CONNECTING PEOPLE IN MOTION

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ARCHITECTURE

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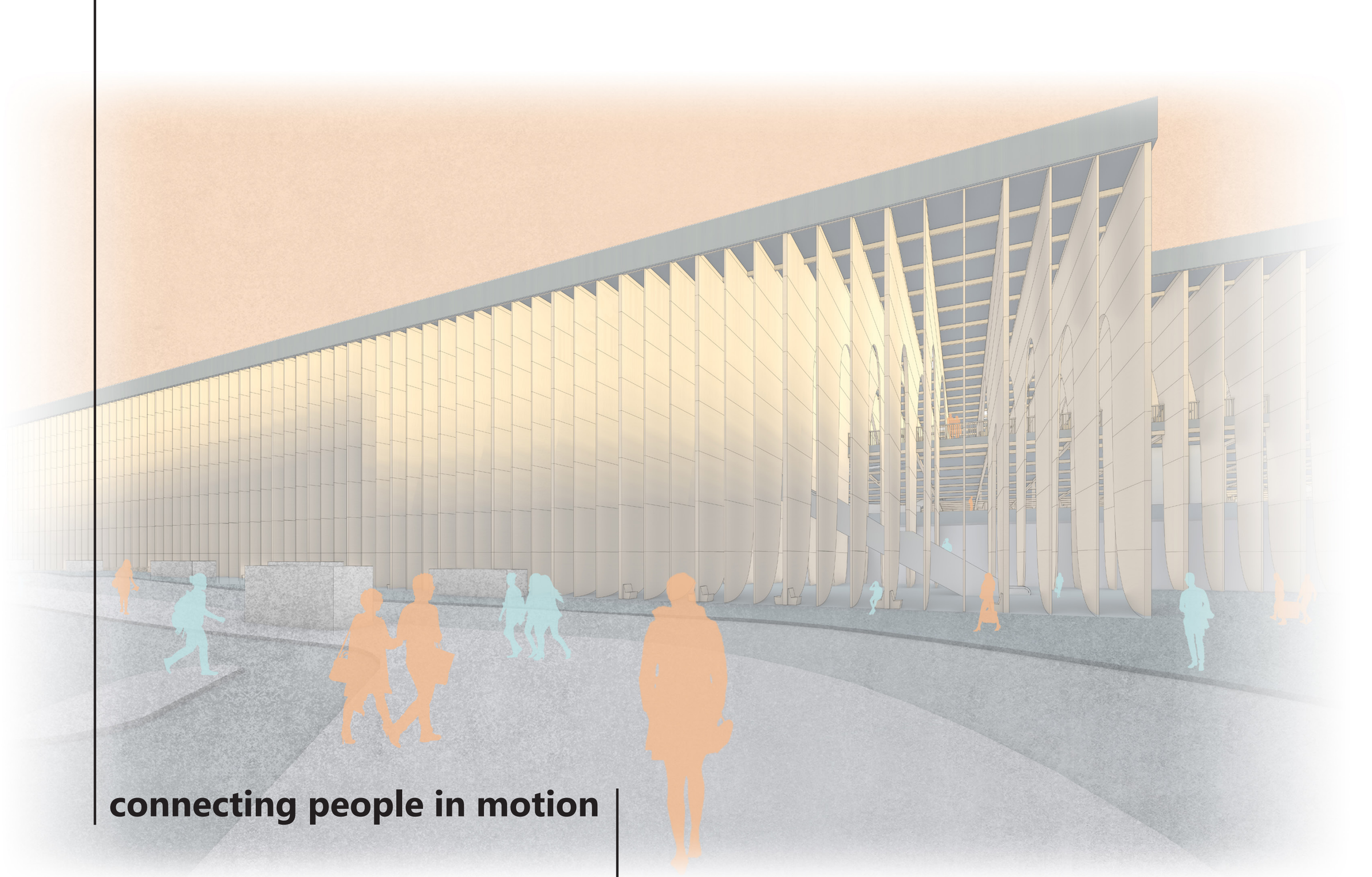

connecting people in motion

| ABSTRACT |

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ABSTRACT

Perception of movement within and between designed spaces starts with the uniquely human ability to relate ourselves to our surroundings, followed by a relationship to the sequential experience of our movement throughout. Architecture is simply a building without the life and movement of the people who use the design, yet individuals may experience and relate to the same design differently. Habitual routes and repetitive paths of movement dull our experience of these spaces while moving towards or within a new space can allow our perception to expand as we take in a new environment, creating excitement but also tension within us.

At our center, there is a phenomenological connection between a preceding space and personal orientation with a future space, helping us understand the new space in relation to ourselves, no matter the mode of transportation for arrival. Transportation hubs are intersections of time, connecting people in motion and guiding both habitual and unfamiliar subjects along their continuous journey. Studying the movement within the Washington metropolitan area, the New Carrollton Station in Maryland perforates the Capital Beltway as a gateway to the region. This thesis aims to understand how people interact with path-connected spaces and connect each subject's mode of arrival, goal, and choice of movement between a newly designed station.

| GENERAL AUDIENCE ABSTRACT |

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GENERAL AUDIENCE ABSTRACT

With the uniquely human ability to relate ourselves to our surroundings, the way we experience moving through architectural and urban designs is impacted by the way we perceive the changing surrounding space. Architecture is simply a building without the life and movement of the people who use the building, yet individuals may experience and relate to the same building differently. Habitual routes, such as commutes that we do daily, may dull our experience of these spaces, while moving towards or being within a new building can open our senses and perception, taking in the new environment and creating excitement but also anxiety within us.

At a psychological and phenomenological level, we can mentally connect the space where we just were with the new space we are in; our sense of direction works with our personal orientation of front and back, left and right. This is still the case if we arrive at a new place by bus or train: our orientation is in relation to the direction we are facing and what is in front of us when we get off. Transportation hubs/stations are designed to connect people in motion, guiding both habitual and unfamiliar riders along their continuous journey to a new place or mode of transportation. Studying the urban movement within the Washington metropolitan area, the New Carrollton Station in Maryland is located along the edge of the region, the Capital Beltway, and welcomes people to the region. This thesis aims to understand how people interact with architecture as they move throughout their daily lives and connect people as they move throughout a newly designed station.

| ACKNOWLEDGMENTS |

Thankful for the experiences I've had,

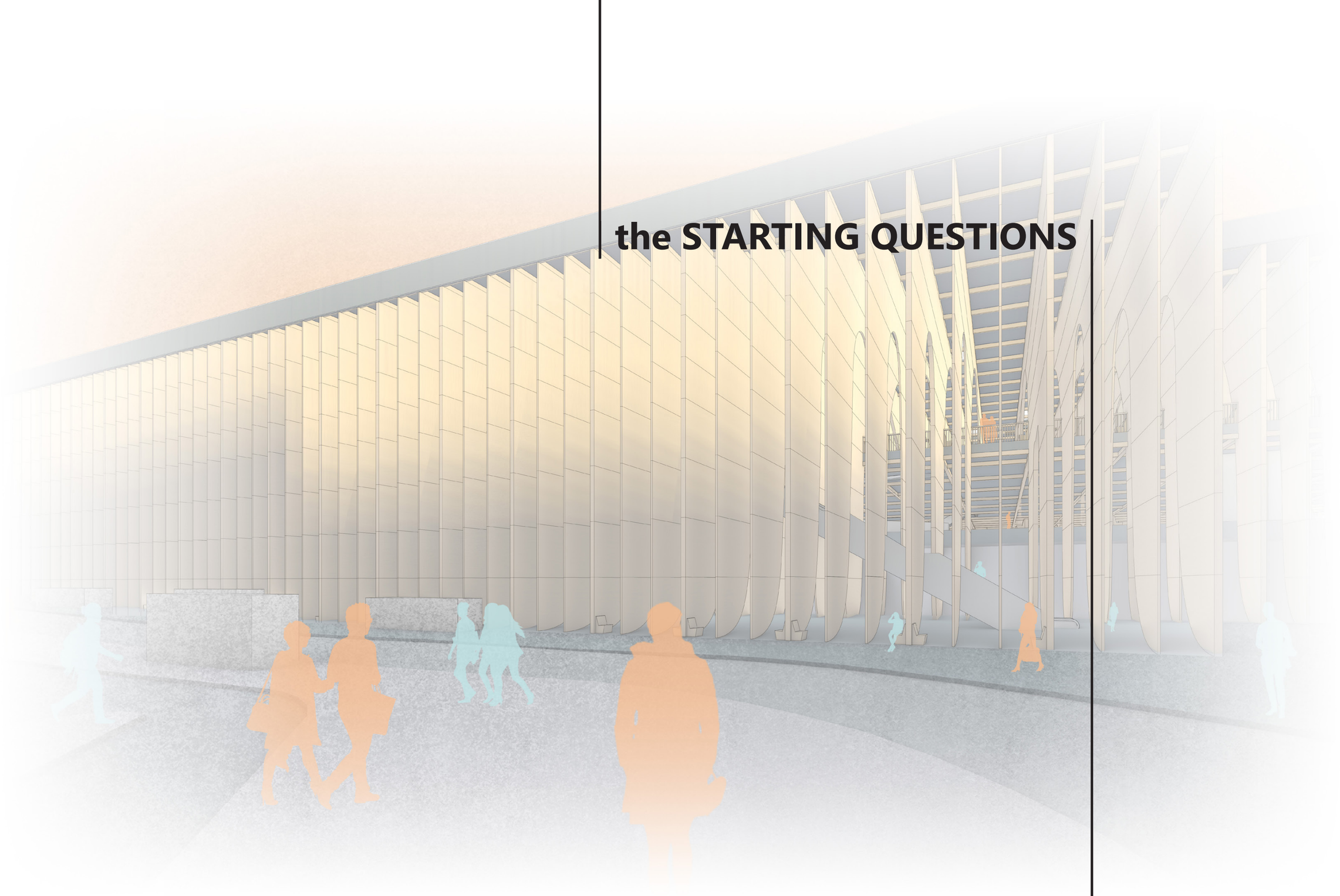
I appreciate all of the time my committee chair and members have spent pushing me forward in my architectural education. Andrew Linn, Susan Piedmont-Palladino, and Paul Kelsch: you have all taught me so much throughout the past two years in various discussions and teachings; the development of the thesis and myself alike would not have been possible without you.

I am thankful for my time at the WAAC; moving here was quite a life-changing experience, and I could not have done it without the support of the friends I have made here.

Even from miles away, my friends and family in Texas have made their presence known; I am thankful for everything they have done for me with every effort made to support me from a distance.

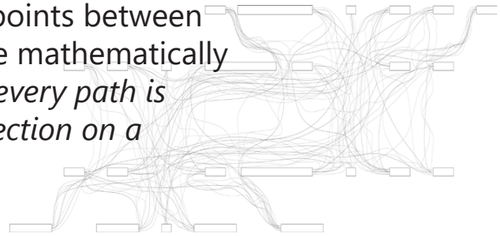
| the CONTENTS |

the STARTING QUESTIONS



path-connected spaces

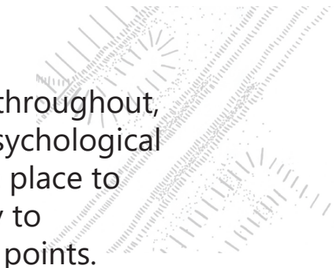
In the mathematics of topology, a path-connected space is a space containing two points that are connected by a continuous function. Along this path's function, the points between the end intervals are also continuously connected. A topological space can be mathematically proven as path-connected... *What does that mean for architectural spaces? If every path is connected in math, how does that translate to the personal experience of connection on a subject's path of movement?*



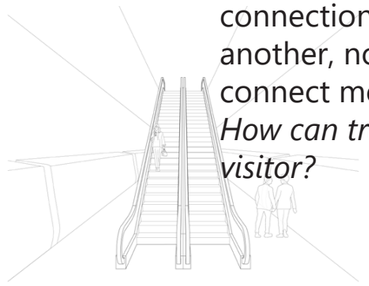
habit vs. unfamiliar

This thesis aims to understand people's perception of movement and how it impacts our understanding and relationship with architecture. People move throughout and between architectural spaces every day, but the experience and relationship with the space is a dynamic unique to each individual. Habitual routes and repetitive paths of movement, such as a daily commute or the walk from the bedroom to the kitchen, become almost second nature to us; our experience of these spaces is potentially dulled. On the other hand, moving towards or within a new space can allow our perception to expand as we take in new surroundings; this experience, however, can create both excitement and tension within us. *Can architecture guide movement, therefore relieving the tension of experiencing a new space, while simultaneously heightening the senses for all?*

train stations

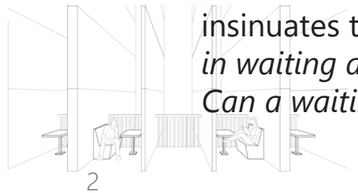


Perception of motion in architectural spaces is mostly experienced by walking throughout, but this perception exists elsewhere through many modes of transportation. Psychological connection of these spaces exists in the understanding of movement from one place to another, no matter the means. Transportation hubs are spaces that exist simply to connect moving people; it is but a temporary point in a person's path of many points. *How can transportation stations design for both the habitual commuter and the unfamiliar visitor?*



waiting

Discussion of perception of movement in architecture, specifically in a train station, insinuates the perception of waiting that occurs. *Can architecture encourage relief in waiting and inspire connection to the future point along our path of movement? Can a waiting space inspire connection to others?*



people

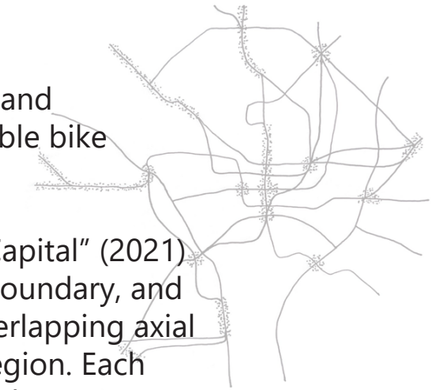
How do people perceive movement?

This thesis aims to understand how people interact with path-connected spaces. Movement through architectural spaces at a personal scale, a building scale, and a city scale creates a unique relationship each individual may have with the built environment. At the same time, phenomenological research helps us understand an overall perception of space and movement, allowing an application of perception to both existing spaces and newly designed spaces.

People move within and between designed spaces every day, allowing a uniquely human perception of the space in relation to themselves, the subject, and in relation to their movement throughout. Perceptual space is centralized through the subject who passes through different spaces each day, interacting with the surrounding objects as they are seen. This subject is oriented within a space and starts to understand what is in front of them as well as left or right. A forward goal allows for depth in view as well as distance and time. The uncertain future creates a relationship with the familiar past, connecting each orientation change along the subject's path of movement. This goal creates a sequence of movement for the subject; what changes is the view of and relation to the surrounding objects. Through this, the subject may relate an entrance to a space as the front, creating a unique personal connection to a new space as they move throughout.

in motion

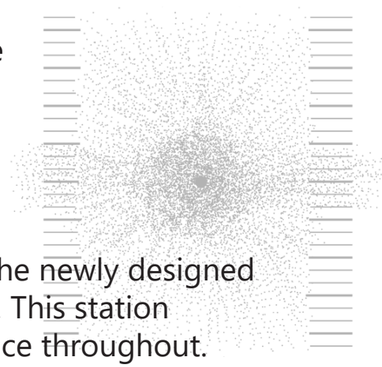
How do people move within the Washington metropolitan area?



Movement within the Washington metropolitan area exists through many different modes of transportation. People travel to and throughout the District of Columbia and surrounding areas of Virginia and Maryland by train, car, and bus, with many accessible bike lanes and walkable areas.

The National Capital Planning Commission (NCPC) uses a framework of design in the "Comprehensive Plan for the National Capital" (2021) that includes axial highway lines as an extension of the core of the city, gateways to both the core and the District diamond boundary, and integrated Metro stations that connect the city and region. With a similar approach, this thesis explores the tension of the overlapping axial highway and train lines within the boundary of the Capital Beltway; the Beltway emerges as the experiential gateway to the region. Each Metro stop is a moment to choose a new mode of circulation throughout the region, with four stations welcoming visitors and commuters outside of the Beltway. The station in New Carrollton, Maryland, develops as a true front door, welcoming Interstate 50 to Amtrak, Maryland Area Rail Commuter (MARC) Penn Line, Washington Metropolitan Area Transit Authority (WMATA) Orange Line, and the new WMATA Purple Line.

Above-ground train tracks running through the New Carrollton Station and throughout the region have created a divide between the two sides; the necessity for connection between the two sides of the tracks is prevalent when analyzing the circulation near and throughout the station.

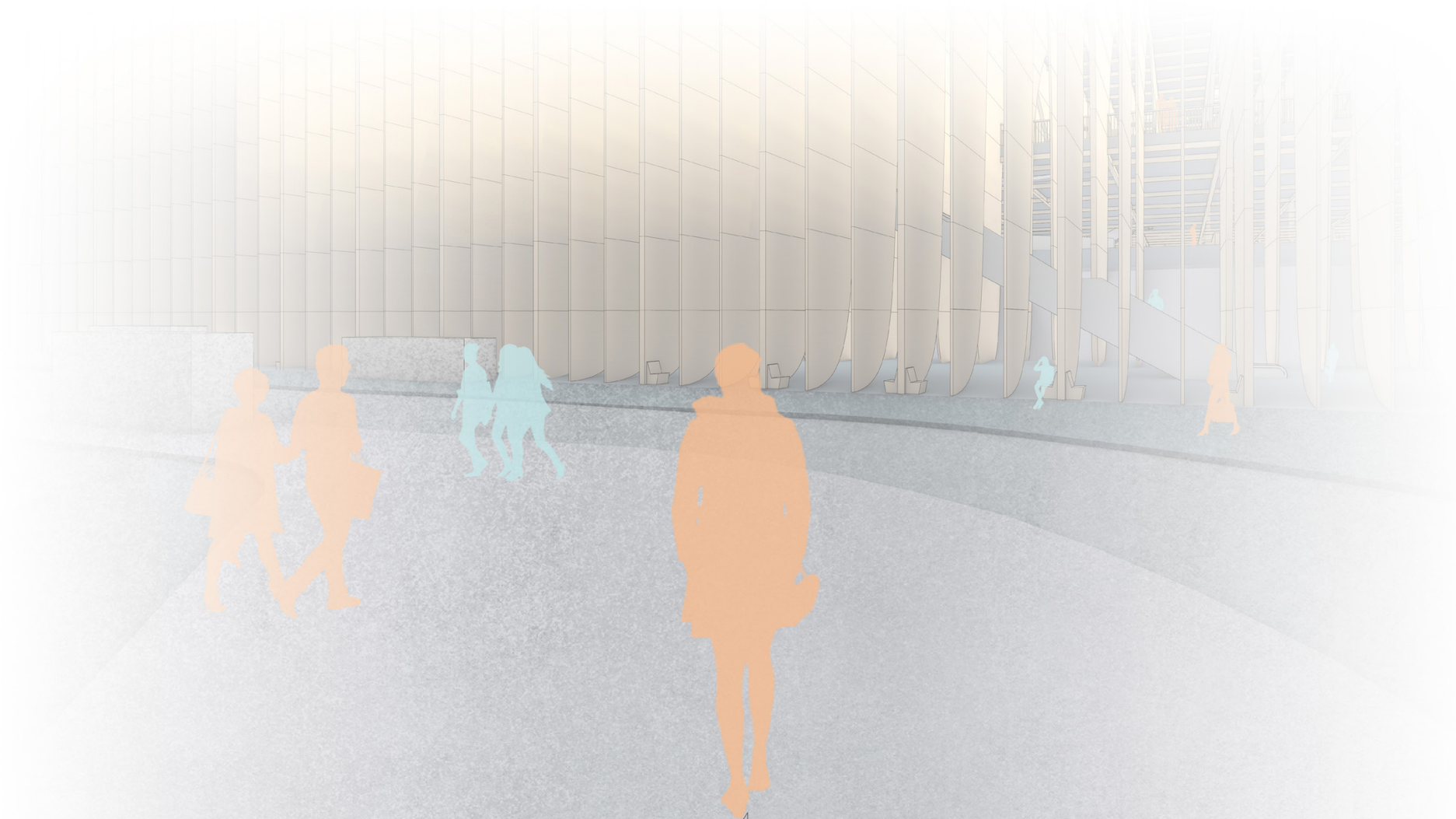


connecting

How does the design of a train station connect people, their perception, and their movement?

Existing circulation and conditions of the New Carrollton Station limit movement and lack visual connection of the site. The newly designed station connects walkable circulation patterns for each subject's mode of arrival, goal, and choice of movement between. This station design aims to connect each subject's sequence of goals, whether habitual or unfamiliar, and create a sustained experience throughout.

the SUBJECT



perception

*people move at a **PERSONAL** scale*

"I catch space at its source, and now think the relationships which underlie this word, realizing then that they live only through the medium of a subject who traces out and sustains them; and pass from spatialized to spatializing space"
- Maurice Merleau-Ponty, Phenomenology of Perception, 1945 (trans. 1958)

Perception of movement starts with a subject and their relationship to the space around them. With research from both Maurice Merleau Ponty in "Phenomenology of Perception" and Yi Fu Tuan in "Space and Place: The Perspective of Experience" (1977), the perception of space and movement through space is broken down into diagrams of these relationships to the subject. The diagrams in this section are an integral part of the understanding of people in motion and impact the research, representations, and design that follow.

movement

*people move at an **ARCHITECTURAL** scale*

"Our habitual style of thinking, it is often said, is a stream of consciousness pouring and pushing its way through the present; but this feeling, which I call simultaneous perception, seems calmer, more like a clear, deep, reflective lake[...] which keeps us linked to our surroundings"
- Tony Hiss, The Experience of Place, 1991

Perception of the surrounding space is a constantly changing relationship of the subject and the architectural design around them. Studying a few architectural designs, the relationship created between a subject and their surroundings is understood through the various designs of movement.

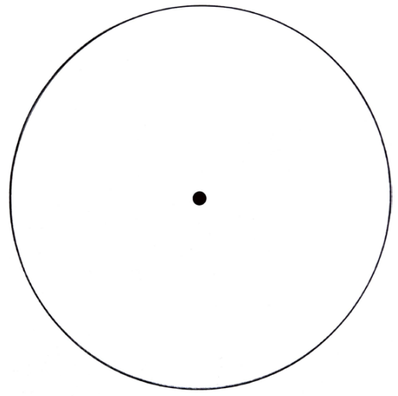
choice moments

*people move at a **CITY** scale*

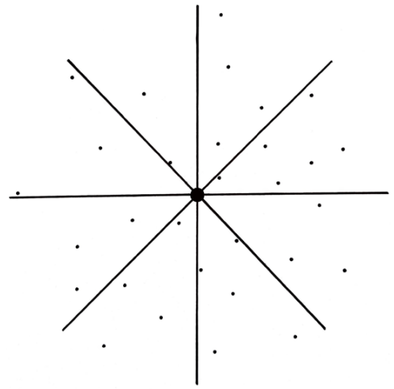
"Buildings... constitute the social organisation of everyday life as the spatial configurations of space in which we live and move"
- Bill Hillier, Space is the Machine: Space Syntax, 2004

Space Syntax, a study at University College London founded by Bill Hillier in 1974 with collaborative research from Julienne Hanson, is a collection of theories and methods that can be used to recognize the movement of people in both an urban environment as well as within a building. A space is understood as a conjunction of all of the spaces connected to it as people move through and within; people in motion are at the center of this relationship and research. Representations and techniques used by the Space Syntax Laboratory are interpreted and applied in specific diagrammatic ways that show a unique perception of the Washington metropolitan area.

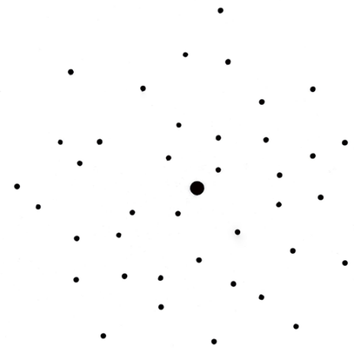
SPACE lives through a subject with a perceptual center as the subject embodies themselves within.



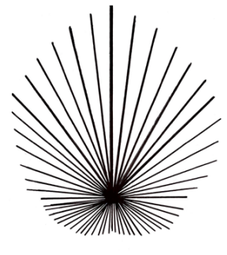
ORIENTATION of the subject at a momentary point gives positioning and relative awareness to the surrounding objects.



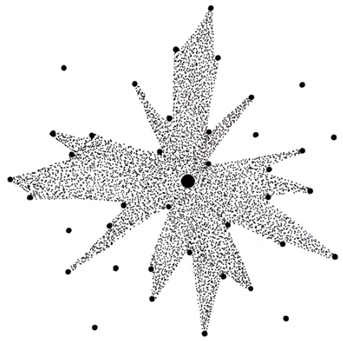
Relation to **OBJECTS** in an environment surrounding a subject exists within this realm of space and may vary depending on the subject's view.



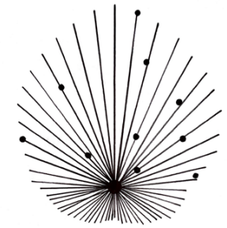
DIRECTION occurs when a subject is aware of the space around them by their natural orientation of front, back, left, and right.



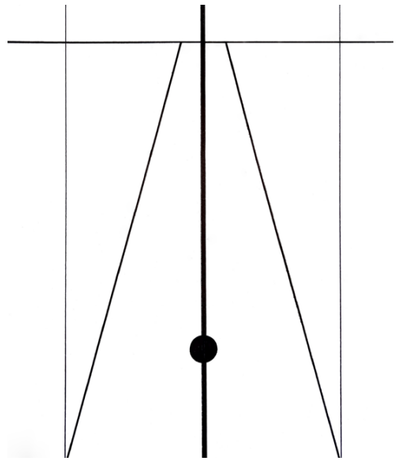
The **ISOVIST**, or volume of viewpoints surrounding a subject, connect the subject to these objects within a radiating visual field.



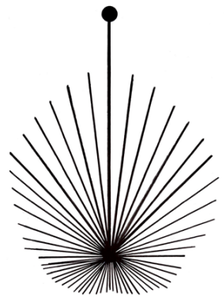
Directional **RELATION** to the objects is a subject's true visual perception and relationship to the surrounding environment at any given point.



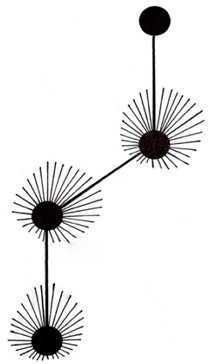
DEPTH lays out parallel lines as a road before a subject, allowing a visual perception of continuous space at a momentary point.



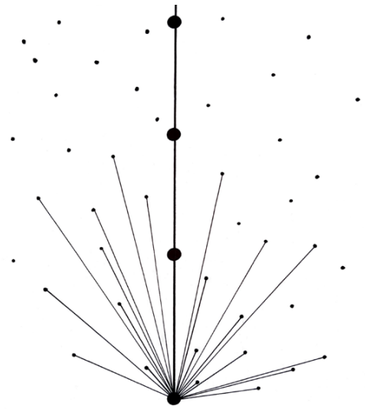
This continuous space is understood through momentary **FORWARD GOALS** a subject has; distance implies time with an uncertain future.



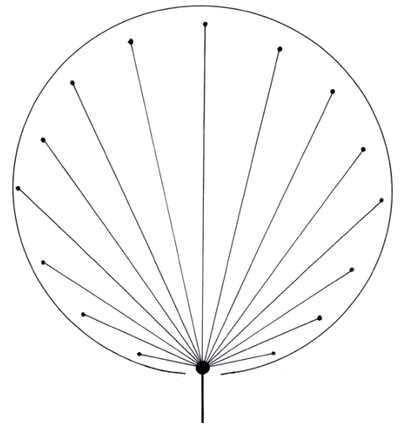
SEQUENTIAL EXPERIENCES string together multiple forward goals with changing orientation related to that which came before.



Memory relates the **SHIFTING VISUAL FIELD** as the subject moves from one point to the next.



A subject's relationship to a **NEW SPACE** as they enter incorporates a bias of the entry as the front, relating the objects towards the subject.

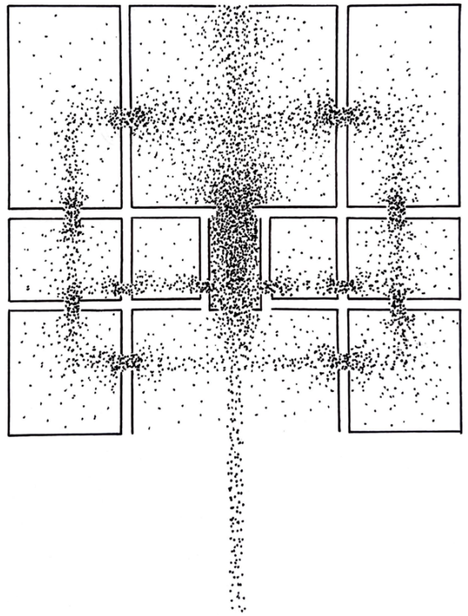


As a subject progresses, each new space invites **CONNECTION** to that which has gone before, whether habitual or unfamiliar.

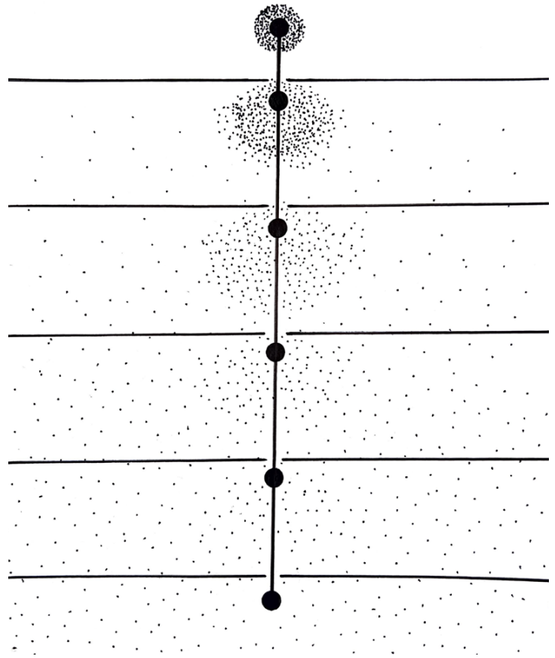
THRESHOLDS develop as moments of change where continuation and relation to that which has gone before can be a resolution of tension, or quite the opposite. The movement between and throughout thresholds allow for a sequential experience from one to the next and can either enhance the **RESOLUTION OF TENSION** or create more along the way.

Villa Emo's continuous yet free movement throughout creates tension at each doorway that is relieved upon entering the room. Roman baths, in a similar way, string rooms along a central axis with each room bringing people together while simultaneously relieving tension.

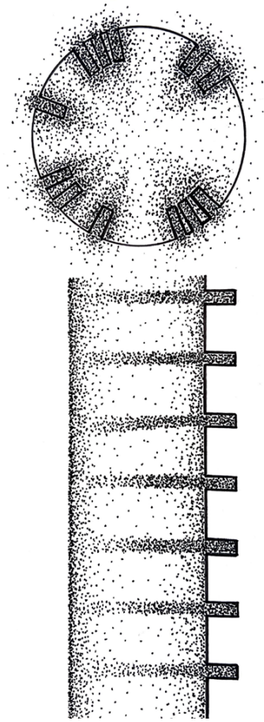
Texas A&M University's Bonfire Memorial uses notches in a bench along a path to represent a passing year in history, connecting each with the next, and projecting moments along the pathway that continue a **SUSTAINED EXPERIENCE**.



interior walls of Villa Emo
Villa Emo, Andrea Palladio (1561)
Fanzolo di Vedelago, Italy



axial spaces of Roman baths
Trier Imperial Baths, Roman Empire (287)
Trier, Germany



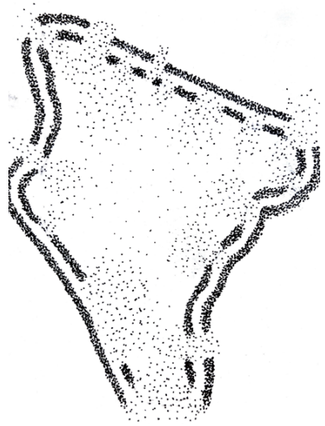
the "History Walk" path to the "Spirit Ring"
Texas A&M Bonfire Memorial, Robert Shemwell (2004)
College Station, Texas

movement as...

Designing spaces corresponds closely with designing movement; movement develops as the subject experiences the design, as studied with the landscape designs below.

CONNECTING VIEWS

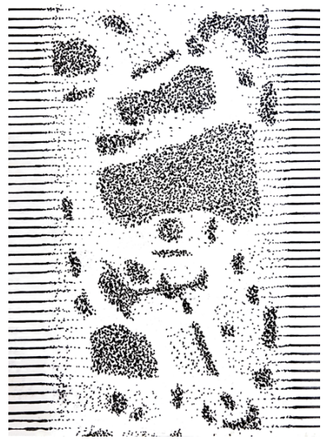
The walk around the lake at Stourhead is designed to continuously open towards "picturesque" views that give a sense of connection to the other moments.



Stourhead Garden
Wiltshire, England

SURROUNDINGS

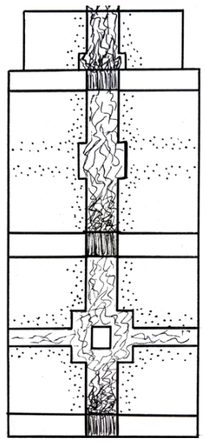
Tall buildings surrounding Central Park allow for continuous connection of orientation as the design moments change.



Central Park
New York City, New York

FLOWING WATER

Shalimar Bagh's central axis of flowing water gives life to the central movement of people along it.



Shalimar Bagh
Kashmir, India

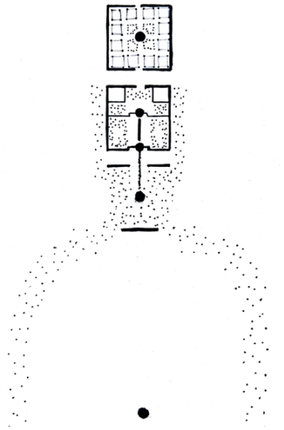
BETWEEN SPACE

Japanese Stroll Gardens, such as Koishikawa Korakuen, portray depth through changing scenery with movement as the space between.

Koishikawa Korakuen
Tokyo, Japan

SPATIAL SEQUENCE

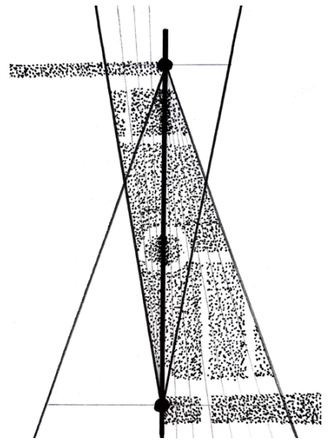
Three squares are sequentially connected as the Villa Lante's central axis is understood through one-point perspective.



Villa Lante
Bagnaia, Italy

FULFILLING VISION

Viewing Vaux-le-Vicomte from one point, the topography change and distance is designed to only be fully understood when arriving at the other end.

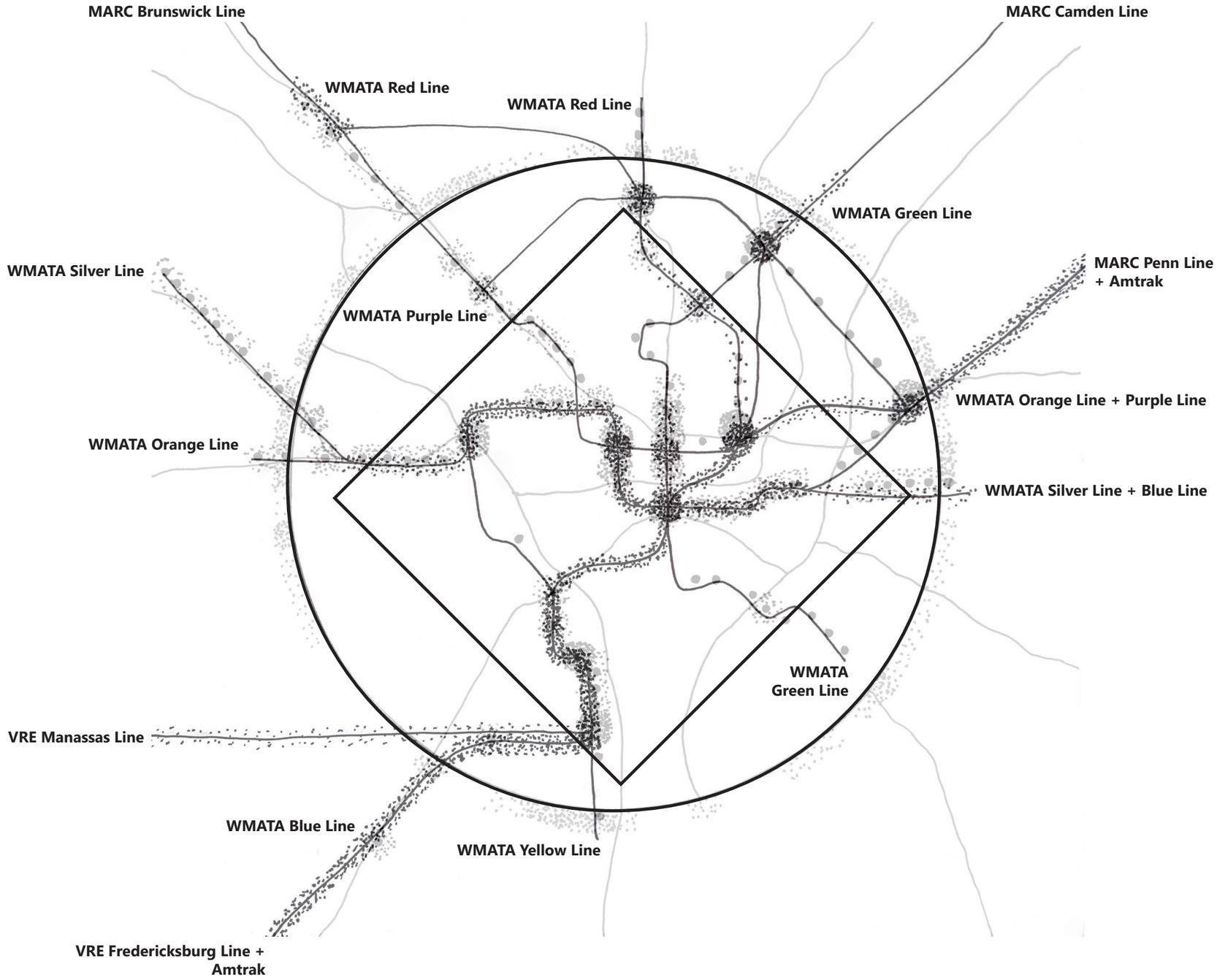


Vaux-le-Vicomte
Maincy, France

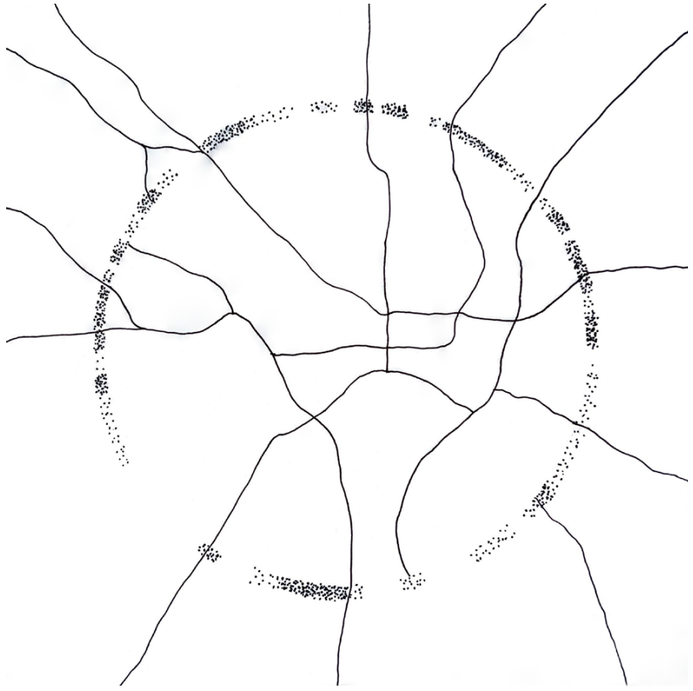
At a city scale, movement within the Washington metropolitan area exists through many different modes of transportation. People travel to and throughout the District of Columbia (represented by the original diamond-shape boundary) and surrounding areas of Virginia and Maryland by train, car, and bus, with many accessible bike lanes and walkable areas.

The **TENSION** of the overlapping axial highway and train lines within the boundary of the Capital Beltway is diagrammed to understand which stations allow for choice: having a choice to change the mode of transportation for progression throughout the region is vital to connect the area.

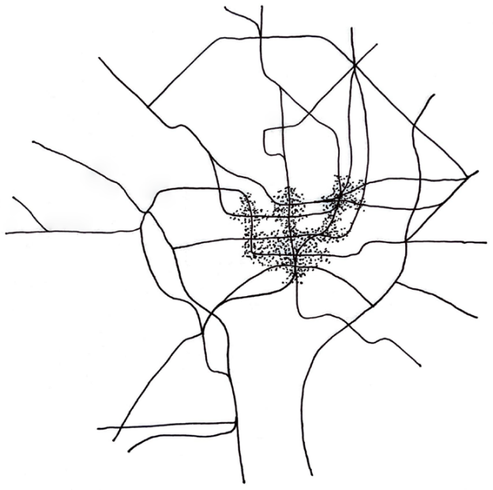
Within the Washington metropolitan area, the Beltway is an experiential **GATEWAY** to the region and the diagrams focus along the periphery.



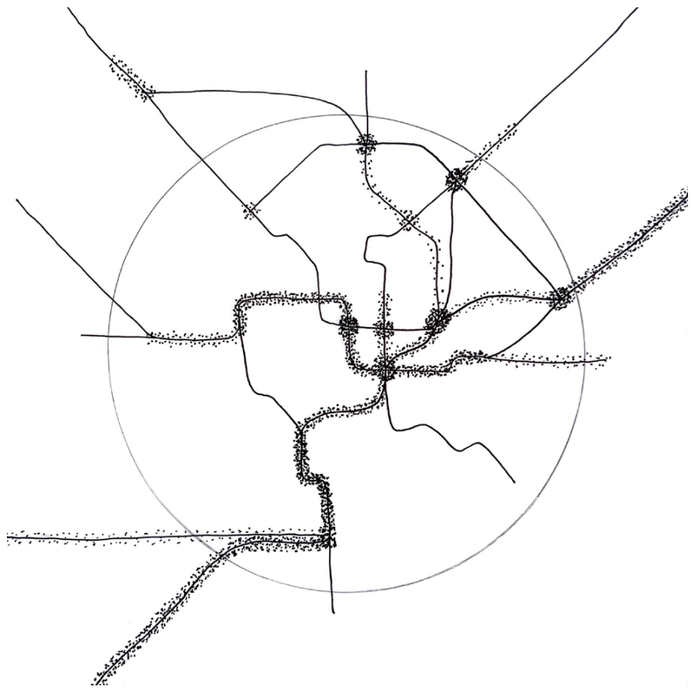
HIGHWAY LINES move within the city, connect to the tension of the Beltway traffic, and extend to the surrounding areas.



The National Capital Planning Commission (NCPC) focuses on highway lines and train lines as an **INTEGRATED** extension, and therefore destination, of the District of Columbia's core.



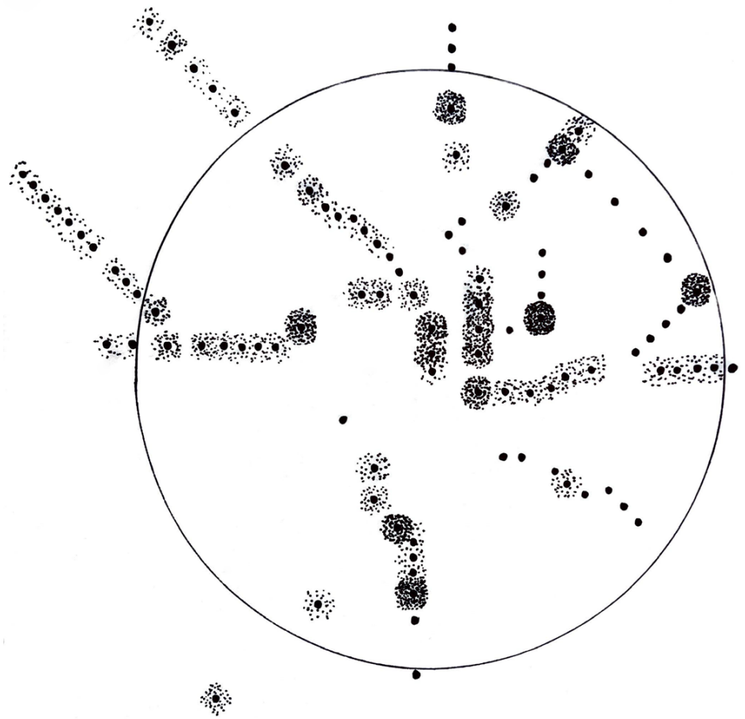
TRAIN LINES overlap local Washington Metropolitan Area Transit Authority (WMATA) lines with the Virginia Railway Express (VRE), the Maryland Area Rail Commuter (MARC), and Amtrak.



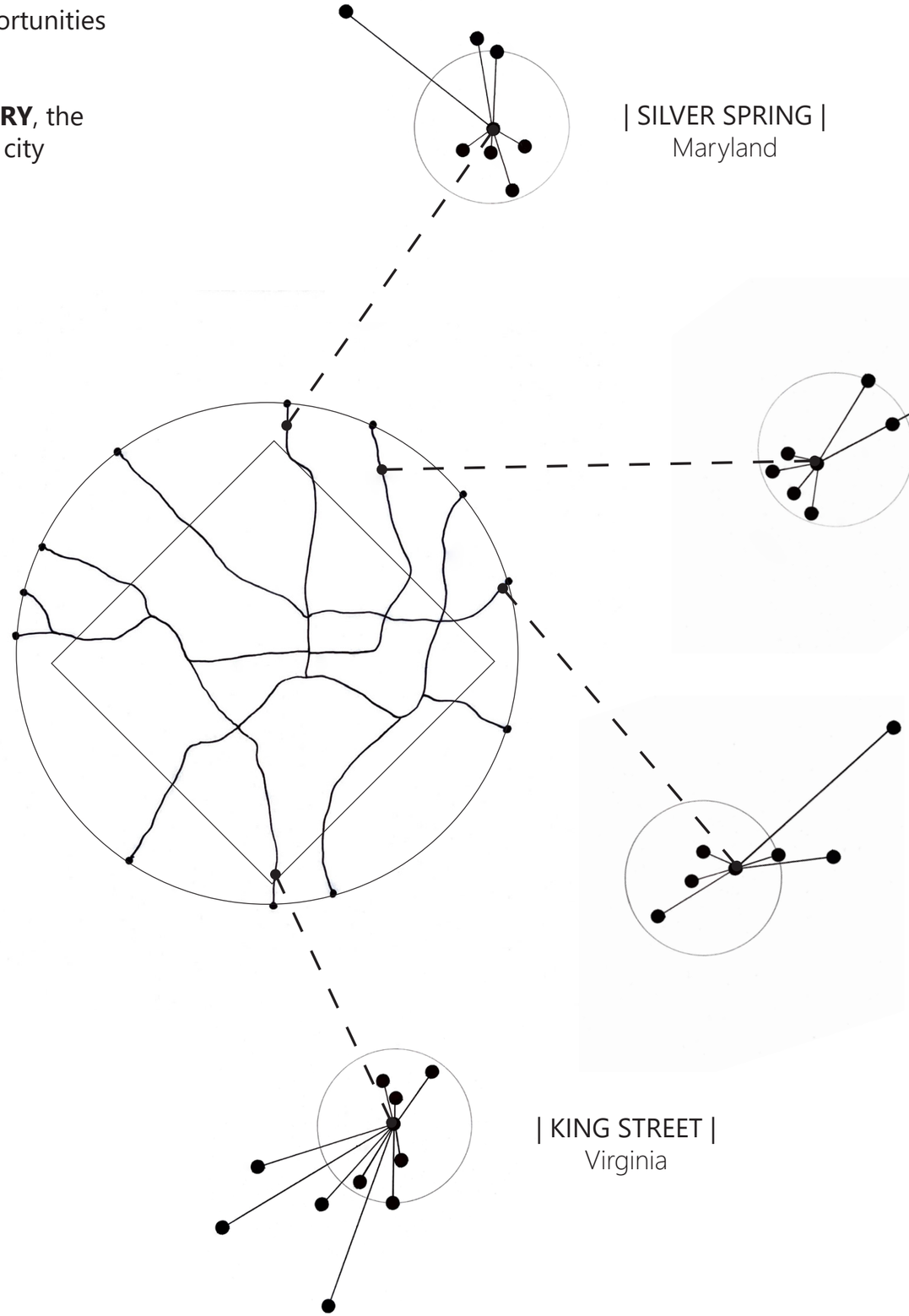
Within the region, the tension in this overlap of highway lines and train lines shows many places with "**THROUGH-MOVEMENT**" or choice along a line of movement.

Each Metro station takes on varying tension of **CHOICE** with different opportunities for commuters and visitors to change their mode of transportation.

Considering the Beltway as a threshold with the points along the **PERIPHERY**, the correlating station points nearest to them are experiential gateways to the city through all **MODES OF TRANSPORTATION**.



Four stations are shown through **CHOICE DIAGRAMS**, each experiencing different levels of through-movement.

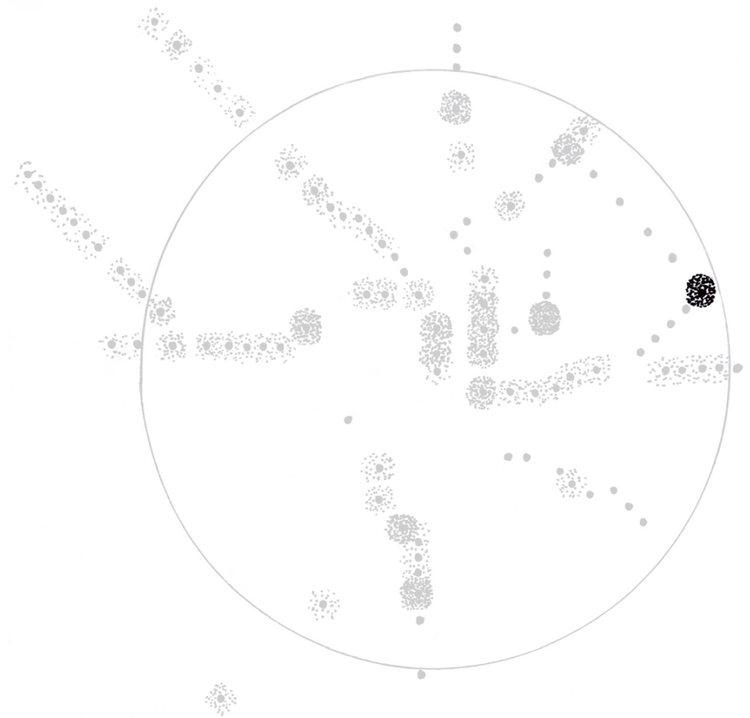


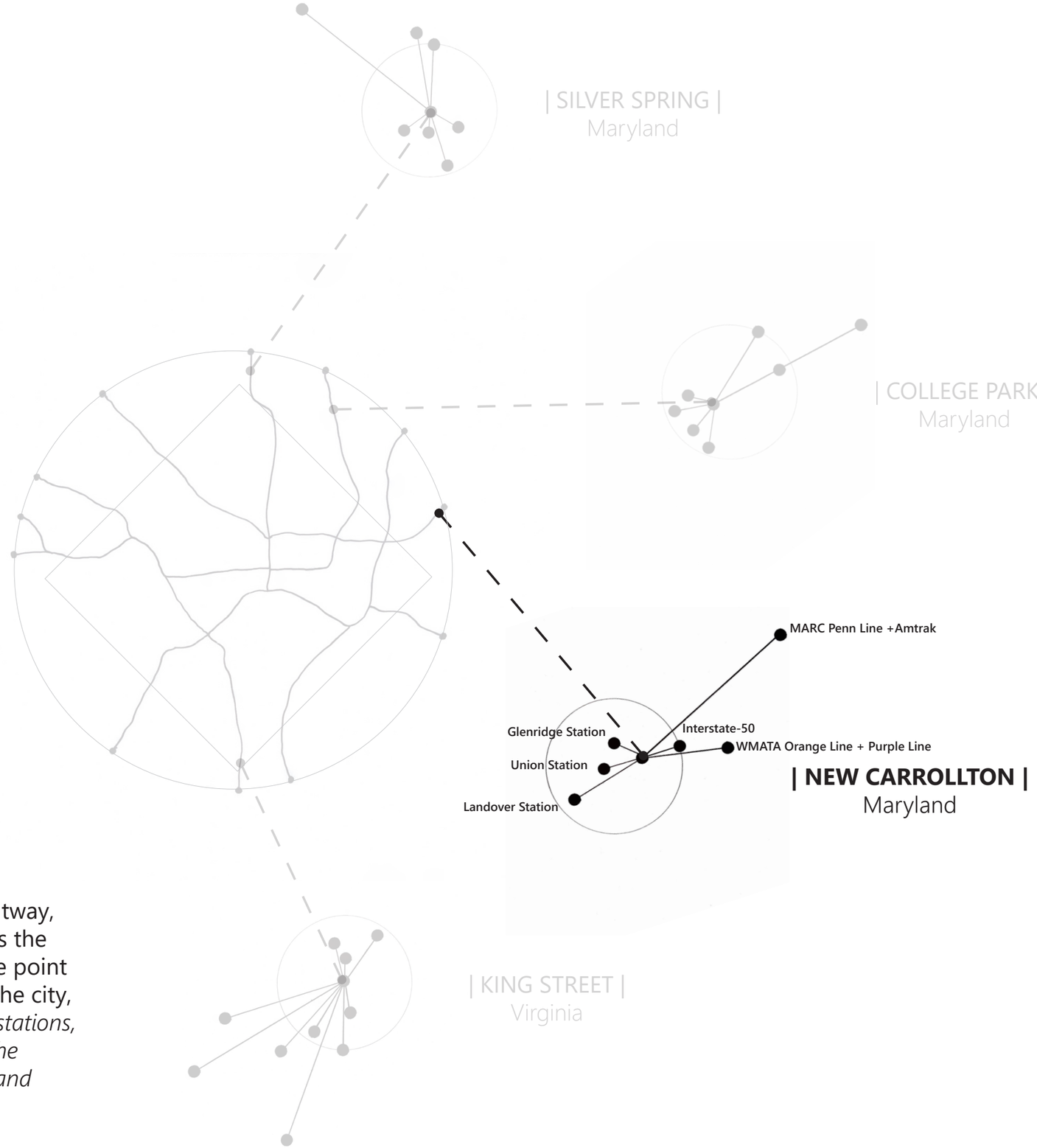
| SILVER SPRING |
Maryland

| COLLEGE PARK |
Maryland

| NEW CARROLLTON |
Maryland

| KING STREET |
Virginia





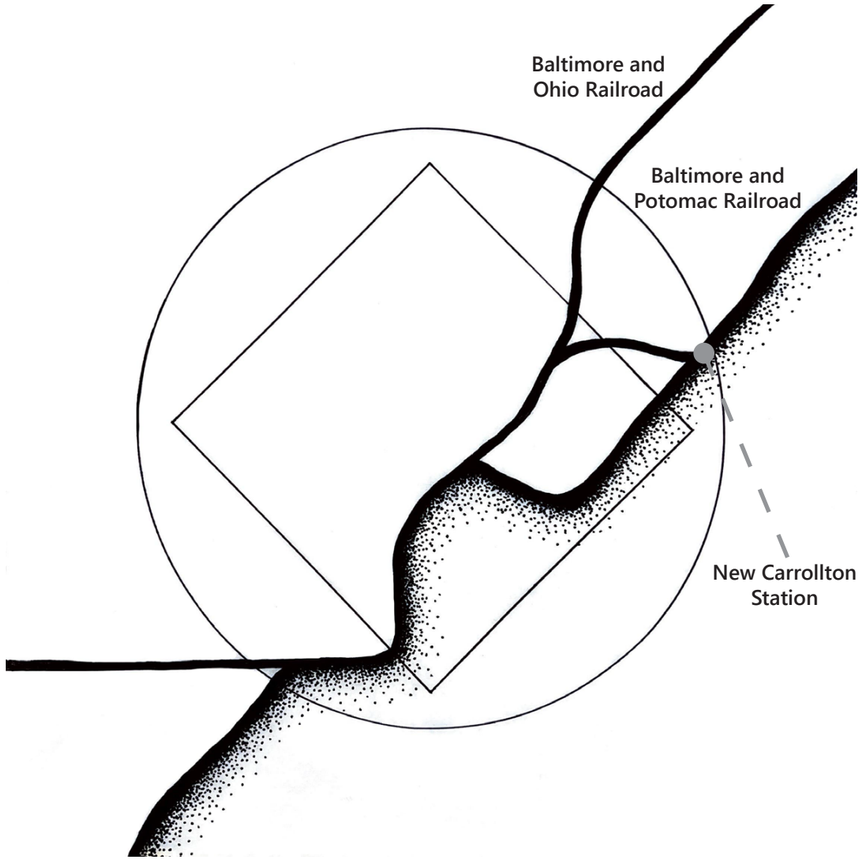
The **NEW CARROLLTON STATION** is located immediately within the Beltway, welcomes the MARC Penn Line and Amtrak preceding Union Station, and is the endpoint for the Metro Orange Line and new Purple Line. The station is the point of tension that invites movement through it, becoming a true gateway to the city, and begins to question: *Can architecture guide movement in transportation stations, relieving the tension of an unfamiliar rider while simultaneously heightening the senses for a habitual commuter? Can architecture encourage relief in waiting and inspire connection to the future point along our path of movement?*

the SITE

disconnection

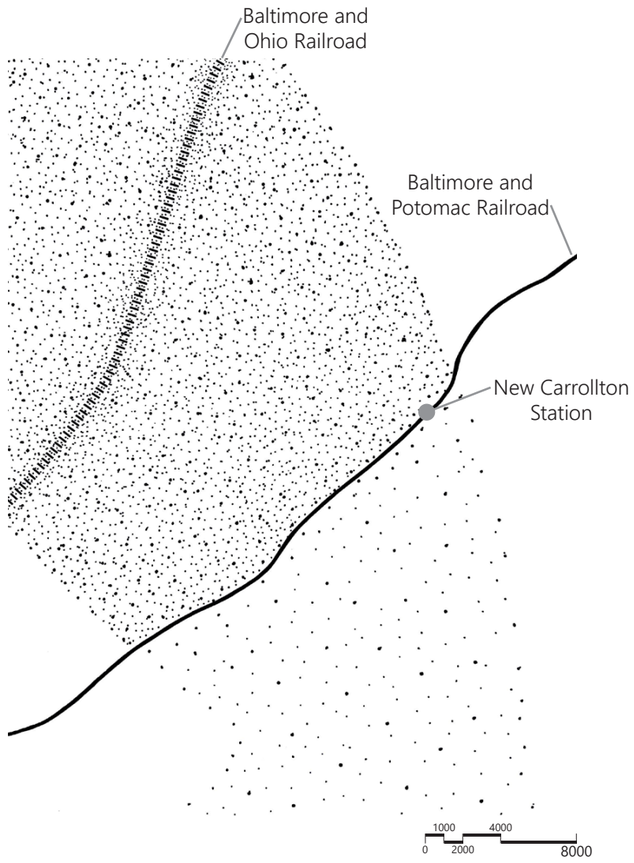
Looking at the historic train tracks that continue to run through the Washington metropolitan area, the former Baltimore and Potomac Railroad that currently hosts the MARC Penn Line created a natural line of disconnection between the two sides; this disconnection is not apparent, however, with the Baltimore and Ohio Railroad that runs parallel north of it. Both railroads run through Prince George's County in Maryland, a county located on the eastern side of the District of Columbia where the New Carrollton Station is located.

Above-ground train tracks along the Baltimore and Potomac Railroad mostly responded to the topography north of the tracks, leaving a disconnection to the south side of the tracks with the stations (including the New Carrollton Station) existing as the only connection points; although **INTENDED TO CONNECT**, the train tracks detached the sides from each other.

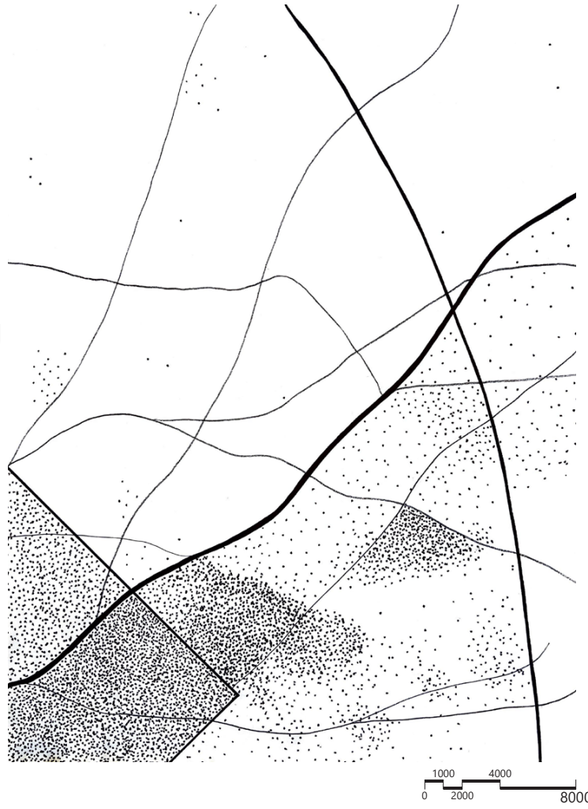


Comparing the population densities and demographic populations, DW Rowlands references American Community Survey (ACS) data to create maps of the Washington metropolitan area. Her articles and maps are represented here in diagrammatic ways to emphasize the disconnection of the area surrounding the New Carrollton Station.

The Baltimore and Ohio (B&O) Railroad developed **ELECTRIC STREETCARS** in the 1890s, permitting residents to move further from the city before commuting by car was easily accessible; suburbs formed along the train tracks, such as Mt. Rainier, Brentwood, Riverdale, and College Park. The Baltimore and Potomac (B&P) Railroad, however, did not get this treatment, and this impact on the **POPULATION DENSITY** can still be seen today. Comparing the population density, based on a map created by DW Rowlands who references 2016 ACS data, of the area above the B&P Railroad to the area below, the diagram shows that the population is nearly double even though both sections are located within the Beltway in Prince George's County.



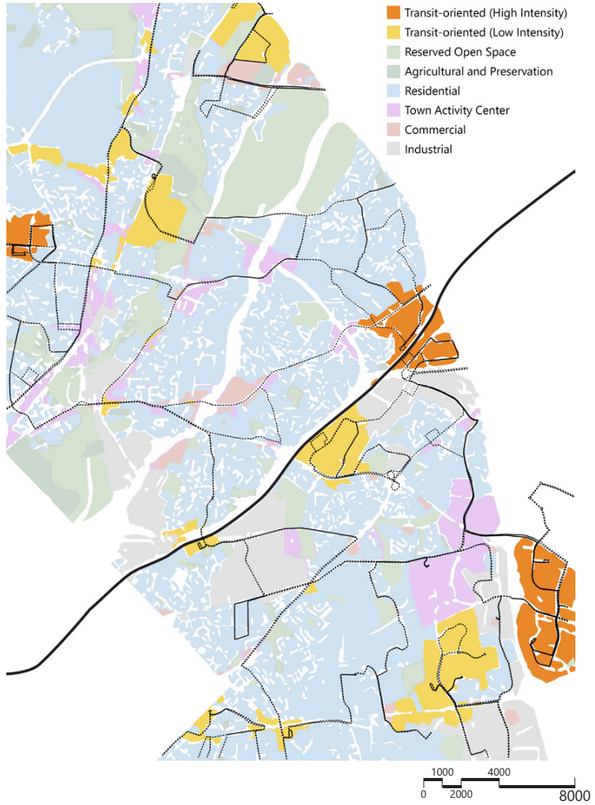
In 1970, the demographic population density data proves the heavy disconnection that the B&P Railroad tracks created between the two sides. The diagram shows this by exaggerating an accurate demographic map created by DW Rowlands of the metropolitan area: by only representing the density of **BLACK RESIDENTS**, the train tracks show the division created between the two sides.

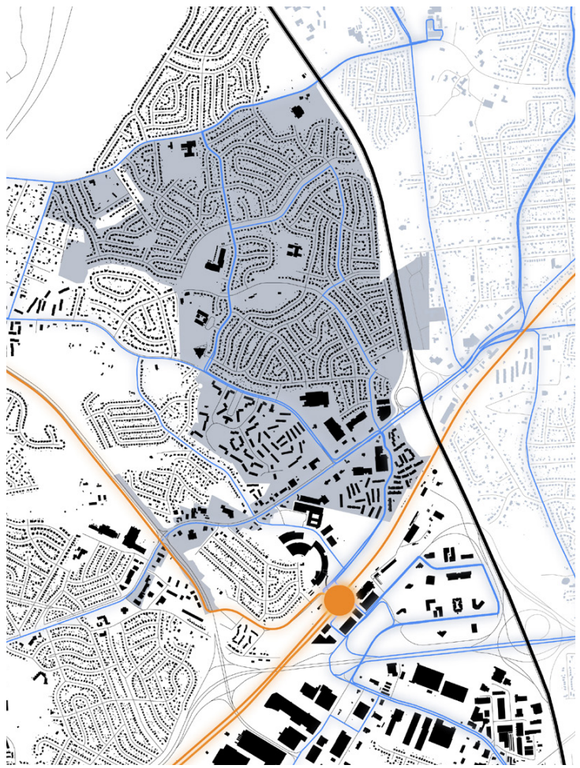


Prince George's County has set out to develop three "Downtowns," which are currently zoned as "High-Intensity **TRANSIT-ORIENTED**" districts and are seen in orange on the **ZONING MAP** to the right. The New Carrollton Station is one of these districts with the county investing in mixed-use development surrounding the station. On a county scale, their goal is to incorporate walkability and ease of access to public transportation for residents to connect the communities. The map overlays the bus routes and the rail line moving through the New Carrollton Station.

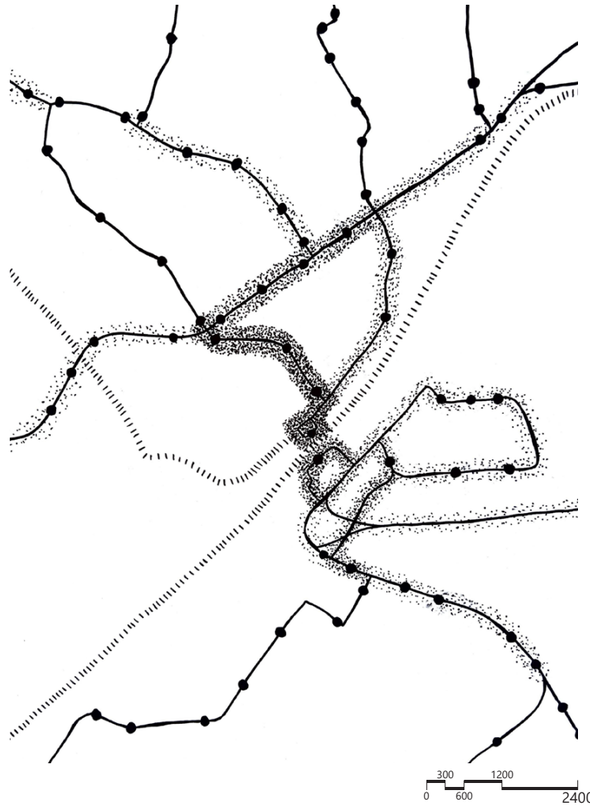
Although the city boundary of New Carrollton, shown in light blue, does not reach the area surrounding the station, the bus lines extend from the station into the city, connecting the **CITY TO THE STATION.**

Highlighting the movement along the Metro Orange Line and the Beltway, the station becomes an **INTERSECTION OF MOVEMENT** for the county, as shown in the map on the right.

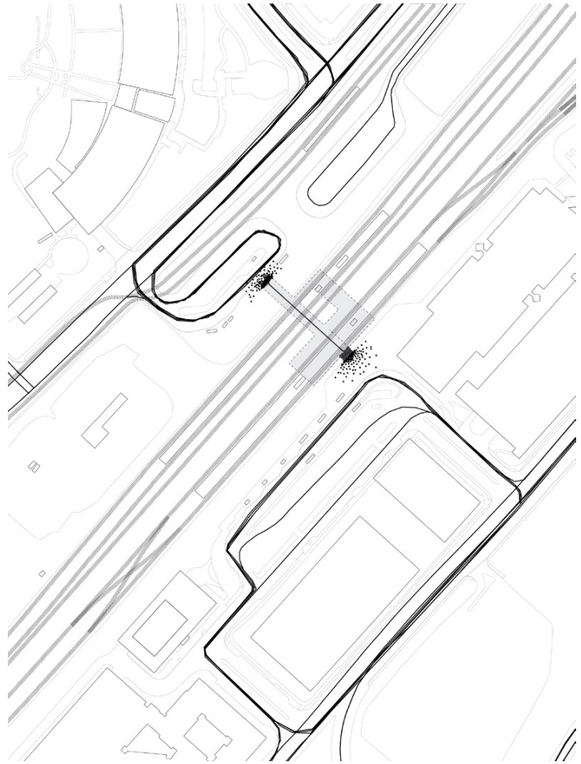




Analyzing the movement closer to the station, the surrounding **HIGHWAY INTERSECTIONS** create tension when making a choice; though the lines may connect in some way, a wrong exit in a car can cause an unwanted connection that is hard to return from.



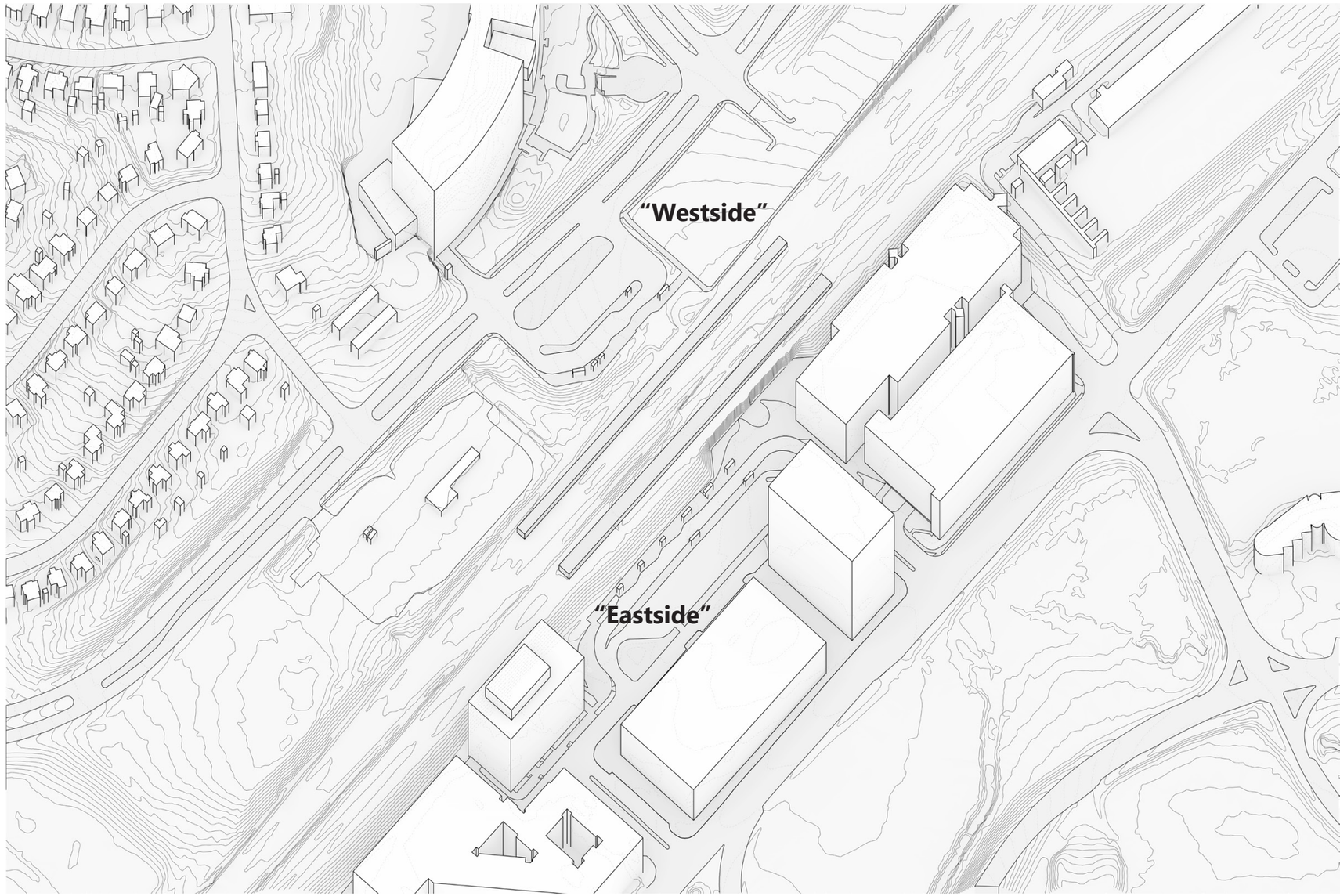
At the same scale, diagramming the **BUS LINES** that stop at the station, the bus routes move through the surrounding areas and show the connection the station has to the other points. In this diagram, the tension of the station point is exponential compared to the others as it is a meeting point for all of the lines; the bus lines extend on their respective sides but do not cross over. The station is the only point of connection between the communities as people cross over to change from one line to another.



Surrounding the station are two roads advancing parallel to the tracks; as the bus and car lines turn towards the station, the intersection creates an experiential threshold for all drivers and riders, bringing movement closer to the station. People progressing along these **LINES OF MOVEMENT** will then transition to walking on foot and meet up with others approaching the station on foot. Inversely, there is movement of those leaving the station who walk on their own line of movement and may join the progression of the bus or car line simultaneously.

The Washington Metropolitan Area Transit Authority (WMATA) maps out the New Carrollton Station site in reference to the “Westside,” located northwest of the station platforms, and the “Eastside,” located southeast of the station platforms. Because of the many different bus stops varying between each side, these titles are given for clarification and mapping purposes. The topography change can also be seen in this axonometric drawing with the Eastside as the lower side. The station’s surrounding development is currently under construction and many of the public Board Approvals reference the changes occurring on the Eastside. The Westside, on the other hand, will change as the WMATA Purple Line alters the site conditions.

Although intended as simplified map titles, these labels emphasize the **DISCONNECTION** between the two sides in both development and experience; the station should be the connection.



2024 Site Axonometric Drawing (existing)

changes over time

| 1978 | The New Carrollton Station opened

| 2003 | Parking Garage (1) is built

| 2010 | Prince George's County approves a New Carrollton Transit District Development Plan

| 2015 | Metro agrees to a joint development for the station

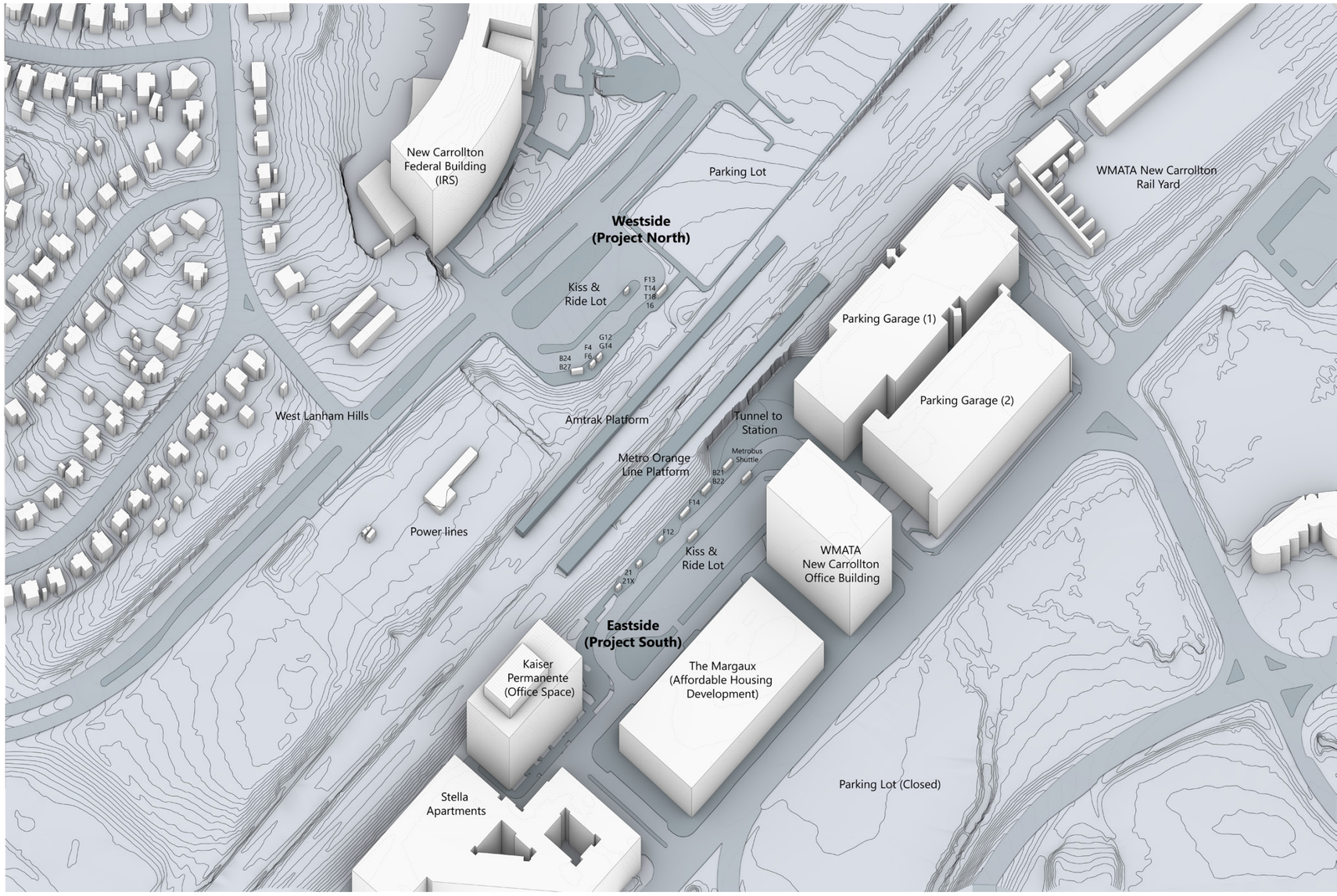
| 2016 | Parking Garage (2), Stella Apartments, and the Kaiser Permanente office building are approved and begin construction (Phase 1 - all completed)

| 2022 | Metro's office building completes construction. Construction begins for The Margaux housing development and a new Parking Garage (1) replacing the existing garage (Phase 2 - still under construction)

| 2024 | The Margaux and Parking Garage (1) are almost completed

| 2028 | The Purple Line Metro Station will open (currently under construction)

| 2032 | The proposed station design in this thesis will complete construction



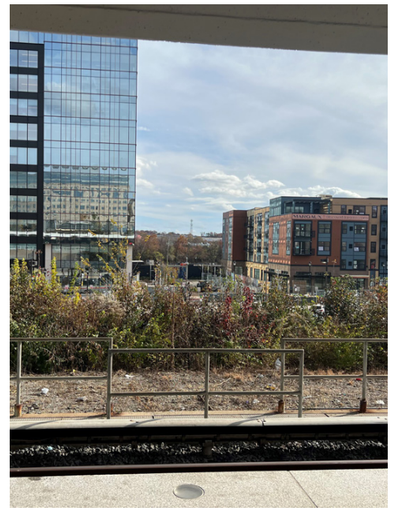
2024 Site Axonometric (existing)

Westside bus stops facing northwest
(IRS Building)

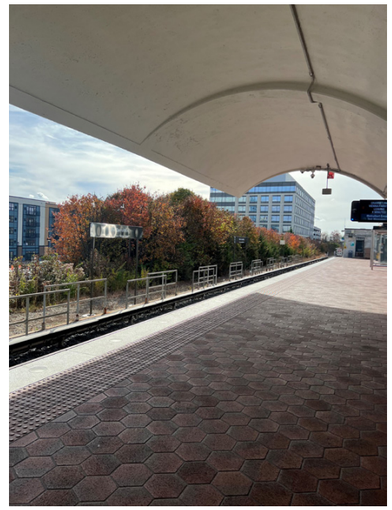
Metro platform facing northwest
(IRS Building)

Metro platform facing northeast

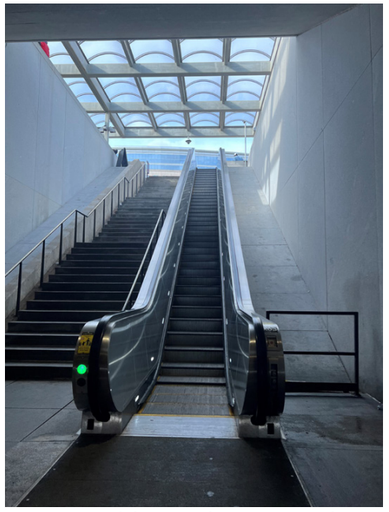
Metro platform facing east
(garages + WMATA offices)



Metro platform facing Southeast
(WMATA offices + The Margaux)

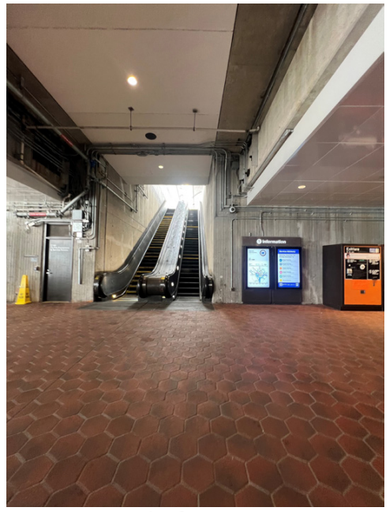


Metro platform facing south
(The Margaux + Kaiser Permanente)



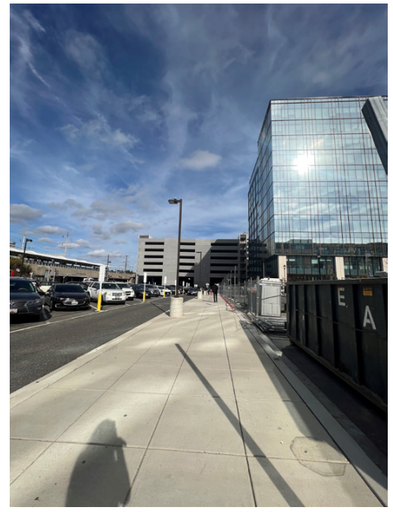
Westside escalator tunnel entrance facing northwest
(IRS Building)

Tunnel facing northwest



Metro platform entrance escalator facing southwest

Eastside tunnel entrance facing north

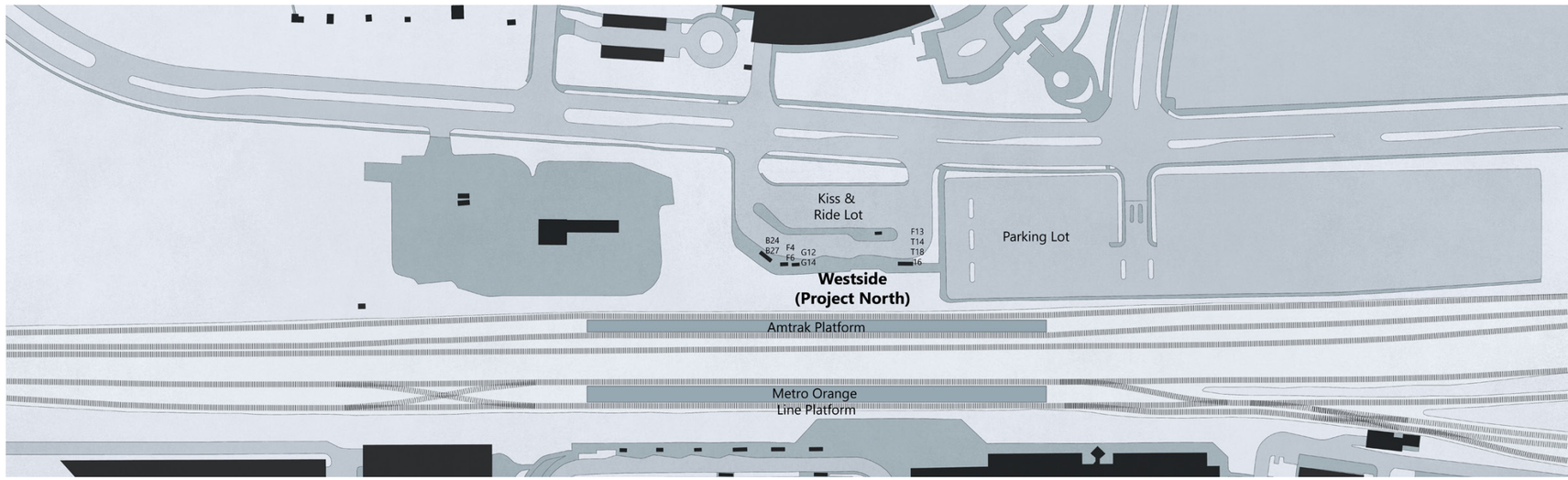


Eastside sidewalk facing northeast
(Eastside entrance + garage 1 + WMATA offices)

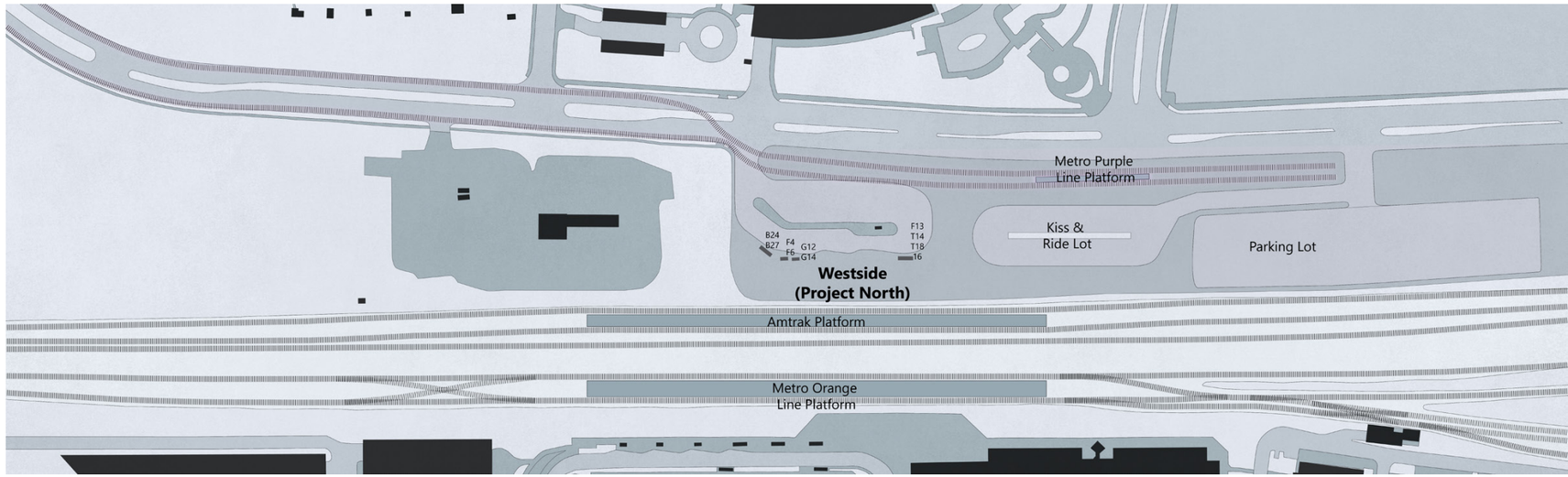
Eastside intersection facing northeast
(The Margaux + garage 1 + WMATA offices)

The **Purple Line Station** will be located on the Westside (Project North) and will be completed by 2028. The light-rail lines and platform will be adjacent to the existing station with little effect on the station in construction.

Circulation patterns approaching the station from the Westside will change subtly. The bus stops will be located in the same position but the line of movement will circle back at the intersection; it is no longer a one-way entrance. The Kiss & Ride line, however, will enter through a different intersection that will be constructed over the existing parking lot, making the parking lot smaller. Overall, the sidewalk is extended towards both the existing station and new Purple Station as a way to connect the two.

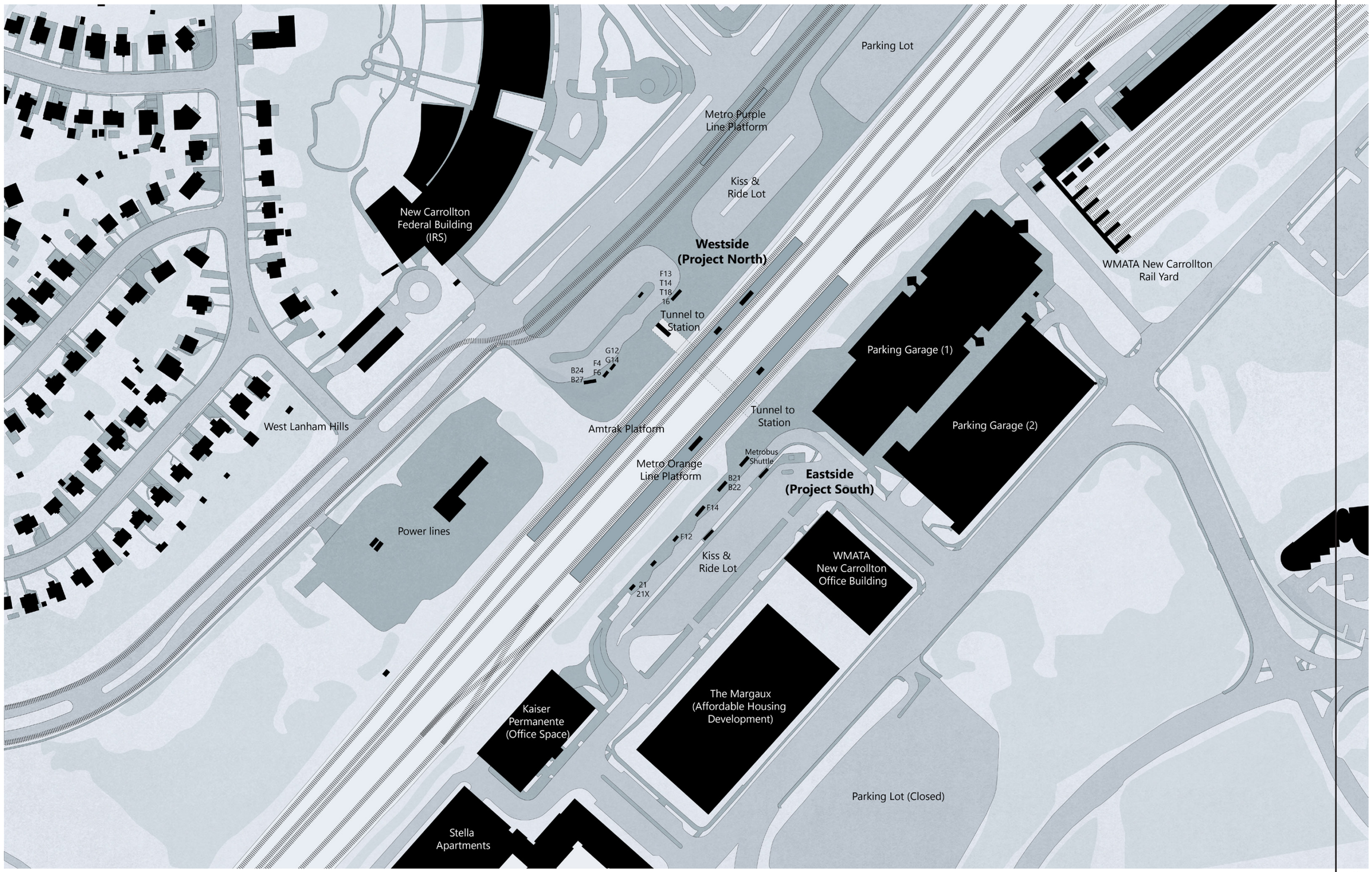


2024 Site Plan (existing)



2028 Site Plan (existing + Purple Line)

Collaborating with the 2028 site plan, the design proposal will include the new Purple Line conditions.



2028 Site Plan (existing + Purple Line)

the STATION

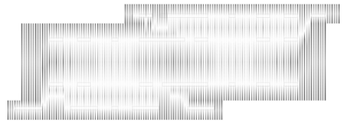
connecting circulation

*the **SITE** design*

Existing single-entrance escalators in the station are accessible through a tunnel underneath the platforms, creating tension in the limited movement. Proposing more escalators and other vertical elements of circulation, such as elevators, ramps, and stairs, there is more choice of movement, easing tension, and more points of connection towards the subject's goal. Different topographic levels of the entrances to the station are referred to as separate planes of existence, the "site planes," and use the vertical choice moments to ascend towards a singular "ground plane," located about 20 feet above the platforms. This ground plane is the station's level of circulation and connection to the other modes of transportation available within and around the station; the floor level embraces movement along a singular plane and functions as a "plane of connection."

structural experience

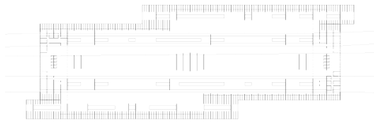
*the **STRUCTURE** design*



Analyzing the movement along the ground plane, people influence the design. Linear members are placed perpendicular to the platforms, allowing the effects of a moving design to engage each segment; each linear member materializes as a structural "fin." The fins are structural Cross Laminated Timber panels that span across the tracks from one side of the site to the other and connect the site and ground planes to the roof; they embody the structure, the station, and the experience. Skylights guide movement and provide natural light for the station and the platforms below. A moving design demonstrates where edges emerge; the edges of the station are designed as waiting spaces as well as interior spaces for transportation functions. Mass and void work cohesively to create a connecting experience while moving through the station: orientation and framed views relate the subject to their changing surroundings.

planes of connection

*the **SEQUENCE** design*

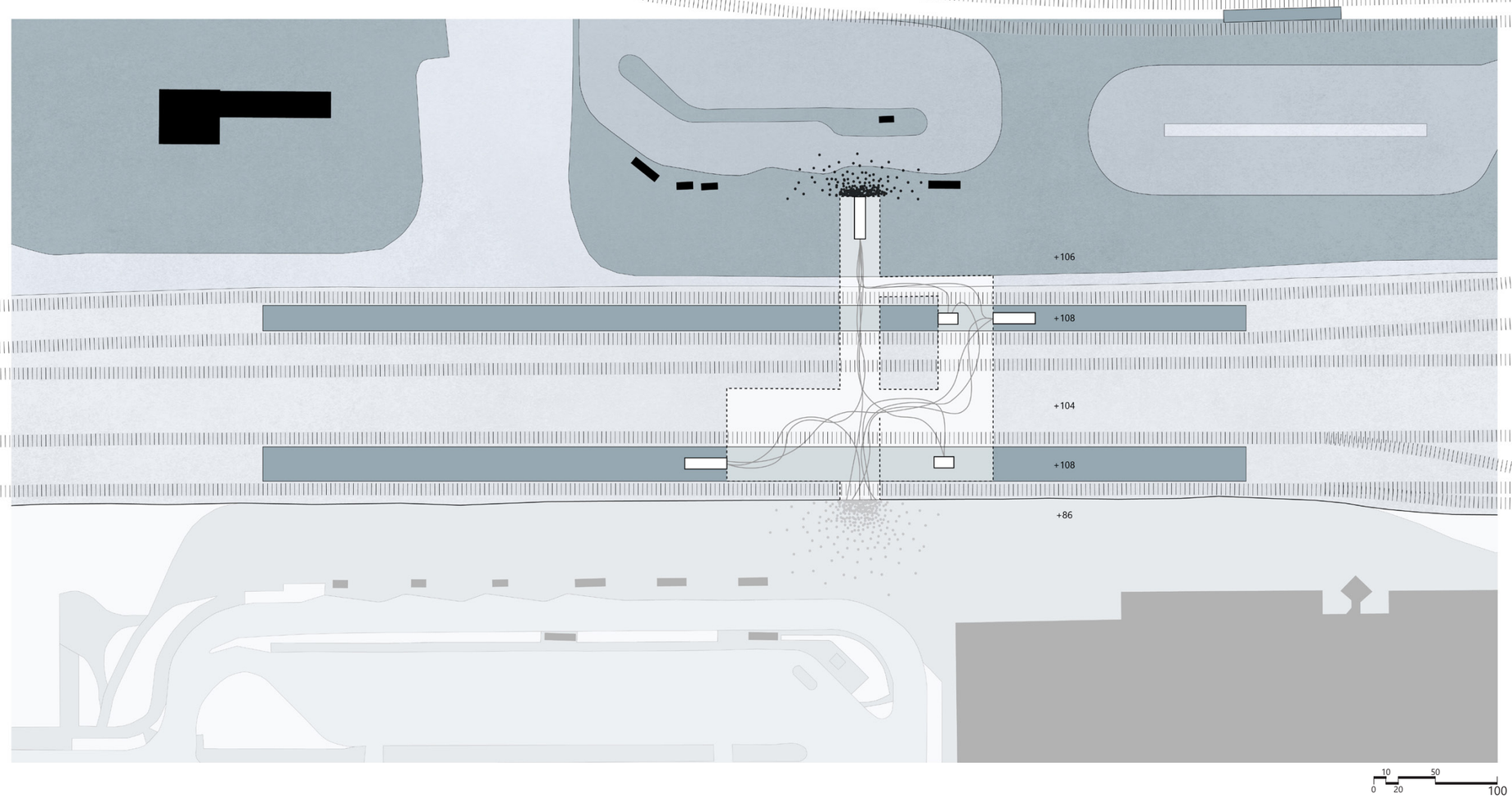


The 2032 New Carrollton Station connects the site through movement, allowing people to move freely with a relief of tension. Forming the station responds to the needs of the site, with careful consideration of the Eastside, the Westside, and the platforms, and the movement desired between. Existing as a transportation hub with experiential movement throughout, the station functions as a space for people. The waiting spaces can be used by anyone who may choose to visit the station as well as the retail shops and cafe. People working for Amtrak, MARC, and WMATA can use the station for functional purposes and simultaneously enjoy the ease of movement. Habitual subjects who commute through the station every day can still undergo a heightened sense of experience, even as they get the same cup of coffee from the cafe every Monday. Unfamiliar subjects can feel the tension of a new space begin to relieve as the design guides them towards their forward goal, allowing each step to connect to the last, with places to wait comfortably for their first Metro ride into the Washington metropolitan area.

connecting circulation

EXISTING *circulation through the station is underneath the platforms, where movement throughout is limited.*

Though guided underneath to the same level, the entrances take on different relationships that respond to the **20 FT TOPOGRAPHY CHANGE** between the two sides. The Westside (Project North) entrance is a canopy with a single escalator that descends to the tunnel, whereas the Eastside (Project South) entrance is a simple opening in the retaining wall.



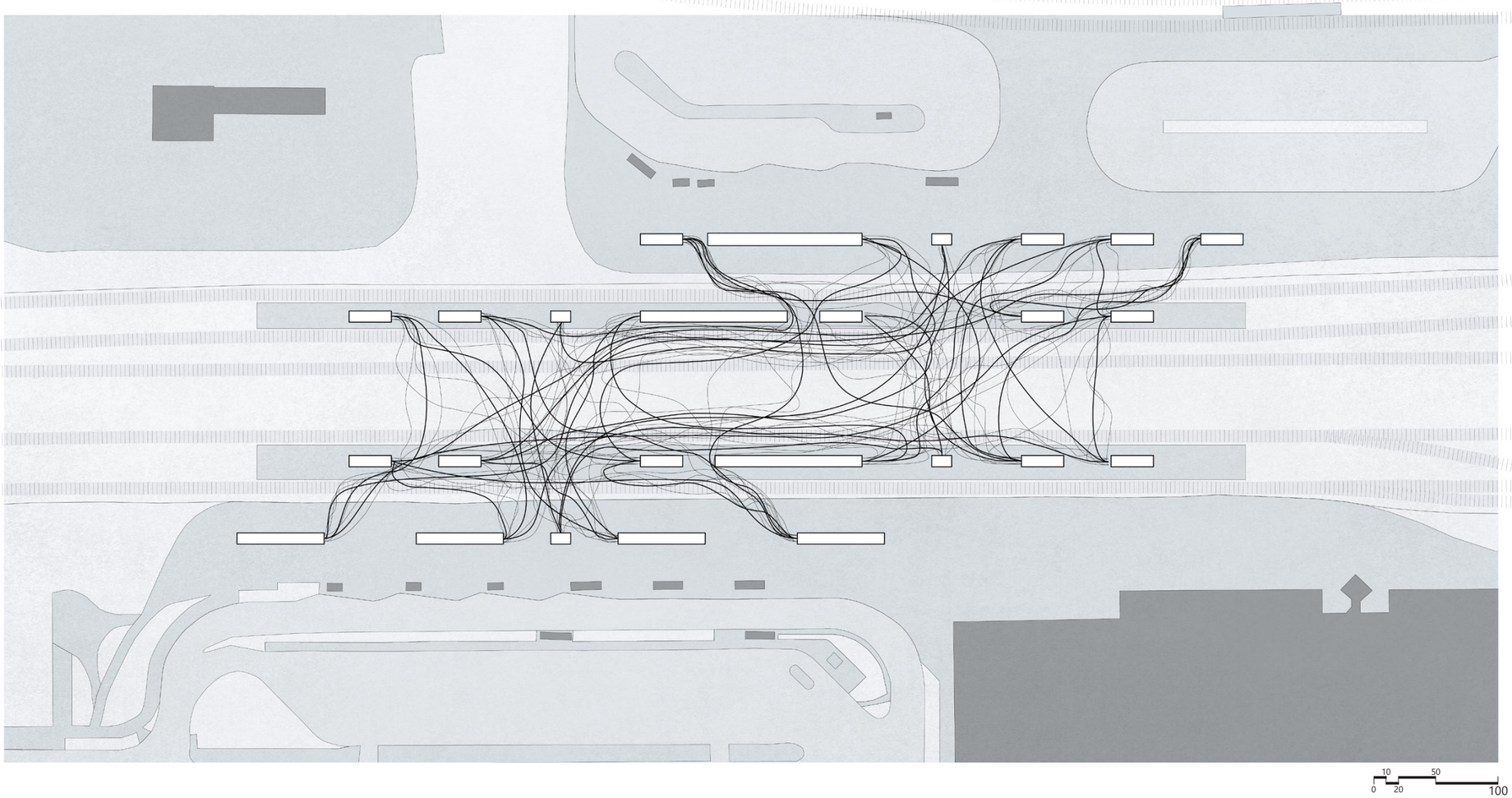
Both entrances move people towards a single escalator upwards, one for each platform, and the overlap of those getting off of a train creates tension within the **TUNNEL** that is only released at the exit moments.

connecting circulation

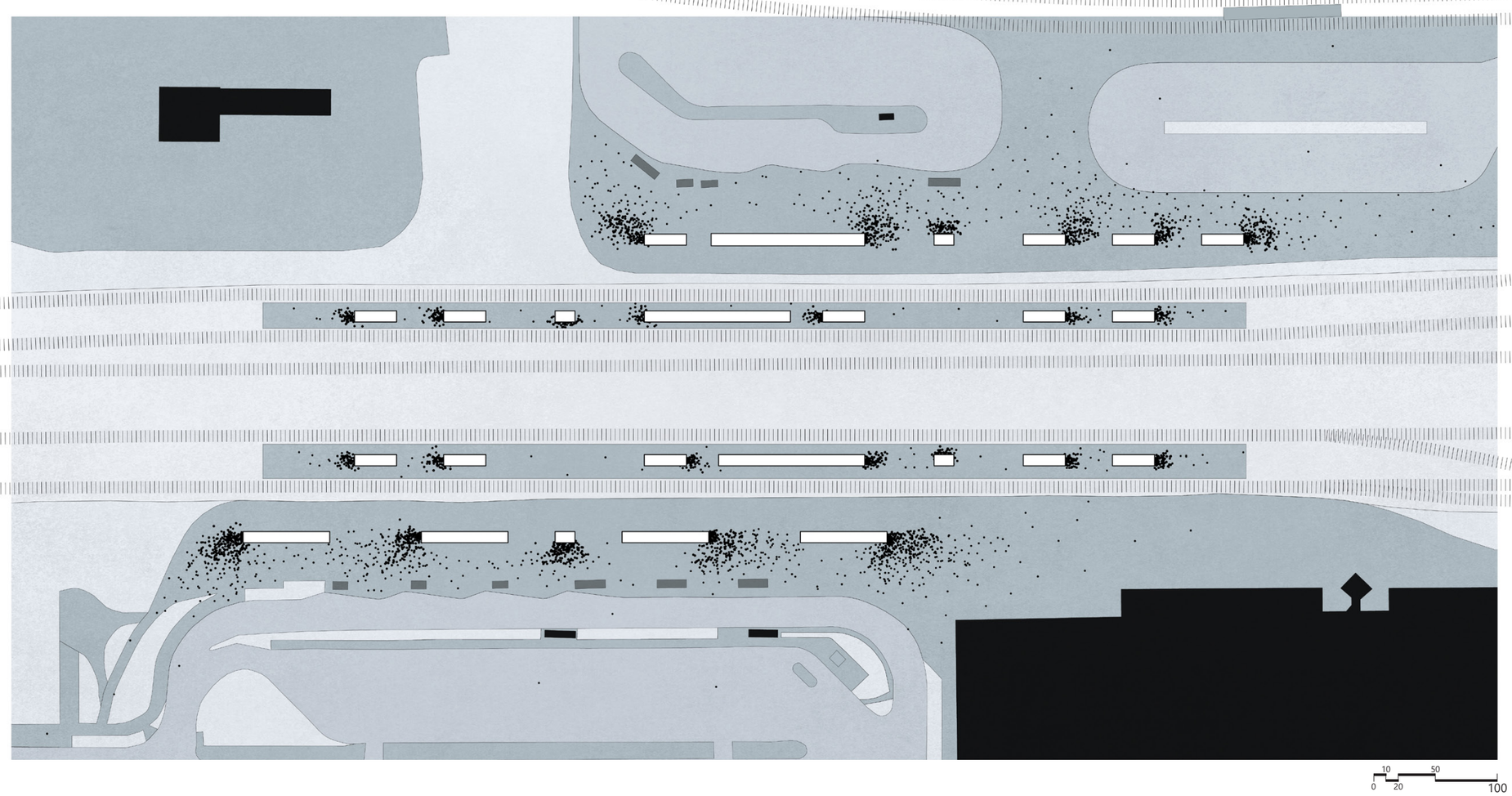
PROPOSED *circulation through the station would exist above the platforms, connecting choices of movement.*

Increasing choice and therefore connection points to the same level, **VERTICAL CIRCULATION** is placed parallel to the platforms, allowing movement to flow freely between.

Each escalator, elevator, and staircase will ascend movement from the site and platforms onto the same **CONNECTED LEVEL** of circulation; the overlap of those progressing with an opposite goal is lessened.

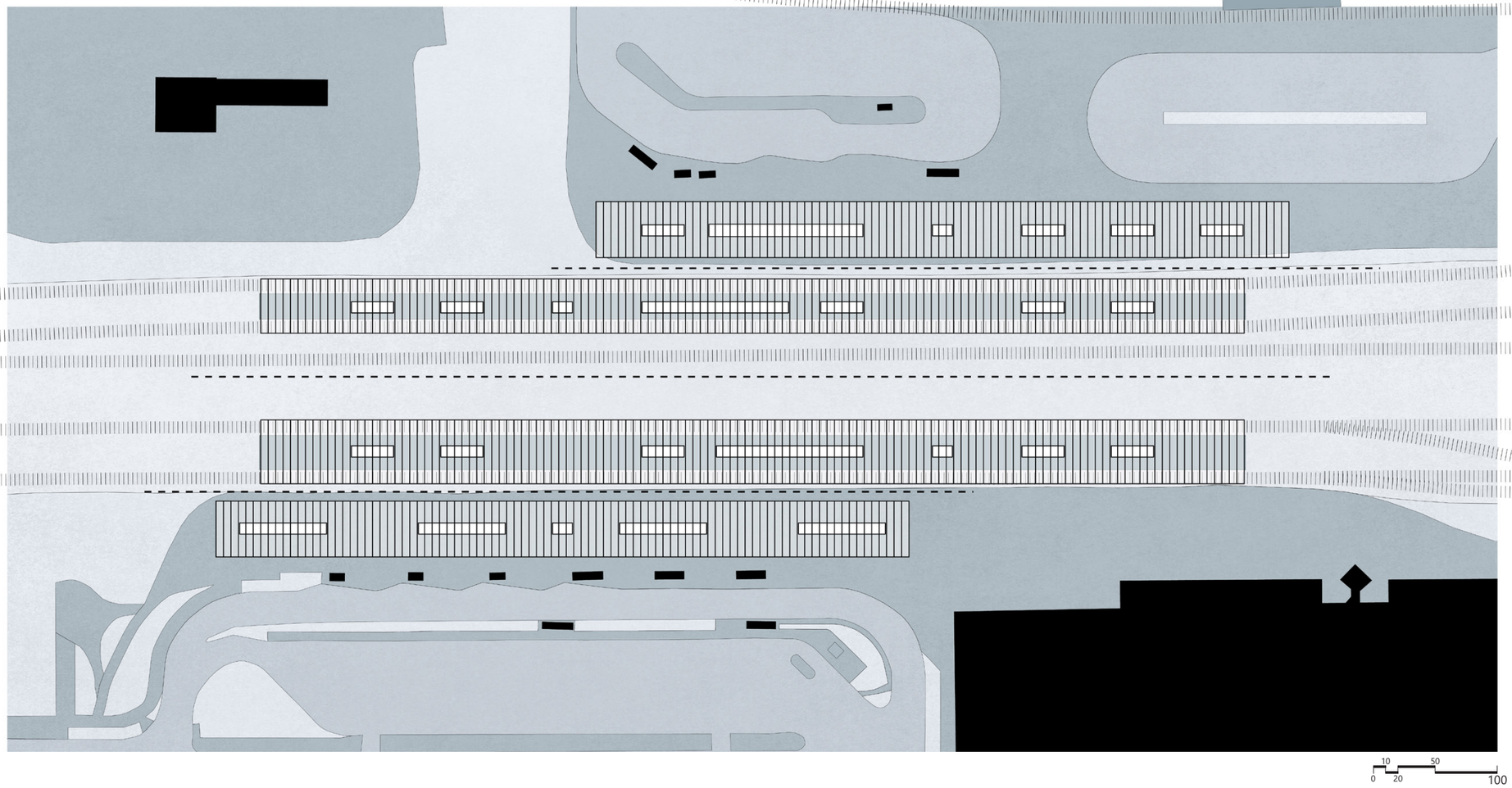


The vertical choice moments create a direct **SITE CONNECTION** that allows freedom of movement throughout the site as well; there is more than one entrance/exit to the station as people are approaching from and leaving towards many different places.



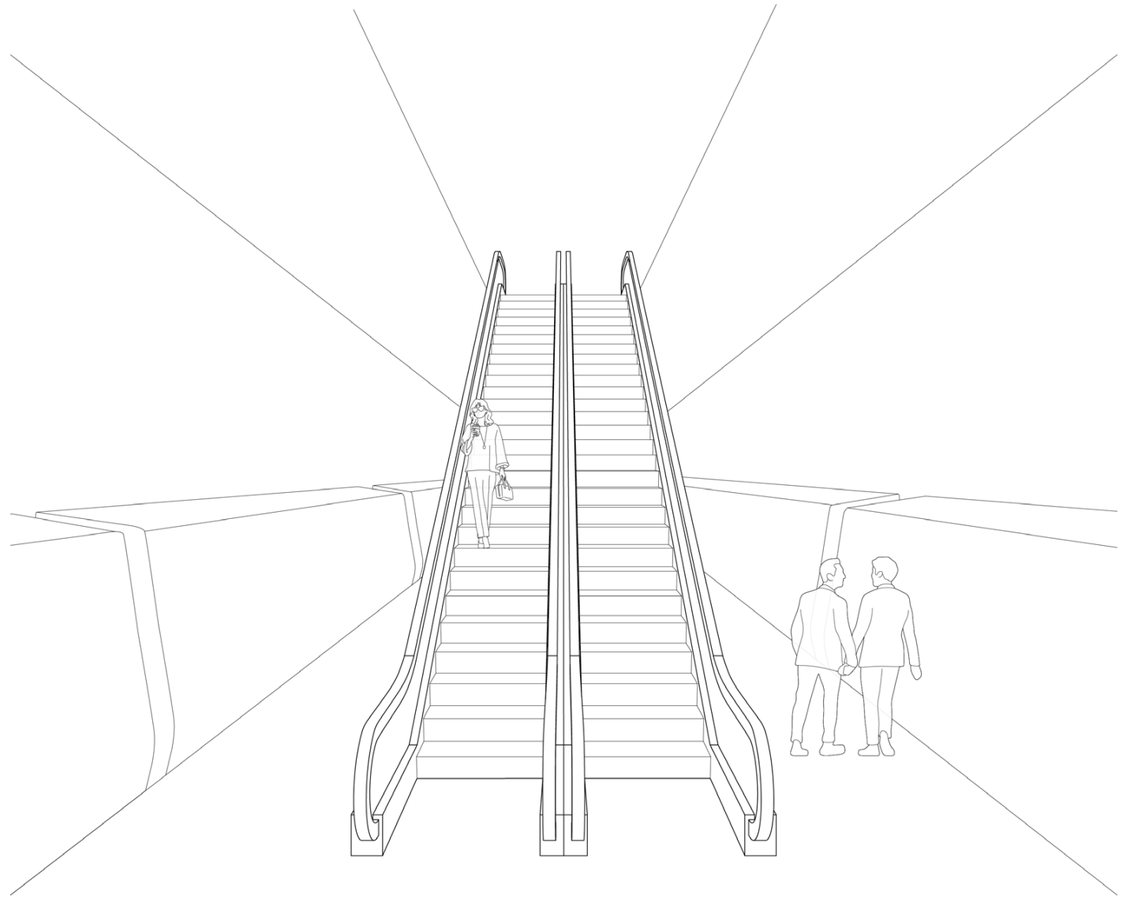
Just as the vertical circulation placement responds to the **ASYMMETRICAL SITE** conditions on either side, as well as the platforms, the form connects the offset movement.

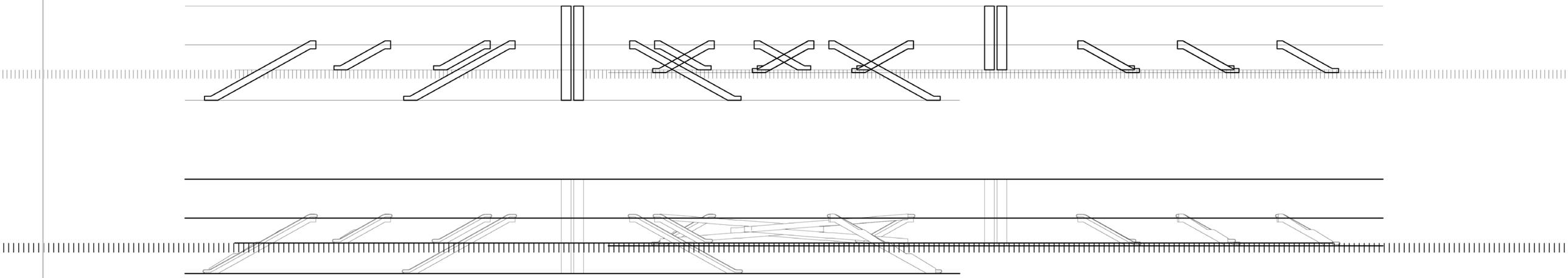
Parallel to the tracks, the form **STITCHES** together the two platforms to each other with a linear distance of the platforms themselves. This connected fabric of the platforms is then stitched to the Westside and to the Eastside.



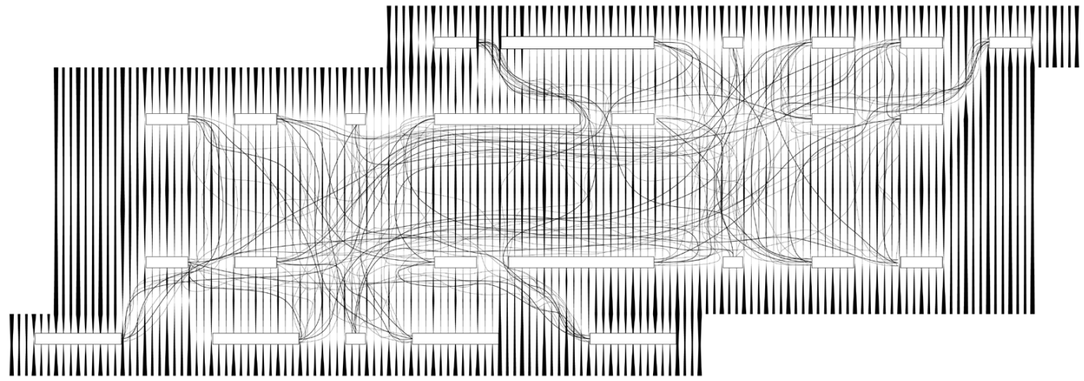
Connecting the vertical circulation from the different topography levels of the site to the same ground level above gives an experiential aspect to the design: the escalators, stairs, and ramps are laid out in front of the subject, guiding movement in either direction. Level changes existing on the site influence the height and therefore length of the vertical elements; the subject's movement, however, is at a continuous angle with the escalator's parallel progression experienced through **DEPTH** .

Peeling away from the new unaltered ground plane above, the elements connect to the varying site planes, creating an experiential consistency of movement throughout the station. The mostly flat roof above is placed as a covering for the station and works with the **PLANES OF CONNECTION** .

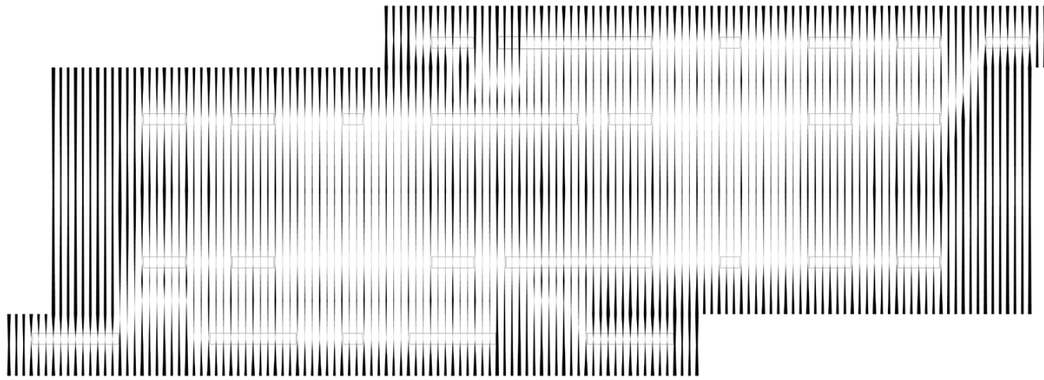




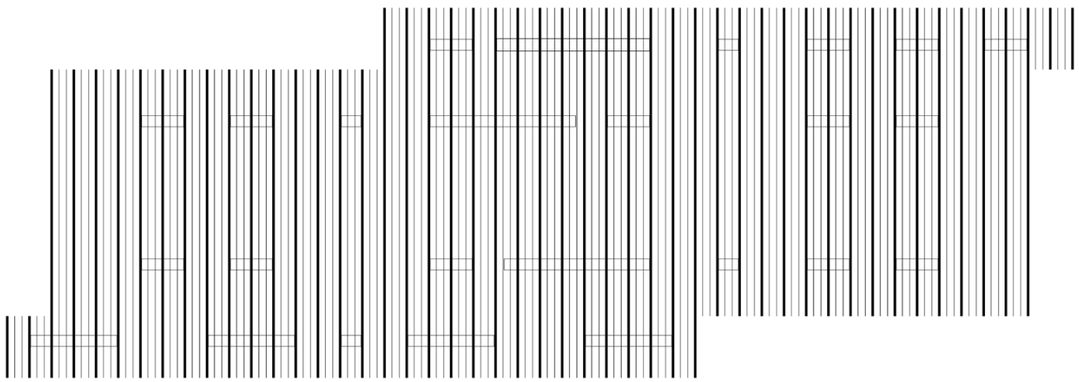
A continuous linear representation of the station's form is engulfed around the circulation lines as the motion of people shapes the design. Movement is the **BETWEEN SPACE** as the concentration of form engages depth in plan around it.



Each line in the diagram develops as a structural "fin," connecting to the subject moving throughout the station. The subject can absorb the **REPETITIVE** structural member with subtle interactive changes; continuous immersement creates an engaging sense of mystery and comprehension for the subject in motion.

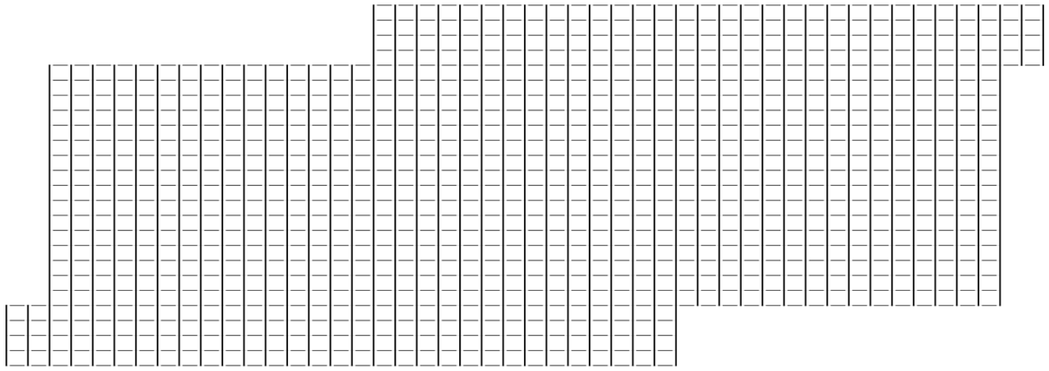


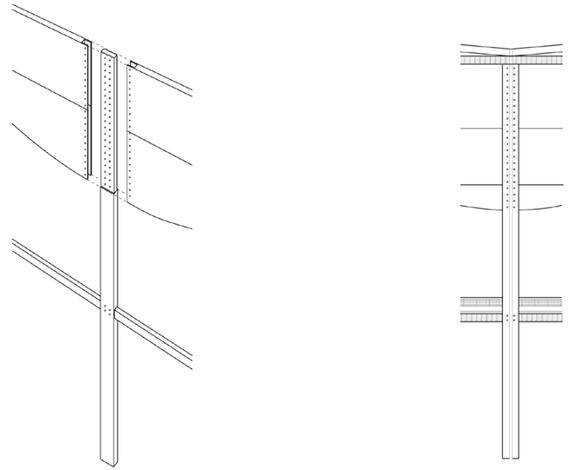
Relation from one fin to the next desires **RHYTHM** as movement so often desires. Every third fin resolves thicker than the two before, and so on.

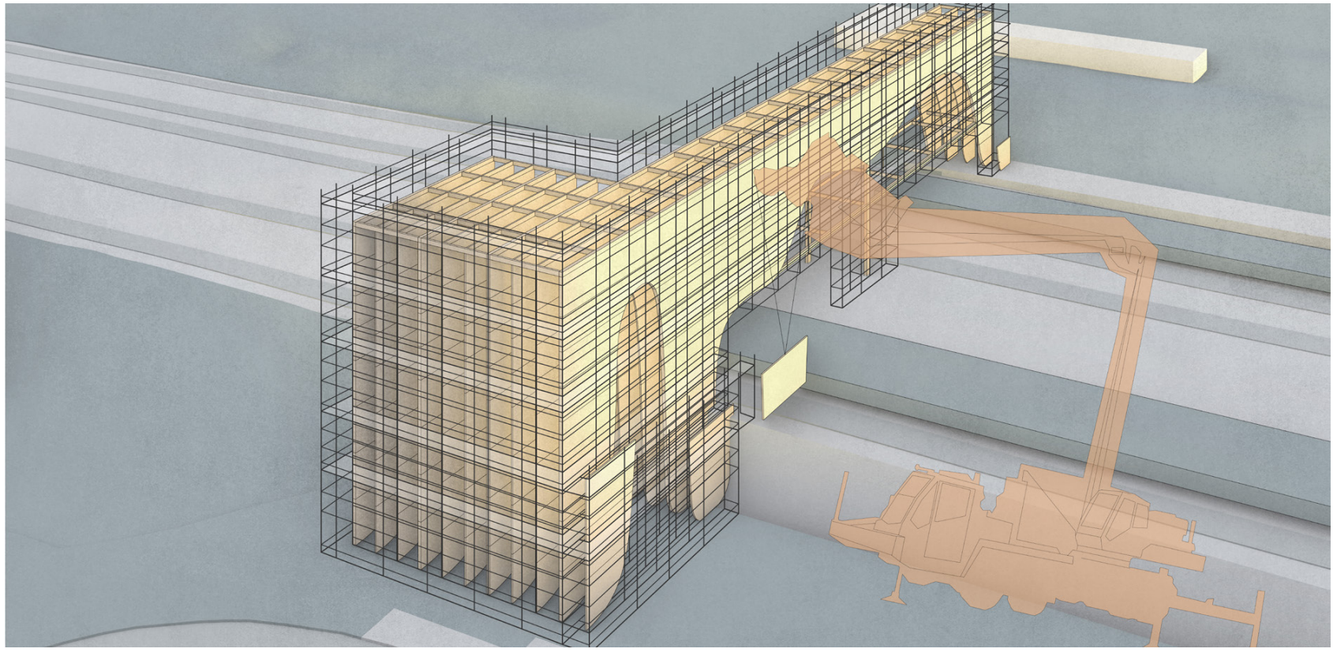


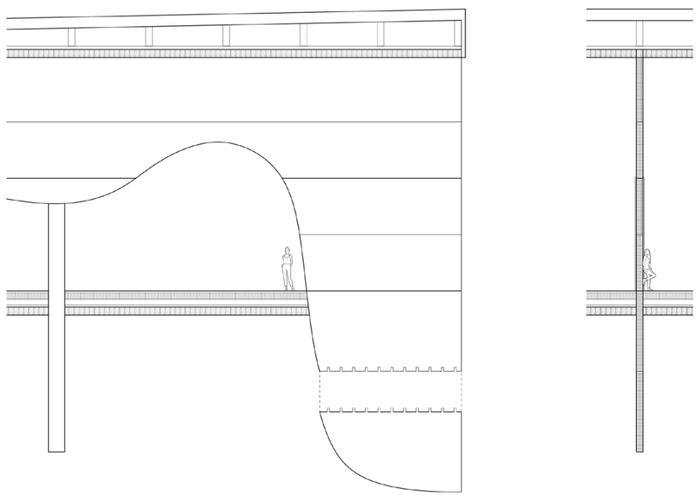
The fins are made with **CROSS LAMINATED TIMBER (CLT)** with both 3-ply panels for the simply experiential fins and 7-ply panels that are part of the structural grid. These structural fins are 18 feet apart with two 3-ply fins in between, each set 6 feet apart on center. The horizontal beams are diagrammed to show their location within the grid as they span between the structural, continuous fins.

The fins are structurally reliant on themselves at the edges with a few columns between to support the linear span. Structural columns for the 7-ply fins are placed down the center of the grid, responding to the location of the rail lines below. These columns, specifically, are located at the low centerline of the roof, allowing rain water to channel down the columns into the soil of the train tracks. Through this placement and others, the fins are bolted to the column as the CLT panel wraps around, locking it into place. The panels are moved onto the site as 7-10 feet tall pieces that connect and support each other as the fin is built up. They are up to 70 ft long which can be transported by freight cars, specifically a Centerbeam Flatcar, which is often used to carry lumber.









Meticulously designing **EACH FIN** in relation to that which had come before while simultaneously responding to the site conditions, including the vertical circulation placements, the experience of the station develops with each design move.

The fins engage all three scales of movement, impacting how people move and live; they are the station, the structure, and the experience all in one.

| personal scale |

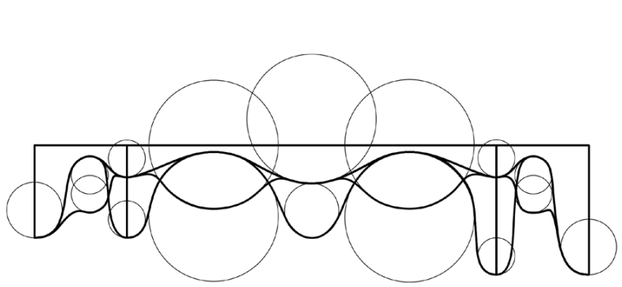
Incremental changing curves relate in a structural sequential experience.

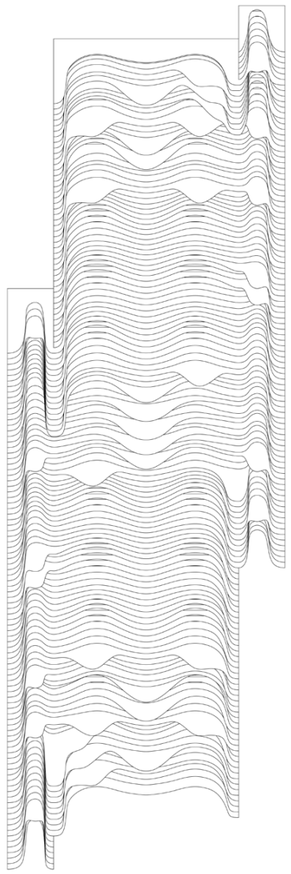
| architectural scale |

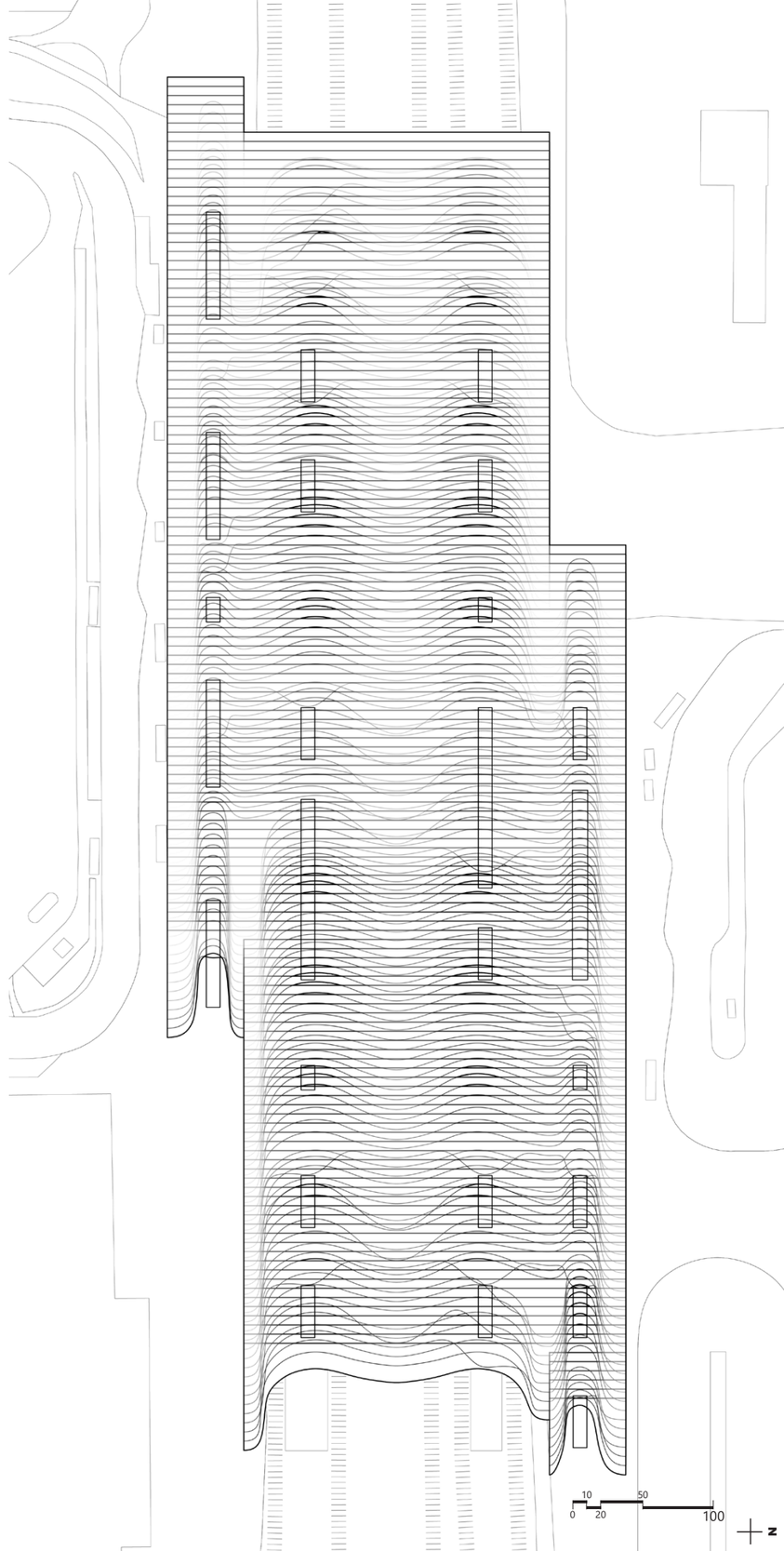
Rhythm of structural repetition unites the experience and the station.

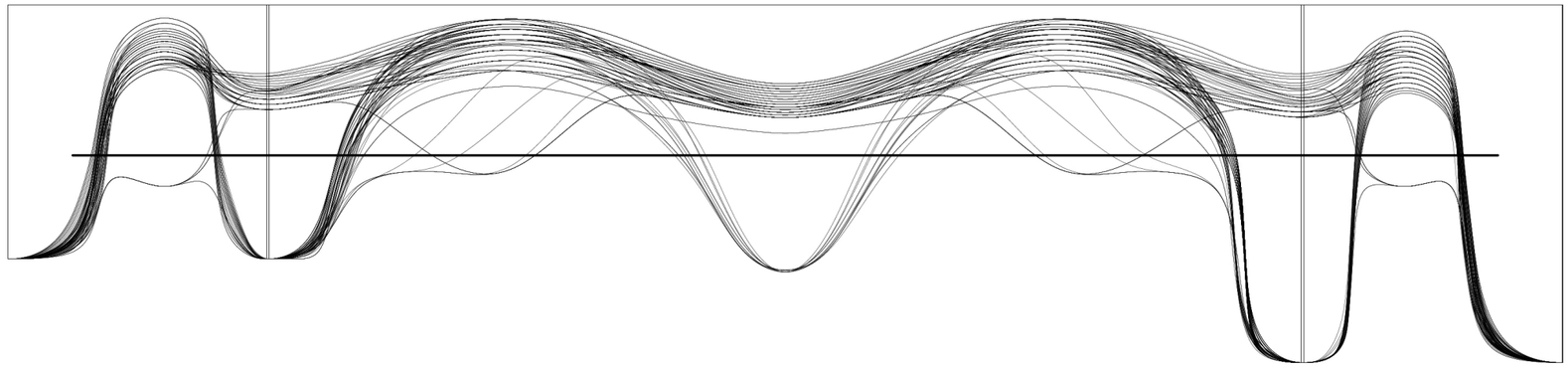
| city scale |

Continuous connection to the surroundings orients the station in the city.

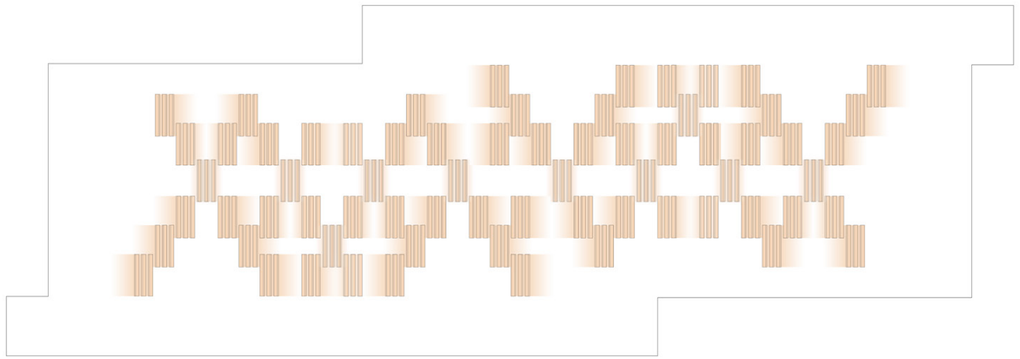


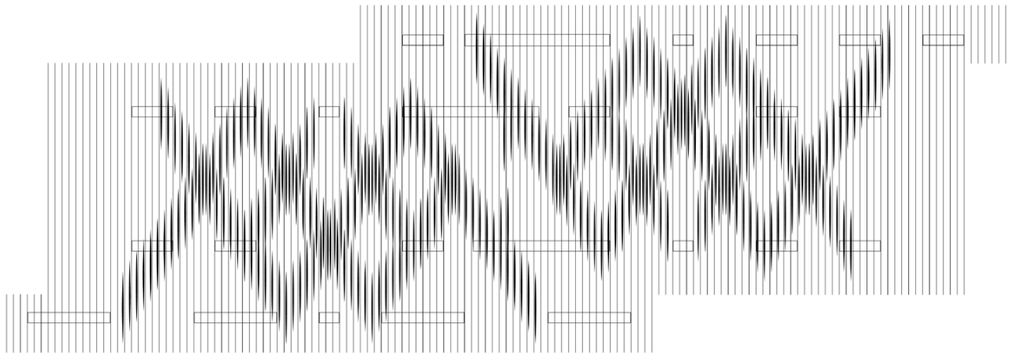


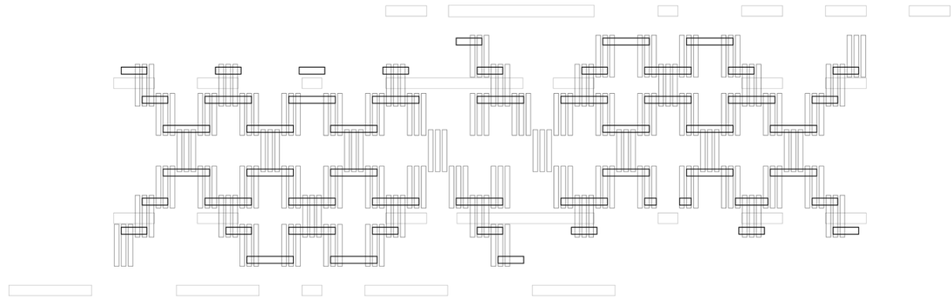


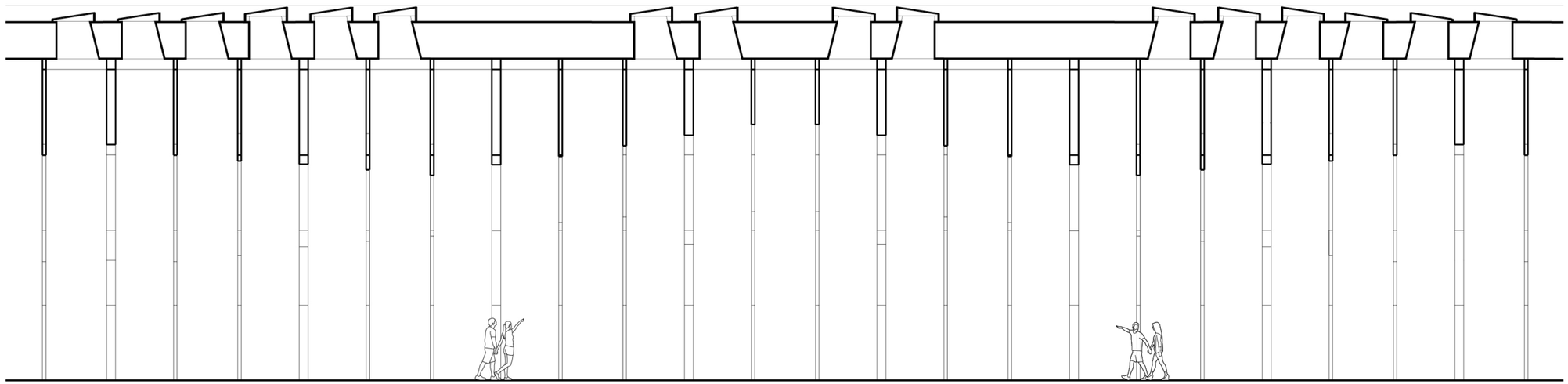


SKYLIGHTS are placed above the entrances of the platform escalators; the sinusoidal diagram shows a rhythmic pattern, connecting these entrance skylights and determining placement for the other skylights. Horizontal skylights are placed amongst the ground plane, connecting the skylight movement to the site plane along the platforms. This wavelength-like diagram also applies directionality to the continuous movement shown, translating to the decision of directionality changes throughout the skylights.



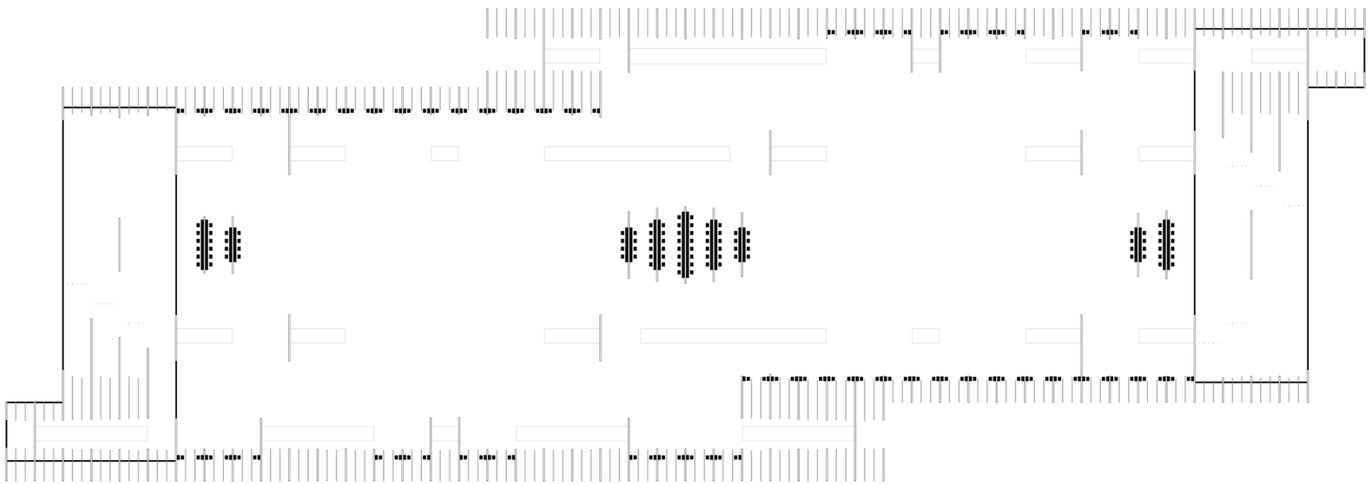


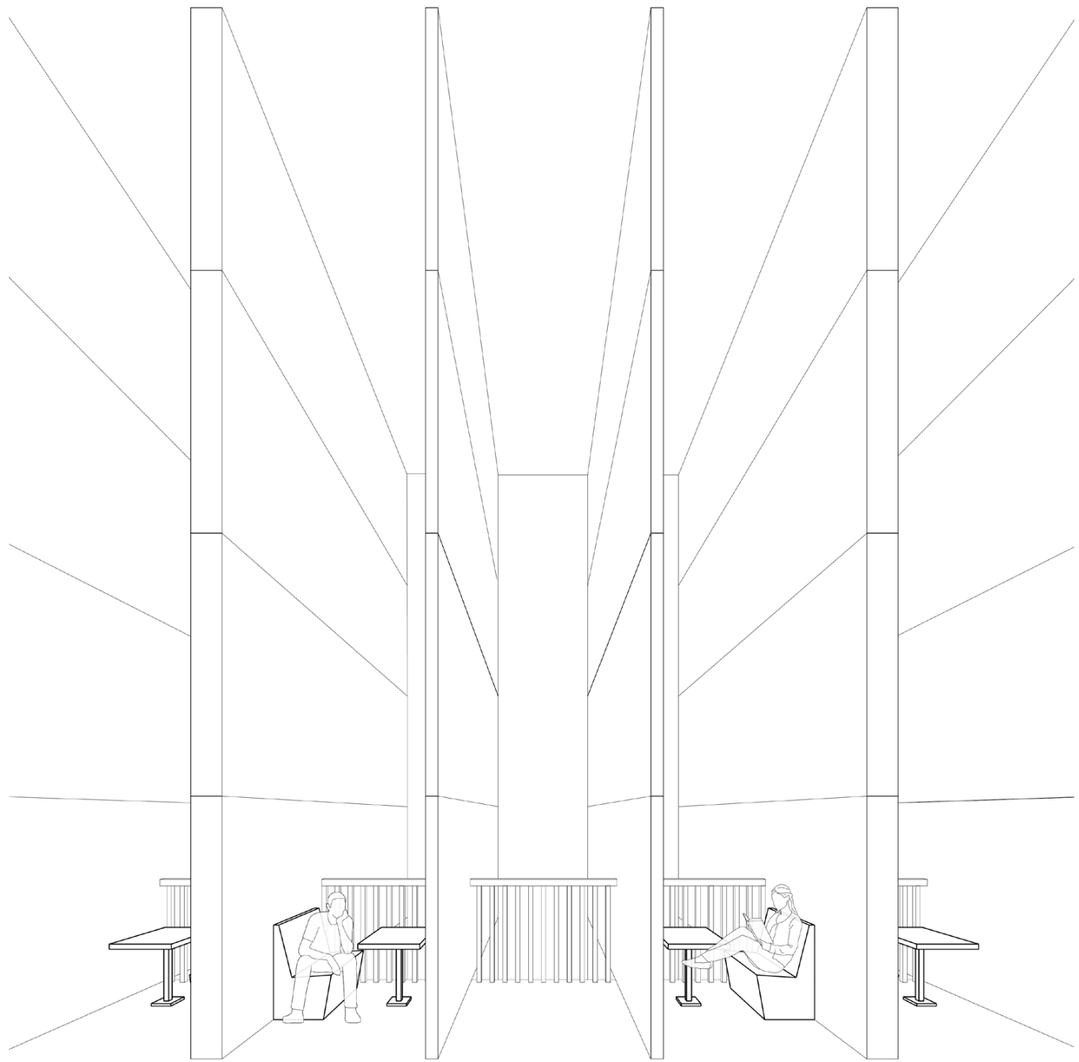




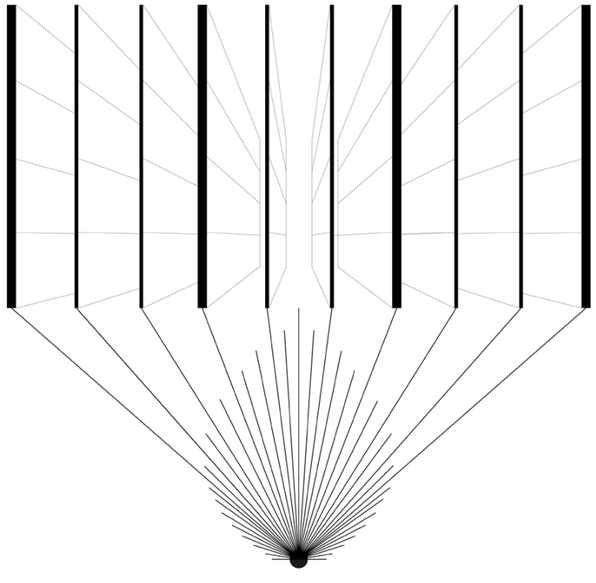
Movement between the fins allows for the edges to exist as **WAITING SPACES**; there is less movement through these momentary spaces of the station which can relieve the tension of waiting. Similarly, the station edges on the site level and open spaces along the platform take on some of this relief.

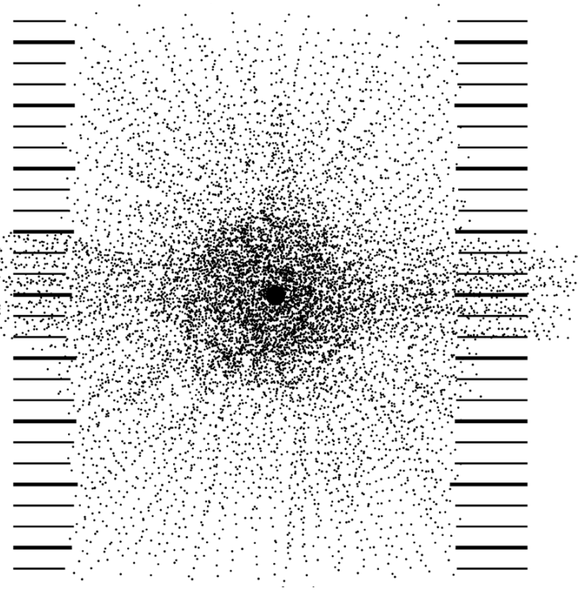
With less movement along the edges, the left and right sides of the station welcome enclosed, conditioned space that hosts various transportation functions within. These interior functions include Amtrak ticketing, WMATA operations, retail spaces, a cafe, and restrooms.



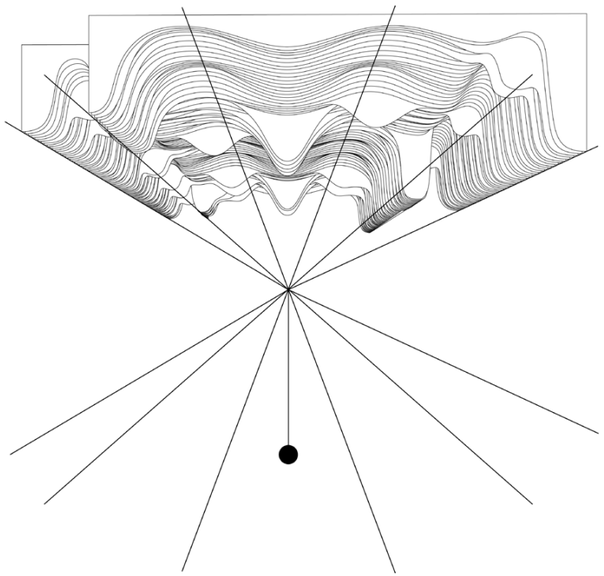


Repetitive linear **MASS** of the fins provides *orientation* for a subject, directing them to what is parallel to the structure.





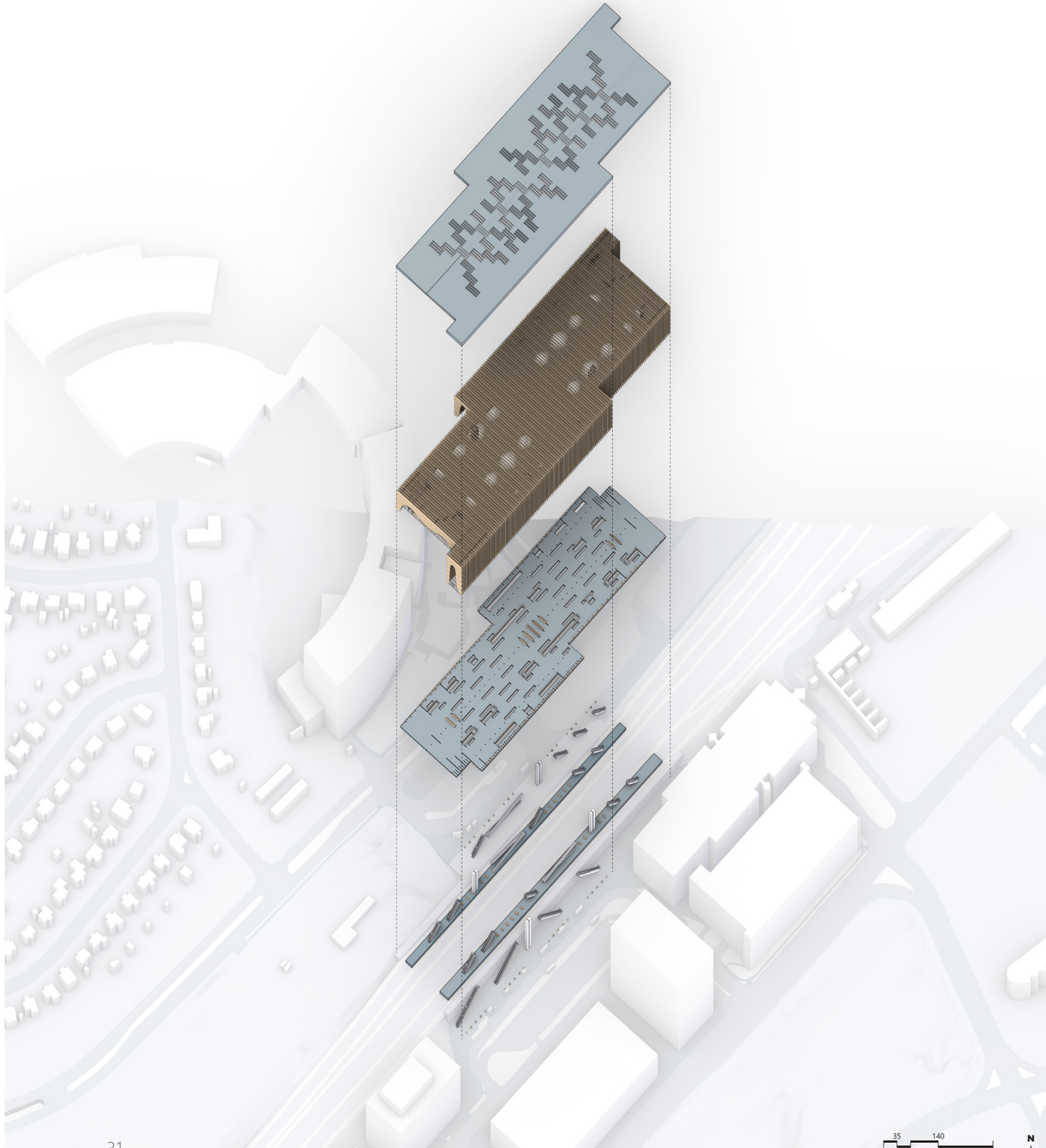
VOIDS between each fin connect the subject to their surroundings with *framed views*; simultaneously, the *isovist*, or visual field, is embraced within the station.



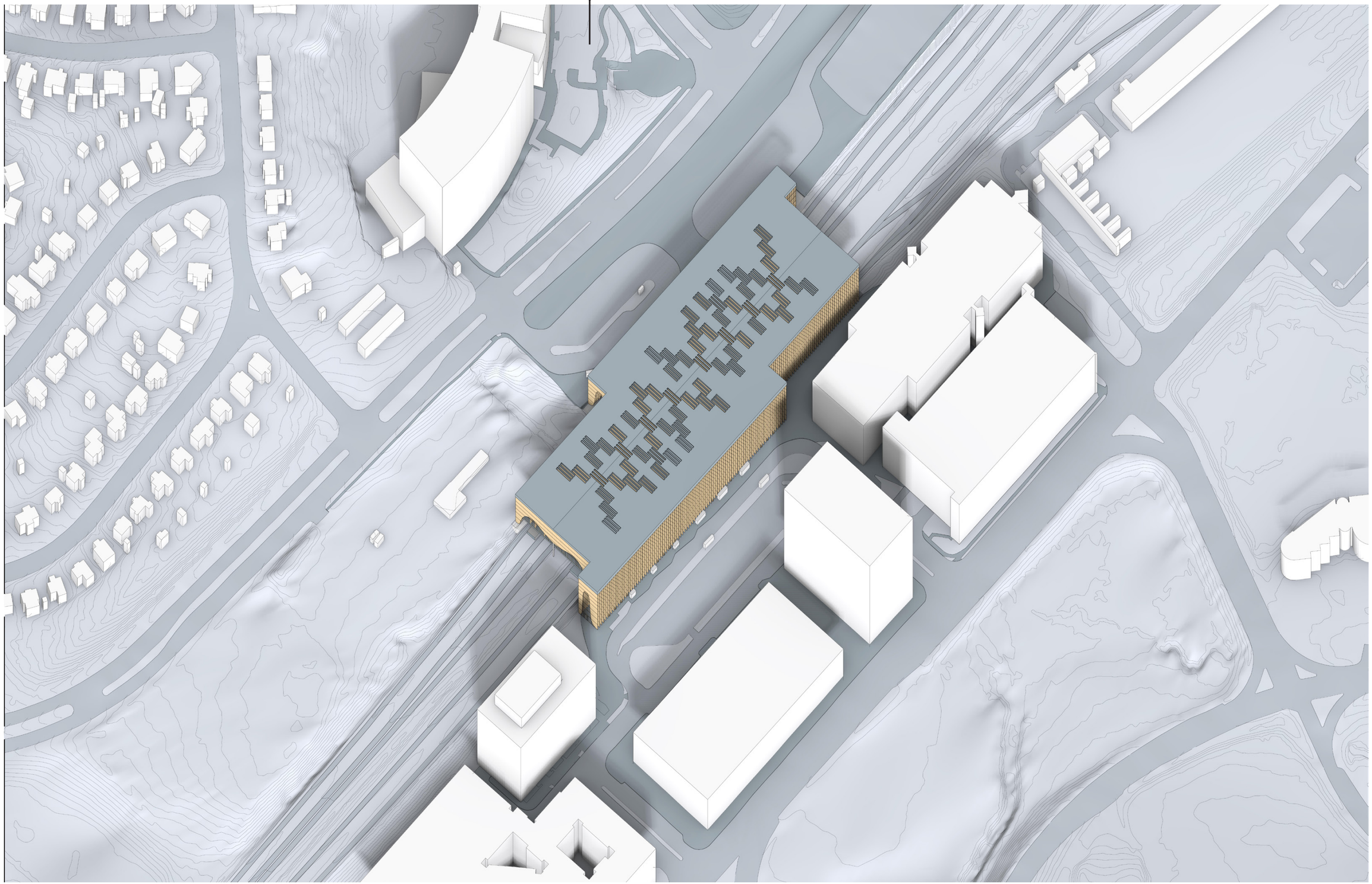
Spatial sequence occurs through both the **MASS AND VOID** which a subject experiences in *depth*; the connecting views and continuous structure allow the subject to relate themselves within the space.

planes of connection

The 2032 New Carrollton Station is not just placed on the site, but moves between the two sides as a **CONNECTION THROUGH MOVEMENT.** The three planes of the station are connected physically by the linear fins, each specifically designed with the next. Lifting the movement above the site level, the escalators follow the fins upwards towards the circulation level, where interaction with the structure continues as people move.



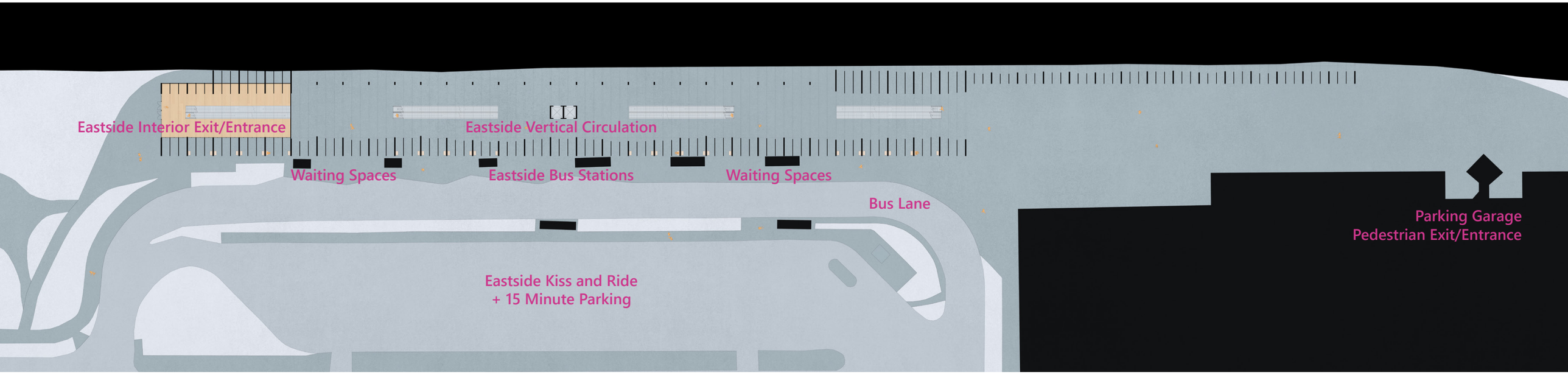
2032 New Carrollton Station Site Axonometric



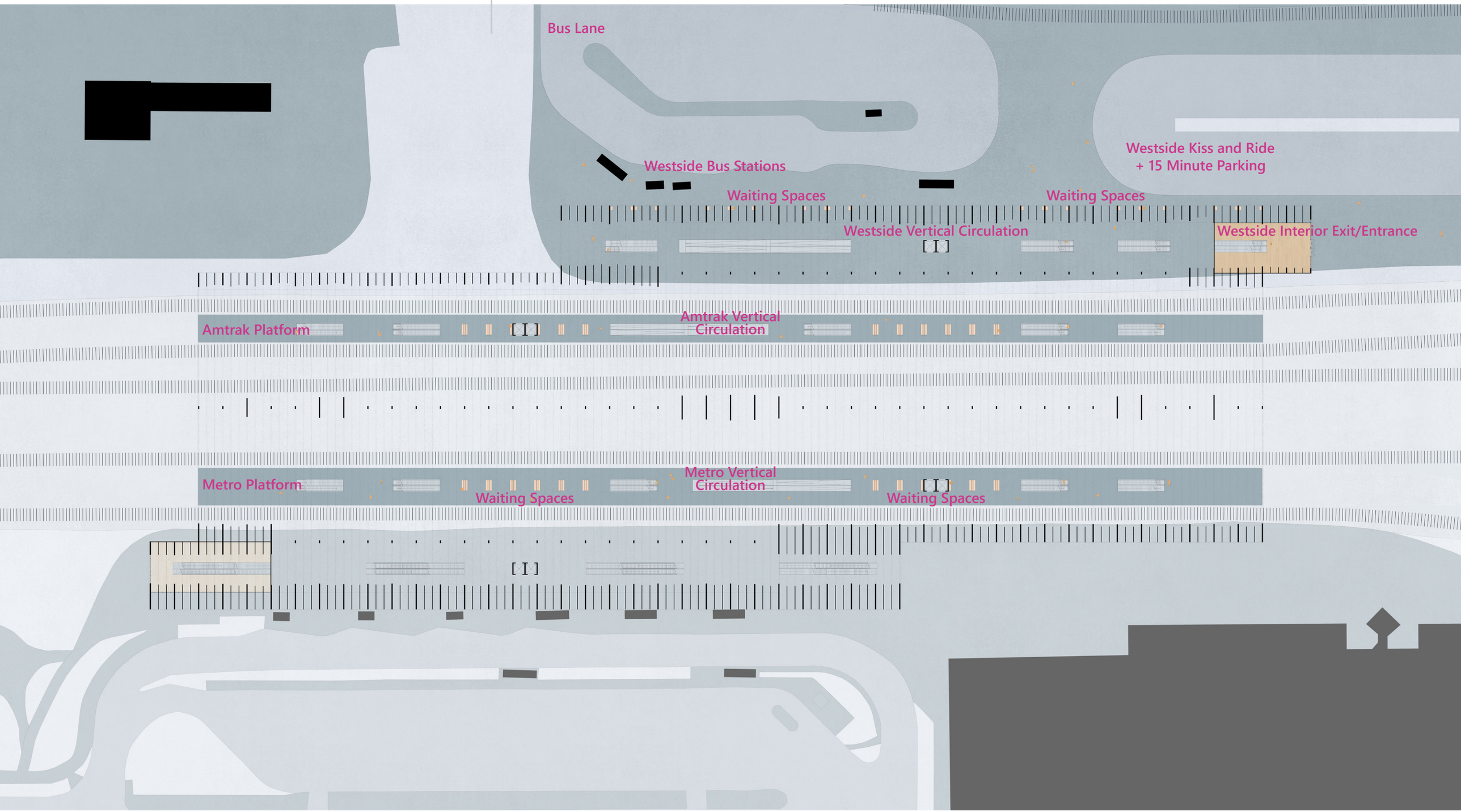
0 20 45 90 180

N

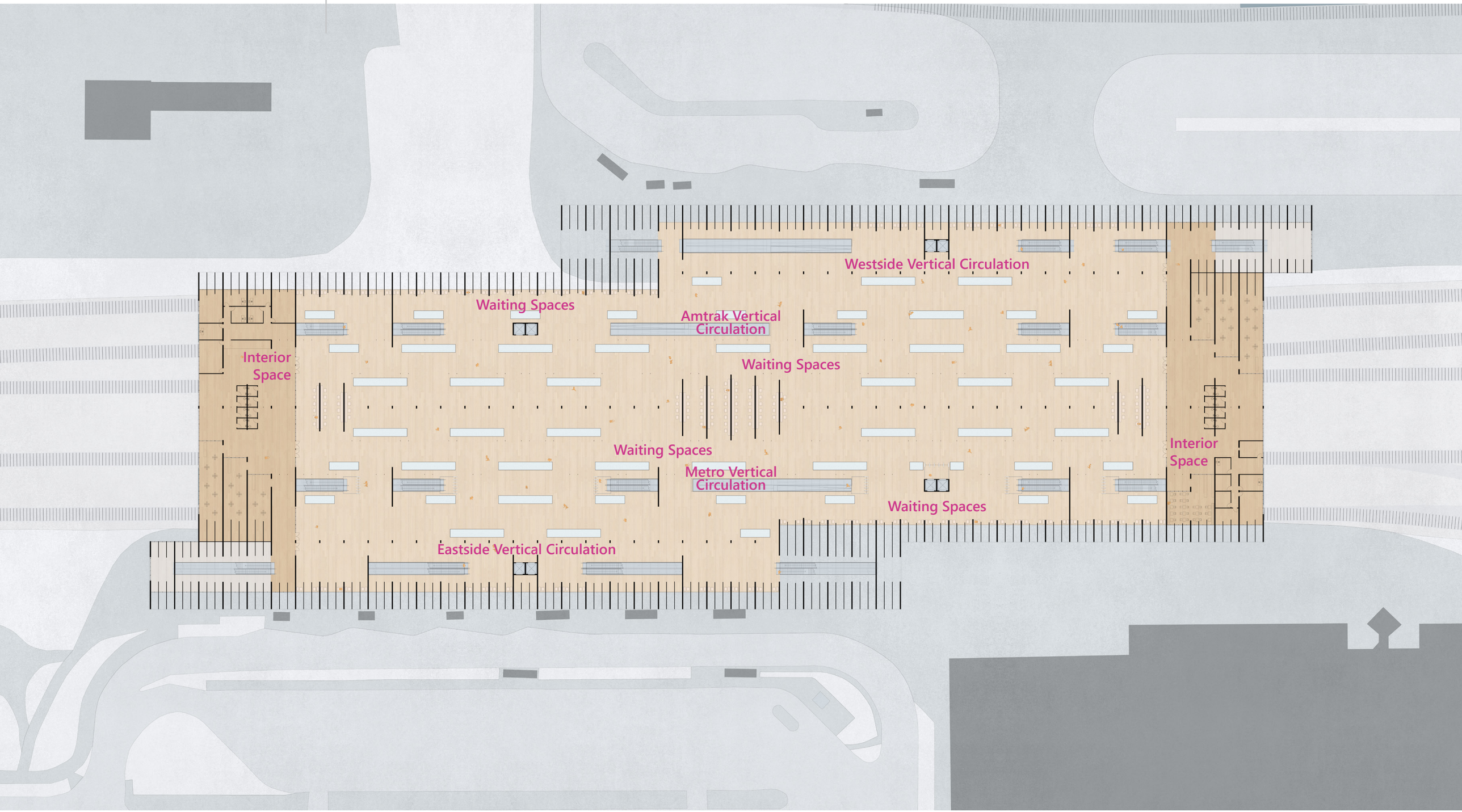
Eastside level site plan



Westside + platforms level site plan

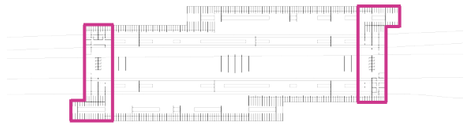


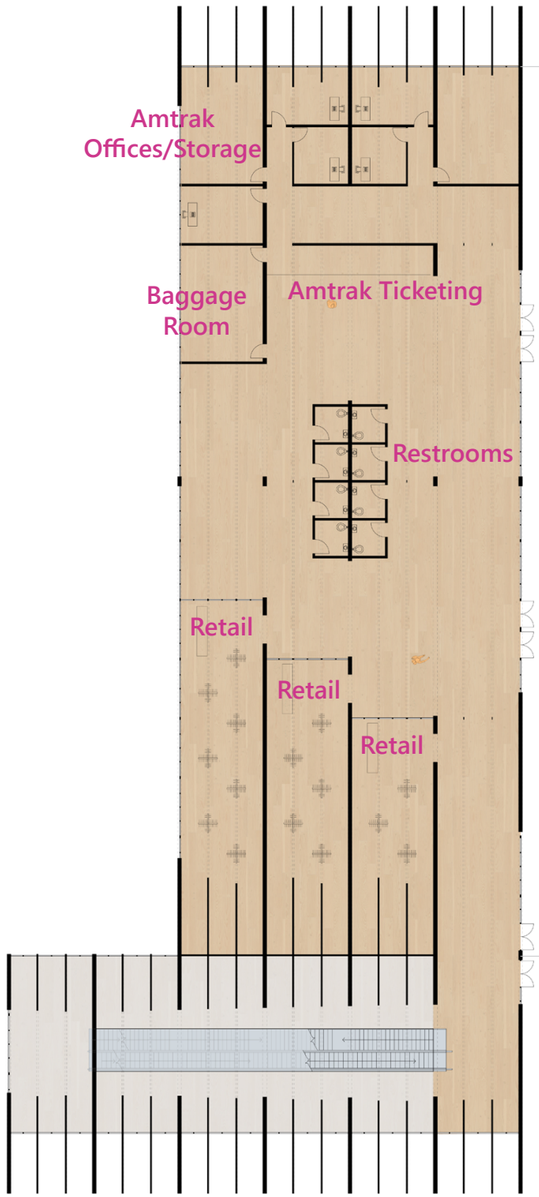
station level floor plan

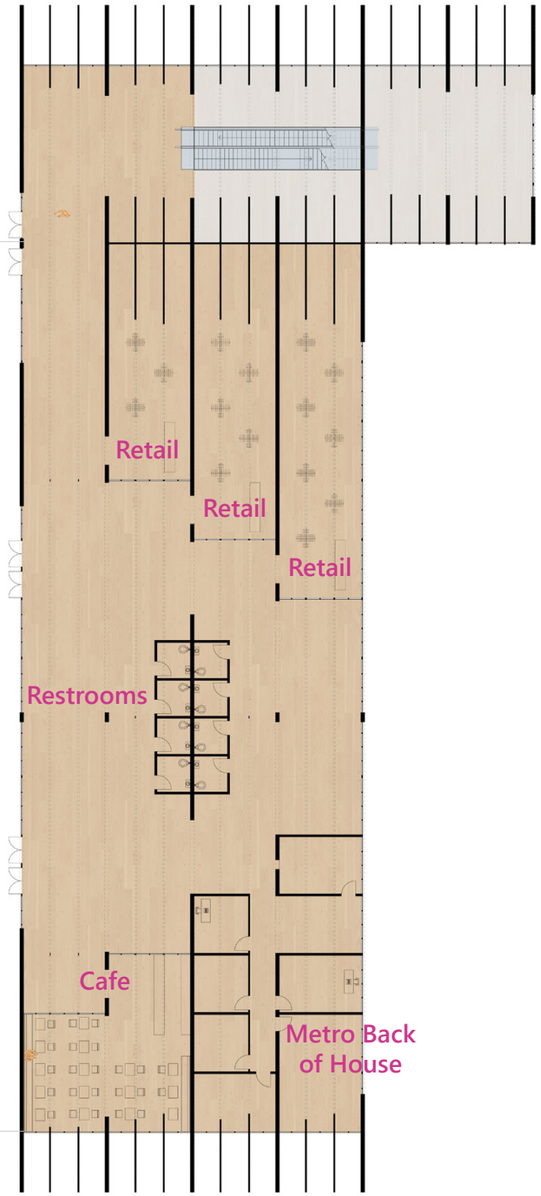


interior program plan

the edges as interior transportation functions

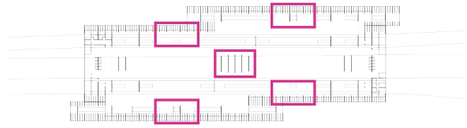


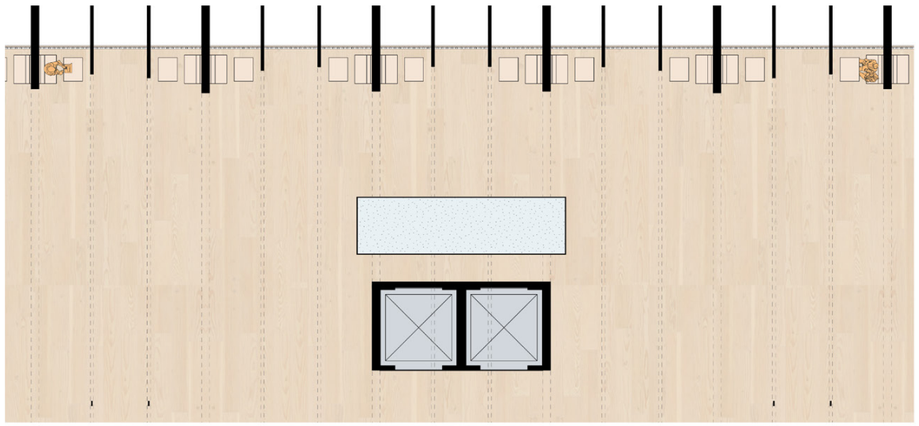


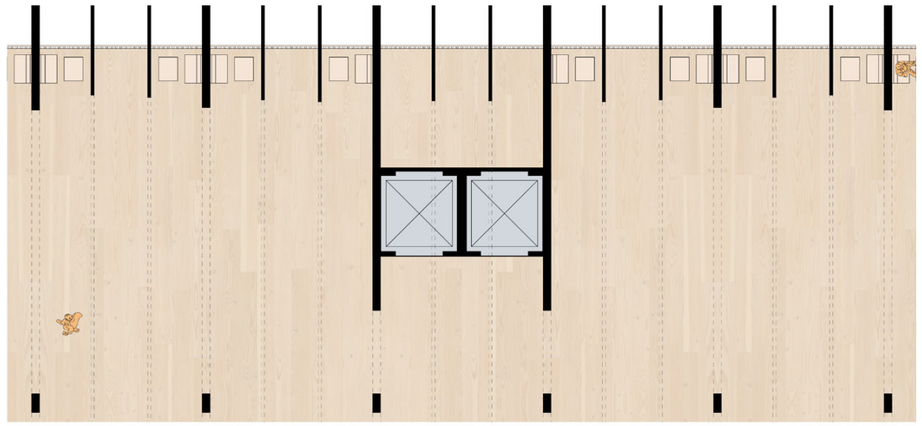


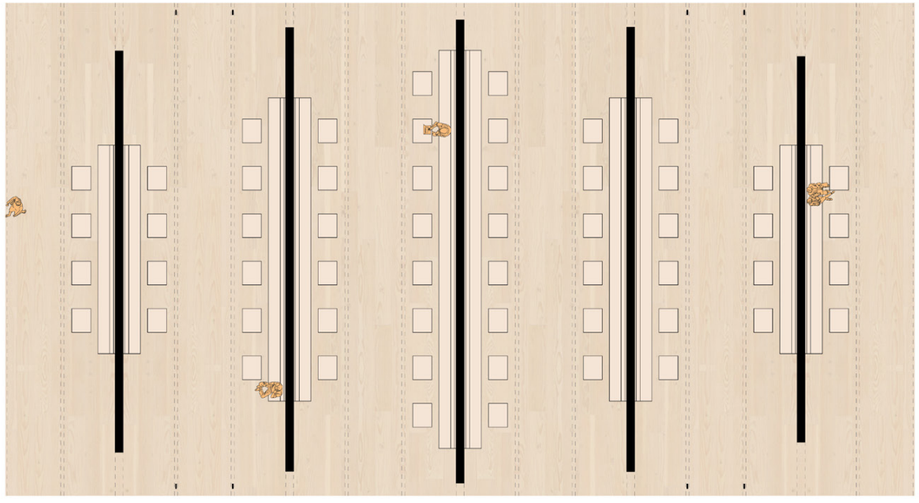
the edges as waiting space

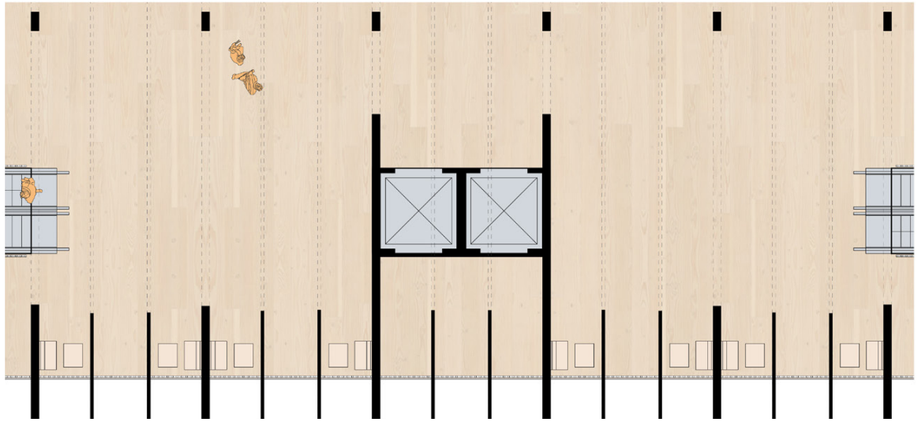
zooming in on a few waiting spaces

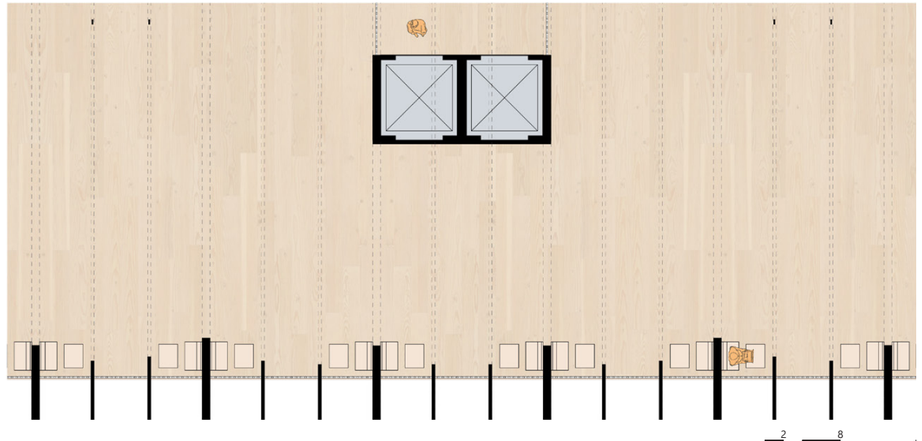




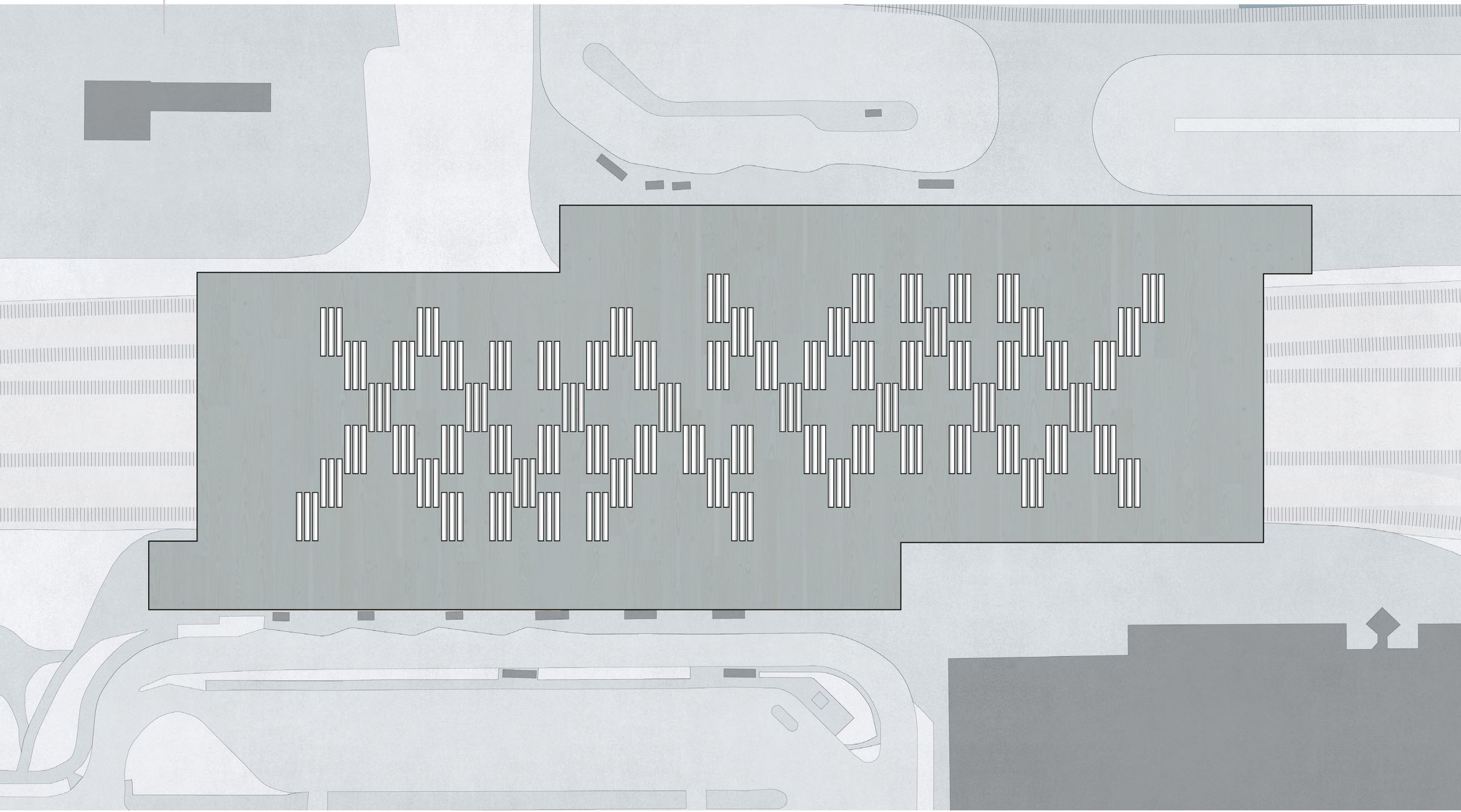




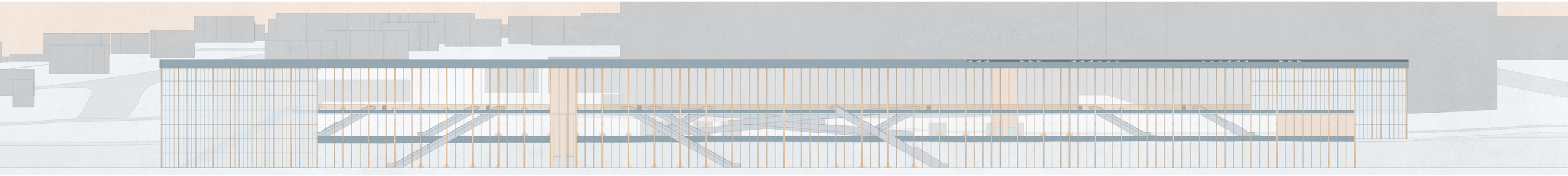




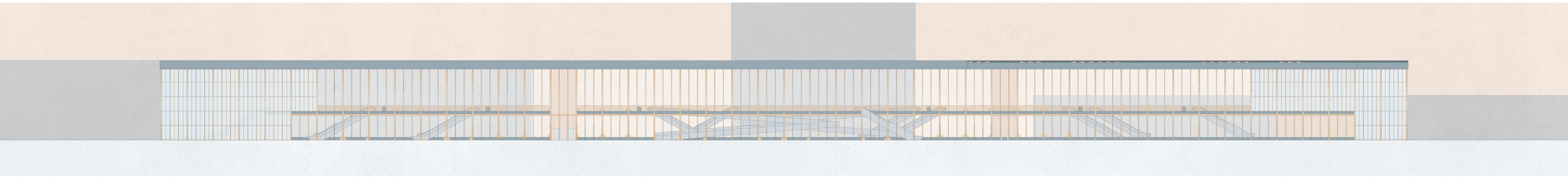
roof plan



elevations



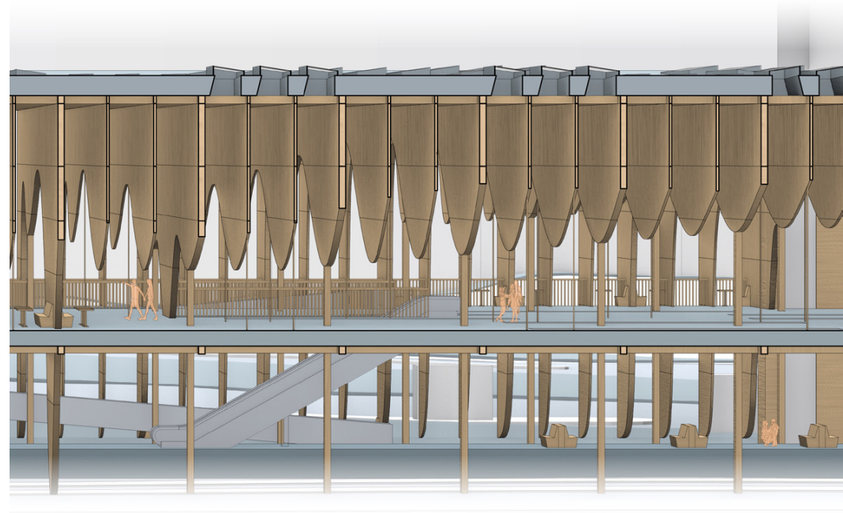
Southeast Elevation

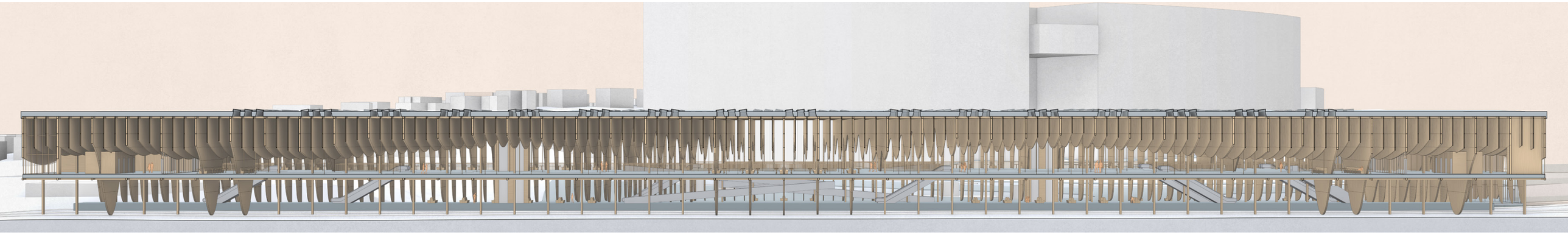


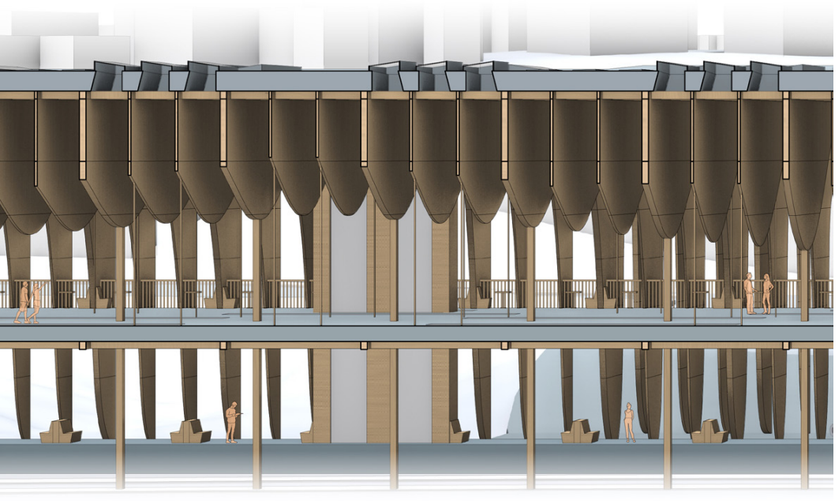
Northwest Elevation

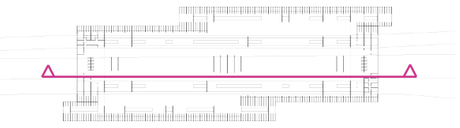
section perspective

parallel to movement along the platforms



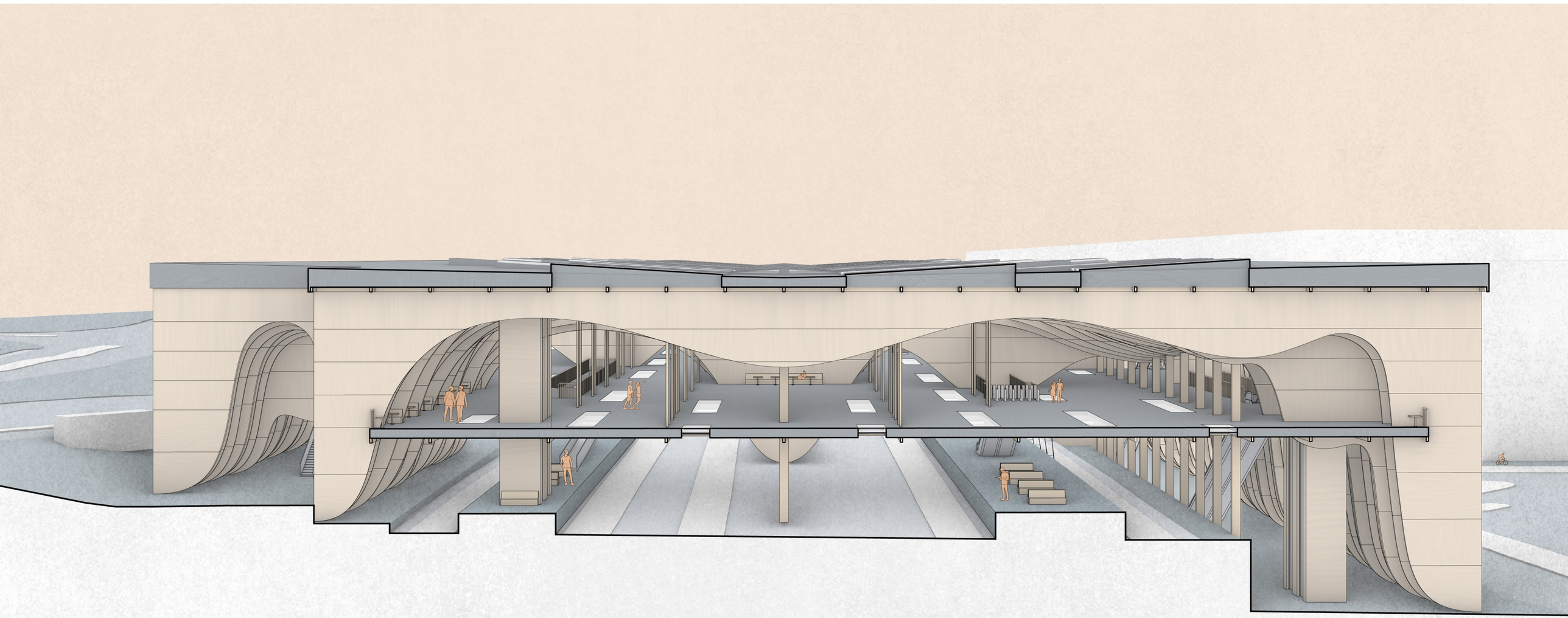


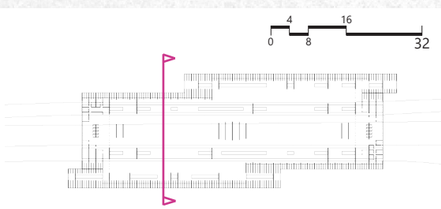




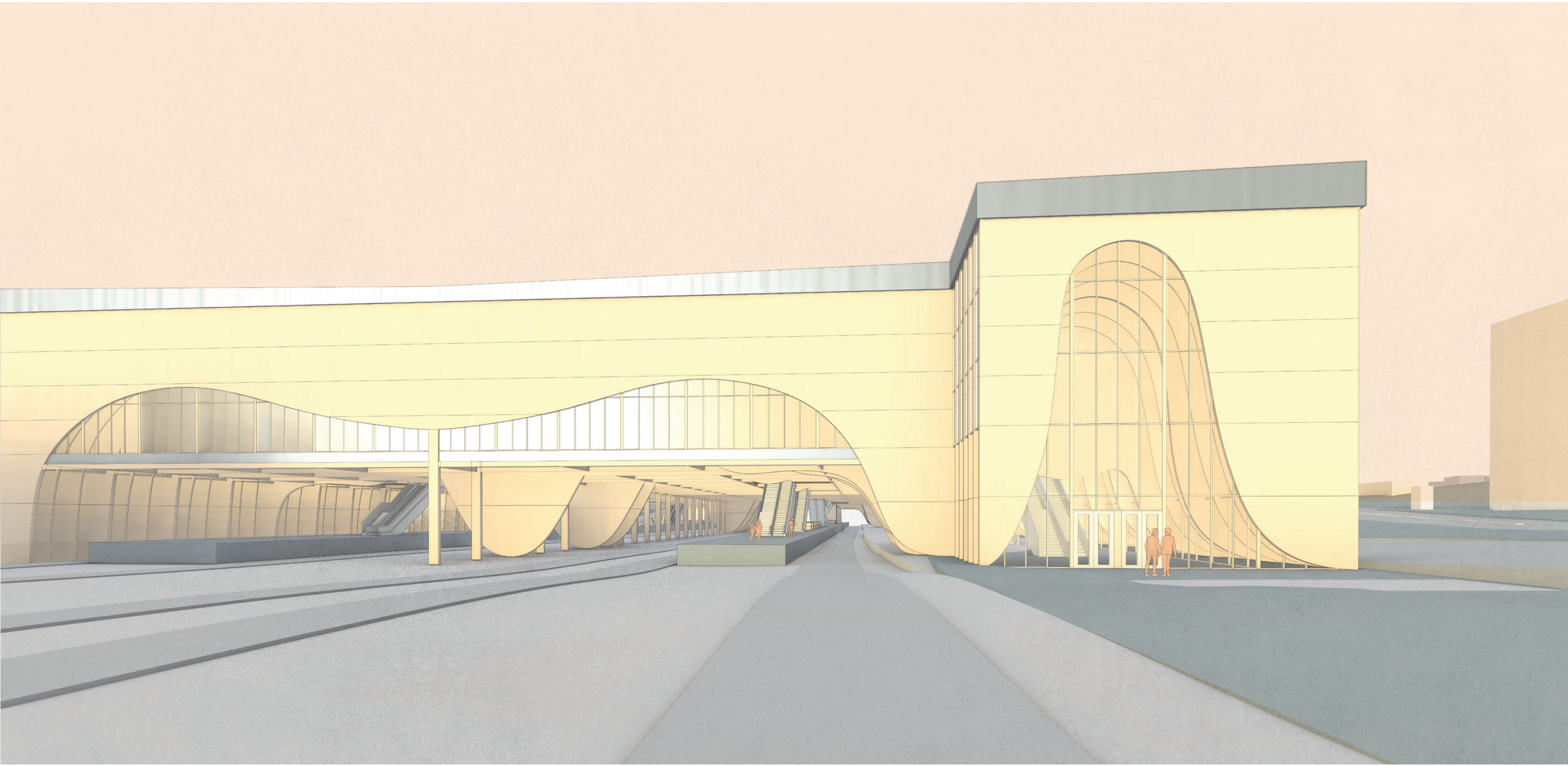
section perspective

parallel to movement connecting the site



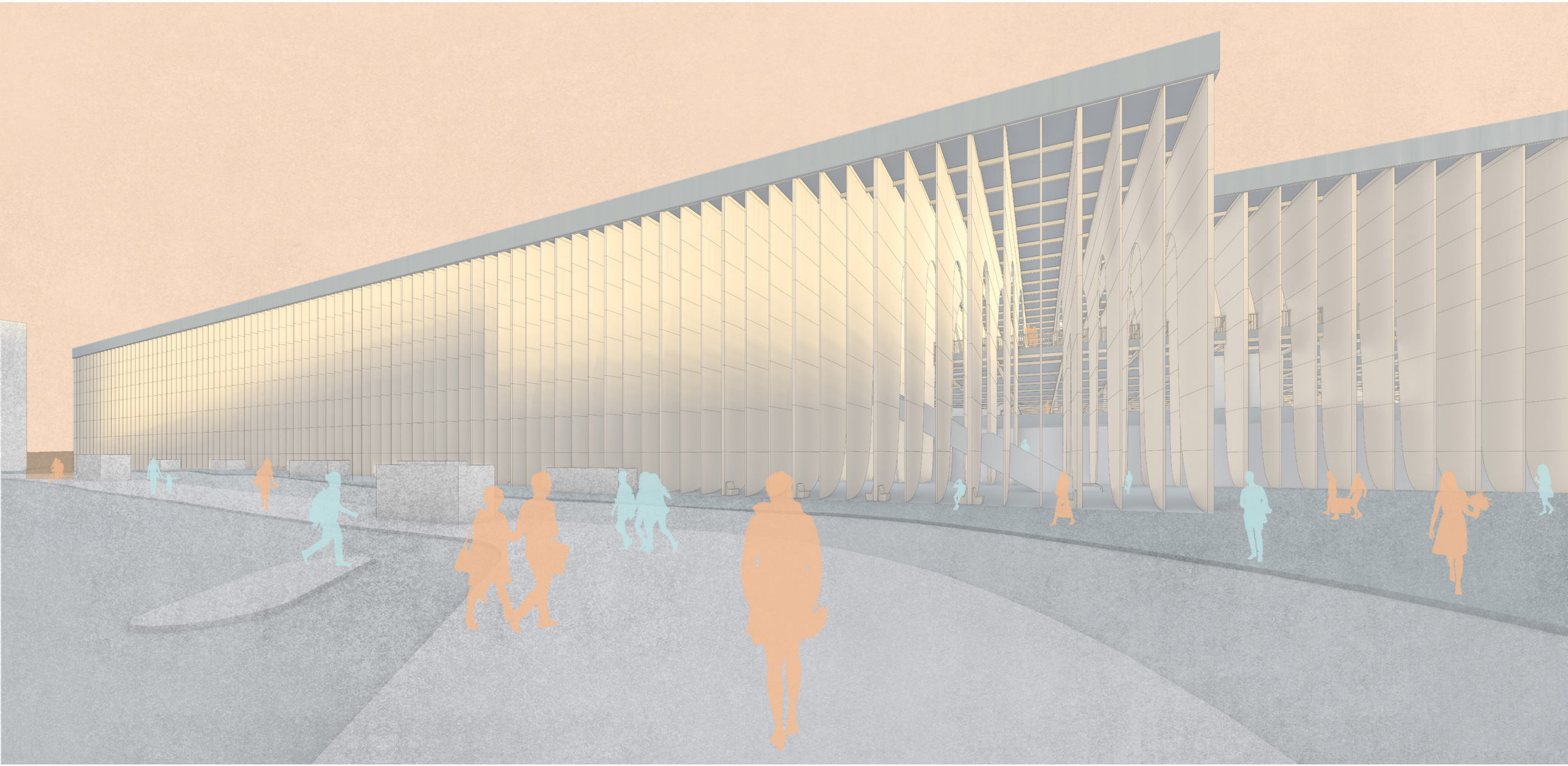


Amtak driver perspective moving from outside of the Beltway at sunrise



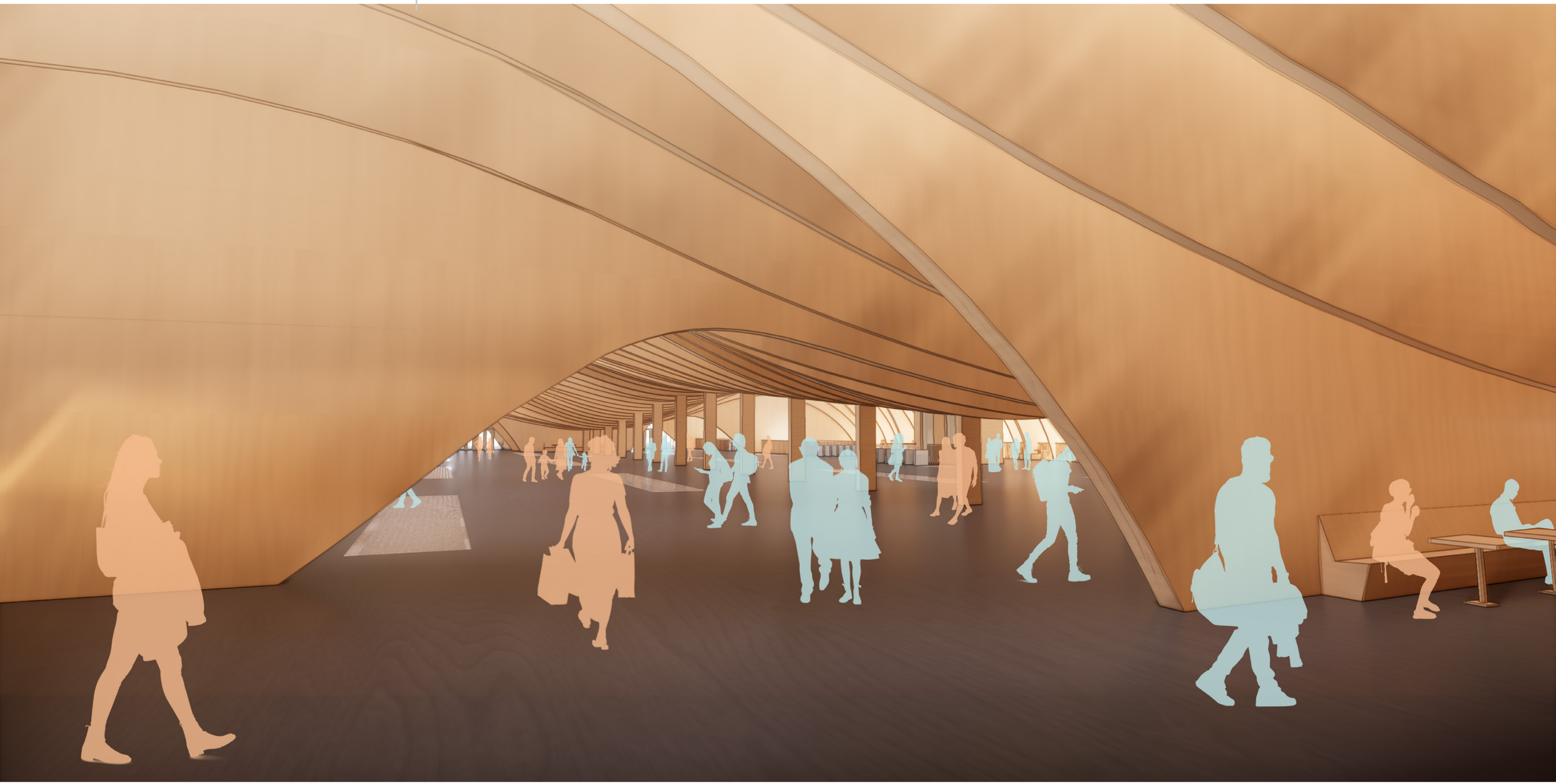
moving towards the station

arriving from the parking garage at sunrise



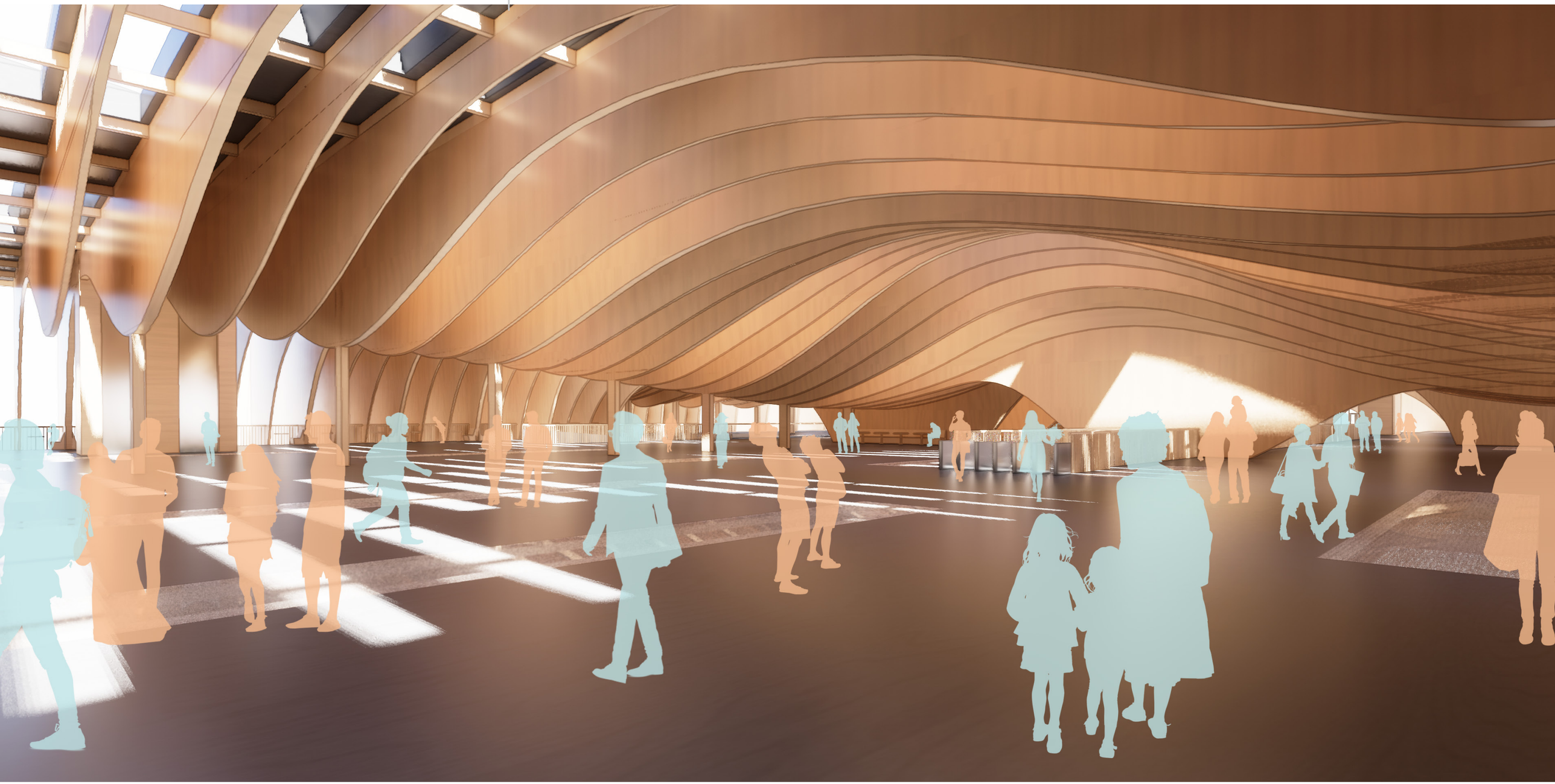
walking from Amtrak Ramp

an unfamiliar subject (orange) moving through the station



walking from an Eastside escalator

a habitual subject (blue) moving through the station



Metro platform waiting space

an unfamiliar subject looking northeast, waiting to see the Metro train

Metro platform waiting space

a habitual subject looking southwest, familiar with the commute

the SOURCES

references

All images, drawings, models, and photographs done by author, unless otherwise noted.

| BOOKS |

Alexander, C. (1977). *A pattern language*. Oxford University Press.

Buber, M. (1957). The William Alanson White Memorial Lectures, Fourth Series. *Psychiatry*, 20(2), 97–104. https://doi.org/10.1080/00332747.1957.11023080

D'Hooghe A. (2010). *The Liberal monument: Urban design and the late modern project*. Princeton Architectural Press.

Farman, J. (2018). *Delayed response: The Art of waiting from the ancient to the instant world.* Yale University Press.

Giedion, S. (1971). *Architecture and the phenomena of transition: The Three space conceptions of architecture*. Harvard University Press.

Hillier, B. (2004). *Space is the machine: Space syntax.* Press Syndicate of the University of Cambridge. https://spaceisthemachine.com/

Hiss, T. (1990). *The Experience of place.* Knopf Doubleday Publishing Group.

Merleau-Ponty, M. (1958). *Phenomenology of perception* (C. Smith, Trans.). Routledge & Kegan Paul. (Original work published 1945)

National Capital Planning Commission. (2021). *Comprehensive plan for the National Capital.* Author. https://www.ncpc.gov/plans/compplan/

Pfeiffer, T. S. (1980). Behaviour and Interaction in Built Space. *Built Environment (1978-)*, 6(1), 35–50. http://www.jstor.org/stable/23286084

Sennett, R. (1994). Flesh and stone: The Body and the city in western civilization. W. W. Norton & Company.

Tuan, Y. F. (1977). *Space and place: The Perspective of experience*. University of Minnesota Press.

Weiss, A. S. (1997). *Mirrors of infinity.* Princeton Architectural Press.

| WEBSITES |

The Maryland-National Capital Park And Planning Commission. (2024). *New Carrollton downtown access and connectivity strategy*. Prince George's County Planning Department. https://www.pgplanning.org/community-planning/placemaking/new-carrollton-downtown-access-and-connectivity-strategy

UCL Space Syntax. (2024). *Overview.* UCL space syntax. https://www.spacesyntax.online/overview-2/

Washington Metropolitan Area Transit Authority. (2024). *New Carrollton Joint Development.* WMATA. https://www.wmata.com/initiatives/plans/new-carrollton-joint-development/index.cfm

| ARTICLES |

Malouff, D. (2015, August 12). *MD & VA commuter rail look great together on one map*. Greater Greater Washington. *https://ggwash.org/view/38996/md-va-commuter-rail-look-great-together-on-one-map*

Pachilova R. (2020, July 4). *Spaces for communication: Improving connections and care in the built environment*. ArchDaily. https://www.archdaily.com/943009/spaces-for-communication-improving-connections-and-care-in-the-built-environment

Rowlands, D.W. (2018, May 17). *Here's the primer you need to understand Prince George's extraordinary diversity*. Greater Greater Washington. https://ggwash.org/view/67566/prince-georges-county-demographics-vary-a-lot-by-region

Rowlands, D.W. (2020, January 13). *How the region's racial and ethnic demographics have changed since 1970*. D.C. Policy Center. https://www.dcpolicycenter.org/publications/regional-demographic-shifts/

Rowlands, D.W. (2020, August 10). *How the Baltimore & Potomac Railroad and the Penn Line shaped the region's suburbs*. Greater Greater Washington. *https://ggwash.org/view/78698/how-the-baltimore-and-potomac-railroad-and-the-penn-line-shaped-the-regions-suburbs-2*

| MAPS |

Maryland Department of Transportation, (2018). *Project maps: Veterans Parkway to Ellin Road* [Purple Line map for reference]. https://www.purplelinemd.com/about-the-project/project-maps

Prince George's County Planning Department. (2021). *GIS Open Data Portal* [Linework for Prince George's County maps]. https://gisdata.pgplanning.org/opendata/

Prince George's County Planning Department. (2024). *PGAtlas* [Prince George's County zoning map reference]. https://www.pgatlas.com/

Washington Metropolitan Area Transit Authority. (2020). *New Carrollton Metro Station joint development board action/information summary* [New Carrollton Metro Station map reference]. https://www.wmata.com/about/board/meetings/board-pdfs/upload/20200723-BOARD-11A-New-Carrollton-JD-Approvals-FINALIZED.pdf