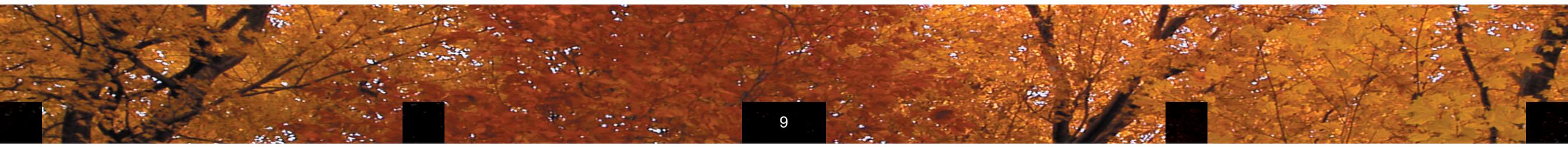


WEST ELEVATION (23rd STREET)



photo 9: west elevation of park from Rock Creek



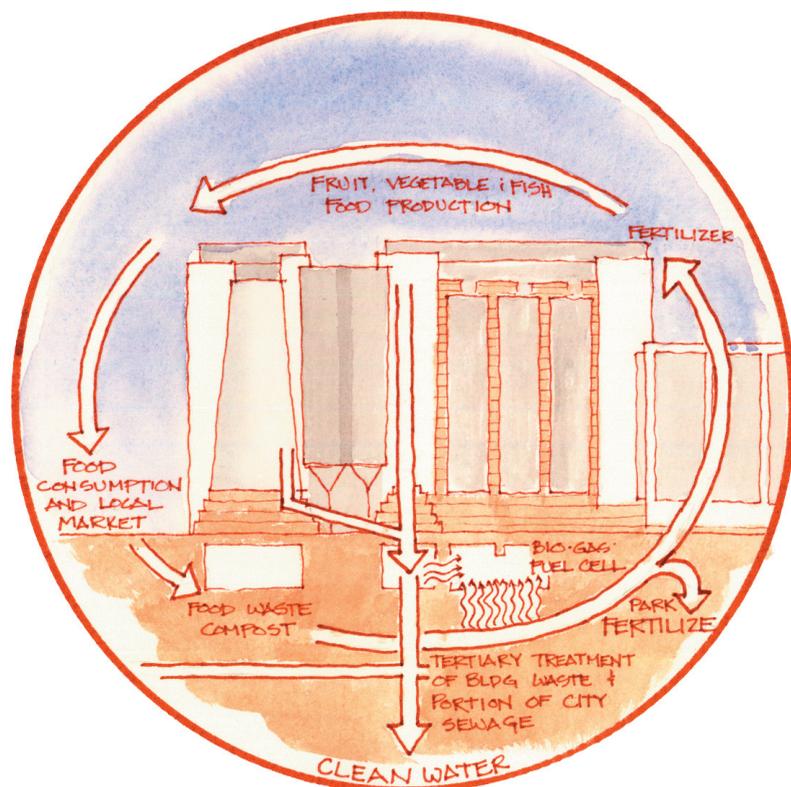


DIAGRAM 4: NUTRIENT CYCLES

the collaborative spaces in the building. Water from the surrounding site and from the sky above falls onto the terraced wall and is collected in the drainage system that irrigates the plants growing up the steep slope. The plants grow upon the wall and provide shelter and food for insects, birds, and other wildlife.

One of my early goals for the building was to express transparency of the natural processes used throughout the building. The inclusion of the natural processes as a design element serves as much as an educational tool for the Institute as much as it meets the building's functional needs. From the collection and distribution of energy to the disposal of waste, this building is designed to operate primarily on the resources freely available in the form of solar income. Everything the use of this building produces is incorporated somehow back into a productive cycle, or dealt with in a way that results in clean, non-toxic "waste" that is returned to the city that sustains the building.

Greater awareness and attention to the long term costs and benefits of design decisions could make a far greater impact on the quality of the environment than removing millions of cars from the roads. Materials used throughout the building were selected with a concern for ecological impact over their entire life cycle. Renewable and reuseable materials are assembled in such a way that their value can be reclaimed when the building is demolished. The operation and maintenance of a building also represents substantial costs to the owner and the environment. Some research even suggests that one of the largest contributions to pollution is

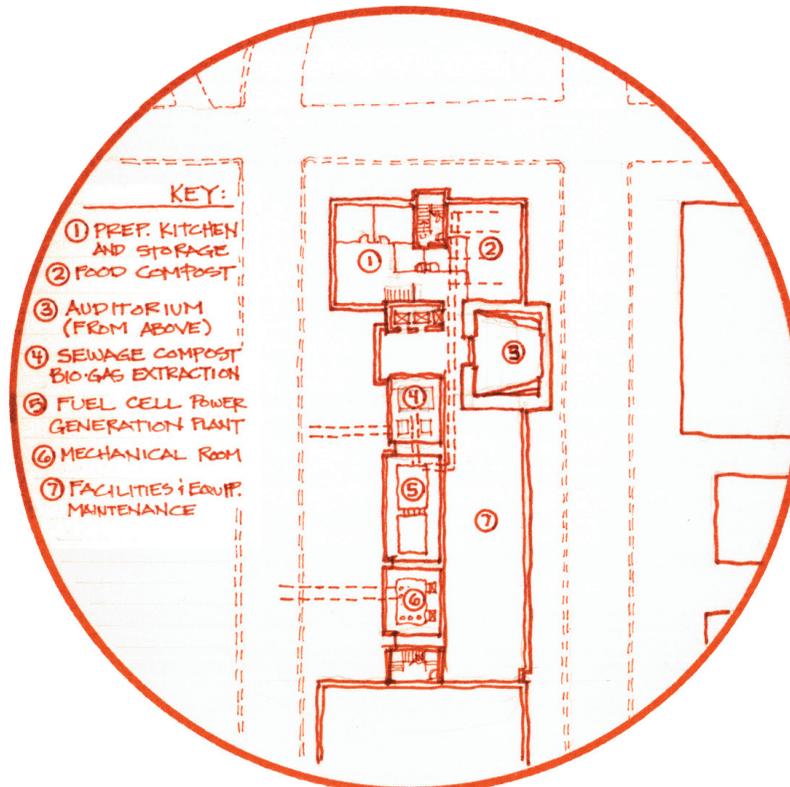


DIAGRAM 5: LOWER LEVEL PLAN

the operation of our current building stock. With a holistic approach to the design of systems, the design team can dramatically affect the environmental impact of a building.

Encouragingly, our understanding of how building systems work with natural systems has come a long way in the last ten years. Few buildings take advantage of the full range of techniques, or combine them in such ways as fully appreciate the scope. Budget constraints, and many times, existing building codes can result in compromises that limit the effectiveness of the systems available to a design team. Without the real world limitations of time or money, this design takes known systems and uses them in an integrated architectural design.

The diagrams above illustrate the main cycles at work in the building: ventilation, energy, solid 'waste' and water flows. Each system works in conjunction with the others, and their relationships are intended to reflect a balanced ecological system. The Institute would incorporate these processes into the educational programs for the general public.

The sun is the appropriate starting point for all the building's systems. On the top floor of the Institute, the food production greenhouse harnesses the sun's energy directly. The glass roof contains a matrix of integrated photovoltaic cells over the primary roof and thermal coils between bays. The photovoltaics generate electricity directly which power an electrolysis reaction to create hydrogen for use

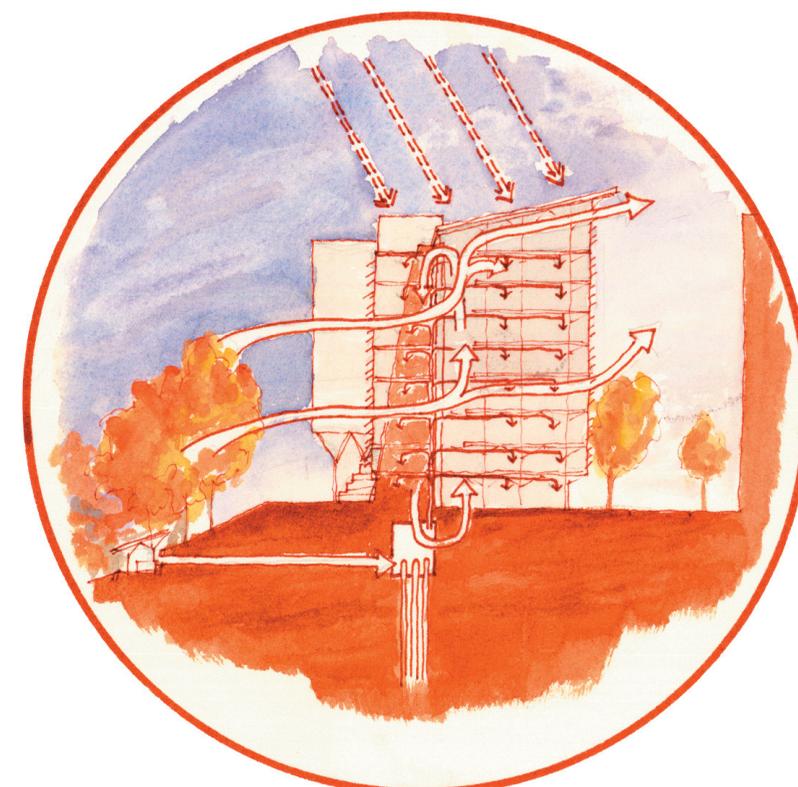
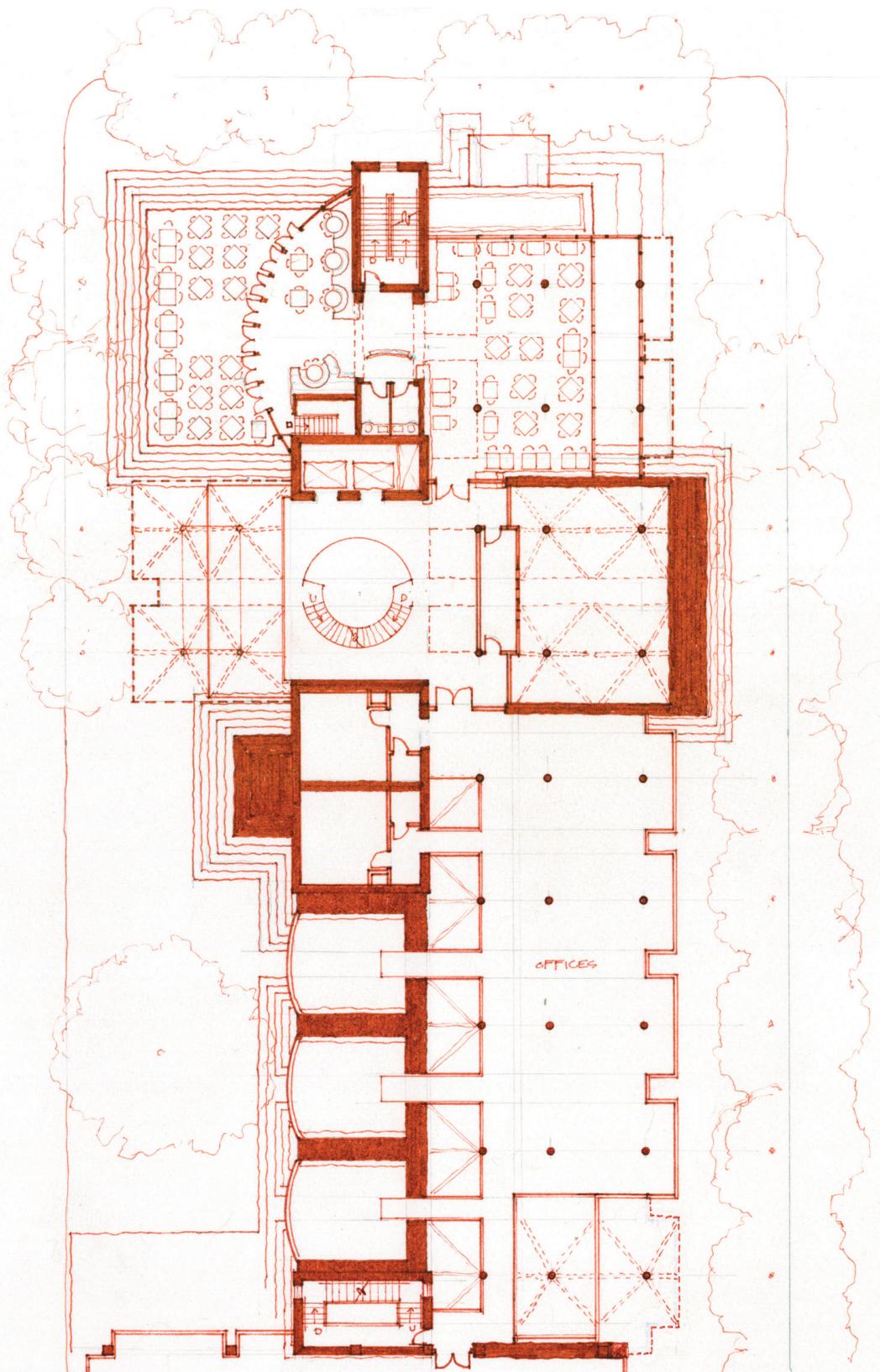
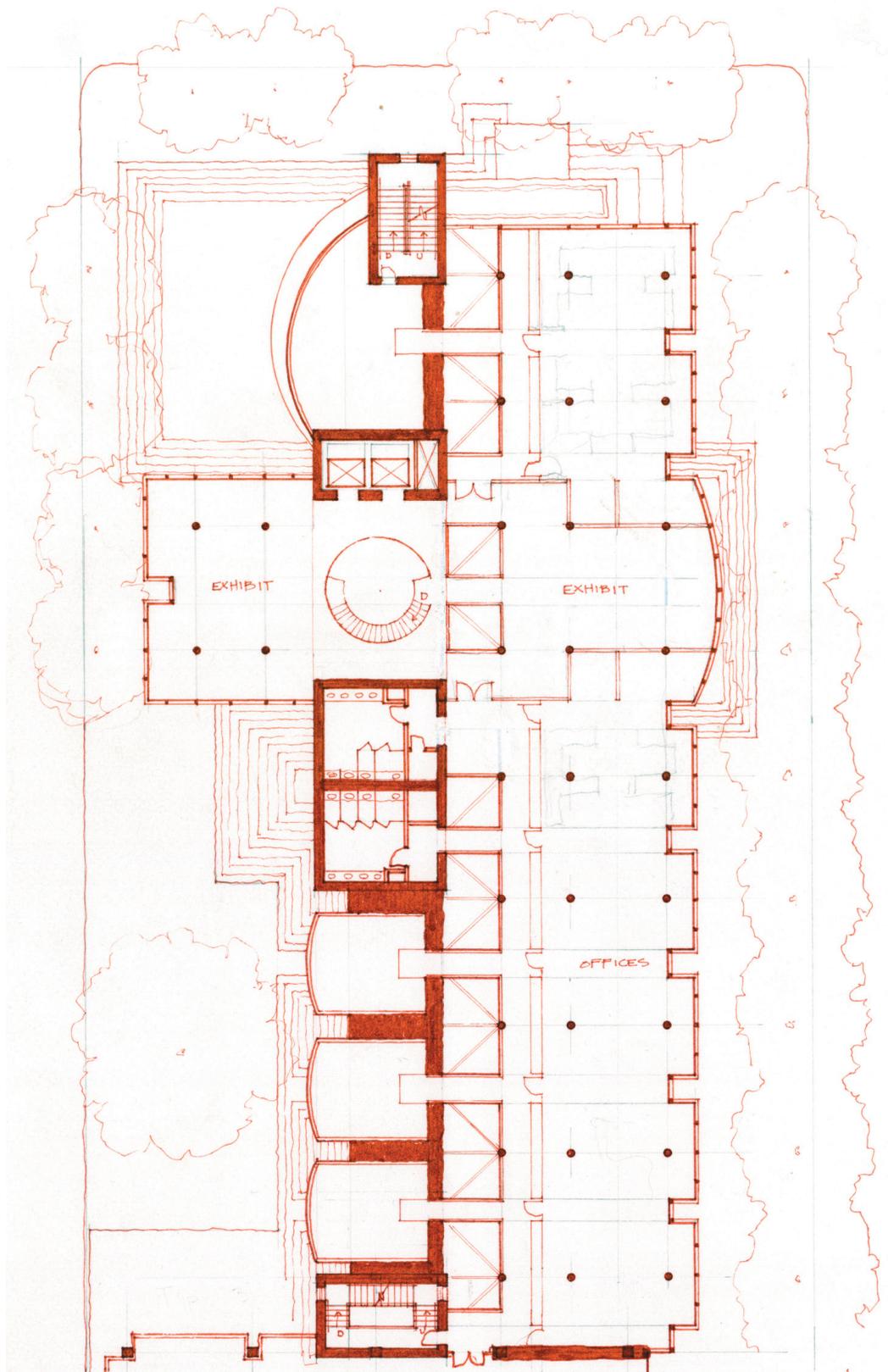


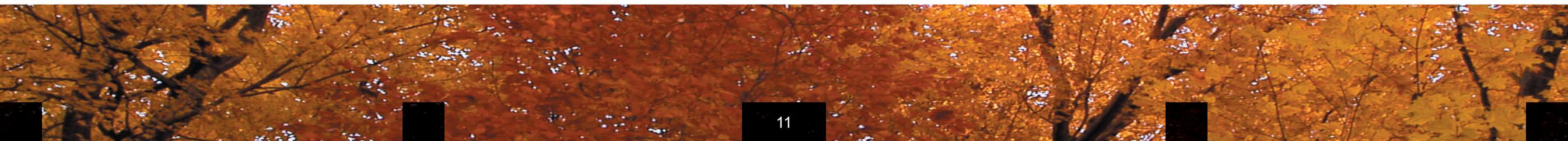
DIAGRAM 6: AIR FLOWS THROUGH BUILDING



SECOND FLOOR PLAN



THIRD FLOOR PLAN (TYPICAL)



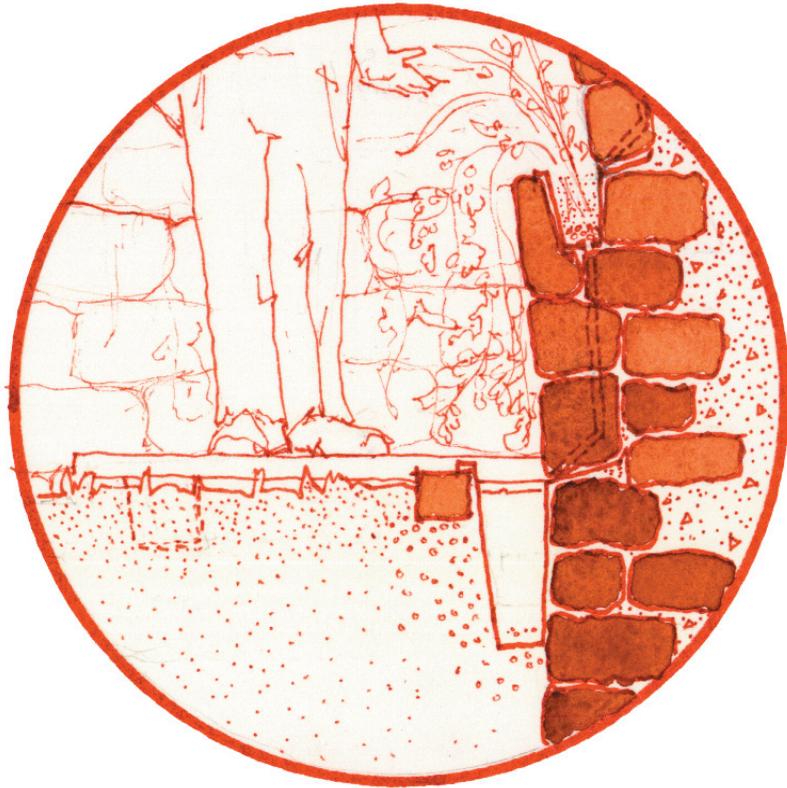
in the fuel cell generator. If the fuel cell is operating fully off methane reclamation, the electricity can be used directly, or sold back to the power company for use throughout the city. Thermal cells circulate fluid used to heat all of the water for the building and are potentially a source of thermal mass to ease the load on the mechanical systems during the cool times of year.

The fuel cell generator provides a source of balanced “clean” power in one of the most ecologically benign methods available to current technology. It uses the methane from composters in the building as a fuel source to drive the chemical reaction that produces electricity, heat, pure water and carbon dioxide. Additionally, electricity from the solar cells could be used to break water down into the primary reactants of hydrogen and oxygen. The generated electricity is used in the building or sold back to the power company and the heat from the reaction can be captured and used to pre-heat the building hot water system. The water is used as drinking water throughout the building. Carbon dioxide can also be contained and used in the production of fertilizers and plastics at nearby facilities.

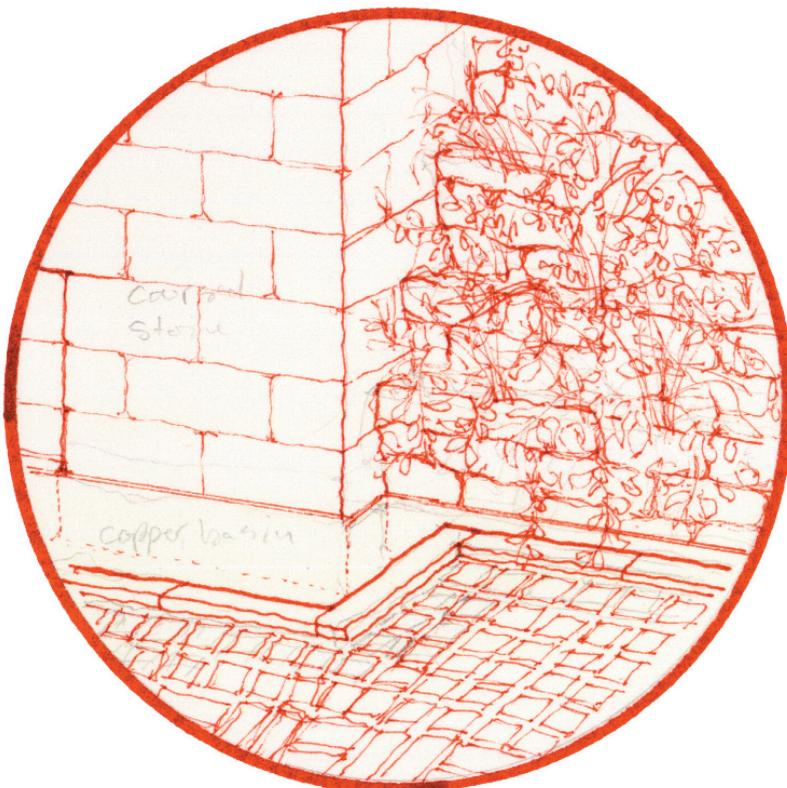
The sun’s energy provides the needed light for photosynthesis in the food production facility and keeps the upper level heated throughout the year. The heated air can be exhausted through perimeter windows and roof vents to draw cool air up through the building envelope. The small greenhouse building in the park serves as an air filtration and intake point for fresh cool air from the bottom of Rock Creek Park (air temperature in Rock Creek is typically about 10° cooler than the surrounding neighborhoods).

All work areas in the building have direct access to daylight adequate for most purposes throughout the day. Each occupant also has a view to the outside from a seated position. In the public spaces, daylight penetrates deep into the center of the space through the full height atrium along the stone wall. Shading from excessive solar gain is accomplished in a few ways. The north-south orientation of the building eliminates a large portion of the direct solar gains from southern sun, while the adjacent buildings and roof overhang control eastern sun. Additionally, a wire trellis outside the skin of the building supports vines from planters at the base of the building to shade the windows and provide some filtration of street particulates from the air. Manual shades on the interior of all windows also contribute to shading, and can be suited to the preferences of the occupants. Low western sun is blocked primarily by the trees in Rock Creek Park, with additional screening from the manual shades.

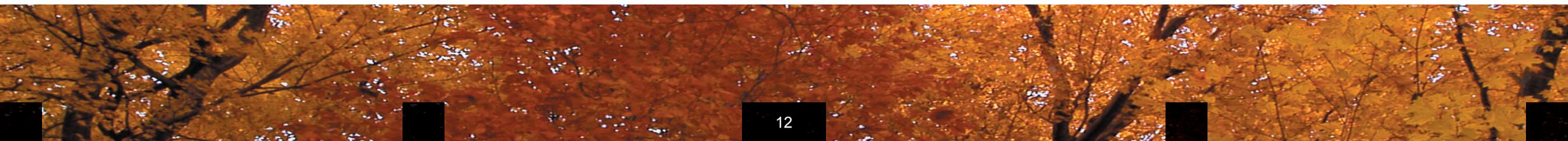
Photosynthesis begins another nutrient cycle in the building. The series of large growth tanks in the greenhouse level are a self-contained complete ecosystem. From microbes and bacteria to large vegetables, fruits and flowering plants, and even fish, these tanks are a working example of urban agriculture. The Institute uses the facility both for educational purposes and as a source of income. The produce used is used on the ground floor in the cafe which gives the public a tasty way to experience organic produce, and understand where their food is coming

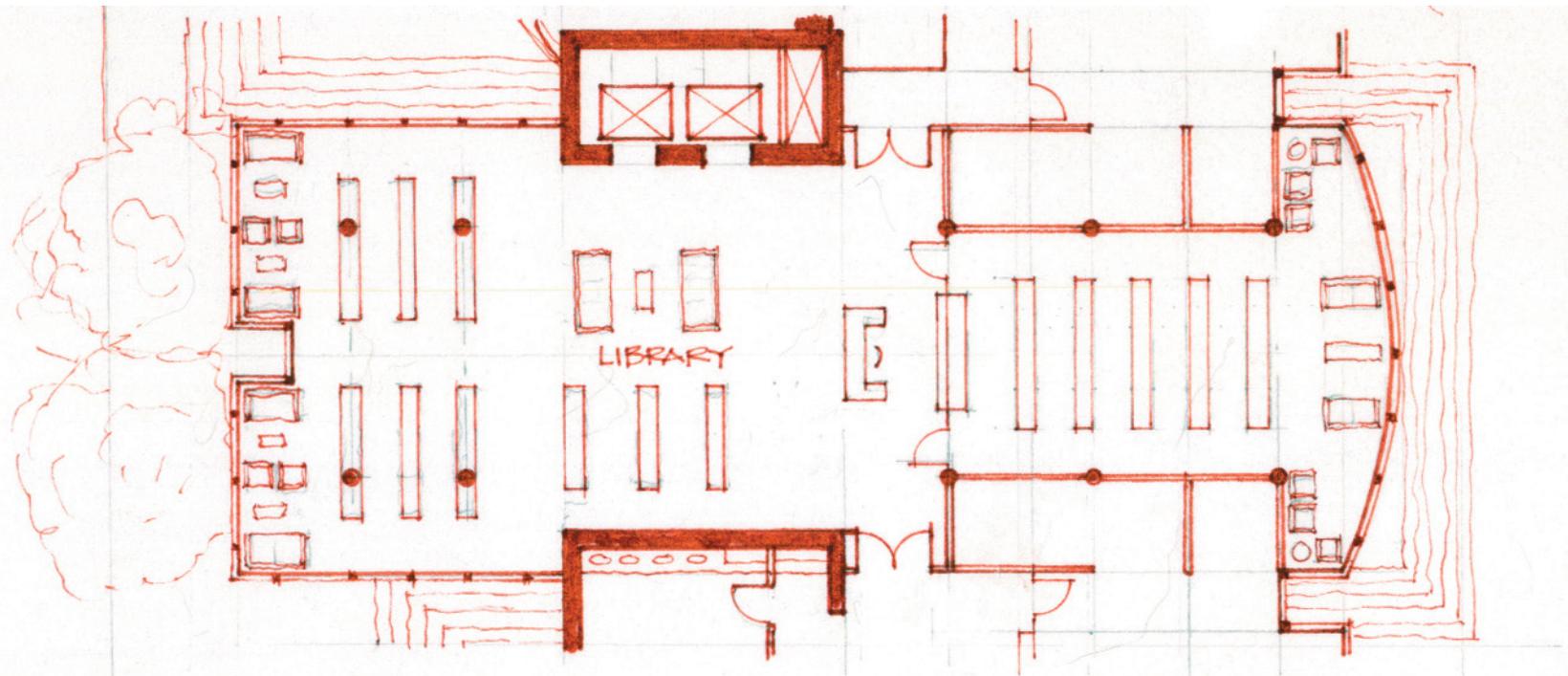


DETAIL 2: BASE OF STONE WALL



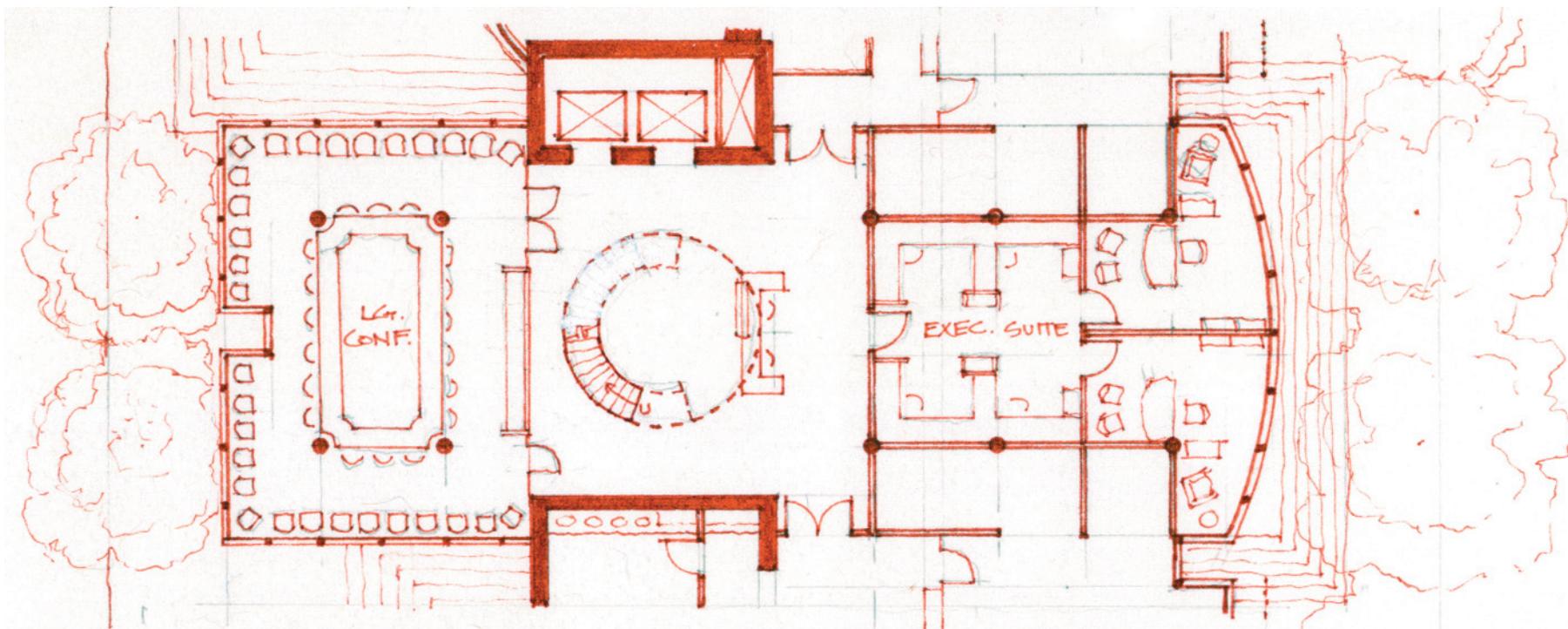
DETAIL 3: POOL AT BASE OF NORTH STAIR ENCLOSURE





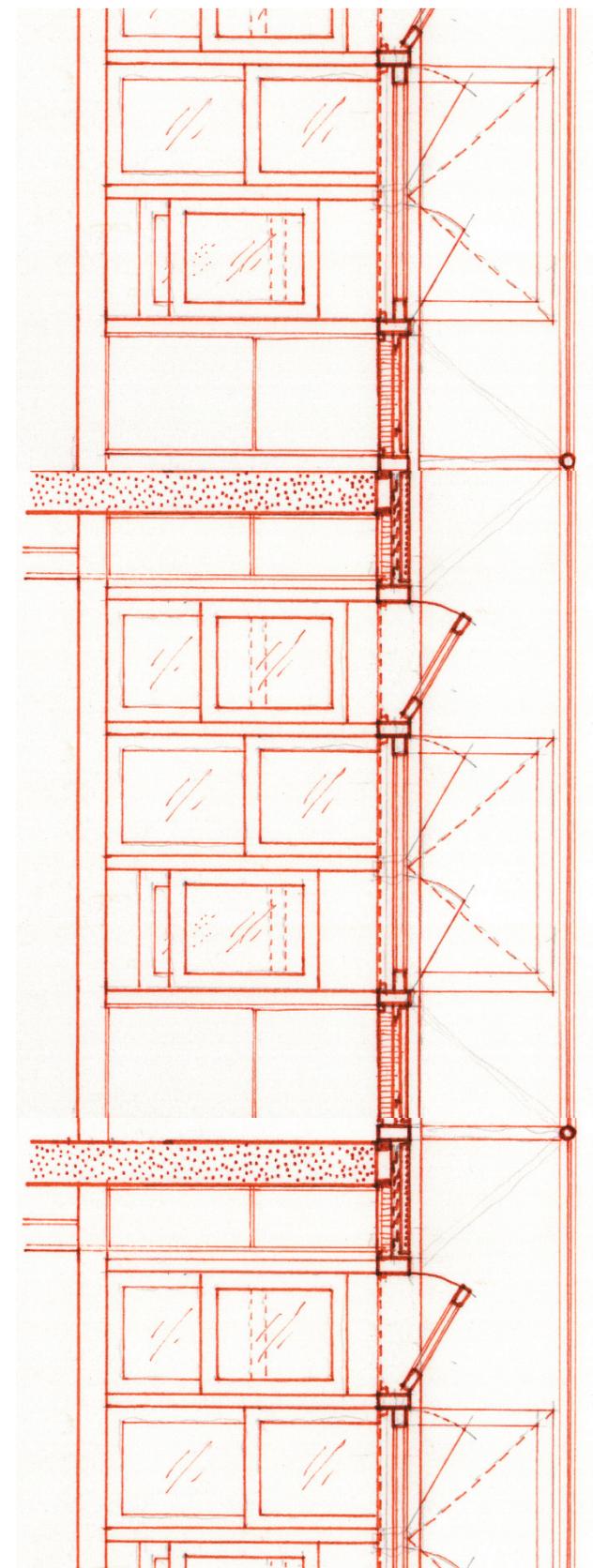
FIFTH/SIXTH

PARTIAL PLAN - 5th & 6th FLOORS



SEVENTH/EIGHTH

PARTIAL PLAN - 7th & 8th FLOORS



WINDOW SECTION

