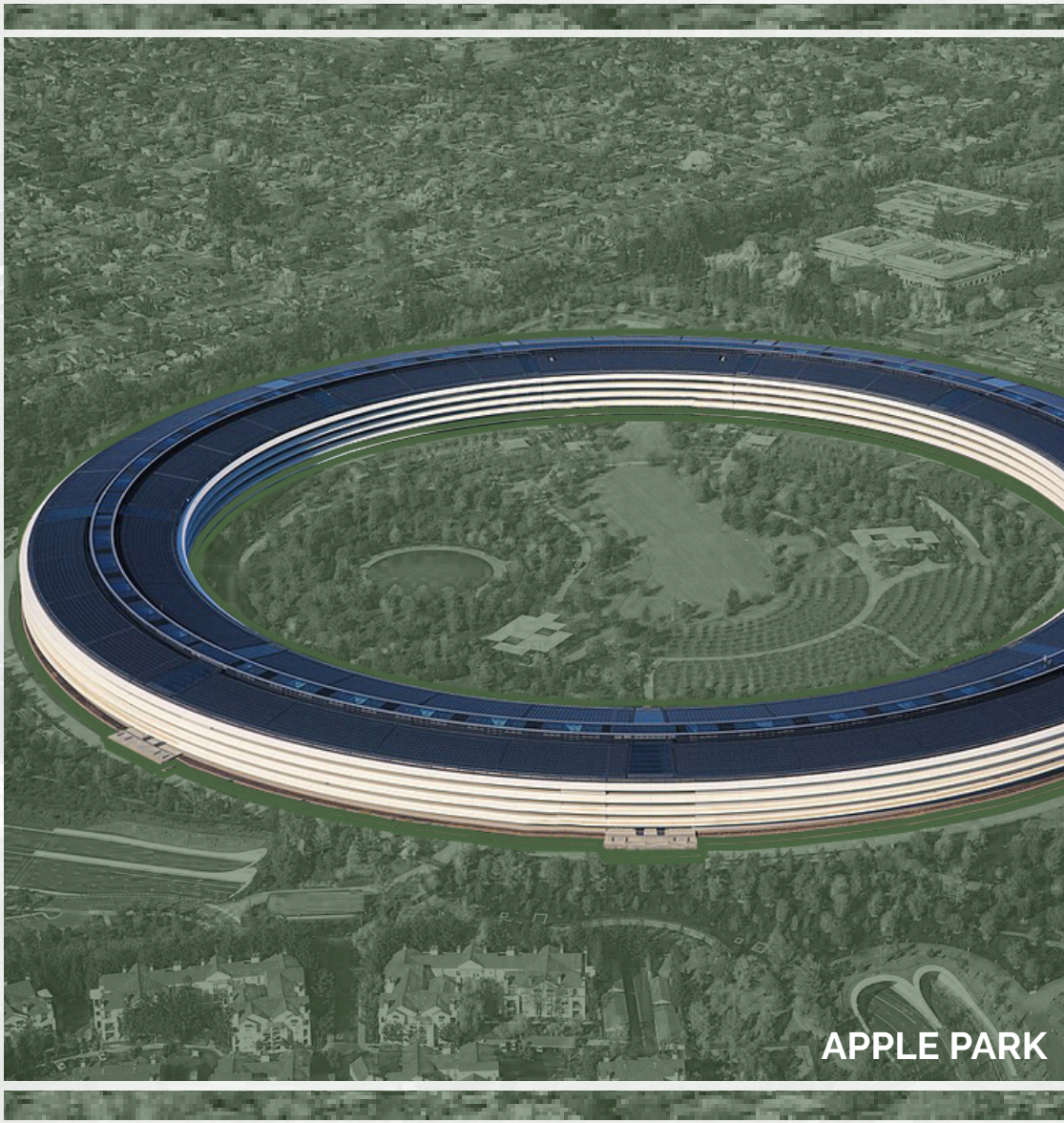
GREEN STRATEGIES FOR BUILDING DESIGN (ARC61804)

CASE STUDY & COMPARATIVE ANALYSIS

TUTORED BY: NIK SYAZWAN BIN NIK AB. WAHAB

INTERNATIONAL SCHOOL OF KUALA LUMPUR



APPLE PARK

PREPARED BY:

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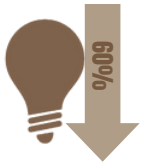
INTERNATIONAL SCHOOL OF KUALA LUMPUR

AMPANG HILIR, KUALA LUMPUR, MALAYSIA

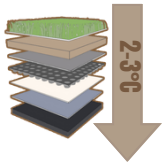
The International School of Kuala Lumpur (ISKL), located in Ampang Hilir, is a premier international school that offers an American-based curriculum. Opened in 2018, the school's design draws inspiration from traditional Malaysian kampung houses, particularly in its emphasis on communal spaces and natural ventilation. Its modern campus serves over 1,500 students from diverse backgrounds and is designed to encourage collaboration, innovation, and a strong sense of community.

SUSTAINABLE KEY FEATURES

Malaysia's first school with **LEED Gold certification**



Classrooms use **60% less lighting** via daylight



Green roofs **cutting cooling** needs by **2–3°C**

Operable windows & corridors i**mproves cross-ventilation**

AREA
105,000 m2

CLIMATE CONTEXT
Tropical Climate

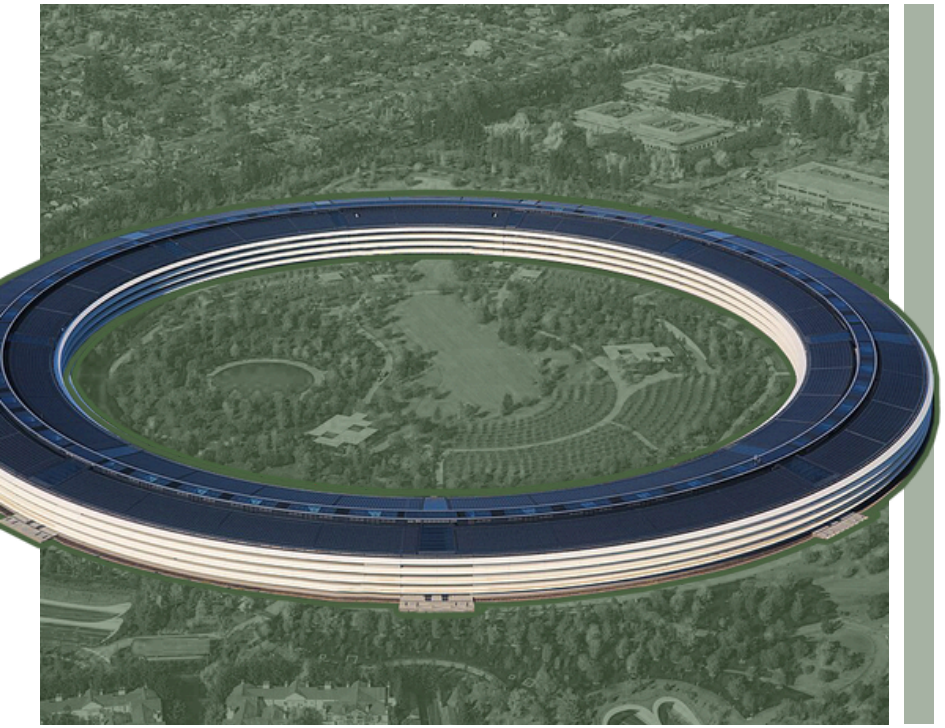
ARCHITECT
HOK, VERITAS Design Group

NO. OF STOREYS
3-4 Storeys

BUILDING FORM
Clustered Pavilion Layout

BUILDING TYPOLOGY
Educational, International School

CERTIFICATION
LEED Gold Certification



APPLE PARK

CUPERTINO, CALIFORNIA, UNITED STATES

Apple Park, located in Cupertino, California, is Apple Inc.'s global headquarters and a benchmark in sustainable corporate architecture. Completed in 2017, the campus features a striking circular main building set within a 175-acre landscape. Its design subtly references the forms and layouts of early California missions, emphasizing harmony with the natural environment through cloister-like courtyards, low horizontal forms, and fluid indoor-outdoor transitions.

SUSTAINABLE KEY FEATURES

360° glass façade brings **80% daylight** to workspaces

High-tech shading **reducing cooling by up to 30%.**

Open design allow natural ventilation **75% of the year**

100% renewable energy with 17 MW solar

AREA
708,000 m2

CLIMATE CONTEXT
Mediterranean Climate

ARCHITECT
Foster + Partners

NO. OF STOREYS
4 Storeys

BUILDING FORM
Circular Form

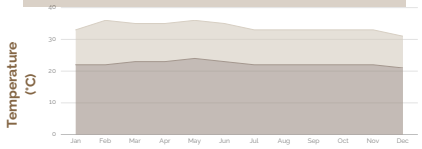
BUILDING TYPOLOGY
Office Campus

CERTIFICATION
LEED Platinum Certification

INTERNATIONAL SCHOOL OF KUALA LUMPUR

Kuala Lumpur has a **hot, humid and rainy** tropical climate with hi**gh temperatures** and frequent rainfall year-round, especially during **inter-monsoon months**. This supports a lush, green environment. However, climate change and urbanization are increasing **extreme weather events**, requiring adaptive strategies to improve the city's environmental resilience and long-term sustainability.

TEMPERATURE



Consistently high temperatures throughout the year. Air temperatures ranging from **29.3°C to 37.3°C**, with urban heat island intensities (UHII) reaching up to **8°C** in built-up areas compared to green spaces.

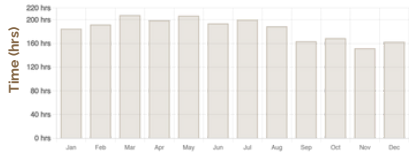
HUMIDITY

Relative humidity levels exceeding **80%**. This high humidity combined with elevated temperatures.

RAINFALL

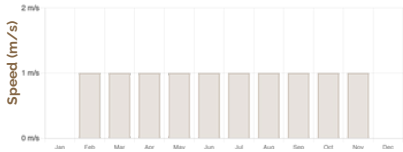
The city receives averaging approximately **2,400 mm** annually. Rainfall is typically distributed across two monsoon seasons: **the Southwest Monsoon** (May–September) and **the Northeast Monsoon** (November–March)

DAYLIGHT



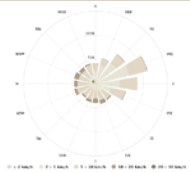
Kuala Lumpur experiences approximately **12 hours of daylight year-round**.

WIND



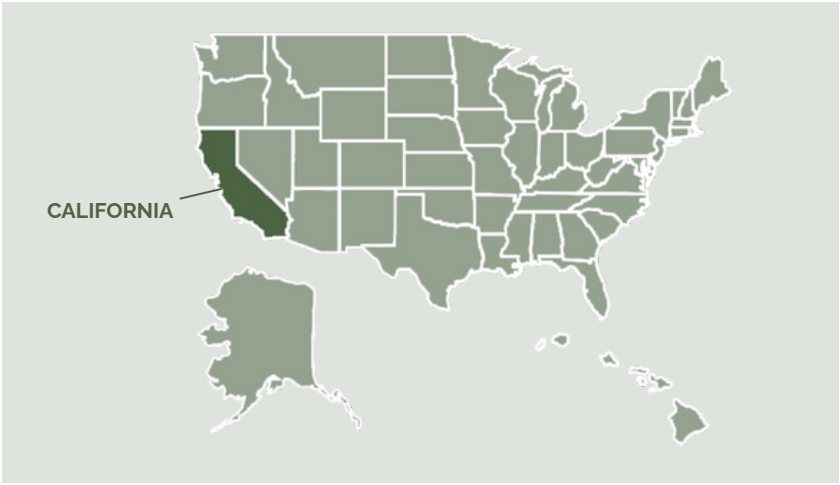
Wind speeds in Kuala Lumpur averaging around **3.7 m/s**, predominantly from the southeast.

WIND ROSE DIAGRAM



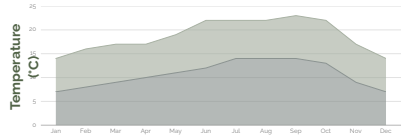
Winds from the **north** and **northwest** are minimal, indicating limited air movement from those directions.

APPLE PARK



Cupertino experiences a mild **Mediterranean climate**, marked by **warm, dry summers and cool, wet winters.** The area enjoys plentiful **sunshine and low humidity** for most of the year, creating a comfortable and stable environment. Cupertino are typically clear, dry, and warm, with low humidity and abundant sunshine,

TEMPERATURE



Mediterranean climate characterized by **warm, dry summers and mild,** wet winters. Average high temperatures range from **13°C (55°F)** in **January** to **27°C (81°F)** in **July**.

HUMIDITY

Relative humidity in Cupertino varies throughout the year, averaging around **75% in the mornings** and dropping to about **50% in the afternoons**.

RAINFALL

Average annual rainfall of approximately **400 mm (16 inches)**, predominantly between November and March.

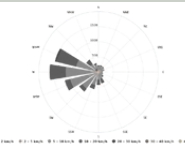
DAYLIGHT

Cupertino enjoys **ample daylight year-round**, with longer days in the summer months.

WIND

Prevailing winds in Cupertino are generally from the northwest, with average speeds around **5 to 10 km/h**

WIND ROSE DIAGRAM



Winds from the **eastern** directions is minimal. This wind pattern is essential to consider in architectural and urban planning

INTERNATIONAL SCHOOL OF KUALA LUMPUR

The **International School of Kuala Lumpur (ISKL)** is located in **Ampang Hilir.** The site is surrounded by a blend of residential **neighborhoods, embassies, and green spaces**, making it both secure and accessible. It sits near key urban infrastructure, including major roads, public transport links, and recreational parks, which support daily commuting and outdoor learning activities.

CLIMATE RESPONSE

Building Orientation
Organized around a curved north-south spine, minimizing east-west exposure and reducing heat gain from low-angle morning and evening sun.

Rainwater Harvesting
Deep roof overhangs, sunshades, and vertical fins protect glazing and facades from direct solar radiation.

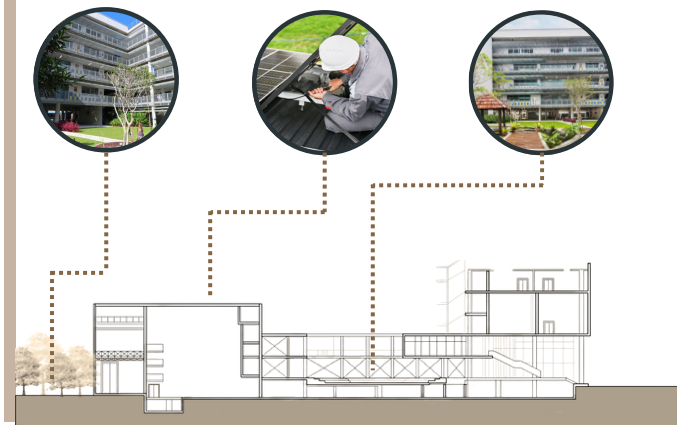
Shade & Sun Control: Deep roof overhangs, sunshades, and vertical fins protect glazing and facades from direct solar radiation.

SITE RESPONSE

Topography
Preserved existing trees and natural topography, embedding the buildings into a green framework.

Environmental & Ecological
Incorporates photovoltaic solar panels to generate clean energy.

Hardscape:
Central courtyard as a communal space, supported by shaded walkways and native landscaping



APPLE PARK

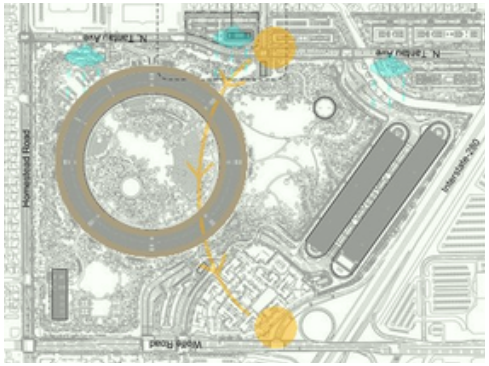
Apple Park is located in Cupertino, California, The site occupies approximately **175 acres**, previously used as a Hewlett-Packard campus, and is now transformed into a **highly integrated corporate landscap**e. It is surrounded by a **mix of suburban residential neighborhoods**, t**ech campuses, highways and low-density commercial zones**, reflecting the typical urban fabric of Silicon Valley.

CLIMATE RESPONSE

Building Orientation
Apple Park's main building is a massive, circular "ring" oriented to maximize exposure to natural light while minimizing heat gain.

Shade & Sun Control
Use of curved glass panels incorporates solar control coatings and shading strategies that reduce solar heat gain

Rainwater Harvesting
Designed with bioswales, permeable pavements, and landscaped basins to manage stormwater and enhance groundwater recharge.

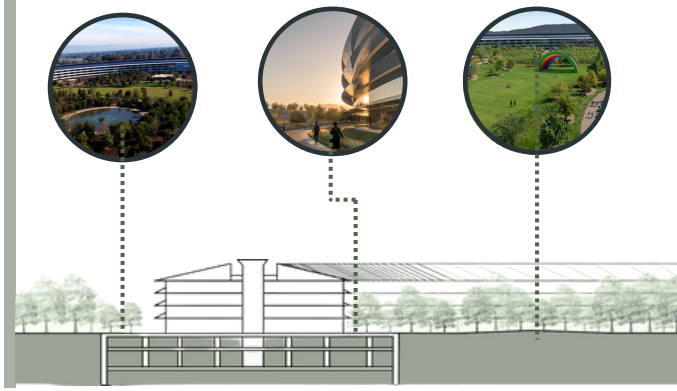


SITE RESPONSE

Topography
Largely flat with subtle elevation changes. Ideal for creating a large, unified building footprint like the circular "ring" structure.

Hardscape
Curvilinear paths and paved walkways follow the natural contours of the site, designed to encourage walking and biking over vehicular use.

Environmental & Ecological
80% of the site is green space, including orchards, meadows, and forested areas that act as urban habitat corridors.



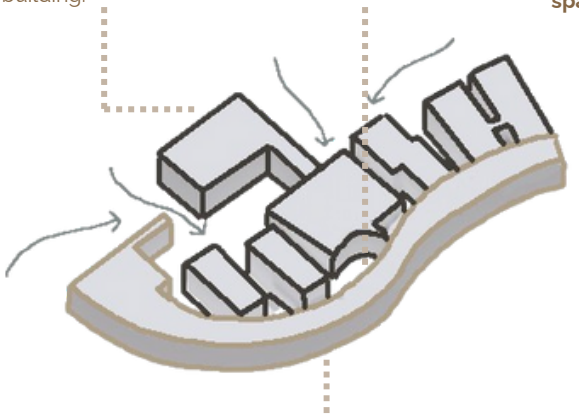
INTERNATIONAL SCHOOL OF KUALA LUMPUR

The design of ISKL responds to both its **educational purpose** and the **tropical climate** of Kuala Lumpur. The campus integrates seamlessly with the **existing landscape, preserving trees and using outdoor spaces** as functional extensions of learning. The school uses modern forms with materials and shading systems suited to the local context

MASSING

Features **clusters of low-rise buildings**, including a five-story administrative building.

Organized around a central and curved spine to **link various academic wings and public spaces**.



Organized around a **central and curved spine** that runs **north to south**, minimizes **east-west exposure** and **reducing solar heat gain** and **enhancing natural ventilation**.

USER EXPERIENCE

Learning Pods & Breakout Spaces
Open pods let students work independently or in small groups beyond the classroom, creating a spatial rhythm of openness and enclosure.

Indoor–Outdoor Integration
Classrooms and common spaces open up to green courtyards, gardens, and play zones.

Multi-Scale Spatial Experiences
Large open halls, medium-sized learning hubs, and intimate study corners give users a range of spatial choices depending on their needs.

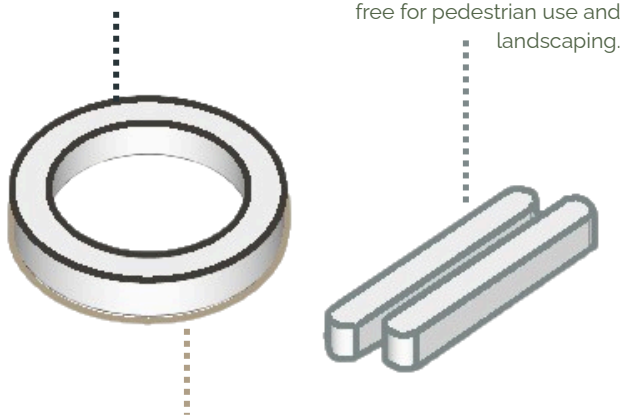
APPLE PARK

Apple Park's design reflects Apple's **core values of innovation, sustainability, and user well-being** through its **iconic circular form**, extensive use of natural ventilation, and renewable energy systems. The architecture seamlessly **integrates with the landscape**, offering green courtyards, walking trails, and transparent workspaces that promote indoor–outdoor connectivity.

MASSING

A perfect circle symbolizes **unity, infinity, and seamless collaboration**. **reducing vertical transportation.**

Parking for approximately 14,200 vehicles is located underground and in **two multistory parking structures**, keeping the surface free for pedestrian use and landscaping.



The structure rises **four stories above ground and extends three stories below,** maintaining a low profile that integrates with the surrounding landscape, promotes **a sense of openness.**

USER EXPERIENCE

Landscape Design & Environmental Integration
The design boosts biodiversity, regulates microclimate, and supports well-being through a strong nature connection.

Visitor Center & Public Accessibility
Public access is provided via an AR model, café, store, and rooftop, allowing engagement with the campus without affecting employee privacy.

Centralized Ring Building and Spatial Organization
The building promotes collaboration with its continuous loop design, offering all employees equal access to light and views

INTERNATIONAL SCHOOL OF KUALA LUMPUR

Design with a focus on **adaptable education** and **climate-responsive** architecture.

SITE CONTEXT

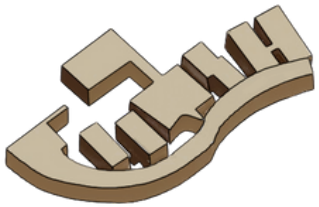
Surrounded by **residential neighborhoods** and **green spaces**

Native landscaping support **educational** and outdoor use

Natural topography preserved with **existing trees** integrated

BUILDING CONTEXT

- Inspired by **traditional Malaysian architecture**, emphasizing thermal comfort.
- **Curved spine** connecting teaching blocks for seamless movement.
- **Preservation of existing flora** and use of **screened facades** for energy efficiency.
- **Educational environment** supporting collaborative learning.
- Incorporation of **passive design elements** for thermal comfort.



SUSTAINABILITY STRATEGIES

Designed to consume **60% less energy** than typical schools in similar hot, humid climates.

Classrooms are designed with **light shelves and north-south orientation** to maximize natural light penetration

Designed with **flexible learning spaces** that can adapt to evolving educational needs.

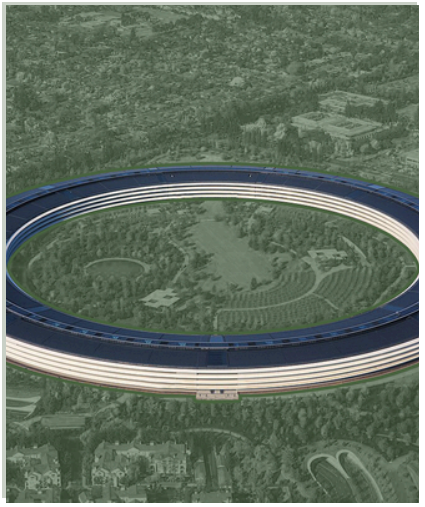
CONCLUSION

ISKL prioritizes a **human-centered educational environment** that harmonizes with its tropical surroundings through passive design strategies, energy efficiency, and environmental integration. ISKL through educational adaptability and passive systems in a hot-humid context. It emphasizes flexibility, natural ventilation, and learning-driven spatial planning,

APPLE PARK

Design with an **iconic expression** of brand identity and sustainability

SITE CONTEXT



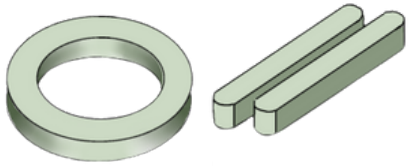
Surrounded by **suburban homes**, **tech campuses**, and **highways**

Largely flat with subtle elevation changes

Landscapes act as **habitat corridors** help **regulate site's microclimate**

BUILDING CONTEXT

- **Futuristic ring-shaped design** symbolizing unity and innovation.
- **Circular layout** promoting fluid movement and collaboration among employees.
- **80% green space with native vegetation**, reflecting sustainability goal.
- Corporate headquarters emphasizing **innovation and employee well-being.**
- **Advanced systems** like natural ventilation and renewable energy integration.



SUSTAINABILITY STRATEGIES

The building's **all-glass exterior** allows ample natural light, creating a bright and open workspace.

Achieves **net-zero energy status**, powered entirely by renewable energy sources.

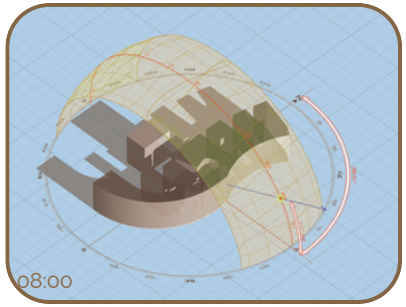
Landscaped with **native, drought-tolerant species**, reducing water usage and enhancing resilience to climate change.

CONCLUSION

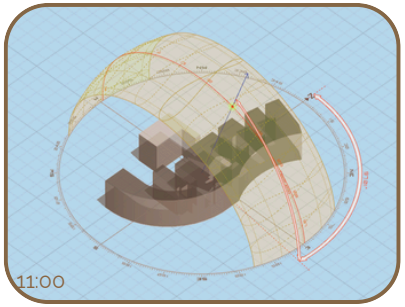
Apple Park represents a **high-tech, innovation-driven vision** of sustainability, manifesting in its net-zero energy operations, advanced renewable systems, and iconic ring-shaped architecture. Apple Park through cutting-edge technology and biophilic integration in a temperate climate.

INTERNATIONAL SCHOOL OF KUALA LUMPUR

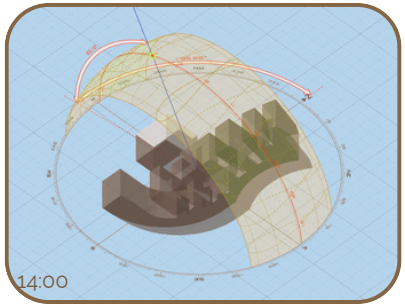
Location: *3.155893, 101.740434*
Climate: *Equatorial tropical — hot and humid year-round*



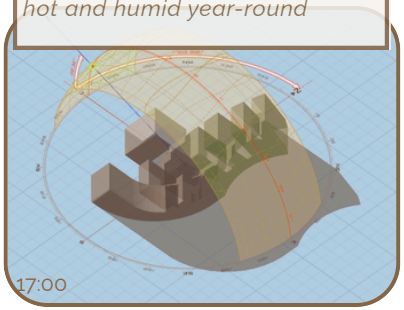
- Azimuth ~105°, Altitude ~25°
- Strong east light for early daylighting
- Glare risk on east-facing façades without shading



- Azimuth ~140°, Altitude ~65°
- High sun angle gives intense daylight
- Horizontal shading (e.g., overhangs) is essential



- Azimuth ~230°, Altitude ~65°
- West façades receive strong sun, high heat load
- Effective daylighting, but needs glare/heat control



- Azimuth ~270°, Altitude ~15°
- Low-angle west sun causes visual discomfort
- Warm light useful for ambient lighting with control

SUMMARY OF SUN ANALYSIS

✔ Daylighting Advantages

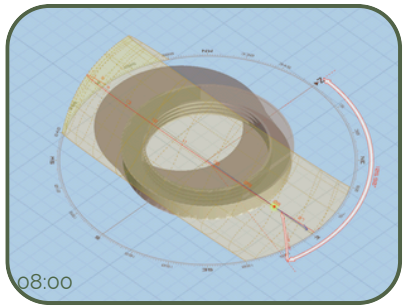
- Consistent, strong daylight all year (12-hour days)
- High sun angles ideal for roof lighting and overhang shading
- Excellent potential for daylight harvesting

✘ Daylighting Disadvantages

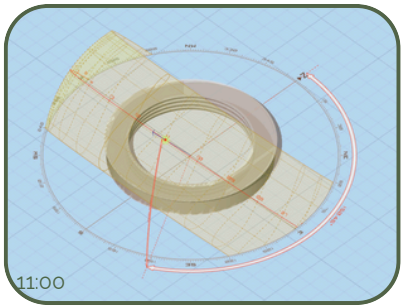
- High risk of glare and overheating, especially on east and west façades
- Requires constant solar control (louvers, shading devices)
- Humidity amplifies heat gain if unshaded

APPLE PARK

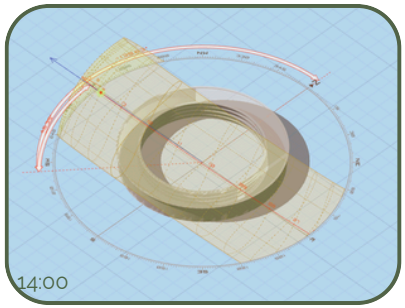
Location: *37.335130, -122.008833*
Climate: *Mediterranean — hot, dry summers and mild, wet winters*



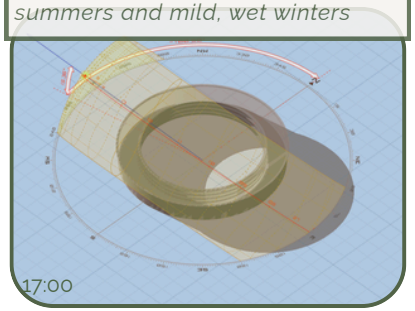
- Azimuth ~100°, Altitude ~10–20°
- Low sun, soft east lighting
- Long shadows ideal for diffuse light



- Azimuth ~135°, Altitude ~40–60°
- Balanced daylight for south-facing rooms
- Low glare if windows are properly shaded



- Azimuth ~230°, Altitude ~50–70°
- Strong southwest sun—high solar gain
- Shading required to prevent overheating



- Azimuth ~280°, Altitude ~10–20°
- Warm, low sun on west façades
- Glare risk and overheating in summer

SUMMARY OF SUN ANALYSIS

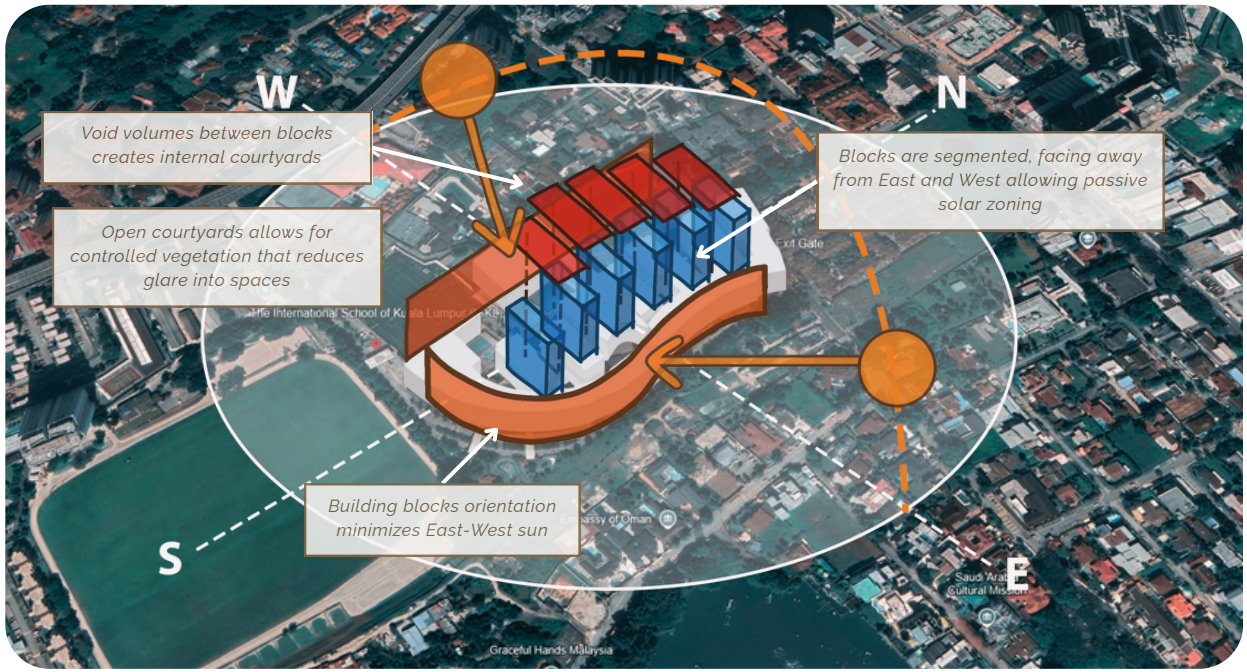
✔ Daylighting Advantages

- Seasonal sun shifts allow passive solar heating in winter
- South façades receive balanced light with low glare
- Long summer days provide extended daylighting potential

✘ Daylighting Disadvantages

- Strong glare and heat gain on east/west façades in summer
- Short winter days can limit daylighting in deep spaces
- Requires adaptable shading to handle seasonal variation

INTERNATIONAL SCHOOL OF KUALA LUMPUR



DAYLIGHT STRATEGIES THROUGH URBAN PLANNING

- Located on an urban district (Kuala Lumpur) with surrounding mid-rise buildings and roadways, *ISKL is limited to an irregular site shape.*
- ISKL responds by breaks down its massing into *discrete, linear blocks* and organizes them around *internal courtyards and open corridors.*
- Blocks are oriented to *minimize east–west solar exposure,* reducing glare and heat gain.
- The segmentation of mass into multiple blocks allows *passive solar zoning*, separating high-glare zones from soft-lit zones.
- This creates a more responsive micro-urban environment, allowing for smaller courts and *passive ventilation paths that regulate light and airflow.*

IMPACT ON DAYLIGHT

- **Sky View Factor (SVF):** limited on some edges due to surrounding mid-rise buildings, but internal courtyards increase exposure to the sky.
- **Height-to-street width ratio (H/W):** kept on similar heights to prevent self-shading, at the same time encourages diffused daylight into all wings.
- Vegetation and treescapes are used to control glare while still allowing filtered light into classroom windows and common areas.

APPLE PARK

DAYLIGHT STRATEGIES THROUGH URBAN PLANNING

- Located on Curpertino, California, featuring wide open landscape ensures no plot restrictions
- Apple Park response with a low site coverage ring-shaped building.
- All facades receive daylight at different times of day due to the 360-degree exposure, requiring fine-tuned daylight control through glazing and interior shading.
- Interior courtyards and atriums supplement daylight in deeper plan areas, while landscape planning outside the ring prevents overheating through selective tree planting and mounds.

IMPACT ON DAYLIGHT

- With no neighboring structures nearby, the building benefits from unobstructed solar access from all angles.
- The 100% controlled landscape design allows strategic placement of trees and berms to balance shading and daylighting.

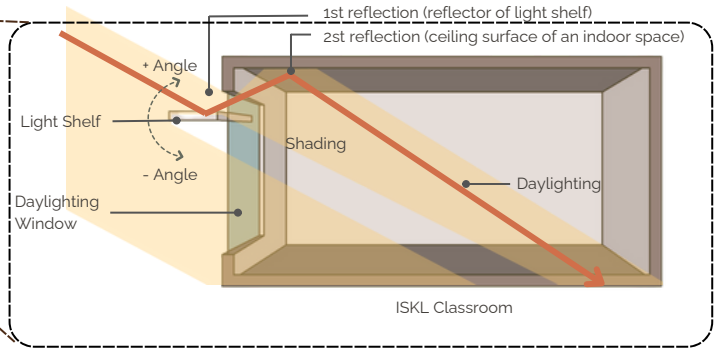
INTERNATIONAL SCHOOL OF KUALA LUMPUR

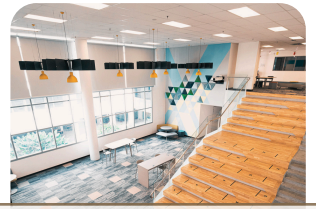
BUILDING DESIGN STRATEGIES

- **Fragmented Block Form:** Multiple separate building blocks enhances daylight access by reducing building depth, allowing light to enter from multiple orientations
- **Low-rise (3–5 storeys):** Minimizes self-shading between blocks and increases sky exposure for facades and windows.
- **Courtyard-Centric Layout:** Internal courtyards acts as light wells bringing light into the plan

ROOM DESIGN STRATEGIES

The daylight factor (DF) criteria used for ISKL is in the range of 0.5% to 3.5% for classrooms. In Malaysia, a daylight factor of 0.5% will provide over 70% of the hours of 8am to 6pm an illuminance level higher than 100 lux. For DF above 0.5%, close to 100% of the hours of 8am to 6pm will have illuminance level higher than 100 lux (Tang & Chin, 2013).



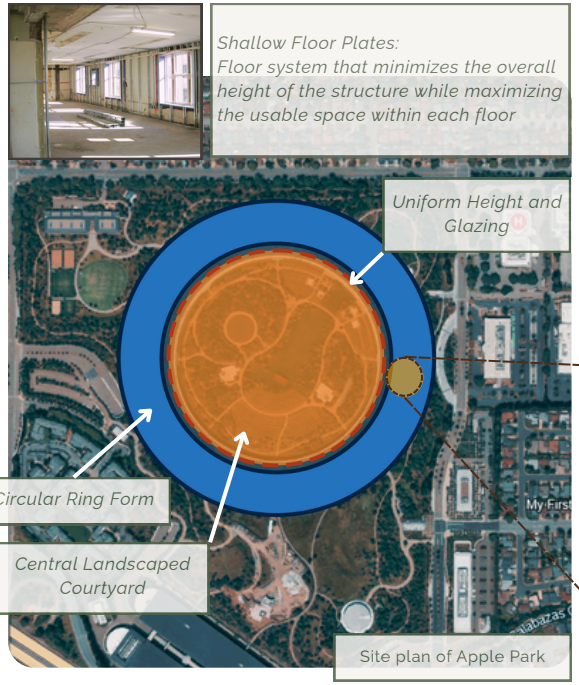

North-South facing facades feature full-height curtain windows that maximizes daylight


Windows are installed on both sides of the classroom so additional daylight is allowed from the corridors.

APPLE PARK

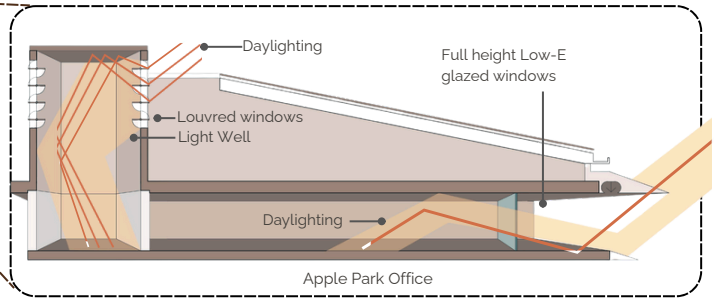
BUILDING DESIGN STRATEGIES

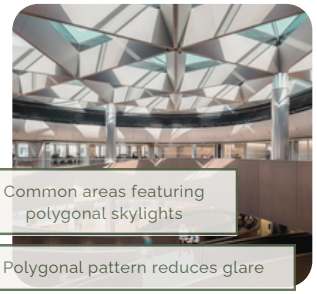
- **Circular Ring Form:** 360° building orientation ensures all spaces receive some daylight. No rear walls allows every room to have either inner or outer daylight exposure.
- **Shallow Floor Plates:** Ensures natural light can reach the interior from windows, reducing reliance on artificial lighting even in deep-plan areas.
- **Central Landscaped Courtyard:** Acts as a large light reflector for inner-facing offices, adding brightness and sky visibility.
- **Uniform Height and Glazing:** 4-storey consistent height with floor-to-ceiling curved glazing maximizes daylight exposure and exterior views.



ROOM DESIGN STRATEGIES

Office daylighting requirements in the United States specify that natural light should be accessible to at least 75% of regularly occupied spaces (Boubekri et al., 2014). The minimum daylight factor is 2-5% for effective illumination (Boyce et al., 2003), with recommended illuminance levels between 300-500 lux for general tasks (IESNA, 2011). Proper daylighting design can reduce energy consumption by up to 50% through reduced artificial lighting needs (Galasiu & Veitch, 2006).




Common areas featuring polygonal skylights
Polygonal pattern reduces glare

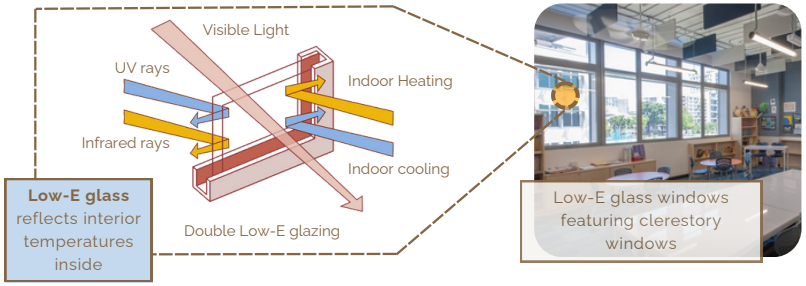

Open office plan maximizes natural light reaching into the building

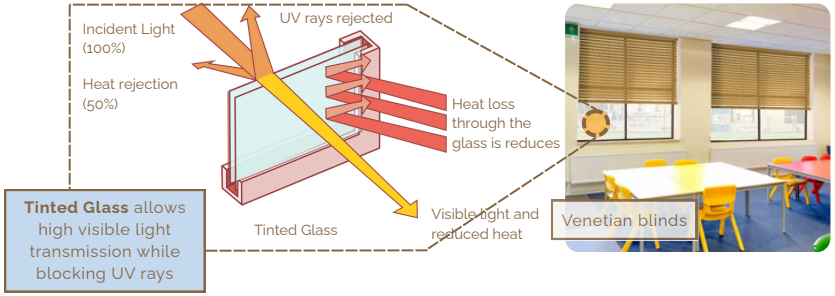
INTERNATIONAL SCHOOL OF KUALA LUMPUR

GLAZING SYSTEMS

Low-E Glass with Optimal VLT (50-60%)

- Low-E glass has an ultra-thin, nearly invisible metallic or metallic oxide coating (applied via sputtering or pyrolytic deposition) that selectively controls heat and light transmission.
- Clerestory windows allow high-level daylight without glare at eye level.





APPLE PARK

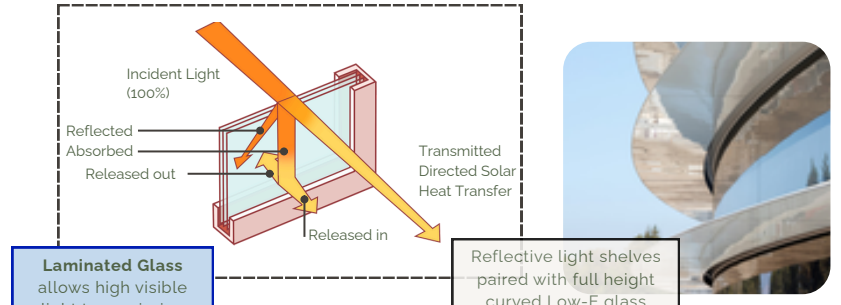
GLAZING SYSTEMS

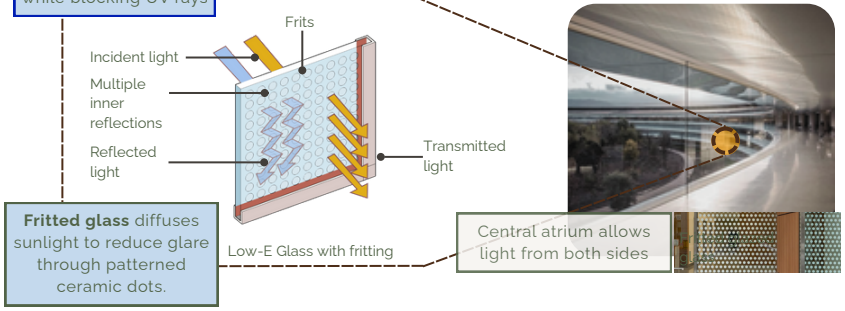
Low-E Glass with Ceramic Fritting

- The 4-story-tall curved glass panels are coated with a spectrally selective Low-E layer, allowing visible light (VLT ~60-70%) while blocking infrared heat.
- Ceramic frit dots (printed on the glass) reduce glare by diffusing sunlight.

Double-Glazed Insulated Units

- The thermally broken glazing system reduces heat transfer, maintaining indoor comfort in California's Mediterranean climate.





SHADING AND LIGHT CONTROL SYSTEMS

Light Shelves

1. External light shelves with a reflective top surface are placed to reflect daylight deeper into the room ceiling.
2. Light shelves at the same time acts as shading to reduce glare.

Perforated Aluminum Sunshades (Brise-Soleil)

1. Angled to block direct sunlight while allowing indirect light.

Blinds

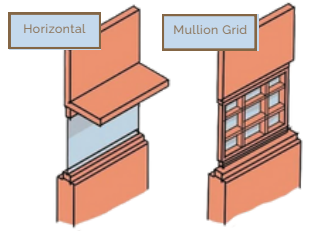
1. Horizontal Venetian blinds act as glare protection devices by blocking direct views of the sky while allowing daylight in.

Central Atrium & Skylights

1. Atriums across campus distributes daylight to adjacent corridors.
2. The intersecting blocks welcomes light filtering into the voids formed. And across multiple volumes

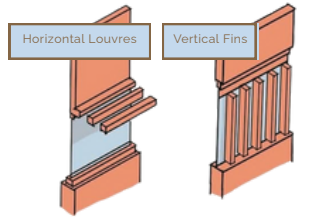

Aluminium light shelves doubles as sunshades


Atriums welcoming sunlight



Blocks high-angle midday sun, reducing glare and heat, allows daylight

Breaks daylight into smaller patches, reducing overall light penetration



Adjustable daylight control, reducing direct sun while maintaining brightness.

Block low-angle morning and evening sunlight, reducing glare

SHADING AND LIGHT CONTROL SYSTEMS

Motorized Aluminum Louvers (Exterior & Interior)

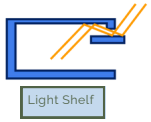
1. **Exterior:** Adjustable louvers track the sun's movement, blocking direct sunlight when needed.
2. **Interior:** Retractable fabric blinds provide additional glare control.

Central Atrium with Light-Diffusing Ceilings

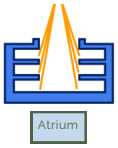
1. The open-ring design allows daylight to penetrate from both the exterior and interior courtyard.
2. White reflective ceilings bounce light deeper into workspaces.


Light Well

A vertical shaft that brings natural light from the roof down to lower floors.


Light Shelf

A horizontal surface that reflects sunlight deeper into a room while shading near windows.


Atrium

A large open space in a building that allows daylight to reach each levels from above.


Motorized aluminium louvers controlling glare


White reflective ceilings along corridor

Other Daylight Strategies


Full-height double glazed windows with low profile skylights


Series of double-pitched skylights


Low profile beams skylights


Louvred canopy system

INTERNATIONAL SCHOOL OF KUALA LUMPUR

Location: Kuala Lumpur, Malaysia
Climate: Equatorial tropical – consistent high sun angles and 12-hour days throughout the year
Sun-Path Highlights:

- Strong east/west sunlight increases heat and glare risks
- Requires constant solar control due to intense and stable daylighting

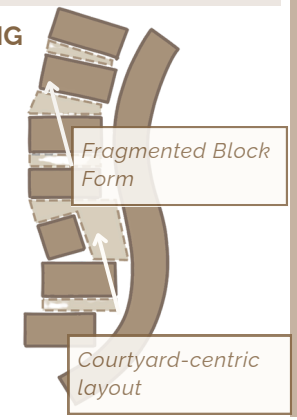
RESPONDING THROUGH URBAN PLANNING

Site Strategy:

- Segmented linear blocks facing away from east-west to minimize glare
- Internal courtyards and open corridors allow passive airflow and filtered light

Impacts:

- Reduced east-west exposure minimizes overheating
- Courtyards improve daylight penetration and ventilation
- Limited sky view factor (SVF) due to surrounding mid-rise structures



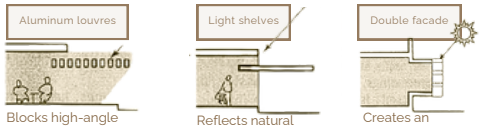
RESPONDING THROUGH BUILDING AND ROOM DESIGN

Room Features:

- North-south facades with curtain windows
- Dual-sided window installation improves light access

Daylighting Factor:

- Designed to exceed 100 lux for over 70% of daylight hours



RESPONDING THROUGH SHADING DEVICES

Glazing: Double Low-E glass with optimal visible light transmission (50–60%)
Shading:

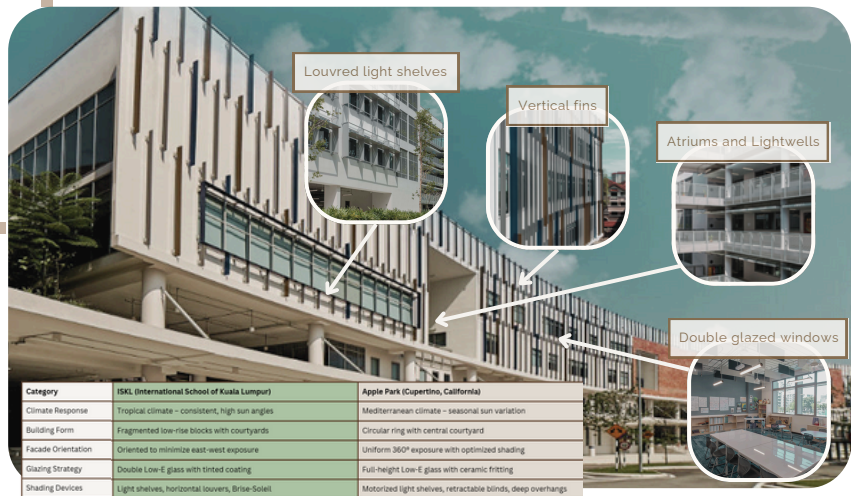
- Light shelves and clerestory windows reflect light deeper inside
- Venetian blinds and aluminum sunshades (Brise-Soleil) reduce heat/glare

Light Control:

- Atriums distribute light across corridors
- Multivolume design enhances light diffusion

CONCLUSION

ISKL uses a climate-responsive design suited to Malaysia's tropical environment. Shaded facades, dual-aspect classrooms, and open courtyards reduce glare and heat while maximizing natural daylight and ventilation. The school's layout minimizes east-west exposure and supports energy efficiency and student comfort through passive strategies.



Category	ISKL (International School of Kuala Lumpur)	Apple Park (Cupertino, California)
Climate Response	Tropical climate – consistent, high sun angles	Mediterranean climate – seasonal sun variation
Building Form	Fragmented low-rise blocks with courtyards	Circular ring with central courtyard
Facade Orientation	Oriented to minimize east-west exposure	Uniform 360° exposure with optimized shading
Glazing Strategy	Double Low-E glass with tinted coating	Full-height Low-E glass with ceramic fritting
Shading Devices	Light shelves, horizontal louvers, Brise-Soleil	Motorized light shelves, retractable blinds, deep overhangs
Daylight Control	Atriums, clerestories, and reflective surfaces	Skylights, light wells, and intelligent lighting systems
Technology Integration	Primarily passive systems	Active daylighting controls with automation
Interior Light Access	Dual-aspect classrooms and open corridors ensure light distribution	Shallow floor plates and reflective ceilings enhance light spread
Sustainability Focus	Passive design for energy reduction and thermal comfort	Smart systems for energy optimization and user well-being
Key Benefit	Year-round balanced daylight with minimal energy use	High daylight quality with dynamic, occupant-centered control

APPLE PARK

Location: Cupertino, California
Climate: Mediterranean – hot, dry summers and mild, wet winters
Sun-Path Highlights:

- Seasonal variation allows for passive solar heating in winter
- More balanced and diffused light, but potential glare in summer afternoons

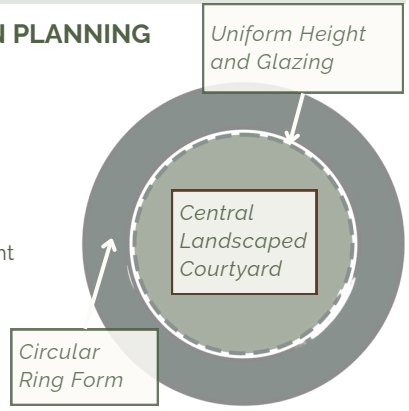
RESPONDING THROUGH URBAN PLANNING

Site Strategy:

- Circular ring with internal atrium for unified daylighting
- Open landscape around the building ensures no obstruction to sunlight

Impacts:

- 360° sun exposure maximizes daylight availability
- Strategically placed vegetation and berms reduce overheating risks
- Uninterrupted sky access enhances daylight quality



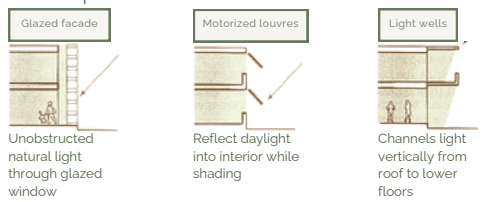
RESPONDING THROUGH BUILDING AND ROOM DESIGN

Room Features:

- Full-height Low-E glazed walls
- Skylights and polygonal ceiling designs reduce glare

Daylighting Factor:

- Targets 300–500 lux, accessible to at least 75% of occupied areas



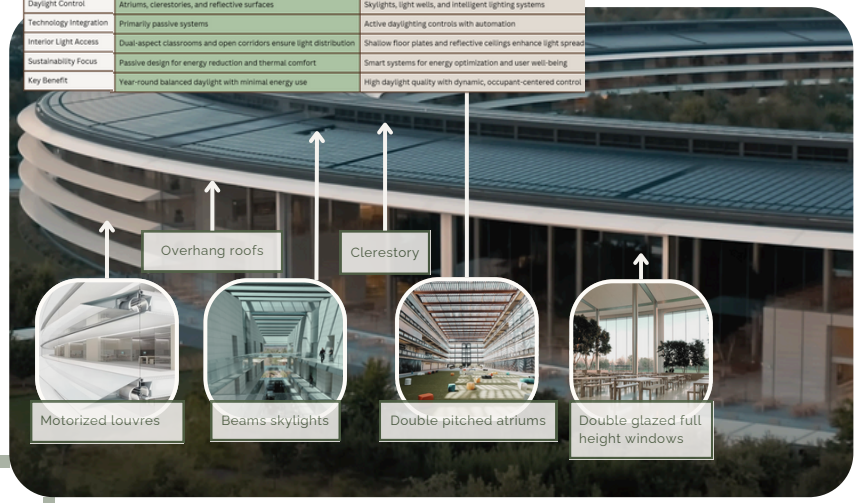
RESPONDING THROUGH SHADING DEVICES

Glazing: Low-E glass with ceramic fritting (VLT ~60–70%)
Shading:

- Motorized louvers and retractable fabric shading systems
- White reflective ceilings and atriums bounce light deeper inside

Light Control:

- Fritted glazing dots diffuse sunlight
- Central light wells and skylights provide vertical light penetration

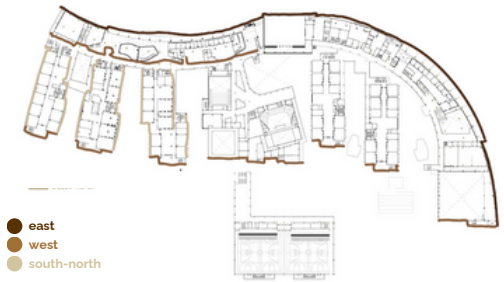


CONCLUSION

Apple Park combines advanced glazing, automated shading, and floorplate design to ensure even, comfortable daylighting throughout the building. The circular form and central courtyard bring in natural light from all sides, while smart systems adjust lighting in real time for occupant well-being and energy performance.

INTERNATIONAL SCHOOL OF KUALA LUMPUR

FACADE LOCATION



South-North Facade

Facade & Overhang roof

- Big window allow lights in during teaching hours.
- Relaying on opening to allow indirect sunlight goes into the classroom.
- Covering high-angle sunlight that can cause thermal discomfort and relying on mechanical cooling system.

West Facade

Facade

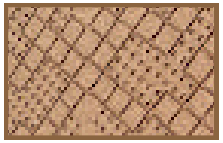
- Fully wall on west direction due to high temperature of sunlight during afternoon minimize heat gain from direct sunlight.
- Exposed staircase for safety reason and alleviate western solar exposure directly to the building.

Overhang Roof

- decrease heat came from afternoon heat gain, while allowing cross-ventilation and protect passerby during rain.
- provide shading and obstruct sun heat going to inside

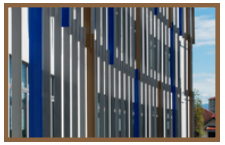
East Facade

1. Clay Brick Facade



- Used clay brick as local material
- filtered light and reflected more sunlight
- cover major openings to achieve thermal comfort
- Interpret Malaysia traditional pattern (Songket pattern

2.Metal Fins



- Prevent heat transfer and give shading through interior space
- reduce direct sunlight from afternoon peak sun
- Minimize mechanical cooling by reducing solar heat

3.Curtain Wall

- Allows ample daylight into communal spaces and corridors
- Set behind deep eaves and vegetation to prevent glare and overheating.

4. Overhang Roof

- Blocking solar exposure on Ground floor. and improved air circulation

APPLE PARK

FACADE CONCEPT

Form
The circular shape emphasizes unity and endless innovation

Transparency
Facade uses extensive curved glass panels, maximizing daylight and visual connection to nature

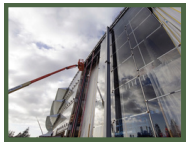
Minimalism
Reflects Apple's product design philosophy—clean lines, simplicity, and perfection in form

DESIGN STRATEGIES

1.White Glass Canopy

- Protrude from the structure to label floors
- Reduce diffuse light and enhance comfort
- Provide shade and support natural ventilation

2.Glass Panel



- Reduce daytime use of artificial lighting
- High-performance glass minimizes heat gain
- Skylights enhance natural interior lighting

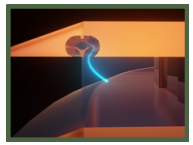
3.Main Roof Panel

- Low reflectivity to reduce glare

4.Large Glass Sliding Door

- connect the dining indoor and outdoor

5.Natural Ventilation



- Providing active ventilation system which bring fresh air in from outside

6.Solar Panel Roof

- Generates the energy to used for the main building major energy needs

FACADE TREATMENT

For circular form of facade, where there is no different facade type, so they use different treatment for different orientation.

South / West

Due too highest sun exposure in the orientation, especially in the afternoon, they made some adjustment

- Made deeper overhangs to blocks the sunlight.
- Utilized higher glass coating and have higher solar heat gain control to reduce cooling loads.

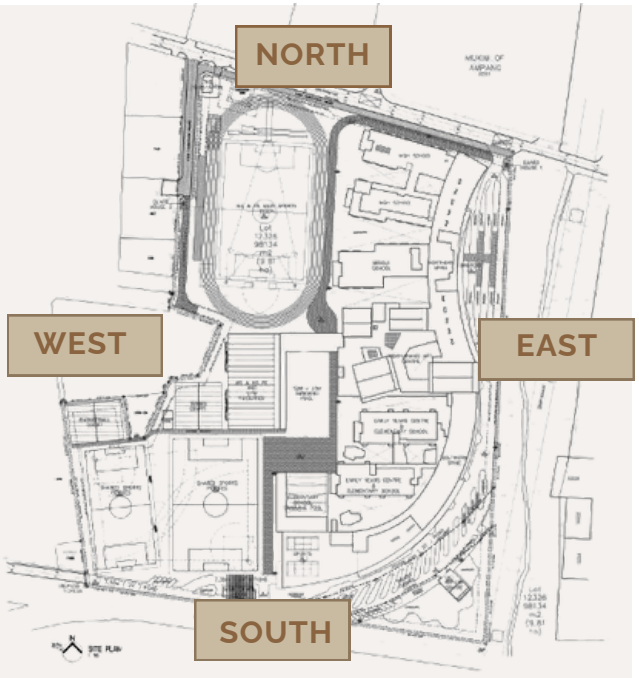
East

This orientation faced morning sunshine, where got cooler sunlight and less intense. Shading is more minimal than west-faced .

North

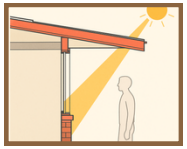
This orientation is the coolest and got least direct sunlight. Minimal shading and clear glass are ideal for skylight to goes inside. Allow minimal sunlight penetration.

INTERNATIONAL SCHOOL OF KUALA LUMPUR



WEST

Overhang Roof



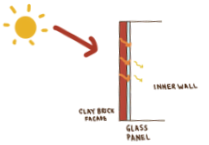
- Overhang Roof shield the classroom from evening sun using floor and wall reflections for diffused light.

Emergency Staircase

- Emergency staircase placed on west side to reduce afternoon heat in classrooms.
- Enhances thermal comfort and reduces reliance on mechanical cooling.
- Complies with UBBL requirement for staircases with openings for natural light.

EAST

Double Skin Facade



- Vented cavity buffers heat, reducing early heat gain
- Pre-warms morning air to minimize temperature swings
- Maintains stable indoor temperatures with less HVAC use
- Inner façade diffuses light; outer layer blocks glare
- Cuts morning reliance on artificial lighting

Aluminum Fins

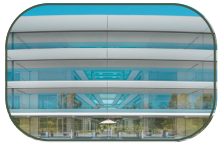
- Vertical aluminum fins diffuse sunlight and reflect morning sun
- Reduce artificial lighting during the day
- Offer passive shading without blocking light
- Lower indoor temperatures and cooling loads

NORTH-SOUTH

Cantilever Roof

- Cantilevered roof above windows blocks direct sunlight and improves thermal comfort.
- Skylight openings allow natural light without added heat.

APPLE PARK



Office Wing

- Highlight a glass partition wall that extends from floor to ceiling and has a hazy connection. Combine refined architectural surfaces with prestressed concrete pieces to create the largest precast concrete integration.
- Sliding doors not only fulfill a practical function but also enhance the building's iconic appearance and work in harmony with Apple's natural design.

Sliding Facade

- These mechanical doors, which connect the interior and exterior, roll silently on a track underneath the floor. developing a stronger connection with the surrounding landscape.
- These doors move in accordance with the ring-shaped building's curve, while motors in the basement enable seamless operation.

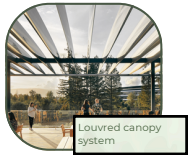
Full-Height Facade

- The glass façade complements the building's canopy systems and precast concrete framework. The building's sustainability objectives are furthered by the shading and light and glare control provided by the canopy blades that extend from each floors.
- Apple's philosophy of blinding nature to the workplace was established by improving the view of the apple to the surrounding green spaces and orchard within the ring.

- Controlled aluminum shading to control the amount of sunshine that enters the room and minimize heat loss in the winter and excessive heat transfer in the summer.
- Lowering the demand for artificial lighting and air conditioners while providing a trendy and pleasant way to controlling temperature and light.

- The atria in the restaurant encourage communication and teamwork in the four floors of the working area. Additionally, improve illumination and allow employees to move about in the Eight Cardinal Points. Emphasize natural lighting and design places that are light and spacious.

- Reflective elements contribute to the development of sustainable goals by reducing heat gain. To ensure that the white finishes in the canopy appear white instead of greenish due to the iron concentration, a unique manufacturing procedure was applied. The glazed panel suppressed the view of the greenery and encouraged the transition between the internal and outdoor spaces.

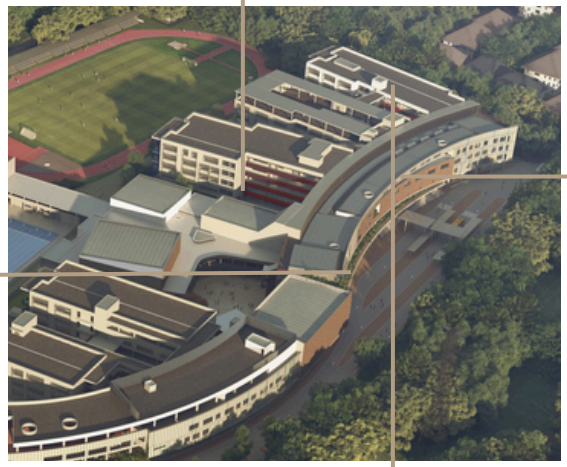


- The carbon fiber fins that seem to hover above the terrace go well with the building's simple, minimalistic style. They also improve visitor comfort by offering shade and reducing glare without obstructing sunlight. Moreover, helps create the building's distinctive transparency and lightness.

INTERNATIONAL SCHOOL OF KUALA LUMPUR

Daylighting Harvesting
Reduce reliance on artificial lighting thus carbon emission.

Water Harvesting
Collects rainwater on the roof for flushing .

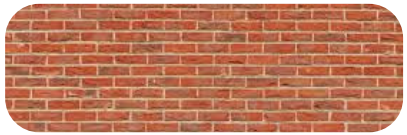


Energy Generator
Use photovoltaic to generate on site energy generator.

Energy Efficiency System
Lighting and AHU in combination with chilled floor slab

MATERIAL

Clay Brick

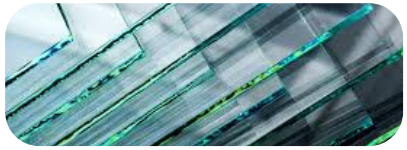


- Slowly absorb and release heat
- Keep tropical spaces cooler by day and warmer at night
- Natural, permeable material allowing moisture diffusion
- Serve as a thermal buffer

Recycle Steel Bars

- Vertical fins offer strong support and enable vast spans with slim sections
- Provide a sleek, industrial look
- Made from low embodied energy scrap steel

High Performance Glazing Glass



- Cut down on solar heat gain.
- Increase the amount of natural light.
- Enhance the thermal comfort of classrooms and common areas.

Aluminum-colored fins

- Reduces the need for HVAC systems
- Supports ISKL's sustainability objectives
- Reduces the demand for artificial light by enabling controlled daylighting.

USER EXPERIENCE

East Facade :

- Introduce local traditional pattern and material for education purpose.
- Entrance clearly state ISKL for visual hierarchy.
- With a lot of shading, increasing thermal comfort for user either indoor or semi indoor places.
- Greeneries inside and around building allow breezy zones that encourage thermal comfort naturally.

North-South Facade :

- Using this orientation for teaching area minimize solar heat and thermal discomfort for user and using AHU (Air Handling Unit) for renewing air indoor.

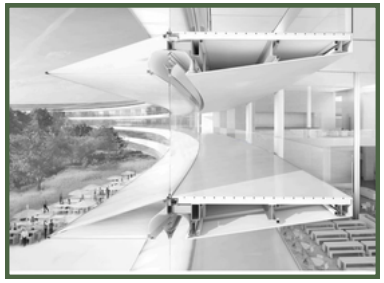
West Facade :

- For avoiding peak solar heat, the building only placing emergency staircase and overhang roof to shaded unwanted direct sunlight during west solar exposures.

APPLE PARK

Solar Panel with Photovoltaic System

- 75% of power have been covered up by sustainable energy by on-site power sources, from the solar panel that use photovoltaic applications.
- Take hydrocarbon fuel from plant and convert to clean energy.
- Utilize dynamical louvers, shading, and mechanical system to reduce energy use.
- Low-energy HVAC system for chilled water to cool air near workshop.



Louvers

- Can be found in behind curved glass panel, that allow controlled air ventilation to inside.
- Underroof overhangs, metal louvers integrated subtly for exhaust ventilation and heat dissipation.

MATERIAL

360 ° Curved Glass Bend

- Full-height glass maximizes natural light all day
- Open-air hallways and movable parts reduce HVAC needs
- Interior blinds, large overhangs, and carbon fiber canopies provide shading

Limestone

- Gradual heat storage reduces temperature swings and aids natural ventilation
- Wide-open areas absorb sound
- Improves fire protection in interior cores and partitions

Aluminum panels

- High-performance Low-E curved glass supported
- Aluminum roof eaves reduce solar gain
- Integrates night-flush systems and movable louvers for passive cooling

Timber wood

- Timber vertical slats soften glass & metal
- Aligns with Apple's environmental principles
- Smooth, lightly stained or natural wood maintains minimalist style

USER EXPERIENCE

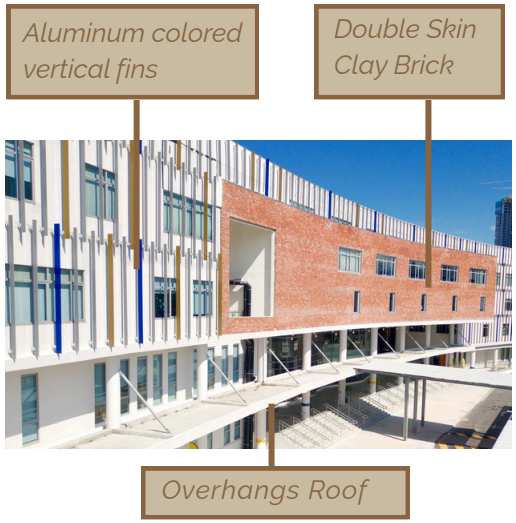
- Greeneries around building help to **gain cool and fresh air** make a comfortable environment.
- Glazed facade jack up workers to enjoy the scenery outside. it believe to pressing down stress level.
- Having visitor place for outsider to come in with **warm ambient** made them feel welcoming to the Apple Campus.
- Rooftop of the visitor center **serves apple campus building as the view**, let outsider see the building directly without disturbing the working area.
- Underground theater made a privet and mysterious area, where they had apple product launching here. So people can see it from outside even they have full glass wall.

INTERNATIONAL SCHOOL OF KUALA LUMPUR

A large aperture along the South-North facade lets in more light throughout the day, which brightens the classroom. At ISKL, the façade design takes advantage of this orientation by incorporating expansive glazing and sun-shading devices, allowing diffuse daylight to penetrate deep into learning spaces while minimizing glare and heat gain.

SHADING DEVICE

ISKL used those shading to reduce on using mechanical system in the building and naturally gaining thermal comfort within interior and exterior space.



One tactic to assist reduce heat exposure when the region is directly struck by the strongest sun is to place the emergency staircase on the west facade.

Cross ventilation from the outside to the inside is facilitated by the gerenneries surrounding the building.

CONCLUSION

International School of Kuala Lumpur used passive design for facade to reduce dependency on mechanical and artificial lights. Double skins facade used along the entrance (East side) not only for shading but also creates design hierarchy to focus on the facade design with traditional and industrial blending.

APPLE PARK

Apple Park's circular façade adjusts to varying sun orientations with different treatments on each side. It features continuous floor-to-ceiling curved glass and engineered horizontal and vertical shading fins that adapt to the sun's path, balancing light, heat, and glare for optimal comfort throughout the day.

SHADING DEVICE

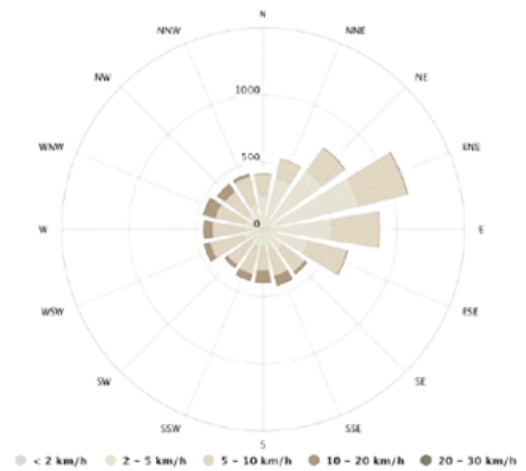
The building's inner facade has a more sparse overhanging roof since it receives less sunlight and vegetation helps to absorb solar heat. To allow outside air to enter, louvers serve as a cross ventilation system.

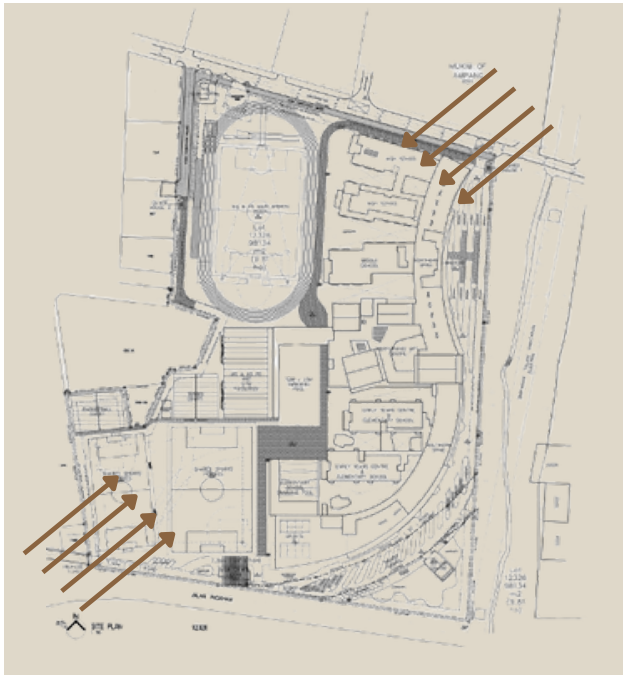
Its design helps reduce glare and minimize solar heat gain, contributing to the building's overall energy efficiency.
The roof also conceals integrated mechanical systems and photovoltaic panels, merging functionality with clean design.

CONCLUSION

Apple Park circular exterior, which features the largest glass form, was designed to reduce the building's mechanical system. The building's overhanging roof, which has varying shade angles, keeps the building's modest, circular exterior while providing comfort throughout. Eighty percent green space helps the building's air circulation.

INTERNATIONAL SCHOOL OF KUALA LUMPUR





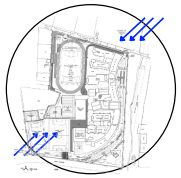
November to March: wind direction are from Northeast
May to September: wind direction from Southwest
Average 1–2.5 m/s in urban area like Kuala Lumpur due to building and topograhy

Open-Air Circulation Spaces

Wide, covered walkways connect different sections of the campus.Even it is not air-conditioned but designed to promote cross-ventilation using natural airflow.

Central Courtyard as Ventilation Spine

This circular layout supports cross-ventilation by allowing air to flow through operable windows and internal space



Wind-Responsive Building Orientation

The campus is oriented to face South and North,to capture prevailing breezes, especially from the Southwest,and to avoid direct sunlight heat from East and West .

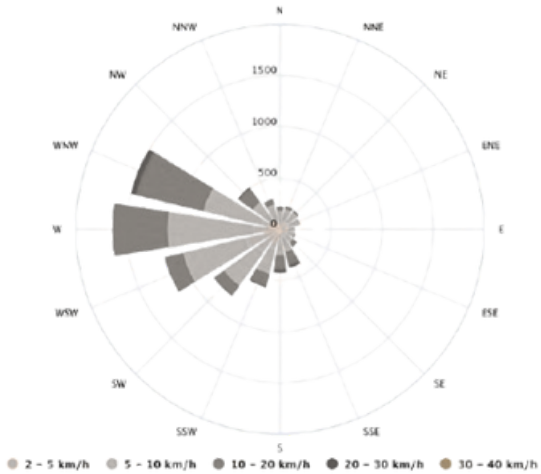
Screens and Shelter

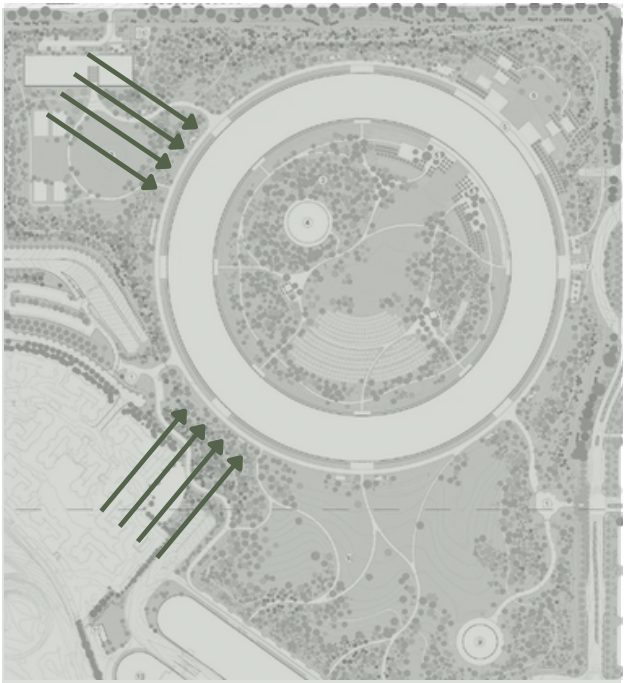
Large overhangs and vertical fins, help shade windows and walls. These design minimizing solar gain while permitting airflow through semi-outdoor and indoor spaces.

Stack Effect and High Ceilings

High ceilings and ventilation openings at the top allow warm air to rise and exit.

APPLE PARK





Prevailing Wind Direction: From west to northwest for approximately 8.9 months annually, peaking at 92% westerly winds in August
Average Wind Speeds: Between 6.5 to 8.5 mph (10.5 to 13.7 km/h)

Hollow concrete slabs

The slabs act as floors and ceilings with hollow cores that allow air to flow through, supporting natural ventilation and maintaining indoor comfort.

Ring shape design

This circular layout supports cross-ventilation by allowing air to flow through operable windows and internal atrium.The difference between inner and outer air pressure will increase air movement which promote cross ventilation.

Louvers system

Louvers integrated into the building facade, draw in fresh air from outside, ensuring a continuous supply of healthy air throughout the building, even during colder months.

Sliding glass panels

These can be opened to expose the interior to the outdoors when weather conditions are favorable, allowing for direct natural ventilation

Canopy system

A series of white, glass canopies that protrude from every floor of the building Designed to address the intense California sun,

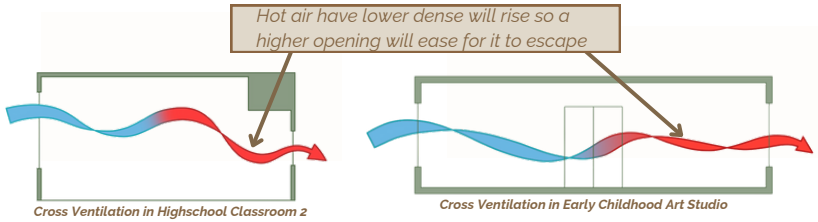
Underfloor Ventilation Duct System

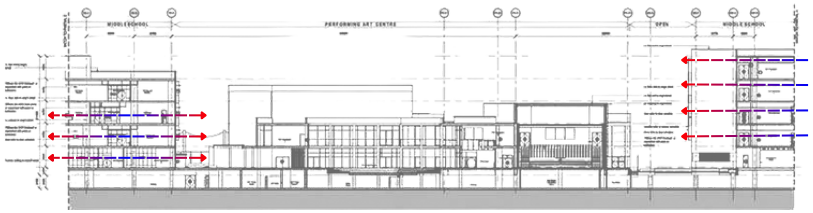
Durkee's underfloor air dispersion system strategically places fabric air ducts beneath a raised access floor, serving as an air delivery highway to transmit conditioned air to targeted areas.

INTERNATIONAL SCHOOL OF KUALA LUMPUR

CROSS VENTILATION

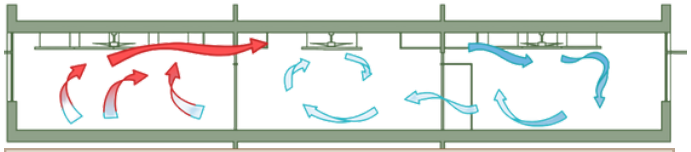
Cross ventilation is achieved through the strategic placement of operable windows and openings on opposite sides of classrooms and corridors. The building's open-plan layout and courtyards support uninterrupted airflow, reducing the reliance on mechanical cooling and promoting sustainable, passive design principles.



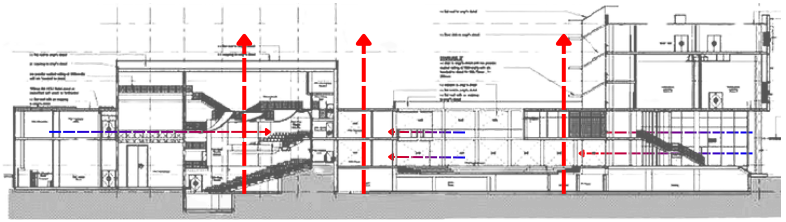


STACK VENTILATION

ISKL maximizes stack ventilation through double-volume spaces, high ceilings, and clerestory windows or roof vents that allow warm air to rise and escape naturally. Cooler air enters through lower openings, creating a vertical airflow that refreshes interior spaces. This passive strategy reduces reliance on mechanical cooling, regulates indoor temperatures, and supports the school's green building and energy-efficient, climate-responsive design goals.



The section diagram shows how ceiling fans are able to cool a row of adjacent classrooms with openings, effectively reducing the use of air-conditioning in multiple rooms.



hot air escape from the building and pushing cool air into it

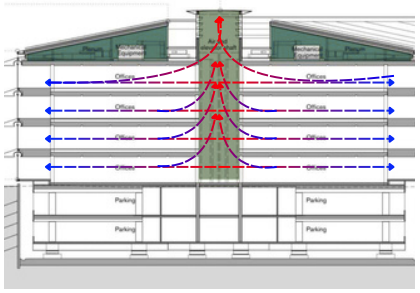
high ceilings and atriums enable stack ventilation, reducing mechanical cooling and boosting energy efficiency.

APPLE PARK

CROSS VENTILATION

Apple Park's unique ring-shaped design incorporates ventilation gaps on both the inner and outer façades, enabling air to flow freely and naturally through the building. This strategic design creates pressure differences that effectively guide prevailing winds from the exterior facade inward toward the central courtyard. As a result, consistent cross ventilation is achieved throughout all office zones, promoting a comfortable and naturally ventilated environment that reduces reliance on mechanical cooling and enhances occupant well-being.

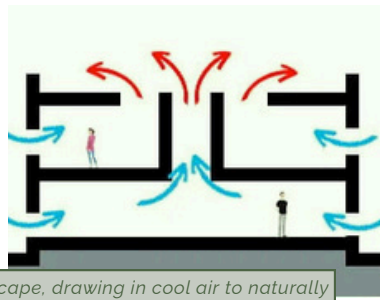
opening gap



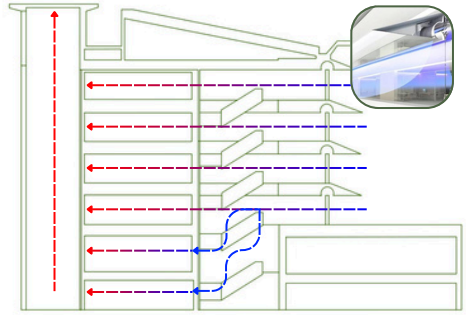
ring shape form

STACK VENTILATION

Apple Park features high ceilings throughout its workspaces and communal areas, contributing to a sense of aesthetic openness while enhancing passive environmental performance. These tall interior volumes play a key role in the building's stack ventilation system, where warm air rises and exits through strategically placed vents at the roof level, while cooler air is drawn in at lower points. The building's circular design, combined with central atriums and concealed rooftop openings, facilitates this natural airflow. Additionally, the high ceilings improve daylight distribution, reducing reliance on artificial lighting and supporting Apple's broader goals of energy efficiency and sustainability.



tall spaces allows hot air rise and escape, drawing in cool air to naturally ventilate and reduce cooling needs.



Gap allowing air to flow

INTERNATIONAL SCHOOL OF KUALA LUMPUR

Air Movement

Open-air corridors and perforated façades enhance airflow, while small building blocks boost ventilation. Atriums, high ceilings, and clerestory windows support stack ventilation by letting warm air rise and cool air enter.

Massing and Orientation

The campus features low-rise blocks around open courtyards, creating smaller volumes. Open corridors and covered walkways guide wind flow, while classroom blocks face southwest winds, with openings on opposite walls for cross ventilation.

High Ceiling and Open Atrium

Atriums act like chimneys—warm air rises and exits through vents or operable windows. Linked to open corridors and courtyards, they further enhance cross ventilation.

Landscape and Plantation

The evaporation from pools, fountains, and water features around the school absorbs heat from the surrounding air. Tree canopies, green walls, and planted courtyards provide shade, reducing solar heat gain on building surfaces.

CONCLUSION

ISKL's design makes the most of natural airflow by using open-air walkways, a central courtyard, and smart building orientation that catches the breeze. High ceilings, along with screens and shelters, help hot air rise and escape, while the surrounding greenery and water features cool the air as it moves through. Together, these elements create a comfortable environment that feels fresh and open, without relying heavily on air-conditioning.

APPLE PARK

Air Movement

Air gaps between the inner and outer façades at Apple Park act as thermal buffers, helping air flow and reducing heat gain. Large automated windows open to let fresh air in, supporting the building's natural cooling system.

Massing and Orientation

The ring shape of Apple Park encloses a central courtyard and gives every space access to fresh air from either the inner or outer façade. Its continuous form allows air to flow in from one side and out the other, enabling cross ventilation.

High Ceiling and Open Atrium

Apple Park's open-plan layout (large, unobstructed floor plates with minimal partitions enables air to flow freely throughout the workspace. This help both stack and cross ventilation in the building

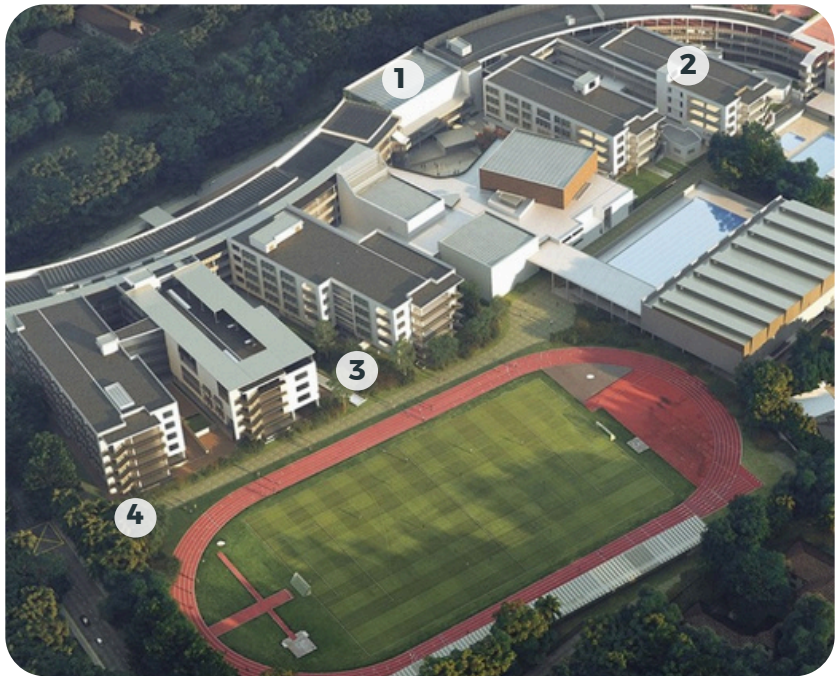
Landscape and Plantation

Approximately 9,000 trees at Apple Park help cool the courtyard through evapotranspiration, where plants release moisture into the air. This process creates a shaded, cooler, and more humid environment compared to the surrounding exterior.

CONCLUSION

Apple Park's natural ventilation works through a smart mix of passive design strategies. The ring-shaped building, along with high ceilings, sliding glass panels, and hollow concrete slabs, helps air move freely and keeps indoor temperatures steady. Louvers, canopies, and an underfloor ventilation system guide and control airflow throughout the day. The landscaping and water features in the central courtyard help cool the air before it enters the building. .

INTERNATIONAL SCHOOL OF KUALA LUMPUR



LANDSCAPE FEATURES

1. Campus Entrance
Landscaping around the entrance enhances the welcoming point for people entering the building.

2. Campus Atrium
Landscaping within the campus blocks create an inviting leisure space

3. Shading Vegetation
Strategic landscaping for shading area are scattered around the campus, reducing the need for active cooling.

4. ISKL Eco Garden
An eco garden educates children about gardening as well as doubling as an edible garden for the school.

HARDSCAPES


Pathway


Courtyard


Gazebo


Building Architecture


Playground


Manmade Pond

SOFTSCAPES


Calathea lutea


Creeper


Frangipani Tree


Dieffenbachia


Belian Tree


Meranti Tembaga


Ixora


Taro plant


Nyatoh Taban Merah


Eugenia trees


Lawn Grass


Hibiscus

APPLE PARK

LANDSCAPE FEATURES

1. Campus Courtyard
The flat open courtyard is offers a suitable space to host events and gatherings within the park.

2. Campus Orchard
The several rows of orchard contains over 800 fruit trees, referencing California's Bay Area's countless food plantation.

3. Extension of the landscape
The landscape in apple campus isn't limited to within the ring, it also extends beyond the building to neighboring parts of the campus.

4. Manmade pond
The manmade pond references the waters in the surrounding area which enables all the greenery to exist in the Bay Area of California.

5. Standalone Cafe
2 cafes rest inside of the campus park, offering a place to grab a drink or snack and to meet up with fellow colleagues.

HARDSCAPES


Main Campus Building


Manmade Water Body


Rainbow Stage


Pathway


Outdoors Terrace


Steve Jobs Theater


Visitor Center


Glendenning Barn


Apple Cafe

SOFTSCAPES


Coast Live Oak


Valley Oak

Blue Oak

Native California Grasslands

Golden Apple Tree

Graven stein Apple Tree

Plum Tree

Persimmon Tree

Granny Smith Apple Tree

Apricot Tree

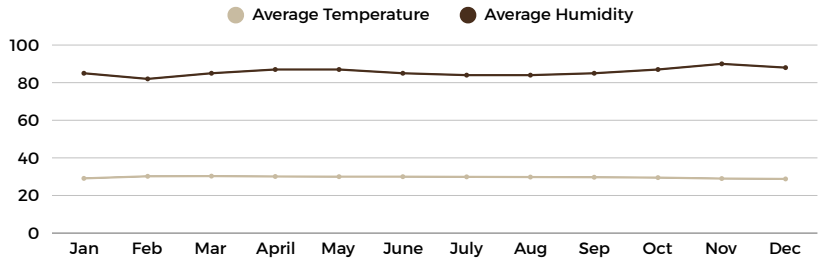
Pink Lady Apple Tree

Cherry Tree

Native Trees
Fruit Trees

INTERNATIONAL SCHOOL OF KUALA LUMPUR

CLIMATIC ANALYSIS IN KL [2024]



Analysis:
In tropical climates such as Kuala Lumpur, Malaysia. The average temperature during the day hovers around 30°C to 34°C, whilst the humidity stays above 80% in most occasions.
The high humidity and relatively high temperatures during the day make it difficult for humans to cool off efficiently, it also makes the perceived temperature higher

Response:
The landscape is placed strategically to block direct sunlight in many of the commonly circulated spaces such as walkways and corridors. This is to reduce the harsh temperatures and still allowing for wind breeze to pass through.

DESIGN STRATEGIES

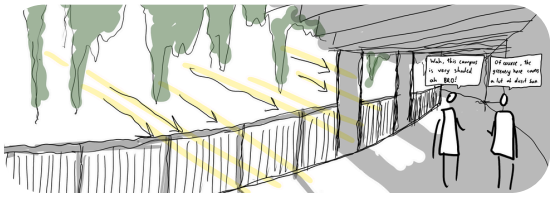
Educational Opportunity
ISKL utilizes in-house plantations for academic purposes as well, teaching their children about the life cycle of a plant and what plants are suitable for Malaysian soil to grow and consume.


Educational Opportunity

A more Humane Learning Environment
Besides it's practical uses, a well-planned landscape also serves to please the eyes, improving mood, reduces stress, benefiting academic clarity as well as enhancing social interactions.


A more Humane Learning Environment

Achieving Thermal Comfort
By strategically placing vegetation in areas with harsh sunlight, the plants can offer valuable shade for campus goers. Thus, Improving thermal comfort throughout the campus, this improves the overall well-being of students and staff.


Achieving Thermal Comfort

USER EXPERIENCE

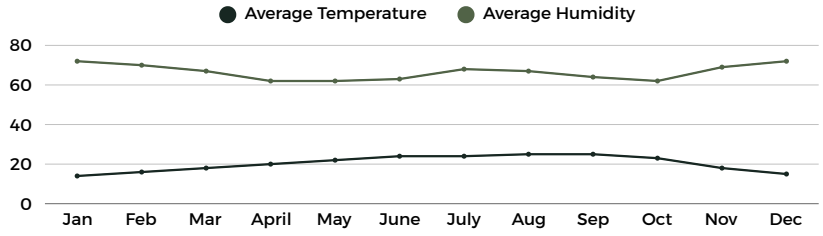

Greenery spots create shading and a welcoming space for socializing between campus goers


Vegetation that are woven into the campus acts as a natural air filter, improving the surrounding air quality


Campus landscaping offers a more pleasing environment for learning and for working.

APPLE PARK

CLIMATIC ANALYSIS IN SAN JOSE [2024]



Analysis:
San Jose has a warm-summer Mediterranean climate with hot, dry summers and mild, wetter winters. Average summer temperatures reach 28–30°C, while winters stay around 14–18°C.
Rain is minimal and mostly occurs from November to March. With over 300 sunny days per year and moderate humidity, the climate favors passive cooling, natural light, and outdoor living.

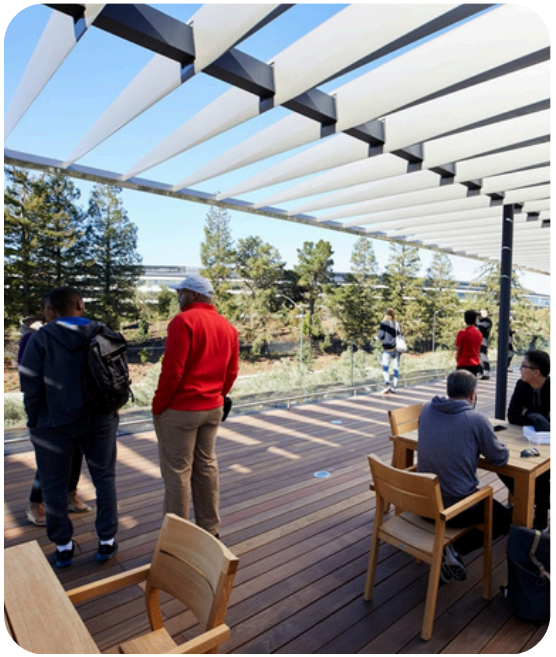
Response:
The apple park houses California's local flora, specifically done so to preserve the local biodiversity in the area. Secondly, the open concept of the park is done so without a roof is because San Jose receives very little rain, so a roofless concept is still acceptable in terms of practicality as compared to another region such as Malaysia with tropical weather that frequently rains.

DESIGN STRATEGIES

Biodiversity and Habitat Restoration
The landscape within the park simulates the existing landscape in Silicon Valley, California. Even going as far to reference the plantations in the local scene and the water body of the Bay Area.

The Campus "Melting Pot"
The park within the building has 9 openings for workers from different departments to come and go, bumping into each other and talking about work from different departments with the goal of exchanging ideas with one another.

Transportation and Access Strategy
The car park of the campus is located underground, allowing vegetation to be facilitated in and around the building. The campus also sits next to "Interstate 280" A highway that links the old campus to the new one.


Interaction in the Campus Park

USER EXPERIENCE


Workers can use the common space in the campus landscape to collaborate and spark innovation.


The campus access sits right next to a common highway, making entry easier for occupants.


The local landscape in the park serves to calm workers, reduce stress and promote a healthier work environment

The public part of the campus is cut off from working departments to reduce disturbance.

INTERNATIONAL SCHOOL OF KUALA LUMPUR

LANDSCAPE ARRANGEMENT

Clustered Pockets of Landscape
The landscape in ISKL is arranged in a way that it is concentrated in pockets in between building blocks, whilst vine vegetation are spread out around the walkways.
This strategy allows for maximum shade and the additional greenery pockets for leisure and social activities.

SUSTAINABILITY IN MIND

More shade, less cooling
As we have discussed, ISKL prioritizes strategic landscapes to reduce the need for active cooling, by providing shade from direct sunlight.
This saves costs long term for the Campus, reducing the need for active cooling such as fans and air conditioning. It also allows the semi outdoors corridors to not overheat.

PLANTATION

Tropical plants are selected to withstand the monsoon season in Malaysia. Especially harsh sunlight and heavy rainfall.


Calathea lutea


Taro


Creeper


Ixora


Lawn Grass

MAINTENANCE

Izyan Nadirah is the Fields and Grounds Manager in ISKL and overseas all management of landscape in the school.

CONCLUSION

Landscape Background
During the Construction stage of the Ampang Hill ISKL campus, a specific budget was set aside for the landscape of the campus, focusing on deep planning and futureproofing the wellbeing of students and staff.

Functionality and Appeal
The landscapes in ISKL functions simultaneously at a beautification project and well as a practical one. The campus landscapes shelter campus occupants from the sun whilst providing a space for socializing.

Educational Purpose
ISKL also hosts classes around their plants, teaching kids a thing or two about the life cycle of a plant. The campus is looking to diversify its plants so that children can have an opportunity to meet more exotic plants for themselves.

APPLE PARK

LANDSCAPE ARRANGEMENT

Centralized Multipurpose Landscape
Apple's park landscape is situated in one big center, focusing on a space that can provide multiple uses rather than many smaller pockets as seen in ISKL.
Apple's park center landscape is big enough to host events, house cafe's and grow fruit plantations.

PRESERVATION OF LOCAL SPECIES

Apple's Commitment Indigenous Vegetation
During the Design of the campus, Apple wanted to simulate the local environment inside of the ring-shaped building. Calling up local arborists such as David Muffly to oversee the plantation for the project, totaling up to over 9000 plants.
The plants were handpicked for their appeal and resistance to drought which has become more common in Silicon Valley.

PLANTATION

As Apple Park is located in San Jose, California, the campus falls under the mediterranean weather which is comprised of mild, wet winters and hot, dry summers. The area doesn't receive much rainfall as well. Thus native species of vegetation are used for their suitability and locallity.


Golden Apple Tree


Coast Live Oak


Native California Grasslands


Apricot Tree

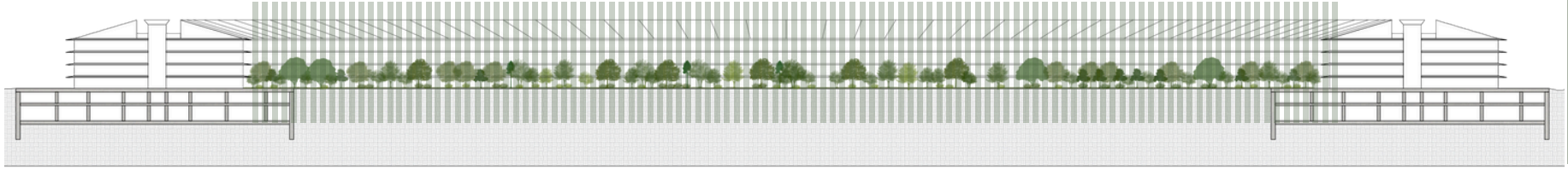

Valley Oak

CONCLUSION

Landscape Background
Under the considerate planning of Steve Jobs, Johnny Ive, and Normal Foster. The CEO of Apple, Chief Designer at Apple and Architect for the Apple Campus Respectively. They've successfully integrated their ideology of a park within a building for their HQ.

A Park within a Building
The Ideology is fixated on an open space with the ability to gather people in one space for leisure, collaboration as well as for events.

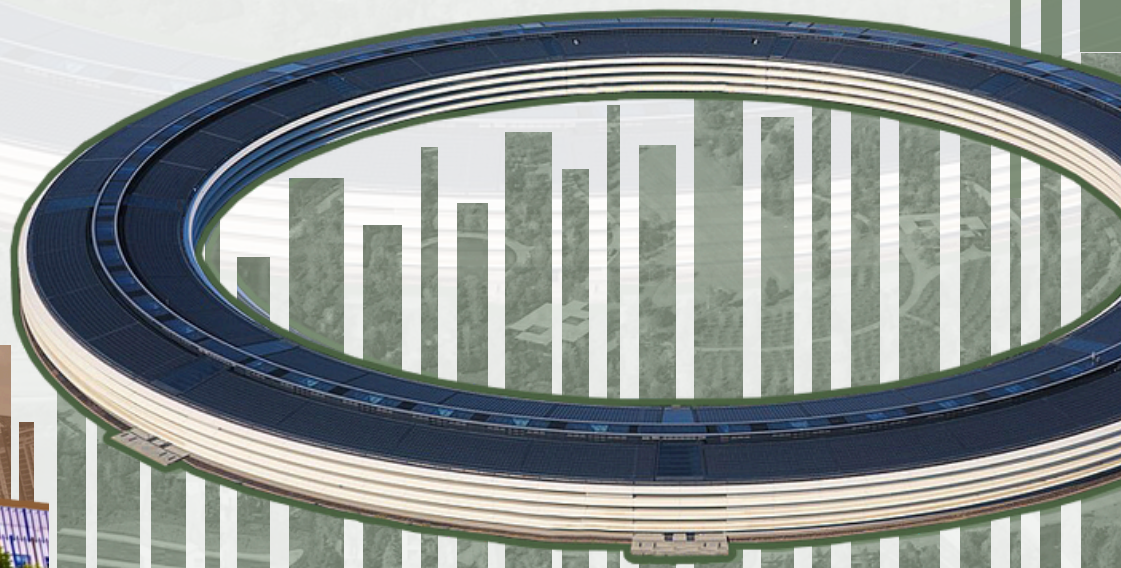
Tribute to San Jose's Flora
The design of the internal park of the campus encapsulates the essence of what it is like to be in Silicon Valley, the Technology Hub in the United States, without missing over detail to landscape and site context.



Both **ISKL** and **Apple Park** stand as strong examples of green building design, each showcasing a holistic approach to sustainability that integrates site planning, daylighting, facade design, natural ventilation, and landscape strategies. These buildings go beyond simply reducing environmental impact—they actively shape healthier, more adaptable, and more engaging environments for their users.

ISKL's design is deeply rooted in its tropical context, utilizing passive techniques such as natural ventilation, shaded facades, and carefully oriented spaces to reduce reliance on mechanical systems. The strategic landscape enhances microclimate comfort, supports biodiversity, and contributes to educational and social programming. Altogether, ISKL demonstrates that sustainable design can be deeply human-centered, educational, and functionally integrated.

Apple Park reflects a highly engineered, innovation-led approach to green design. It achieves sustainability through precision planning, smart technologies, and biophilic integration. From automated daylighting and advanced ventilation systems to its immersive park-like landscape, the campus embodies a vision where nature and technology coexist in harmony, all while achieving net-zero energy performance.



International School of Kuala Lumpur. (n.d.). Our campus. Retrieved from https://www.iskl.edu.my/
United States Green Building Council (USGBC). (2018). LEED Gold Certification: ISKL. Retrieved from https://www.usgbc.org/projects

Weather Atlas. (n.d.). Kuala Lumpur climate: Weather by month, temperature, rainfall, and sunshine hours. Retrieved from https://www.weather-atlas.com/en/malaysia/kuala-lumpur-climate

Department of Meteorology Malaysia. (2020). Weather patterns and wind trends in Kuala Lumpur. Retrieved from https://www.met.gov.my/

Foster + Partners. (2017). Apple Park. Retrieved from https://www.fosterandpartners.com/projects/apple-park/
Apple Inc. (2017). Apple Park: Creating the greenest building on Earth. Retrieved from https://www.apple.com/newsroom/
U.S. Green Building Council (USGBC). (2017). Apple achieves 100% renewable energy at Apple Park. Retrieved from https://www.usgbc.org/

National Renewable Energy Laboratory (NREL). (2018). Case study: Apple Park energy systems. Retrieved from https://www.nrel.gov/

Weather Spark. (n.d.). Average weather in Cupertino, California. Retrieved from https://weatherspark.com/y/1330/Average-Weather-in-Cupertino-California-United-States-Year-Round

Sustainable Building Research Centre (SBRC). (2020). Daylighting principles for tropical and temperate climates. University of Wollongong. Retrieved from https://sbrc.uow.edu.au

Weather Spark. (n.d.). Average weather and daylight in Kuala Lumpur and Cupertino. Retrieved from https://weatherspark.com/

Perez, R., Seals, R., & Michalsky, J. (1993). All-weather model for sky luminance distribution—Preliminary configuration and validation. Solar Energy, 50(3), 235–245. https://doi.org/10.1016/0038-092X(93)90017-I

International School of Kuala Lumpur. (n.d.). Sustainability and campus design. Retrieved from https://www.iskl.edu.my

Apple Inc. (2017). Apple Park: The vision for a sustainable campus. Retrieved from https://www.apple.com/newsroom/

Boubekri, M., Cheung, I. N., Reid, K. J., Wang, C. H., & Zee, P. C. (2014). Impact of windows and daylight exposure on overall health and sleep quality of office workers: A case-control pilot study. Journal of Clinical Sleep Medicine, 10(6), 603–611. https://doi.org/10.5664/jcsm.3780

Galasiu, A. D., & Veitch, J. A. (2006). Occupant preferences and satisfaction with the luminous environment and control systems in daylit offices: A literature review. Energy and Buildings, 38(7), 728–742. https://doi.org/10.1016/j.enbuild.2006.03.001

Apple. (n.d.). Apple Park. Foster and Partners. https://www.fosterandpartners.com/projects/apple-park

HOK. (n.d.). International School of Kuala Lumpur. HOK. https://www.hok.com/projects/view/international-school-of-kuala-lumpur/

The Veritas Design Group. (n.d.). Architecture and education: International School of Kuala Lumpur. The Veritas Design Group. https://theveritasdesigngroup.com/expertise/architecture-2/education/?id=1239

Architizer. (2017). Architectural details: Apple Park windows. Architizer. https://architizer.com/blog/inspiration/stories/architectural-details-apple-park-windows/

Design Life Cycle. (n.d.). Apple Campus 2: The design behind Apple Park. Design Life Cycle. https://www.designlife-cycle.com/apple-campus-2

ArchDaily. (2017). Million-square-foot Apple campus to open in April, and it looks incredible. ArchDaily. https://www.archdaily.com/805921/million-square-foot-apple-campus-to-open-in-april-and-it-looks-incredible

HOK. (2021). Reframing a sustainable future: The International School of Kuala Lumpur. HOK. https://www.hok.com/design-annual/2021-reframing-a-sustainable-future/the-international-school-of-kuala-lumpur/

International School of Kuala Lumpur (ISKL). (n.d.). Panthers of ISKL: Izyan, the agriculturalist and landscape artist. ISKL. https://www.iskl.edu.my/panthers-of-iskl-3-izyan-the-agriculturalist-and-landscape-artist/

Weatherspark. (2024). Historical weather during 2024 in Kuala Lumpur, Malaysia. Weatherspark. https://weatherspark.com/h/y/113829/2024/Historical-Weather-during-2024-in-Kuala-Lumpur-Malaysia

Countryaah. (n.d.). California weather by month. Countryaah. https://www.countryaah.com/california-weather-by-month/

Wired. (2017). Apple Park's tree whisperer. Wired. https://www.wired.com/story/apple-parks-tree-whisperer/

Meteoblue. (n.d.). Kuala Lumpur weather forecast for the next week. Meteoblue. https://www.meteoblue.com/en/weather/week/kuala-lumpur_malaysia_1735161

DurkDuct. (n.d.). Apple Park: A revolution in clean energy. DurkDuct. https://www.durkduct.com/application/apple-park.html

Medium. (2020). Apple Park: A revolutionary clean energy Apple Bite Estate. Medium. https://medium.com/predict/apple-park-revolutionary-clean-energy-apple-bite-estate-26d434559d95

Arquitectura Viva. (n.d.). Apple Park 1. Arquitectura Viva. https://arquitecturaviva.com/works/apple-park-1

Apple. (2016). Apple Campus 2 project: EIR public review. Apple Inc. https://s3.amazonaws.com/Apple-Campus2-DEIR/Apple_Campus_2_Project_EIR_Public_Review-Full.pdf

YouTube. (2018). Apple Park tour: A look inside the campus. YouTube. https://www.youtube.com/watch?v=VbeM8Lf7s5A&t=100s

YouTube. (2019). International School of Kuala Lumpur campus tour. YouTube. https://www.youtube.com/watch?v=T9dJ_cE5Asw&t=207s

YouTube. (2020). Exploring Apple Park: The world's most innovative campus. YouTube. https://www.youtube.com/watch?v=Gk4BUvWr000