

Title:	Local Urbanism: High-Rise Building Design in the Development of High Density Cities
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Subjects:	Architectural/Design Building Case Study
Keyword:	Urban Habitat
Publication Date:	2016
Original Publication:	Cities to Megacities: Shaping Dense Vertical Urbanism
Paper Type:	<ol style="list-style-type: none">1. Book chapter/Part chapter2. Journal paper3. Conference proceeding4. Unpublished conference paper5. Magazine article6. Unpublished

Local Urbanism: High-Rise Building Design in the Development of High Density Cities

复杂城市环境下地域都市主义的尝试 ——广州林和办公楼建筑设计



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Abstract | 摘要

This project is located in the Tianhe district of Guangzhou, which is the area with the highest density in the city. There are Linhe village and high-rise residential buildings around the project site. At the beginning, the design is focused on balancing the influence of the scale and the density of its surrounding through the movement of the architecture volume and the change of windows between the form and the density. We've tried to reduce the sense of disharmony of scale between the project and the surround buildings. At the same time, it responds particularly to the building identification and the solution between energy savings and the quality of function. It is an active attempt at the idea of local urbanism during the process of high-density urban development.

Keywords: Fuse of Old and New, High Density, Local Urbanism, Urban Environment

本案位于广州城市密度最高的天河老城区，周边村屋和高层住宅鳞次栉比。方案在一开始即着重解决城市尺度及密度所带来的影响，通过体块错动，开窗形式及密度上的变化，消隐其体量尺度与周边建筑的不协调感，同时在应对建筑身份认识、解决节能问题、提升使用质量方面均做出的独特回应，是一次在城市高密度发展下地域都市主义的尝试。

关键词：新旧融合、高密度、地域都市主义、城市环境

Introduction

The rapid and high-density development of current cities brings a series of challenges to be addressed, including urban texture, cultural identity, energy utilization, and transportation problems. Although these are challenges faced on a global level, they are much more acute in the Pearl River Delta. The subject project of this paper is located in the highest-density historic district of Guangzhou, adjacent to Linhe Village, which can be thought of as a "village-in-city," with surrounding low-rise houses and high-rise residential buildings set in a series of rows. The scheme focused on dampening the negative effects of size and density through manipulation of the architectural volume, fenestration, and a change of density so as to reduce the volume, scale, and the sense of incongruity. Additionally, the project formulates a unique response to aspects of building identification, problems of energy conservation, and objectives for improving the quality of life, making a positive contribution of high-density development that retains strong regional characteristics.

High-Density City and Local Urbanism

As our societies have become increasingly urbanized, the available land resources of

引言

当今城市快速、高密度的发展，必然带来一系列需要应对的挑战，其中包括城市肌理、文化认知、能源利用、交通问题等。虽然这些是全球范围面临普遍的挑战，但在珠江三角洲这一区域表现得尤为突出。本方案位于广州城市密度最高的天河老城区，又紧临城中村林和村，周边的村屋和高层住宅鳞次栉比。方案在一开始即着重解决尺度及密度所带来的影响，通过体块的错动，开窗的形式及密度上的变化，消隐其体量尺度与周边建筑的不协调感，同时在应对建筑身份认识、解决节能问题、提升使用质量方面均做出自己的独特回应，是一次在城市高密度发展下地域都市主义的积极尝试。

高密度城市与地域都市主义

随着社会经济的发展，城市人口的不断增长及集中化，城市可使用土地资源日益紧张，高密度城市早已成为越来越多城市建设规划的发展方向。高密度城市建设在经济、社会、交通等方面在一定程度上实现了城市资源的有效利用，城市空间和功能呈现密集而丰富的选择，城市生活因集约化而更加高效率，节约城市人口的时间和精力。然而，另一方面城市高密度常常带来了不容忽视的问题，如交通拥挤、环境

cities have become increasingly strained. Increasingly, the high-density city has been the favored development direction of urban planners for some time. High-density urban construction realizes efficiencies to a certain extent, with respect to economy, society, transportation, and so on. Dense cities often provide a rich choice of functions. Urban life becomes even more efficient because of intensification and saves time and energy for urban residents. However, the density of the city usually causes some problems that can't be ignored, such as traffic jams, environmental pollution, monotonous architectural forms, excessive pursuit of economic benefits and feverish construction speed, ignoring human values and regional features, etc. The rapid build-up of modern cities has led to a degree of monotony that makes many cities indistinguishable from one other and unrecognizable to their own citizens. Residents gradually lose awareness of the urban context when the landscape is dominated by repetitive blocks. Also, it is difficult to enhance the quality of life, neighborhood relationships and community vitality under these circumstances.

Obviously, the high-density city is the inevitable result of current urbanization trends. The challenges of urbanization are particularly evident in the developed cities of China. The question becomes: How to follow the development demand of society, to respond actively to the high-density urban environment, and to create the livable sustainable architecture? During the design process, the following questions need to be answered: How to resolve the complex and contradictory relationship between humanity and nature, so as to maintain the sustainable development for both? How to preserve traditional culture? How can unique regional natural and cultural features be sustained through the process of urban development? How to balance the relationship between the forces of globalization, urbanization and the peculiarities of each city?

Background

The Linhe office building is located at the intersection of Linhe East Road and Zhandong Road in the Tianhe district of Guangzhou. It is a high-rise office building set among historic renovation projects in Linhe Village, including residences, commercial residential buildings, and this office building. As the daily office space of the returned Linhe Villagers' committee, it provides rentable offices for the public. The villagers and developers jointly manage and operate this building,

and both can draw incomes from rent. In addition, the design considered the need for a supermarket, catering, and a cultural activity center for the community. The multifunction, mixed-use building can provide convenience for residents' lives, stimulate the vitality of community, and provide the conditions of a livable urban environment.

The project block of Linhe Village is located in the heart of the Tianhe district, one of the highest-density areas in Guangzhou. The building stock is a mix of different eras, uses and styles. Nearby is the Guangzhou East Railway Station, a commercial center, modern high-rise office buildings, a high-rise hotel, and a residential area with both new and old styles coexisting.

The buildings at different stages are intended to develop to a high level of density and a high building plot ratio. Each plot was developed to the highest degree. Additionally, because of the long time span of construction, a complicated urban texture has permeated the area. New and old buildings are interwoven with each other, forming a complex, high-density urban environment. Moreover, the project also needs to face another environmental factor that can't be ignored – the north side of the plot is close to Guangzhou East Railway Station, thus carrying strong potential to transmit noise and visual influence to the office building.

Therefore, the realistic question we needed to face at the beginning of design was: How to make a positive architectural response within a crowded and complex urban space? In this project, there were several contradictions that had to be addressed:

1. The design needed to respect the urban context and texture, while considering how to incorporate the organic vernacular of the locality, create vigorous and lively open space, and improve the environmental quality of the project's surroundings. The building should harmoniously integrate into the high-density urban environment without sacrificing its own identity.

2. For this project, Linhe Village had asked a developer to get involved in the renovation plan. However, at the beginning of design for this office building, the entire planning and design work for surrounding residential buildings had already been completed. Nevertheless, the design needed to consider its own operating requirements, need for return on investment, commercial operations and social publicity, which would be dependent upon the cooperation of the villagers' committee and the developers.

污染、建筑形式过于趋同单一、过于追求经济效益和建设速度而忽视了城市所应具备的人文价值和地域特征等等。这些快速建成的现代城市化建筑日益相似，导致的结果是城市的可识别度降低。市民在这些不断更新的街区中逐渐缺失对城市文脉的认知，生活环境难以得到提升，邻里关系受到影响，社区活力无法得以保持延续。

显然，高密度城市是城市化趋势所导致的不可避免的结果，这种城市化的挑战在中国发达城市更显突出。如何顺应社会 and 时代的发展需求，积极应对高密度城市环境，创造出宜居的、可持续的城市化建筑是当下建筑师所需面对的当务之急。在此设计过程中，下列问题是需要得到积极应对的：如何解决城市化过程中出现的人与自然间复杂的矛盾关系，保持人与自然的可持续发展？城市的文化传统如何得以保留？城市在发展过程中如何延续自身的自然、地域特征？如何平衡全球化、城市化与城市自身独特性的关系？

项目背景

林和办公楼位于广州市天河区林和东路和站东路交接处，属于林和村改造项目中的高层办公楼。林和村改造项目主要包括重建村民回迁住宅、商品住宅及本办公楼。办公楼作为林和村村委回迁后日常办公场所的同时，也为社会提供可出租的办公用房。村委与开发商共同管理及运营此办公楼，双方可从办公出租收入中共同获得资产收益。除此以外，设计需考虑在办公楼的低层设有超市、餐饮、社区文化活动中心用房，多功能的混合使用可以方便周边居民生活、激活社区的活力，为创造宜居的城市环境提供条件。

项目所在的林和村地块，位于广州城市密度最高的天河区核心地带，周边建有不同年代、风格多样、功能混合的建筑群，包括有广州火车站、商业中心、现代的高层写字楼、高层酒店、新旧并存的住区。这些不同时期出现的建筑均呈现高密度、高容积率的发展方向，区域内的每一块用地被最大限度的开发；而又由于它们建成时间跨度大，形成了相对自由生长、复杂的城市肌理。不同形式的新建筑与旧建筑在此片区互相交织，形成了高密度的复杂城市环境。另外，项目还需面对另外一个不容忽视的环境因素是地块北侧紧邻广州火车站铁路轨道，由此会对办公楼带来噪音影响和视觉影响。

因此，如何在纷杂拥挤复杂的城市空间中做出积极的应对是我们在设计之初便需面临的现实问题。在这个项目里，我们需要解决几个矛盾：

1. 设计需尊重城市文脉与肌理，思考城市化过程中新旧建筑如何有机融合、时代性



Figure 1. Linhe Office and the city (Source: Yang Ni)
图1. 林和办公楼与城市背景 (来源: 倪阳)

3. In addition to office space, the office building also needed to provide life support for the village returnees and the surrounding community residents, to implement a mix of uses and to improve accessibility, thereby creating additional social, economic and environmental benefits. The multifunctional space needed to be integrated into the building reasonably and efficiently.

4. The railway junction to the north would bring noise and visual impact to the office building, so the design needed to address the plot's proximity to the railway tracks (Figure 1).

Project Introduction

The Linhe high-rise building has a GFA of 46,700 square meters, of which 37,716 square meters are above the ground and 8,994 square meters are underground. Its height is 99.90 meters, with 21 stories above ground (four of which comprise the podium) and two

stories underground, which contain a garage with 184 parking spaces. It has a 4.8 plot area ratio.

This project contains 6,605m² of public facilities (4,150m² of supermarkets, a 2,400 m² cultural activity center and 55 m² public washroom), 3,963 m² of commercial area, and 26,776 m² of office area, with two levels of basement for garage and equipment spaces. The first floor has an office foyer, business center, supermarket and public washroom. The second floor has a supermarket and restaurants, the third floor a catering service, the fourth floor an activity center, the fifth floor an activity center and office. Floors 6 to 20 contain office space.

Terrain Approached Master Plan Design

The project plot is on marginal land, forming a sound barrier and a sight barrier between the residential area and the railway junction.

与地域性的传承关系，为城市创造积极开放的使用空间，提升项目周边的环境品质。建筑应和谐融入复杂的高密度城市环境而不失自身的可识别性。

2.本项目中，林和村引入了发展商参与城中村改造方案，办公楼在方案设计之初，用地周边的住宅便已全部规划设计完毕。而办公楼是由村委与开发商共同运营，设计需考虑好项目自身使用要求、投资回报、商业运营与社会公共性的平衡关系。

3.办公楼除办公空间以外，提供了回迁村民、周边社区居民生活配套，实现建筑的多功能使用和提高建筑的公共可达性，从而为社区创造更多的社会效益、经济效益、环境效益。多功能空间需合理、高效的整合在建筑内部。

4.北侧的城际铁路枢纽站对办公楼产生噪音及视觉的影响，设计需从总平面布局、建筑立面造型到构造细节上合理处理好地块与铁路轨道的矛盾关系（图1）。

项目简介

林和高层办公楼总建筑面积46700平方米，其中地上建筑面积为37716平方米，地下面积为8994平方米，建筑容积率4.8，建筑层数为地上21层（其中裙楼4层），地下2层，建筑高度为99.90米。地下两层汽车库，共停车184辆。

本工程包含了公建配套6605平方米（包括超市4150平方米，文化活动中心2400平方米，社区公共卫生间55平方米），商业面积3963平方米，办公面积26776平方米。地下两层布置车库和设备用房，首层为办公入口大堂、商务中心、超市、社区公共卫生间；二层为超市和餐饮商业用房；三层为餐饮，四层为文化活动中心，五层为文化活动中心和办公；六~二十一层均为办公。

契合地形的总平面设计

在林和村改造的规划设计中，该地块是作为回迁住宅区与铁路枢纽之间的声音屏障和视线屏障的一个边角地，地块小且处于天河中心区的边缘地带。因此，从城市角度来说，办公楼需应对北侧铁路及周边复杂环境的不利影响；从经济性来说，需在用地紧张的前提下合理设计总平面布局，提高土地利用效率。为此，在总平面设计中，建筑顺应了地形边界、满足城市规划中的退缩要求、避开建筑间的视线干扰范围，斜切成了平行四边形的平面布局形式（图2）。

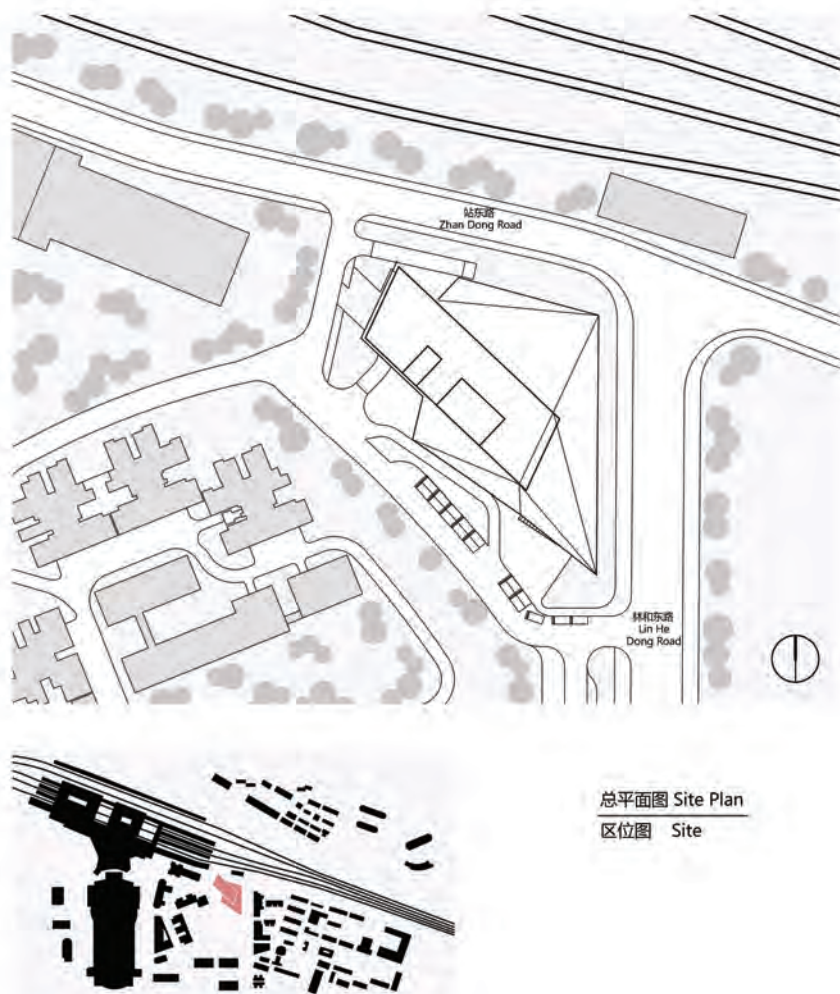


Figure 2. Site Plan (Source: Yang, Ni)
图2 区位与总平面图 (来源: 倪阳)

The plot is small and located on the fringe of Tianhe district. Therefore, from the aspect of the urban surroundings, the office building design needed to consider the adverse effects brought by the railway to the north and the surrounding complex environment. From the economic point of view, it needed to have a master plan that would enhance land utilization. Therefore, in the master plan design, the building meets the requirement of terrain boundaries and setback rules in urban planning, and keeps away from visual interference between buildings, resulting in its parallelogram plan layout (Figure 2).

Firstly, in order to meet the requirements of the high-rise tower, as well as the setbacks required by the railway right-of-way, the tower turns a broad face to the southwest. Secondly, in order to effectuate the triangle shape, the plan has been cut crosswise into a parallelogram. The overall layout of the tower and podium makes for a compact footprint that maximizes the land utilization of the plot. The parallelogram-shaped typical floor plan allows the tower to achieve effective north-south lighting and ventilation. Its reasonable

space and scale of spatial depth create efficient and humanistic advantages (Figure 3). Thirdly, the parallelogram tower and high-rise buildings of the newly-built community are staggered in their layout. The vertical transportation core tube of the tower is set along the south side of a typical floor, so as to avoid visual interference between occupants of the new building and those of high-rise buildings to the southwest. In addition, oblique and interlaced surfaces and other high-rise buildings in community naturally form an inclined angle and wind gap, which will be good for channeling breezes and improving ventilation and air quality.

The building volume was conceived by using a planar polygon and inclined cutting handling method to keep the building plan consistent with the façade concept. The building presents a spiral polygonal relationship from the podium to the tower. The whole building volume looks concise and clean, which helps the building integrate into a complex urban environment with a low-key, modest posture that resonates with local character. This avoids causing a jarring

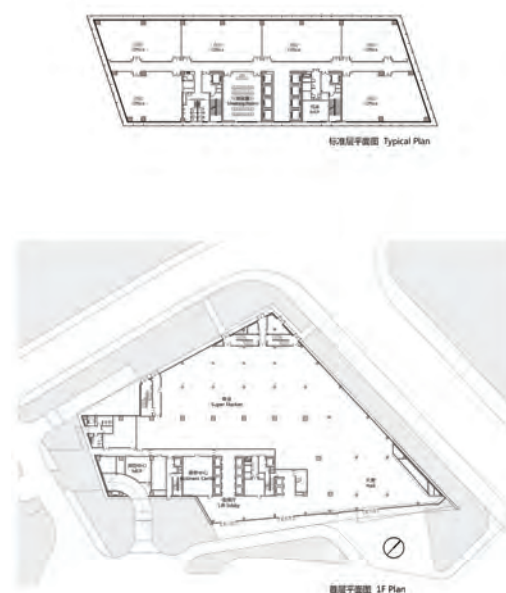


Figure 3. 1st floor plan and the typical plan (Source: Yang, Ni)
首层平面与标准层平面 (Source: 倪阳)

首先,为满足高层塔楼与北侧用地红线和铁路控制线的规划退缩要求,塔楼平面成西南向布置;其次,契合地块三角形的形状,塔楼平面被斜切成平行四边形,塔楼与裙楼布置紧凑,如此使得地块使用率得到最大限度的提升,而且平行四边形的标准层平面让办公塔楼获得良好的南北向采光和通风,合理的开间和进深比例也为办公空间创造出高效和人性化的优点(见图3)。第三,平行四边形塔楼与新建小区高层建筑尽量错开布局、塔楼交通核心筒设置在标准层南侧,从而在高密度社区中避免了办公楼与西南侧高层住宅间的视线干扰;而且斜向错动的平面与小区其他高层建筑自然形成夹角及风口,有利于小区的自然导风,改善小区的风环境及空气质量。

斜线切割的体量处理

建筑体量和造型元素沿用了平面的多边形和斜线切割等处理手法,使得建筑平面与立面在设计手法上保持了一致性。建筑从裙楼到塔楼呈现出螺旋上升的多边形体量关系,整个体量简洁利索,让该建筑体以低调谦逊而不失个性的姿态融入到复杂的城市环境中,避免了新建办公楼与现有周边建筑产生过多的差异感。而作为立面表皮基本构成元素的单元式穿孔铝板也采用了平行四边形,斜线切割设计手法从



Figure 4. Aerial view (Source: Yang Ni)
图4. 鸟瞰图 (来源: 倪阳)

sense of difference between the new office building and existing surrounding buildings. The perforated unitized aluminum plates of the façade skin adapt the parallelogram shape. The inclined cutting design method guarantees achieving an organic unity of design language, from the large-scale plane and volume relationship, down to the façade detail (Figure 4).

Respect the Façade Design of the Urban Context

The site is surrounded by high-rise buildings at a high density. In response, the façade design takes small windows as its principal motif, which facilitates a strong sense of composition. In order to coordinate these features with the surrounding environment, this design eschews the common all-glass wall of typical skyscrapers, instead emphasizing a sense of composition and sculpture as its starting point.

The façade design includes a unitized perforated aluminum component, with five different patch sizes, which forms a continuous façade skin. The parallelogram-shaped aluminum plate takes modular design. The external profile size is 2250 mm x 2250 mm, which is appropriate to the column grid of 9 meters' span and a floor height module of 4.5 meters. The inner opening

of unitized aluminum plate has five sizes in the range of 1100mm–1600mm. Through parametric design, the five different sizes of aluminum plate units form rhythmical density changes on the façade, to avoid excessive homogenization and to make the project demonstrate a unique character while respecting its neighbors at the same time. Also, the inner opening height of each unit is aligned with the height of the sight lines in each floor for the convenience of the users to view the outdoor landscape through the aluminum plate skin layer. In addition, the plates have 25-mm-diameter pores, distributed to match the proportions of the parallelogram and add a sense of lightness and permeability. The 50% perforation density of the aluminum wrapping around the building creates a breathable skin, which can play the role of sun-shading and blocking outside noise, while allowing natural ventilation and light penetration.

The podium containing the entrance lobby, supermarket, restaurants, commercial space, and community activity center has a different level of privacy from the towers, resulting from the consideration of the relationship between architectural space and urban space. Due to the openness and accessibility of the entrance areas, the podium has a significant impact on the quality of urban space and the living environment. Therefore, part of the façade of the podium is covered by a glass curtain, so as to strengthen ties between interior and

平面、体量关系贯穿使用到立面细节处理上，保证了设计语言有机统一（图4）。

尊重城市环境的立面设计

基地周边建筑多为高层建筑，密度高，外立面以小窗式设计为主、实体感强。为协调这些周边环境特点，本设计舍弃常见的全玻璃幕墙立面手法，以强调建筑自身的实体感和雕塑感为出发点，对外立面设计了五种不同开窗尺寸的单元式穿孔铝板组件，形成连续、具有实体感的立面外表皮。这些平行四边形的单元式铝板考虑了建筑的模数化设计，外轮廓尺寸均为2250X2250mm,与9m的平面柱网跨度和4.5m的层高模数相适应；而单元铝板的内开口则从1100~1600mm分为五种尺寸。这五种不同尺寸的铝板单元，通过参数化设计，在立面上形成富有韵律的疏密变化，避免了立面的过于均质化和单一化，使得本项目在与周边建筑协调统一的同时，彰显个性。而且每个单元的内开口高度与每楼层视线高度相适应，方便室内使用人员能透过铝板表皮层观看室外景观。另外，单元式的铝板均为穿孔铝板，孔洞直径为25mm，配合平行四边形的尺寸规律地分布在铝板上，增加了建筑外表皮的轻盈感和通透感。穿孔率达到50%的冲孔铝板如同“会呼吸”的表皮包裹在建筑外侧，在保证建筑自然通风、采光、视线穿透的同时，也达到了遮阳、屏蔽外界噪音的作用。

而办公楼的低区裙楼，作为办公入口大堂、超市、餐厅、商业、社区活动中心等



Figure 5. Perspective (Source: Yang, Ni)
图5. 低点透视图 (来源: 倪阳)

outdoor space. Thus, the public space in the building interior can integrate into the urban square and street more openly. These semi-open ground-floor spaces blur the distinction between interior and outdoor spaces, providing better service for urban residents, and adding vitality to the city (Figures 5–9).



Figure 6. South façade (Source: Yang Ni)
图6. 南立面图 (来源: 倪阳)



Figure 7. Entrance hall 1 (Source: Yang Ni)
图7. 入口大堂1 (来源: 倪阳)

公共空间，与办公塔楼的私密性不同，在使用上则更需考虑建筑空间与城市空间的结合关系。因为高层建筑底部空间的开放度和易达性，对城市空间的品质和人们生活环境的质量具有重要的影响。为此，低区裙楼立面局部的采用回玻璃幕墙立面，加强了建筑底部室内外空间的联系，让建筑内部公共空间更开放的融入到城市广场和城市街道。这些半开放的底层建筑空间，模糊了室内外的空间界限，更好的为



Figure 9. Entrance hall 2 (Source: Yang Ni)
图9. 入口大堂2 (来源: 倪阳)

城市居民服务，提供居民交往的活动场所，增添城市活力（图5–9）。

经济节能的双表皮设计

我们希望本设计在提供优质空间的同时能控制工程造价，既能为改造区居民提供高品质的配套设施，同时也为村民和发展商

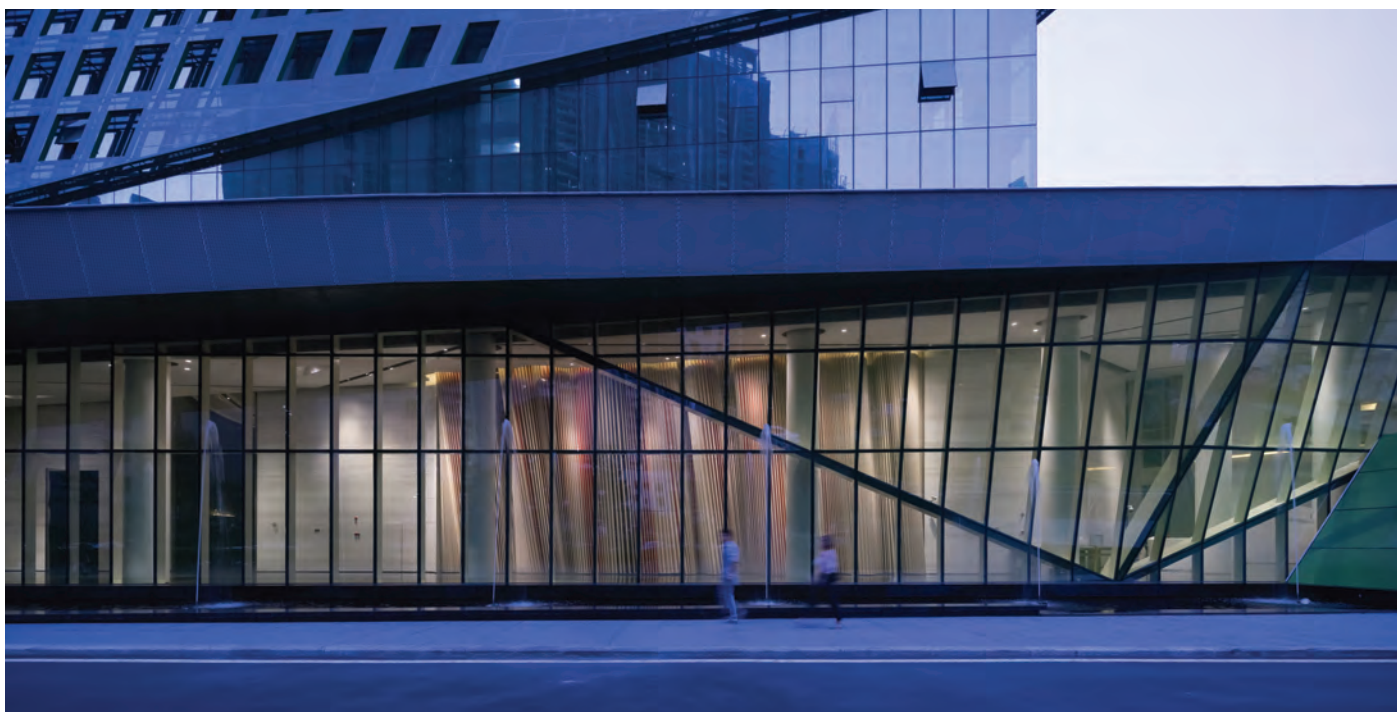


Figure 8. Office entrance (Source: Yang Ni)
图8. 办公楼入口 (来源: 倪阳)



Figure 10. Entrance hall 3 (Source: Yang Ni)
图10. 入口大堂3 (来源: 倪阳)



Figure 11. Outer skin (Source: Yang Ni)
图11. 外表皮 (来源: 倪阳)

Low Cost and Energy-Efficient Double Skin Design

We hope to provide a high-quality space design as well as control cost, in order to offer high-quality facilities to the residents in the historic renovation area, as well as obtain a good return on investment for the villagers and developers. These objectives go

hand-in-hand with design goals of “low-cost, appropriate, elegant and energy-saving.” Thus the building takes the double-skin design of low-cost unitized perforated aluminum on the outside and ordinary aluminum alloy windows inside (Figure 10–11), which affords the following advantages:

取得良好的资产回报，达到“经济、适用、美观、节能”的设计目标。为此，建筑采用了低成本的外侧单元式穿孔铝板和内侧普通铝合金窗的双层表皮设计（图10–11），具有以下优势：

1. 双表皮的设计避免了建筑过多的采用传统全玻璃幕墙外立面，防止城市出现千篇一律的“玻璃盒子”建筑风格。是对现代建筑如何诠释地域性和城市化的思考结果。

2. 单元式穿孔铝板与普通铝合金窗相结合，铝板单元采用模块化

的设计，具有施工材料经济、构造简单、易实施、方便维护等优点，与采用全玻璃幕墙相比降低了工程建造成本。

3. 双表皮的设计，能减少对周边高密度建筑的光污染影响。

4. 地块北侧临近火车站运输铁路，其噪音对本项目的影响不容忽视，而双表皮的外围护结构则能起到很好的降噪作用。

5. 穿孔铝板的通透率接近50%，使得建筑室内在双表皮外墙的条件下也能获得良好的自然采光。

6. 两层表皮之间形成了900mm宽的空气缓冲层，穿孔铝板外遮阳及节能玻璃组成被动式综合遮阳系统，同时兼顾夏季自然通风、办公人员视野、防雨及外遮阳，在不降低室内舒适的前提下，达到建筑节能的目的。经过能耗模拟分析，与常规的高层建筑玻璃幕墙系统相比，该被动式综合遮阳系统可阻隔将近42%的长波太阳辐射进入室内，相当于降低16.7%的夏季空调负荷，可以满足公共建筑节能设计标准对于透明围护结构遮蔽性能的要求。室内采光模拟分析的结果表明，采用了该综合遮阳系统以后，室内自然采光照度虽然有所降低，但标准层平面，靠窗的工作面上仍有906小时可以满足300lx的工作要求。

7. 两表皮之间在每楼层位置设计了铝合金格栅便道，该便道考虑了专业人员的荷载和进入的可能性，方便其对建筑外立面进行日常清洗与维护。

因此，本项目的双表皮设计，对建筑自身遮阳、自然通风、采光、被动式节能等方面均能起到积极的作用。

结语

在过去，高速发展的城市化进程中，我们往往以孤立单一的设计思维来应对高密度城市所产生的新旧交替的复杂环境，常常缺乏思考新旧的融合中如何以现代的手

1. The design of the double skins avoids the excessive use of the traditional full-glass curtain wall façades, which prevents the insertion of another monotonous “glass box” architectural style in the city. This is the result of thinking about how regionalism and urbanization for modern architecture are interpreted.

2. The design combines the unitized perforated aluminum plates with ordinary aluminum windows. The aluminum plate design takes advantage of modularization, using cheap material, simple structure, easy implementation and maintenance, at a lower construction cost than a typical glass curtain wall.

3. The double-skin design can reduce the impact of light pollution on the surrounding high-density buildings.

4. The north side of the project plot is adjacent to rail lines, so the potential of a noise nuisance for the project can't be ignored. To some extent, the double-skin peripheral structure can reduce the noise.

5. The permeability rate of the perforated aluminum is nearly 50%, which can bring the building interior good natural light, even through a double-skin façade.

6. A 900 mm-wide air buffer layer is formed between the double skins. A passive and integrated sun-shading system is made up by the combination of perforated aluminum and energy-saving glass, as well as the consideration of natural ventilation, office staff views out, protection against rain, and external sun-shading. The system can thus realize energy conservation without compromising interior comfort. Through simulated analysis of energy consumption, compared with a regular high-rise glass curtain wall, this system can block about 42% of the long-wave solar radiation into interiors in summer, which can save 16.7% on air-conditioning power consumption. The skin system can also meet the requirement of screening the performance of the transparent maintenance structure, while following the design standard for the energy efficiency of public buildings. The results of the interior-lighting simulation analysis shows that even when interior lighting is reduced this combination sun-shading system can still achieve 300lx for 960 hours in a typical floor plan.

7. Set between the two layers, a catwalk with aluminum floor grill considers the load and access requirements for professionals to

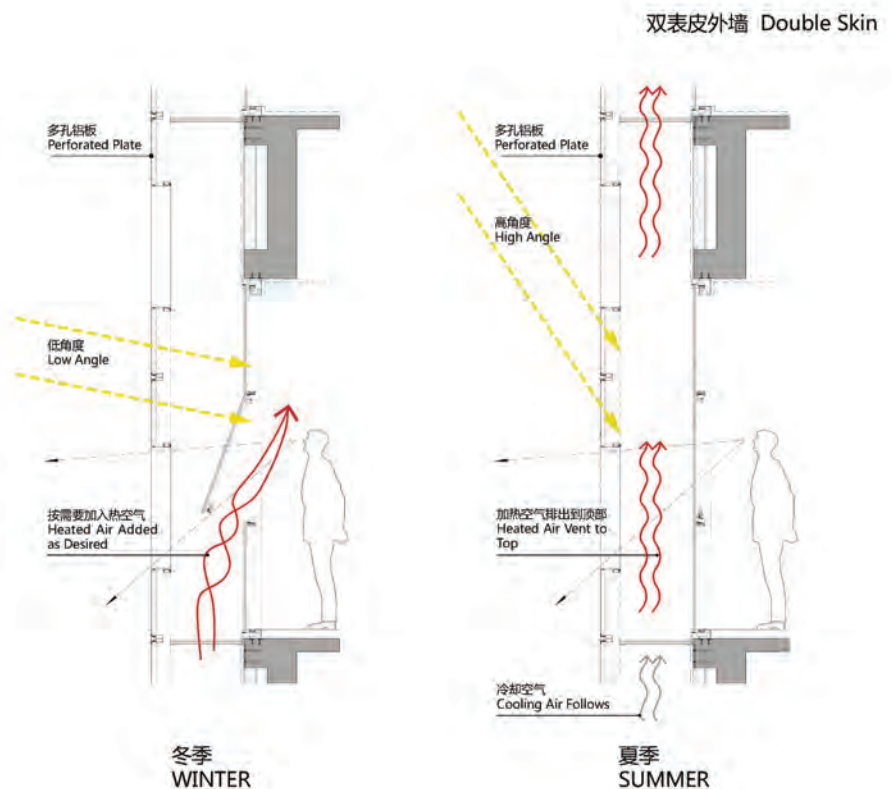


Figure 12. Energy saving effect of double skin (Source: Yang Ni)
图12. 双表皮节能效果 (来源: 倪阳)

perform the daily cleaning and maintenance for the façade conveniently and safely.

Therefore, the double-skin design of this building plays a positive role across aspects such as solar shading, natural ventilation, lighting, and passive energy conservation.

Conclusion

In the past, rapidly developing urban areas tended to use a one-size-fits-all approach to deal with the complex existing built environment. This usually meant demolishing the old high-density city and replacing it with new construction. There was typically a lack of thinking about how to inject new vitality to the community with modern techniques, by way of integration of new and old buildings, as well as ignorance of the regional vernacular and history. From the schematic design forward, the design and development team set out to think and deal with the above questions when conceiving the Linhe office building, which now stands as an attempt at high-quality contextual architecture in the complex and high-density urban environment.

法，通过对地域的演绎和历史的了解，把新的活力注入到社区当中。而广州林和办公楼，从方案设计之初便围绕以上问题进行思考与解决，是在复杂的高密度城市环境下地域都市主义的一次尝试。