THE BELL LABS CHARRETTE

A SUSTAINABLE FUTURE

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Preface

Completed in 1962, and expanded in the years following, the Bell Laboratories, which were designed by Eero Saarinen, with landscape by Sasaki, Walker and Associates landscape architects, grew to nearly 2,000,000 square feet through its 1980s expansion. In 2007, Alcatel-Lucent vacated the 472-acre property, leaving it in a state of limbo. On April 11, 12, and 13, 2008, thirty-six design professionals and planners convened in Holmdel, New Jersey to participate in a charrette to visit, study, reflect, analyze, and scheme over the building and its landscape. This publication is intended to document the charrette and to be a resource to those who wish to learn more about the effort to preserve and rehabilitate Bell Labs in a way that will respect its origins and the integrity of its design, while adapting the site to meet the uses of a new era.

Modern Architecture Preservation

Why we are looking at Bell Labs

Schemes by Preferred Unlimited, Inc. 2007.

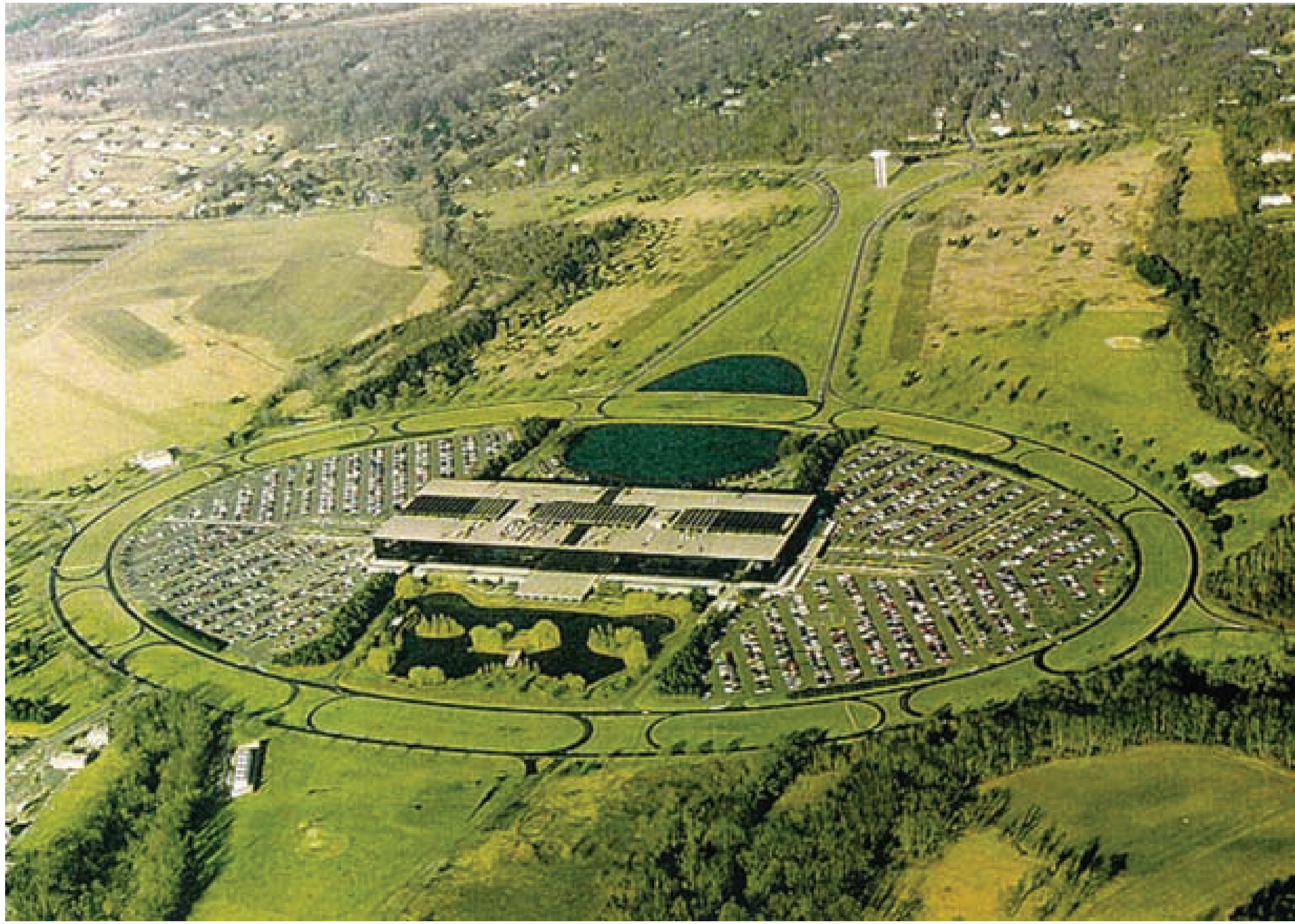
In discussions over the past few years about the future of Bell Labs, no convincing arguments were put forward about the true importance of the building and site and how to re-use it. Instead, it was assumed that the property was a blank slate and media reports served tacitly to set the stage for the public's acceptance that (at least partial) demolition would be necessary in order to reinvigorate the site.

As a few of us began to counter this assumption, groups started to coalesce around how to save the building and landscape. These groups included the New Jersey chapter of the American Institute of Architects (AIA-NJ), Preservation New Jersey (PNJ), and DOCOMOMO-US New York/Tri-State (the regional chapter of the international group devoted to the Documentation and Conservation of Buildings, Sites and Neighborhoods of the Modern Movement), as well as their national umbrella. To some, preservationists smack of the "taste police" or worse, self-anointed elitists who seek to dictate and control. To others preservationists are saviors and the conscience of culture. Like most matters involving humans, the truth falls between these extremes. Perhaps even more important than saving the building and site was the need to make sure that their future was decided based on looking at all realities and assessing the entire range of responses to the problem.

Below: Charrette breakout groups were created to promote discussion and investigation to present to the larger group of participants.

The public discourse about Bell Labs prior to the charrette largely revolved around a limited set of issues. Surely, maintaining tax-ratables for the locality of Holmdel, the property's marketability, and reigning in inappropriate development are still reasonable concerns. The thrill of the organization of a charrette with nearly forty individuals who gave their time and intellect to help envision a solution was unimaginable. In the post-charrette reality we are here to illustrate that the building and site are more significant, more beautiful, more flexible, more sustainable, and more adaptable to new uses than previously imagined. Our contained experiment that was the charrette sketched a vision of a viable future for the building and site (the proverbial win-win scenario), provided that the appropriate ingenuity, creativity, and resolve come to bear on this problem.

Michael Calafati, AIA
Chair, Historic Resources Committee, AIA-NJ



Why Bell Labs is significant

Bell Laboratories: Of and For Invention **by Nina Rappaport**

Bell Telephone Laboratories, designed by Eero Saarinen & Associates from 1957–62 (with Anthony J. Lumsden as project architect), and built for the research division of AT&T on 472-acres in Holmdel, New Jersey, was commissioned to be an iconic symbol of progress and innovative technology endeavors. The rectilinear, symmetrical, and refined complex came out of the American corporate campus planning genre of the late 1950s and early 1960s, similar to projects such as Skidmore, Owings & Merrill's Connecticut General Headquarters of 1956 and was appreciated by those who worked there as well as the architectural community. Its inventiveness as a place of exploration of new building materials, along with its scale, and the scope of its program literally and ideologically reflected the growing telecommunications industry.

The building's significance lay first in its new configuration of office and laboratory spaces, gleaned from Saarinen's experiences at his inventive IBM Minnesota Laboratory (1958), the GM Technical Center in Warren, Michigan (1948–56), and the Thomas J. Watson Research Center for IBM in Yorktown Heights, New York (1956–61). In Holmdel, however, he focused on interior flexibility of office layouts, as well as the closely knit areas for the researchers that also included workplaces designed for increased privacy. Common spaces such as corridors and atria and extensive landscaping linked researchers in contemplative environments. Technological exploration of new materials such as mirrored glass, in tandem with new construction solutions enabled Saarinen to design concepts that contributed to a new aesthetic of high technology precision.

Eero Saarinen (1910–1961), a well-known and highly regarded architect, who was featured on the cover of *Time* magazine, completed projects such as the TWA Terminal at JFK Airport (1956–62) now under restoration, the Yale Ingalls Hockey Rink (1956–59), the Saint Louis Gateway Arch (1947–65), and residences among other projects. Recently, his projects and persona have renewed attention due to new books about him and his work and the traveling exhibition *Eero Saarinen: Shaping the Future*. Amenable to the clients needs, he designed to suit their individual programs and sites and created iconic formalist compositions while experimenting with new materials. The work of his firm was continued by Kevin Roche John Dinkeloo and

Associates, who also finished Bell Laboratories.

The Bell Labs complex, which housed more than 5,000 scientists and staff, is set in a bucolic landscape of 472 acres of woodlands, wetlands, and open fields designed by Sasaki, Walker & Associates landscape architects. They designed an extensive landscaped roadway with a man-made oval pool around which the road network led to parking spaces angled to form a visually compelling graphic from above. The six-acre pool is used for the building's services, including air-conditioning and fire protection. As a landmark for the site they placed a 127-foot-high, 300,000 gallon, white-painted steel water tower adjacent to the road.

The building's first phase was 711,172 square feet (70 feet by 135 feet), and five stories above grade. A second phase built in 1966, after Saarinen died, expanded it from the core to the back for its current 350-feet depth and to create the interior courtyard space. In 1985, Roche and Dinkeloo expanded the building's length with two more bays at each end adding office spaces. The building is raised on a five-foot above-grade concrete podium from which intake and exhaust systems for the building's air-conditioning is housed. The lower level includes an auditorium, cafeteria, shops,

mailroom, library, computer room, services, and loading docks, as well as a huge basement facility for technical equipment and mechanical systems. The complex presents itself as a five-story building from the entrance front, but, thanks to the site's slope, the lowest level is exposed on the opposite elevation, allowing the cafeteria and dining rooms to take full advantage of the landscape.

Numerous design innovations were cited by critics and architects at the time of the building's completion. Primary in the discussion were the building's layout and spatial arrangements comprising four, six-story units separated by the open cruciform atrium. In fact, Bell referred to these as Buildings 1, 2, 3, and 4. The shorter axis middle sections served as the entrance and reception lobby and led to the transverse open atrium space capped by a skylight in Corten steel. An extensive and dynamic corridor network allowed light into the building and provided a new kind of public space for an office building. Rather than the typical double-loaded corridor, or open loft-like offices, the configuration offered both privacy and community—similar to the new lobby of today. The 24-foot-deep laboratories on one side of the interior corridor and 12-foot-deep offices, on the other, were setback from the façade with 6-foot-wide corridors circulating between the offices and the periphery of the building against the window-wall. These perambulating corridors provided expansive views out to the landscape while the interior corridors provide private access to offices with views to the atrium space. Shorter cross bridges served as walkways above the atrium on the upper floors.

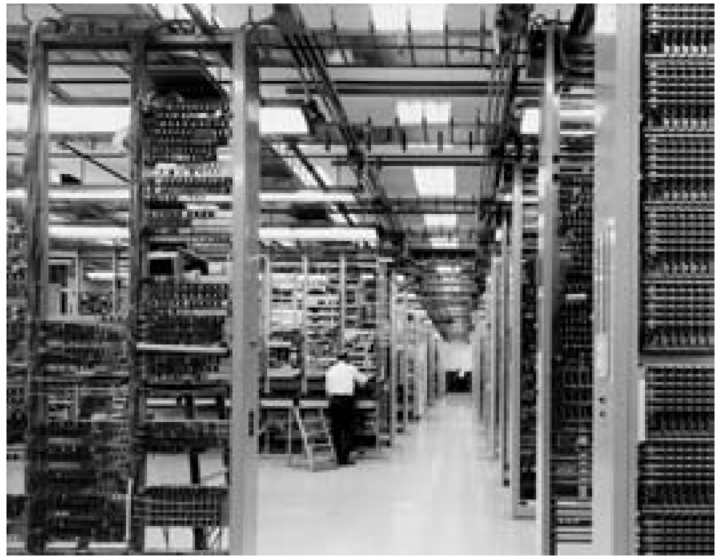
The building structure was a flexible interior arrangement with flat-slab, reinforced-concrete construction with column bays 45-feet-9-inches by 18 feet and a working module of 6-feet-square. Inverted channels in the ceiling supported partitions for the acoustics and lighting fixtures. These units open an area core or split into various module sizes for offices; in addition space dividers doubled as storage wall units. The module system was a way for the scientists to expand and contract their work space as needed in order to have more immediate control over it. The elevator cores served as the infrastructure connectors between the first and second phase of the building, as the addition could basically plug into the old. The 1985 extension executed in steel rather than concrete by Kevin Roche continued the repetitive modules in a rhythmic and symmetrical flow.

The mirrored glass façade was the most visually compelling element of the complex, and while used for portions at the IBM campuses, here Saarinen used it as the primary cladding material, exploiting its translucency and transparency. The mirrored glass, which reflected 75 percent of the sun and transmitted 25 percent daylight, was first completed only on the south side, since the fabricator could not produce enough glass for the entire building. What was not mirror-glazed in the first phase (front and east and

Opposite: Bell Labs' mirror-glazed façade
Below: Lower level computer servers.

west sides) was a gray, heat-resistant glass. Eventually, the entire building was sheathed in the new mirrored-glazed glass. The two panes of 3-foot by 6-foot-6-inch glass were laminated with a plastic film and a thin layer of aluminum particles sandwiched between. The panes were held in place with neoprene gaskets and separated with anodized aluminum mullions. The glass had a double function, to allow for views out of the building and for privacy (employees could not be seen except in the evenings when the lights were on) and to reflect sunlight, thereby reducing heat gain. Additionally Saarinen was able to eliminate shades, which he thought cluttered the space. The building became invisible, blending with the landscape by reflecting it.

Historically, Bell Labs was the site of technological advancements in the telecommunications industry. It was home to the work of Nobel Prize laureates, to the creation of radio astronomy by Karl Jansky in 1932, as well as to the development of the transistor, microwave transmission, and, more recently, cellular telephones. When Alcatel purchased Lucent, which had purchased AT&T, the company didn't need as vast a workspace for its employees and the building was vacated in 2007. Today, the building holds potential for reevaluation and reuse as a sustainable, flexible, multipurpose structure, one that embodies a significant chapter in the history American scientific research and development and a sustained period of progress and optimism.



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Bell Labs oral history project

In April and May, Nina Rappaport with Christiana Pena, a Columbia University graduate student in historic preservation, worked with the Oral History Center at Columbia to record the personal histories of former Bell Labs employees (called "Pioneers"). She interviewed seven Pioneers, some of whom also presented their stories at the opening night of the charrette. A summary of their discussions is included here.

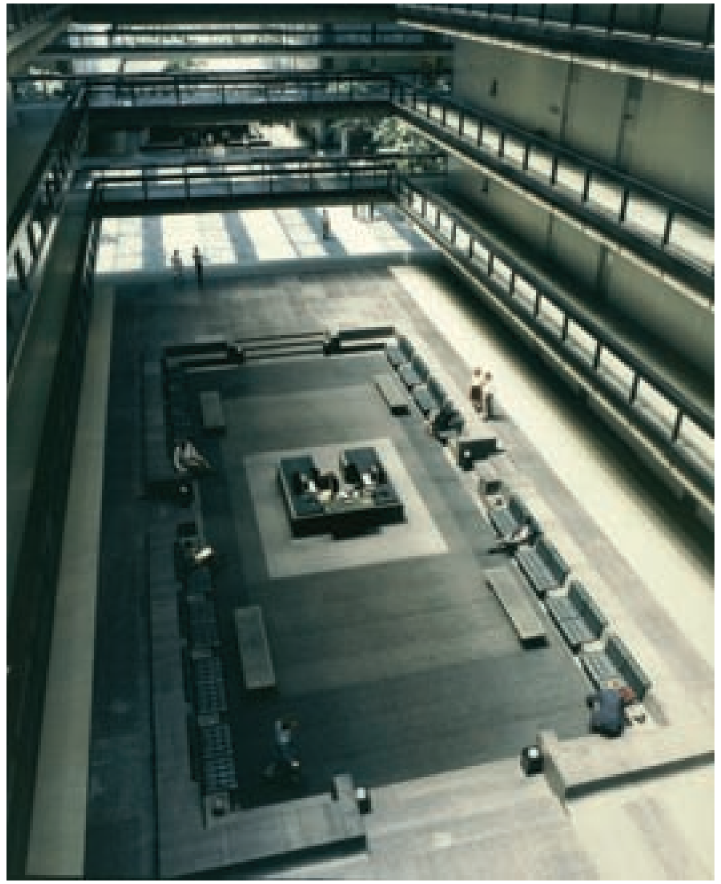
Was your first day of work your first day at the Bell Labs campus? What were your initial impressions?

Only one respondent was familiar with the Holmdel area before accepting a position with Bell Labs. In general, experiencing the labs themselves did not take place until each new hire's first day of work. For **Tom (MTS/Data Communications)**, "the place was a self-contained city." Truly, commuting to Bell Labs was something that required adjustment on the part of the employees. For **Norman (Operation Systems Quality Director)**, coming from a job in New York City, the change from mass transit to personal vehicle transportation was interesting: "I had never heard of snow tires [before working at Holmdel]." Likewise, **Ruth (Education Department)** recalls: "I quickly learned that without a car (or a driver's license) I was completely dependent on my co-workers and roommate for getting to and from work. My first day ended with me in tears, as I waited a long time at a bus stop in Whippany on a sweltering 100-degree day." Accessing the "City of Bell"—as it might have appeared to its employees—was a process, which marked most of the respondents' initial impressions of the campus. **Leland (Software Development)** is no exception, and his memories of his interview day at Holmdel are particularly vivid: "[We] entered the building, and gave our names to the woman receptionist at the massive stone desk in the center of the atrium; then [we] sat on one of the benches in the "sunken living room" of the lobby, waiting for our contacts to appear. I stared up at the crosswalks amazed by the many people hurrying, walking, and strolling by. I could not help feeling a profound sense of awe; this was Bell Labs I was visiting, and they were considering me for employment."

What were your responsibilities at Bell Labs?

Members of the Bell Labs staff appear to have had the opportunity to move among departments and expand their own knowledge and that of the company's by contributing to various departments during their tenures. Many respondents noted several projects on which they were involved. These ranged from development of software and data communications equipment to major missile simulation projects. Ruth remarked that at Bell Labs, she felt able to utilize all of her undergraduate math and engineering knowledge. She continued on to note that Bell Labs assisted her in earning a graduate degree. The company encouraged its employees to continue their education, developing the One Year On Campus Program. Leland was one such employee selected to return to school, Purdue University, where he obtained his Masters degree in electrical engineering.

Right: Library
Below: View from above of the reception desk in the sunken reception area.



Please describe what your workspace was like.

Tom describes his workspace as a "four-man office with lab space across the hall. Personal storage space in the office was rather limited, but all space was usable and well designed. The labs were excellent, with flexible arrangements that could be changed as needed. Phone service was somewhat limited; no voice mail in those days, and the company wouldn't provide full key telephone service to allow us to pick up in the lab. Being engineers who understood the system, we made a few modifications that NJ Bell didn't like …" **James (Design, Education and Management)** explains that office size was tied not only to job ranking but to the building in which a department operated: "Engineers worked in two- to four-person offices or laboratories. Supervisors and department heads had private offices that varied in size according to "level" and building characteristics. [There was] about 180 square feet for a department head, a bit less for a supervisor. We spent a lot of time in the labs." As employees changed departments or were moved up in their positions, their workspaces could be altered. As Norman stated: "My workspace was small, but grew as I was promoted." The offices, regardless of rank, were windowless. When inquiring into why this was so, Leland was told that "the architect prohibited artwork from hanging on the walls, as he considered the people to be the decorations." Prohibiting visual

distractions in the workspace was compensated for with inspiring landscaping (although some workers rebuffed the ban on decorations and hung wall-sized paintings that resembled a window with a view of the outdoors" in their workspaces, as **Sam [Transmission Systems Engineer]** recounts). Leland continues: "Once, an astute co-worker remarked that [the] gardener is the most professional person in this entire building.' He had a point. The gardens were full of poinsettias at Christmas time, lilies at Easter time, and were always filled with well chosen, well placed, and well cared for plantings." Knowing that beautiful grounds surrounding their office space was most certainly refreshing. Employees could view these green spaces from non-office communal space via an extensive amount of glass. Sam remembers that "the reflecting glass was particularly impressive and provided delightful views, constantly changing with time of day, weather conditions, and the angle from which you approached." Sam continues on to remark how pleasing the plantings—both inside and out—were for the employees, noting that the interior plantings "provided a health benefit by improving the air quality through photosynthesis."

While at work, did you tend to stay in your department? How often, if ever, would you say you visited other departments (to speak with colleagues, visit friends, deliver or retrieve materials, etc.)?

"The advantage of working at Bell Labs," according to James, "was that one encountered people from all levels and disciplines." Indeed, all respondents noted that, whether for work purposes (Tom: "As circuit designers, we worked closely with physical designers a couple of aisles away. We also worked with systems engineers over in Building 2, so had occasion to visit them."), or for self-interest (Norman: "I always wandered around the buildings."), they regularly moved outside of their own departments. In doing so, James says he could seek out the knowledge of other Bell employees: "There was always an expert available on virtually any subject one needed to explore in depth."

Did you use the grounds at Bell Labs?

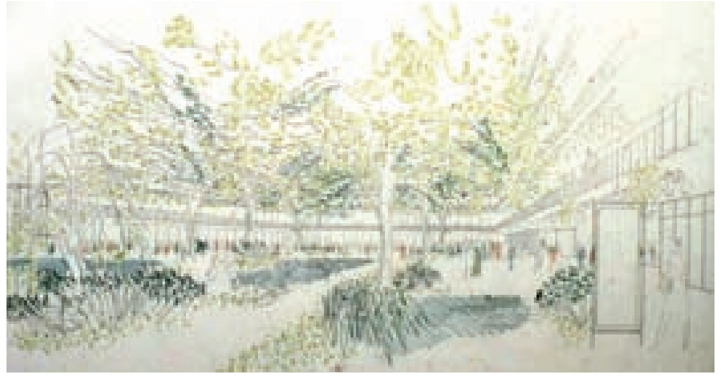
Not all respondents used the grounds at Bell Labs themselves, though all at least remarked on their forms of use by others—be that for softball games or flying model aircraft. Norman passed his lunchtime hour strolling through the grounds. James notes that they were ideal for providing a respite from the labs: "Most of the offices in Holmdel had no windows, so [the grounds were] conducive to wandering and interacting." For Ruth, there is some regret that she did not allot more time in her day for being out of doors: "Now that I look back I can't understand why I didn't take advantage of the beautiful surroundings in Holmdel." Leland

Opposite: View from the upper floor interior out to the front landscape.
Below: Sketch by Eero Saarinen, 1956.

provides a contrast as he used the grounds daily for lunchtime strolls. And even occasionally cross-country skied on the Labs' front lawn.

What kinds of problems or quirks did you find in the building (layout, mechanical, etc.)? How would you have improved them?

Here the respondents affirm their earlier sentiments regarding the city-like nature of the Bell Labs campus. While James and Norman praise its layout and conveniences, saying "I thought the whole layout was well designed for the work being done there," and "It was a great building. We had a U.S. Post Office and a credit union on the premises. There was a large room in the sub-



basement with an incredible model train layout," others noted some of the design's downfalls. "Cynics described the layout as 'looking like a prison,'" remembers Leland, "The walls are steel painted white. There is no wood or fabric used. Colors are all neutral." Echoing his earlier comments about the architect's intent, Leland again suggests that "the inspiration comes from the gardens, grounds, people, library, lunchroom conversations, meetings, auditorium presentations, and the work." "Distances were huge from one point in the building to another," recalls Ruth "The roof leaked, but that only affected those who later worked in the atrium. I loved the interior design in the mid 1960s, before a shortage of space resulted in offices and the library taking over the atrium." **John (DMTS Department Head)** went as far as to describe this taking over of the atrium as "cannibalizing." Sam also laments the loss of the atrium's function: "Many of us were disappointed when plans were implemented to locate many services in the atrium at the expense of aesthetics and health-encouraging plantings."

How did the facilities change while you were working at Bell Labs?

Employees of Bell Labs experienced a great amount of change in their work environment as the facilities grew beyond the confines

Left: Office Interior at Bell Labs
Below: The largest dining room facing north takes advantage of the sloping site with vistas to the landscape.

of the original building. “While there, I (and others) watched two more buildings being constructed, the atrium being glassed in and, later, all four buildings being lengthened,” said James. As Ruth already mentioned, the atrium was altered to accommodate expansion needs before all of the construction was completed. Along with the structural components of the facility, Bell Labs’ interior changed with the times. Leland was fortunate to have his department selected as trial space for Steelcase modular furniture, which was found to be more colorful and more efficient than the old, traditional gray desks. “A consulting firm made this into an elaborate project,” he recalls.

What were the best aspects of working at Bell and the least comfortable?

The communal nature of Bells Labs, fostered by employee clubs, belies the facility’s size. Aside from overcrowding prior to expansion, respondents describe a professionally exciting environment fostered by the landscaping and architecture, as well as the excellent library. “The biggest advantage was our pride in the organization, and the feeling that we were treated as valued assets,” Tom said. “The Bell Labs Club was a great way to meet others in the building whom we would not otherwise interact with. Having the award-winning building just reinforced that impression.” Further strengthening the sense of community was the impression by some that “the senior management was interspersed throughout the building, in offices that weren’t very much more palatial than normal technical people,” as John recalls. The employees were—regardless of rank—all equally equipped, which enhanced their feeling of parity. The sense of belonging was felt by some to include Bell Labs on a national scale. James remembers, “We paid a lot of visits to other Bell Labs facilities around the country and attended many technical meetings and conferences.”

The division between interior and exterior is evident in Buildings 1 and 2 that flank the main reception area and direct the view south to the curtainwall and walkways.

On a typical day, how did you move in and around the building?

The Bell Labs campus was a nexus of activity. Though former employees have noted here that many of their work needs were met by their own workspace, they have also attested to a high degree of interaction with other departments. That said, movement was often achieved by means of stairs. Ruth reminds us, “As I mentioned before, the distances were huge, but I’m a hiker, so it didn’t bother me.” Likewise, Sam “[took] advantage of the physical benefits of using stairs when arriving and departing for work and when going to lunch or to service areas.” When equipment was being relocated, the elevators were more frequently used. In general, though, these horizontal and vertical distances did not seem to encourage any animosity toward the building’s layout. On the contrary, to this question Norma responded with the lighthearted comment: “I rode around on my unicycle, of course!”

What is your favorite story or anecdote of working at Bell Labs?

As Tom states, “My good memories are more about the people I worked with than about the building.” He continues to offer reasoning for this: “In the early years the building was basically ‘transparent,’ not in the sense of the glass walls but rather that it was so well designed and laid out that it met our needs without being apparent.” The events which define the respondents’ time at Holmdel were highly varied: amusing for James—“The magician, Randi, who lived nearby, would come to the Holmdel auditorium during lunch hour and show us his magic tricks, including de-bunking the ‘psychic’ Uri Geller. We had a lot of employee musical groups, including folk song groups and a small symphony orchestra that gave performances in the auditorium during lunch hour.”; catastrophic, for Ruth who recalls two separate experiences involving a crashed computer server and a failed missile simulation; or unconventional, for Norman who witnessed a small plane make an emergency landing on the lawn. Still, they all seem to confirm Tom’s sentiment—the building was a successful backdrop to the innovative work being done and wildly diverse memories being created at Bell Labs. These memories were not always of the “everyday.” Leland’s recollections teem with striking moments: Nobel Prize recipient luncheons, demonstrations for the President of Malaysia, even the filming of a commercial that involved the facilities being circled by a helicopter.

Charrette Organization

Why save Bell Labs

Entry façade today.

Bell Labs Holmdel is historically important because it was a site for innovation, for the development of important new ways of looking at things. Innovation is precisely what the site needs today. It is easy to dismiss Bell Labs as an obsolete, oversized white elephant, no longer usable by its corporate owners, in an industry that has moved on. It is easy to imagine that the best and highest use of the site is for luxury homes, because that is what has been favored by the real state market in that region in recent decades. Yet, the easy, conventional view misses some key points. First, the building and its landscape are cultural icons worth preserving—masterpieces by great artists. Second, the real estate market of tomorrow will differ from that of yesterday, as baby boomers age and high gas prices change the economics of commuting. Finally, the potential of the building for adaptive re-use has never been systematically investigated, and potentials could abound for its re-use.

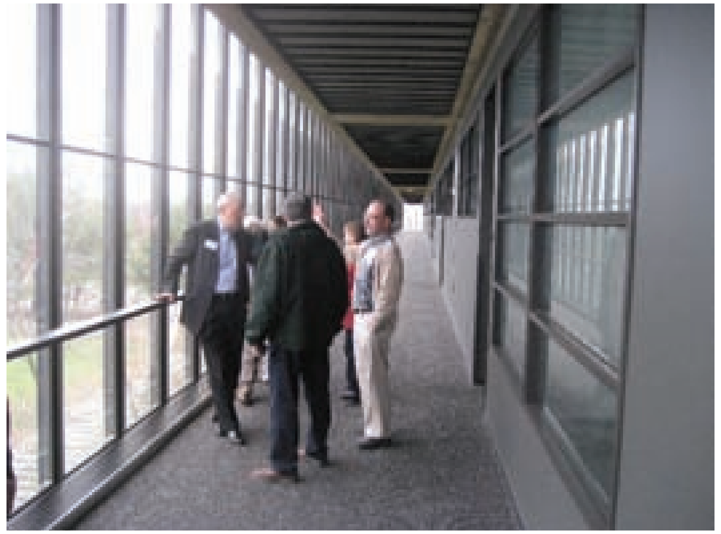
A charrette is an intensive workshop that brings together design professionals from relevant disciplines to focus innovative thinking on a particularly challenging problem. It is like a structured brainstorming session. A large number of professionals—far more than any single project design team would normally include focus their attention for a few days on a vexing problem. The ideas that emerge are often new and exciting.

The objectives of the Bell Labs Holmdel charrette were as follows: first, to understand what is important and worth preserving at the site; second, to understand the preservation challenges and the real-world constraints; third, to expand the set of future possibilities for the site, and the building itself; and fourth, to encourage a wider public and private developer discussion about the possibilities for adaptive re-use of the site and to explore which ideas have feasibility.

How we get ideas

The range of participants in the charrette was part premeditation, part serendipity, and auspicious overall. While the majority of participants arrived from the New Jersey and New York metropolitan region, the Boston and Washington, D.C. regions were also well represented. Of the thirty-six charrette design participants (page 69), just over half were registered architects, licensed landscape architects, and professional engineers (fifteen, five, and three, respectively). The remaining participants included professional planners (three) and historians (four), and one interior designer. To round out the group, there were numerous license-track interns and students in professional degree programs (eight). The interaction between young, mid-career, and seasoned practitioners was remarkable. The devotion of the participants to seek solutions to the challenges of Bell Labs is also noteworthy as they turned over three days to an uncompensated effort at a time when spring was finally arriving in the Northeast.

A charrette doesn't just happen. It takes planning, resources, and the recruitment of a group of talented volunteers. An organizing committee did the planning, acquired the resources, and recruited the volunteers. A local partner (Citizens for Informed Land Use) assisted with logistics, the meeting space, and provision of great food to fuel the volunteer efforts. A facilitator (myself) organized the schedule of the charrette and managed its operation.



The charrette event spanned three days, starting on Friday, April 11, 2008 with a tour of the Bell Labs building and site, followed by a public event during which neighbors and former Bell Labs employees (the "Pioneers") answered questions about the site, the building, and its significance. Saturday was the professional heart of the charrette, during which the participants undertook four systematic brainstorming exercises and produced the bold proposals and arresting visual images shown in this publication. Finally, on Sunday, the professional participants reported back to the public on what they had discovered. Members of the public in turn offered comments and criticisms.

The charrette's brainstorming exercises moved from the general to the specific during Saturday's work sessions. In the first session, participants asked what is significant about this facility, in part interpreting what neighbors and former occupants had told them on Friday night. The second session explored the nature of the preservation challenge, identifying constraints that ranged from the technical to the political and economic. The third session moved to the realm of solutions, exploring general strategic directions worth pursuing. The fourth session zoomed into solutions for particular problematic features, such as the sustainable systems and HVAC, organized along disciplinary lines. In the fifth session, the participants regrouped into multidisciplinary teams, each of which worked on a different adaptive re-use proposal. In the final session, the teams shared their results with all of the participants. This highly efficient process ensured that participants had multiple opportunities to learn from and inspire one another, and led to a set of creative, yet well-grounded proposals for future uses of Bell Labs.

As facilitator of this charrette, I am grateful that so many talented professionals donated so much time—giving up a whole spring weekend. The participants took the task seriously and produced some truly innovative solutions to the problem that is Bell Labs. I was impressed by the level of community support for this effort, and warmed by the hospitality of the local hosts. I was equally impressed by the dedication and energy of the historic preservation community whose members came from far and wide to rally around this project. The ideas shown in this publication have the potential to lead an imaginative investor toward realization of a truly exciting re-use of the Bell Labs Holmdel site.

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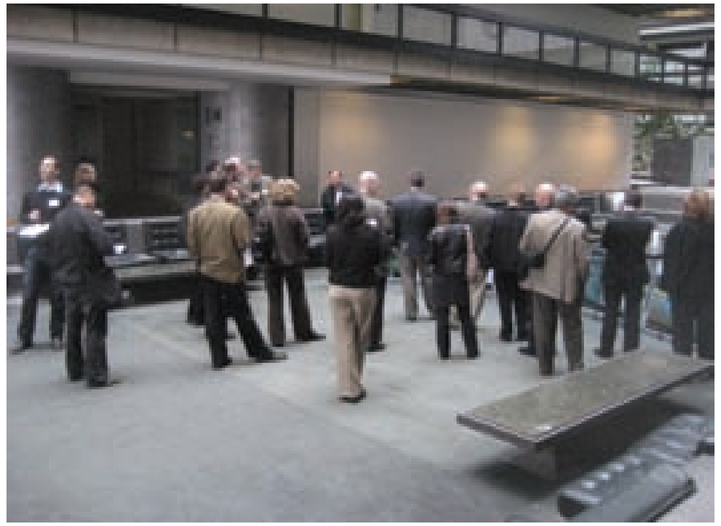


Left and Opposite: The charrette participants toured the building at the start of the three day event.
Below: Charrette working groups.

Charrette Ideas and Visionary Schemes

How we can make it work

To unveil all of Bell Labs' mysteries, after visiting Bell Labs on Friday afternoon, charrette participants completed analysis on Saturday, dissecting and synthesizing its many aspects to make re-use program concepts possible later in the day.

The mass that is Bell Labs

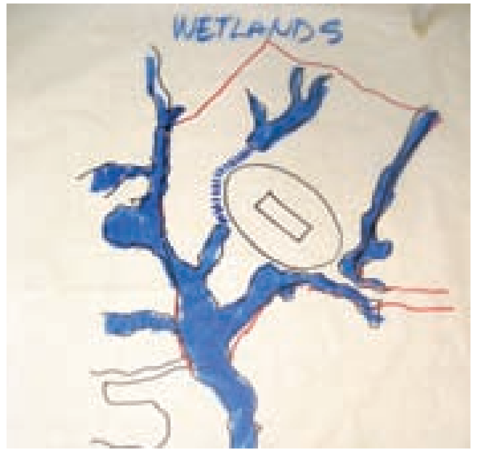
The usable area of Bell Labs, after deductions are made for the lowest floor (the first floor is often perceived as the basement level because it is partially below grade and below the main floor) and the main floor (or the second floor) and the atrium area, is less gargantuan than perceived. While still very large, it could be developed for different uses, especially when it is considered as four, 5-story buildings on a common podium with a common basement (calculations by Harold Fredenburgh).

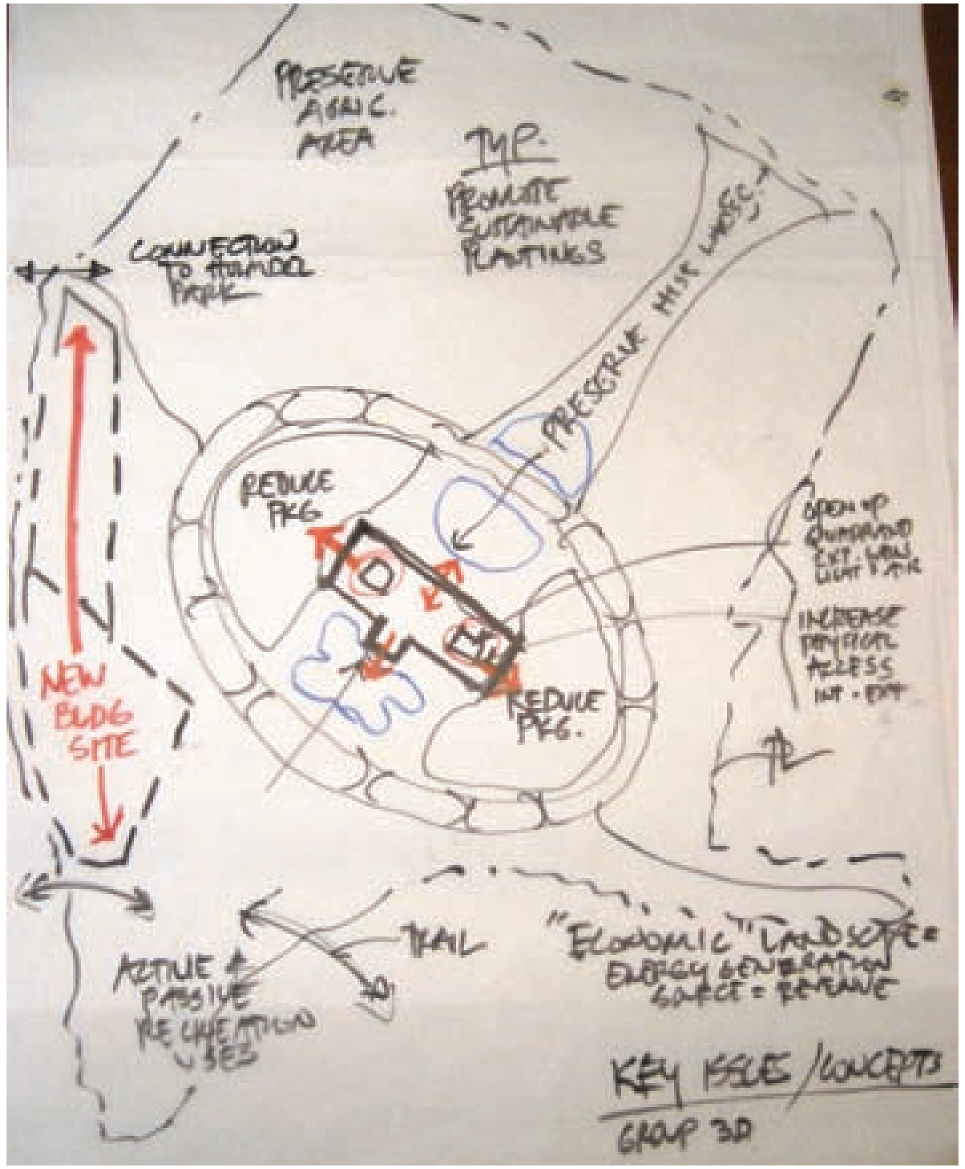
	Pre 1980	Post 1980
Floor 1 Basement	319,514 sf	443,546 sf
Floor 2 Open Atria Level	69,620 sf	99,546 sf
Floor 2 Elevator Cores	6,032 sf	6,032 sf
Floors 2–6 Building	875,788 sf (four 5-story buildings at 218,947 each, 43,795 sf per floor)	1,343,680 sf (four 5-story buildings at 268,736 each, 53,747 sf per floor)
Floors 3–6 Elevator Cores	24,128 sf	24,128 sf
Floors 3–6 Bridges	10,000 sf (not including corridors wrapping around blocks)	15,504 sf (not including corridors wrapping around blocks)
Total Area	1,305,082 sf	1,932,436 sf

Opportunity or Limitation

Bell Labs' site, both as part of a county and a township, pose interesting contrasts. The open space is recognized as a valuable asset and an increasingly rare commodity in the northern NJ/NYC region. Monmouth County, a part of this region, remains a fast-growing area. Holmdel Township is a mix of open space and parks and some congested highways and related development. The Bell Labs site—the western and more open portion of the township—neighbors public parklands. Wetlands on the site, part of the Navesink-Swimming River Watershed, feed the local reservoir. The recreational tie-ins, especially for passive activity, are obvious.

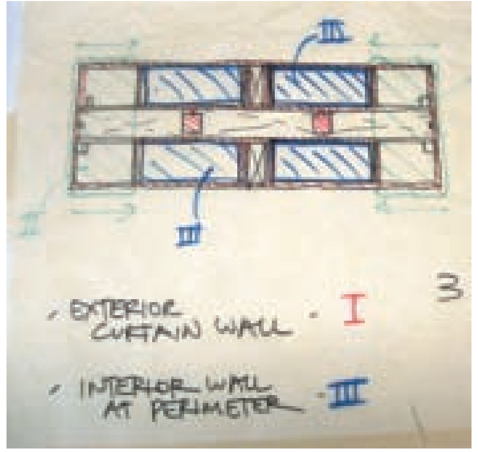
Access to public transportation is difficult. While the Garden State Parkway is convenient, local streets are not served by regularly scheduled bus service and the nearest train stations, both which are beyond the parkway, are five miles away. It seems that the automobile will remain the primary means of access.

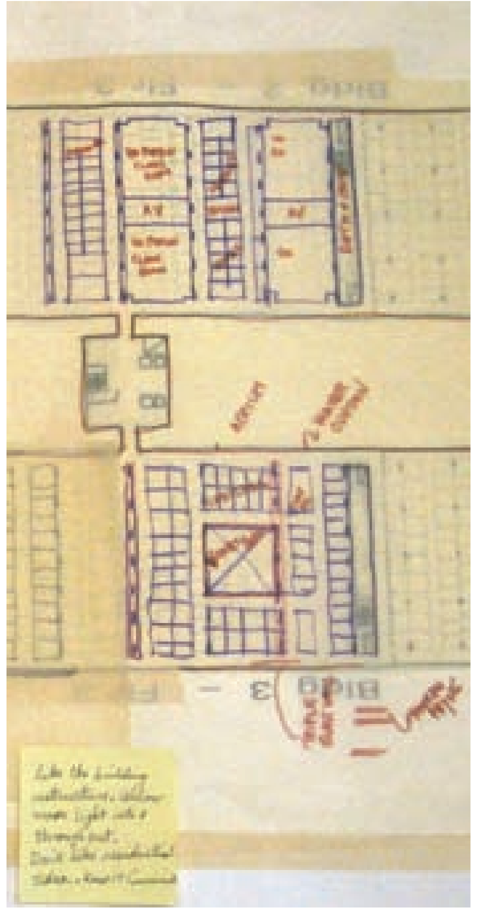


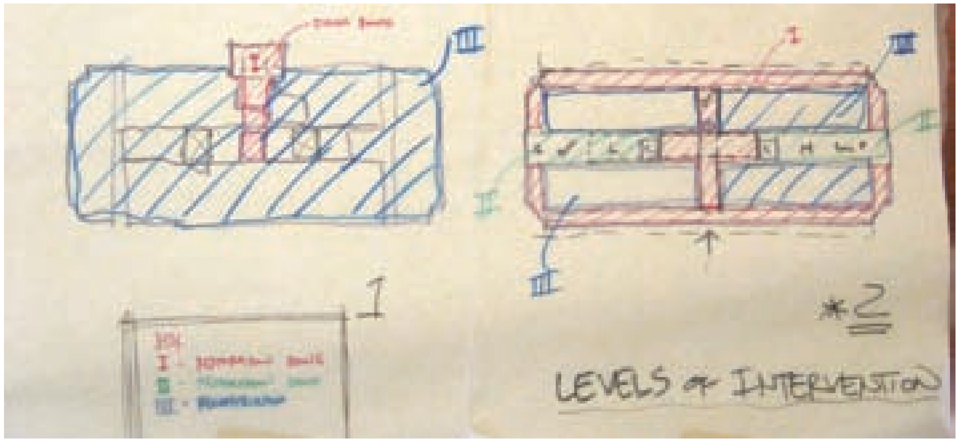


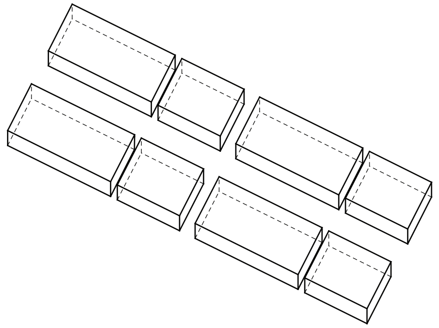
Preservation issues

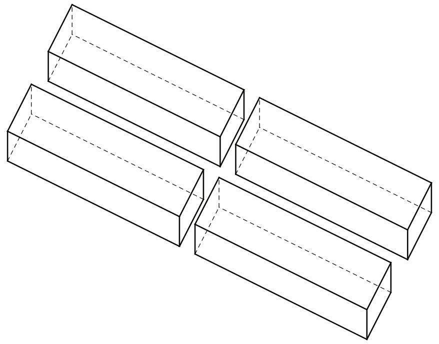
Identifying and ranking the importance of character-defining features of the building were key to the charrette design participants. The designers arrived at a consensus that maintaining the integrity of the curtain wall system (especially along the long elevations), the central atrium, the auditorium, and the lower level dining areas was essential. The importance of the curtain walls at the shorter end walls was considered less significant in order to allow possible manipulation or partial removal for new natural ventilation. The interior volumes and layouts of original laboratory and office space were considered the most adaptable for alterations.

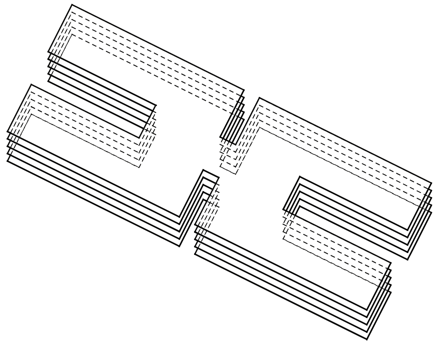






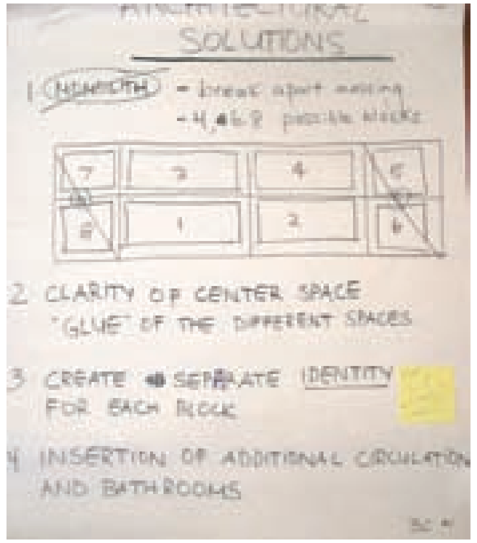


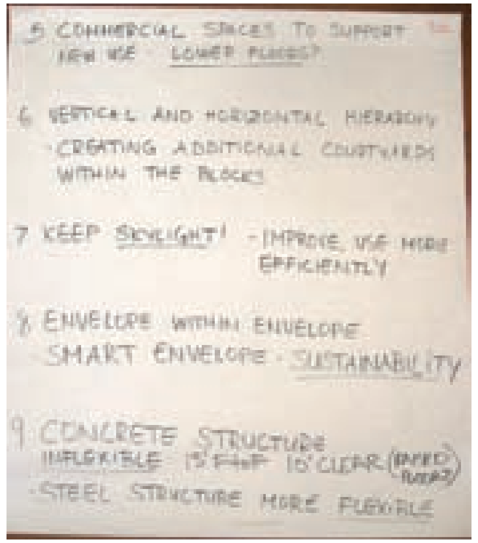


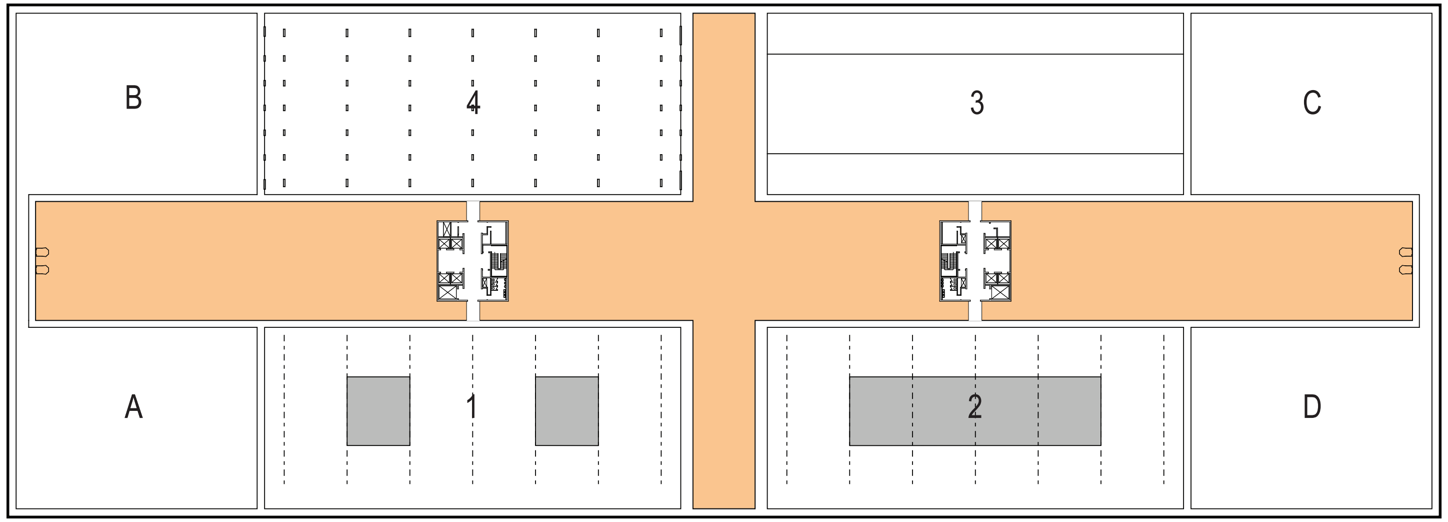


Building analysis

The identification of building preservation issues allowed for the subsequent distillation of approaches to adaptive uses. This allowed new ways to consider different building scenarios, such as the building's transition from a single building-single user to multiple uses. While each of the four buildings could be adapted to new uses, the atria and the main floor would be emphasized as common elements to bind the new uses together.

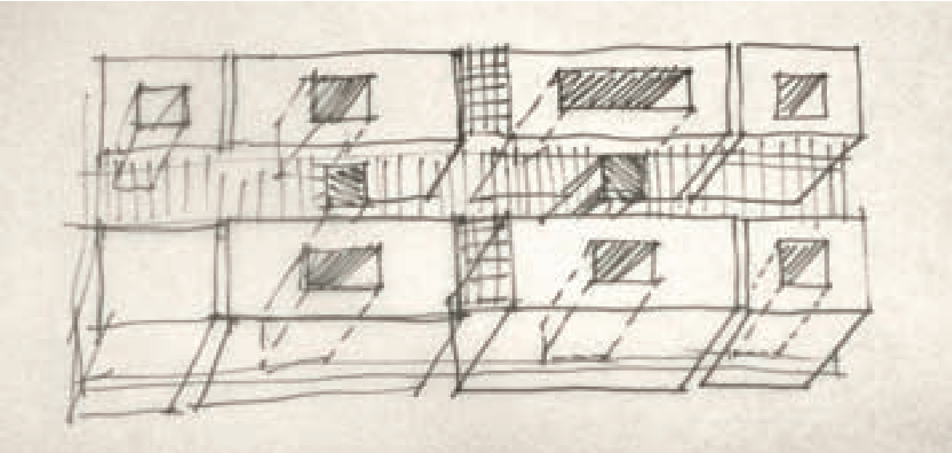


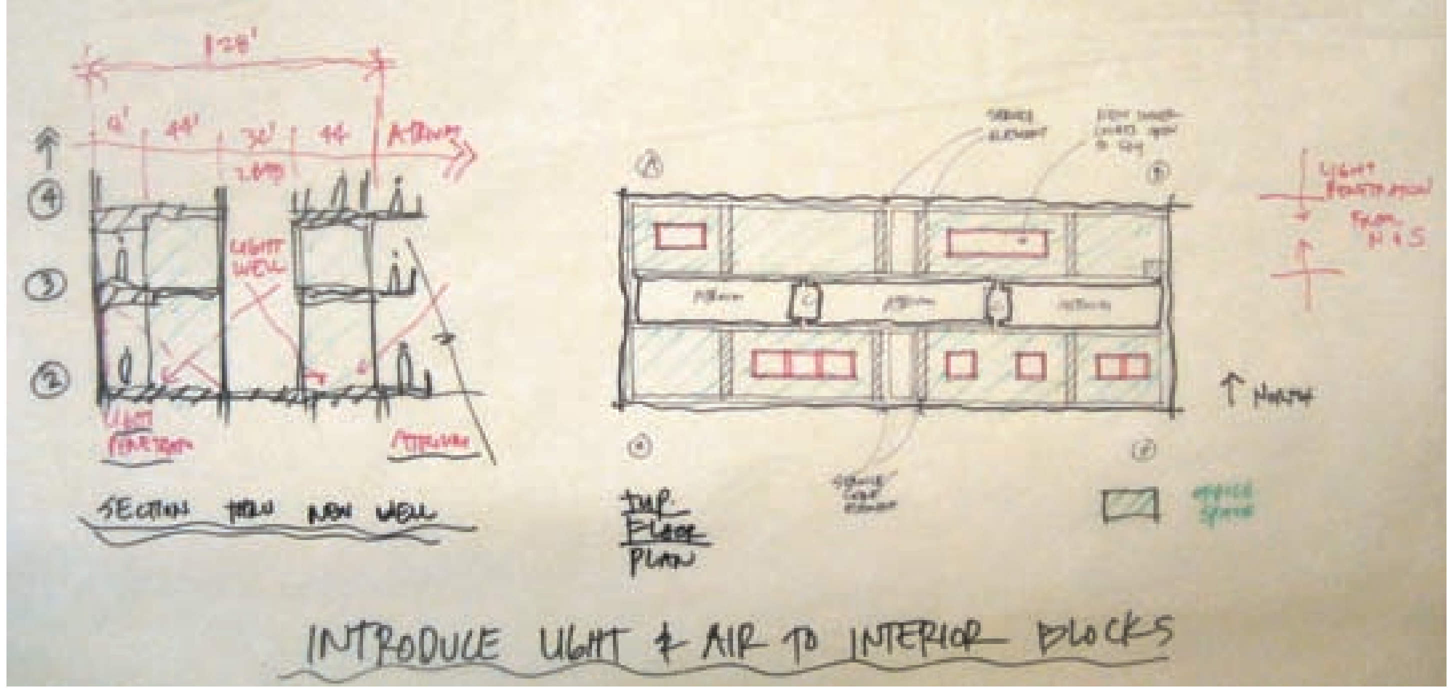




Volume and circulation

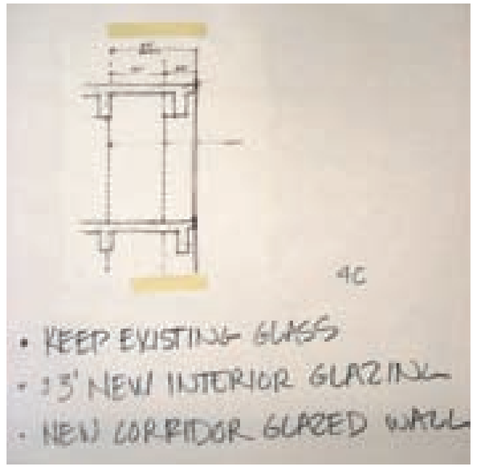
Detractors, who doubt adaptive re-use, have questioned the potential for windowless office/laboratories. However, the charrette saw the potential for the introduction of new atria and light wells. Natural ventilation and light could be brought down to as many as four floors (3rd through 6th) by means of “coring” several levels, with no outward change in building character. The same approach could be used to improve interior circulation by introducing new localized stairwells to unite two or more levels, according to users’ needs.

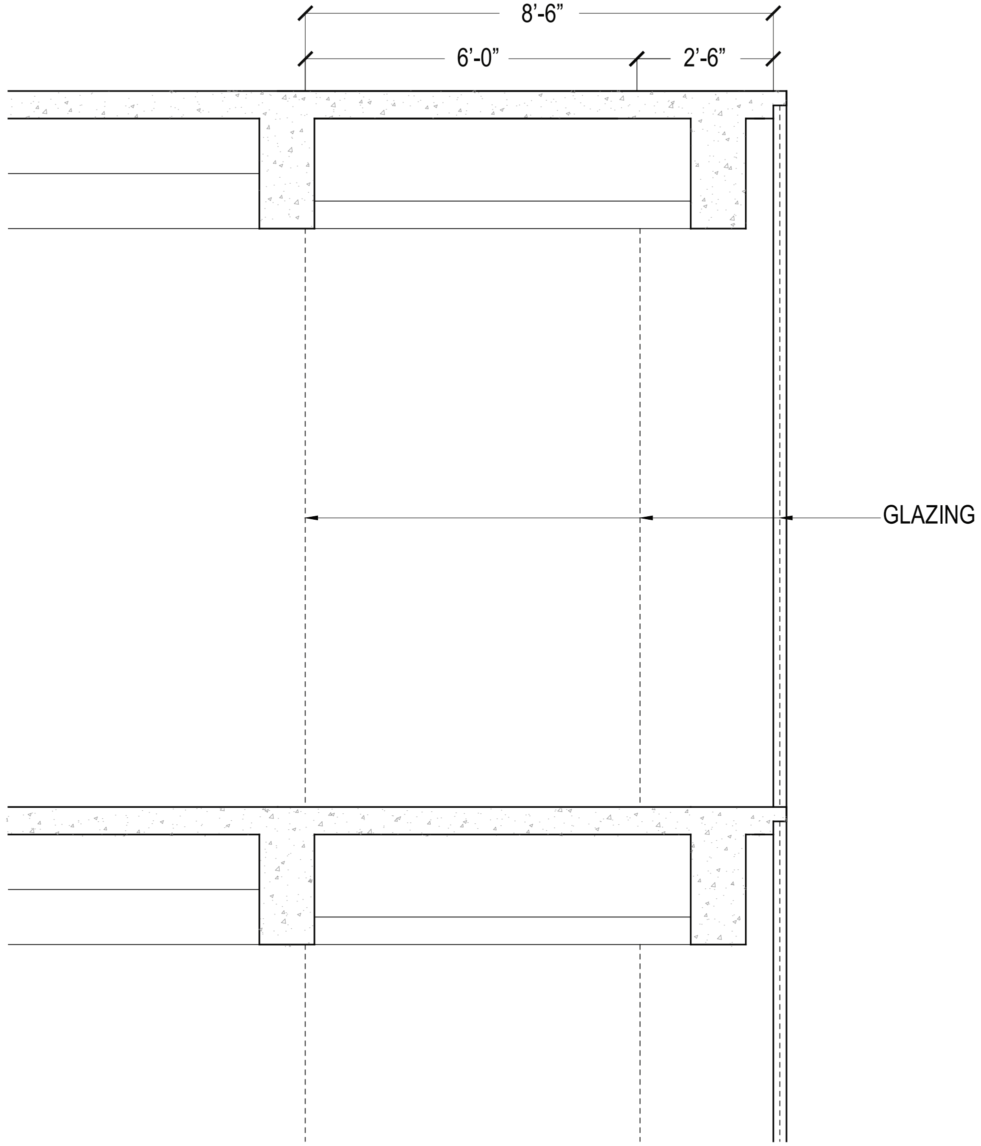




Lighting—exterior wall

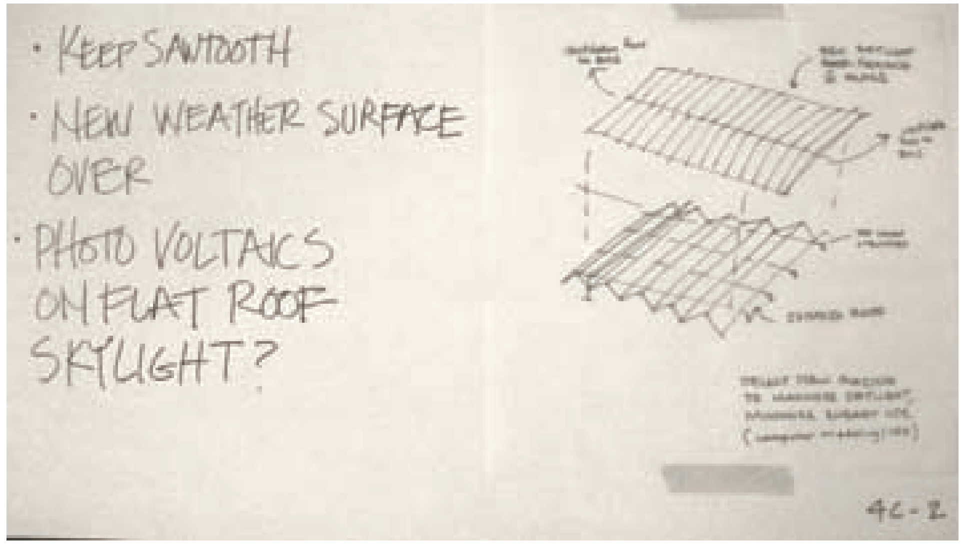
Improved thermal performance of the existing curtain wall and a reduction in the need for artificial lighting could be accomplished by the introduction of new interior glazing. The redundant glazing at, or near, the exterior curtain wall could further reduce solar gain and could be installed as orientation to sun and new uses dictate. Replacing the solid interior corridor walls with glazed panels would be a straightforward way to acknowledge the change in use and to reduce the demand for electricity.

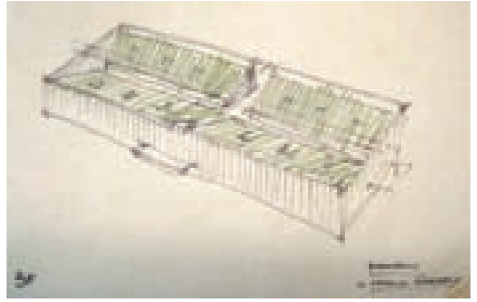


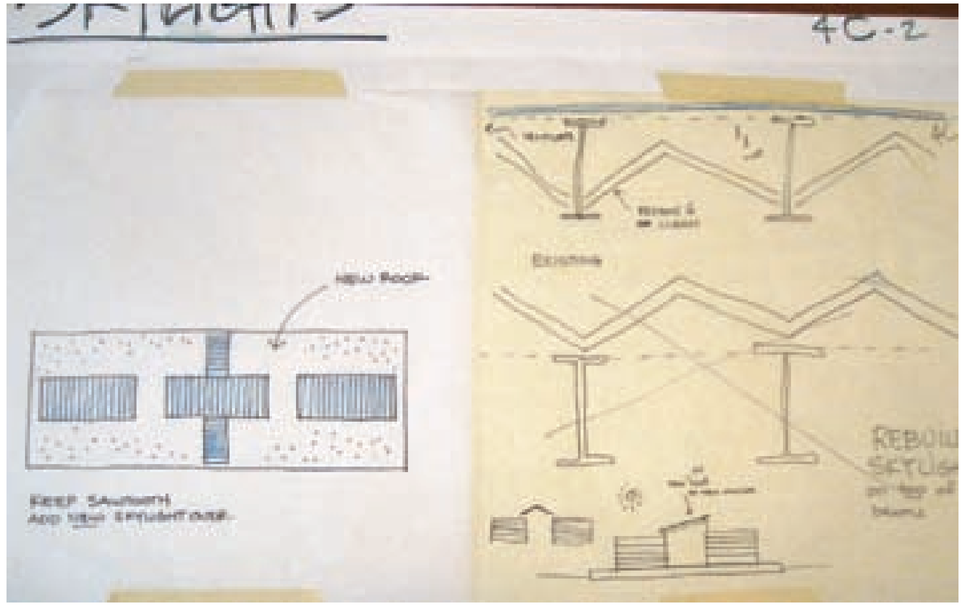


Roof

New glazing to increase curtain wall performance could be applied in a similar way to the roof. Additional glazing over the skylights would allow their saw-tooth configuration to remain, while it would address the leaks that have been a long-standing maintenance concern. The remaining large expanses of the roofscape could be put to use as a field for photovoltaic panels, or new materials such as ETFE cushions could be applied. In an even more elaborate scenario, enhanced skylights and the electric-producing panels could be aspects of a greater landscaped “green roof” that could be an outdoor space and insulate against undesirable heat loss and heat gain.

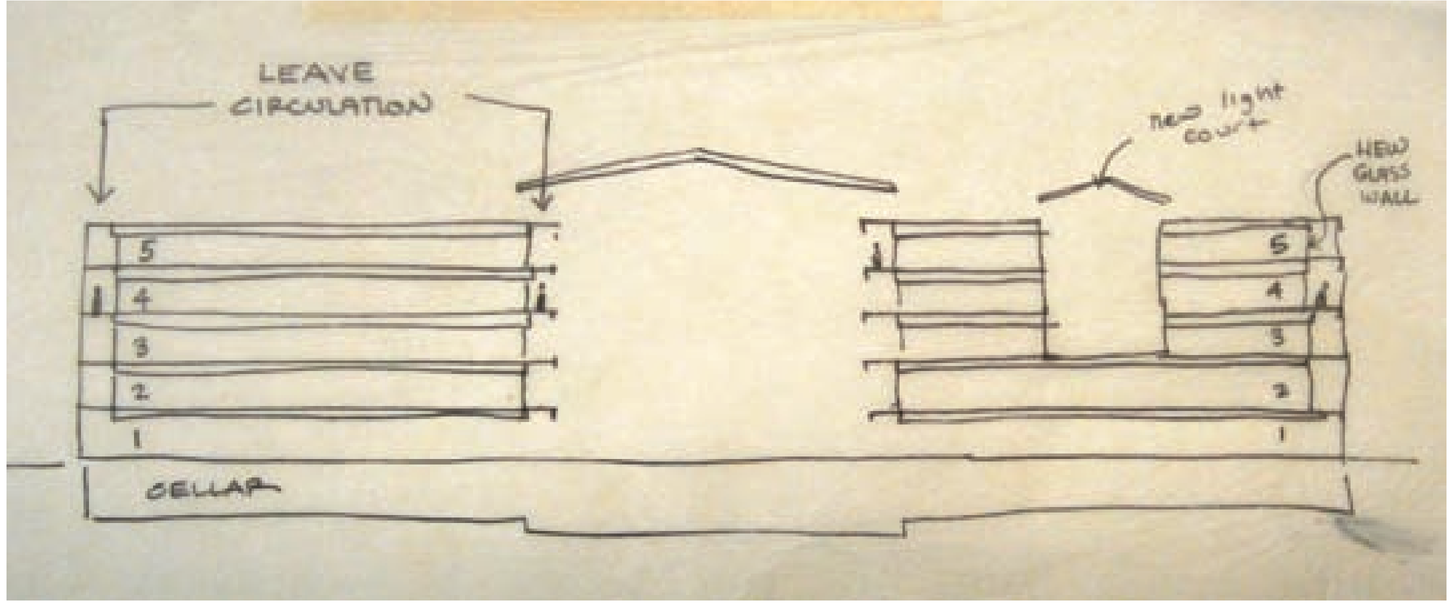






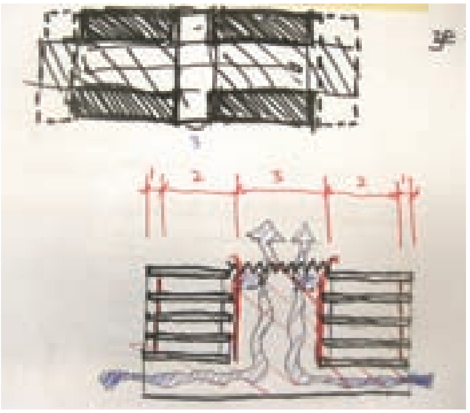
Core

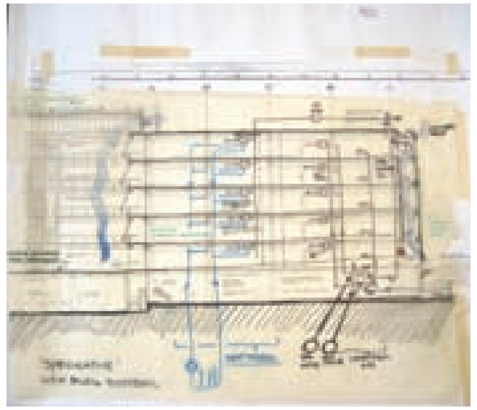
Since the building’s overall cooling demand surpasses its overall heating demand annually, bringing natural ventilation to the interior cores of the building could significantly contain energy costs. Retrofitting the existing skylights to be operable (even if only at their vertical perimeter), installing new light wells and atria down several floors, and additional glazing at the existing perimeter curtain walls as well as the space available beneath the second-floor slab could all be employed to increase natural ventilation.

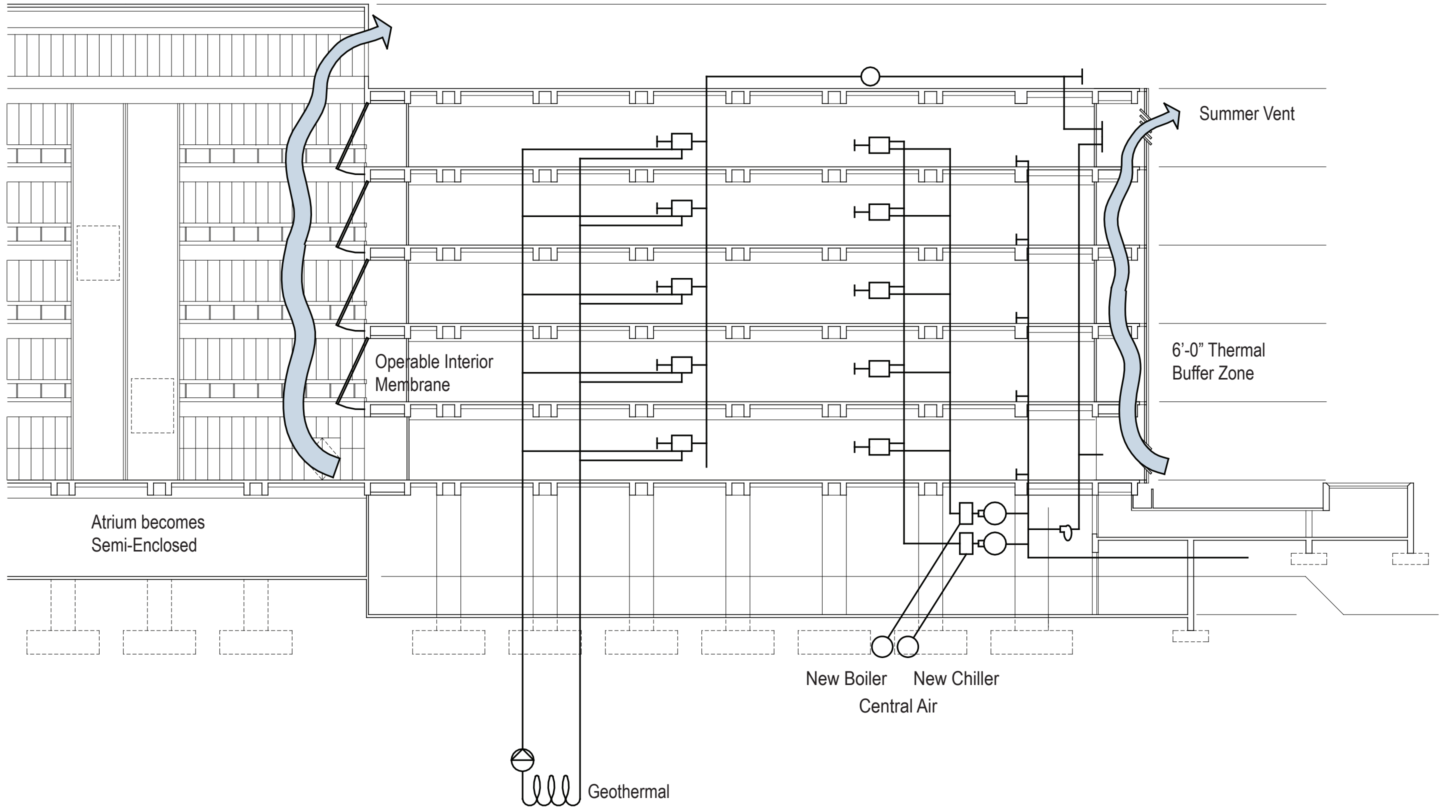


Mechanical—sustainable

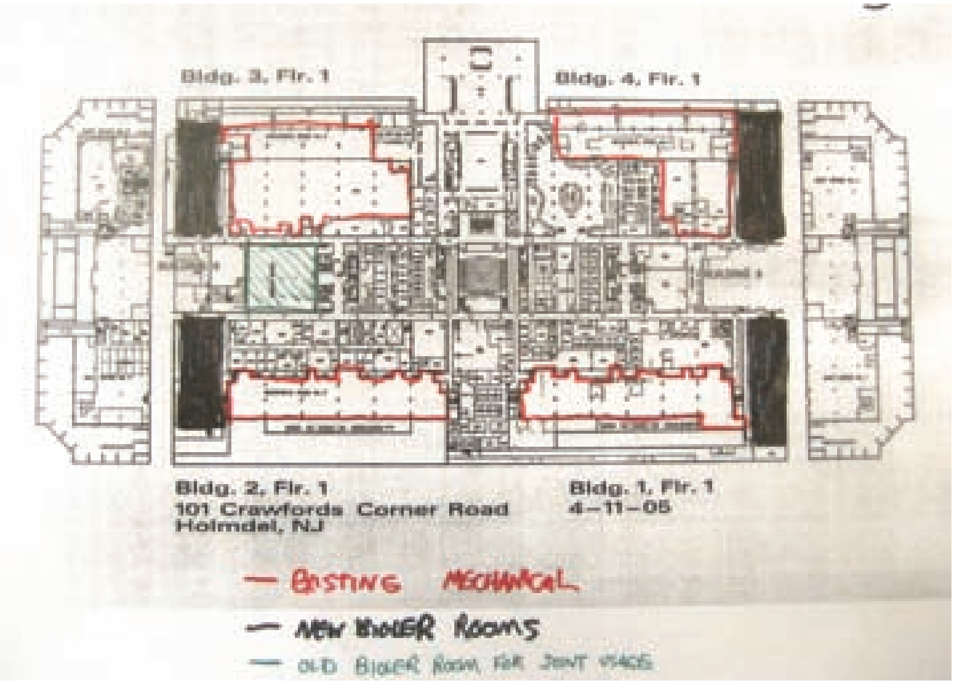
Bell Labs was planned and built for a single user at a time when energy was inexpensive and plentiful and the equipment that conditioned the interior environment was larger than today. Interiors were sealed environments. Changes in this philosophy over time, the evolution of state-of-the-art equipment and the cost of fuel, together with the need to adapt to multiple users, all point to a new direction.

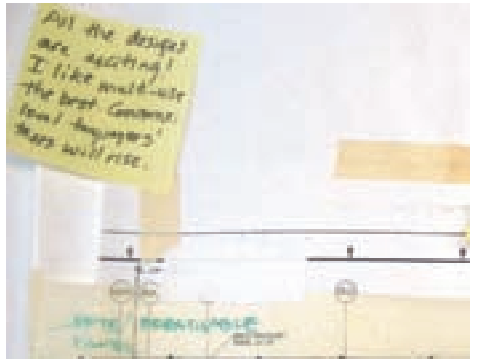


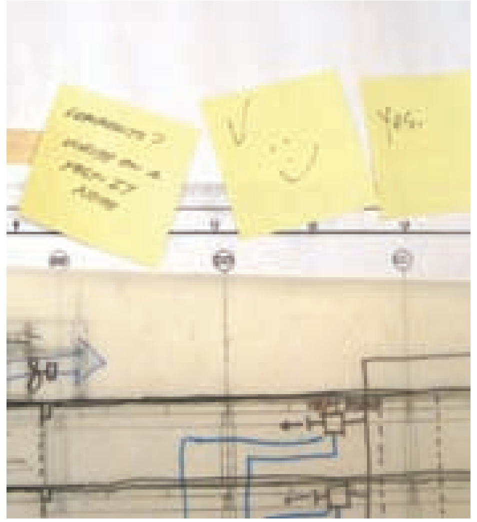


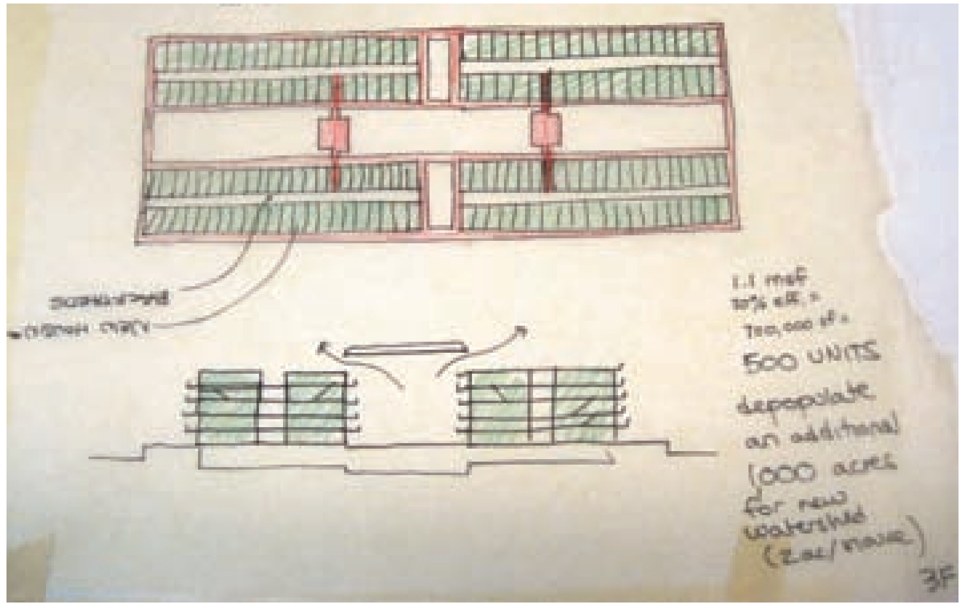


The charrette illustrated ways to increase the existing curtain wall performance through: the use of additional interior glazing; natural ventilation with new operable windows and skylights; and tapping into ambient conditions to reduce energy costs through geothermal heating and cooling. These adaptations will require newer, more compact, and more efficient decentralized equipment. The approach will liberate the first-floor mechanical equipment making it usable as income-producing space.





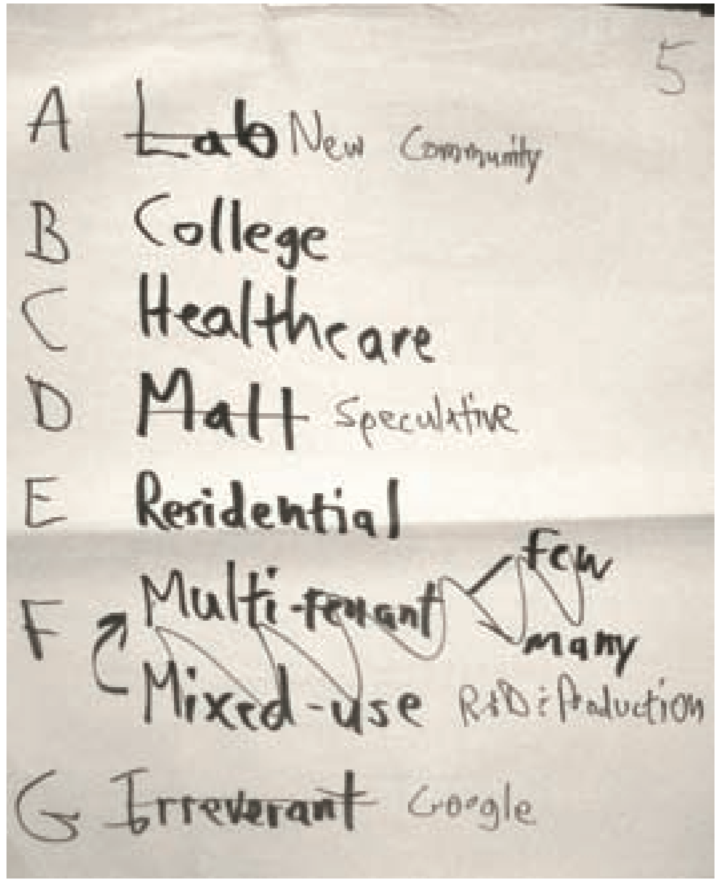




What works

Programs and possibilities

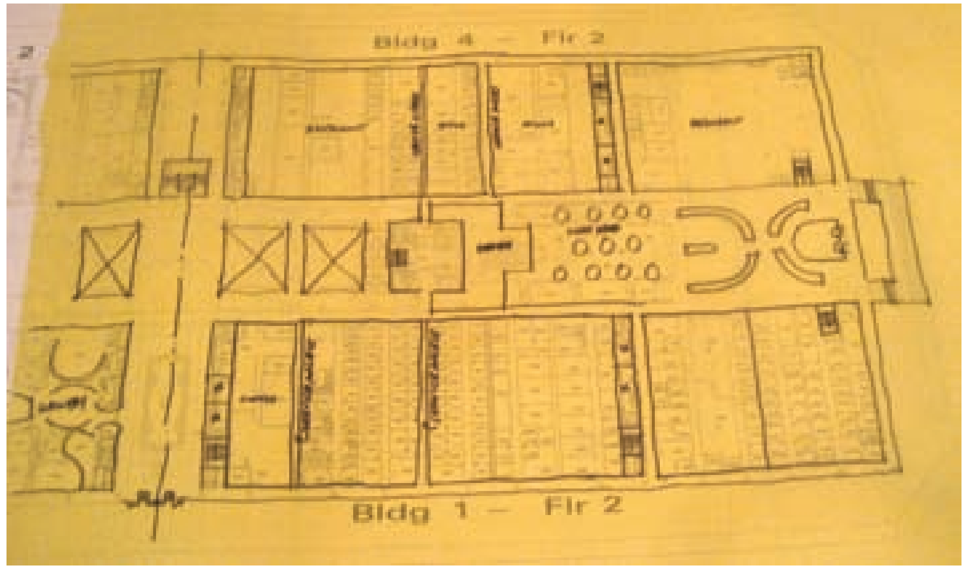
The charrette's exploration of an array of possible changes to existing building elements provided necessary fodder and made redesigns possible. The program scenarios described in the next pages—Multi-tenant/Commercial; Center for Graduate Studies; Health Center; Speculative Commercial with Enhanced Sustainability; Residential; Research, Development and Production; and The Silver Bullet—have dual importance, namely they illustrate an expanse of uses that could be considered and they demonstrate various approaches to physical mechanisms for manipulating the building that could be employed in a few, many, or all of the proposed new uses.

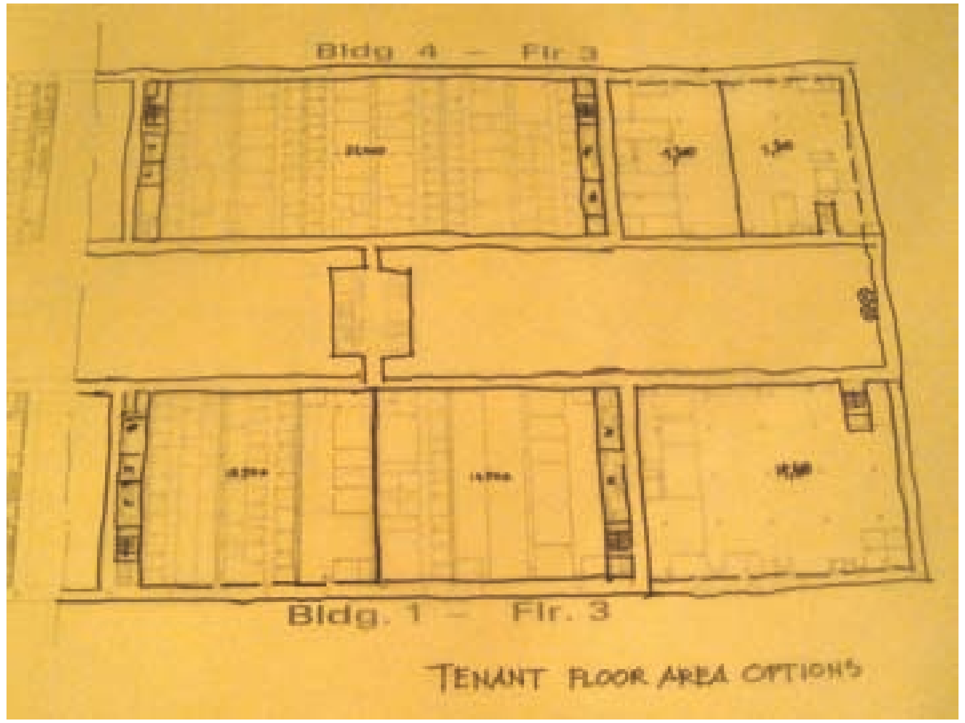


Multi-Tenant Commercial

The Multi-Tenant scheme explored the opportunities and challenges of converting a single-tenant research facility into a multi-tenant commercial office building. This scheme addresses issues such as identity and individual access, shared common area facilities, and mechanical and service requirements. The resulting concept provides a sense of community for a commercial "village" in a parklike setting. The scheme includes:

- Flexible office spaces ranging from 7,000 square feet to 25,000 square feet, with the possibility of larger configurations.
- Retail spaces and amenities to support the commercial tenancy: restaurants, bookstores, and an art gallery
- Common meeting and presentation spaces
- Mechanical, service, loading dock, and building administration spaces on the lowest level

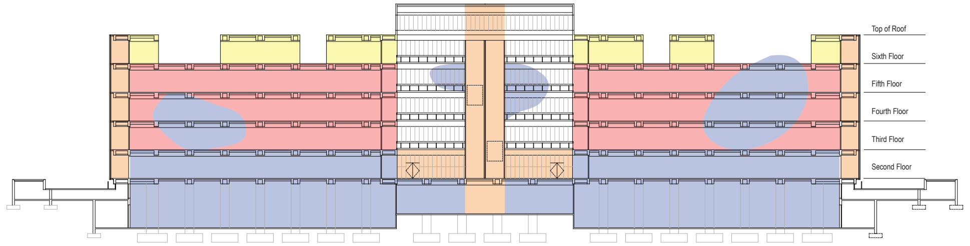




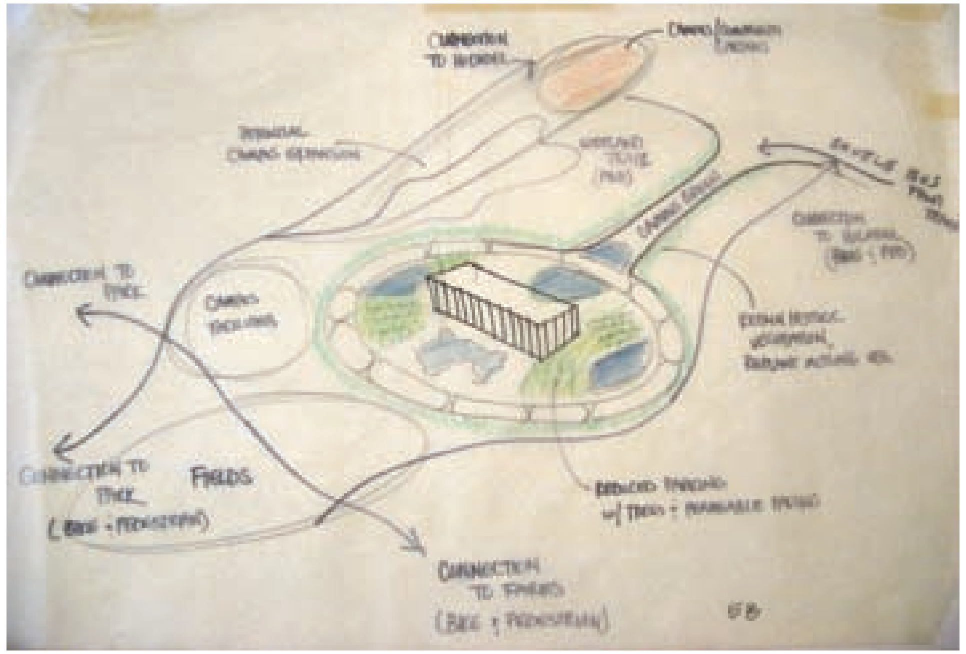
Center for Graduate Studies

A Center for Graduate Studies recognizes the need of a number of local and regional colleges for additional facilities, especially for the establishment or expansion of graduate programs. This concept provides both individual and shared infrastructure within the existing Bell Labs building and identifies expansion zones on the site for future growth. The scheme organizes the building vertically, with common university spaces on the second-floor entry level and the floor above, with two colleges occupying separate quadrants on the three levels above. Individual identity is introduced in the rooftop architectural expression through a series of gardens, open spaces and penthouses. The scheme includes:

- Standard classroom floor and double height multimedia lecture halls
- Shared "main campus" common area facilities on the entry-level plinth
- Residential rooftop units for visiting scholars and faculty
- Parking on the lower level
- A campus green along the existing approach road with connections to mass transit



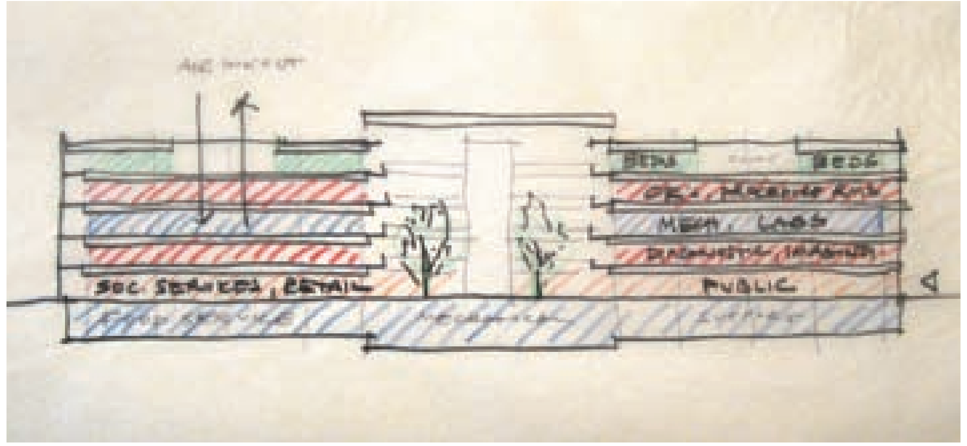
Classroom Space - Flexible
Large Flex Spaces - Large Lecture Halls, Auditorium, Cafe
Circulation
Small Classroom

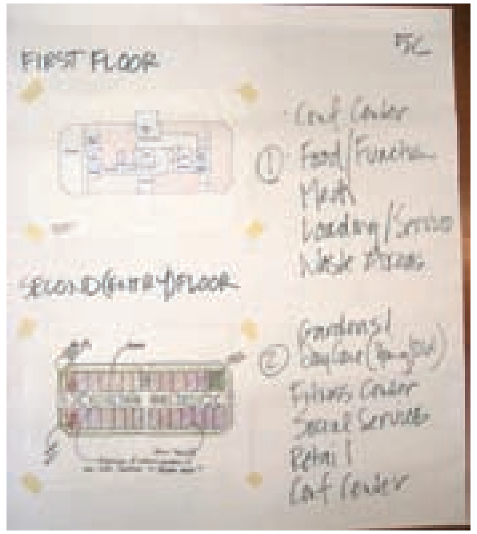


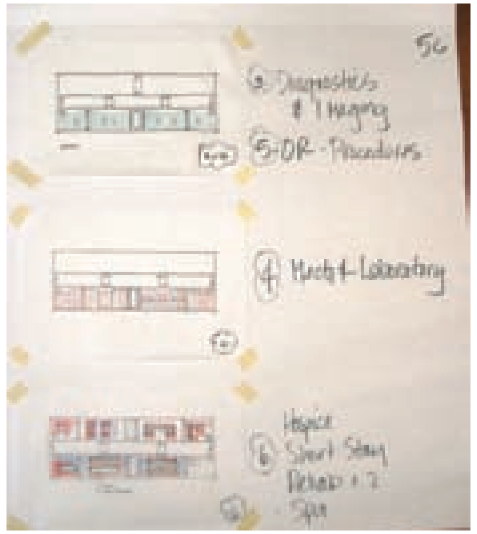
Healthcare Center

The Healthcare Center concept incorporates a comprehensive inpatient and outpatient medical facility. This scheme keeps the building shell and open atrium spaces intact and adaptively re-uses the four major quadrants. Public and community spaces such as social services and insurance assistance, daycare and fitness centers, retail spaces, and a conference room are located on the entrance level, with outpatient facilities on the floor above. Uses are organized by the degree of public-private/outpatient-inpatient program from Level 2 up to Level 6. There is a strong emphasis on community-based and preventative medicine in this concept. This scheme also includes:

- Diagnostic and imaging procedure suites
- Laboratory
- Rehabilitation center
- Psychological health center
- Hospice
- Doctors' offices
- Pharmacy



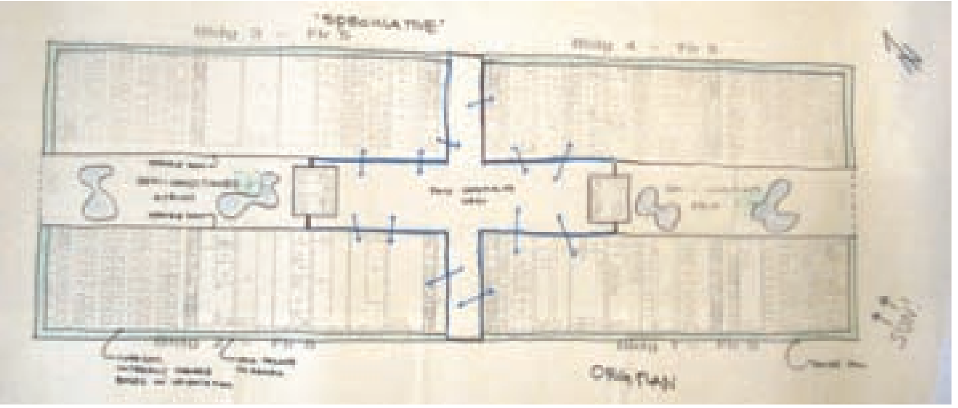


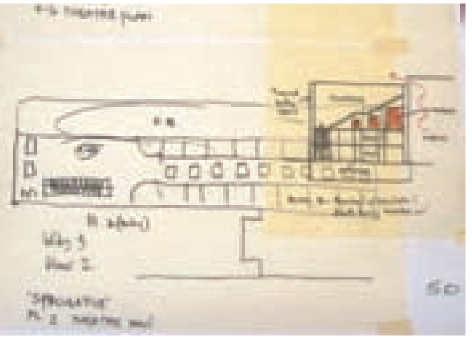


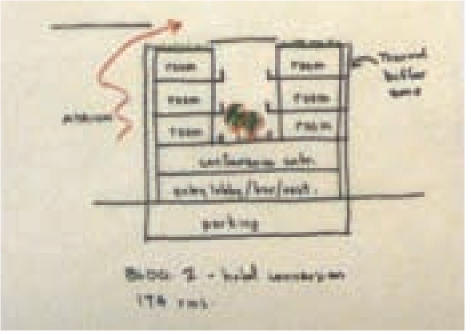
Speculative Commercial with Enhanced Sustainability

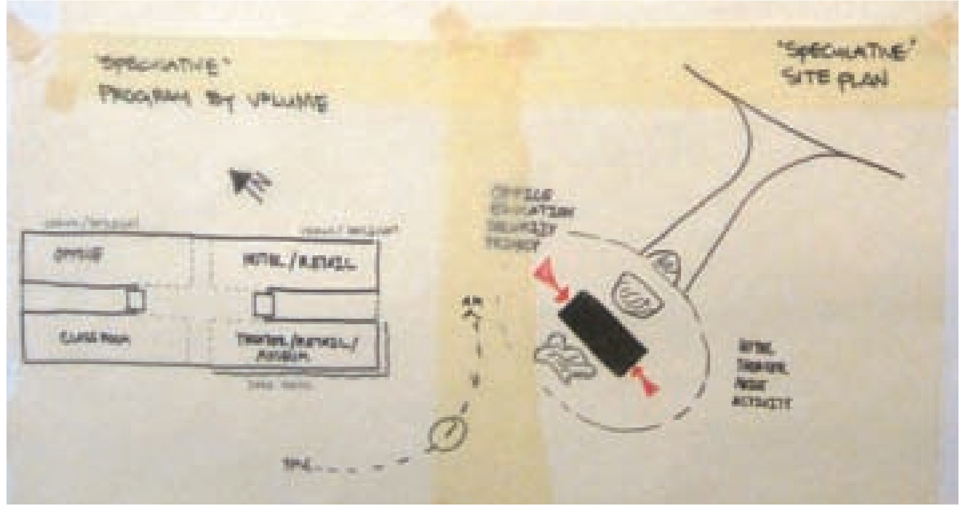
The Enhanced Sustainability concept explored the opportunities to introduce new active and passive green design to the existing Bell Labs building. The scheme does not focus on a new use for the building, but rather showcases the technological adaptation of a 1960s sealed-glass structure. As such, this approach is a new type of laboratory, demonstrating the potential re-use of a generation of post-war office buildings. Potential uses can be organized within the building according to solar orientation: offices, hotel rooms, and other spaces benefiting from natural light on the north side; spaces requiring little or no natural light, such as theaters or a museum on the screened south wall to minimize solar heat gain. Sustainable design ideas in this scheme include:

- A limited lobby area, fully air-conditioned, with the east and west thirds of the atrium semi-conditioned, utilizing natural convection cooling
- Modifying the perimeter corridors to provide a self-venting double wall with a narrower, air-conditioned corridor set within a new glass passage adjacent to the offices.
- A closed-loop geothermal system with heat pumps on each floor
- Introduction of operable windows at the east and west atria
- The use of water-walls as a fire separation strategy





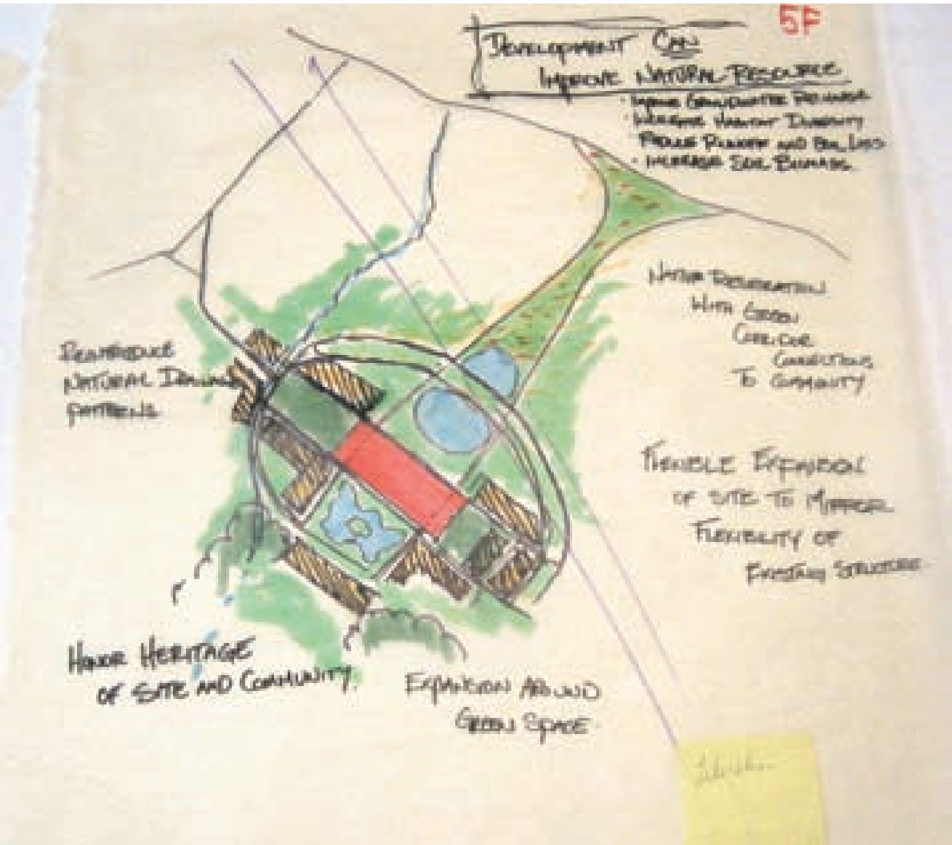


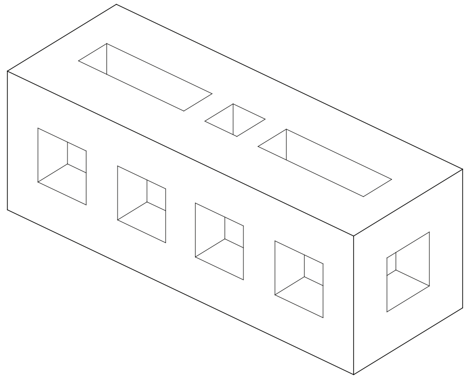


Residential

A number of concepts of varying degrees of density and adaption were developed in this study to convert the Bell Labs into a residential use. To introduce requisite light and air into the interior of the building, different prototypes were generated, ranging from a series of carved-out cubic courtyards to a stepped "wedding cake" configuration along the axis of the original atrium. Individual townhouses, simplexes, and duplexes were all incorporated within the existing structure. The more intensive development concepts resulted in a new town plan with infill housing both within and outside of the ring road. The concepts include:

- Enclosed and underground parking
- Significant private and semi-public green space
- Community retail and support spaces
- Identified expansion zones on-site

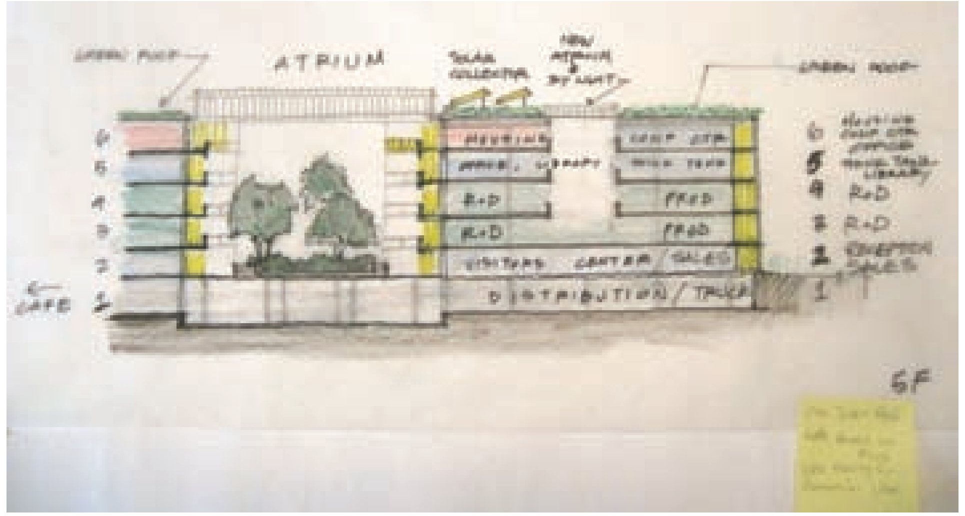


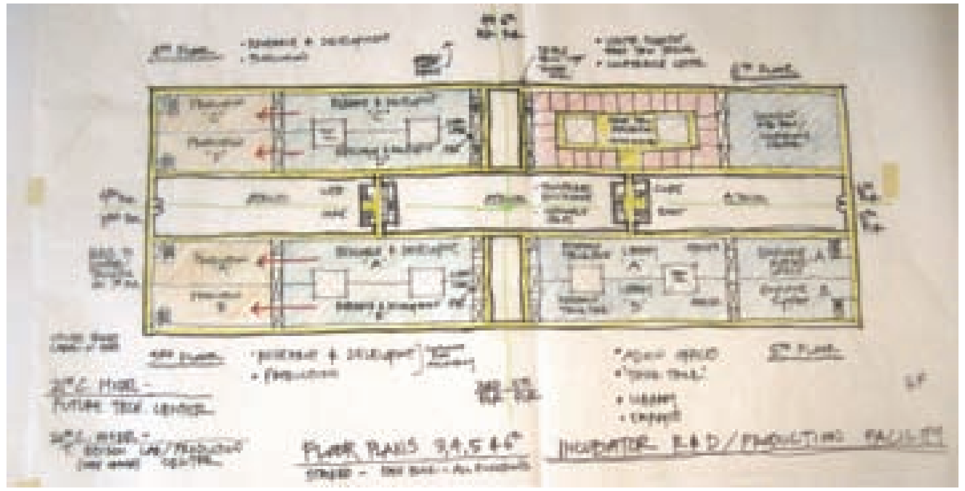


Research, Development, and Production Facilities

The Research, Development, and Production concept extends the legacy of Bell Labs by providing comprehensive services and infrastructure for twenty-first-century incubator industries. Using Thomas Edison's West Orange, New Jersey laboratory and production facilities as an early prototype, this concept assembles under one roof, for a number of companies, all services, from initial research to sales and distribution. The scheme incorporates sustainable building and site design. It also anticipates its own success with a smart growth, linear city plan extending from the Bell Labs site. As incubator businesses expand, attendant community facilities and residences develop alongside it. The scheme includes:

- Shared conference rooms, library, sales rooms, visitor center, and food service spaces
- Common distribution, loading dock, and shipping areas
- Individual research labs, administrative offices, prototype development, and production facilities for each user
- Short-term housing for visiting scientists, researchers, and other guests

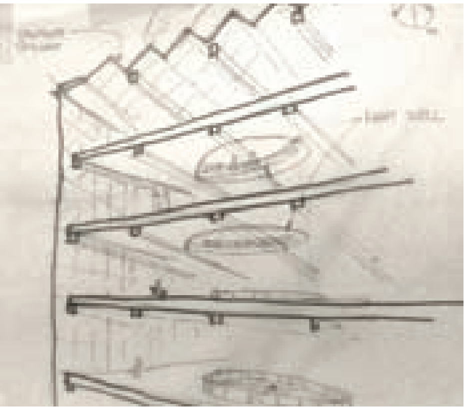


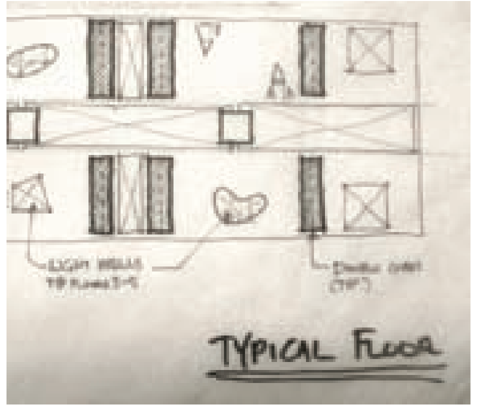


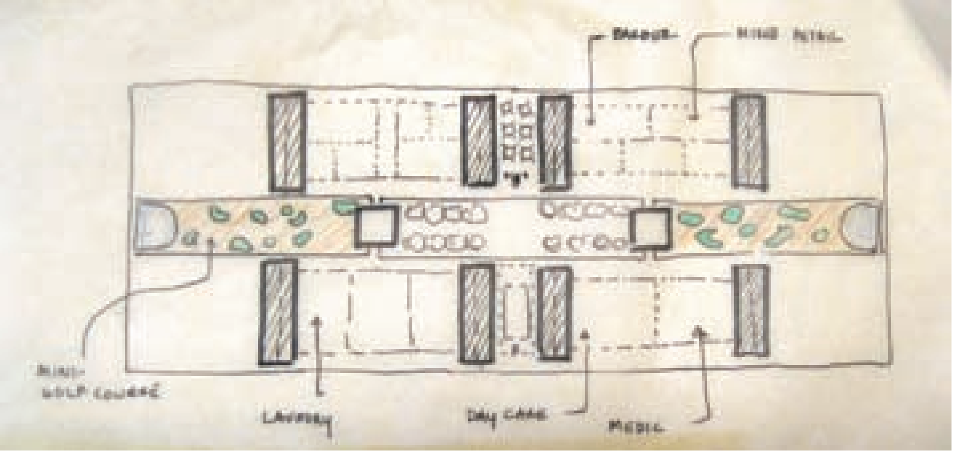
The Silver Bullet

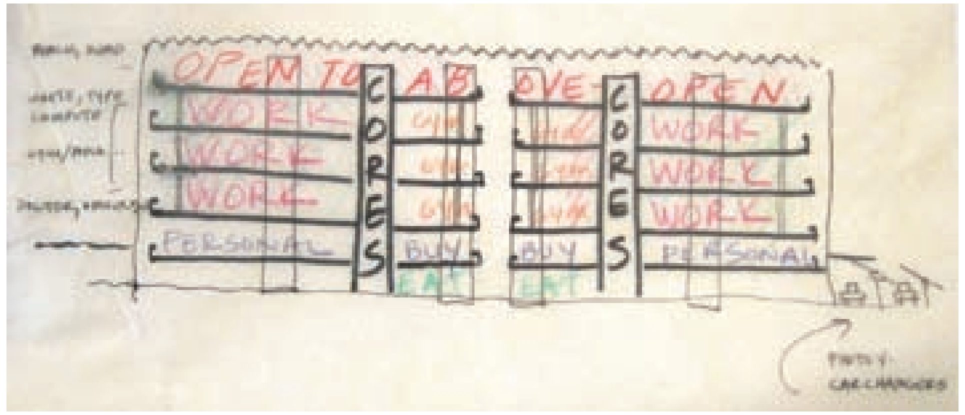
The Silver Bullet scheme introduces a new single corporate user assuming the use and stewardship of the Bell Labs complex. This enlightened corporate entity would enhance the work environment to twenty-first-century expectations, thus this scheme has taken on the moniker Bell Labs 2.0. In this exercise, one company is the identified user and the plans have been developed to accommodate the need of a contemporary high-tech company. In this scheme:

- Space needs are similar to the original Bell Labs plan: non-hierarchical, flexible individual and group workspaces, ample circulation, and meeting areas for informal interaction
- Worker services provided for 24/7 use: daycare, food services, medical, health club, laundry, sport fields, and walking trails
- Existing power and IT connections exist on-site
- Highly experienced and educated workforce available to the new user
- Planar surfaces of the site and building would be used to collect solar energy to help reduce energy dependence on outside sources, specifically the parking lots and flat roof



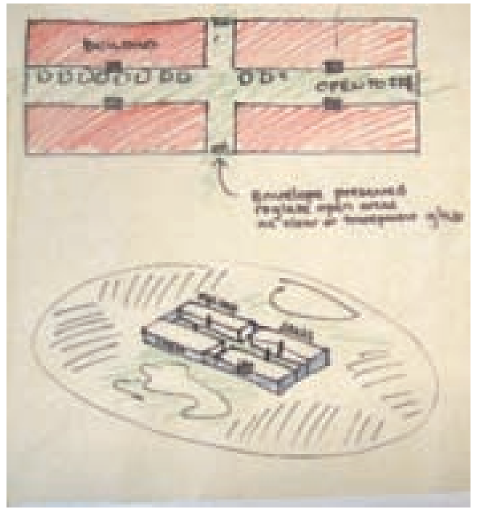


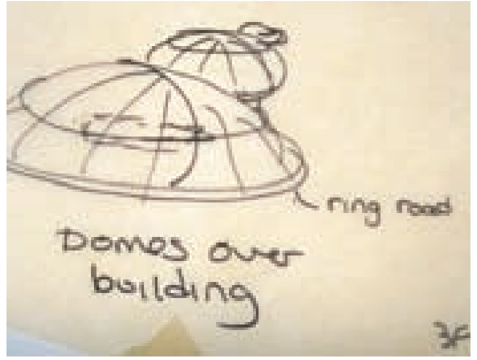


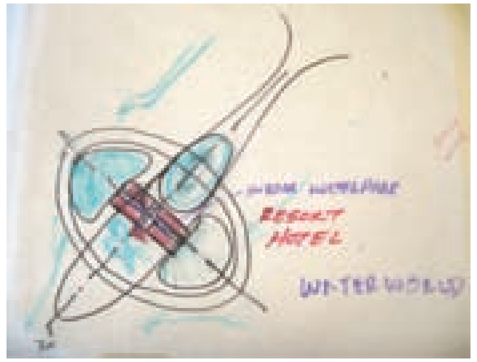


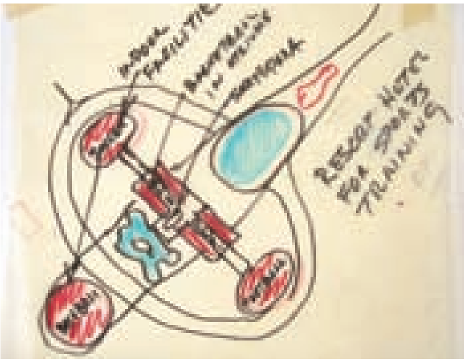
Provocative Schemes

A few participants decided to also explore provocative schemes for contrast and effect. These included re-landscaping, a Buckminster Fuller-type dome cover, hotel complex, and a sustainable parkland.

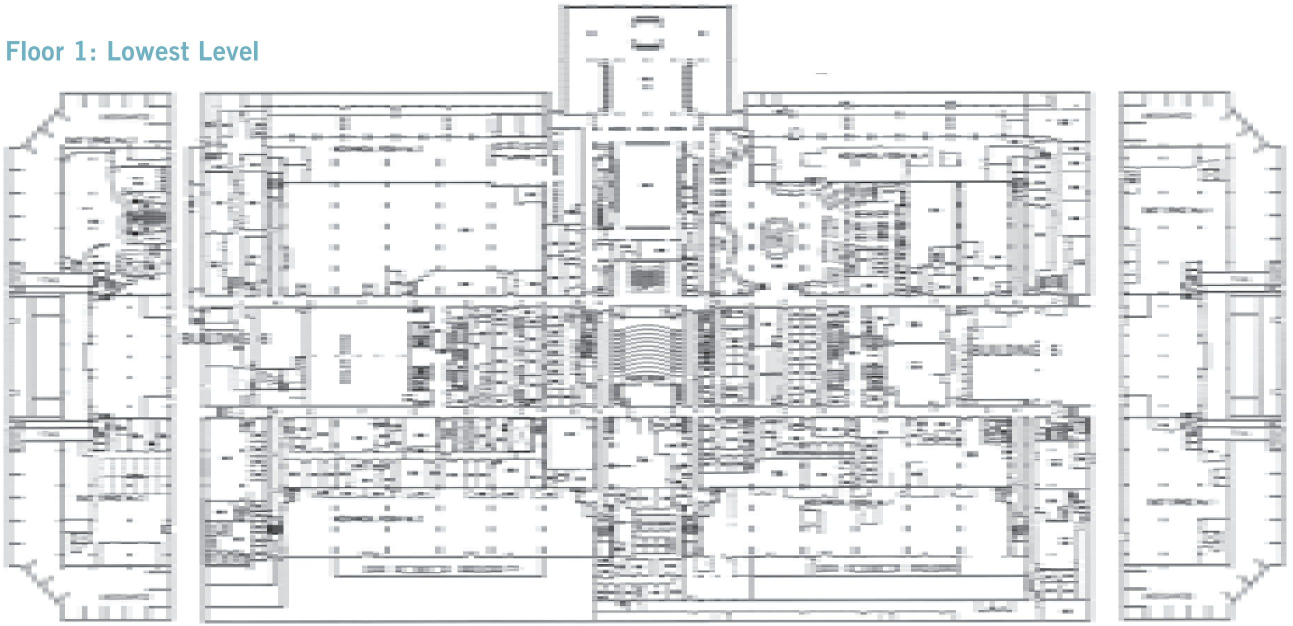




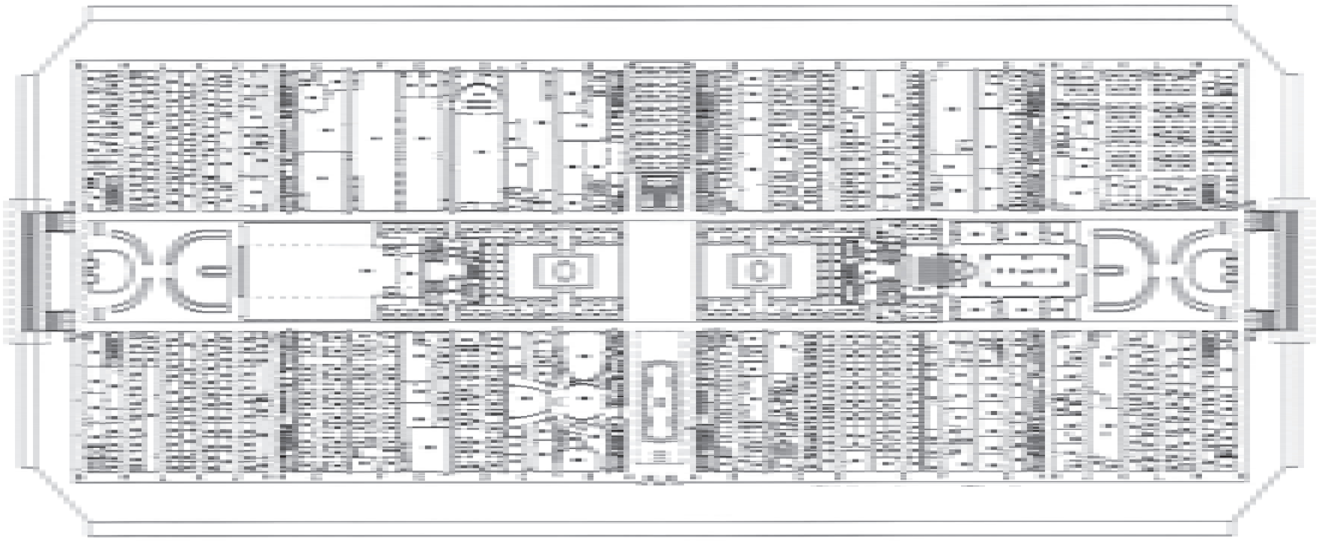




Floor 1: Lowest Level

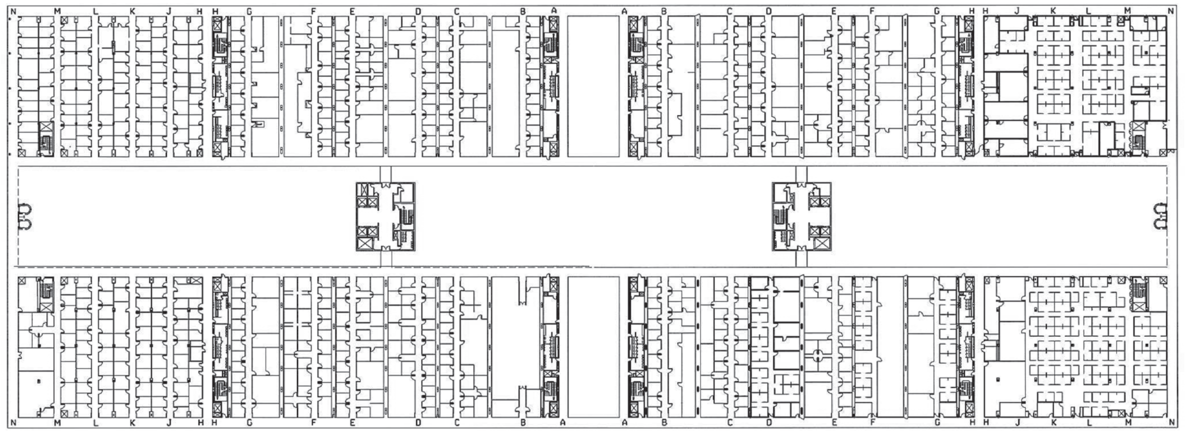


Floor 2: Main Level and Ground Level of Atria



Building plans provided by Alcatel-Lucent.

Floor 3: Upper Level*



Floor 4: Upper Level*

*Floors 5 and 6 are similar to Floors 3 and 4.

Detailed Analysis

The following work was completed by students at New Jersey Institute of Technology in Summer 2008. Using the charrette studies as a foundation, the students' work further illuminated the charrette's base of knowledge and proposals for adaptation.

Site and Access

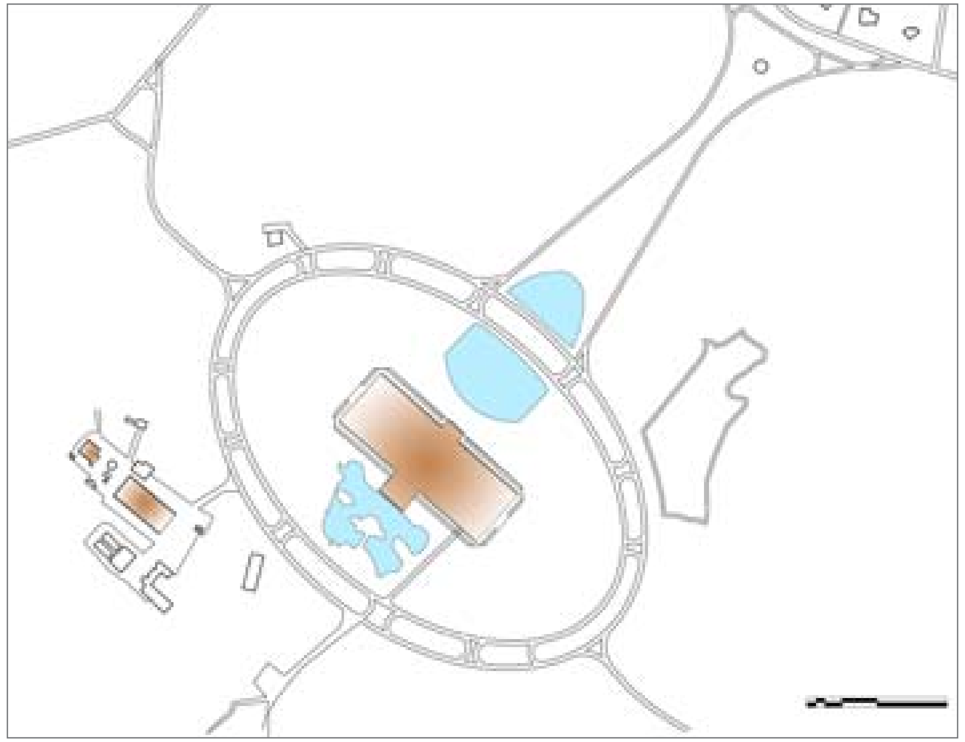
Bell Laboratories is located in the Township of Holmdel, in Monmouth County, New Jersey, approximately 40 miles south of New York City. This primarily residential town can be accessed by public transportation (NJ Transit) from New York Penn Station or Newark Penn Station, with local station stops at Hazlet and Middletown—both within 10 minutes of the Bell facility. The site is also accessed by local bus routes along Crawford's Corner Road and has easy access to the Garden State Parkway at exits 114 and 117. Local Routes 9, 18, 34, 35, and 36 are also close by. The area has abundant shopping, schools, and basic retail within an eight-mile radius. Within two miles of Bell Labs there are four county and state parks: Holmdel Park, Telegraph Hill Park, Tatum Park, and Thompson Park. Each offers hiking trails, as well as recreational courts and playgrounds. The PNC Bank Arts Center, formerly the Garden State Arts Center is in use from May through October. The state's Vietnam Veterans' Memorial is adjacent to the Arts Center facility, and each can be accessed through local roads or exit 116 on the Garden State Parkway.

Monmouth County, New Jersey

Site Organization

Bell Labs can be entered from three locations, with the main entrance off Crawford's Corner Road in Holmdel. The east and west entries are secondary and were used for deliveries and service vehicles. Access was planned via a circular ring road gained via the three entrances to the building. At the center of the ring road is the main building, with on-grade parking to the east and west of the building.

On the west side of the site is the Hop Brook Watershed. Hop Brook is a semi-surfaced body of moving water that flows into the Swimming Water Reservoir and then to the Navesink River. The Watershed is marked by areas of dense vegetation. The Bell facility includes a water treatment plant that filtered water from the building before entering the Watershed's stream.



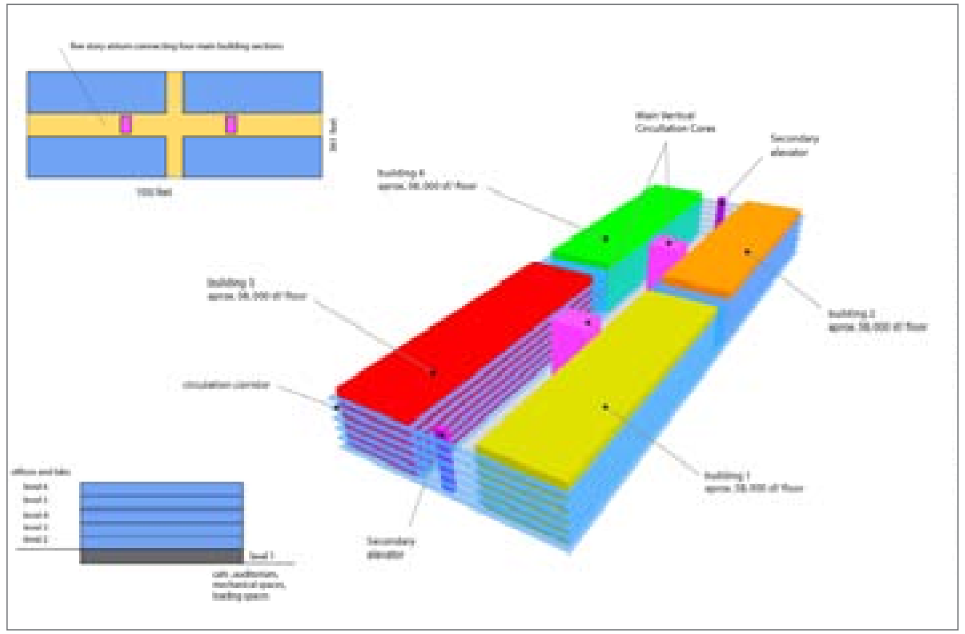
Watershed Location

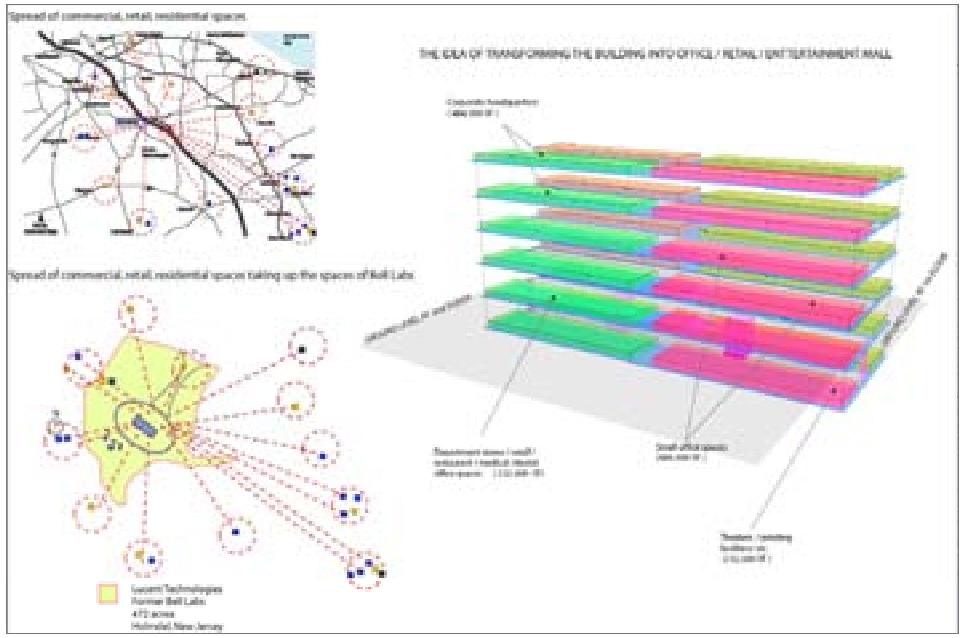
Site Boundaries

Aerial View

Building Organization

The main laboratory building is organized as four concrete bars with mirror glass façades. They share two main vertical circulation cores within a large central atrium is over 1000 feet long. All buildings contain a circulation corridor along the exterior mirror glass curtain wall, allowing lab spaces to be laid out internally. Each of the four bar buildings contains approximately 58,000 square feet per floor over six levels, or 290,000 square feet each. The total gross area of the main building, excluding the atrium, is 1,392,000 square feet. Total lot coverage including parking lots is 2,393,719 square feet over 472.9 acres (20,590,376 sf). Total building coverage on the site is 2.2 percent.



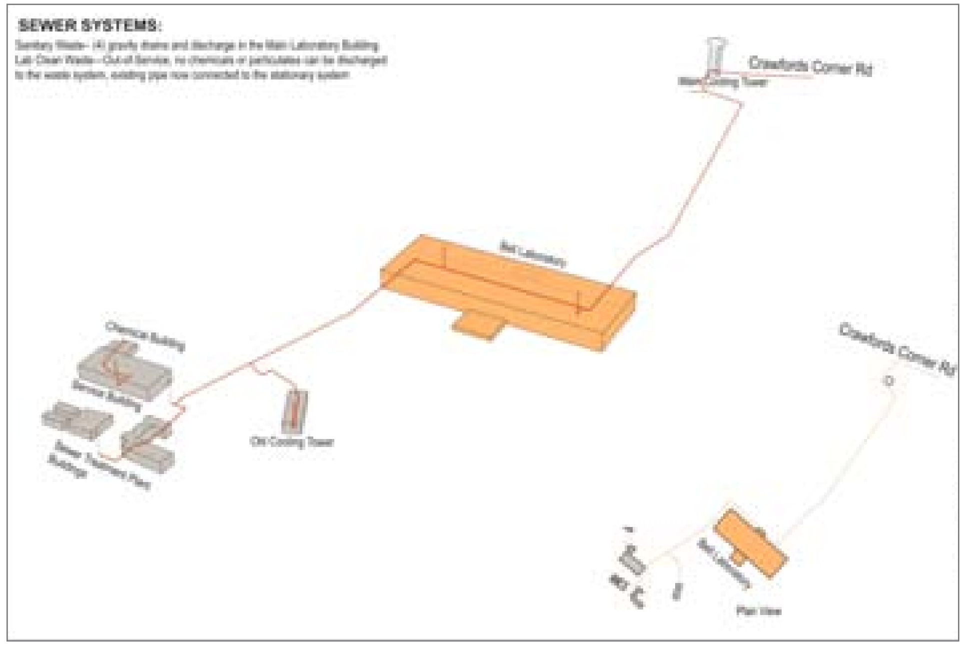


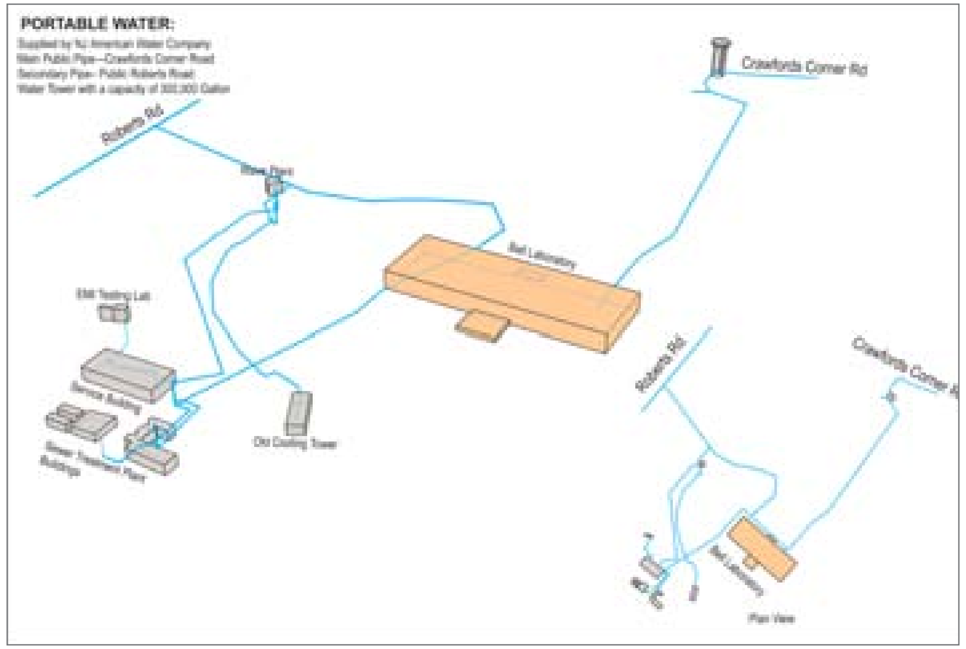
Utilities

Students studied the possibility of replacing the antiquated hot water system with a system of earth ducting. In this system, water from Hop Brook could be used to cool fresh air that is collected through a series of ducts and then piped into the building. To achieve the desired air temperature, students calculated that a series of forty ducts at lengths ranging from 375 feet to 525 feet could be radially arrayed around the existing ring road of the building. Cooling was needed throughout the year and heating had not been as great a concern. Such a system could reduce energy consumption for cooling by 50–75 percent by utilizing water that is at a lower temperature than the air throughout most of the year.

Originally, sewer services to and from the facility were carefully planned between the main laboratory building and a series of smaller structures on site. Among these exists a cooling tower and sewage treatment plant. Four gravity drains in the main laboratory building carried sanitary waste to a chemical treatment plant where liquids were either cleaned and discharged or disposed of via other means.

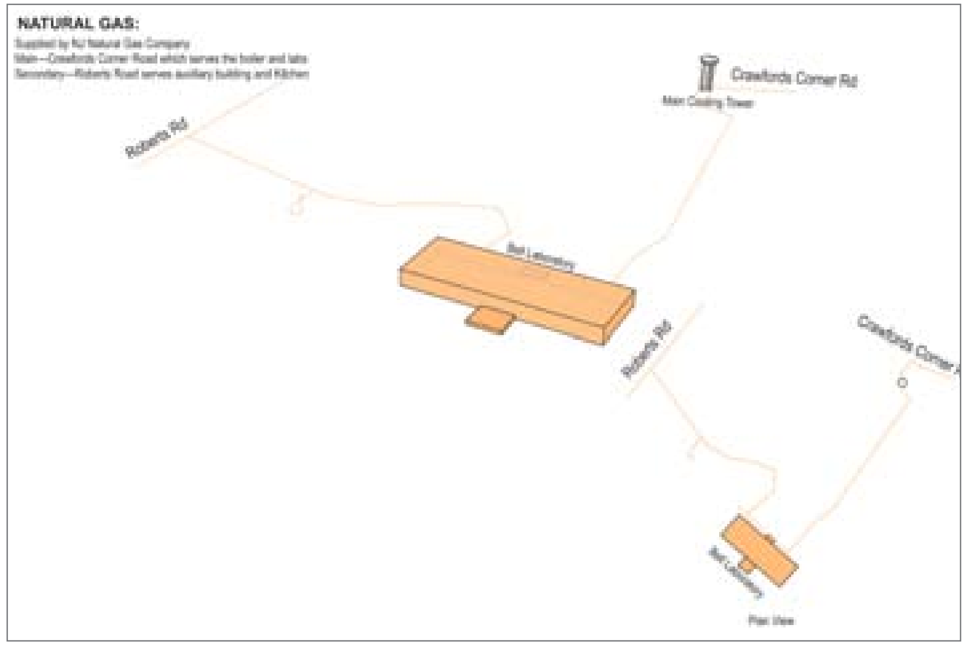
Potable water is supplied by the New Jersey American Water company, with two lines carrying fresh water into the facility. The main public line enters the site from Crawford's Corner Road and is connected to the 300,000-gallon water tower. A secondary line enters from Roberts Road to the west and connects to the secondary structures designed to support the activities of the main laboratory building. Fire protection was also a concern due to the nature of work in the main laboratory building. Water hook-ups to thirteen fire hydrants around the facility remain, as do an electric and a diesel powered pump that are designed to pull water from the facility's ponds and discharge it as necessary.

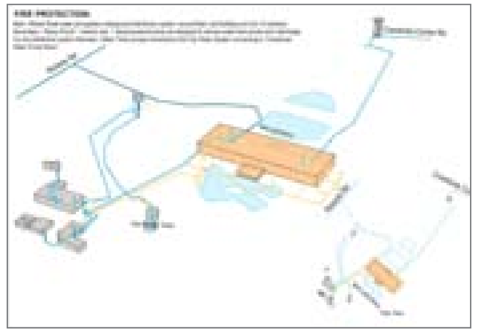


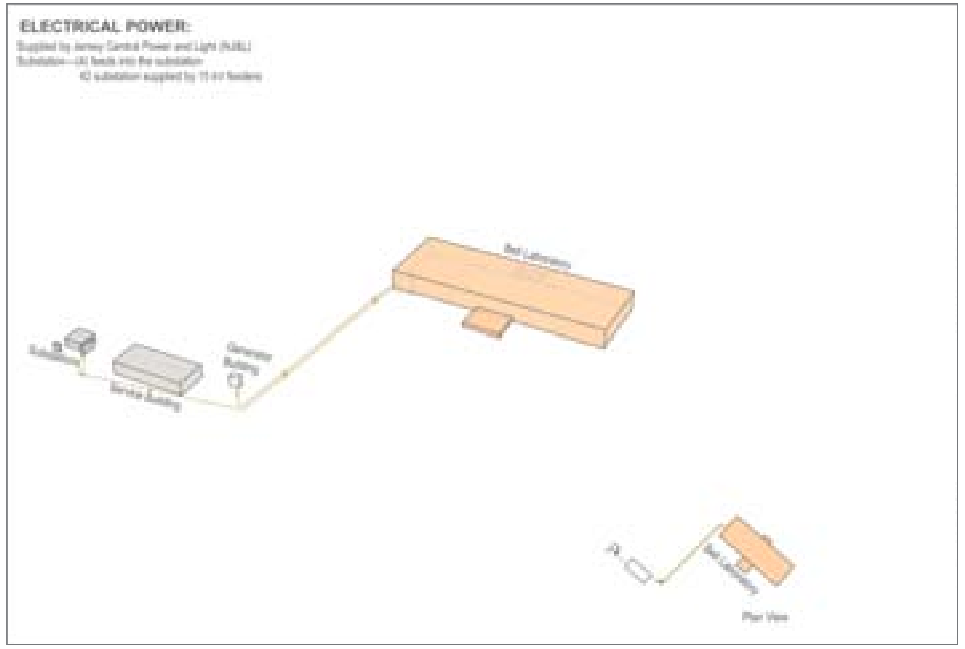


Natural Gas is supplied by the New Jersey Natural Gas Company, with two gas lines. The main line enters off Crawford's Corner Road to the north and serves the numerous boilers in the basement of the main laboratory building, as well as any labs requiring natural gas. A secondary line enters the site from Roberts Road and serves all auxiliary buildings as well as the facility kitchen in the basement of the main laboratory building.

Electrical power is supplied by Jersey Central Power and Light. There are forty two electrical substations that exist on the site which are supplied by 15 kV feeders. Electrical power enters the main laboratory building through the southwest corner.

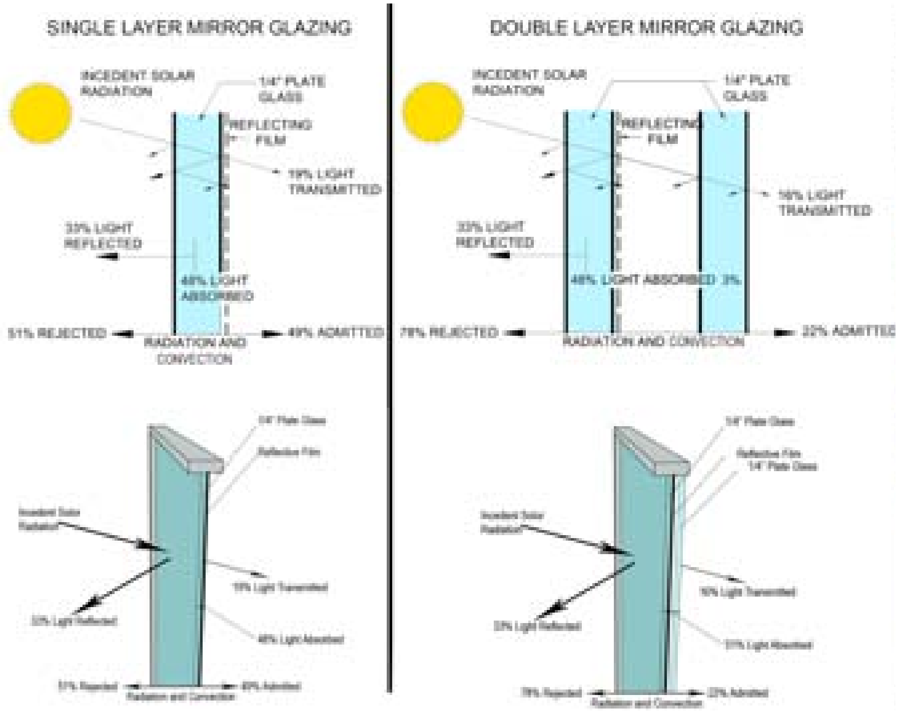


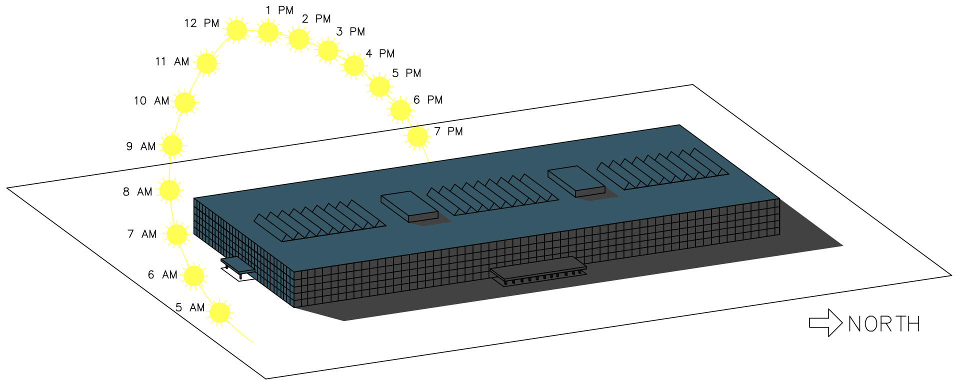




Façade System

In the original mirrored glazing system, the reflecting film absorbed approximately 48% of incident solar radiation, while reflecting 33% and allowing 19% to be transmitted into the building. The existing glazing system allows for 49% of heat to be admitted through radiation and convection. While these numbers seem adequate for such an application, in warm months the solar gain on the south and west sides of the building are worth reconsideration.





SOLAR ORIENTATION
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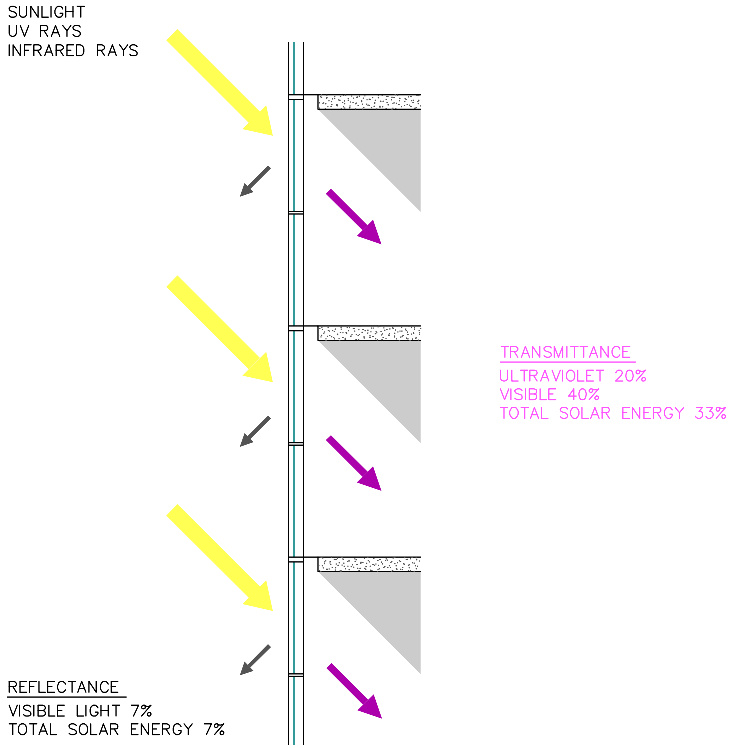
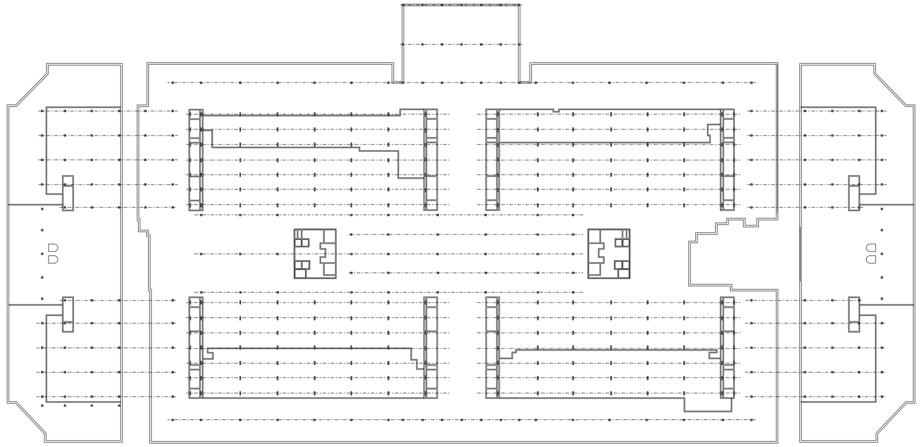
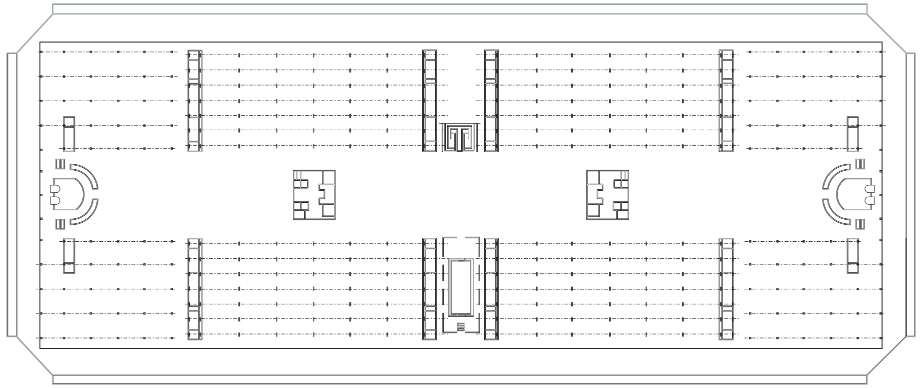
Following the ideas developed in the charrette, the students illustrated the concepts for a second ¼" glass sheet with an air barrier to increase the amount of reflection and lessen the amount of heat admitted through radiation and convection. Using rules of thumb, it was estimated that the second layer of glass would transmit 16% of sunlight—only 3% less than the single pane system, while decreasing the amount of radiation and convection by 27%. The utilization of a double glazing system would also therefore decrease the amount of energy consumption to operate the building.

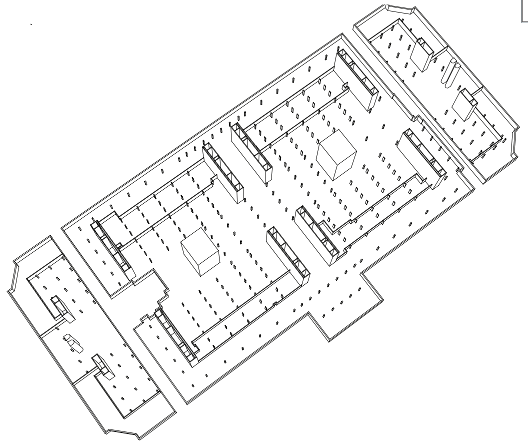


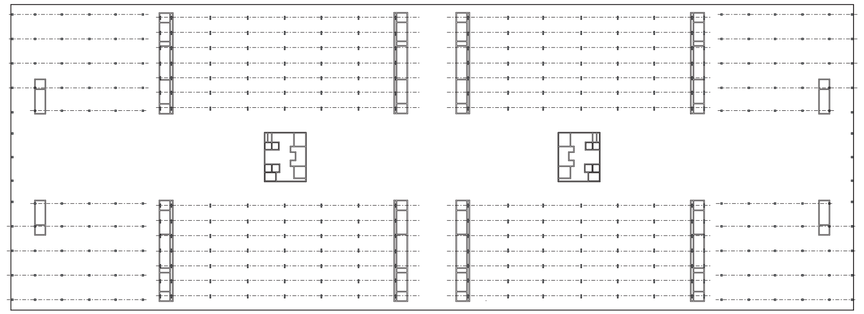
Structural System

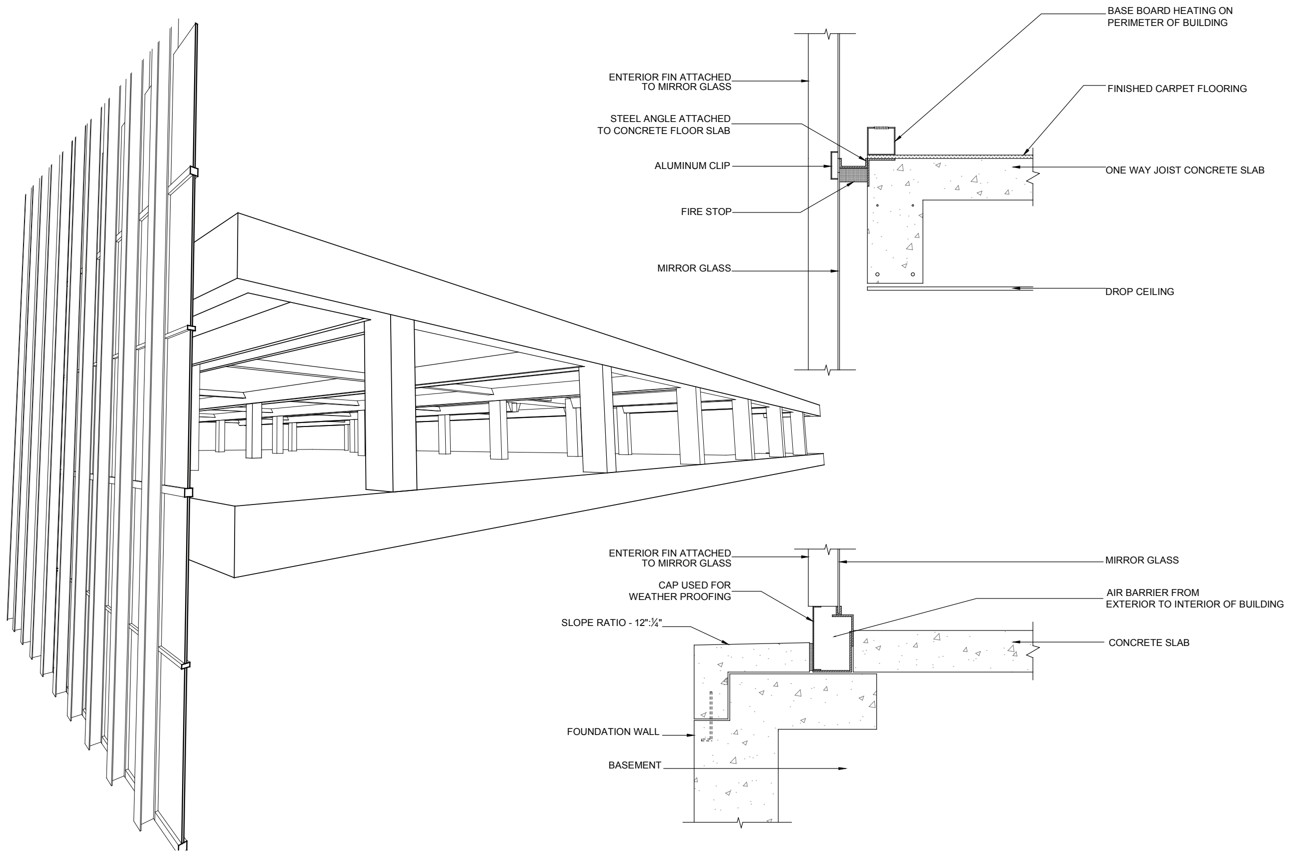
The main laboratory building consists of a concrete column and slab structural system with an internal column grid designed to contain laboratory spaces while allowing circulation on the perimeter of the main floors. The typical bay widths in the main structure are 45' on center, which allows for free spans in the auditorium in the basement while still accommodating the efficient layout of the smaller lab spaces above. The addition to the four original bars in the early 1980s utilize steel and smaller spans of 31' on center, but layout of the lab spaces in similar fashion was still achieved.











Conclusion

Where we go from here

The months that separate the actual charrette weekend and this release of publication have served to clarify the impact of convening nearly 40 designers to brainstorm about the possible imaginative ways to save Bell Labs as a cultural icon and make yet make it in germane in a new era. In short, there is no shortage of respectful design innovation to meet this challenge. This publication illustrates the many approaches and mechanisms that could be used in combination to serve this purpose.

In order for good ideas to take hold and shape, however, they must be supported and fostered by the appropriate climate. With many of the physical constraints and possibilities of Bell Labs identified and understood, it seems that that a viable future for Bell Labs is rooted in both design innovation and in what local policy and regulation will permit. The adaptive use of existing buildings is recognized widely as one of the green movement's most effective tools and most environmentally friendly activities. Re-use scenarios will be stifled if local zoning regulations do not evolve to allow new programs. Re-use scenarios will be awkward and diminishing if character defining architectural features and the building's setting in the designed landscape are not honored and preserved. Meeting the reality of the changing marketplace by adapting Bell Labs to multiple uses while upholding the brilliance of its design can serve as a model for bringing modern buildings and sites to a sustainable future.

Image credits

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Stephen Leddy
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The Bell Labs Charrette

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