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Human Scale in Vertical Urbanism

竖向城市设计中的人性尺度



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Sudhir Jambhekar is an architect and urban designer with nearly 50 years of experience on a wide variety of award-winning projects of various scales and typologies that span the globe. He approaches design as a perceptive search for meaning and usefulness, narrowing the infinite possibilities for a project to an idea that balances the forces at work in each. His approach is rooted in the belief that all elements are part of the larger whole, and each element of the built environment is not only worthy of, but requires, design excellence.

建筑规划设计师Sudhir Jambhekar 在近50年的从业经验中其屡获殊荣，作品涉及各种类型和规模，范围遍及全球。他将设计理解为一种寻找意义和实用价值的过程，在无数可能性中找出一个能平衡项目的各种限制条件和外力的办法。他的设计理念植根于坚信每一个元素都是整体的一部分，建筑环境中的每一个元素都值得并必须为之精心设计。

Edward Mayer is an architect and Senior Associate at FXFOWLE with over 23 years of experience. Edward recently completed overseeing six mixed-use parcels in the King Abdullah Financial District, a new 340,000-square-meter urban development that emphasizes the integration of business and recreational activities, creating a significant identity within an attractive setting for the financial district and the citizens of Riyadh, Saudi Arabia. Programmatic components include office, residential, educational, sports, retail, and cultural facilities. As Project Manager, he coordinated work with the client, contractor, and end users.

Edward Mayer 具有23年的设计经验，是FXFOWLE的设计总监。Edward 近期主持完工了在阿卜杜勒国王金融区 (KAJD) 的6个地块的综合体。这个新建的340,000平米城市开发项目着眼于办公和娱乐休闲的结合，为沙特阿拉伯首府利雅得的市民设计了一系列吸引人的环境，从而形成其独特的个性。综合体的功能包括办公，住宅，教育，体育，零售和文化设施。作为项目主管，Edward 承担了协调甲方，施工方和使用者之间的工作。

Abstract

As global cities continue their horizontal sprawl, climate change bears down on our finite natural resources, and energy costs and population growth soar, it is imperative that we look to verticality in urban design to create dense, sustainable, and livable city centers. Fundamentally, our struggle to accept density and vertical urbanism may stem from most developments' disregard for human scale, a concept that creates a comfort level that cannot be quantitatively measured. Therefore, dense, urban developments must juxtapose built elements in appropriate relationships; the proportions and components of buildings are critical to creating places where people want to live, work, worship, and play.

Keywords: Urbanism, Density, Human Scale, Verticality, Public Space, Materiality

摘要

随着全球化都市的持续扩张，气候变化对有限的自然资源带来越来越大的压力。能源价格的飙升和人口的快速膨胀迫使我们着眼于竖向的城市设计，以创造更密集，可持续发展的，宜居的城市中心。根本上，人们难以接受高密度和竖向城市的原因源于大部分开发商对人性化尺度的漠视。人性化尺度是一个无法量化衡量的用于创造舒适度的概念。因此，高密度的城市项目必须将各种建筑元素并置在合理的相互关系之中；建筑的比例和各组成部分对于创造人们乐于在其中居住，工作，宗教礼拜和休闲娱乐的场所尤为重要。

关键词: 城市设计，密度，人性化尺度，竖向性，公共空间，材料

Introduction

As global cities continue their horizontal sprawl, climate change bears down on our finite natural resources, and energy costs and population growth soar, it is imperative that we look to verticality in urban design to create dense, sustainable, and livable city centers.

Though the idea of high-density, mixed-use developments is an obvious solution to these strains, and even though tall buildings—skyscrapers—were “invented” over 150 years ago with technological advances in fireproofing, deep foundations, and the elevator safety devices when it was discovered that steel could be mass-produced relatively inexpensively (and even though we have rapidly absorbed advances in technology into all aspects of our daily lives), human beings still resist large-scale buildings. Why? Certainly, there are many of examples of poorly designed megaprojects that ignore the very benefits they could and should contain. Such projects include self-referential, isolating towers that separate people from their neighbors and amenities; contribute to heat island and canyon effects; and are often built purely for economic reasons, ignoring program and community needs, and further driving away all but the affluent consumers.

简介

随着全球化都市的持续扩张，气候变化对有限的自然资源产生了压力。能源价格的飙升和人口的快速膨胀迫使我们着眼于借由竖向城市的设计来创造更密集，可持续发展的，宜居的城市中心。

虽然高密度综合体的开发已经无疑是对上述压力的解决办法之一，更不用说高楼大厦早在150年前随着防火，深型基础和电梯安全技术的发展，在钢材可以被相对低价地批量生产时已被“发明”（而且我们也早已在日常生活的方方面面快速的吸收技术的进步），人们却依然抵触大尺度的建筑，为什么？当然，不乏有设计糟糕的大型项目出现，它们忽视了那些根本的可以使它们获益的因素。这些设计常常有封闭的，孤立的塔楼，将里面的人和周围的环境和设施隔离开；它们加剧了热岛效应和峡谷效应；那些项目往往是完全出于经济考虑，而忽视功能和社区需求，只会让使用者避而远之。

相反的，人们喜欢城市和城市带来的便捷。城市可以让人们与自己的家人朋友在同一个地方生活和工作，离得更近；可以让人们在步行距离内到达常用的公建，文娱场所，公共交通，以及找到各种僻静或者热闹刺激的角角落落。据世界卫生组织公布，到2030年10个人中有6个人将生活在城

Conversely, people like the idea of cities and the conveniences they offer. Cities allow people to be physically close to family and friends, to live and work in the same place, and to have access to critical amenities, cultural resources and diversity, public transportation, and pockets of both tranquility and excitement – all within walking distance. According to the World Health Organization, by 2030, six out of every 10 people will live in a city, and by 2050, this proportion will increase to seven out of 10 people. Currently, around half of all urban dwellers live in cities with between 100,000 and 500,000 people. Increasingly, we have no choice but to go up.

Fundamentally, our struggle to accept density and vertical urbanism may stem from most developments' disregard for human scale, a concept that creates a comfort level that cannot be quantitatively measured. Therefore, dense, urban developments must juxtapose built elements in appropriate relationships; in terms of ground coverage, open space, usage, size, form, etc., the proportions and components of buildings, including materiality and details, are critical to creating places where people want to live, work, worship, and play.

The following case study demonstrates the appropriate open and public spaces in relation to building ground coverage with of mixed use buildings: retail at the lower levels, amenities, places of entertainment, worship and monorail connection. Buildings and their components of varying scales and heights are juxtaposed to optimize daylight and creating a feeling of openness. In addition, strategies of using tactile materials, green spaces, open air and light, humanizing massing by breaking down the scale, façade elements used to add texture and be purposeful, each building responding differently to its own site and immediate context, creating individual characteristics have been used to create a sense of place that climatically, environmentally and culturally responds and reinterprets.

King Abdullah Financial District, Case Study

The solution to our resistance to density and verticality, therefore, lies in looking beyond population per acre and distance between adjacent buildings to define and measure density. One method for lessening the discomfort caused by large-scale building is to pay attention to the relationship of building height to open space—streets, parks, etc.—with local climate, hours and strength of daylight, culture, and energy conservation driving that ratio, as well as design. In addition, in a dense, vertical development, buildings should be designed at varying heights for visual “breathing space,” light and sky penetrating the ground floor plane and at the pedestrian levels. It helps to place working and living spaces on higher floors, while dedicating lower levels to public amenities in close proximity to landscape elements.

These and other methods of bringing human scale to vertical urbanism were woven into FXFOWLE Architects' design process for the King Abdullah Financial District (KAFD) in Riyadh, Saudi Arabia. It was the firm's vision to not simply counteract the wariness with which Riyadh's residents might approach such an unprecedented and large project—one that will house thousands of people and was designed and built in one decade—but to provide them with sustainable, urban living.

At KAFD, the main focus has been to create walkable/pedestrian-friendly community where people can work and live within a reasonable proximity. A monorail system has been designed to serve

市里;到2050年,这个比例将增加到十分之七。现在,大约有一半的城市居民居住在100,000到500,000人口的城市里。人口的不断增加,我们除了向上发展别无他法。

根本上,人们难以接受高密度和竖向城市的原因源于大部分开发商对人性化尺度的漠视。人性化尺度是一个无法量化衡量的用于创造舒适度的概念。因此,高密度的城市开发必须将各种建筑元素置于合理的相互关系之中,包括占地面积,开放空间,功能,面积,形式等;建筑的比例和各组成部分,包括材料和细部,对于创造人们乐于在其中居住,工作,宗教礼拜和休闲娱乐的场所尤为重要。

下面的案例说明了如何处理开放公共空间和综合体建筑的占地的关系,在底层设置零售,便利设施,娱乐,宗教设施和轻轨交通站。建筑各部分大小高度各异,它们被有效并置来优化采光,形成开敞的空间感。有触感材料,绿化空间,露天场所和采光的处理用以消解尺度来创造人性化的体量,立面构建的设计丰富了建筑肌理同时也具有功能性。每一个建筑体对其所在基地和环境应对方式各不相同,形成各自的特性,这种特性营造出的场所感对气候,环境和文化作出回应并重新诠释。

阿卜杜勒国王金融区, 案例

研究人们对密度和竖向性的抵触情绪时不能通过用每公顷人口数和相邻建筑间的距离来定义和衡量密度。减少大型建筑带来的不舒适感的方法之一是着眼于建筑高度和开放空间——街道,公园等——的关系。当地气候,日照时间和强度,文化,节能都对这种关系有决定作用,也从而对设计起到决定作用。此外,高密度的竖向城市设计中,应将建筑设计成不同的高度,以提供视觉上的“喘息空间”,并使行人在地面层享受到阳光和天空。这样可以将工作和生活空间放在高层,而将亲近绿化景观的底层空间用于公共设施。

这和其他一些把人性化尺度带进竖向城市的设计方法贯穿于FXFOWLE Architects在沙特阿拉伯首府利雅得的阿卜杜勒国王金融区(KAFD)项目的整个过程中。公司的目标不仅仅是要解决利雅地居民对这一前所未有的大型项目的排斥心理——一个将住有几千人口,工期十年的项目——并且要给他们提供可持续的城市生活。

在KAFD中,规划的重点一直都放在创造适宜步行的社区,使人们可以在合理的距离范围之内工作生活。一条为整个金融区服务的轻轨系统现在正在施工中。此外,规划还强调了节能节水以及废水利用。

利雅地是沙特阿拉伯的首府和最大城市,人口5千2百万。自2008年起,FXFOWLE受委托在7个地块上设计共12座建筑。(见图1)新的城市中心KAFD占地1.6百万平米,建筑5百万平米,是由Henning Larsen Architects和Shankland Cox做的总规。开发区里的3百万平米建筑面积几乎同时开工,包括清真寺,办公楼,住宅,商业,娱乐和绿地,几乎所有项目都已近完工。FXFOWLE的项目之一建筑环境博物馆将于2014年9月开始施工。一条轻轨和多处人行天桥把各个建筑和地块连接起来。业主的目标是创造一个高密度,多功能的金融区,适宜步行并提供各种工作和生活的便利设施。业主同时希望把利雅地市民从不断向外扩展的城市化进程拉回到一个可持续发展的城市中心来。(见图1)除了上述的几点,以下的思考原则也有助于FXFOWLE平衡KAFD项目中的密度,尺度和竖向城市设计:

the financial district and is currently under construction. Additionally, emphasis has been placed on Energy and Water savings along with the use of recycled water.

Beginning in 2008, FXFOWLE was commissioned to design 12 buildings on seven parcels totaling in Riyadh—Saudi Arabia's capital and largest city, home to more than 5.2 million people (see Figure 1). This new city center, called the KAFD and containing a total of 5 million square meters of buildings and 1.6 million square meters of land, was masterplanned by Henning Larsen Architects and Shankland Cox. Almost all of the development's three million square meters of floor space have been under construction simultaneously, including a mosque, office buildings, housing, retail, entertainment, and green spaces, and all are nearing completion. A Museum of the Built Environment, one of FXFOWLE's buildings, is set to begin construction in September 2014. A monorail and skywalks will connect the buildings and each parcel. The client's goal for the project is to create a high-density multi-faceted financial district with a variety of amenities that is also pedestrian friendly and conducive to working and living. The hope is also to draw citizens of Riyadh—a city that continues to sprawl outwards—back to a sustainable core. In addition to those mentioned above, the following key philosophical principals also helped FXFOWLE balance density, scale, and vertical urbanism in the KAFD:

All of the parcels of the KAFD are organized around a landscape element called a “wadi,” a dry, desert riverbed that Henning Larsen maintained strictly for pedestrian use. Temperatures drop dramatically in the mornings and evenings in Riyadh, and people enjoy strolling and eating outdoors during these hours—the wadi respects and responds to the cultural and climatic aspects dealing with human scale and quality of life. FXFOWLE placed certain retail elements in each of its buildings at this wadi level, enlivening the pedestrian experience. A vehicular street level, which is about seven meters higher than the wadi, separates car traffic from pedestrian traffic. Underground parking connects visitors and residents directly to the buildings above (see Figure 2).

FXFOWLE, per the planning guidelines, also ensured that each parcel contains a mix of residential and commercial uses, encouraging continual engagement of the site and allowing the architects to adjust the scale and design of each building according to program. Building heights vary from parcels to parcel and within parcels as well as between individual structures within the parcels. Five- to seven-story residential buildings with retail bases are located on parcel 2.09, while mixed-use buildings of about 33 floors are on located on parcels 4.07 and 4.08. The Museum is five levels, while the mosque is two. Though not designed by FXFOWLE, the KAFD contains stock exchange buildings in the central district that soar as high as 385 meters or about 90 stories. Density is dispersed according to location and orientation.

Particularly important in a desert (or any harsh) climate, the buildings and parcels in the KAFD are connected by skywalks. During mid-day, when the temperatures are uncomfortably hot, this internal street becomes the main artery. The entire KAFD is served by monorail, connecting pedestrians to each parcel. This allows for the quick and convenient circulation of people throughout the site and connects them to parking structures.

Last but not least, design also matters. Today, “decoration” is a four-letter word, but details in a contemporary language offer approachable visual cues. FXFOWLE's buildings in the KAFD are uniquely different from each other, but all contain a common thread. In the classical

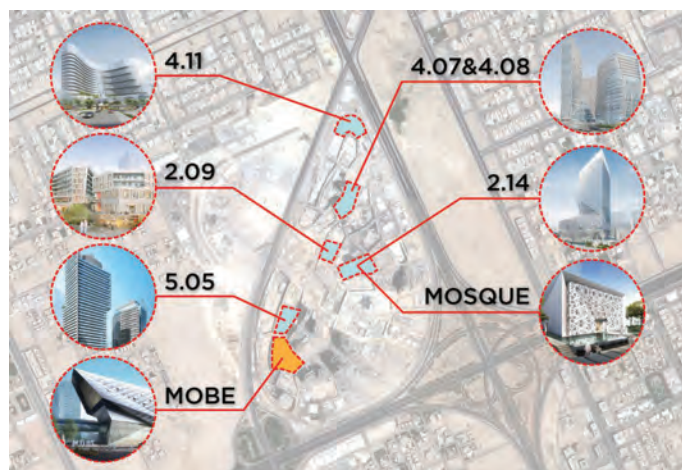


Figure 1. Overall KAFD plan indicating parcels designated to FXFOWLE

图1. KAFD 整体规划中FXFOWLE 地块所在地

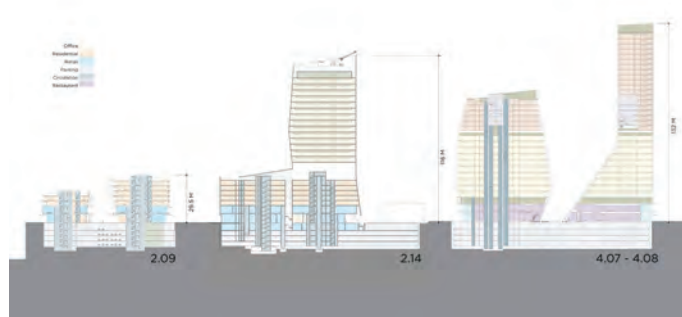


Figure 2. Comparative section through parcels 2.09, 2.14, and 4.07-4.09 showing variation in massing and nature of mixed-use

图2. 地块2.09, 2.14, 4.07—4.09的剖面比较表明建筑体量和和使用功能的多样性。

KAFD项目的所有地块都是围绕着一个景观元素——一条干枯的河床 (wadi) ——组织而成的, Henning Larsen规划时将之保留下来并规定只作人行使用。利雅地早晚气温降低, 人们喜欢在这些时段漫步和露天餐饮——保留河床体现了处理人性化尺度和生活质量时对文化和气候要素的尊重。FXFOWLE 在每个建筑中河床所在的层面设置了特定的商业功能, 以丰富步行体验。车行层面比河床高出7米, 有效地将人车分流。地下停车使游客和居民直接通达上层的建筑。(见图2)

依据规划准则, FXFOWLE保证了每一个地块包含住宅和商业的混合使用, 这样可以刺激基地的使用效率, 并有利于建筑师依据不同的功能来变换每个建筑的体量和外观。建筑的高速每个地块各不相同, 地块之中的建筑之间也各不相同。商业在底层的5-7层住宅位于地块2.09, 33层的综合体在地块4.07和4.08上。博物馆是5层楼, 清真寺两层。KAFD中另有一座位于中心的非FXFOWLE设计的证券交易所高达90层385米。建筑的密度在不同的位置和朝向影响下各不相同。

KAFD的地块和建筑之间由人行天桥相连接, 这对于沙漠气候 (或任何一种恶劣气候) 尤为重要。在中午气温异常炎热的时候, 这个内部的街道就成了主动脉。再由轻轨把行人送到KAFD的各个地块。使人们快捷地到达停车场及基地的任何一处。

最后, 设计同样重要。现在, “装饰”是一个忌讳的说法, 但是采用当代设计语言的细部处理仍是令人愉快的视觉表达。FXFOWLE在KAFD的建筑各不相同, 但是都具有一个共性。在古典建筑中, 非功能性装饰部件的使用出于多种原因, 其中之一也许是将其作为联系建筑和人的尺度的手段。我们在此把功能性的元素, 如

architecture nonfunctional decorative elements were adopted for multiple reasons but perhaps also served the purpose of relating the buildings to the human scale. Our approach takes the functional elements such as shading devices (see Figures 3, 4, 7 and 10) or fenestrations permitting diffused light (see Figures 5, 6) and building components such as minaret at the mosque (see Figure 5) and optimizes and adopts them for helping these projects to relate to human scale. Public spaces and amenities are part of each design and material choices are based on building typology. The formal resolution of each building on different parcels responds to immediate adjacencies, site configurations, and the micro-level context, yet they consistently connect back to the look and feel of the larger KAFD and, in turn, to the city of Riyadh. Below are more detailed descriptions of FXFOWLE's buildings in the KAFD, and the elements that reflect these broader human scale strategies.

Parcel 2.09

The program brief for this site asked for two residential blocks, one five-story and the other two-story, on top of a two-story retail base. A skywalk connects the two structures internally and to adjacent buildings. The skywalk level has external stairs that allow easy access to the wadi-level retail and public spaces. Clad in limestone, with punched windows, the buildings face a shared cul-de-sac that provides drop-off space and leads to below-grade parking areas. The buildings are smaller than those around it, offering a more intimate scale. The color and finish of the limestone cladding references the jagged sandy stones that puncture the local desert and wadi environment. Punched windows and the use of sand stone on the Façades, direct influences of typical Saudi homes long ago, control admittance of the daylight into living environment. Terraces and shading devices are also adopted for providing shade. With a lime stone façade, the building emulates rock formations along the sides of the wadi (see Figure 3).

Parcel 2.14

This parcel incorporates multiple uses, including office, residences, retail, and a small neighborhood mosque. A 26-story tower is located in the center of the parcel to take advantage of north and south view corridors through the adjoining sites and provide a contrast to the lower-scaled residential building along the wadi. The mosque is located to the east of the tower in the larger, quieter end of the wedge-shaped site. Residential components define the south side (see Figure 4).

The tower is defined and articulated by its uses. The lower, five-story residential base is clad in bands of granite, mimicking the striated rock walls that line the edges of wadis found in the Saudi desert. Staggered, horizontal windows create additional texture. The tower—with Façades that inflect where they meet the base—continues the banding with a series of white wind shades. The building engages directly on the wadi, with retail components and vertical access points. Canopies and typical retail storefront systems line the wadi Façades. (Pedestrians at this level may not even be aware of the tower rising above them because the base of the building relates directly to the street: this is a design and scale strategy used throughout FXFOWLE's parcels.)

Meanwhile, the two-story mosque complements the massing and color of its taller, mixed-use neighbor. In contrast to the warmer colors of the residential podium, the mosque's stark white marble Façade signals the serenity of a place of worship. As with the residential and retail podium, the mosque also serves to visually lower the height of the entire site to human scale and have a weightier, more personal relationship to the wadi. The landscaping, canopies of tress and a reflecting pool invites interaction literally at

遮阳构件 (见图3, 4, 7, 10), 间接采光的开窗 (见图5, 6), 以及建筑元素如清真寺的塔楼 (见图5) 等, 设计使之与人的尺度产生联系。公共空间和便利设施是每个设计的一部分, 材料的选择基于建筑的功能类型。不同地块上建筑的形式对应与其相邻的结构, 基地的特性和其他微观环境。与此同时, 他们又与整个KAFD, 以及整个城市的外观和体验相辅相成。以下是对FXFOWLE在KAFD的建筑以及其中体现人性化尺度策略的元素的详细介绍。

地块2.09

这个基地的任务书要求两个居住体, 一个5层, 一个两层。居住体建于两层高的零售群房之上。人行天桥连贯两个体量, 并将其与相邻的建筑连接起来。天桥所在层面有室外楼梯, 居民可以方便的到达河床层面的零售和公共空间。建筑面朝一个用于上下客和连接地下停车的公共无尾街, 立面采用大理石板幕墙以及壁龛式的深开窗, 这组建筑比周围的建筑都要小, 使之具有更亲切的尺度。大理石幕墙的颜色和材质使人联想到当地沙漠和干枯河床



Figure 3. Parcel 2.09 - Residential building with retail base; façade inspired by Vernacular architecture.

图3. 地块2.09——商业底座的住宅; 立面灵感取自当地的建筑。



Figure 4. Parcel 2.14 - Low-scale residential linear building along the wadi with office tower rising from behind.

图4. 地块2.14——河床沿岸线形的低层住宅, 办公塔楼立于其后。



Figure 5. Parcel 2.14 – Mosque; inspired by the traditional Islamic architecture.
图5. 地块2.14——受传统伊斯兰建筑影响的清真寺

the ground level as a place of reflection or an oasis along the winding landscaped wadi. The metal screens that infill the openings are based on the layering of several geometric patterns to create an intricate interlocking of forms (see Figure 5).

Parcel 4.07 and 4.08

These combined sites were developed as one parcel with two mixed-use towers, 88 meters and 133 meters tall, respectively. A retail podium connects the two and spans a shared landscaped plaza, overlooking the wadi. The podium's first two levels contain retail and public space. A bridge crosses the wadi and ties into the KAFD's bridge-level pedestrian network. In these two parcels, the residences are geared toward singles and young couples, adding income diversity. Retail components directly engage the wadi. A long, wide sloped ramp allows access from the ground floor courtyard to the wadi below; and conversely from the wadi up to the multiple retail uses at ground level. The unique aspect of this group of buildings is the amount of self-shading at the ground level that is created by the sweeping forms of the buildings masses. This is not dissimilar to the tall and narrow spaces that weave thru the buildings in the older Arabic cities.

Parcel 4.11

This mixed-use building occupies a very prominent site at the northernmost tip of the KAFD, bound to the south by a two-lane access road, which feeds into a network of expressways connecting to the center of Riyadh and its international airport. The building's design responds to the curved shape of the site, optimizing views while adding a strong visual statement and providing self-shading through wrapping around the mass. A skywalk connects the building to adjacent parcel 4.09. (see Figure 9). The building's faceted, serrated curtain wall system breaks down the continuous glass façade into a visually digestible scale, with residential units further delineated by deep terraces. The roof terrace of the two-story podium provides public green space. In addition, this stepping of the façade helps give the building an approachable street-level presence. Form was inspired by the jagged edged formations experienced in the natural formations in the wadi.

Parcel 5.05

This mixed-use complex, comprising office space, residences, retail, and parking, is located on a prominent site at the center of the KAFD. Skywalks connect it to other parcels and the museum, and the KAFD monorail runs along the access street to the east. The complex is made up of a residential tower and commercial tower on a retail podium. The commercial tower has a serrated laminated stone and glass curtain



Figure 6. Parcel A.07 – The form and façade of the Museum of the Built Environment was influenced by early Saudi architectural heritage sites.
图6. 地块A.07——建筑环境博物馆的立面和形式受到沙特古建遗迹的影响

里冒出的参差不齐的沙岩。深开窗和石材立面直接受到典型的沙特传统民居的影响，予以控制室内的日照。设计还采用了露台和遮阳装置来遮光。大理石的立面使建筑看似河床沿岸的岩石层。(见图3)

地块2.14

这个多功能的地块的包含了办公，住宅，零售和一个小的社区清真寺。一座26层高的塔楼矗立于基地中央，塔楼所在处可以享受到穿过相邻基地之间的视觉通廊直通南北的景观，塔楼的体量也和河床沿岸小尺度的住宅形成对比。清真寺位于塔楼的东面，坐落在这个楔形基地的较大而安静的一端，住宅楼界定了基地的南端。(见图4)

塔楼的外形是由它的功能来决定的。下面五层居住功能的底座外挂带状的花岗石，模仿沙特沙漠中干枯河床边条状的岩壁。错置的水平条窗更丰富了它的质感。塔楼和底座相交的地方立面发生了变化，白色的风板在塔楼部分延续立面的带状语汇。建筑沿河床设置零售并配备垂直交通，以此与河床直接产生联系。天棚和典型的店面橱窗构成了河床的立面。(在这个层面的行人几乎察觉不到座落于其上的塔楼的存在，因为建筑的底座与街道产生直接的联系：这是一个FXFOWLE在所有地块上普遍采用的策略)

两层高的清真寺和与塔楼相邻，与其高大的体量和颜色相辅相成。和住宅的暖色调相反，清真寺纯白色大理石体现出宗教场所的静谧。与此同时，和住宅以及零售体的共通之处在于清真寺的设计从视觉上降低了整个基地的尺度而使之更人性化，并与河床产生更丰富和亲密的关系。绿化，树冠和倒影池吸引人们在地面层的活动，行人可以静静的休息，也可以沿着蜿蜒的景观河床漫步。立面上开口处嵌入的金属屏风复杂交错的纹案是由多种几何图形层叠构成。(见图5)

地块4.07和4.08

这两个基地被连在一起作为一个地块来开发，用以建造两座综合塔楼，一座88米高，一座133米高。零售功能的裙房将两座建筑连在一起，并且在之间形成一个俯瞰河床的公共景观广场。裙房的一二层是零售和公共空间。一座跨越河床的桥把建筑体与KAFD的整个步行桥系统连在一起。这两个地块主要是面向不同收入阶层的单身青年和年轻夫妻。零售元素与河床相连，由一条长长的坡道从底层庭院通向下面的河床；也从而连系了河床与地面层的各种商业设施。这组建筑的独特之处在于，建筑本身延展的体形在地面形成了大量的遮阳。这和古代阿拉伯城市中建筑之间的深窄的街巷空间有相似之处。

wall that responds to climatic condition, deals with issues of privacy, and adds scale and textural quality to the façade (see Figure 10). The various façade systems respond to their climatic orientation and typology. The serrated edges, stones and terraces take their reference from the cliff walls of natural wadi formations. Mass and façades are composed to breakdown the scale. Introduction of retail at the lower three floors and landscape spaces on the terraces as well as at the ground and wadi level humanizes public spaces.

Parcel A-07

The Museum of the Built Environment sits on a large plaza bisected by a pedestrian park. The five-story Museum, with a chiseled, crystalline form inspired by Saudi Arabia's world heritage sites, will house permanent galleries as well as temporary exhibitions that interpret the historical development of art and architecture in the Arabian Peninsula. The museum façade is draped in faceted laminated glass. The façade's triangular units reference traditional Arab design and deflect the desert's harsh daylight. The Museum is a cultural amenity that enhances the quality of life for the residents of the KAFD and connects them to their culture (see Figure 6).

Conclusion

The KAFD projects outlined above are the result of a thoughtful design process culminating in vertical urbanism that sensitively and successfully deals with the issues of density and human scale. The following list is offered as a summary of the elements that were utilized at KAFD as outlined above and help make these kinds of developments places where people want to live and work:

- Large-scale development should offer people places to work, live, play, and worship with convenience and comfort. A mix of retail, residential, and commercial uses animates a site and encourages the continual use of its resources at all vertical levels. Retail, in particular, brings the human scale to the street and skywalk levels (see Figure 7). Retail areas are located at the wadi level and ground level to provide a welcoming experience to the pedestrians and drawing users through the building at grade, wadi and skywalk levels.
- Landscape elements maintained solely for pedestrians weave through developments. They connect buildings, encourage interaction, add visual texture and provide cool areas for relaxation. Streets should include friendly way finding and lighting elements to guide them to their destination (see Figure 8). The KAFD landscape provides a setting for relaxation and structures protect from the sun. Forms, materials and details are sized to respond to human scale and Arabic traditions and local climate. Vegetation and materials were locally selected and sourced; water features reflect the wadi environment.
- Pedestrians should be separated from vehicular traffic as much as possible, with parking offered below grade and connecting directly to residential buildings. When possible, parking below buildings should be limited to encourage people to use alternate modes of transportation (monorail, skywalks, walking, biking, etc.) by providing parking in separate structures placed at strategic locations.

地块4.11

这个综合体坐落在KAFD区最北角一个重要的基地上。其南面的两车道是连接国际机场和利雅地市中心的高速路的匝道。建筑设计回应弧形的基地，在充分利用景观面的同时形成强烈的视觉语言，并用遮阳板包裹整个立面。人行天桥把这座建筑与相邻的4.09地块间接起来。(见图9)这座建筑锯齿状的幕墙系统把连续的玻璃面在视觉上转化成为适宜的尺度，住宅部分更是由深深的挑台层层挑出。两层裙房的屋顶花园提供了公共绿化空间。递阶式的立面同时使建筑在街道高度的尺度更为宜人。这个形式的灵感也是取自天然河床中参差不齐的边缘形态。

地块5.05

这个综合体由办公，住宅，零售和停车构成，地处KAFD中心。人行天桥把它和其他地块以及博物馆联接起来。轻轨经过地块东边的道路。这个综合体是由住宅楼，办公楼及一个零售商业的裙房组成。办公楼锯齿状的石材玻璃幕墙回应了当地气候条件，提供了私密性，并为立面增添质感和尺度感。(见图10)各种立面系统分别对应他们所在的朝向和建筑功能。锯齿边，石材，露台，都是受河床地形中岩壁的启发。体量和立面经过精心组织以消解尺度。底下三层用作商业，在露台，地面和河床层面都布设了绿化景观，使公共空间更人性化。



Figure 7. Parcels 4.07/4.08 – Retail base creates human scale; mixed-use towers above.
图7. 地块4.07/4.08——建筑底层商业形成了人性化的尺度；混合功能的塔楼立于其上



Figure 8. Parcel 4.07-4.08 – Landscape and public spaces between the two buildings.
图8. 地块4.07/4.08——两栋建筑之间的公共空间和景观设计



Figure 9. Parcel 4.11 – A skywalk level connects to adjoining buildings.
图9. 地块4.11 人行天桥连接相邻的建筑

地块A-07

建筑环境博物馆坐落在一个由人行公园穿越而过的大型广场上。这个五层楼的博物馆轮廓分明，晶体式形态灵感取自沙特阿拉伯的世界遗产遗迹。博物馆设有永久藏品展区，也有展馆举办用以陈现阿拉伯半岛上艺术和建筑发展史的短期展览。博物馆的立面由多面体的夹层玻璃包裹而成。立面上三角形式参考传统的阿拉伯设计语汇，在此也用以反射沙漠地区的强烈日照。博物馆增添了KAFD中居民的生活质量，并成为联结他们和本土文化的纽带。(见图6)

小结

上述KAFD 项目是通过周密的设计过程在竖向城市建设中审慎地并成功地解决了高密度和人性化的尺度的问题。以下总结了前面提到过的那些我们在KAFD 项目中采用的 有助于让此类开发项目成为人们乐于生活和工作的场所的策略:

- 大型开发项目应该为人们提供方便和舒适的生活，工作，娱乐，宗教场所。商业，住宅和办公的混合有利于激活一个基地，并充分利用竖向各层空间的资源。尤其是商业，可以把人性化的尺度带到街道和天桥的层面。(见图7)
- 建筑在河床和地面的高度设置商业零售，把河床，地面和天桥的行人吸引到建筑中来。
- 针对行人设计的景观元素贯穿整个基地，同时联系建筑与建筑，激发人与人的互动，增加视觉肌理，为休闲娱乐提供凉爽的环境。
- 街道应设有导向标识和灯光系统以方便人们找到目的地。(见图8) KAFD 的景观设计提供了休闲场所，也成为庇荫遮阳的结构。形式，材料和细部设计考虑到人性化的尺度，阿拉伯的传统和当地的气候。植被和材料都是从当地的资源中挑选;水景的设计也是映射河床环境。
- 尽可能的人车分流，地下的停车应直接与上层的住宅相连。在允许的情况下，限制建筑下方地面停车的数量，而



Figure 10. Parcel 5.05 – The building's façade uses laminate marble on glass to diffuse daylight and provide privacy.
图10. 地块5.05 –大理石贴面的玻璃立面柔化直射日光同时提供私密性。

- Large developments should be served by easily accessible public transportation, helping people move quickly and conveniently between destination points, such as the monorail that connects and moves through the KAFD development.
- Skywalk levels should connect buildings and provide amenities at an intimate scale. In adverse climates, skywalks become important internal arteries (see Figure 9).
- Street widths and building heights should directly relate according to climate and daylight. At KAFD, buildings were situated to afford self-shading and create narrower spaces reminiscent of early Arabic city planning.
- Buildings should serve as scale elements, varying in height and massing according to placement and program. The variety of building masses will provide diversity to the development and interest to the user. The KAFD building masses respond to each other and no two adjacent buildings are of the same height or mass.
- As with a city that rises organically over time, buildings should be designed as unique elements, but also connect to their larger environment. Material choices can be informed by a building typology, and sensitive details in a modern language can add texture and human scale to a building façade and program (see Figure 10).

在外围适当的地方设置停车设施，以鼓励人们使用电车，人行天桥，自行车等其他交通方式。

- 大型项目应有配套的便利公共交通，帮助人们快捷抵达各处，例如服务整个KAFD的轻轨。
- 用天桥连接各个建筑，在天桥的层面布置小型的休闲便民设施。在恶劣的气候中，天桥成为了重要的内部动脉。（见图9）
- 街道的宽度和建筑的高度应在气候和日照的条件下互相关联。在KAFD项目中，建筑的布置使之实现自我遮阳，并形成狭窄的空间使人联想到早期的阿拉伯城市规划。
- 建筑的高度和体量应根据位置和功能而变化。丰富的建筑形体为地块创造了多样性和趣味性。KAFD里的各个建筑互相呼应而没有两座相邻的建筑具有一样的高度和体量。
- 随着城市的自然发展，既要建筑作为独特的个体来设计，也要使之与大环境相适宜。材料的选择可以根据建筑的功能类型来决定，现代感的细部的处理可以为建筑的立面和功能增加质感以及宜人的尺度。（见图10）

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