ULI DEVELOPMENT CASE STUDIES

Kuala Lumpur City Centre

Kuala Lumpur, Malaysia

Project Type:
Mixed-Use / Multi-Use

Case No:
C034009

Year:
2004

SUMMARY

Kuala Lumpur City Centre (KLCC) is a master-planned, mixed-use development encompassing 40.5 hectares (100 acres) of prime land in the middle of Malaysia's capital city. It is the largest public/private real estate development venture in Malaysia. The project's major landmark, the PETRONAS Twin Towers, undoubtedly will remain the development's primary anchor. The towers were officially declared the tallest buildings in the world in 1998. The KLCC project is being constructed in phases over many years. The master plan shows a total of 22 separately titled development parcels surrounding a 20-hectare (50-acre) park. Seven parcels either have been developed or are under construction in 2004. The success of KLCC was seen from the outset to be of national interest. The owner and developer—KLCC Holdings Berhad, an unlisted public company whose largest shareholder is Petroliam Nasional Berhad (PETRONAS), the Malaysian national petroleum company—is responsible for the development and coordination of new projects undertaken directly or in joint venture with other firms.

FEATURES

- World's tallest twin towers, connected by a two-story skybridge
- Large-scale, multiphase, mixed-use, master-planned redevelopment of a prime center-city site
- The largest public/private real estate venture in Malaysia

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SPECIAL FEATURES

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INTRODUCTION

Malaysia is a multiethnic nation with a population of approximately 23 million at the turn of the millennium. The country is rich in natural resources, lies outside the region's larger earthquake fault lines, and, though subject to monsoon rain conditions, does not experience the typhoon/hurricane winds felt in some other parts of southeast Asia. Malaysia won its independence from the British in 1957. Periods of significant growth over the decades have strengthened the economy, greatly improved the quality of infrastructure, and raised the standard of living. This is especially true in the country's urban areas.

The large-scale nature of the Kuala Lumpur City Centre project is unique in many ways. The site is unprecedented in its size and location. The parties involved represent pillars of industry and a government whose leader at the time was recognized for his proactive involvement in the physical development of the country. With the assistance of the government and the availability of a large source of capital, the project was and is destined to make its mark. Perhaps more important, it is continuing to prove its value from an urban redevelopment standpoint while serving as a functional and much-appreciated national landmark.

GENERAL DESCRIPTION

At buildout—which is projected to occur in 2015—the total area of KLCC will be some 1.67 million square meters (18 million square feet), excluding parking. The development projects completed as of mid-2004 include the following:

- PETRONAS Twin Towers, two office towers containing a total of 341,760 square meters (3.68 million square feet);
- Suria KLCC, a 137,400-square-meter (1.48 million-square-foot) shopping center;
- Menara Maxis, a 70,000-square-meter (753,473-square-foot) office tower;
- A 5,400-space public/private parking garage that primarily serves the three projects listed above;
- Mandarin Oriental hotel, a 643-room, five-star hotel;
- Menara Exxon Mobil, a 52,000-square-meter (559,723-square-foot) office tower;
- The District Cooling Centre, an infrastructure facility;
- A 6,000-square-meter (64,583-square-foot) mosque;
- KLCC Park, a 20-hectare (50-acre) open space providing recreational and entertainment opportunities; and
- Access to light-rail transit (LRT).

Under construction as of mid-2004 are the following:

- Kuala Lumpur Convention Centre, an 87,000-square-meter (936,459-square-foot) convention, retail, and entertainment facility;
- Traders Hotel, a 600-room, four-star hotel; and
- Two residential towers containing a total of 176 condominium units in 94,340 square meters (1.02 million square feet).

This case study focuses primarily on the project's main icons and landmarks: the PETRONAS Twin Towers and the adjoining Suria KLCC shopping center.

The PETRONAS Twin Towers are symmetrical office towers rising 88 stories. At just under 452 meters (1,483 feet) in height, they remain the tallest twin towers in the world. Each contains a gross building area of approximately 170,880 square meters (1.84 million square feet). The net leasable area of each tower is approximately 130,000 square meters (1.4 million square feet), totaling around 260,000 square meters (2.8 million square feet). Tower 1 serves as PETRONAS's headquarters, while Tower 2 is leased to other tenants. Additional entertainment, recreation, and exhibition spaces are located within both towers and at the podium levels.

Suria KLCC, a highly successful shopping center, was planned and constructed at the same time as the PETRONAS Twin Towers. The facility features 338 department stores, shops, restaurants, and entertainment outlets within its 93,000-square-meter (1 million-square-foot) net leasable area. Suria KLCC is an integral part of the overall project and draws significant numbers of people to the development.

THE SITE

As is the case in many of the world's larger cities, the location of Kuala Lumpur's city center has shifted as the city has developed. The land now occupied by KLCC previously was the site of the Selangor Turf Club, where horse races were held from 1896 until 1992. In the late 1970s, it became apparent that traffic congestion in and around the club was getting to be unmanageable and that a racetrack was not the best use of land in this prime location. The 40.5-hectare (100-acre), irregularly shaped site is bordered by a major thoroughfare and commercial belt (Jalan Ampang) to the north and west and a predominantly residential belt to the south and east.

Ground conditions in and around the site—an underground stratum containing limestone, coupled with the presence

of a nearby underground waterway—made development there rather difficult. The owners recognized early on in the planning process that geotechnical design would play an important role in the overall development plan. They also realized early on that the large number of people forecast to use KLCC, both in the initial phases as well as during the course of its development over the years, would necessitate significant improvements to the area's infrastructure. Unlike in other Asian city-center sites of similar size, there were no squatter issues to resolve, a situation that enabled easy clearance and demolition of existing structures.

DEVELOPMENT PROCESS

Older Malaysians remember well the infamous traffic jams and disruption caused during racing seasons at the old Selangor Turf Club. The area around the club was built up gradually over the decades. In the early 1980s, the government decided that the club, an institution created during British occupancy, had to relocate away from Kuala Lumpur's center city. Thus began the planning process for this prime property.

In the early planning days, the site was earmarked as a "green lung" for the city, with little or no commercial development. While the concept of such a large park was attractive, the enormous potential urban rehabilitation opportunity afforded by the site also was obvious. The compromise was to plan and promote a new city center surrounding a large park with public amenities, one that would be significantly larger and better provided for than any other park within the city's central business district.

In 1990, Kuala Lumpur–based MAI Holdings was chosen as the master developer for the site. MAI Holdings entertained a vision for the site similar to that held by then–Prime Minister Mahathir Mohammad: to create a place where people could work, live, visit, shop, and enjoy leisure and cultural activities in a convenient and pleasant environment. This final objective was broad in scope and was expected to meet the needs of Kuala Lumpur and its inhabitants.

During 1990, an international competition was held to select a master planner for the project. The appointed planners, Klages Carter Vail & Partners (now known as RNL International), clearly defined the site and its benefits and prepared a working master plan, which then went through numerous rounds of changes before it was approved. Early versions of the master plan and various studies made it clear that the new development would require a number of infrastructure-related additions and improvements. One of the earliest infrastructure-related decisions was to consolidate chilled-water air conditioning for the entire site at a district cooling facility that became known as the District Cooling Centre (DCC). The costs of building this facility, and of undertaking road works, constructing new tunnels, and providing mechanical and electrical services, were to be sizable, and were budgeted for accordingly.

In early 1991, MAI Holdings announced the joint venture partnership in which PETRONAS, the national petroleum company, would become a major shareholder and an anchor occupant of the development. The Kuala Lumpur City Centre development company, KLCC Holdings Berhad, was formed soon thereafter.

Progress was rapid from that point on. During mid-1991, an international architecture competition was held and eight of the world's leading architects presented design concepts. Cesar Pelli & Associates Architects was selected to design the project's first phase, including the PETRONAS headquarters, its adjacent tower (which was not always assumed to be a twin), and a shopping center that was to be attached to the office towers.

Project management was an enormous undertaking, especially since the developer chose to use a fast-track method of design and construction. Several methods were employed to speed up the project's progress. In particular, the developer set up an entire local architecture practice to advance the work from a local standpoint as well as to facilitate a transfer of technology during the development process. (The firm was subsequently dissolved after the completion of Phase I.) After reviewing construction alternatives for the superstructure and engineering works, the developer decided to select different contractors for the Twin Towers. While this increased the amount of administration and management needed, the developer believes that the combined forces of the dual contractors expedited the work overall.

The project was officially launched on September 15, 1992. In May 1993, piling and foundation work commenced. The PETRONAS Twin Towers were topped out in March 1996 when the spires were lifted in place, pushing the towers to a height of 451.9 meters (1,482.6 feet). PETRONAS first occupied its premises in January 1997. Tower 2's first occupants moved in in December 1997, while Suria KLCC opened its doors for shoppers on May 8, 1998.

PLANNING AND DESIGN

The architect's brief for the PETRONAS Twin Towers involved designing the buildings to reflect a Malaysian identity. This was a difficult task, as there were no relevant projects in the country at the time that could easily be translated into a vernacular high-rise design. Fundamentally, the towers were expected to feature world-class architecture and to become a source of pride for the nation. After researching Islamic heritage, the architect proposed a plan featuring a geometric pattern composed of two rotated and superimposed squares with small, rounded infills. Local materials were to predominate throughout the interior.

The earliest master plans envisioned two towers located at the northwest corner of the site, where they would serve

as a gateway to the rest of the development. The architect's proposed symmetrically designed towers were meant to be tall, but originally were not planned as the world's tallest. However, a PETRONAS space planning study indicated that the firm's operations would need a total usable area that would require a height close to that of the world's tallest building—at the time, the 443-meter-high (1,453-foot-high) Sears Tower in Chicago. The architects and engineers were asked to consider the implications of this fact to the overall design. By adding mass and spires to the top of each tower, they were able to exceed the record (as defined by the Council on Tall Buildings and Urban Habitat) without changing the number of stories or the floor-to-floor height. The PETRONAS Twin Towers were the world's tallest building when they were completed, and they remain the world's largest twin towers.

The resultant height and corresponding core size, however, provided a rather inefficient floor plate. The solution involved attaching an "annex" of almost entirely net leasable area rising to level 44. The floor plate size changes significantly from the "low zone" to the "high zone." The largest net leasable floor plate measures 2,018 square meters (21,722 square feet); the smallest is 323 square meters (3,477 square feet). The overall net/gross efficiency of the towers is approximately 76 percent.

The architects thoroughly explored external finish and detailing alternatives, preparing numerous models and mock-ups during the design process. The cladding finish includes horizontal bands of glass and a combination of brushed and satin-finished stainless steel. This was the largest order ever placed for this type of stainless steel building cladding. The many angles and semireflective finish create an interesting effect, especially at dawn and dusk, and under the intense night lighting scheme.

A mid-level, two-story skybridge was designed to connect the PETRONAS Twin Towers and enhance the void between them. The skybridge also evolved into a life-safety application; since it incorporates fire-rating measures, the skybridge provides an added means of evacuation.

Each tower contains 29 double-deck, high-speed passenger elevators and ten escalators. Other features that are attractive to the buildings' users include a high-grade raised flooring system and integrated, high-performance acoustical ceiling, lighting, and heating, ventilation, and air conditioning (HVAC) systems. The improved specifications provide flexibility, convenience, environmental benefits, and, perhaps more important, a competitive marketing edge.

The aforementioned 30,000-ton chilled-water plant known as the District Cooling Centre serves the entire KLCC development. A service tunnel and/or utility reserves connect all buildings to the District Cooling Centre. The plant is run by a combination of natural gas–driven cogeneration equipment along with steam turbine and electric chillers. The associated ice plant also assists in lowering operating costs. The plant is equipped with 100 percent backup facilities.

A concert hall was planned to link the PETRONAS Twin Towers at the podium level. The acoustically acclaimed 865-seat PETRONAS Philharmonic Orchestra Hall is the venue for the Malaysian Philharmonic Orchestra and also serves as a performing arts facility for other musical and cultural events.

The net lettable 93,000-square-meter (1 million-square-foot), six-level Suria KLCC shopping center effectively anchors the base of the PETRONAS Twin Towers on the KLCC Park side. The main mall was planned in a crescent shape to afford retailers maximal shop frontage. The center contains two major department stores, one junior department store, a cinema complex, a supermarket, and 336 other specialty shops, food outlets, and service businesses. Suria KLCC has a different owner than the rest of the development; KLCC's developer sought a relationship with seasoned shopping center owners and managers Rodamco N.V. of the Netherlands to participate in the venture and ensure the success of the center. Since the time Suria KLCC was completed, the owner also has assumed the role of shopping center manager.

On the top floor of Suria KLCC sits the Petroleum Science Museum and Reference Library, an interactive science discovery center with an "oil and gas" theme. State-of-the-art displays and exhibits are intended to stimulate interest in science and technology, particularly in petroleum science. The complex also boasts a reference library offering materials and information on energy, petroleum, petrochemical, and related industries. The facility is used as an educational resource not only by visitors to Suria KLCC but also by local and international students.

Galeri PETRONAS, located on the third level of Suria KLCC, is the complex's venue for viewing and appreciating traditional and contemporary works of art.

A 5,400-space parking garage is located underneath the PETRONAS Twin Towers, Suria KLCC, and Menara Maxis. It will tie into the adjacent undeveloped parcel (lot C) when this parcel is developed.

APPROVALS

Understanding the massive, fast-track development program KLCC Holdings had undertaken, the Kuala Lumpur City Hall decided to assist the project by providing dedicated building plan inspection staff and facilities to expedite approvals. Without the close interaction between the design team and the relevant statutory bodies, the project almost certainly would not have been finished as quickly as it was. During the approval process, the developer chose to go beyond complying with Malaysian standards for life safety and structural requirements by also meeting or

exceeding international standards for high-rise development.

CONSTRUCTION

The fast-track method of construction was adopted early; advanced and accurate planning therefore was imperative. The selection and ordering of equipment, materials, and finishes were timed to coincide with the awarding of construction contracts. Many specialists were brought on board to support the design and construction teams. At the height of construction, more than 7,000 workers, speaking many different languages, were on the site. Safety was one of the developer's major areas of emphasis; PETRONAS's quality control and safety record was not to be blemished. All persons entering the site had to adhere to the client's strict safety precautions, which were more exacting than those typically enforced on other local building projects.

FINANCING

The total cost of developing the PETRONAS Twin Towers and its associated infrastructure alone was Ringgit Malaysia 2.8 billion (US$1.12 billion, at the foreign exchange rate of RM2.50 = US$1; in late 1998, the Ringgit was pegged to the dollar at RM3.80 = US$1 and remains so to date). This excludes the cost of Suria KLCC and the other buildings involved.

The financing methods used were primarily traditional ones. Initial site clearance and the start of infrastructure development were funded by shareholders' equity. Project finance and working capital were drawn from financial institutions in the form of loans. The PETRONAS Twin Towers were refinanced after completion. The new facility consisted of a mix of mortgage-backed end-finance along with short-, medium-, and long-term bonds secured against PETRONAS's long-term lease commitment. A securitized arrangement via a special-purpose vehicle was considered; however, the structure ultimately chosen was effective and well placed in the debt market at the time. No special tax incentives were involved.

Each separate development within KLCC is responsible for discerning and meeting its own financing needs. To date, construction and end-finance facilities have been predominantly by way of equity finance and traditional bank borrowings, the latter involving a mix of fixed and variable interest rate loans. KLCC's agreement with each respective development partner mandates a maximum 60:40 debt-to-equity ratio in which any cost overrun is paid for through advances from shareholders.

MARKETING AND TENANTS

Tower 1 of the PETRONAS Twin Towers is fully occupied by PETRONAS. Tower 2 is leased to a variety of tenants ranging from oil- and gas-related businesses to financial services firms. Strong demand from the technology sectors was seen when the towers were given Multi-Media Super Corridor (MSC) site status, entitling technology-based companies that meet specific criteria to take advantage of an array of tax incentives.

In March 2004, the occupancy rate for Tower 2 was 69 percent, resulting in a 15 percent vacancy rate for both towers. The asking-rent, based on traditional terms, is RM86/square meter/month (the equivalent of US$272/square meter/year or US$25/square foot/year at the current foreign exchange rate).

Suria KLCC has been successful from the outset, with little turnover of tenants and increased revenue per square meter in each year of operation. True to large-scale shopping center concepts, Suria KLCC has a balanced mix of strategically positioned tenants. The anchor tenants are Isetan of Japan (25,000 square meters/269,098 square feet), Parkson Grand of Malaysia (15,000 square meters/161,459 square feet), and the Asian-based Tanjong Golden Village Cineplex group (6,000 square meters/64,583 square feet). The balance of specialty shops, restaurants, and services support the success of the complex. Rental rates vary widely based on tenant size, location within the complex, marketing mix, use, and contract terms.

Outside of PETRONAS Twin Towers and Suria KLCC, a number of other buildings and specific end users make up the Kuala Lumpur City Centre development at present. In particular, the 643-room Mandarin Oriental hotel, the majority of which is owned by KLCC Holdings Berhad, is located immediately adjacent to the PETRONAS Twin Towers. To the east is Menara Maxis, the headquarters for a Malaysian telecommunications company, and opposite the PETRONAS Twin Towers is Menara EXXON-Mobil, developed for the Malaysian headquarters of this well-known international oil and gas conglomerate.

Planned and under construction as of mid-2004 is the Kuala Lumpur Convention Centre, which will feature approximately 87,600 square meters (942,918 square feet) of conference, retail, and entertainment space when it opens in mid-2005. Of particular interest is the construction of a "next-generation" aquarium project occupying part of the basement that will be known as Aquaria@klcc. Immediately adjacent and connected to the convention center will be the 600-room, four-star Traders hotel.

Further to the east, two 43-story residential towers that will contain 176 exclusive condominium units are under construction. Sales, which will begin in mid-2004, are expected to reach benchmark pricing levels for Kuala Lumpur.

MANAGEMENT

KLCC is managed by a wholly owned subsidiary of the developer. Property management is divided into several divisions to attend to the development's various needs and uses. Numerous third-party contractors provide maintenance and management services. The largest of these are the operators of the District Cooling Centre, garage management, and those responsible for maintaining and servicing all means of vertical circulation. At any given time, more than 200 staff are directly employed or outsourced in the regular maintenance and management of the entire 40.5-hectare (100-acre) site and buildings under KLCC's care.

EXPERIENCE GAINED

The KLCC development is clearly impressive. The effort made to achieve the end result of the development's initial phase was enormous. The learning curve was swift and the transfer of technology inevitable. The project therefore served a purpose greater than a typical mixed-use, high-rise development. One could argue that whatever the additional cost born by the developer—beyond what perhaps would not have been spent by a traditional private developer—has to be chalked up to the greater good of the city and the country.

In hindsight, the developer would have scaled back some redundancies built into the project. At present, for instance, the development is served with a 100 percent backup for the air-conditioning plant, which likely will not be fully used during the life of the project. Nevertheless, some of the additional life-safety features that were perceived as superfluous have in fact given the towers added recognition and have assisted in diminishing any negative impressions subsequent to the September 11, 2001, terrorist attack on the World Trade Center in New York. Overall, KLCC has made an incredible contribution to the urban fabric of Kuala Lumpur. It is much appreciated by the thousands of people who visit and work within the complex on a daily basis, both Malaysians and foreigners alike.

PROJECT DATA

LAND USE INFORMATION

Site area (hectares/acres): KLCC total: 40.5/100.0; PETRONAS Towers/Suria KLCC: 2.2/5.4

LAND USE PLAN

Use	Total KLCC, Existing (Square Meters/ Square Feet)	Total KLCC at Buildout, Projected (Square Meters/ Square Feet)
Buildings	75,200/809,446	149,735/1,611,733
Streets/surface parking	50,000/538,195	50,000/538,195
Landscaping/open space	200,000/2,152,780	200,000/2,152,780
Other	74,800/805,140	265/2,852
Total	400,000/4,305,561	400,000/4,305,561

GROSS BUILDING AREA (GBA)

Use	PETRONAS Twin Towers and Suria KLCC (Square Meters/ Square Feet)	Total KLCC, Existing (Square Meters/ Square Feet)	Total KLCC at Buildout, Projected (Square Meters/ Square Feet)
Office	341,760/3,678,670	463,760/4,991,866	1,115,849/12,010,887
Concert hall	2,600/27,986	2,600/27,986	2,600/27,986
Retail	137,405/1,479,014	137,405/1,479,014	152,405/1,640,472
Residential	NA	0/0	154,344/1,661,343
Hotel and future serviced apartments	NA	71,941/774,366	132,441/1,425,582
Convention center	NA	0/0	87,624/943,176
Mosque	NA	5,600/60,278	5,600/60,278
Other (District Cooling Centre)	NA	19,137/205,989	19,137/205,989
Subtotal	481,765/5,185,670	700,443/7,539,499	1,670,000/17,975,713
Parking	251,000/2,701,739	251,000/2,701,739	694,835/7,479,134
Total	732,765/7,887,409	951,443/10,241,238	2,364,835/25,454,847

LEASABLE AREA

Use	PETRONAS Twin Towers and Suria KLCC (Square Meters/ Square Feet)	Total KLCC, Existing (Square Meters/ Square Feet)	Total KLCC at Buildout, Projected (Square Meters/ Square Feet)
Office	259,738/2,795,794	361,733/3,893,658	870,362/9,368,490
Retail	94,585/1,018,103	94,585/1,018,103	104,910/1,129,241
Total	354,323/3,813,897	456,318/4,911,761	975,273/10,767,731

DEVELOPMENT COST INFORMATION

Total Development Cost:
PETRONAS Twin Towers and directly associated infrastructure (used also for a large portion of the remaining site): Ringgit Malaysian 2.8 billion (approximately US$1.12 billion)

DEVELOPMENT SCHEDULE

Planning started: 1991
Construction started: 1993
Sales/leasing started: 1995
Phase I completed: August 1999
Projected completion: 2015

DIRECTIONS

By mass transit from Kuala Lumpur International Airport (KLIA): Take a dedicated high-speed express train to Kuala Lumpur Sentral (KL Sentral), then transfer to the light-rail transit (LRT) system, proceeding directly to KLCC Station. Total travel time is approximately one hour.

By car from KLIA: Travel north along the North-South Expressway approximately 60 kilometers (37 miles) to the dedicated exit and tunnel access for the KLCC development. Total travel time is approximately one hour in nonpeak traffic.

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The 88-story pETRONAS Twin Towers, the centerpiece of Kuala Lumpur City Centre, rise above Suria KLCC?a large-scale shopping center?and a popular water park.

Kuala Lumpur City Centre, seen under construction in 1996, is the largest public/private real estate venture in Malaysia.

The large-scale, high-density development at Kuala Lumpur City Centre is balanced by a 20-hectare (50-acre) park.

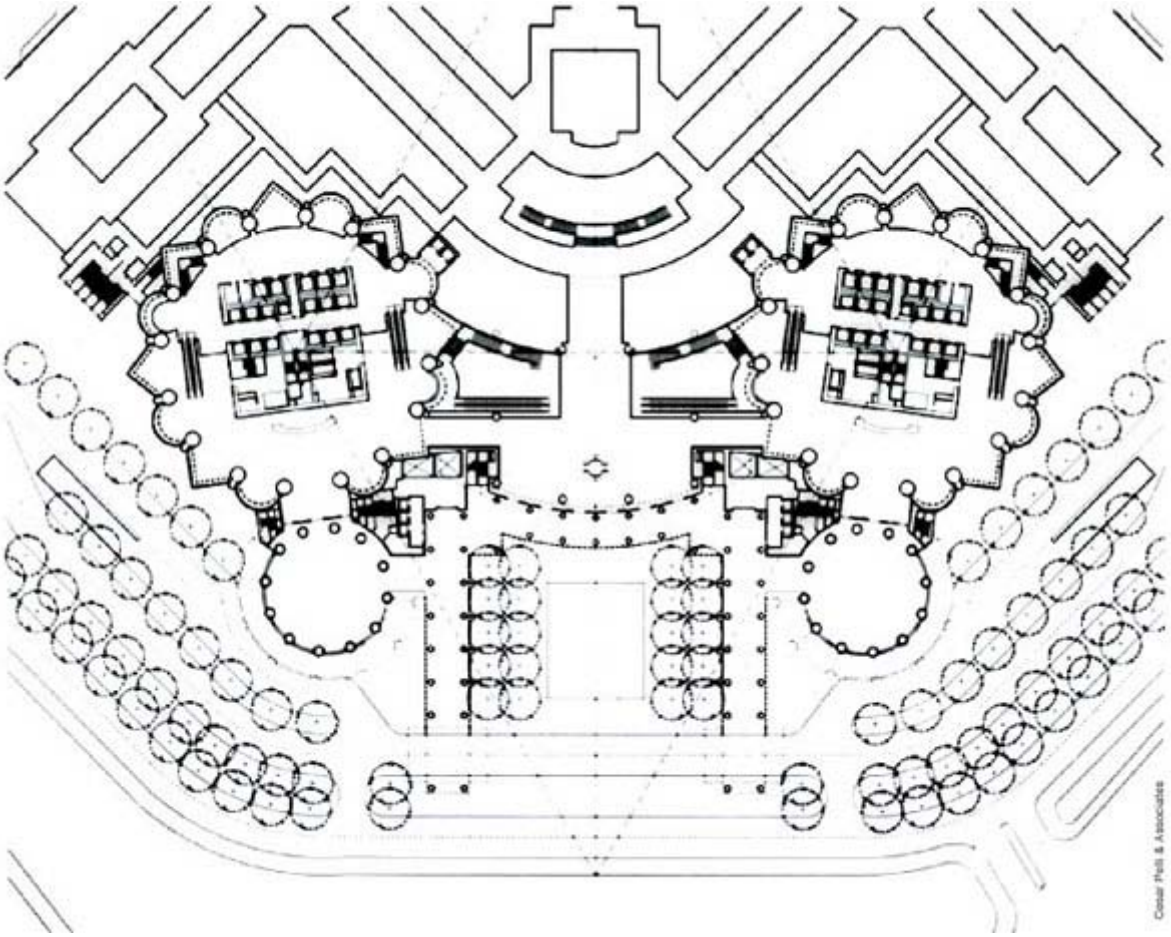
The pETRONAS philharmonic Orchestra Hall joins the pETRONAS Twin Towers at the podium level.

A massive skylight is at the core of the Suria KLCC shopping center.

As the city of Kuala Lumpur expanded toward the Selangor Turf Club horse-racing venue (shown here circa 1990), the club was relocated outside the city center and new uses were sought for the site, which eventually accommodated Kuala Lumpur City Centre.

An early model of KLCC.

The KLCC master plan.



The ground-floor plan for the pETRONAS Twin Towers.