Project Summary

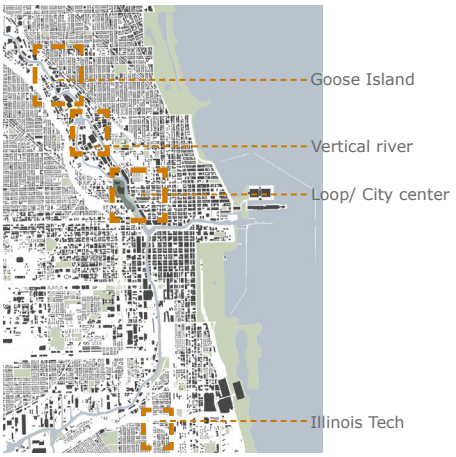

Figure 08. Map of Chicago showing VR location.

Over the past few years Chicago's Financial District has experienced extraordinary growth. Some modern tech companies resonate with the contemporaneous spirit they see in the city. This spirit is perfectly represented by some urban developments which are being proposed for the river shore, converting former industrial or abandoned sites in rich public spaces.

One of those projects is River District, by Solomon Cordwell Buenz (SCB) Architects. SCB has developed a master plan (Figure 03) for the 30-acre site of the Freedom Center printing plant. The property is located in the Chicago downtown neighborhood, along the west bank of the Chicago River's North Branch, between Grand Avenue and Chicago Avenue. River Heights team has contacted SCB and received permission to develop the design of one building within their master plan. Vertical River Office Building (VROB) consists of a 15-story office building which aims to become an example of sustainability and innovation, exploring how architecture can deal with some of the crucial issues of cities: climate change, satisfying the growing demand of office buildings, and generating new modern public spaces for citizens.

Design Strategy

The design process focuses on reaching the zero-energy target and reducing the building's carbon footprint. Therefore, the building has timber structure, creating a double challenge, having a 15-story timber structure and being zero energy.

This design is based on simple but efficient strategies, always complementing one another, so that it functions as an organism. From a simple square grid, the envelope surface has been minimized. Orienting the building south maximizes solar exposure. The grid is composed of a stiff Cross Laminated Timber (CLT) constructed in two rings of 20 ft x 20 ft structural units surrounding a vertical core. In the interior ring, there is an atrium which provides light and natural ventilation. The exterior ring holds the offices. Four 3-story-high "winter gardens" spiral up from floors 3 to 14 providing natural light and serving as public gathering spaces for the occupants. A radiant ceiling system, coincident with the structural units of the perimeter, is proposed, enabling each unit to work independently. Moreover, the main source of heating and cooling is a water-source heat pump using the river as the main source. As the rooftop was not enough for PV generation, more panels have been included in the façade.

Project Data

Location:	Chicago, Illinois, USA
Climate zone:	5A
Building size:	159,132 ft^2; 15 stories
Occupancy:	416 people; 300 ft^2/pers.
Target EUI:	23.85 kBtu/ft^2.year


Figure 09. SCB's River District Master Plan

Technical Specifications

Envelope R-value:	R-38
Roof R-value:	R-50
Foundation R-value:	R-20
Window values:	U-0.17
	SHGC-0.2
Primary HVAC:	water sourced heat pump
Secondary HVAC:	radiant ceiling
Onsite PV:	746,061 kWh/year
Airtightness:	0.26 ACH @ 50 P
Overall window to wall ratio:	30%