

# Parking Infrastructures

A Presentation by

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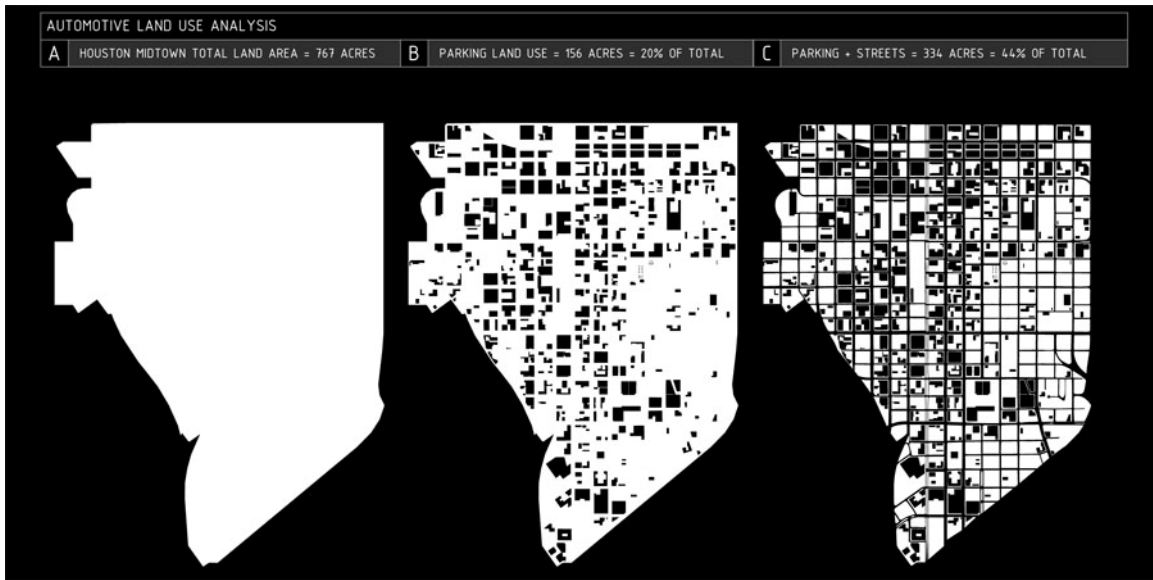
At the

45<sup>th</sup> International Making Cities Livable Conference

June 10-14, 2007

Portland, Oregon





*Midtown Houston automotive land use analysis*

Thirty-Three percent of the buildable area of Midtown Houston is occupied by parking uses. Parking uses a land area equivalent to the cumulative footprint of all of the buildings in Midtown. Midtown Houston has a total surface area of 767 acres, of which parking lots and garages occupy 156 and streets another 178, meaning that automobile uses occupy a full 44% of the gross surface area of this part of Houston. These facts became evident as part of research I carried out in 2004 in conjunction with the Midtown Redevelopment Authority in Houston, Texas. The intent of this research was to investigate potential means of addressing the blighted and underdeveloped conditions in the Midtown district of Houston, a neighborhood of immense opportunity due to its immediate adjacency to Houston’s central business district at a moment when city centers across the United States are becoming increasingly relevant and subject to immense redevelopment efforts. The city of Houston is further interested in developing a pedestrian-oriented infrastructure and city fabric, and has already made steps to address this issue through the introduction of Houston’s first surface light rail project. The Red Line, which runs down the Main Street corridor the length of Midtown connecting Rice University with the central business district, will provide future residents of Midtown with public transportation access to two of Houston’s primary centers.



*Midtown Houston, 2004*

This research is all the more relevant as the conditions in Midtown Houston are typical of the problems at play in cities across the United States that developed in the 20<sup>th</sup> century, a condition of blight directly attributable to the automobile. This blight stems from the fact that the urban fabric has developed in an era where the automobile is the primary form of transportation, which has resulted in a city fabric that is completely out of scale with any pedestrian use and has a

fundamentally alienating character. Midtown Houston is a fundamentally automobile dominated landscape, where streets are generally five lane thoroughfares and all commercial and residential uses are accompanied by parking lots and structures greater in size than the use they serve. The scale of the accompanying parking facilities is the main contributing factor to the dispersed and desolate quality of the area, and the impossibility of creating a continuous and walkable urban fabric. This qualitative observation is confirmed when one examines the parking issue from a quantitative perspective. A parking stall typically requires, when one accounts for back-out space and circulation, 355 square feet. The city of Houston requires one parking stall per 250sf of commercial use, and two per residential unit, at an average 1,350sf per unit. Meaning, that for every square foot of space dedicated to parking, one can maintain 1.9 square feet of residential use or .7 square feet of commercial use. These conditions are not unique to Houston, thus the conclusions that arise from this research are not only potential solutions for increasing the quality of urban life in Houston, but in cities across the United States.



*Downtown Santa Monica*

Due to the widespread nature of this problem, some attempts have already been made to address the systemic nature of the parking problem. The City of Santa Monica in 1965 built six parking garages to serve its then blighted downtown core. While that core, now known as the Third Street Promenade, has since seen a major resurgence, with the help of the parking facilities, this particular arrangement highlights problems with an after-the fact approach to dealing with parking. The majority of the commercial uses in the area pre-date the introduction of the garages, and did suffer from a difficulty of automobile access, however they were not integrated with the parking structures in any way beyond the necessary adjacency. This results in garages which exist as a necessary evil of the modern urban condition, with their own attendant blight. A more significant problem is that the garages address only commercial uses, thus eliminating the potential development of a mixed-use or residential typology in this area. The unfortunate result of this is that downtown Santa Monica has evolved into a shopping mall on an urban scale, with many pedestrians, boutiques, restaurants and movie theaters but no 24 hour presence, residents or quotidian activities which would lend it a true urban character.

Another project that attempts address the parking problem in a fresh way is the 1111 Lincoln Road project in Miami, designed by Herzog & de Meuron. This project, which was undertaken in the time since the research that I am presenting here concluded, reaches many similar conclusions in how to address these issues. The central premise being that parking garages should occur with multiple uses, in this case ground floor retail of 50,000sf, office space of 110,000sf, 5 residences, and 300 parking spaces. In tandem with this project, the City of Miami will close to vehicular traffic the block of Lincoln Road in question to match the original 1960 pedestrian mall vision of Morris Lapidus. While this project is commendable in both breaking new ground on the potential uses within a parking garage and on the aesthetic potential of the

type, it is still symptomatic of one essential conceit in the practice of urban development across America. The conceit being that the project occurs entirely within the bubble of a single private parcel holder, and fails to capitalize on any opportunities to behave as player on an urban network, providing parking serving only its own uses. Ultimately, this project's contribution to its local urban condition will be limited to increased revenues and property values for itself and area businesses. Yes, it is a new building typology, but it is not capable of generating a new, or even significantly modifying the existing, urban condition.



*1111 Lincoln Road*

This raises the issue of how, then, can the treatment of parking be used as a device to alter and improve the urban condition in Midtown Houston? In Midtown, parking is currently provided as a private amenity in conjunction with piecemeal development in the most economically expeditious manner possible. What if, instead, parking is reconsidered as a civic infrastructure, where it can be implemented to serve a larger public good? This paper proposes that public agencies could provide parking in the form of neighborhood garages that aggregate and densify the parking use. Each garage would serve a predetermined tributary area of parcels, such that the owners of these parcels would be liberated from the constraints of providing parking, while encouraged to develop mixed-uses by their allocation of parking spaces.

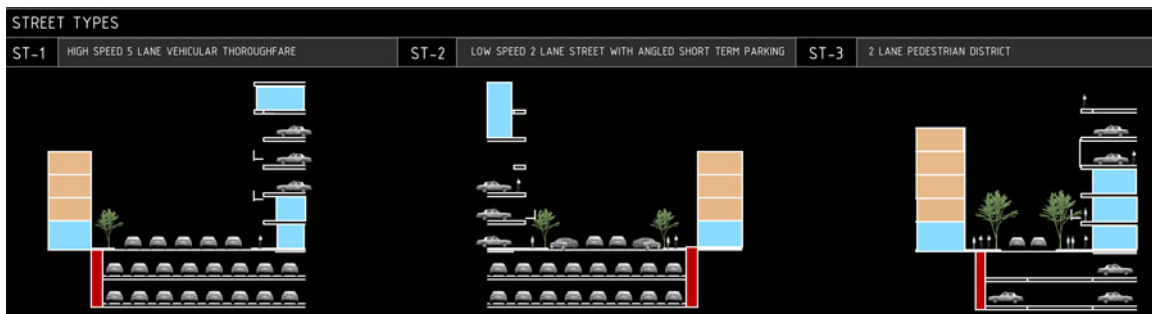


*Zoning and development plans*

Through this research I determined that an optimal scenario for the deployment of this infrastructure was to insert into Midtown a garage serving the portions of six blocks that would comprise a 3 block long corridor, a basic critical mass for the creation of a self sustaining urban condition. This also provides a certain economy of scale whereby a mixed use and residential neighborhood occupying parcels totaling 175,000 square feet can be served by a parking facility

occupying a parcel of only 25,000 square feet in size, a ratio of 1:7 that improves dramatically over the existing average of 1:3.

The garages would create a de facto zoning regulation through the distribution of parking stalls among the tributary parcels. These parcels would be subdivided into two “zones”, MX and R. Parcels fronting along the commercial corridor would be designated MX and would be allocated 24 parking stalls per 5,000 sf parcel. This allocation is calibrated to encourage a medium density mixed-use fabric along the commercial corridor, and as a result of accepting this parking incentive, property owners would be required to provide a mixed use development comprised of three stories of residential use above one story of commercial use. Parcels adjacent to, but not directly on, the commercial corridor would be designated R and would be allocated 16 parking stalls per 5,000 sf parcel, conditional upon maintaining eight units of residential use.



Street types

In addition to zoning regulation, this research proposes a reworking of traffic engineering with respect to the mixed use urban neighborhood generated by the insertion of a parking infrastructure. The streets in Midtown are currently comprised exclusively of four and five lane thoroughfares, whose high speeds and intensity of traffic are not conducive to a neighborhood atmosphere. One thoroughfare, type ST-1, is best kept adjacent and perpendicular to the commercial corridor, to maintain efficient access into and out of the garage district and to handle the vehicular flow into and out of the parking infrastructure. Beyond this, this research proposes two additional street types to comprise the network tying the garage district into the city at large. The second, type ST-2, runs also perpendicular to the commercial corridor but is reduced to only two lanes of one-way traffic with the remaining street width utilized for short-term angled street parking on both sides, creating a great ease of access for business clientele and the like. The third, type ST-3, runs the length of the commercial corridor and is also reduced to two lanes of one-way traffic, the remaining street width in this case being utilized for the widening of the sidewalks to accommodate a robust pedestrian life, sidewalk dining, street vendors, etc. Along this street type there are pull-outs for passenger loading.

In addition to the strong sense of urban community, neighborhood identity, and improved quality life the implementation of parking infrastructures enables, it also enables a wholesale rethinking of the existing housing typologies as seen throughout Houston. The typologies currently seen in Midtown run the gamut, from single family detached homes to large apartment complexes to large scale mixed- use developments, and each existing type highlights shortcomings in the development in Midtown as it now occurs, and how the shortcomings are inextricably linked to the issue of the automobile.

The most common, and least conducive to the evolution of a thriving urban environment, is the single-family detached home. These homes average a floor area of 1,700sf on lots averaging

5,000sf, giving them an FAR of .34 and a total of 10 families per city block. While this type of development may conform with a fifty year old idea of the American Dream when located in a distant suburb, these homes in Midtown are largely ramshackle and undesirable as they do not have the perceived safety of a remote location. Furthermore, the extremely low population density generated by this pattern of development, 1 adult per 2,500sf of land, is not a sufficient critical mass to support or generate commercial uses within a walkable radius, much less even knowing the name of the resident at the other end of the block.



*Single family detached housing*



*Single family townhome housing*

A more recently developed type is that of the single family townhome. This type is an incremental improvement over the single family detached home in its reduced setbacks and increased density. This type typically occurs at a floor area of 4,200sf per 5000sf lot, for an FAR of .88 and 30 families per city block or about one adult per 833sf of land. This type requires streets into the block interiors by which are accessed private garages for each individual dwelling, creating an environment where residents leave the sanctity of their own private dwelling only when they are already ensconced in an automobile, and will rarely go so far as to walk on the adjacent sidewalk.



*Medium density housing*

A third type demonstrates the current infeasibility of medium-density multi-family development in Midtown. This example includes a 5 story courtyard type apartment development. This, while relatively dense, demonstrates the impossibility of a continuous urban fabric of such development, as it is accompanied by a six story parking garage which occupies

three quarters of the adjacent block and is connected by a bridge. The garage in this case presents to a pedestrian an impenetrable façade on all sides, negating any potential continuity. Again, residents will inevitably see their neighborhood streets through a windshield as they will use the bridge to access the garage and leave via automobile. The development incorporates no commercial uses in its two block scope and negates the potential of any adjacent commercial uses by impeding continuity and housing residents who may never know the streets. Although the residential portion of the development is fairly high-density, when the garage is accounted for the total development has an FAR of only 1.6



*High density housing*

A similar new development occupies two full blocks with a seven story residential building with an embedded parking garage, that after providing courtyards presents an FAR of 3.2. This development, while commendable in its very high density, maintains an urban presence of a highly impenetrable compound. This is due, in part, two its two-block scale where it was able to occupy the street right of way between the two blocks thereby disrupting the continuity of the Midtown street network with a seven story façade. The impenetrability is further enhanced by lack of any commercial space such that the street level façade consists of windows to dwelling units, which are accessed through the building interior, that are set back behind a defensive colonnade. Again, due to the embedded garage, residents come and go only in a car.

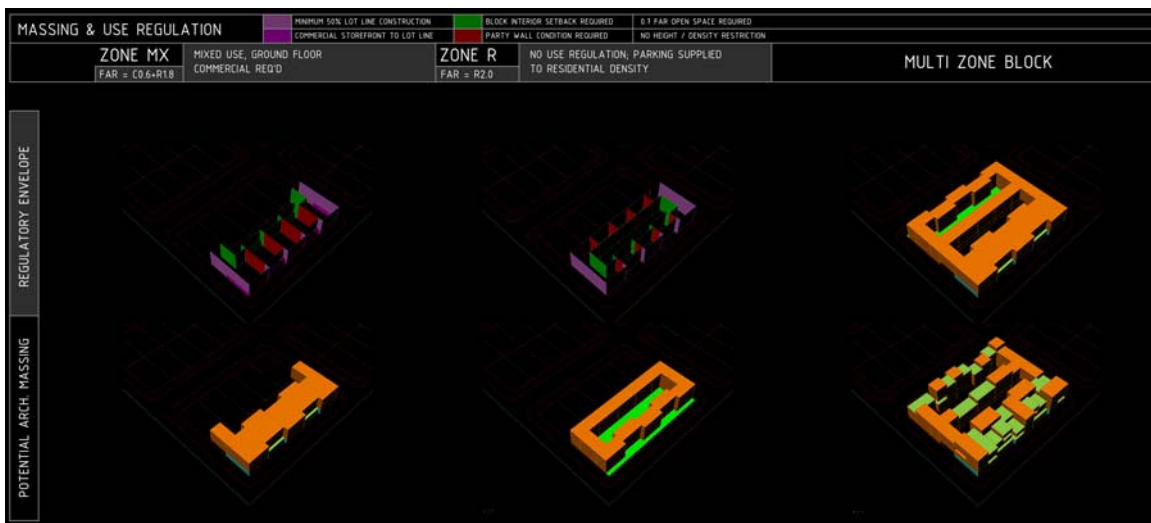


*Mixed-use medium density housing*

A highly praised mixed-use development has taken place very recently at the Northern end of Midtown. It is four blocks in scale and consists of street level commercial with three stories of residential above, with two strategically located embedded parking structures, for an FAR of 2.6. The street level commercial is highly successful in creating a vibrant street environment while at the same time activating the courtyards within the block interiors. This project is in many ways exemplary of the potential of mixed-use developments in cities like this, but exemplifies some of the problems this model faces. The first major problem is that any developer wishing to undertake such a project is limited to locations where he or she can obtain four contiguous and total city blocks of land, in this case totaling 246,500sf. This reality eliminates any possibility of urban infill development as the economies of scale necessary to accommodate parking and

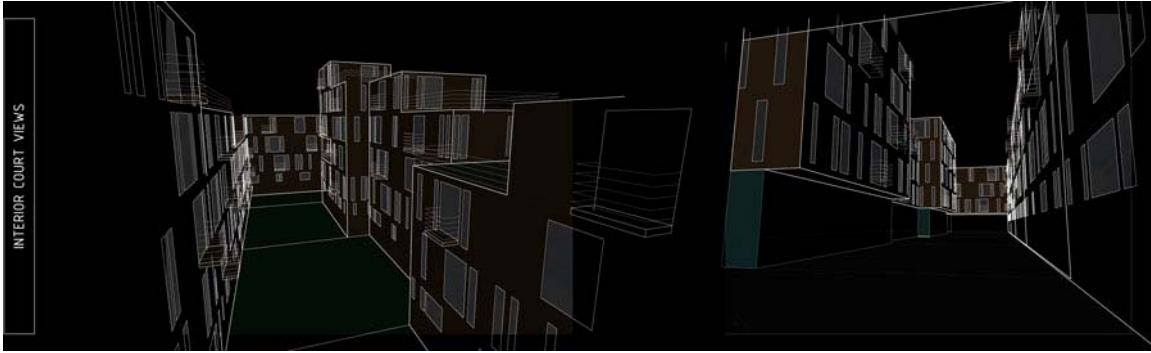
sufficient residents to support the commercial uses are prohibitive. The second major problem is that such developments are oppressive and stifling in their uniformity. The vibrancy and pleasure of city life stems in a large part from the variety and unexpected and unharmonious adjacencies of places and building not all built with same hand.

The introduction of parking infrastructure, in relieving property owners within the tributary area of the onerous requirement of providing parking, fundamentally changes the development parameters and architectural typologies by making the economies of scale, heretofore a guiding principle, entirely unnecessary. The three previous examples of contemporary multi-family development in Midtown occupy parcels ranging in size from 85,000sf to 246,500sf. Being now relieved of providing parking, the owner of a single typical 5,000sf parcel can build to a combined FAR of 2.4, commercial and residential, something that under the current circumstances is not possible without acquiring large, continuous tracts of land.



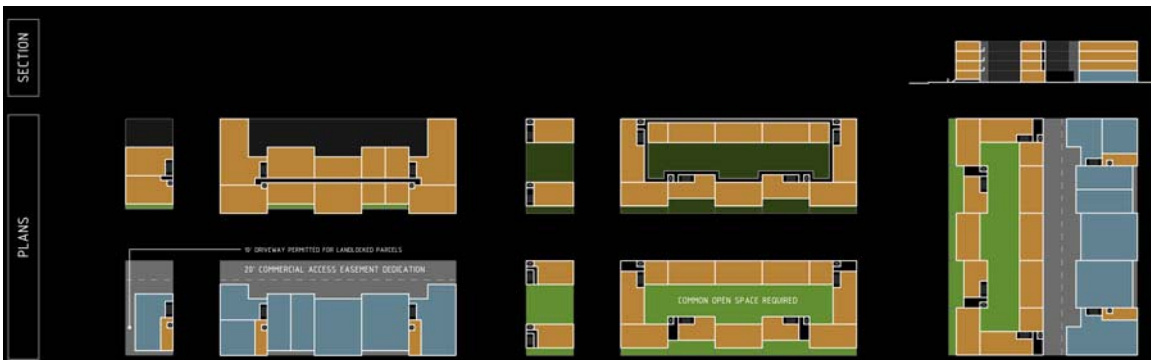
*Massing and use regulation*

This, in turn, necessitates a wholesale rethinking of zoning regulations in Midtown. The existing zoning code was written with the intent of regulating freestanding buildings on adjacent parcels. Due to the vastly higher density made possible by the Parking Infrastructures, and the very small typical parcel size (5000sf), construction up to the lot line must be permitted resulting in a party wall typology. This new model of zoning regulation will require a minimum of street lot line construction for residential, that commercial uses are always built 100% to the street lot line, block interior setbacks to maintain .7 FAR open space, and party wall construction within the allowed building envelope. These regulations, while always functional and effective for the development of individual parcels, are formulated to maintain a purposeful architectural massing for the full block through the ultimate aggregation of these parcels.



*Typical housing and mixed use interior court views*

In the MX, or mixed-use, zone, this regulation is defined in such a way as to always maintain a continuous street frontage of commercial at grade level occupying 60% of the lot area, with three stories of residential above. The block interior setback is defined in such a way as to provide access to all commercial uses from the rear for vehicular access and loading purposes, to separate vehicular needs to the rear and pedestrian access and uses to the street. This furthermore provides uninterrupted light and air access for the residential units at the rear, and creates an interior courtyard in each block which will allow each to maintain a unique identity. In tandem with this, each property owner will be required to provide an easement through the rear in order to maintain this commercial access alley.



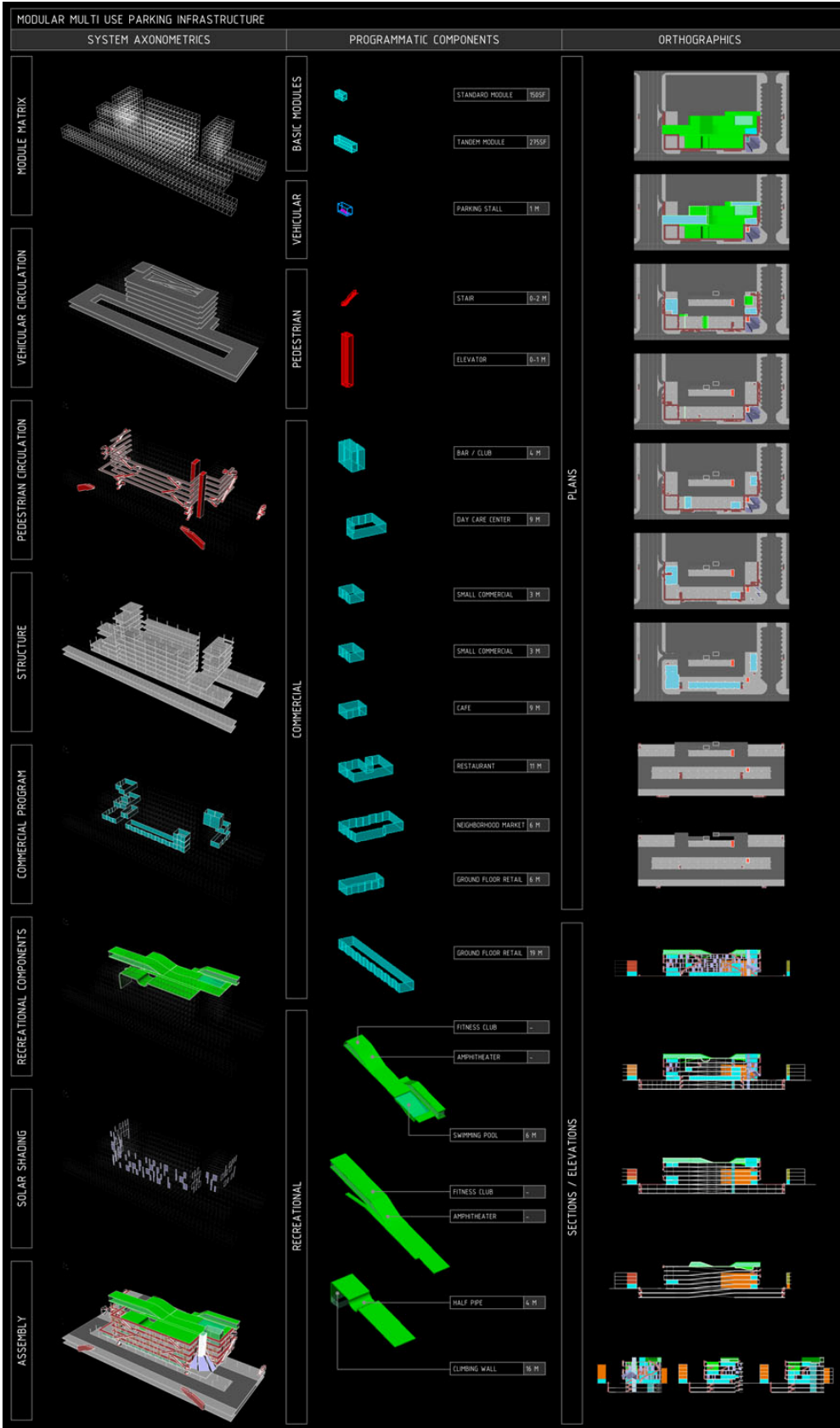
*Typical mixed use and housing parcel and full-block plans*

In the R, or residential, zone, the zoning is defined in such a way as to also create a courtyard typology for each block. Parking is supplied to enable 8 residential units per lot, and the block interior setbacks permit a lot coverage of 25% at the street and 25% at the rear. This will enable units with street frontage to have light and air from the rear at the courtyard as well as the street. As the R zone is proposed to always abut the MX zone at the rear, the units at the rear of the R zone will also have dual access to light and air, from the courtyard as well as from the commercial alleyway. In addition, a small front yard is required in the R zone to maintain a landscaped condition adjacent to the sidewalk.

These setback requirements are further developed through the introduction of variation in the depth at which the street-side massing abuts the street. A small alternation of the depth of this abutment will enhance the visual interest of the streetwall by introducing depth and by providing most of the resulting residential units with corner windows. This visual interest is further enhanced by the omission of height limits, allowing the building massing to be modulated in order to accommodate large terraces, roof gardens, and decks at no loss of saleable square

footage to the owner. This caveat is significant in that while the building footprint and street frontage is carefully controlled by the setbacks, the overall building massing may vary significantly from building to building, creating a potentially exciting urban environment. Density limits are also omitted from this new zoning, but are controlled in a de facto manner through the allocation of parking stalls to individual parcels.

The rethinking of the zoning and street types in terms of best supporting a walkable and vibrant urban neighborhood carries through in the rethinking of the parking structure itself. Rather than seeing the garage as merely a storage container for cars, it would be programmed at all levels with appropriate types of commercial and recreational uses such that the ramps and drives of the garage would be interior streets accessing more uses. The parking garage would exist as a modular multi-use parking infrastructure, modular in the sense that the dimensions of the parking stalls generate a universal matrix into which a variety of programmatic, multi-use, modules fit. The modules while, including parking stalls, also include the necessary vertical pedestrian circulation components, as well as a wide variety of commercial uses that due to their modular nature can easily be modified or reconfigured at any time.



Modular multi-use parking infrastructure

The commercial establishments that would fit well in the parking infrastructure fall primarily into two categories, the first being quotidian neighborhood services. These are services such as a dry cleaner, day care, or mini-mart. These services make the most sense for accomplishing one's daily errands in tandem with making a trip to the garage when leaving or returning home. The second category is of entertainment related establishments, such as restaurants, bars and cafes. These types of establishments are essential for establishing a community in relation the parking node, such that the garage would perform the role of town square. To better serve these uses, the pedestrian circulation is externalized in a series of catwalks and stairs so that the uses within the garage can be accessed by either pedestrian or vehicular means, while neither circulation mode ever cross. The externalized pedestrian circulation allows users to be seen by and interact with those on the street, further integrating the urban surroundings with the garage itself.



*View from exterior pedestrian circulation of parking infrastructure*

In addition to this catalog of uses that are accommodated within the parking matrix, the garage also accommodates recreational uses. This is accomplished through the modulation of the roof surface, a surface with ideal solar exposure as well as panoramic view of Houston in all directions. This surface can be modulated to accommodate a fitness club, outdoor swimming pool, climbing wall, half-pipe and skate-park, and courts of all kinds. These recreational functions further enhance the sense of community, as the primary clientele of this use will be neighborhood residents. In addition, an area of the roof is set aside and modulated to perform as an outdoor amphitheater, wherein could be held impromptu performances by local artists or an annual summer music festival showcasing artists of national repute. Such events would be dynamic community gatherings, as well as drawing people from the city at large.



*Street view of parking infrastructure showing potential adjacent development*

Ultimately, these parking infrastructures could not only be inserted at strategic points within the city to create small scale self-sustaining neighborhood conditions and stimulate nodes of development, but also phased in over a longer term to create continuities and networks of parking facilities, neighborhoods and uses that would over time create a unique dense urbane character for Midtown. Parking infrastructures will be instrumental in spurring the redevelopment and resurgence of Midtown by eliminating parking as a major obstacle to development and creating urban ‘nodes’ within a heretofore undifferentiated expanse that will attract residents and businesses.

Instead of backing out of his/her private garage each morning, a local resident will walk the one city block (330 feet) to the garage, on the way doing errands, picking up a morning coffee, meeting a new neighbor, then getting into the car and driving to work. The garage would no longer be a painful fact of automobile centered life, but rather the town square in a new paradigm of a vibrant urban neighborhood.



*Typical approach to neighborhood parking infrastructures*