INDUSTRIAL PROMISES

Speculative thinking for Sharjah's industrial districts

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I. INTRODUCTION

An urban overview

As the oil rich cities of the Gulf continue to grow and develop, many governments have taken steps to diversify their economies through real estate development, global tourism, financial services, and industrial production. Through the segregation of various industries and land uses into separate urban developments linked by high-speed, vehicular transportation systems, cities in the United Arab Emirates have used a top-down, modernist, urban planning model to structure and control urban growth. This twentieth-century attitude towards the development of the twenty-first-century city has led to the clumping of many residential districts away from commercial and industrial zones and a reliance on automobile-driven transportation systems fuelled by inexpensive petroleum.

The gleaming towers, expansive shopping malls, multi-lane highways, and luxury villas of the Gulf region are examples of what urban sociologist Richard Sennett might call a 'closed' urban system. The closed nature of parts of Dubai and similar cities is in part due to the legacy of modernism through the "over-determination, both of the city's visual forms and its social functions".¹ These closed systems have been built and are serviced by crews of migrant workers from across the Global South who do not have equal access to the closed city in which they live, given the segregation of the city into autonomous clusters based on programme and social class. Further complicating the urban context of the UAE, workers in the construction and service industries in the UAE and other countries have immigrated over the past decades to find work and careers far from home. The number of workers that have immigrated to the UAE far outnumbers the country's population of permanent citizens. As rapidly developing cities like Dubai are built on industries – real estate, tourism, and finance-driven by global capital, a very large income gap between the wealthy and the working class has subsequently developed, affecting the built form of the city.

As a component of social equality and economic mobility and as a tenant of the modern city in many parts of the world, the accessibility of affordable housing is an issue of growing importance in a country with a large expatriate, working class population. Although developable land is seemingly limitless in the UAE, the demand for comfortable, affordable housing for working class expatriates is significant due to tight governmental control over land policies and a relatively high cost of living in urban centres.² Many working class individuals are forced to live in cramped, corporately owned dormitories or within industrial areas of the city that offer few public amenities or open space. On a positive note, Dubai and other cities in the Gulf region have acknowledged this

problem and are working on new initiatives to provide better housing for low-income residents. The government of Dubai has recently enacted policies to formally address the socio-economic stratification of income groups and to address the desperate need for affordable housing.³

In reaction to the lack of public amenities, open spaces, and space for leisure, the working class residents of the UAE's industrial zones have altered and re-inhabited the fabric of the modern city. In reaction to the rigors of modernist planning, the working class has in effect constructed, developed, and inhabited an informal layer of leisure spaces between factories, in vacant lots, and at the urban periphery of the city.

Presented through the lens of Sennett's definition of urban 'openness', this chapter features a historical and urban overview of the industrial areas in the Emirate of Sharjah as well as design research carried out by an undergraduate architecture studio at the American University of Sharjah. The student work outlines the ways in which the industrial areas have the potential to become models for mixed-use, urban development while maintaining the physical infrastructure of the modernist city. Through site research, including the mapping of new uses for industrial spaces, and with proposals to graft new forms of housing into these zones, student design projects provide compelling, new ideas that address the modernist legacy of the 1980 master plan by Sir William Halcrow & Partners for Sharjah. The following sections also describe architectural and infrastructural strategies for the transformation of Sharjah's industrial districts into repurposed sites that are able to support a more equitable urban environment based on Sennett's definition of an 'open city'.

Worker demographics and housing

Given the nature of available work opportunities and of policies prohibiting low-income workers from obtaining sponsorship visas for family reunification in the emirates, a large percentage of this working class is relatively young and male. Male expatriate residents who want to bring their families into the country must earn a minimum monthly salary of 4,000 Emirati dirhams,⁴ preventing many workers from living together with their families. Subsequently, a significant demographic shift towards large percentages of young men working in the emirates has skewed the make-up of residential communities and lifestyles. Tendencies of groups of young men to sublet and subdivide residential housing stock to make it more affordable has led to animosity from local residents and also generally put a strain on housing conditions.⁵

Housing regulations that control where migrant workers may reside have become stricter in recent years. The Emirate of Sharjah, bordering Dubai, is home to many low-income workers who have sought more affordable housing than Dubai has to offer.

In Sharjah, government agencies have forbidden young, single, working class men, commonly referred to as 'bachelors', from living in family-designated areas. Instead, bachelors are forced to live in industrial areas, surrounded and bound by buildings dedicated to storage, logistics, and manufacturing.⁶ Due to twentieth-century, modernist-planning ideals, these zones were initially devoid of public amenities or open spaces for recreation based on the fact that they were not planned as residential areas.

Learning from informal development

The informal occupation of the interstitial and peripheral zones of the rapidly developing, twenty-first-century city by the working class reveals potential for the design of strategic, infrastructural amenities and new forms of affordable housing. This opportunity led to the establishment of an undergraduate, architectural design studio at the American University of Sharjah to further study this urban condition and to provide design proposals for urban interventions to accommodate affordable housing. Methodological site analysis and speculative design work were employed to explore ways in which the industrial districts of Gulf cities can offer viable urban fabric and infrastructure for a more open and equitable society.

The goals of the research and design investigations undertaken relate to what Sennett refers to as the open city: "The cities everyone wants to live in should be clean and safe, possess efficient public services, be supported by a dynamic economy, provide cultural stimulation, and also do their best to heal society's divisions of race, class, and ethnicity".⁷ Design proposals build on the informal, hybrid, and mixed-use nature of Sharjah's industrial districts to propose opportunities that offer an open system of public amenities and social and economic mobility to the residents. In opposition to the typical clearance of old urban districts to create a tabula rasa for new programmes, employed throughout the developing world, the studio sought to keep the built form of the modernist industrial infrastructure in place while working to create new layers of amenity over, under, and in-between buildings.

II. URBAN DEVELOPMENT IN SHARJAH

With a land area of 2,590 square kilometres, Sharjah is the third largest emirate in the UAE. It shares borders with Dubai to the south and with Ras Al-Khaimah to the north and wraps around a part of Ajman. Sharjah is a significant manufacturing centre for the country as 40% of the total number of industries in the UAE are based in Sharjah. A large portion of these companies include petrochemical, textile, leather, and food-production service providers as well as basic, non-metal businesses.⁸

According to the Department of Statistics and Community Development in Sharjah's 2015 census, the total population of the emirate is 1.4 million. Expatriates constitute approximately 87% of the total population; about 79% of the population is under the age of 30; and more than two-thirds of the expatriate population is male.⁹

The Emirate of Sharjah is zoned into five, major, land-use categories: residential, industrial, commercial, agricultural, and free trade zones. Of these land-use categories, Sharjah's industrial areas are particularly interesting from an urban perspective as they are the most complexly layered in terms of programme and use. While the industrial zones were originally planned with architecture and infrastructure dedicated to warehousing and manufacturing, over time commercial and residential uses as well as informal spaces dedicated to other modes of dwelling, urban agriculture, and recreation emerged organically within them.

Sharjah's industrial zones

As Sharjah's oil and gas reserves are not as large as those of other emirates or Gulf states such as Abu Dhabi or Bahrain, economic diversification has played a role in the formation of the city. Industrial districts have been in place for decades and were an early part of urban and economic growth in Sharjah since the formation of the UAE in 1971. Large tracts of land were zoned for industrial use which have helped to provide products and resources for a growing city and region. These parcels were inland of the coastal historic centre of Sharjah and positioned along Sharjah's southern border with Dubai. ●

fig.1

The industrial zones' position near the Dubai border helps not only to expedite the movement of goods and services to the larger, more rapidly developing emirate to the south but also creates a buffer zone of sorts between the two emirates. Likewise, on the Dubai side of the border, the airport and a mountainous landfill (Dubai's solid waste dumping area) are pushed against the Sharjah municipal boundary.

A pair of twentieth-century master plans for the expansion of Sharjah contributes significantly to the legacy of modernism in the emirate. The 1968 plan by the British civil engineering firm Halcrow & Partners allowed the urban area concentrated along Sharjah's coast to extend inland in a more rectilinear, increasingly gridded manner. The plan, like many mid-century urban plans across the Western world, emphasized vehicular connections at the expense of traditional neighbourhood fabric.¹⁰

Over the course of the next decades, Sharjah's rational layout of gridded blocks was furthered as the emirate developed. A subsequent master plan, drawn in 1980 for Sharjah's land use until the year 2000, extended the city's rectilinear urban grid and assigned programmatic uses to the large blocks of land defined by

1985

1995

2005

2015

fig.1

Development of the urbanized area of Sharjah in five-year increments from 1985 to 2015, showing present-day industrial areas enveloped by growing urbanization (Source: Jason Carlow, 2020. Reuse not permitted).

the matrix of vehicular roads. This zoning map identified a series of industrial areas running from the coastline along the border with Dubai towards the southeast. Instead of being pushed out to the periphery of the city, Sharjah's industrial zones were allowed to remain relatively close to the urban centre. The execution of the master plans of 1968 and 1980 has left a significant modernist imprint on the Emirate of Sharjah that not only defined the urban form of the city but also determined the architectural form of the industrial zones.

Given that Sharjah's industrial areas have been an important district for production and dwelling in the city for over forty years, they have been imbued with complex layers of informal infrastructure that other districts – which developed more rapidly or under tighter controls – lack. Workers and their families have built a community within the industrial districts that offers a host of commercial amenities and supports a variety of

socio-cultural groups. Districts are mixed-use with barbershops and convenience stores nestled between the factories and warehouse buildings. The district is also closely connected to the urban and transportation infrastructure of the city.

According to Sennett, the organic growth of a city is a significant factor in its degree of 'openness' and social, cultural, and economic success.¹¹ Because they were not originally designed as residential enclaves and have been somewhat neglected by high-end, Dubai-style redevelopment funded through global capital, Sharjah's industrial zones have grown and developed over a significantly longer time span when compared to other urban neighbourhoods of the UAE. They were not designed and built through top-down methods in a short period of time but have grown, adapted, and evolved slowly.

Industrial zone redevelopment

Sharjah has begun an initiative to re-establish its industrial zones farther inland, away from the city centre. Sharjah Asset Management, the investment branch of Sharjah's government, announced the launch of a new industrial zone, Al-Sajaa Industrial Oasis, in 2015. The project comprises one of the largest industrial zones in the region and is part of Sharjah's economic diversification masterplan. Located in close proximity to Sharjah International Airport, Emirates Road highway, and Al-Hamriya Port, Al-Sajaa Industrial Oasis will provide 353 building plots on over 130 hectares of land.¹² In addition to plots for industrial use, Al-Sajaa will also have facilities for worker housing and new amenity hubs provided for workers. An entertainment and shopping centre will be constructed in order to provide retail outlets, banks, and other services for the workers living in the new industrial area. The complex is planned to include leisure facilities and a movie theatre.¹³

The establishment of a new industrial area on the outskirts of the city suggests that the emirate will somehow update the existing production zones. A number of questions are raised by the potential relocation of manufacturing in the city. What kind of industrial or post-industrial legacy should these areas have? Should they be redeveloped, re-zoned, or repurposed?

Industrial zones in other cities have made successful transformations into vibrant urban zones though the re-adaptation of modernist sectors of the city. Buildings in New York City's SoHo district, previously used for textile production, are now repurposed for high-end retail uses and luxury loft apartments. Culver City in Los Angeles County, with industrial lots originally built for aircraft production and film studios, now hosts retail boutiques, art galleries, and restaurants. Even the Al-Quoz industrial zone in Dubai is showing signs of urban transformation with the repurposing of industrial warehouses for indoor children's playgrounds, organic

supermarkets, and creative industry compounds like Al-Serkal Avenue. With their mixed-use fabric, open-grid street network, and connections to urban centres, Sharjah's existing industrial zones hold much promise for becoming model developments based on the concept of an open city. The largest problems within the zones are the lack of public spaces as well as recreational and institutional support systems to further encourage socio-economic development.

III. OPENNESS/CLOSED-NESS

In his book *Building and Dwelling: Ethics for the City*, Sennett dedicates a chapter to "Five Open Forms", which are attributes of an open city and therefore resist urban 'brittleness', a quality attributed to many urban designs of the modern era. Through their existing urban fabric and complex layers of occupation and use, Sharjah's industrial districts have the promise of operating much more 'openly' than typical residential and commercial enclaves that have been developing through Dubai-style, top-down planning. Sennett's attributes of open urban forms include the terms "Synchronous", "Punctuated", "Porous", "Incomplete", and "Multiple".¹⁴ These terms can be used to measure Sharjah's industrial areas' degree of openness to better understand how well the districts perform from social and urban perspectives and where there are still shortcomings to remedy.

Synchronous forms

In Sennett's description of synchronic urban spaces, "The Bazaar is a synchronic space, while the stadium is a sequential space".¹⁵ In other words, a better, more open city is one that allows and encourages events to happen spontaneously and simultaneously. Though the industrial districts were zoned in a top-down manner for a singular use, the fact that they accommodate residential and production programmes activates them in ways different than those of other industrial zones. Their occupation over time, the insertion of additional forms of housing, and the evidence of informal economies and leisure activities has converted sequentially planned space into a synchronic environment.

The result is a set of neighbourhoods that have benefitted from the informal layers of commerce and occupation in symbiosis with the production infrastructure of factories and warehouses. Vegetable markets and modest retail outlets line the networks of paved and unpaved streets. Cricket pitches pop up in vacant lots on Fridays, and clusters of used furniture are found in the shade of trees and along alleyways.

Punctuated forms

Similar to the way in which urbanist Kevin Lynch theorized about the legibility of urban systems through their form, Sennett uses the metaphor of grammatical punctuation as a way to discuss the importance of strategically placed, urban elements such as street grids, monuments, and even street furniture to add legibility and character to space.¹⁶ Without unique character, Sennett argues that parts of cities planned with a modernist ideology become indistinct, homogeneous, interchangeable, and therefore “closed”.¹⁷

The lack of ‘punctuation’ of Sharjah’s industrial areas through meaningful monuments, markers, and public spaces is one of the area’s shortcomings. Along with the development of parks and leisure facilities at the Al-Sajaa Industrial Oasis on the outskirts of Sharjah, the emirate is planning for the introduction of new, landscaped park spaces in Industrial Zones 3 and 12.¹⁸ However, in the meantime the districts rely instead on informal means of urban adaptation to imbue the spaces with character and liveability. Ad-hoc volleyball courts are constructed in empty lots, and second-hand upholstered furniture is gathered together into makeshift, outdoor living rooms in alleyways. ● Sharjah’s informal networks of publicly accessible leisure space that punctuate the interstitial spaces between industrial buildings have the capacity to become a more meaningful network of spaces and perhaps even enrich the grammar behind Sennett’s definition of urban punctuation.

fig.2

Porous forms

“The closed boundary dominates the modern city”.¹⁹ Sennett proposes that a building or neighbourhood with a flow between the inside and the outside is inherently more open.²⁰ In comparing membranes and boundaries, he notes that membranes are more porous and allow material to pass through easily whereas boundaries represent tightly controlled and regulated edges. Sharjah’s industrial zones have edges that are mostly porous in that they are not gated or situated in private estates. They are part of an open, street-grid system that allows entry in from every direction. In contrast to the enclaved labour camps in the Muhaisnah district of Dubai, the residential housing within Sharjah’s industrial zones is in a programmatically mixed and varied district. An open grid of streets and alleyways designed for the efficient transportation of commercial and industrial goods creates a neighbourhood that is not bound or isolated as an enclave. After decades of urban development during which Sharjah’s urban planners extended commercial and residential zones farther inland, Sharjah’s industrial zones now occupy a relatively well-situated, central territory in the overall city. With access to bus lines to Sharjah’s city centre and to the Dubai Metro system, the industrial zones are relatively well connected to transportation infrastructure and proximate to developed urban areas.

fig.2 Diagrams show informal occupation of spaces between buildings and in empty lots for leisure activities by foreign workers residing in industrial areas. Drawings by Mona Moussalem and Maha Abdelsalam (Source: American University of Sharjah, 2018).

Incomplete forms

Sennett praises cities that allow residents to become their own architects, cities that are allowed to adapt and change over time without total reconfiguration or redevelopment. He also refers to a strong “type-form” as a necessary device to create an urban fabric within which to adapt and vary. “A type-form is a piece of urban DNA which takes on different shapes in different circumstances.... In the realm of buildings, the type-form is open to substitutions as well as variations”.²¹

Sharjah’s industrial areas are largely made up of large warehouse buildings; low-rise housing blocks; linear commercial strips along major roads; and unbuilt lots. Though they may be artefacts of modern, single-use planning, the generic warehouse buildings that cover much of the industrial zones are highly flexible in their potential uses. In the Al-Quoz industrial area of Dubai, there are multiple instances of warehouses repurposed as art galleries, indoor children’s play areas, co-working office buildings, and shopping centres. Existing housing stock can be easily adapted from predominantly shared, bachelor apartments to family units or renovated to suit a wider range of residents from more diverse income groups. The unbuilt lots are direct evidence that the districts are incomplete and therefore adaptable to socio-economic changes through the addition of new buildings and open spaces. Sharjah’s industrial zones have been incomplete and programmatically flexible for decades and remain ready to take on new forms and uses.

Multiple forms

The last of the five open forms that Sennett suggests are part of a more liveable and equitable city is multiplicity. That is, instead of grounding urban form on a singular master plan that distributes urban functions and amenities based on relative efficiency, cities should allow for multiple and redundant uses to spring up wherever they are needed.²²

Sharjah’s industrial zones were laid out in the aforementioned 1980 master plan for land use in Sharjah but never internally planned. Despite being demarcated zones, designated for production within the overall city master plan, lots and associated building uses have no overall, top-down logic guiding their internal composition. Developed over time as the city grew, informal economies, social networks, and dwelling patterns have added greater multiplicity to the zones by adding functionality to sub-zones and residential neighbourhoods on an ad-hoc and market-driven basis.

Through the recognition and strengthening of these five aspects of the industrial zones in Sharjah, the districts as hybrid neighbourhoods built on a modernist infrastructure hold much promise to serve as an urban model for new forms of development and to “create the material conditions in which people might thicken and deepen their experience of collective life”.²³

IV. EXPERIMENTS IN HOUSING DESIGN

The research and design work presented in this section has been in a sense triggered by recent governmental efforts to address the problems and challenges of affordable housing in rapidly developing Gulf cities such as Dubai and Sharjah. The work represents an effort to identify key issues in the development of affordable housing for the UAE and presents new housing solutions through design iterations.

As previously mentioned, the urban analysis and design work featured in this section was carried out within the context of an undergraduate design studio in the Department of Architecture at the American University of Sharjah. The studio title – Over, Under, In-between – not only refers to the activation and occupation of space for housing within the city but also to how affordable housing must work above, below, and in spite of socio-economic obstacles within the global culture and local space of industrial production. How can architecture move beyond the mere provision of shelter and allow residents opportunities to advance their livelihoods and improve the overall built environment? The pedagogical goals of the studio are tied to Sennett's definition of the open city. "The cities everyone wants to live in should be clean and safe, possess efficient public services, be supported by a dynamic economy, provide cultural stimulation, and also do their best to heal society's divisions of race, class, and ethnicity".²⁴ Design solutions seek opportunities to offer an 'open' system of public amenities to the industrial zones and in turn social and economic mobility to the residents.

Studio context

The urban contexts chosen for the studio participants to map and investigate were Industrial Areas 10 and 11 in Sharjah, along the border of Dubai. The development of housing prototypes for the 'bachelor class' in this complex site came from various types of urban analysis. Students were encouraged to search the complex industrial zones for dynamic issues based on urbanist Andrea Kahn's theories of the definition of urban sites, namely, that they "are dynamic rather than static, porous rather than contained".²⁵ The studio recorded patterns of flows, movement, mass, void, economic exchange, production, and habitation through the invention of analytical maps and diagrams. Students created drawings, diagrams, and maps to represent economic, social, and spatial issues. The identification of these key urban issues aided the definition of more specific, strategic sites for architectural and urban intervention.

Design projects

In order to grapple with the artefacts of modernist urban planning and activate new types of space within the industrial areas, students developed design projects at the architectural

Student projects represent 'typological interventions' in buildings within Sharjah's Industrial Zones. "Reframing Industrial Housing" by Farah Kazali and Joanna Fattal (right) reconfigures the ubiquitous Butler Building frame to hybridize spaces for working and dwelling while the "Elevating Industrial Living" project by Mona Moussalem and Maha Abdelsalam (left) suspends leisure and public open spaces above a factory yard (Source: American University of Sharjah, 2018).

fig.3

scale to test sites, programmes, and opportunities for affordable housing. New type-forms for living are designed to be flexible in nature and respond to environmental, social, economic, urban, and architectural conditions uncovered in the urban analysis phase of the semester. The projects therefore challenge the singularly programmed, residential-housing types and gated communities of the contemporary Dubai region. Conversely, residential programmes are inserted into and between industrial buildings to create new opportunities for dwelling. Projects with common strategies are categorized and presented in the following sections.

Category 1: Typological interventions

The first series of projects propose to create new space for housing through additions and alterations to the modernist building types within Sharjah's industrial zones designed for production. Sharjah's industrial areas contain numerous abandoned or unused warehouses. The project by Farah Kazali and Joanna Fattal, titled "Reframing Industrial Housing", ● proposes the re-configuration of a standard, Butler Building,²⁶ structural frame to accommodate current and future uses and in so doing introduces possibilities for new economies and changes to the overall urban fabric. The project proposes to interweave indoor and outdoor production zones with residential units. The dwellings could be utilized by both residents of the neighbourhood and workers in the same building. The Butler Building structure is transformed into a site for investigation, enabling residential units to exist over, under, next to, and in-between the frames that support the warehouse.

fig.3
(right)

The generic nature of the project site and the ubiquitous Butler Building frame allow the proposal to potentially be implemented in any industrial context in the world, thus affording the scheme impact on a global scale. Its flexible design allows for integration with existing or even incomplete Butler Building frames. Structural adjustments to the building frames allow for different spatial configurations which subsequently alter the organization of the interior. Strategic manipulation of the frames yields multiple new building types. The project anticipates future fluctuations in the live/work nature of the site and amplifies the existing conditions within the industrial areas by formally hybridizing production and residential zones in a single building.

The second project in this group, titled “Elevating Industrial Living”, was developed by Mona Moussalem and Maha Abdelsalam. ● The team’s site analysis of the ad hoc leisure spaces built by the migrant workers of Sharjah revealed a need for improved communal spaces for workers within Sharjah’s industrial zones. Through the project, the team explored the exploitation of air space above warehouses and factories as a new potential site for dwelling and leisure space. The space directly above and adjacent to an existing building of workers’ housing was chosen as a project site.

The project proposes a new, vertical, structural frame that contains affordable housing units with communal spaces suspended above a new factory and production space below. The project provides a mega-structural, cantilevered space frame to house a number of reconfigurable residential units. The reconfigurability of units enables different programmes to be inserted, removed, or adapted according to future programmatic needs. A floating landscape of leisure spaces is visible from the production spaces below, providing a hybrid ecosystem of domestic and work zones through the interpenetration of architectural volumes. With the potential to be reproduced across the UAE’s industrial zones, the building type has the capacity to provide local amenity hubs for the large population of expatriate workers.

Category 2: Dwelling with industrial artefacts

Sharjah’s industrial areas are characterized by clusters of empty lots, warehouse buildings, and housing facilities mixed together with an array of commercial outlets and informal social spaces. Bishoy R. Girgis and Nermin Sherif Hegazy’s “Mechanized Urbanism” project ● investigates the capacity of a community to be formed by the large-scale equipment found around typical industrial zones. The proposal seeks to develop a reconfigurable building prototype that combines the site’s three programmes of production, housing, and leisure in a setting where they can co-exist and function in a dynamic network. Like shipping containers at a port, the various modular components of the project can be

fig.3
(left)

fig.4

fig.4

A community formed and adapted by a production-line gantry by Bishoy R. Girgis and Nermin Sherif Hegazy. Incorporating machinery like the gantry as an organizer of social space and provider of services makes it a socioeconomic asset to the entire area (Source: American University of Sharjah, 2018).

mechanically configured by the residents to create adaptive combinations of housing, production, and amenity. Like many of the projects in the studio, the proposal challenges the separation of dwelling and production in the city and instead combines living with working together in a prototypical community. The appropriation of machinery like the gantry by the workers themselves transforms industrial capital into an instrument capable of organizing of social space and providing services. Equipment dedicated to industrialist production by day becomes a socioeconomic asset to the entire community in off-hours.

Category 3: Appropriating vehicular infrastructure

Two student teams developed proposals that seek to activate surplus space at the fringes of vehicular infrastructure. The teams found inspiration in precedent projects such as Le Corbusier's Plan Obus for Algiers with linear housing blocks running under a highway and Paul Rudolph's Lower Manhattan Expressway proposal for a new city built around a motorway. Azmiha Raza and Misbah Baig's project, titled "Median Strip", ● proposes to build a linear, multifunctional building above a road-traffic, divider line within Sharjah's industrial zones. The project piggybacks affordable housing on a vocational training institution to provide local workers with improved access to educational opportunities. This new institution, hovering above vehicular infrastructure, would provide the community with improved socioeconomic mobility. Students sought to create opportunities to attract and sustain a diverse international workforce in the UAE by introducing a training campus in the industrial area. The institution could also function as a space for leisure, informal economic activity, and communal gathering for workers in the area. The ribbon-like building complex is designed with the potential to

fig.5
(above)

fig.5 Design proposals appropriate vehicular infrastructure. “Median Strip” by Azmiha Raza and Misbah Baig (above) proposes a multi-functional linear building above the roadway median strip in Sharjah’s industrial zones. The “Urban Loop Holes” project by Jumanah Abbas and Sarah Al-Adayleh (below) introduces a new strand of vehicular infrastructure to better connect Sharjah with Dubai (Source: American University of Sharjah, 2018).

expand and grow along the vehicular infrastructure of the industrial zones while contributing to the growth of Sharjah’s economy by creating a stronger and more educationally advanced workforce.

Based on a critical urban analysis of Sharjah’s industrial zones, the “Urban Loop Holes” project by Jumanah Abbas and Sarah Al-Adayleh ● is a proposal for greater symbiosis between architecture and infrastructure, specifically focused on mobility for vehicles and socio-economic mobility for workers. By integrating affordable housing and public amenities within elevated roadways and looping on- and off-ramps, the project not only improves vehicular mobility between Sharjah and Dubai but also uses a large-scale investment in highways as a platform to offset the cost of social infrastructure. By elevating existing roadways and embedding the curved off-ramps into new buildings on empty lots, the project is able to reclaim the existing ground level as public space. Situated above, below, or adjacent to the roadways, the architectural geometry and building typology of housing is

fig.5
(below)

adapted to the curvature of the highway off-ramps. Considering the project at a global scale, “Urban Loop Holes” provides a new design methodology to integrate architecture with vehicular infrastructure that could be deployed in similar urban conditions across the world.

Category 4: Anticipating future economies

The students responsible for designing this series of projects made predictions about the social and economic development of Sharjah, Dubai, and the Gulf region. Beyond the mapping of urban form, projects used publicly accessible governmental policies, newspaper articles, and white papers concerning the growth of the UAE as research material to shape their proposals. The subsequent projects investigate how speculative planning for the future needs of a city might consider the spatial side effects of industrial automation or global tourism as drivers of urban development.

“Housing Mass Tourism”, by Shaimaa Mostafa Genidy, was developed in response to one of Sharjah’s strategies for economic development and global recognition to attract more than ten million tourists per year. ● The project proposes to introduce a series of thick parking platforms as a support system for the growing tourism industry. The platforms would be strategically placed adjacent to existing and future sightseeing routes for a new fleet of tour buses. An elevated datum of parking decks, built for housing the vehicular by-products of mass tourism, would hover above the industrial landscape and would double as a host for affordable housing and public amenities. The 500-metre-long, corrugated structures – inspired by the typical cross section of pre-cast concrete, vehicular viaducts – merge infrastructure and habitation, parking and housing, as well as vehicles and people through varying the profile of the folded structural slabs. Folded surfaces serve to create inhabitable spaces with seamlessly integrated floor, wall, and roof planes. The project creates spaces that accommodate different types of functions, ranging from small housing units to communal dining rooms, from landscaped parks to decks for bus parking and cricket matches.

fig.6
(above)

Tasnim Al-Tinawi and Uthra Varghese’s project, “Agri-Industrial Housing”, ● explores a radical layering of food-production systems and affordable housing within an industrial site. The project is inspired by the fact that many expatriate inhabitants of Sharjah’s industrial districts supplement their income and diet by growing vegetables and raising livestock between factory buildings. The formalization of these various programmes at a larger scale has the potential to create a new urban environment that combines space for housing and leisure with urban farming, storage, and distribution. New, elevated, residential dwelling units are situated within large, structural space frames along the edges of an existing

fig.6
(below)

fig.6

Projects anticipate future economies within Sharjah's industrial zones. "Housing Mass Tourism" by Shaimaa Mostafa Genidy (*above*) proposes integrating housing and public spaces with elevated parking decks for tourist buses. "Agri-Industrial Housing" by Tasnim Al-Tinawi and Uthra Varghese (*below*) proposes rooftop farming, leisure zones, and market spaces layered on top of existing worker housing, with new market housing at the periphery (Source: American University of Sharjah, 2018).

worker-housing complex. The new community is positioned at the periphery of a new layer of rooftop farms. Units provide unexpected views that offer residents a green zone of pastoral respite from the industrial nature of the surrounding districts. Through a relatively straightforward, architectural intervention, the project seeks to elevate the socio-economic mobility of the residents by creating an independent agricultural industry where the working class can farm their own food and sell their produce in the marketplace. The proposal for providing urban farming on the rooftops of existing buildings aims to create an amenity that can be later incorporated in other housing areas on site.

V. CONCLUSIONS

The industrial districts of cities like Sharjah present an interesting opportunity in the development of open, more equitable cities in the Gulf region. Originally planned as single-use zones for manufacturing and production during the modernization of Sharjah, through the addition of layers of corporate and informal

dwelling they have grown into dynamic, mixed-use urban districts brimming with culture and activity. Over the decades of economic development in the UAE, the population of working class residents has grown dramatically in Sharjah. Measures to restrict working class bachelors from living in residential areas has further burgeoned industrial zone populations through shared, market-rate apartments and informal dwellings. Somewhat ironically, the regulatory effort to remove working class labourers from higher-class residential areas and to isolate bachelors within the fixed boundary of the industrial zones of the city has led to the creation of an 'open' and fluid urban fabric in the districts. In contrast with the urban character of Dubai's labour camp neighbourhoods, Sharjah's industrial zones provide a richer, more diverse urban context.

The speculative design proposals presented here as new prototypes for affordable housing are based largely on augmenting the positive urban aspects of Sharjah's manufacturing districts. Studio projects aim to transcend typical housing types and top-down, neighbourhood planning strategies often employed in the Gulf region by responding more thoughtfully to the existing social, economic, environmental, temporal, urban, and architectural conditions in Sharjah. The work in the form of speculative design contends that only by amplifying the scope and vision of housing to the scale of urban and regional infrastructure can architecture begin to provide public amenity and social mobility to affect flows of people and capital. Only through envisioning architecture at larger scales and across longer spans of time can architects and urban designers start to foster a trend towards openness and to formulate strategies for the repurposing of the modernist cities of the Gulf.

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Notes

- 1 Richard Sennett, "The Open City", in *Towards an Urban Age* (London: Cities Programme The London School of Economics and Political Science, 2006), accessed October 17, 2020, http://v0.urban-age.net/0_downloads/UA_Summit_Berlin_Newspaper.pdf, 6.
- 2 Jason F. Carlow, "Over, Under, In-Between: Worker Housing within an Industrial Ecology", in *Conference Proceedings, ACSA 2018 International Conference: New Instrumentalities* (Washington, DC, Association of Collegiate Schools of Architecture, Forthcoming).
- 3 "Dubai's Housing Policy for Low-Income People", *Gulf News*, March 13, 2017, <https://gulfnews.com/opinion/editorials/dubai-s-housing-policy-for-low-income-people-1.1993181>.
- 4 "Sponsoring Residency Visa by Expatriates", The United Arab Emirates' Government Portal, accessed July 23, 2018, <https://www.government.ae/en/information-and-services/visa-and-emirates-id/sponsoring-residency-visa-by-expatriates>.
- 5 Afkar Abdullah, "Sharjah Wants Bachelors Out of Residential Areas", *Khaleej Times*, October 30, 2017, <https://www.khaleejtimes.com/nation/sharjah/sharjah-wants-bachelors-out-of-residential-areas->.
- 6 Afkar Abdullah, "Leave Family Areas, Sharjah tells Bachelors", *Khaleej Times*, October 30, 2017, 6.
- 7 Sennett, "The Open City", 1.
- 8 "Overview of Sharjah", Sharjah Airport International Free Zone Authority, accessed May 24, 2019, <http://www.saif-zone.com/en/About/Pages/Sharjah.aspx>.
- 9 "About Sharjah", The United Arab Emirates' Government Portal, accessed May 14, 2019, <https://www.government.ae/en/about-the-uae/the-seven-emirates/sharjah>.
- 10 Hassan Radoine, "Sharjah, UAE", in *Architecture and Globalisation in the Persian Gulf Region*, eds. Murray Fraser and Nasser Golzari (London: Routledge, 2016), 201.
- 11 Richard Sennett, "The Open City", 6.
- 12 Mary Sophia, "Sharjah Launches New 14 Million sq ft Industrial Zone", *Gulf Business*, October 22, 2015, <https://gulfbusiness.com/sharjah-launches-new-14-million-sq-ft-industrial-zone/>.
- 13 "New Recreation Parks Part of Efforts to Raise Labour Standards", *Sharjah Update*, October 26, 2016, accessed May 20, 2019, <http://www.sharjahupdate.com/2016/10/new-recreation-parks-part-of-efforts-to-raise-labour-standards/>.
- 14 Richard Sennett, *Building and Dwelling: Ethics for the City* (New York: Farrar, Straus and Giroux, 2018), 207.
- 15 *Ibid.*, 207.
- 16 *Ibid.*, 213.
- 17 *Ibid.*, 213.
- 18 "New Recreation Parks", *Sharjah Update*.
- 19 Sennett, *Building and Dwelling*, 220.
- 20 *Ibid.*, 218.
- 21 *Ibid.*, 231–232.
- 22 *Ibid.*, 236.
- 23 *Ibid.*, 241.
- 24 Richard Sennett, "The Open City", 6.
- 25 Andrea Kahn, "Defining Urban Sites", in *Site Matters: Design Concepts, Histories and Strategies*, eds. Carol Burns and Andrea Kahn (London: Routledge, 2005), 286.
- 26 The term 'Butler Building' is a brand name for a building system developed by the Butler Manufacturing Company. The term refers to the generic, long span, rigid metal buildings typically used for warehouses and factory buildings.