

OFFICE FOR URBANIZATION

RESEARCH REPORT

Mobility Oriented Design:
The Case of Miami Metrorail

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OFFICE

Mobility Oriented Design: The Case of Miami Metrorail



Harvard University
Graduate School of Design

Mobility Oriented Design: The Case of Miami Metrorail

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Office for Urbanization

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The Harvard University Graduate School of Design is dedicated to the education and development of design professionals in architecture, landscape architecture, urban planning, and urban design. With a commitment to design excellence that demands the skillful manipulation of form and technology that draws inspiration from a broad range of social, environmental, and cultural issues; the Harvard GSD provides leadership for shaping the built environment of the twenty-first century.

The Harvard GSD Office for Urbanization draws upon the School's history of design innovation to address societal and cultural conditions associated with contemporary urbanization. It develops speculative and projective urban scenarios through design research projects. The Office imagines alternative and better urban futures through applied design research. The Office aspires to reduce the distance between design innovation and societal impact.

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Miami appears to function as a kind of circulatory hub, an infrastructure defined as much by the dispositions and habits of its residents as by its institutions and physical infrastructure for the movement and translation of people and cultural forms.¹

Edward LiPuma, Professor of Anthropology, University of Miami and
Thomas Koelble, Associate Professor of Political Science, University of Miami

Fig. 1. Vizcaya Station

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The city of Miami has always been modern. Born of the railroad and fed by the airlines, it was shaped by transportation systems that linked the city to distant destinations while dividing local districts. Perhaps as a result ... the city has long been divided into interdependent, yet spatially distinct cities.²

Gray Read, Professor, Florida International University School of Architecture

Fig. 02. South Miami Station.

Introduction

The Harvard University Graduate School of Design's Office for Urbanization draws upon the School's history of design innovation to address societal and cultural conditions associated with contemporary urbanization. It develops speculative and projective urban scenarios through sponsored design research projects, imagines alternative and better urban futures through applied design research, and aspires to reduce the distance between design innovation and positive societal impact.

The challenges of contemporary urbanization rarely correspond to discrete professional or disciplinary boundaries. The Office is committed to enabling and accelerating societal impact through collaborative, multidisciplinary design projects. This work aspires to construct alternatives to present conditions and predictable outcomes with a relevant array of future options. These scenarios are selected in order to insulate individuals and their communities from the most adverse social and ecological impacts associated with ongoing processes of urbanization. They are also identified for their potential to contribute to urban life and culture as well as our knowledge of urban sites and subjects. The work of the Office centers on design as an activity of collective imagination.

This work can be described under the general rubric of design research. The Graduate School of Design has a longstanding tradition of pursuing research through a diverse array of methods and media. Faculty members pursue research agendas closely associated with the humanities on the one hand, or with the natural, social, or political sciences on the other. In addition to those forms of research, faculty at the School pursue design research as its own unique form of knowing in and about the world.

Mobility Oriented Design (MOD): The Case of Miami Metrorail investigates the multiple facets of public transit in Miami-Dade County and its effects on the urban fabric. Broadly, this design research project seeks to understand how public transit operates within the county and why it has historically underperformed. *MOD* focuses on Miami Metrorail as a case study and identifies and analyzes the specific parameters that have guided transportation and development within the city's emergent transit corridor along U.S. Highway 1.

Through collaboration with a team of subject matter experts, including 2 x 4, Stamen, and CityFi, this research project synthesizes multiple perspectives and analytical frameworks to present the historical and contemporary factors that contribute to Miami Metrorail's low ridership and poor accessibility. It pays particular attention to the influence of public opinion, the day-to-day experience of riders, and the relationship between the transit system and its surrounding urban context. A close analysis of these factors and an investigation of correlated prospects and issue areas informs several design scenarios that are intended to visualize and project future options and investment alternatives. Ultimately, this project proposes a menu of recommendations at a variety of scales that are meant to inform decision-making around reinvigorating Metrorail's existing infrastructure, facilitating ridership, promoting higher-density living, and improving the rail's integration into the urban fabric.

As a case study, Miami Metrorail presents unique opportunities for reconceptualizing how existing transportation infrastructure can shape urban form. The story of Metrorail's beginning provides crucial background for understanding its current physical and cultural position within the city. When Metrorail debuted in

1984, it was met with an underwhelming reception. Inspired by Washington DC's Metro and Disney's Monorail, the new rail system was envisioned as a breakthrough addition to Miami's transportation network. But, in reality, local and state officials were forced to value-engineer out many of Metrorail's most compelling design features well before implementation. As a result, in its early years Metrorail met only 15% of projected average weekday ridership and had a minimal effect on Miami-Dade County's property values. While the original plan promised fifty-four miles of track, multiple lines connecting to Miami International Airport and Miami Beach, and a ridership of almost 200,000 people daily, today's Metrorail consists of just twenty-four miles of track, two lines, and an average weekday ridership of around 68,000.³ There are twenty-three station stops and the track runs predominantly along a north-south axis, with Downtown Miami at the midpoint and only one short connection to Miami International Airport.

Despite the presence of an underused Metrorail, Miami's population growth has overwhelmed the city's transportation capacity in the past decade: a recent traffic survey rated Miami one of the country's most congested cities.⁴ The oversaturation of cars and low public transit ridership of is not a new phenomenon. Rather, it is tied to the city's history of zoning and land-use policies. For decades, it was typical for the city to stipulate high-volume parking requirements for new construction and generally avoid mixed-use development. Over time, these policies have created a culture of automobile dependency that contributed to the proliferation of low-density development.

Since 2000, however, county and city organizations along with Miami-Dade Transit have focused on Transit Oriented Development (TOD) as an alternative approach to generating denser urban growth and redevelopment. Several pilot projects around transportation planning, Miami 21 (the new zoning ordinance), and a comprehensive new development plan have created an opportunity to reexamine Miami's transportation infrastructure. *MOD* seizes upon this opportunity and in particular presents Miami Metrorail as a crucial asset to be reexamined, highlighting its potential to shape and guide the transformation of an emergent transit corridor. While transit-oriented development is a much-discussed topic in city planning, this project adds to and extrapolates from TOD's standard methods.

Based on a more holistic analysis of the experience of public transit in the city, MOD analyzes Metrorail along three broad vectors: public perception, lived experience, and dense destinations. This research puts forth these under-examined vectors as powerful drivers of the development of dense transit hubs and cohesive transit corridors.

First, increasing Metrorail ridership must address the stigma associated with riding the Metrorail and with public transit in Miami at large. Since its inception, Metrorail was never properly positioned in Miami's public imaginary. Its precedents, DC's Metro and Disney's Monorail, captured the imagination, but when Metrorail debuted it was not supported by robust public communications and suffered from bad press. Thus, Metrorail needs to be repositioned within the city's imagination through a cohesive rebranding effort. This approach has less to do with the system's physical infrastructure than with improving public opinion of the system's efficiency, sanitation, and safety — an opinion formed by decades of low ridership and poor public perspective.

Second, while Miami Metrorail's infrastructure is largely intact, the user experience needs to be improved in order to overcome existing physical and psychological barriers. In Miami, cultural perceptions of Metrorail present a greater barrier to ridership than infrastructure. U.S. 1, for example, is a physical and psychological impediment that needs to be offset by giving stations a sense of arrival. Furthermore, Metrorail's ridership and usage must also contend with the city's overwhelming preference for and dependency on automobiles; the county's high parking requirements and history of low-density growth around transit hubs have contributed to the entrenchment of Miami's car culture. Metrorail has the potential to offer an efficient, comfortable, and elevated alternative experience tailored to Miami's unique cultural character.

Finally, Metrorail has the possibility to connect to and guide the transformation of its neighboring context — ultimately forming dense transit hubs that are desirable destinations in their own right. While transit-oriented development is important, it only accounts for one part of the solution. Growing Metrorail's ridership will require a holistic, multi-scalar, and intermodal approach. At present, Metrorail suffers from a lack of integration with the day-to-day life of its

communities, particularly vis-à-vis the 'last mile' problem, wherein the remaining distance from the station must be covered by foot or other modes of transport. Increasing connectivity and activity within commuter sheds can help to alleviate this issue. In addition, by partnering with other agencies to promote events and public programming within the vicinity of Metrorail and attending to residential and commercial uses, existing stations can evolve from 'park-and-ride' stops to 'live-work-play' destinations.

Covering issues from signage to zoning, the following design recommendations address many different scales of intervention and investment. While most recommendations are synthesized from extensive academic research, others require additional study. This design research project ultimately seeks to demonstrate that Miami Metrorail is in fact a latent asset in the city's transportation network, and that leveraging existing investments and optimizing existing infrastructure can drastically improve the life and impact of the transit system. Through a detailed analysis of current conditions as well as a reconceptualization of Miami Metrorail's position within the city's imagination, this project explores potential scenarios, communicates choices, and facilitates decision-making surrounding Miami Metrorail and its emergent transit corridor.


This research project is led by Principal Investigators Charles Waldheim, John E. Irving Professor of Landscape Architecture; Jesse M. Keenan, Lecturer in Architecture; and Mohsen Mostafavi, Dean of the Harvard Graduate School of Design and the Alexander and Victoria Wiley Professor of Design, and includes a team comprising Michael Rock of 2 × 4, Eric Rodenbeck of Stamen, and Gabe Klein of CityFi as well as research associates, graduate research assistants, and students from across the GSD. The project launched in 2017 and has since gathered expertise from across the GSD and the University, as well as through several fruitful meetings with The Lennar Foundation and other stakeholders. This report synthesizes the best practices and compelling cases pertaining to this subject and proposes strategies and solutions for rethinking public transit in Miami-Dade County. Recommendations presented here should be understood not as design projects but as principles conveyed through design scenarios. This report was made possible with the generous support of the Lennar Foundation, Inc.

RECOMMENDATIONS

Summary

Prospects


Scenarios

A photograph of a modern, elevated transit station platform. The platform is covered by a large, flat concrete roof supported by several white columns. The floor is paved with light-colored square tiles. In the center, there is a wooden bench and a white signpost with a Metrorail logo and directional arrows for Northbound and Southbound. Two white cylindrical trash receptacles are positioned on either side of the bench. The background shows a road with palm trees and a modern white building with a curved facade. The sky is overcast.

Many drivers who tried transit when gasoline prices went through the roof are sticking with transit now that pump prices have dropped. Passengers often comment that as long as [Miami keeps] improving public transit ... they'll continue to use it.⁵

Gena Holle, Transit Specialist


Fig. 03. Douglas Station.



I am interested in studying the hurdles for those who don't want to use their cars to move around and what incentives we can provide to bring people to use mass transportation alternatives. We are working towards making a cultural change on how people in [Miami] see public transportation.⁶

Alice Bravo, Director of the Department of Transportation and Public Works (DTPW) for Miami-Dade County

Fig. 04. Brickell Avenue.



It has a stigma: the attitude here is that public transit is for people who don't drive nice cars.⁷

Marco Gazamanes, Miami Resident and Metrorail Rider

Fig. 05. Road inundated by tidewater in the Faena District of Miami Beach.

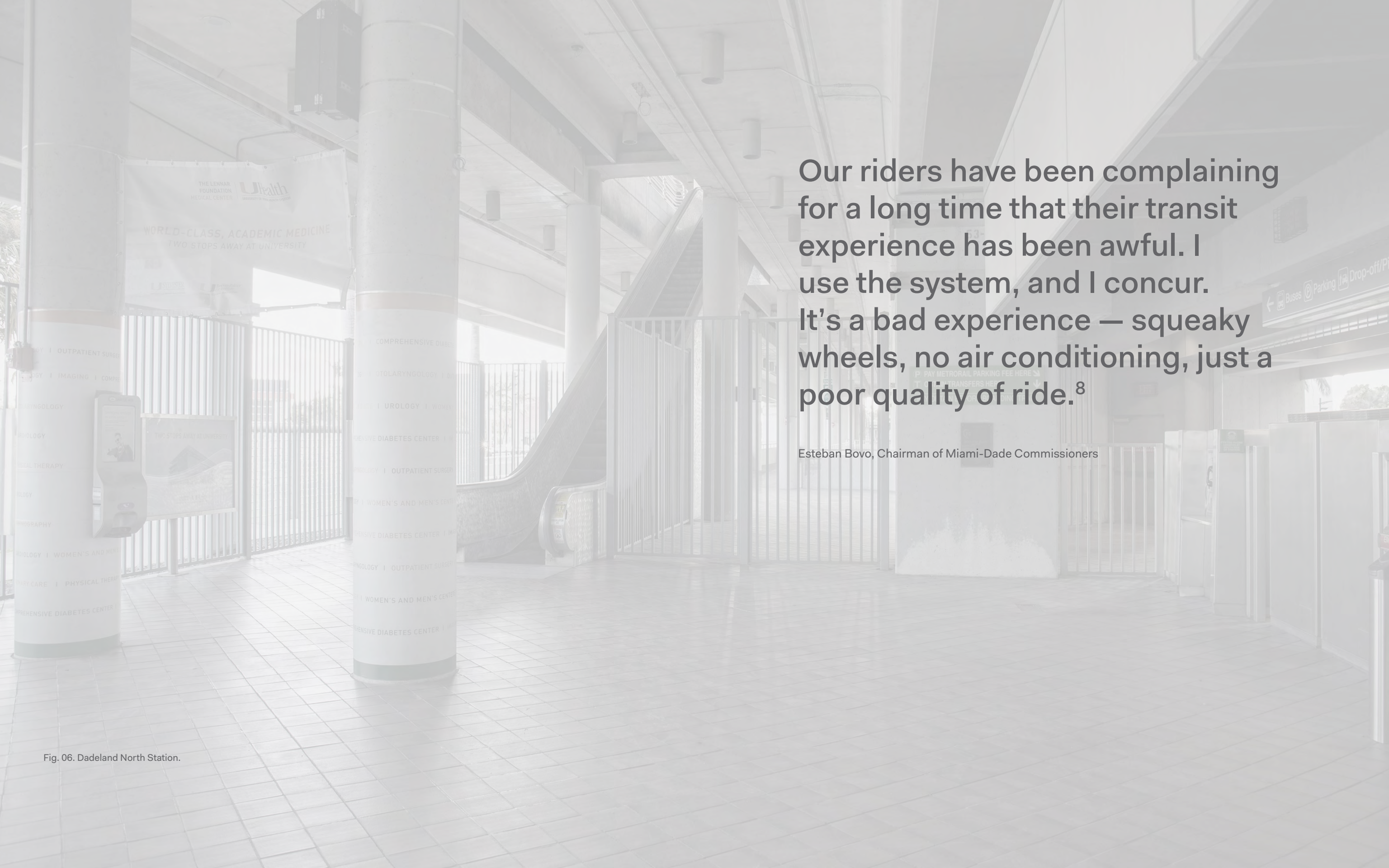
Identities

Miami Metrorail was inspired by the Washington DC's Metro and the Disney Monorail, two precedents that demonstrated the scope of the city's ambition for its new public transit system. While these prior efforts succeeded in capturing the imagination, many of Metrorail's original design features were value-engineered out before the system was constructed, resulting in decreased funding for landscaping, bilingual signage, materials, and lighting. When it debuted in 1984, Metrorail struggled to garner the ridership that planners had originally projected.

In part because of the stigma associated with public transit, compounded by the city's history of automobile dependency, Metrorail still faces significant psychological and cultural barriers to ridership. Rather than focus on an extensive infrastructural overhaul, Miami Metrorail should foreground the issues of identity and perception and work to identify the cultural and social barriers that prevent people from taking public transit. Through various branding, advertising, and social media tactics, Metrorail has the opportunity to recast its image in the city. By repositioning Metrorail within the city's cultural imagination, the system stands to gain visibility and increase ridership.

> Collaborate with a branding agency to evaluate the relationship between public transit and the cultural imaginary of Miami. Based on this research, decide on a theme or emotional tone and a related set of tactics. These tactics should manifest across different areas of Metrorail and could include devising a new slogan, addressing access, deploying custom sounds, integrating artwork, adding programming, curating arrival graphics, creating connectivity, and broadcasting to social media.

- > Reintroduce Metrorail into Miami's cultural imagination by creating a slogan for the rail system and by renaming the station stops. For example, the Hyper-Miami identity could celebrate the multiplicity of the city by inviting riders to "Discover a new side of Miami."
- > Deploy a vibrant and iconic graphic strategy through signage and other interfaces that create a strong visual presence and make Metrorail easily recognizable. For example, activate station entrances by applying a bright accent color: consistent color coding helps alert residents to the presence of public transportation hubs in their neighborhood and across the city.
- > Promote the benefits of the Metrorail experience through targeted communication strategies, such as reward and point systems, that invite new riders and counteract the stigma around public transit.
- > Use social media and technological platforms to create a strong virtual presence and convey the interactive experience of riding Metrorail. These communication strategies can be integrated into the Metrorail interfaces: a Foursquare mayor could have their name prominently displayed within the station; real-time mapping could provide riders with dynamic maps, train-tracking, and wait times; or station displays could highlight popular nearby destinations.
- > Implement user-friendly apps that convey the value of existing assets and calculate the tradeoffs between housing location and transportation cost. Apps should educate both city residents and professionals on the economic, experiential, and environmental benefits of transit-oriented lifestyles and multi-family housing.



Our riders have been complaining for a long time that their transit experience has been awful. I use the system, and I concur. It's a bad experience — squeaky wheels, no air conditioning, just a poor quality of ride.⁸

Esteban Bovo, Chairman of Miami-Dade Commissioners

Fig. 06. Dadeland North Station.

Environments

While the physical infrastructure of the Metrorail is a significant part of the public transit system, the day-to-day experience of riding the train and frequenting the stations and their surrounds is arguably as, if not more, important. Reimagining Metrorail's future must begin by addressing the broader experience of its riders, from climactic controls to small conveniences such as snack and drink vendors. Thus, in addition to reconceptualizing Metrorail's emotional tone and graphic identity, discrete physical and technological upgrades to the existing stations can vastly improve the daily life of riders, grow overall ridership, and encourage additional investment in the city's public transit infrastructure.


Beyond their function as stops along a public transit line, Metrorail stations should deliver a welcoming and holistic sensorial experience. Presently, the harsh materiality and lighting of the stations hinder accessibility, but if basic amenities are improved Metrorail stations can become active and inviting environments. In particular, addressing issues of climate, comfort, accessibility, appearance, convenience, and safety can reposition Metrorail as a more appealing alternative to vehicular travel.

- > Cultivate a comfortable atmosphere and climate for riders. To mitigate Miami's hot and humid climate during all seasons, deploy various cooling strategies, such as fans, air-conditioning, misting, and shade devices.

- > Enhance both physical and visual accessibility to the stations. At present, stations are located in relative obscurity from their surroundings. Choreographing an entry sequence through landscape strategies, signage, and wayfinding would

emphasize station locations and make them easier to find and access.

- > Upgrade the surface materials and cladding. The stations are primarily constructed out of concrete, but softening the exterior with lighter and softer materials, such as perforated screens, can lend them a new, fresh appearance. Improving interior and exterior safety and accent lighting would also make stations more safe, inviting, and functional spaces.
- > Communicate safety. Prioritize interior and exterior lighting, and use highly visible anti-slip material around portals and high-traffic areas.
- > Provide convenience to travelers. Incorporate more seating into Metrorail stations, along with light retail, vending machines, and other amenities that invite users to linger.
- > Improve wayfinding in and around the stations. Direct visitors with visual interfaces, bilingual signage, overhead announcements, and district maps. Highlight intermodal connections that connect Metrorail riders to their final destinations.



The county is sitting there with totally underutilized dead space at the stations. You can't make new real estate; you have to regenerate. It's smart development. [...] We have to take advantage of what we have.⁹

Michael Comras, partner with Grass River and Federal Realty Investment Trust

Fig. 07. South Miami Station with no pedestrian crossing or signage.

Publics

Because Metrorail evolved within the context of low-density, car-oriented development, stations are currently sited amid large surface parking lots. In general, stations stand in relative isolation from the urban fabric and therefore lack pedestrian-friendly access points and suffer from low visibility. With growing commitment to transit-oriented development, however, Metrorail stations have the opportunity to better cater to pedestrians and facilitate easier intermodal transfers and commutes.

Currently, U.S. 1 presents both a physical and psychological barrier to pedestrian access to Metrorail. Overcoming this obstacle requires a careful rethinking of the multiple directions of approach and the stations relationship to the public realm. Broadly, the stations have the potential to signify a sense of arrival. Whether through landscape strategies or improved parking management plans, the station surrounds can visually and spatially choreograph a pedestrian-friendly approach sequence while cultivating a lively public realm.

- > Maintain visibility from afar. Ensure that stations benefit from open viewsheds and highly visible access points that accommodate multi-directional approaches.
- > Design for pedestrians. Create welcoming public plazas and pedestrian-friendly boulevards in station-adjacent areas. Encourage the development of lively, engaging streetwalls with plentiful storefronts and reduced or eliminated setbacks.

- > Curate landscape and vegetation in and around stations in ways that speak to pedestrian contexts. For example, incorporating flora from nearby neighborhoods into the design of each station can strengthen a sense of local identity. Incorporating plant life onto second-level platforms can help maximize station visibility.
- > Provide shade. Employ canopies and trees to relieve and mitigate heat and humidity in public spaces, improving neighborhood walkability.
- > Design around physical and psychological barrier of U.S. 1. The strategic placement of overpasses and bridges can fill the gap between Metrorail and adjacent destinations, such as nearby residential neighborhoods and commercial zones.
- > Implement parking management plans to increase parking usage efficiency. Providing street parking and pay-by-phone options can work to maximize flexibility and convenience, while shared parking at garages can cater to the needs of both residents and visitors.

The first and last part of [the rider's] trip is often . . . the longest, the most time consuming, the most uncomfortable, and the least reliable. For people to ride transit, their journey does not start when they board transit and does not end where they alight.¹⁰

Miami-Dade Transportation Planning Organization

Brickell

Fig. 08. Brickell Avenue Station.



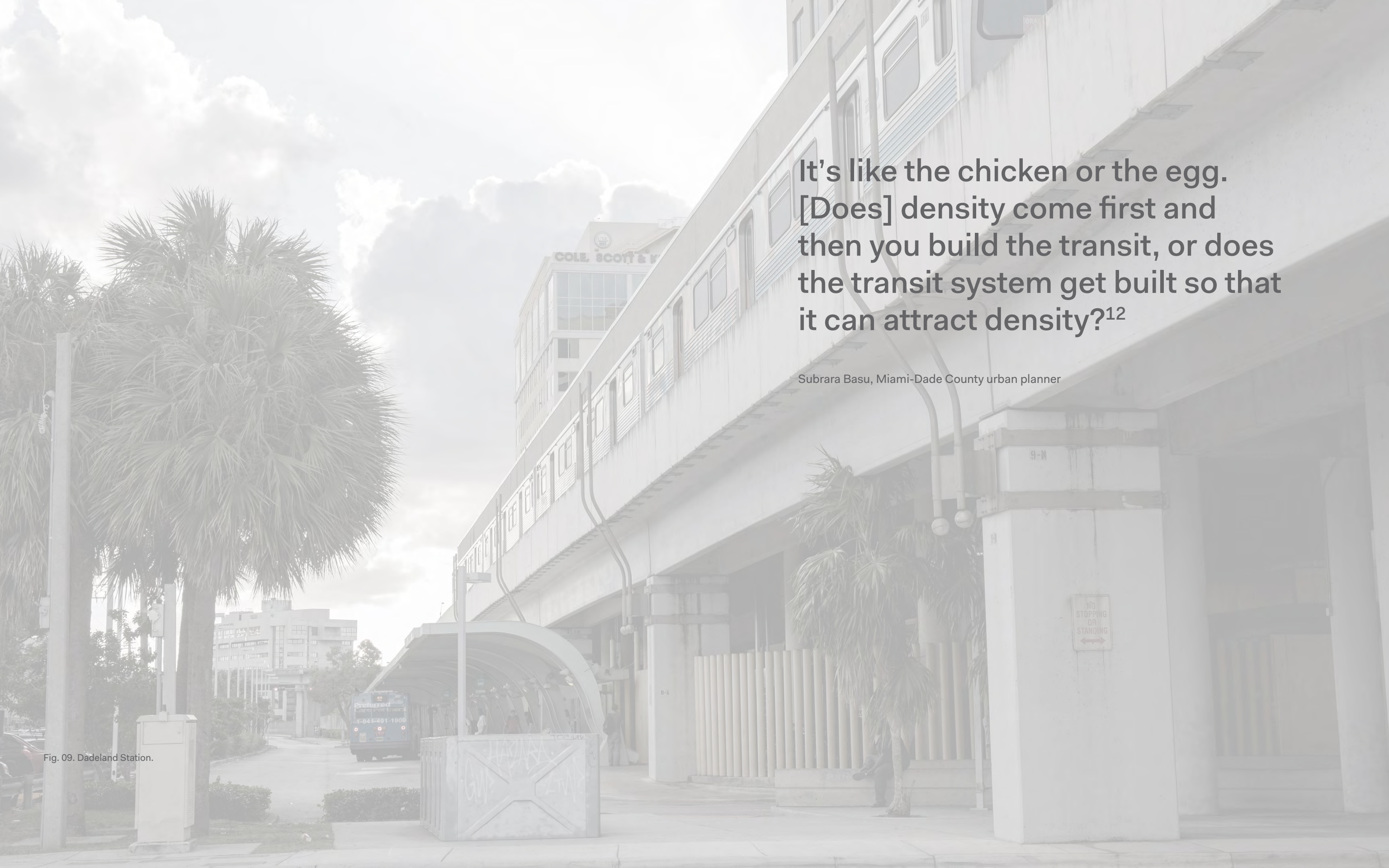
Events

Miami's joint development regime has directly spurred transit usage. Ridership increased by approximately 30 percent at the Brownsville Metrorail Station after the completion of a joint development project in 2012, while the Related Group's joint development at Santa Clara Station in 2000 spurred ridership there by 90 percent.¹¹ With increasing interest and investment in transit-oriented development, and growing proof that this development can impact transit usage, Metrorail has the opportunity not only to increase density but also to create lively neighborhoods around existing stations.

Presently, Metrorail suffers from a lack of integration into the day-to-day life of its surrounding communities. But by curating the stations' character and program (from retail to commercial uses) and planning for the walking shed as a whole, Metrorail can grow ridership and form walkable communities. Yesterday's park-and-ride stops can become today's live-work-play destinations. By some measure, Dadeland represents the beginning of this urban transformation.

> Curate a neighborhood character. Approach Metrorail-adjacent retail as an entertainment experience to grow visitorship, recasting stations as gateways thereto. Curate local amenities and ensure the placement of daily retail (such as groceries and cafés) within walking distance of the stations.

- > Cultivate live-work-play areas around Metrorail stations. Promote job growth and densify retail, office, and commercial development in key areas to develop lively mixed-use neighborhoods and build a sense of place.
- > Introduce public programming and events, such as outdoor music performances and fairs, around stations to attract community attention and increase public appeal.
- > Pair with The Underline to coordinate and host tie-in programming and events.
- > Communicate connectivity. Embed Metrorail into Miami's broader transportation network by developing methods of highlighting and facilitating intermodal commutes. Create clear, intuitive links to urban cores and other parts of the city.



It's like the chicken or the egg.
[Does] density come first and
then you build the transit, or does
the transit system get built so that
it can attract density?¹²

Subrara Basu, Miami-Dade County urban planner

Fig. 09. Dadeland Station.

Policies

Though Miami-Dade County has experienced fast-paced growth in the past decade, until the early 2000s city and county planning organizations continued to spur low-density development and automobile dependency through high parking requirements for new construction, a bias against mixed-used development, and an emphasis on low-density residential construction at the urban fringe.

However, in recent years a shift towards joint development ventures and transit-oriented development has opened the door for policies that create denser, walkable neighborhoods around Metrorail's existing stations. Through zoning overlays and recalculated building envelopes, the city can not only promote residential density to support ridership goals for Metrorail but also guide urban form for more livable transit districts.

- > Create overlay districts to create density within a ten-minute walking shed of each transit hub. This would serve to upzone adjacent blocks, strengthen neighborhood identities, support new ridership, and guide urban form around Metrorail stations.
- > Adjust zoning envelopes and building typologies according to solar performance in order to maximize shade in public areas.
- > Integrate Metrorail into rest of the city by communicating connectivity and promoting intermodal transit and development.



A vital part of Metrorail's future begins with defining the broader user experience of its riders.¹³

Michael Rock, Principal, 2 x 4

Fig. 10. Dadeland South Station under utilized space.



Shift Public Perception

Observation:

Metrorail was never properly positioned in Miami's public imagination.

Strategy:

Reposition Metrorail through rebranding.

1. Metrorail's precedents, DC's Metro and Disney's Monorail, captured the imagination.
2. Metrorail was not supported by robust public communications and suffered bad press.
3. Many features of Metrorail were value-engineered before implementation.

Fig. 11. Poster promoting the Disney Monorail, opened 1971.

Scenario 01: Shift Public Perception

Themes and Tactics

Because Metrorail never met its original ridership projections, it has continually escaped the public's imagination. The Metrorail's infrastructure itself is intact, but the transit system requires rebranding. How can Miami Metrorail grow to be embraced by the people and culture of its city? This approach explores possible user experience ideas along two axes: themes (addressing emotional tonality); and tactics (concrete expressions).

Four possible emotional tones are: Hyper-Miami, Urban Oasis, Counter-Culture, and Futurism; tactics include potential slogans, access, sound, art, programming, arrival, connectivity, and social media.



Fig. 12. Four emotional tones for Metrorail: (top left, clockwise) Hyper-Miami, Urban Oasis, Futurism, and Counter-Culture

Scenario 01: **Hyper-Miami**

Theme: Hyper-Miami

Discover a new side of Miami.

Core Concepts: Mine, Yours, Diversity, Personal, Ownership

Keywords: Spirited, Contextual, Local

Visual Cues: Color, Pattern, Vibrancy



Fig. 13. Local Voices
Use local celebrities to make train announcements in both English and Spanish in recognition of Miami's multi-lingual communities.

Scenario 01: Hyper-Miami

IFTTT

A world that works for you

IFTTT is the free way to get all your apps and devices talking to each other. Not everything on the internet plays nice, so we're on a mission to build a more connected world.

Enter your email



Fig. 14. If This Then That
For individual stations and people's other accounts. Foursquare mayor of a given station gets their name prominently displayed on the station somewhere. Or gets to choose the artist who paints the mural. Or gets discount at local venues, free coffee, whatever it is.



Fig. 15. Carpool Shuttles
Deploy disruptive colored shuttles to transport riders from their homes to the station. Carpool sized shuttles feel neighborly and intimate.

Scenario 01: **Urban Oasis**

Theme: Urban-Oasis

Elevate your everyday.

Core Concepts: Relaxation, Ease, You-focused

Keywords: Panoramic, Contemplative, Al Fresco, Relaxed

Visual Cues: Blue, Sybaritic, Tranquil, Elevated



“We’ll be arriving at Coconut Grove shortly.
The time is 3:30 pm. The forecast is hot and
sunny, getting up to a high of 93 degrees...”

Fig. 16. Relax & Ride
Use a single distinctive and calming voice for all train and station announcements. Broadcast the local weather forecast as an implicit reminder of the climate controlled comfort of the trains.

Scenario 01: Urban Oasis



Fig. 17. Elevated Sanctuary
Dramatize the rider's ascension from the ground level up to the elevated platform reinforcing the feeling of getting away from it all.

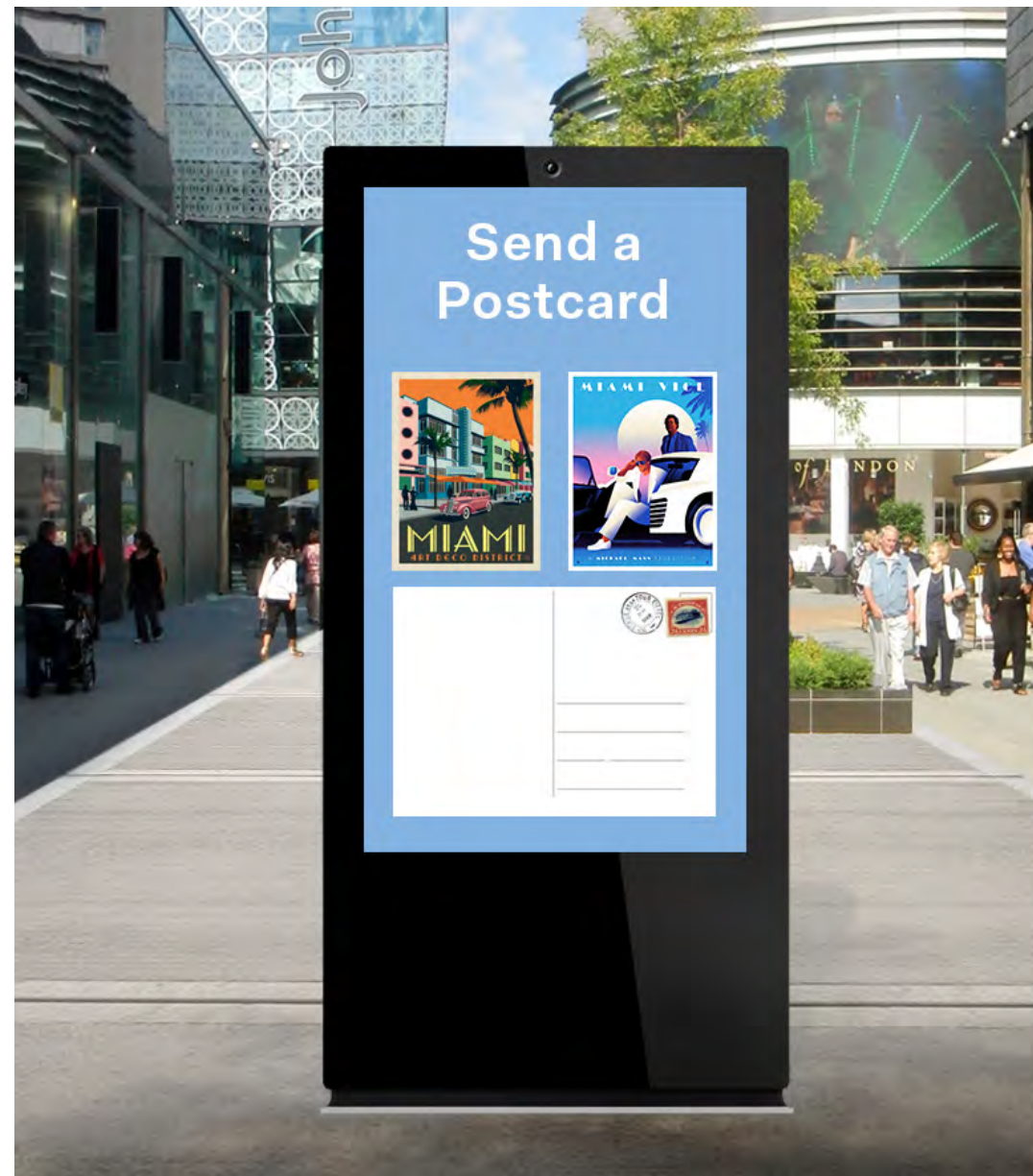


Fig. 18. Digital Postcards
Allow riders to select postcards from different eras of Miami's history, write, and send digitally while they wait.

Scenario 01: **Counter-Culture**

Theme: Counter-Culture

Take back Miami.

Core Concepts: Freedom, Democracy, Access, Reclamation

Keywords: Provocative, Independent, Socially-Conscious

Visual Cues: Vernacular, Street, Punk

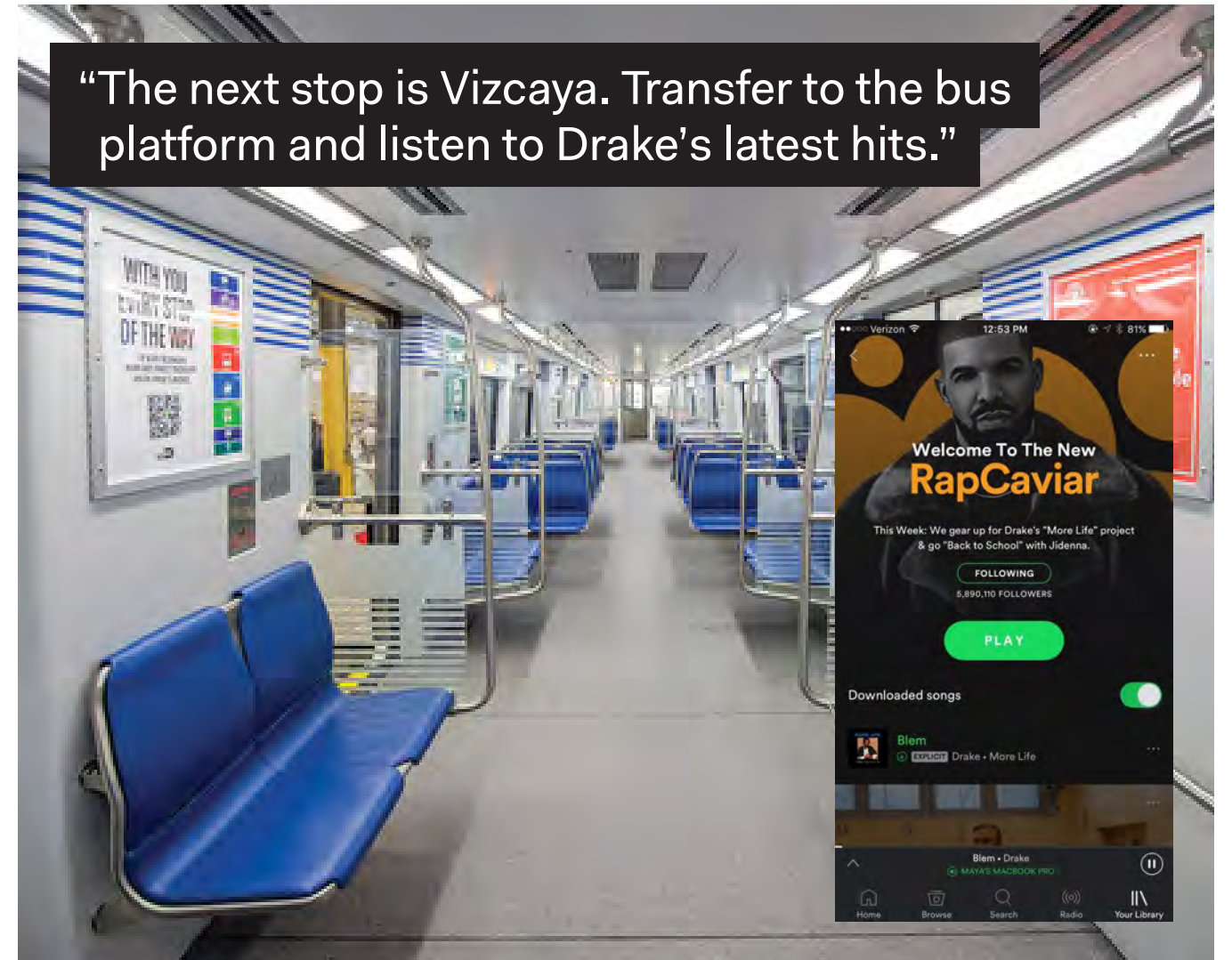


Fig. 19. Playlist Soundtrack
Entertain riders with sound-tracked announcements that highlight counter-cultural artists.

Scenario 01: Counter-Culture



Fig. 20. Lifestyle Rewards
A wearable metrocard that also allows you to access lifestyle destinations like live concert venues.

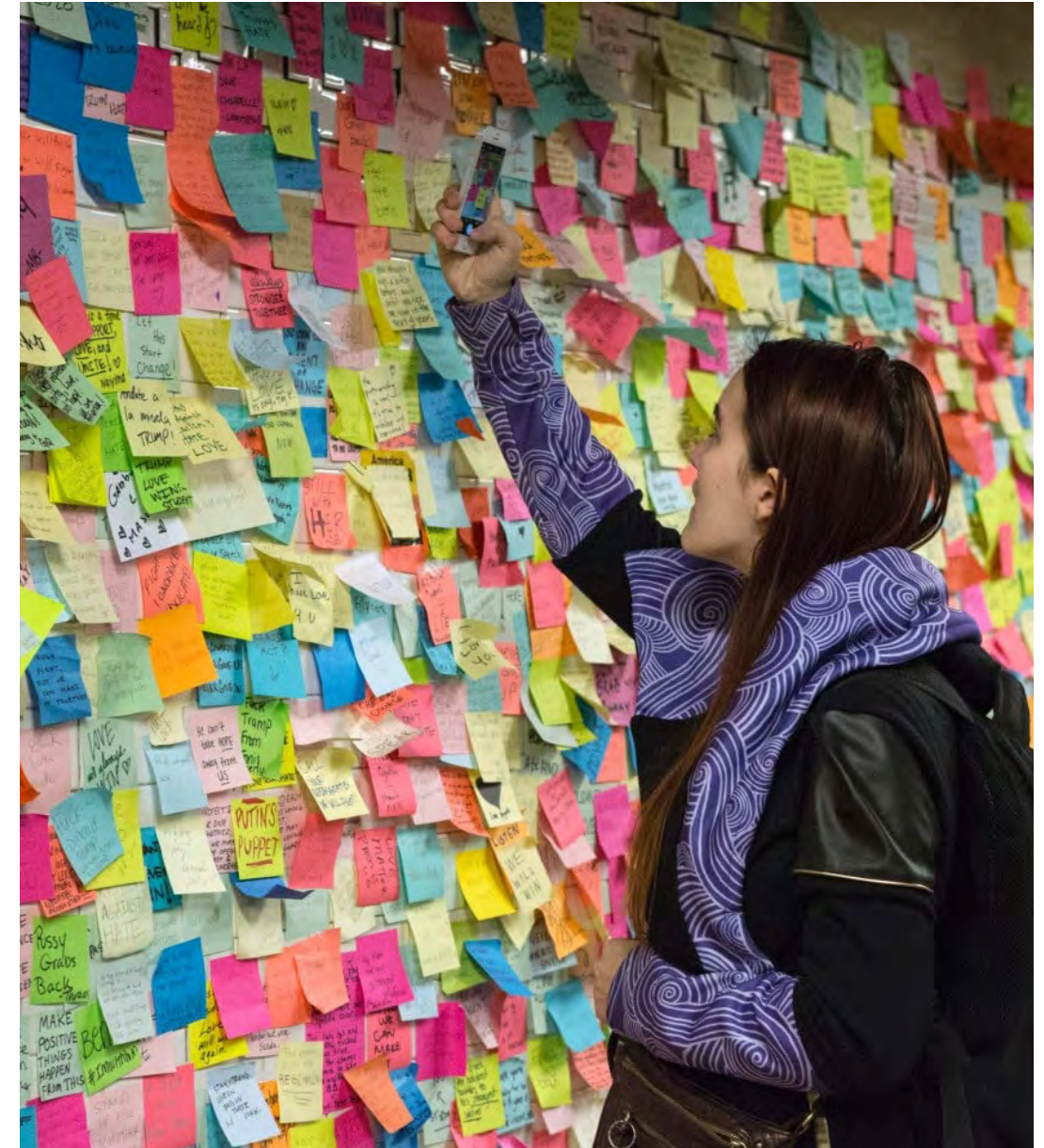


Fig. 21. Pop-Up Activism
Activate metro stations as a physical gathering space and venue for social and political conversation.

Scenario 01: **Futurism**

Theme: Futurism

Here to get you there.

Core Concepts: Seamless, Connected, Ease

Keywords: Efficient, Practical, Technology-Forward

Visual Cues: Cool, Dynamic, Screen-Based

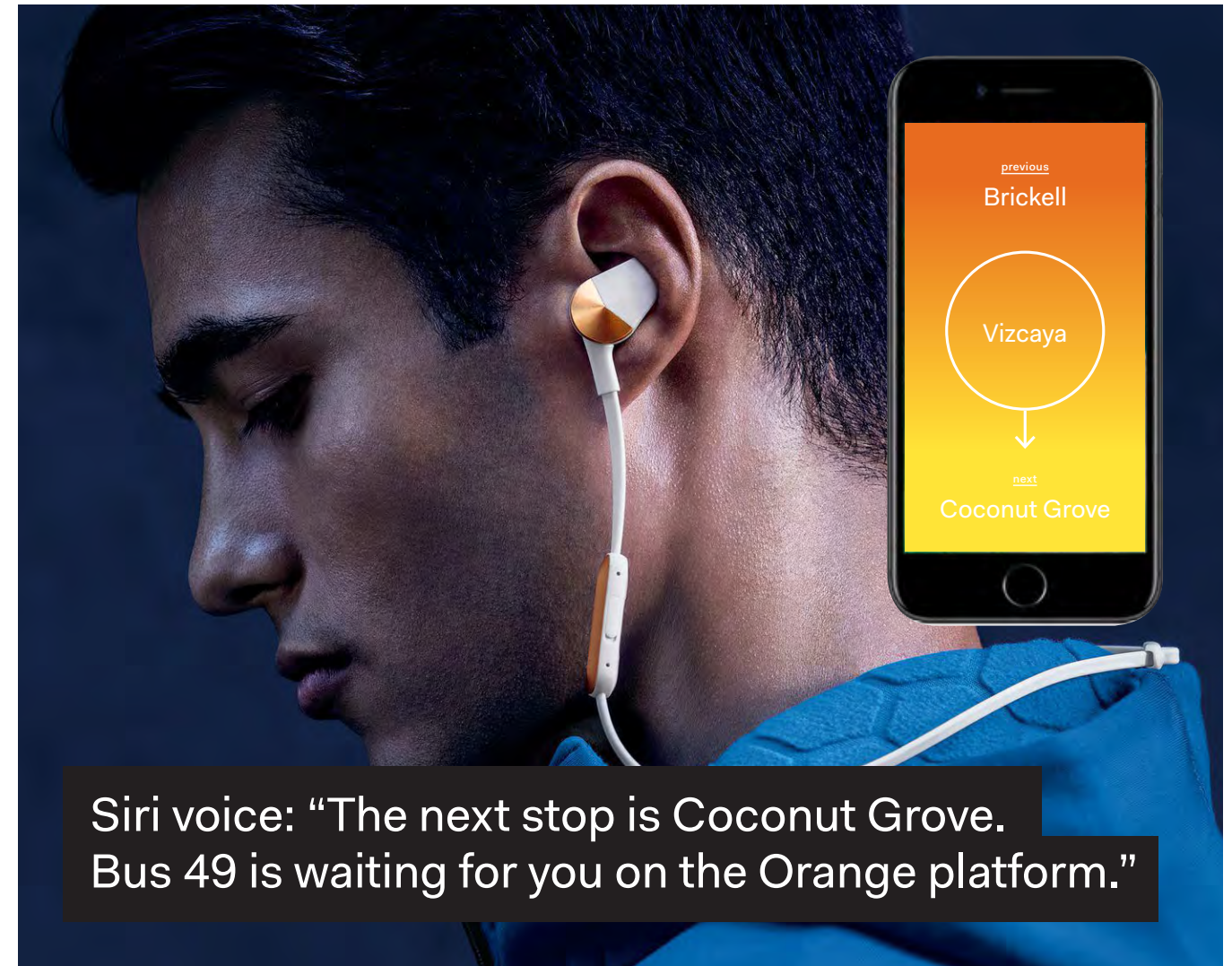


Fig. 22. Automated Personality
Establish an automated voice personality for the system that can also be engaged through the app.

Scenario 01: **Futurism**



Fig. 23. Virtual Supermarket
 Make use of commuters' waiting time by offering in-station digital shopping kiosks. Purchased goods are later delivered to the consumer's home.

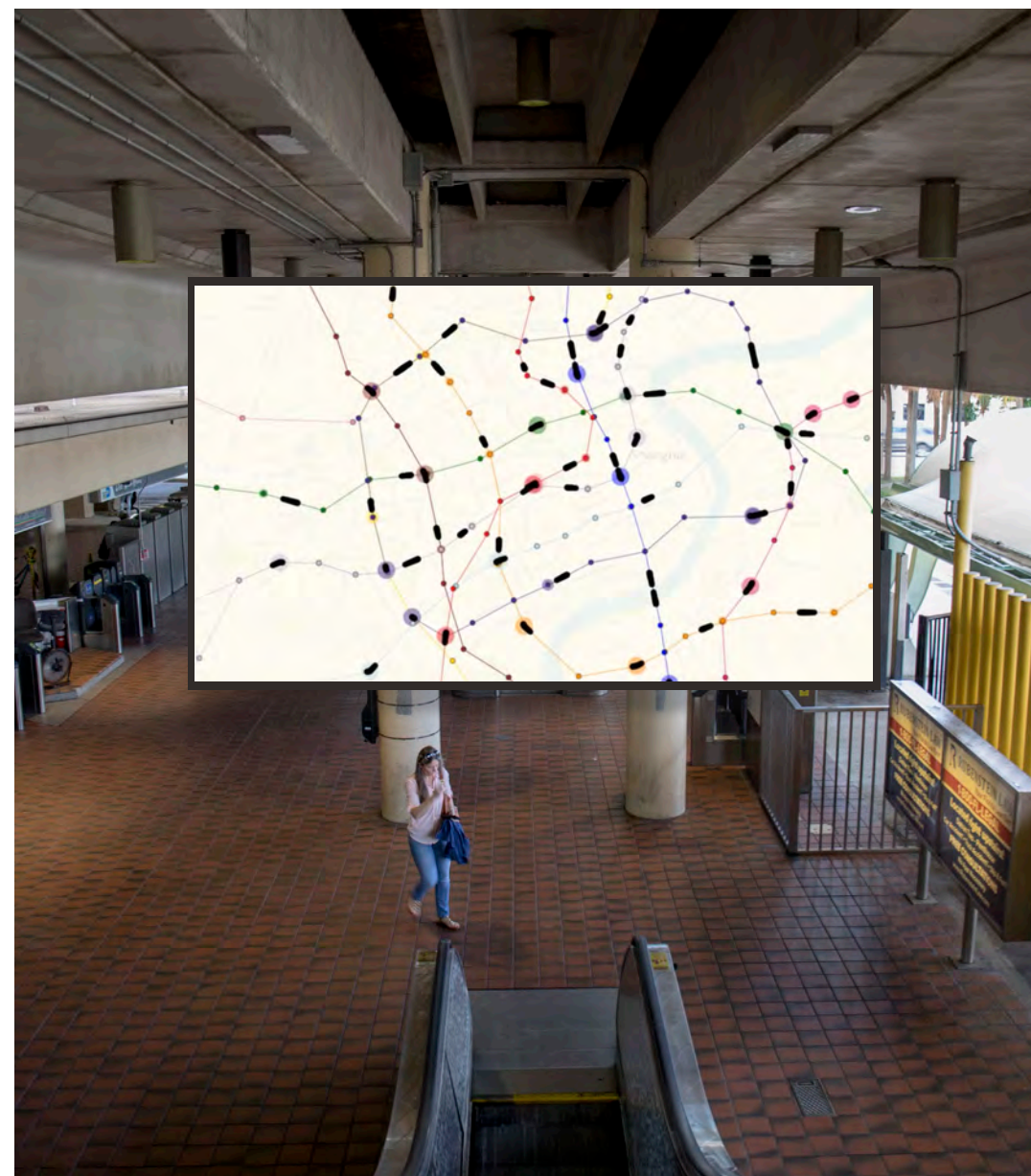


Fig. 24. Train Visualization
 Prominently display infographics of train traffic in the stations as a way of informing riders of current conditions as well as serving as a kind of ambient artwork.



Enhance the Experience

Observation:

Cultural perceptions of Metrorail are a greater barrier to ridership than infrastructure.

Strategy:

Elevate, upgrade, and enhance the lived experience of riding Metrorail.

1. U.S. 1 is a physical and psychological impediment that can be offset by creating a sense of arrival at Metrorail stations.
2. The dominance of Miami's car culture and distribution of urban sprawl conspire against Metrorail's success.
3. Metrorail stations, while serviceable as infrastructure, are islands surrounded by parking lots.

Fig. 25. Breakwater Hotel in South Beach Miami.

Scenario 02: Enhance the Experience

Visibility

Metrorail stations suffer from a lack of visibility. Upgrading the materiality, lighting, and signage of the stations can vastly improve the experience of riding Metrorail. Simple improvements include recladding and softening the existing Brutalist concrete structures with new, cost-effective finishes and curating the vegetation in and around the stations. In particular, vegetation on the second-level platforms can help maximize station visibility from afar. These material strategies should be aligned with district-wide rebranding efforts.

In addition to architectural materials, improving the exterior, interior, and accent lighting will make stations more visible at night and will also create a safer transit environment. These strategies can also pair with rebranding efforts by using colored lights, much like 1111 Lincoln Road Garage's purple-lit top floor.

Stations can improve wayfinding by installing bilingual signage throughout, and bus and train trackers and user-friendly interactive screens that calculate personal commutes and transfers can engage and inform the public. As part of a larger urban strategy, establishing clear viewsheds, designing boulevards and plazas, and creating access points will optimize station visibility and make Metrorail a more welcoming and accommodating space.

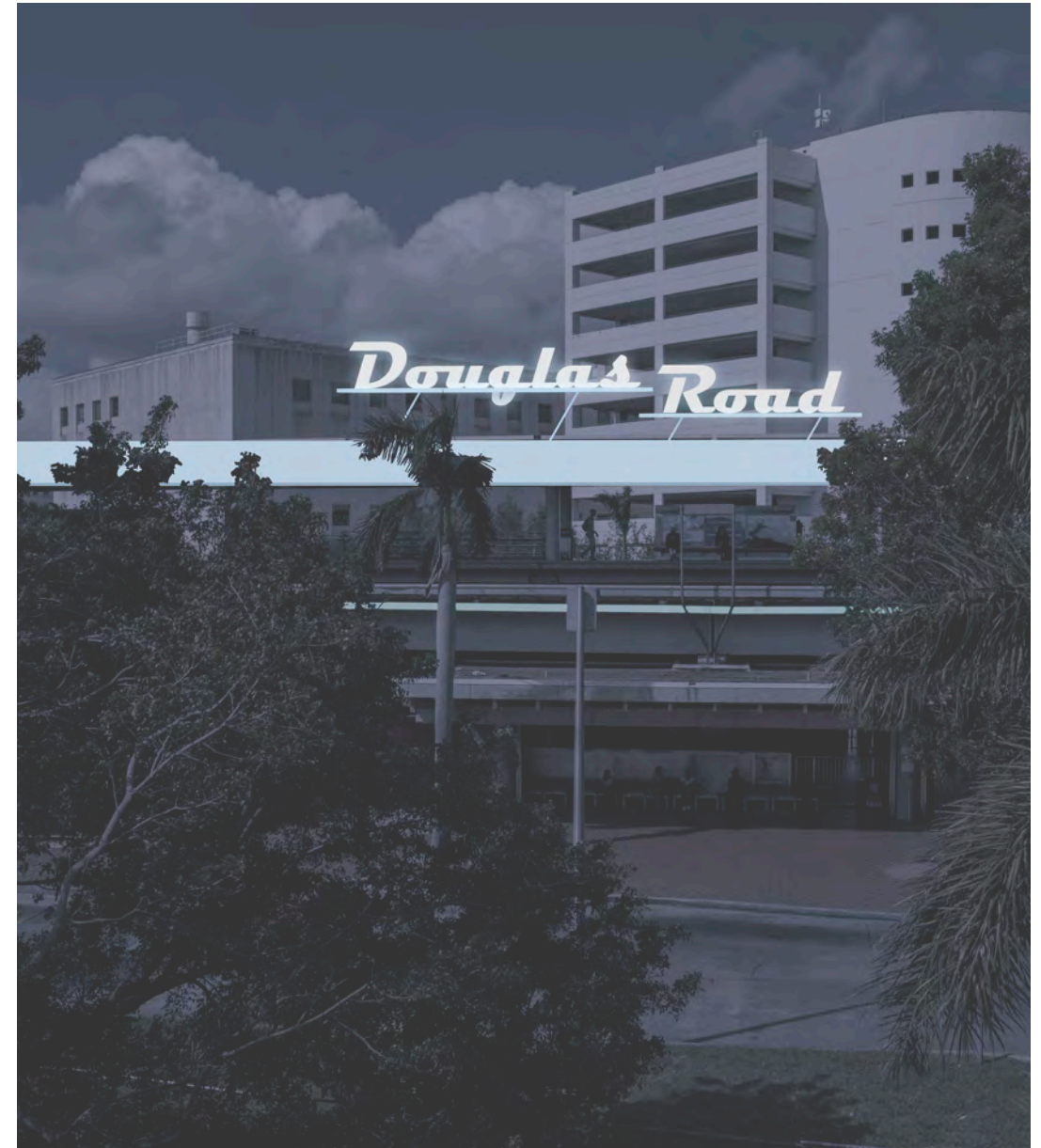


Fig. 26. Rendering for Douglas Road shows how the use of colored light can improve visibility for the station.



Fig. 27. Metrorail Station rendering, staging materiality upgrade.

Scenario 02: Visibility

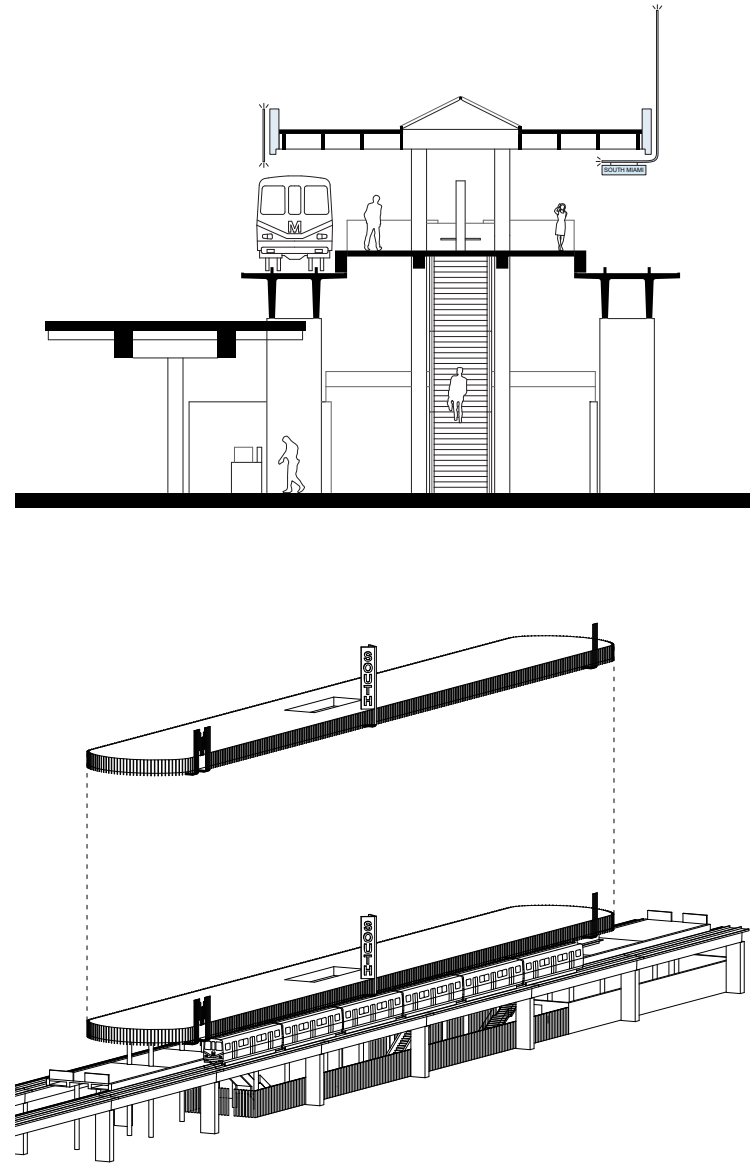


Fig. 29. Section and exploded axonometric of South Miami Station.
Fig. 30. Rendering image for potential look of the station.

Scenario 02: Enhance the Experience

Comfort

Miami is hot and humid for three out of the four seasons. Therefore, enhancing the experience of riding Metrorail must address issues related to comfort, atmosphere, climate, and convenience. First, fans, air conditioning, and misting can maximize comfort during all seasons. Second, introducing audio features such as announcements by local voices, customized music or playlists, and other sound devices can provide ease of communication while relating to the city's cultural imagination. Finally, providing light retail at stations, such as smart vending machines or newsstands, in addition to standard bodily comforts like seating and anti-slip stair treads, can vastly upgrade the experience of riding Metrorail.



Fig. 31. Rendering of comfort related features to be added at the stations.

Scenario 02: Comfort

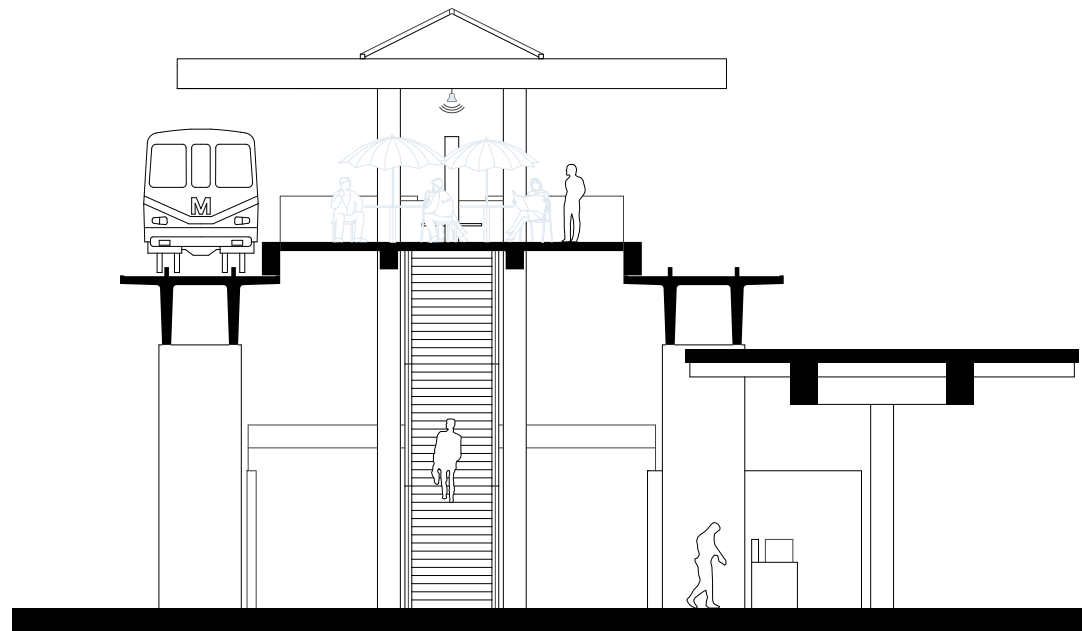


Fig. 32. Potential comfort improvement through shades and chairs, South Miami Station Section.

Fig. 33. Rendering of Metrorail station.

Scenario 02: Comfort



Fig. 34. Furniture at stations.

Scenario 02: Enhance the Experience

Arrival

Stations have the opportunity to signify a sense of arrival. Landscape strategies can be deployed to improve the context of the stations: curating vegetation, designing paving, and creating pedestrian-oriented street walls (e.g., storefronts and reduced or eliminated setbacks) can improve approach and entry sequences. Introducing heat-mitigation (e.g., canopies and trees) around the stations and addressing parking requirements and management can also facilitate walkability in the neighborhood. Implementing parking management plans, introducing shared resident and rider parking and pay-by-phone parking, and adding street parking with sidewalks can all help maximize parking efficiency. Pairing with The Underline for infrastructural and aesthetic improvements and developing design strategies to overcome the physical and psychological barrier of U.S. 1 can improve accessibility to the stations and help increase the flow of riders.



Fig. 35. Satellite image of a Metrorail station.

Scenario 02: Arrival

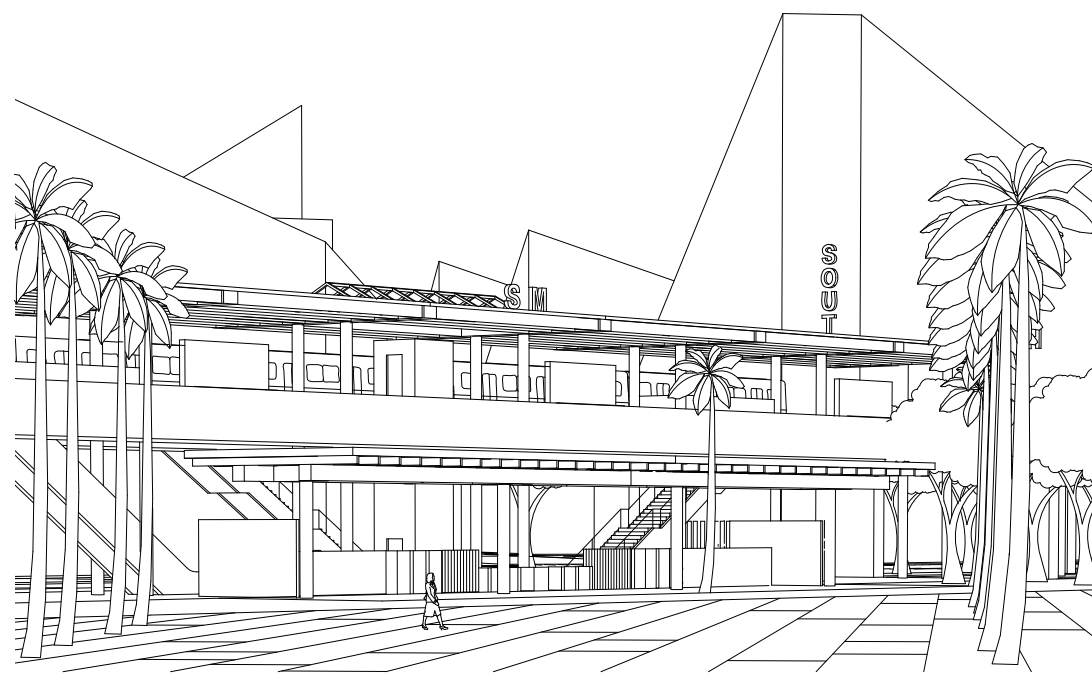


Fig. 36. Potential arrival boulevard, Douglas Road Station.

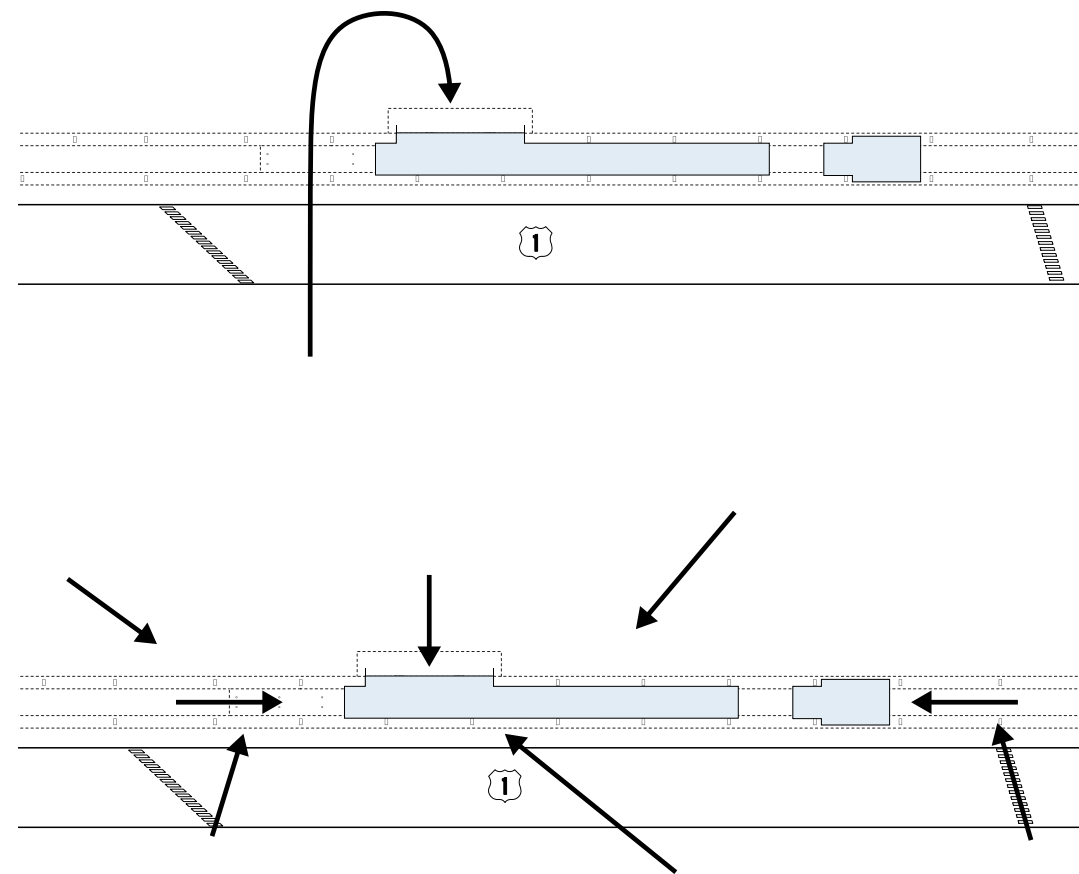


Fig. 37. Directional Entries
Above: Existing Condition, indirect access from U.S. 1.
Below: Proposed Condition, multi-directional access from U.S. 1.

Scenario 02: Arrival

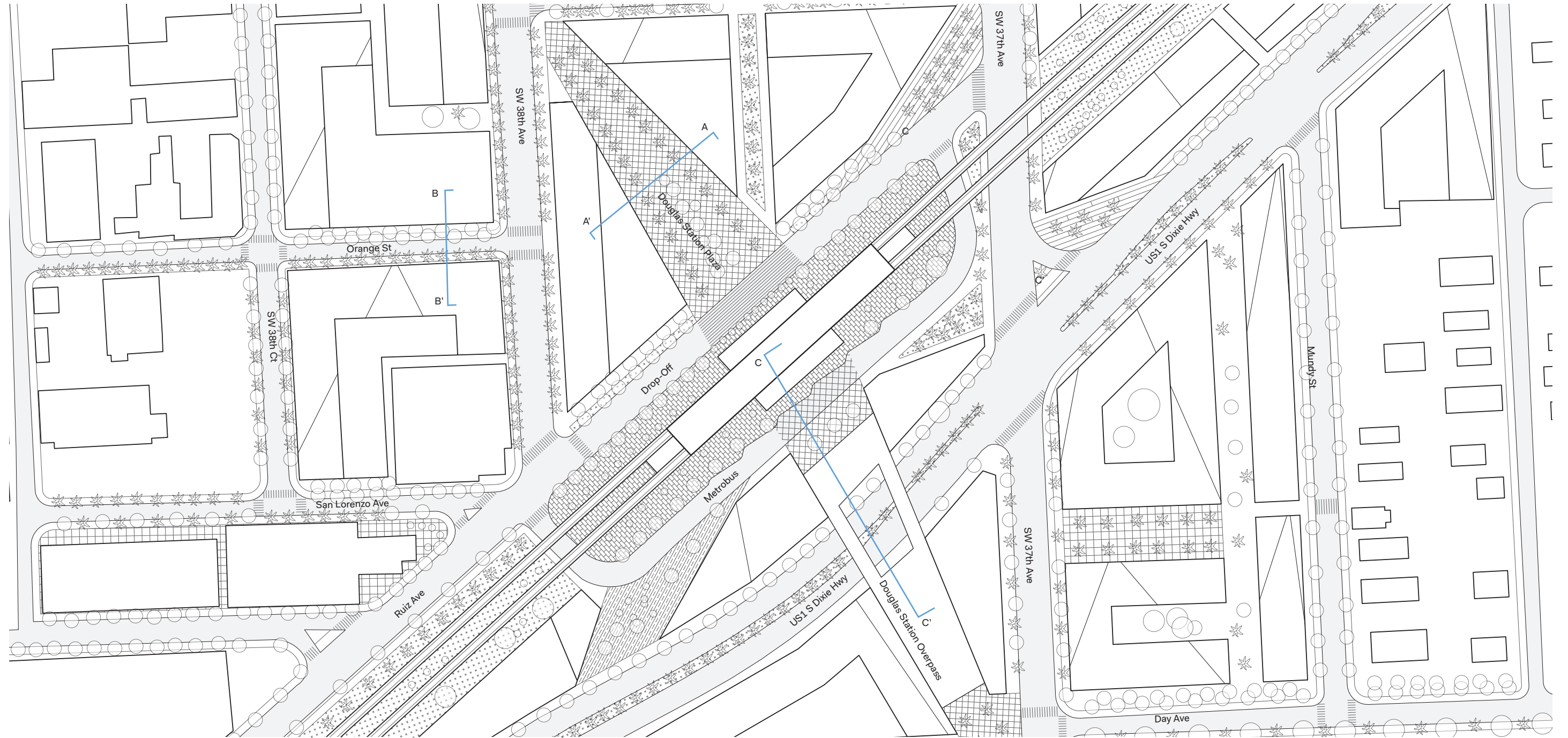
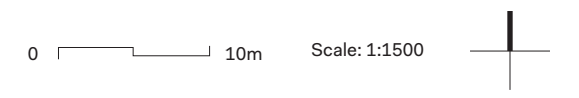


Fig. 38. Douglas Road New District (Public Realm).



Scenario 02: Arrival

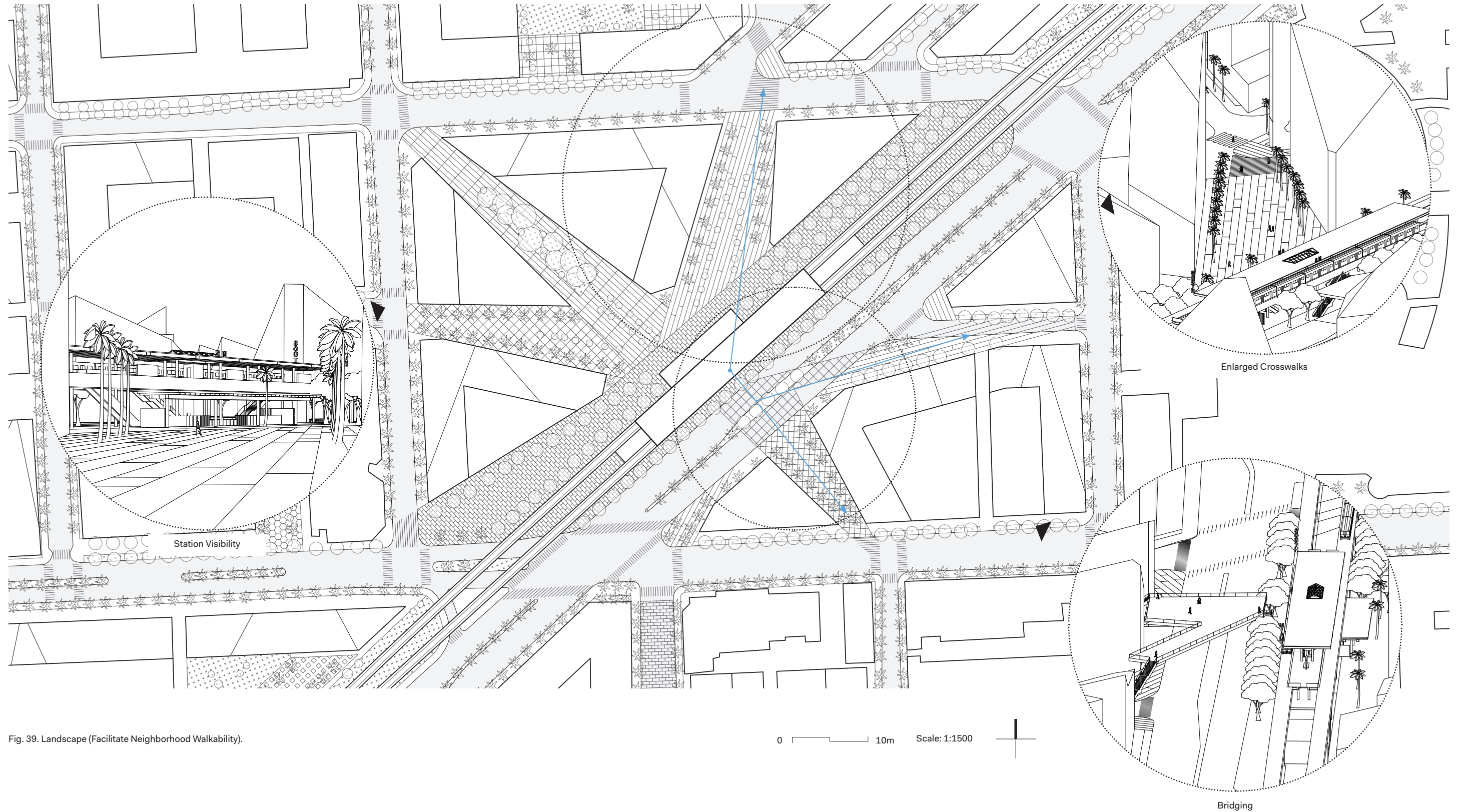


Fig. 39. Landscape (Facilitate Neighborhood Walkability).

0 10m Scale: 1:1500



Develop Desirable Destinations

Observation:

Growing Metrorail's ridership requires a holistic, multi-scalar, intermodal approach.

Strategy:

Create lively, dense, walkable communities immediately around Metrorail.

1. Metrorail suffers from a lack of integration into the day-to-day life of its communities.
2. Transit-oriented development is important, but accounts for only one part of a solution.
3. Yesterday's park-and-ride stops must become today's live-work-play destinations.

Fig. 40. Rendered view of potential events to be developed around the Metrorail stops.



Fig. 41. Rendered view of potential events to be developed around the Metrorail stops.

Scenario 03: Develop Desirable Destinations

Connectivity

Metrorail faces the “last mile” problem: the most difficult part of the user journey lies between the station stop and their final destination. Metrorail can improve its connectivity to its urban contexts by creating linkages and maximizing efficiency. First, publicizing possible connections through district maps can help create links to adjacent urban cores. In addition, supplementing Metrorail with trolleys and improved street corridors can strengthen the transition between stations and urban cores. For example, Coconut Grove station could be connected to downtown Coconut Grove by improving the 27th Street corridor and adding transportation linkages. In addition to creating transit links, Metrorail can improve rush-hour train capacities as well as intermodal synchronicity between trains and buses for more efficient transit.

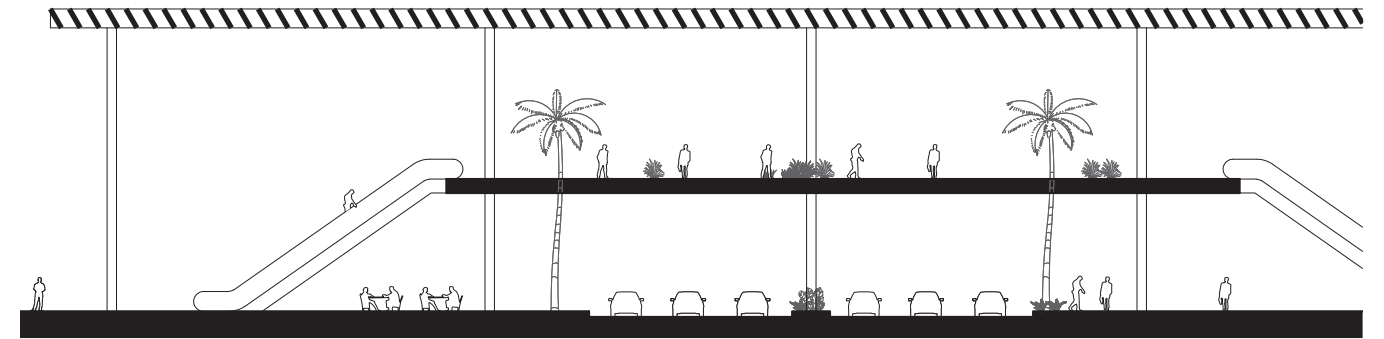


Fig. 42. Trolleys and improved street corridors.

Scenario 03: Connectivity



South Miami Section Type CC



Douglas Road Section Type CC

Figs. 43, 44. South Miami and Douglas Road New District (Typological Sections).

Scenario 03: Develop Desirable Destinations

Events

Public programming can be an effective means of building cohesive neighborhoods and attracting visitors. Metrorail can activate its stations by collaborating with The Underline to coordinate and host public events. These can take the form of both one-off events, such as outdoor music performances and fairs, and recurring programs like Critical Mass Miami (a monthly cycling meet up). Retail can also be treated as a form of entertainment: Wynwood, for example, has been reborn as Miami's "Design District" by cultivating a network of galleries, museums, outdoor art spaces, restaurants, and high-end shops. By creating retail destinations and incorporating daily amenities within each station's walking shed, Metrorail can recast each stop as a gateway to new live-and-work districts.



Fig. 45. Monthly cycling meet ups.

Scenario 03: Events

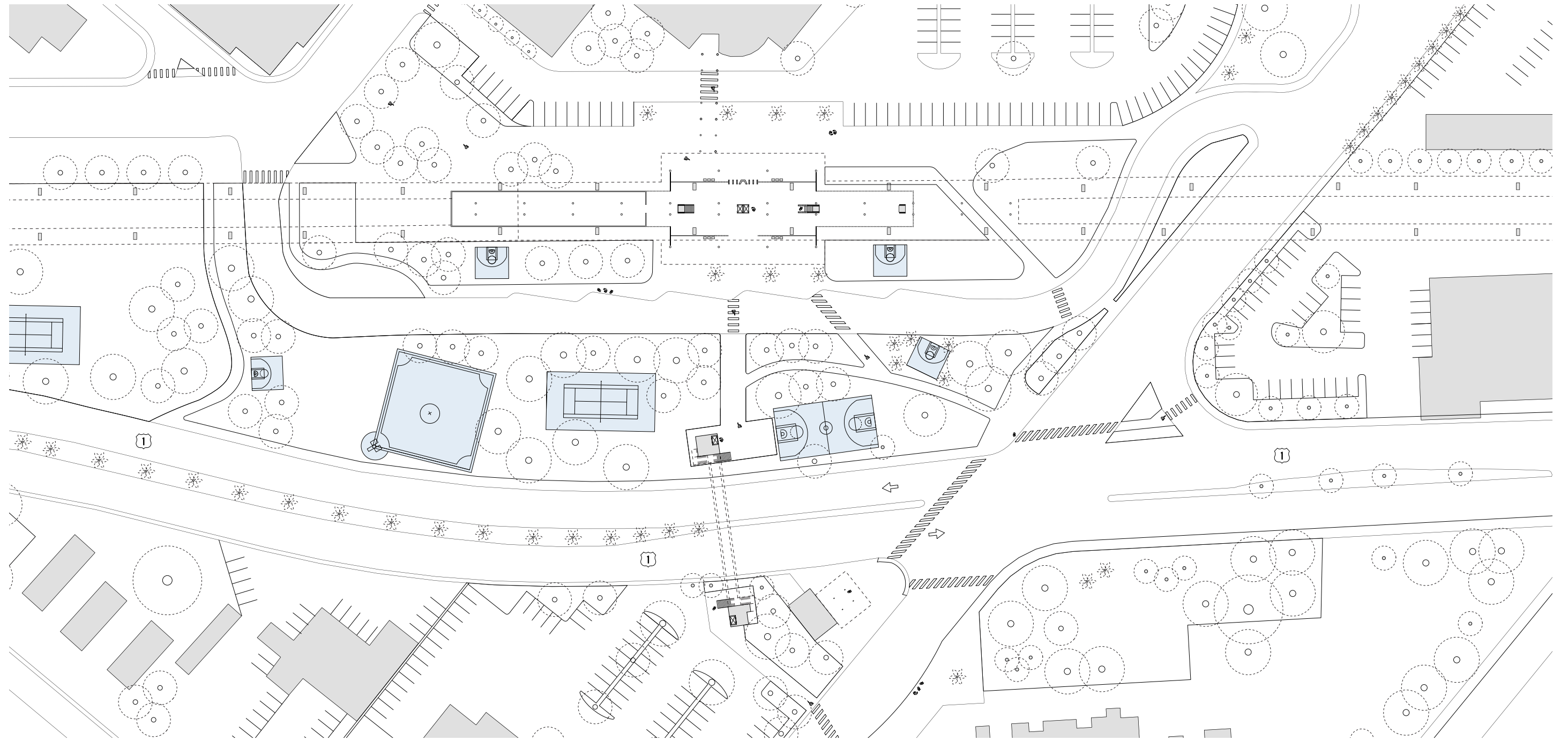


Fig. 46. Introduce public program to activate stations.

0 20m Scale: 1:1000



Scenario 03: Events

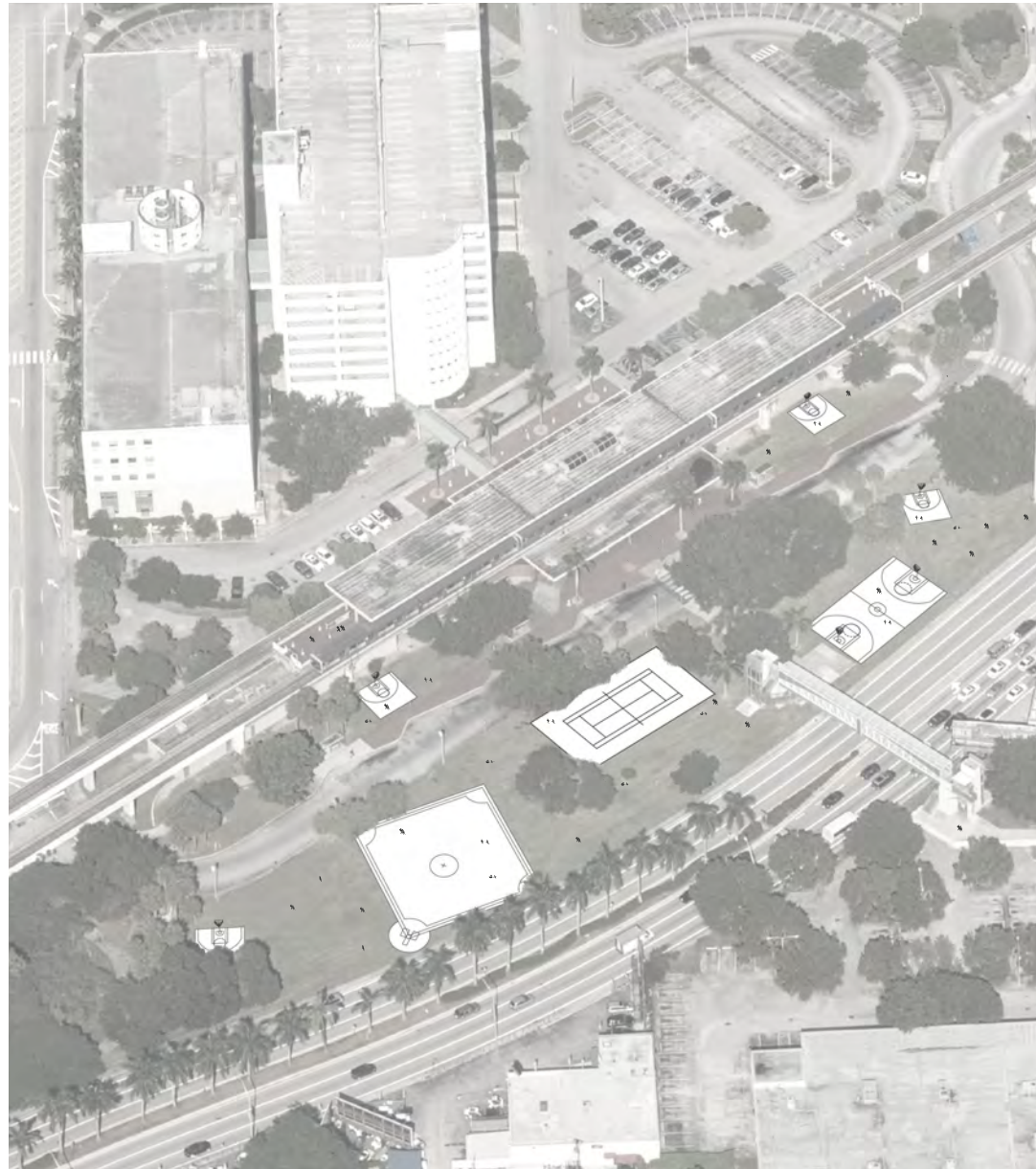
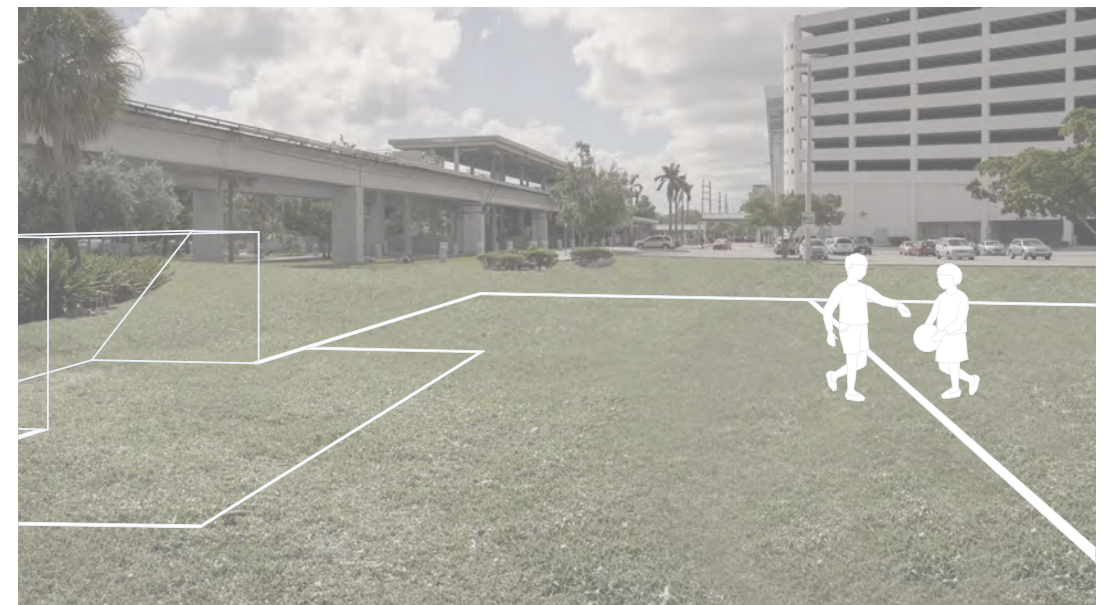


Fig. 47. Introduce public program to activate stations, aerial image rendering.

Fig. 48. Art interventions.
Fig. 49. Soccer field.



Scenario 03: Develop Desirable Destinations

Density

Taking steps to increase density and guide urban form in the areas surrounding stations stands to increase ridership, enhance the user experience, and improve public perception of Metrorail. Implementing zoning overlay districts within a ten-minute distance of the stations can dramatically upzone blocks in those areas. Prospective zoning approaches include: changing T5 zoning to T6; allowing T3 lots to accommodate multi-family buildings; allowing T3 lots to accommodate accessory units; eliminating T3 adjacency restrictions where appropriate; changing parking minimums to maximums; changing dwelling unit density (du/acre) maximums to minimums; introducing incentives that encourage mixed-income, multi-family housing; and creating a 'reverse impact fee,' which is paid by the developer upon leasing or sales to reduce risks and barriers to development. Impact fees should also be recalibrated to reflect not only the negative but also the positive externalities associated with TOD. In addition, Metrorail could pursue pairing development with The Underline to increase housing densities (via FAR bonuses) in exchange for funding toward the construction of The Underline.

Densifying residential units around stations is crucial to reach the thresholds necessary to support ridership and rebrand adjacent areas as new neighborhoods. Metrorail should aim for at least 75 du/acre and no parking requirements within one-half-mile radius of the stations. Pairing with a citywide 'managed retreat and densify' plan can encourage additional transit-oriented development while simultaneously reducing vulnerable housing at low-lying coastal areas, and strategic public-private partnerships can increase mixed-use development around stations. Improving the overall public experience is important: morphing zoning envelopes and building typologies according to solar performance can maximize shade, and encouraging nearby developments or community associations to "adopt" their local stations can help ensure they stay well-maintained and fully operational.



Fig. 50. Housing density derived from Metrorail development.

Scenario 03: Density

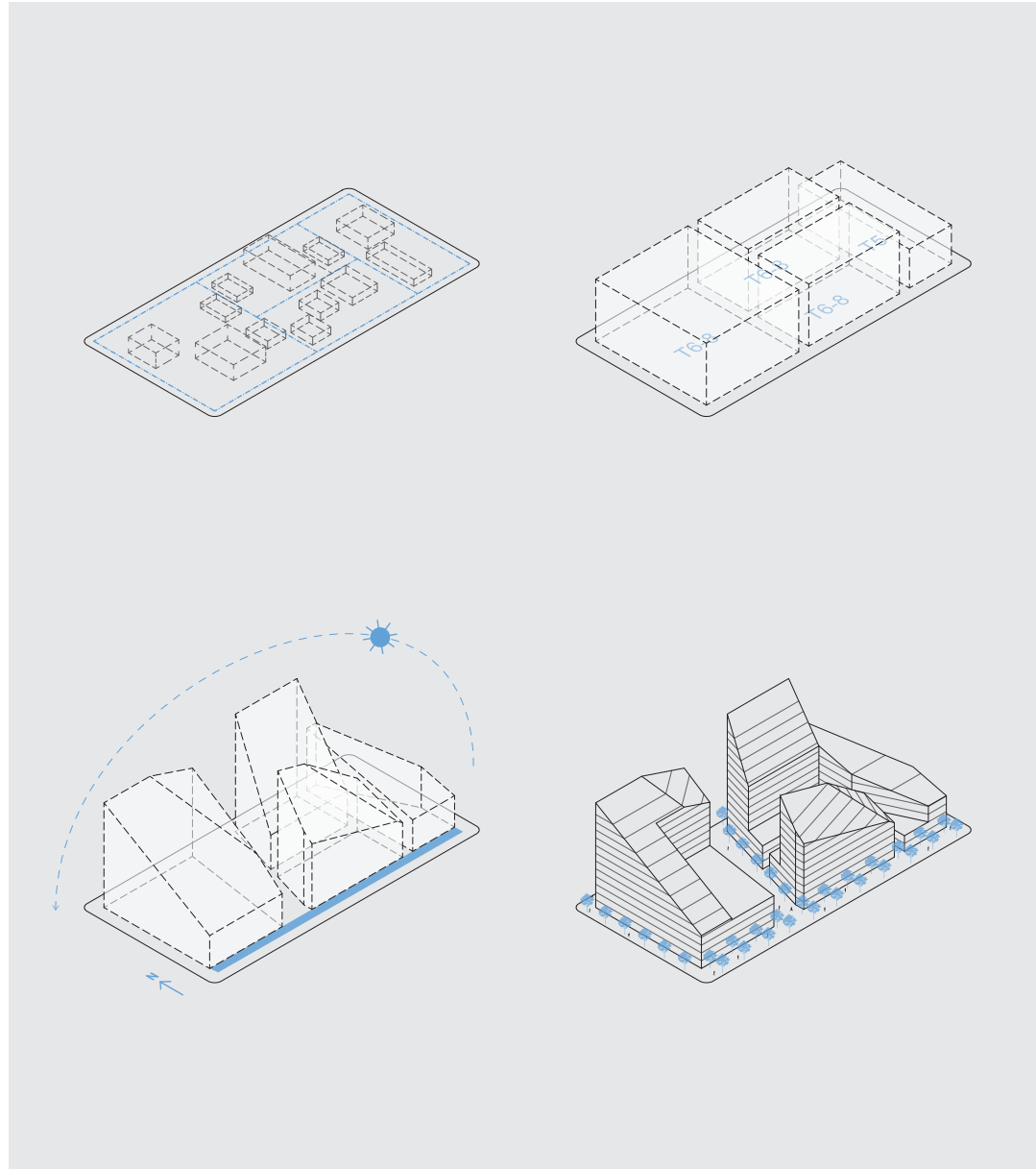
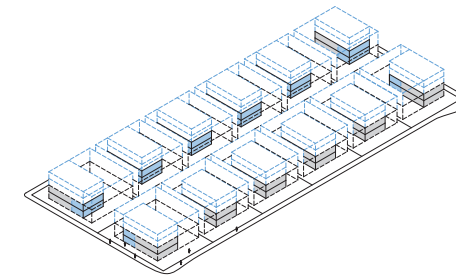
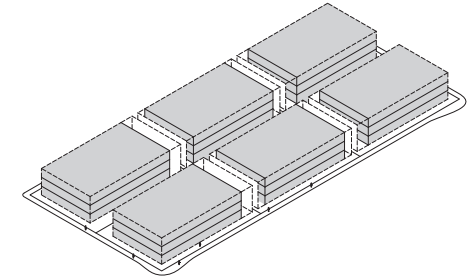


Fig. 51. Potential zoning to maximize viewsheds and shadow on the public realm.

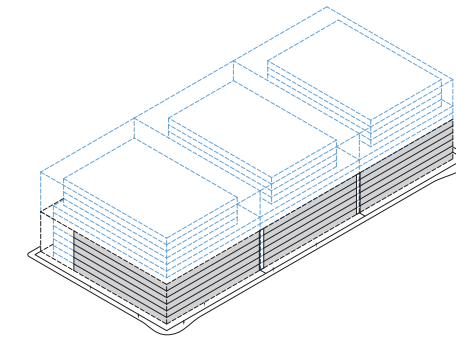
Fig. 52. Potential zoning to maximize viewsheds and shadow on the public realm.



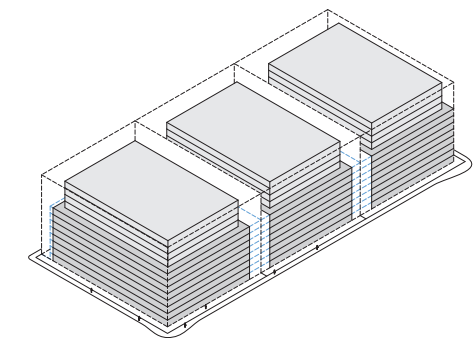
T3: Suburban Transect Zones



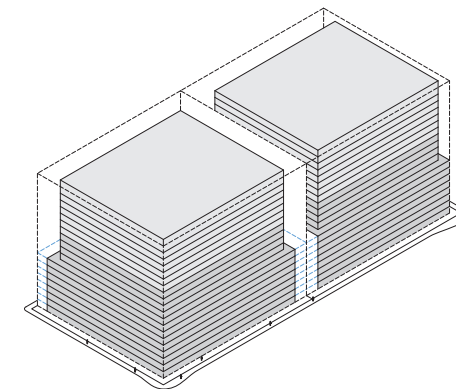
T4: General Urban Transect Zones



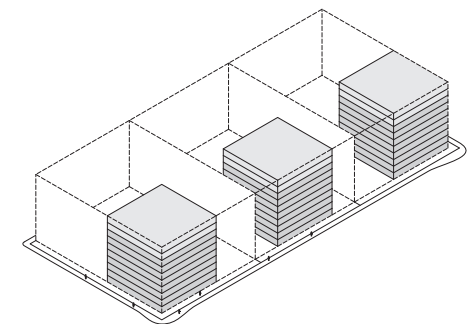
T5: Urban Center Transect Zones



T6-8: Urban Core Transect Zones



T6-12: Urban Transect Zones



D1: District Zones - Work Place

- Allowed by right
- Proposed Revisions
- Bonus for public benefits

Scenario 03: Density



Fig. 53. South Miami Station Zoning Revisions (Proposed).

0 150m

Proposed Upzone lots Scale: 1:7500



Scenario 03: Density



Fig. 54. South Miami New District (Building Typology).

Scenario 03: Develop Desirable Destinations

Apps

Metrorail can mobilize digital platforms to convey transit benefits and inform the public. By implementing user-friendly apps that convey the value of existing assets and calculate the tradeoffs between housing location and transportation cost, it can work to educate both city residents and professionals on the economic, experiential, and environmental benefits of transit-oriented lifestyles and multi-family housing.

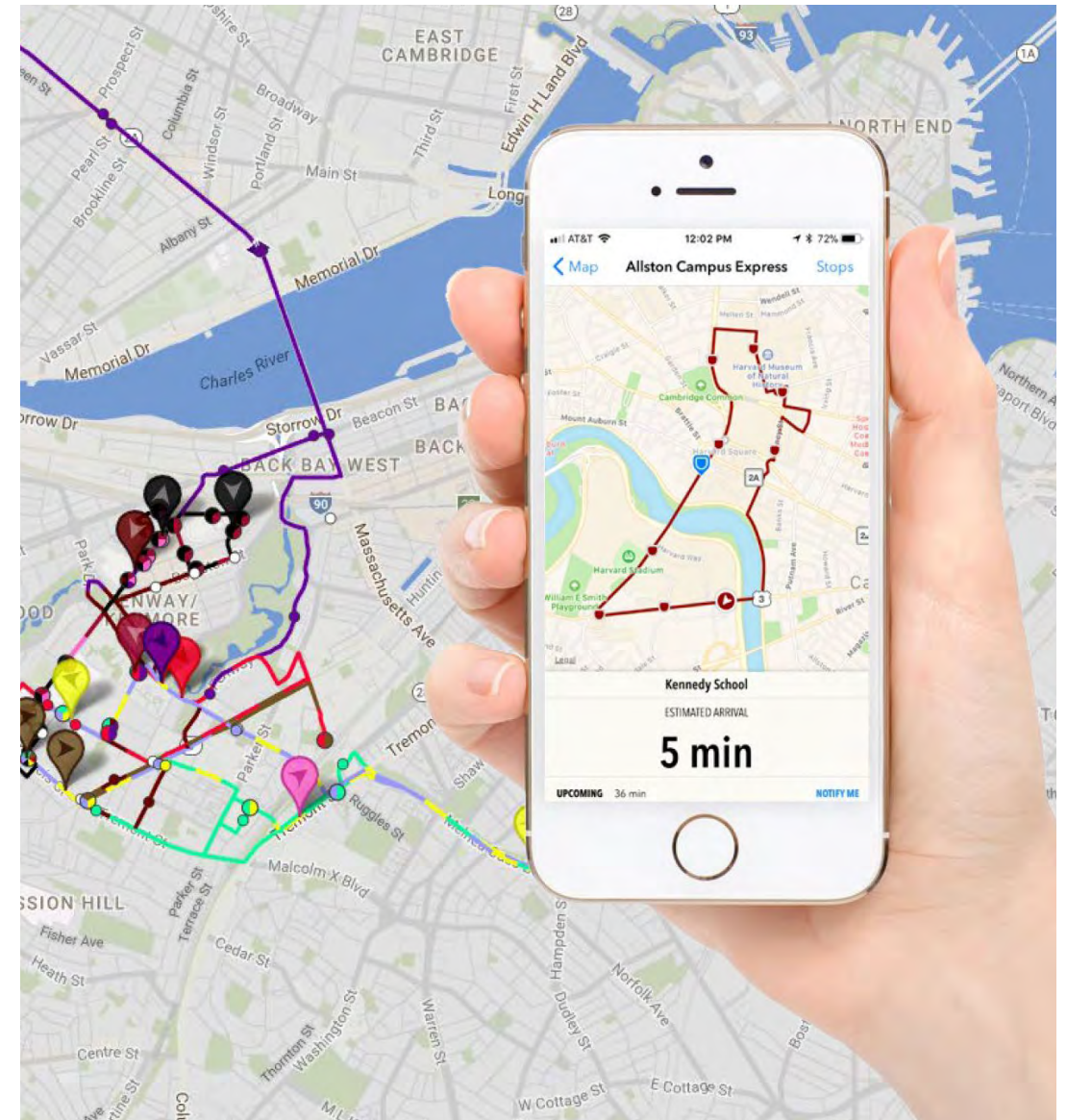


Fig. 55. Mobile apps calculating distances and time and cost benefits.

iMOD

iMOD is a real estate lifestyle app that allows users to find and select housing based on a profile of their transportation needs. Consumers are able to optimize where they want to live based on the time and costs associated with all forms of transportation, including cars, ride-share, walking and mass transit. From daily commutes to picking up groceries, iMOD allows consumers to instantly figure out the quickest and cheapest way to live their lives. If you are moving to a new city or simply want a way to manage your household budget, iMOD is an invaluable tool for promoting sustainable, healthy and inexpensive urban lifestyles.

iMOD stems from empirical research evaluating the performance of Miami's Metrorail. While asset management, operations and facilities were found to be significant barriers to usage, it was negative perceptions among the general public that were deemed to be a primary explanation for low ridership. iMOD was envisioned as a model for shaping positive perceptions within the existing networks for housing selection, shared mobility and mass transit. By highlighting the synchronicity and consumer value associated with living near mass transit, iMOD is poised to be a practical tool for realtors, new and existing residents and policy officials who struggle to balance housing and transportation decisions.

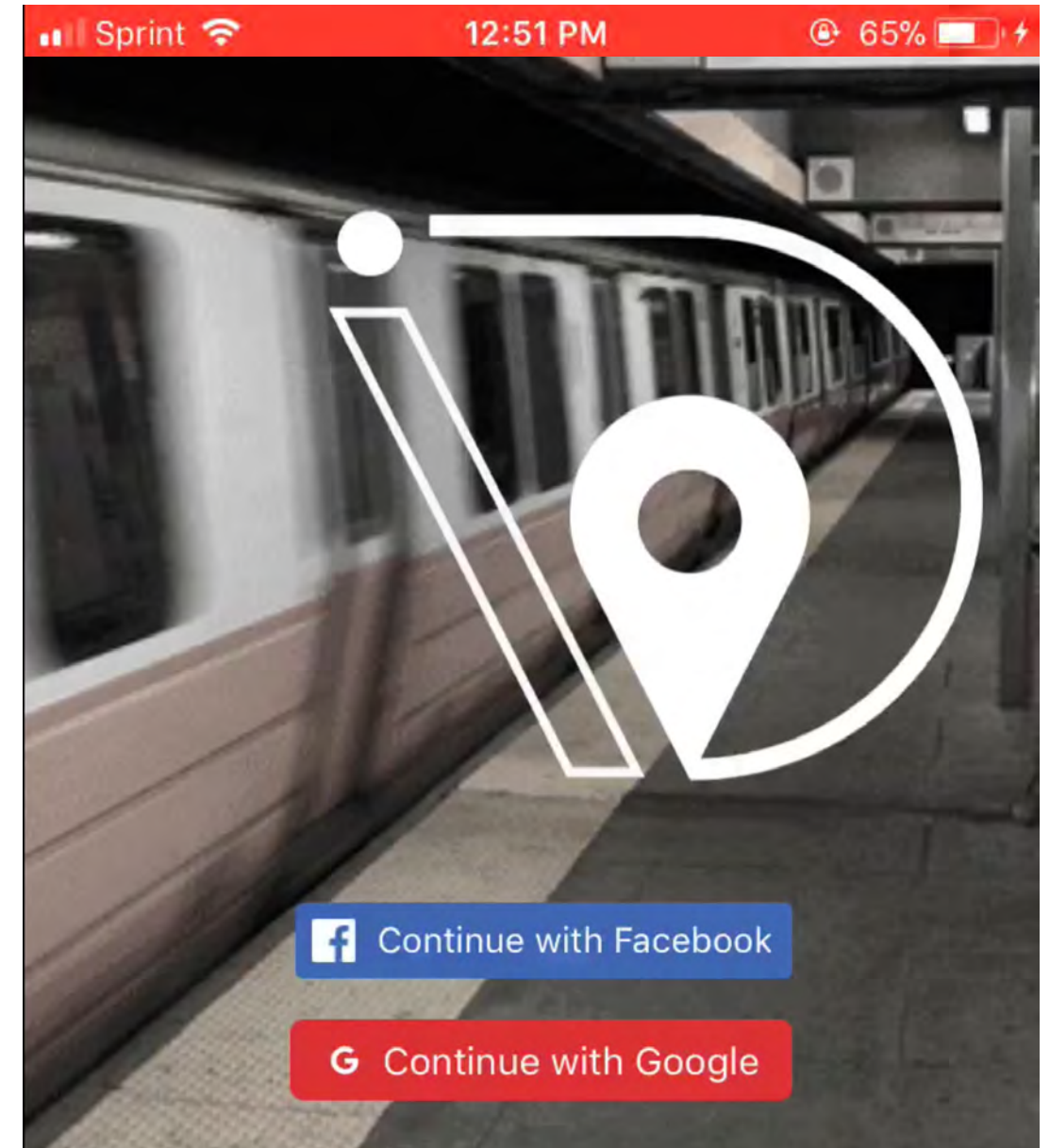
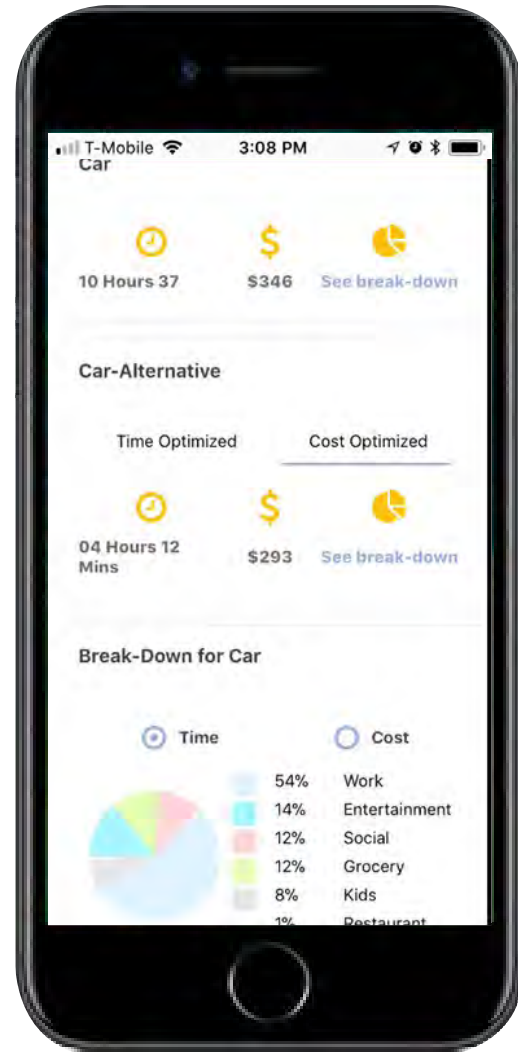
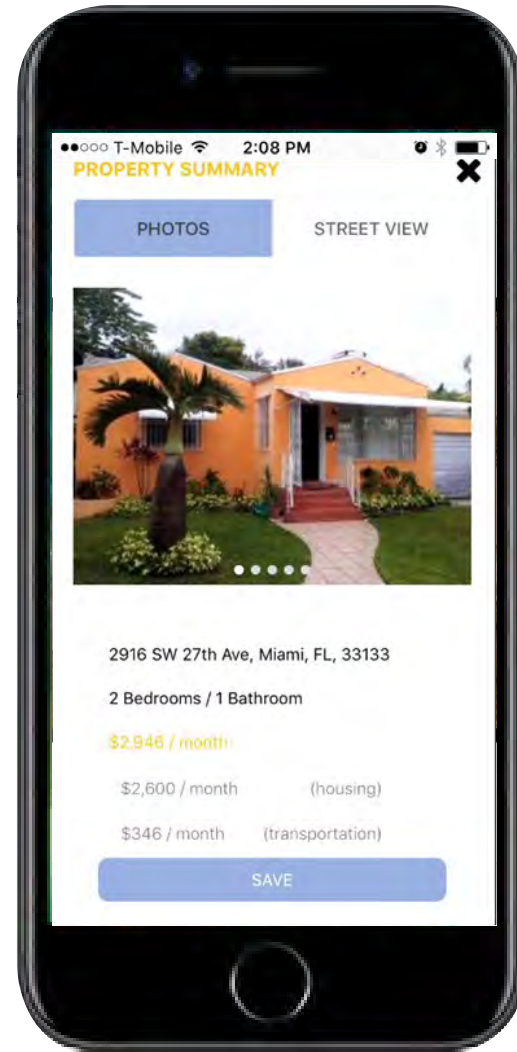


Fig. 56. Digital application for transportation.

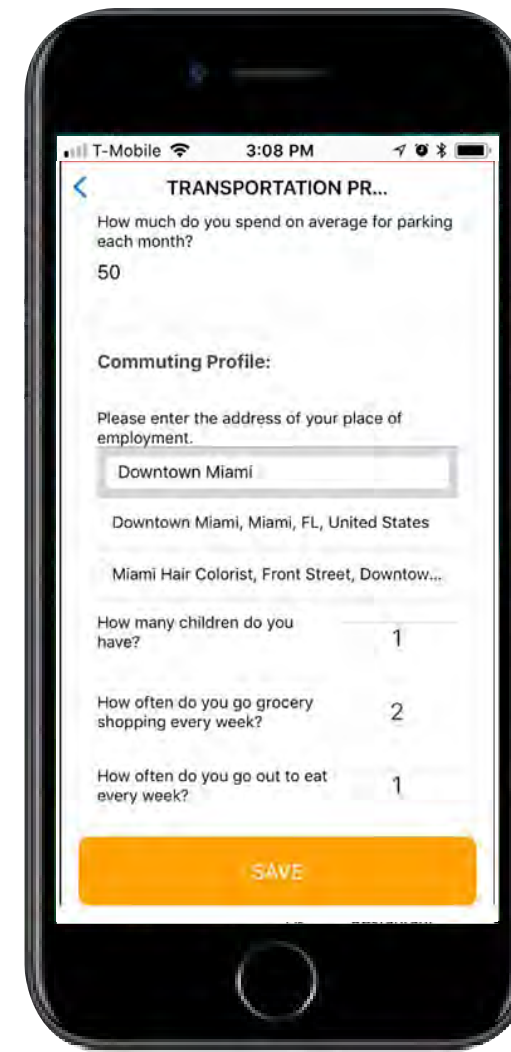
Scenario 03: Apps



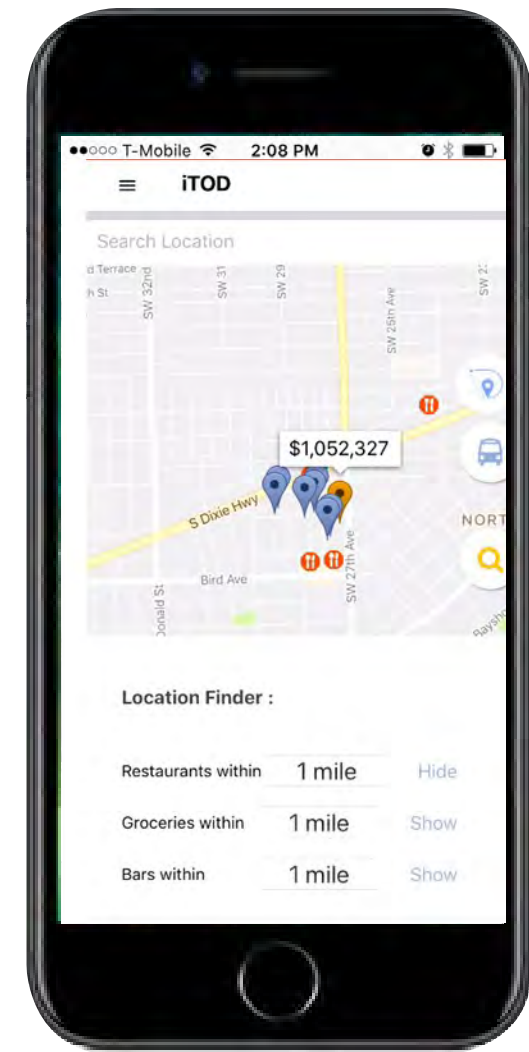
Explore Trade-offs between **Time and Cost**



Rent + **Travel Cost**



Commuting Profile



What Places Matter to **You**

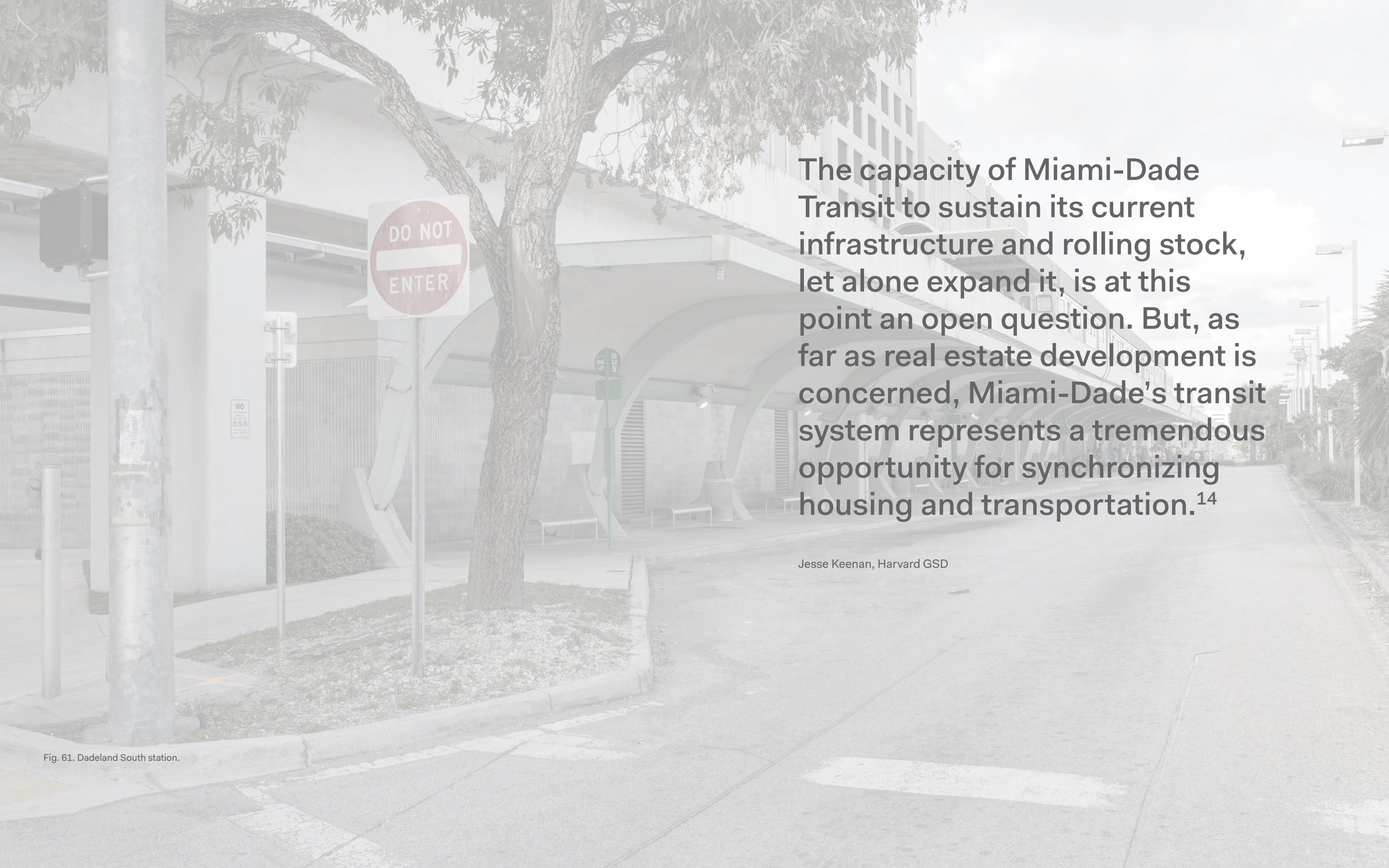
Fig. 57. Time and cost.
Fig. 58. Rent and travel cost.

Fig. 59. Commuting.
Fig. 60. Favorite locations.

PROCESS

Contexts

References



The capacity of Miami-Dade Transit to sustain its current infrastructure and rolling stock, let alone expand it, is at this point an open question. But, as far as real estate development is concerned, Miami-Dade's transit system represents a tremendous opportunity for synchronizing housing and transportation.¹⁴

Jesse Keenan, Harvard GSD

Fig. 61. Dadeland South station.

Contexts: National Case Studies

MIAMI, FL

System: Metrorail
 Year Opened: 1984
 System Length: 24.4 miles
 Stations (Lines): 23 (2)
 Annual Ridership (2016): 104,373,300
 Avg. Daily Weekday Boardings (2014): 76,858
 Metro Population: 5,502,379
 Daily Ridership as Percentage of Metro Population: 1.4%
 Year Last Expanded: 2012



MINNEAPOLIS, MN

System: METRO Light Rail
 Year Opened: 2004
 System Length: 21.8 miles
 Stations (Lines): 37 (2)
 Annual Ridership (2016): 22,963,500
 Avg. Daily Weekday Boardings (2016): 72,900
 Metro Population: 3,551,036
 Daily Ridership as Percentage of Metro Population: 2.1%
 Year Last Expanded: 2014



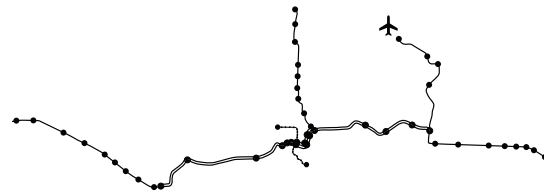
SEATTLE, WA

System: Link Light Rail
 Year Opened: 2009
 System Length: 20.4 miles
 Stations (Lines): 16 (1)
 Annual Ridership (2016): 19,121,621
 Avg. Daily Weekday Boardings (2016): 66,203
 Metro Population: 3,733,580
 Daily Ridership as Percentage of Metro Population: 1.8%
 Year Last Expanded: 2016



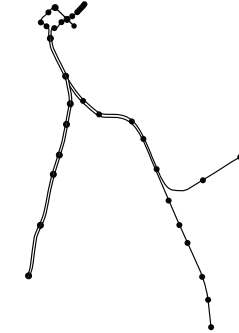
PORTLAND, OR

System: MAX Light Rail
 Operator: TriMet
 Year Opened: 1986
 System Length: 60 miles
 Stations (Lines): 97 (5)
 Annual Ridership (2016): 40,240,300
 Avg. Daily Weekday Boardings (2016): 124,200
 Metro Population: 2,389,228
 Daily Ridership as Percentage of Metro Population: 5.2%
 Year Last Expanded: 2015



DENVER, CO

System: Denver RTD Light Rail
 Year Opened: 1994
 System Length: 58.5 miles
 Stations (Lines): 62 (7)
 Annual Ridership (2016): 24,585,000
 Avg. Daily Weekday Boardings (2016): 75,900
 Metro Population: 2,814,330
 Daily Ridership as Percentage of Metro Population: 2.7%
 Year Last Expanded: 2017



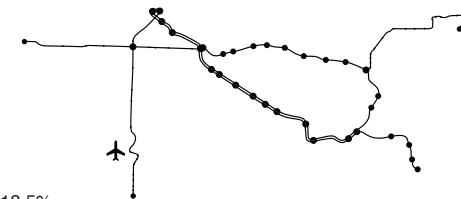
DETROIT, MI

System: Detroit People Mover
 Year Opened: 1987
 System Length: 2.94 miles
 Stations (Lines): 13 (1)
 Annual Ridership (2016): 2,413,414
 Avg. Daily Weekday Boardings (2014): 6,000
 Metro Population: 4,292,060
 Daily Ridership as Percentage of Metro Population: 0.1%
 Year Last Expanded: 2017 (Q-Line)



VANCOUVER, BC

System: SkyTrain
 Year Opened: 1986
 System Length: 79.6 miles
 Stations (Lines): 53 (3)
 Annual Ridership (2016): 137,380,000
 Avg. Daily Weekday Boardings (2014): 454,600
 Metro Population: 2,463,431
 Daily Ridership as Percentage of Metro Population: 18.5%
 Year Last Expanded: 2016



NEWARK, NJ

System: Newark Light Rail
 Year Opened: 1935
 System Length: 6.2 miles
 Stations (Lines): 16 (2)
 Annual Ridership (2016): 5,724,544
 Avg. Daily Weekday Boardings (2014): 19,994
 Metro Population: 277,140
 Daily Ridership as Percentage of Metro Population: 7.2%
 Year Last Expanded: 2006

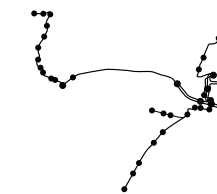


Fig. 62. Case studies.

Contexts: Metropolitan Rails

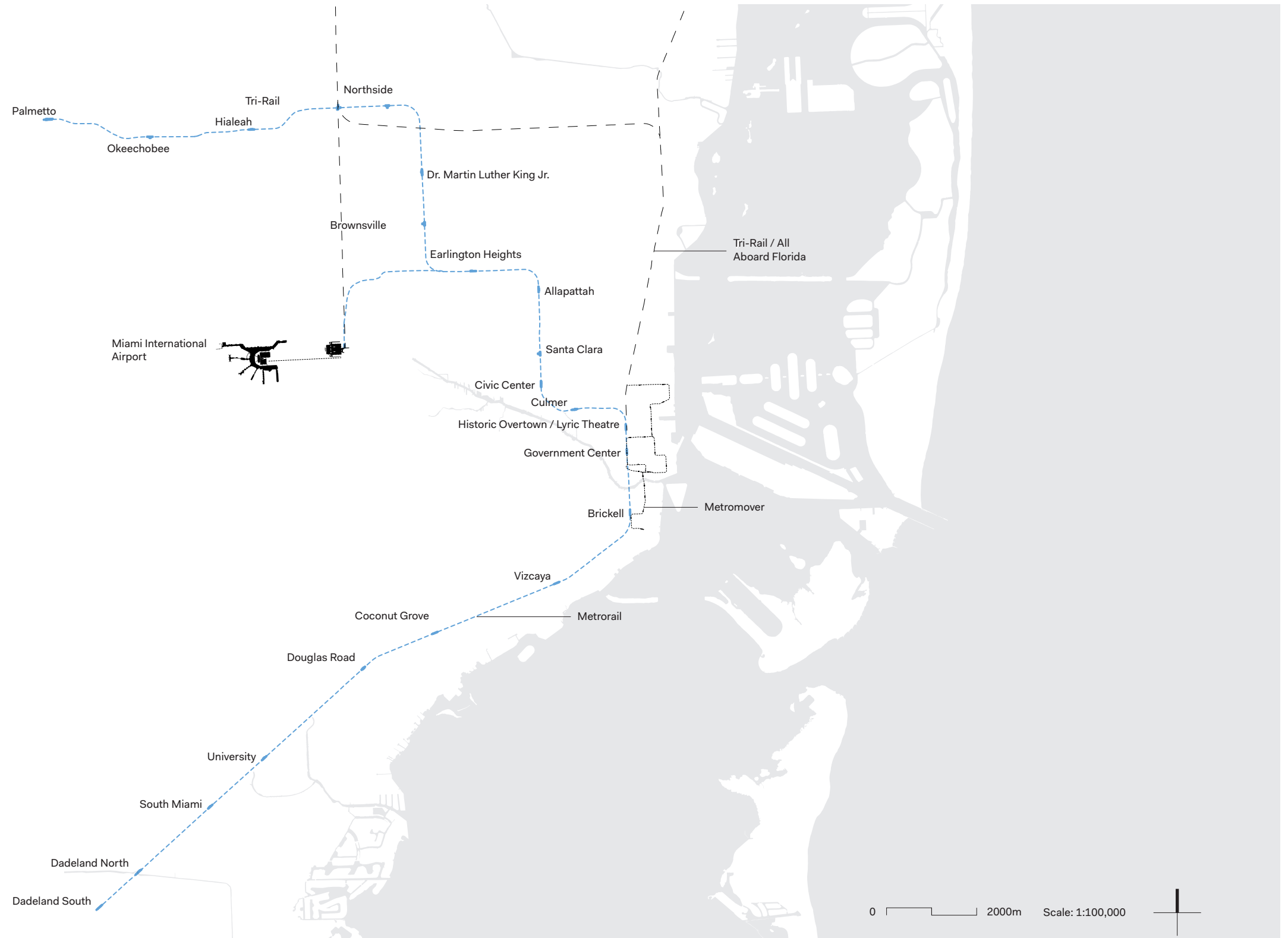


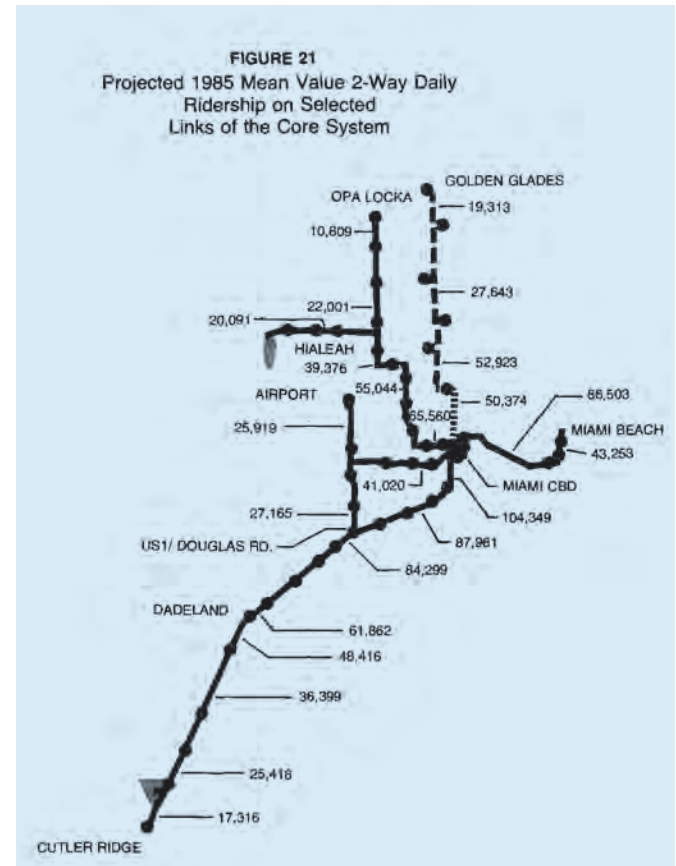
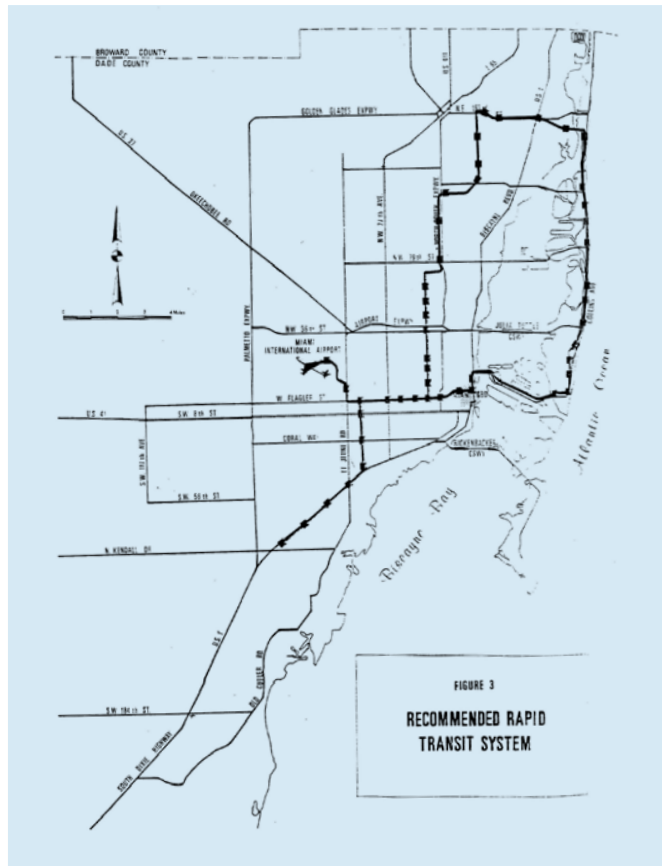
Fig. 63. Metropolitan rail network.

Contexts: Metropolitan Rails, Highways, Bus Routes



Fig. 64. Metropolitan rails, highways and bus routes.

Contexts: Historical Promotion



1959

“Will Dade commuters ever really ride on a high-speed monorail transit system? Artists’ sketches of bullet shaped monorail cars whizzing by high above snarled earthbound traffic are thrust under the noses of practically every city with a transit problem...But an actual operating monorail line in the U.S. is still almost as far from reality as a man-carrying moon rocket.”

Fig. 65. 1959 Miami Herald article on the future monorail system.
Fig. 66. Miami Herald article.

1969

“The first state of construction calls for the 24 miles of rapid transit consisting of...a corridor with direct access from Miami Beach and downtown Miami to the Miami International Airport. The consulting firm of Simpson & Curtin of Philadelphia...suggests the possibility that special cars would whisk passengers from Miami Beach to the airport after they had checked baggage and tickets at a beach terminal.”

Fig. 67. Rapid transit system projection.
Fig. 68. 1976 daily ridership projection.

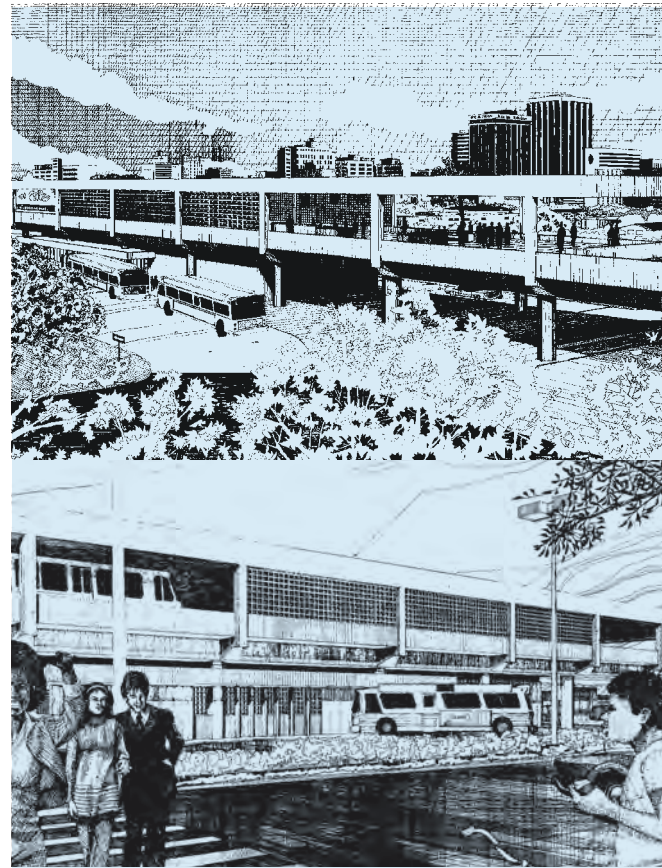
1971

“Rapid Transit Daily Ridership Projection: 212,300.”

1976

“Rapid Transit Daily Ridership Projection: 500,000.”

Contexts: Historical Promotion



1976

Preliminary Engineering Report by Kaiser Engineers.

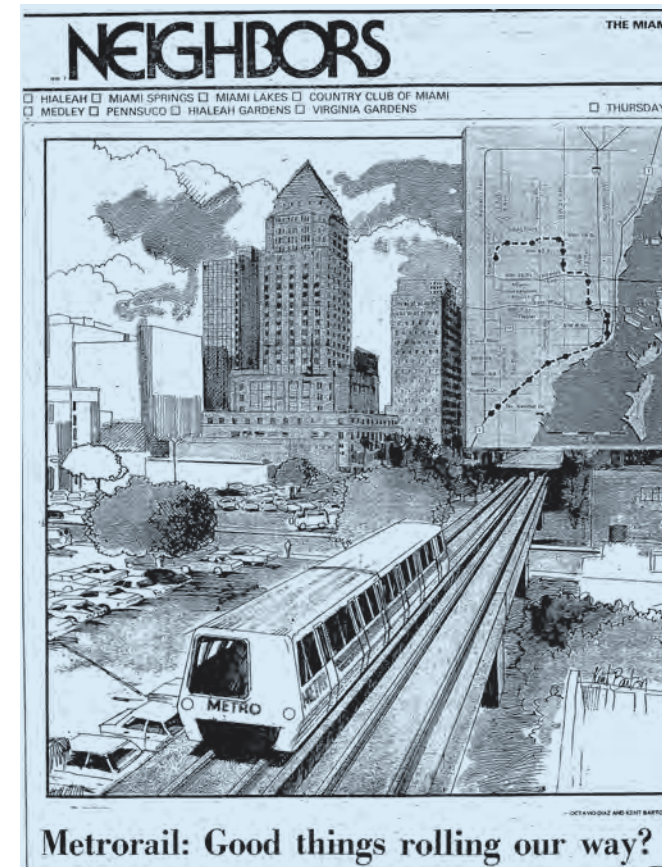
Fig. 69. Rapid transit projection renderings and report by Kaiser Engineers.



1979

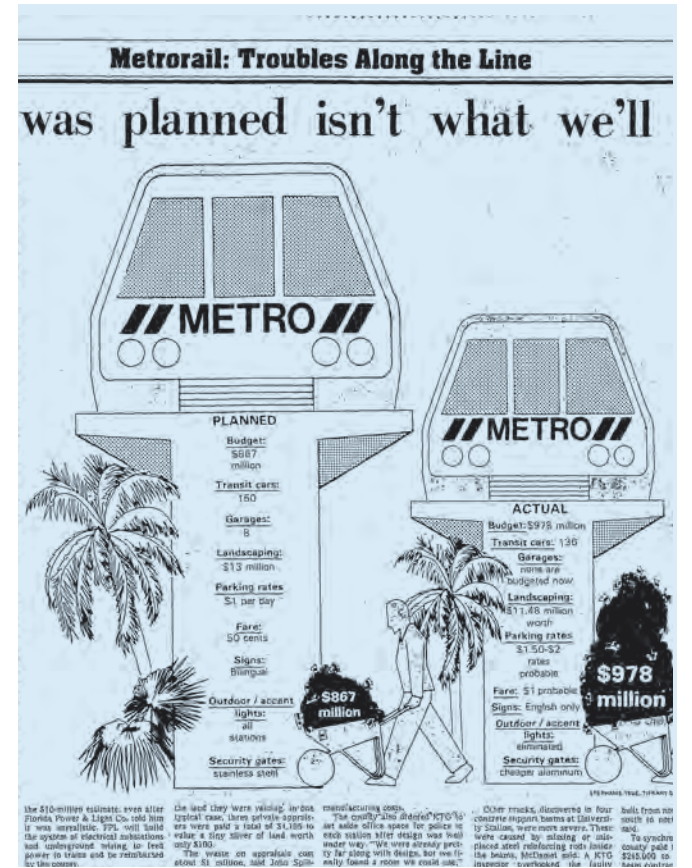
"After waiting 39 years for the next train, Dade County will break ground this week for its new commuter rail system."

Fig. 71. Miami Herald "Neighbors" section cover.



1980

Cover spread of Miami Herald "Neighbors" section showing the Metrorail leaving Government Center station in downtown.



1981

"Metrorail: Troubles Along the Line."

Fig. 72. 1981 article.

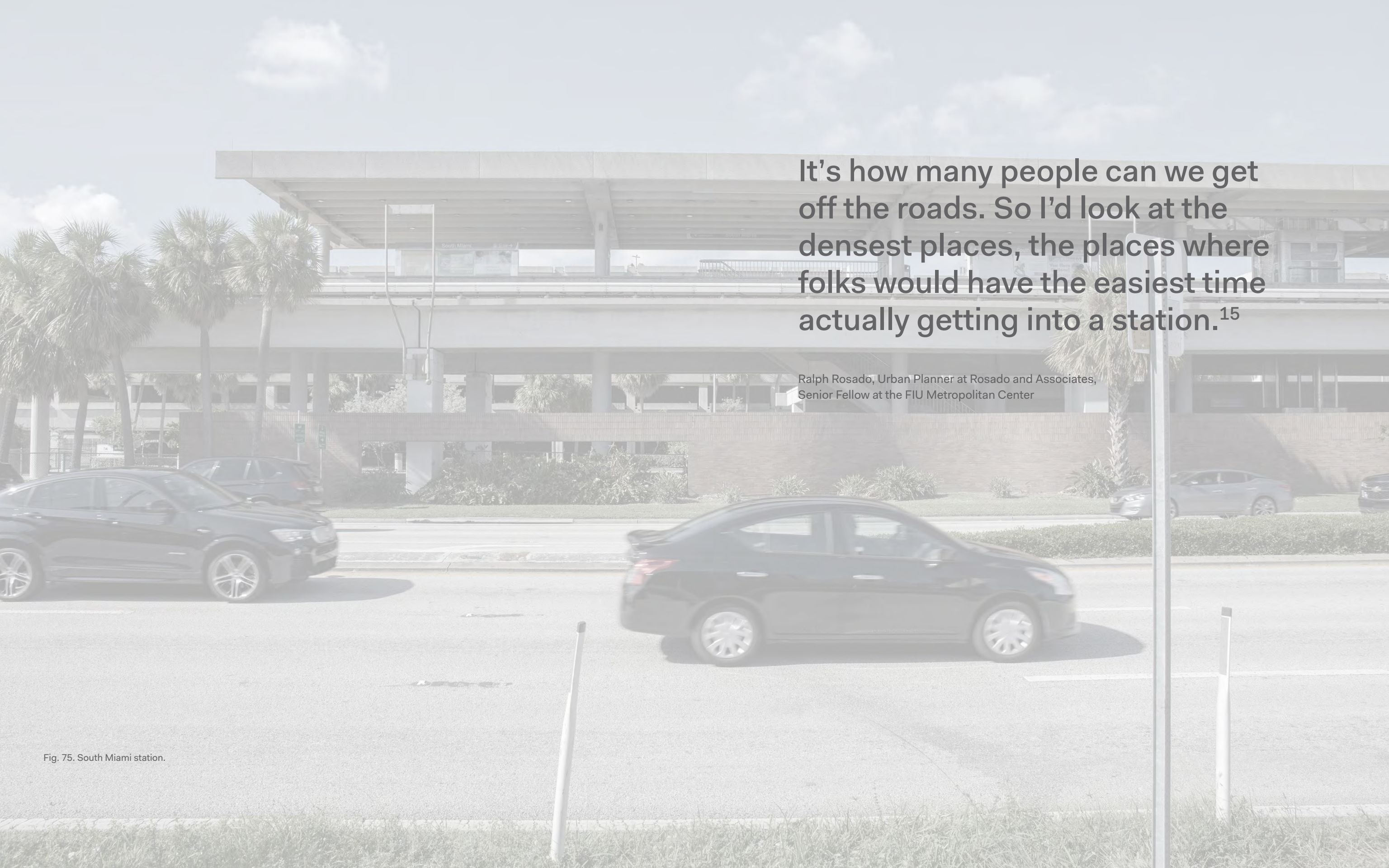
Contexts: **Historical Promotion****1984**

“Step into the future with METRORAIL! Among our nation’s transit systems, METRORAIL is truly unique. Rising above traffic-congested streets, modern trains offer a fast, smooth ride in safety and comfort, while providing a look at South Florida’s stunning scenery. METRORAIL is bringing the Magic City of sun and surf into the next century, making innovative strides along the way.”

Fig. 73. Metrorail grand opening in 1984.
Fig. 74. Opening day.

**1984**

Opening day crowds overwhelm Metrorail system.

A photograph of the South Miami station, a modern transit hub with a large, flat, cantilevered roof. The station is elevated on concrete pillars. In the foreground, a multi-lane road has several cars, including a dark sedan in the center and a dark SUV on the left. Palm trees are visible on the left side of the station. The sky is bright with some clouds. A semi-transparent text box is overlaid on the right side of the image.

It's how many people can we get off the roads. So I'd look at the densest places, the places where folks would have the easiest time actually getting into a station.¹⁵

Ralph Rosado, Urban Planner at Rosado and Associates,
Senior Fellow at the FIU Metropolitan Center

Fig. 75. South Miami station.

References: Typical Station

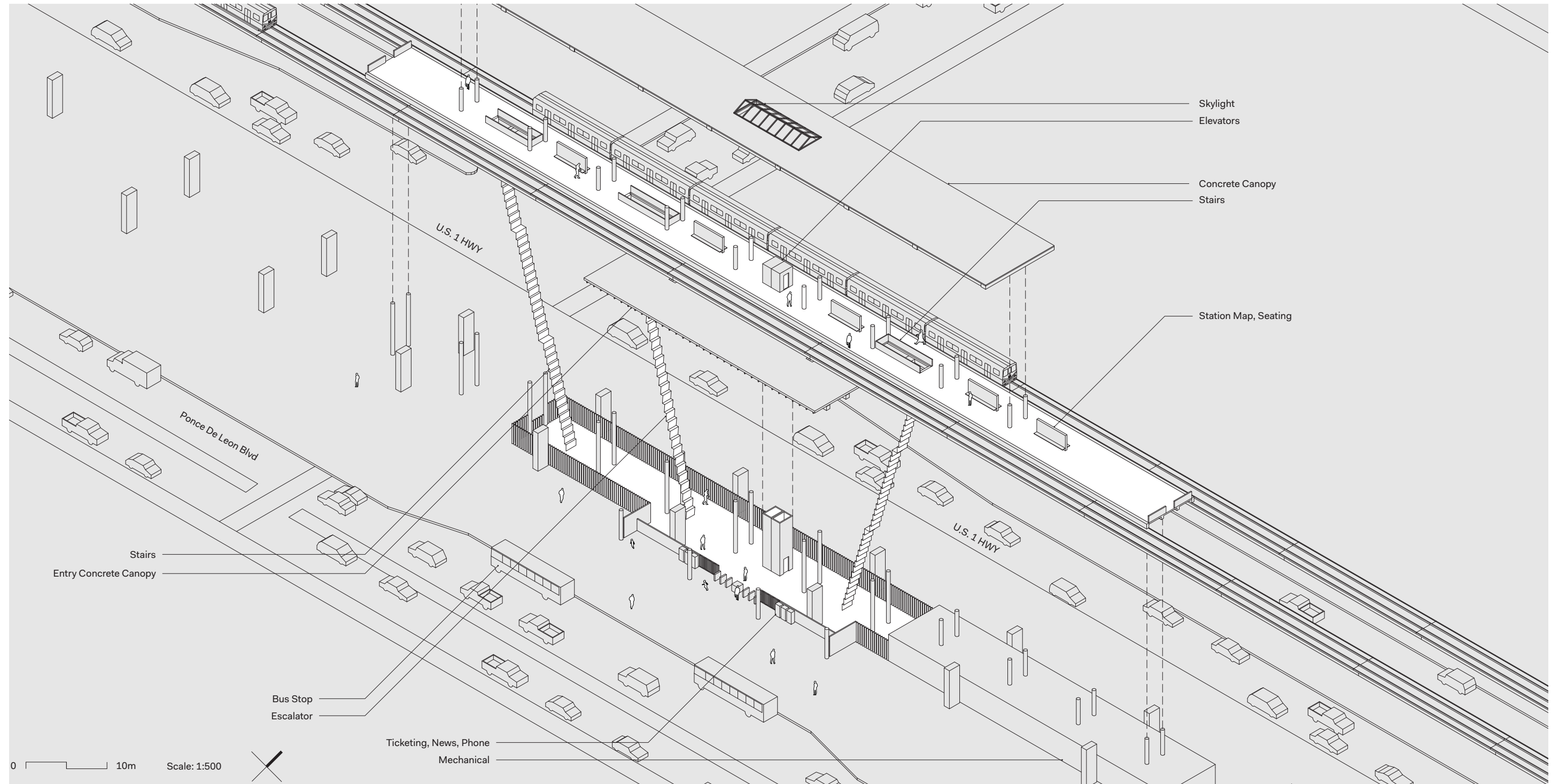


Fig. 76. Exploded axonometric of typical station.

References: Typical Station Dimensions

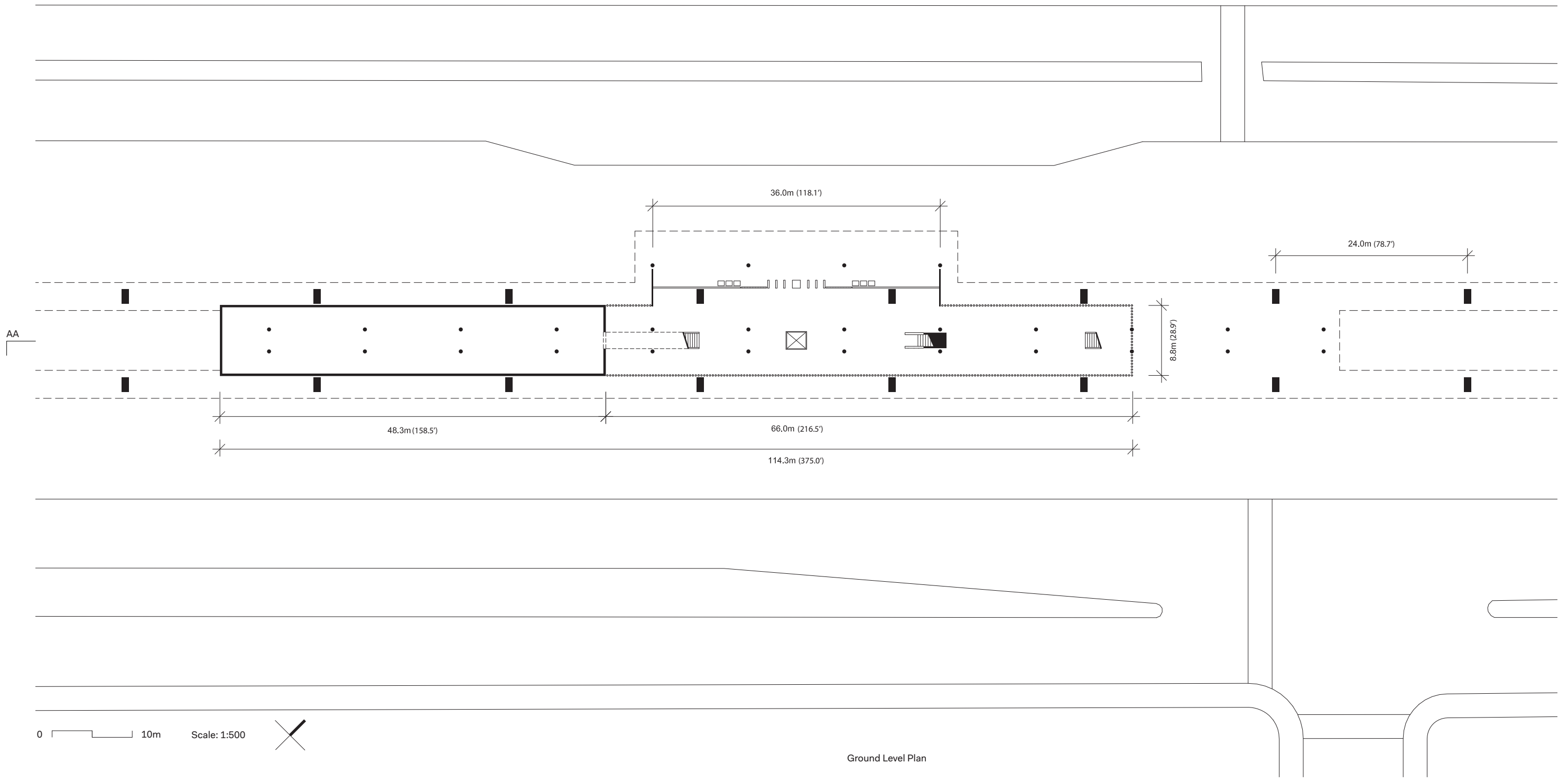
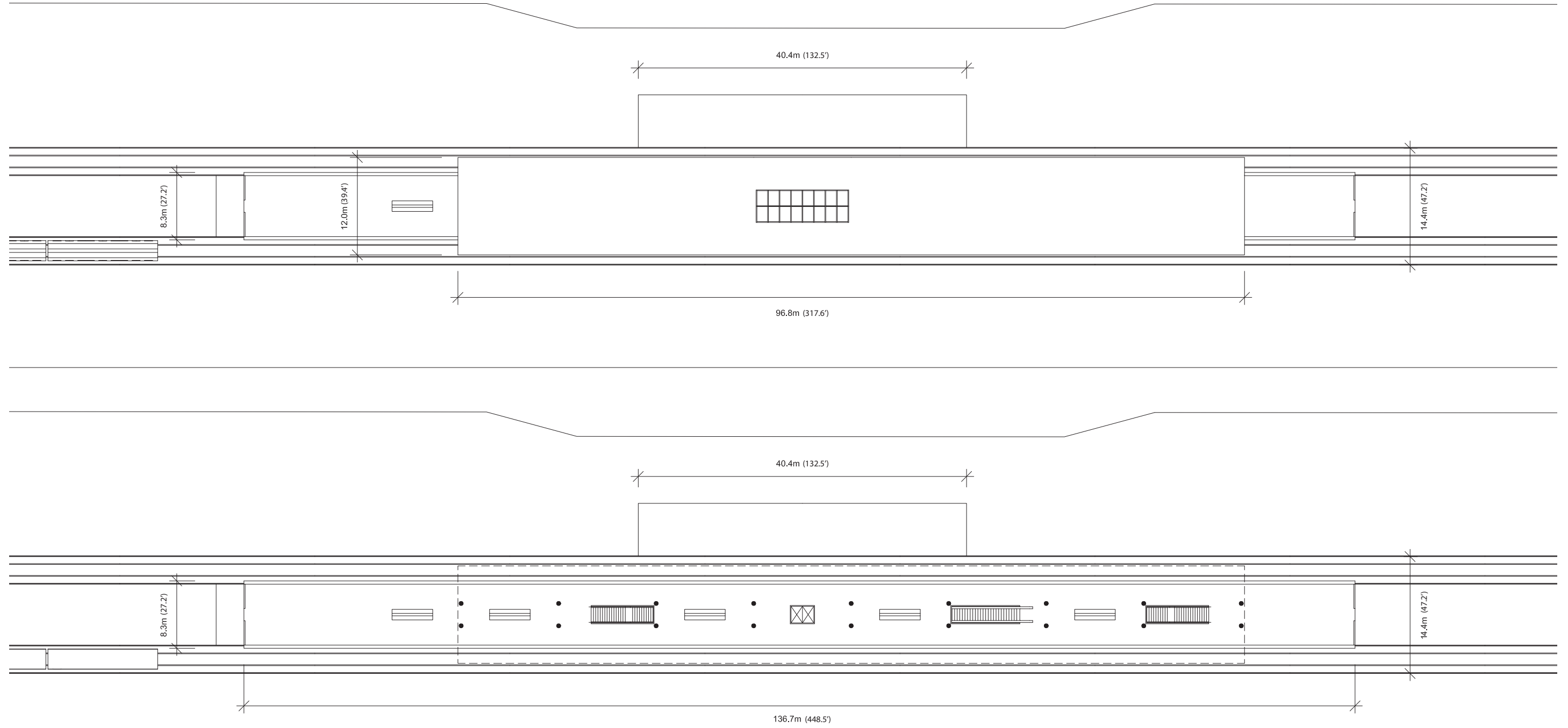


Fig. 77. Station dimensions.

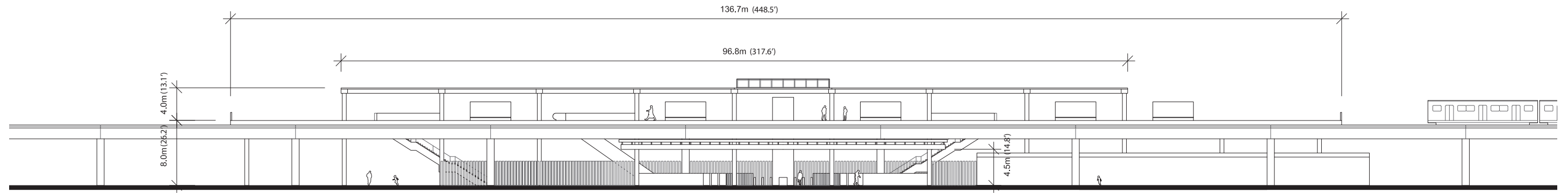
References: Typical Station Dimensions



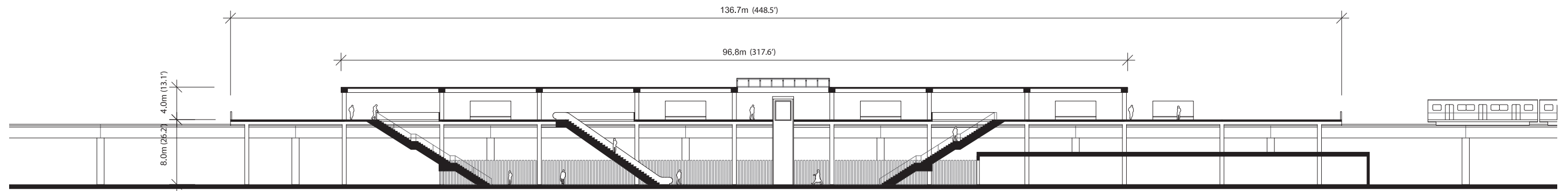
0 10m Scale: 1:500

Fig. 78. Station dimensions.

References: Typical Station Dimensions



Elevation



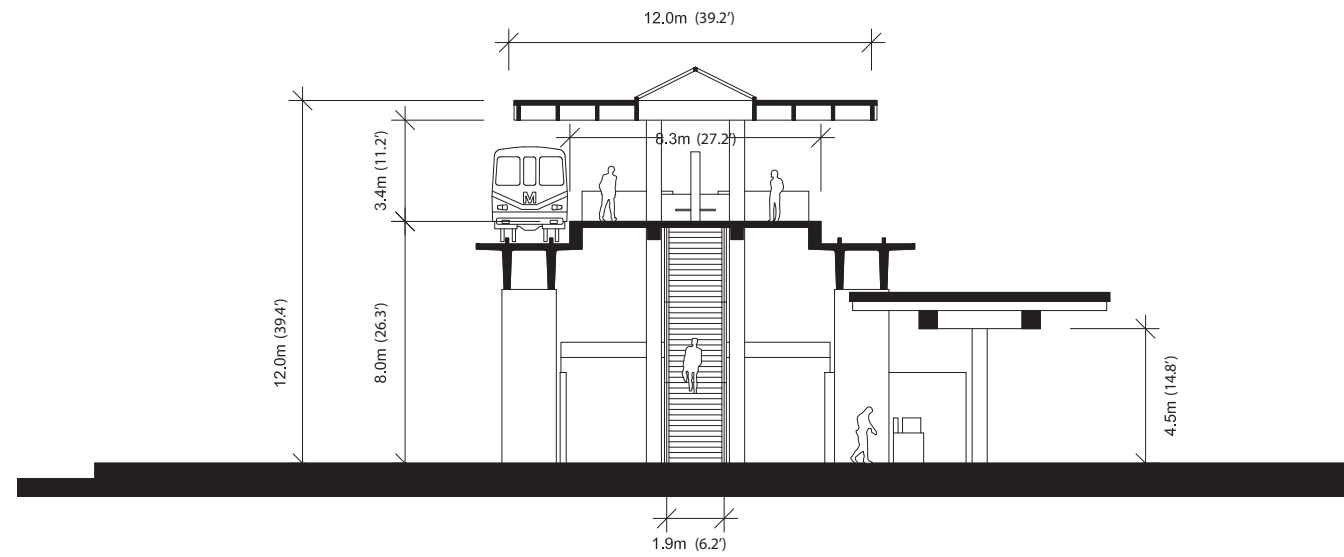
Section AA

0 10m Scale: 1:500



Fig. 79. Typical station dimensions, elevation.
Fig. 80. Typical station dimensions, section.

References: Typical Station Dimensions



0 10m Scale: 1:500

Fig. 81. Section with escalators.

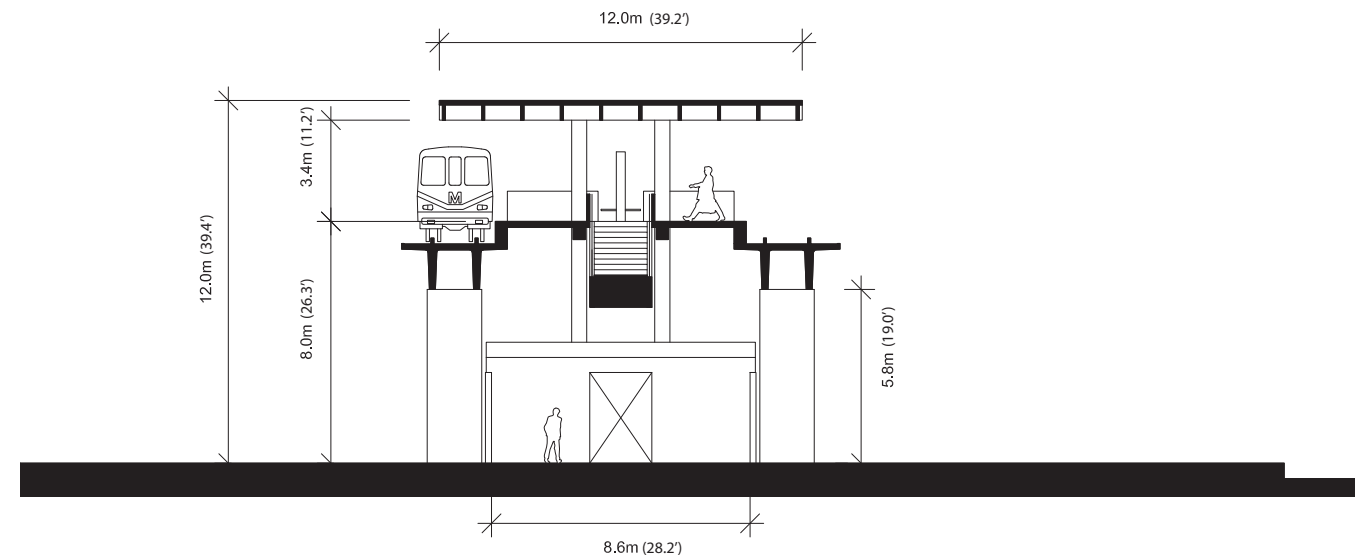



Fig. 82. Section with elevator access.



Residential development, in particular on U.S. 1, would have [the] tremendous advantage of allowing people to board the future metro and go to their jobs without using their cars. In order to support our growing population, the right place to do it is along the corridor.¹⁶

Steve Zarzecki, President of Concerned Citizens of Cutler Bay

Fig. 83. South Miami train.

Notes

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Credits

Figs. 1-10, 61, 75, 83; Oriol.

Fig. 11; Disneyland Poster.

Figs. 12-25, 40, 55; Courtesy of 2 X 4.

Figs. 26-34, 36-39, 41-46, 48-54, 56, 62-64, 76-82, ; Office for Urbanization.

Figs. 57-60, Courtesy of Jesse M. Keenan.

Figs. 35, 47; Google.

Fig. 73; Miami Metrorail.

Figs. 65-66, 71-72; Miami Herald.

Fig. 74; Simpson Curtin.

Figs. 67-69; Kaiser Engineers.

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