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## South Madrid and High Speed. An example of symbiosis

**Ayrault Pérez, Juan**

ADIF<sup>1</sup>

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### Abstract

The process of transformation of Madrid-Puerta de Atocha station runs parallel with the evolution of the urban space around. Railway was early implemented in an area outside the city wall that had been the object of important urban projects in the 18th and 19th century.

Throughout the 20th century, Atocha area concentrated a significant number of public buildings, cultural and teaching facilities, presided by the General Hospital and its ancillary buildings.

A project by Alberto del Palacio provided in 1892 the iron canopy, whose tympanum has been the iconic image of the station since.

After decades of dereliction of the area and serious threats to heritage buildings on the mid 20<sup>th</sup> century, a new sensitivity towards industrial architecture appeared on the 70's. This fact helped to preserve the historic station and made it the terminal for the new HS line Madrid -Seville.

The improvement of the commuter network in the 80's and the implementation of the new High Speed line in 1992 meant a revolutionary change into citizens' perception of railway and a key dynamic factor on railway renewal on the 21st century. Atocha is nowadays the undisputed top railway passengers' hub in the country.

A parallel process of urban renovation and cultural concern triggered the implementation of cultural facilities such as the Prado Museum enlargement, the appearance of new ones, such as the Thyssen-Bornemisza and Reina Sofia Art Center, and the successive creation of other complementary ones that turned the area into the Golden Triangle of Art, one of the highest concentration of world-class art galleries on Earth. Private investments have taken advantage of the situation and enhanced retail and accommodation sectors. Atocha has obviously benefited from the quality improvement of its surroundings.

In summary: HS success relies not only on its obvious technical and operational advantages, but also on the boundary conditions of its main destination.

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*Keywords: high-speed railway, urban development, intermodality, Atocha, Golden Triangle.*

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<sup>1</sup> Ayrault Pérez, Juan. ADIF. jayrault@adif.es

## 1. Introduction

These pages are dedicated to explain the evolution of an urban space originally located out of the city walls, how it acquired a central position when railway was implemented and the way that it has increased its symbolic and cultural character in parallel with the development of the High Speed railway, highlighting the multiple ways in which the two processes are connected.

In order to avoid repetition of long names, a few acronyms are used. A list at the end of the article, before the bibliographical references, clarifies the issue.

Some urban references have been simplified. The author has chosen the terms ‘Atocha Station’, instead of the official denomination ‘Madrid-Puerta de Atocha station’ and ‘Atocha square’ in reference to the urban space that no one but the official maps name ‘Glorieta del Emperador Carlos V’. The two main parts of the station are simply named ‘Commuter station’ and ‘HS station’ or ‘HS terminal’

## 2. Railway and the City

Railway appeared in the mid 19th century as a revolutionary mode of transport that changed dramatically the way people and freight moved. Up to this moment, travel times had not substantially improved since the moment when Romans established a road network that covered the whole empire.

Railway stations were originally implemented outside the urban walls. Describing the station as the city gate is even a cliché, but in fact a deeply based one, as in the first decades of railway development thousands of new station buildings were located exactly in front of the physical gates of city walls.

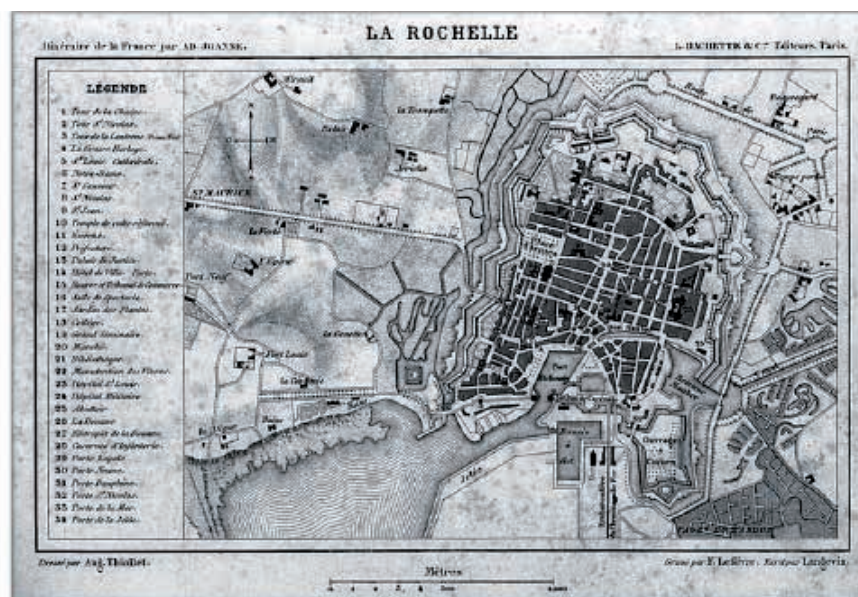


Figure 1: Station located by the city walls. La Rochelle in 1862. Itinéraire de Poitiers à la Rochelle, à Rochefort et à Royan. Source : Wikipedia.

When railway became the undisputed mass transport mode, the image of the station was the first impression of the place for the newcomer. This fact has remained unchanged. Railway operators and infrastructure managers know that stations represent a substantial part of passengers’ experience, even if they take a tiny part of travel time.

Their locations turned central due to cities’ growth, in many cases fostered by railway itself. In

these almost two centuries past, cities and railway have had a parallel development, although their relationship has been somehow asymmetric, as railway's demanding geometry established tough conditions. The flexible tissue of the city had to adapt to the rigid lines of tracks. Costly civil works frequently raised barriers and segregated neighbourhoods.

On the other hand, railway injected plenty of energy on cities' activity, fed their growth and ordered their surrounding territories.

Madrid and the area around Atocha station are a good example of these permanent dynamics.

### 3. Atocha urban area: origins and evolution

#### 3.1 Outside the city walls

Prior to railway implementation, Atocha was an external urban area. Since the arrival of the Royal Court to Madrid in 1561, the city exceeded its medieval walls and was successively encircled by other enclosures with no military purpose, but only for taxation. The latter was built in 1625. One of its openings was the so-called Atocha gate, located in a spot close to the current roundabout and the fountain in front of the station.



Figure 2: Atocha gate and the Artichoke Fountain in 1840. Source: Wikipedia.

The gate stood at the edge of a leisure zone, the Prado (meadow), a promenade that provided shadow, water and fresh air to Madrid citizens in summer hot season.

Outside the Atocha gate started the road to Valencia, a very important connection with the closest harbour. It was also the way to Vallecas, a small town that supplied flour and bread for the court. In the near vicinity stood the sanctuary of Atocha, a very popular place of worship patronized by the monarchy which gave its name to the area.

### 3.2 The Age of Enlightenment

During the reign of Fernando VI, around 1750, a network of tree-lined avenues, the so-called Baroque Fork (Tridente Barroco), was designed and built by Joseph Salcedo, a military engineer. The pattern of roads organized all the territory between the south wall and the river with no purpose of fostering the enlargement of the city, constrained by the taxing walls.



Figure 3: Paseo de las Delicias in 1770 by José Bayeu.

Source: Museo del Prado.



Figure 4: The Baroque Fork designed by Joseph Salcedo.

Source: <http://www.madrid.org/cartografia/planea/cartografia/html/web/index.htm>

The Prado, that was inside the walls, kept its leisure character, receiving an increasing number of visitors. It was divided into three parts: the northern section named Prado de Recoletos, the central part called Prado Viejo or de San Jerónimo and the southern section or Prado de Atocha, now the eastern limit of the old station, totalling some 2 km.

In the corner of calle Atocha, a hospital was built in 1603 under the initiative of King Phillip II, with the purpose of unifying many private and underfunded assistance foundations. In the 18th century, the new enlightened mentality of King Charles III government fostered the ambitious project of a modern building, following the example of the Albergo dei Poveri, sponsored by the same king during his reign in Naples. The project by royal architects José de Herosilla and Francesco Sabatini occupied an area substantially more extended than the previous building.

By the death of King Charles in 1788 the works remained unfinished. Only the west courtyard and the north wing were built and operating. In 1832 the building was complemented by the Royal College of Surgery in a neighbouring plot.



Figure 5: General Hospital section Source: [www.museoreinasofia.es](http://www.museoreinasofia.es)



Figure 6: General Hospital North wing, now Royal School of Music. Source: Luis García in Wikipedia.

In 1763, José de Hermosilla, also under the patronage of King Charles government, designed an essentially enlightened project: an urban promenade along the Prado, surrounded by buildings with a cultural and scientific use: the Royal Botanical Garden, more extended than now, linked to the Natural History Cabinet, now Museo del Prado.



Figure 7: Paseo del Prado watercolour by Isidro González Velázquez. Source: BNE.

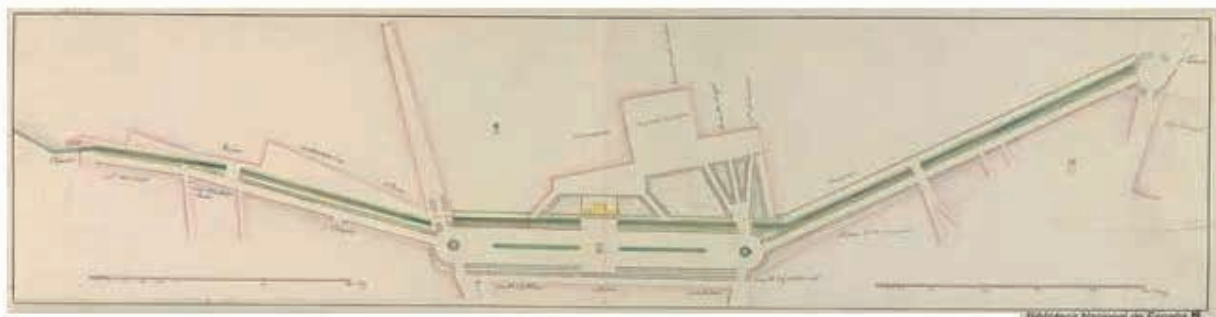


Figure 8: Paseo del Prado Project by José de Hermosilla. Source: BNE.

The Royal Observatory was established in a nearby hill, beside the grounds of the Retiro Royal Gardens. All three works were projected by Juan de Villanueva, the best known Spanish neoclassical architect.

The design was completed with fountains representing Cybeles (Earth), Neptune (Sea) and Apollon (Sun) and other minor sculptures.

All three remain in place and make the place one of the most beautiful avenues in Madrid and one of the best examples of enlightened urban design. The Artichoke fountain was set at the edge of the promenade, in the square besides the gate were the Prado de Atocha began. Now a bronze reproduction occupies its place.

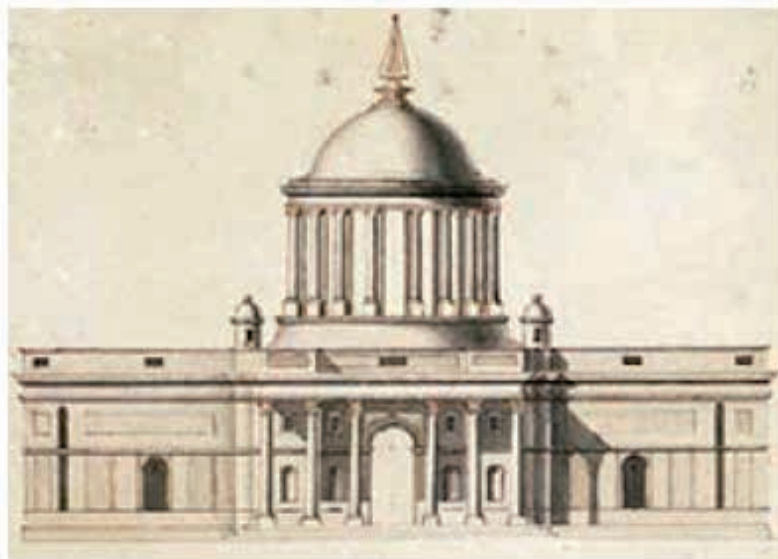


Figure 9: Royal Observatory, by Juan de Villanueva.

Source: <http://www.historialia.com/>



Figure 10: Royal Cabinet of Science, by Juan de Villanueva.

Source: <http://www.historialia.com/>



Figure 11: Royal Botanical Gardens, by Juan de Villanueva.

Painting by Luis Paret.

Source: Museo del Prado.

The area where the station stays remained outside the city walls up to their disappearance in 1868. Prior to this date many changes had taken place.

#### 4. 'A deadly beast arrives, flashing fire and smoke'. Railway in the 19th century

##### 4.1 Early railway development

A hollow area south of Atocha gate, the bed of a modest brook, was chosen to start the second railway line in the country, from Madrid to Aranjuez, in 1851. The line was the first section of the railway to Alicante, intended to connect Madrid with the coast, completed in 1856. A modest building called Embarcadero was the first terminal station. Twenty years after its opening, Atocha was the central terminal of the company MZA, whose lines connected the most important cities in the south and east of the country.



Figure 12: Embarcadero Station in Atocha. Madrid Aranjuez line opening in 1851. Source: FFE.

##### 4.2 Station enlargements

The first station soon proved insufficient for the increased services. A new building, designed by Victor Lenoir in 1863 was set in front of the old station to house MZA offices. In 1880, a railway by-pass connected Atocha with the Norte station, the head of MZA competitor Compañía del Norte. This new link totally changed the character of the south part of the town, which turned into an industrial area. This character remained unchanged until the second half of the 20th century.

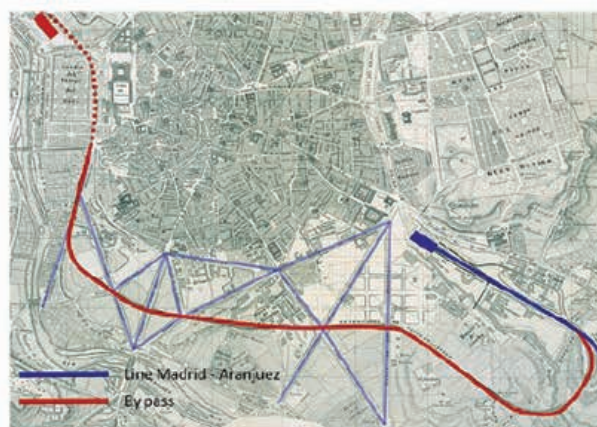


Figure 13: By-pass line between Atocha and Norte stations. Source: Ferropedia.

A new building designed by engineer Alberto del Palacio substituted in 1892 the old 'Embarcadero'. The shape of its canopy turned into an urban landmark for 100 years and is still the most identifiable element of the station nowadays.



Figure 14: Atocha station projected by Alberto del Palacio. Source: Via Libre.



## 5. Urban development in the 19th Century

### 5.1 Breaking the limits

On 1860 Carlos María de Castro projected the Madrid urban enlargement plan that bears his name. The plan forecast the city growth on the north, west and south. The whole Atocha area was redesigned, although the existing railway obliged to adapt the regular pattern of the plan to the existing railway facilities and respected too the layout of the baroque avenues from 1750. The demolition of the 1625 wall by the revolution called 'La Gloriosa (The Glorious)' accelerated the process.

### 5.2 New neighbours in town

In these new grounds, redesigned by the square pattern of Castro's plan, other relevant buildings dedicated to culture and politics were added:

- In 1875, Dr. Pedro González Velasco founded the Anatomic museum, nowadays National Anthropology Museum.
- In 1897, the Ministry of Fomento (Agriculture, Industry and Public Works), designed by architect Ricardo Velázquez Bosco, was built on the grounds of the Royal Botanical Garden. The same building currently houses the Ministry of Environment.
- In 1899, the Pantheon of Illustrious Men was partially established on the grounds of the former Dominican convent of Atocha. Due to the lack of funds, only the courtyard and the campanile were built.



Figure 15: Carlos M. de Castro enlargement plan and public buildings implemented.

Source: [www.madrid.es](http://www.madrid.es) and Juan Ayrault



Figures 16 - 17 - 18: Ministry of 'Fomento' - Anatomic Museum -Pantheon of Illustrious Men.

Sources: <https://artedemadrid.wordpress.com/2011/11/14/el-palacio-de-fomento/>

[http://www.historiadelamedicina.org/Instrumentos/instrumento\\_157.html](http://www.historiadelamedicina.org/Instrumentos/instrumento_157.html)

<http://urbanity.cc>



## 6. Railway in the 20th century.

### 6.1 Madrid Railway Access Plan

The new station by Alberto del Palacio soon exhausted capacity. Several plans were designed like the one in 1924 to enlarge the terminal, but were never carried out.

Madrid metropolitan area grew up to 900.000 inhabitants on the early thirties. Railway accesses were congested and connections between southern and northern stations slow and inconvenient: the by-pass line between Atocha and Norte (now Príncipe Pio) was only used for freight.

After several unsuccessful plans, the Republican Government (1931-1939) promoted a new Madrid Railway Access Plan in 1933. Its main objectives were the construction of a new station in the north, a tunnel linking Atocha with the new northern terminal and a by-pass line on the northeast, connecting lines from Barcelona and Irún (Atlantic French border).

The works were initiated but soon interrupted by the Civil War (1936-1939).



Figure 19: Madrid Railway Access Plan.

Source: <https://informetfm.wordpress.com> & JAY

### 6.2 Post war crisis and recovery in the 60's

War damages and harsh economical conditions after the war led to private railway companies' limited usefulness or even to bankruptcy. In 1941 the Government merged most of them in the national network 'Renfe'. The top priority was then rebuilding infrastructures damaged by the war, but aside from this it was a time of scarce investment, so the network remained basically like in the 19th century. Nevertheless, economical recovery from 1960 favoured the finishing of works started by the republican plan: the first North-South tunnel link opened in 1967; a new provisory north terminal in Chamartín opened in 1968. The current building was inaugurated in 1975. North-western, southern and eastern lines in Madrid region were finally connected. Nevertheless, the boundary conditions had substantially changed when the new infrastructure was open: Madrid area had more than tripled its population; road and aerial transportation had multiplied in a proportion that no one could have imagined in 1933.



Figure 20 and 21: 'Apeadero' station in Atocha and Chamartín station. Source: Adif.



### 6.3 Railway challenges in an evolving scenario

The democracy arrived (1977) with the railway system in a very bad mood, unable to compete with road and aerial transportation.

Consequently, long distance services stagnated. Instead, commuter services demand increased significantly in a network with scarce capacity to withstand more pressure.

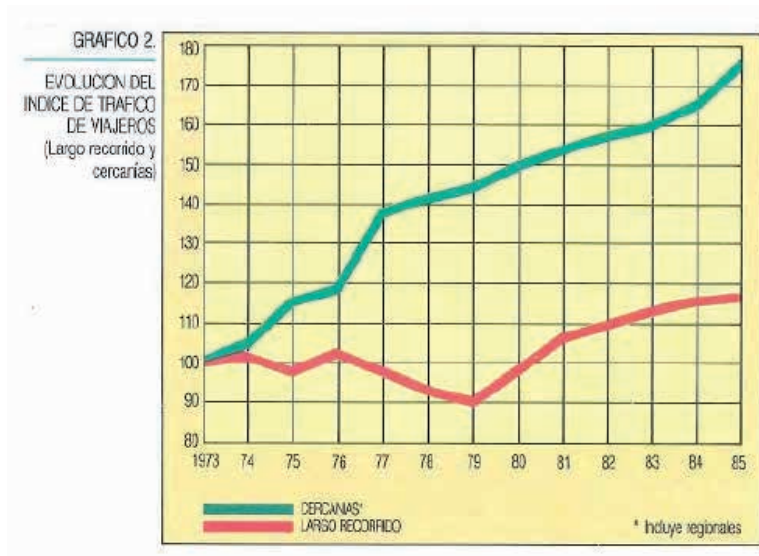


Table 1: Passenger traffic evolution 1973-1985. Source: PTF 1987.

Several plans followed with the intention of closing a substantial part of the network. In order to start a way to solve structural shortages, Renfe signed in 1979 the first Programme-Contract with the Government. The latter would provide economical resources; Renfe compromised with renovation and services improvement. A new Programme-Contract was signed in 1984 with the final aim of making railway profitable. In 1985, 901 km of highly loss-making lines were closed all over the country, many of them in scarcely populated areas.

### 6.4 Urban growth and transport crisis

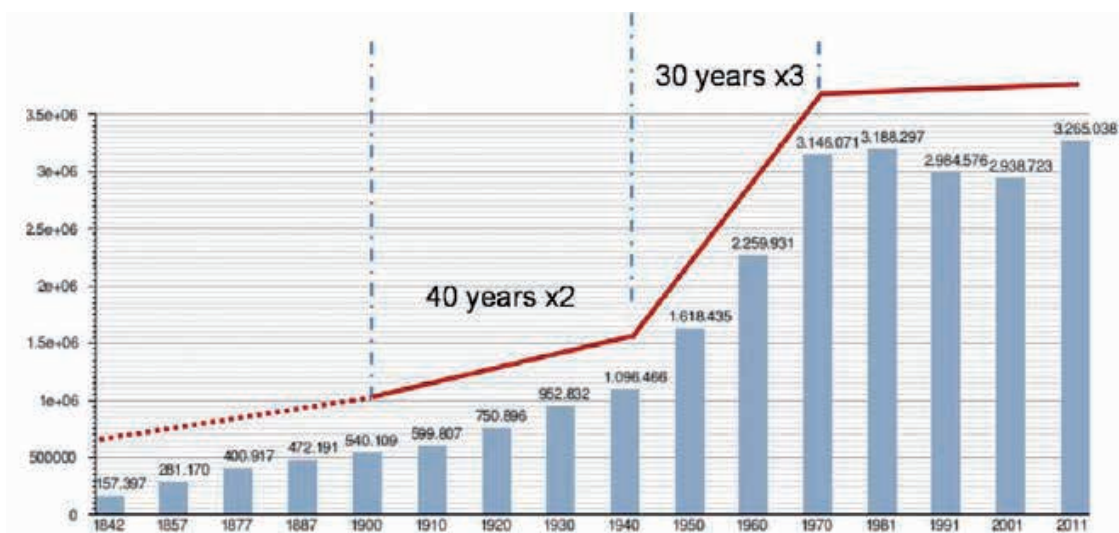


Table 2: Madrid city population growth 1842-2011. Source: Wikipedia and Juan Ayrault

In the period 1940-1970 Madrid tripled its population. Since then, figures remained stable but the metropolitan area increased significantly, particularly in the south-western metropolitan area supplied with commuter lines acceding to Atocha. Transport demand congested the access roads and commuter turnout soared. Economical recovery on the mid 80's increased the trend. The situation reached moments of severe tension: the railway network was close to collapse. Riots provoked by angry users took place in April 1986 in Atocha Station.

### 6.5 The birth of new commuter networks: Cercanías

As a reply to urban transportation challenges, the first socialist government in the democracy implemented several measures in order to improve the commuter railway network in major Spanish urban areas. In respect to Madrid metro area, all the services were studied as a whole and rescheduled with periodic timetables. New stretches were projected to connect lines that were not integrated in the network. Atocha was decided to be the linking point of all the lines, due to the fact that most of the lines already started there or were accessible through the tunnel to Chamartín.

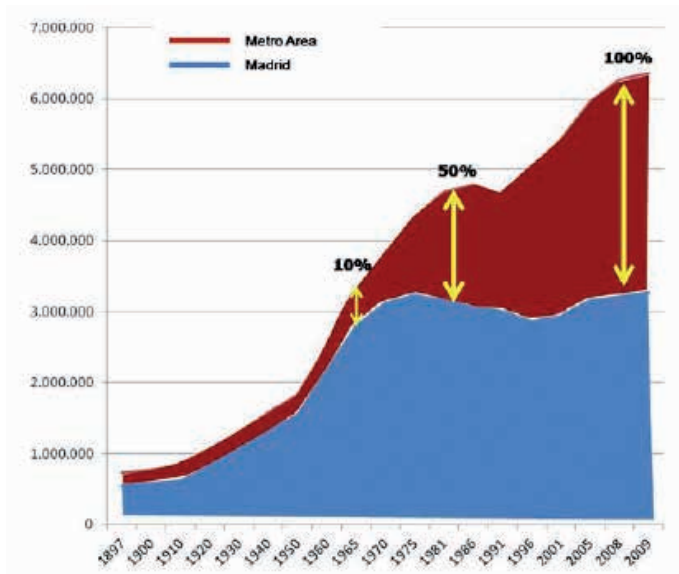


Table 3: Madrid Metro Area population growth 1897-2009. Source: Wikipedia and Juan Ayrault



Figure 22: Commuter (Cercanías) network in 1989 + projected extensions.



Figure 23: Cercanías network in 2007. Source: Adif and Juan Ayrault files.

In 1988, the new commuter station projected in 1983 opened with 10 tracks, connected to the 1967 tunnel. Two years later, in 1990, a second tunnel linked Atocha with the south-western line to Móstoles, until then isolated from the network. In 1996 a new line following the old bypass between Atocha and Principe Pío (Pasillo Verde) was open. The process went on and in 2007 a new tunnel N-S was open with a new station in Sol, acceding la Puerta del Sol, the symbolic core of the city. This new tunnel permitted to connect with the north two lines that firstly ended at Atocha. The whole network functioned as an integrated system.

### 6.6 Rail Trasport plan - New access to Andalusia.

In respect to long distance routes, railway in Spain faced a big challenge: survival face to the harsh competition with road an aerial transport. Long distance passenger services experienced poor results on the 70's and the situation was worsening as far as road infrastructure improved. In 1987 a Railway Transportation Plan was approved by the Government. Several proposals stood out: A triangle line

Madrid-BarcelonaValencia-Alicante with standards of 200 kph, a new connection between Vitoria and Bilbao to avoid the extremely complicated Orduña pass, a new access to Andalusia and other lines improvement with standards from 160 to 200 kph.

Access to Andalusia was one of the most problematic existing connections due to the slow passage through Despeñaperros mountain pass, very difficult to solve technically. Consequently, a new line was proposed 60 km westwards, connecting the old line Madrid-Ciudad Real-Puertollano with Córdoba through the mountain range of Sierra Morena. In 1988 a dramatic decision with important consequences was made: all new HS lines will be built with the standard gauge (1435 mm), instead the Iberian gauge (1668 mm).

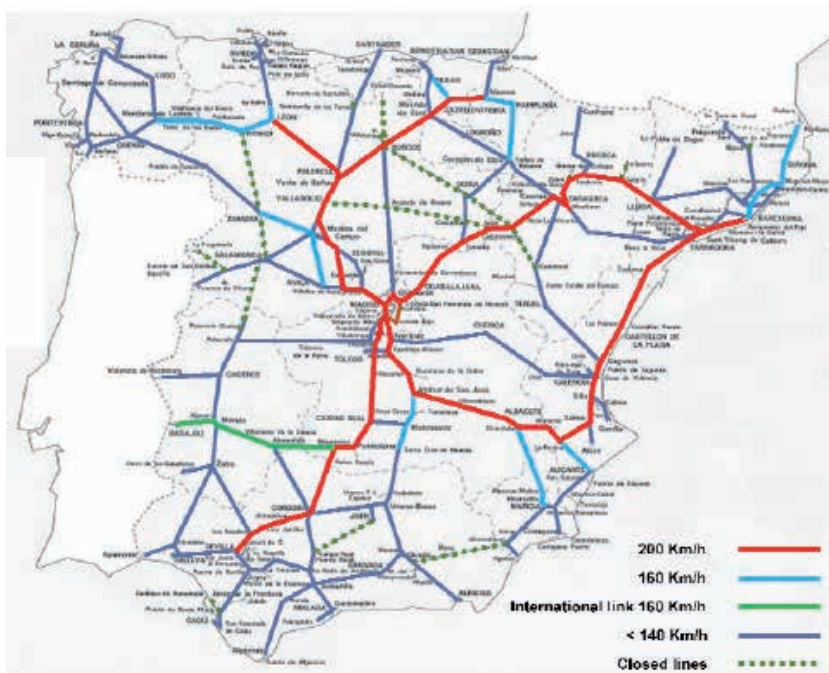


Figure 24: PTF plan (1986) and line standards.

Source: PTF <http://www.vialibre-ffe.com/noticias.asp?not=5154> and Juan Ayrault



Figure 25: New Railway Access to Andalusia (NAFA).

Source: Ferropedia and Juan Ayrault.

## 7. Madrid Atocha's surroundings. Urban development in the mid 20th century

The history of HS in Spain and more precisely in Madrid and Atocha station would not be completed without the record of the urban evolution on the mid 20th century. Some of the most critical decisions regarding railway were taken in close connection with the urban dynamics that took place along the 20th century. Because of that, it is indispensable to look back and watch carefully what was happening to the society and the city of Madrid on those critical years, particularly from the post-war period to the 80's.

### 7.1 New (sour) wine into old wineskins

Railway evolved due to social demands and political decision. Regarding the area subject to this study, the setting of the new HS line and particularly the decision of implementing the terminal station of a brand-new HS line in an old refurbished and enlarged building cannot be separated from the process performed on-site.

After the civil war, the urban area surrounding Atocha station faced a long process of dereliction that reached the decade of 1980. Madrid population and motoring development soared from the early 60's. New problems with urban traffic were faced by local powers with aggressive policies of urban highways. One of the most harmful examples was the road bridge built in Atocha square that totally changed the character of the place in 1968. This new infrastructure, far from solving traffic conditions, provoked the worsening of traffic jams and a dramatic rise of pollution. Hotels located in the area were particularly affected due to the plummeting air quality and noisy environment. Hotel Mediodía, opened in 1914, languished with its main façade leaning on the noisy and polluting bridge. Hotel Nacional, a 1926 beautiful Secession work by Modesto López Otero, closed its doors at the late 70's. Atocha area accommodation standards fell to a lower standard.

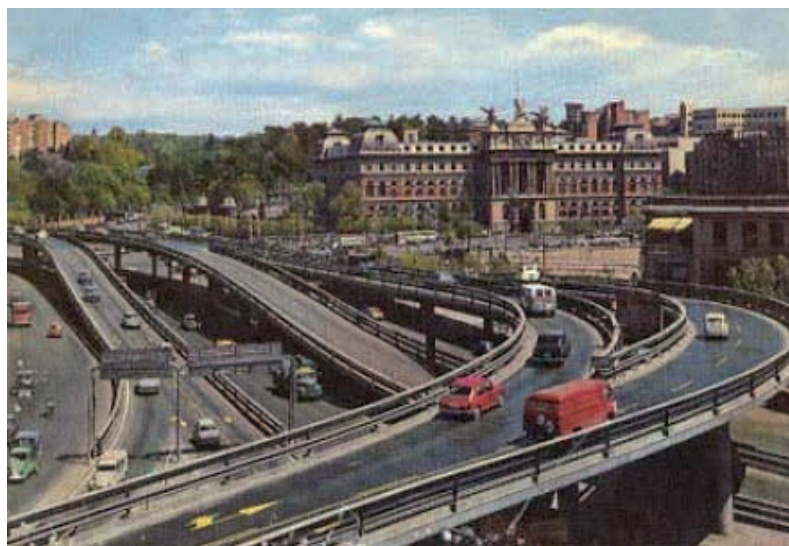


Figure 26: Atocha road bridge: the 'Scalextric' . Source: <http://danceandcars.blogspot.com.es/2010/04/scalextric-de-atocha.html>

The effect was so harmful that as early as 1975 the City council started considering the demolition of the bridge, built only seven years before. It would last in place only nine years more.

### 7.2 Heritage threatened. The age of scorn

On the other hand, a notorious increase of urban property prices led to real estate speculation and consequently a permanent threat for heritage buildings. In 1965 the old General Hospital finished its function. Years later, its proprietor, Madrid Provincial Government, had plans to demolish it and raise an 18 stories building. In January 1969, a report by Fernando Chueca, from the Royal History Academy, brought about its inclusion as a historical monument and consequently saved the building.



Figure 27. General Hospital.  
Source: Artehistoria.com



Figure 28. Madrid Atocha canopy.  
Source: FFE.



Figure 29. Palacio de Medinaceli, one among the many palaces demolished in La Castellana.  
Source: urbancidades.wordpress.com



Figure 30. Palacio de Villahermosa, now ThyssenBornemisza Museum.  
Source: artedemadrid.wordpress.com

In 1976, Renfe presented a plan to displace Atocha station, demolish the old building and build a supermarket. The proposal raised a lot of controversy. A campaign against Renfe project cancelled the company's plan, but still in 1978 press articles begged for the station not to be demolished.

In the early 70's, the neighbouring Royal Botanical Garden was almost abandoned, even though it still maintained part of its initial scientific task. Its original buildings had been altered by unfortunate interventions. Surprisingly, the worst threats came even from culture officials, as a project of a museum dedicated to Goya could have seriously damaged the place. Fortunately the project was discarded after receiving numerous criticisms.

The palace of Marquis of Villahermosa, now the venue of Thyssen-Bornemisza museum avoided nearly demolition, but lost all its 18th century magnificent interior decoration in 1973. The Lopez-Quesada bank commissioned a project that preserved only its façades to install the bank headquarters.

In fact, heritage destruction was generalized at that time. 19th century architecture was generally disregarded as 'bourgeois' and 'decadent'. Madrid experienced discouraging examples of losses such as the Cebada market, built in 1880, the Grasset workshops by Demetrio Ribes and plenty of private aristocratic palaces in the Castellana avenue. This phenomenon was not exclusively Spanish. Along the 50's, 60's and 70's, masterworks such as the Penn station in New York City, Euston station in London, Les Halles in Paris or Victor Horta's buildings in Brussels were

pitiless demolished, in many cases to make room for buildings of an uttermost mediocrity. The latter was one of the numerous actions that coined - quite unfairly, though- the infamous verb ‘brusselization’ as a synonym of speculative, disrespectful and careless urban development.



Figures 31-32 Euston Station, demolished in 1961-1962. Les Halles, Paris, demolished in 1971.

Source: Wikipedia.



Figure 33. Maison du peuple, Brussels, by Victor Horta, demolished in 1965. Source <http://www.ianthearchitect.org>

Figure 34. Penn Station. New York City, demolished in 1963. Source: Wikipedia



Figure 35: Antonio López 1960 Painting 'Atocha'. Source: [www.diariolibre.com](http://www.diariolibre.com)

In summary: some of the best achievements of the Enlightenment and the industrial architecture of the 19th century were not only deteriorated but also seriously threatened.

A token of how undervalued was the area on the mid 20th century is a picture of 1960 by Antonio López. A couple of lovers in the middle of a desolate square describe the state of dereliction of Atocha area. The road bridge built eight years later worsened the scenario.

The first Madrid catalogue of heritage-listed buildings in 1974 settled the first conditions for heritage preservation. The arrival of democracy and a growing public concern for cultural values implemented new conditions that favoured from the early 80's the use and refurbishment of historic buildings. The process was sustained, supported by adequate political decisions.



### 7.3 Madrid Urban Planning and Atocha complex project

In a process parallel to the railway improvement plans, the socialist City council elected in 1979 promoted an urban plan that settled different principles. A book published in 1982 set the main lines of the new municipal policy.

The General Plan was approved in 1985. Some of its basic principles such as heritage recovery and urban public transport improvement had direct consequences for the station and its surroundings.

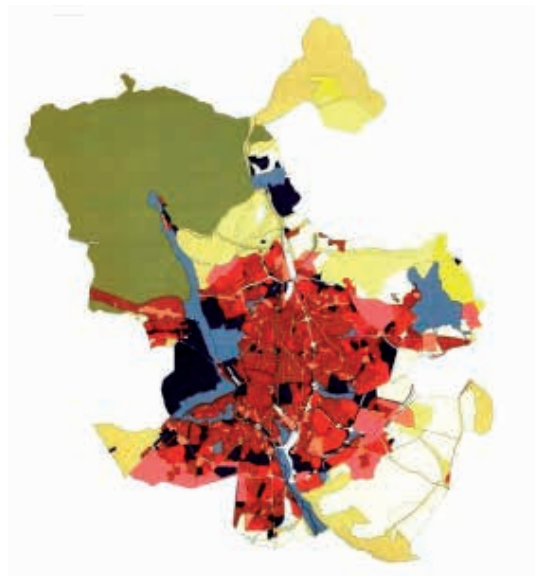


Figure 36: Madrid General Plan 1985.

Source: <https://arquites.wordpress.com/2013/01/01/plangeneral-de-madrid-de-1985/>

A commission appointed by the ministry of Public Works designed a proposal in close cooperation with the city council that included urban regulations and the essential characteristics of railway infrastructure. The special plan for the area was finished on December 1983. In April 1984, an agreement among the Ministry of Transport, the City Council, the Regional Government and Renfe was signed.

The architecture was not detailed on the planning regulations. Therefore, five teams were selected in order to design a new railway complex that should include a commuter station with ten tracks, connected with the existing tunnel, a High Speed terminal with 15 tracks, an access bridge to both, an urban bus terminal and a new metro station at the existing line 1. Out of these five, Moneo proposal was chosen on September 1984.

The whole area reshaping was parallel with the building of the station. The infamous ‘scalextric’ disappeared, traffic lanes were redesigned, a bronze reproduction of the 18th century Artichoke fountain occupied the place of the original, now shown in the Retiro Park. The renovation of the area was radical but at the same time respectful with the site’s history.

### 7.4 A new station for a brand-new line

In 1992 the new High Speed terminal was opened. A concrete, glass and steel new canopy sheltered 15 tracks, initially seven with standard gauge for HS services and eight with Iberian gauge for other regional or LD services. It was the edge of the first Spanish HS line, from Madrid



to Seville. A new era on Spanish railway had begun. The old terminal by Alberto del Palacio was refurbished and integrated in the new complex. The old canopy sheltered a tropical garden, which was not part of the original architectural project, but a proposal from the city council with unexpected consequences.

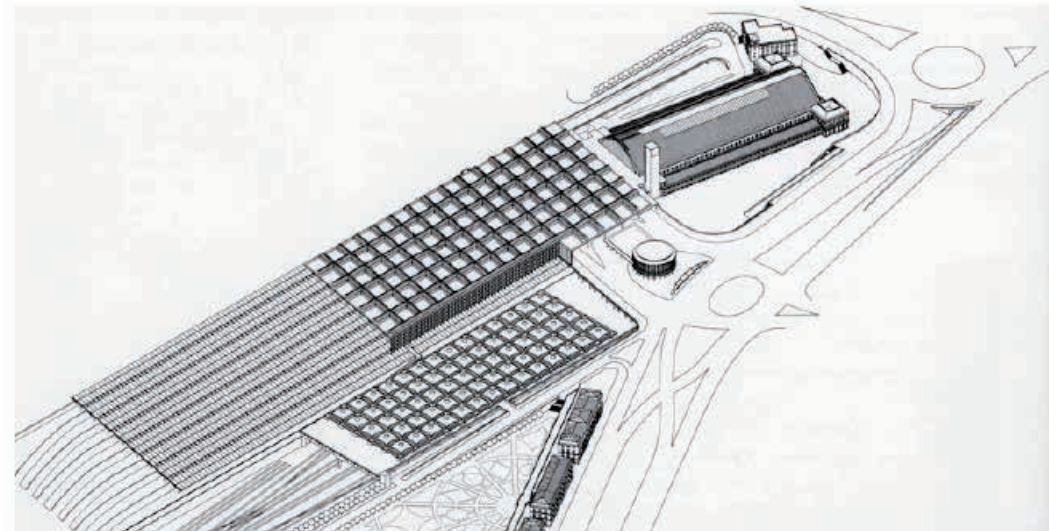


Figure 37: Rafael Moneo awarded project for Atocha station.

Source: <http://madrid2008-09.blogspot.com.es/2009/06/apuntes-miercoles-20-de-mayo.html>



Figure 38: Atocha station complex.

Source: Adif



## 7.5 New cultural facilities

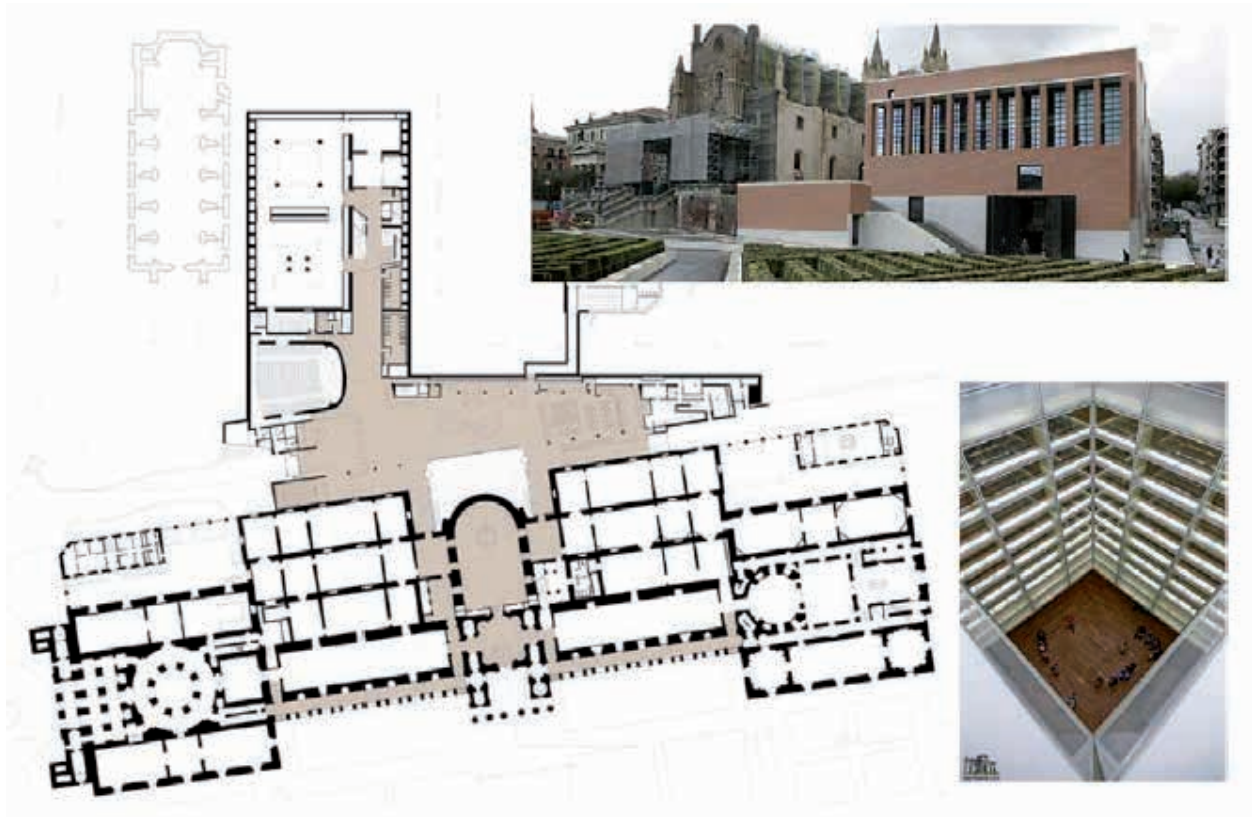
In a generation term, a new sensitivity toward the heritage and the commitment of cultural officials appeared and fostered relevant projects involving the refurbishment of old facilities.

Apart the Prado, the very jewel of the crown, periodically subject to renovations along its history, the first significant renovation of the area came on the late 70's. The Royal Botanical Garden was refurbished in from 1977 to 1981, funded by the Ministry of Culture. Senseless projects were fortunately forgotten. The architectural part was designed by Antonio Fernández Alba, who made an exemplary recovery of the most refined neoclassical architecture: the original 18th century buildings were renovated, eliminating inappropriate additions. The project restored the 18th century gardening plan and recuperated the most relevant vegetation elements as well. In 1993, a new glasshouse was built according to a project by Ángel Fernández Alba, Soledad del Pino and José Manuel de la Puente.



Figure 39: Royal Botanical Garden.  
Source: <http://www.secretosdemadrid.es>

The Prado museum was the object of an international contest won by Rafael Moneo. The building grew underground and added a new pavilion around the ruins of the old cloister of San Jerónimo monastery, enlarging the surface dedicated to temporary exhibitions, workshops and ancillary services, thus liberating surface in the old Villanueva building for the permanent collection exhibition.



Figures 40-41-42: Prado museum enlargement by Rafael Moneo.

Source: [www.museodelprado.es](http://www.museodelprado.es)

The same Ministry promoted the transformation of the former General Hospital into the Reina Sofia Art Centre, with an exemplary project by Antonio Fernández Alba. Now it is the most visited museum in Madrid, housing the symbolic Guernica by Pablo Picasso and an excellent collection of Spanish 20th century painting.



Figure 43: Centro de Arte Reina Sofia. Refurbished courtyard and garden.

Source: [www.museoreinasofia.es](http://www.museoreinasofia.es)



Figure 44: Centro de Arte Reina Sofia. Lift towers by Vázquez de Castro and Iñiguez de Onzoño.

Source: [www.museoreinasofia.es](http://www.museoreinasofia.es)

In 1992 three communication glass towers by José Luis Íñiguez de Onzoño and Antonio Vázquez de Castro were located in west and north façades.



Figure 45: Centro de Arte Reina Sofía. Enlargement by Jean Nouvel. Source: [www.museoreinasofia.es](http://www.museoreinasofia.es)

In 2006 an enlargement designed by Jean Nouvel doubled the exhibition surface

permitting to reshape the best collection of Spanish modern art.

Up North, by the Neptune fountain, the new Thyssen-Bornemisza Museum opened in 1992 in an old palace to exhibit one of the most impressive private art collections: the one purchased by the Spanish Government to Baron Thyssen-Bornemisza.

The building had been acquired by the State after

the bankruptcy of its former proprietor, the Banca López Quesada.

Paseo del Prado by Alvaro Siza. In 2002 the City Council approved a new plan for the axis Recoletos-Prado, won by Portuguese architect Alvaro Siza Vieira in an international contest. The plan was partially implemented near Atocha area, although the bulk of the project remains still pending, due to disagreements between the City Council and the Regional Government



Figure 46: Thyssen Bornemisza museum. Source: [www.esmadrid.com](http://www.esmadrid.com)



Figure 47: Recoletos-Prado axis by Alvaro Siza & J. M. Hernández de León. Source: <http://es.globedia.com>

When the three star museums -Reina Sofia, Prado and Thyssen- were established, the area began to be known as Paseo del Arte (Art Promenade) or Golden Triangle of Art. The three world-class art galleries were complemented by other cultural landmarks that shaped one of the biggest concentrations of artworks in the world.

Caixaforum, an exhibition centre sponsored by the third Spanish bank opened in 2008 in an old powerhouse. The exciting project by Herzog & De Meuron, an old brick industrial vessel lifted in the air by powerful pillars, was complemented by the amazing Vertical Garden created by French artist Patrick Blanc, located in the front square, where an old petrol station once stood.

Besides Caixaforum, an innovation space sponsored by the City Council occupies the old Belgian Sawmill (serrería belga). Medialab started in 2013 in the old industrial facility renovated with a project by María Langarita and Víctor Navarro.

Other secondary buildings survived dereliction too and complemented the others: Renfe and Adif preserved their French-like office buildings in Av. Ciudad de Barcelona, including the old MZA office building by Victor Lenoir.

Not far, the Italian-style campanile of the Pantheon watched its serial neighbours.



Figure 48: Caixaforum and vertical garden.  
Source: Wikipedia



Figure 49: Medialab.  
Source: Madrid.es



Figure 50: Old MZA offices and Pantheon's campanile.  
Source: Juan Ayrault

## 7.5 Beyond the Golden Triangle

The influence of the Golden Triangle went much beyond the ‘noble’ Prado Avenue. A secondary axis took progressively shape along the formerly industrial Ronda de Atocha. Some prestigious institutions were housed in refurbished industrial or office buildings.

Circo Price occupied the former PACISA cookies factory. It was the first building dedicated to circus shows after the disappearance of the former Price circus in 1970.



Figures 51-52-53: La Casa Encendida, Circo Price, Tabacalera.  
Source: [www.lacasaencendida.es](http://www.lacasaencendida.es) - [diario.madrid.es](http://diario.madrid.es) - [www.elpais.com](http://www.elpais.com)

A private savings bank sponsored the culture centre La Casa Encendida in a former banking office.

Nearby, since 2003 the self-managed Tabacalera culture centre runs in an old tobacco factory, a magnificent example of 18th century industrial building.

## 7.6 Accomodation

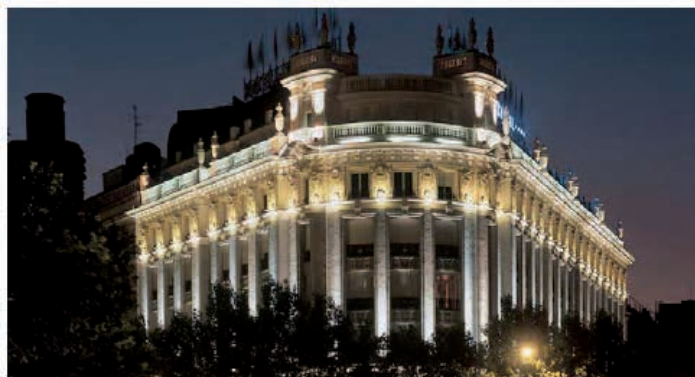


Figure 54: Hotel Nacional.

Source: <https://www.booking.com/hotel/es/nhnacional.es.html>

The effect of Atocha area urban renovation on accommodation facilities was revolutionary. One of the oldest hotels in town, the Mediodía, the worst affected by the building of the road bridge a few meters far from its balconies, caught its breath again and was refurbished. Hotel Nacional, closed since the late 70’s, was renovated and reopened almost twenty years later, in 1995, stimulated by the opening of the HS line.

Newspapers mentioned that the refurbishment addressed to ‘clients from Seville’, with no prospect of the

much further horizon that HS would bring to Madrid transportation. Other hotels followed: Rafael Atocha in 1998 and AC Atocha in 2009 were set on the western side (calle Méndez Alvaro), a former industrial area under renovation. Hotel Paseo del Arte in Atocha Street, besides the Nacional, took its name in 2003 from the new brand of the area.

NH Atocha opened in the eastern side, near the Ministry of Environment. Besides, Only You Hotel Atocha occupied as recently as 2016 an old apartment building.

Summarizing, in the term of these past twenty-five years, all accommodation facilities in the

immediate vicinity of Atocha station have been renovated and new establishments triple the original figure of rooms offered.

**Table 4: Renovated and new hotels in Atocha Area in the period 1992-2017**

Renovations since 1992	Opening	Renov.	Rooms	New openings after	Opening	Rooms
<b>1992</b>						
Mediodía	1914	cont.	167	AC Atocha	2009	161
Mora	1950?	cont.	55	NH Atocha	1994	68
Nacional *	1926	1995	206	Only You Atocha	2016	204
Sleep'n	1956	2016	80	Paseo del Arte	2003	260
				Rafael Atocha	1998	245
<b>Total</b>			<b>508</b>	<b>Total</b>		<b>938</b>

\* Closed from 1978 to 1995

Source: Data collected by the author

## 8. Madrid-Puerta de Atocha 25 years later

### 8.1 HS first impact

The implementation of a HS line drew a lot of scepticism. As late as 1991 the press complained about the decision of building the line with standard gauge and forecast a failure in passenger numbers and an unnecessary excess of capacity. Figures were not very ambitious: Madrid Seville line began with twelve services a day, six on each direction, and a forecast of 3.900 passengers a day.

In spite of gloomy predictions, the 'AVE' made a big impact on public opinion. Passengers demand exceeded the most optimistic predictions and the services soared accordingly. After ten years of operation the turnout had more than tripled. A new mezzanine was built in 2002 in order to separate passenger flows. In 2010 arrival flows were displaced southwards to a new pedestrian bridge, which was the first element of a new arrivals terminal, still to be completed.

### 8.2 A country's hub

In these past 25 years, Atocha station has experienced a dramatic rise in passengers' number, from an early figure of 1,9M HS travellers a year in 1993, the first whole year to be operational, to the current 19M in 2016. That means exactly tenfold.



Figure 55: HS trains in Atocha. Source: Juan Ayrault



Initially the principal traffic was from Madrid to Seville, although other destinations benefited partially of the new track with the help of variable gauge systems (Málaga, Huelva, Cádiz). The rise was sustained during the first ten years, reaching 6,5M passengers in 2002, more than three times the figures of 1993. The further increase was parallel to the opening of new lines:

**Table 5: HS passengers 1992-2016. Major increases highlighted in yellow.**

Line/Service	Year	Passengers	Annual incr.
Madrid - Sevilla	1992*	1.300.000	
	1993**	1.875.000	100,00%
	2001	6.331.980	111,07%
	2002	6.529.491	3,12%
Madrid - Lleida/Huesca	2003	6.883.294	5,42%
	2004	8.222.611	19,46%
Madrid - Toledo	2005	9.071.790	10,33%
	2006	11.096.960	22,32%
Madrid - Málaga	2007	12.112.542	9,15%
Madrid - Barcelona	2008	14.582.292	20,39%
	2009	14.039.340	-3,72%
Madrid - Valencia	2010	12.959.169	-7,69%
	2011	15.679.224	20,99%
	2012	15.038.075	-4,09%
Madrid - Figueres/Alicante	2013	16.390.132	8,99%
	2014	17.960.251	9,58%
Madrid - Cádiz	2015	18.773.832	4,53%
	2016	19.502.257	3,88%

\* April to December \*\*First entire year

Source: Adif

Openings of new lines had substantial effect on passengers' turnout. The relation between the start of lines to Barcelona, Málaga and Valencia and double digit rises must be noticed.

This success in terms of passenger figures must not be understood only as a consequence of High Speed itself. Atocha was conceived as an intermodal hub into which customers could easily connect with commuter lines, metro and buses. According to Renfe data, in 2016 at least 2,2M customers purchased HS + commuter combined tickets.

Atocha has the undisputed top position as the most frequented commuter station in the country. It supplies also a noticeable amount of medium distance services. The whole provides a unique interchange point where HS passengers have endless possibilities of continuing their way.



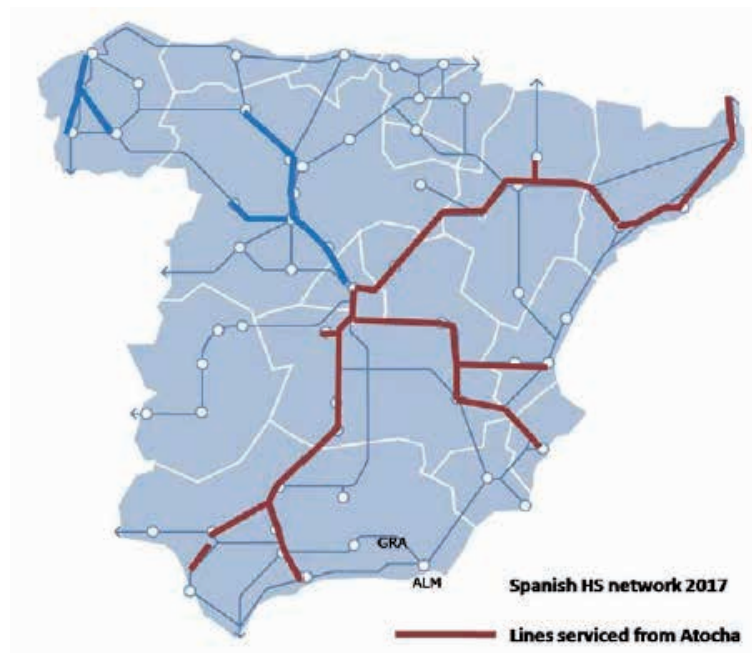


Figure 56: HS network serviced from Atocha. Source: Adif and Juan Ayrault

In spite of Atocha's success, tensions never disappeared. Scarcity of parking spaces provoked complaints from customers that could hardly park their vehicles before taking their trains. In 2007, during the mandate of Alberto R. Gallardón, the City Council proposed the transfer to the HS terminal to a building 4 km southwards, on the grounds of the Abroñigal freight station. Adif and the Ministry never accepted this proposal, defending that Atocha's location favoured intermodality much more than the suggested one that, in any case, was only more accessible for private cars. Even this point was uncertain, as Abroñigal station stays in a section of the first road ring (M-30) particularly exposed to traffic jams.

### 8.3 A complex system

Atocha works as a complex piece of architecture and engineering, an addition of particular elements closely linked that work as a whole. Commuter and HS stations, located in different levels, as well as ancillary facilities, retail venues and leisure areas complement each other as part of the passenger experience.



Figure 57: Commuter station dome, arrivals terminal and vaulted car park. Source: Adif.



A brick dome appears on the surface to call the presence of the underground commuter station, located on the east side.

It is the linking point of all local lines. Its position favours the immediate connection with metro line 1, one of the busiest in the extended Madrid metro network.



Figure 58: Commuter station. Source: Adif.

Before the opening of the 2nd N-S tunnel in 2007, Atocha CS reached 500.000 passengers per day, although the opening of the tunnel reduced this figures in favour of other new stations like Sol.



Prior of the tunnel opening, most of the travellers coming from the south had to transfer to the only passing-by line, on platforms 1 and 2, which had severe capacity problems at the rush hours.

Besides, at the HS terminal, fifteen tracks and their corresponding platforms are sheltered by a magnificent concrete, steel and glass canopy, the so-called hypostyle room.

Figure 59: High Speed terminal canopy. Source: Adif.

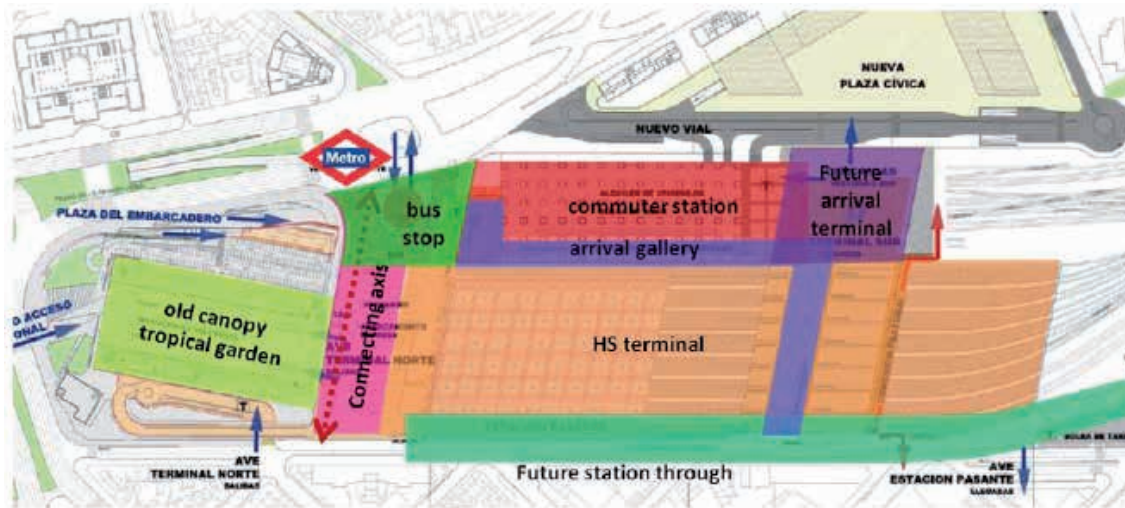


Figure 60: Atocha complex plan: Three main pieces and a connecting link. Source: Adif - Juan Ayrault.

Both terminals are connected by a transversal pedestrian axis that works as an urban passage. More than 60.000 non-passengers a day go through it. The barrier effect usually caused by railway infrastructure is broken, as that corridor is the principal access from the western neighbourhoods to the metro station, located in the eastern side. A ‘waiting bridge’ on the southern section of the platforms, is prepared to connect the western side with the future arrivals terminal.

The old canopy by Alberto del Palacio houses railway operator’s facilities, as well as retail and food venues, but most of all the iconic tropical garden that all the visitors highlight as spectacular and unique, sometimes with the disappointment of station operator that must face the costly maintenance of the garden.

With the exception of the crisis period between 2008 and 2012, Atocha continues its steady growth, facing day by day new challenges. The major one is the continuity of HS services. In 2017-2018 a HS tunnel is about to open to link northern and south-eastern HS networks, currently isolated from each other. It will be the third North-South tunnel. A future HS station through is projected on its western side, under tracks 14 and 15 and Méndez Alvaro street.

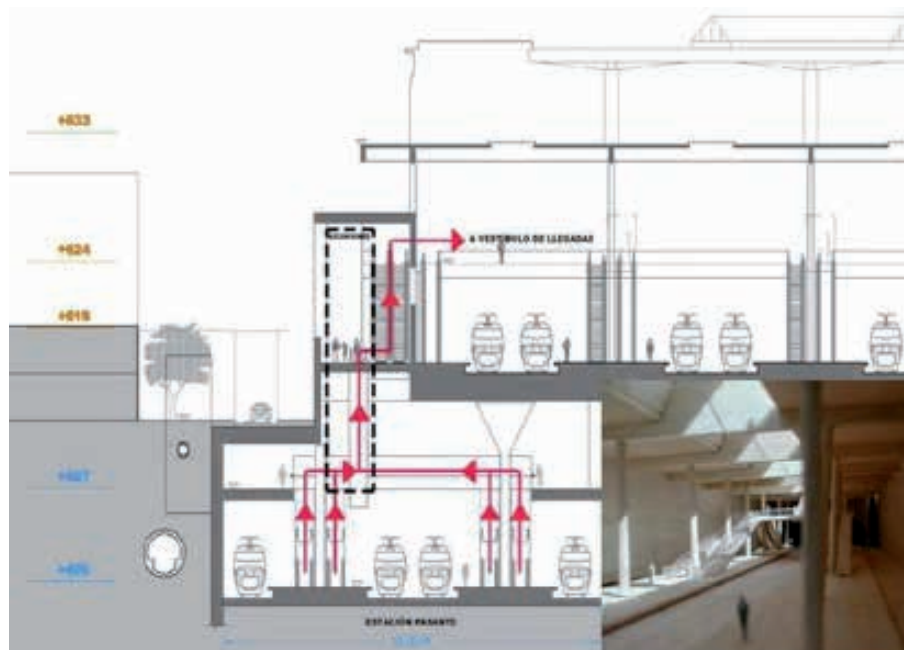


Figure 61: Future station through. Cross-section. Source: Adif.



#### 8.4 More than just a station - Beyond efficiency, technology and engineering

The importance of stations on passenger experience was mentioned at the beginning of this paper and takes part of its final conclusions. It is a fact that, beyond functionality and technology, the place where the travel starts and ends has an effect than leans more on psychology than on pure 'rational' concepts. It is certain that passengers appreciate the efficiency of a HS service, value the time spared, compare the fares with other transport modes, take advantage of services offered...

But their experiences do not end there. Feelings driven by colours and smells, images seen or remembered, memories of other places visited, of sad farewells, of friendly encounters... A station is a complex space where people meet and divert, where many things could happen and, more than everything, where the adventure of travel starts or finishes. Do not forget that the train itself is a strange transport mode where human relations can happen, more than in any other one. In fact, trains are moving spaces where the comedy of life continues at stage and, surprisingly, moves. I consciously avoid to mention how many stories have been written about events happened on a train and a station. This is another story..



Figure 62: Stazione Termini - Vittorio de Sica. Source: Pinterest .

A travel to and from Atocha cannot be understood without the passenger impression on his or her arrival/departure: journey, way in, waiting time, arrangements, shopping, departure...

From Atocha windows, strange artefacts can be seen: a columned building crowned with winged horses, a neoclassic temple on top of a hill, an odd campanile escaped from Tuscany emerging behind a row of French-like buildings with slate roofs and Parisian mansards, aligned like a train, an endless horizon of working class blocks...

Inside the buildings, walls of smooth orange-red bricks bring echoes from Amsterdam or London; a huge iron vault shelters an unexpected tropical garden surrounded by a thin mist, strange creature grown in a dry and continental city with harsh winters.



Figure 60: Tropical garden. Source: Adif.

Atocha regularly appears in the international press as one of the most spectacular stations in the world. It is curious that the feature that draws more attention once and again is the tropical garden, an element that was not part of the original refurbishment project.

Tobias Buck, correspondent in Madrid for Financial Times, qualifies Atocha as ‘splendid’ in a recent article in which he summarizes the best of his Madrid experiences after four and a half years in office.

Another article in Asahi Shinbun, one of the most read newspapers in the world, highlighted in November 2016 the condition of Atocha as the city gate and its proximity to the top class museums.

Lisa Abend, correspondent in Spain for NY Times for many years, described her first impression of the station when she arrived as a 19 years old student, and how years later the whole building was wholly transformed and provided her very different sensations, and how little by little it became a familiar space. She wrote it in an emotional article on the occasion of the savage terrorist attack of March 4th 2004.

Unfortunately, some memories refer to that terrible attack, that thirteen years later still bring some madrileños to tears. However, they evoke too the wave of sympathy and solidarity that we experienced and shared in those dreadful days.



Figure 64:

Article about Atocha station in Asahi Shinbun, November 2016. Source: <http://globe.asahi.com/station/2016110400014.html>



Summarizing: Atocha is everything but a neutral space. It is certainly an efficient building that provides top class services to customers: hurried business persons, commuters, easy-going tourists, etc, but it is also a place for memories, for meetings, for dreams...

## 9. Conclusions

The area around Atocha gate experienced constant urban renovation projects in the 17th and 18th centuries.

Its role as a key communication spot was enhanced with the implementation of railway in the mid 19th century, when the area incorporated other industrial, political and cultural facilities.

In 1892 Alberto del Palacio constructed the building that lasted for a century as an iconic image.

In the mid 20th century, both the urban surroundings and the railway terminal endured a process of dereliction and were severely threatened by wrong transport policies, speculation and disregard for their architectural values.

Planners' reflections in the early 80's recovered the appreciation for city centres. These new principles resulted in a positive assessment of Atocha's central position in town. New policies recovered the character of the area with a notorious respect for its past and a fresh vision of its future.

The renovation of Atocha station was possible due to a new sensitivity toward 19th century iron and industrial architecture and a general major concern for heritage.

Close cooperation between local and national authorities transformed dramatically the surroundings of Madrid Atocha turning it into the Golden Triangle of Art, a world class cultural hub that draws millions of visitors per year. These transformations attracted new services such as accommodation, art galleries and new housing provided by the private sector.

HS arrival 25 years ago to Madrid-Puerta de Atocha was a disruptive event that turned upside down railway perception by Spanish society. Atocha station as a major railway hub combines HS regional and long distance services with the whole commuter network and other modes. This fact has been crucial for its success.

But HS railway and the city nourish each other. A renovated urban space plus a world-class station are a good recipe for success. This success is not only linked to the efficiency of the HS line and the quality of the railway service, but to the image provided by a brand new terminal that integrates the best of the old, urban and culturally rich architecture with the functionalities of a modern terminal, and its character as an open gate to an open, vibrant and welcoming city called Madrid, my beloved hometown.

Portosin (Galicia). September 2017.

## 10. Acronyms

• ADIF	• Administrador de Infraestructuras Ferroviarias
• APA	• American Psychological Association
• BNE	• Biblioteca Nacional de España
• CARS	• Centro de Arte Reina Sofía
• COAM	• Colegio Oficial de Arquitectos de Madrid
• EP	• El País
• ETSAM	• Escuela Técnica de Arquitectura de Madrid

• FFE	• Fundación de los Ferrocarriles Españoles
• FT	• Financial Times
• HS	• High Speed
• NYT	• New York Times
• PTF	• Plan de Transporte Ferroviario
• RENFE	• Spanish Railway Operator
• RJB	• Real Jardín Botánico
• UPM	• Universidad Politécnica de Madrid

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### 11.7 Pictures

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*Sine amicitia, vita esse nullam*