

On Collective Form

BY FUMIHIKO MAKI

The following article is an edited version of the keynote address presented at the *13th International docomomo Conference* that took place in Seoul, Korea, in September 2014. In this essay, Fumihiko Maki's urban design theory and practice are traced through nearly 60 years of written and built work. Extensive travel and observations of village formations (under the auspices of the Graham Foundation) in 1958, research and writing "Investigations in Collective Form" at Washington University in St. Louis, and associations with the Metabolist Group and Team X are elements which Maki has stitched together to form his understanding of urban architectural group form strategies. These strategies have been tested in a variety of projects throughout Japan and elsewhere; together with his texts, they form a continuing body of work that exhibit how successful, quality urban environments are created.

Introduction

The summer of 1958 was to prove the most memorable period of my life as an architect. I was teaching in the School of Architecture at Washington University when I received word that I had been selected as a Fellow by the Graham Foundation, which has its headquarters in Chicago. The Graham Foundation fellowship, established principally to support young artists including architects in pursuing research of their own choosing, was perhaps the most generous fellowship in the world at the time.

I decided to spend most of the following two years traveling in South-East Asia and the Middle East, regions I had not visited before, as well as Northern and Southern Europe. It was for me a journey to the West.

Of the many cities and villages I visited on two extended trips in those two years, the ones that made the greatest impression on me were communities of houses, built with walls of sun-dried brick and tiled roofs, of the kind that are scattered all along the Mediterranean in countless numbers. The sight of those houses — their features thrown into sharp relief by deep shadows — linked and piled on top of each other on the hillside under the strong sun and against the background of a deep blue sky was by itself remarkable, but what was even more striking was the fact that the community, that is, the collective form, was composed of quite simple spatial elements such as rooms arranged around a small courtyard.

At the time, architects and historians in Japan had not yet begun to undertake surveys of villages. I saw in those collective forms an expression of regional culture, that is, a body of wisdom accumulated over a period of many years.

The impressions gathered on that journey are behind the proposal entitled "Group Form" which I presented in 1960 with my friend, the architect Masato Otaka. That was a time when the development of land to the West of Shinjuku

Station, formerly occupied by a water purification plant, was starting to become a widely discussed topic. This joint proposal was intended to be not so much an actual scheme for that area as a demonstration of the idea of group form.

However, the proposal was not meant to confirm what I had discovered with respect to forms of dwelling in villages on my journey. At the time I was interested in the notion of an urban order based on a collection of elements and believed it offered an alternative to the order, based on enormous structures built on the scale of civil engineering works, that architects and utopians had been proposing since the start of the 20th century.

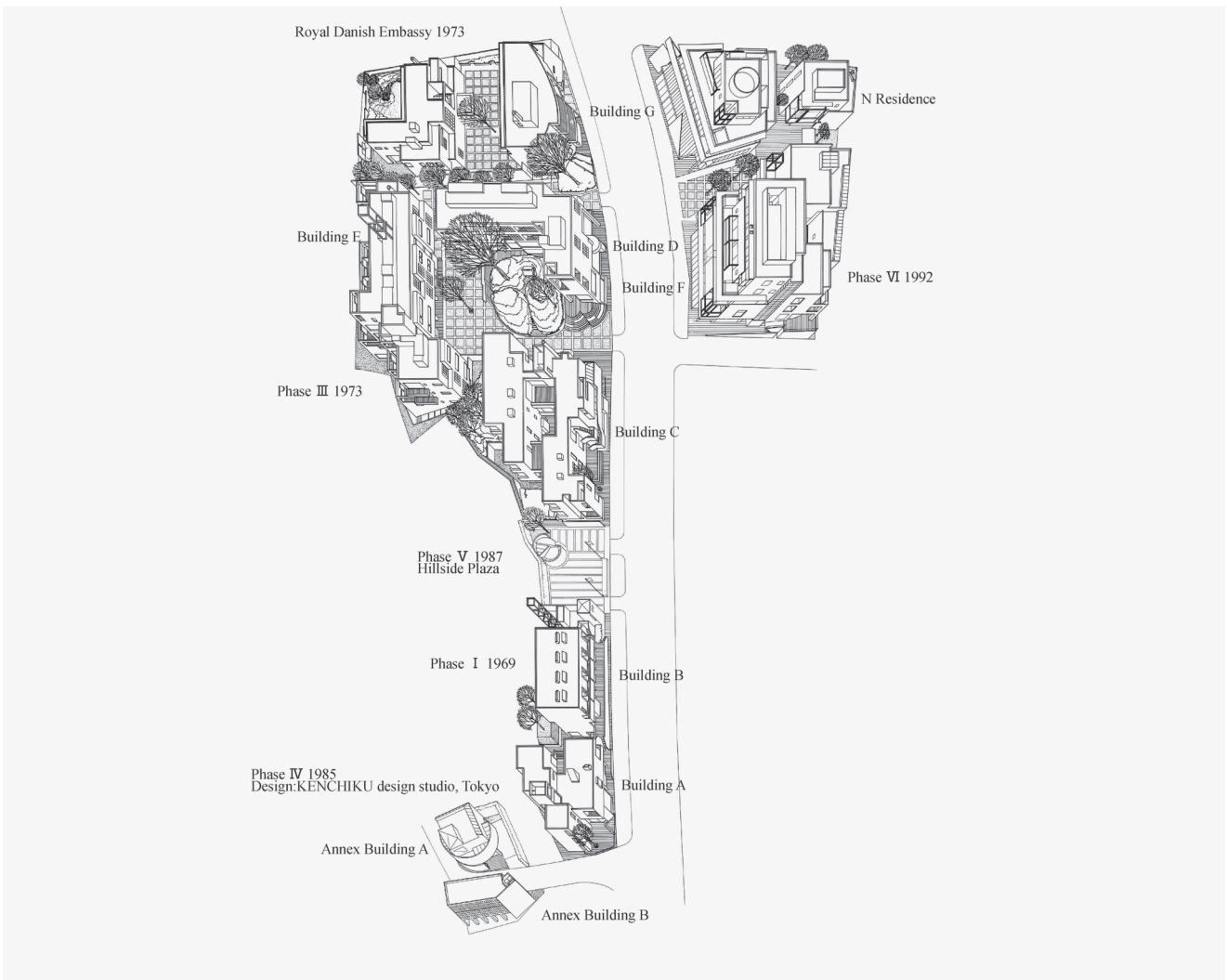
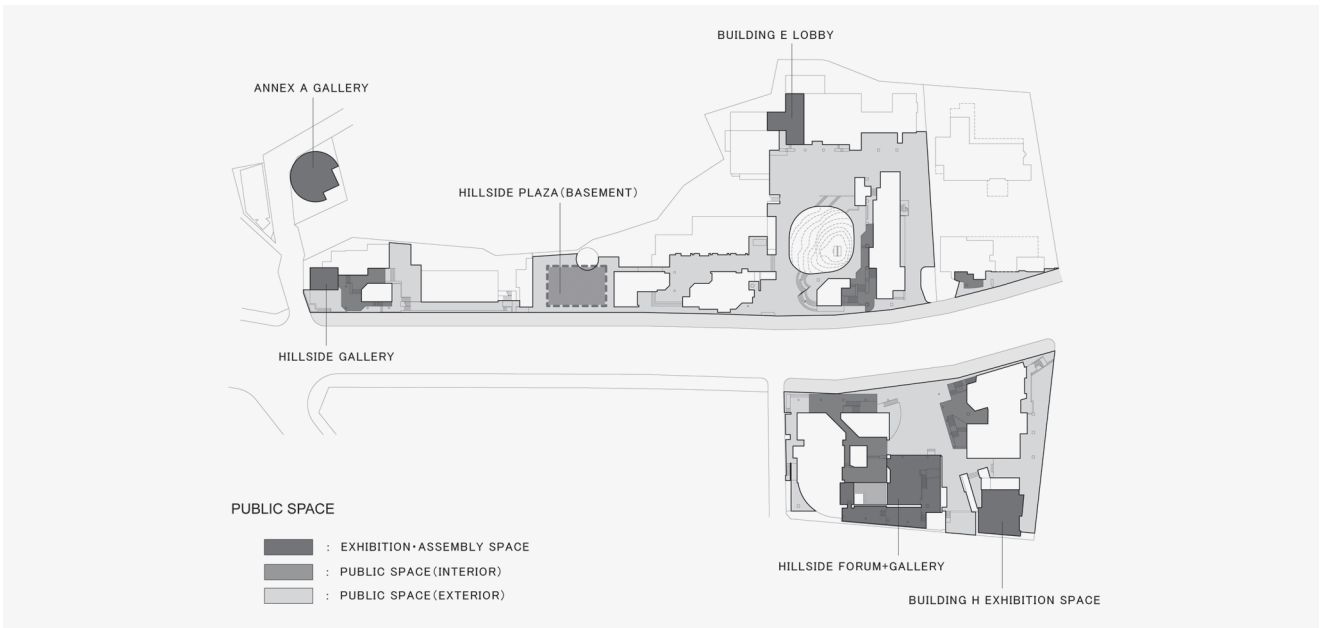
The notion of starting with individual elements to arrive at a whole was not only elaborated in the idea of collective form but subsequently became a basic theme for my own architectural aesthetic and logic.

This two-year journey was valuable in that, it gave me an intuitive knowledge of the fact that ultimately, in an organic form such as a city, the urban order can only be maintained if the autonomy of individual buildings and districts is assured.

The early 1960s were a time when the architectural world was still exploring various issues of modern architecture that had been developed before the war. At the same time, doubts were starting to be expressed about the validity of the ideas of modern architecture with respect to the city, and new investigations were being initiated. The megastructure can be seen in the context of the time as an attempt, based on a faith in technology, to expand the realm of architectural possibility.

In summer of 1960 I participated in a Team X conference in Southern France. Although members continued to take a humanistic, regionalistic approach and to reject megastructures, they were troubled by "the issue of great numbers", that is, the effectiveness of architects in dealing with the problem of housing large numbers of human beings.

01 Fumihiko Maki + Maki and Associates, Hillside Terrace, Tokyo, Japan, 1969 - 1992. Diagram showing various types of public spaces in the Hillside Terrace complex. © Maki and Associates.



02 Fumihiko Maki + Maki and Associates, Hillside Terrace, Tokyo, Japan, 1969 - 1992. Axonometric drawing of the Hillside Terrace complex showing Phases I - VI. © Maki and Associates.



03 Fumihiko Maki + Maki and Associates, Hillside Terrace, Tokyo, Japan, 1969 - 1992. Aerial view of the Hillside Terrace complex. © ASPI, n/d.



04 Fumihiko Maki + Maki and Associates, Keio University, Shonan Fujisawa Campus, Fujisawa, Japan, 1990 - 1994. Entrance façade of the Shonan Fujisawa Campus. © Toshiharu Kitajima, 1992.

In 1961 I returned to teaching at Washington University and, using notes I had previously made, I wrote over the course of a year a paper describing the three paradigms of collective form that would subsequently become the first chapter of “Investigations in Collective Form”. I still remember typing the original sheets from which mimeographs were made. I sent copies of this “underground” publication to the members of Team X, American architects and urban designers with whom I had recently become acquainted. I received an unexpectedly large number of responses. People like Walter Gropius, Kevin Lynch and Jacob Bakema took the time to send letters with their comments. One reason my paper met with such a response was that, as I have already mentioned, the early 1960s were a time when new explorations were at last being undertaken into architecture’s place in the city and the relationship between the city and architecture. In addition, my approach, which was to study the relationship between architecture and the city from the perspective of collections of buildings and quasi-buildings, was different.

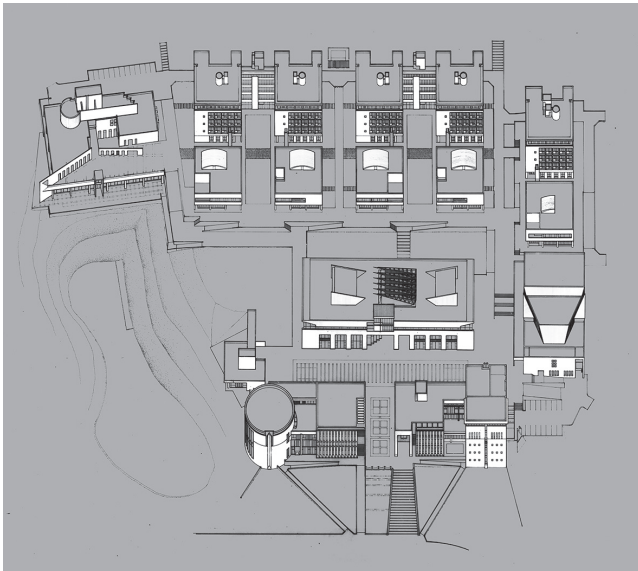
“Investigations in Collective Form” was published in 1964. The second chapter, which I wrote with Jerry Goldberg, at the time a research student at Washington University, was an essay on collections of elements from the perspective of linkage. The question of linkage is discussed on various levels. If each building, that is, each structural unit of the city, has its own lifespan, then different elements are apt to be replaced at different times. The relationship that ought to be created between elements of different ages is dealt with here as an issue of organic linkage between elements. The city thus can be seen as the sum total of countless events being generated simultaneously. When the architect or planner introduces something new under such circumstances, that act fits into certain operational categories. An attempt is made to discover the stance of the designer with respect to the city in the process and meth-

od of the particular operation. To put it another way, the historical context each individual carries with him is made apparent by such operations.

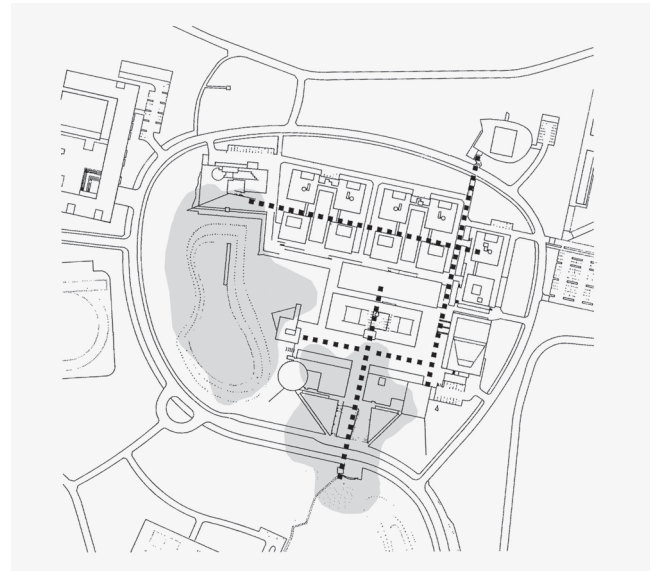
As I have already stated, such a position recognizes that the city as a physical place and social system depends on the autonomy of individual elements and seeks ways in which each individual element may participate in the whole.

The first chapter appears at first glance to present the three paradigms of collective form — “compositional form”, “group form” and “mega form” — as opposing, antagonistic patterns, but as stated at the end, the three patterns or modes are not mutually exclusive but can coexist in one configuration. They define the three basic relationships that always exist between individual elements and the whole. Lack of experience in actually designing buildings may account for an oversight. I neglected to consider the existence of space as a medium, in either collective form or linkage. It was a premise of my argument that the elements of compositional form are architecturally more self-sufficient than those of either group form or mega form, but I ought to have undertaken a more extended analysis of modes of exterior space and the interstices between elements within the composition. It was only later, in planning projects such as Hillside Terrace, Rissho University, and the Fujisawa campus of Keio University, that I gradually gained experience and learned that collective forms can depend on how such exterior spaces are created.

Through experience I also discovered a more subtle technique. By emphasizing the autonomy of individual architectural elements and deliberately creating weak linkages between them, one enables those elements to become more distinct indices of time and place. I learned that opposition and its antithesis, harmony, in fact characterize relationships on many different levels and that their cumulative effect determines our actual image of the city.



05 Fumihiko Maki + Maki and Associates, Keio University, Shonan Fujisawa Campus, Fujisawa, Japan, 1990 - 1994. Drawing of Keio University, Shonan Fujisawa Campus. © Maki and Associates.



06 Fumihiko Maki + Maki and Associates, Keio University, Shonan Fujisawa Campus, Fujisawa, Japan, 1990 - 1994. Campus master plan diagram showing the N - S and E - W axes. © Maki and Associates.

Time and Landscape: Hillside Terrace

The Hillside Terrace project took exactly 25 years, or a quarter of a century, from the first plan (in 1967) to the completion of the sixth phase (in 1992) (Figures 02 and 03). The flow of time can be gauged by the transformation of Tokyo, including the district of Daikanyama in that interval. Time is also to be measured by shifts in my own consciousness, and changes in architectural character effected from phase to phase in the project reflect the passage of time.

Public Space

The landscape of Hillside Terrace lasting for over two decades is centered on public spaces, including the sidewalk in front of the site (Figure 01). Ever since the first phase, various small public spaces have been provided. Both outdoor and indoor public spaces are made open to the outside world. It may not be appropriate in today's city to have a building open directly onto the urban environment. Here, each building is a largely self-sufficient world, opening itself only to an outdoor space that is itself cut off in part from the city. Each building affords view of others, and it is through the mutual exchange of views that a collective form comes into being. The views are limited to eye-level and have a sense of scale. There have been various public spaces in the history of cities. Spatial character usually determines what is public in the city. A metropolis can provide overwhelming spaces unavailable in small cities or villages. However, public spaces in cities do not exist just for crowds or communities. They are also places that allow people to enjoy solitude. Our urban spaces become much richer when there are many different layers of public spaces and meanings. In Japan, *nawa*, historically played a role in providing a public space in urban society, not unlike that of the plaza or square. Yet at the same time it retained a private dimension.

In a metropolis, people take strolls, just as people in the countryside go to mountains or rivers. In that way they are able to establish a special, spatial relationship between themselves and portions of the city. The extent to which streets suitable for walks and public spaces are provided can be considered an effective index in determining the quality of urbanity in a city. Sadly, the contemporary city is being gradually divested of such public character.

Such themes having to do with public character have been on my mind constantly throughout the 25 years I have worked on Hillside Terrace.

Space is not the only element at Hillside Terrace that has a public character. In the course of 25 years, programs too have been gradually developed. The owners felt strongly that the project should not be limited to commercial and residential use. For the last 10 years, various cultural events such as the annual SD Review and musical performances have been held here. The fifth-phase underground space called Hillside Plaza provided a place for such activities. In the sixth phase, a new multipurpose space was located facing the ground-level plaza. It is intended primarily for artistic exhibitions and gatherings and has a corner where refreshments are served. The space is like the first floor area in SPIRAL where various informal events are held.

I have enjoyed creating this unusual combination. In summary, Hillside Terrace not only marks a period of my own life but is my homage to Tokyo of the late Showa and early Heisei eras.

Campus in a Pastoral Setting

Periphery and Center

Keio University decided to establish a new campus centered around two new faculties as well as middle and high schools in the Shonan district of Fujisawa City, approx-

imately 30 kilometers from Tokyo. There are at present about 4,000 undergraduates and 200 graduate students. One of the main objectives of this university is to develop a new approach to education adapted to the growth of information and communication industries in recent years. This campus was constructed in four stages beginning in 1990 and was completed in 1994 (Figure 05).

A campus in a pastoral setting is a special educational environment. Here, I would like to re-examine how we went about creating that environment, beginning with the preparation of the master plan. The project offers a case study in the development of a collective form.

The 30-hectare site is in a hilly area typical of the western part of the Tokyo Metropolitan Region. There are a number of gently sloping hills on the site. Beautiful evergreens still grow here and there around the site, but within the project area the land was largely covered with *susuki* (Japanese pampas grass) and undergrowth. On clear days Mt. Fuji is visible beyond the woods on top of the hill to the west. The topography gave us relatively little to go by, so we decided to begin by forming two domains: a center and a periphery. This was a way of giving the collection of buildings an identity. At the same time, this enabled the campus to merge with the surrounding pastoral environment in a natural way. We began by building a loop road, thus dividing the site into a central domain within the loop and a peripheral domain without. There are two gates to the campus, one at the northern end and the other at the southern, and by connecting the approaches from those gates to the loop road a network for pedestrian and vehicular circulation was created.

Another important step we took was to carefully plot the loop road, taking into account differences in ground level and geographical features, so that the land within the loop would be visibly higher than the rest of the site.

Layering of Axes and Spaces

Within the loop are arranged the classroom, research and administration facilities that form the core of the campus. The loop measures 250 meters east to west and 330 meters north to south. Approximately a third of this enclosed area was occupied by an existing pond and woods on the south side. It was decided to locate the facilities on the remaining two-thirds, thus preserving the trees and the pond. We decided to divide the whole into small domains of equal size by creating a number of approaches along east-west and north-south axes (Figure 06). This master plan was also a response to a request by the university that the facilities be dispersed like houses in a village as much as possible. By siting buildings along north-south and east-west axes, we were able to create exterior spaces that are each different in character, scale and view. The individual architectural spaces were adapted to these exterior spaces.

The campus has a "face". So do individual buildings. It is the face that determines the identity of both the campus and individual buildings. When people perceive the face of a building in the same way, that building becomes a mnemonic device for society. It was decided to create a face for

the Fujisawa campus at that point where, having passed through the front gate and climbed a gently sloping road, one comes to the hill (Figure 04).

Another distinctive exterior space is the axial space created by the cluster of research and classroom buildings that extends north to south. At the south end of this exterior space is the terrace on top of the student center. Beyond the terrace is a tall stair tower of the middle and high schools. In the short intervals between lectures, this space becomes crowded with students and is the most heavily trafficked area on the campus.

A pastoral landscape also follows the logic of collective form at the Fujisawa campus.

Republic Polytechnic Campus Singapore

High Density Campus

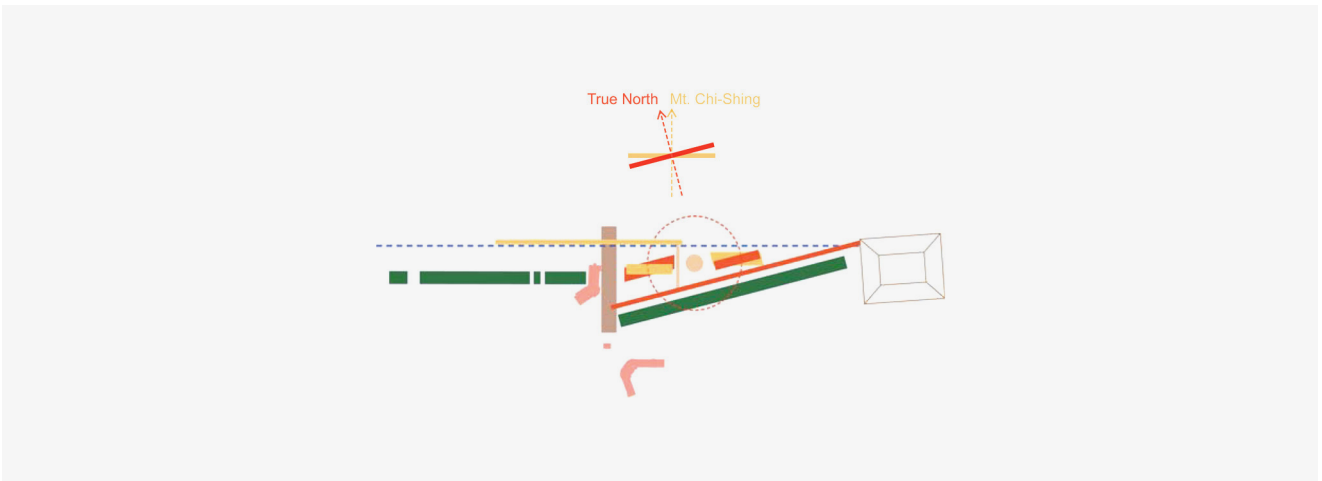
The site is located in Woodlands in the northern part of Singapore and consists of 20 hectares with a total building floor area of 240,000 m² (Figures 07 and 10). The campus services over 13,000 students and 4,000 faculty and staff members creates a relatively high density campus in a tight site. Consequently, a creative and efficient spatial strategy was devised that concentrates the main educational program within a central nucleus, termed the Learning Hub, and is surrounded by a series of satellite buildings that support the campus. The central Learning Hub consists of 11 medium rise classroom buildings, termed Learning Pods, with a large Agora space at the ground level with spaces for collective learning, including a large library, research labs, lecture halls, food courts, and other gathering spaces. Innovative spatial planning allowed sufficient open space to be preserved for outdoor courtyards, which enriches the entire campus with natural lighting and ventilation and provides extensive views.

Green Campus in a Tropical Region

Once occupied by an old British prison camp, the site of the new Republic Polytechnic is located on a gently sloping terrain and surrounded by a Regional Park and dense forest. The new campus preserves the green qualities of the original site and is integrated into the existing topography while also introducing new landscape elements that contrast with the natural wilderness. The existing slope of the site is maintained through a series of terracing ground floor levels with a sloping roof that is covered by a vast green space, termed the Lawn. Sunken courtyards cut into the Lawn level creating voids in the Agora roof and bring in natural light and provide views to nature. Covered walkways connect between the various buildings on the Lawn level, providing protection from the daily showers and strong sun in Singapore.

Students spend most of their day within the Learning Hub and/or the Agora focusing on their studies. Then, as evening sets in, the Lawn transforms into a kind of oasis for gathering and for casual activities to finish off the day. The new landscape of the campus strengthens the sense of place and ties the various buildings together as a whole.

07 Fumihiko Maki + Maki and Associates, Republic Polytechnic Campus, Woodland, Singapore, 2007. Aerial view of the Republic Polytechnic Campus.
© Maki and Associates, 2007.



08 Fumihiko Maki + Maki and Associates, Taipei Main Station redevelopment, Taipei, Taiwan, under construction. Taipei Main Station redevelopment model photograph.
Top left shows the concept of the dragon and phoenix symbols. © Maki and Associates.

The Republic Polytechnic has implemented a new educational system in Singapore known as PBL— Problem Based Learning. In contrast to the traditional classroom lecture method, the new teaching style requires multiple spaces, which are referred to as Learning Pods. At the beginning of each day, the Facilitator or Instructor will present a problem that the students have to solve by the end of the day. After receiving the problem, the students will disperse individually or in groups to the various learning centers throughout the Learning Hub (library, media center, workshops, dry labs / wet labs / clean rooms, etc) in pursuit of an answer. At the end of the day, the students then return to the Learning Pods to present their solution to the given problem.

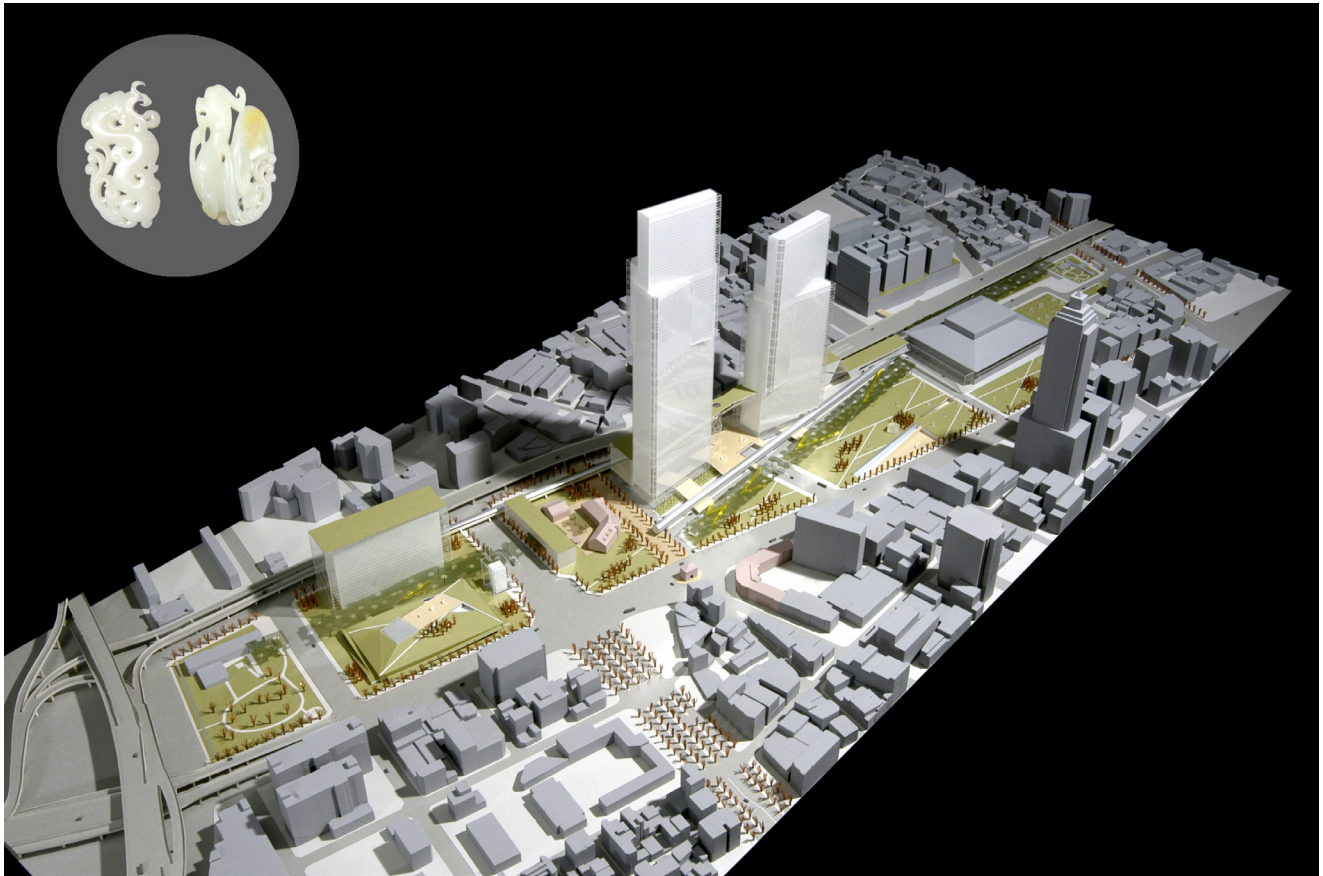
In response to this academic style, the concept of the Agora space was developed with the intentions of creating

a large mega-space to house all of the collective educational spaces together under one roof. In addition, communal spaces (food courts, student center, etc) are also interspersed within the Agora to provide places for informal study, eating, and social activities. This spatial strategy minimizes the student’s travel distance and maximizes their ability to access information and conduct research.

The Development of Collective Form

In 1964, I published “Investigations in Collective Form” in which I describe and illustrate three approaches to collective form — “compositional form”, “group form”, and “mega-form”.

Some forty years later, the spatial and formal organization of the new Republic Polytechnic campus can be observed as a clear example of this concept (Figure 11). In response



09 Fumihiko Maki + Maki and Associates, Taipei Main Station redevelopment, Taipei, Taiwan, under construction. Master plan diagram showing the East-West spine and the shifting street grid axes. © Maki and Associates.

to the programmatic requirements for maximum flexibility, adaptability, and efficiency, 11 identical Learning Pods (40 meters × 40 meters) form a group of collective learning spaces whose combination or separation provide maximum flexibility (group form).

The Agora (240 meters × 160 meters) serves as a large space with a network of crisscrossing passageways that are effectively connected to the vertical movement systems of the 11 Learning Pods (mega-form).

Surrounding the central nucleus of the campus is a series of satellite buildings, including the main administration building, the cultural center, sports complex, parking garage, power plant, and staff housing. Each building takes its own unique form, but together, along with the buildings of the central Learning Hub, they are organized compositionally in relation to each other as well as to the campus as a whole (compositional form).

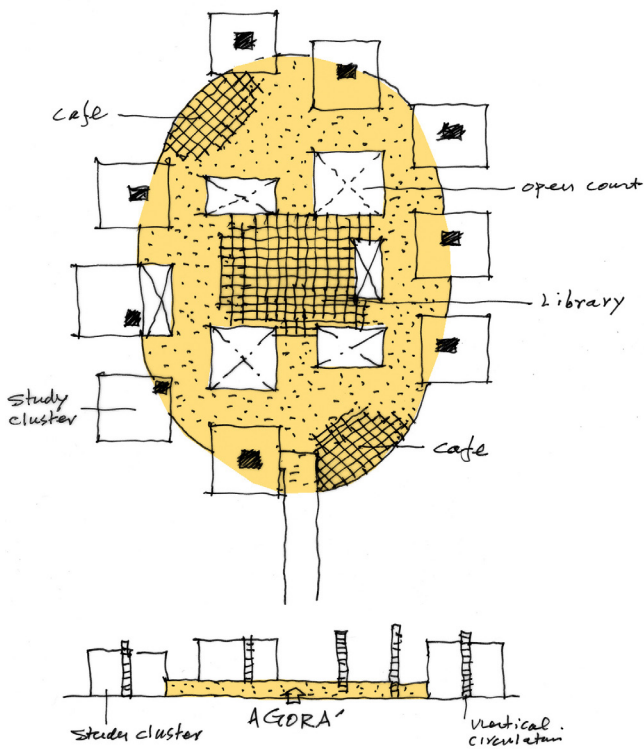
Taipei Main Station (TMS) Project

The Taipei Main Station (TMS) project site occupies an essential location in central Taipei, dotted by a number of important historical buildings and places (Figure 08). It forms part of an east-west spine that stretches from the Tansui River to Hua-Shang, and beyond to the Shing-Y sub-city center

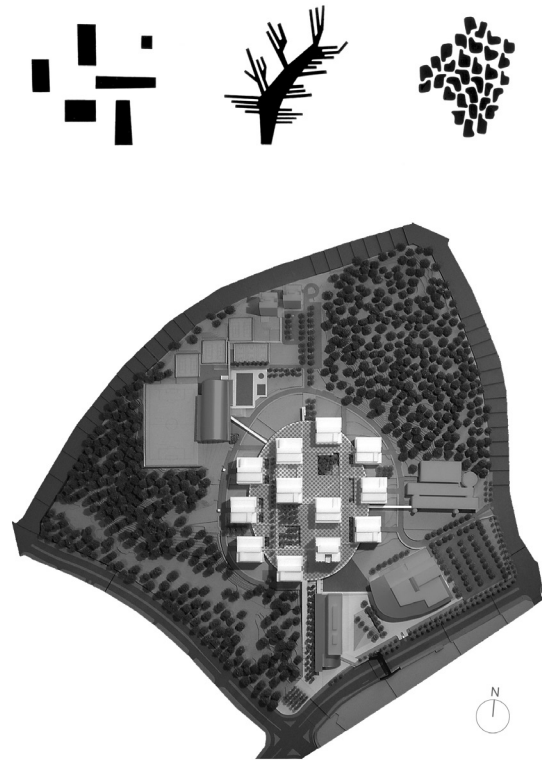
district. The site is also situated at the junction of two shifting street grid systems. One aligns in accordance with true north, and the other derives from the position of the original city walls, which align with the axis to Mt. Chi-Shing.

Urban Design Strategy 1: Substantiation of the Park System
Our urban design proposal re-organizes the site into five distinct districts: the Recreation Zone along the Tansui River; the Convention Zone (where we propose IT related facilities with a medium height office complex, and a half-submerged exhibition space whose surface is covered with greenery); and the Memory Zone which contains a cluster of preserved buildings as well as the new City History Museum. This zone is articulated by a long Memory Mall that concludes at the old North Gate.

The TMS Zone has also been redesigned to emphasize the continuity of green space. These green spaces and comprehensive movement systems link the five zones, each with a distinct character. This network of green space not only reinforces the city spine as a major public place in the city, but also provides a cool island that will mitigate the impact of heat from the surrounding city, particularly when new development increases the density in the area. The park system offers much needed open space in Taipei's central



10 Fumihiko Maki + Maki and Associates, Republic Polytechnic Campus, Woodland, Singapore, 2007. Campus plan diagram showing the Agora space (in orange) encompassing the various communal functions of the campus. © Maki and Associates.



11 Fumihiko Maki + Maki and Associates, Republic Polytechnic Campus, Woodland, Singapore, 2007. Top: Group form diagram - from left, group form; mega-form; compositional form. Bottom: Model photograph of campus. © Maki and Associates.

district and also provides space for both permanent and temporary art activities. 30-meter wide linear forests and the Taipei skyways, which run parallel to the linear forests, further articulate this park system.

Urban Design Strategy 2: Expression of Two Symbolic Axes
The most important urban design concept is to establish clear order for the exterior space (horizontal) and for the Gate Towers (vertical) by utilizing the two axes of true north and Mt. Chi-Shing (Figure 10). The micro-cosmos we attempted to create is a metaphor of Long-Feng (Dragon and Phoenix) a symbiotic relationship.

Urban Design Strategy 3:

The Creation of a Dynamic Landmark with the Gate Towers
The Gate Towers become prominent silhouettes in the Taipei skyline, constantly changing according to the distance and direction from which they are viewed, the weather, and the time of day. The two Gate Towers have two axes as explained in Urban Design Strategy 2 — one in accordance with the true north, and the other with the axis of Mt. Chi-Shing. The interconnected relationship between two towers symbolizes the Long-Feng metaphor. The towers also suggest the human figure — an angled head, shoulder, and

body — giving each a unique formal presence. These angled surfaces catch and reflect natural sunlight, dramatically offering ever-changing silhouettes.

Conclusion

Since the publication of the Group Form concept (in *Metabolism 1960* and later in *Investigations in Collective Form*), I have had been fortunate to realize a wide range of projects based on collective form over the last fifty years. This essay has examined four different projects — two in existing cities (a suburban area of Tokyo and a central district of Taipei) and two academic campuses (with very different physical setups, educational programs, and densities). Each project is illustrated with simple diagrams and images that outline their distinct approaches towards collective form. Just like the design of single buildings, the quality of collective form is determined by the capability and sensitivity of its architect. My conclusion is that there is no recipe that guarantees success. ■

Fumihiko Maki

(b. 1928, Tokyo). Architect (1954), University of Tokyo and Harvard University. Principal of Maki and Associates since 1965. Major projects: Hillside Terrace, SPIRAL, Makuhari Messe, MIT Media Lab, 4 WTC New York. Prizes: Wolf Prize (1988), Pritzker Prize (1993), UIA Gold Medal (1993), Prince of Wales Prize in Urban Design (1993), *Praemium Imperiale* (1999), AIA Gold Medal (2011).