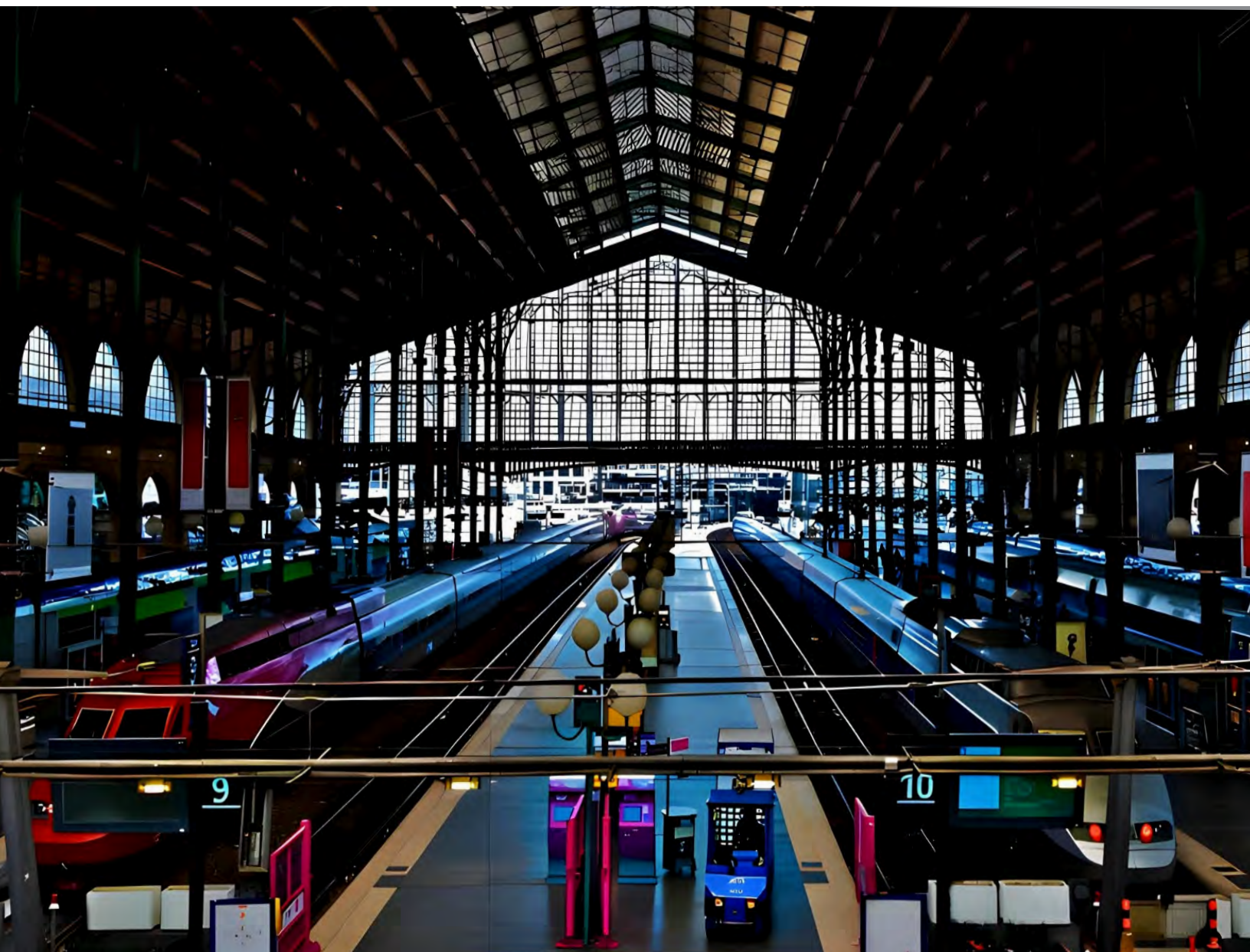


Learning at 200 mph: Lessons for Better Passenger Rail from France and Spain

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Abstract

In May 2025, a group of U.S. students and professionals traveled from Paris to Madrid by high-speed rail—with intermediate stops in Strasbourg, Lyon, Valence, Barcelona, and Zaragoza—to study passenger rail systems and stations in France and Spain. Through site visits to seven cities, 19 stations, and in-depth discussions with European transportation and urban planning experts, the group examined how HSR and station design support efficient mobility, urban vitality, and successful megaproject delivery. This report synthesizes lessons from this study trip relevant to North America, with a particular focus on station planning, governance, and project execution.

Findings show that HSR is a highly competitive mode for trips of roughly 100–500 miles, offering reliable, low-stress, and city-center-to-city-center travel that rivals air and automobile modes. Well-designed stations enable seamless connections across local, regional, national, and international scales, while prioritizing pedestrians, cyclists, and transit over private vehicles. In France and Spain, stations also act as urban destinations—integrating retail, services, public space, and cultural amenities—and as catalysts for neighborhood regeneration and transit-oriented development.

This report also emphasizes the importance of designing stations around their least flexible elements—location, tracks, and the station location itself. While there may be considerable uncertainty about future passenger volumes and development around a station, it is nonetheless critical to do one’s best to get these items right from the outset. European case studies highlight the role of governance in station management and megaproject delivery. Strong national institutions, centralized station management, and coordinated wayfinding and amenities create a seamless passenger experience across multiple operators in major city center, multi-modal transit hubs. Further, purpose-built delivery entities with high in-house capacity and institutional memory, along with streamlined approval processes, enable rail megaprojects to be completed more quickly and at far lower costs than comparable projects in the United States. Complementing these technical and organizational approaches, effective outreach strategies that focus on project benefits build public trust while staying true to strategic project principles.

Taken together, the lessons from France and Spain suggest that HSR can play a transformative role in U.S. mobility and urban development—but only if paired with well-located, people-centered stations; strong governance; integrated planning; and credible, efficient project delivery.

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ES. Executive Summary

ES.I Introduction

In May 2025, a group of 12 U.S. graduate students and professionals led by Eric Eidlin traveled from Paris to Madrid—with intermediate stops in Strasbourg, Lyon, Valence, Barcelona, and Zaragoza—entirely by high-speed passenger rail. The group toured 19 different stations and attended seminars with leading European transportation and urban planning professionals in many of them. The goal was to draw lessons from France and Spain—countries with advanced high-speed rail systems and functional, lively main city stations—and apply them in North American rail networks and cities.

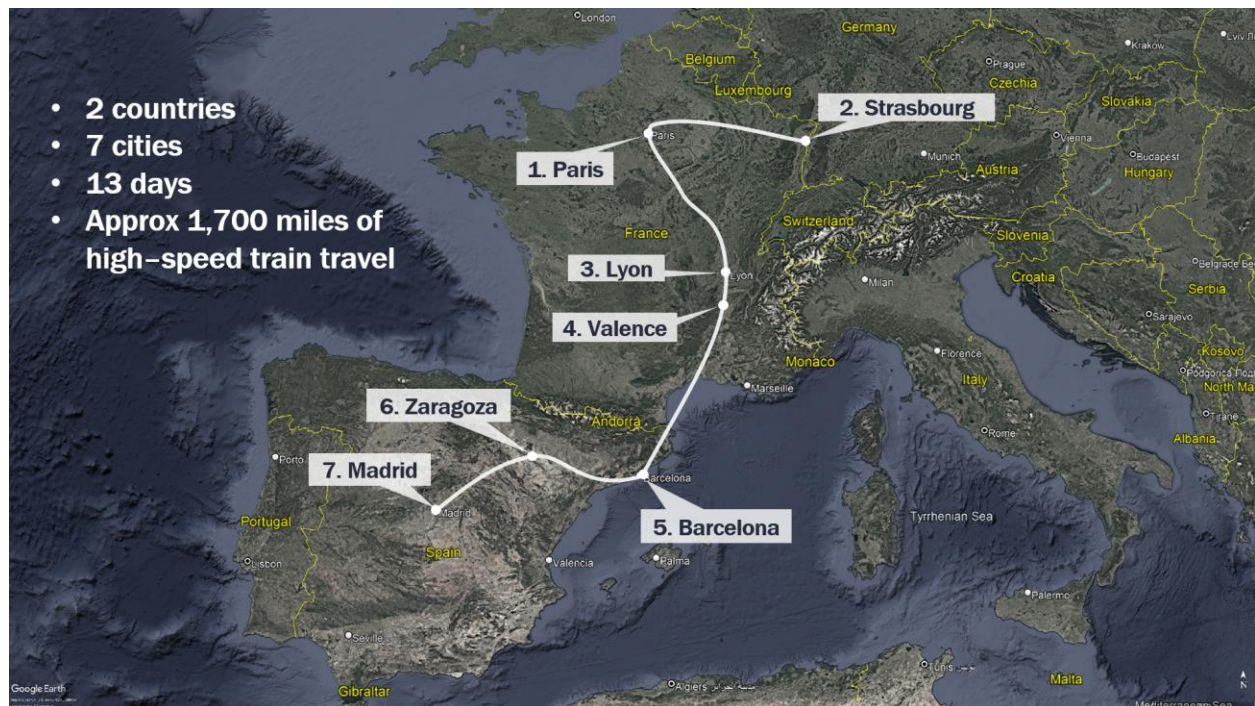


Figure 1. Study trip Itinerary.

Source: Graphic by Eidlin; Google Earth aerial imagery

In the early 1900s, the United States led the world in passenger rail. By 1916, its network exceeded 254,000 miles and carried 98 percent of intercity travelers, connecting nearly every city and town. After World War II, rising automobile use and highway investment drove a steep decline in rail service, with routes cut and quality eroded. Today, outside of the Northeast Corridor, passenger rail in this country is often slow and unreliable, and it has fallen far behind the global standard for a modern network.

The trip highlighted the transformative potential of high-speed rail (HSR). The group came home with insights on how passenger rail can fill a “missing middle” in the continent’s intercity modal hierarchy—medium-distance trips that high-speed rail is uniquely positioned to serve.

The group also returned home with ideas on how to more effectively advance passenger rail initiatives on the North American continent.

Through our research, we found that when stations are designed in partnership with the neighborhoods around them, they become more than transit points—they evolve into dynamic centers of urban life. Key lessons included the value of people-centric design and the need to get the least-flexible station elements—tracks, platforms, and the station location—right from the start, even amid uncertain future conditions such as ridership. The trip also underscored the importance of strong, strategic involvement from higher levels of government, in partnership with local governments, and illuminated best practices in efficient megaproject delivery, along with public engagement approaches that inform, inspire, and help advance major projects.

In recent decades, countries in Asia and Europe have shown how HSR can reshape daily travel, connect urban centers more efficiently, and enhance quality of life and economic opportunity for cities and regions. World leaders such as Japan, France, Spain, and Germany, demonstrate how to set up their systems for success—beginning with the right station design and station area planning, supported by the right governance structures, and by following the right practices in project development. All these insights are crucial for advancing U.S. passenger rail and creating stations that serve both as transportation hubs and civic anchors.

In this report, we present our insights and takeaways from our trip, which are meant to lay the foundation for additional research, in the form of eight lessons.

ES. 1 Lesson 1: High-speed rail is simply a better mode of travel for many trips and for many reasons

Over the course of the trip, group members discovered the benefits of high-speed rail (HSR) and the situations in which it is a better means of intercity travel than driving or flying.

ES.1.1 Learning from leading European nations in high-speed rail

Experiencing France's *Train à Grande Vitesse* (TGV) and Spain's *Alta Velocidad Española* (AVE) networks first-hand illustrated these benefits to the group, especially for participants who had never used HSR before.

France's TGV is Europe's busiest system, carrying [130 million passengers in 2024](#) with an impressive 95% on-time performance record. Spain's AVE, the largest by track length in Europe, carried only [39 million passengers](#) in 2024, but has seen large growth over the past couple of years.

ES.1.2 The ideal travel distance for high-speed rail is between 100 and 500 miles, with the sweet spot at around 300 miles

High-speed rail (HSR) serves trips between 100 and 500 miles exceptionally well. These distances are too long for cars or conventional rail to compete efficiently and are short enough that an airplane's higher cruising speed rarely offsets the time and hassle of reaching airports and navigating security checkpoints.

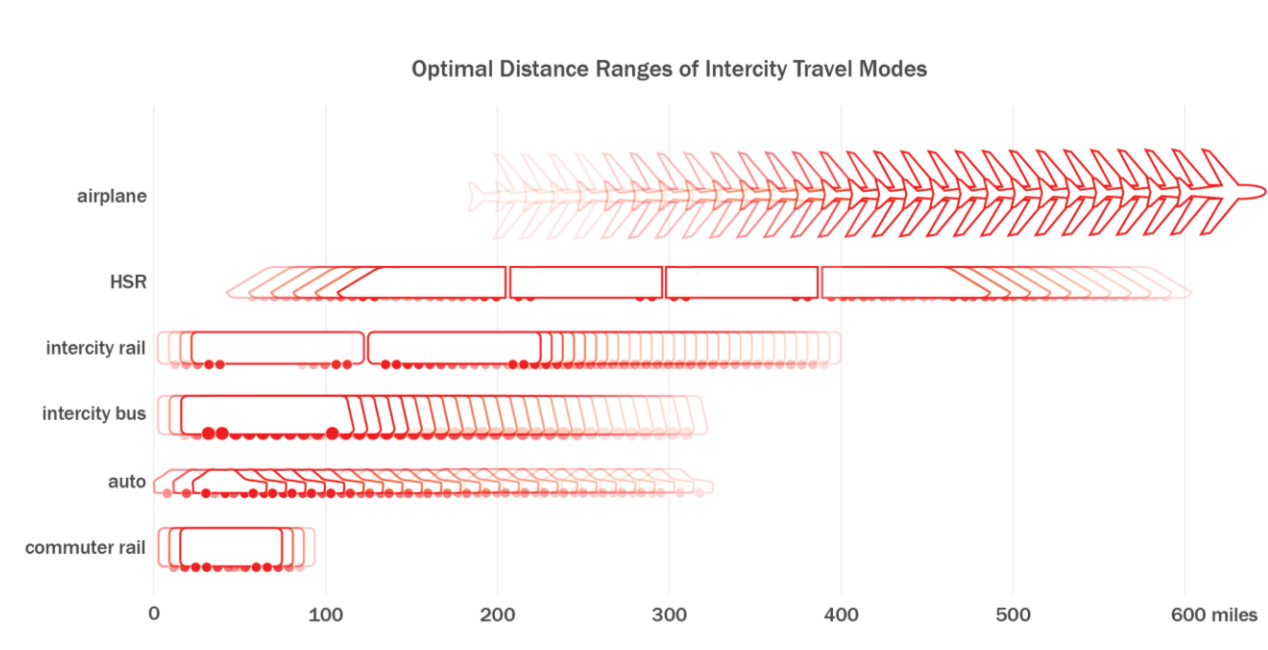


Figure 2. The optimal distance ranges for intercity travel modes.

Source: Graphic by Eric Eidlin. (Originally published in [“Making the Most of HSR In California: Lessons from France and Germany,”](#) German Marshall Fund Report June 2015)

ES.1.3 The proximity advantage: City center vs. remote access

The primary differentiator between rail and air travel is urban proximity. Unlike airports, which require vast, remote areas for safety and operation, rail infrastructure can be integrated directly into the urban fabric. This allows development to flourish around stations and delivers passengers closer to more destinations and transit connections in the heart of metro areas.

ES.1.4 The train travel experience: more comfortable and pleasant than other modes

High-speed rail offers the same kind of amenities as conventional trains—such as café cars that offer a good selection of food and beverages, no restrictions of device usage with free Wi-Fi, and the ability to rest. High-speed trains just enhance these benefits. As these trains can sustain speeds of 150 mph or more and run every 30–60 minutes, HSR delivers faster door-to-door trips than driving, while offering far greater comfort and reliability.

ES.1.5 Elevating the journey: When HSR outcompetes road and air

While conventional rail often provides many of the same onboard amenities as high-speed rail (HSR), HSR builds on that foundation by adding the decisive advantage of time. Operating at sustained speeds above 150 mph and offering frequent departures, HSR delivers door-to-door travel times that can surpass both driving and flying on key corridors.

By linking city center to city center, HSR eliminates the peripheral access time, security delays, and boarding buffers associated with air travel, while also avoiding highway congestion and parking constraints. The result is a mode that combines speed, reliability, comfort, and

convenience—transforming travel from a logistical burden into an integrated, seamless experience.

ES.1.6 What can be done in a day?

Our same-day roundtrip from Paris to Strasbourg and our multi-leg journey along the Barcelona–Zaragoza–Madrid corridor demonstrated what high-speed rail (HSR) makes possible within a single day. The sheer volume of meetings, site visits, and exploration we were able to accomplish compressed both distance and time in ways that would have been impractical by car or air.

These experiences underscored how well-designed HSR networks expand the boundaries of everyday life. They enable feasible same-day roundtrips for business meetings, medical appointments, family visits, and major sporting or cultural events located hundreds of miles away. Over time, such networks can also expand regional “commute sheds,” allowing people to live farther from major urban centers while maintaining reliable access to employment, education, and cultural amenities.

HSR does not simply connect cities—it fundamentally changes time-space relationships.

HSR can make our cities and regions more accessible

Building HSR lines from scratch as is being done in California is a heavy lift. The construction of tracks, tunnels, and rail structures is costly and disruptive. Once built, however, HSR can be a highly beneficial long-term investment given its efficiency, reliability, comfort, and strong environmental performance—especially when it substitutes for car and short-haul air travel.

ES.2 Lesson 2: Great stations facilitate mobility across multiple geographic scales—from local and regional, to statewide, national, and even global

Train stations do more than connect cities—they link local neighborhoods, regions, nations, and sometimes even global destinations. They serve as transfer points between intercity, regional, and urban rail, as well as buses, and act as safe connectors for pedestrians.

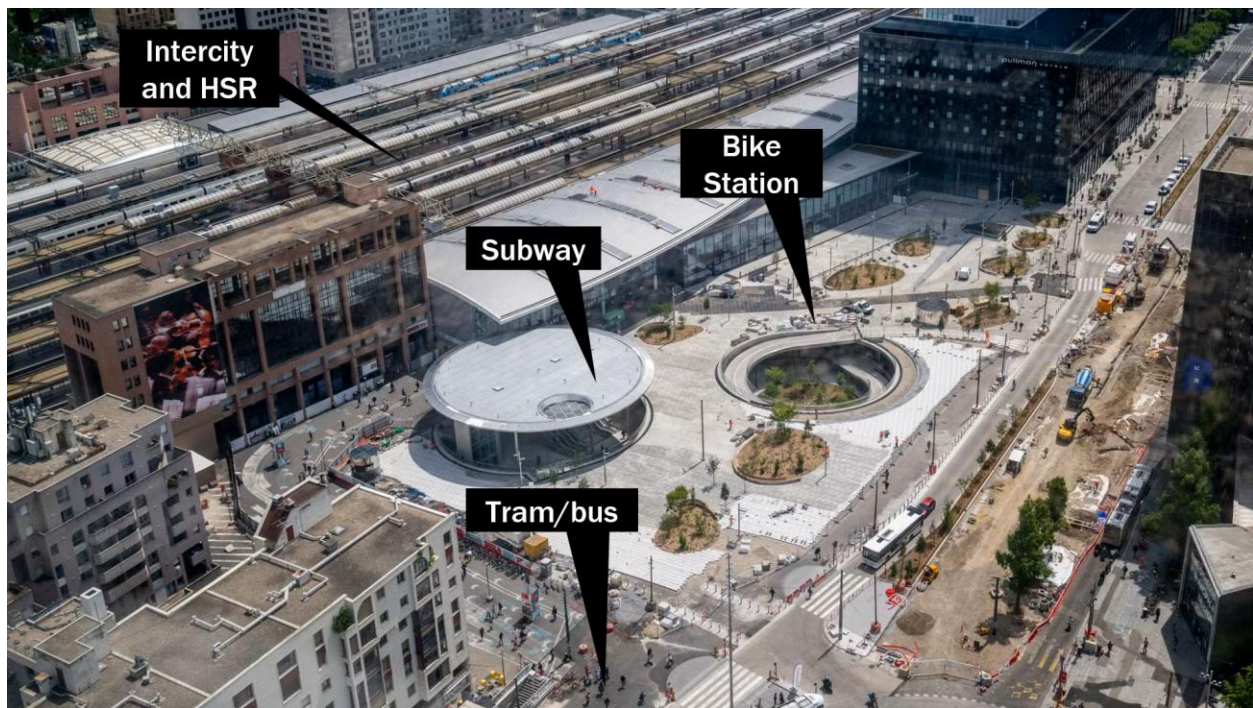


Figure 3. *Lyon-Part-Dieu Station 2.0 nearing completion in summer 2025. Lyon-Part-Dieu Station has been thoroughly redesigned to prioritize the most sustainable and space-efficient modes of putting these closest to the main station entrance along Place Charles Beraudier on the west side of the station.*
Source: [Bruno Amsellem/Divergence for Le Monde](#), annotations by Authors.

Unlike the overwhelmingly car-dependent cities of North America, French and Spanish stations prioritize pedestrians, cyclists, and public transit. Their biggest mobility hubs move several times the number of people as large international airports daily. As shown in Table ES-1 below, Atlanta Hartsfield International Airport—the *busiest in the world*—handles fewer passengers daily than Paris’s *third busiest rail station*—Paris Gare de Lyon. Additionally, these great stations start with the traveler, creating pedestrian-focused areas that scale from the city block to the region.

ES.2.1 Main central stations: Capitals of mobility

During our trip, we visited the preeminent cultural, economic, and political capitals of France and Spain. At the center of these major cities were their main central railway stations. We saw stations of all ages, designs, and layouts, but they all had one thing in common: these massive complexes bring modes of all levels together in one place for endless trip possibilities—from high-speed and regional rail services, to local transit network metros, trams, and buses—serving as the nucleus of mobility in their cities and regions.

Charles-de-Gaulle International Airport: France’s Global Mobility Hub

Charles-de-Gaulle is Paris’s international gateway to the world and is one of the busiest airports in Europe with 192,000 daily passengers and 2,000 daily flight movements. This global hub is connected to France’s robust HSR network, opening up a range of possibilities for travel in France. From CDG Airport, one can easily board a high-speed train directly to another major French city such as Lille, Lyon, Bordeaux, and more. Those traveling to the urban core of Paris enjoy a one-seat ride on the Réseau Express Régional (RER), the high-frequency regional rail system for Île-de-France, the greater Paris region.

Our trip was not limited to existing stations, though, as we got a glimpse into the future of urban mobility under construction at Barcelona’s La Sagrera Station construction site. This modern-day mega-station will become Barcelona’s new main railway hub, anticipating 275,000 daily passengers. This 3.2-million-square-foot (300,000-square-meters) complex will have 18 tracks total—10 tracks for high-speed trains and eight for Barcelona’s regional rail service *Rodalies de Catalunya*—and connect to three Barcelona Metro lines, L4, L9/L10, and a 19-bay bus station.

This new station is also significant on an international level, as it is the literal connection point of the Spain’s Central Corridor to Madrid and the line that connects to France.

Spain’s city center tunnels

Both Barcelona and Madrid each have two main city center high-speed stations—one in the north, one in the south. Originally built as terminals where rail lines would come into the city and end, both cities built tunnels connecting their main stations. This opened up more travel possibilities by linking previously separate parts of the HSR network and bringing high-speed service to two different ends of the city. With all services topping at both stations, HSR will be closer to different neighborhoods and connected to a different set of local transit connections—bringing rail service closer to people’s origin and destinations to improve first- and last-mile travel.

Table 1. Spanish City Center High Speed Rail Tunnels

Tunnel	Length
Barcelona Sants-Sagrera	3.60 miles (5.8km)
Madrid Atocha–Chamartin	4.54 miles (7.3km)

Source: [Barcelona tunnel complete](#), [Madrid tunnel unites Spain’s standard gauge high speed networks](#)

While much older than Barcelona’s future station, Paris’s major rail stations—Gare du Nord, Gare Saint-Lazare, and Gare de Lyon—each serve hundreds of thousands of daily users, seamlessly integrating intercity, regional, and metro services. All three of these stations move more people each day on their own than the busiest airport in the world, Atlanta Hartsfield-

Jackson International Airport. Further, Paris’s *fourth* busiest station, Gare Montparnasse, handles roughly the same number of people as Charle-de-Gaulle International Airport. One of our group members used the term “high-capacity urban gateways” to describe Paris’s historic terminals that have evolved into modern, well-designed mobility hubs that enable efficient, multi-scale travel within dense urban areas.

Table 2. Daily Visitation of the Largest Station Hubs in Paris Compared to the Busiest Train Station and Airport in the U.S.

Travel Hub	Daily Passengers	Notes
Paris Gare du Nord	700,000	Busiest rail station in Europe
Gare Saint-Lazare	312,000	2 nd busiest station in Paris
Paris Gare de Lyon	310,000	3 rd busiest station in Paris
New York Penn Station	600,000	Busiest rail station in North America
Paris Charles de Gaulle Airport	190,000	Top 5 busiest airport in Euro
Atlanta Hartsfield-Jackson Airport	286,00	Busiest airport in the world

Sources: [Station Passenger Traffic – SNCF](#), [New York Penn Station: Constraints and Considerations for Meeting Future Demand](#), [Groupe Aéroports de Paris](#), [Atlanta Hartsfield-Jackson International Airport](#)

ES.2.1 People-centric stations promote more comfortable and efficient mobility

When cities design stations and surrounding areas around the needs of people—both travelers and other users—they can fully capitalize on the proximity and efficiency that passenger rail offers in ways cars and airplanes simply cannot. Planners in France and Spain have come to recognize that people-first stations are the future of urban mobility and have reimaged many of their stations in recent years to reflect this ambition.

Barcelona–Sants Station is a notable case in point. As the city’s main rail hub, it serves an average of [just under 130,000 passengers each day](#). While the station brings together multiple levels of mobility, its surrounding auto-oriented streetscape and the prioritization of space for vehicles—combined with insufficient circulation space inside the station building—have long resulted in overcrowded conditions and a station environment that remains oriented more toward cars than people. We experienced these shortcomings during our trip.

However, we also learned how the station and its surrounding areas are being transformed to address these shortcomings. New plazas, walkways, and green spaces will better connect the station to the surrounding neighborhood. Space dedicated to vehicles will be reduced by 75%, shifting the balance of public space to an 85/15 ratio of pedestrian to vehicle use. At the same time, the station building itself will be significantly expanded—roughly doubling in size—to improve circulation. The metro and high-speed rail concourses are being enlarged, while bicycle and transit facilities are being enhanced to support smoother multimodal access and strengthen the surrounding urban fabric.

Gare de Lyon-Part-Dieu is another example of a station that long struggled with overcrowding and has since undergone a major redevelopment to accommodate growing passenger flows. Originally designed to handle about 35,000 daily passengers when it opened in 1983, the

station has been comprehensively modernized in anticipation of rapid growth through 2030 and beyond.

Over the past decade, local officials and transportation planners have implemented the large-scale *Multimodal Interchange Hub* program through a series of coordinated projects. Once heavily oriented toward car access and plagued by congestion, the station has been redesigned to modernize the facility and re-prioritize the surrounding area for sustainable transportation modes.

The station's footprint has expanded with new boarding halls, public plazas, and commercial space. When completed, concourse space will have tripled. On the outside, the area around the station have been reconfigured to greatly improve pedestrian and cycling access and connections to tram and bus stops. A new, enlarged front plaza creates a transition between the station and the city. Beneath it, an underground passage connects directly to the Lyon Metro and to France's largest bicycle parking facility with 1,500 spaces. Additional improvements also serve the roughly 30,000 non-rail users who pass through the area each day, including the Pompidou underpass—a new pedestrian and cycling route beneath the tracks that links the neighborhoods on both sides of the station.

Gare de Strausbourg-Ville is another notable example, and a particularly useful model for smaller cities. Strasbourg has a population of about 291,000 (roughly 490,000 in the metropolitan area), yet its station handles an impressive 80,000 passengers per day, a number projected to approach 100,000 by 2030. In recent years, the station has incorporated several distinctive design elements that support efficient, human-centered mobility, namely its glass-roof and redesigned station plaza that opens toward the historic city center.

Because the original station building is a protected historic structure, officials could not significantly alter it. Instead, they constructed a large glass canopy over the station's front façade, creating additional indoor circulation space while preserving the historic building. The expansion also improved connections to the underground tram station.

At the same time, the adjacent *Place de la Gare* was redesigned to function as a welcoming public plaza and transitional space between the station and the city. This area supports seamless connections to Strasbourg's local mobility network—bus stops, bicycle parking, and pedestrian routes linking the station district *Quartier de la Gare* with the city center. Vehicle traffic is routed away from the main entrances, separating pedestrians from cars and improving safety, comfort, and intuitive wayfinding. The result is a station forecourt where multiple transportation modes coexist efficiently while strengthening the surrounding public realm.

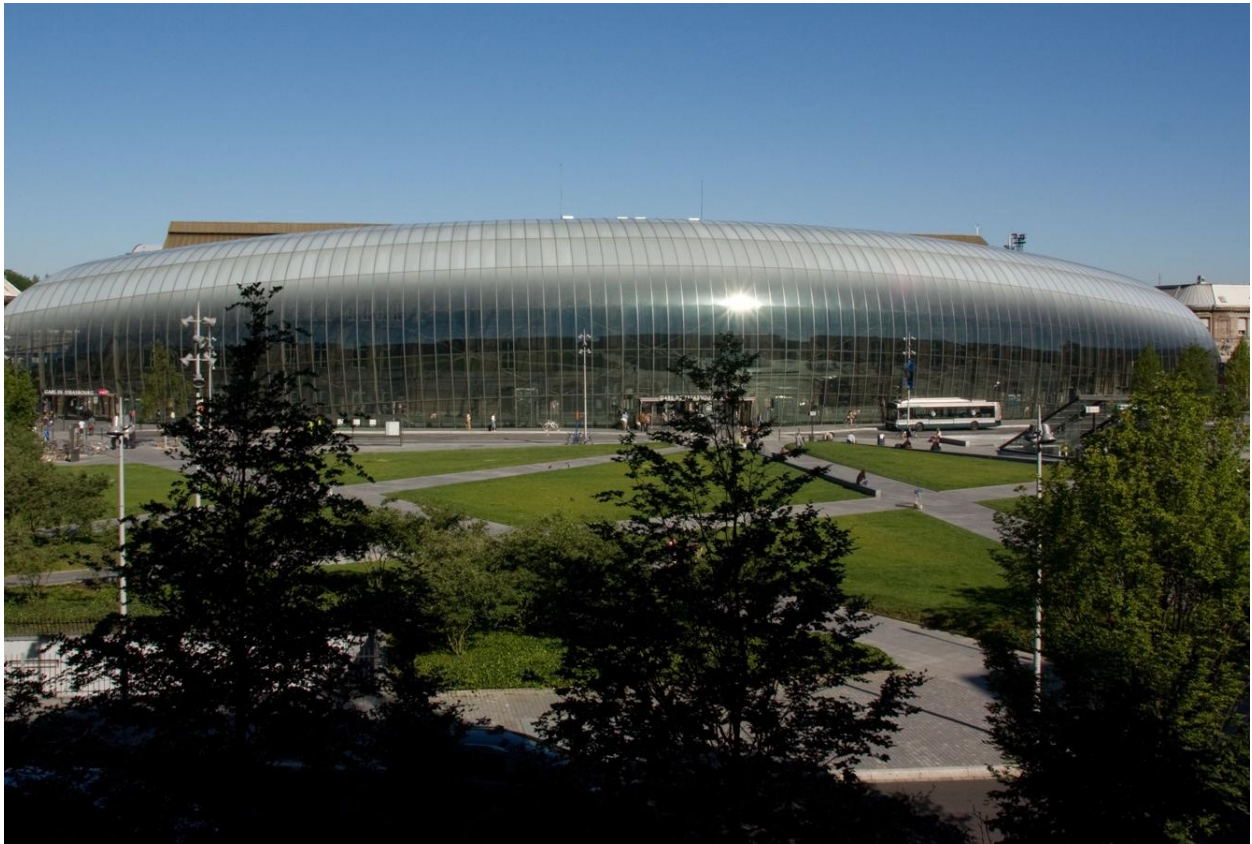


Figure 4. *View of the front of Gare de Strasbourg-Ville from the opposite end of Place de la Gare, the station's main front square.*

Source: Poudou99, Wikipedia

Great stations put people first

Good support trips at all scales through careful integration of multiple modes and hyper-local urban design. They move people efficiently, expand travel possibilities, and connect cities both nationally and internationally. But the best stations succeed by prioritizing people over cars, creating space for walking, cycling, and mass transit. “People congestion” is beneficial, providing the ridership that is necessary to support the stations and the services that stop there, while fostering urban activity around the station.

ES.3 Lesson 3: People-centric stations do more than simply move people; they also shape the neighborhoods and broader urban areas around them

Large rail stations are central to urban life, shaping neighborhoods and fostering vibrant city districts. During our travels, we encountered stations of many shapes, sizes, and ages. One quality they all shared, however, was a clear priority: putting travelers first rather than vehicle traffic. By facilitating efficient rail and other forms of mass transit—combined with people-first urban design—these stations support lively, thriving districts around them.

ES.3.1 France's historic station districts are designed for foot traffic

The neighborhoods around France's historic main stations predate the automobile and were designed for walking as the primary mode of travel around them. The spatial efficiency of rail travel, mass transit, and hyper-local modes allows more space for compact development for offices, housing and hotels, dining, shopping, and other kinds of amenities and cultural activity to exist in a core civic space.

Paris's terminal stations (also called "dead-end stations" or "stub-end stations"), like Gare du Nord and Gare Saint-Lazare, illustrate this particularly well: stub-end station layouts fit into dense street grids especially well since they don't bisect entire cities in the way that many through-running stations do. In this way, they can often better support local commerce and urban life. Pedestrian and cycling infrastructure around these stations further enhances urban vibrancy.



Figure 5. *Aerial view of Gare de l'Est (left) and Gare du Nord (right) and surrounding urban context of Paris' 10th arrondissement. This image clearly shows how neighborhoods in central Paris grew up around transportation infrastructure, and especially large terminal stations.*

Source: David Monniaux, [Wikimedia Commons](#)

In Strasbourg, “*Quartier de la Gare*” is a fitting name for the neighborhood surrounding its main station. The street grid converges on the station and its generous station plaza at *Place de la Gare*, seamlessly connecting the main transport hub to a thriving city center.

However, while the station area is well-integrated with the city to the east, ground-level tracks separate that thriving urban district from the neighborhood to the west. A primary objective of the current station modernization program—Gare 360 Degrés—is thus to create a direct crossing over the tracks. It will not fully eliminate the barrier, it is intended to reduce the divide created by the rail corridor, a challenge we saw other through stations address in different ways throughout the rest of our journey.

ES.3.2 Right-of-ways reimagined: City building around rail infrastructure

When it comes to cities and their rail lines, every place is different. The layout, development patterns, size, and age of a city—and the way rail lines were built around them—vary widely. Each city inherits a unique set of conditions shaped by past decisions, and major changes to rail infrastructure are extraordinarily expensive and complex. During our travels, we saw several creative ways planners were working within these constraints to better reconnect their cities.

At Lyon-Part-Dieu, the *Pompidou Passageway*—an underpass closed to car traffic and dedicated to pedestrians and cyclists as part of the recent station redesign effort—has become a key element in softening the divide created by the rail right-of-way. Combined with the expansion of the station and the addition of new access points, it provides more ways for the roughly 30,000 daily non-rail users who pass through the station area to cross the tracks.

The challenge at the La Sagrera station site in Barcelona was far greater than at Lyon-Part-Dieu. The former freight yards created a divide that felt more like a canal or river separating the two sides of the city. Spanish transportation officials recognized this “historic urban scar” and made repairing it a central goal of the La Sagrera project. Once completed, a 2.5-mile-long (4-km-long) linear greenway—*El Parc del Camí Comtal*—will span 94 acres (38 hectares) of rail infrastructure, helping to knit northeast Barcelona back together.

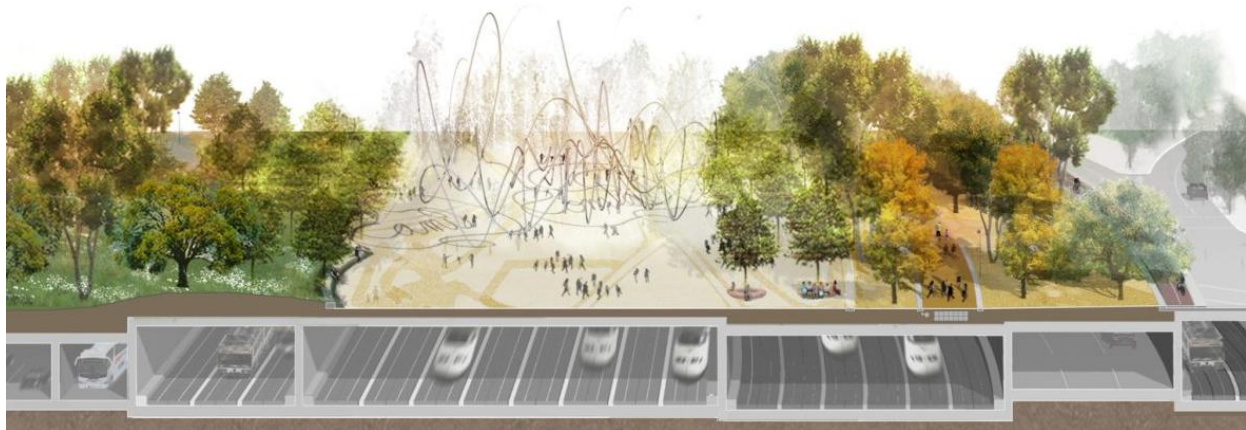


Figure 6. *El Parc del Camí Comtal buries rail and road infrastructure and brings 180,000 locals new access to a new expansive urban park.*

Source: BSAV

We also observed innovative solutions to address rail barriers at smaller stations and rights-of-way just outside of the central core of Paris and at Valence-TGV Station. They all demonstrated how rail infrastructure can reconnect neighborhoods or repurpose unrealized space.

ES.3.3 Rail station modernization projects are about much more than transportation. They are city-building endeavors.

Lyon-Part-Dieu and Barcelona-La Sagrera show how modern station projects can drive broader urban transformation initiatives.

The station redevelopment improves the transportation function of the station, but it is just one piece of a broader initiative. The *zone d'aménagement concerté* (ZAC) *Part-Dieu Ouest* ("focused development area") covers 94 acres (38 hectares) of projects for greater mixed-use development and public space around the station. The activity is integrated with the people-centered mobility enhancements of the station project and leads to an overall higher quality of place.

Barcelona's vision for La Sagrera is to create a "new urban center" by providing homes for 25,000 residents and commercial space for 30,000 jobs. The project demonstrates how station developments can drive the socioeconomic recovery of entire neighborhoods. To reach this goal, BSAV is prioritizing human-scale, local connectivity through the new station and park, while leveraging heavy rail and metro lines to provide regional commuters with speed and ease of access.

Although our time at Madrid-Chamartín was brief and lacked a formal expert presentation, the ambitious redevelopment occurring there warrants recognition. As part of the broader *Madrid Nuevo Norte* program, the station is undergoing a series of capacity improvements designed to support sustainable growth. Together, these projects reflect a "compact, mixed-use city model" that concentrates daily needs and urban activities within a high-density district integrated directly into the rail infrastructure.

The impact of great stations extends far beyond travel

Because stations efficiently move large volumes of people, they unlock space for vibrant urban activity to flourish around them. Mobility and urban life feed one another; these districts thrive when people can navigate to, from, and within them with comfort and ease.

ES.4 Lesson 4: Great stations aren't just places to board trains. They are destinations in and of themselves.

Great rail stations are more than transit hubs; they are destinations that integrate transportation with retail, dining, leisure, and public space to create vibrant urban centers. While rail travel efficiently brings people to a city's core, a truly great station also brings the city's amenities and culture directly to the rail infrastructure. These offerings provide significant value not just to passengers, but to the non-rail users who live, work, or spend time in surrounding areas.

French and Spanish planners recognize this critical role that stations play in daily life. SNCF's *Gares et Connexions* subsidiary and ADIF's *Vialia* and *Tiendas de la Estación* brands fully capitalize on these opportunities, delivering a vast array of services at large rail hubs.

In this lesson, we highlight several unique models from our travels that can serve as inspiration for U.S. cities looking to reimagine their own transit gateways.

ES.4.1 Stations as urban destinations

Madrid-Atocha exemplifies this approach by incorporating a large tropical garden surrounded by shops, cafés, and cultural amenities into its historic terminal. Open from 5 a.m. to 1 a.m., this lush public space serves as a serene haven of greenery in the heart of Spain's bustling capital.

To the north of the city, Príncipe Pío similarly transformed its historic rail facilities, converting one part of the terminal into a vibrant shopping center and another into an entertainment complex. Both developments have been significant successes: the shopping center attracts approximately 12 million visitors annually, and the 50-year lease for a theater house—the *Gran Teatro Bankia Príncipe Pío*—generates €23.4 million in rent for ADIF. By repurposing underutilized infrastructure for commercial and cultural use, Príncipe Pío has evolved into a premier multi-use destination seamlessly served by regional rail, two Madrid Metro lines, and several bus routes.



Figure 7. *Interior view of Príncipe Pío Station in central Madrid. The photo shows the shopping center integrated into the station (background and left), a well-regarded mall with a diverse mix of retail, dining, and entertainment—including a cinema. Its prime location at a major transportation hub generates steady foot traffic, allowing it to compete successfully with larger regional shopping centers across the Madrid metropolitan area.*

Source: Eric Eidlin

ES.4.2 Retail integration maximizes a station's economic and placemaking value

Príncipe Pío is just one station that has capitalized on large-scale retail integration, as we saw Paris's Saint-Lazare and Lyon's Part-Dieu integrate retail galleries and services, attracting both travelers and locals, generating revenue that can be reinvested into the network, and injecting life into surrounding neighborhoods.

In 2009, Paris Saint-Lazare was renovated to be a [“City Booster”](#)—a station designed to drive economic activity, social life, and mobility. The station renovation introduced a new reception hall and a three-story, 107,000-square-foot (10,000-square-meter) commercial gallery with 87 shops. The renovation has been a huge success that brings in about €160 million (~\$189,000 million) annually, SNCF customer data shows how it has successfully intertwined rail travel with retail options.

In Lyon, a centerpiece of the station's expansion is the *Béraudier Gallery*, a 118,000-square-foot (11,000-square-meter) addition. Spanning three levels and hosting 20 new commercial tenants—including shops, services, and restaurants—this new wing significantly enhances the offerings at Lyon-Part-Dieu and increases the overall value the station provides its users.

ES.4.3 Making the station a center of gravity for everyday needs for everyone

By embedding amenities that serve routine, everyday needs, rail stations become essential "centers of gravity" for both commuters and local residents. They capitalize on the primary advantage of rail infrastructure: proximity. Ultimately, stations act as space-efficient facilitators of mobility, bringing people, goods, and services closer together within a remarkably small urban footprint.

We saw several offerings we thought were unique at the European stations we visited:

- Parcel lockers
- Childcare
- Co-working spaces
- Health services and fitness centers

More than mobility: Great stations are hubs for everyday life

All the types of offerings and services we observed strengthen stations' economic and social value, reinforcing their role as focal points of urban activity rather than mere points of transit.

ES.5 Lesson 5: Building with the future in mind is essential. When planning a station, you should start with the least flexible elements first—tracks, platforms, and of course the location of the station itself

A successful station requires planning for decades of growth, beginning with the most permanent and least flexible decisions: location, track layout, and platform configuration. These early choices shape not only rail operations, but also the surrounding urban fabric and long-term city form. Experience across Europe demonstrates that while hubs like Lyon-Part-Dieu, Barcelona-Sants, and Madrid-Chamartín can be retrofitted to expand capacity, such

interventions are invariably costly, complex, and limited by the constraints of an active station environment.

ES.5.1 Where one decides to build a station is the most fundamental and consequential decision one makes in station planning

Station site selection determines how well a station can deliver on the core principles covered in previous lessons: maximizing proximity, facilitating mobility across various scales, and fostering meaningful urban placemaking.

Zaragoza-Delicias illustrates both the ambition and the risks of locating a station outside the urban core. While the building itself is a striking architectural achievement—offering a beautiful open hall with ample circulation and generous, accessible platforms—its effectiveness is hampered by its isolation.

Originally conceived alongside a large-scale redevelopment of the surrounding district, the project was stalled by the 2008 financial crisis, leaving the station's immediate environment incomplete. Today, the station remains walled off by dominant perimeter roadways and lacks robust local transit links to the historic center. These car-oriented access patterns and the failure to deliver on proximity have created significant hurdles that have proven difficult to overcome after the fact.



Figure 8. Relationship between Zaragoza's Delicias Station and city center.
Source: Graphic by Eric Eidlin. Aerial imagery from Google Maps

By contrast, Barcelona-La Sagrera demonstrates the value of strategic site selection. Where others saw a desolate freight yard, city officials saw an opportunity to create a "city within a city." The 94-acre site provided ample room for a massive, 3.2-million-square-foot, multi-level

facility. With 18 tracks, the station is designed to accommodate future demand without the operational compromises forced upon more constrained hubs. Furthermore, its location on the opposite end of the city from Sants improves regional equity by bringing high-capacity rail access to a part of the city that has historically been underserved by rail and mass transit.

Lyon-Part-Dieu offers a similar case of strategic relocation. Built in the early 1980s on the site of a former military barracks and rail yard, the location was chosen for its connectivity to the national network and its potential for high-density growth. That gamble has largely paid off: today, La Part-Dieu is France's most significant employment district outside of Paris. However, despite the brilliance of its initial location, the facility itself has begun to encounter new constraints as it struggles to keep pace with its own success.

ES.5.2 Building the right station from the start

Lyon-Part-Dieu station complex has been operating far beyond its intended capacity for years. Originally designed in 1980 to handle 35,000 daily passengers, it now accommodates over 135,000. The efforts over the last decade to expand—including adding an entirely new track, widening platforms, and reworking concourses—underscore just how expensive and disruptive retrofits can be. As SNCF's Director of Station Transformation Frédéric Longchamp emphasized, getting these fundamental elements right from the outset is essential; they are the most difficult and costly features to correct later. Barcelona-La Sagrera is applying this lesson in real-time, utilizing its massive footprint to build in the necessary capacity from day one.

Tomorrow matters, but the decades after matter even more

Taken together, these case studies point to three clear principles for the next generation of rail hubs:

- **Prioritize proximity:** Select central, transit-rich locations that integrate seamlessly into the urban fabric.
- **Design for the future:** Build for long-term capacity and multimodal access from the start to avoid the "retrofit trap."
- **Establish strong governance:** Implement structures capable of enforcing high-quality planning and design standards over the entire lifecycle of the project.

ES.6 Lesson 6: The presence of strong national actors leads to better station management and a more unified passenger experience

This lesson highlights that strong national governance leads to better station management and a unified passenger experience. France and Spain each have dedicated bodies that oversee every aspect of all passenger rail stations in their respective countries—day-to-day operations, business strategy and management, and the planning and design of large-scale renovations.

ES.6.1 A “top-down” versus “bottom-up” approach: What is better for the passenger?

SNCF's *Gares et Connexions* (G&C) is a third-tier subsidiary company in charge of all 3,000 French railway stations, and it is the self-proclaimed “railway station specialist.” Spain's ADIF oversees all 1,448 of Spain's rail stations. It does not have a dedicated subsidiary company

dedicated to stations as in France, but performs similar functions and possesses similar responsibility and authority over them.

This "top-down" approach enables the seamless coordination of all the elements required to create a functional, world-class station. By consolidating operations under a single entity staffed by experienced professionals, every facet of the station—from long-term planning and renovations to daily wayfinding and amenities—is managed with a unified vision. This ensures a consistent, high-quality experience across various transit operators, providing a sharp contrast to the fragmented U.S. model, where planning priorities and standards often vary significantly across different cities and regions.

ES.6.2 Multiple operators can share large stations seamlessly

To comply with European Union law and prevent conflicts of interest, national infrastructure managers, SNCF Réseau and ADIF, operate independently from national service providers, SNCF Voyageurs and Renfe. At major international hubs such as Paris Gare du Nord, Lyon-Part-Dieu, Barcelona-Sants, and Madrid-Atocha, the operators simply utilize the facility, while the infrastructure managers retain decision-making authority. This centralized oversight ensures that even with multiple competing operators, the station functions as a cohesive, passenger-focused environment rather than a fragmented collection of platforms.

Wayfinding illustrates this impact: clear, unified signage, context-sensitive displays, and consistent layouts make stations intuitive for passengers—even large and complex older stations like Paris Gare de Lyon, shown below, that were built incrementally over time.



Figure 9. *As this interior view of one of the large train sheds at Paris Gare de Lyon shows, strong involvement by the national rail operators in shaping the overall customer experience—including clear, unified wayfinding—creates a seamless and coherent journey even in a busy, historic station.*

Source: Eric Eidlin

Centralized planning ensures stations serve the broader region effectively, accommodate future growth, and provide a consistent, multi-operator passenger experience.

ES.7 Lesson 7: Spain and France build transportation megaprojects faster and cheaper than the U.S.

The group's site visits to multiple project sites in France and Spain highlighted stark disparities in both cost and delivery speed between European and U.S. infrastructure projects. While a comprehensive analysis of the systemic drivers behind these differences is beyond the scope of this report, the topic was raised so frequently by group participants that it became impossible to ignore. Consequently, this lesson provides a series of high-level observations, placing the costs of the projects we observed up close alongside comparable U.S. projects and proposals to offer a necessary perspective on global best practices.

ES.7.1 Through-running tunnel projects

Spain's city center rail tunnels:

- Barcelona's Sants–La Sagrera tunnel: [€179.3M for 3.5-mile tunnel in January 2008](#) → \$335.1M in 2025 USD for ~\$96M per mile
- Madrid Cercanías (not HSR) Atocha–Chamartin tunnel: [€550M for 4.6-mile tunnel in 2006](#) → \$1.1B in 2025 USD for ~\$238.6M per mile

U.S. city center tunnel projects:

- Boston's North–South Rail Link: [\\$6.1 to 12.6 billion 2018 USD for 5.5-mile tunnel](#) → \$7.9 to \$16.1 billion adjusted to 2025 USD for ~\$1.4–\$2.9 billion per mile
- San Francisco's Portal Project (also known as the Downtown Rail Extension): [\\$8.3B USD for 2.2-mile tunnel](#) at the end of 2025 for \$3.8B per mile

ES.7.2 Station renovations

France and Spain station transformation:

- Lyon-Part-Dieu Multimodal Interchange Hub and Track L: [€441.9M estimated cost in 2025](#) → ~\$600M in 2025 USD
- Barcelona-Sants Transformation: [€410M estimated cost in 2022](#) → ~\$580M in 2025 USD

United States station transformation projects:

- Washington D.C. Union Station Expansion Project: [\\$8.8B](#) in 2023 USD → ~\$9.3B in 2025 USD
- San Jose Diridon Station: Total cost estimated at [\\$4-5B](#) in 2025 USD

ES.7.3 Major metro expansions

The Grand Paris Express is expanding the Paris Metro by more than 125 miles at around \$530 million per mile. Madrid Metro added 130 miles at \$60-\$95M per mile over the course of its massive expansion undertakings since the late 1990s.

U.S. metro projects are orders of magnitude more costly on a per mile basis. Bay Area Rapid Transit (BART)'s expansion into San Jose at \$2.1 billion per mile, and the Seattle Light Rail extension at \$2 billion per mile.

Key drivers of European efficiency include strong, centralized governance, institutional knowledge retention, and iterative project improvement. Specialized delivery entities like *Société du Grands Projets* (SGP) ensure expertise and continuity across large programs. These approaches highlight how efficient project organization and public-sector capacity enable Europe to achieve far more for less, offering lessons for U.S. infrastructure delivery.

ES.8 Lesson 8: Mega-project outreach efforts should foster trust, showcase confidence and competence, and excite the general public

Mega-project outreach should foster trust, demonstrate competence, and inspire public confidence. Public engagement is essential, and U.S. agencies often invest heavily in it, holding numerous community meetings and building relationships with stakeholders. However, when extensive outreach intersects with uncertain funding and unclear project timelines—as is often the case for projects like California HSR—it can slow decision-making and complicate project delivery. The combination of evolving public input and shifting project constraints can lead to adjustments that, while responsive, risk delaying progress and creating public frustration.

By contrast, France and Spain often adopt a more centralized, top-down approach that allows key decisions to be made efficiently while still providing targeted opportunities for input. Madrid's Metro expansions in the 1990s and 2000s, for example, focused consultation on statutory requirements and construction impacts, enabling rapid progress and building public goodwill as communities experienced tangible benefits.

ES.8.1 Using modern marketing to promote the future of transit

Sophisticated communication campaigns for projects like the Grand Paris Express and Lyon-Part-Dieu clearly articulate benefits, timelines, and impacts, fostering trust without extensive iterative consultation at every stage.

The campaigns are both intuitive and comprehensive, reaching the general public at many different points throughout the project development process. During our site visits, construction site fences were covered with colorful billboards presenting various details and benefits of the project. In the digital world, both projects have dedicated websites and social media accounts, where interested members of the public can get lost down rabbit holes of engaging, high-quality content.

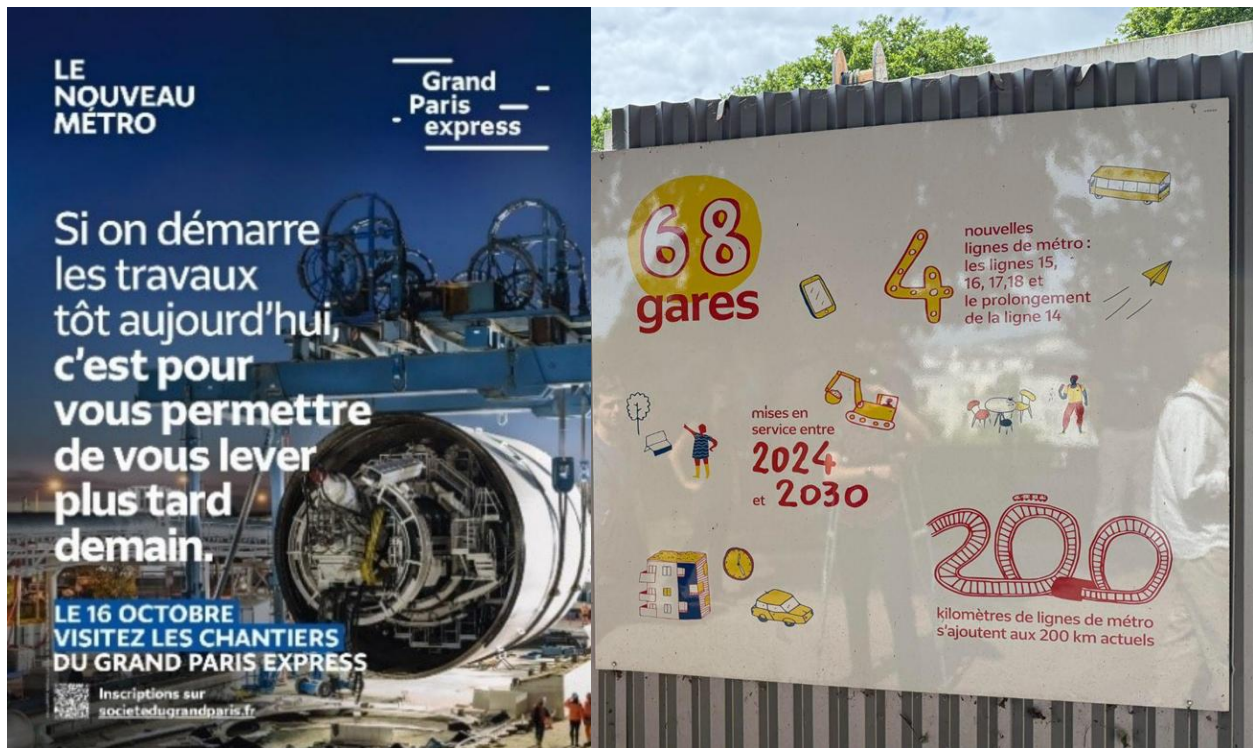


Figure 10. *These signs illustrate how the Grand Paris Express communicates with the public. At left, a poster effectively makes the case that enduring some construction disruptions today in the present will yield long-term benefits. The slogan might be translated as: "We are starting work early in the day today so that you can wake up later in the day tomorrow." At right, a bright, graphically compelling, and approachable info poster—mounted on construction hoardings—offers clear and compelling information about the project in a colorful and user-friendly format. Sources: Société des Grands Projets (left); Eric Eidlin (right)*

Closing the loop: Strategic engagement and proven delivery

The U.S. experience illustrates a fundamental tradeoff: extensive public engagement can strengthen relationships between agencies and the public. But when paired with funding uncertainty and long delivery timelines, broad and open-ended processes—especially those focused more on impacts than benefits—can slow or even derail projects. European models suggest a more effective balance: clear, benefits-focused communication combined with confident, strategic, and centralized decision-making can deliver major infrastructure efficiently while still building public support.

ES.9 Bringing It Home: European Lessons for Better Passenger Rail in the U.S.

The ultimate goal of this report is to lay the groundwork for future research and spark critical conversations regarding the improvement of U.S. rail networks and station planning. To conclude, we apply our group's primary takeaways to an American context, examining how these European models can be adapted to several specific U.S. cases.

ES.9.1 High-speed rail corridor opportunities in the U.S.

As discussed in this report, High-Speed Rail (HSR) excels at trips of roughly 100–500 miles, filling a critical “missing middle” in the U.S. modal hierarchy. These distances are often too long for cars or conventional rail to compete efficiently, yet short enough that an airplane’s higher cruising speed rarely offsets the time and hassle of navigating security and traveling to airports that are frequently located far from city centers.

European rail stations and networks demonstrate how high-quality service, integrated planning, and thoughtful station-area development can enhance both mobility and quality of life. The U.S. possesses several corridors within this ideal distance range, many of which are already connected by conventional rail. However, outside of the Northeast Corridor, these services tend to be slow and infrequent. Implementing true high-speed, high-frequency rail would transform travel and economic life in these regions, such as:

- Boston → 215mi → New York City → 94mi → Philadelphia → 139mi → DC
- San Francisco → 186mi → Fresno → 218mi → Los Angeles
- Las Vegas → 270mi → Los Angeles
- Dallas → 239mi → Houston
- Chicago → 297mi → St. Louis → 248mi → Kansas City
- Chicago → 91mi → Milwaukee → 336 mi → Minneapolis
- Cincinnati → 107mi → Columbus → 142mi → Cleveland
- Vancouver → 143mi → Seattle → 174mi → Portland
- Atlanta → 245mi → Charlotte → 167mi → Raleigh
- Miami → 285mi → Tampa → 84mi → Orlando

American cities have also explored the potential of city-center tunnels to unite separate terminal stations, mirroring the successful models seen in Madrid and Barcelona. Projects such as Boston’s North–South Rail Link and a potential connection between New York’s Grand Central and Penn Station would be transformative for their respective regions. However, despite decades of discussion and numerous feasibility studies, these remain unfunded proposals. In contrast, the Spanish and French examples move from study to reality through sustained national investment and strategic, high-level leadership at the state and national levels.

ES.9.2 Unlocking the potential of U.S. station districts

In the largest urban centers of the U.S., existing stations and their surrounding districts already possess the foundations to serve their cities as effectively as those in France and Spain. They successfully link heavy rail to local transit networks and move thousands of people to and from city cores that remain vital cultural and economic hubs. However, these “bones” are often poorly fused because the station and its neighborhood are rarely treated as a single, holistic ecosystem. Too often, mobility is planned in isolation from the broader urban fabric.

European rail networks demonstrate that high-quality service, integrated planning, and thoughtful station-area development are not mutually exclusive, but are mutually reinforcing. By closely examining these models, U.S. planners can better enhance multimodal integration

and forge stronger connections between transit hubs and their surrounding neighborhoods through purposeful transportation investment and urban design.

ES.9.3 America's most walkable, well-served rail station districts are still overrun with cars

Large U.S. stations in the nation's most transit-rich urban centers—including New York's Penn Station and Grand Central, Washington Union Station, and Chicago Union Station—are technically "walkable" by virtue of their central locations. Yet, in their current state, they remain car-dominated, which severely limits local vibrancy and pedestrian comfort. Commuters exiting these stations are immediately confronted by heavy vehicle traffic while being confined to narrow, crowded sidewalks.

Despite being well-served by intercity, regional, and local rail, these cities are missing the opportunity to create truly people-centric environments. The rail service and urban density are already present; what is missing are the transitional zones and spacious public areas required to connect these mobility hubs with the cultural and economic centers surrounding them.

Quieter, safer, and more efficient station districts are not a far-off dream—they are right there for the taking if we prioritize people-centric design over vehicle throughput.

ES.9.4 So close, yet so far: The disconnect in U.S. station districts

Many U.S. station areas remain physically isolated from their urban context, separated by highways, expansive surface parking lots, and narrow, uninviting pedestrian pathways. These barriers effectively neutralize the benefits of a central location.

Stations in Washington D.C., Los Angeles, Seattle, St. Louis, Cleveland, and San Jose serve as primary examples of this missed potential. While these hubs are optimally located within city centers, surrounding car infrastructure diminishes their impact and civic presence. Because the local urban layout prioritizes vehicle throughput over the traveler's experience, these stations fail to serve as integrated anchors for the diverse range of cultural and economic activities nearby.

ES.9.5 Focused on function: few U.S. rail stations provide reasons for non-passengers to pass through

Some U.S. cities have successfully maintained their historic terminals as urban destinations in their own right. These stations often succeed due to their grand scale and built-in capacity for diverse amenities. However, in many other major American cities, the station experience has been reduced to little more than a waiting room. These post-1970s facilities were often built as downsized replacements for larger, historic predecessors.

The minimal design of these modern stations centers on pure functionality. Beyond a basic convenience store or vending machines, many lack even fundamental services like ATMs or reliable Wi-Fi. They are not designed as attractive places to spend time, nor do they add value to the broader urban fabric in the way their European counterparts do. While these facilities may suffice for cities that currently see only a few trains per day, any plan to increase rail

service will require a fundamental re-evaluation of these stations to transform them from simple transit stops into vibrant civic anchors.

ES.9.6 Narrow-sited selection: Consequential U.S. station location and relocation

The history of relocated stations in Atlanta, Albany, Detroit, Jacksonville, and Phoenix illustrates a cautionary tale: moving rail hubs away from city centers severs vital connectivity and stifles the potential for catalytic urban development. Once a station is pushed to the periphery, the "fused" relationship between transit and the city core is often lost for generations.

Modern projects like California High-Speed Rail and Brightline West present a mixed outlook for urban integration. While stations like Fresno are well-positioned within the existing urban fabric, others, such as Bakersfield, sit in underdeveloped, auto-oriented zones. The success of these central-but-isolated sites is entirely contingent on massive private investment to build new neighborhoods from scratch and a complete overhaul of local transit networks. Similarly, Brightline West's planned terminals in Rancho Cucamonga and Las Vegas face pronounced first- and last-mile challenges, highlighting the risk of building stations that function as islands in a sea of car-centric infrastructure.

ES.9.7 When no one's in charge: Fragmented management at U.S. train stations

Compounding these physical challenges, multi-operator hubs with fragmented management—such as New York Penn Station and San José Diridon—illustrate how institutional complexity can further degrade the passenger experience, resulting in confusing wayfinding and cumbersome, multi-agency ticketing.

U.S. stations often have strong physical foundations but require better integration across operators and services, more coordinated management, and multi-disciplinary planning that combines transportation, land use, and urban design. By investing in these elements, stations can become true mobility hubs that connect neighborhoods, regions, and cities efficiently while also acting as anchors for economic activity, public life, and urban development that mirror the transformative role seen in the most successful European examples from France and Spain.

ES.10 Conclusions and Key Takeaways for the U.S.

HSR offers fast, reliable travel that often outperforms driving and can rival, or surpass, air travel when door-to-door time is considered. By directly connecting city centers, HSR supports compact, transit-oriented development and reduces the friction of long-distance trips. Well-planned stations can catalyze economic growth, strengthen regional rail networks, and anchor vibrant urban districts. In the United States, however, these benefits are not automatic: uncertain funding, fragmented governance, and cautious phasing can delay projects and blunt their transformative potential.

Our observations from France and Spain show that HSR thrives where stations are well-located, integrated, and managed with strong, centralized leadership. Great stations function on one hand as efficient mobility hubs, connecting multiple scales of travel, anchoring neighborhoods, and reinforcing land-use patterns that support transit. Thoughtful planning of permanent elements—station location, platforms, tracks, and multimodal access—is critical, as is clear

communication of benefits to build public trust. They also serve as destinations in and of themselves.

European projects also demonstrate the value of effective public engagement and credible delivery. Consistent project execution should be complemented with clear, visually compelling messaging to help communities understand long-term benefits of these large investments and short-term disruptions. France and Spain consistently deliver megaprojects efficiently, maximizing urban and economic benefits, highlighting the gap in U.S. practice where opportunities are often missed.

For HSR to transform American cities, agencies must make deliberate choices in leadership, design, governance, communication, and delivery, learning from the more mature European models.

ES.11 Topics for Future Research

- **Governance, institutions, and organizational capacity:** Examine how European rail success depends on empowered institutions with clear authority, aligned to the geographic scale of travel markets. Particular focus should be placed on France’s station development entities—such as Special Purpose Local Development Companies (SPLs) and Public Development Agencies (EPAs)—and the extent to which analogous models could be adapted to the U.S. context.
- **Institutional alignment across scales:** Investigate how U.S. governance frameworks might better reflect regional and interregional travel patterns, moving beyond fragmented, project-by-project approaches toward coordinated network planning.
- **Projects of national and regional significance:** Study how France uses formal project designation as an active delivery tool to mobilize funding, streamline approvals, and enforce coordination, and why similar U.S. programs have been less effective.
- **Passenger experience and basic comfort:** Analyze how stations prioritize fundamental amenities—particularly seating and waiting space—and compare European and U.S. approaches, including case studies such as Union Station (DC), Moynihan Train Hall, and Grand Central Terminal.
- **Security practices and tradeoffs:** Explore Spain’s post-2004 rail security model, its operational impacts on passenger flow, and lessons for balancing safety, convenience, and throughput in growing U.S. rail systems.
- **Project costs, delays, and delivery risk:** Identify institutional, political, and financial drivers of delays and cost escalation in megaprojects, drawing lessons from cases such as La Sagrera Station and Barcelona Metro Lines 9 and 10.
- **Station systems and network design:** Assess how many major stations a city needs to ensure capacity and resilience, comparing European multi-station models with U.S. single-terminal cities.

- **Toward true mobility hubs:** Research governance, funding, and design strategies that enable stations to function as integrated mobility hubs and catalysts for surrounding urban development.

I. Introduction

By Hunter Bickel and Eric Eidlin

With contributions from David Archuleta, Joseph Faria-Poynter, Leah Greenblat, Dakota Gross Susan Herre, Alex Kenefick, Matt Miller, Robert Munson, Desiree Rodarte, Franklin Tang, Emily Treffert

On May 29, 2025, a group of 12 students and professionals, accompanied by SJSU Master of Science in Transportation Management faculty Eric Eidlin, arrived in Paris, France, to embark on an intensive 12-day trip filled with train journeys, station tours, seminars, and sightseeing. The group returned with lasting memories, meaningful souvenirs, phones full of photos and videos, and—most importantly—valuable insights from two European nations that are global leaders in passenger rail.

Our group was diverse: some had worked in the field for many years, while others were just beginning their careers. All shared a common passion for passenger rail and sustainable transportation and had enrolled in this study trip to bring back home actionable lessons.

After our final meal as a group, we gathered around a large table in a Madrid courtyard and reflected on what we had learned. We had a wide-ranging conversation about what intrigued us, what surprised us, and what impressed us. We had a lot to chew on, more than we had time for before having to board our return flights to the U.S.

That is why we decided to take the discussion offline and produce a detailed report. This report captures the group's key insights and takeaways from our study trip on best practices in rail and station planning, with a clear focus on how these lessons can be applied in the U.S. context. In the process of preparing the report, we uncovered a number of topics that warranted deeper exploration, and we present some of that additional research here. Many more questions emerged than we could fully address within these pages. To keep that momentum going, we conclude with a section that plants the seeds for future research—inviting others to pick them up and run with them on future study trips.

I.1 Our journey from Paris to Madrid

It would be hard for the average American to comprehend how we traveled approximately 1,700 miles through seven cities without getting into a car or plane, but we did just that. Our entire journey from Paris to Madrid, and every stop along the way, was entirely done by high-speed rail. We also logged many more miles by mass transit within the many urban regions that we visited, traveling on a wide range of metros, regional trains, trams, and buses. We did not take a single ride in a car and only used planes for our journeys over the Atlantic.

Our trip started with four days in Paris. On one of those days, we took a day trip to and from Strasbourg, a city 300 miles to the east that sits on the German border. After Paris, we headed down to Lyon along Europe's busiest HSR corridor, a trip that took just shy of two hours. We spent two days there. From there, we continued on to Barcelona, where we spent three days. On our final travel day via HSR, we left Barcelona in the morning for a half-day excursion to the

mid-sized city of Zaragoza before we arrived in Madrid, the final city in our itinerary, in the evening.

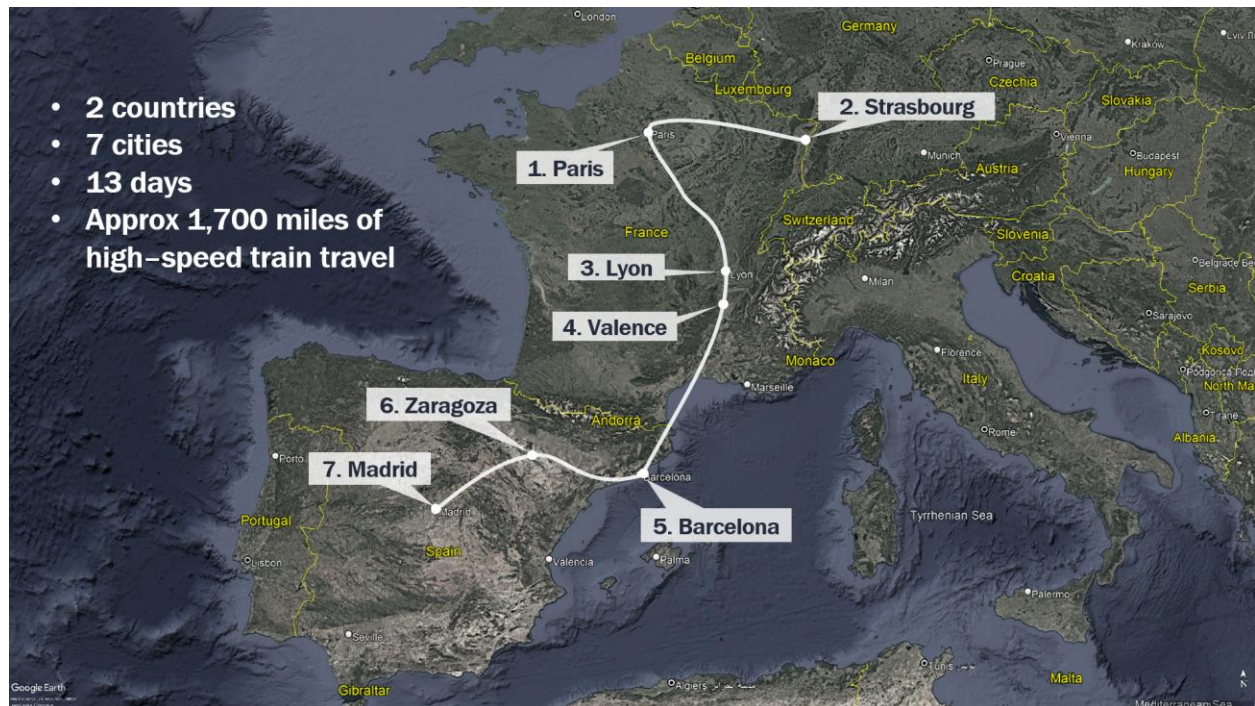


Figure 11. Study trip itinerary.

Source: Graphic by Eric Eidlin; Google Earth aerial imagery

I.2 Tours and Seminars by Professionals from:

- French Railways Stations & Connections Group (SNCF Gares & Connexions)
- Paris/Sorbonne University / French National Centre for Scientific Research (CNRS)
- Lyon-Part-Dieu Urban Redevelopment Agency (Société Publique Locale (SPL) Lyon-Part-Dieu)
- Cergy Paris University
- Barcelona Sagrera Urban Redevelopment Agency (Barcelona Sagrera Alta Velocitat (BSAV))
- Polytechnic University of Catalonia (Universitat Politècnica de Catalunya (UPC–BarcelonaTech))
- Railway Infrastructure Authority of Catalonia (Infraestructures Ferroviàries de Catalunya (IFERCAT))
- Spanish Railway Infrastructure Manager (Administrador de Infraestructuras Ferroviarias (ADIF))
- Technical University of Madrid (Universidad Politécnica de Madrid)
- RedBici Network of Cities and Regions for the Bicycle (RedBici (Red de Ciudades y Territorios por la Bicicleta))

While our meetings covered a wide variety of topics, the primary focus of the trip remained station and neighborhood area planning. In total, we visited 20 rail stations, spanning a vast range of sizes, designs, and eras. Our itinerary included massive hubs with over half a million daily visitors, as well as smaller facilities serving tens of thousands. We analyzed the operational differences between stub-end terminals and through-running stations, moving from historic landmarks over a century old to modern post-WWII facilities and even a massive project being built from scratch. Each site provided unique lessons, sparking critical discussions as we compared their respective strengths, weaknesses, and how well they served the specific needs of their host cities.

I.3 Stations We Visited

Paris, France

- Paris Gare du Nord (large, historic central city station)
- Paris Gare Saint Lazare (large, historic central city station, no HSR)
- Gare de Stade de France Saint-Denis / St. Denis-Pleyel (new inner-ring suburban and underground urban rail station complex, no inter-city trains)
- Gare de Charles de Gaulle (air-rail hub station, urban periphery)
- Paris Gare de l'Est (large, historic central city station)
- Paris Gare de Austerlitz (large, historic central city station, no HSR)
- Paris Gare de Lyon (large, historic central city station)

Strasbourg, France

- Gare de Strasbourg-Ville (large, historic central city station, thoroughly reconstructed)

Lyon, France

- Gare de Lyon-Perrache (large, historic central city station)
- Gare de Lyon-Part-Dieu (large central city station)

Valence, France

- Gare de Valence TGV Rhône-Alpes Sud (peripheral interchange station)

Barcelona, Spain

- Estación de Barcelona-Sants (large central city station)
- Barcelona Estación de França (historic central city station, no HSR)
- Estación de Barcelona-La Sagrera (under construction) (large new central city station)

Zaragoza, Spain

- Estación de Zaragoza-Delicias (large new urban station outside of urban core)
- Zaragoza-Portillo (recently reconstructed central city station, no HSR)

Madrid, Spain

- Estación de Madrid-Atocha (large, historic central city station)
- Madrid Principe Pío (large, historic central city station, no HSR)
- Madrid Moncloa (bus only interchange station)

- Madrid-Chamartín-Clara Campoamor (large station outside of urban core from 1967 being thoroughly expanded and reconstructed)



Paris Gare du Nord

By Nord794ub – Own work, CC BY-SA 4.0,

<https://commons.wikimedia.org/w/index.php?curid=4634654>



Figure 13. Paris Gare de l'Est
 By Hugh Llewelyn – Gare de l'Est Uploaded by Oxyman, CC BY-SA 2.0
<https://commons.wikimedia.org/w/index.php?curid=24388790>



Figure 14. Paris Gare Saint-Lazare
 By Moonik – Own work, CC BY-SA 3.0
<https://commons.wikimedia.org/w/index.php?curid=23639863>



Figure 15. Paris Gare de Lyon
 By Tom Corser - Tom Corser, CC BY-SA 3.0,
<https://commons.wikimedia.org/w/index.php?curid=147103726>



Figure 16. Gare de Strasbourg-Ville
 Source: By Hugh Llewelyn - Strasbourg Station Uploaded by Oxyman, CC BY-SA 2.0,
<https://commons.wikimedia.org/w/index.php?curid=24388751>



Figure 17. Gare de Lyon-Perrache
Source: Hunter Bickel



Figure 18. Gare de Lyon-Part-Dieu
Source: Julien Sauvadon, [France 3 Auvergne-Rhône-Alpes](#)



Gare de Valence-TGV

Source: Photographer unknown. Own work assumed (based on copyright claims), CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=2168592>



Figure 20. Estación de Barcelona-Sants

Source: By morrocoyalador – Own work, CC BY-SA 4.0, <https://commons.wikimedia.org/w/index.php?curid=83372800>



Figure 21. Barcelona Estación de França

Source: Fototrenes - Flickr, CC BY-SA 2.0,

<https://commons.wikimedia.org/w/index.php?curid=2266152>



Estación de Barcelona-La Sagrera construction site

Source: Javierito92 - Own work, CC BY-SA 3.0,

<https://commons.wikimedia.org/w/index.php?curid=22945795>



Figure 23. Estación de Zaragoza-Delicias

Source: Zarateman - Own work, CC0,

<https://commons.wikimedia.org/w/index.php?curid=8099913>



Figure 24. Estación de Madrid-Atocha

Source: Gryffindor, CC BY-SA 3.0,

<https://commons.wikimedia.org/w/index.php?curid=5384006>



Figure 25. Madrid Príncipe Pío

Source: Hugh Llewelyn – Príncipe Pío metro lines Uploaded by Oxyman, CC BY-SA 2.0, <https://commons.wikimedia.org/w/index.php?curid=24389897>



Figure 26. Estación de Madrid-Chamartín-Clara Campoamor

Source: Zarateman - Own work, CCO
<https://commons.wikimedia.org/w/index.php?curid=39401876>

There is a lot we learned from these two European countries that are world leaders in HSR. Having actually experienced these rail networks and stations as travelers, combined with thorough site tours and seminars, our long list of rich insights can be summarized into eight primary takeaways:

- Lesson 1.** High-speed rail is simply a better mode of travel for many trips and for many reasons.
- Lesson 2.** Great stations facilitate mobility across multiple geographic scales—from local and regional, to statewide, national, and even global.
- Lesson 3.** People-centric stations do more than simply move people; they also shape the neighborhoods and broader urban areas around them.
- Lesson 4.** Great stations aren't just places to board trains. They are destinations in and of themselves.
- Lesson 5.** Building with the future in mind is essential. When planning a station, you should start with the least flexible elements first—tracks, platforms, and of course the location of the station itself.
- Lesson 6.** The presence of strong national actors leads to better station management and a more unified passenger experience.
- Lesson 7.** Spain and France build transportation megaprojects faster and cheaper than the U.S.
- Lesson 8.** Mega-project outreach efforts should foster trust, showcase confidence and competence, and excite the general public.

I.4 Why do this trip? What can we in the U.S. learn from France and Spain?

In the early 1900s, the United States was widely regarded as a global superpower in passenger rail. By 1916, it operated the world's most extensive rail network, spanning more than 254,000 miles and linking virtually every major city and small town. Rail dominated intercity travel, carrying 98 percent of all long-distance passengers. But as automobile ownership surged after World War II, rail rapidly ceded ground to highways. Service quality declined, routes were cut, and much of the once-robust network deteriorated.

Passenger rail has a long way to go before it once again becomes a preferred mode of travel in the U.S. Today, American rail service is largely uncompetitive and often treated as a novelty. Outside of the Northeast Corridor, Amtrak's premier offerings are its few long-distance scenic routes like the California Zephyr, Empire Builder, and Coast Starlight. While these provide breathtaking views, frequencies are limited to a single train per day per direction. This makes rail a "bucket list" leisure experience rather than a viable transit option, feasible only when punctuality is not a priority.

In recent years, however, there has been a noticeable surge in demand for passenger rail. Amtrak set consecutive ridership records in 2024 and 2025, while simultaneously launching several new state-supported services. With ambitious plans to [double network ridership by 2040](#), initiatives like the [Corridor Identification and Development Program](#) and [Amtrak](#)

[Connects US](#) have put forward bold visions for the national network. These programs represent a significant shift toward a more expansive and frequent rail future.

Plans from private entities show great promise as well. In Florida, the private venture Brightline began operating its "higher-speed" service—with top speeds of 125 mph—between Miami and West Palm Beach in 2018, fully extending the line to Orlando in 2023. The service attracted [impressive ridership](#) almost immediately—a feat many skeptics considered nearly impossible in a sprawling, auto-oriented state. Brightline West, an affiliate company, is currently building the 220-mile Los Angeles–Las Vegas corridor. This project has faced its own set of challenges, but construction continues to push along.

Several other HSR initiatives promising faster, more reliable service are either under construction or under active consideration. In the West, California High-Speed Rail—which aims to eventually connect Los Angeles and San Francisco—continues to make steady construction progress despite high-profile delays. In the Midwest, the [Illinois High-Speed Rail Commission](#)'s initiative to build a dedicated line between Chicago and St. Louis is gaining significant momentum. Other vital corridors, including Portland–Vancouver, BC, and Dallas–Houston, remain under serious proposal.

All of these projects align with the "missing middle" logic of high-speed rail: they connect large metropolitan areas situated 100 to 500 miles apart—a distance range perfectly suited for rail to outperform both cars and planes. While these projects are in varying phases of development and have each faced unique struggles, their collective progress demonstrates that a future defined by robust, competitive passenger rail in the U.S. is possible.

The cultural and economic peak of many American central cities coincided with the "Golden Age" of rail in the early 20th century, just as their subsequent decline mirrored the post-WWII erosion of passenger service. By contrast, the vibrant urban cores of the European cities that we visited continue to grow in prominence, anchored by their main stations. As we seek to revitalize hollowed-out American downtowns, we wanted to understand the role that stations play as civic gateways and explore leveraging existing assets.

Our journey through France and Spain was a mission to understand how the United States can successfully deliver better passenger rail. We examined a broad spectrum of drivers, from station design and placemaking to governance, operations, and project delivery. We recognize that the U.S. rail sector could benefit from an infusion of ideas from nations with decades of expertise.

Beyond technical delivery, the trip allowed us to address a fundamental question often lost in the noise of megaprojects: Why invest in passenger rail and HSR in the first place? Scholars Bent Flyvbjerg and Dan Gardner urge decision-makers to interrogate the underlying purpose of an investment before focusing on its execution. In the U.S., HSR is too often pursued as an end in itself—something to build—rather than a means to achieve broader societal and economic goals.

Experiencing modern European infrastructure firsthand made the answer clear: high-quality rail transforms the daily lives of citizens and enhances the health of the cities it serves. While

enjoying these benefits abroad is easy, delivering them at home is a profound challenge. By closely examining French and Spanish practices, we have distilled eight key lessons to guide the future of U.S. rail systems and the regions they support.

1. Lesson 1: High-speed rail is simply a better mode of travel for many trips and for many reasons

High-speed rail (HSR) does more than move people faster; it unlocks a level of convenience and comfort that transforms the travel experience. While these benefits may seem obvious to seasoned riders, they were eye-opening for our group, most of whom were experiencing HSR for the first time. Our journey sparked constant comparison between the seamless nature of European rail and the familiar frictions of American car and air travel. Moving at speeds up to 200 mph while working at a table, walking to a café car, or simply watching the landscape pass without the stress of traffic or airport security changed our baseline for what "convenient" travel looks like. It became clear that HSR is not merely a faster version of a traditional train, but a distinct mode that competes with the efficiency of flying and the door-to-door flexibility of driving.

1.1 Learning from leading European nations in high-speed rail

France and Spain have developed extensive high-speed rail networks designed to connect prominent cities in located at optimal distances for high-speed train travel. Both nations are characterized by strong central governments and the economic, political, and cultural preeminence of their national capitals. Consequently, their HSR networks prioritize rapid travel between the capital and secondary cities, with lines radiating outward in a "star-shaped" or radial pattern from Paris and Madrid.

1.1.1 France's *Train à Grande Vitesse* (TGV): Europe's busiest high-speed rail network

France was the first country in Europe to develop HSR when it opened the Paris–Lyon corridor in 1981, which is still the busiest line in Europe today.

France's [1,740-mile \(2,800 km\)](#) high-speed network is among the most heavily utilized in the world, [carrying 130 million passengers in 2024](#) alone. As SNCF continues to modernize and expand its network, high-speed rail is no longer just a premium alternative to traditional trains, but the backbone of the country's intercity transportation system.

1.1.2 The *Alta Velocidad Española* (AVE): Europe's largest and the world's second-largest high-speed rail network

Spain was a relative latecomer to HSR service in Europe, beginning with a starter line between Madrid and Seville that opened in April 1992. This first line served as a successful proof-of-concept, which helped build political and public support for building out a national HSR network. Once the line was operational and people saw the benefit of this transportation technology, Spain mobilized to develop the largest HSR network in terms of track mileage in Europe over a short 20-year period.

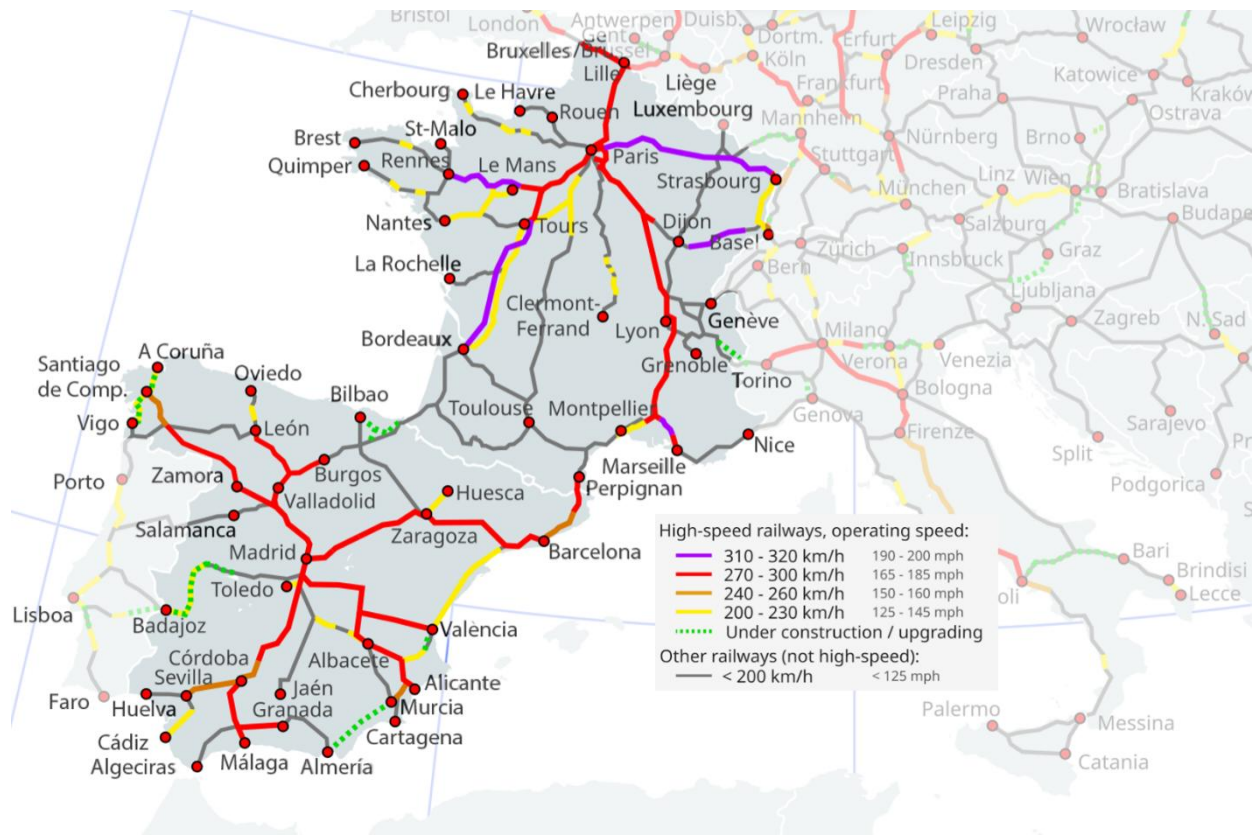


Figure 27. HSR in France and Spain.

Source: Graphic by Eric Eidlin, adapted from *Operational High-Speed Lines in Europe*, updated June 2025, by Bernese Media, [Wikimedia Commons](#)

Spain boasts the longest high-speed rail network in Europe and the second-longest in the world, featuring the highest track mileage per capita of any nation. However, its system is currently used less intensively than France's. In 2024, Spain carried about 40 million HSR passengers—nearly 100 million fewer than the French system. On a per-mile basis, France carries roughly 74,700 passengers, while Spain carries about 15,800—approximately 20% of France's utilization. Despite this current gap, Spain's growth trajectory is remarkable. Ridership surged by 22 percent in 2024, vastly outpacing France's four percent. Driven by continued network expansion and the second phase of rail market liberalization launched in October 2024, Spain's ridership is projected to continue its steep ascent.

1.2 The ideal travel distance for high-speed rail is between 100 and 500 miles, with the sweet spot at around 300 miles

High-speed rail (HSR) finds its greatest competitive advantage in the 100-to-500-mile range, with the "sweet spot" at approximately 300 miles. While cars and conventional rail efficiently serve trips under 100 miles, and air travel dominates distances over 500, HSR thrives in the corridor between them.

To be effective, HSR requires direct, dedicated rights-of-way that allow trains to maintain sustained speeds of at least 150 mph. This is the threshold necessary to meaningfully outperform the interstate system. At a distance of 300 miles, HSR is not only faster than driving

but significantly more convenient—provided service is frequent, ideally arriving every 30 to 60 minutes. Unlike the high-stress environment of highway driving, rail allows travelers to work, dine, or rest while moving at twice the speed of traffic.

Simultaneously, these medium-distance trips are too short to justify the "friction" of air travel. Once commuters factor in travel to peripheral airports, security checkpoints, gate wait times, and taxiing, the speed advantage of a 500-mph aircraft largely disappears. For journeys under 500 miles, HSR offers a seamless, city-center-to-city-center experience that air travel simply cannot match.

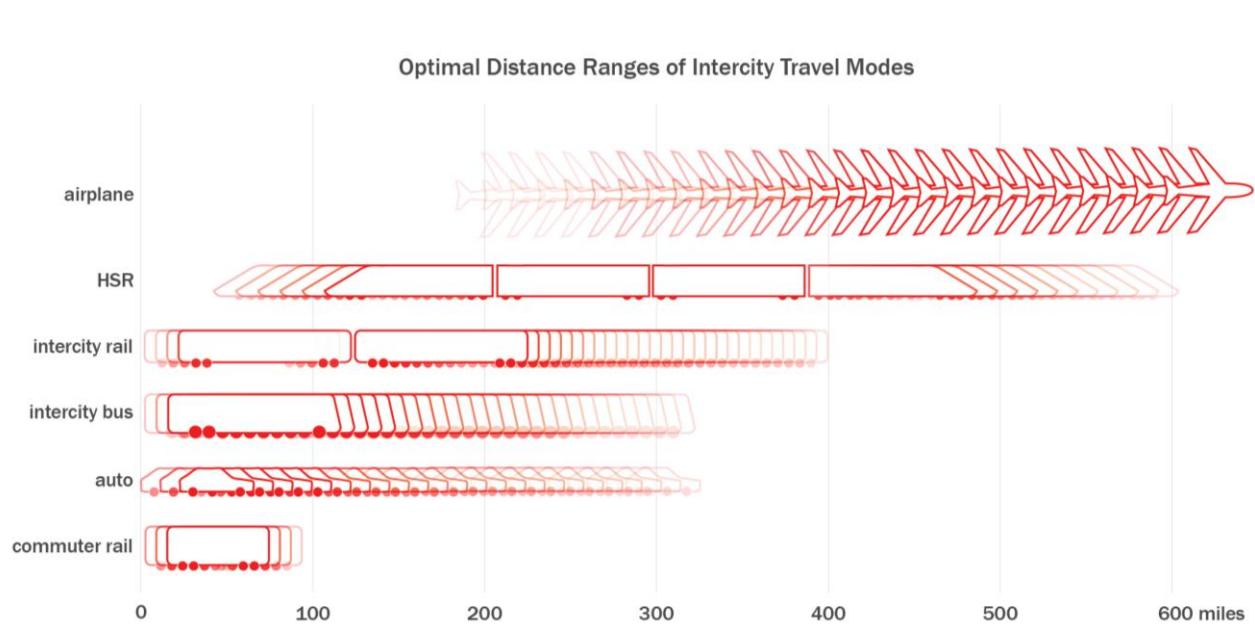


Figure 28. *The optimal distance ranges of intercity travel modes.*

Source: Graphic by Eric Eidlin. (Originally published in "Making the Most of HSR in California: Lessons from France and Germany," German Marshall Fund Report, June 2015)

1.3 City center-to-city center travel time versus first-mile/last-mile access time

The first- and last-mile travel to and from a train station, airport, or highway plays a major role in total travel time, especially for trips in the 100-to-500-mile range. Main rail stations are typically centrally located within cities, giving them a clear advantage in city center-to-city center travel compared with air travel, as location is a key part of convenience.

Rail stations are often located in dense urban areas within or adjacent to city centers, downtowns, or central business districts. This positioning brings stations closer to travelers' true origins and destinations, reducing time spent accessing the system. Dense urban neighborhoods also offer a wide range of amenities within walking distance, including hotels, offices, landmarks, shopping, and entertainment. For destinations beyond walking range, central locations typically provide strong connections to local transit networks. Major stations are usually

served by multiple rail and bus lines, giving travelers a broad set of options for reaching destinations across the city outside of central cores.

While rail infrastructure requires substantial space, the amount of space needed per passenger is far less than for air or car travel. Rail is uniquely capable of moving hundreds of people directly into the heart of a city. With careful and creative design, rail stations are among the most space-efficient ways to bring large numbers of people into urban centers—a reality we experienced firsthand during our European trip and one evident in many of the United States' largest cities.

By contrast, aircraft require extensive space for takeoff and landing, so airports occupy large sites well outside city centers—often several miles away, and sometimes even farther for residents on the opposite side of the city. As a result, airports are less integrated with the surrounding urban fabric, making trips to and from them more time-consuming and less convenient. Airports rarely have meaningful activity within walking distance and are typically less connected to local transit networks, often functioning as the terminus of metro lines. This limits onward travel options compared with centrally located rail stations.

Rail travel facilitates a more integrated relationship between travel and daily life by offering proximity, convenience, and direct access to everything a city has to offer. As a result, rail supports a wide range of trip types—commuting, work-related travel, leisure, and everyday errands—allowing travel to occur seamlessly alongside daily activities. By contrast, air travel is largely centered on the act of traveling itself, often requiring travelers to structure entire trips around the journey. We explore how French and Spanish stations exemplify and maximize these advantages and their contributions to urban activity and everyday life in greater detail in Lessons #3 and #4.



Figure 29. Locations of main rail stations and airports in Paris and Lyon. The black and red lines indicate mainlines railways, and the yellow zone on the Paris map indicates the city center, which is served by all seven of Paris's main line rail terminuses. All the rail lines converge into the cores of the city and metropolitan area at the main stations, while the airports are often located far away from them.
Source: Creator unknown, accessed via seat61.com (both images)

In France and Spain, as well as other nations like Germany and Japan, this idea is further enhanced. In these countries, high-speed rail routes also connect chains of intermediate cities, allowing direct city-to-city travel between mid-sized cities without long drives or airport transfers. This multiplies convenience across entire regions rather than concentrating it in a few major metropolitan areas.

Also, as we discuss in more detail in Lesson #2, Spain's two largest cities have made strategic investments to make high-speed rail more convenient for first- and last-mile travel. By connecting their major stations with rail tunnels, trains can pass through and serve multiple central locations instead of just stopping at a single terminal.

France's short-haul flight ban: A pragmatic approach to cleaner, greener travel

In 2023, France [implemented a law banning certain short-haul domestic flights](#) on routes where several adequate direct high-speed rail alternatives of two and a half hours or less exist. The goal is to reduce carbon emissions and encourage travelers to choose rail instead of air travel. Another provision of the law is that the train journey must allow for adequate same-day roundtrips, stating that a person traveling to a city for a day trip must reasonably be able to spend a minimum of 8 hours at the destination before heading back to the origin city.

So far, only three air travel routes to and from Paris-Orly Airport have been affected: Bordeaux, Lyon, and Nantes. Going forward, an additional three routes may be included: Lyon and Rennes between Paris Charles-de-Gaulle Airport, as well as Lyon and Marseille. All these city pairs are within the ideal distance range of high-speed rail between 100 and 500 miles and are long well-established corridors in the TGV network that are served by fast and frequent trains.

Table 3. French Short-Haul Flight Corridor Travel Times by Air and Rail

Corridor	Distance	Flight time	Non-stop HSR Travel time
Paris–Bordeaux	362 miles (584 km)	1h20m	2h
Paris–Lyon	290 miles (466 km)	1h15m	2h
Paris–Nantes	239 miles (385 km)	1h5m	2h
Paris–Rennes	220 miles (354 km)	1h5m	1h25m
Lyon–Marseille	194 miles (313 km)	55m	1h40m

Many rail travel times that are longer include one or more stops along the route. The runtime for HSR reflected above is based on non-stop travel times only.

While many of these flight times are less than half the equivalent rail trip, it's important to remember that they reflect only **flight time**—the time from when a plane pushes back from the gate at the origin airport to when it arrives at the gate at its destination. They do not account for the other time-consuming parts of air travel discussed earlier: getting to and from the airport, clearing security, waiting to board, boarding, deplaning, and baggage claim with some trips.

Air travel involves far more variability and risk of delay than rail travel. Not with the flight itself, but across every stage of the journey outside the airplane—traffic getting to and from the airport if one is traveling by car, the length of the security line, etc. But even when everything goes according to plan, these additional steps can add significant time.

Meanwhile, Spain's government has agreed to adopt a similar policy as part of its climate action plan, aiming to restrict flights where fast rail options under 2½ hours are available, with exceptions for international connections at hub airports; like France, critics argue [the actual number of banned flights may be limited](#) once those exceptions are applied.

The primary intention of these regulations is to promote more climate-friendly travel. By incentivizing train travel, however, they offer an additional benefit: encouraging people who might otherwise choose to fly to experience rail travel instead. Looking beyond the intended climate impacts, the regulation creates an opportunity for travelers to discover the advantages of train travel—higher travel quality, lower stress, greater comfort, and the ability to make productive use of travel time.

1.4 The train travel experience: More comfortable and pleasant than other modes

High-speed rail, and most intercity train travel, can be a more comfortable and less taxing travel experience and come without the time-consuming and unpleasant parts of air and car travel.

Unless you are riding in a limousine or flying first class, trains offer more spacious seating and wider aisles between seats. On one train ride, a group member took advantage of the freedom to move about the train, spending much of the trip walking through the cars to explore and stretch her legs. This would obviously not be possible in a car. And while technically possible in the short economy cabin of a plane, the narrow aisles and jostling may make the stroll more difficult... and it would almost be guaranteed to generate some side-eye from fellow passengers if you were to do it!

During the longer journey from Lyon to Barcelona, the higher quality of the rail travel experience became clear. Our group moved freely between assigned seats and the café car, a level of freedom and flexibility that made the multi-hour trip far more comfortable and enjoyable than a cramped flight. One member of our group sat near a team of passengers who were preparing for a meeting, sharing a table and a laptop over espressos. No time was wasted in travel for these folks.

1.4.1 Amenities: Already on board and more choices

It is also worth noting that the café cars on our trains offered multiple high-quality food and drink options. On every journey, passengers could choose from a range of meals, snacks, and beverages—including alcohol, since no one was driving.

On planes, proper meals are typically only an option on long international flights or in first class; on shorter flights, sometimes water and snacks aren't even served. On road trips, while there may be a variety of food options available along the route, you need to stop to get them. This means adding to the total trip time, especially if you sit down to eat. Conventional trains have café cars as well, and this is actually an area where [Amtrak does quite well in the eyes of frequent U.S. rail travelers](#). But combined with their speed and reliability, high-speed trains elevate the advantages of these amenities to create a compelling package that car and air travel simply can't match.



Figure 30. Menu offerings aboard French Railway trains (left) and Amtrak (right).

Sources: French: snCF-voyageurs.com; Amtrak: amtrak.com

1.4.2 Better use of time: Choose whether to be productive or to recharge

Compared to the constraints of a car or plane, high-speed rail allows passengers to travel with far greater comfort and productivity. A 300-mile journey that typically requires a five-hour drive, or the multi-step exhaustion of air travel, can be completed in three hours or less. More importantly, this time is not "lost" to the commute; because it is easy to work, study, or rest while en route; passengers can stay productive or catch up on sleep while traveling at nearly 200 mph.

Trains often provide fast, reliable Wi-Fi and larger tray tables than economy-class planes, enabling passengers to work more comfortably. Also, unlike flights, there are no takeoff or landing restrictions. From the moment someone boards and sits down in their seat to the moment they arrive at their destination and get off the train, tablets and laptops can be used freely, just as at home or in the office. On short-haul flights especially, there is a considerable amount of time in which one is aboard the plane and cannot use their devices.

Because train travel can be highly productive, passengers can maximize their time at both their origin and destination. Work or study tasks that might otherwise cut into sightseeing, meetings, or rest can be done in transit. Our group took full advantage of this when working on the trip's main recap assignment: project teams met and collaborated on brainstorming and sharing notes from our meetings and site tours aboard the train, leaving more time for exploration during our brief time in each city.

The time spent on these trains is also an opportunity to comfortably recharge. If riding in a car, an individual is likely driving, unless they are a passenger. With air travel, with all the steps involved and cramped seating arrangements outside of first class, it can be far less restful. Members of our group also put this into practice on our journeys between cities when running on tight, fast-paced schedules: Those who were tired rested their eyes, arriving refreshed and ready to go when we arrived at our next destination.

HSR allowed us to integrate work and rest into our travel time, making the most of the limited hours in each city we visited.

1.4.3 Convenient schedules and proximity

A high-quality HSR network is about more than just physical speed; it must provide a level of convenience that makes rail the superior choice over driving or flying. While a train traveling at 180+ mph is impressive, its speed advantage is largely negated if it only runs every few hours. Without scheduling flexibility, the time saved in transit is often lost to the wait. By contrast, many travelers prefer cars because they perceive driving as an "on-demand" convenience—the freedom to depart at will. Even if drivers ignore the unpredictability of traffic or fuel stops, that sense of autonomy is a powerful competitor. To succeed, an HSR network must match this "freedom" by providing frequent, all-day service. When trains depart every 30 to 60 minutes, rail shifts from a scheduled event to a reliable utility, offering the true flexibility required to win over the American driver.

Along the corridors we traveled, high-speed trains departed every 30 to 60 minutes from 6:00 a.m. to 9:00 p.m. This high frequency transforms the user experience by aligning rail travel with personal schedules rather than forcing travelers to plan their day around a rigid timetable.

Consider a typical Friday getaway: if a traveler is delayed at work and misses a 3:10 p.m. departure, the loss is negligible if the next train arrives at 3:45 or 4:00 p.m. However, if the next available service isn't until 6:00 p.m., the mode loses its competitive edge. Frequent service eliminates the "penalty" of a missed connection, providing the same sense of autonomy and peace of mind traditionally associated with car travel.

Table 4. Service Frequency on the Busiest French and Spanish HSR Corridors

Corridor	Round trips per day	Time of first train	Time of last train	Trains per hour	Operators
Paris–Lyon	~40	6:20 a.m.	8:59 p.m.	2-3	SNCF, Trenitalia
Paris–Strasbourg	~20	6:54 a.m.	8:25 p.m.	1.5	SNCF
Barcelona–Madrid	~40	5:40 a.m.	9-9:30 p.m.	2-3	OUIGO Spain, Avlo, AVE and IRYO

Sources: [SNCF Connect \(Paris to Lyon timetables\)](#), [Trenitalia \(Paris–Lyon timetables\)](#), [SNCF Connect \(Paris to Strasbourg timetables\)](#)

1.4.4 Reliability

High-speed trains—like other electrified passenger trains running on dedicated passenger rail tracks—are typically more reliable than cars and airplanes because they operate in their own travel corridors with fewer sources of delay. Trains are not subject to roadway congestion, and they are less affected by weather conditions that disrupt driving or flying. This gives passengers a level of predictability in travel time that is difficult for other modes to match.

High-speed rail also avoids the unpredictability of the air travel experience. Flying requires travelers to build in two to three hours for travel to an outlying airport, check-in, baggage drop, security screening, and potential delays at the gate or tarmac. By contrast, HSR passengers typically require only a brief arrival window—often about 10–20 minutes before departure. Even in stations with security checks—such as in Barcelona, as we discuss later in this report—arriving at the station 30 minutes before departure is usually more than adequate to find your train, store your bags, and take your seat.¹

Operational practices play a key role in reinforcing this reliability. France’s TGV, for example, achieves roughly 95% on-time performance, largely because high-speed trains operate on dedicated or minimally shared rights-of-way. By separating high-speed services from slower regional and freight trains, the system avoids many of the delays common on mixed-use corridors—issues that are particularly pronounced in the United States, where passenger trains often operate on tracks owned by freight railroads and must yield to their trains, which are given priority at traffic bottlenecks. This network architecture not only delivers reliable service for HSR passengers, but also improves overall rail performance by reducing conflicts and preventing cascading delays across the system.

Taken together, these factors—frequency, flexibility, central station access, direct city-to-city service, and productive travel time—are core elements of a true HSR network. The hallmark of such a network is fast, reliable intercity travel departing every 30–60 minutes, all day long. In

¹ Unlike airports, most European rail stations do not have routine security checks because of the lower perceived risk, the high daily volume of passengers, and the operational challenges of screening in open, urban stations. Rail travel relies on ticketed access, reserved seating on high-speed trains, and police presence or randomized inspections to maintain security. In contrast, airports handle concentrated, high-stakes travel where catastrophic incidents are more likely, making full security screening both necessary and socially accepted. Exceptions exist, such as in Spain, where some high-speed services require security checks following past attacks.

short, the success of HSR comes from both the physical characteristics of the mode and how the networks are designed and operated—they provide dedicated infrastructure, immunity from traffic, weather resilience, simplified station processes, and predictable travel time.

1.5 What can be done in a day?

Our group did two day trips as part of our overall study trip. One was to Strasbourg during our time in Paris, as part of an out-and-back day trip from Paris. The other was Zaragoza, which we visited as a mid-point six-hour stopover on our way from Barcelona to Madrid.

It is hard to imagine accomplishing everything we did on these two days by car or airplane, as either mode would have taken much longer and been far more taxing. Our trips clearly demonstrate why HSR is the ideal mode for interregional travel of 100–500 miles—it allowed us to cover more ground, board closer to our starting points, and disembark nearer to our final destinations. In this way, it enabled us to make the most of each day with greater comfort and less stress.

1.5.1 Speeding to Strasbourg

We traveled between Paris and Strasbourg on the TGV network's fastest line: *LGV Est*, which reaches top speeds of 320km/h (200 mph). The train trip is a comfortable 1h45m journey going one way, compared to a slog of five hours or more on the road.

Unlike many flights or road trips, we didn't have to wake up at the crack of dawn to reach the station. Our train departed Paris around 10:30 a.m., and we arrived in Strasbourg just after noon. In six hours, we crammed in a site study of Gare de Strausbourg-Ville, walking around the historic city center, and a tour of an old industrial site outside the city center right on the German border that is being redeveloped into a burgeoning live-work district. Thanks to Strasbourg's fast and frequent tram system, we were back at the station by 6 p.m., giving participants who wished to explore the station area further extra time before our return train to Paris, which departed around 6:45 p.m. We arrived back in Paris a little after 8 p.m., early enough for some members to go out to dinner and experience the streets alive with celebration after Paris beat Inter Milan in the Champions League Final—the European soccer equivalent of the Super Bowl. It was exciting to witness this significant cultural moment as visitors.



Figure 31. Top: Two maps comparing the travel route and times between Paris and Strasbourg by HSR and car. Bottom: The timeline of the study group's day trip to Strasbourg.

Sources: Graphics by Eric Eidlin – Base map: Google Maps; Strasbourg Station photo: David Illiff

It's for trips like these that HSR handily out-competes the car. If we had left Paris at the same time by car, we would have arrived in Strasbourg in the late afternoon at approximately 4 p.m. By that late in the afternoon, we had already explored much of the city and were getting ready

to head back to the station for our return train trip to Paris. HSR speeds up, simplifies, and allows people to get more out of their travel days when taking regional trips.

Imagine being a resident of Paris on a business trip to Strasbourg: you could have completed your workday, returned to Paris, and still joined the evening celebrations with family, friends, and fellow soccer-crazed Parisians. HSR makes this possible—it turns what might have been a long, tiring day into one where you can do more, experience more, and truly get the most out of every moment.

1.5.2 Spain's Central Corridor: 3 cities in 13 hours

The Madrid–Zaragoza–Barcelona corridor opened in 2008 and chopped the total trip time by rail from 6h down to around 2h45m. Renfe also makes this service very convenient by running about 40 daily roundtrips on the corridor between 6 a.m. to 9 p.m. This day felt a bit different from our trip to Strasbourg, as we were traveling with luggage and needed to allow extra time for security checks—now a part of intercity rail travel in Spain following the 2004 Madrid commuter train attacks, which killed nearly 200 people and fundamentally reshaped the country's approach to rail security.

Even with the security checkpoint, we arrived at Barcelona's main station, Barcelona-Sants, about 45 minutes before our 9 a.m. departure—still far less buffer time than many people feel they need with airport security. We reached Zaragoza-Delicias around 11 a.m., where lifelong Spanish rail executives Iñaki Barrón de Angoitia and Ma Teresa Escolano met us and gave us a tour of the station. We then spent a few hours in the city center where we enjoyed a traditional Aragonese lunch, then explored the Roman ruins and the old Zaragoza Cathedral before returning to the station for our 6 p.m. train. Our 7:30 p.m. arrival in Madrid left time for a relaxing evening walk and a 9 p.m. dinner near our hotel.

This multi-leg trip is a great example of HSR enabling an extremely productive day in multiple cities. Our experience showed that inter-regional travel corridors are not limited to just two cities. Slightly longer corridors like this connect two major cities through a smaller city in between, opening up more possibilities for people living or visiting any of the three.

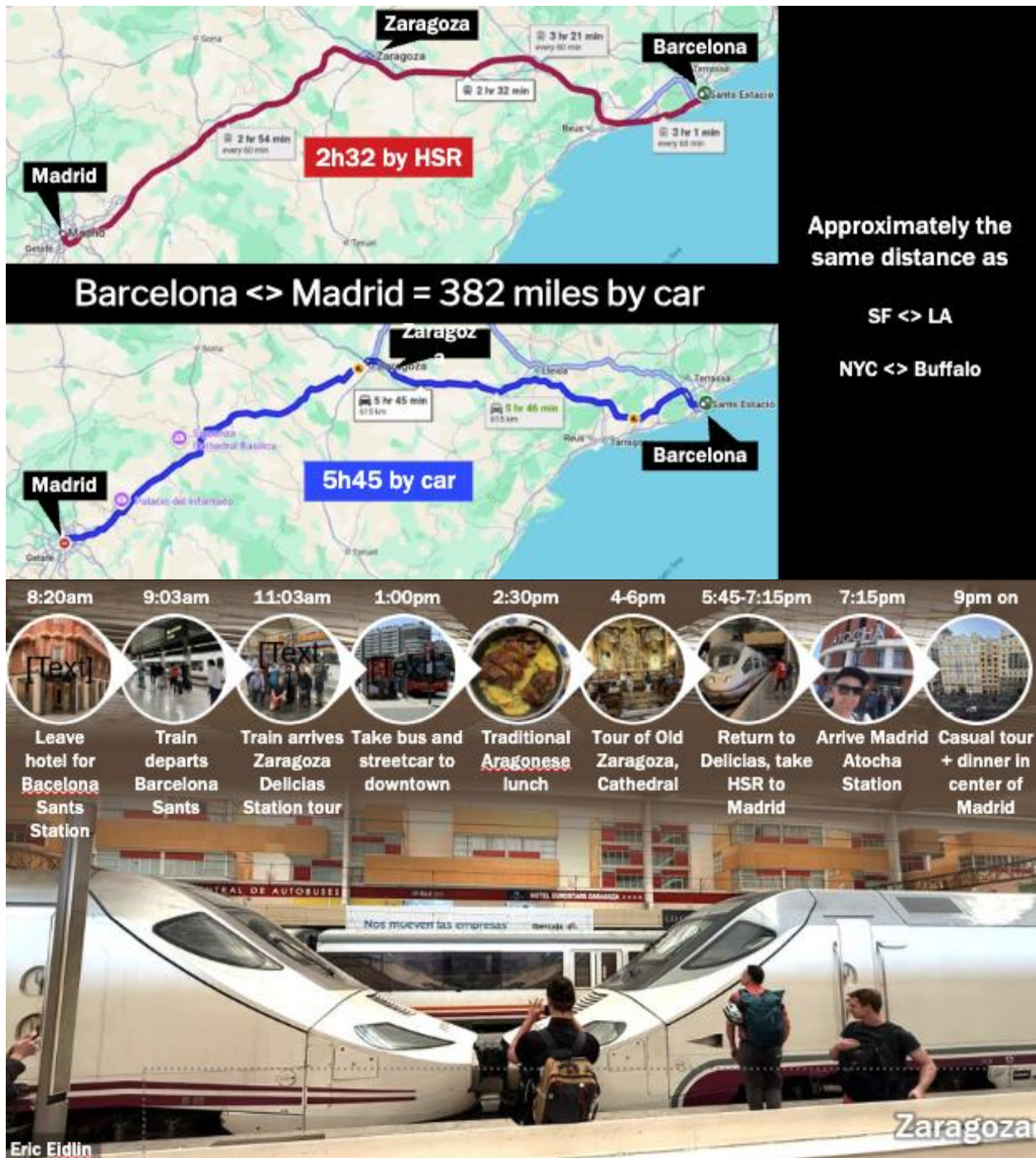


Figure 32. Top: Graphic top comparing travel time between Barcelona and Madrid by high-speed train and car. Bottom: The study group's timeline of the day trip on the Barcelona–Zaragoza–Madrid corridor.

Sources: Graphics by Eric Eidlin – Top: Base map: Google Maps; Zaragoza-Delicias Station photo: Eric Eidlin

1.5.3 When high-speed rail makes the trip possible: the power of the one-day trip

HSR doesn't only benefit visitors like us who are trying to pack as much as possible into a short European trip. It also enables a wide range of everyday trips for people who live in these regions and can rely on it as a practical, time-saving travel option.

In-Person Business Meetings: Fast and frequent rail travel makes it possible to attend meetings in cities one to three hours away without staying overnight. Travelers can save on hotel costs, sleep in their own bed, spend the evening with family, and avoid missing commitments at home. In many cases, tight schedules simply do not allow for overnight trips. As noted earlier, the ability to work or rest while traveling also makes the journey itself.

Access to Specialized Services and Retail: HSR enables residents of less populated regions to reach specialized medical care, professional services, and niche retail offerings only available in larger urban centers. This is particularly valuable in the era of online shopping, which has made it increasingly difficult for smaller cities to sustain specialized stores.

Quick Family Visits: HSR makes it feasible for students or professionals living one to three hours away to make short, spontaneous trips home. For example, a traveler could visit family for a Sunday holiday, spend the afternoon together, and return home in time for a full night's sleep. Because the journey itself allows for productive study or work, they can jump right back into their routine on Monday morning without having "lost" the weekend to transit.

Attending Sporting, Cultural, and Social Events: Whether it's a rival team playing nearby, a popular artist on tour, or a local festival or convention, HSR allows people to make a day trip out of these events. Passengers traveling in groups can also enjoy the journey itself socializing at a four-seat table—with a selection of snacks and beverages too—before and after the event.



Figure 33. Travelers on the train to Strasbourg in a work meeting.

Source: Leah Greenblat

“For years, scholars have debated what high-speed rail ultimately means for smaller and mid-sized cities. Much of this literature emphasizes that improved accessibility cuts both ways: while high-speed rail makes it easier to reach these cities, it also makes it easier to leave them.

Whatever the case, in Spain—as in much of Europe—high-speed rail has reshaped daily life for residents of smaller urban areas by expanding their access to services and amenities their home cities could never fully support on their own. A specialist medical appointment, a rare professional service, or a visit to a store carrying hard-to-find goods no longer requires an overnight stay or a complicated journey. Instead, trips to major cities such as Madrid or Barcelona can be made comfortably within a single day—and just as easily reversed.

This shift is especially visible in retail. As online shopping has eroded the viability of specialized stores in smaller cities, the value of seeing, touching, or trying a product in person has not disappeared. High-speed rail has stepped in to fill this gap, allowing residents to access the depth and variety of retail offerings at brick-and-mortar stores in larger urban markets while maintaining strong ties to their home communities. In this way, high-speed rail does not simply connect cities—it subtly rebalances the relationship between them.”

— Dr. Inmaculada Mohino

1.5.4 High-speed rail for commuting?

As we learned during our trip, HSR is highly capital-intensive, requiring substantial investments in time, funding, right-of-way, and materials. Given these costs and impacts, HSR works best when corridors are selected carefully and can support strong ridership. For this reason, most projects initially focus on passengers who are willing to pay higher fares, such as business and leisure travelers. These passengers help justify the upfront investment and cover operating costs. Over time, expanding service to more price-sensitive riders, including commuters, can help diversify ridership, fill trains, and build demand between cities—including intermediate, mid-sized communities.

While we were in Europe, trip participant Matt Miller, Director of Mobility Transformation at Ecology Action, observed that by allowing people to cover greater distances more quickly and comfortably, HSR allows people to “expand their commute sheds.”

“HSR’s speed and ease of use challenges the negative U.S. notion of the ‘super commuter.’ If you can live in one place and work hundreds of kilometers away... but can still make that journey via zero-emission, fast, and reasonably affordable HSR, then HSR can support a bigger commute shed. This can allow for different housing and settlement patterns, including more rural or small-town living... while at the same time allowing access to all of the amenities, resources, and opportunities that big metropolitan areas have to offer. Thinking about how this applies to California, people could live in more affordable communities in the Central Valley while accessing high-paying jobs in the Bay Area without sitting in two hours of traffic on the freeway... and since they would be traveling by clean electrified HSR service, they wouldn’t need to feel guilty about the negative environmental impacts of traveling these long distances ...” — Matt Miller

As Matt mentioned, there are environmental considerations to this as well. Constructing the viaducts, rail lines, and catenary wires required for high-speed service inevitably includes significant environmental impacts. Once built, however, carrying passengers over long distances on clean, electrified high-speed trains consumes relatively little energy and produces minimal additional environmental impact, assuming that energy is derived from clean sources. If commuters who would otherwise use carbon-emitting vehicles can be persuaded to switch to trains, the environmental benefits can be substantial.

HSR can make our cities and regions more accessible

High-speed rail (HSR) effectively shrinks regional distances, unlocking new possibilities for daily life. However, this connectivity requires proactive local planning to succeed. Without parallel investments in housing supply, improved accessibility can drive up costs and displace residents. Similarly, if HSR is not paired with walkable urban design and robust local transit, car dependence will persist for the “last mile” of most trips. Realizing HSR’s full potential depends on coordinated land-use and mobility strategies that ensure connected communities become more livable and equitable—rather than simply more expensive or auto-oriented.

2. Lesson 2: Great stations facilitate mobility across multiple geographic scales—from local and regional, to statewide, national, and even global

The reason why train stations exist in the first place is to accommodate passenger rail services that connect people to destinations farther away. In addition to serving as transfer points from intercity trains to regional or urban rail, or to intercity bus service to smaller towns close by, they also serve as the front doors of cities and as safe connectors for people on foot moving between neighborhoods who would otherwise be divided by train tracks.

In this section, we profile some of the central city stations we passed through that achieve the broad range of objectives noted above. These stations come in many different shapes, sizes, styles, and layouts. We saw stations over a hundred years old that have evolved over time, others built in recent decades undergoing far-reaching renovations, and one being built from scratch. Despite these differences, all were designed for modern travel and a future of efficient and comfortable mobility for the cities they serve.

Global connections: Paris Charles de Gaulle Airport Station—where global air travel meets world-class high-speed rail

Paris Charles-de-Gaulle (CDG) is one of the [top 15 busiest airports globally](#). But CDG Airport facilitates more than just air travel to and from Paris. It is a global air *and* rail hub where travelers from all over the world are connected to all the rail and public transportation services that converge in the French national capital. The Paris CDG high-speed station accommodates almost [50,000 daily passengers](#) and is served by 320 trains daily.

With services to cities all over the country, travelers flying into CDG Airport don't have to change to a different flight if their destination is another French city. The CDG high-speed station is situated on the *LGV Interconnexion Est*, which is a connection point for several of France's main HSR corridors and allows air travelers to reach other major cities with a simple transfer to a train right inside the airport terminal. Bordeaux, Marseille, Montpellier, Nantes, Lillie, and Lyon are all reachable by HSR from CDG, the complete list includes many other cities and even Brussels, Belgium, as well.

For those traveling directly to or from the Paris city center, the Réseau Express Régional (RER) provides fast, frequent electrified rail service with a travel time of approximately 30 minutes. When service is this reliable, the "penalty" for missing a train is virtually nonexistent. Our group experienced this firsthand: after a miscommunication caused half of our party to miss the initial departure, they simply boarded the next train—an express service—and actually arrived at CDG ahead of the first group. This level of frequency removes the anxiety of transit and ensures that the airport remains seamlessly connected to the urban core.



Figure 34. A train pulls into Charles-de-Gaulle Terminal 2 TGV station.

Source: Claude Shoshany - Own work, CC BY-SA 3.0

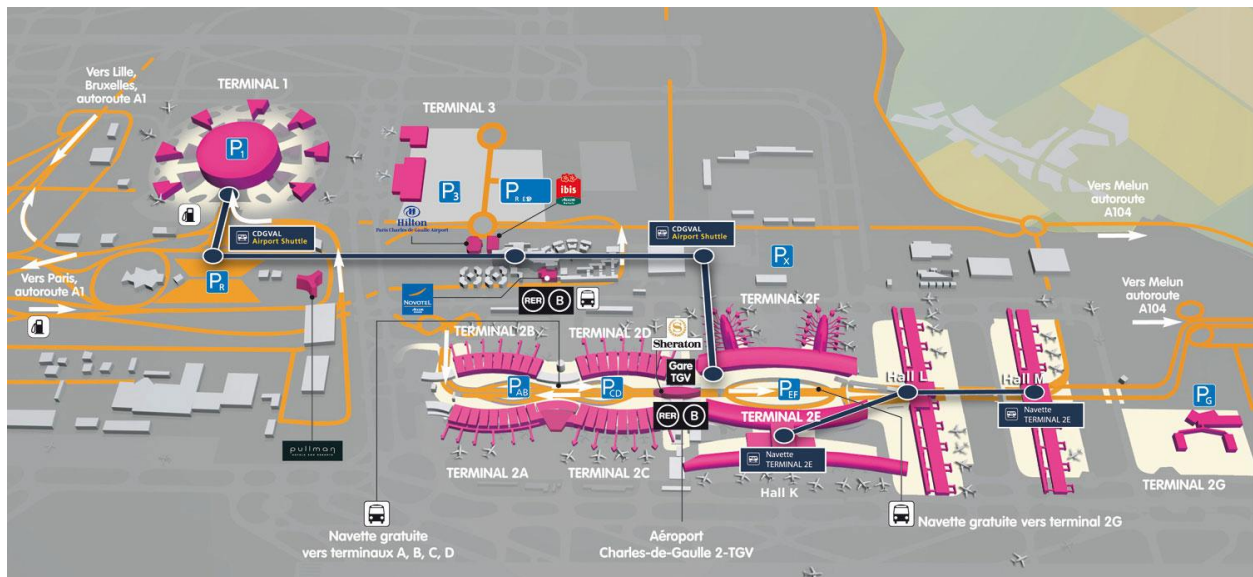


Figure 35. Bottom: Diagram of Charles-de-Gaulle Airport, showing the rail connections right in the center of the facility.

Source: parismap360.com

2.1 Main central stations: *Capitals of mobility*

Just as large cities function as political and economic capitals for their countries and regions, their main stations act as true “*capitals of mobility*.” These stations bring every scale of travel together under one roof in the hearts of cities—from HSR connections to other regions and countries, to commuter trains from surrounding suburbs and smaller cities, to local metro and bus lines. A traveler might arrive on a high-speed train and walk straight to an office or hotel nearby, or transfer seamlessly to a regional or local service. And because major stations often sit at the intersection of multiple metro lines, many people pass through them simply to change lines, without ever boarding an intercity or regional train at all.

With so many travel possibilities in one place, these large facilities are critical to not just the cities and regions they serve, but oftentimes an entire nation, and sometimes even neighboring countries.

2.1.1 Barcelona-La Sagrera: A modern-day mega-station

La Sagrera is a new station that is taking shape on a site previously occupied by a defunct rail maintenance yard and a complex of industrial buildings. Once complete, it will become Barcelona’s new main station and is anticipated to accommodate around [275,000 daily passengers](#). La Sagrera will relieve congestion at the city’s current main station, Barcelona-Sants, but will complement it rather than replace it.

Rail travelers will be connected to a vast selection of travel options to wherever they are going to or coming from—whether it be somewhere in the nearby neighborhood, Barcelona proper, the Spanish Catalonia region or other countries. This new station will truly facilitate mobility across all scales:

- HSR: The gateway for corridors coming from the south of Spain to the French network and beyond.
- Regional rail: *Rodalies de Catalunya*²—Catalonia’s regional rail network—will serve the station with three lines: R1, R2, and R2N.
- Metro: Extension of two subway lines—L4 and L9/L10 shared trunk line.
- Bus: A new 19-bay bus area, connected to outer ring roads and highways through underground tunnels.
- Cycling and walking: To facilitate these hyper-local modes, a brand new park to facilitate these hyper-local modes, as it will reunite two long-divided neighborhoods previously separated by a large freight station and corridor.

² Rodalies de Catalunya is the regional rail service Catalonia, mostly centered around commuter service for Barcelona. There are 17 lines—three variations of R2, totaling 19 different services—that serve about 350,000 people every day over 290 track miles.

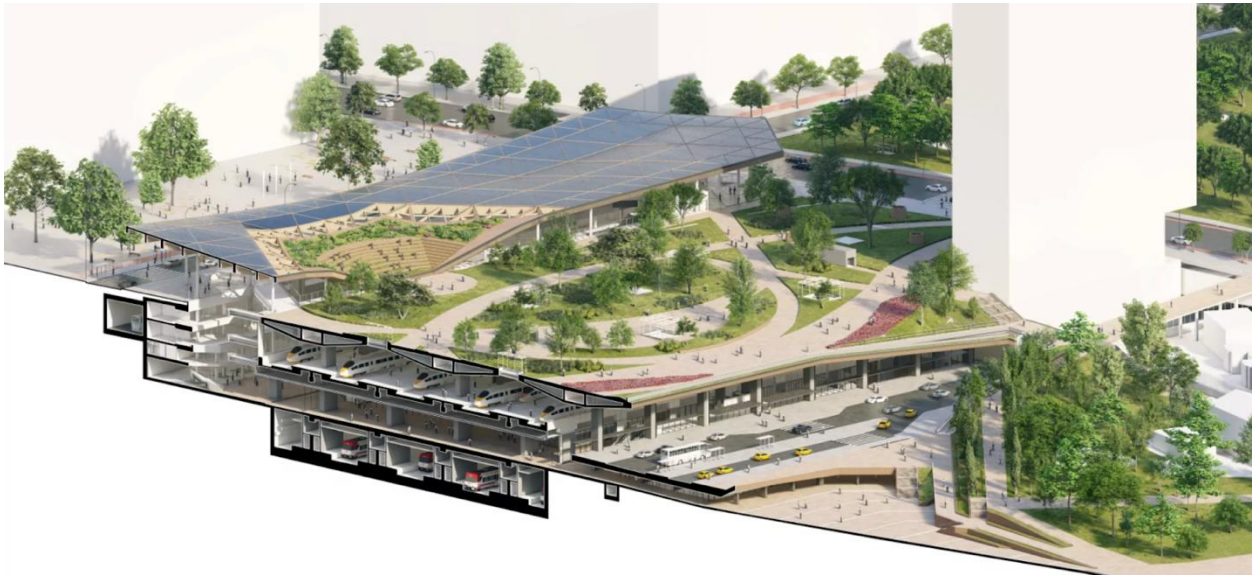


Figure 36. A rendering of the multi-level complex of the future Sagrera Station. The top level and main level will be green space for travelers and non-travelers to comfortably circulate throughout the area. High-speed train platforms are one level down and regional trains at the bottom level, with a concourse between them to facilitate transfers between train and local networks. La Sagrera Station will improve travel locally in northeast Barcelona, the Catalonia region, and internationally. Source: Barcelona Sagrera Alta Velocitat (BSAV)

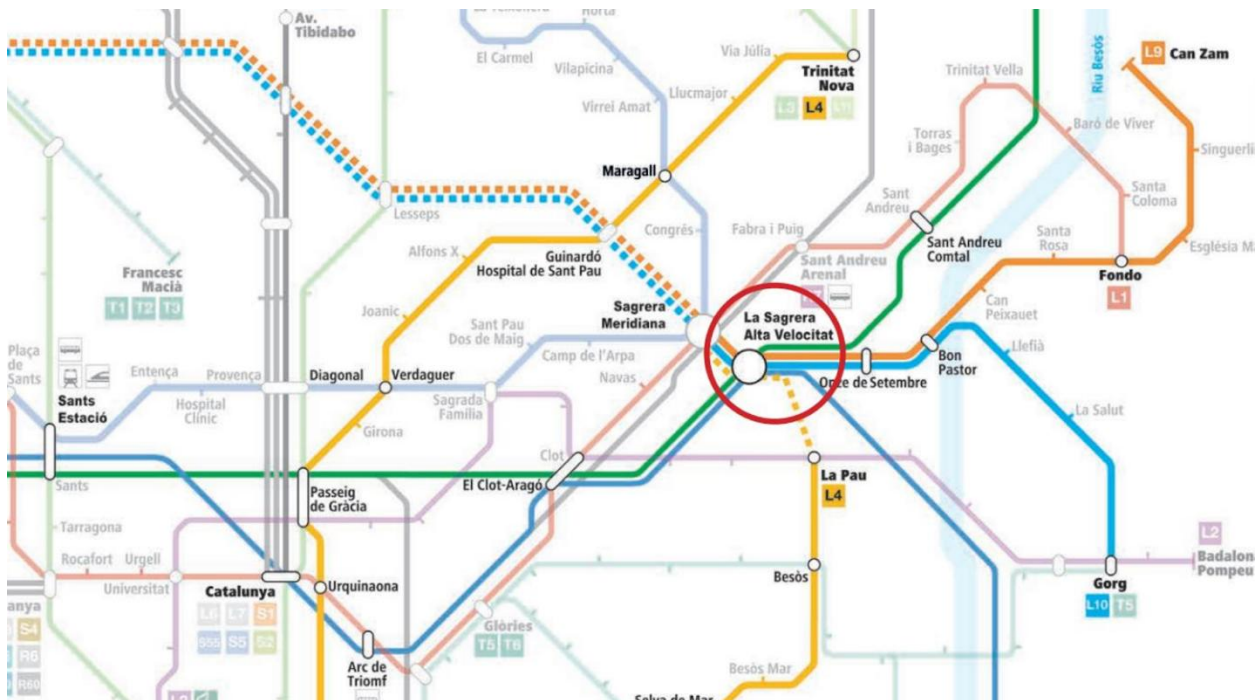


Figure 37. Barcelona Rodalies and Metro map, with lines in color showing they will stop at La Sagrera. Dashed lines showing future expansions under construction of L4 and L9/L10, the three lines being expanded to stop at La Sagrera. Source: BSAV

As an entirely new station, the La Sagrera project reflects Spain's broader vision for mobility and clearly demonstrates the role of a major station as a true "transit capital." *Barcelona Sagrera Alta Velocidad* (BSAV)—the public entity responsible for constructing the station and developing the surrounding district—describes the project this way:

"Barcelona's privileged location will in fact turn it into the capital of a macro region that is beginning to take shape on the map: 'Barce-Lyon', one of the 12 macro regions which, according to the experts, will make up the centres of economic, territorial and social power of the future of Europe." — [BSAV](#)

This vision of a macro-region has driven the development of an entirely new station designed to fulfill a major connecting role at the intersection of Spain's most important HSR corridors. La Sagrera will link the Madrid–Barcelona–French Border line, the Central Corridor, and, in the future, the Mediterranean Corridor, which is planned to extend HSR south along the Spanish coast and throughout southwestern Europe, connecting Spain, France, and Italy.

In fact, La Sagrera is the actual connection point where the French and Spanish HSR networks meet:

- To the north, French and Spanish operators—SNCF and Renfe—collaborated on the Barcelona–Perpignan line, completed in 2013. During our visit, trains passed through the station en route to Sants without stopping, but once construction is complete, all high-speed trains will serve La Sagrera, enabling seamless transfers and strengthening both domestic and international connectivity.
- To the south, the Madrid–Zaragoza–Barcelona line, opened in 2008, connects Spain's major economic centers. In 2013, it was extended north past Barcelona-Sants via the 3.5-mile (5.6-kilometer) Sants–La Sagrera city center tunnel. The tunnel and northern corridor converge at La Sagrera.

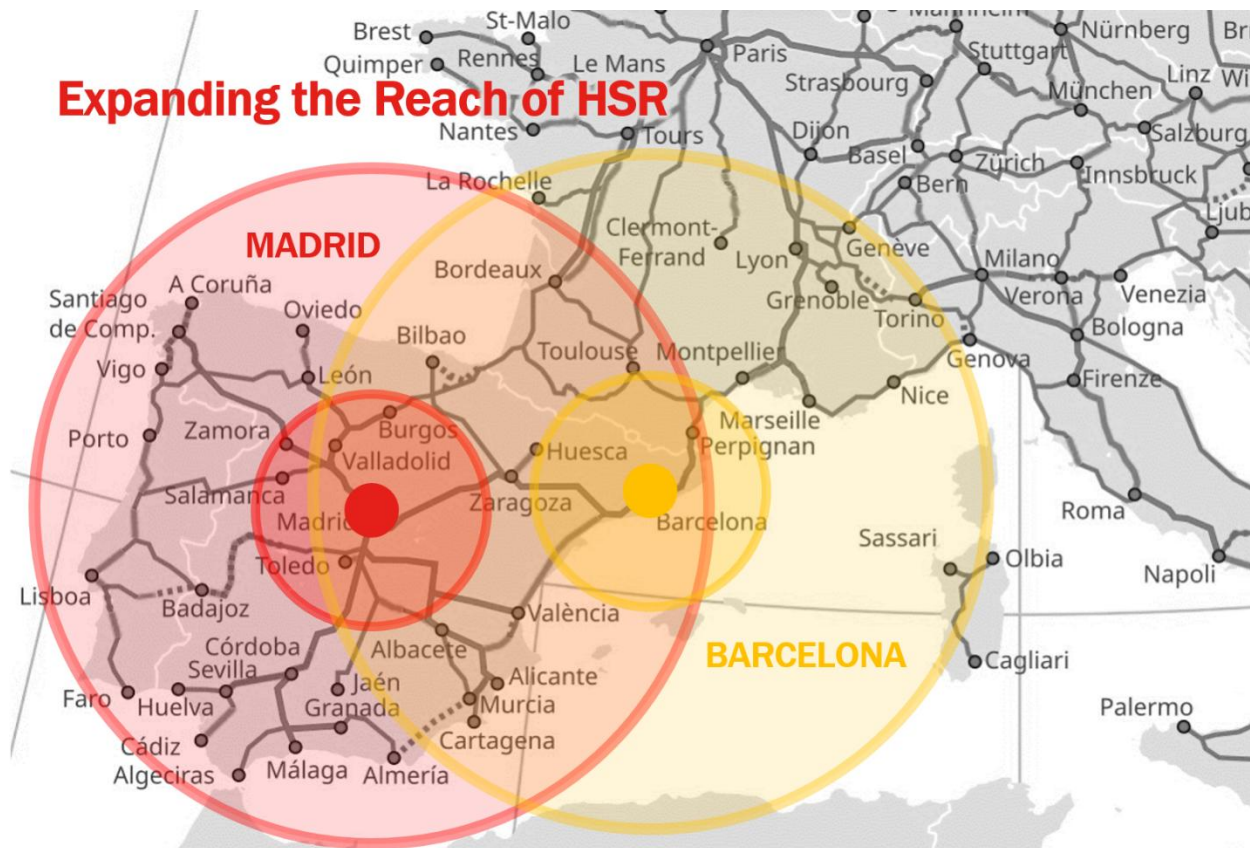


Figure 38. *Overlapping spheres of influence illustrate the reach of Spain's two largest urban regions. HSR tunnels connecting multiple stations within Madrid and Barcelona will allow passengers to pass through these large cities without changing trains, improving access to different parts of each city and promoting seamless national and international connectivity.*



Figure 39. *High-speed lines intersecting in serving Barcelona and the date of construction of each the various segments.*

Source: Classical geographer, [Wikimedia Commons](#)

Connecting corridors: Spain's city center tunnels link main stations and open up new travel possibilities

To better connect these cities to national and European rail networks, Spain identified opportunities within their cities to strengthen the role of main stations as national and continental gateways. In both Madrid and Barcelona, this inward focus took the form of new tunnels linking each city's two principal stations. Where high-speed services once terminated at a single station, the tunnels now allow all services to stop at both.

Improving intercity rail through historic city centers is among the most difficult transportation challenges in the developed world. Berlin managed it only because reunification created a once-in-a-century redevelopment opportunity, enabling the construction of Berlin Main Station on land formerly occupied by the Berlin Wall land. Paris, by contrast, has never seriously pursued through-running for intercity services, given the cost and complexity of such an undertaking. While Paris did successfully tunnel through the city to connect terminating commuter lines to form its hybrid regional-express metro *Réseau Express Régional* (RER) network, these tunnels exclude intercity trains. This limitation prevents "one-seat rides" for long-distance journeys that pass through, but do not originate in, central Paris.

Against this backdrop, Spain’s achievements in Madrid and Barcelona are extraordinary. Both cities have taken on major tunneling and station-integration projects in their dense urban cores to improve national rail connectivity. Now, each station functions as a key node within the national rail network, with these links improving connectivity and opening up more travel options for passengers across Spain.

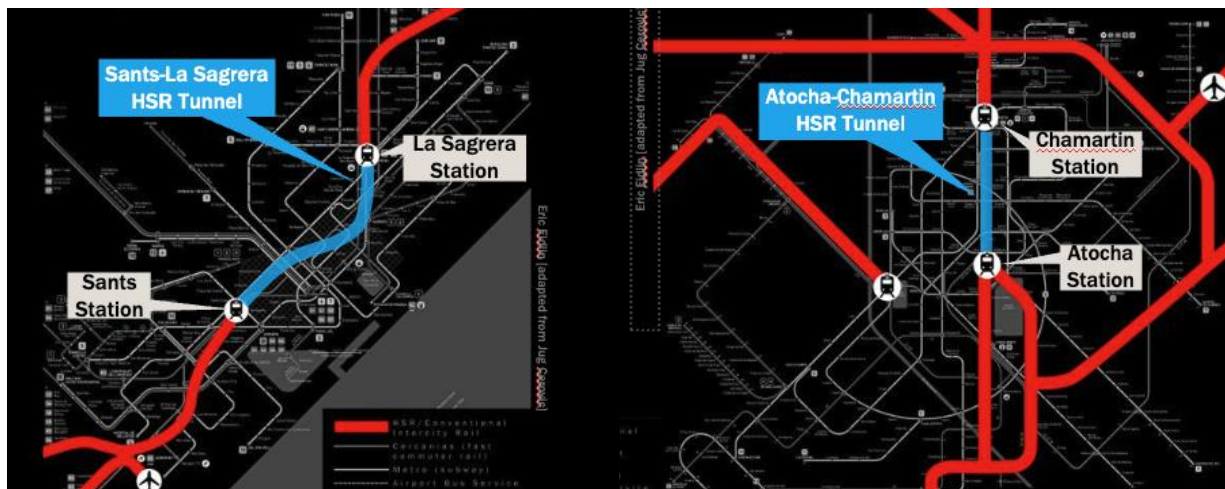


Figure 40. *Diagrams of the rail networks in Barcelona (left) and Madrid (right). Red lines indicate high-speed lines that serve the city, and blue lines represent the new tunnel connections within the city.*

Source: Graphics by Eric Eidlin, adapted from Jug Cerovic

Barcelona: Sants–La Sagrera Tunnel

The HSR tunnel connecting Sants and the future La Sagrera station was completed in 2013. Since then, high-speed trains run through the tunnel without stopping while La Sagrera remains under construction. Once the station opens, all high-speed services will stop at both stations.

As we’ve outlined, this tunnel is the crucial connection link of France’s and Spain’s HSR networks. As we experienced on our trip, we took a train from Valence down the Mediterranean Corridor to Barcelona. If we wanted to, we could’ve kept going to Zaragoza or Madrid on Spain’s Central Corridor without transferring thanks to the new tunnel.

Madrid: Atocha–Chamartín Tunnel

Completed in [July 2022](#), the 4.54-mile (7.3-km) tunnel links Madrid’s two major stations, Atocha and Chamartín Clara-Compor, transforming both from terminal stations into connected through-running hubs for the high-speed network. We visited the construction site of the new underground station at Atocha, a key element of the broader [station modernization effort](#) program. To the north, Chamartín is undergoing an even more extensive reconstruction and expansion to accommodate future growth.

Before the tunnel opened, trains to and from Valladolid would stop at Chamartín, and trains from Alicante, Seville, and Valencia would stop at Atocha—transferring to get from one train to another required a ride between the stations on a *Cercanías Madrid* train, Madrid’s electrified

regional trains similar to the *Rodales* in Barcelona. Now, someone traveling between these destinations can simply stay on the train if the other station is more convenient.



Figure 41. Before the city center tunnel in Madrid, lines from the north would terminate at Chamartin, and line from the south at Atocha. Before, if travelers are coming through Madrid, they would have to alight from one train, then slog across the city to another station. Now, corridors are connected through the city center tunnel, opening up more trip possibilities and more efficient operations.
 Source: Louis Lee, accessed via reddit.com

Individually, each main city station facilitates mobility across scales reasonably well, but linking multiple main stations unlocks far more possibilities for seamless travel across geographic levels. For high-speed rail, through connections eliminate forced transfers between stations where different corridors currently terminate. At the local scale, they allow passengers to choose the origin and destination stations that best suit first- and last-mile access, since these major stations sit on opposite sides of the city. Each offers distinct metro and bus connections and is within closer walking or cycling distance of different neighborhoods.

Paris, with its seven major intercity rail terminals, has no intercity rail lines that run through the city center; only the RER through-runs on heavy rail. Together with the Paris Métro, these regional services provide strong cross-city connections between intercity stations. Given Paris's outsized economic and cultural role within France, relatively few travelers pass through the city

without stopping—a dynamic that also applies, to some extent, to London in the UK context. Still, for those who do travel through Paris, intercity journeys typically require a transfer. While this may be manageable for commuters or casual day trips, it becomes far more cumbersome on longer journeys, particularly when traveling with luggage.

The operational benefits of through-running stations

These tunnels convert connected stations into through-running facilities, allowing trains to pass through rather than terminate. In historic terminals, this has required adding run-through platforms beneath existing tracks. [The result is a more efficient rail network](#): trains move in a single direction with fewer conflicting movements, reducing congestion at station throats. Instead of reversing, trains briefly stop to drop off and pick up passengers before continuing onward in the same direction, shortening dwell times, increasing throughput, and enabling more trains per hour.

2.1.2 Paris's high-capacity urban gateways

The drawbacks of terminal operations at Paris's main stations do not diminish the mind-boggling scale at which they move people in one of the largest cultural and economic centers in Western Europe. The striking Beaux-Arts architecture of the city's historic railway stations symbolize the importance of these stations as grand gateways to the French capital—architecturally significant spaces that are highly functional and play a critical role in mobility for the city, region, and country.

Gare du Nord, Europe's busiest railway station, serves as Paris's primary gateway from the north, connecting the city to destinations with numerous regional and intercity services across northern France along with the neighboring countries of Belgium, the Netherlands, Germany, and the United Kingdom via the Channel Tunnel. The scale of activity at the station is extraordinary with nearly 800,000 people passing through each day. By comparison, Hartsfield–Jackson Atlanta International Airport, the world's busiest airport, handles fewer than half that number, with roughly [286,000 daily passengers](#).

Our group stayed in the 10th arrondissement near Gare du Nord and arrived using a variety of modes that all come together at this station. Most flew into Charles de Gaulle Airport and took the RER B directly to Gare du Nord. Several traveled internationally on the international HSR operator Eurostar from London or Amsterdam. Others who arrived in the city a few days early reached the station by metro. These varied arrival paths converged seamlessly at Gare du Nord and Gare de l'Est, which is also nearby, and both served as a hub for our trips throughout the week.

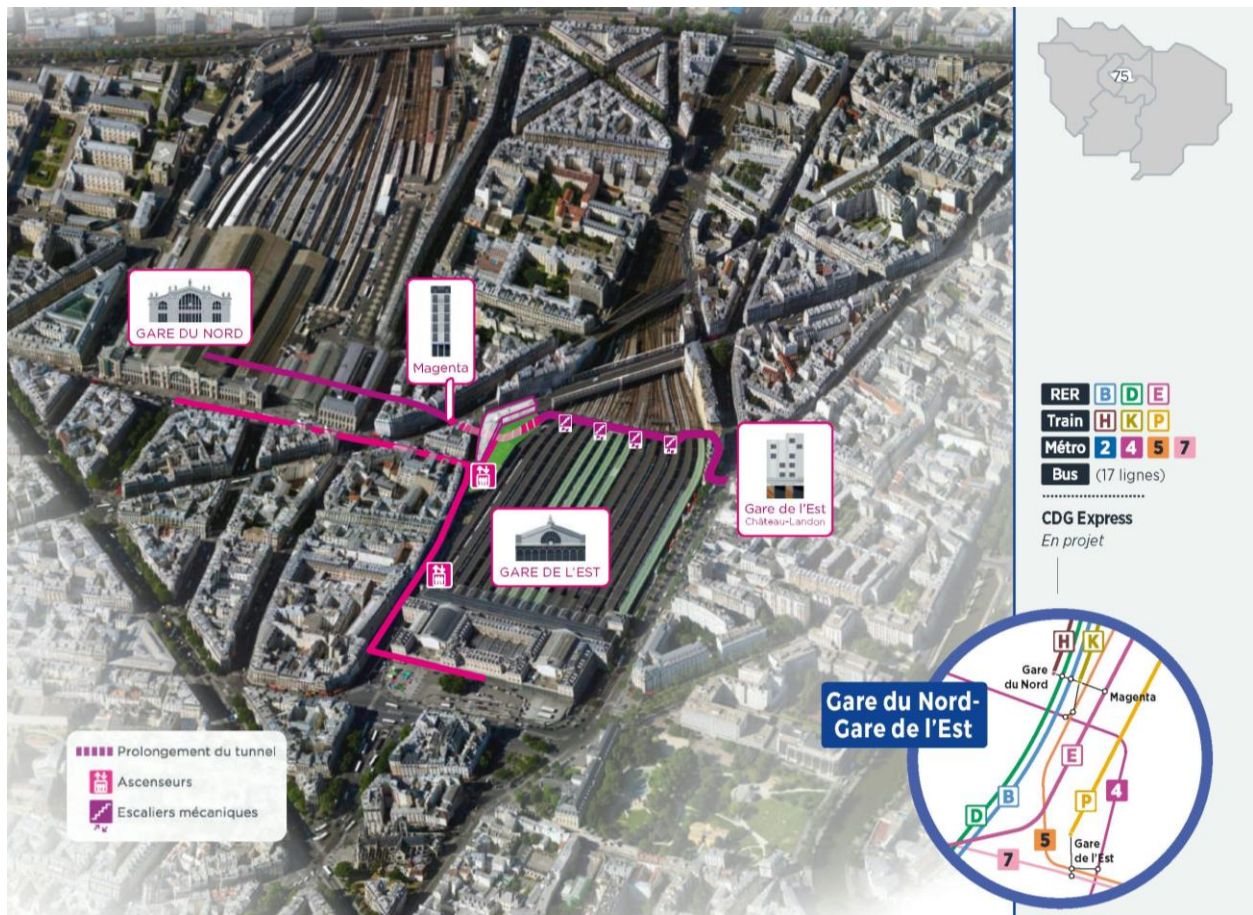


Figure 42. *The area between Gare du Nord and Gare de l'Est is being transformed to better support walking, with upgraded sidewalks, public spaces, and street crossings, complemented by the new RER E (Magenta) station that creates a seamless underground connection between the two major rail hubs.*

Source: Ile-de-France Mobilités

Other Paris stations also welcome impressive numbers of people on any given day. Gare Saint-Lazare, the city's second-busiest station, serves 312,000 passengers daily, while Gare de Lyon handles almost as many—310,000 daily. It is worth pointing out that Paris Charles de Gaulle Airport, France's busiest airport with about 190,000 daily passengers, sees roughly the same number of people on a daily basis as Gare Montparnasse, Paris's fourth-busiest mainline rail station.

Paris Gare du Nord (704,000 daily travelers)³

- **Intercity Rail**
 - *TGV InOui* – SNCF HSR Operator
 - *OuiGo* – Low-Cost SNCF HSR Operator
 - *Eurostar* – International HSR Operator
 - *Intercites* (IC) – Conventional Intercity Network
- **Regional Rail**
 - *Réseau Express Régional* (RER) – High-Frequency Regional Rail-Express Metro Hybrid
 - *Translien* – SNCF Commuter Rail Service for Paris Region
 - *Transport Express Régional* (TER) *Île-de-France* – SNCF Commuter Rail Service for Paris Region
- **Local**
 - Metro – 3 lines
 - Local Bus – 6 routes
 - Night Bus – 3 routes
 - Cycle –1,200-space bike parking garage

Paris Gare Saint-Lazare (312,000 daily travelers)

- **Regional Rail**
 - RER
 - *Translien*
 - TER
- **Local**
 - Metro – 4 lines
 - Local Bus – 10 routes
 - Night Bus – 11 routes
 - Cycle – [482 bike parking spaces](#)

³ Daily totals are derived from SNCF's Open Data. Annual passenger numbers for 2024 are divided by 365. In this part of the report, these numbers represent rail passengers only. Later in the report, we will state larger numbers that include total daily users—passengers and non-passengers— when we discuss the broader role and function of a station beyond travel.

Paris Gare de Lyon (310,000 daily travelers)

- **Intercity Rail**
 - *TGV InOui*
 - *OuiGo*
 - *Trenitalia's Frecciarossa – Italian National HSR Operator*
- **Regional Rail**
 - RER
 - *Translien*
- **Local**
 - Metro – 2 lines
 - Local Bus – 9 routes
 - Night Bus – 12 routes
 - Airport Shuttle – Direct Bus Service to CDG Airport
 - Cycle – 408 spaces

Paris Gare Montparnasse (188,000 daily travelers)

- **Intercity Rail**
 - *TGV InOui*
 - *OuiGo*
- **Regional Rail**
 - *Translien*
 - *TER Île-de-France*
- **Local**
 - Metro – 4 lines
 - Local Bus – 9 routes
 - Night Bus – 9 routes
 - Cycle – 375 spaces



Gare Saint-Lazare public transport options

Including active button links for detailed maps on each line showing stops and connections along with timetables

Paris Metro lines for Gare Saint-Lazare



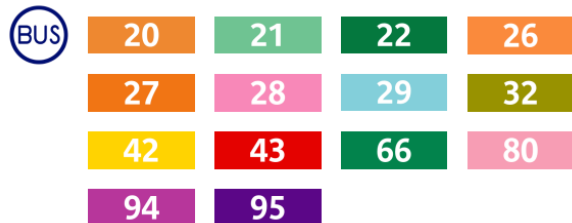
Train lines for Gare Saint-Lazare



Live [Train arrivals and departures](#) at Gare Saint-Lazare

Buses for Gare Saint-Lazare

Daytime buses



Noctilien night buses

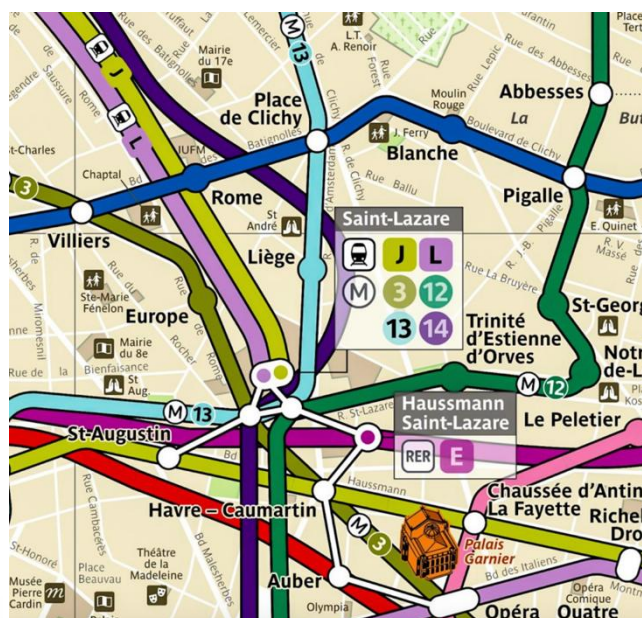


Figure 44. The wide range of modes that serve Paris Gare Saint-Lazare, listed to the left and a map of rail service to the right. Gare Saint-Lazare is served by 1,600 regional and intercity trains each day, and directly connects to four Metro lines (a fifth line that is a short walk away) and over two dozen local and night bus routes.

Source: eutouring.com

Gare de Lyon public transport options

Including active button links for detailed maps on each line showing stops and connections along with timetables

Paris Metro lines for Gare de Lyon



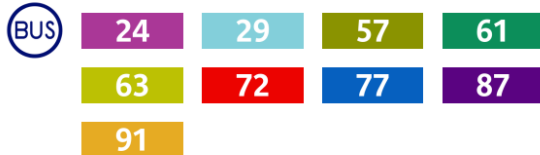
Train lines for Gare de Lyon



[Live Train arrivals and departures](#) at Gare de Lyon

Buses for Gare de Lyon

Daytime buses



Noctilien night buses



Airport shuttle buses and tour buses

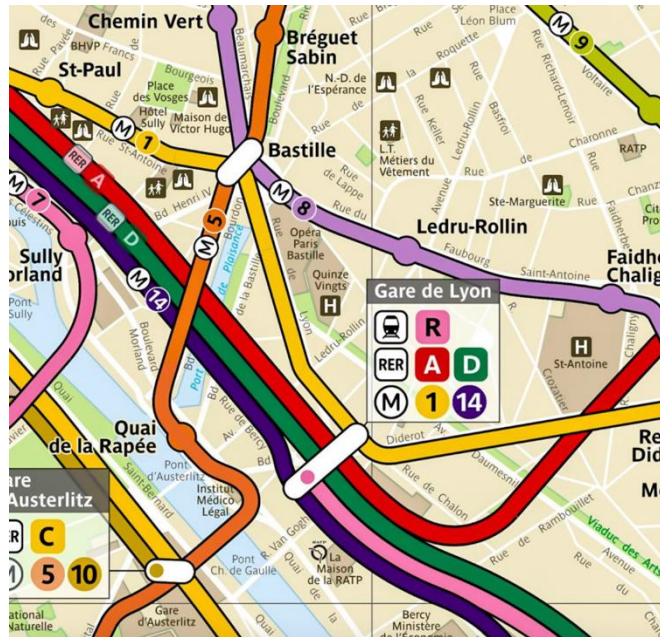


Figure 45. *The wide range of modes that serve Paris Gare de Lyon, listed to the left and a map of rail service to the right. In addition to being Paris's third busiest main line station and the northern terminus of Europe's busiest high-speed line, the station is a hub for two RER lines and two Paris Metro lines. There are also a handful of bus connections, including a direct express service to Charles-de-Gaulle Airport.*
Source: eutouring.com

Paris is an exceptional case, and most cities do not require multiple central-city terminals of this scale. Yet setting aside differences in size and population, Paris's stations demonstrate what is possible when a city integrates transportation modes of different scales: efficiently moving large numbers of people while enabling diverse trip types from the heart of dense, walkable urban areas.

The walkability of central Paris neighborhoods is a key factor in the success of the city's main stations. These stations are located within dense, historic districts that predate the automobile, originally designed for walking as the primary mode of travel. In recent years, these neighborhoods have been retrofitted to support cycling as well, further enhancing accessibility. The efficiency of movement arises not only from concentrating multiple rail lines in a single

station but also from highly integrated station and neighborhood planning—the French ethos that station projects are fundamentally city-building projects.

These station areas function as neighborhoods in their own right, supporting a wide range of everyday urban activity. By prioritizing people over vehicles, they enable a form of mobility that is more comfortable, safe, and efficient than what is typically experienced around major stations in the United States.

In a large American city, one might expect a major train station to be dominated by car traffic, with expansive pick-up and drop-off zones crowded with taxis, passenger vans, and private vehicles. Paris (and several of the other cities we visited) offers a striking contrast. In central Paris, the space around major stations is largely dedicated to pedestrians, cyclists, and public transit, with these modes clearly prioritized over private cars.

Paris’s centrally-located stations move more people than many of the world’s busiest airports without large parking lots or congested “kiss-and-ride” lanes. This efficiency is possible because the system is designed to move people, not vehicles—starting at the most basic level by prioritizing space for travelers themselves.

2.2 People-centric stations promote more comfortable and efficient mobility

Of the stations that we visited, those that best succeeded at facilitating travel across different geographic scales shared one common trait: they put people first. Scalable mobility starts at the level of the city block, and the area immediately surrounding the station must be supremely pedestrian-oriented. This is for the simple reason that *all people who pass through the station are pedestrians for some portion of their journey*. This holds true whether someone walks from a nearby office building to the station, transfers from one metro line to another or a different mode, or even if the person drives a car to the station and walks from a parking garage to the rail platform. We observed “success” when we saw the general practice of pushing car traffic out of the most centrally located areas at stations in order to prioritize walking, cycling, and mass transit.

We also visited stations that have been very car-centric for several decades but were now undertaking modernization projects to improve pedestrian circulation—both within the station and the neighborhoods around them. These projects are emblematic of a broader trend throughout France and Spain toward a multi-modal future in cities that is centered around people.



Figure 46. *Examples of station plazas serving as vital transitional zones between station and city.*

Sources: Clockwise from top left: Gare St. Lazare (photo by Eric Eidlin); Gare de Strasbourg (photo: Desiree Rodarte; Place Charles Béraudier, Lyon-Part-Dieu (photo: Muriel Chaulet)

2.2.1 Barcelona-Sants 2.0

In addition to constructing a new main station at La Sagrera, Barcelona, is upgrading Sants Station, the city's current primary rail hub in the southwest of the city. Sants is severely overcrowded, with [just under 130,000 passengers passing through daily](#). Built in the 1970s, the station was never designed to accommodate this level of demand, and when it was integrated into the HSR network in 2008, ridership surged beyond its capacity.

Estació de Barcelona-Sants

- **Intercity Rail**

- *AVE* – Renfe’s HSR Operator
- *Avlo* – Renfe’s Low-Cost National HSR Operator
- *Alvia* – Renfe’s National Medium-Distance HSR Operator
- *EuroMed* – Renfe’s Mediterranean Coast HSR Operator
- *Renfe Operadora* – Spanish Conventional Intercity Operator
- *Iryo* – Private HSR Operator
- *TGV InOui*
- *OuiGo España* – SNCF’s Spanish HSR Operator

- **Regional Rail**

- *Rodalies de Catalunya* – Renfe's Regional Rail Operator for Catalonia

- **Local**

- Metro – 2 metro lines
- Local Bus – 8 local routes
- Cycle – Unclear—authors unable to find clear, conclusive data



Figure 47. Screenshot of Barcelona rail transit map, annotation around Barcelona-Sants and listed rail lines by authors.

Source: Generalitat de Catalunya

Many Barcelonans feel that Sants is not befitting a city of Barcelona's stature. During our visit, Professor Francesc Robusté, a transportation expert from Barcelona Tech who accompanied the group on site visits and meetings, articulated this widely shared view. He noted that Barcelona-Sants is often seen as underwhelming—functional but impersonal and confusing—and lacking the grand, welcoming “front door” presence expected of a major international city, making it a poor first impression for many visitors.

“Many people in Barcelona feel that Sants is simply not worthy of the city. It works reasonably well at moving people, but it does not inspire. The station is impersonal and architecturally stuck in a very drab 1970s modernism that offers no sense of arrival or civic pride. There is no real ‘front door’—nothing that tells you that you have arrived in one of Europe’s great cities. The problem is not just the building itself. The approaches from every direction are dominated by wide roadways, taxi and bus drop-offs, and a harsh, concrete-heavy environment that prioritizes vehicles over people. Instead of welcoming visitors into Barcelona, the station feels like an infrastructural back-of-house. For many first-time visitors, Sants creates a poor and deeply unmemorable first impression of the city.”

– Dr. Francesc Robuste

Overcrowding at Sants is compounded by the station's auto-oriented design and heavy use of cars and taxis, which compete for limited space at station entrances. This creates an unpleasant—and at times stressful—environment for people arriving on foot, who must navigate access roads and streams of queued and moving vehicles. Our group experienced this firsthand: arriving by bike, we crossed expansive surface parking lots under the Mediterranean sun and struggled to find anywhere to park our bikes.



Figure 48. *Barcelona-Sants 1.0. Existing conditions at the station, which is currently undergoing a major transformation. The station area is currently dominated by asphalt—surface roads and parking lots and is not pedestrian-friendly. This is being remedied in the new station concept. Clockwise from top left: Southern entrance to the station today, which is the more pedestrian-oriented side (photo by Eric Eidlin); at right, the largely asphalt-dominated area around the station with the station building in the background (photo by Hunter Bickel); bottom left: study group navigating the car-dominated spaces around the station by bike in the hot Mediterranean summer sun.*

Source: Eric Eidlin



Figure 49. *Local taxi access is overwhelmingly prioritized on the south end of the station, while pedestrians are only granted a narrow space to walk through the area.*

Source: Baxtiyor - panoramio, CC BY 3.0,

<https://commons.wikimedia.org/w/index.php?curid=18563898>



Figure 50. Private car access is the primary mode at the front of the station, creating an unfriendly environment for people and bicycles.

Source: CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=115375>

The Barcelona-Sants transformation will bring the mobility hub into the modern era, with a [vision](#) for the new station to be a “central meeting point,” “citizen-focused,” and better integrated with the surrounding urban area.⁴

Reconfiguration of space around the station

The expansion of Barcelona-Sants station involves a comprehensive reorganization of the surrounding 18-acre area, with pedestrian spaces and an extensive network of new walkways forming the core of the redesign. The project will increase [pedestrian space by 85%](#), while overall vehicle access is expected to decrease by 75%, creating a far more walkable and accessible station environment.

Plaça dels Països Catalans, the main front plaza of Barcelona-Sants station, serves as the centerpiece of a design concept that prioritizes public space at the station’s primary entrance. Once construction is complete, the plaza will be restored to closely resemble its original layout. The five-lane vehicle driveway that currently takes up 2.1 acres of space will be removed and given back to pedestrians for a new main front plaza that will total 4.5 acres. It will serve as the primary transition zone surrounded by green space and trees to provide “natural protection”

⁴ For a video overview of the station transformation (in Spanish), see: <https://elpais.com/espana/catalunya/2024-04-21/barcelona-transforma-y-amplia-sants-su-gran-estacion-de-tren.html>

from traffic and will feature seating areas, large shade canopies, playgrounds, and a water fountain for children to enjoy and create a more livable space overall.



Figure 51. Rendering of the future Plaça dels Països Catalans, the main front plaza and transitional zone of Barcelona-Sants. The new plaza will total just over 4 acres for a vast circulation space for rail passengers to circulate and non-rail move through the area or even spend time in. Private vehicle traffic will be pushed away, and pedestrians are to be given full priority to the station's main entrance.
Source: Ajuntament de Barcelona

These changes will be complemented by the elimination of vehicle traffic on the wide road to the north of the station, *Carrer de Viriat*, and reallocating the space pedestrians and cyclists to form an overall larger space. A new pathway for active transportation uses will span the entire north side of the station connecting the two main plazas on opposite sides of the station—*Plaça dels Països Catalans* on the east and *Plaça de Joan Peiró* on the west. Bicycle and scooter users will also be able to access an underground parking facility on this side of the station, which will be connected to the bike lane on the pathway.

Both private cars and local bus areas will be relocated and concentrated to the south of the station on *Passeig de Sant Antoni*, which is currently the wide thoroughfare on that side of the station. The roadway will be significantly reduced in size and will be reoriented as a kiss-and-ride area. A sizable portion of the current roadway will be turned into extended pedestrian space for more spacious entry and exiting of the station, while what is left of the road will function as the main interchange for surface vehicles—with one lane for cars and one for buses.

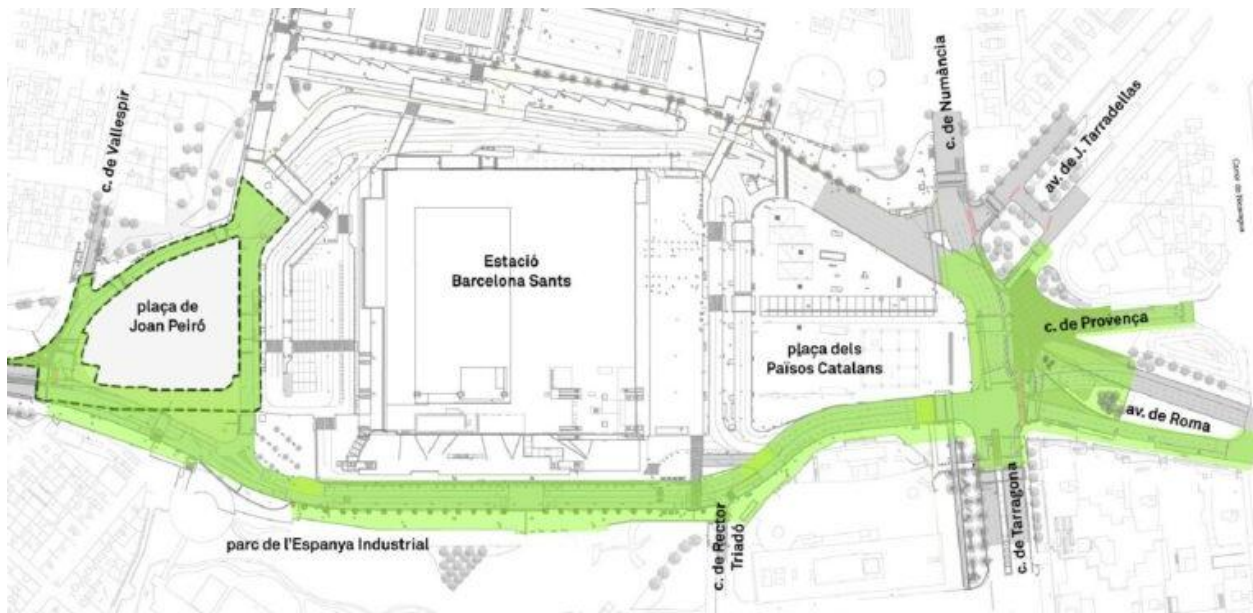


Figure 52. A map from the Barcelona City Council showing how traffic is to be reoriented in the Sants station area indicated with green highlight on the roadways.
Source: Ajuntament de Barcelona

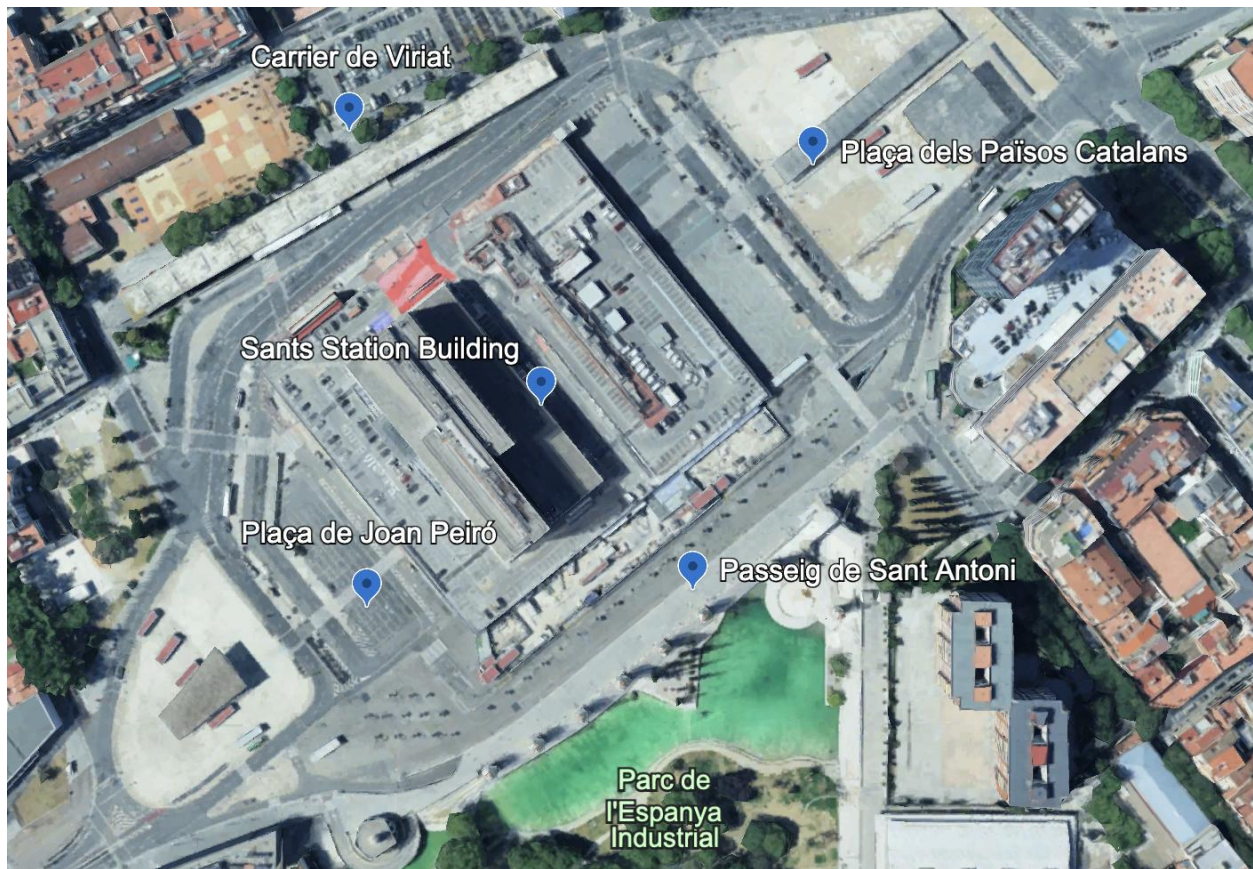


Figure 53. Aerial view highlighting the predominant allocation of space for vehicles at Sants Station, including wide access roadways and expansive parking lots immediately surrounding the Sants station building.
Source: Google Earth



Figure 54. *Rendering of the future main front plaza of the station, Plaça dels Països Catalans. An enlarged plaza with car traffic pushed far away from the main entrance. On the north side of the station (image is facing west), there will be a direct pathway for pedestrians and cyclists to cross between the two longitudinal sides of the station.*

Source: Grupo TYP SA

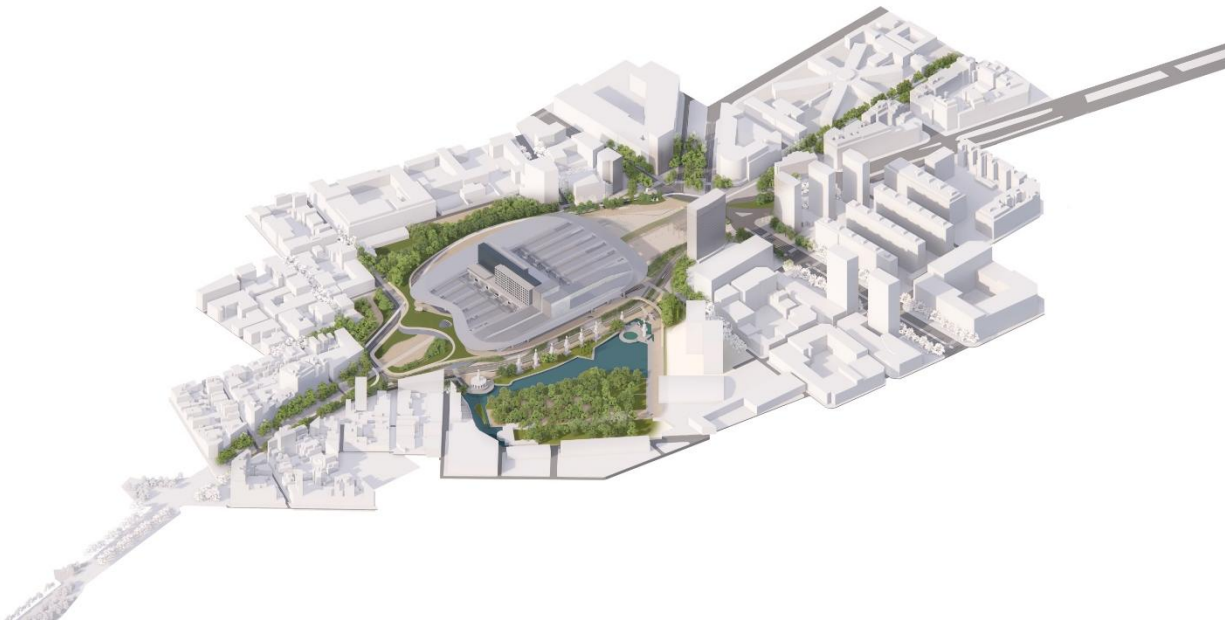


Figure 55. *Barcelona-Sants 2.0. The redesigned Sants Station is a great example of a station that facilitates national and European train service, while also facilitating circulation at the local level and serving as an important city-building project. The graphic at top shows the transformation of the station area from one primary dominated access roadways and parking lots for vehicles into a people-first area, increasing pedestrian surface area to 85%. The graphic below shows that the new concept for the station prioritizes pedestrian access from all sides of the station with continuous and comfortable spaces that include ample vegetation.*

Source: Grupo TYP SA

A larger station with more access

Improvements to walkability and increased passenger capacity are possible due to a major expansion of the station building, which will double concourse space that will total 387,500 square feet (36,000 square meters).

The station will have four façades, one for access to the station on every side, with large foyers that let in ample natural light and vast space for people to orient themselves with the station. These expansions will also include upper floors that provide additional circulation walkways, as well as new boarding areas and waiting rooms.

The new station complex will be organized into three main halls. A “general lobby” will serve the south side of the station, while the north side will feature two distinct boarding halls—one for high-speed trains and one for *Rodalies de Catalunya* services. Adjacent to the *Plaça dels Països Catalans*, both boarding halls will be expanded, but each area will remain separately configured to streamline passenger circulation and keep flows organized for the different rail services.

The main hall (labeled in Figure 45 as “VESTÍBULO GENERAL”): The south part of the building will be enlarged by 30%. This part of the station will feature new commercial space and improved customer assistance areas, as well as the main space for people passing throughout the station to make their way around in all directions.

High-speed services hall (labeled in Figure 45 as “ALTA VELOCITAT”): This area will be an entirely new boarding area. The completed hall will be a staggering 175% increase in surface area for high-speed rail passenger boarding, which will total 110,000 square feet.

***Rodalies de Catalunya* hall** (labeled in Figure 45 as “RODALIES”): The existing boarding area will be enlarged to 47,360 square feet, up from just under 28,000 square feet before. Part of this expansion will include a new entrance from *Plaça dels Països Catalans*.



Figure 56. Organization of high speed ("Alta Velocidad") and regional rail ("Rodalies") facilities in the future rebuilt Barcelona-Sants Station, along with primary station hall "Vestibulo General."

Source: Ministry of Transport and Sustainable Mobility, accessed via [Grupo TYPESA](#)



Figure 57. Rendering of high-speed rail services concourse.

Source: Ministry of Transport and Sustainable Mobility, accessed via [typsa.com](#)

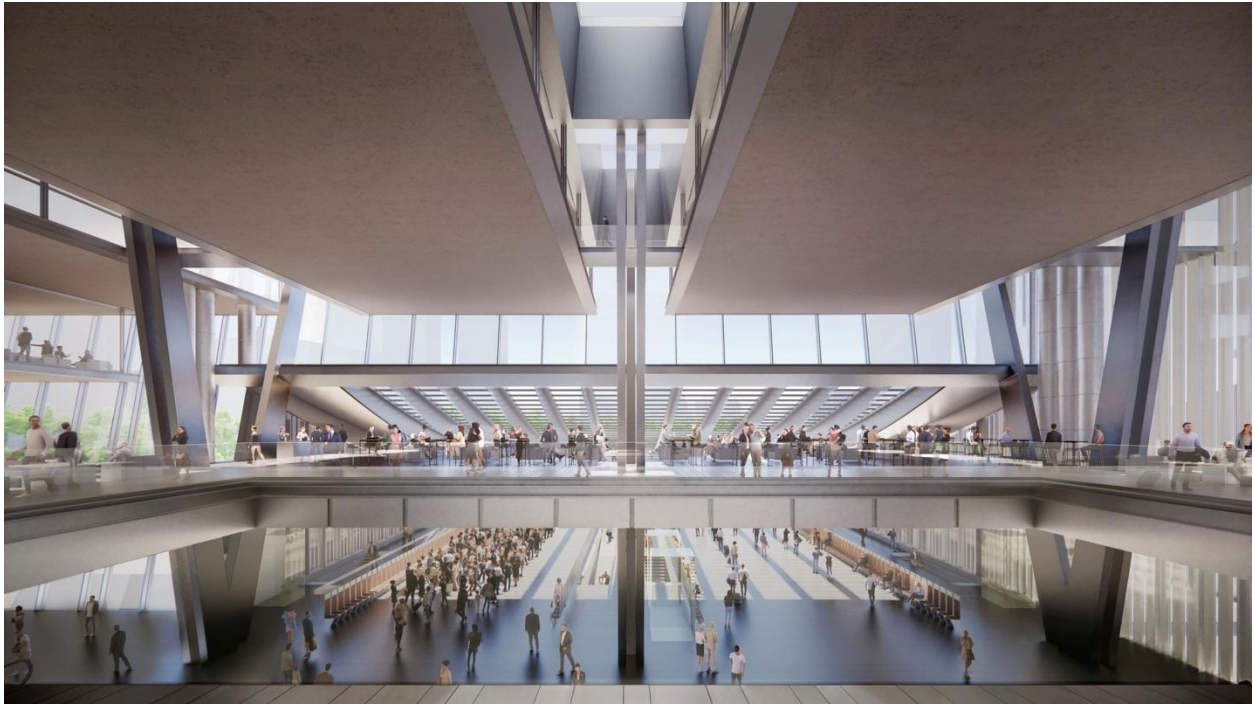


Figure 58. New high-speed services boarding hall.

Source: ADIF

There will also be an entirely new concourse for connections to the Barcelona Metro. This new concourse will improve the connection between the L3 and L5 Metro lines and heavy rail services, as well as facilitate transfers between the two lines themselves.



Figure 59. Barcelona-Sants new metro lobby.

Source: Ajuntament de Barcelona, accessed via traveltomorrow.com

This project is bringing a station that has been long overdue for modernization to the 21st century. According to many of the local experts with whom we met, it is a necessary evolution in a city that is growing both in population and economic significance, as well as being one of the top tourist destinations in Europe.

These improvements look ahead to the future of rail travel and correct the mistake of the last half of the 20th century urban planning: taking space away from people and giving it to cars. Sants reorienting its station as a space by returning it back to people is an acknowledgment that people-centric travel hubs are ultimately the best way to facilitate mobility across scales, and that orienting station districts for private vehicle travel is not very efficient or comfortable. The next station we discuss is another great case study for this.

2.2.2 « Réinventer les mobilités » Lyon-Part-Dieu’s transformation is reshaping mobility across the region and southeastern France

Lyon is often described as France’s “second city,” the most significant urban center outside Paris in terms of cultural influence, historical importance, and economic strength. Although the city proper is smaller than Marseille, the Lyon metropolitan area is larger. Lyon’s prominence historically stems from its strategic position at the confluence of the Rhône and Saône rivers—a location that long made it a vital hub for trade, transport, and commerce. This advantage, together with its historic leadership in silk production and later its diversification into other industries, underpinned its growth and enduring influence.

In recent decades, Lyon’s position along Europe’s busiest HSR corridor has further strengthened its role. It was the first city to be linked to Paris by HSR in 1981, and the Paris–Lyon line remains the busiest high-speed corridor in Europe. Today, Lyon functions as a crucial interchange for the Rhône administrative region—roughly equivalent to a U.S. state—and France’s national high-speed network, as well as a growing share of western European passenger rail. SNCF now shares the station with other national operators, Italy’s Trenitalia and Spain’s Renfe.

Completed in 1983, Lyon-Part-Dieu emerged during “Les Trente Glorieuses”, a post-WWII era of booming industrial output and rising car ownership. Much like in the U.S., French urban planning then prioritized automobiles, resulting in a station designed primarily for car access. The surrounding area exemplified “sol difficile”—a pedestrian-unfriendly environment dominated by large roadways. Although main walkways were elevated above the street, pedestrians and cyclists often navigated the street level anyway, despite the awkward and dangerous conditions.

This pedestrian-unfriendly station had also been operating at well over its intended capacity since it opened in 1983. It was designed for 35,000 passengers per day, but by 2000, the station saw 80,000 passengers on a typical day. Today, the number ranges from 135,000–140,000 daily. Staring down forecasts as high as 175,000–200,000 daily passengers by 2030, modernizing Lyon-Part-Dieu and preparing the station to meet future travel demands became a major priority for local officials and planners.⁵ The city and metropolitan area governments of Lyon have been working with SNCF for the last decade on renovations that will open up the station

⁵ Passenger numbers and forecasts were provided to authors during the meeting and site tour Frédéric Longchamp of SNCF Gares & Connexions, Director of the Lyon-Part-Dieu redevelopment.

to accommodate 100,000 additional passengers each day with the [Multimodal Interchange Hub](#) project.



Figure 60. *Lyon-Part-Dieu Station 1.0. These views of the Lyon-Part-Dieu station area as originally laid out in the early 1980s show the *sol difficile* (“pedestrian unfriendly conditions”) surrounding the station. The station area was laid out at the height of the auto-oriented “Les Trente Glorieuses” era, during which the efficiency of automobile circulation was the primary objective of investments in transportation infrastructure. In this initial iteration of the station, pedestrian circulation is one level above the street. As shown in the image lower-left, many pedestrians opt instead to take a more direct and intuitive—albeit dangerous—route along the streetcar tracks, which run parallel to the auto travel lanes. Bicyclists also do this rather than take the more circuitous official bike route around the shopping center. Correcting these poor pedestrian and bicycle connections is one of the key objectives of the current station area redevelopment effort.*

Sources: top left and right: Agence d’Urbanisme de Lyon; bottom left: Eric Eidlin

Gare de Lyon-Part-Dieu

- **Intercity Rail**
 - TGV InOui
 - Trenitalia Frecciarossa
 - Renfe’s AVE
 - Intercites (IC)
- **Regional Rail**
 - TER Auvergne-Rhône-Alpes

- **Local**
 - Metro – 1 line
 - Tram – 3 lines
 - Express Tram-Train – The *Rhôneexpress* between city center and Saint-Exupéry Airport
 - Local Bus – 9 routes
 - Intercity Bus – 4 routes
 - Cycle – 1,500 spaces

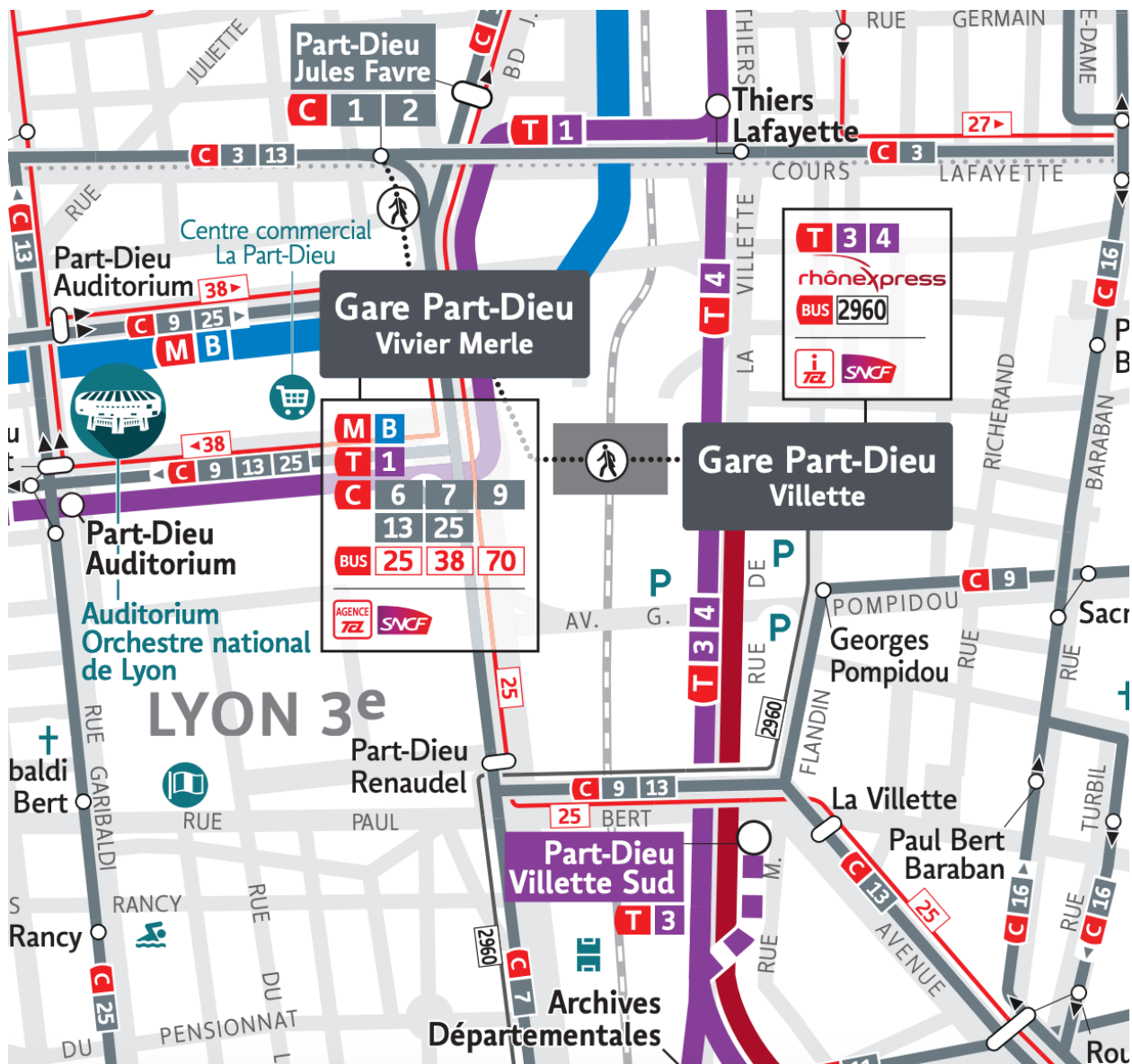


Figure 61. Primary public transportation options service Lyon-Part-Dieu Station and surroundings.

Source: *Transports en commun lyonnais (TCL)*

Lyon-Part-Dieu is a major interchange for local mobility, with [165,000 people using mass transit](#) at the station each day—a figure expected to grow in the coming decades as overall station use increases. It is also considered the heart of the city’s cycling network, as Frédéric Longchamp, project architect for SNCF, told our group. This central role explains why the district’s redevelopment has added more than 2,600 cycle racks in total, including roughly 2,000 indoors and 700 in public spaces.

In addition to railway and local transit users, 30,000 people pass through the station using it as an east-west connection for the neighborhoods on separated by the tracks. Planners recognized the important role that the station area plays in hyper-local travel and realized the need to reorient the space to better support these pedestrian flows.

The current station redesign effort kicked off in 2011 with the vision for creating a modern travel hub for more comfortable mobility and knitting the city together. Over the last decade, the station has been thoroughly reconfigured to prioritize the most sustainable and space-efficient modes first—the modes that bring the greatest number of people into the station with the fewest negative impacts on quality of life—through a series of separate projects with a unified goal.

Tripling the square footage of the station⁶

Like Sants, Lyon is expanding the size of the overall complex with new passenger concourses, station access points, and commercial space.

The expansion of the station’s footprint totals 355,200-square-feet (33,000 square meters) over the course of a few projects:

- **Main Concourse / Hall 1:** Pushing out the wall under the platforms and adding waiting areas. This increased the space in the station’s main passenger circulation area by 30%.
- **Hall 2 Pompidou:** A new concourse that is fully accessible—via stairs, escalators, and elevators—to all 6 platforms. It was built to help relieve congestion in the main hall by taking on an estimated 20% of the station’s foot traffic.
- **The Galerie Villette:** A new concourse opened on the east side of the station in 2022 that added 43,000 square feet (4,000 square meters).
- **Béraudier Gallery:** The 107,600-square foot (10,000 square meters) multi-level commercial gallery that opened four more access points to the station on its west side.

Place Charles Béraudier

Place Charles Béraudier is the main front plaza and interchange on the west side of the station—where 75% of rail travelers exit—in the heart of the La Part-Dieu district. One of the most significant projects in the station’s transformation is reimagining this space into a new, multi-level plaza and circulation area for a more comfortable station experience.

⁶ Figures in this section were provided to authors during the meeting and site tour Frédéric Longchamp of SNCF Gares & Connexions, Director of the Lyon-Part-Dieu redevelopment, and our meeting with Guillaume Bruge of SPL Lyon-Part-Dieu.

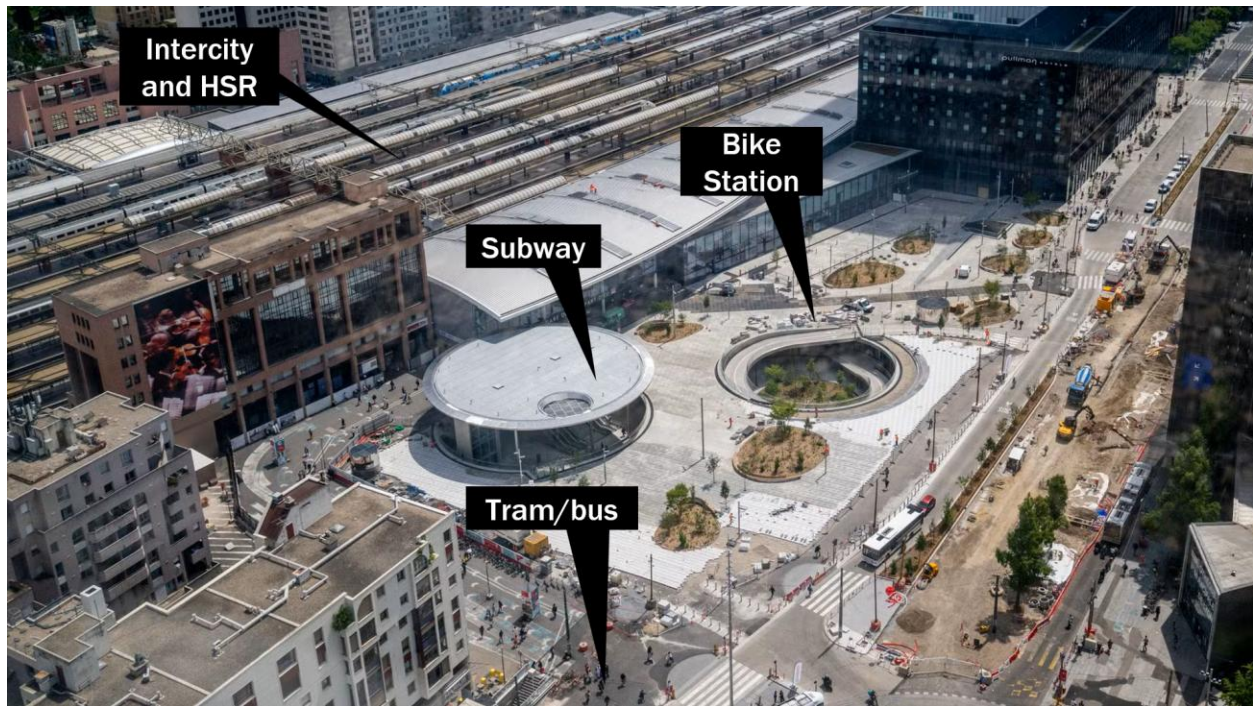


Figure 62. *Lyon-Part-Dieu Station 2.0 nearing completion in summer 2025. Lyon-Part-Dieu Station has been thoroughly redesigned to prioritize the most sustainable and space-efficient modes by putting these closest to the main station entrance along Place Charles Béraudier on the west side of the station.*

Source: Bruno Amsellem/Divergence for Le Monde, annotations by authors

On the ground level, a new large open plaza, which [opened in September 2025](#) a few months after our visit, is a transitional zone for pedestrians passing through the station area, both for rail travelers and non-rail travelers. Below ground is a large concourse that facilitates connections between several transport modes. Perhaps the most significant improvement is the passageway to Metro Line B because, of the 75% of rail travelers who exit to the west side of the station, 60% of them transfer to the metro. This lower level also features the new 1,500-space bike garage, which is now France's largest bike parking facility.

There is also taxi stand and a kiss-and-ride area that is located underground and out of the way, minimizing disruption of vehicle traffic to the main parts of the station on the surface. There is also a multi-level parking garage with 600 spaces spread across three levels underground.

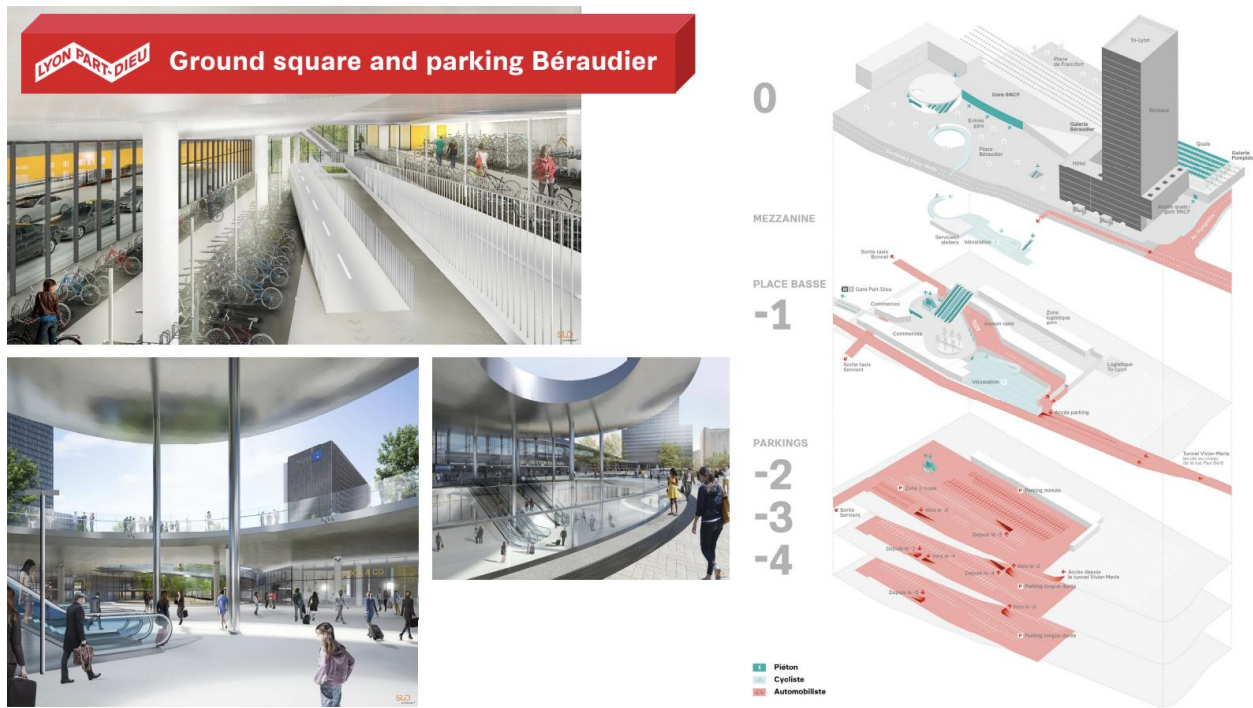


Figure 63. *The Place Charles Béraudier is a multi-level interchange for the highest-trafficked area of Lyon-Part-Dieu Station. On the ground level, a large public plaza for pedestrians—rail travelers and non-rail travelers—to comfortably through the area. On the lower levels, there is a passage to the metro, bike and car parking garages, and a taxi stand.*

Source: Société Publique Locale (SPL) Lyon-Part-Dieu

Pompidou Passageway: Connecting two sides of the tracks by reclaiming space from cars and giving it to people

One important realization for planners in Lyon was that the station serves a vital role as a safe connector for walking and biking *through* the station area between the Villeurbanne neighborhood on the east side of the tracks and the Vivier-Merle district on the west side. The most significant renovation for this crossing took place at the southern end of the station on *Avenue Georges Pompidou*, the street that passes under the tracks. This underpass, which previously was for cars only, is now exclusively for pedestrians and cyclists.

In fact, two significant improvements were achieved in this one sub-project, which was basically just pushing out the wall from the inside of the station. On the inside, more space was created for a new concourse, Hall 2, and access to the tracks with new stairs, escalators, and elevators up to all the station's platforms. On the outside, the size of the passageway is smaller than when it was for vehicles, but there is still enough room for a four-meter-wide two-way cycle path and two pedestrian walkways on both sides that are each about two meters wide. Because it is for pedestrian and bicycle-only, it doesn't need to be as large to facilitate efficient and comfortable mobility. It also includes 130 new bike racks, 40 of which are docks for Lyon's bikeshare service [Vélo'v](#).



Figure 64. *The Pompidou Passageway enhances the station's purpose as a neighborhood connector across the tracks. Previously a four-lane roadway, it was converted to a biking and walking connection next to an inside concourse that now provides secondary access to all boarding platforms.*

Source: SPL Lyon-Part-Dieu

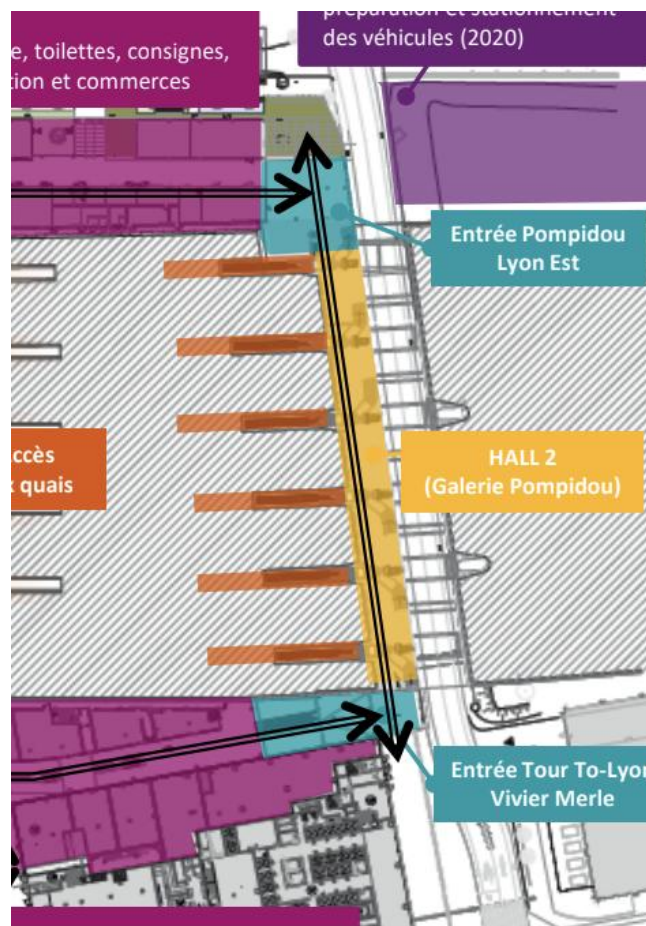


Figure 65. *A screenshot of a diagram of Lyon-Part-Dieu station zoomed into the south side of the station over the Pompidou Avenue underpass. The yellow rectangle indicates the new Hall 2, the vertical black line with arrows indicates the old wall between the station building and the underpass. The Hall 2 expansion pushed the station building slightly outward, slightly decreasing the size of the Pompidou Passageway. Before the station renovation project, the entirety of the underpass was dedicated to cars. Now, it is for pedestrians and cyclists, while the wall from inside the station was pushed out to make room for a new boarding concourse with full accessibility—stairs, escalators, and elevators—to all platforms.*
Source: SNCF Gares et Connexions

2.2.3 Gare de Strasbourg-Ville: A bold station for a somewhat smaller city

Though Strasbourg is not as populous as the other European cities we visited—300,000 people within the city and around 490,000 in the metropolitan area—its station nonetheless moves people very efficiently each day and across different scales. Gare de Strasbourg-Ville sees almost [80,000 travelers on a daily basis](#), and is expecting that number to jump to [100,000 passengers by 2030](#). Like Lyon, it is a key rail hub for France in a couple of ways. For one, it sits on one end of France’s fastest high-speed line, *LGV-Est*. Second, being located right on the French and German border, it is used as a key interchange with services connecting to Germany, Switzerland, and Belgium, sometimes referred to as the “crossroads of Europe.”

Strasbourg is one of several smaller-to-midsized French cities that has leveraged investment in a major rail hub to significantly improve mobility and reshape the city in ways rarely seen in the United States. With a strong mix of high-speed and regional rail services, a robust tram network, and streets that prioritize walking and cycling, Strasbourg demonstrates that great stations come in all sizes. What matters most is how effectively they connect rail travelers to the city core and to local transportation networks—efficiently, comfortably, and seamlessly.

Gare de Strasbourg-Ville

- **Intercity Rail**
 - *SNCF TGV InOui*
 - *SNCF Intercités (IC)*
 - *DeutscheBahn Intercity Express (ICE)* – German National HSR Operator
- **Regional Rail**
 - *SNCF Transport Express Régional (TER) Grand Est*
- **Local**
 - Tram – 3 lines
 - Local Bus – 3 routes
 - *Bus à Haut Niveau de Service* (French translation to Bus Rapid Transit) – 2 routes
 - Cycle – 1,400+ spaces, including one Velhop (bikeshare) station

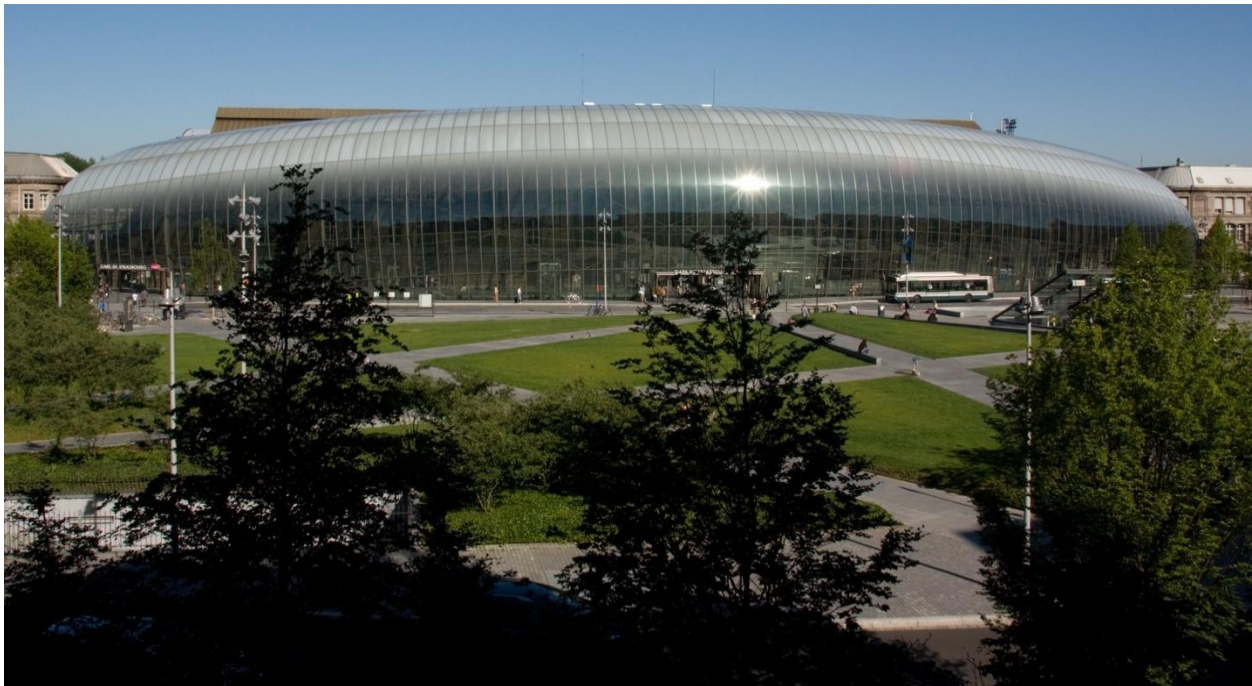


Figure 66. *View of the front of Gare de Strasbourg-Ville from the opposite end of Place de la Gare, the station's main front square.*

Source: Poudou99, Wikipedia

Multiple factors led to the decision to revamp the Strasbourg-Ville Station into the station it is today. Originally built in 1883, the station evolved over the years, but was not keeping up with the city and French rail network's growth in the second half of the 20th century. As passenger volumes grew—particularly after Strasbourg was selected as the seat of the European Parliament in 1992—the station became increasingly inadequate in size. The station was also outdated in its design and heavily shaped by the car-centric ethos of the post–World War II “Trente Glorieuses” era, much like Lyon-Part-Dieu.

At Strasbourg-Ville, vehicles were allowed to pick up and drop off passengers directly at the station's front entrance, as shown below in Figure 31. Upon exiting the station, travelers were met by a wall of traffic and a vast expanse of surface parking. This condition was improved in the early 1990s during the construction of the Strasbourg tram network with the *Gare Centrale* station, the only underground station of the tram system right under the front plaza, *Place de la Gare*. These upgrades provided more pedestrian space and pushed car traffic further away from the entrance, but it still wasn't quite enough. The connection between the train station and tram station was still not direct, as you still had to exit the station building and make your way outside to get to the nearest entrance.



Figure 67. *Gare de Strasbourg-Ville circa 1970. Like many other stations at this time, car access was prioritized at the very front of the station.*

Source: Photographer unknown, accessed via SNCF Gares et Connexions

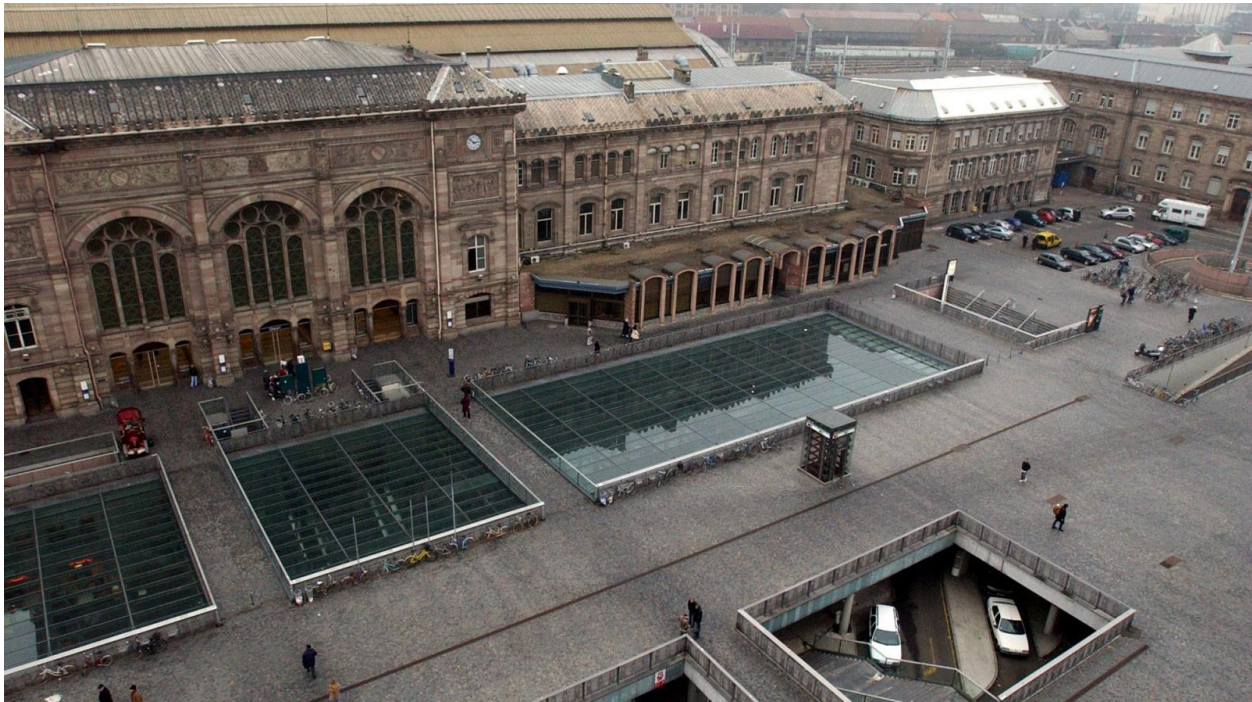


Figure 68. The front area of Strasbourg-Ville after the construction of the Gare Centrale tram station and reconfiguration of Place de la Gare.

Source: *Dernières Nouvelles d'Alsace (DNA)*

By the early 2000s, Strasbourg and SNCF realized it again needed to upgrade the layout and facilities for how people moved throughout the station and between different modes, especially in anticipation of higher passenger volumes with *LGV Est* under construction, which would slash the train trip between Paris and Strasbourg from four hours to around 2h20m⁷. So, less than a decade after the major reconfiguration that came from the new tram station, Strasbourg and SNCF took on an even larger reconstruction project of the station with two projects centered around significantly enhancing pedestrian movement. Both were completed right in time for the commencement of high-speed rail service.

An audacious and forward-looking expansion for a historic station

As the high-speed line was under construction, the station added four new tracks, going from nine to 13, and extended platforms to accommodate longer TGV trains. The facility also added a new platform access concourse at the north end, which provided travelers with a third platform access concourse. However, Strasbourg looked at the station space and the area around it and realized the circulation of people within the complex needed to be improved as well. It needed to greatly expand indoor space, something very important in Strasbourg's sometimes inhospitable wintertime climate.

The original station building was designated as a historic site in 1984, so drastic changes to the existing structure were out of the question. Instead, an 86,000-square-foot glass roof was constructed over and around the original building, expanding the overall footprint of the

⁷ When the line originally opened in 2007, the trip time was 2h20m as this was the first phase of the line's opening. Trips were reduced to 1h45m when the second phase of the line opened in 2016.

station. Stretching out 25 meters from the front of the building, it covered the front entrance and where the driveway used to be and created a whole new concourse with approximately 32,000 square feet ([~3,000 square meters](#)) of additional indoor circulation space. It also stretches out far enough for access points down to the underground tram station and parking garage to be encapsulated inside of the new concourse, creating a more cohesive transit hub facility by better integrating heavy rail services and tram services.



Figure 69. Construction of glass roof.

Source: Fabien Romary, <https://www.archi-wiki.org/index.php?curid=19933>

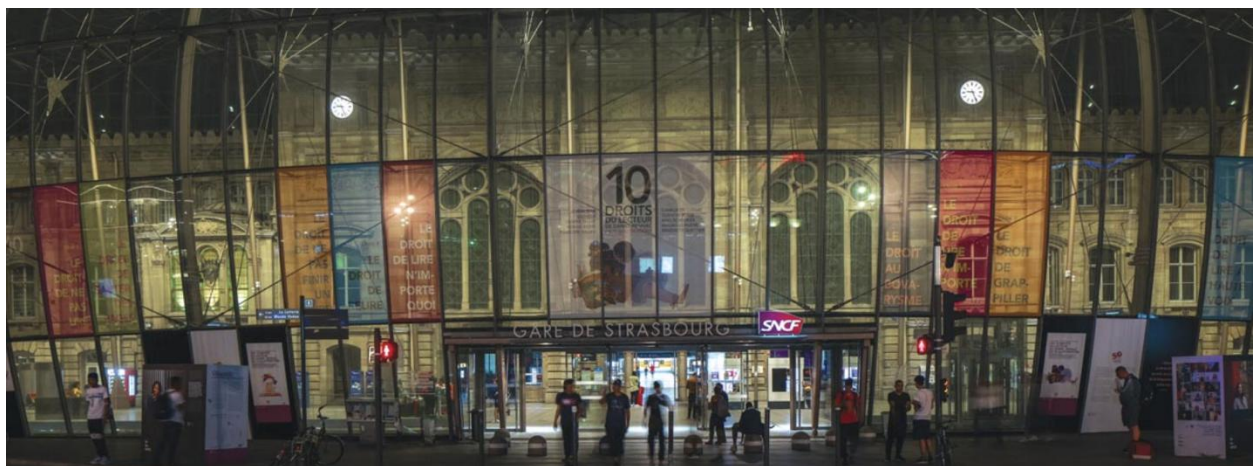


Figure 70. Front-facing view of completed glass roof over the original station façade.

Source: Photographer unknown, accessed via SNCF Gares et Connexions



Figure 71. *Original station façade inside the glass roof.*
Source: Hunter Bickel



Figure 72. Access to underground tram station, Gare Centrale, and parking garage enclosing under the glass roof, creating a more direct connection to heavy rail services.
Source: Diliff - Own work, CC BY-SA 3.0,
<https://commons.wikimedia.org/w/index.php?curid=31549959>

While some argue the glass "bubble" diminishes the original façade's grandeur, it created a sunlit indoor concourse that expanded the station's footprint and moved its entrance forward. Rather than demolish and rebuild, the project preserved the original, already spacious station

and its striking design, while expanding its footprint through a contemporary addition. This expansion took place alongside another large-scale project that drastically improved movement between the station and the city and other local transportation networks.

The present-day Place de la Gare: A highly-valued transitional space between station and city

At many stations, public plazas and transitional zones immediately surrounding the buildings significantly enhanced the user experience. These "threshold spaces" serve several vital functions. For commuters, these areas offer room to spread out during peak periods rather than being confined. For first-time visitors, they provide essential orientation; stepping into an unobstructed open area allows for intuitive wayfinding in an unfamiliar city. From a placemaking perspective, these plazas offer "breathing spaces" within dense transit districts. They create a pleasant environment for both travelers and passersby, accommodating a range of activities—from residents seeking fresh air and friends meeting for lunch to small-scale cultural events.

Strasbourg-Ville's [Place de la Gare](#) is the large plaza in front of that station many group members appreciated in its role as a threshold space between the station and the city core of Strasbourg. This spacious open area is helpful in such a high-traffic zone for rail passengers and others who are just passing through the area. While Lyon-Part-Dieu's *Place Charles Béraudier* and Barcelona-Sants's *Plaça dels Països Catalans* are newer or under construction transitional zones, *Place de la Gare* is well-established and has some unique features.



Figure 73. *This image shows the generous space in front of Strasbourg Main Station, Place de la Gare, which is primarily reserved for pedestrians. Public buses run along a narrow two-lane road directly in front of the station, which is for their dedicated use. Most private vehicles are routed to the opposite side of the district, where they can access the underground parking garage and several rental car offices, shown bottom left in this image.*

Source: Michel Desvigne, Paysagiste

On the far side of the almost five-acre ([two-hectare](#)) plaza, a row of hotels marks the beginning of the city. This transitional zone provides generous space for walking, cycling, and transit, making movement through the busy station area far more comfortable. Rather than concentrating all connections in a single location, transit functions are distributed across the plaza, with multiple bus stops and bike racks serving travelers arriving from and departing toward different directions of the city.

The narrow two-lane road that runs directly in front of the station entrance is reserved solely for buses. Most private vehicles are routed to the opposite side of the plaza, where they can access the underground parking garage and several rental car offices. Traffic-calming measures further manage this access, slowing vehicles and heightening driver awareness by channeling them through a deliberately narrow driveway with tight turns.

Although the plaza creates a buffer between the station and the city, it still enables direct, easy access for pedestrians. From the station's main entrance, a straight walk across it leads to *Rue de Marie Kuss*, the pedestrian spine of the *Quartier de la Gare* ("station district"). This makes

the area a well-judged transition space by providing breathing room without sacrificing connectivity.



Figure 74. *Aerial view of Place de la Gare in 1968.*
Source: Dernières Nouvelles d'Alsace (DNA)

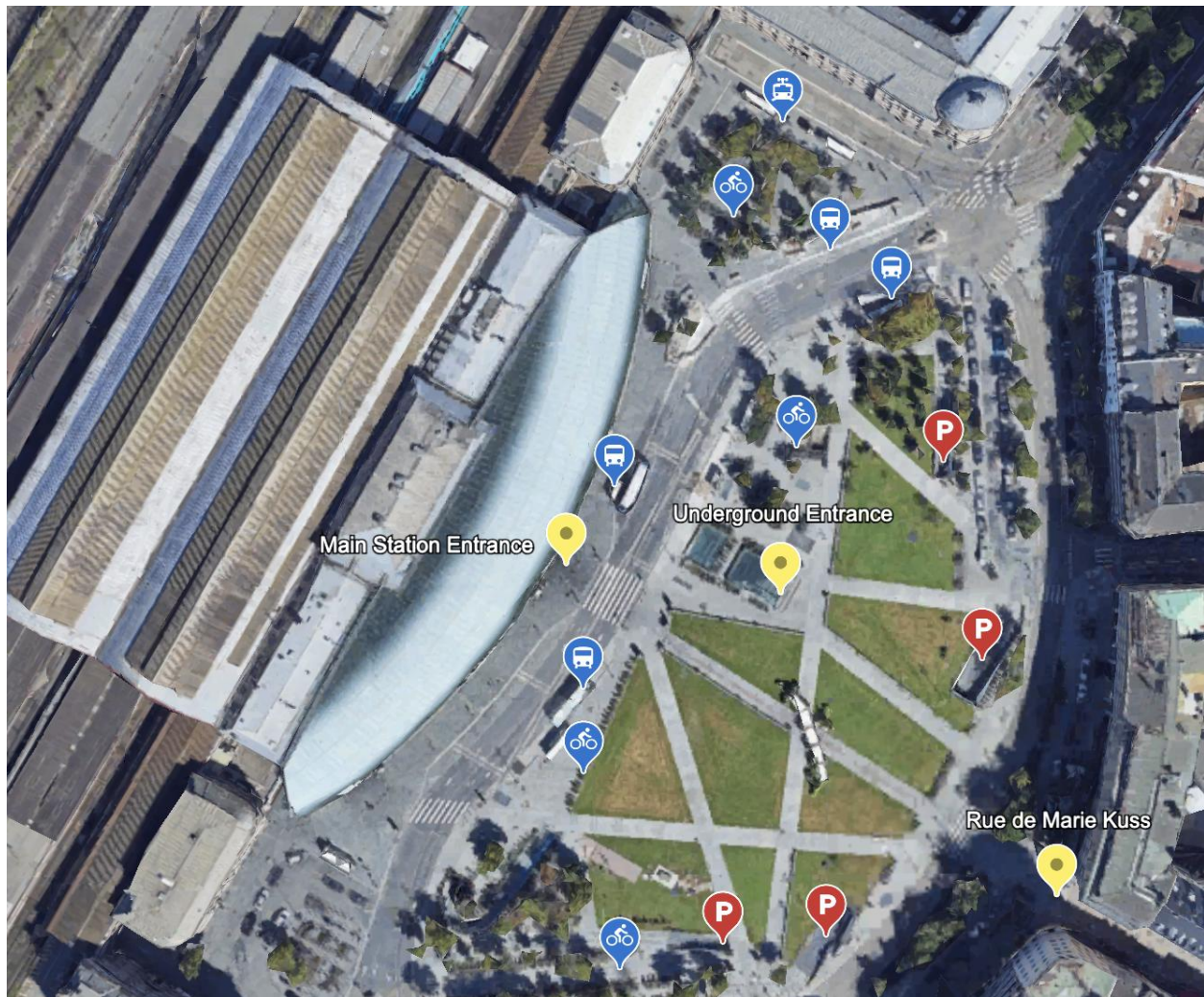


Figure 75. Aerial view of Strasbourg Main Station (Gare de Strasbourg) and Place de la Gare, showing transit connection points distributed throughout the plaza. The station prioritizes mass transit and micromobility, with a tram stop directly adjacent to the main entrance (top of image), and bus stops and bike racks positioned to serve travelers arriving from multiple directions. Car access is limited to underground parking and pushed away from the station frontage. Also not shown is the underground connection to two additional tram lines, accessible via an entrance in the center of the plaza.

Source: Google Earth, annotations by authors

“When vehicles and parking spaces do not immediately surround primary station entrances, the station becomes more welcoming and convenient for all. Strasbourg and Paris Gare du Nord are good examples of this, where no parking is visible from the front of the station, but pedestrian activity is bustling. These buffer zones can also add to this effect, like in Strasbourg. They can help transition between station and city, weaving the urban fabric together while offering travelers places to relax or socialize.” — Joseph Faria-Poynter

More to come for Strasbourg

While Strasbourg-Ville Station has developed impressively since the early 2000s, it remains heavily oriented toward the east and the historic core. The western side is quite literally the "other side of the tracks"—a neglected back door. Unlike the reconfigured Lyon-Part-Dieu for example, the station fails to adequately connect the neighborhoods separated by the rail lines.

Strasbourg aims to address these shortcomings through the Gare 360 Degrés project. As the name suggests, the plan seeks to transform Strasbourg-Ville into a station that better serves the city from all sides by tackling the issue of the isolation of the Remparts neighborhood on west side of the tracks. The project's long-term ambitions center on broader urban placemaking and development, but its early phases focus on immediately enhancing mobility. These first-stage improvements are expected to be delivered by the early 2030s (Figures 66–68):

Underpass reconfiguration: *Rue Georges Wodli* is a key link under the tracks between the east and west sides of the right of way, as it is the closest crossing to the station. Planners are considering taking this underpass with car traffic and giving it to pedestrians and cyclists, like the Pompidou Passage at Lyon-Part-Dieu. The idea is to link this throughway with a new access point and walkway leading to the main station hall.

New concourse for platform access: Officials are considering rehabilitating the "Post Office Tunnel" at the station's north end to create a fourth platform access concourse. While reopening the tunnel won't immediately improve west-side connectivity, planners suggest it could eventually serve as a vital link between the two sides.

New space for travel interchanges and retail: At the intersection of *Rue de Remparts* and *Rue Georges Wodli*, a new western concourse will feature shops, a bus terminal, a taxi stand, and a parking garage. Its location near the *Autoroute de l'Est* exit ramps ensures easy access for automobiles, capturing travelers who might otherwise drive and keeping heavy vehicle traffic out of the station's central core, and regional and intercity buses.



Figure 76. *Conceptual drawing facing the new passenger area at the intersection of Rue Georges Wodli and Rue de Remparts in a repurposed building, which is currently a public house. To the left-hand side of the image, you can see where the new bike path leads people under the tracks and creating a link to the main station area on the east side. This improvement is considered the first stage of the Gare 360 degrés plan, where a foundation will be laid for better activity on the west side of the tracks and connectivity between both sides.*

Source: Drawing by Lise Leménorel / Arep, accessed via rue89strasbourg.com



Figure 77. *Conceptual drawing of the passageway under the tracks on Rue Georges Wodli. This is on the east side of the tracks, where the main station and district are. The passageway is some distance from the station building, so there will be a new pathway that leads passengers to the station, which begins at the “Gare de Strasbourg” sign.*

Source: Drawing by Lise Leménorel / Arep, accessed via rue89strasbourg.com

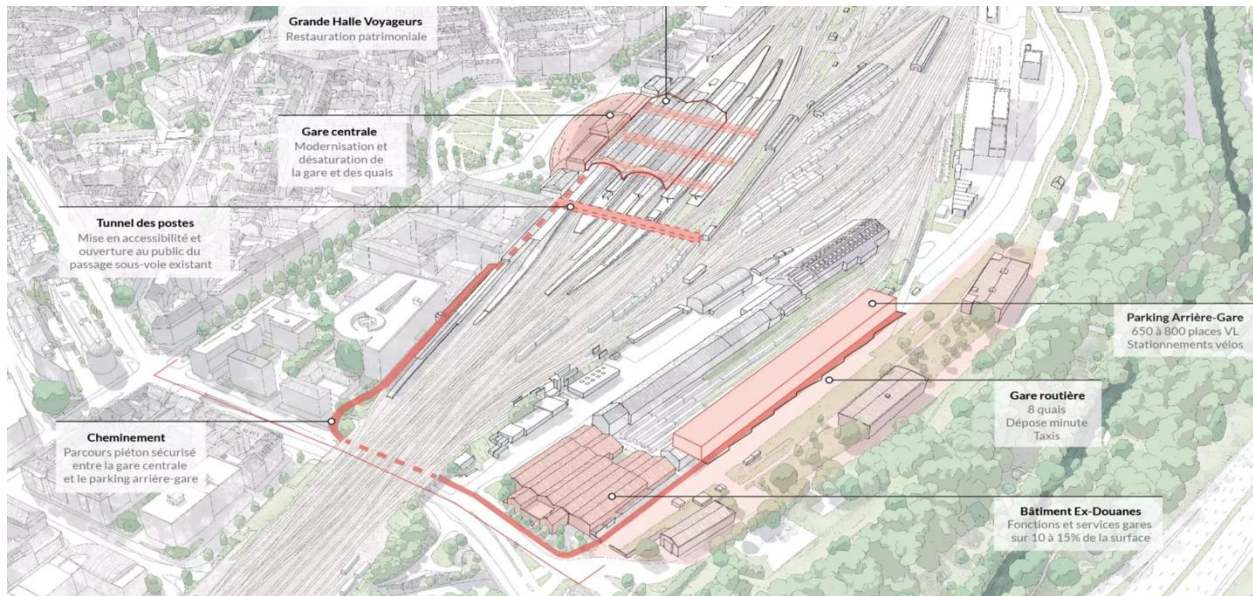


Figure 78. *Diagram of the first stage of Gare 360 Degrés projects. Facing south, this drawing offers a broader view of foundation being laid for a station that covers more ground in the surrounding area, thus better serving the west side of the tracks. The new building with the bus station and parking structure are connected are shown to be roughly linked on Rue Georges Wodli under the tracks in anticipation the passageway is reconfigured for pedestrians and cyclists.*

Source: Drawing by Lise Leménorel / Arep, accessed via rue89strasbourg.com

Great stations put people first

Mass transit works best when many people are traveling between the same origin and destination that are concentrated into dense, urbanized areas. The same cannot be said for cars, where congestion undermines speed, reliability, and comfort. With rail and mass transit, relatively little space is needed to move large numbers of people efficiently.

People congestion also sets the surrounding station district up for success. By prioritizing space for people, rail and transit hubs can attract more activity—more “traffic” in the form of footfall—which in turn supports vibrant urban and economic life. Fewer cars are needed to access the station, resulting in less vehicle traffic, noise, and pollution. The outcome is a more vital, inviting, safer, and more comfortable station environment overall.

3. Lesson 3: People-centric stations do more than simply move people; they also shape the neighborhoods and broader urban areas around them

Large rail stations are the nuclei of the urban districts in which they are located. Well-designed ones optimized for quick, efficient, and comfortable travel can also foster lively, thriving city center neighborhoods. SNCF *Gares et Connexions* (G&C)—the French national rail station management and planning subsidiary body—views stations as the true “urban integrator.”

There is no right or wrong, nor is there a standard or a set criteria planners must follow. We saw a variety of stations of different designs and ages, we observed stub-end terminals and through stations, each shaping the neighborhood around them in unique ways. But the best stations with the liveliest neighborhoods all had something in common: they were designed for people rather than for vehicles.

3.1 France’s historic station districts are designed for foot traffic

In maintaining this design, these station districts flourish as vibrant urban areas. It is important to note that these station facilities and their infrastructure layouts are very different from each other; Paris stations are stub-end terminals, Strasbourg is a through-running station. Still, in their own unique ways, they facilitate an environment for the people who use these stations and frequent the areas around them.

Our early experiences in Paris and Strasbourg fed into a larger theme the group discussed throughout the rest of the trip: the impacts of stub-end terminals versus through-running stations on broader urban areas.

3.1.1 Terminal stations of Paris: Enduring anchors of urban life

In the early days of the railways, most major stations were built as stub-end terminal facilities: tracks approached from one direction and ended at a station located in or near the city center. Being the large city that it is—and given its role as the crossroads of most of the country’s rail lines—Paris has seven “main” large city center rail stations. All of these are stub-end terminals to intercity rail lines that emanate outward in different directions from the capital city, forming a star-shaped pattern: Gare du Nord is the terminal for lines coming from the north, Gare de l’Est serves the *LGV Est* line to Strasbourg, Gare de Lyon serves the *LGV Sud-Est* corridor to Lyon, and so on.⁸

⁸ This map shows the different areas of France that are served by each of the terminal stations in Paris: [Railway stations and area directly served by trains on departure from Paris, France](#).

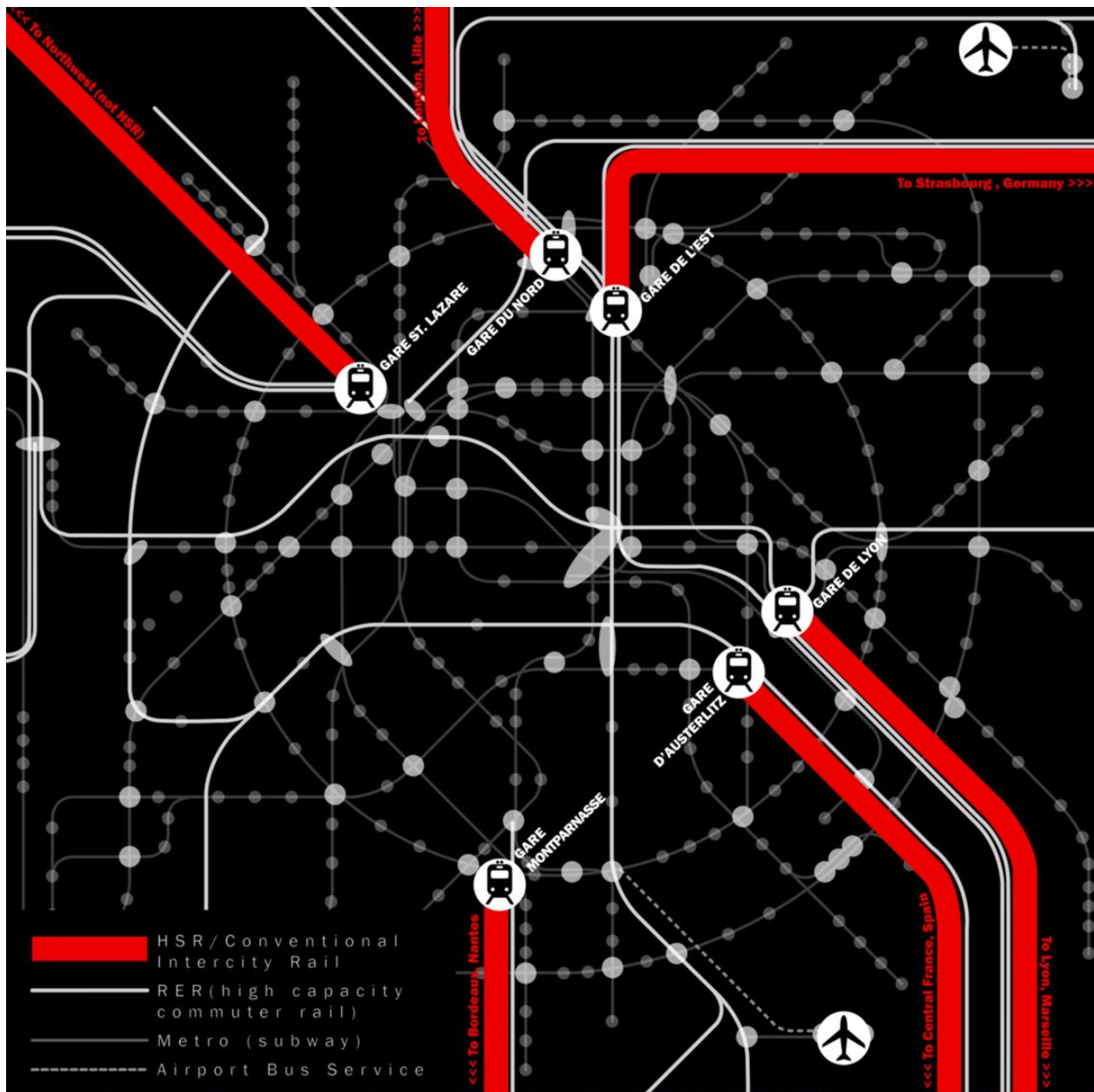


Figure 79. *Six large terminal or “stub-end” train stations in Paris, which mark the end of the various HSR lines that serve different regions of France and Europe. For example, trains bound for London or Lille leave from Gare du Nord, while trains bound for Lyon or Marseille use Gare de Lyon. The arrangement of stations forces passengers who are simply passing through Paris on their way to other destinations to make often time-consuming transfers between stations by public transportation.*

Source: Graphic Eric Eidlin, adapted from Paris base map by Jug Cerovic

The arrival of these 19th-century rail terminals transformed rural outskirts into dense urban neighborhoods. While the rail lines initially attracted industrial activity, they now anchor modern urban life, surrounded by clusters of retail, dining, and business. These stations remain vital mobility hubs, yet they have evolved into vibrant districts. Because they were developed long before the automobile, these neighborhoods prioritize walking and compact activity over car travel.

During our four-night stay in the 10th arrondissement, we lived the station's influence firsthand. Our hotel was a short walk from Gare de l'Est, and our first evening exploring the area revealed how deeply the neighborhood has developed around its infrastructure. It was clear that the district's vibrancy is directly shaped by transit investments that dictate the flow of people through the city.

We also toured Gare Saint-Lazare, Paris's oldest mainline station, and spent a lot of time in the surrounding 8th arrondissement. Anchored by the station since 1837, with its current building completed in 1889, this area is a bustling commercial center for major international firms. Like Gare de l'Est, the station is defined by a large public plaza at the heart of a pedestrian-friendly design that integrates the station into the city fabric, supporting a vibrant daily life for commuters and travelers alike.



Figure 80. *Aerial view of Gare de l'Est (left) and Gare du Nord (right) and surrounding urban context of Paris' 10th arrondissement. This image clearly shows how neighborhoods in central Paris grew up around transportation infrastructure, and especially large terminal stations.*

Source: David.Monniaux, [Wikimedia Commons](#)



Figure 81. *As shown in this aerial, Saint-Lazare integrates into the dense street grid, demonstrating how a central station drives pedestrian circulation, supports adjacent land uses, and influences the commercial viability of its surrounding urban context. This station sees an impressive 416,000 total visitors daily—three times the number of people who pass through San Francisco International Airport on a given day.*
 Source: Google Earth

These areas' emphasis on people rather than cars is a major reason they have become activity-rich urban centers. In both the 8th and 10th arrondissements, streets are narrow, with at most one or two lanes for cars, often supplemented by one or two bike lanes and minimal surface or curbside parking. Some side streets are entirely closed to vehicles, creating space for outdoor dining and pedestrian movement. Larger streets approaching the stations typically feature buffered cycle lanes. Prioritizing slower, sustainable, and space-efficient modes near stations enhances safety and reduces noise, while historic buildings continue to host offices, hotels, shops, and cafés—without a single surface parking lot in sight.

Each station acts as an urban anchor, both shaping and responding to the surrounding dense street grid. By concentrating pedestrian flow, the station bolsters the commercial vitality of adjacent blocks, with streets often naturally guiding people toward the facility as a central focal point. Connectivity remains seamless; bridges and integrated street designs ensure rail infrastructure serves the city without disrupting the urban fabric. Furthermore, by routing regional rail through post-1960s tunnels, planners preserved the original terminal layouts and the vibrant urban life they host.

Stub-end terminal stations, unlike through-running lines, do not slice through the city, allowing them to support more cohesive and livable urban districts. While less efficient operationally, terminals often provide substantial benefits for urban life and placemaking, a point repeatedly noted by participants during our trip.

This observation ties back to one of rail travel's core strengths: proximity. By enabling hundreds of thousands of daily movements within a compact footprint, these stations make it possible for dense, vibrant urban centers to flourish around them.

"Paris St. Lazare ... provides seamless access from the primary entrance to the heart of the city's 8th arrondissement. Paris Gare du Nord does the same in the 10th arrondissement. Unlike through-running stations, both St. Lazare and Gare du Nord are much more easily accessible from all sides and are more integrated with the urban landscape, providing quick and direct access to hotels, cafes, and everything in between." — Joseph Faria-Poynter



Figure 82. *The track approach looking north from St. Lazare. This photo shows how tidily a high-volume and high-capacity rail corridor can fit into a dense urban environment.*

Source: Dicklyon, [Wikipedia](#)

The spatial efficiency of rail stations and track infrastructure as compared to airports is even more glaring when looking at Paris. Figure 83 shows Paris Charles de Gaulle International Airport (CDG) on top, below this is an aerial image of central Paris at the same scale. This shows that the amount of land taken up by CGG airport amounts to a substantial portion of Paris, one of Europe's largest cities. And this view includes all six major terminal stations in Paris, which collectively accommodate almost two million daily passengers. This is over ten times as many people who visit Paris CDG on a daily basis.

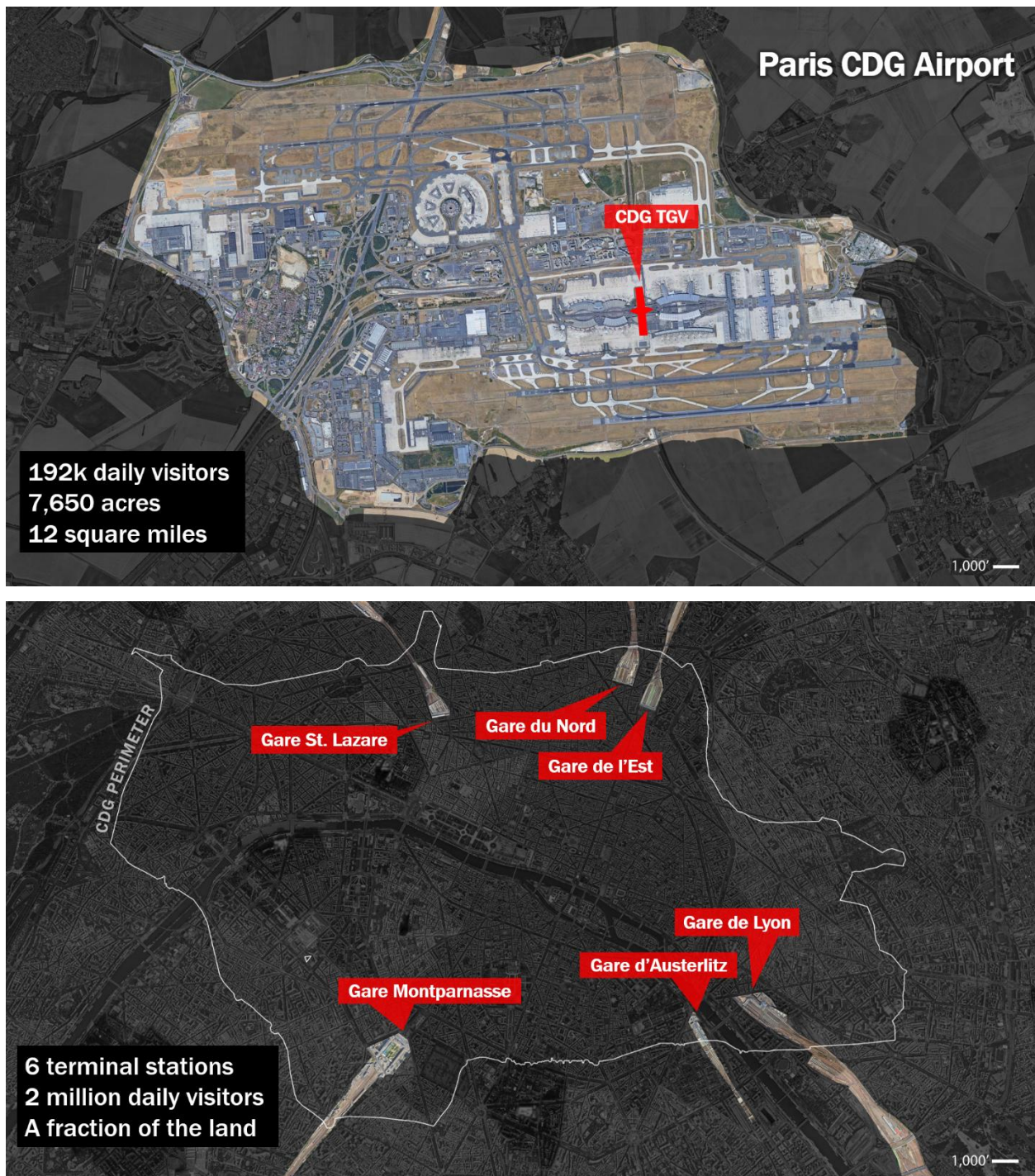


Figure 83. Comparing the spatial efficiency of rail and air infrastructure: the case of Paris. This graphic illustrates that all six of Paris's central train terminals—and most of the surrounding central city—could comfortably fit within the footprint of Charles de Gaulle (CDG) Airport, occupying only a fraction of the land.

Source: Eric Eidlin

Table 5. Size and Daily Visitors of Paris Stations and CDG Airport

Facility/Neighborhood	Surface Area	Average Daily Visitors ⁹
Paris Charles-de-Gaulle International Airport	7,650 acres / 12 sq. miles (32 sq. km)	192,000
8th arr. (Gare Saint-Lazare)	959 acres / 1.5 Sq. miles (3.88 sq.km)	416,000
10th arr. (Gare du Nord & Gare de l'Est)	715 acres / 1.12 sq. miles (2.89 sq. km)	946,000

Table 6. Paris Stations + CDG Airport — Average Daily Visitors (2024)

Location	Annual Visitors (2024)	Daily Visitors
Paris Gare du Nord	291,681,697	799,000
Paris Saint-Lazare	152,124,655	416,000
Paris Gare de Lyon	144,574,465	396,000
Paris Montparnasse	86,231,246	236,000
Paris Gare de l'Est	53,935,809	147,000
Paris Austerlitz (<i>estimate</i>)	25,000,000	68,000
Paris Charles de Gaulle Airport (CDG)	70,290,260	192,000

Sources: [SNCF fréquentation en gare](#); [Paris Charles de Gaulle Airport](#)

3.1.2 Strasbourg's streetscape activity centers around its main rail station

The district surrounding Gare de Strasbourg-Ville is aptly named *Quartier de la Gare*, reflecting the station's undeniable influence on the area. The local street grid radiates from and converges at Place de la Gare. Streets leading to the station are lined with restaurants, cafes, and shops. Key nearby destinations, such as the Place des Halles shopping center and the Médiathèque Olympe de Gouges media library, further anchor this vibrant neighborhood.

The station's transit options and the district's diverse urban life are mutually reinforcing. Since the [car-dominated post-war era](#), the city has reclaimed the station interface for pedestrians. The revitalization of Place de la Gare—alongside expanded tram, cycle, and [pedestrian arterials](#)—has streamlined travel within the city core. By deprioritizing private vehicles and removing them from the station front, Strasbourg has reduced congestion in the surrounding narrow streets, making sustainable transport the most convenient choice.

⁹ These figures include the average total number of people who utilize the station daily, including for reasons unrelated to travel like dining and shopping. These numbers are the total visitors in the year 2024 divided by 365.

The reduction in car traffic has spurred a vibrant influx of pedestrians, making the district a more attractive destination. Visitors can move freely and comfortably alongside thousands of others; even in such a busy hub, the layout provides ample breathing room. This compact, pre-automobile development thrives when space is prioritized for people-centered mobility, allowing diverse amenities to flourish in an accessible core. This accessibility would be compromised if the area were overrun by vehicles and pedestrians were confined to narrow sidewalks.



Figure 84. Strasbourg's Main Station and the greenspace surrounding it.

Source: Photographer unknown, accessed via The Thierry Muller Group



Figure 85. *View of Strasbourg Place de la Gare.*

Source: Photographer unknown, accessed via tabiparislax.com



Figure 86. *A west-facing view on Rue de Maire Kuss where the city and station area transition from one another, as Gare de Strasbourg-Ville can be seen in the background.*

Source: La Petite Auberge de Strasbourg

However, while the eastern station area is a thriving environment, the expansive ground-level tracks to the west create a significant divide. The western Remparts neighborhood—home to historic fortifications and the Fosse des Remparts park—remains awkwardly isolated between the railway and the *Autoroute de l'Est*.

The Gare 360 Degrés vision aims to bridge this gap by [opening the station to the west](#), integrating the neighborhood with the broader city while preserving its heritage. Beyond mobility improvements outlined in Lesson #2, redevelopment that includes a hotel and expanded green space is being explored. While [a new direct crossing is under study](#), implementation is estimated for 2040–2050, as planners must first account for a massive capacity expansion that could nearly double the station tracks from 13 to 25.

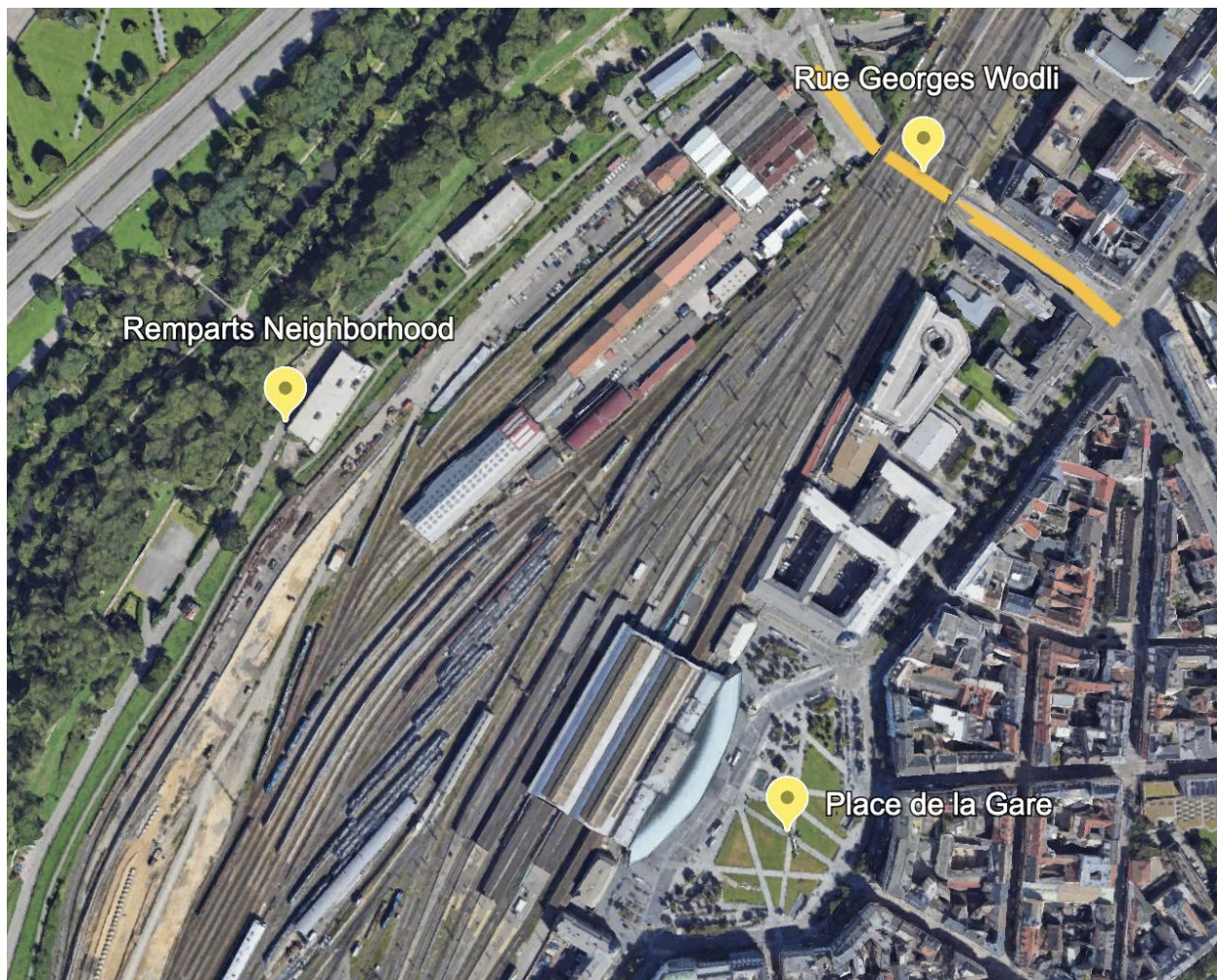


Figure 87. *Strasbourg's Quartier de la Gare streetscape on the east side of the right of way is centered around the core station area, but the Remparts neighborhood on the west side is completely isolated.*

Source: Google Earth

Ultimately, Paris's terminal stations demonstrate how stub-end designs minimize urban bisection, and how Strasbourg presents the challenges of through-running infrastructure. It highlights the difficulty of maintaining the operational efficiency of a through-running station while mitigating physical disruption—a balance that requires the same creative urban design observed at other stations throughout the trip.

3.2 Right-of-ways reimaged: City building around rail infrastructure

The group noted that while stub-end stations favor placemaking, several well-designed through-running stations successfully reduce the "barrier effect" of tracks. These cases prove that regional rail operations can thrive without preventing a vibrant urban district from developing around them.

In Paris and Spain, impressive engineering enables through-running services via tunnels beneath historic terminals and city centers. By keeping rail operations far below the surface, these hubs minimize disruption to the urban fabric. They achieve the best of both worlds: the efficiency and connectivity of through-running operations paired with the placemaking benefits typical of terminal stations.

However, such tunnels require costly engineering, and many cities must manage existing surface infrastructure without the option of subterranean expansion. These cities have used creative urban design to mitigate the impact of tracks bisecting central neighborhoods, ensuring the divide is minimized and a lively, integrated district can still exist.

3.2.1 The redesigned Lyon-Part-Dieu Station maximizes space for people to pass under the tracks

The redesigned Lyon-Part-Dieu Station maximizes permeability beneath its tracks. Although the rail lines bisect the city, their 15-foot elevation minimizes their impact on neighboring districts. Travelers access platforms via Hall 1, which opens to both sides of the elevated structure, while streets continue freely below. As noted in Lesson #2, 30,000 daily non-rail travelers use the station as a vital pedestrian link. Planners and architects embraced this role when designing Lyon-Part-Dieu 2.0, further reducing the barrier effect by expanding circulation and adding access points throughout the complex.

Two major interventions define this approach:

- 1. An expanded station footprint:** Enlarging the station increased rail capacity while creating a more comfortable thoroughfare for local pedestrians.
- 2. Creation of the new *Pompidou Passageway*:** Closing this route to cars and dedicating it to cyclists and pedestrians allowed the concourse to grow with the construction of Hall 2.

Together, these improvements facilitate movement beneath the tracks, transforming two separate neighborhoods into a single, integrated station district.

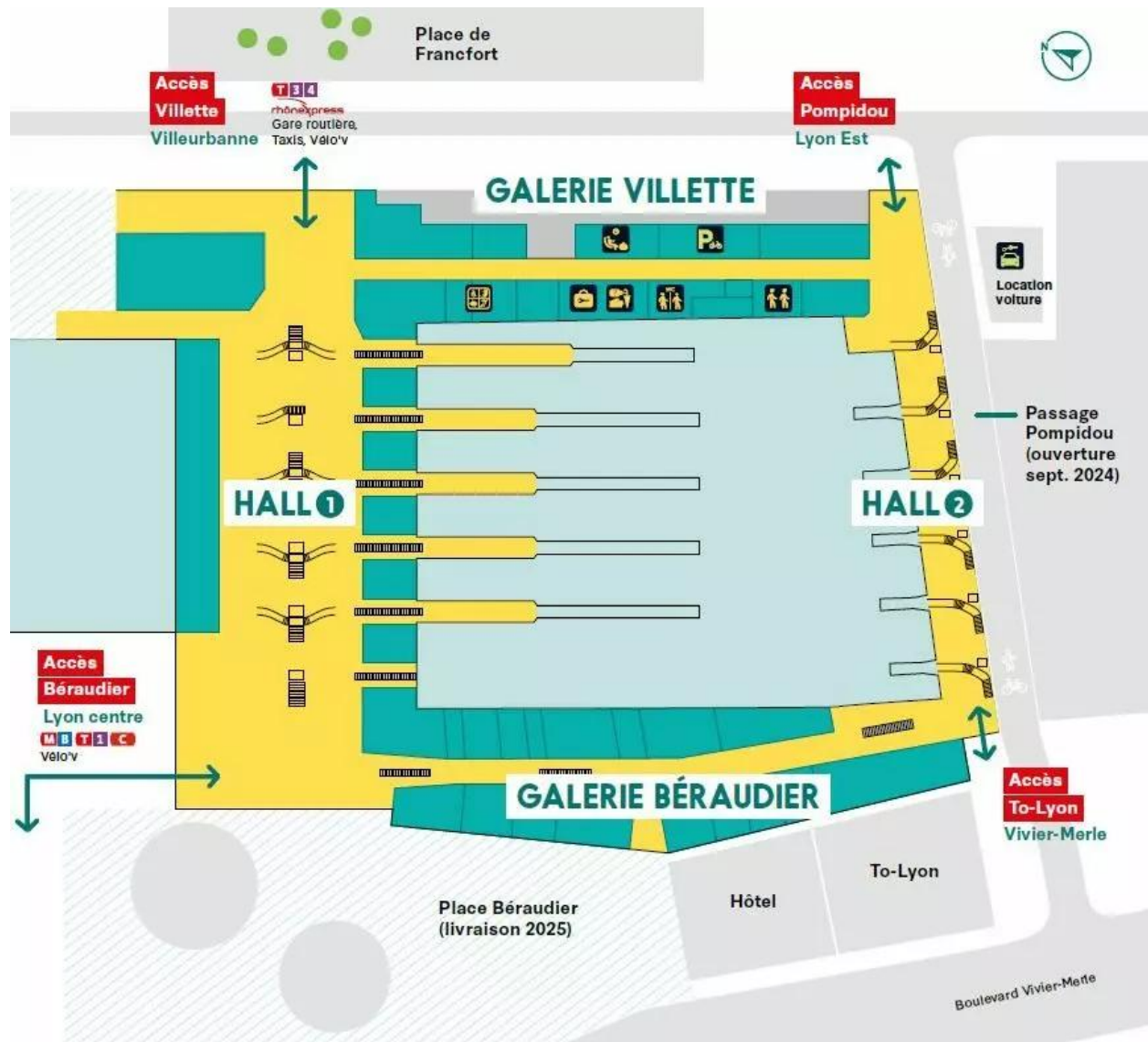


Figure 88. *Diagram of passenger concourse spaces in the redesigned Lyon-Part-Dieu Station.*
Source: SPL Lyon-Part-Dieu



Figure 89. *Sidewalk and bikeway leading to the Pompidou Passageway and entrance on the east side of the tracks, facing west. An underpass that used to be for cars, it was slightly reduced in width to make room for the Hall 2 concourse inside the station. Still, even with this resize, there was more than enough room for 13-foot-wide two-way bike lane, and 6.5-foot-wide sidewalks on each side. The station planners turned a thoroughfare for cars into a comfortable crossing for people, taking advantage of a critical access point under the tracks to better connect the two sides.*

Source: Hunter Bickel

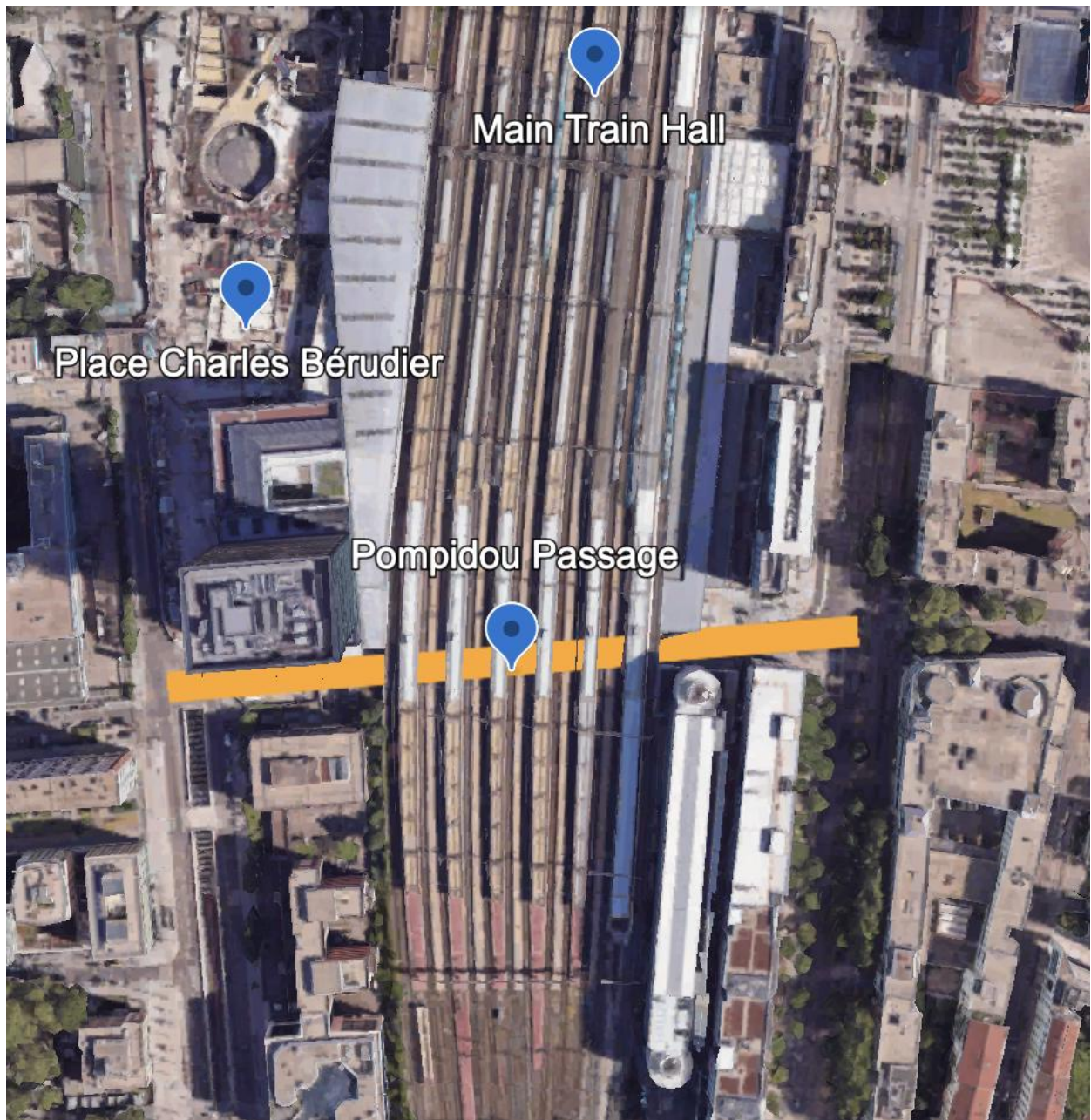


Figure 90. *Aerial view of Lyon-Part-Dieu Station.*
Source: Google Earth, annotations by authors



Figure 91. *Bird's eye view of newly rebuilt Place Béraudier, a new ample public space. Photo shows the spiral ramp down to the 1,500-space underground bike parking garage in the foreground, the circular canopy for the subway entrance at left, the western entrance to the station and the elevated intercity rail tracks at rear, as well as the Pullman Hotel at right, completed in late 2023.*
Source: lyon-partdieu.com

Despite the rail tracks running through the city center, the station is far more land-efficient and urban-friendly than Lyon Saint-Exupéry Airport. On just one-twelfth of the land area, Lyon-Part-Dieu moves over five times as many daily passengers while fostering a thriving downtown around it. And, with creative architecture and taking passageways away from vehicles, it feels much more like a connected neighborhood.

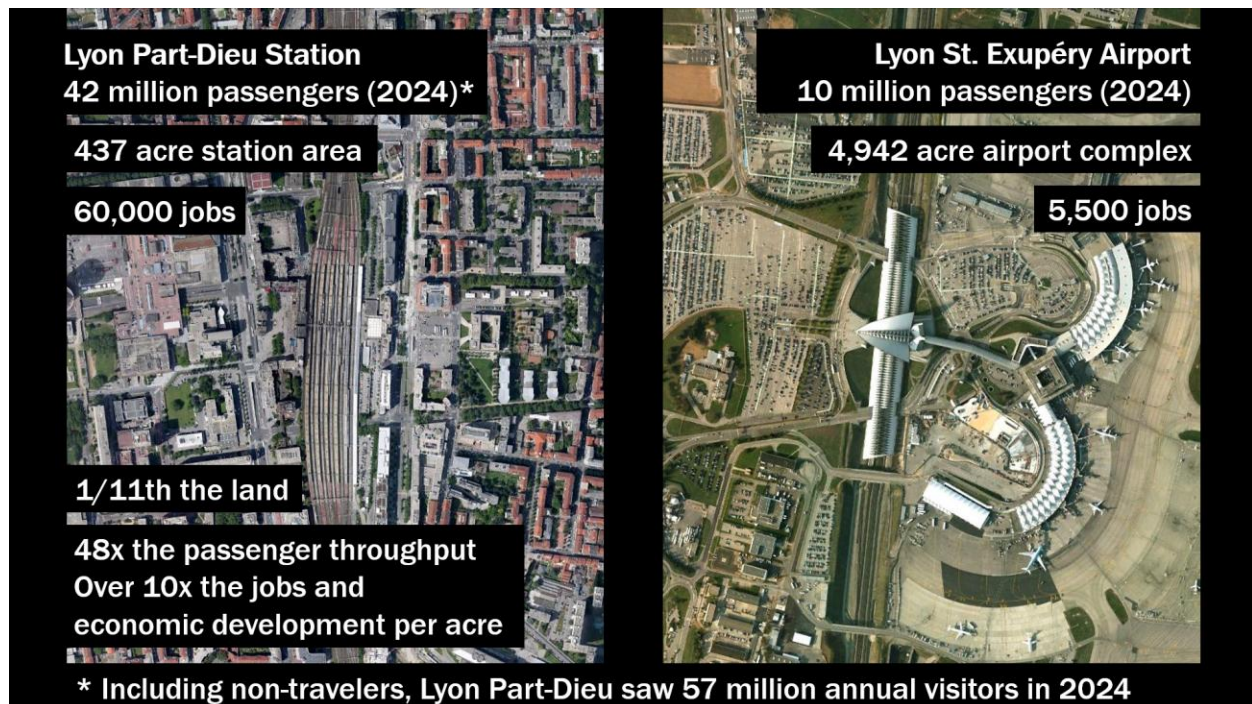


Figure 92. *Lyon-Part-Dieu, Lyon’s main train station (left) shown at the same scale as city’s airport, Lyon St.-Exupéry (right), which also includes an HSR station. While Part-Dieu station has a much smaller footprint than St.-Exupéry and is tightly knit into surrounding development, it accommodates many times more passengers on a daily basis and is surrounded by far more development.*

Source: Eric Eidlin, Google Earth aerial imagery. Data for Lyon-Part-Dieu: [SNCF Open Data](#) (station visitation); [SPL Lyon-Part-Dieu](#) (station area development and jobs); Lyon St. Exupéry Airport: [aeroport.fr](#) (airport visitation); [Inlux](#) (jobs)

3.2.2 Out of sight, out of mind: Barcelona’s new green corridor will cover the rails (and roads)

For decades, Barcelona’s Sant Martí and Sagrera neighborhoods were divided by an old freight station and a wide track right-of-way, making them feel like entirely separate parts of the city. Bridges crossing the tracks were few and far between, leaving the area neither lively nor walkable—aptly described by the Transport Ministry of Spain (MITMA) as a “historic urban scar.” This is not a district that typically attracts residents to work, live, or spend time in, nor tourists to visit.

Planners saw more than a barrier, however: They saw an opportunity to transform the disruptive rail right-of-way and build a green corridor on top of it with the new *El Parc del Camí Comtal*. A central feature of the Barcelona-La Sagrera station project, the park will reconnect the long-divided area into a linear greenway by around 100 acres (~40 hectares) of rail and road infrastructure and stretching roughly 2.5 miles (4 km)—about the length of New York City’s Central Park—to provide park access to 180,000 residents.

By capping the tracks with green space and walkways, the project will effectively stitch the neighborhoods back together, integrating Sant Martí and Sagrera into a single, cohesive urban area in northeast Barcelona.

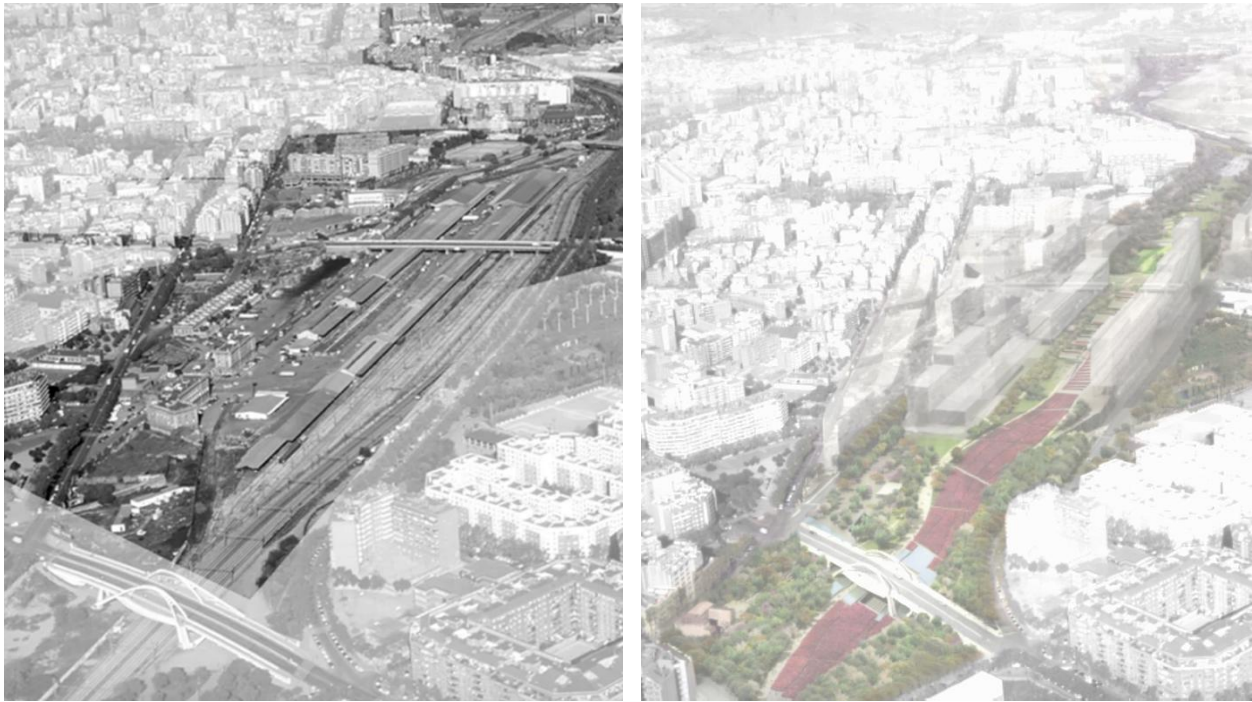


Figure 93. These before and after images demonstrates how the broader La Sagrera redevelopment effort will heal a “historic urban scar” in the fabric that was introduced long ago when railroad tracks were first built.

Source: BSAV

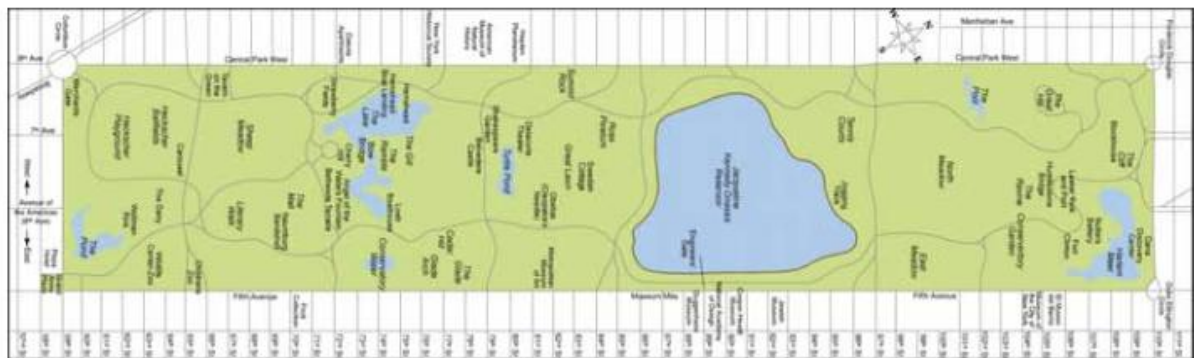


Figure 94. Rendering of El Parc del Camí Comtal at La Sagrera, Barcelona. This 4-km linear park will be built over currently depressed rail tracks, creating a continuous green corridor that reconnects neighborhoods, enhances pedestrian and cyclist mobility, and integrates the station into the surrounding urban fabric.

Source: BSAV



Figure 95. *El Parc del Camí Comtal buries rail and road infrastructure and brings 180,000 locals new access to a new expansive urban park.*
Source: BSAV



Central park, New York (4000 x 800m)



Parc del Camí Comtal, Barcelona (4000 x 25-100m)

Figure 96. *Scale comparison of new park being built at La Sagrera as compared to Central Park in New York City.*
Source: BSAV

3.2.3 The unique 'bridge' station of Valence-TGV

Valence-TGV, where the group had a 90-minute layover en route to Barcelona, sits on the *LGV Méditerranée*, one of France's premier high-speed corridors. The station serves both local stops and full-speed express services between Marseille and Lyon. It represents another unique example of a through station.

The station is constructed directly above the high-speed tracks, which run in a trench underneath the station building. This "bridge" design allows the station to connect the landscape on either side while enabling trains to pass with minimal disruption. Interestingly, the expansive parking lots flanking the complex proved to be a greater detractor from the "quality of place" than the high-speed trains passing beneath at over 150 mph.

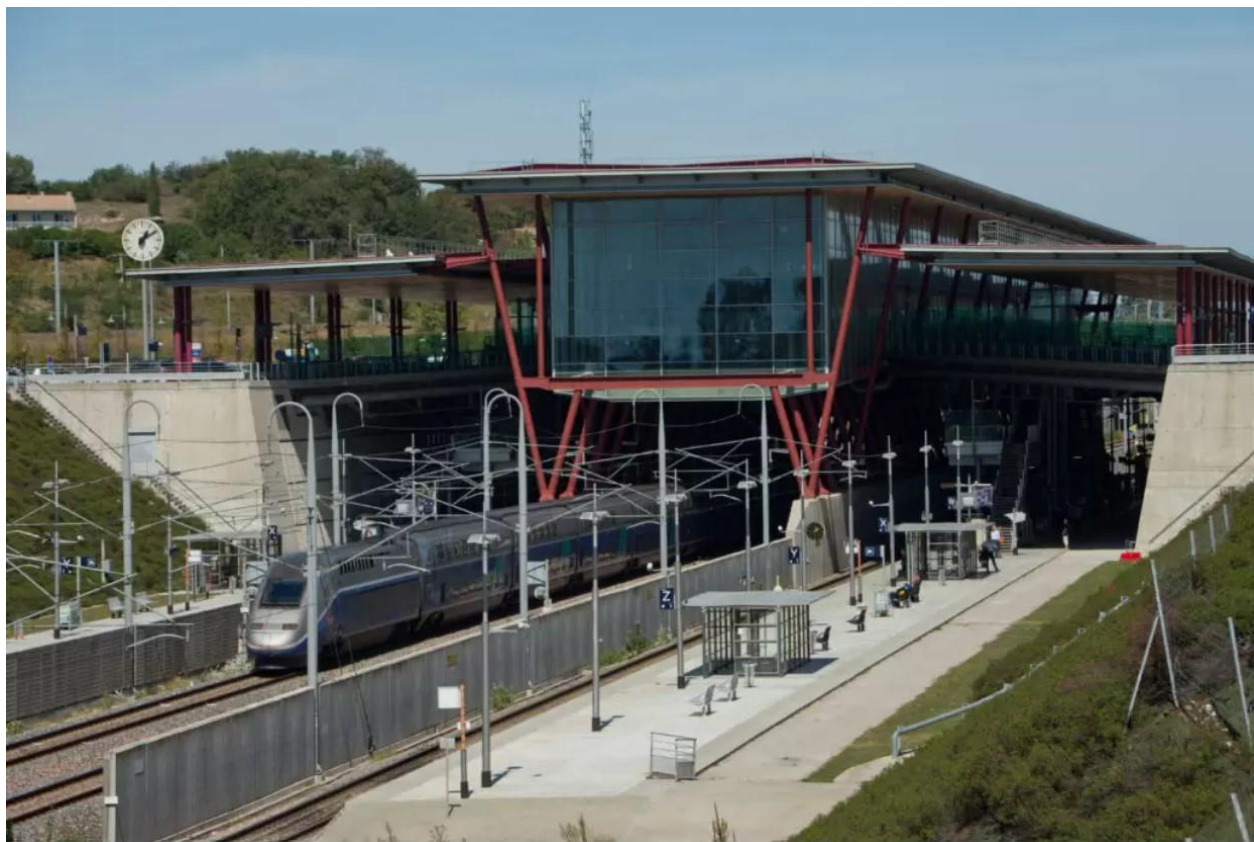


Figure 97. *Valence-TGV Station spans the high-speed LGV Méditerranée corridor, acting as a bridge over the tracks. Its elevated design allows trains to pass with minimal impact on surrounding neighborhoods, while connecting the land on both sides of the trench. Considered the “gateway to the South of France,” Valence is in the heart of the Rhone River Valley in southeastern France, roughly 60 miles south of Lyon. A population of about 67,000 people is well-served by HSR with two stations: one in the city center, Valence-Ville, and another about 10 kilometers northeast of the city center, Valence-TGV.*

Source: Philippe Giraud, Ville, Rail & Transports



Figure 98. Map of TGV network in south France, showing Valence as the connection point between LGV Rhône-Alpes and LGV Méditerranée.

Source: By Classical geographer - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=5874843> (screen grab zoomed in by authors)

3.2.4 Paris's creative urban connections

Railroad tracks have a legacy of dividing communities, yet they remain one of the most space-efficient ways to connect cities. Because they move large numbers of people with a smaller footprint than highways and airports, they are uniquely suited for city centers. By integrating stations and approaches into the urban fabric, planners can minimize disruption and foster vibrant, pedestrian-friendly districts.

Beyond Lyon's below-track passageways and the ambitious capping of tracks at La Sagrera, we encountered several other compelling models for overcoming these physical divisions.

Pleyel Urban Crossing

The *Franchissement Urbain Pleyel* ("Pleyel Urban Crossing") is a major pedestrian bridge and a key element of the Saint-Denis Pleyel station development. It connects the new Metro Line 14 station and the working-class Pleyel neighborhood on the west side of the tracks with the

Plaine Saint-Denis district on the east, a rapidly growing area with France's national soccer stadium, the Olympic Aquatic Center, and many high-density office buildings on the east. Spanning almost 1,000 feet (300 meters) over Europe's widest and busiest rail corridor—48 tracks including approaches to Gare du Nord and a nearby train yard—the bridge includes over 130,000 sq. ft (12,000 m²) of public space. The bridge and station were built in time for the 2024 Paris Olympics and are arguably the purest physical representation of the French concept of the “gare connectrice” (“connector station”). The Pleyel Urban Crossing reduces urban divides by linking neighborhoods with very different socioeconomic profiles, facilitating transfers between the RER and Metro, and providing pedestrians with direct access across a previously impassable rail barrier.



Figure 99. *Shown here is The Franchissement Pleyel, an almost 1,000-foot (300 meter) long bridge that connects the working-class Pleyel neighborhood on the west to the large and growing office and entertainment district on the east side in the Plaine St. Denis. This is a clear physical representation of the French concept of “la gare connectrice” (“connector station”).*

Source: DVVD Architectes Ingenieurs

Paris Rive Gauche

Paris Rive Gauche offers another strong example of construction over active rail infrastructure. Large office and residential buildings are being built directly above the tracks leading into Gare d’Austerlitz, reclaiming valuable land and knitting former voids back into the urban fabric. This long-term integration effort has gradually extended the city grid over several decades—all while rail service has continued uninterrupted below.



Figure 100. *Paris Rive Gauche illustrates large-scale urban development constructed over an active rail corridor leading into Gare d’Austerlitz, reclaiming land and reconnecting neighborhoods previously divided by the rail trench.*

Source: Eric Eidlin

Issy-les-Moulineaux

The old rail viaduct in the Issy-les-Moulineaux is another great example of rail infrastructure in Paris that connects across the tracks. This old rail viaduct found new life housing artist studios and other commercial uses underneath, making the rail viaduct act as a quasi-two-sided building that activates both sides. This demonstrates how even legacy infrastructure can be repurposed to support local economies and activate underutilized urban space.



Figure 101. *Les Arches at Issy-les-Moulineaux repurposes an old rail viaduct to house artist studios and commercial spaces underneath. The viaduct functions as an active building façade, connecting neighborhoods on both sides while activating previously underutilized urban space.*

Source: Eric Eidlin

3.3 Rail station modernization projects are about much more than transportation. They are city-building endeavors.

The future of a station building is inseparable from the future of the city it serves. Projects in Lyon and Barcelona illustrate a people-first approach to station districts, which can have broader impact when complemented by thoughtful development. By supporting modern mobility designed for—and to attract—people, these stations can stimulate wider social and economic activity.

3.3.1 Transforming Lyon’s “decision-making district”

The neighborhood around Lyon’s main train station, La Part-Dieu, is France’s most important economic hub outside of Paris. It is currently home to over 20,000 residents, 60,000 jobs with people working for 2,500 different businesses and companies, and over 17 million square feet of commercial space that already hosts a rich variety of urban activity:

- 35 million annual visitors to the nearby Westfield Mall
- 1.3 million annual visitors to the nearby Paul Bocuse food market
- *UGC Ciné Cité Part-Dieu* cinema multiplex with 18 theaters
- More than 150 annual concerts at nearby *Auditorium-Orchestre National de Lyon* concert hall
- *Bibliothèque Municipale de Lyon-Part-Dieu* – a significant municipal library with 1.8 million documents

The station improvement project is part of a broader initiative within the *zone d'aménagement concerté (ZAC) Part-Dieu Ouest*—or “focused development area”—which spans 93 acres (38 hectares). While the *Multimodal Interchange Hub* initiative serves as the centerpiece that brings everything together, the transformation of the Part-Dieu district is a more wide-ranging project that extends well beyond the station renovations.

The local and regional governments are pouring hundreds of millions of Euros into the Part-Dieu neighborhood to create a new lively urban center with offices, housing, commercial activity, hotels, green space, and more. In the words of the initiative’s project management body *Société Publique Locale (SPL) Lyon-Part-Dieu*, it [aims](#):

- To achieve a better jobs/housing balance in the new development areas.
- To build significantly more housing, particularly affordable housing. On our tour, we were told that upwards of 1,500 new housing units are to be built.
- To pioneer new construction methods in order to reduce the carbon footprint of buildings; also, to favor renovation over demolition.
- To develop local facilities for the quality of life of residents.
- To create 28.4 acres (11.5 hectares) of peaceful, lush public spaces—a 15% increase—that are open to all and an overall area that gives priority to pedestrians, cyclists, and mass transit.
- To increase the diversity of economic activities, particularly the social and solidarity economy, as well as local businesses and services with over 1.2 million square feet (120,000 square meters) of renovated space within the district’s buildings.

At the heart of the Part-Dieu revitalization is a commitment to comfortable, active travel. The station area acts as the vital link for these changes, fostering a lively urban environment that caters to residents and visitors throughout the day.



Figure 102. *Lyon-Part-Dieu Station and the surrounding Part-Dieu business district, illustrating a markedly different urban form from Lyon's historic core.*

Source: Thierry Fournier / Grand Lyon



Figure 103. *The view facing west on Place Charles Beraudier of the La Part-Dieu district skyline. This image clearly shows a vast space where people circulate in Lyon's central district, "a district where it is a joy to live."*

Source: Laurence Danière, accessed via lyon-partdieu.com

3.3.2 La Sagrera is “a new urban center” for northeast Barcelona

Barcelona is building a city within a city on the site of a long-neglected freight rail station, not just a large transportation hub. The project demonstrates how station developments can reshape and drive the socioeconomic recovery of entire neighborhoods.

Once fully developed, La Sagrera will serve 100 million passengers annually with its new state-of-the-art facility while also providing homes for 25,000 residents and office and commercial space for 30,000 jobs across its new developments. Centered on comfortable, hyper-local travel, the project aims to reduce commuting distances, promote social cohesion, and establish a strong “[territorial identity](#).”

Like SPL Lyon-Part-Dieu, Barcelona Sagrera Alta Velocitat (BSAV), the publicly-owned company created for overseeing the project, envisions a diverse range of tertiary activities strategically located near the station to maximize accessibility and support vibrant urban life in the following ways:

- Planning hotels and offices around the station, for ease of accessibility for commuters and travelers.
- Providing housing and local amenities dispersed throughout the area.
- Offering other commercial and tertiary activity clusters concentrated in specific areas.

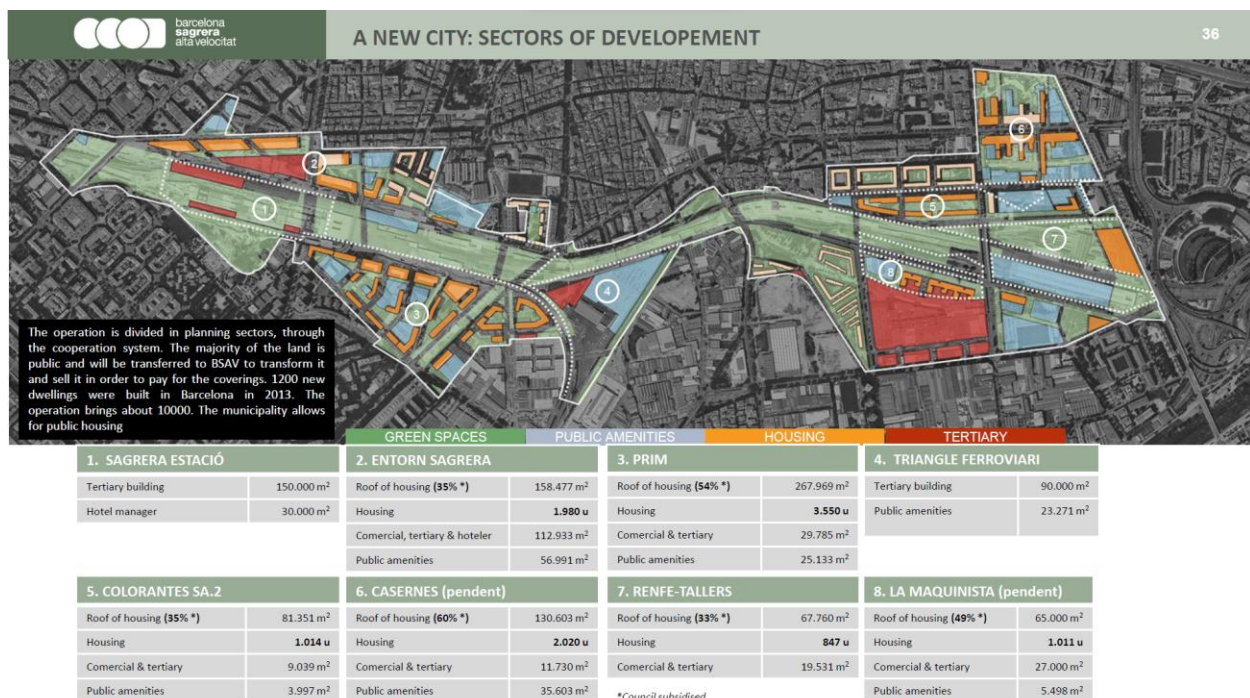


Figure 104. Development program for La Sagrera redevelopment area showing the impressive scale and diversity of planned development within the station area.
Source: BSAV

Currently, to cross the railway tracks, a person may have to walk or bike a considerable distance to the nearest crossing bridge, so reconnecting the neighborhoods on either side of the rail corridor is obviously essential to this vision. It was very apparent to our group the impact this large divide had on the area. As we were walking to the construction site from the metro, we passed through a nondescript residential neighborhood with many old buildings in various states of disrepair and, as we highlighted earlier, the area was not very walkable and was not a place designed to adequately host urban activity.

The new *El Parc del Camí Comtal* is critical to establishing a hyper-local travel vision at La Sagrera Station, enhancing the area's strategic development. A 2.5-mile deck over the tracks will provide a linear green corridor for residents, featuring walkways and bike paths seamlessly integrated into Barcelona's robust cycleway network. More than just an urban park, this green corridor serves as vital infrastructure for local connectivity; by reuniting two long-separated neighborhoods, it creates a more livable environment for a thriving new urban center.

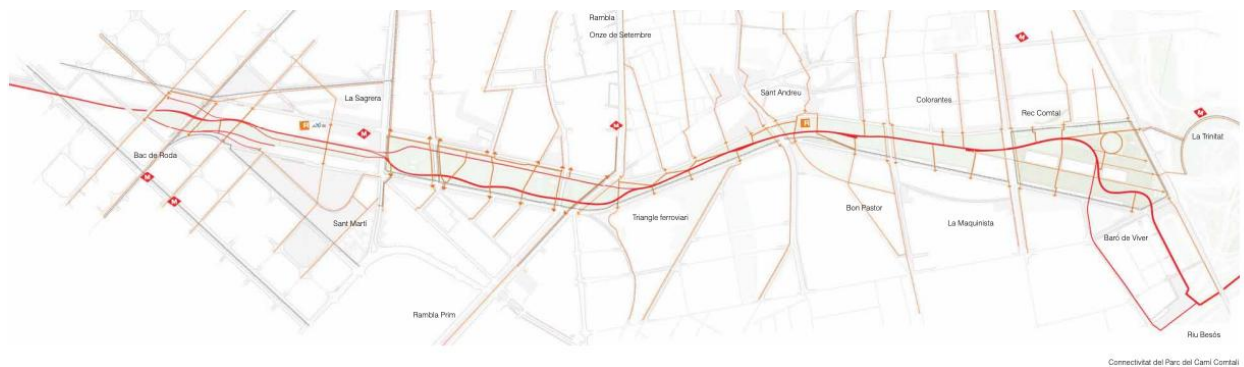


Figure 105. New pedestrian and bicycle circulation routes made possible by the development of the Parc del Camí Comtal and La Sagrera Station development project.

Source: BSAV

3.3.3 Madrid's vision for Chamartín is "turning a train station into an ecosystem"

Madrid Chamartín is another major station we visited—one that anchors the broader *Madrid Nuevo Norte* urban transformation. Although our time there was limited and we did not receive a formal tour, we wanted to highlight it as a case study given its significance in the European context. Chamartín is such a far-reaching undertaking that will reshape mobility in Madrid, the surrounding region, and ultimately all of Spain. Like several projects discussed earlier, it is truly a multi-disciplinary city-building effort in which the large investments being made at the station are shaping the parameters of the urban development for the district that is emerging around the station.

The *Madrid Nuevo Norte* redevelopment will transform a corridor roughly 3.5 miles long, covering 569 acres (230 hectares). When complete, it will include around 16.1 million square feet of office space (roughly 1.5 million square meters), 10,485 new homes, and roughly 99 acres (40 hectares) of new open space. The project aims to create a "100% sustainable city." The rail hub is described as "the infrastructure that ties the entire project together" with the

core of the regeneration concentrated around the station. As is the case in Barcelona with La Sagrera, leaders of the *Madrid Nuevo Norte* initiative view the rail infrastructure that has bisected the northern part of Madrid as a major barrier that has compromised the quality of life in the northern part of the city. As is the goal with La Sagrera in Barcelona, a major goal of the project is therefore to “[heal](#)” the area with this project.



Figure 106. Birds-eye view of the future Madrid Chamartín station district.

Source: Bucharest, accessed via esteyco.com

The development program of Nuevo Norte includes:

- 4.3 million square feet (400,00 square meters) of new green space.
- 10,500 new housing units.
- ~50 acres (~20 hectares) of railways tracks covered.
- 90% of the plots of land will have ground-floor retail space.
- 150,000 jobs with the new economic activity in the area, on top of the 200,000 construction jobs created to make it happen.

The Cuatro Torres Business Area (CTBA) is a cluster of five skyscrapers along Madrid’s Paseo de la Castellana, featuring some of Spain’s tallest buildings. It serves as a major hub of office and commercial activity. Developed on the former Real Madrid training grounds, the district includes towers ranging from 36-to-57 floors and 590-to-820 feet in height (180-to-250-meters), altogether providing several million square feet of premium office and mixed-use space. The project website [claims](#) that it is creating the largest business center in Southern Europe, and CTBA sits immediately south of Madrid-Chamartín Station and forms a key component of the larger area’s redevelopment, with the station’s expansion and modernization helping anchor and enable the continued growth of this high-density business district.



Figure 107. View of the Cuatro Torres Business Area (CTBA) as seen from Chamartin Station in June 2025. Surface parking lots in the foreground and other lower-intensity buildings will be replaced as part of the broader Madrid Nuevo Norte redevelopment plans.

Source: Eric Eidlin

The redevelopment project will reconfigure the station building and the exterior spaces on all four sides, with the goal of better integrating the station into its surroundings and improving access to all transportation services. Project leaders are adopting a “compact, mixed-use city model” that concentrates daily needs and activities in one area, so that most destinations are only a short walk or bike ride away. In addition to housing and workplaces, the plan includes schools, parks, health care facilities, shops, and cultural venues—all within a short walk or bike ride. And for residents or visitors who do need to travel farther, the district will be well-connected to both local and regional transportation networks.¹⁰

The station will be upgraded with a new northern terminal, creating a dual-terminal system with the existing station serving as the southern terminal. The north terminal is envisioned as an “urban destination,” while the south terminal will continue to prioritize urban transport connections. The plan also includes a new underground bus interchange—keeping bus infrastructure out of the way—and the addition of six high-speed rail tracks, doubling capacity and bringing the station’s total track count to 18.

¹⁰ [Chamartín station, an essential element for the future of Madrid](#)

The impact of great stations extends far beyond travel

Across France and Spain, recent station projects show that rail infrastructure can do more than move people; it can actively shape an urban environment. When designed around everyday users, stations can support active neighborhoods, reconnect areas long divided by rail infrastructure, and reinforce compact, mixed-use urban development patterns. No one station is the same, as we saw stub-end terminals and through stations with elevated or buried tracks host these urban districts. Despite existing urban development layouts, cities can make their stations and their approaches to work for both passengers and the surrounding city. The better station districts are able to design around railway tracks and facilitate efficient, people-centered mobility, the better it can host vibrant cultural and thriving economic activity.

In the next lesson, we look at several busy rail stations that take this idea a step further, where activity is not only enabled by the station area but generated by the station itself.

4. Lesson 4: Great stations aren't just places to board trains. They are destinations in and of themselves.

"... an integrated urban rail station is the ultimate mobility hub, one that combines many modes of transportation to allow you to get from virtually anywhere to everywhere. When you add the retail [and] commercial layer to that mobility hub, you have a core civic space for a thriving city where people can gather, shop, and travel from right within the city."

— Matt Miller

Central rail stations are multi-purpose hubs that support a wide range of travel needs. While regional rail serves daily commuters and visitors, intercity lines accommodate both business and leisure travelers. By integrating retail and dining with rail infrastructure, these stations transform from mere transit points into convenient, all-in-one destinations.

Beyond transportation, these stations serve as vital assets for the surrounding community. When woven into the urban fabric, they become everyday hubs for residents, local workers, and pedestrians. Whether meeting for coffee, shopping, or enjoying unique amenities like public plazas and cultural facilities, people often visit these spaces even when they aren't catching a train.

Ultimately, a main rail station's value is maximized when it hosts a diversity of activity. As we explore in this lesson, these facilities generate economic and social value far beyond their transit function, becoming vibrant places where people choose to spend time.

4.1.1 How France and Spain seek to maximize the potential of stations

By centralizing station management and planning (detailed in Lesson #7), rail infrastructure managers in France and Spain can execute coherent, system-wide development strategies. Rather than relying on fragmented local processes, this structure leverages national expertise and shared network experience. It empowers dedicated teams to better capitalize on the cultural and economic potential of stations, utilizing specialized brands to serve both travelers and the local community.

SNCF's *Retail et Connexions*

SNCF *Retail & Connexions* is the commercial arm of SNCF *Gares & Connexions*. It transforms traditional railway stations into "urban villages"—vibrant hubs where shopping and services meet travel. By curating a mix of retail, dining, and essential services, they ensure stations provide value not just to commuters, but to local residents and workers as well.

ADIF's branded retail experiences

Administrador de Infraestructuras Ferroviarias (ADIF) is Spain's national rail infrastructure manager, responsible for planning, operating, and maintaining the country's rail network, including tracks, signaling, and stations. In addition to these technical functions, ADIF oversees the commercial management of stations, setting investment priorities and establishing revenue frameworks that support ongoing modernization.

ADIF views its busiest stations as vital economic and cultural assets, leveraging branding and customized business models to enhance retail and commercial activities. These initiatives are structured around [two main station brands](#) that unify the network's approach:

ADIF *Vialia* is the development model applied at major city stations with strong retail and cultural activity. These stations are intended to combine rail travel with a broader mix of uses that serve both travelers and the surrounding city. Across five cities—Albacete, Bilbao, Málaga, Salamanca, and Vigo—ADIF *Vialia* encompasses more than 300 commercial spaces, totaling approximately 1.3 million square feet (120,000 square meters). The *Vialia* project, at Vigo station, received [recognition from the International Union of Railways in 2021](#) in the “Retail and Commercial Affairs” category, citing its excellence in customer experience and retail innovation.

ADIF *Tiendas de las Estaciones*—literally translated as “station shops”—are the commercial areas at Spain’s busiest railway stations. They are designed to offer a broad mix of retail and dining within a single, integrated, high-quality environment. Rather than a collection of individually operated shops and restaurants, *Tiendas de las Estaciones* function together as a curated ensemble under unified management and branding, creating a more coherent and consistent experience. Nine stations currently operate under this initiative: Alicante / Alaanat, Barcelona-Sants, Córdoba, Gerona, Madrid-Chamartín, Madrid-Atocha, Seville-Santa Justa, Valencia-Nord and Valencia-Joaquín Sorolla.

4.2 Stations as urban destinations

Stations can be destinations for dining, shopping, and leisure, housing a range of amusement and entertainment activities. They can also be places of respite, and we observed a handful of stations that excelled in these respects.

4.2.1 Madrid-Atocha Almudena Grandes

One of the clearest examples of the notion of the “station as a destination” is Madrid’s iconic Atocha Station in its original terminal, which was removed from rail service in 1992 and transformed into a vibrant public space. Its [43,000-square-foot \(4,000-square-meter\) concourse](#) now hosts shops, restaurants, a nightclub, and a large indoor tropical garden.

The tropical garden is a unique feature of the station, providing a lush oasis in a dense urban area filled with transportation infrastructure. It offers a welcoming space for people to relax, with nearby restaurants and cafés for coffee or snacks. Open daily from 5:00 a.m. to 1:00 a.m. with free access, the garden enhances the station’s role as a civic space where visitors can gather, adding cultural and social value beyond its mobility function.



Figure 108. *Madrid-Atocha Station features a large tropical garden in its main atrium, creating an unexpected oasis of greenery in a highly urbanized area. This vibrant space transforms the station from a transit hub into a destination, for travelers and non-travelers alike.*

Source: Coralma, [Wikimedia](#)

4.2.2 Madrid Príncipe Pío

Príncipe Pío is a secondary rail station served by *Cercanías Madrid*, the region's commuter network, with connections to the Metro and local buses. Located at the northern edge of the city center, it was originally known as Estación del Norte and served as Madrid's main terminus for northern rail lines until the larger Chamartín station opened nearby after World War II.

After years of underuse, Madrid officials and ADIF partnered with the private sector to transform Príncipe Pío into a vibrant, multi-faceted urban destination—part shopping mall, part entertainment hub, and part transport interchange. The project offers a compelling case study of how stations that have lost rail prominence can still deliver substantial public and economic value—a place for the public to enjoy, as well as a new job and tax revenue generators.

In the early 2000s, parts of the historic train shed and the original 1882 passenger hall [were converted](#) into the [Centro Comercial Príncipe Pío](#). Today, this 301,400-square-foot shopping center features around 80 stores, a supermarket, 29 restaurants, a nine-screen cinema, and multiple fitness centers, attracting approximately 12 million visitors annually while preserving the site's historic character.

Some years later, developers saw another opportunity in the 1928 passenger hall, this time in the form of a theater and entertainment complex. A consortium of entertainment companies won the contract to convert the 75,350-square-foot ([7,000-square-meter](#)) space into a multi-venue center that can [host up to 2,000 visitors](#). In 2018, the *Gran Teatro Bankia Príncipe Pío* opened, and today offers a wide range of performances—from concerts and musicals to theater productions and cabaret shows.

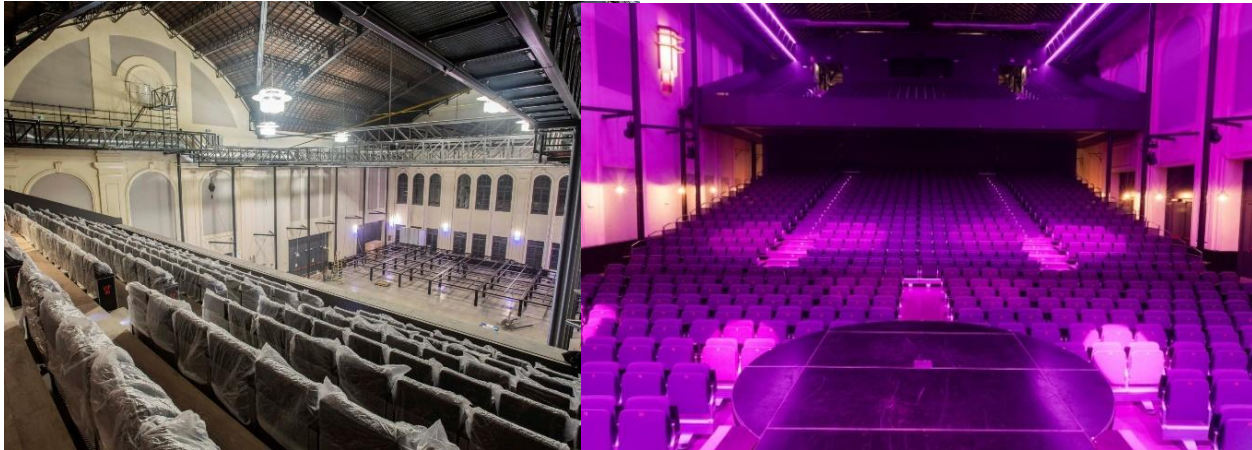


Figure 109. Image showing conversion of former train station hall into performing arts venue at Príncipe Pío, Madrid.

Source: [Gran Teatro Caixabank Príncipe Pío](#)

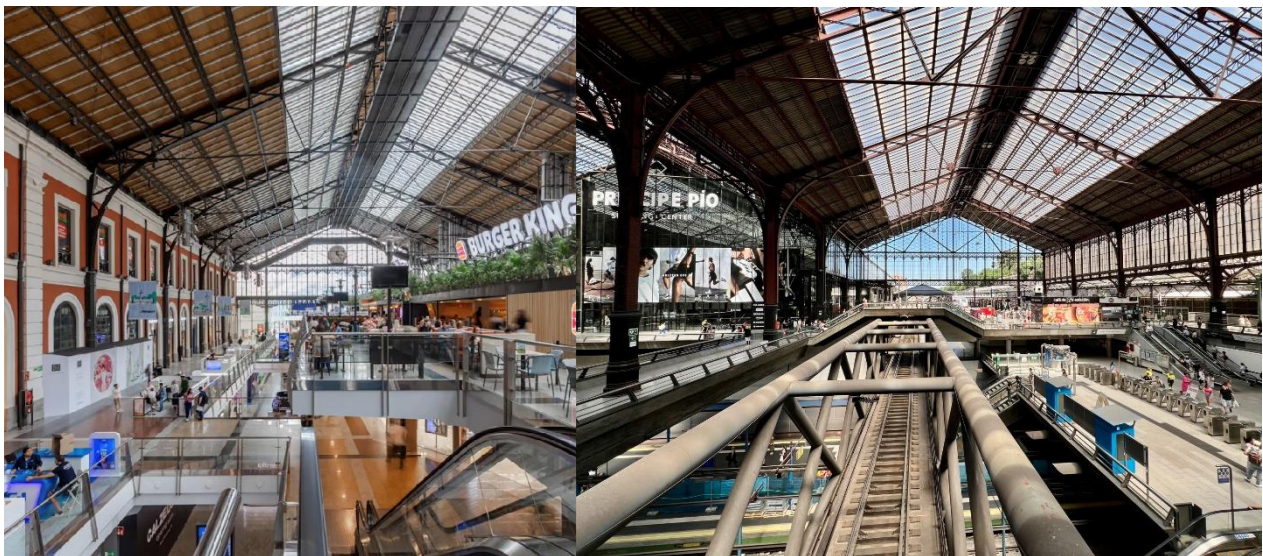


Figure 110. Interior photos of Madrid Príncipe Pío. Some of the rail platforms with a view of the shopping center in the background at left. The photo at right shows the interior of the shopping mall.

Sources: Left: Matt Miller; Right: [Klepierre](#)

The case of Principe Pío seems especially noteworthy when you consider the benefits for cash-strapped U.S. transit agencies. The 50-year lease for the *Gran Teatro Bankia Príncipe Pío* alone brings in more than [€23 million](#) in rent for ADIF. By repurposing underutilized spaces for commercial and cultural uses, Príncipe Pío has generated new revenue streams that Spain's infrastructure manager can reinvest in its railway network that comes in the form of rent payments, advertising revenue, and more.

4.3 Retail integration maximizes a station's economic and placemaking value

"Stations can benefit from the integration of retail uses. By making stations into destinations of their own, they can provide increased passenger throughput and revenue from businesses." — Joseph

While not entirely unfamiliar in the U.S., several European case studies illustrate how to maximize the non-transportation potential of rail stations. Many networks, particularly in older stations, have made significant investments in retail—a strategy that few major U.S. stations have fully leveraged. We explore this further in the *Bringing It Home* section of this report.

Príncipe Pío is just one example. Across nearly every city we visited, stations were embracing the benefits of integrating retail, generating impressive returns for their rail networks. In 2024, SNCF's *Gares et Connexions* (G&C) reported €1.9 billion (~\$2.19B USD) in revenue, of which €300 million (\$346 million USD) came from commercial revenue. One of the nation's top stations contributes significantly to this total and serves as a model for how a station can function as a large-scale retail center.¹¹

4.3.1 Gare Saint-Lazare

In 2009, SNCF sought a new economic model to strengthen the finances of its stations. The agency looked to the historic Saint-Lazare Station to develop a prototype for future hubs, envisioning it as a ["City Booster"](#)—a station designed to drive economic activity, social life, and mobility. The station renovation introduced a new reception hall and a three-story, 107,000-square-foot (10,000-square-meter) commercial gallery with 87 shops, as well as an adaptive reuse of the long-underutilized waiting hall, known as the *"salle des pas perdus"* ("the room of lost footsteps").

¹¹ Figures provided to authors from our meetings with Fabrice Morenon, managing director of SNCF Gares et Connexions.



Figure 111. *Paris Gare Saint-Lazare's three-level commercial gallery, located immediately beside the stub-end platforms, exemplifies France's model of station redevelopment that integrates rail operations with retail and urban activity.*

Source: Eric Eidlin

Today, Gare Saint-Lazare functions as much as a shopping center as it does a railway station, seamlessly blending the travel and shopping experience. This is reflected in passenger and consumer behavior: 55% of passengers make at least one purchase at the station's retail outlets, and 68% of visitors go to shops each time they pass through the station. Further, even as the station is situated in one of Paris's already well-established and busiest shopping districts, 20% of people who pass through the station go there solely to shop. Overall, the station also saw improved customer satisfaction and recently ranked second-best in the country in a national survey of SNCF customers.



Figure 112. *Fabrice Morenon of SNCF's Stations and Connections Division made a point of showing us the Foot Locker inside the Saint-Lazare station shopping mall, noting its exceptional performance. The store generates roughly four times the sales per square foot of an average Foot Locker, largely due to its prime location within the second busiest train station in Paris (and France).*

Source: Fabrice Morenon

The station was renovated through a public-private partnership between SNCF and the real estate trust Klépierre. Under a 40-year lease, Klépierre manages the retail spaces and returns 30% of the rent to SNCF. Meanwhile, SNCF maintains oversight of the station and public areas, retaining all revenue from advertising and vending machines.

The venture has yielded great returns for both parties and has exceeded expectations. The general turnover is €16,000 per square meter. Multiplied by 10,000 square meters, that totals an impressive €160 million (~\$189,000 million) annually.¹²

¹² Figures in this section provided to authors from our site tour and meeting at Gare Saint-Lazare with Fabrice Morenon, managing director of SNCF Gares et Connexions.

4.3.2 Béraudier Gallery at Lyon-Part-Dieu

Between *Place Béraudier* and the station tracks, *Béraudier Gallery* is a new three-level shopping gallery totaling 118,000 square feet (11,000 square meters) and housing 20 new commercial spaces for shops, services, and restaurants.

Lyon, as discussed, is expecting significant passenger growth and is seeking to capture increased foot traffic to generate revenue. Maximizing revenue at major hubs with high passenger volumes, such as Lyon-Part-Dieu and Paris's main stations, is central to SNCF's strategy. This is because only about 40 of France's 3,000 railway stations are profitable. With the revenue generated at those stations, it is spread across the entire country's network to help subsidize the many smaller, less busy stations across France.



Figure 113. *The new Galerie Béraudier at Lyon-Part-Dieu adds 10,000 square meters of retail space across three levels, creating a vibrant link between Place Béraudier and the station while capturing revenue from increased passenger flows.*
Source: [TCY, Wikimedia Commons](#)

4.4 Making the station a center of gravity for everyday needs for travelers, residents, and workers alike

“What stood out to me most in Spain and France was how stations played a much larger role as community centers, rather than simply places to board a train. The integration of commercial services was especially impressive: barber shops and salons, pharmacies, libraries, and grocery stores were embedded within the stations, serving not only riders but also neighborhood residents—particularly when nearby businesses were closed. I also appreciated the emphasis on family-oriented amenities, including HSR cars dedicated to parents traveling with infants and children, as well as play areas within stations. Too often, stations in the U.S. are uninviting and lack these kinds of amenities.” – Dakota Gross

The primary objective for the Gare Saint-Lazare and Lyon-Part-Dieu projects was to align retail and services directly with passenger needs. By offering amenities that simplify the daily commute, stations provide immense value to those traveling to and from work.

Beyond transit, these hubs evolve into urban centers that serve the broader community. By catering to residents—not just travelers—the station increases its civic value. In addition to standard offerings like cafés and pharmacies, unique services are integrated into the concourse, seamlessly intertwining essential tasks with the daily flow of the neighborhood.

4.4.1 Parcel lockers

Parcel delivery lockers, such as those in Paris and Zaragoza, exemplify how stations can meet everyday logistical needs. By integrating package pickup and drop-off into the daily commute, these lockers allow passengers to streamline their routines while simultaneously bringing more people through the stations.

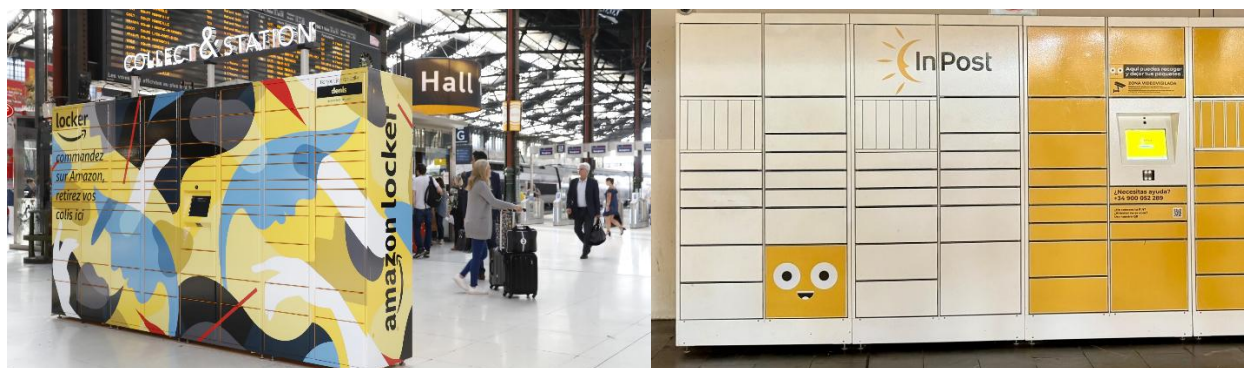


Figure 114. At left, Amazon locker at Paris Gare de Lyon Station. At right, InPost locker at Zaragoza-Delicias Station.

Sources: [Amazon.eu](https://www.amazon.eu) (left); Eric Eidlin (right)

4.4.2 SNCF Childcare

Also in Paris, stations have added childcare services for commuting parents at local Île-de-France stations, this makes life a lot easier by eliminating an extra daycare trip. Drop-off and

pick-up can be combined seamlessly with their daily commute, saving time, reducing stress, and making rail travel more practical.

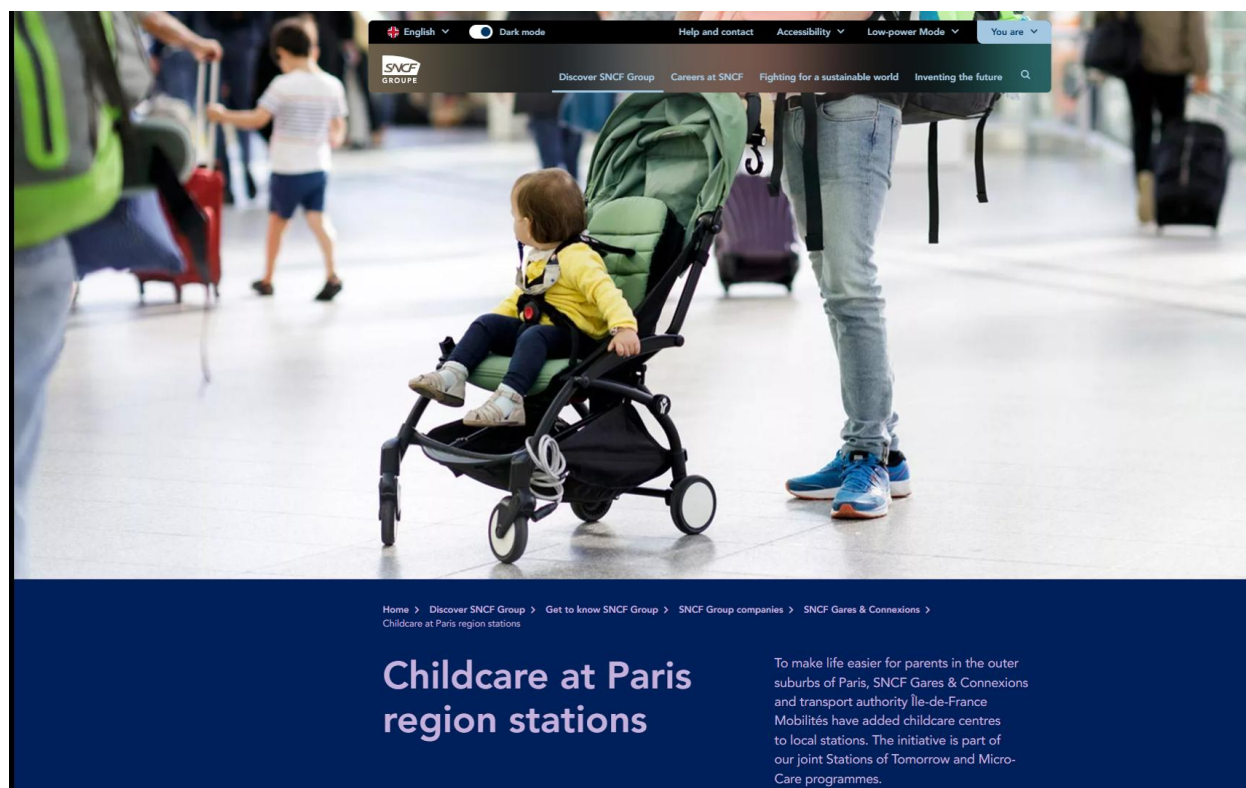


Figure 115. Beginning in 2019, SNCF has opened small daycare facilities at a number of rail stations in suburban locations within the Paris region, allowing parents to conveniently drop their children off at train stations on their way to work. This includes daycare centers in the Paris suburbs of Seine-et-Marne, Argenteuil, Bondy, Villiers-Neauphle-Pontchartrain, and Dammartin-Juilly-Saint-Mard. Source: [SNCF](#)

4.4.3 Business centers and co-working spaces

In the late 2010s, SNCF started partnering with third-party vendors to develop two types of micro-workspaces [to provide business travelers spaces to work while on the go](#). Work stations are quiet spaces from 100-to-540 square feet (10-to-50-square meters). They offer free Wi-Fi and electrical outlets designed for limited working time. For longer working periods, co-working spaces ranging from 750-to-2,300 square feet (70-to-250 square meters) are available for rent, for individual and group sessions.

4.4.4 Health & hygiene offerings

Madrid-Atocha stands out for the robust offering of health and hygiene amenities available there. At “Health Assessment Stations” located near the station atrium, passengers can get checks for their blood pressure, heart rate, oxygen levels, height, weight, and body mass index (BMI). Hygiene facilities like showers and touch-free toilets are also available. Most of these services and facilities are all accessible for [one Euro](#), while a 20-minute shower is €5.

It's also worth noting the several other stations across that have similar health-oriented offerings:

- Lyon-Part-Dieu has a biometric lab and medical consultation outlet.
- Gare Saint-Lazare also has a biometric lab.
- Madrid Principe Pío has several fitness centers.

Bonus mention: SNCF's À vous de jouer

One detail we especially appreciated—though not unique to any single station—is the SNCF [initiative to place public pianos in many station concourses](#), free for anyone to play. These pianos create moments of surprise and joy, prompting strangers to pause, listen, and sometimes even join in. It's a small touch that humanizes the station environment while reinforcing SNCF's image, and that of rail travel more broadly, as innovative, welcoming, and culturally engaged.



Figure 116. One of over 70 "self-serve" pianos that station visitors can play free of charge at train stations throughout France. This one is located at Paris Gare de Lyon.

Source: [Paris Update](#)

More than mobility: Great stations are hubs for everyday life

What makes stations truly valuable is the range of services, amenities, and activities they offer, allowing them to function as multi-purpose hubs for the station district—and often for the city or region as a whole. The transportation and retail functions of the station complex establish a symbiotic relationship with each other: business opportunities thrive when they are well-connected to transit—as trains, metros, and buses move lots of people to and from concentrated areas efficiently. Great stations enhance this synergy by supporting a wide array of services for both everyday passengers and visitors.

5. Lesson 5: Building with the future in mind is essential. When planning a station, you should start with the least flexible elements first—tracks, platforms, and of course the location of the station itself

In many of the historic European cities we visited, there is understandably very little land available in the city center for new development. Many of these neighborhoods have maintained the same layout and buildings for hundreds of years, leaving limited space for expansive new rail infrastructure; even small-scale expansion is difficult in most cases.

As discussed in previous sections, these central districts were originally shaped by and built around rail infrastructure. However, even in non-historic neighborhoods, once tens of thousands of square meters of tracks are laid and a station is constructed, these pieces of infrastructure become fixed, essentially permanent elements. As subsequent development rises around them, the built form of the station district becomes further cemented.

This permanence is a reality not only for the station itself, but for the city at large. The creative retrofitting seen at stations such as Lyon-Part-Dieu, Barcelona-Sants, and Madrid-Chamartín-Clara Campoamor is incredibly impressive, yet there are physical limits to what retrofitting can achieve. To create hubs that facilitate comfortable, efficient mobility, planners must anticipate future growth and determine how infrastructure can best serve the city's long-term evolution.

5.1 Where one decides to build a station is the most fundamental and consequential decision one makes in station planning

Once a station's location is determined, that choice is essentially permanent; the infrastructure cannot simply be relocated at a later date. While this may seem an obvious statement, it serves as a key insight for understanding the placement of several observed stations. Zaragoza-Delicias stands as a relevant case here, one that stands in stark contrast to examples of Barcelona-La Sagrera and Lyon-Part-Dieu.

5.1.1 Zaragoza-Delicias: A great station; a station district still in the making

Zaragoza joined the Spanish high-speed network in 2003, with the opening of the Madrid–Barcelona corridor. A mid-sized city of 690,000 inhabitants and 740,000 in the metro area, it serves as a key node in Spain's rail network with its central location in the Ebro Valley. It links major Spanish cities, such as Madrid, Barcelona, and Bilbao, and connects the Iberian Peninsula to Europe. We visited the city because it shares many similarities with California's Central Valley cities along the future HSR route—like Fresno and Bakersfield—that occupy strategically-positioned midpoints between larger economic centers.

Upon arrival in Zaragoza, we were wowed by the expansiveness of the station itself. As shown in the photo below, the building is an intricate prism-like structure supported by steel arches with a design that lets natural light flood into the cavernous interior space, making for a pleasant passenger experience and easy to find one's way around the station. The arrival and

departure platform area is vast, stretching roughly 2,000 feet long by 600 feet wide (600 x 180 meters), for a total area of almost 1.1 million square feet (or roughly 100,000 square meters). To put this in perspective, that is roughly equivalent to 15 standard soccer fields.

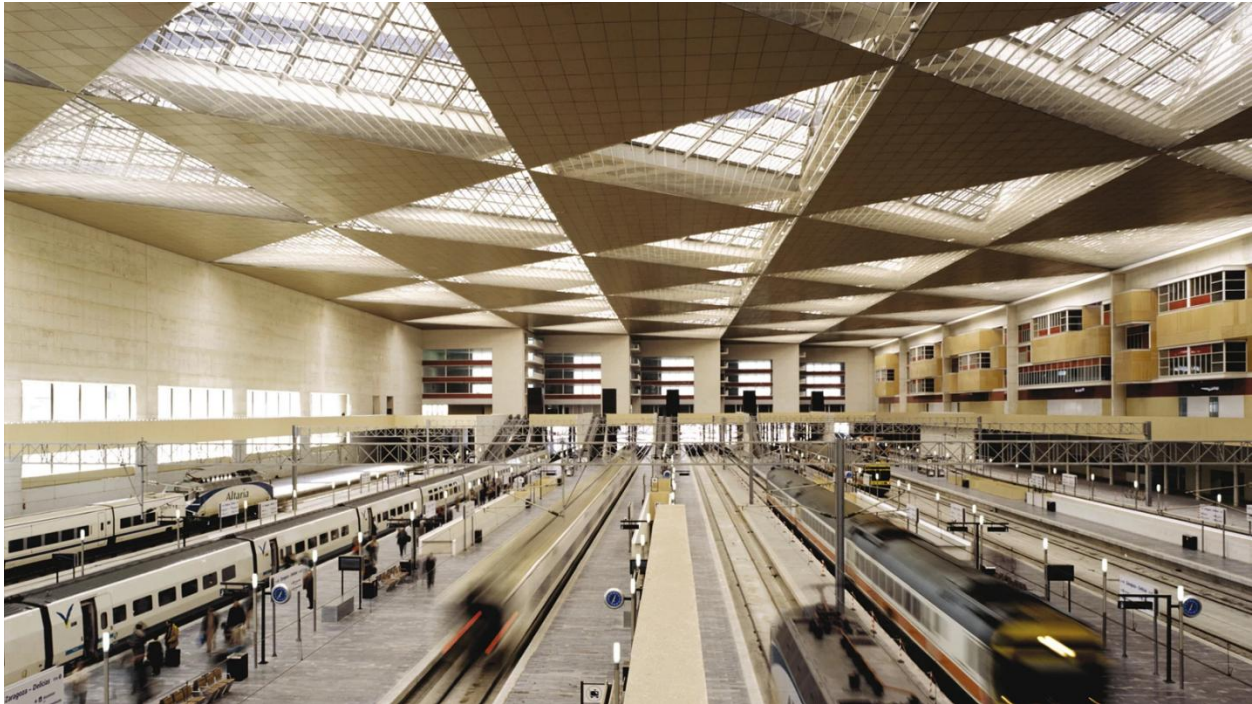


Figure 117. *The expansive platform area at Zaragoza-Delicias. Zaragoza-Delicias Station features a spacious, light-filled interior topped by a distinctive prism-like roof supported by steel arches. The design creates a welcoming arrival area and an intuitive, easy-to-navigate space for passengers.*

Source: [Alejo Baqué](#).

When HSR lines first reached Zaragoza, local and national authorities built the new station on a brownfield site outside downtown. This approach mirrors Lyon's decision with Part-Dieu, also located just beyond the historic city center. Although Delicias is only slightly farther from Zaragoza's core (2.1 miles / 3.4 km) than Part-Dieu is from Lyon's (1.7 miles / 2.8 km), it feels much more remote.

In many respects, the station feels more like an airport than a true urban rail hub—a stark contrast to the other cities we visited. By building a station outside the city core, it sacrifices high-speed rail's primary advantage: central proximity. This isolation is compounded by a local transit network that doesn't do a great job of bridging this gap effectively. While four bus routes link the station to *Plaza Aragón*, one of the main public squares in Zaragoza's core, there are few direct connections to other landmarks like *Plaza de Nuestra Señora del Pilar* and the Cathedral-Basilica, the city's most recognizable landmark. Getting there required a bus-to-tram transfer. Between the 15-minute wait in the early summer heat and the crowded commute, the journey to the Cathedral-Basilica took over a half-hour, making the city center feel farther away than it actually is.



Figure 118. Relationship between Zaragoza-Delicias Station and Zaragoza's city center.

Source: Graphic by Eric Eidlin. Aerial imagery from Google Maps

A rail hub outside a city center can catalyze new development and evolve into a thriving district. Yet this requires not only strong planning and governance, but also favorable market conditions. Zaragoza-Delicias illustrates this complexity. Despite early hopes that the station area would grow into a vibrant new urban node, the surrounding district remains largely unfinished. Much of this stems from external factors: the 2008 economic and real estate crisis stalled planned development, and many projects have not resumed. In this respect, Zaragoza's challenges differ from Lyon-Part-Dieu, where a new tertiary district successfully emerged around the station.

Ultimately, many of the shortcomings at Zaragoza-Delicias relate to access planning decisions that are part of the original station layout. While the station sits only two miles (3.5 km) from the center, its design prioritizes automobile access at the expense of the surrounding urban fabric. Drivers enjoy the most convenient experience, with an integrated underground garage that delivers them directly to the platforms. Taxis hold the second-most favorable position—they pick up and drop off passengers along the curb immediately as one exits the station onto the street. By contrast, local bus stops are relegated to the periphery, offering little shelter and requiring passengers to navigate a wide, car-dominated thoroughfare. The absence of a comfortable transitional zone for pedestrians and transit users creates a sense of detachment, making the station feel slightly further from the city's vibrant heart than it truly is.



Figure 119. *At Zaragoza-Delicias Station, the most convenient access is reserved for cars, with direct entry to the platforms via an underground parking garage, as shown on left. Taxis also have easier access than public buses. As seen in the image on the right, getting to the bus stop from the station exit requires crossing a busy access road full of taxis.*

Source: Eric Eidlin

When assessing the development of Zaragoza-Delicias, it is important to bear in mind the histories of Lyon-Part-Dieu and Barcelona-Sants—two stations initially built to prioritize auto access, but that are currently undergoing transformations to bring them out of the auto age into a more pedestrian and people-friendly present. Lyon-Part-Dieu, opened in 1981, did not begin its major redevelopment until the early 2010s. Barcelona-Sants, completed in the 1970s, launched its major overhaul in 2023—nearly fifty years later. Perhaps Zaragoza-Delicias will undergo a similar transformation in the coming years as time passes and its station area matures. We should not count out a 'Zaragoza-Delicias 2.0' that prioritizes non-auto access, becomes a better facilitator of mobility across scales, and even becomes a destination in and of itself.

These cases provide valuable context and serve as important lessons for high-speed rail in the U.S., especially for smaller cities that may one day host high-speed service but currently lack established transit. It reminds us that the benefits of HSR are neither automatic nor immediate; cities do not transform around new stations on opening day. This reality must be a primary consideration when planning stations for small and mid-sized stops between large metropolitan hubs, such as the cities of California's Central Valley.

5.1.2 Barcelona-La Sagrera: Capitalizing on a generational opportunity

Barcelona is seizing a rare opportunity for a city of its age: the development of a high-capacity transit hub in a near-perfect new location. The La Sagrera site is uniquely suited for several reasons.

First, its position in the city's northeast—geographically opposite the existing Sants station—extends intercity rail access to an entirely new demographic of residents and workers. Strategically, the site sits at a vital crossroads; it occupies a corridor where multiple high-speed and *Rodalies de Catalunya* lines converge before branching into their respective city-center

tunnels. With the former freight yard no longer in heavy use, the city has transformed a legacy industrial site into a critical node where diverse rail services finally align.



Figure 120. *Barcelona's transit landscape is anchored by major regional interchanges like Plaça de Catalunya and Glòries, which integrate regional rail, metro, tram, and bus services. While Barcelona-Sants has long served as the primary intercity gateway, the development of La Sagrera represents a bold expansion of this network. By transforming an underutilized freight yard in the northeast, the city is creating a new mobility hub that unites existing regional and intercity lines with new metro extensions, ensuring high-capacity transit is appropriately distributed across the metropolitan area.*

Source: BSAV

Second, as we discussed before, the site injects new life into a largely undeveloped urban area, providing the space needed to build a station that can accommodate Barcelona's future capacity. Had local leaders chosen a denser, more established neighborhood, construction would likely have faced significant constraints, limiting both the station's size and the potential for surrounding new development.

As Spain's rail network continues to expand, Barcelona has positioned itself at the center of international connectivity by developing a 3.2-million-square-foot (300,000-square-meter)¹³ transportation complex. This new hub is designed to transform rail travel across Spain and Western Europe, providing the capacity and comfort necessary to support a projected 275,000 daily passengers.

¹³ Figure provided during our meeting and site tour with Joan Baltà of Barcelona Sagrera Alta Velocidad.

By prioritizing spatial efficiency, the station will go a long way toward alleviating the chronic overcrowding issues that have historically plagued Barcelona-Sants. The impact of La Sagrera spans every scale, from hyper-local urban revitalization to international transit logistics. The facility will feature 18 tracks—10 dedicated to high-speed rail (HSR) and eight for regional services—supported by expansive concourses designed for optimal circulation and seamless local transit integration. Ultimately, the station’s specific location was the foundational factor in Barcelona’s ability to meet the growing demands of modern, high-load passenger rail.



Figure 121. *La Sagrera rail yards and construction site.*

Source: barcelonacatalonia.eu

5.1.3 The right move: Lyon makes the smart decision to build a new through station on the edge of downtown

In the 1960s, the French military decided to leave its cavalry barracks located in the La Part-Dieu neighborhood it had occupied for about a century. The site was subsequently targeted for new urban development as part of a broader French national planning strategy to develop new “decision-making business districts” outside of Paris, aimed at distributing economic growth more equitably across the country.

By the 1970s, as planning began for France’s first high-speed rail line between Paris and Lyon, Lyon-Perrache was designated as Lyon’s principal station. However, Perrache was a stub-end station located on a peninsula west of the city center, making it poorly suited to function as a through-running HSR node for services linking Paris with the Mediterranean coast.

Local officials identified La Part-Dieu as an ideal site for both urban redevelopment and a new primary railway hub. Although situated just east of the historic core, its central location ensured that major destinations remained within a short walk or transit ride. Unlike other parts of the city center, the site was free of the physical constraints that typically preclude high-density development in a centuries-old European city. Furthermore, much like Barcelona's La Sagrera, the presence of an adjacent, well-connected rail yard allowed the city to establish a major station without the massive undertaking of reconfiguring new mainline tracks.

When Gare de Lyon-Part-Dieu opened in 1983, it supplanted Perrache as the city's transit nexus and the central node of the regional network. This transformation catalyzed the growth of the surrounding area into what is now the largest office district in France outside of Paris.



Figure 122. *An eastward view of the Cuirassiers barracks in the La Part-Dieu neighborhood, circa late 1960s. The barracks occupy the center of the frame, situated west of the railway lines visible in the distance. This site has since been transformed into the Westfield La Part-Dieu mall, which currently attracts 35 million visitors annually.*

Source: @ArchivesdeLyon, accessed via lyon-partdieu.com



Figure 123. *Relationship between Lyon-Part-Dieu, Lyon’s former main station prior to Part-Dieu’s opening in 1983, and the city’s downtown core.*
 Graphic by Eric Eidlin. Aerial imagery from Google Maps

5.2 Building the right station from the start

As noted earlier and emphasized by SNCF’s Director of Station Transformation, Frédéric Longchamp, the layout of tracks and the width of platforms are among the most consequential station design decisions. Once construction is complete, these elements are extremely difficult and costly to change, as they form the structural backbone around which all other station functions must adapt.

Lyon-Part-Dieu offers a clear illustration. When the station opened in 1983, it was already operating beyond its intended capacity, having been designed for just 35,000 daily passengers. Today, it routinely serves around 140,000 passengers per day. This gap was driven largely by the unexpected success of the Paris–Lyon high-speed rail line, which far exceeded early ridership projections—reaching 10 million passengers by 1981 and growing to 52 million annually by 2019. Because the station was underbuilt from the outset, rising demand quickly overwhelmed its capacity.

Expanding tracks and platforms within a dense urban environment—a challenge Mr. Longchamp now faces—has proven extremely difficult. The lesson is particularly relevant in North American contexts, where rail ridership is still developing, and there may be pressure to build stations that are small, narrow, and inexpensive—even though long-term growth may ultimately demand far more generous infrastructure.

Table 7. Past, Present, and Future Daily Ridership at Gare de Lyon-Part-Dieu

	1983	2001	2025	2030
Lyon-Part-Dieu Daily Passenger	35,000	80,000	135,000-140,000	175,000-200,000

Source: Passenger numbers and forecasts were provided to authors during the meeting and site tour Frédéric Longchamp of SNCF Gares & Connexions, Director of the Lyon-Part-Dieu redevelopment.

After years of continued growth—even after it was operating at over capacity from the very beginning—the city and station planners found it necessary to modify the backbone elements in order to update facilities to catch up with current traffic and meet future needs. During our tour of the station, Mr. Longchamp explained how station designers found and created space within the existing structure to increase capacity since construction began in 2017. Being resourceful to find more space has been important since there has been little room to expand the station since it opened 40 years ago.

The first major improvement was the construction of an entirely new track—Voie L (“Track L”)—which increases service capacity and reduces delays. This addition provides greater operational flexibility and improves overall service quality, as planners expected an [eight percent reduction in minutes lost during peak hours](#). The project is also a major step toward delivering high-capacity regional rail service, [RER-type system](#) in Lyon, one with through-running and more frequent trains that operate as a high-frequency regional rail-express metro hybrid.

Station planners also saw the track extension as an opportunity to widen the platform between Tracks K and L—a critical but difficult intervention. The narrow platforms built decades ago remained a significant constraint, as crowding on these platforms creates not only inconvenience but also safety risks, making such targeted upgrades essential.



Figure 124. Image of Voie L ("Track L"), which was added to the east side of the station.

Source: Le Progrès / Maximw JEGET, accessed via ledauphine.com

As noted earlier, Lyon is upgrading concourses and waiting areas while expanding rail capacity. The renovation will triple the station's footprint to 355,200 square feet (33,000 square meters) and add entrances on all sides.

Lyon-Part-Dieu shows that major station renovations are possible, but few stations enjoy the same flexibility to correct past design decisions once construction is complete. Such renovations are also enormously expensive. It is therefore essential for cities and rail networks to design not just the station they need now, but one they'll need in the coming decades. Anticipating future passenger growth, service patterns, and network expansion—to avoid overcrowded stations and the need for costly, complex retrofits decades later.

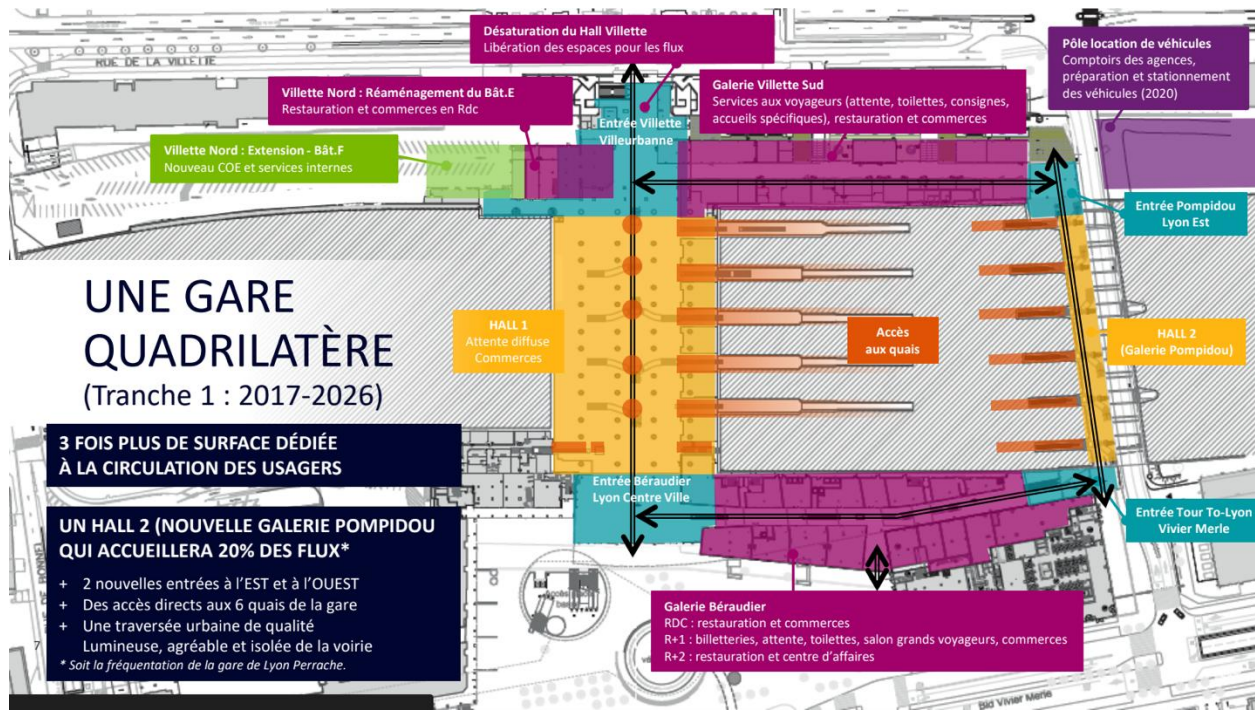


Figure 125. Image of Lyon-Part-Dieu Station renovations.

Source: SNCF

With the development of La Sagrera, Barcelona appears to be successfully anticipating future demand by designing a facility capable of handling 275,000 daily passengers. While Barcelona-Sants served 130,000 passengers per day in 2025, La Sagrera is positioned to absorb much of this load as Spain's rail network evolves and volumes increase. Unlike the reactive expansions seen at Part-Dieu and Sants, BSAV planners have proactively prepared for growth by integrating improved High-Speed Rail (HSR) services, a new regional rail hub, and expanded metro connections. At 3.2 million square feet (300,000 square meters) across four levels, the station's scale significantly surpasses both Part-Dieu and Sants, even following their recent renovations.

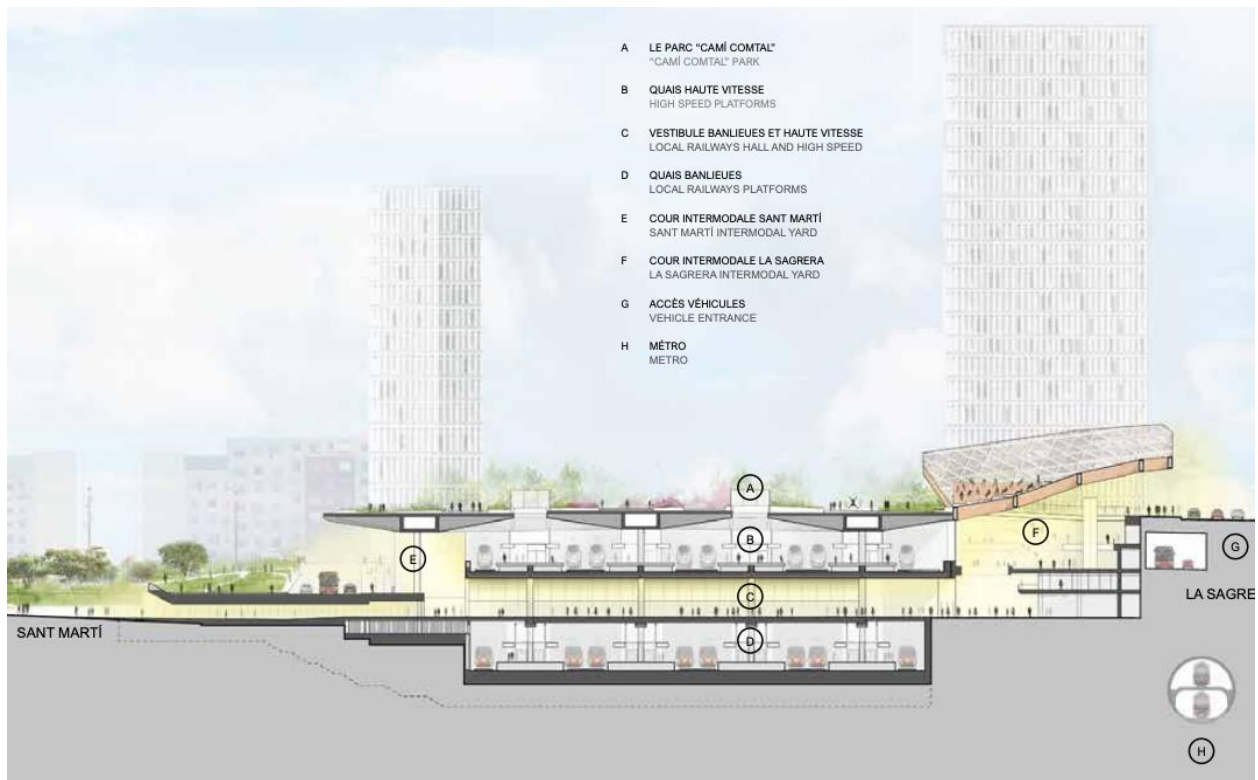


Figure 126. Section drawing showing the vertical organization of the future La Sagrera Station. The graphic shows the rooftop park on the top level (A), with high-speed platforms located just below that, on Level B. Level D houses regional trains, while access to both the high-speed Level B and regional Level D is via a shared concourse, Level C.

Source: BSAV

Tomorrow matters, but the decades after matter even more

Choosing where and how to build a station is a decision that shapes a city for generations. By examining the strengths and shortcomings of rail hubs in Zaragoza, Lyon, and Barcelona, we can identify essential planning principles to ensure the success of future rail travel in the U.S.

The priority of centrality: A successful station should deliver travelers directly into the heart of the city, where destinations are reachable on foot or via seamless transit. Proximity to downtowns and employment centers is critical to maximizing the return on high-speed rail (HSR) investments. Conversely, stations on the urban fringe often fail to provide these benefits; they extend trip times and complicate navigation, as peripheral districts rarely offer the transit density found in the urban core.

Most stations we visited in France and Spain excelled at capitalizing on their central locations. Zaragoza-Delicias, however, illustrates the challenges of the alternative. While it is a masterclass in modern architecture, its distance from the historic core and the lower frequency of transit connections make it feel less integrated into the city's pulse than its more centrally located peers.¹⁴

Building on "good bones": Whenever possible, planners should opt to build on “good bones.” Historic central stations are anchored within mature, transit-supportive urban fabrics that are exceptionally difficult—sometimes impossible—to recreate from scratch. Successful stations require a well-established “there” to serve as a functional anchor.

If infrastructure constraints or dense development necessitate building outside the core, the new station must not exist in isolation. It should be designed as a dual-purpose hub for both origins and destinations, integrated into local cycling and mass transit networks to ensure it remains highly accessible.

Scaling for the future: Cities must select sites capable of serving their regions for centuries. While rail is inherently space-efficient, the long-term success of any network depends on its ability to scale. Stations must be designed with surplus capacity to handle increasing passenger volumes and traffic demands far into the future.

To be truly “future-proof,” design must prioritize the efficient management of high-volume train and pedestrian traffic. This requires engineering platforms and tracks to meet long-term projections—a significant challenge in regions with currently low ridership that are planning for service expansion. Beyond the tracks, safety and throughput depend on wide platforms with multiple ingress and egress points, creating a permeable hub that allows for generous circulation and multi-directional access.

Proactive planning – Barcelona vs. Lyon: In Barcelona, BSAV planners have successfully anticipated these needs at La Sagrera. By selecting a site free of major constraints, they are building a facility large enough to accommodate future growth. This proactive approach ensures they will not be hindered by an undersized complex—a struggle that has hampered Lyon-Part-Dieu and Barcelona-Sants for years following their respective openings.

The necessity of strong governance: Ultimately, sophisticated station planning is unattainable without robust institutional structures. Strong governance is required to enforce high-quality design practices and ensure that these long-term visions are carried out effectively.

¹⁴ For a more thorough discussion of this issue, see Eric Eidlin (German Marshall Fund of the United States, 2015), https://todresources.org/wp-content/uploads/2016/10/Eidlin_HighSpeedRail_Jun15.pdf.)

6. Lesson 6: The presence of strong national actors leads to better station management and a more unified passenger experience

Great stations are not merely products of good engineering; they are the results of sound governance. The sheer variety of elements involved—layout, passenger flow, amenities, and technical operations—makes coordination a monumental task. France and Spain address this by managing their hubs under a 'single umbrella.' This dedicated, centralized structure allows for a unified strategy that spans from daily maintenance to building entirely new facilities. It is this institutional clarity that allows these European stations to achieve the high-quality, coordinated outcomes that are rarely achieved in the American context.

6.1 A “top-down” versus “bottom-up” approach: What is better for the passenger?

Certain ways of planning infrastructure can vary across cities and regions in the U.S.—they can even vary *within the same region*. A central operator that can align multiple priorities under one vision can prevent the very fragmented way of rail infrastructure we have today; we outline two case studies later in the *Bringing It Home* section of this report.

Political winds and market forces shift in France and Spain, just as they do in the U.S., but station projects in these countries are far less vulnerable to such changes. Both nations maintain strong, stable governance entities responsible for all aspects of station management—from daily operations to major development and renovation efforts. These specialized organizations centralize planning, are staffed with experienced professionals, and have the autonomy needed to implement their vision effectively.

6.1.1 SNCF Gares et Connexions

On our first full day of the trip, we met with Fabrice Morenon, managing director of *Gares et Connexions* (G&C), the subsidiary of the French national railway company (SNCF) that is responsible for managing, planning, and operating France's 3,000 railway stations. He explained the role the subsidiary plays as the central body for French rail station governance and described how G&C is the “railway station specialist” for France.



The “Stations & Connections Department” was created in 2009 in a French rail transport reorganization and regulation law. Over the next handful of years, the department [evolved with new legislation](#), having its role and purview expanded. In the 2018 Law for a New Railway Pact, Stations & Connections was established as a public limited company and a subsidiary of SNCF Réseau (translated to SNCF Network), which is SNCF's subsidiary division for all French railway infrastructure. In this legislation, Stations & Connections was granted organizational, decision making, and financial autonomy over its roughly half-billion-Euro budget and entrusted with its three main “missions”:

1. **Transparent, non-discriminatory public service**
2. **Intramodality**
3. **Balanced regional growth**

These priorities inform every aspect of G&C operations, from daily management to large-scale renovations. By implementing enhancements consistently across the network, G&C ensures a high-quality experience for every rail passenger in France.

This standardization is driven largely by the revenue-sharing model SNCF applies to its 3,000 stations. As noted in Lesson #4, only about 40 of France's busiest urban hubs operate at a profit; the revenue generated by these primary stations is redistributed to support the rest of the national network.

Mr. Morenon explained the philosophy behind this approach: G&C views the 3,000 stations as a single, unified network. Since every journey involves two nodes—an origin and a destination—all travelers deserve a high-quality experience at both ends of their trip. Rather than prioritizing stations based on their individual balance sheets, SNCF treats the entire system as one interdependent entity, ensuring that investment is not dictated solely by the profitability of an individual station.

There are two main revenue sources G&C brings in to operate in these stations and set aside for future upgrades:

- **Regulated:** Fees from rail operators for access and to use the station.
- **Unregulated:** Economic activity from within the station—rents, advertising revenue, parking fees, etc.

6.1.2 Administrador de Infraestructuras Ferroviarias (ADIF)

Administrador de Infraestructuras Ferroviarias (ADIF) is the national railway infrastructure manager, which includes tracks, signaling, and stations. It falls under the purview of Spain's Ministry of Transport and Sustainable Mobility.



ADIF was conceived in 2005 out of the European Union's Railway Sector Act, which required all large national railways to manage infrastructure independently. Before this directive, Spanish railway network governance was even more centralized under Renfe. But the EU law required the separation of management operations to prevent a monopoly and encourage more competitive operations. Thus, RENFE was split up; *Renfe-Operadora* was created to take over rail operations and service delivery, ADIF was created to own and maintain railway infrastructure.

ADIF oversees 1,448 railway stations in the Spanish network in a similar fashion as SNCF's G&C. They are responsible for facility planning and maintenance, day-to-day operations, and commercial ventures. They lease track capacity to rail operators to use the station, and manage all of the various functions of passenger experience, from wayfinding to parking management.

A key difference from France is that ADIF has no dedicated subsidiary for stations like SNCF's G&C. Renfe and ADIF function as completely separate entities under Spain's Ministry of Transport and Sustainable Mobility, unlike SNCF's *Voyageurs* (operator) and *Réseau* (infrastructure manager), which are subsidiaries under the parent company SNCF Groupe.

In the bigger picture, ADIF oversees the planning and delivery of larger-scale improvements to its station facilities, and it is currently overseeing the projects we toured at Barcelona-Sants and Madrid-Atocha, as well as the one we briefly checked out at Madrid-Chamartin. It is also a key stakeholder in *Barcelona Sagrera Alta Velocitat* (BSAV), the public project planning and management company of the La Sagrera project.

In the U.S., it is often assumed that delivering the most effective and citizen-responsive public investments require devolving decision-making to the lowest level of government possible. However, our experience in France and Spain showed that exactly the opposite was the case when thinking about investing in regional and intercity rail infrastructure. For those rail investments, it is critical to involve the level of government whose geographic purview most closely matches the extent of the railway. Doing so helps ensure that stations are designed to support seamless, system-wide movement, rather than reflecting only local priorities. Railways inherently connect distant places, and political priorities can differ from city to city.

In France and Spain, SNCF and ADIF play the key roles of managing service and providing a consistent and unified experience across all cities and regions, ensuring that the network functions cohesively for travelers.

The Spanish high-speed rail market liberalization model

The Spanish HSR network received [significant financial support from the European Union](#), with major infusions starting in the late 1990s and accelerating through the 2000s (especially the 2000-2006 & 2007-2013 periods). These EU funds covered approximately [one quarter of the cost of building the network](#). On the operating front, Spain was able to keep fare prices low [thanks to subsidies from the European Union and Spanish governments](#). However, because of lower than anticipated ridership for many years and mounting maintenance costs, Spain still faced considerable debt.

In 2019, ADIF introduced a new operating framework to boost HSR demand and improve service quality. Rather than allocating capacity train-by-train, ADIF began auctioning standardized round-trip path packages on major high-speed corridors, bundling outbound and return slots to give operators predictable schedules and enable frequent, competitive service.

Capacity packages were awarded to the Spanish national operator *Renfe* (operating premium AVE and low-cost Avlo services), *OUIGO* España (the low-cost HSR subsidiary of France's SNCF), and *Iryo*, a new entrant jointly owned by Spanish firms and Italy's national rail operator, *Trenitalia*.

This liberalization fundamentally reshaped Spain's HSR market. Competition increased service frequencies, expanded destinations, diversified fare options, and drove down ticket prices. As a result, ridership rose sharply—particularly between 2023 and 2024—as more frequent, affordable services attracted new passengers, shifted trips from air and auto to rail, and generated [roughly €150 million in additional track-access revenue](#) for ADIF.

While competition thrives on these corridors, ADIF still centralizes infrastructure planning and maintenance across the entire network. This standardization delivers major benefits—lower costs, better interoperability, and a less fragmented rail system overall.

6.2 Multiple operators can share large stations seamlessly

We visited several of Europe's premier transit hubs, which accommodate a diverse array of national operators and internal agency divisions. While managing the conflicting interests of these various entities could easily become a complex ordeal, both France and Spain maintain strong coordination across different levels of government. In these systems, the station management body actively mediates between stakeholders to prioritize functionality and ensure a unified, seamless experience for the passenger.

Main city stations and the operators they host:

Paris Gare du Nord

- *SNCF TGV* – French HSR Operator
- *Eurostar* – International HSR Operator
- *Intercités* (IC) – Conventional Intercity Network
- *Réseau Express Régional* (RER) – High-Frequency Regional Rail-Express Metro Hybrid
- *Transilien* – SNCF Commuter Rail
- *Transport Express Régional* (TER) *Ile-de-France* – SNCF Commuter Service for Paris Region

Lyon-Part-Dieu

- *SNCF TGV*
- *Intercités* (IC)
- *TER Auvergne-Rhône-Alpes* – SNCF's Commuter Service for Lyon Region
- *Deutschebahn Intercity Express* (ICE) – German HSR Operator
- *Trenitalia Frecciarossa* – Italian HSR Operator
- *Renfe AVE* – Spanish HSR Operator

Strasbourg-Ville

- *SNCF TGV*
- *Intercités (IC)*
- *TER Grand Est* – SNCF Commuter Service for Grand Est Region
- *DeutscheBahn Intercity Express (ICE)*

Barcelona-Sants

- *AVE, Avlo, Alvia, and EuroMed* – Renfe HSR Operators
- *Renfe Operadora* – Renfe Conventional Intercity
- *Iryo* – Private HSR Operator
- *InOui and OuiGo España* – French HSR Operators
- *Rodalies de Catalunya*—Renfe’s Regional Service for Catalonia

Madrid-Atocha

- *AVE, Avlo, Alvia, and EuroMed*
- *Altaria, Avant* – Renfe’s Medium-Distance HSR Operators
- *Renfe Operadora*
- *Cercanías Madrid* – Renfe’s Regional Service for Madrid



Figure 127. A view looking out into Gare du Nord’s main concourse. Off to the left, there are Eurostar trains; to the right, SNCF TER and TGV trains.

Source: photographer unknown, accessed via seat61.com



Figure 128. A Renfe AVE train next to an Iryo train at Madrid-Atocha.
Source: Photographer unknown, accessed via all-andorra.com



Figure 129. Spanish and French high-speed trains facing off at Barcelona-Sants Station.
Source: Pabloprat, Adobe Stock Image. [Used with license]

The overall design of every facility we visited in France and Spain reinforces a unified, multi-operator approach. Instead of separate “terminals” for individual rail services with carved-out territories, all operators share one integrated station that works well for every train that serves it and every passenger who passes through. For frequent travelers, especially, the result is a place they can use easily and consistently, no matter which service they’re taking or where they’re headed. For first-time users or travelers who pass through very infrequently, it is much easier to navigate.

“We saw that large stations with multiple operators can offer a unified passenger experience... even stations that grew incrementally over time. Gare du Nord, for example, has multiple SNCF services alongside Eurostar trains and connects to local Paris transport networks. Gares & Connexions being in charge of the station facilitates the different needs and interests and makes the big decisions to create a unified station experience for all its operators and passengers. The process in different U.S. cities and states can be very convoluted, especially for agencies that may have conflicting interests, who may have different priorities or financial resources, or that don’t work well together for other reasons. Having an entity with an interest and responsibility in guaranteeing seamless travel for all passengers—something that is most natural for an entity working at the state or national level—is essential to functional planning and coordination.” — Hunter Bickel

6.2.1 Small details matter: Unified wayfinding makes for a cohesive rail station

Unified wayfinding is a hallmark of the station management model we observed in France and Spain. At Paris Gare du Nord, for example, a high-traffic hub with numerous transit connections, the use of consistent and colorful signage creates an intuitive environment. Even within the sprawling footprints of older stations, this commitment to clear, standardized wayfinding ensures that travelers can navigate complex levels and services with ease.



Figure 130. *As this interior view of Paris Gare de Lyon shows, strong involvement from national rail operators in shaping the customer experience—including unified wayfinding—creates a seamless journey, preventing a historic station from feeling disjointed after years of piecemeal updates.*

Source: Eric Eidlin

Beyond having a united approach to signage, we saw efforts both in France and Spain to improve the visibility and usefulness of wayfinding. For the 2024 Summer Olympics, France achieved this by adapting signage to ambient light conditions. There, SNCF implemented signage that was context-sensitive signage to ensure information is seen and understood—banners used on upper levels with natural light, while on-floor projection is used on darker lower levels of stations. We saw similar approaches in the Lyon and Barcelona subway with overhead projections to remind people to spread out along the platform, while floor markings show where to wait and where to leave space for boarding and alighting.

This cohesion is achieved through a standardized design language where typography, color palettes, and contextual placement remain uniform across the entire station—and indeed, throughout every station in the city. By moving away from a fragmented model where multiple operators manage their own branding, the station provides passengers with a single, intuitive system of navigation. This clarity is only possible when a complex facility, with all its distinct zones and transitions, is managed as a singular, integrated entity.



Figure 131. *Context-sensitive signage ensures information is seen and understood. Banners are used on upper levels with natural light; as shown in this photo of Paris Gare St. Lazare. Projection is increasingly used on the darker lower levels of stations, as shown in this photo of Paris Gare du Nord.*

Source: Franklin Tang

7. Lesson 7: Spain and France build transportation megaprojects faster and cheaper than the U.S.

While a comprehensive audit of international infrastructure costs remains beyond the scope of this report, the stark disparity in project delivery between France, Spain, and the United States was a recurring theme of our study trip. Addressing these gaps is especially timely following the release of Derek Thompson’s *Abundance* (with a foreword by Ezra Klein). The book has moved to the center of national discourse, garnering widespread media attention and igniting a high-profile debate over the systemic hurdles facing the California High-Speed Rail project.

Though a full post-mortem of these cost disparities is not our primary objective, the European projects we examined demonstrate the transformative potential of efficient delivery. By placing comparable U.S. initiatives alongside these international counterparts, we aim to illustrate more than just a contrast in spending; we offer a vision of what is possible when infrastructure is delivered with precision.

7.1. Through-running tunnel projects

7.1.1 Spain’s city center tunnels are cost-effective connections

Two of Spain’s city center rail tunnels—massive civil engineering undertakings—are all the more remarkable because of their cost efficiency.

Madrid Atocha–Chamartín Cercanías (commuter rail, not HSR) Tunnel:

€179.3M for 3.5-mile tunnel in January 2008 → \$335.1M in 2025 USD for ~\$96M per mile.

Note: Figure from the Foundation of Spanish Railways. This is the figure we found for when the construction contract was awarded in 2008, not the final cost when completed. Calculations were made based on the Transit Cost Project methodology.

Madrid Atocha–Chamartín Cercanías (commuter rail, not HSR) Tunnel:

Madrid Cercanías (not HSR) Atocha–Chamartin tunnel: €550M for 4.6-mile tunnel in 2006 → 1.1B in 2025 USD for ~\$238.6M per mile.

Note: Figures from NYU’s Transit Costs Project urban rail projects database converted to 2025 dollars. This is Madrid’s commuter rail tunnel connecting the two stations—different from the HSR tunnel mentioned previously in the report. It includes intermediate stations, which is the main factor in higher per-mile costs direct-bore tunnel with no intermediate stations. We note this tunnel because it is a closer comparison for the Boston North-South Rail Link, which includes alternatives studied for infill stations for commuter rail.

Taken together, these projects demonstrate a simple truth:

When complex infrastructure can be delivered faster and for a fraction of U.S. costs, countries can afford to take on more—and more ambitious—projects.

7.1.2 U.S. through-running: Higher costs for smaller ambitions

In contrast, U.S. cities face much higher costs, even for smaller undertakings.

Boston’s proposal to connect North and South stations with a roughly 5.5-mile tunnel was projected to cost between \$7.9 to \$16.1 billion in 2025 U.S. dollars (converted from \$6.1 to \$12.6 billion in 2018 U.S. dollars) according to the [North South Rail Link Feasibility Reassessment Final Report](#) by the Massachusetts Department of Transportation in 2019—depending on various factors, such as the number of tracks, tunnels, and stations.

San Francisco’s Portal project, also known as the Downtown Rail Extension, is a project to extend Caltrain and California HSR underground from their current terminus at Fourth and King Street and King Street to a new station beneath the Salesforce Transit Center. With a total length of 2.2 miles, the current cost estimate for the project is [\\$8.2 to \\$8.5 billion](#) and the estimated completion date for the project is 2035.

7.2. Station renovations

7.2.1 Lyon-Part-Dieu

Lyon-Part-Dieu will end up being approximately \$600M ([€441.9 million](#)). We were also amazed at the low price of their significant station redevelopment effort given the scope of that project.

This amount included:

- \$260.5M for station and station facilities.
- \$148.4M for Track L and platform widening.
- \$182.3M for public spaces.
- \$16.2M for car rental facilities.

By U.S. standards, this budget is remarkably low for a project of this scale. Even more impressive is that a third of it—\$182.3 million—went toward public spaces. This proves the French can build major stations more affordably without sacrificing the high-quality features that make them attractive urban amenities.

7.2.2 Spanish stations

The major expansion and reconfiguration of the Barcelona-Sants station will end up costing around \$580 million in 2025 U.S dollars ([€410M in 2022](#)).

7.2.3 Station building in the U.S.

For comparison, recent rail station redevelopment projects in the U.S. have been significantly more costly. For example, the [Washington Union Station Expansion Project](#), which involves improvements that are like those with the Lyon-Part-Dieu and Barcelona-Sants projects, adding concourse space and increasing access points all around the station, is expected to cost [over \\$8 billion](#). On the other coast, current estimates for rebuilding San Jose Diridon Station total about [\\$4-\\$5 billion](#).

7.3 Major metro expansions

7.3.1 Paris is doubling its metro for a fraction of what it might cost in the U.S.

Doubling the current extent of the Paris Metro, the 125-mile Grand Paris Express is a sprawling expansion that far exceeds the scale of any current U.S. transit capital expansion project. This ambition is supported by relatively low construction costs, estimated at just over \$60 billion, or around \$530 million per mile.

However, by European standards, the project is seen as a high-cost endeavor. To celebrate local identity, planners commissioned world-renowned architects to design each station as a unique landmark rather than using a standardized template. Although the project has faced scrutiny for cost overruns, its 'expensive' European price tag still represents a level of efficiency that U.S. agencies could only dream of.

Construction began in 2016 to extend two existing lines, both of which were completed in time for the Olympic games in 2024. Construction of several new lines has been underway since 2015. New service on these lines will begin operations in phases between 2025 and 2031.

7.3.2 Madrid is a world leader in efficient and cost-effective subway rail construction

While Paris' Grand Paris Express program might not be considered a bargain by everyone, Madrid's Metro expansion over the past several decades stands out as a global benchmark for cost efficiency. Between 1995 and 2007, [the Madrid Metro undertook a rapid expansion](#) that transformed it into one of the most extensive urban metro systems in the world.

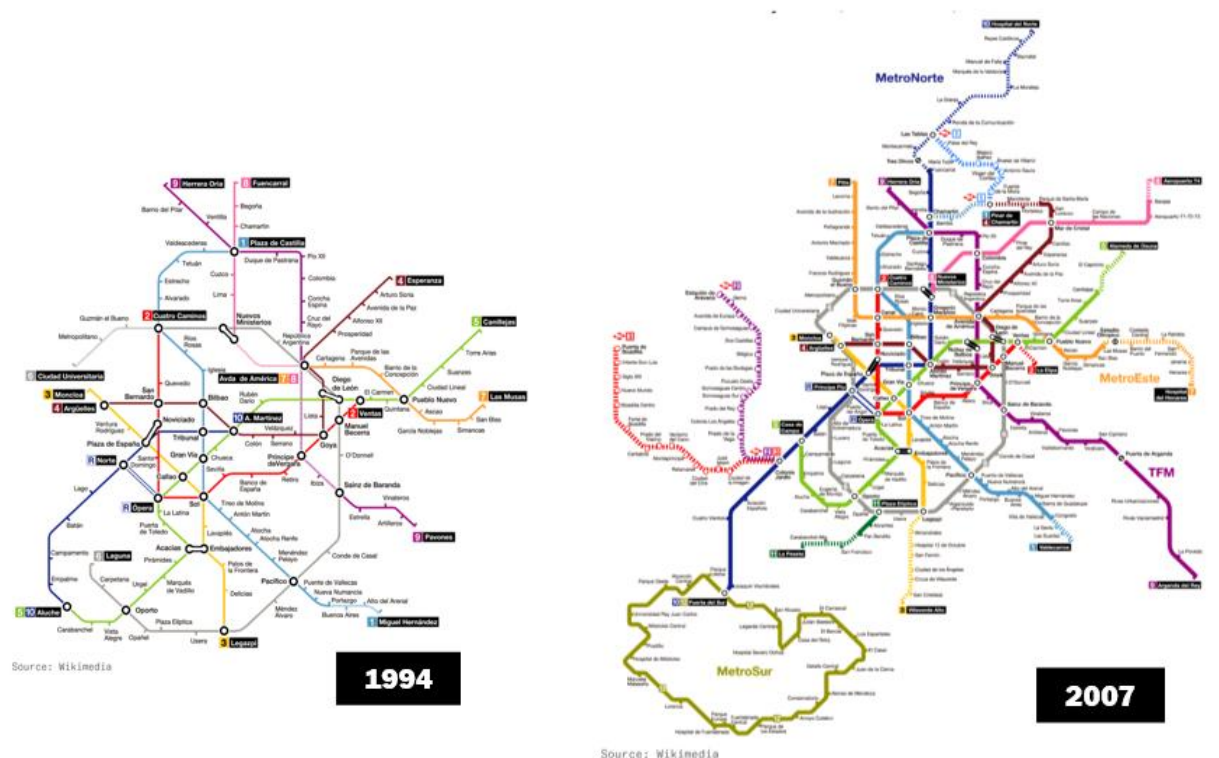


Figure 132. *Madrid Metro expansion 1995-2007, the period in which the system grew most rapidly.*

When the building spree began in 1995, Madrid's network covered about 114 km (71 miles). Over the next 12 years, the regional government added 203 km (126 miles) of new track—nearly tripling the system's length. Today, the network continues to expand, reaching over 300 km (186 miles) across more than 300 stations.

The primary 1995–2007 expansion was delivered at an average cost of roughly \$60–\$95 million per mile (in 2023 dollars), depending on the section—a fraction of the cost of comparable Western transit projects. While a full analysis of Madrid's success is beyond the scope of this report, the project serves as a vital benchmark. Its cost efficiency is particularly striking when compared to U.S. mass transit projects, which routinely face severe budget growth and schedule delays.

With its physical footprint largely established, Madrid is reaping the rewards of this infrastructure investment. Key additions from this period include MetroSur—a circular line connecting five major southern suburbs—alongside dedicated express links to Barajas Airport. Today, Madrid Metro is shifting its focus toward system modernization, such as the full automation upgrades on Line 6 planned for 2027. This shift demonstrates how cities can maximize network capacity through technology following a period of rapid capital build-out.

7.3.3 Getting less for more: Urban rail projects in the U.S. face much higher costs and construction timelines, even for smaller projects

Urban rail projects in the United States are currently grappling with a "less for more" reality: skyrocketing costs and protracted timelines that dwarf international standards. While expansion programs in cities like Paris and Madrid deliver massive networks for relatively modest sums, U.S. projects often cost significantly more while delivering only a fraction of the mileage.

7.3.4 Key Comparisons in Cost and Scale

BART to San Jose (Silicon Valley): This six-mile tunnel project is currently estimated at \$12.7 billion (2025 dollars), or roughly \$2.125 billion per mile. Though construction finally began in 2024 following years of delays, completion is not projected until 2039. To put this in perspective, this single six-mile segment costs nearly as much as Madrid's entire 130-mile (210 km) expansion between 1995 and 2007. On a per-mile basis, the San Jose extension is 34 times more expensive than the Madrid benchmark.

Seattle's Sound Transit (West Seattle Extension): The planned four-mile extension of the 1 Line light rail—which includes just four new stations—is facing similar fiscal hurdles. As of September 2025, cost estimates have surged to \$7.9 billion. At nearly \$2 billion per mile, this modest extension is approaching the price point of the BART San Jose project, further illustrating the systemic struggle with transit affordability in the U.S.

7.4 When projects cost more, we build less

7.4.1 The price of progress: Opportunity costs in U.S. transit

The exorbitant cost of U.S. infrastructure is a significant barrier to progress. When a single project consumes a disproportionate share of limited public funds, the "opportunity costs" are immense: fewer resources remain for the rest of the network, and we ultimately build less. If we hope to successfully deliver ambitious projects like **BART to San Jose**, **Diridon Station**, or **California High-Speed Rail**, we must find ways to deliver them more efficiently.

Throughout our site visits, a central question emerged: how do French and Spanish sponsors consistently get "[more for less](#)"? While an exhaustive accounting of these international differences is beyond this report's scope, the group identified several salient impressions—chiefly regarding project organization and governance.

7.4.2 Retaining expertise: The SGP model

The evolution of the **Grand Paris Express** offers a vital lesson in institutional memory. As Dr. Cynthia Ghorra-Gobin explained, the entity overseeing the project—originally the *Société du Grand Paris* (SGP)—was created specifically for this regional expansion. In 2023, as its mandate grew to include a broader portfolio of public works, it was renamed the [Société des Grands Projets](#) ("Megaproject Development Company").

The rationale was strategic: The expertise gained during the Grand Paris Express should remain within the public sector and be deployed across future projects, rather than dissipating once a single program ends. This model directly addresses the **"first-timer" problem**—a common pitfall for U.S. megaprojects where specialized knowledge is lost between completions.

7.4.3 The power of continuous iteration

Franklin Tang, a participant from the NYU Marron Institute, noted that these European successes stem from a principle of continuous iteration:

"The projects we encountered exemplify a core principle: experience and know-how gained on one megaproject—such as the Madrid Metro expansion or the HSR tunnels in Barcelona—are retained within the public sector. This institutional knowledge is then leveraged and deployed on subsequent lines and stations, ensuring each new project is more efficient than the last."

Closing the capacity gap

Addressing the cost and timeline challenges in the U.S. requires more than just money; it requires a structural shift in how we steer projects. Currently, U.S. efforts are hampered by:

- **Fluctuating political and public support:** A struggle to maintain momentum across multiple electoral cycles.
- **Funding gaps:** Inconsistent financial streams that trigger delays.

- **In-house capacity:** A lack of public-sector technical expertise to effectively manage and lead massive undertakings.

Establishing the right governance structures is not just a secondary administrative task—it is the prerequisite for building the infrastructure of the future.

8. Lesson 8: Mega-project outreach efforts should foster trust, showcase confidence and competence, and excite the general public

In our discussions with European experts familiar with the American context, some suggested that the U.S. may actually lead in the realm of public engagement. This observation stems from the sheer frequency of touchpoints: U.S. officials meet extensively with residents and stakeholders to gather input throughout a project's lifecycle.

However, a self-critical view suggests that while these touchpoints ensure the public is heard, they do not always ensure the public is served. Ultimately, citizens want steady, efficient progress on the transformative transportation projects that improve their daily lives. While robust input is essential, the current U.S. model often allows engagement processes to delay—or even derail—the very projects the public originally sought to build.

8.1 Strategic leadership and the "top-down" dilemma

Just as active management from higher levels of government improves station operations, early-phase planning and project development benefit from strong, strategic leadership. In the U.S., this is often labeled a "top-down" approach—a term that carries a significant negative connotation.

However, our experiences in France and Spain demonstrate how and why such leadership is essential for the effective delivery of large infrastructure projects. Strategic direction from top government actors ensures that a project's momentum is maintained across electoral cycles and bureaucratic hurdles, preventing the stagnation that frequently plagues decentralized planning.

The expansion of the [Madrid Metro](#) in the 1990s and early 2000s is a prime example. Public engagement around Madrid's program focused primarily on meeting statutory requirements and communicating construction impacts. While residents and local governments were informed about surface disruptions and station access, the broader public was not invited to shape core project elements like alignments or construction methods. These critical-path decisions were made by the regional government, reflecting a deliberate emphasis on rapid, high-quality delivery rather than iterative consultation.

"Throughout construction, community engagement remained limited and top-down... if a majority of the residents affected... wanted a change to the plans, they could be modified. But if the change entailed an increase in costs, project staff were likely to deny the request.

While there was criticism... there was also significant demand from people to get metro expansions near them... The principle behind this approach was that the government represented the democratic will of the community, as opposed to that of a vocal minority who might show up at several rounds of consultation to oppose plans." — [Ben Hopkinson, Works In Progress](#)

Madrid's process gave officials the autonomy to make decisive choices, allowing the program to move forward. The majority received what they voted for: an extensive, useful system. As communities witnessed this rapid progress and benefitted from improved service, it built the public goodwill and momentum necessary for continued expansion.

In contrast, U.S. transit agencies are often hampered by a fear of criticism. This hesitation to finalize key project elements drives up costs and slows delivery. A lack of strong leadership can also lead to a "thinning out" of projects—removing or postponing disruptive components to avoid friction. These changes often dilute the project's quality, limiting its ultimate benefits.

U.S. agencies could learn from the French and Spanish willingness to weather temporary criticism in favor of long-term utility. By "riding the wave" of initial pushback and delivering the project as designed, agencies can reach the point where the benefits begin to materialize. Once a system is operational, the temporary inconveniences of construction are often forgotten, replaced by the momentum needed for future phases.

The U.S. approach to engagement is deeply rooted in a respect for community relationships and individual rights. However, we must ask if this comprehensive process is always serving the public's ultimate interest. When engagement occurs alongside significant uncertainties in funding and timelines—as seen with California High-Speed Rail or Diridon Station—it can inadvertently create a gap between public expectations and reality.

Finessing this balance is key. As recently retired KQED reporter [Dan Brekke](#) noted in a retrospective interview, the best way for U.S. sponsors to garner public support is to deliver projects within reasonable timeframes and budgets. The French and Spanish experiences offer vital clues on how to achieve exactly that.

8.2 Using modern marketing to promote the future of transit

The public engagement strategies for the Grand Paris Express and Lyon-Part-Dieu succeed by striking a delicate balance: they invite meaningful community input while maintaining a rigorous focus on articulating project benefits. This dual approach serves as a powerful tool to constructively address opposition and navigate the uncertainties or valid concerns inherent in massive infrastructure shifts.

French project management bodies excel at this by investing in vibrant, comprehensive PR campaigns that transform rail development into a source of public excitement. By utilizing every available touchpoint with high-quality, integrated content, they turn transparency into a bridge for communication—ensuring the public is not just informed about the project, but sees the long-term value for their community.

8.2.1 Grand Paris Express

The Grand Paris Express project is especially instructive here. Its sponsors consistently use clear, visually compelling materials that help the public understand not just what will be built, but why it matters. This makes it easier for community members to weigh long-term benefits against the short-term disruptions and costs that large projects inevitably entail. Public trust is

reinforced by the fact that these project sponsors have a strong track record of delivering projects on time and on budget—a history that gives the public confidence that promised improvements will actually materialize.

Together, these factors illustrate an important opportunity for U.S. agencies: communicating more clearly and consistently, while demonstrating credible delivery, can help build broader and more durable support for large infrastructure investments.



Figure 133. *Grand Paris Express promotional materials. On the left, the poster reads: "We are starting work early in the day today so that you can wake up later in the day tomorrow." On the right, a translation of the billboard might read: "We are digging deep today so that you will be able to rise above and get a breath of fresh air farther away tomorrow."*

Source: Société des Grand Projets

We took a tour of the neighborhood that in the southwest of Paris is getting two new stations on Line 1, Issy-les-Moulineaux. On this tour we were exposed to this exciting project and were impressed by the communications materials we saw both on-site and when we conducted further research after our visit.

Strategic construction signage

Project managers transformed the construction perimeter into an interactive touchpoint. By utilizing a high-traffic walkway within a neighborhood park, they greeted passersby with vibrant, informative displays that turned a potential nuisance into an educational opportunity.

A primary goal of the Paris Metro expansion is to enhance regional connectivity through new circumferential service. This allows residents to bypass the congested city center when traveling between outer urban areas and suburbs. One particularly effective graphic, Figure 114, illustrates this impact by applying real-world scenarios to the new transit map. By comparing current travel times on the existing radial Metro and RER networks against the dramatic time savings offered by the new peripheral lines, the campaign helps residents visualize the tangible improvements to their daily lives.

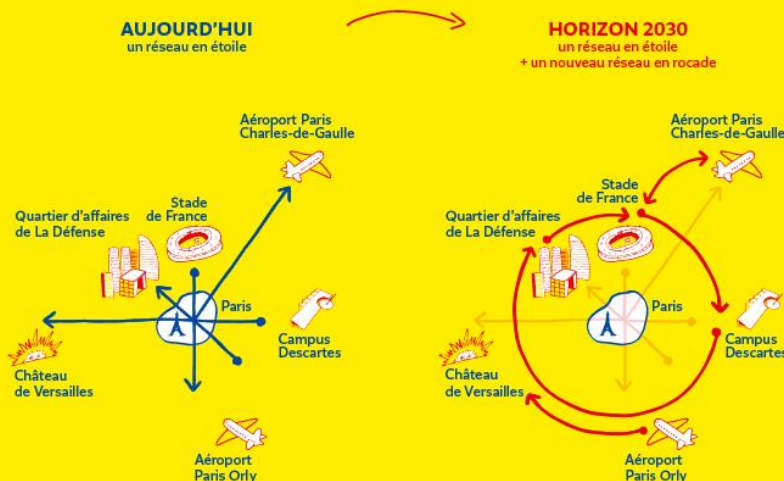


Figure 134. *These signs illustrate how the Grand Paris Express communicates with the public. The bright, graphically compelling, and approachable posters—mounted on construction hoardings—offer clear, easy-to-understand information about the project, with an emphasis on its benefits.*

Source: Hunter Bickel

Le nouveau métro pour se déplacer plus rapidement

Demain, les villes seront reliées entre elles par ce nouveau réseau en rocade, les trajets seront plus directs: un gain de temps et de confort pour l'ensemble des habitants.



Se rendre à un événement sportif

Une famille de Chelles a décidé d'aller voir un match au Stade de France

DE CHELLES À LA PLAINE
STADE DE FRANCE

41 min → 27 min

Se soigner ou rendre visite à un(e) malade.

Un habitant de Montfermeil est soigné à l'Institut Gustave-Roussy de Villejuif. Ses enfants lui rendent régulièrement visite.

DE CLICHY -
MONTFERMEIL
À VILLEJUIF INSTITUT
GUSTAVE-ROUSSY

1h24 → 32 min



Figure 135. Promotional poster of the Grand Paris Express explains and visualizes how the new metro will drastically reduce travel times between two particular points in the Paris region, especially for trips between suburban districts. The poster reads “Tomorrow, cities will be connected to one another by a new metro beltway, which will save time by making it possible for people to avoid traveling through the city center of Paris to make connections to other lines.”

Source: Société des Grands Projets

Digital engagement and social media

Eager to dive deeper into the project after our site visit, our group members fell down several digital rabbit holes exploring the Société des Grands Projets’s (SGP) media-rich ecosystem. Spanning Instagram, Facebook, YouTube, and LinkedIn, the SGP maintains a commanding online presence with a consistent posting schedule of several updates per week.

The content is characterized by exceptionally high production value—it is visually engaging and technically informative, offering a steady stream of new insights that keep the audience

hooked. While social media is a staple for U.S. transit projects, we were particularly struck by the caliber of the SGP's work. The combination of high-end cinematography and clear, frequent updates creates a level of digital engagement that sets a new benchmark for the industry.

Website

The [Grand Paris Express website](#) is both a comprehensive information hub and a masterclass in digital public engagement. Each new metro line and station is granted its own dedicated page, walking visitors through hyper-local details, while broader sections contextualize the purpose and regional benefits of the expansion.

What truly sets the site apart are its interactive features—specifically the trip-time calculators—which allow users to engage deeply with the project's transformative potential. The user-friendly interface makes navigating complex infrastructure data feel intuitive rather than overwhelming. While many U.S. transit projects utilize dedicated, standalone websites to distance themselves from standard government bureaucracy, the Grand Paris Express platform stands out for its superior design, user-friendly interface, and rich collection of detailed information.

La Fabrique du Metro

Translated as "[The Metro Factory](#)," this is an immersive experience open to the public featuring life-size trains and stations, 3D models, videos, and more. Admission is free of charge, with guided tour options up to 90 minutes. The space is open Monday through Friday from 8 a.m. to 7 p.m. with evening tours offered until 8 p.m. two Thursdays per month, making outreach more accessible for a variety of schedules.

Construction site tours

There are [free guided tours](#) available to the public at 12 different construction sites across the network expansion, most of which are for stations and areas around them.

8.2.2 Lyon-Part-Dieu

Comprehensive and user-friendly public information campaigns appear to be commonplace for large transportation megaprojects throughout France. We were impressed with Société Publique Locale (SPL) Lyon-Part-Dieu's efforts in this area in a number of ways.

On-site displays all throughout the station

The project sponsor made sure that everywhere, from the retail space that was yet to open in the new Galerie Béraudier to along the fencing around construction sites of ongoing works outside, that every opportunity to put up promotional signage for the station transformation was taken. The SPL Lyon-Part-Dieu and the project stakeholders ensure no space is wasted, covering all available space with billboards promoting the project in a variety of ways.

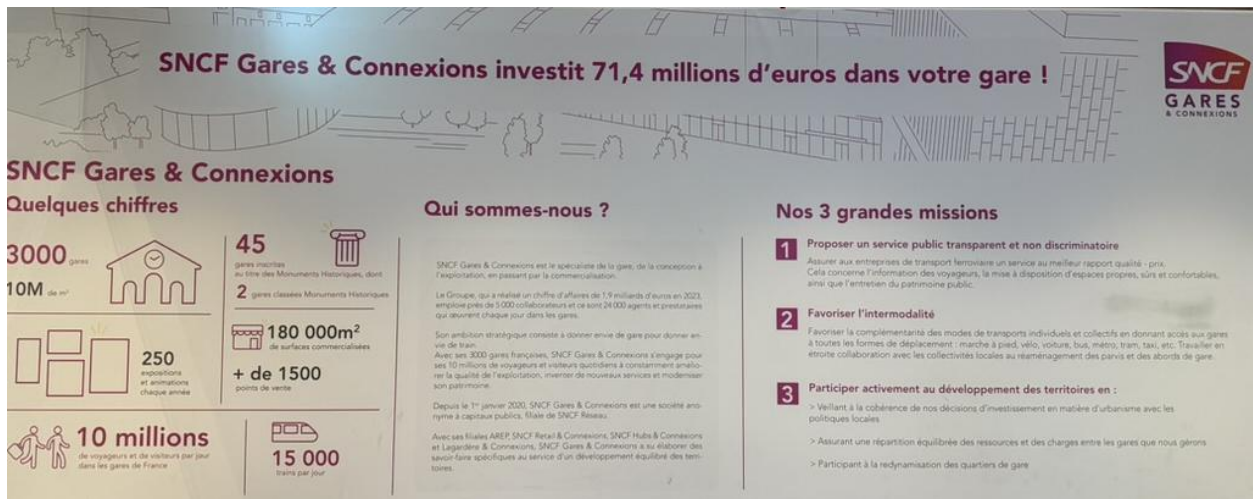


Figure 136. SNCG gares et Connexions promotional billboard inside Lyon-Part-Dieu. The display includes details about how G&C is investing 71.4M euros, describes the role and functions of G&C, and states G&C's 3 main missions.
Source: Hunter Bickel



Figure 137. Construction site image display inside Lyon-Part-Dieu with dates to show progress. The heading says "A monumental project".
Source: Hunter Bickel



Figure 138. A display that describes and maps out the Hall 1 Renovation. The billboard is placed on the walls blocking off the construction area, demonstrating good contextual placement for promoting aspects of the station transformation.
Source: Hunter Bickel

Maison du Projet

In Lyon, we visited “[the project house](#),” a dedicated space for promoting the La Part-Dieu transformation. It is a large room inside of a retail outlet or storefront that features models and has covered the walls with signs and displays, and is staffed with employees to answer questions and elaborate on more details about the project to visitors, providing more opportunities to learn more about the project and visualize it.



Figure 139. *Guillaume Bruge, Communications Director for SPL Lyon-Part-Dieu, explains the station area redevelopment project to the study group in June, 2025 with the help of a large-scale model that is housed at the Maison du Projet.*
Source: Eric Eidlin

Take-ones

Brochures packed with information and imagery about the project were available at the project house and in waiting areas all throughout the station.

Website

Like the Grand Paris Express digital platform, the [SPL Lyon-Part-Dieu](#) website is very comprehensive. It outlines the project's vision, governance, and stakeholders while providing historical context within post-WWII French urban planning. Visitors can access a dedicated media center and navigate interactive maps that link directly to webpages dedicated to individual project components.

8.2.3 U.S. projects would benefit from better storytelling

The significant investment in public communication for these projects is supported by these project sponsors' proven track record in delivering projects. Because there is a high degree of certainty regarding delivery, the public engagement efforts feel transparent and honest rather

than aspirational. Ultimately, trust is maintained because the public is seeing the specific projects they authorized delivered both on schedule and within budget.

This relationship between delivery and credibility is best exemplified by the Grand Paris Express and Lyon-Part-Dieu. These projects do not merely use their websites for marketing; they use them as tools of accountability. Because these agencies have the institutional standing of guaranteed funding and political backing, their interactive maps and social media posts function as 'live' progress reports. This transparency transforms public engagement from a PR exercise into a genuine dialogue, as the public can see the infrastructure being delivered on time and according to the promised vision.

U.S. transit agencies often hesitate to center public outreach on costs and timelines—variables frequently dictated by external forces. This caution is understandable, as budget overruns and delays are magnets for public scrutiny. However, U.S. project sponsors could cultivate greater resilience by emphasizing the long-term transportation and economic benefits. By consistently highlighting these positive outcomes, agencies can build goodwill with the community. This broader perspective is essential for reaching skeptics who may otherwise focus solely on the immediate, disruptive impacts of construction.

“A better story can be told about rail. Communication efforts could be improved to change the cultural notion of car-centric thinking, emphasizing benefits for a greater quality of life and opportunity with rail investment.” — David Archuletta

Closing the loop: Strategic engagement and proven delivery

While U.S. agencies certainly employ many of the same engagement modalities discussed in this section, they are rarely deployed with the same strategic density or "all-of-the-above" consistency seen in the Grand Paris or Lyon-Part-Dieu projects. However, as this section has illustrated, the success of these French strategies does not rely on marketing alone; it is deeply reinforced by the proven track record of the agencies delivering them. As noted earlier in this report, when comprehensive engagement occurs alongside the funding uncertainties and timeline shifts seen in projects like California High-Speed Rail, it risks creating a "cynicism gap" between public expectations and reality. Ultimately, the French and Spanish experiences suggest that the most effective way to garner public support is to marry vibrant communication with credible delivery. Finessing this balance—aligning the transparency of the process with the reliability of the results—remains the vital next step for U.S. infrastructure sponsors.

9. Bringing it home: European lessons for better passenger rail in the U.S.

The goal of this report is not to present a simplistic 'Europe is good, the U.S. is bad' narrative. Instead, it offers fresh insights into how high-quality rail service and thoughtful planning can provide a blueprint for better project delivery in the U.S. By learning from these models, we can ensure that American rail and station developments reap the multiple benefits observed in France and Spain—investments that not only transform mobility and access to opportunity but also significantly improve the urban form of our cities.

Translating these lessons into an American framework, however, is no small feat: if experiencing these benefits as a traveler is easy, delivering them as a sponsor is complex. By synthesizing the core practices observed during our recent trip, we have identified significant opportunities to modernize U.S. mobility hubs and the districts that surround them. This final section applies those international takeaways to the American landscape.

9.1 The U.S.'s high-speed rail corridor opportunities

A common argument against HSR in the U.S. is that the country is simply too large for it to work. But this assumes that HSR must span the entire nation. While a coast-to-coast high-speed network may not make sense from a pure economic perspective, the U.S. contains several corridors with well-spaced clusters of cities that are ideally suited for successful high-speed service:

- Boston → 215mi → New York City → 94mi → Philadelphia → 139mi → DC
- San Francisco → 186mi → Fresno → 218mi → Los Angeles*
- Las Vegas → 270mi → Los Angeles*
- Dallas → 239mi → Houston †
- Chicago → 297mi → St. Louis → 248mi → Kansas City¹⁵
- Chicago → 91mi → Milwaukee → 336 mi → Minneapolis ‡
- Cincinnati → 107mi → Columbus → 142mi → Cleveland ‡
- Vancouver → 143mi → Seattle → 174mi → Portland †
- Atlanta → 245mi → Charlotte → 167mi → Raleigh †
- Miami → 285mi → Tampa → 84mi → Orlando ‡¹⁶

* = under construction

† = official proposal being seriously considered; ongoing or completed feasibility study or advanced planning stages

‡ = no ongoing proposal or initiative for true HSR

¹⁵ † Official study between Chicago and St. Louis only with the Illinois High Speed Rail Commission—Kansas City is not included.

¹⁶ True HSR officially proposed and studied in the 1990s and 2000s, cancelled in 2011.

The Northeast Corridor from Boston to Washington, D.C. is the only U.S. corridor with so-called “high-speed” rail service, provided by the *Acela*. Even so, it falls short of true HSR as experienced in Europe, with lower top and average speeds, which is mainly due to sharp curves on the route, especially through Connecticut, and track sharing with the busiest commuter railroads in the country.

Table 8. NEC versus French and Spanish HSR Corridors

Corridor	Distance	Runtime	Average Speed
New York–Boston	215 miles	3h40m	66 mph
New York–DC	233 miles	3h	82 mph
Paris–Lyon	290 miles	2h	145 mph
Paris–Strasbourg	304 miles	1h45m	173 mph
Madrid–Barcelona	389 miles	2h30m	155 mph



Figure 140. Map of Northeast Corridor and busy commuter railroads that serve the major urban centers between Boston and Washington D.C.

Source: Creator Unknown, accessed via reddit.com

Outside the Northeast, only California HSR, between San Francisco and Los Angeles, and Brightline West, Las Vegas to Los Angeles, are under construction. The remaining corridors have been identified by advocates and rail experts as strong HSR candidates based on population and distance, with some advancing through formal proposals and others currently under study. Today, travel between most of these cities involves a long slog on the highway or a choppy short-haul flight. Some of these city pairs are connected by rail; however, travel times are rarely competitive with driving or flying due to a variety of factors—including intermittent stops, speed restrictions from track curves, the use of slow diesel locomotives, and frequent track sharing with freight railroads.

True HSR could truly transform intercity travel between these cities listed and deliver the benefits we experienced in France and Spain. It would be a faster, more comfortable experience, and would allow people to get more out of every day they travel in their region.

9.2 Connecting the dots: The potential of city center rail tunnels

The opportunity for stronger rail networks isn't just found *between* U.S. cities—it lies *within* them. In Europe, city-center tunnels like the Paris RER or Spain's HSR links through Madrid and Barcelona do more than just connect stations; they tie together much broader geographies by allowing trains to run through the city rather than stopping at its edge. While most major U.S. cities rely on a single hub, several have major terminals situated close enough to justify a transformative connection.

Currently, Philadelphia stands as a pioneer in this area, having "closed the loop" with the 1984 completion of its Center City Commuter Connection. San Francisco is working toward a similar milestone with "The Portal," a project designed to extend Caltrain from its current 4th and King terminus into the Salesforce Transit Center. While this vital link has faced multifaceted delivery challenges, it represents a critical step toward a more integrated regional network.

The Northeast Corridor in particular holds immense untapped potential for this type of connectivity:

- **Boston's North–South Rail Link:** Boston's rail system currently operates as two separate halves, with terminals just 1.5 miles apart. Amtrak and MBTA lines from the north terminate at North Station, while those from the south end at South Station. A connecting tunnel—less than half the length of successful rail links in Madrid—would revolutionize New England's connectivity. Though the project has been a subject of study and advocacy since the 1980s, it remains a compelling vision for the region's future.
- **New York's Midtown stations:** In America's premier rail market, a significant opportunity exists to bridge the gap between Grand Central Terminal and Penn Station. Currently, Grand Central serves the Metro-North Railroad and the Long Island Rail Road (LIRR), while Penn Station handles Amtrak, NJ Transit, and the majority of LIRR traffic. Linking these two hubs would create revolutionize rail travel in the region, moving beyond the current reality where they lack even a direct subway connection.

Notably, the historic stations in Boston and New York are situated closer to one another than their counterparts in Barcelona and Madrid. While this physical proximity suggests a logical link, executing such a connection represents a massive undertaking that requires overcoming deep-seated jurisdictional and financial hurdles. Ultimately, the success of the French and Spanish tunnels demonstrates that the path forward lies in laying out compelling visions for regional megaregional connectivity while clearly articulating why these links are vital for local and regional economies. Success requires more than just a vision; it demands solidly putting in place commitments for long-term delivery across multiple electoral cycles. This includes pursuing specific actions that facilitate the implementation of such large endeavors—from securing stable funding to streamlining development approvals and environmental review processes. The European experience shows that the political will to commit to credible, long-term delivery is what turns these visionary concepts into reality.



Figure 141. Conceptual map of a tunnel connecting Boston's two rail terminals.
Source: Vanasse Hangen Brustlin, Inc., accessed via northsouthraillink.org

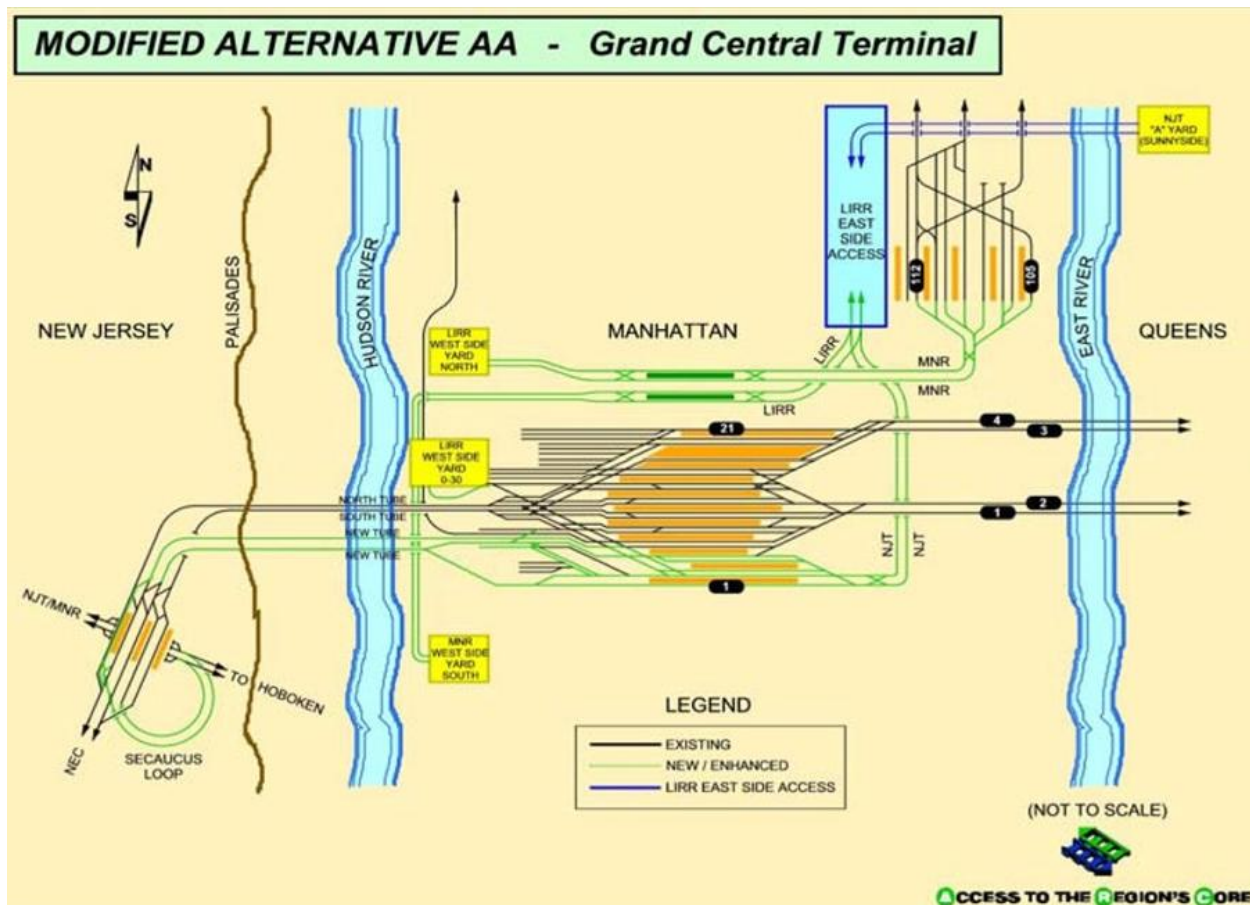


Figure 142. Diagram showing configuration of the Access to the Region's Core project that would better connect New York's northern rail lines that currently terminate at Grand Central to New Jersey.

Source: Access To The Region's Core (joint report by the Metropolitan Transportation Authority, New Jersey Transit, and The Port Authority of New York & New Jersey), accessed via railwayage.com

9.3 Unlocking the potential of U.S. station districts

The premier rail stations in the United States already serve as vital engines for their city centers, seamlessly moving hundreds of thousands of daily passengers. By situating themselves within walking distance of offices, hotels, and urban attractions, these hubs deliver on rail's primary competitive advantage: unrivaled proximity.

The next evolution for these stations lies in transforming them into "urban projects"—a model successfully proven in France and Spain that integrates transit systems directly into the fabric of the surrounding district. The U.S. already possesses the infrastructure capable of supporting multimodal mobility; the opportunity now is to bridge the gap between transportation planning and broader urban design. By aligning these two disciplines, cities can harness massive passenger flows to animate neighborhoods, create lively civic spaces, and foster more dynamic urban economies.

While the U.S. context presents unique challenges—such as strong private property rights and the pressure of short-term planning—there is a clear path toward maximizing the impact of major transit investments. This involves prioritizing the most transit-supportive land uses that specifically cater to the needs of high-speed rail.

In emerging rail corridors, such as those in California, there is a significant opportunity to expand the planning lens beyond housing to include employment and major destinations. By intentionally integrating reliable trip generators—such as universities, K-12 schools, cultural institutions, and government hubs—into the station district, planners can create a built-in constituency for rail. Moving toward this European-inspired model ensures that stations are not just transit stops, but multi-faceted destinations.

9.4 America’s most walkable, well-served rail station districts are still overrun with cars

A few of America’s largest cities boast extensive local and regional rail networks. Their main hubs located in the heart of downtown mirror the major stations of France and Spain, as they are uniquely positioned to maximize the core benefits of rail travel: connecting people to vibrant urban centers from across the metropolitan area and beyond.

To fully unlock this potential, however, we must address how these stations and their surrounding neighborhoods currently prioritize car traffic over pedestrian movement. In many cases, these areas have yet to become true “station districts” where people can move freely and comfortably; instead, travelers are often confined to narrow sidewalks as cars pass along multi-lane thoroughfares. Transitioning toward a pedestrian-first approach will be key to creating the world-class districts these cities deserve.

Midtown Manhattan

Grand Central Terminal and New York Penn Station sit at the heart of America’s premier urban center, surrounded by hundreds of thousands of jobs and dozens of hotels. Beyond offices and hotels, the city’s most prominent destinations—including Times Square, Broadway, Fifth Avenue, Madison Square Garden, Hudson Yards, and the Empire State Building—are all within a short walk, bike ride, or subway trip from these hubs. Combined, they are served by Amtrak’s busiest routes, the three largest commuter railroads in the country, numerous NYC Subway lines, and the PATH train from New Jersey.

While situated in America’s most walkable and transit-rich central business district, the immediate experience outside these stations remains heavily auto-centric. Commuters exiting on almost any side encounter a crush of cars and taxis while navigating often narrow, crowded sidewalks. Although small plazas are scattered near some exits, these stations would better serve their dual purposes as transportation nodes and urban destinations if they featured more generous transitional zones—cohesive spaces where people could spread out and comfortably make their way between the station and surrounding destinations.

Washington D.C. Union Station

Washington Union Station is exceptionally well-situated within the heart of the nation's capital, just a short distance from one of the most prominent walkable destinations in the country: the National Mall.

Despite boasting these unique assets, the area immediately fronting the station remains dominated by car traffic. The station's main entrance and Union Station Plaza immediately recall Strasbourg's iconic *Place de la Gare*, yet the space is currently bisected by multiple lanes of traffic moving through Columbus Circle. These heavy vehicle flows create a significant barrier, making the walking connection between the station, the National Mall, and other nearby destinations less than ideal for such a high-profile civic space.

Chicago Union Station

A grand Beaux-Arts structure situated west of the Loop along the Chicago River, Chicago Union Station serves one of the nation's most vibrant central business districts and the economic heart of the Midwest. As a vital transit nexus for both Amtrak and Metra, the station draws thousands of daily commuters and travelers. It stands as a landmark that seamlessly blends architectural history with contemporary urban life, while its riverfront proximity reinforces its role as both a gateway and a destination.

Although the station is ideally situated in a rapidly evolving district—with restaurants, offices, hotels, and cultural hubs all within walking distance—Chicago's main rail hub remains hemmed in by vehicle traffic. The main entrance on Canal Street prioritizes unfettered access for taxis and rideshares right to the front door.¹⁷ With multiple lanes of car traffic surrounding the station on all sides, pedestrians are confined to standard sidewalks and crosswalks, leaving only a single two-way bike lane on S. Clinton Street for cyclists.

¹⁷ While Canal St. in front of the station is closed for renovation, the authors of this report could not find any indication that the street will be completely closed off to vehicle traffic permanently.

Table 9. Daily Ridership and Transit Connections at Major U.S. Rail Hubs

Station	Daily Passengers	Conventional Rail Service	Local Connections
New York Penn Station	600,000	Amtrak Long Island Rail Road New Jersey Transit	6 NYC Subway lines 5 local bus routes, 8 express and intercity routes 4 Citi Bike (bikeshare) racks with 150+ spaces
New York Grand Central Terminal	250,000	Metro-North Railroad Long Island Rail Road	4 NYC Subway lines 8 local routes, 13 express and intercity routes 4 Citi Bike (bikeshare) racks with 200+ spaces
Washington Union Station	100,000	Amtrak Maryland Area Rail Commuter (MARC) Virginia Railway Express (VRE)	1 DC Metro line 5 local bus routes, 9 other various express and intercity coach services 3 nearby Capital Bikeshare station, totaling ~80 spaces
Chicago Union Station	120,000	Amtrak Metra Commuter Rail	~15 local CTA bus routes Greyhound buses 3 nearby Divvy (bikeshare) stations with 150+ on-street bike racks within one block of the station

Sources: [New York Penn Station: Constraints and Considerations for Meeting Future Demands](#), [Metro-North Railroad](#), [Metropolitan Transportation Authority](#), [Washington, DC - Union Station \(WAS\)](#), [Chicago Hub Improvement Program \(CHIP\)](#).

While these stations have the "bones" of world-class hubs, the broader urban planning stops short of achieving true hyper-local integration. Each day, thousands of travelers arrive and walk to nearby offices or hotels, yet the experience is rarely comfortable or entirely safe. In districts where thousands of people move without a car every hour, the street level still disproportionately prioritizes vehicle space over pedestrian comfort.

As thriving economic and cultural hubs, the cities mentioned above are planning for significant growth in both urban density and rail capacity. Consequently, several regions have launched major infrastructure projects and renovations designed to accommodate higher traffic volumes. These stations are poised for the kind of large-scale transformations seen in France and Spain over the coming years.

While these initiatives are in their early stages, current plans suggest a missed opportunity: they do not yet include significant reductions in car traffic within the surrounding neighborhoods. For example, the [Penn Station Transformation Program](#) focuses primarily on

internal service optimization and concourse improvements. Similarly, the Washington Union Station Expansion Project prioritizes passenger circulation and a new underground garage, rather than reconfiguring the external public realm. The Chicago Hub Improvement Program (CHIP) reflects these same internal-facing priorities.

The increased rail service and improved passenger experience delivered by these renovations offer a clear opening for cities to support seamless mobility at all scales. By reallocating street space to the thousands of people moving through these districts daily, these hubs can finally bridge the gap between transportation and urban life—fully realizing the "integrated" model successfully employed in France and Spain.



Figure 143. *Grand Central Terminal, 42nd Street Entrance, New York City. Perhaps the most famous station in the U.S., Grand Central is renowned for its grand interior spaces. However, its street-level entrances—like this one on 42nd Street—are comparatively far less grand and notably unfriendly to pedestrians.*

Source: Hunter Bickel



Figure 144. *Moynihan Station, housed within the historic Farley post office building.*
Source: CTS Group, accessed via constructionspecifier.com



Figure 145. *Washington DC Union Station entrance, with heavy pick-up and drop-off traffic along entryway.*
Source: unionstationevents.com



Figure 146. *Chicago Union Station entrance, an arrival experience also dominated by pick-up and drop-off car activity.*
Source: *cmap.illinois.gov*

9.5 So close, yet so far: The disconnect between U.S. stations and their surrounding neighborhoods

If these challenges persist in the nation's largest and most walkable hubs, the situation is even more pronounced elsewhere. Most major U.S. stations remain dominated by vehicle traffic, permitting private cars to drive directly to the entrance for seamless pick-up and drop-off. In midsize and smaller cities, stations often prioritize "kiss-and-ride" access and are marooned within vast surface parking lots or situated alongside high-speed "stroads" and highways. Consequently, pedestrian space is marginalized; narrow sidewalks and hazardous crossings often serve as the only links between the station and the city.

Many of these stations possess the "bones" of a world-class transit district—they are centrally located and surrounded by a diverse mix of urban activity. However, they lack the cohesive integration seen in the European examples we visited, largely because car-oriented infrastructure continues to fragment their surroundings. By looking to these international models, U.S. cities can move beyond simple proximity and begin prioritizing the quality of urban life within the station area.

DC Union Station – begging for a more people-friendly arrival experience

When looking at an overhead image of Washington, DC's Union Station area, it's hard not to draw parallels to Strasbourg Station and its *Place de la Gare*. As described earlier in this report, that plaza functions as a generous transitional zone between the station and the city's core. Union Station has a similar opportunity: its plaza sits at the threshold of some of the nation's

most significant destinations, with the green corridor of Senate Park leading directly to the U.S. Capitol and, beyond it, the National Mall.

Despite its proximity to iconic landmarks, Washington Union Station is currently isolated by the six to eight lanes of traffic circling Columbus Circle. The surrounding landscape is further fragmented by expansive surface parking lots, while cyclists attempting to exit the station in any direction will encounter fast-moving vehicle traffic.

The [Washington Union Station Expansion Project](#) proposes several significant upgrades, such as moving parking underground to reclaim surface land for civic use. However, current renderings from the [Union Station Redevelopment Corporation](#) suggest that the auto-dominated character of Columbus Circle will largely persist. Without a more aggressive reconfiguration of the surrounding streetscape, the station may remain an island of transit within a sea of car-centric infrastructure.



Figure 147. Washington D.C. Union Station and the surrounding area.
Source: Google Earth



Figure 148. The front of Washington D.C. Union Station from across Columbus Circle.

By VeggieGarden - Own work, CC BY-SA 4.0,

<https://commons.wikimedia.org/w/index.php?curid=40544115>

Los Angeles Union Station – separated from the city by a 12-lane freeway

Los Angeles Union Station presents a similar challenge, isolated by four-lane roads and expansive surface parking. While the core of downtown is technically within walking distance, reaching it requires crossing a bridge over the twelve-lane San Bernardino Freeway.

A highway bisecting the station and the city center fragments the urban fabric, undermining the very advantage of a downtown rail hub. Although a route may be "walkable" on a map, that rarely translates to a safe or enjoyable experience when the environment is engineered for multi-ton machines rather than people.



Figure 149. Los Angeles Union Station and the surrounding area, with the San Bernardino Freeway directly to its south.
Source: Google Earth



Figure 150. The front of Los Angeles Union Station.

By Codera23 - Own work, CC BY-SA 4.0,

<https://commons.wikimedia.org/w/index.php?curid=72907479><https://commons.wikimedia.org/w/index.php?curid=72907479>

Seattle King Street Station – surrounded by car infrastructure on all sides

While King Street Station features development over its tracks, pedestrian space is restricted to a small front plaza and narrow sidewalks along the high-speed "stroads" of 2nd and 4th Avenues. To the west, the landscape is dominated by expansive surface parking lots shared with Lumen Field and T-Mobile Park. Furthermore, transferring to light rail is notoriously inconvenient, forcing passengers to ascend to street level and navigate six lanes of heavy traffic on 4th Avenue.

Ultimately, the station feels less like a facilitator of seamless mobility and more like a historic landmark forced to conform to a hostile, car-centric environment.



Figure 151. *Seattle King Street Station and surrounding area.*
Source: Google Earth



Figure 152. Seattle King Street Station from the south, with the downtown skyline in the background.

Source: By felix_s - Flickr, CC BY 2.0,

<https://commons.wikimedia.org/w/index.php?curid=1684348>

St. Louis Gateway Transportation Center – fenced off from nearby activity

The historic Union Station nearby has been repurposed as a multi-use destination with family amusement attractions, dining options, and a hotel. Across the street is the Enterprise Center, home to the local National Hockey League team, the 2019 Stanley Cup Champion St. Louis Blues, and a venue for other sporting events and concerts. However, these assets are poorly connected: the station and these major destinations are separated by large, fenced-off parking lots that block pedestrian and bicycle access.

This represents a major missed opportunity, given the station's strong potential to support multimodal mobility through its close connections to the MetroLink light rail, as well as local and intercity bus services.

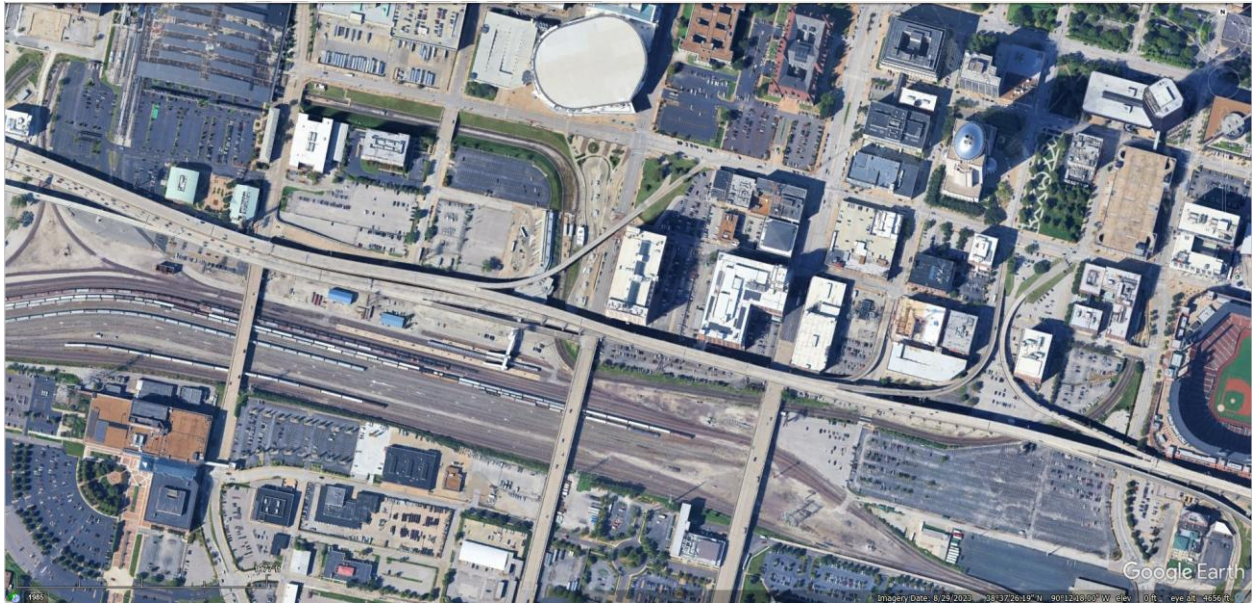


Figure 153. St. Louis Gateway Station and the surrounding area.

Source: Google Earth



Figure 154. Track access at St. Louis Gateway Station. The utilitarian design necessitates a significant vertical transition for passengers, requiring them to ascend and descend to cross the tracks. Unlike many European models studied, the station acts as a physical barrier rather than a multi-modal connector for the surrounding neighborhood.

Source: By Chris Yunker from St. Louis, United States - Amtrak Station, CC BY-SA 2.0, <https://commons.wikimedia.org/w/index.php?curid=101206>

Cleveland Lakefront Station – marooned between the city and the lake

On the Lake Michigan waterfront north of the station are the iconic Rock & Roll Hall of Fame, Huntington Bank Field (home of the local football team, the Browns), and a variety of other waterfront attractions. However, the station is cut off from these destinations by the large Ohio State Route 2 highway—the only pedestrian crossing is located a considerable distance from the station and passes under the highway. To the south, the city begins with City Hall, the public plaza known as “The Mall,” the central business district, and several hotels. While a pedestrian bridge crosses the tracks to the station, the sidewalk leading to the station building is narrow and runs alongside the highway on-ramp.

Overall, the station is poorly integrated into its urban context, representing a missed opportunity to connect prominent destinations, amenities, and activities on both sides of the tracks into a cohesive waterfront district.

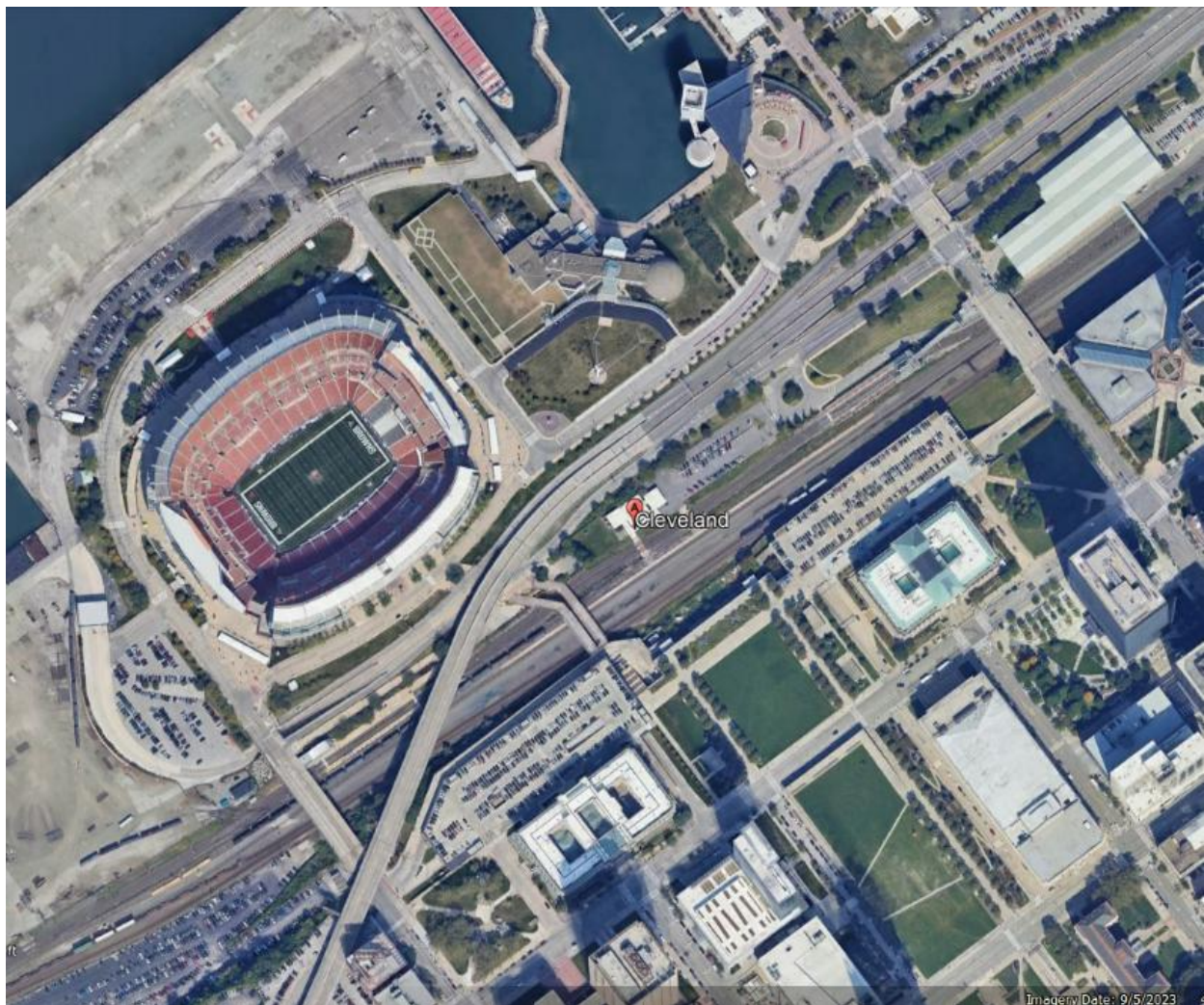


Figure 155. *Cleveland Lakefront Station and the surrounding area.*
Source: Google Earth



Figure 156. Cleveland Lakefront Station – close to major destinations nearby, but cut off by major roadways from the surrounding city.

Source: Cards84664 - Own work, CC BY-SA 4.0,
<https://commons.wikimedia.org/w/index.php?curid=131414979>

San Jose Diridon Station – currently isolated from the rest of the city by seas of surface parking, but poised for a more vibrant and transit-oriented future

San José Diridon Station exemplifies this “so close, yet so far” condition. Despite being one of the best-located stations in California—adjacent to downtown, within walking distance of major destinations, and at the crossroads of multiple regional rail corridors—the station today remains largely disconnected from its urban surroundings. Much of the area immediately around Diridon is still dominated by surface parking lots and wide, vehicle-oriented streets that prioritize access by car over walking, biking, or transit, limiting the quality and continuity of the public realm.

At the same time, Diridon represents one of the most significant opportunities for change in the state. The City has adopted the [Diridon Station Area Plan](#) for a 240-acre district, within which Google owns approximately 80 acres, laying the groundwork for one of California’s premier transit-oriented districts. While Google’s Downtown West development is currently on hold due to post-pandemic shifts in office demand, both the city and Google remain committed to transforming the station area into a complete, vibrant community. This long-term vision is anchored by Diridon’s unparalleled accessibility, as future high-speed rail and BART are planned

to converge here alongside existing and expanding services such as Caltrain, Capitol Corridor, and ACE—creating a once-in-a-generation opportunity to better integrate a major U.S. station with the city it serves.

The five public agencies leading the station redevelopment have established a robust framework to maximize the impact of major public investments at Diridon. A cornerstone of this strategy is the Diridon Station Access Hierarchy.¹⁸ This policy prioritizes the most sustainable and space-efficient modes by positioning them in the most central locations. By emphasizing high-capacity and active transport, the plan facilitates quick, seamless transfers for the greatest number of passengers while creating a more human-centered hub.

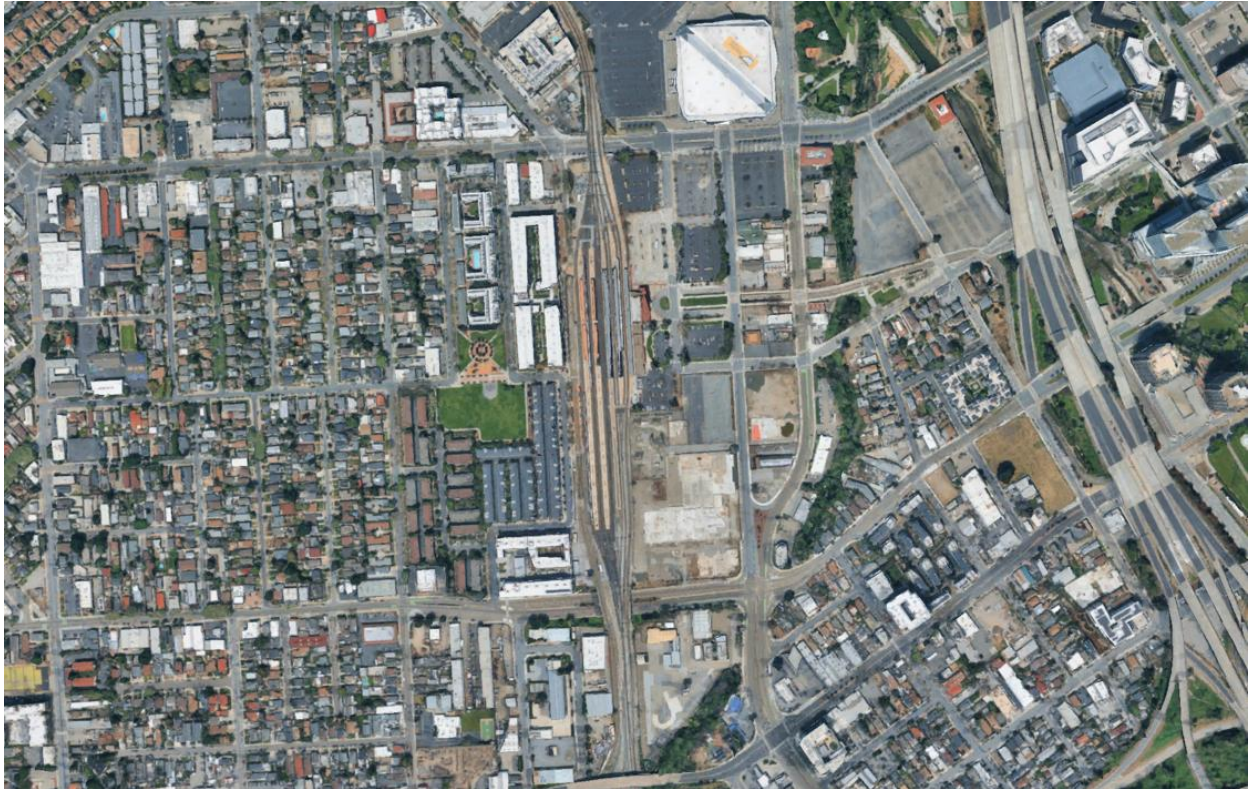


Figure 157. San Jose Diridon Station and the surrounding area.

Source: Google Earth

¹⁸ See page 129 of the [Amended Diridon Station Area Plan](#).



Figure 158. Main entrance, San Jose Diridon Station.

Source: Eric Eidlin

9.6 Focused on function: Few U.S. rail stations provide reasons for non-passengers to pass through

The issues extend beyond weak station-city connections: Most stations simply offer little to attract anyone who isn't there to catch a train.

This is an area where a handful of U.S. stations actually do quite well. Established hubs and recent renovations alike demonstrate that the concept of the multi-faceted station is finally gaining traction in the U.S.

9.6.1 U.S. stations that are destinations

U.S. main stations with higher volumes of rail service, except for Kansas City Union Station, are typically the stations that have seen the opportunity and capitalized on the economic, social, and cultural benefits of being a multi-faceted urban space.

Grand Central Terminal

Grand Central, being a destination and landmark in its own right, is the busiest rail station in the country, accounting for non-travelers that pass through at [750,000 people per day](#). It boasts a robust range of food and drink options, including a large food market on the lower-level concourse, and has a variety of small shops, an Apple Store, and a New York Transit Museum outlet.

Moynihan Train Hall (New York Penn Station)

Opened in January 2021, Moynihan Train Hall is an adaptive reuse of the historic 1913 James A. Farley Post Office Building. Located across 8th Avenue from the original Penn Station, the

facility serves as a modern hub for Amtrak and the LIRR. Though much of the retail has been slow to fully open, the new train hall has made the station a more attractive place to spend time for non-rail travelers.

Washington, D.C. Union Station

Provides a wide range of food and drink options with a large food court on the station's lower level. The station also offers a good selection of shopping options and event planning services, utilizing its historic large rooms for people to use for galas and receptions. The nation's busiest rail station outside of New York effectively attracts people to the station with a handful of seasonal special events.

Chicago Union Station

Chicago also provides a good selection of food and drink options. Like D.C., it takes advantage of its captivating Beaux-Arts design and the space it has as a large, historic facility to host private events and filming. The station offers a handful of these spaces, which vary in size, to accommodate a range of gatherings; renting them costs anywhere from \$125 per hour to starting at almost \$10,000 for the event. There are also WeWork co-working spaces right above the boarding concourse facility (east building).

Denver Union Station

This is one of the more notable cases in which a U.S. station has been transformed in recent years. Over the last decade, the Union Station Alliance has reimagined the historic Great Hall as "[Denver's living room](#)." Several lounges in the historic building have been renovated for travelers and non-travelers to grab a drink or bite to eat. In these renovations, the station added new commercial space to upgrade its shopping selection and a new 112-room hotel.

Salesforce Transit Center

Opened in 2018 in downtown San Francisco, this transit hub features shops, a food hall, a brewery, several cafés, a fitness studio, and office space across two levels—the main ground floor and the lower concourse situated above the train platforms. The facility is crowned by a 5.4-acre rooftop park offering expansive greenspace, walking trails, an amphitheater, and a playground. This elevated sanctuary serves as a "living roof," housing a carefully curated array of plant species sourced from diverse climatic zones across the globe.

Kansas City Union Station

A local landmark, Kansas City Union Station stands out for its deep integration of family-oriented programming. Beyond its dining and retail, the station is defined by the Arvin Gottlieb Planetarium and Science City, which offer immersive shows and interactive exhibits. The facility also functions as a full-scale entertainment hub, housing a movie theater, a live performance venue, and a robust calendar of seasonal holiday events.

9.6.2 One-dimensional, oversized waiting rooms

While the above examples show encouraging momentum, they remain the exception. Many large U.S. rail stations still function primarily as utilitarian corridors designed for speed—enter, board, and leave—where creating a welcoming, people-oriented atmosphere is a secondary concern. Consequently, cities have yet to fully leverage stations and their surrounding neighborhoods to enhance local vitality or the broader appeal of rail travel.

It is worth noting that most modern "destination" stations in the U.S. are historic terminals built in the late 19th and early 20th centuries. With one exception, all the stations mentioned above share this heritage. Their success is rooted in a generous architectural scale that comfortably accommodates both modern rail operations and a diverse mix of public uses. While their striking aesthetics are an advantage, their true value lies in this inherent spatial flexibility.

By contrast, many of today's single-use stations trace their origins to the early Amtrak era of the 1970s. As rail travel declined, cities often replaced large historic terminals with smaller, standardized facilities functioning mainly as waiting rooms with ticket counters. The Amtrak Stations Standard Program, established in 1978, formalized this minimalist approach, and these designs continued—even in major cities—through the 1990s.

These stations were inexpensive and easy to replicate, but their limited size and amenities contributed to the underutilization of both stations and rail travel itself. Many remain in use today, offering few reasons for anyone other than passengers to visit and lacking the flexibility to support broader activity. This is particularly evident in some of America's largest cities; stations in Atlanta, Austin, Houston, Phoenix (Maricopa), and Miami offer no food or beverage options beyond vending machines, lack Wi-Fi, and—with the exception of Miami—do not even provide an ATM.

There is admittedly something of a chicken-and-egg dynamic in the U.S.: stations need more amenities and surrounding development to become useful destinations, yet those amenities often depend on having more frequent train service and higher passenger volumes to succeed. Regardless of where one starts, if Amtrak, transit agencies, and cities aim to improve rail service, they will need to evaluate and redesign stations with an eye toward maximizing their value for the growing number of people who could pass through them.

Table 10. City and Metropolitan Area Population of Major U.S. and Spanish Cities

City	City Population	Metro Population
Madrid	3.3 M	7 M
Houston	2.3 M	7.8 M
Barcelona	1.7 M	5.4 M
Phoenix	1.6 M	5.1 M
Miami	487 K	6.4 M
Atlanta	520 K	6.4 M



Figure 159. Atlanta Peachtree station building.
 By JJonahJackalope - Own work, CC BY-SA 4.0,
<https://commons.wikimedia.org/w/index.php?curid=124203043>



Figure 160. Austin Amtrak station building.
 By Thejudahrice - Own work, CC BY-SA 4.0,
<https://commons.wikimedia.org/w/index.php?curid=179686211>



Figure 161. Miami Amtrak Station building.
 By Phillip Pessar from Miami, USA - Amtrak Station Hialeah, CC BY 2.0,
<https://commons.wikimedia.org/w/index.php?curid=64176007>



Figure 162. Houston Amtrak station building.
 By WhisperToMe - Own work, Public Domain,
<https://commons.wikimedia.org/w/index.php?curid=4457748>



Figure 163. Maricopa Amtrak station building. Connections to Downtown Phoenix with Amtrak Thruway services.

Source: Photographer unknown, accessed via greatamericanstations.com

9.7 Narrow-sited selection: Consequential U.S. station location and relocation

While some cities replaced their grand historic terminals with smaller facilities, others moved rail operations entirely out of their central urban cores. These cities now face a significant disconnect, with stations that are poorly integrated into the surrounding urban fabric and local transit networks.

The following examples highlight stations rebuilt in locations that carry substantial geographic and structural limitations. Because of their isolation, these facilities struggle to facilitate multi-scale mobility or foster the thriving, transit-oriented environments necessary to serve their cities effectively.

Phoenix Union Station → Maricopa Amtrak Station

Built in 1923, Phoenix Union Station sits in the heart of downtown, offering a level of central connectivity that few rail stations can match. It is situated within walking distance of City Hall, the central business district, and key government offices, while a short bike or bus ride connects it to the Phoenix Convention Center and Chase Field.

Despite its prime location, the station was closed in 1996 when rail service was relocated nearly 40 miles south to Maricopa. This move created a significant "last mile" hurdle: currently, passengers bound for Phoenix must board an Amtrak Thruway bus for a 30-minute trip to Downtown Tempe, followed by a 20- to 30-minute ride on the light rail to reach the city center.

There is, however, momentum for change. A proposed Phoenix–Tucson Amtrak route is currently in the planning stages and is intended to restore service directly to the city center within the next decade. While the return of rail is a priority, it remains unclear whether the historic Union Station site will be revitalized as the primary hub for this new service.

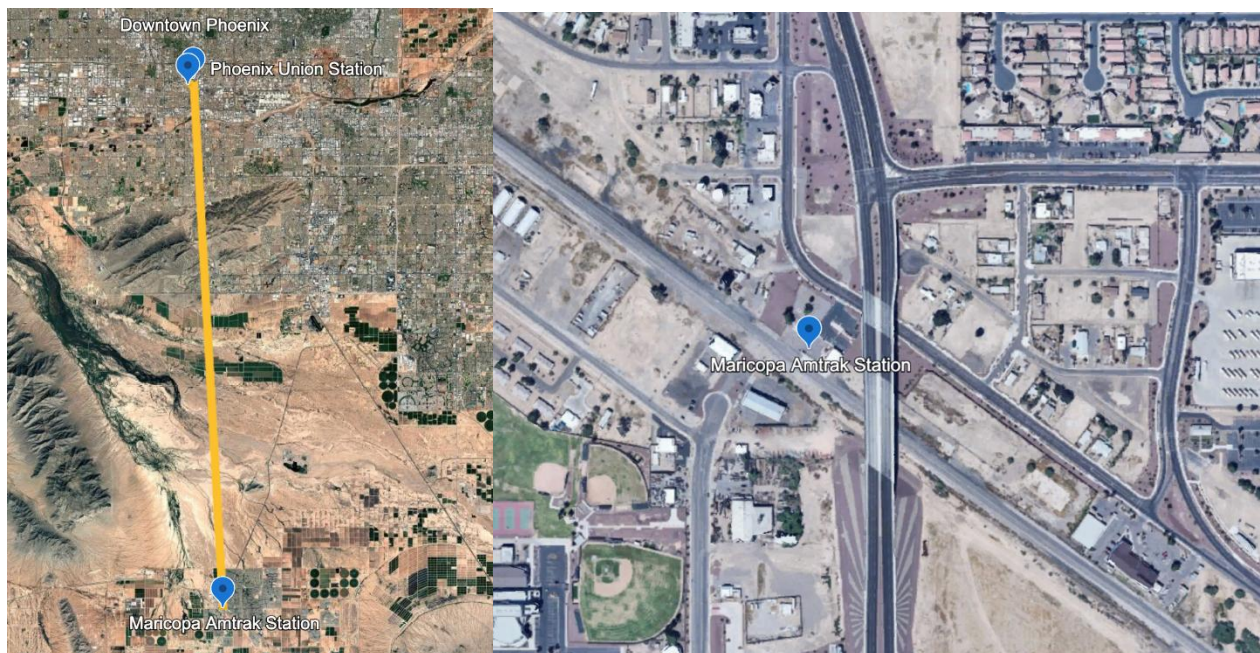


Figure 164. Right: Map of Phoenix and the city's past and present rail stations. Left: Maricopa station site.

Source: Google Earth, annotations by authors

Atlanta's two historic terminals → Atlanta Peachtree Station

Atlanta's Peachtree Station is a prime example of the challenges posed by station relocation. Built in 1918 as a suburban stop several miles north of the city center, it was never intended to serve as a primary metropolitan hub. Today, its location adjacent to Interstate 85 severely limits its potential for transit-oriented development.

The station also suffers from a lack of connectivity; it has no direct links to MARTA trains or buses and sits roughly half a mile south of the point where MARTA and Amtrak rights of way

converge and run closely parallel to each other for a brief stretch. Had the station been sited slightly farther north, it could have more easily facilitated seamless transfers between intercity and local rail. For a city historically founded as a railroad terminus, this fragmented setup represents a significant downgrade from the "Golden Age" connectivity once provided by the now-demolished Atlanta Terminal Station and Atlanta Union Station.

Amtrak has also shown interest in moving rail service back to downtown Atlanta and building a new rail hub in the downtown core. No final decisions have been made, but local officials and advocates have cited the same drawbacks of the current location we outlined in the previous paragraph in expressing the significance of moving rail service back to the city core.

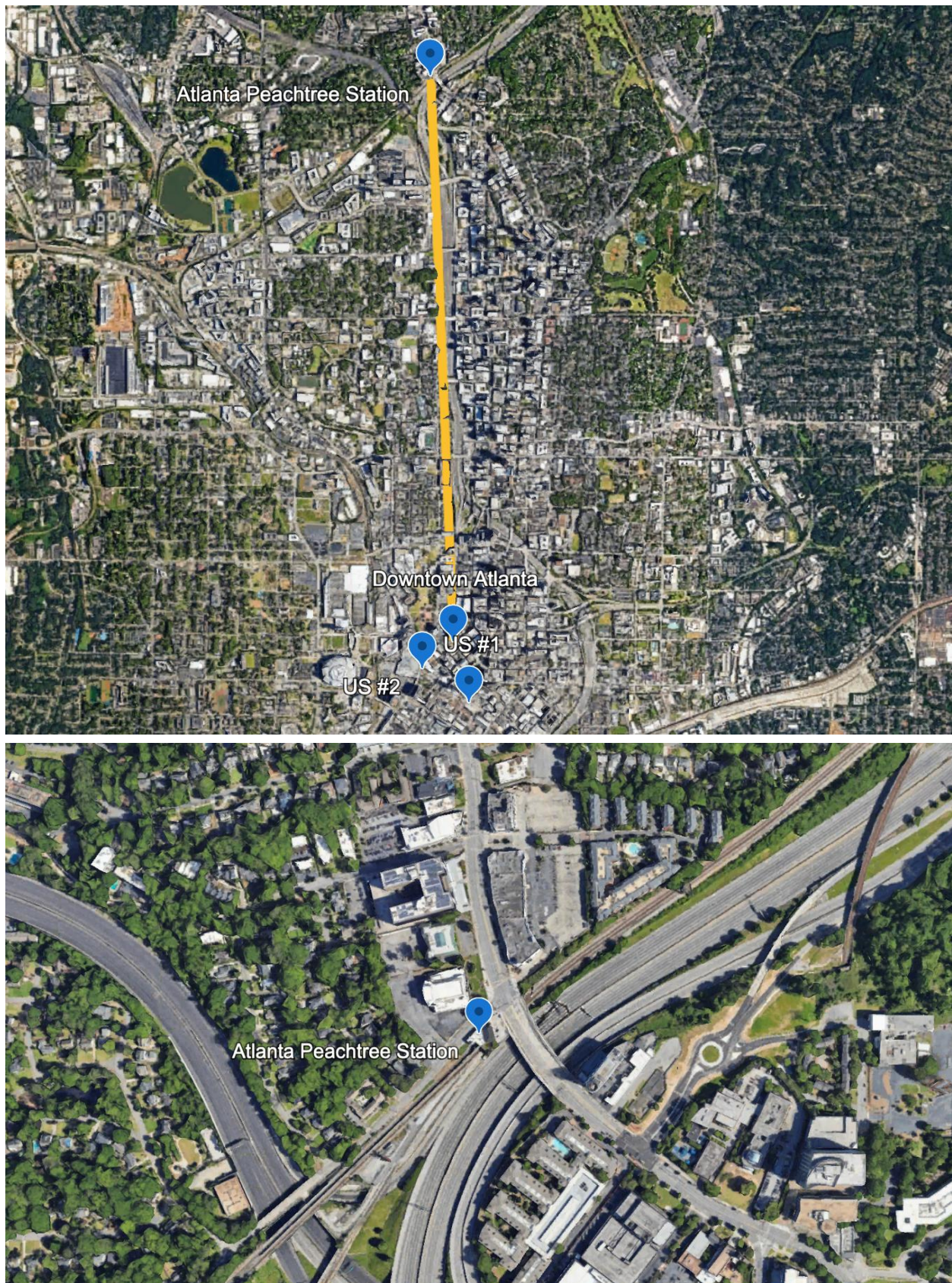


Figure 165. Top: Map of Atlanta and the city's past and present rail stations. Bottom: Overhead view of Atlanta Peachtree Station site.
Source: Google Earth, annotations by authors

Michigan Central Station → Detroit Amtrak Station

Opening in December 1913, Michigan Central Station is a standout of the Beaux-Arts era, distinguished by the massive 18-story office tower rising above its grand concourse. Though located near the city center, the station sits about 1.5 miles west of the primary downtown core and has not seen Amtrak service since 1988. Detroit's current Amtrak stop is located three miles to the north; from there, reaching downtown requires a 20-minute ride on the Q-Line streetcar, which runs every 15 minutes and lacks a direct connection to the station.

The Michigan Central Innovation District initiative offers a promising path forward. The plan aims to restore rail service by the end of the 2020s to the historic site by developing a new 30-acre multimodal hub integrated into a burgeoning urban district. If Detroit is to be better served by rail, revitalizing this landmark would be a significant step toward leveraging its geographic proximity and sparking surrounding economic development.

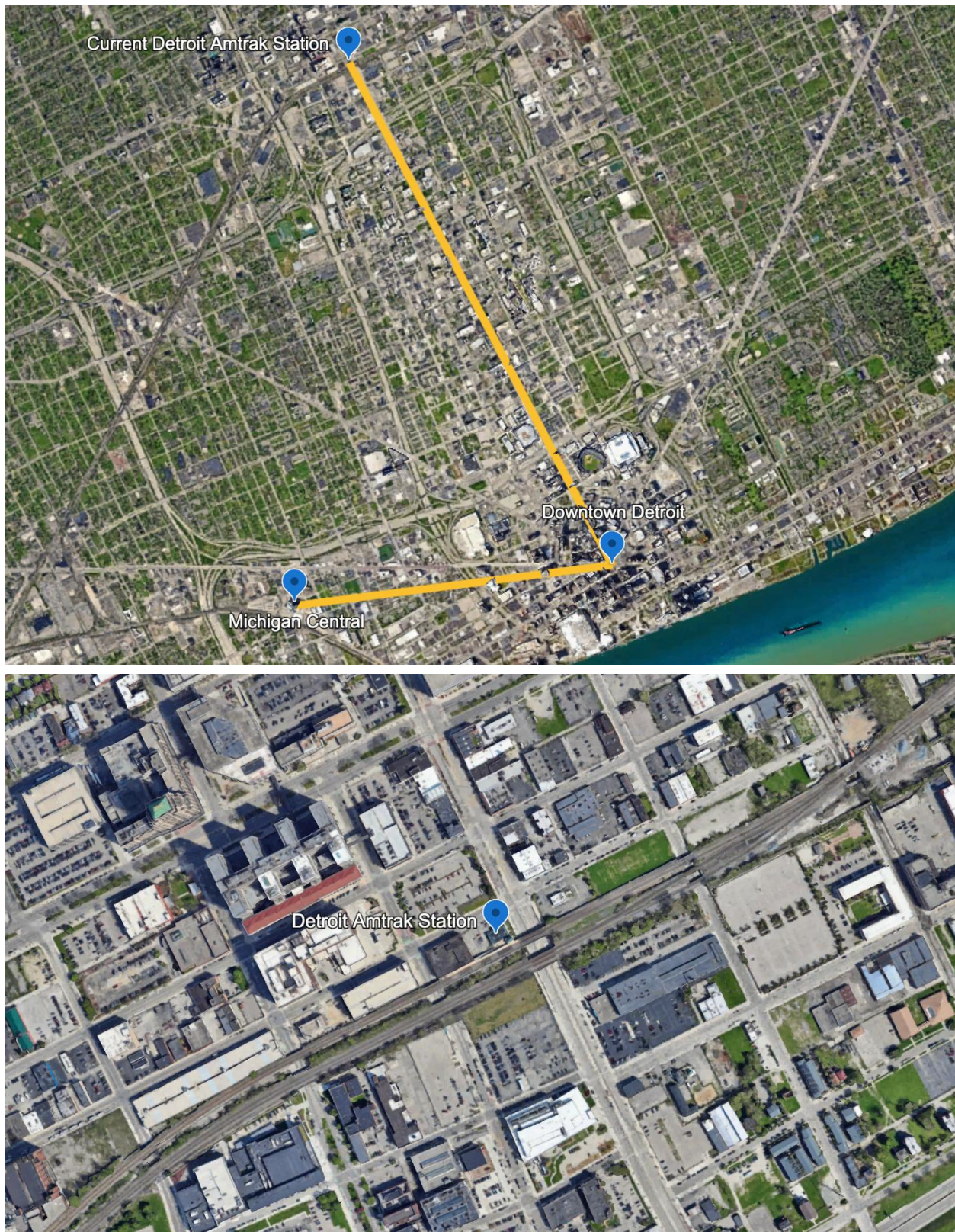


Figure 166. Top: Map of Detroit and the city's past and present rail stations. Bottom: Overhead image of Detroit Amtrak Station.
Source: Google Earth, annotations by authors

Jacksonville Terminal → Jacksonville Amtrak Station

In 1974, rail service in Jacksonville was moved from the historic Jacksonville Terminal to a site about five miles to the northeast, now surrounded by a multimodal freight hub and other low-density development, primarily industrial facilities. The historic station building is still intact in the heart of downtown and is right across the street from the local and intercity bus stations that also connect to the local skyway, but there is no direct connection to the current station site.

When the Jacksonville Transportation Authority (JTA) was looking into plans for its proposed First Coast Commuter Rail (FCCR) line, there were plans to bring service back to the old terminal and partner with the Jacksonville's Downtown Investment Authority for new development in the surrounding La Villa neighborhood. The latest plans include building a University of Florida graduate school campus in the station area.

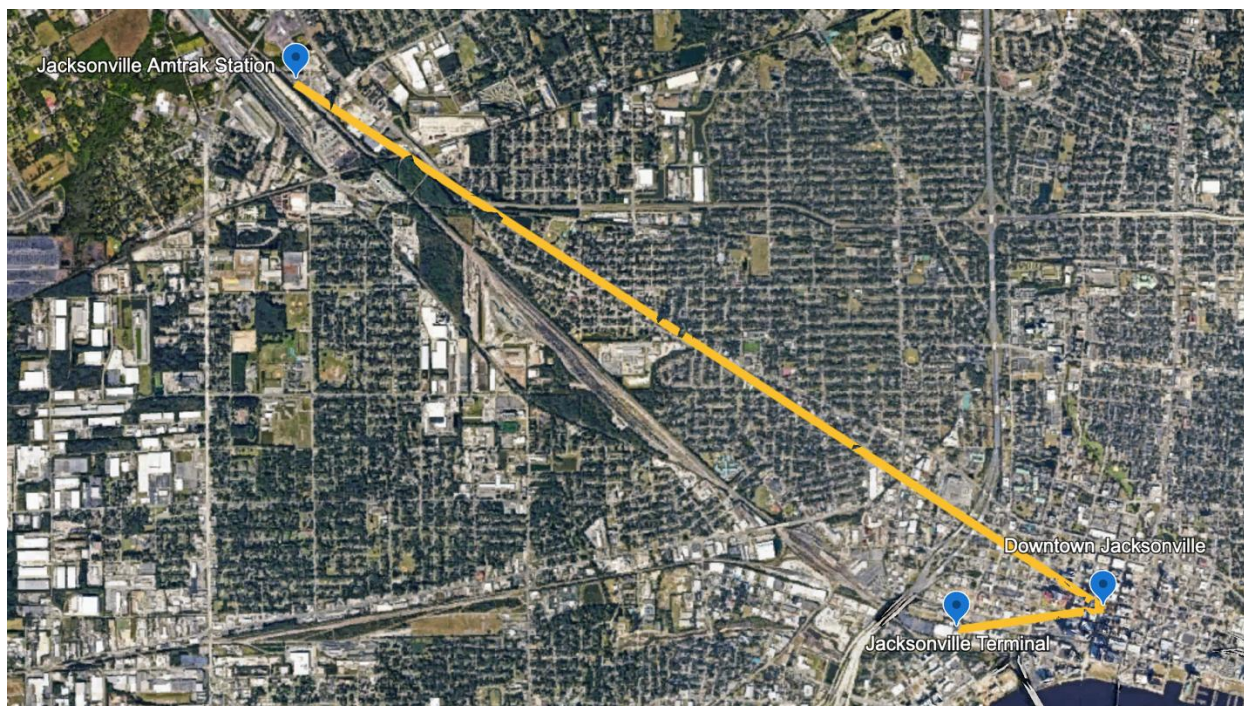
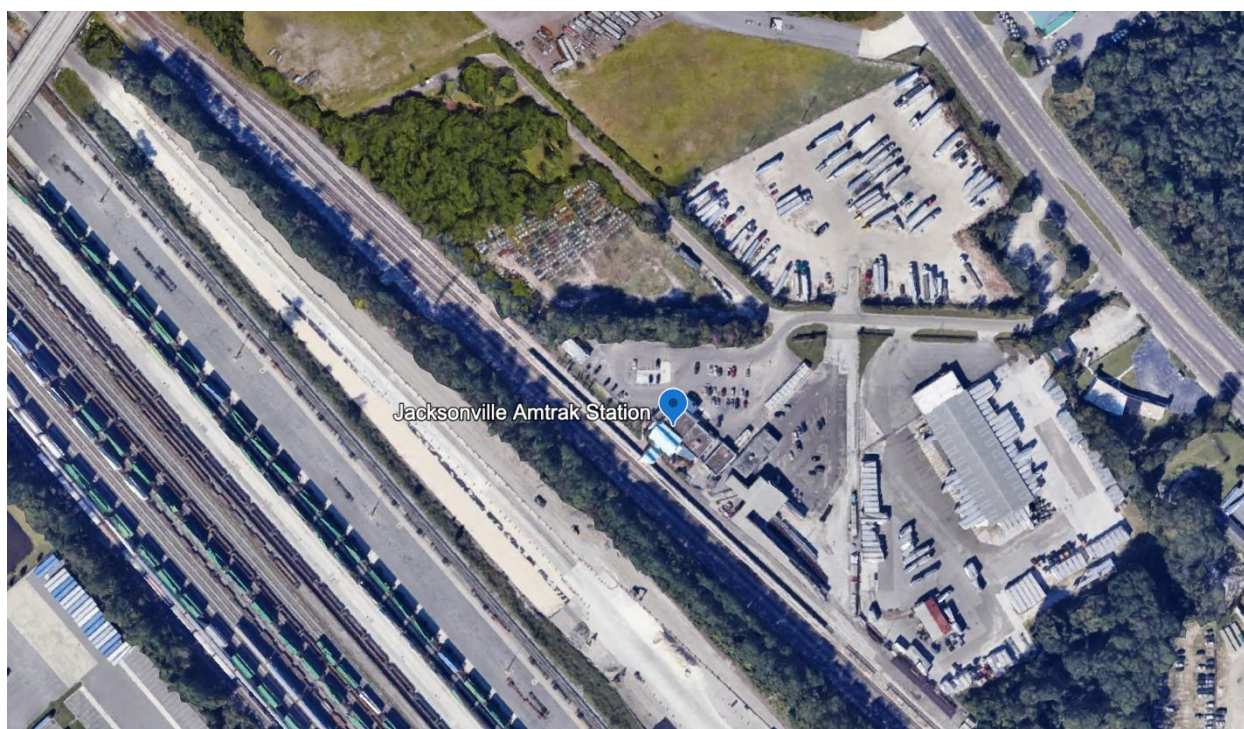


Figure 167. *Top: Map of Jacksonville and the city's past and present rail stations. Bottom: Overhead view of current Jacksonville Amtrak Station site.*
Source: Google Earth, annotations by authors

The stations described above were once conveniently located in vibrant city centers and well-integrated into the surrounding urban fabric. Today, many have been relegated to sites miles from the core, isolated by highways, surface parking lots, and industrial zones. These relocation decisions—largely driven by the mid-century rise of automobile travel—have left facilities physically and socially disconnected from the communities they serve.

As a result, these stations struggle to facilitate multi-scale mobility and fail to function as desirable destinations. Because their current locations offer so little spatial or economic flexibility, they face nearly insurmountable challenges in reconnecting with the urban environment. Without the central density that once defined them, realizing their full potential as civic hubs remains a difficult, if not impossible, task.

9.7.1 American rail stations on a new frontier

Bearing all of this in mind, U.S. stations currently in the planning stages that may be cause for concern here include Bakersfield along the California High Speed Rail alignment, as well as Rancho Cucamonga and Las Vegas, at both ends of the Brightline West line.

Brightline West

Comparison: Paris–Strasbourg vs. Brightline West

The group’s experience traveling from Paris to Strasbourg—a 305-mile journey completed in a single day—highlights the stark difference in utility between integrated and peripheral rail systems. Given the planned locations of the Brightline West termini, it is difficult to imagine the 270-mile Los Angeles-to-Las Vegas trip offering a comparable level of ease or comfort.

For most travelers leaving the Los Angeles Basin, the journey will likely begin with a challenging drive through heavy traffic to reach the future Rancho Cucamonga Station, situated in the eastern reaches of the region. While an intrepid traveler might take Metrolink from LA Union Station, that leg alone requires a 1-hour and 20-minute commitment, excluding the time needed to reach Union Station itself. Upon arriving in Nevada, passengers will find the station located three miles south of the Las Vegas Strip and eight miles from downtown—a rare instance where a city’s airport is more centrally located than its rail hub.



Figure 168. Brightline West Map between Southern California and Las Vegas. The 218-mile corridor does not extend into the core of Los Angeles, as travelers the Rancho Cucamonga Station is about 40 miles away from Los Angeles Union Station in Downtown LA.

Source: [Brightline West](#)

Prioritizing delivery over connectivity

Observations from the study trip suggest that Brightline West prioritizes speed of delivery and cost-efficiency over the "city-center-to-city-center" model typical of international high-speed rail (HSR) best practices. While terminating HSR in an urban core is more complex and expensive, it remains the gold standard for maximizing ridership.

For Southern California travelers, the primary hurdle is a "first 40-to-50-mile" problem rather than a standard "last-mile" connection. This creates a substantial access gap that begins long before the high-speed segment. In Las Vegas, the challenge is mirrored; the station sits eight miles south of the Strip's center—twice the distance of the airport. The project's ultimate success will depend on how seamlessly these peripheral connections are integrated into the traveler's experience.

The trade-off of transit-oriented development

[Brightline West](#) describes its Las Vegas site as offering "easy access to Las Vegas' most iconic destinations." While the 111-acre site presents a long-term opportunity for transit-oriented

development, its current isolation undermines a core advantage of HSR: delivering passengers directly to their destination.

While taxis and rideshares can bridge the gap in the early years of service, the planned location remains a compromise. Bringing HSR into the heart of Las Vegas or Los Angeles is a costly and complex endeavor, particularly given the challenges of electrifying existing corridors in California. However, fully realizing the value of high-speed rail depends on its ability to do what it does best—serve city centers directly and conveniently.

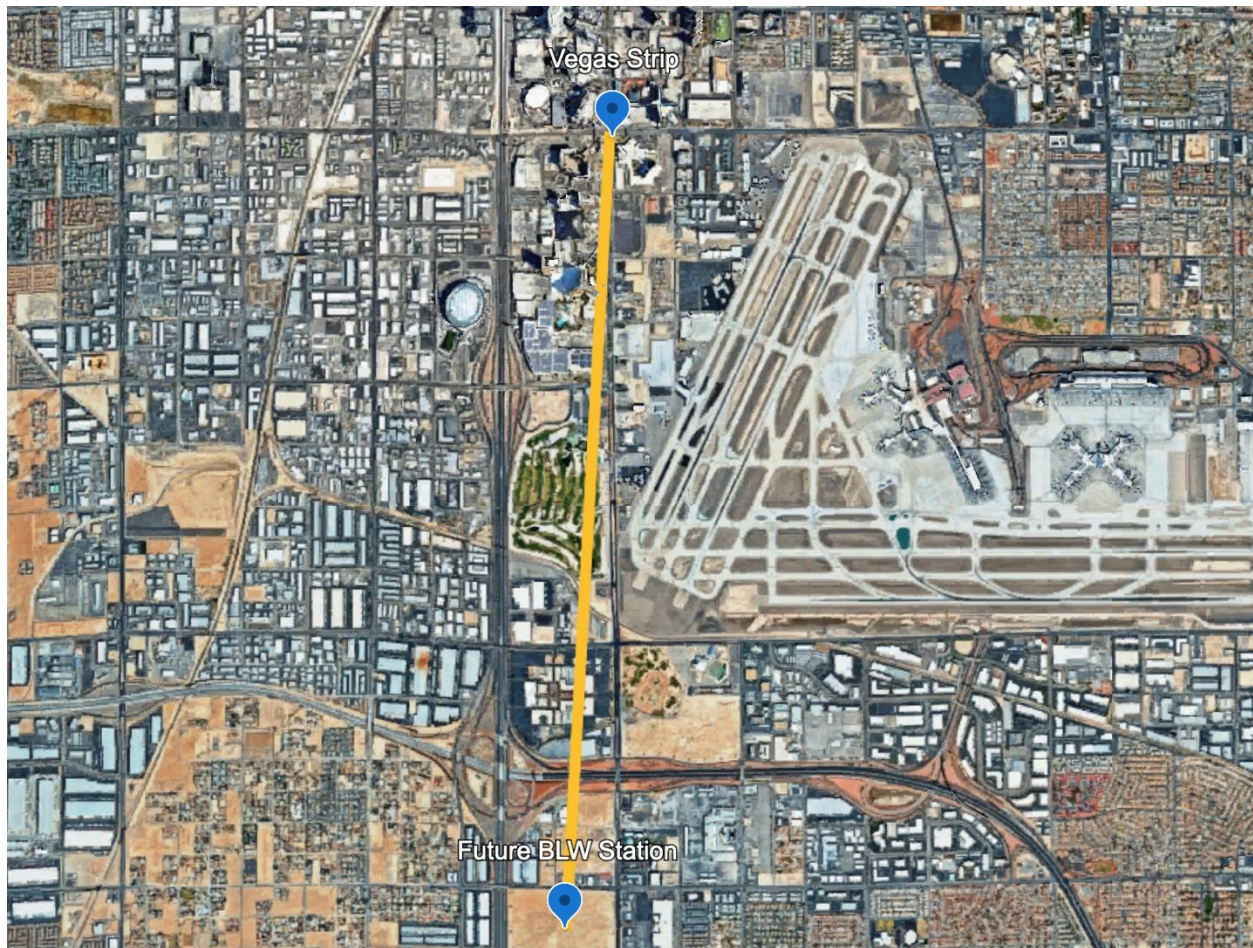


Figure 169. *Brightline West's Las Vegas Station site relative to the Las Vegas trip, a distance just over three miles. Further, this site is about 8 miles from Downtown Las Vegas.*

Source: Google Earth

Bakersfield and Fresno: Two CAHSR stations built on two different sets of fundamentals

The choice of the new station site in Bakersfield should be a cause for concern, particularly when viewed through the lens of international experience. Local leaders opted to build 1.5 miles outside the downtown core to avoid complicated rail engineering, property takings, and noise impacts near the existing Truxtun Avenue station. However, this site near F Street is currently sparsely developed and physically isolated from the city's walkable historic heart.

This distance mirrors the situation in Zaragoza-Delicias, Spain, discussed earlier in this report. More than 20 years after opening, that station remains a "separate island," struggling to integrate with the urban fabric despite Spain's transit-oriented culture. Bakersfield faces an added design challenge: the station will sit on an elevated viaduct. Without vibrant year-round programming and meticulous maintenance of the spaces beneath the tracks, the structure risks becoming a permanent physical barrier rather than an urban catalyst.

The hurdles in Bakersfield are arguably higher than those faced by Zaragoza's planners three decades ago. Unlike the Mediterranean density of Aragon, California's Central Valley is defined by extreme auto-dependency and decentralization. Attempting to anchor a dense, walkable environment in a region where suburban sprawl is the default is a significantly heavier lift, suggesting the station may remain detached from the downtown core for the foreseeable future.

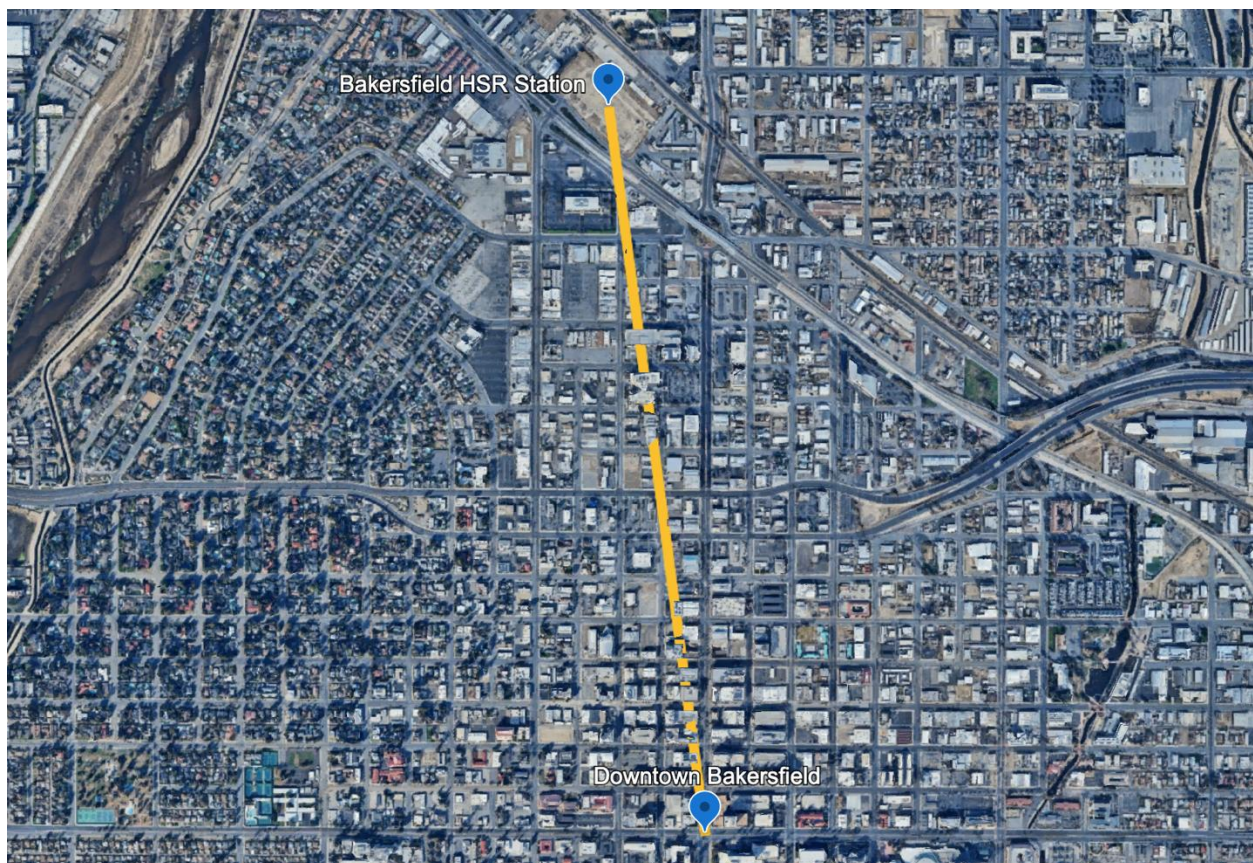


Figure 170. *The Bakersfield HSR station is approximately a mile north of downtown.*
Source: Google Earth

Fresno stands in notable contrast to Bakersfield because its station is built on sounder urban fundamentals, sitting directly in a downtown core already undergoing concerted revitalization. Yet, for all of Fresno's sound fundamentals, we must also not underestimate the task at hand of constructing a truly vibrant urban hub around the station. Like much of the surrounding region, the Fresno station area is currently underutilized and situated within a landscape primarily designed for automobile travel.

Decisions on station access and phasing are key here. While ridership in the early years may rely heavily on the automobile, the risk lies in "hardwiring" this behavior by over-investing in expensive, permanent auto-centric infrastructure like massive parking garages. To achieve the stellar urbanism seen in cities like Strasbourg, France, Fresno needs a strategic, phased approach that allows the district to mature from a car-reliant hub into a truly integrated, walkable destination. This is something that author Eric Eidlin addressed in his 2015 German Marshall Fund report:

[station area plans [in California] must include carefully conceived phasing plans that will foresee how station areas will evolve over time into more urban, compact, and economically dynamic places [over time]. This will be of greatest importance for stations in the most auto-oriented cities of the state where access to the HSR station in the early years of the system's operation will be mostly by car, but where, over the long term, there will be opportunities for more compact development. Phasing plans for some of the smaller stations could include interim land use strategies, economic activities requiring little up-front investment that would be viable in the early years of HSR service. This might include food trucks, open air farmers markets, parks, and even surface parking lots. (Eidlin GMF report, p. 63-64).

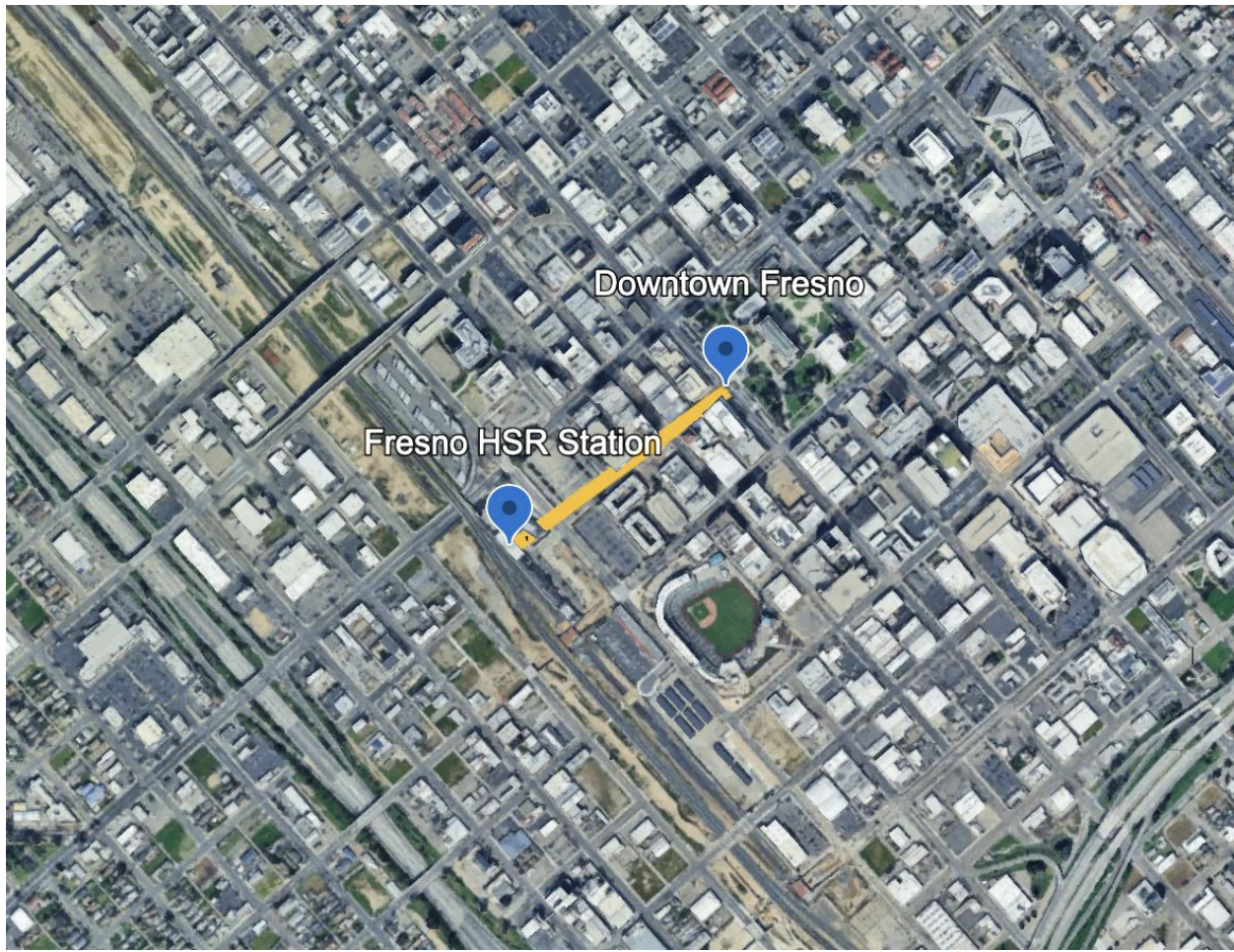


Figure 171. *Fresno's HSR station will connect travelers to the core of the city.*

Source: Google Earth

9.8. When no one's in charge: Fragmented management at U.S. train stations

Visiting well-integrated stations in France and Spain inevitably prompted comparisons with the fragmented experience of the U.S.'s busiest rail hubs. At some stations, planning and design decisions are typically made independently by the multiple agencies that share it, resulting in an every-operator-for-itself approach. This prevents stations from functioning as true regional or statewide mobility hubs.

In effect, many U.S. stations reflect a transportation “tragedy of the commons”: passengers—especially those transferring between operators—must navigate cumbersome and unintuitive connections, use different ticket machines to pay separate fares, and interpret multiple graphic systems created by individual agencies. These disjointed elements also contribute to overcrowded passageways and overburdened facilities such as escalators and elevators, which then become pinch points that slow passenger flow. These factors create an overall unpleasant travel experience, which ultimately pushes people away from traveling by rail.

Our experience in France and Spain suggests that the absence of a dominant regional, statewide, or national rail operator in the U.S. is a major driver of this fragmentation. There are a handful of large rail stations in the U.S. where multiple agencies share stations, but these lack

the strong coordination we saw across the Atlantic. The consequences of this lack of coordination are most visible at two major U.S. rail stations.

9.8.1 Penn Station: Three operator territories within a weakly integrated hub

New York Penn Station is the busiest train station in North America, handling around 600,000 passengers on a typical weekday. This is roughly 100,000 fewer than Paris Gare du Nord—Europe’s busiest. New York’s John F. Kennedy International Airport, LaGuardia Airport, Newark Liberty International Airport only move around 390,000-400,000 people daily ***combined***.

The original 1910 Penn Station was an architectural masterpiece that served New York’s passenger transportation needs very well during the golden age of rail. Its demolition to make way for Madison Square Garden compromised the nation’s busiest transit hub. This loss marked a turning point in the country’s approach to infrastructure, ushering in a protracted period of decline in American rail investment from which the nation has yet to recover.

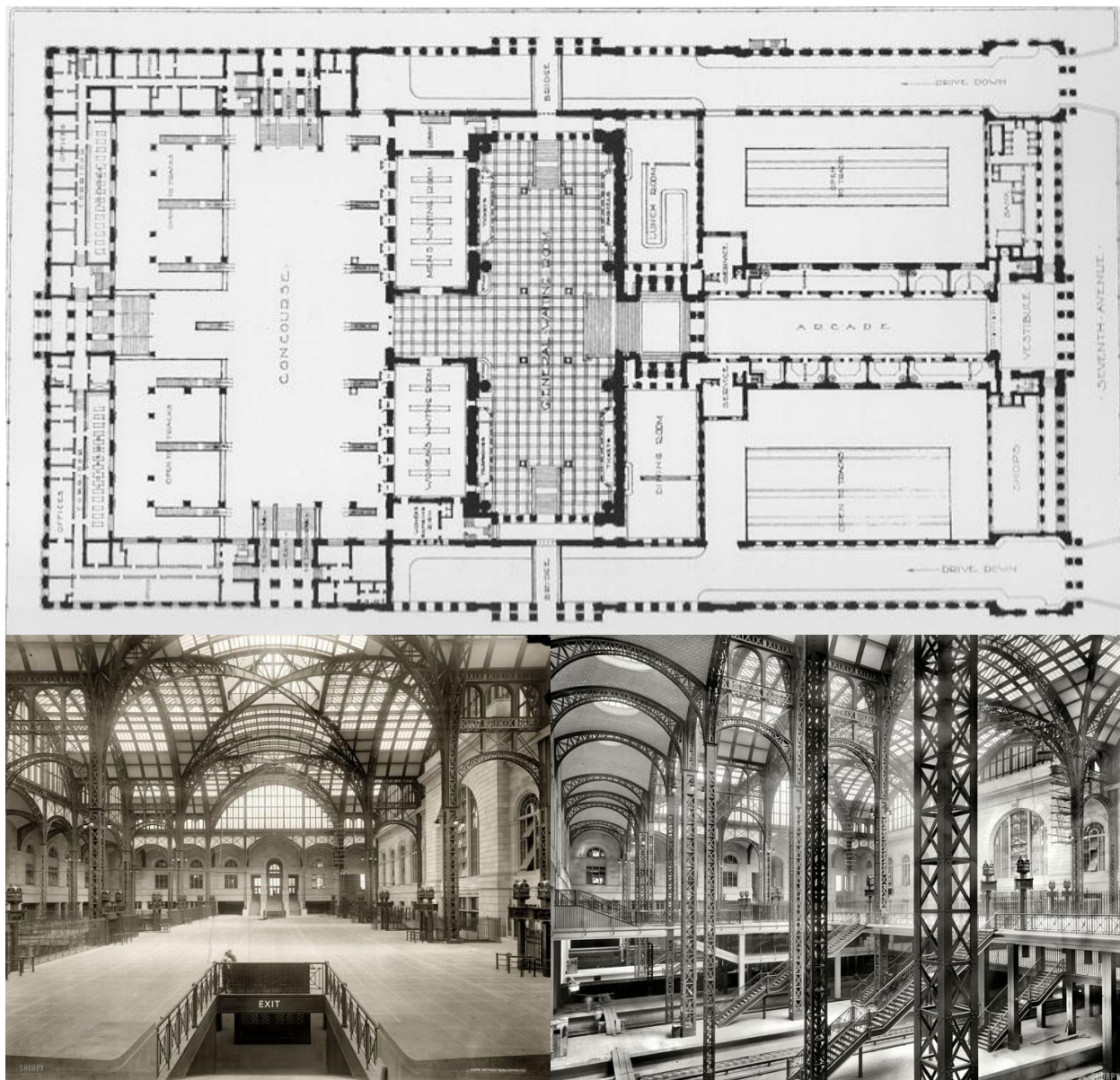


Figure 172. Top: Ground level floor plan of the original New York Pennsylvania Station. Middle: The unified, symmetrical, and wide-open main concourse of the original New York Pennsylvania Station. Bottom: A view of the platform layout inside the main headhouse at the original New York Pennsylvania Station.
Source: newpenn.nyc

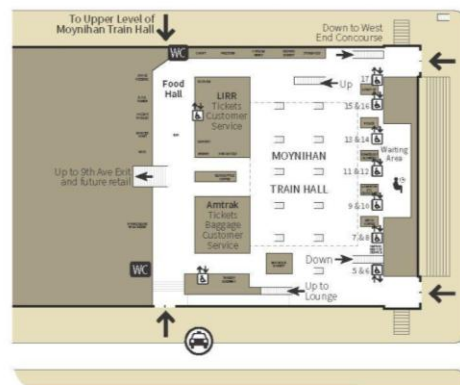
One of the main functional benefits of the original station building was a unified floor plan, much like we saw at every station. That is very much not the case with the current station. In its present form, the hub is not a single integrated facility, but rather a place where multiple services overlap. One in which each operator has its own territory that it plans and manages separately. The agencies use three different addresses for the station, there are three different cleaning contractors, and security is provided by three different police forces.

The maze of the mostly underground station is divided up into four zones:

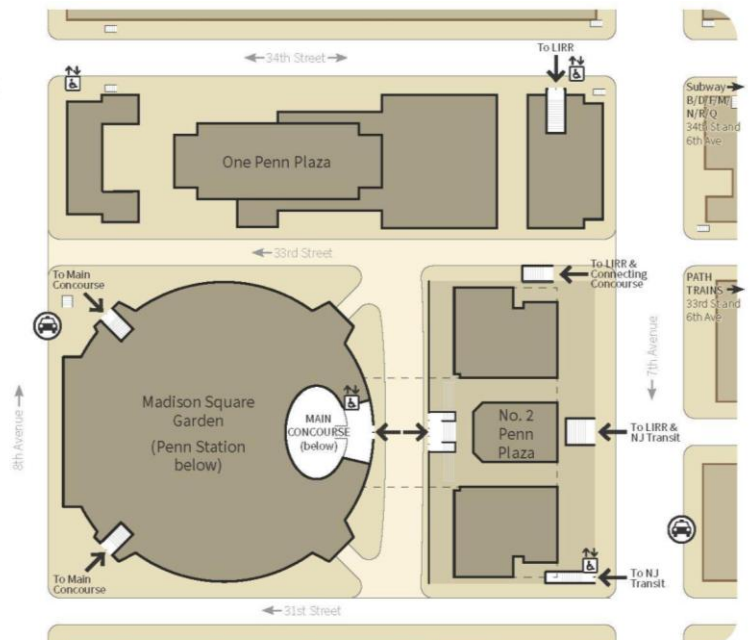
- Moynihan Train Hall and the West End Concourse
- Long Island Rail Road central concourse
- Amtrak and New Jersey Transit shared lobby
- NJT-only 7th Avenue boarding area

Street Level & Moynihan Concourse

Train Service	Shopping	Food & Drink
<ul style="list-style-type: none"> • Amtrak amtrak.com • NJ Transit njtransit.org 	Moynihan Train Hall <ul style="list-style-type: none"> • Darnesilly Flowers • Duane Reade / Walgreens • Gotham News • Love Pop 	Moynihan - Concourse <ul style="list-style-type: none"> • Birch Coffee • Blue Bottle Coffee • La Maison Du Chocolat • Magnolia Bakery • Starbucks • Three's Brewing • Vesuvio Bakery Moynihan - Food Hall <ul style="list-style-type: none"> • Alidoro • BAR • Burger Joint • Chopt • E.A.K. Ramen • H&H Bagels • Jacob's Pickles • Naya • Pressed • Sauce Pizzeria • Yo Sushi



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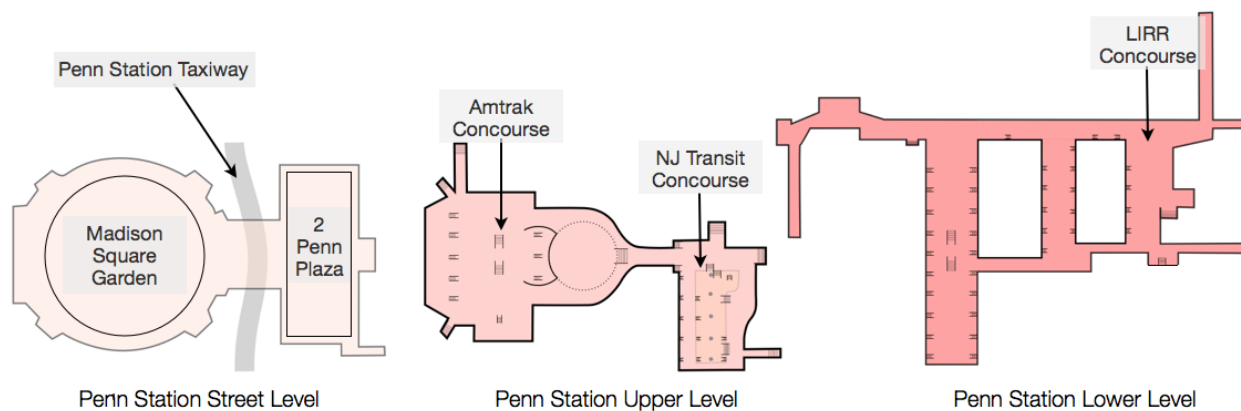


Figure 173. Diagrams showing organization and floor plans of Penn Station and Moynihan Station.

Sources: jasongibbs.com (top) and realtransit.org (below)



Figure 174. Moynihan Train Hall, opened in 2018.
 Source: By D. Benjamin Miller - Own work, CC0,
<https://commons.wikimedia.org/w/index.php?curid=127102131>



Figure 175. Amtrak and NJT shared lobby.
 Source: By Famartin - Own work, CC BY-SA 4.0,
<https://commons.wikimedia.org/w/index.php?curid=148573803>



Figure 176. *Ticketing booth in the New Jersey Transit boarding area.*

Source: By Bonnachoven - Own work, CC0,

<https://commons.wikimedia.org/w/index.php?curid=74799950>



Figure 177. *Long Island Rail Road concourse.*

Source: By Metropolitan Transportation Authority from United States of America - LIRR Penn Station Concourse, CC BY 2.0,

<https://commons.wikimedia.org/w/index.php?curid=144430071>

While recent initiatives like the Moynihan Train Hall and the Long Island Rail Road concourse expansion have improved passenger comfort, they represent isolated upgrades rather than a fundamental solution to the station's lack of a cohesive layout. These efforts, though significant, have not yet addressed the core structural challenges that define the Penn Station complex.

This collection of weakly coordinated improvements, compounded by inconsistent wayfinding and ticketing systems, creates a challenging and often disorienting environment. For everyday commuters and first-time visitors alike, the experience remains disjointed; signage designs and directional phrasing vary between operator territories, further complicating navigation.

9.8.2 San José Diridon Station

New York City is not alone in having rail hubs that struggle to provide an integrated passenger experience. Across the country in California, there are strikingly similar station integration and customer service issues at San José Diridon Station. Already the primary hub for public transportation in Silicon Valley and the southern part of the San Francisco Bay Area, Diridon Station is being redesigned and expanded in anticipation of a many-fold increase in passenger volumes in the coming decades. Caltrain, the owner of the station, has already electrified service on the busy commuter line that runs between San Jose and San Francisco. Electrification has shortened travel times between San Jose and San Francisco and has also enabled the agency to greatly increase frequencies and serve many more passengers.

Local officials are also planning for an extension of the Bay Area Rapid Transit (BART) system, with a stop that will serve Diridon. Last but not least, Diridon is the future HSR station for San Jose and Silicon Valley. Together, these increases in service, along with significant planned development in the area surrounding the station, are expected to lead to an eightfold increase in passengers over current levels.

The current station environment provides an agency-specific passenger experience. As shown in the photo below, ticketing and information systems are organized by individual operator rather than as a unified hub. For example, the digital information screens throughout the station are dedicated solely to Caltrain service, rather than providing a comprehensive overview of all transit options.



Figure 178. San Jose Diridon Station concourse area with ticket machines.

Source: Eric Eidlin

As discussed above, five partner agencies are currently working together to address these shortcomings through the Diridon Station Redevelopment Effort. As shown in Figure 158 below, the future station—as envisioned by the Diridon Partner Agencies—will be rebuilt in a manner that is very much in line with the best practices in station design outlined in this report. This rendering shows a station that *connects* both sides of the tracks, turning a station that has long acted as a barrier between both sides of the tracks, into a connector. In this sense, it is being reshaped along similar lines to Lyon-Part-Dieu. Also, this rendering shows that the spaces that are closest to the station include spacious pedestrian plazas. These spaces serve as the vital transitional zones whose importance we have underscored throughout this report. They also underline a prioritization of setting aside the best and most convenient real estate at stations for people rather than cars.



Figure 179. *This view of the future San Jose Diridon Station represents the future vision adopted by the Diridon Partner Agencies in May 2025. This view is looking east toward downtown along The Alameda / Santa Clara Street at Stockton Avenue. It shows the Diridon Partner Agencies' ambition to turn the station into a "connector" rather than the divider than it is today. It also shows the emphasis on providing spaces for people rather than cars immediately surrounding the station building.*

Source: Foster and Partners Architects, www.diridonsj.org

10. Conclusions and Key Takeaways for the U.S.

Debates about High-Speed Rail (HSR) in the United States often hinge on whether the technology fits the country's geography and development trends. Yet HSR offers innate advantages: fast, reliable, congestion-free travel that connects walkable city centers where transit networks converge. Well-planned stations act as high-capacity urban gateways, catalyzing economic development and strengthening regional rail systems. These advantages, combined with the potential to significantly lower air pollution and greenhouse gas emissions, form the foundation for its appeal.

Critics, however, raise valid questions about cost, ridership, and land-use patterns. These debates underscore that HSR's benefits are not automatic; they materialize only when systems are phased in close coordination with land-use planning. Our experience in Spain and France reinforced a critical reality: rail infrastructure—while perhaps the most beneficial mode for environment and placemaking—requires a massive up-front investment to reap the rewards the public expects. This necessitates a level of collective action and sustained political consensus that is uniquely challenging in the U.S. context. This highlights the need for public education that links significant resource allocation to the great public benefits delivered.

Against this backdrop, our trip demonstrated that HSR is a highly competitive mode—particularly in 100–500-mile corridors—where it is consistently faster than automobile travel and often rivals or exceeds the speed of air travel when accounting for total door-to-door times. In both countries, we saw how stations function as seamless hubs between local, regional, and national networks. This was evident not only at massive metropolitan terminals like Gare du Nord, Gare de Lyon, Atocha, and Chamartín, but also at mid-sized hubs like Strasbourg. Just as importantly, we observed that stations such as Madrid's Príncipe Pío and Gare Saint-Lazare in Paris have become destinations in their own right. By functioning as dynamic nodes that offer a full suite of commercial and dining options alongside amenities like fitness studios, these facilities reinforce the very urban density that rail requires to thrive.

Our observations also underscored that HSR does not transform cities overnight. For that reason, getting the least flexible design elements right from the start is essential. France and Spain demonstrate the high cost of retrofitting stations after the fact; as seen at Lyon-Part-Dieu, correcting under-capacity once a station is operational is far more expensive and disruptive than building for long-term growth from day one. These nations also benefit from unified national leadership in station operations, which stands in sharp contrast to the fragmented governance in the U.S., where North America's busiest transportation hub suffers from disjointed wayfinding and uncoordinated management.

Furthermore, communication is a prerequisite for building public trust. Projects like the Grand Paris Express use visually compelling narratives to help the public weigh long-term regional benefits against inevitable short-term disruptions. For U.S. agencies, the opportunity lies in pairing this clear communication with demonstrated credible delivery. Spain's city-center tunnels, for instance, prove that high-impact connectivity can be achieved cost-effectively when backed by strong institutional capacity. Ultimately, when agencies communicate a holistic view of benefits—integrating economic development with placemaking—and then deliver on those promises, they build the durable support necessary for large-scale infrastructure success.

Ultimately, delivering rail megaprojects requires decision-making authority that matches the geographic scale at which these networks actually operate. Because rail travel typically spans regional, megaregional, statewide, and even national levels, success depends on having public sector capacity and strategic leadership situated at these upper tiers of government. Currently, this type of high-level strategic involvement is uniquely weak in the U.S. context, where fragmented local control often stymies network-wide goals. The lesson is not that U.S. agencies should replicate European models wholesale, but that making deliberate choices to empower institutions at the appropriate scale of governance is essential if high-speed rail is to fulfill its potential.

Finally, our study trip demonstrated that there is no substitute for experiencing these facilities first-hand. Our travels in May and June 2025 gave us a direct appreciation for the mobility and civic pride that a true high-speed rail network, human-centered stations and station districts, and functional project delivery provides. We have returned with a deeper understanding of the institutional alignment required to make such visions a reality. We hope this report spurs the curiosity and political will necessary to show us a way forward for advancing passenger rail projects in the United States—delivering them in ways that most benefit our people by improving mobility and access to opportunity, while creating cities that are more vibrant, connected, and sustainable.

11. Topics for future research

The report you have just read is necessarily long and wide-ranging, reflecting the breadth of insights gained during an intensive 12-day study trip. We covered a great deal of ground in a short period of time and examined rail systems, stations, and governance frameworks across multiple national and metropolitan contexts. At the same time, the trip made clear just how much more there is to explore. Many themes that emerged during meetings and site visits raised important questions—questions that merit deeper investigation than was possible within the scope of this study.

This final section highlights several critical avenues for further research. Together, they point toward a more mature and strategic conversation about high-speed rail, major station projects, and urban development in the United States.

1. Governance, institutions, and organizational capacity

One of the clearest lessons from France and Spain is that success in delivering major station projects—whether entirely new terminals, large-scale modernizations, or new high-speed rail lines—depends on far more than technical expertise alone. While access to highly skilled engineers, planners, and designers is essential, it is equally important that those skills are embedded within institutions that are properly structured and empowered.

Effective delivery requires placing the right people with the right skills in the right positions, with clearly defined responsibilities and decision-making authority. It also requires careful consideration of which roles are best carried out at which levels of government. Rail systems function across metropolitan, regional, and national geographies, and governance structures must align with the same geographic scale at which people actually travel.

A key contrast between the United States and its European counterparts is the comparatively weaker and less strategic role played by upper levels of government in intercity passenger rail. In France and Spain, national and regional governments play a central role in shaping networks, prioritizing investments, and coordinating station development. In the U.S., by contrast, state and regional governments often lack both the authority and the institutional capacity to plan and manage rail services at the scale of real travel markets.

We believe that two related questions merit particular attention:

- **French governance models for station development**, including Special Purpose Local Development Companies (SPLs) and Public Development Agencies (EPAs). How do these entities operate, and what specific problems do they solve? To what extent could analogous models be adapted to the U.S. context, despite major legal, governmental, and societal differences?
- **Institutional alignment across scales**. How can U.S. governance frameworks better reflect the regional and interregional nature of rail travel, rather than defaulting to fragmented, project-by-project approaches?

2. Projects of national and regional significance

Another important area for further study is the use of formal designations that elevate major stations and rail corridors to projects of national or regional significance. In France, such designations play a powerful role: they help clarify priorities, mobilize funding, streamline approvals, and force coordination across multiple levels of government.

The United States has experimented with similar concepts—most notably through the Federal Highway Administration’s “Projects of Regional and National Significance.” However, these designations have generally been weaker, less consistently applied, and far less strategic than their French counterparts.

Future research could explore:

- How France uses project designation as an active governance and delivery tool, rather than merely a symbolic label.
- Why comparable U.S. programs have had more limited impact.
- Whether stronger, more intentional designation frameworks could help advance major rail and station projects in the U.S., particularly those with clear multistate or megaregional benefits.

3. Passenger experience and the fundamentals of comfort

The study trip also underscored how basic design choices can have an outsized impact on the passenger experience. Seating—or the lack of it—is a particularly telling example. While many of the stations we visited featured impressive architecture and high-quality public spaces, some were missing fundamental amenities, such as adequate seating in waiting areas. This issue is not unique to Europe and is especially evident in several high-profile U.S. stations, including Washington, DC’s Union Station, where it can be difficult to find a place to sit unless you are paying to eat at a restaurant or are an Amtrak customer with access to a designated, secure waiting area.

Further research could examine:

- How seating and waiting space are prioritized in station design and management.
- Comparative approaches to passenger comfort in European and U.S. stations.
- Case studies such as Moynihan Train Hall, Grand Central Terminal, and other major U.S. facilities that struggle to balance iconic architecture with basic passenger needs.

4. Security practices and tradeoffs

Spain’s approach to rail security—particularly for high-speed AVE services—stands apart from much of Europe and warrants closer examination. These practices are a direct legacy of the 2004 Madrid commuter rail bombings, which profoundly reshaped national attitudes toward rail security.

Key areas for further study include:

- The evolution of Spain’s station security measures, including luggage screening prior to platform access.
- How these checks differ from airport-style security and why their scope remains limited.
- The impacts of these measures on passenger flow, queuing, and overall station operations.
- Many other European countries, especially for regional and local trains, maintain a more open system where anyone can access platforms, and there are no luggage checks.
 - <https://xxiiai.com/en/le-blog/smarter-transport-hubs>
 - See [video of participant Matt Miller discussing queuing process for train to Toledo](#).

Understanding how Spain balances security, convenience, and throughput could inform future U.S. discussions as intercity rail ridership grows.

5. Project costs, delays, and delivery risk

Several projects examined during the trip—particularly in Catalonia—underscore the challenges of delivering large-scale rail infrastructure on time and on budget. Prolonged delays and cost escalation have reshaped both project outcomes and public perception.

Notable examples include:

- **La Sagrera Station**, where extended timelines have affected both the station itself and surrounding redevelopment.
- **Barcelona Metro Lines 9 and 10**, which illustrate how technical complexity, governance fragmentation, and financing constraints can compound over time.

Further research could focus on identifying the institutional, political, and financial factors that drive such delays, and on extracting lessons relevant to U.S. megaprojects.

6. How many stations does a city need?

The trip raised fundamental questions about station hierarchy, redundancy, and network design. Barcelona’s decision to develop a second major station contrasts sharply with many U.S. cities of comparable size that rely on a single primary terminal.

Comparative cases worth examining include:

- Barcelona’s emerging dual-station strategy.
- Lyon’s two stations, with Part-Dieu functioning as the dominant hub.
- U.S. examples such as New York and Boston (two major terminals), Chicago (multiple terminals), versus Washington, San Francisco, and Los Angeles, which effectively rely on a single main station despite serving very large metropolitan regions.

This line of inquiry invites broader discussion about capacity, resilience, and how station systems should evolve as metropolitan areas grow.

7. Toward true mobility hubs in the United States

Finally, the trip highlighted the need to rethink U.S. stations not just as transportation facilities, but as integrated mobility hubs and urban places. Drawing on the concepts explored throughout this report, further research could examine:

- How stations can better integrate intercity rail, regional rail, metro, buses, micromobility, and pedestrian access.
- Governance and funding models that support long-term, phased station and district development.
- The role of stations as catalysts for surrounding urban neighborhoods, rather than isolated infrastructure projects.

About the Authors

Hunter Bickel

Hunter Bickel is a transportation professional with experience in transit communications, planning advocacy, and rail infrastructure research. He currently works in service communications for the Metropolitan Transportation Authority in New York, where he monitors New York City Transit Subway and Bus service and supports digital engagement across the agency's platforms.

Prior to joining the MTA, Hunter served as Communications Manager for the Effective Transit Alliance, a New York-based technical advocacy organization focused on improving public transportation planning and investment. His primary responsibility in this role was managing the organization's social media accounts, but he also focused on broader communications strategies by developing new ways to spread the ideas and grow the influence of ETA.

Most of his college and early career experience is in strategic communications, with a strong foundation in research and technical writing. He holds a bachelor's degree from the Missouri School of Journalism, where he graduated in 2023.

Eric Eidlin

Eric Eidlin is a practitioner-researcher with deep expertise in transportation, urban planning, and station-area development. He holds degrees in urban design and urban planning and began his career as a consultant before joining the Federal Transit Administration, where he worked on major transit capital projects. Since 2017, Eric has played a lead role in shaping the San José Diridon Station project, to elevate it as a world-class multimodal hub and to attract international expertise to the project.

Eric has extensive international experience, having lived, studied, and conducted research in France, Germany, and Mexico. He is bilingual in French and English and highly fluent in German. Leveraging his language skills and European planning knowledge, he received a Cities Fellowship from the German Marshall Fund, during which he interviewed leading rail professionals and published a widely cited report [Making the Most of High-Speed Rail in California: Lessons from France and Germany](#).

Since 2018, he has taught at San José State University's Master of Science in Transportation Management, offering one of the only courses in the U.S. dedicated specifically to intercity and HSR planning.

NOTE: The views expressed are solely those of the authors and do not represent the views of the City of San Jose, San Jose State University, the New York MTA, or any of their affiliates.

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