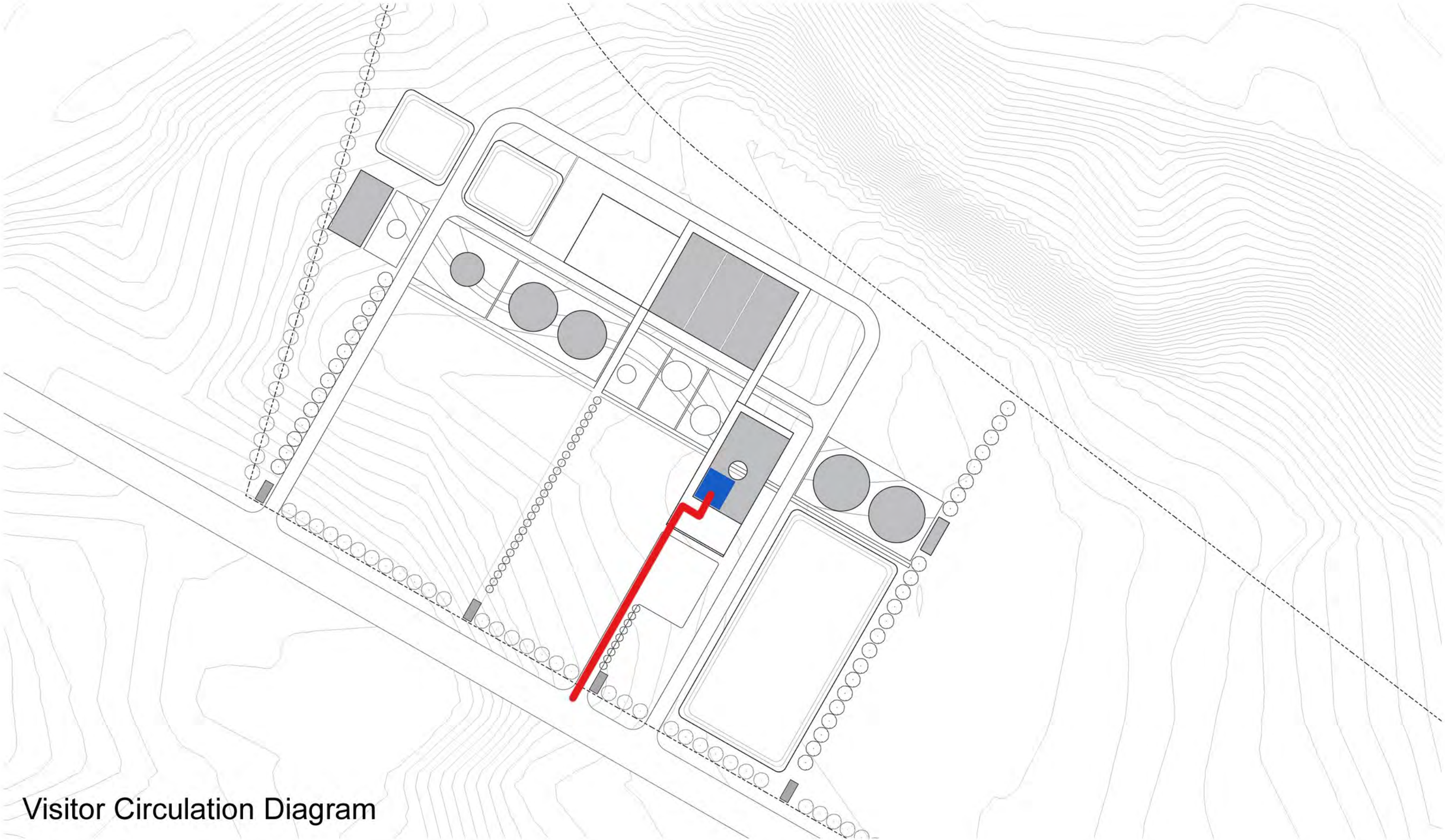




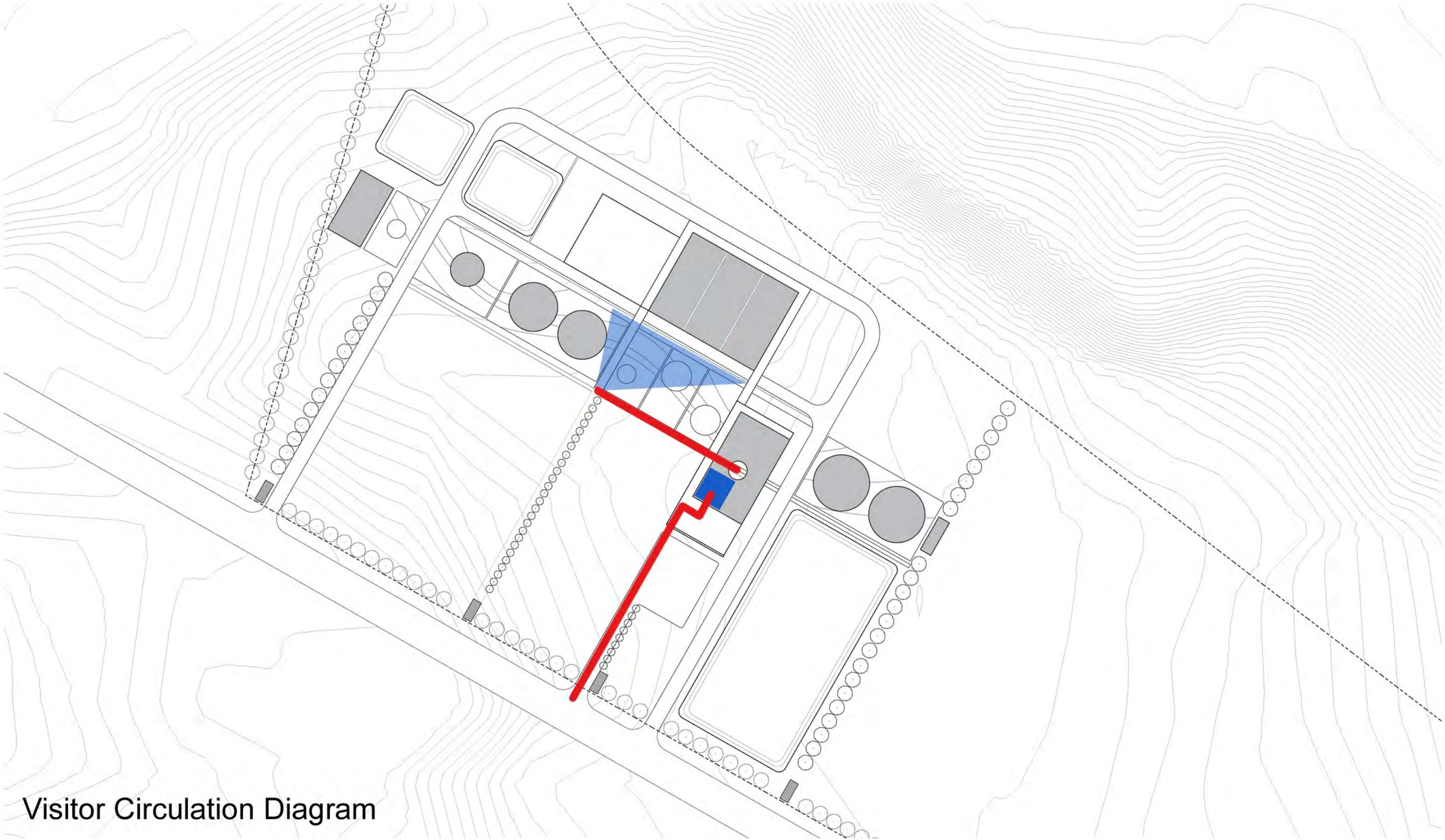
Visitor Circulation Diagram



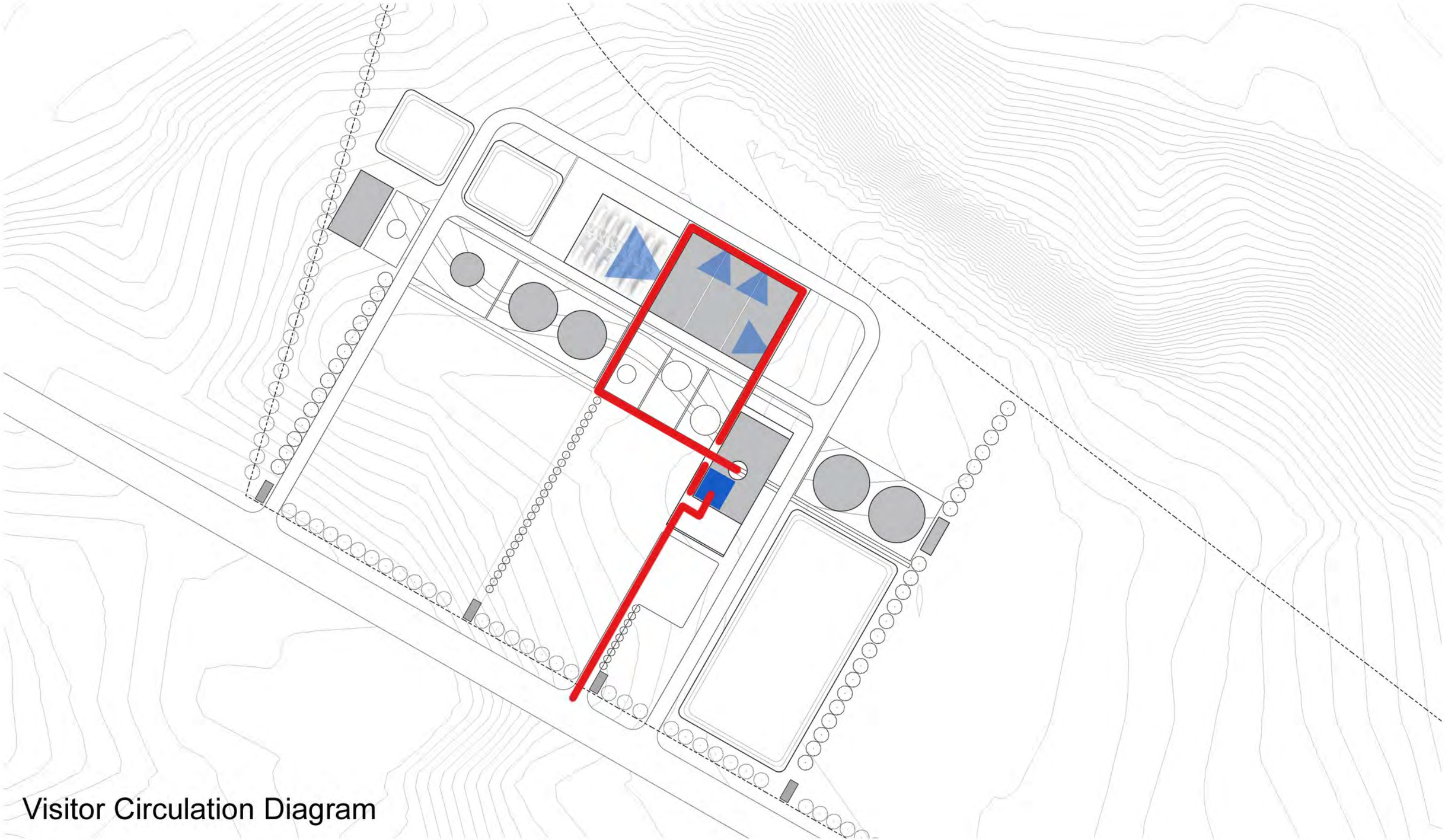
Visitor Circulation Diagram



Visitor Circulation Diagram



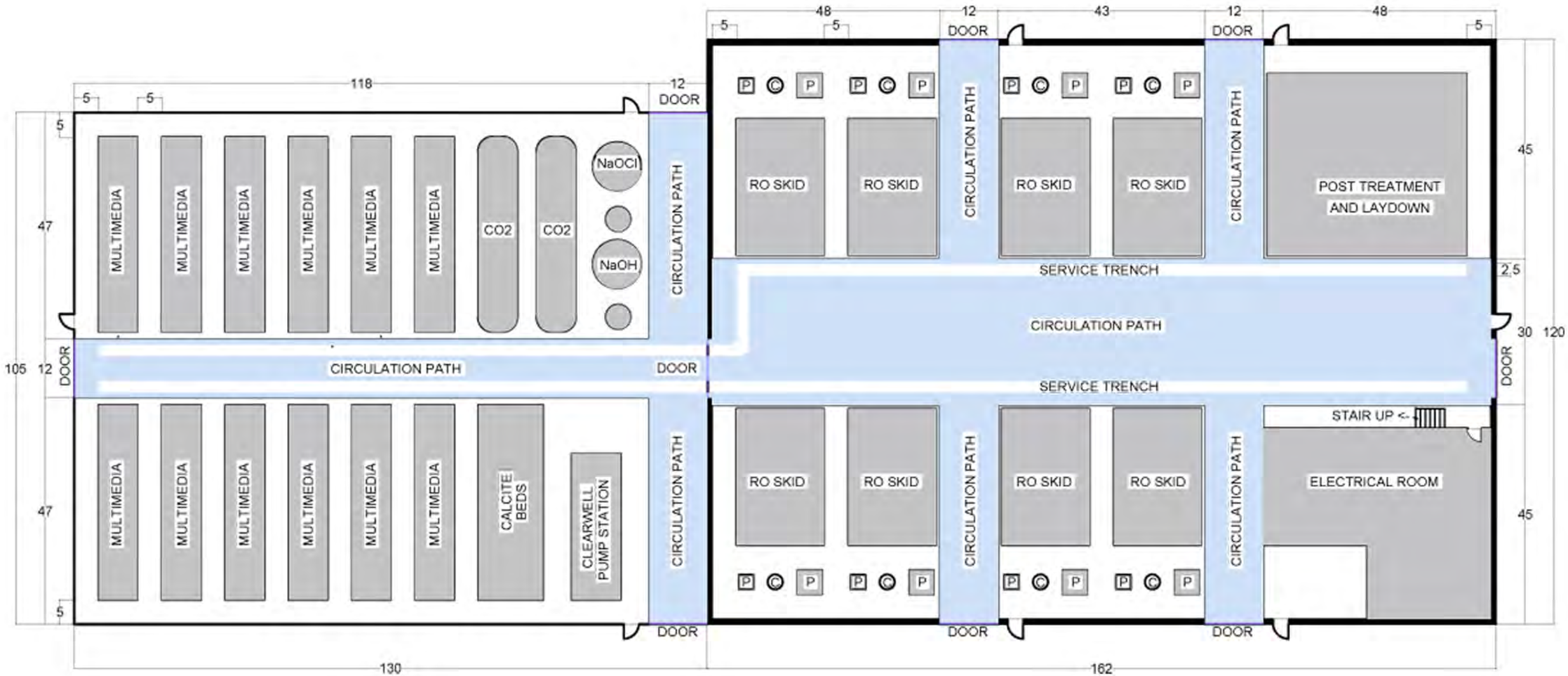
Visitor Circulation Diagram



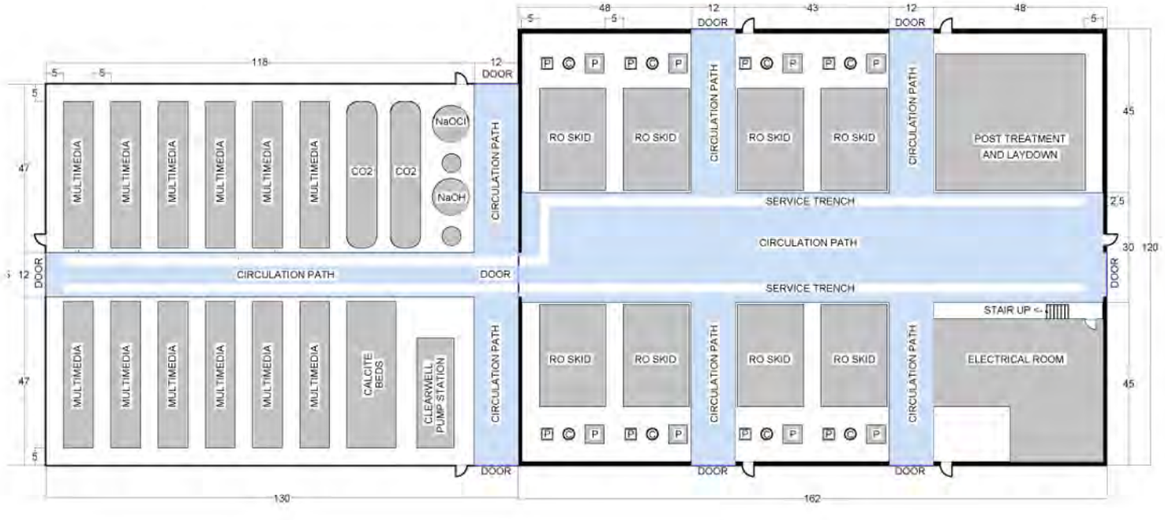
Visitor Circulation Diagram

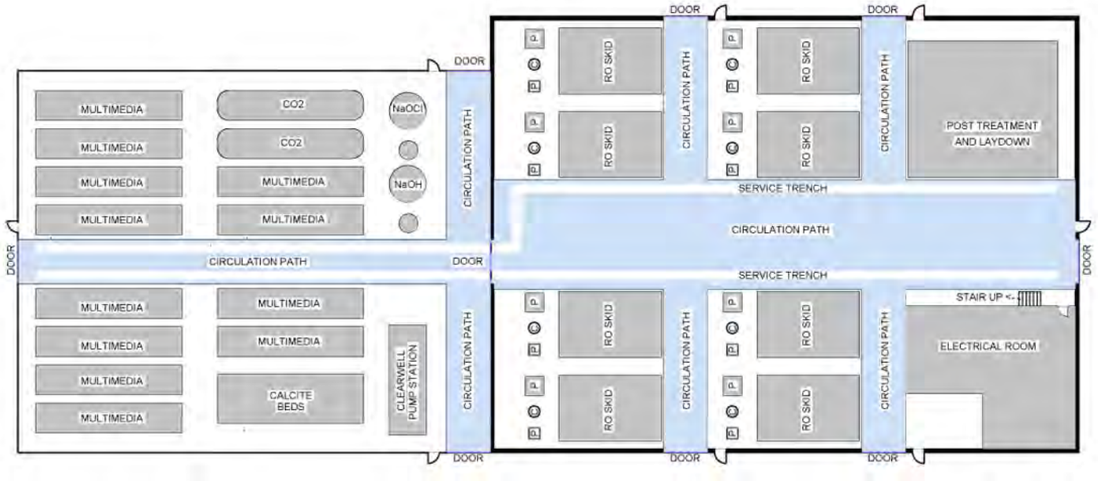

MPWSP
Desalinization
Plant

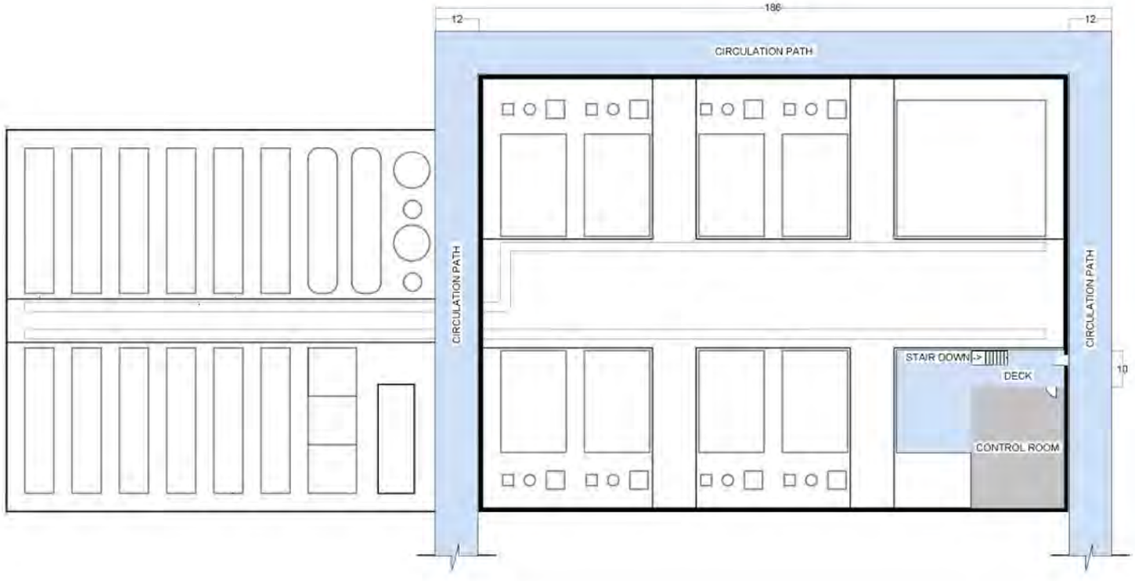
RO & Multi-Media Building Layout Part 1 of 2



RO & Multi-Media Building Layout Part 2 of 2



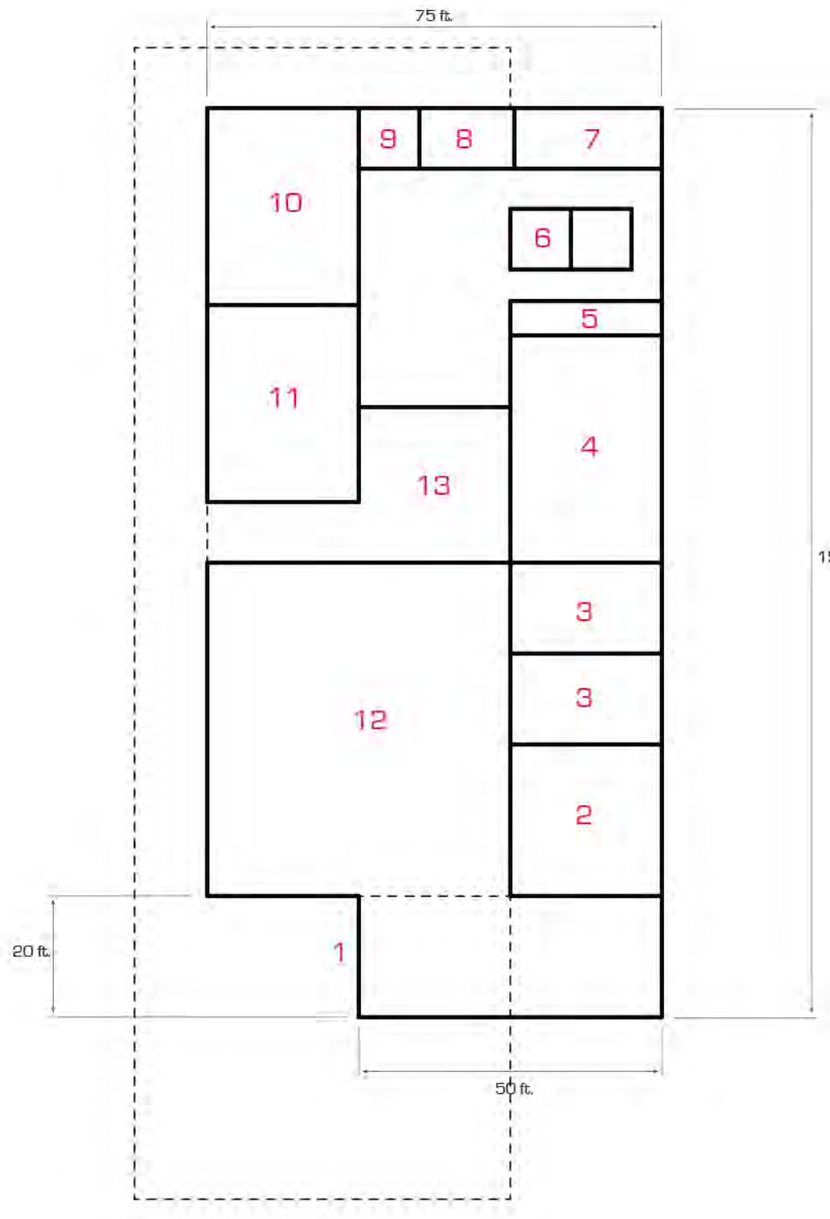


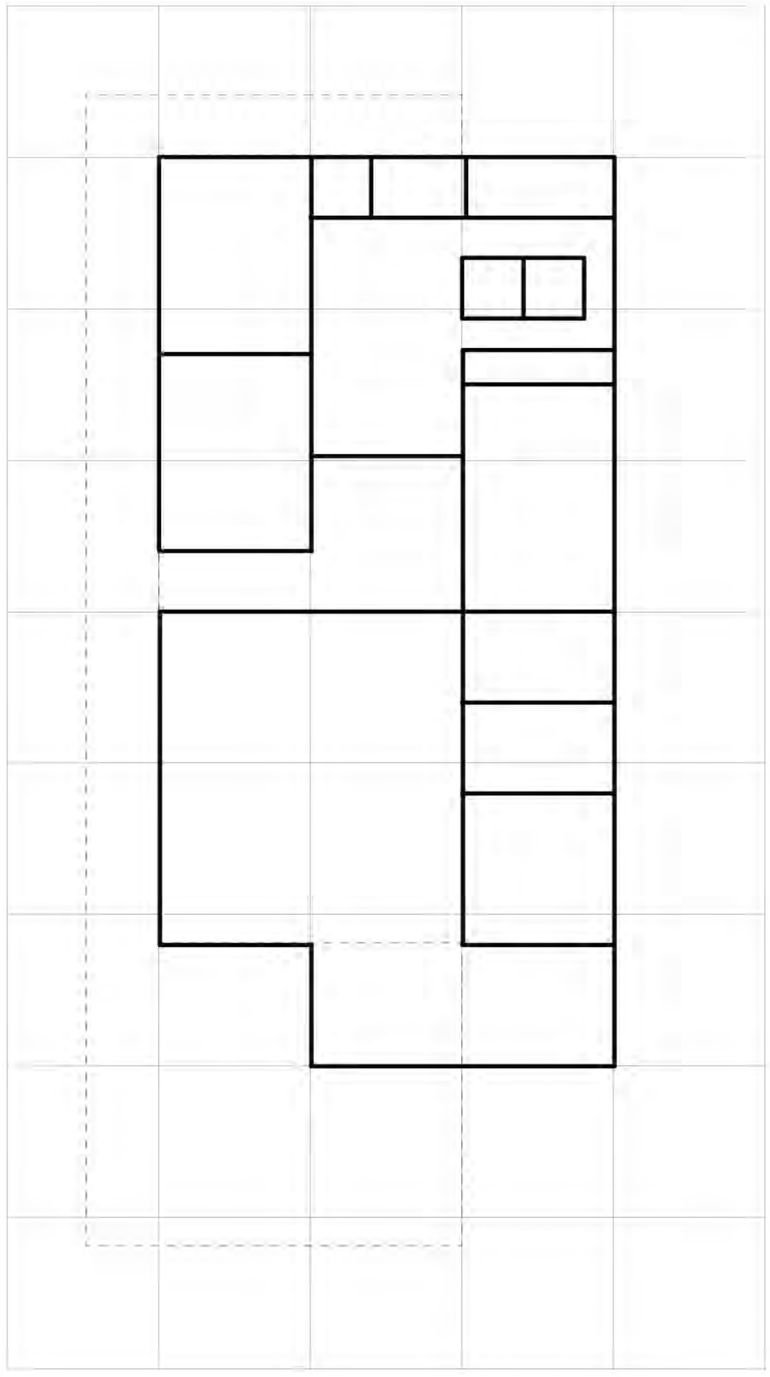


Administration Building

1. Main Entrance
2. Visitor Reception
3. Restrooms
4. Break Room
5. File and Map Room
6. Cubicles
7. **Plant Manager**
8. **Maintenance Supervisor**

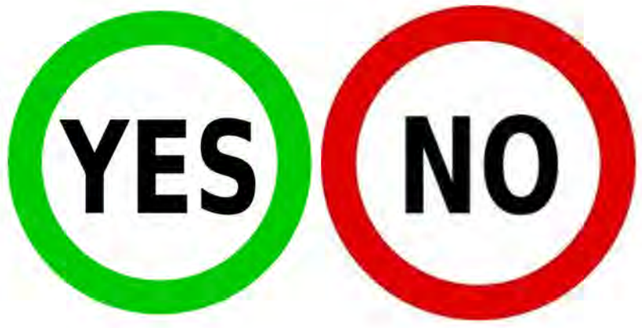
Scale: 1”= 100’





Landscape Strategies

* Preserve and protect as much existing vegetation as possible
* Grassland plants move to on the top of the roof-make a green roof
* Drought tolerant: Seasonal rainfall only
* Planting usually late fall, starting rainy season
helps to make strong root system, require less irrigation
* Landscaping for energy conservation



* Avoid conventional landscaping which are large lawns
* Non-native plants
* Abundant irrigation
* Heavy use of fertilizers and pesticides
* Removing all plant debris from the site

XERISCAPE

What's Xeriscape Landscape

- Defined as "quality landscaping that conserves water and protects the environment."

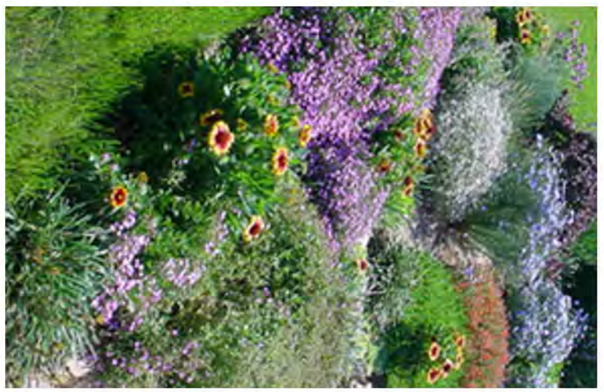
What's People misleading about Xeriscaping?

- It is not a bare earth ZERO-scape(Xeri means "Dry" in Greek), nor is it cactus and gravel rock garden

Benefit of Xeriscape

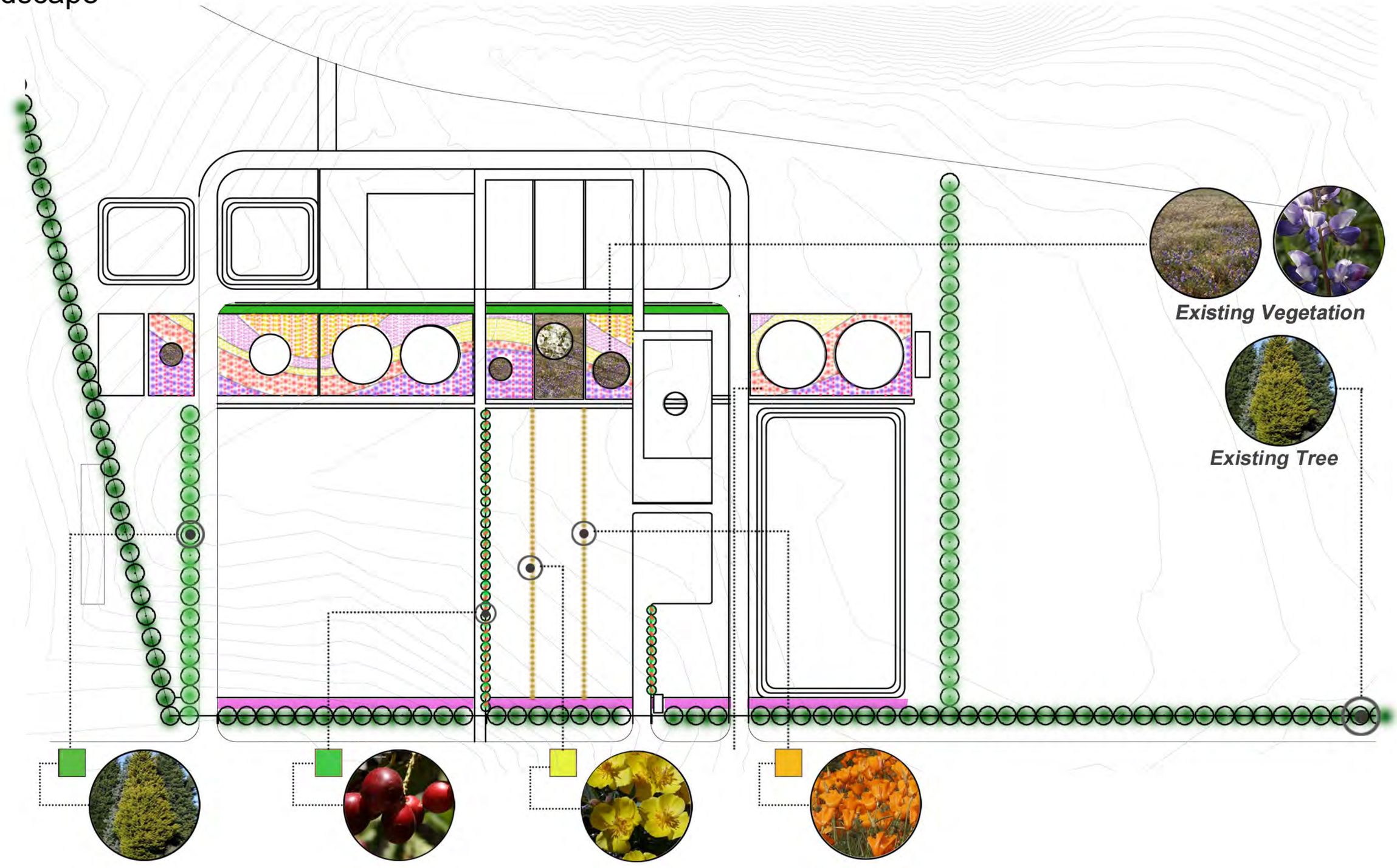
- Reduced water bill and water conservation
- Efficient and cost effective
- Provides wildlife habitat
- Reduces fossil fuel consumption and pollution
- Presents minimal pest and disease problems
- Thrives with little fertilization
- Requires low pruning and maintenance
- Saves valuable landfill space
- Improve property value
- Provides attractive year round landsapes
- Uses beautiful sustainable plants that are well adapted for the area
- It is appropriate for the local soil and climate

[The Seven Princlples of Xeriscape]

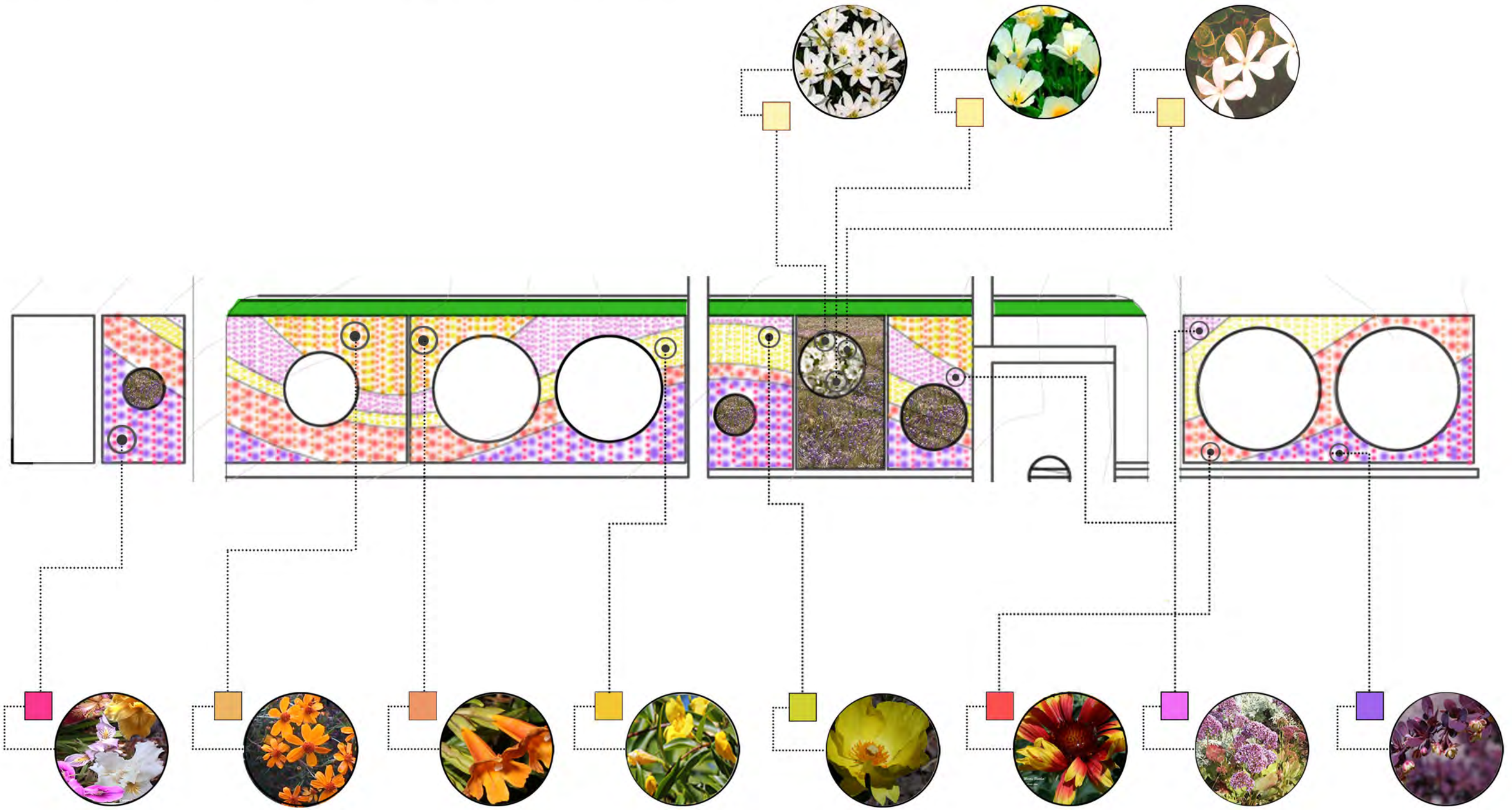


Landscape + Water Molecular

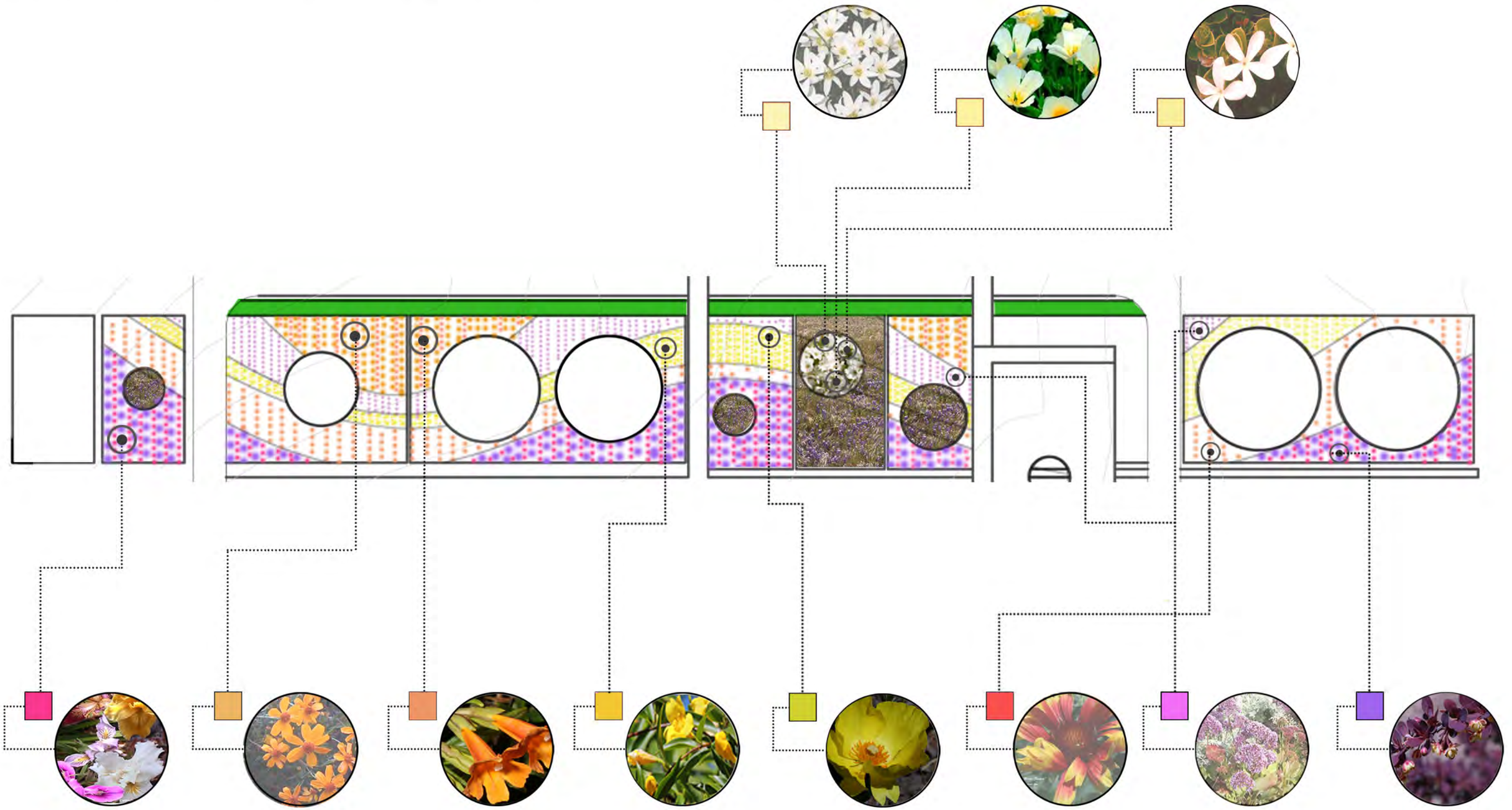
Landscape



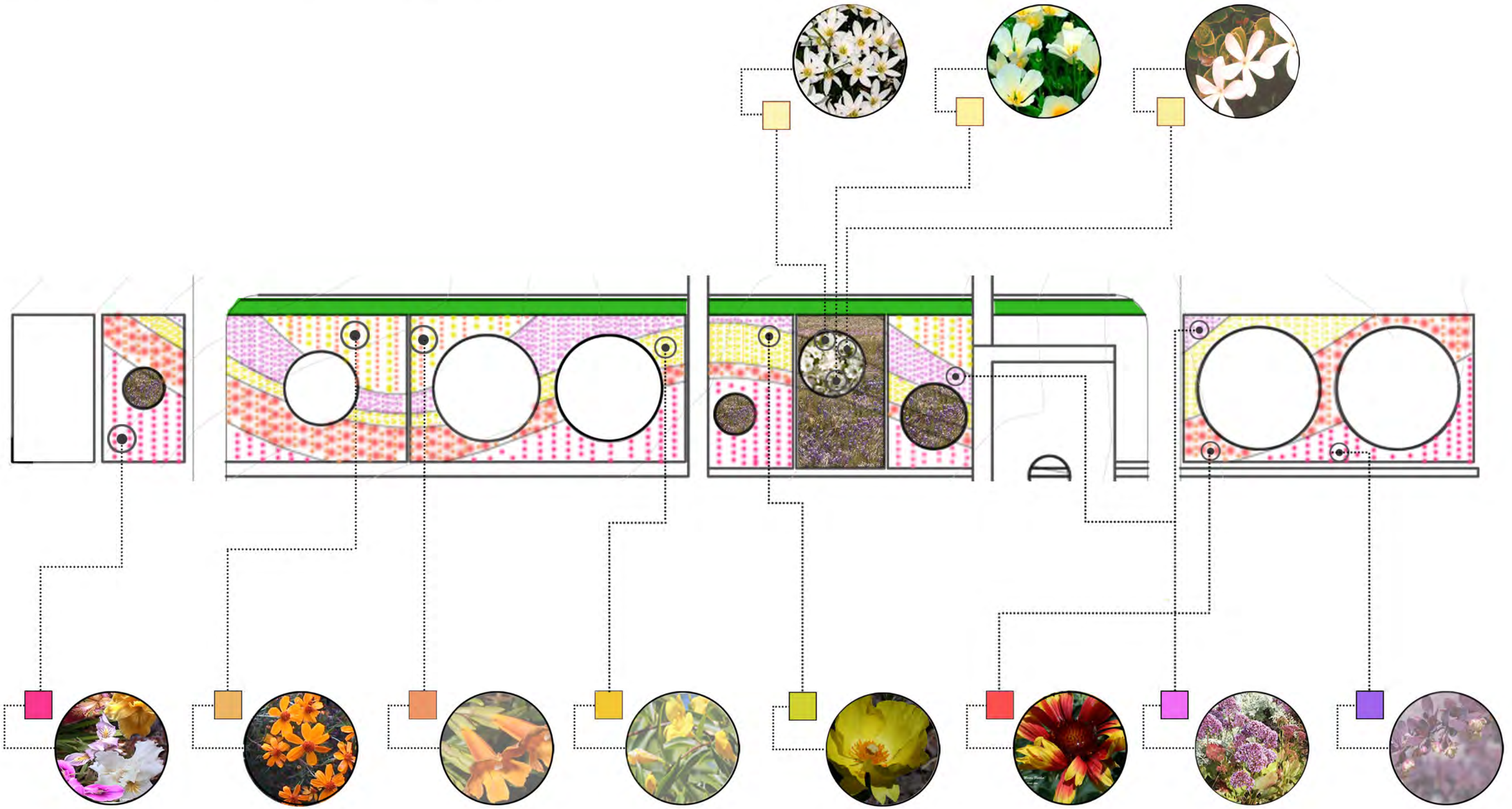
Landscape : Flowers blooming regardless of season



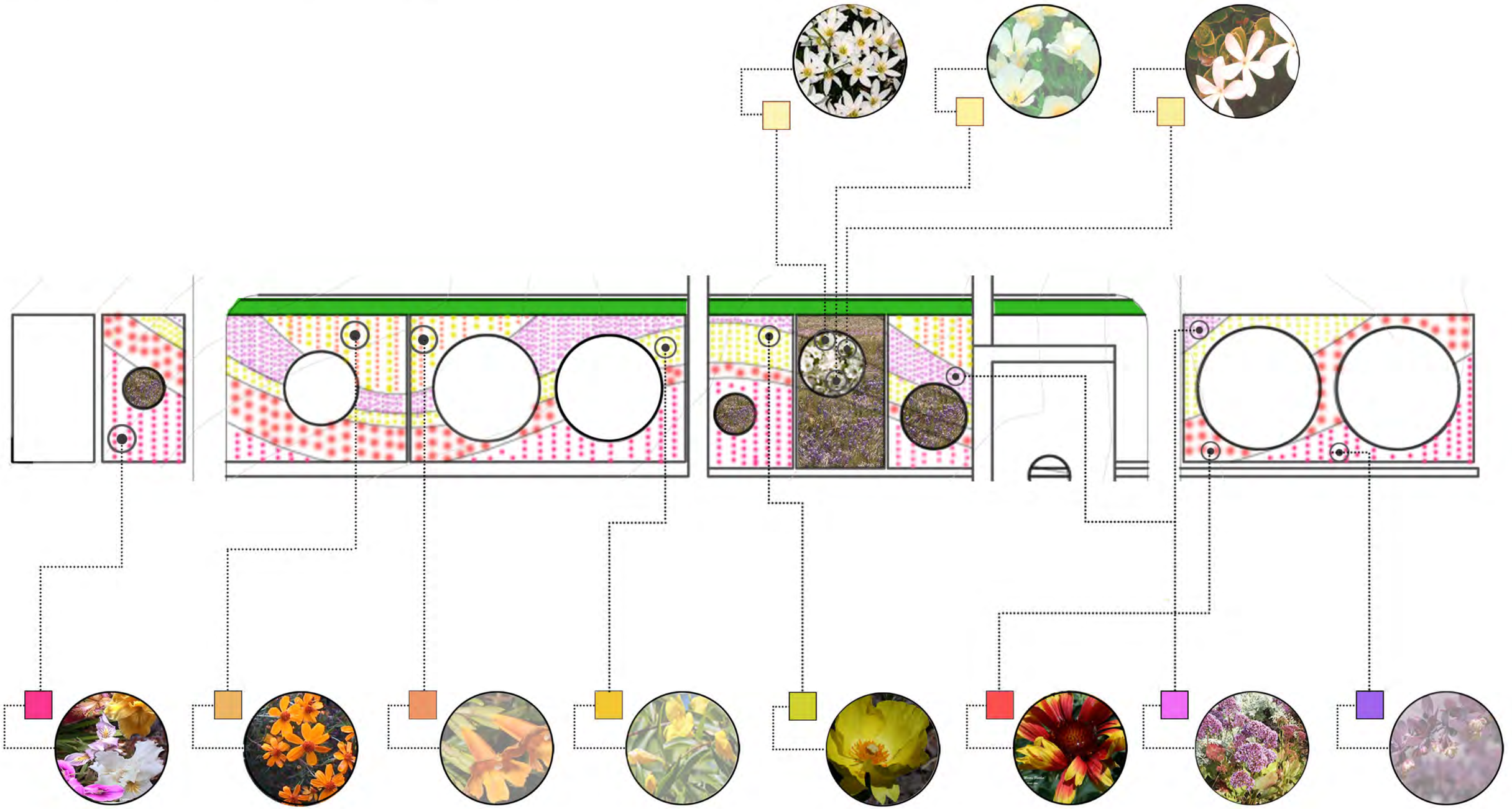
Landscape : Flowers blooming in Spring



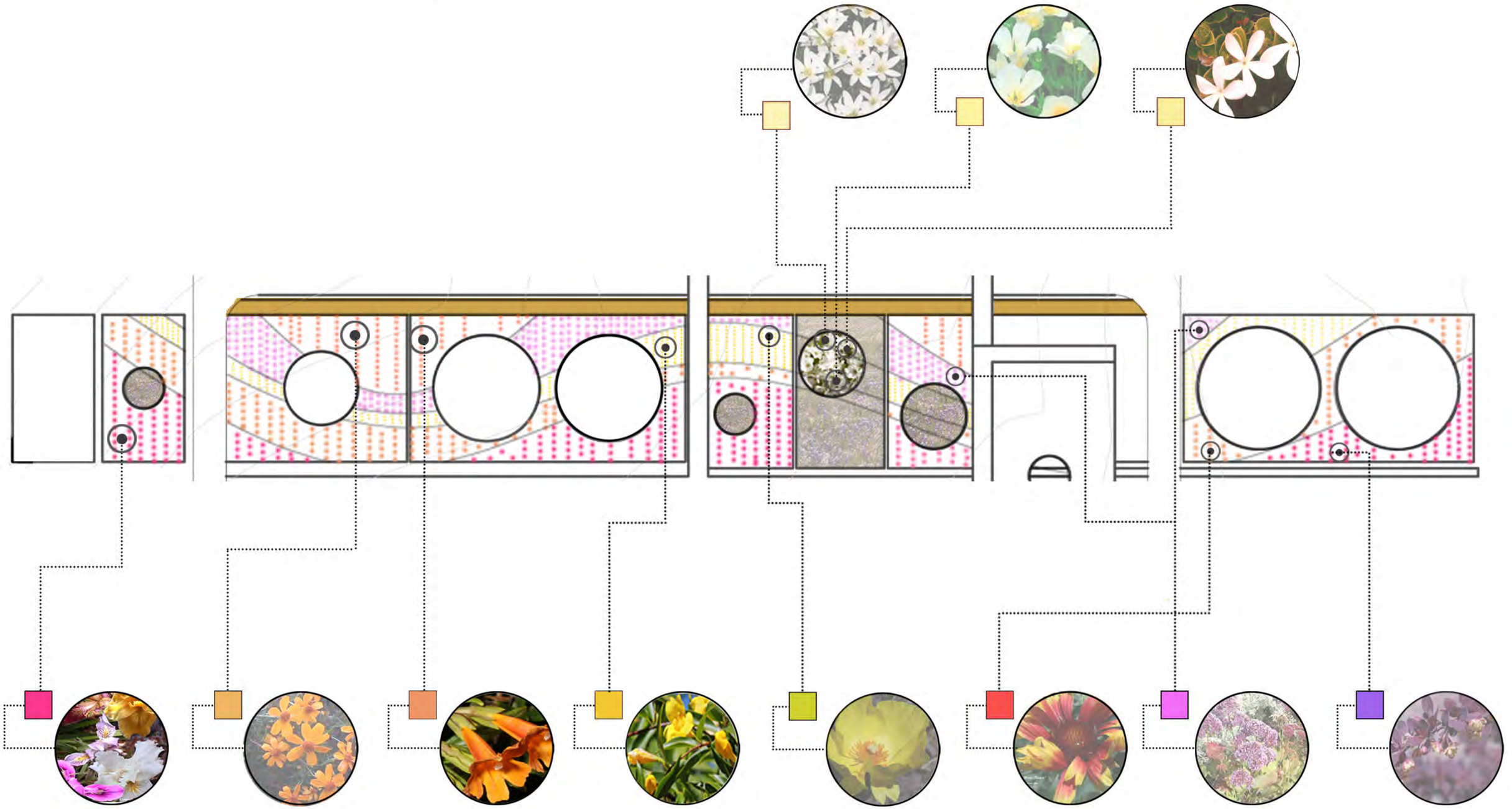
Landscape : Flowers blooming in Summer



Landscape : Flowers blooming in Fall

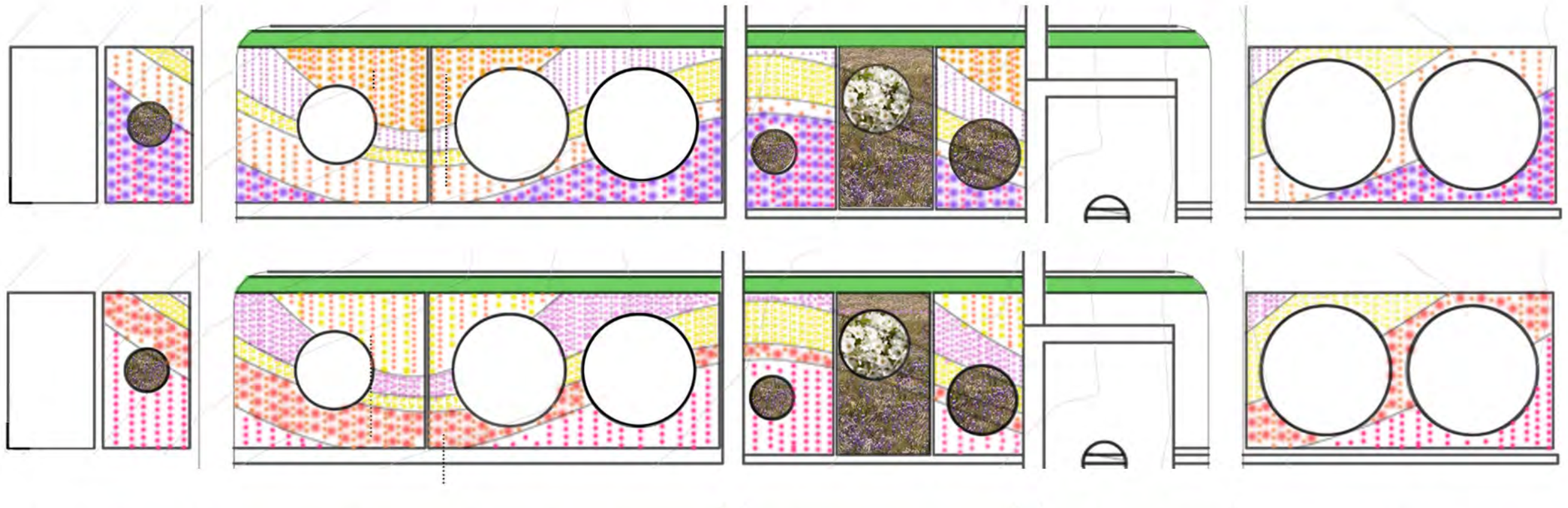


Landscape : Flowers blooming in Winter



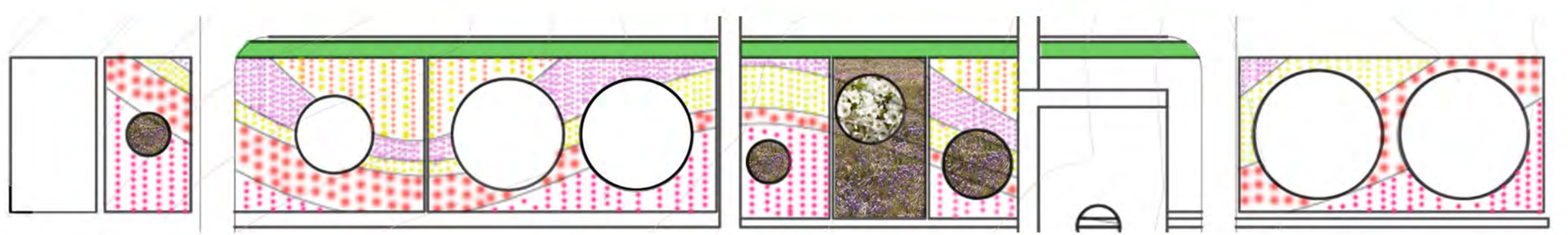
Landscape : Flowers blooming seasons

Spring

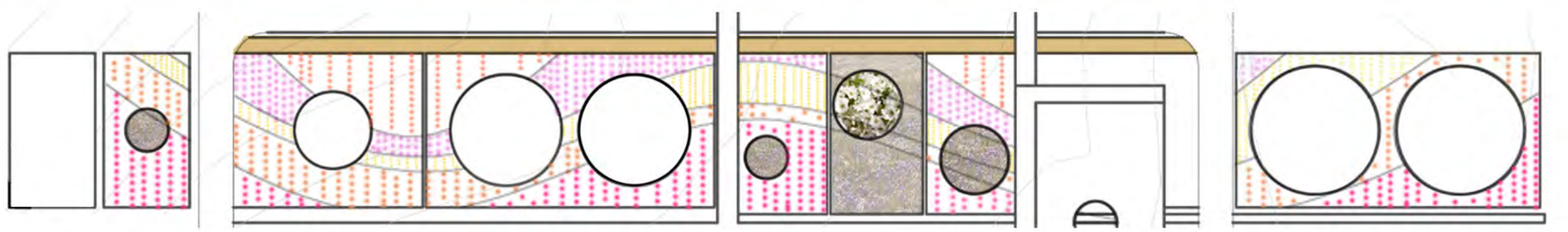


Summer

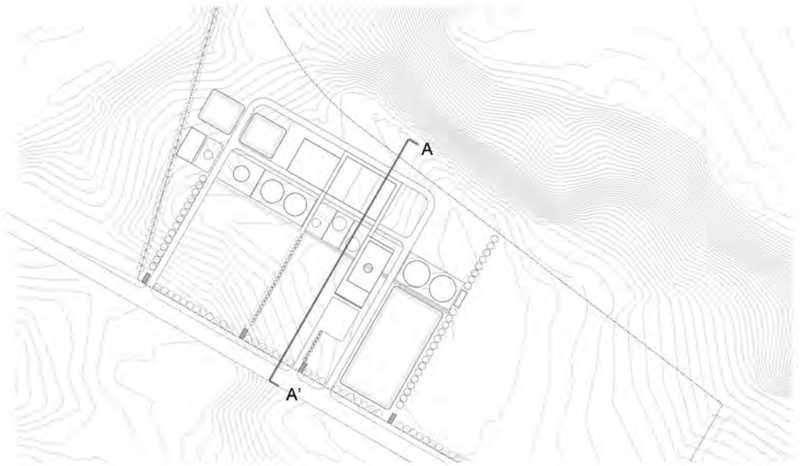
Fall



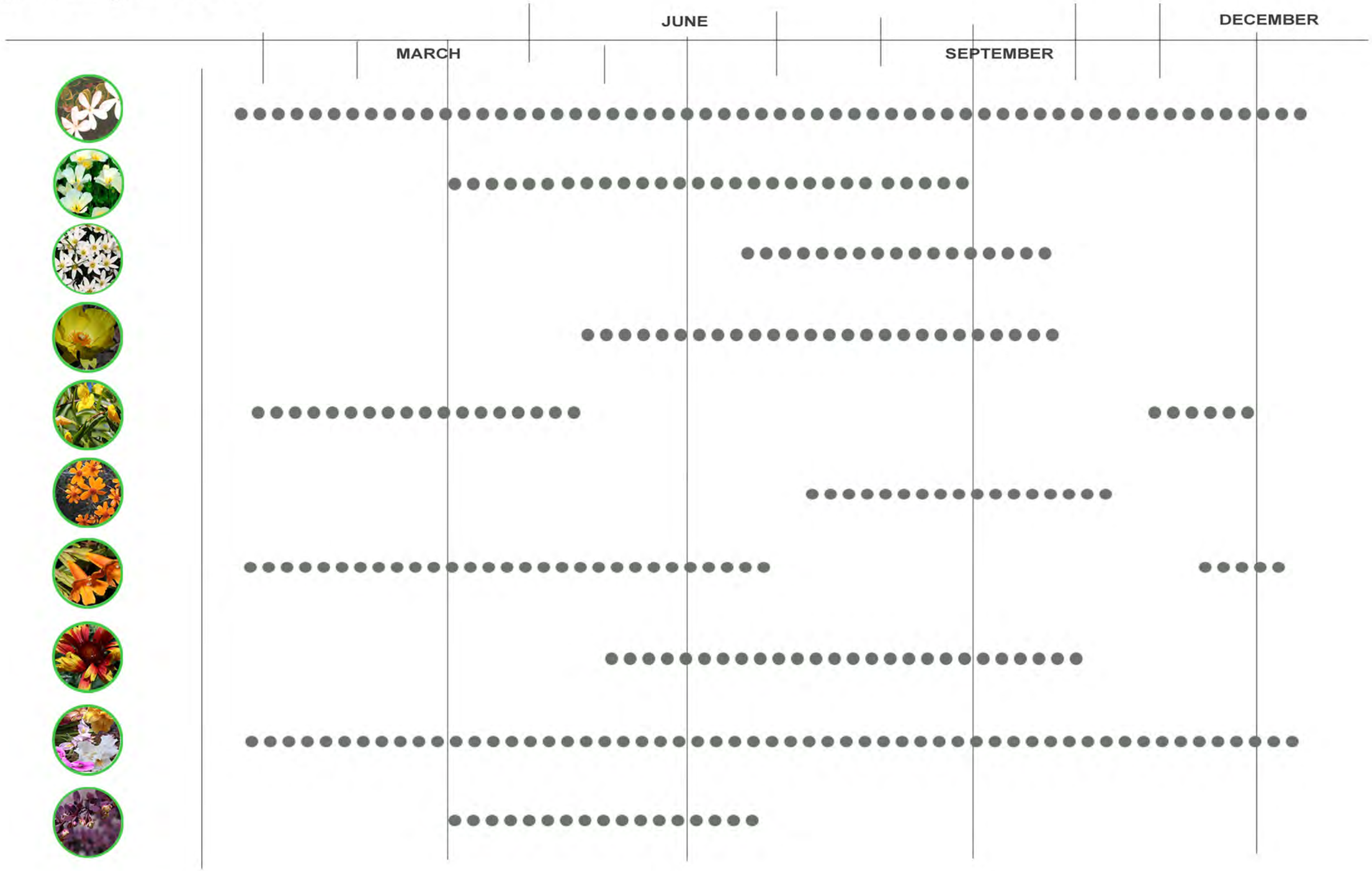
Winter



Landscape on Slopes



Flower blooming Seasons



XERISCAPE PLANTS LIST

Shade Evergreen trees

Ornamental Perennials

Food

Drought Resistant

Eschscholzia cal. W.Linen
White Linen Cal. Poppy
Height : 2-4'
Blooming : March-Sept.

Asteriscus maritimus
Sea Daisy, Sea Aster
Height : 1-3'
Blooming : Year round

Gaillardia X grandiflora
Blanketflower
Height : 6"-4"
Blooming : May-Oct.

Limonium perezii
Sea Lavender
Height : 18"-24"
Blooming : Jul.- Oct.

Lavatera assurgentiflora
Island Mallow
Height : up to 8'
Blooming : year round

Iris Hybrids
Bearded iris
Height : 2-4'
Blooming : Year round

Mimulus flemingii
Island Monkey Flower
Height : 1-4'
Blooming : Dec.-Jul.

Berberis thunbergii
Red Japanese Barberry
Height : 6' / 5' wide
Blooming : Mid Spring

Zephyranthes candida
Fairy Lily
Height : 1'
Blooming : Summer-Fall

Tagetes lemmonii
Bush Marigold
Height : 4'
Blooming : Mid Summer -Late Fall

Prunus ilicifolia
Catalina Cherry
Height : 30' / 10' wide
Blooming : Spring (White Flower)

Feijoa sellowiana
Pineapple Guava
Height : 10-20'

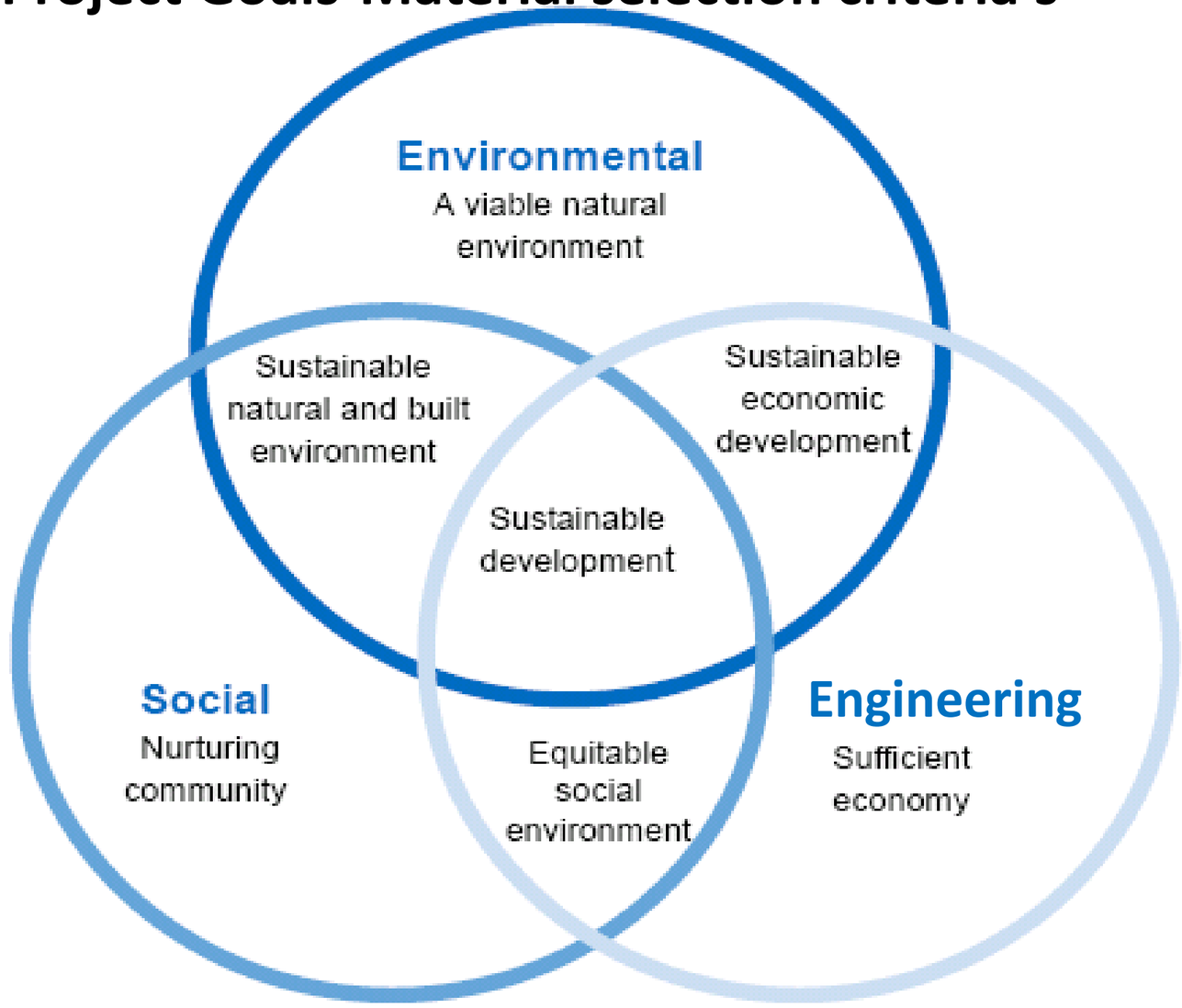
Gelsemium sempervirens
Carolina Jessamine
Height :
Blooming : Late winter - Spring

Hunnemannia fumariifolia
Mexican Tulip Poppy
Height : 2'
Blooming : Spring-Mid. Fall

Carissa macrocarpa
Natal Plum
Height : 2' / 3'wide
Blooming : Year around

Begonia 'Irene Nuss'
Angel Wings Begonia
Height : 4'

Project Goals-Material selection criteria's



Sustainable development is maintaining a delicate balance between the human need to improve, preserving natural resources while optimizing the cost efficiency.

Project Goals-Material selection criteria's

ENGINEERING

Resource efficiency
Cost efficiency
Functionality+Aesthetics

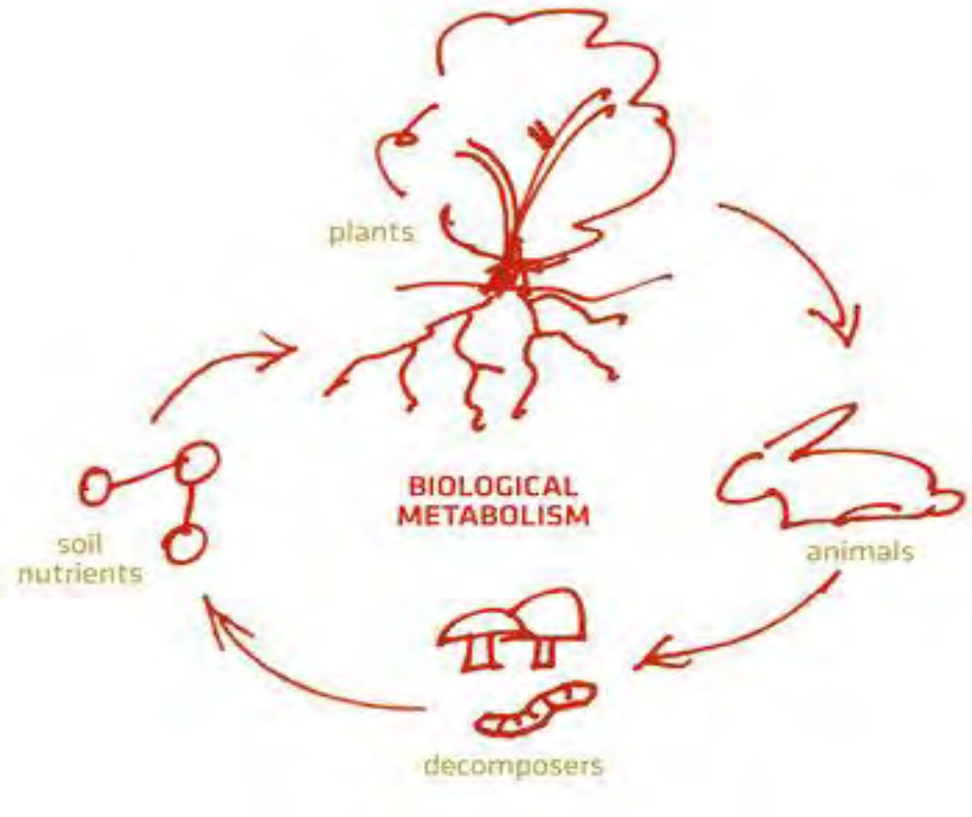
SUSTAINABILITY

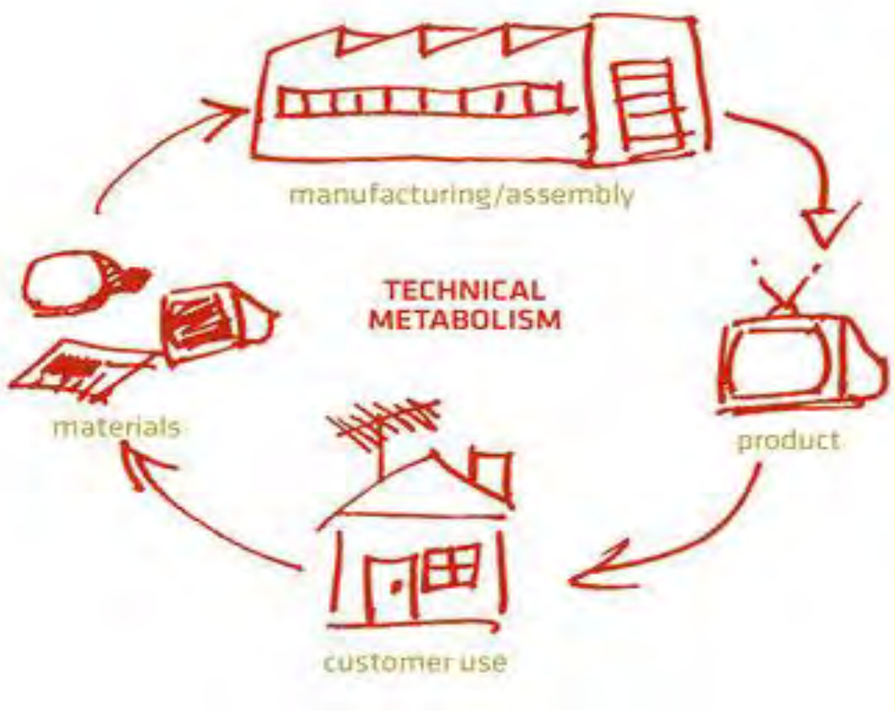
Min Environmental impact
Energy efficiency
Xeriscaping
Net zero admin building
LEED like design
Hybrid/Electric vehicles
Photovoltaic system
Recycling program

COMMUNITY

Education
Volunteer opportunities

Materials and Building systems





Cradle to cradle is an innovative sustainable industrial model that focuses on design of products and a production cycle that strives to produce no waste or pollutants at all stages of the material's lifecycle.

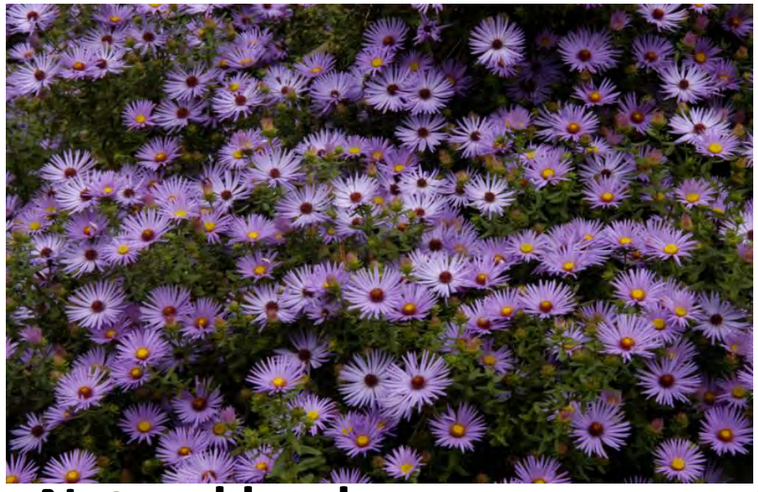
Selection criteria's

- **Cost effective**
- **Locally available**
- **Minimum environmental impact**
- **Reduced maintenance/replacement costs over the life of the building**
- **Energy conservation-Resulting in minimum operation cost**
- **Improved occupant health and productivity**

Materials

Fit the color palette

Fly ash content concrete



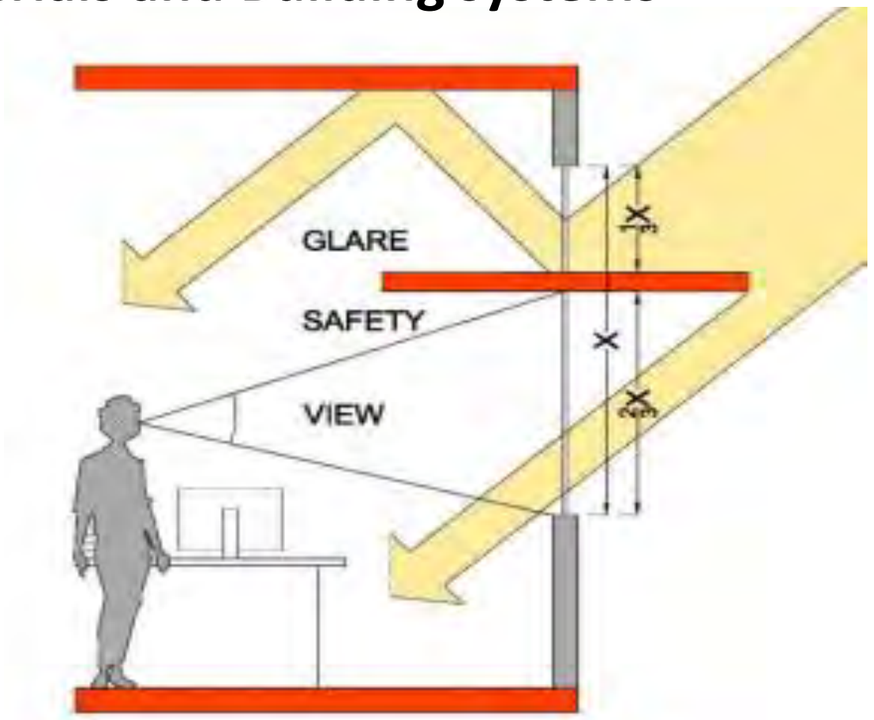
Natural landscape

Permeable paving

Reclaimed wood

Gravel

Materials and Building systems



Shading devices and Innovative **light shelves on south-facing windows** reflect natural light deep into interior spaces while at the same time shading lower windows from direct sun, reducing cooling loads and glare.

the use of incandescent and fluorescent lighting can be reduced or completely eliminated, depending on the space.

LEED-Materials and resources

Selecting sustainable materials
Reducing waste at its Source

Practicing waste reduction
Reusing and Recycling

Credit	Title		
Prerequisite	Storage and collection of recyclables	Required	
1	Building reuse	N/A	
2	Construction waste management		2
3	Materials reuse		2
4	Recycled content		2
5	Regional materials		2
6	Rapidly renewable materials		1
7	Certified wood		1
Total		10	

Plastic Laminate Wall Panels

*A blend of wood-based fibers containing
up to 70% of recycled craft paper and thermosetting resins

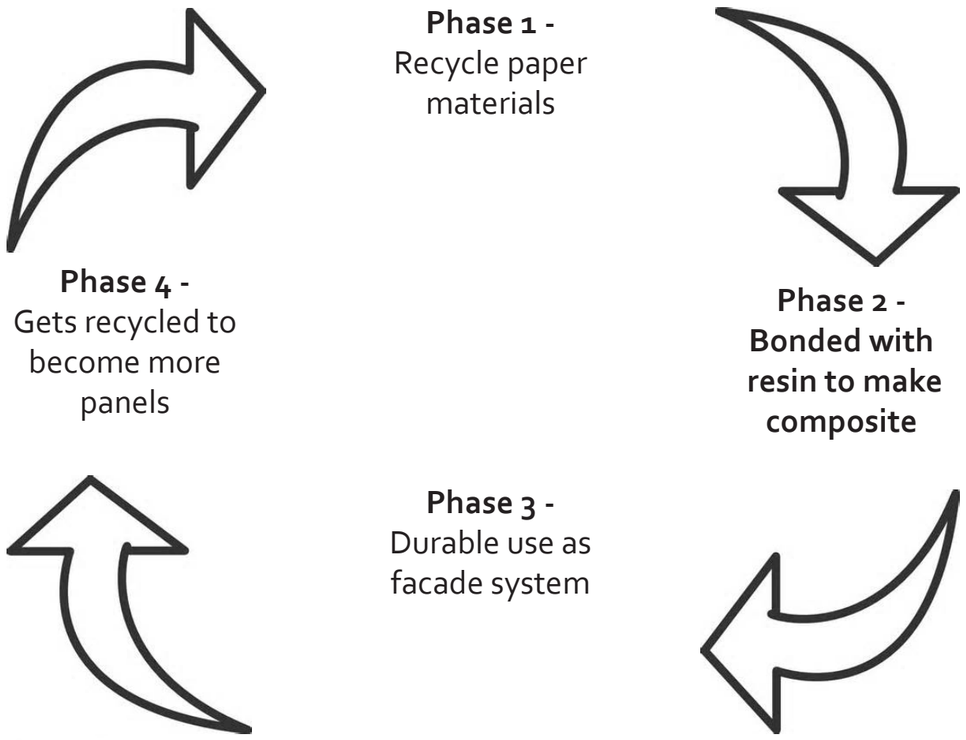
*Solid and sturdy

*Weather resistant and color stable

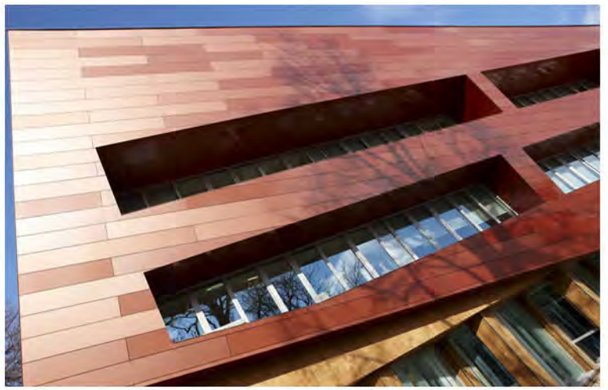
*A broad range of color choices

*Durability

*Low maintenance



*www.trespa.com



Tilt-Up/Cast in Place Concrete Walls

* Low construction cost
* Low maintenance
* Durability
* Easy and effective construction
* Offers the ability to create artistic pattern

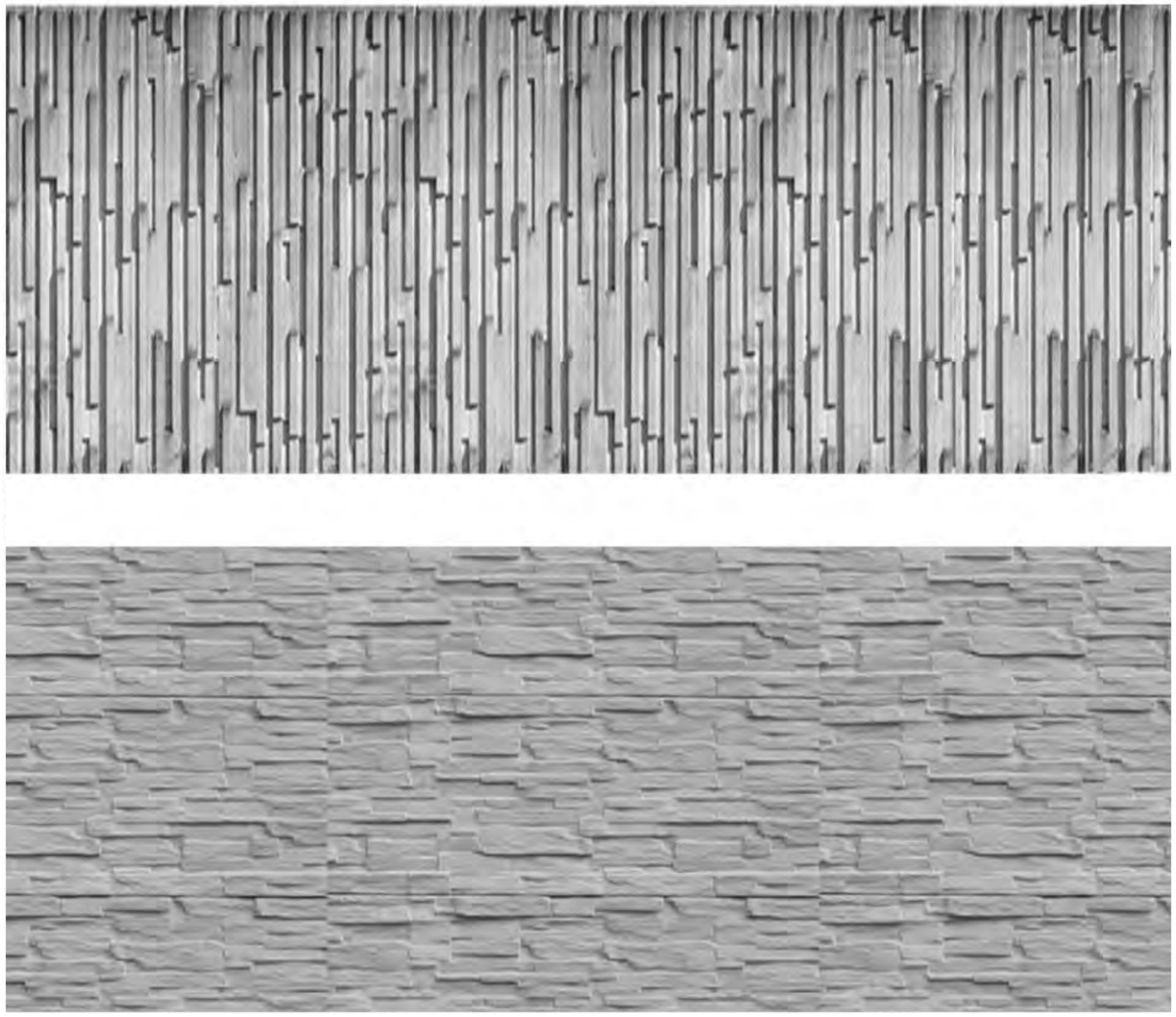
Fly Ash Concrete for LCA

Phase 1 -
Fly Ash used to create concrete

Phase 2 -
Concrete poured in place of fly ash becomes wall

Phase 3 -
Possibility of capturing Fly Ash from on site production for use in concrete

Phase 4 -
Fly Ash is a residual product of combustion at power plants



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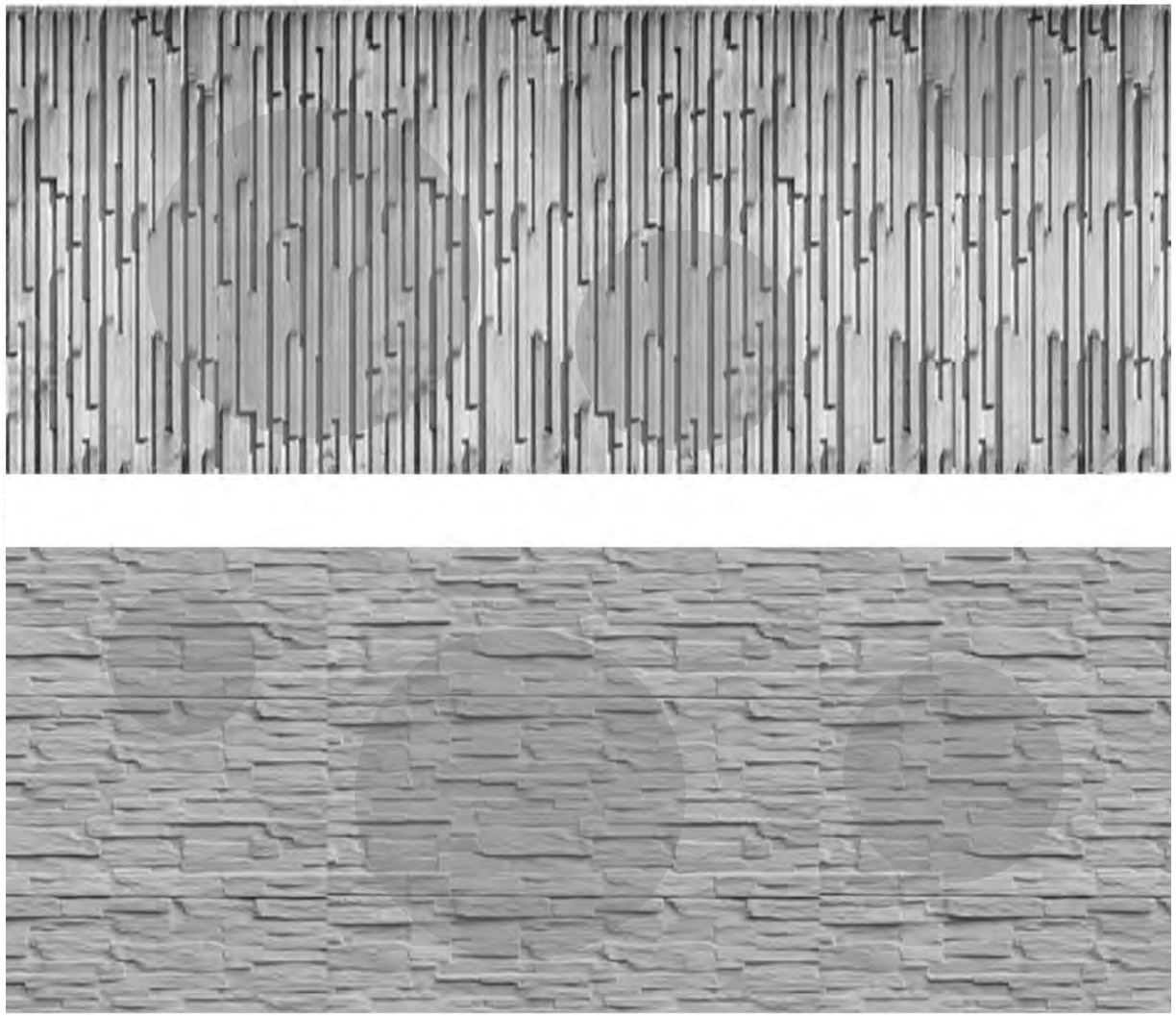

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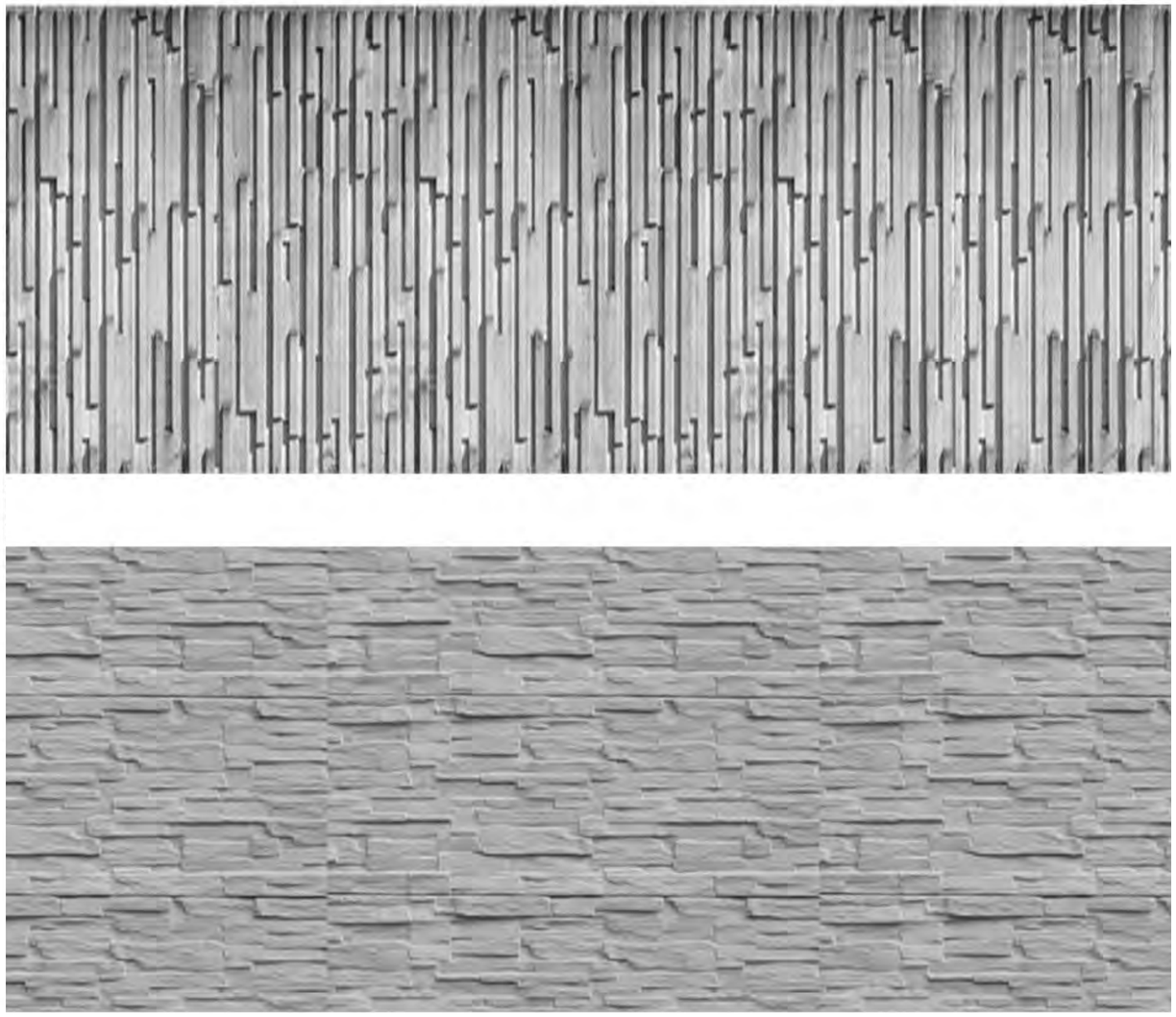


PVC Storm Drain Tubes

*Reuse materials
*Create a unique facade by overlaying tubes
*Help to maintain the building at a moderate temperature
*Tube facade offers a broad range of activities

Phase 1 -
Cut off pipe waste created during construction

Phase 2 -
Cut off pipe could be used as cast in place formwork

Phase 3 -
If pipes are not used, can be turned into gravel

Gravel used to help with permeable areas under plants

Steel or Aluminum Screen

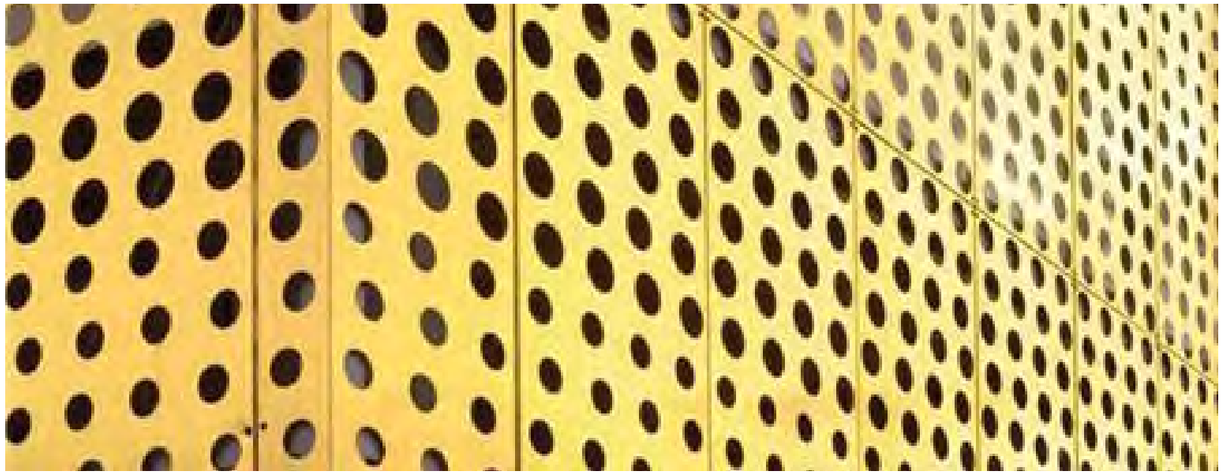
- More afforable than full wall (in the case of the Media Filter Building)
- Most Affordable way to add architectural aestetic
- Affordable way to reduce dead load on building
- Potential for local sourcing
- Potential for highly recycle materials

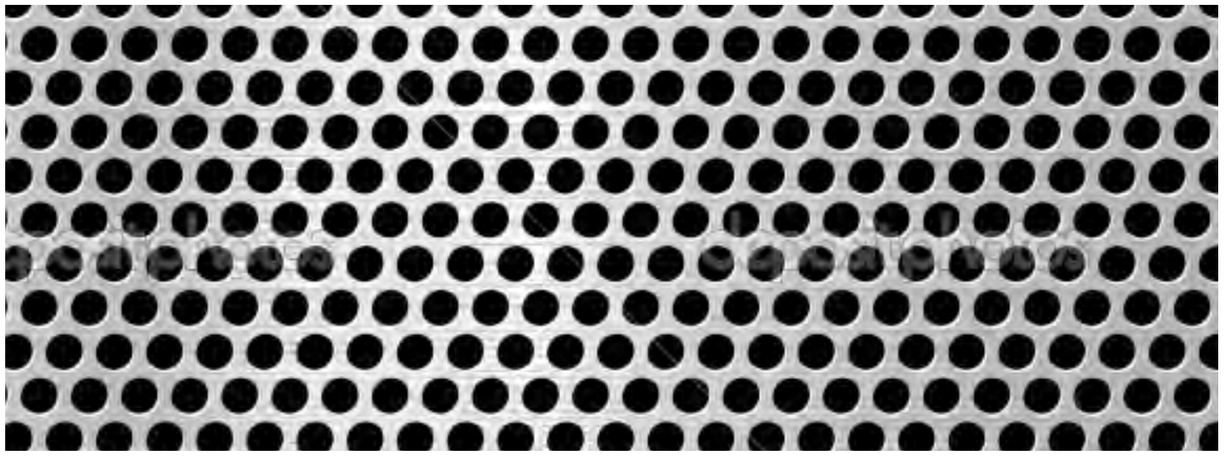
Phase 1 -
Recycles metals gathered from old materials

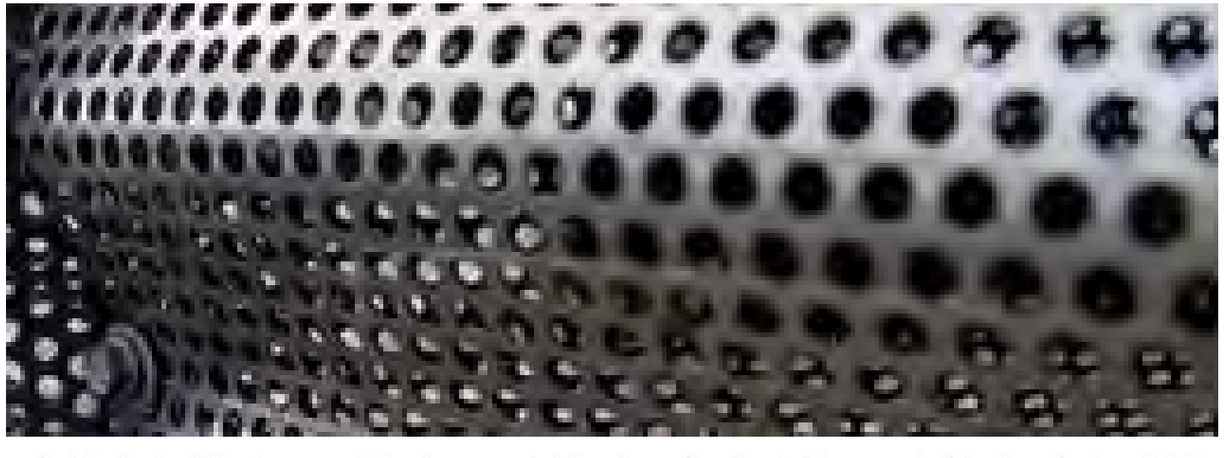
Phase 2 -
Highly common and affordable recycled metal panels applied

Phase 3 -
Screen can be used on future outdoor takes if they need to be replaced

Phase 4 -
Metals go back into recycling system after long use







Glass

- Low-E glass
- Decreases need for artificial lighting therefore lowering cost
- Decreased amount of glass need on site
- Glass serves lighting and viewing dual purpose
- Utility companies that specialize in Cradle to Cradle glass and do not even need to apply it ourselves on site

See-Through Garage Doors

*Provides a panoramic view

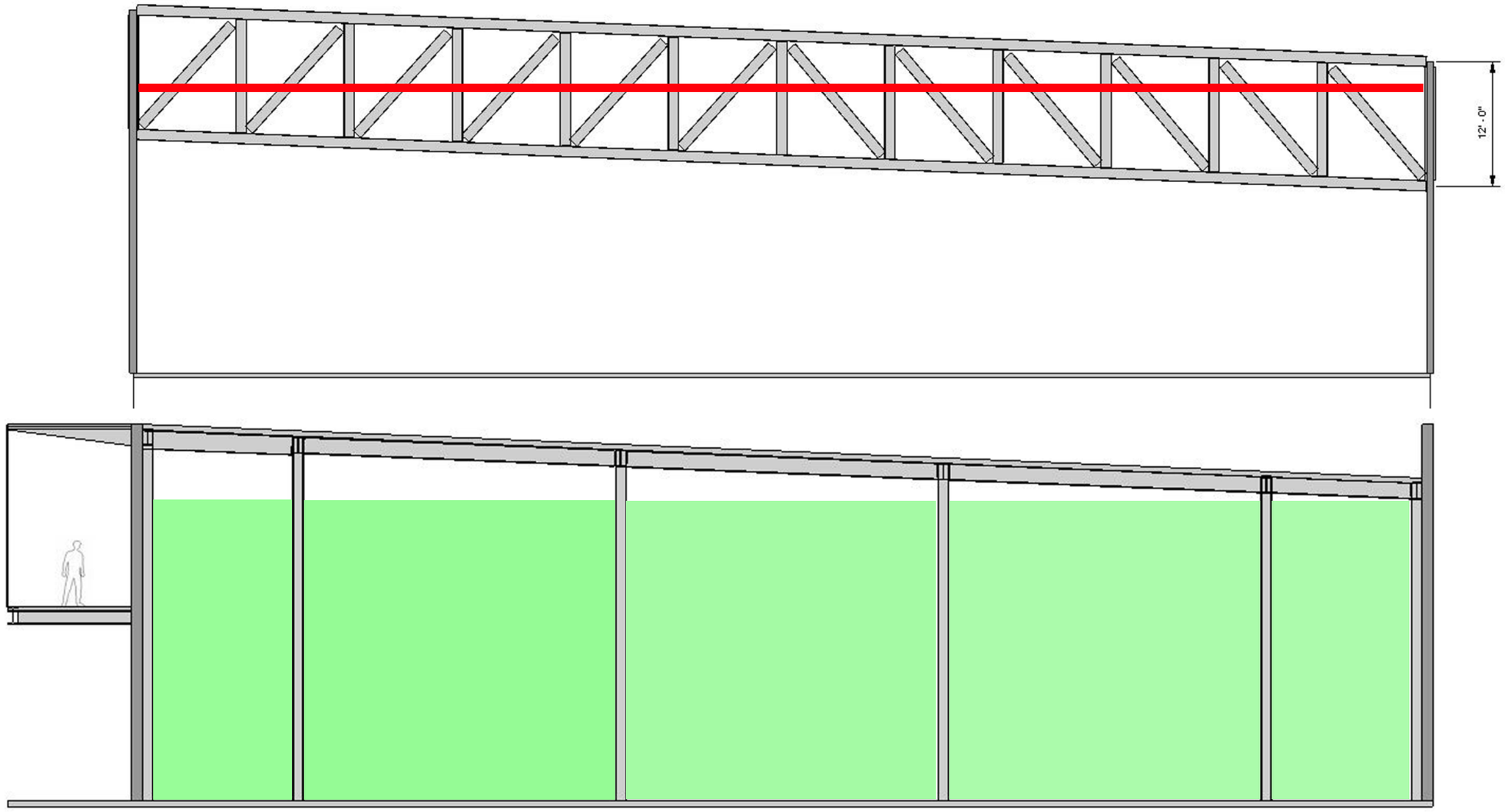
*Creates bright and lively indoor space

*Use polycarbonite for strong, durable & semi-transparent panels in garage doors.

Interior Materials and Sustainable Products

- Cork Flooring
- No VOC paints
- Renewable Material (Bamboo) Cabnetry
- Reclaimed Material (Water Bottles) as Internal dividers
- Duel Flush Toilets
- Sensor Exterior Lights

STRUCTURAL SYSTEM



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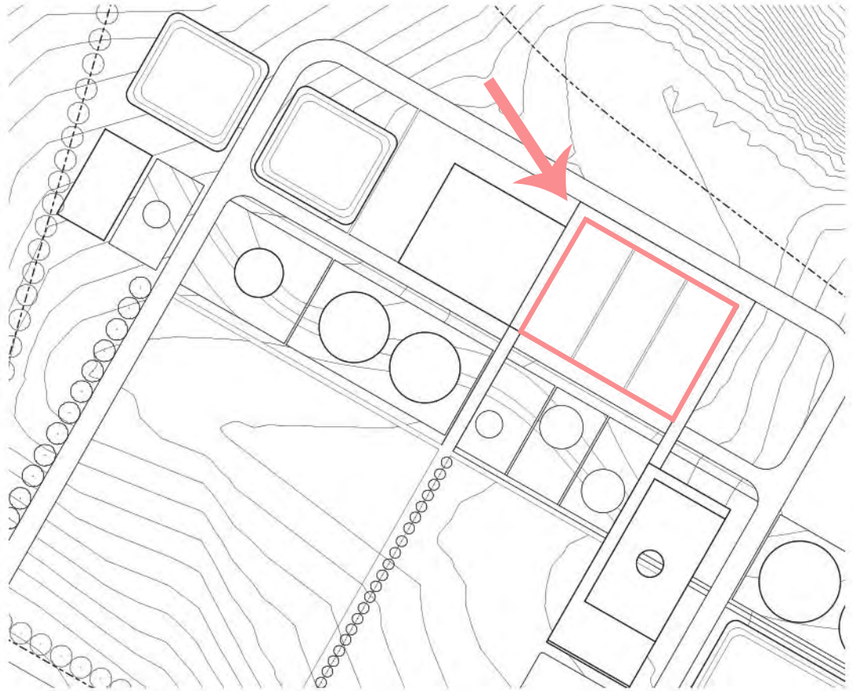

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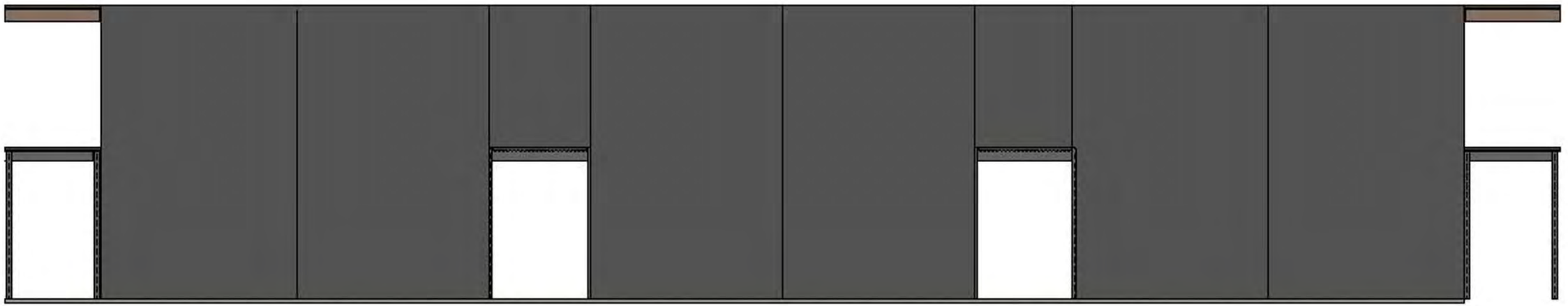

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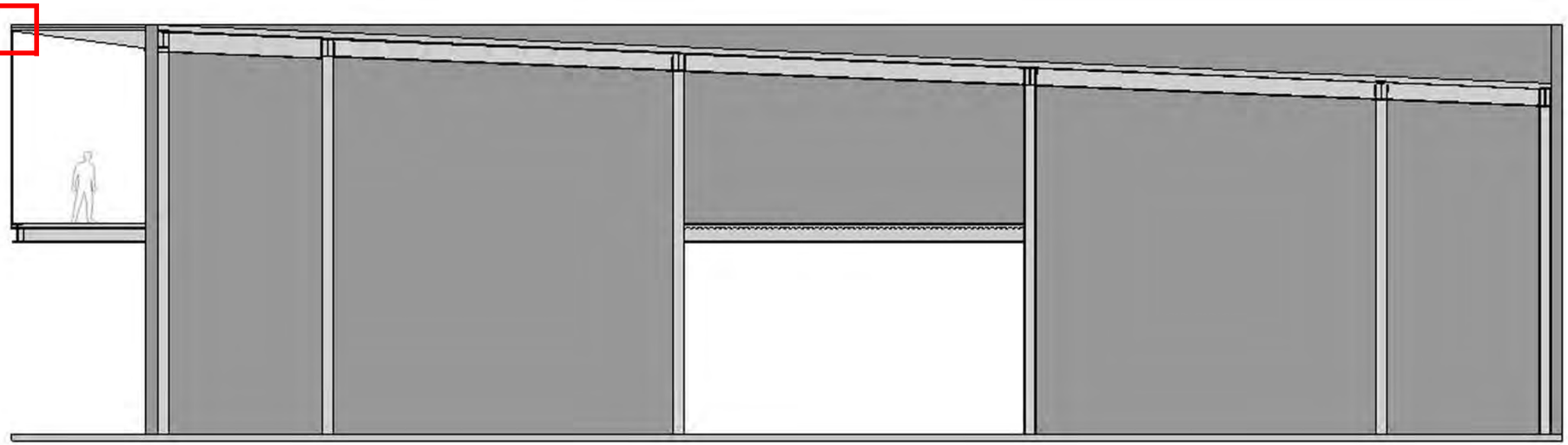
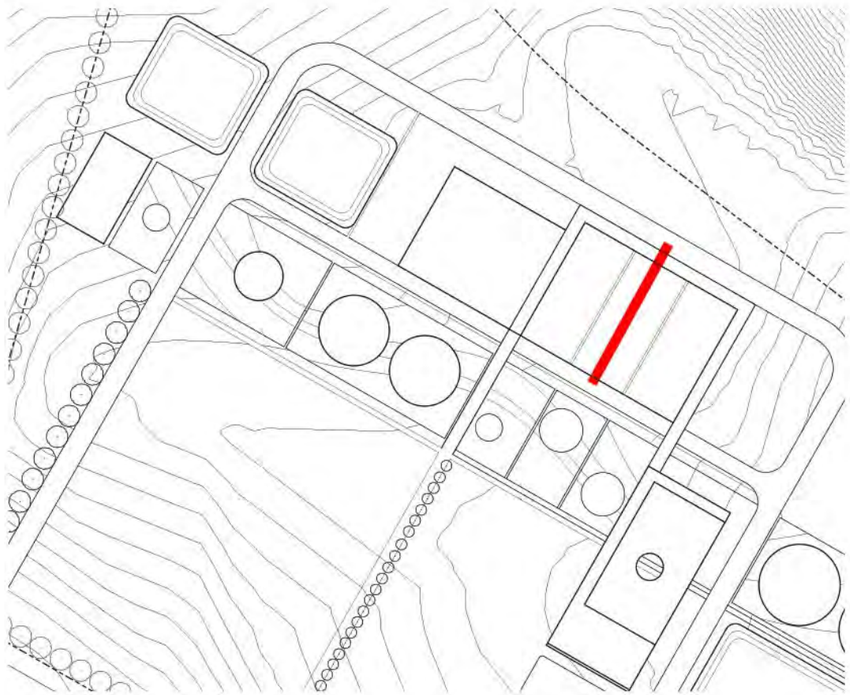
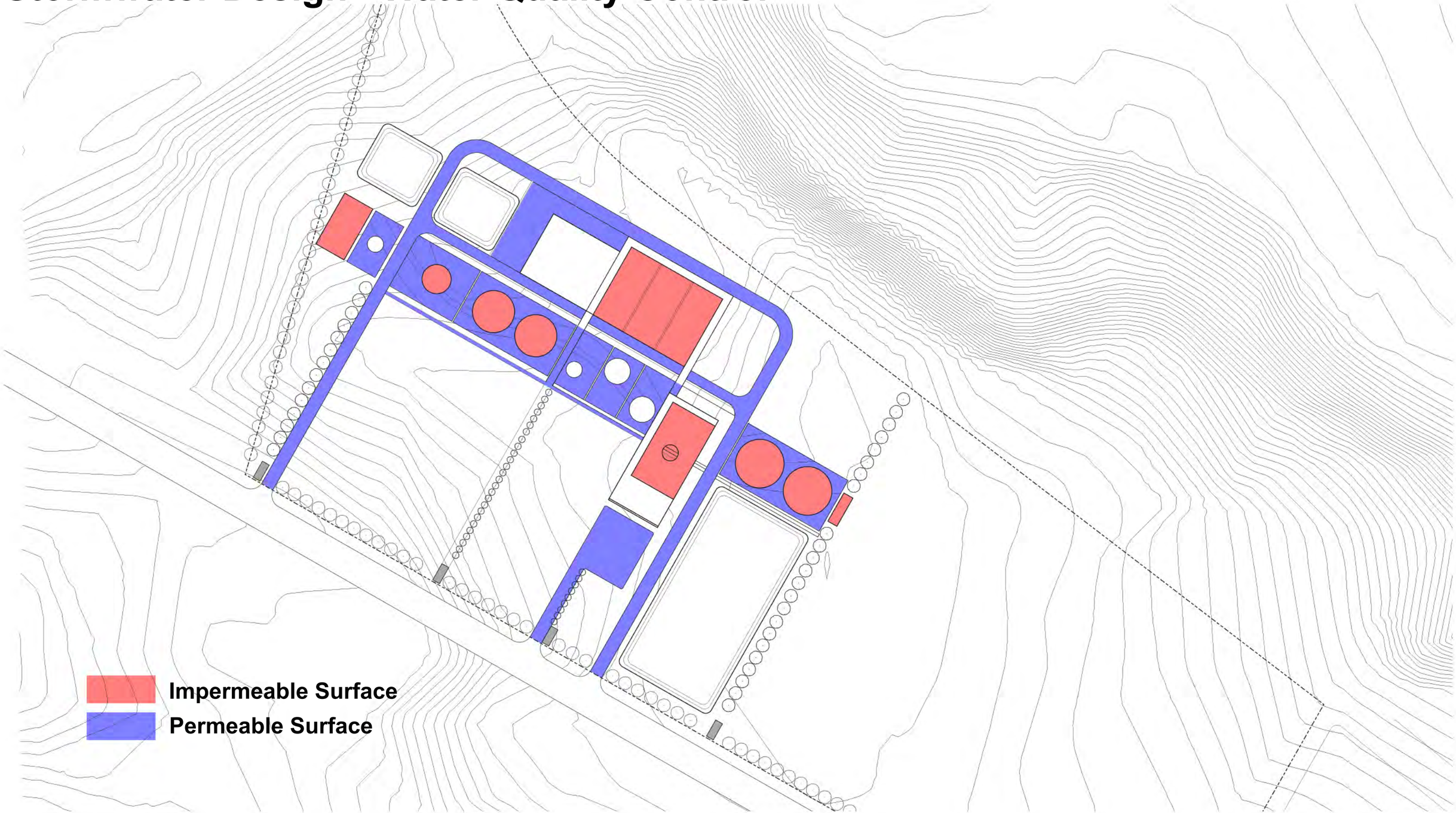




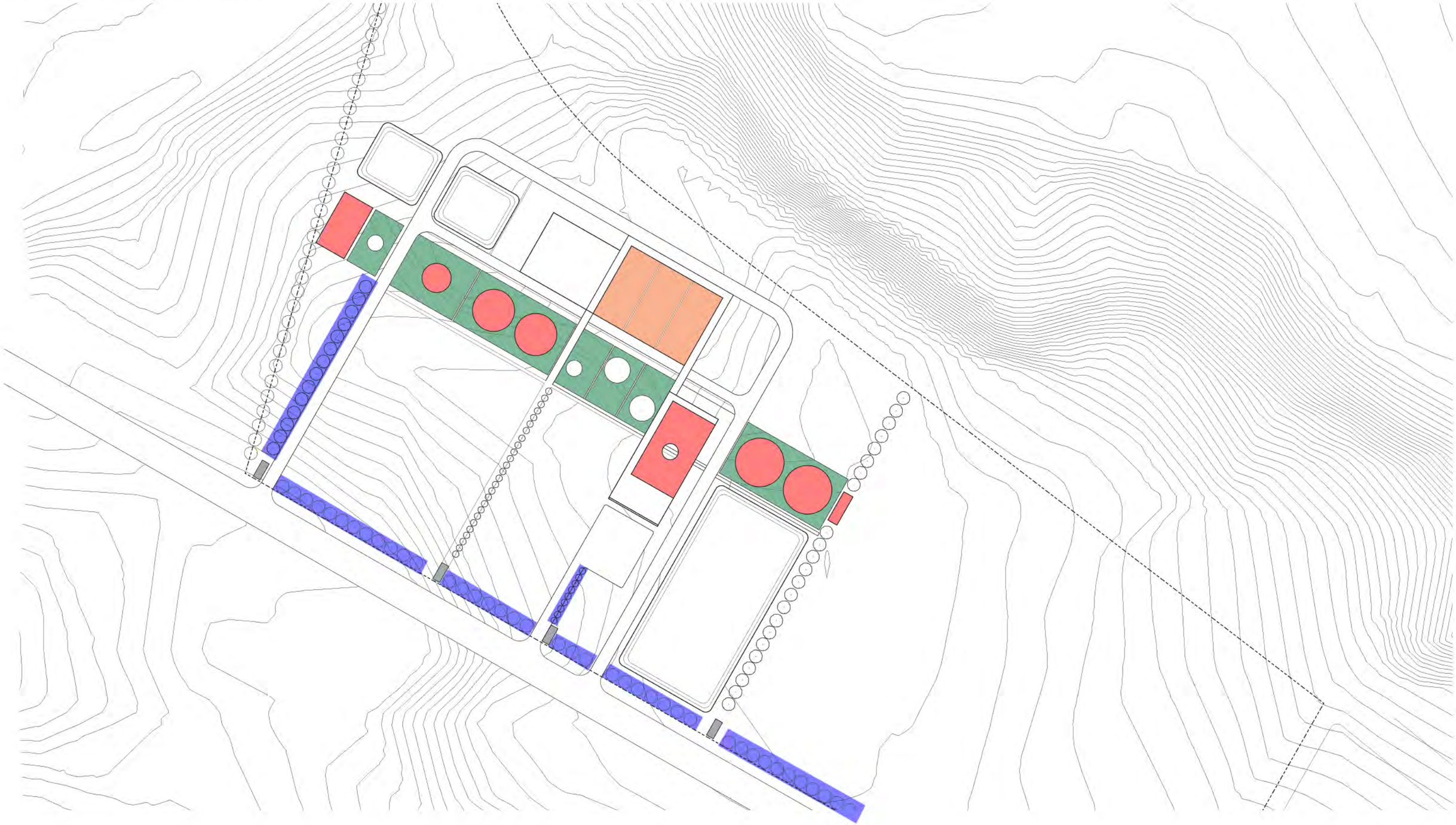
Primary LEED Credit Categories

Protect or Restore Habitat & Maximize Open Space

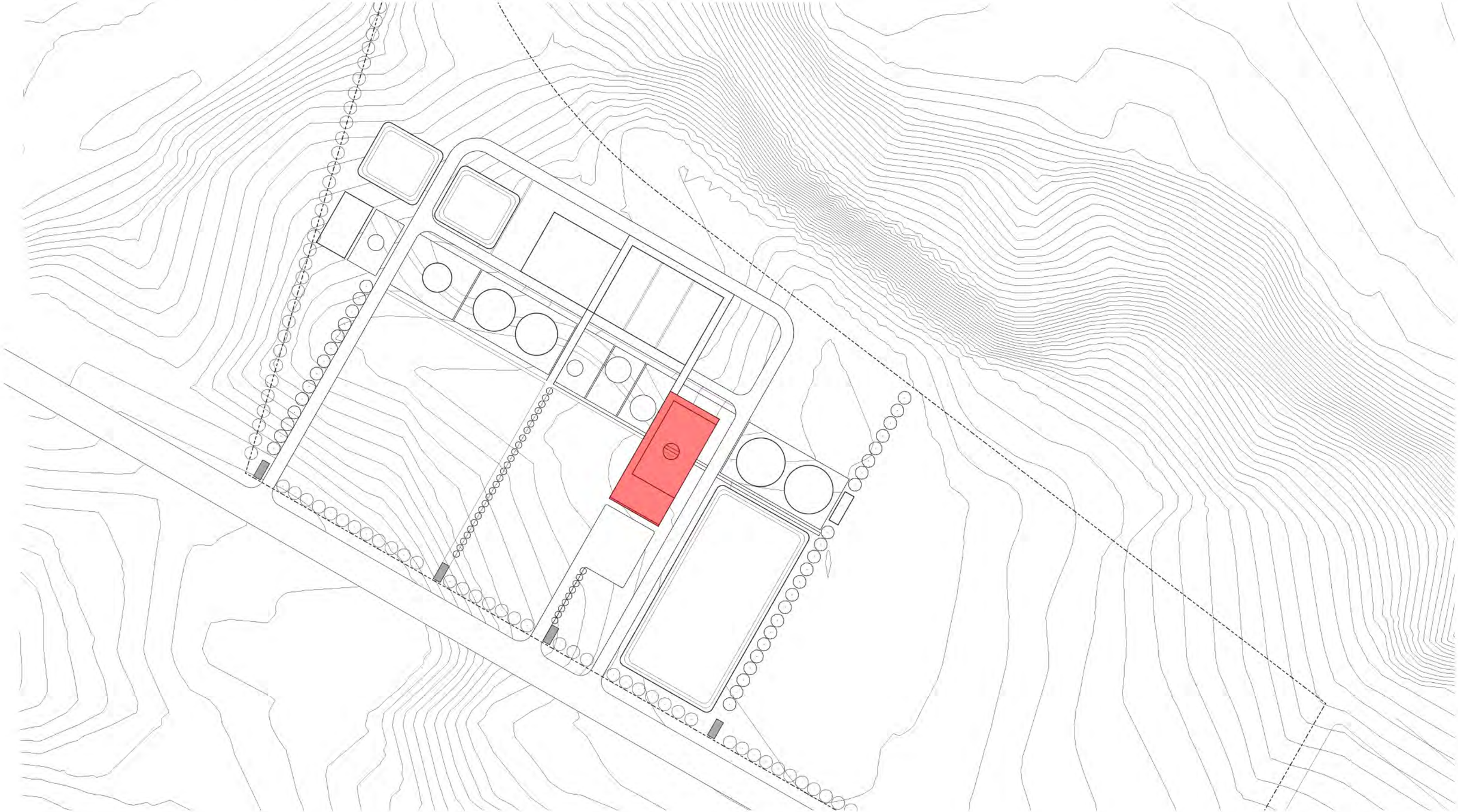
Stormwater Design - Water Quality Control



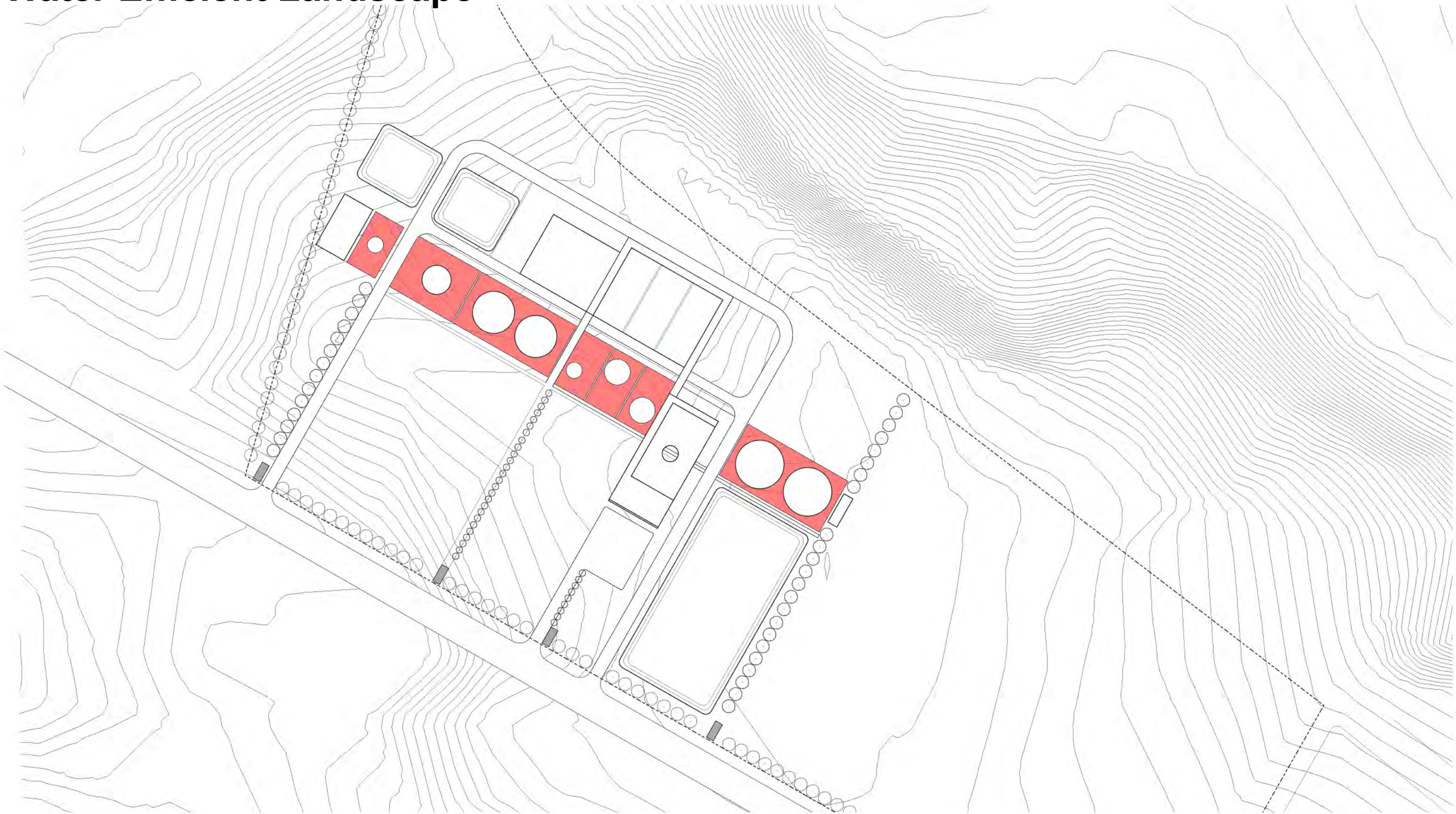
Heat Island Effect



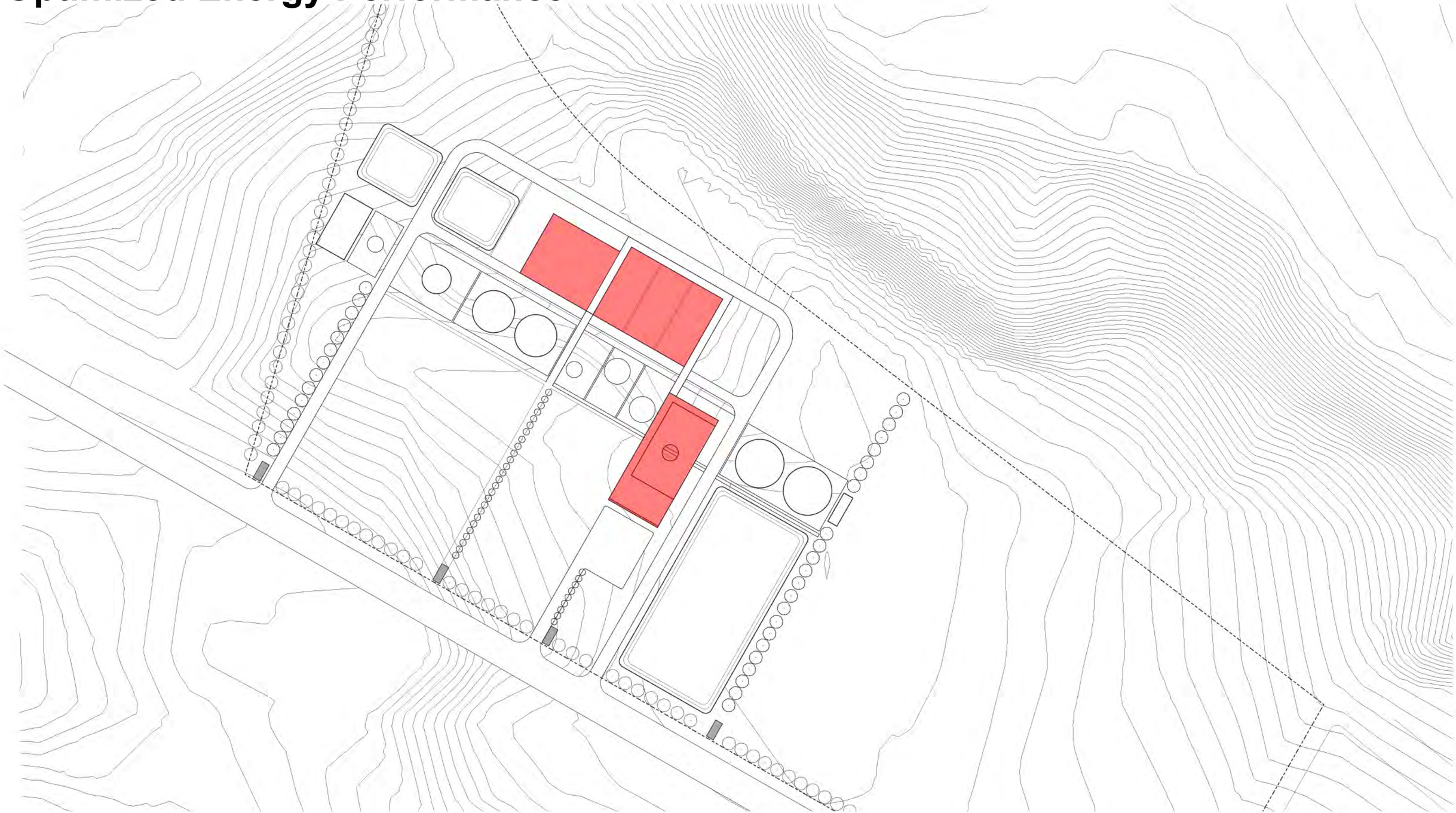
Water Use Reduction



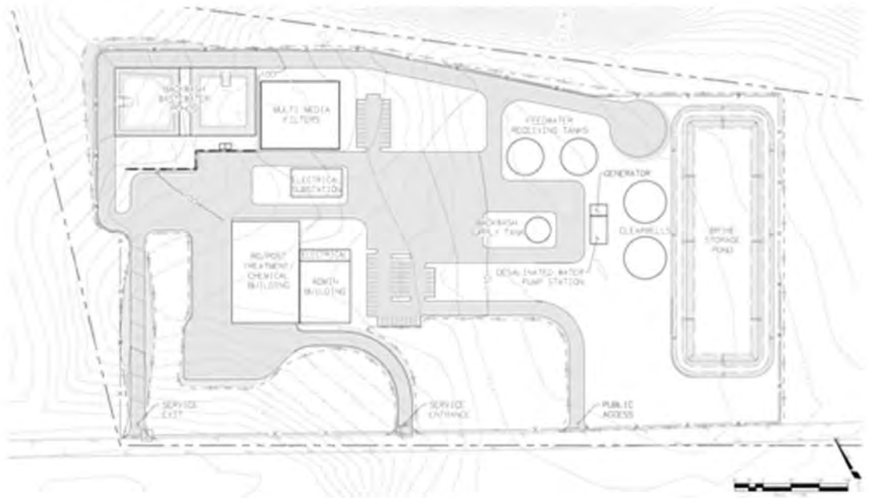
Water Efficient Landscape



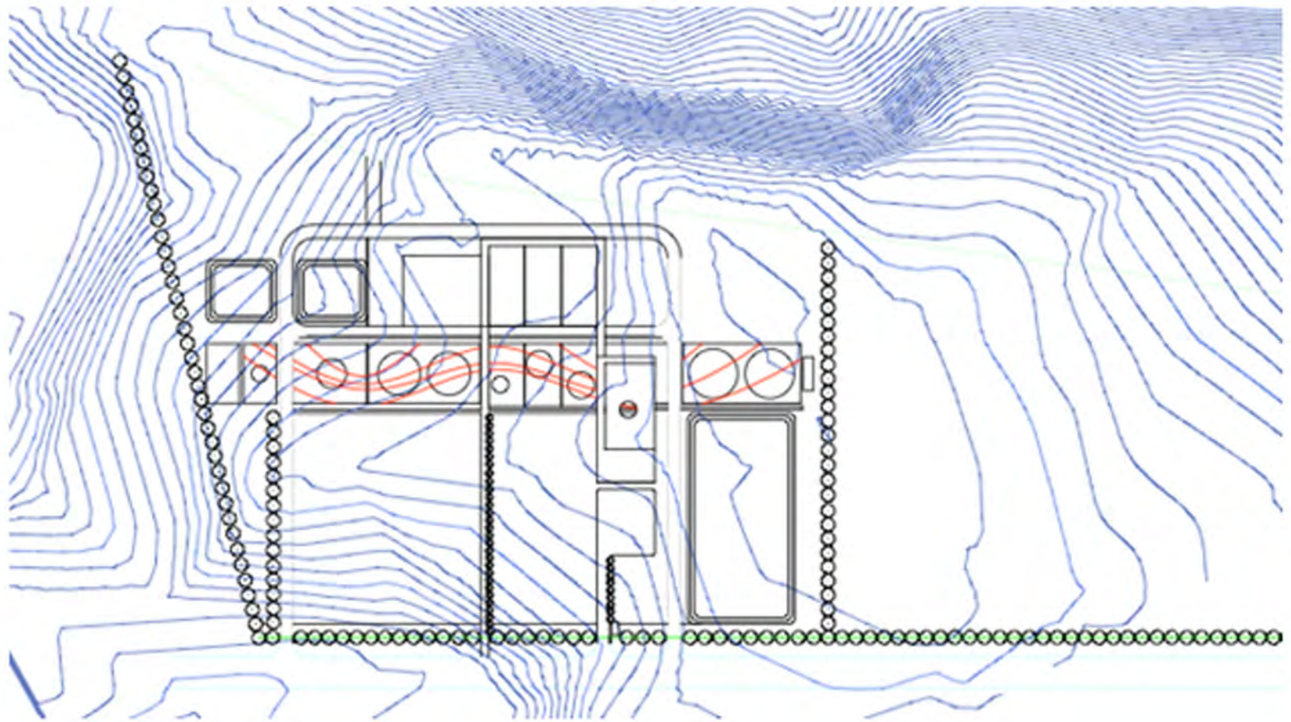
Optimized Energy Performance



Original Conceptual Design



Finished Conceptual Design



1. Reduced building construction by 30%

2. Reduced overall footprint by 40%

3. Reduced grading by 50%

4. Reduced paving by 60%

5. Increased design % complete by 10%


MPWSP
Desalinization
Plant

Site Plan

Legend

1. Feedwater Receiving Tanks
2. Multi Media Filters
3. RO/Post-Treatment/ Chemical
4. Clearwells
5. Brine Storage Pond
6. Administration Building
7. Desalinated Water Pump Station
8. Backwash Supply Tank
9. Open Space
10. Public Access
11. Service Entrance
12. Service Exit
13. Generator
14. Electrical
15. Guest Parking
16. Control Room
17. Main Courtyard
18. Security
19. Electrical Substation
20. Backwash Wastewater Ponds