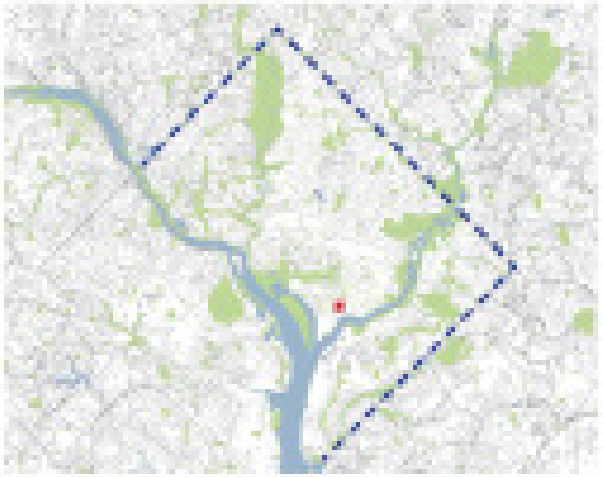
DC WATER HEADQUARTERS
WASHINGTON, DC
CATEGORY: COMMERCIAL ARCHITECTURE

The new LEED Platinum headquarters for DC Water, the sewer and water utility, demonstrates that modern civic architecture can be both beautiful and functional in its pursuit of sustainability. The project—on the Anacostia River in Southwest, Washington, D.C.—reimagines an entirely paved, urban location and an operational water and sewage treatment facility, while returning the landscape to a functioning ecosystem. The project is designed with present and future climate conditions in mind and illustrates the utility's desire to be proactive in addressing its environmental footprint. Portions of the site were below the 500-year flood plain, so to protect the area, the site was raised to one foot above this mark.

The project exemplifies technological innovation through its use of a groundbreaking wastewater thermal recovery system, used here for the first time in a U.S. office building. It captures heat from the flowing wastewater in winter, while using it as a heat sink in summer. The system reduces energy use for heating and cooling by 48%.

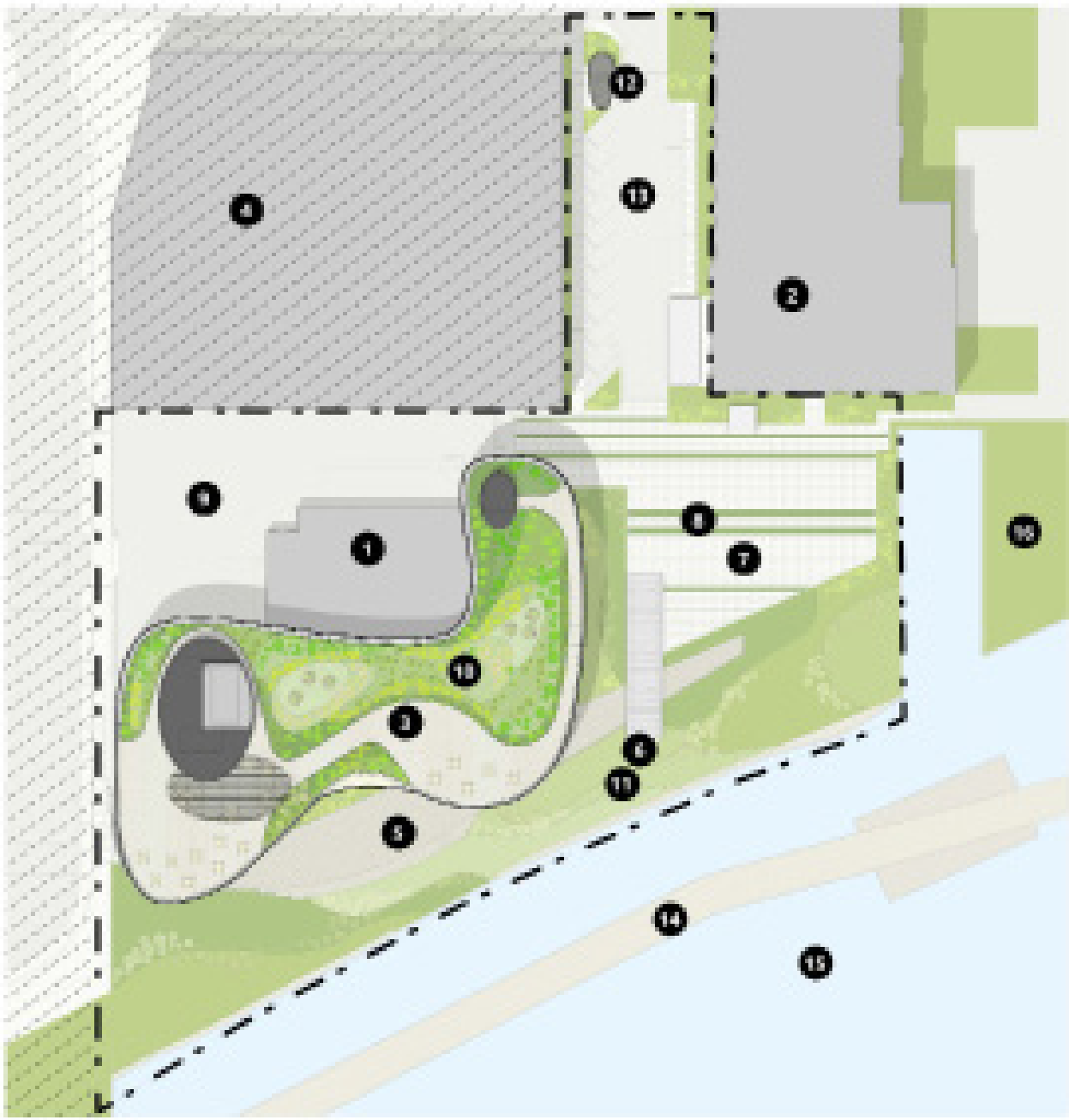
The building's curved form and layered curtain wall is carefully articulated to optimize views, daylighting, energy, and the site. Bioretention plantings and a green roof absorb and filter stormwater before it flows to a 40,000-gallon cistern that collects rainwater for irrigation and 100% of toilet flushing. The exterior façade employs a hierarchy of glazing, painted metal panels, punched windows, and green-glass sunshades to modulate sun exposure. DC Water Headquarters has become an urban icon on the Anacostia Riverfront, and a showcase for the utility.

SITE



Regional Site Plan

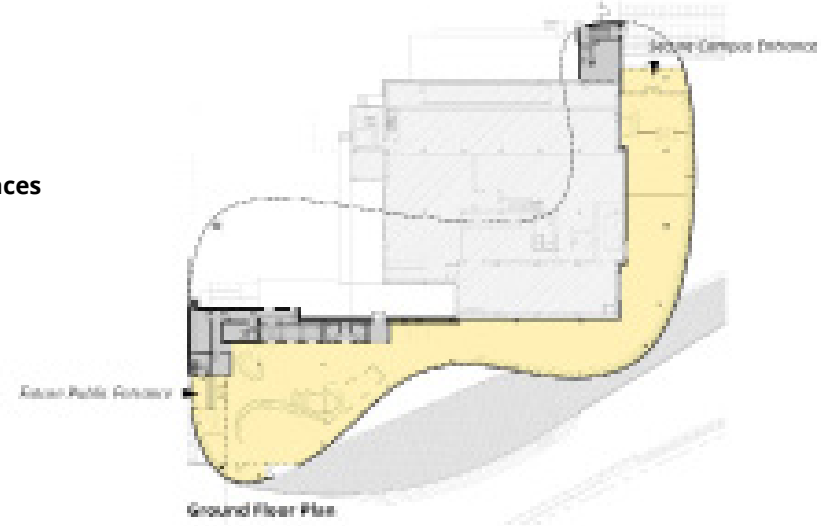
1. **Existing Pumping Station**
2. **Historic Pumping Station**
3. **New DC Water Headquarters**
4. **Future Mixed-use Development (PUD)**
5. **Wood Esplanade**
6. **Promenade**
7. **Autocourt**
8. **Runnels (water collection channels)**
9. **Loading Yard / Pumping Station Operations**
10. **Green Roof /Terrace**
11. **Plantings**
12. **Guard Booth**
13. **Entry Drive**
14. **Existing Riverwalk**
15. **Anacostia River**
16. **Yards Park /Navy Yard**



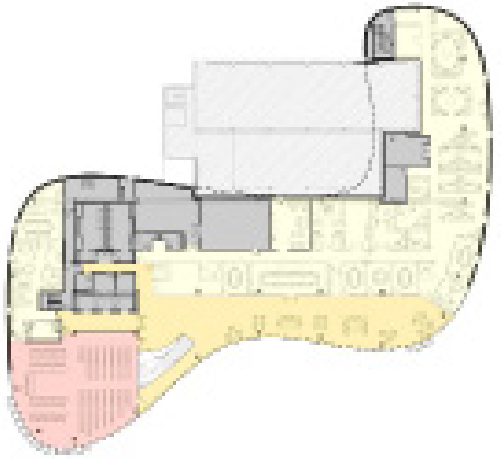
Site Plan

FLOOR PLANS

- Office
- Lobby
- Board Room
- Circulation / Back of House Spaces
- Pumping Station
- Building Above



Ground Floor Plan



Second Floor Plan

Typical Floor Plan (3-6)

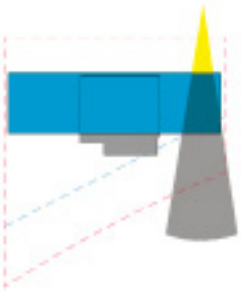
Roof/Penthouse Floor Plan

DESIGN FOR INTEGRATION

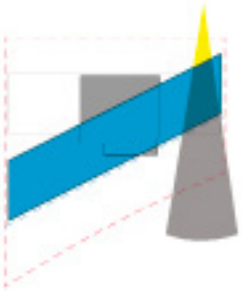
- **DC Water Headquarters**
- **Existing O Street Sewer Pumping Station**
- **Viewshed to the Anacostia River**
- **Property Line**
- **Seawall Setback**
- **Below-grade Infrastructure**

Original Site Conditions

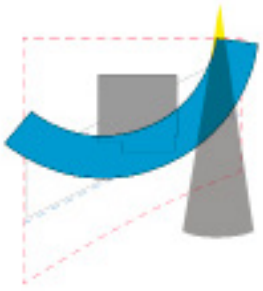
Proposed Design



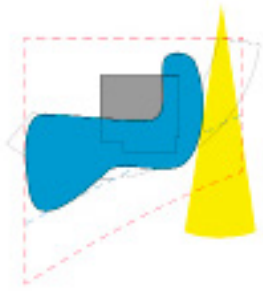
1.
Standard office footprint. Expansive structure above existing O Street Pumping Station.



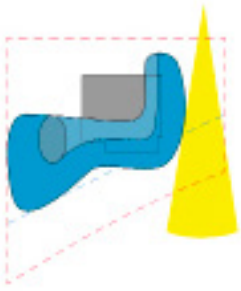
2.
Push office footprint as far off of the O Street Pumping Station as possible.



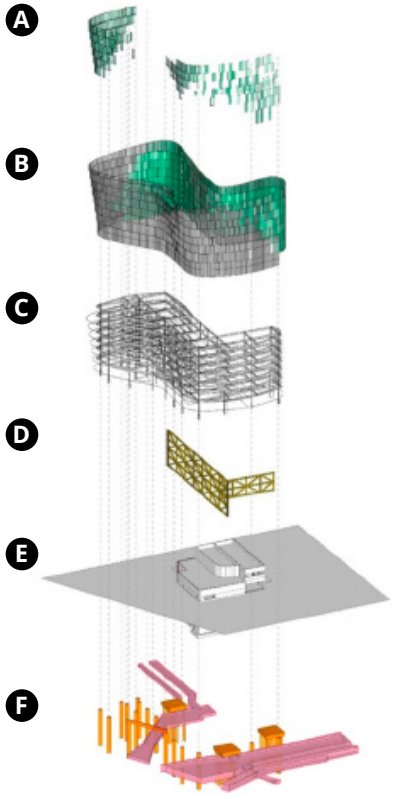
3.
Make office footprint narrower to create better views and daylighting. Capture southeast corner of O Street Pumping Station within footprint of the new building.



4.
Curve office footprint up on east and west ends to maximize views and to maintain Canal Street view shed.



5.
Placing the core at the deepest portion of the footprint creates an ideal office layout. A 35-ft zone of open office with expansive views and optimal daylighting and a 15-ft zone for support spaces and private offices are provided with windows to the north as needed.



A **Exterior Shades**

B **Thermal Envelope/Building Skin**

C **Conventional Steel Structure**

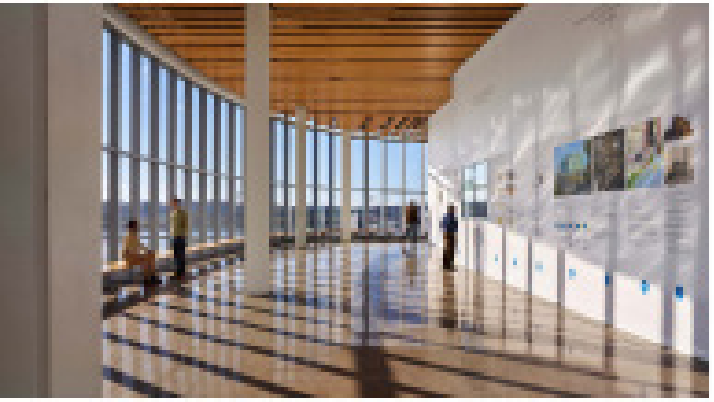
D **Structural Super Truss**

E **Existing O Street Pumping Station**

F **Existing Underground Infrastructure (pink); New Structural Foundations (orange)**

DESIGN FOR COMMUNITY

The project creates a unique place that serves as an educational resource for community sustainability discussions, and acts as a catalyst for the neighborhood's economic development.



DESIGN FOR WATER

Filter Pump

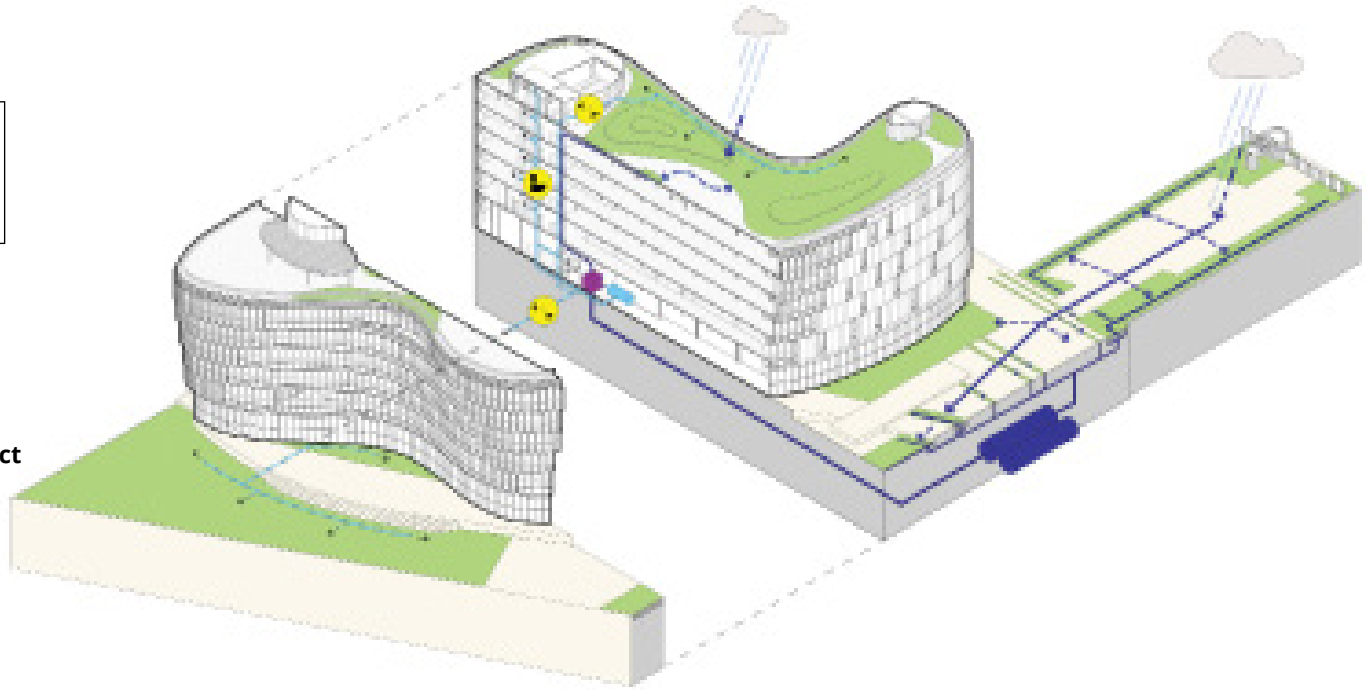
Untreated Rainwater

Treated Rainwater for Toilet Flushing

Treated Rainwater for Irrigation

The building will use 72% less potable water than a typical office building.

Rainwater Harvesting Diagram



1. **Rainwater not absorbed by plants is collected through runnels in the low impact development planters.**
2. **Rainwater is routed to a 40,000 gallon cistern underground.**
3. **Rainwater is sent to the filtration pump room to be filtered and treated to remove impurities.**
4. **Treated rainwater is stored in the 1,700 gallon day tank in the lobby.**
5. **Reclaimed water is used for irrigation and toilet flushing.**

BUILDING DIAGRAMS

Structural System

A. **Below-grade Structure with Auger Cast Piles**

B. **Below-grade Wastewater Tunnels**

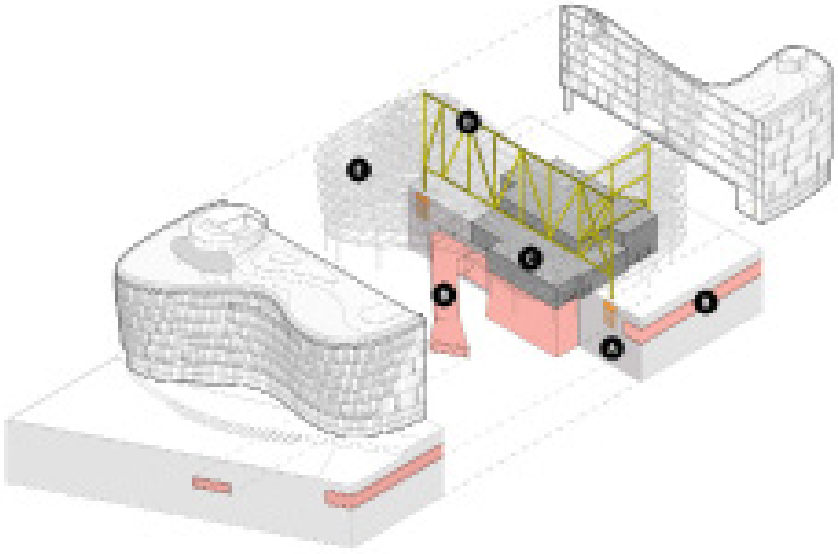
C. **Existing O Street Pumping Station**

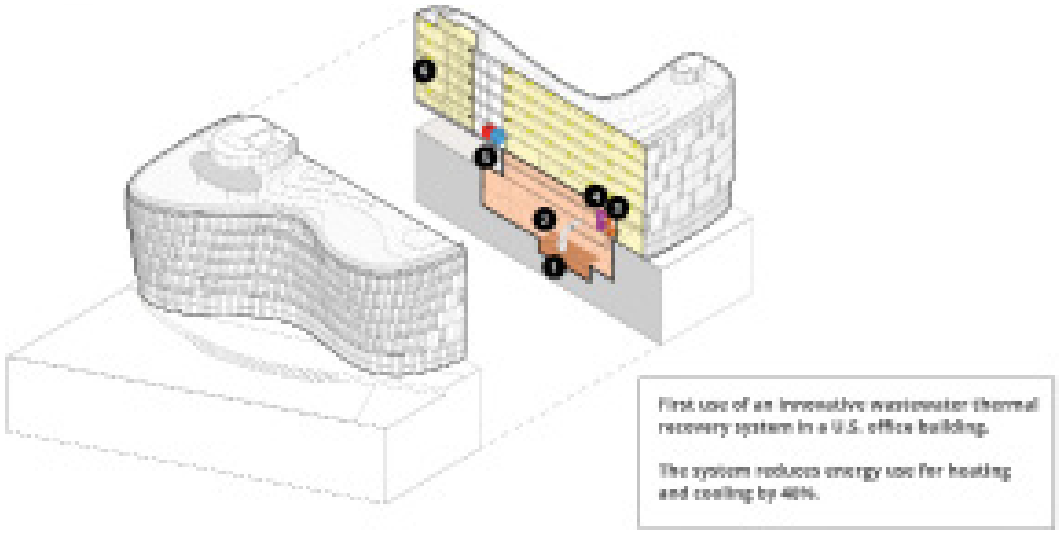
D. **200-foot-long, five-story Main Truss and Secondary Truss**

E. **Conventional Steel Structure**

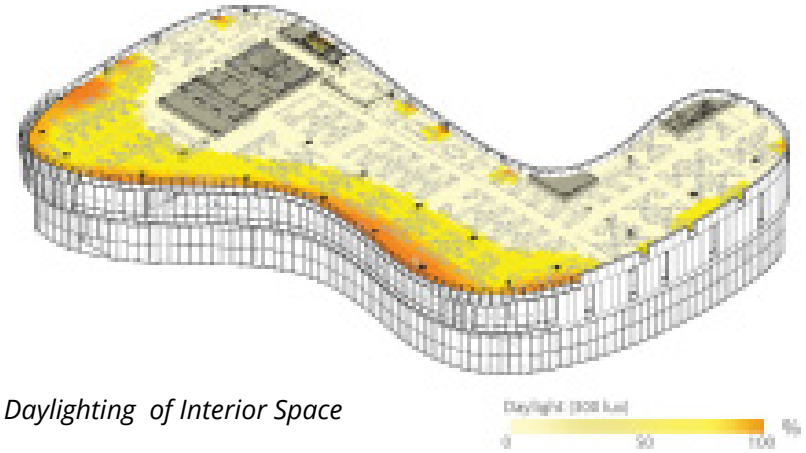
Wastewater Heat Exchange/Mechanical System Diagram

1. **A Wet Well holds wastewater before it is pumped to the Blue Plains Advanced Wastewater Treatment Plant.**
2. **Wastewater is pumped from the Wet Well to the SHARC system.**
3. **The SHARC system filters and separates wastewater and solids.**
4. **The Heat Exchanger transfers heat energy to and from filtered waste water into clean water. This keeps dirty and clean water completely separate. In the summer, heat is transferred to the wastewater, and in the winter, heat is taken from the wastewater.**
5. **Clean conditioned water is sent to the Chiller Plant Room.**
6. **Clean heated water is pumped to heat network fan-powered boxes on every floor. The chiller produces hot and cold water that is distributed throughout the building. Fan-powered boxes provide warm or cool air to the office spaces as needed.**



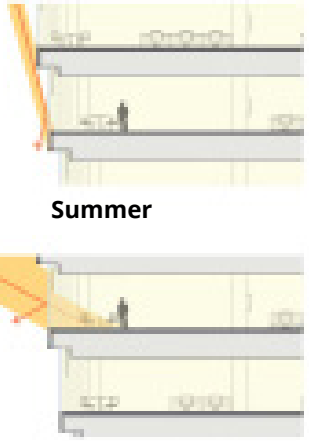


DAYLIGHTING AND SOLAR HEAT GAIN ANALYSIS



Daylighting of Interior Space

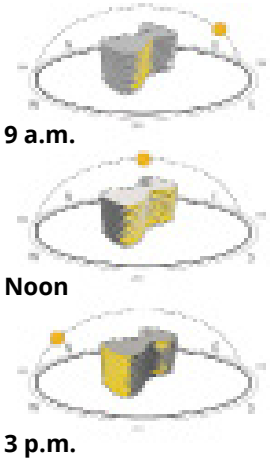
Passive Shading



Summer

Winter

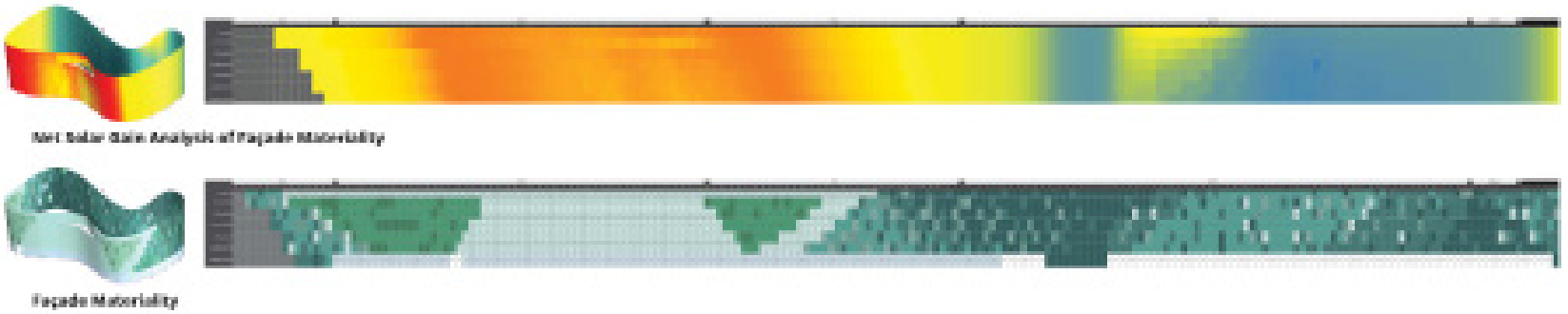
Solar Tracking Shade Diagram



9 a.m.

Noon

3 p.m.



Environmental considerations, such as daylighting and solar heat gain within interior spaces were considered to create a comfortable office environment for staff and visitors. Parametric modeling established a hierarchy of glazing, metal panels, and punched windows significantly reducing solar gain heat loads, while maintaining daylighting and dramatic views.

DESIGN FOR WELLNESS