

The encounter between Almada and the Tagus

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THE ENCOUNTER BETWEEN ALMADA AND THE TAGUS

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To my parents, Patricia and Ivan, for believing in my dream as if it was their own.
And to Josh, for all the love and support.

Resumo

A relação que Almada estabeleceu com o rio Tejo tornou-se vital para o crescimento e desenvolvimento deste território, moldando o seu carácter e a sua identidade. Esta ligação foi sendo estabelecida através das margens – uma ligação física – e através da verticalidade – uma ligação visual – inserindo a cidade nas rotas comerciais que ligam as suas margens ao mundo, mas também conferindo a Almada a sua fama de «miradouro» sobre o Tejo e Lisboa. Esta relação, dinâmica e suscetível a mudanças, teve o seu auge com a industrialização das margens, no século XX, e encontra-se, desde então, em declínio. A zona ribeirinha de Almada é hoje um território obsoleto, uma memória do seu glorioso passado industrial, fragilizando a histórica ligação entre a cidade e o rio.

Utilizando fontes primárias como mapas cartográficos, iconografias várias e antigas descrições, é feita uma análise clara da evolução ao longo do tempo da ligação física e visual de Almada com o Tejo, ilustrando as alterações morfológicas na margem do rio através da construção de um terreno artificial – caracterizando a conquista de Almada sobre o Tejo – mas também considerando a possível subida do nível do mar devido às alterações climáticas – caracterizando a reconquista do Tejo sobre Almada. A esquecida plataforma onde a Lisnave funcionou torna-se então o cenário de uma hipótese de intervenção, permitindo a reconexão da cidade com o rio, tanto física como visualmente. Esta tese procura indagar sobre como a implementação de elementos arquitetónicos podem ajudar a restabelecer essa conexão perdida e voltar a celebrar o encontro entre Almada e o Tejo.

Palavras-Chave: Almada, Tagus, Cidade, Rio.

Abstract

The relationship that Almada developed with the Tagus river became vital to the growth and development of the territory, shaping its character and identity. This connection was established through the city's margins – a physical connection – and by its verticality – a visual connection, allowing the city to become part of trade routes connecting its margins with the world as well as giving Almada its reputation as the 'Miradouro' over both the Tagus and Lisbon. This relationship, which is dynamic and susceptible to changes, had its peak with the industrialisation of the margins during the 20th century and has, ever since, declined. Almada's riverside is currently an obsolete territory, a memory of its glorious industrial past, weakening the city's connection with its river.

Focusing on Almada's physical and visual connection with the Tagus, this dissertation intends to form a clear understanding of the development of this relationship over time and its crucial role in the city's spatial organisation. Using primary sources such as cartographies, historical descriptions and iconographies, an analysis was conducted to illustrate the morphological changes in the river margins. These changes unfolded through the construction of artificial ground, not only characterising the conquest of Almada over the Tagus – but also considering the possible rise of sea levels in the future due to climate change – suggesting the reconquest of Tagus over Almada. The neglected platform where Lisnave once operated becomes ground for an hypothesis of intervention, allowing the reconnection of the city with the river, both physically and visually. This thesis seeks to investigate how the implementation of horizontal and vertical architectural elements can help re-establish this lost connection and celebrate Almada's encounter with the Tagus.

Keywords: Almada, Tagus, City, River.

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*Chove cá fora
sinto-me embaciado
como os dias
comuns que passam.*

*Vejo o rio sempre nítido
perante meu olhar.*

*Nao tenho lágrimas
para ti, Tejo.
Fazes secar meu rosto
Em teu enxaguar.*

*É contigo que quero
desaguar e possuir Lisboa
onde os dias incomuns e doces
são uma vaga infinita
sob teu cais.*

*Tejo que me abraças
docemente sob teu
beijo salgado
sempre presente em mim
paixão de infância
sob travessia
cacilheiro não deixa
esquecimento.*

*Tuas ondas
fazem meu coração
bater em sintonia
e em tempestade
navego sem receio
naufragante desde o nosso
primeiro olhar.*

*Quando não penso em ti
é porque estás presente.*

Hoje é diferente.

Author: Unknown

INTRODUCTION

The Tagus’ birthplace is Montes Universales and its destination is the Atlantic ocean. It occupies the bottom of the valley cutting through both Spain and Portugal, nourishing many cities and flowing past cliffs. Just before the river reaches the territory of Almada and pours itself into the ocean, after crossing 1007 km of land, it spreads itself, forming into an estuary. The estuary becomes a transitioning zone between the river and the open ocean, creating a physical connection between the river’s margins and the Atlantic.

Almada emerges from the top of cliffs on the Tagus’ Southern margin, watching the river and Lisbon from above. The city’s location grants a direct visual connection with the river and the lands across the water. The margins provide easy access to the water, connecting the Northern and Southern margins of Tagus both visually and physically. Instead of being an element of separation, the river Tagus became a “street”, where boats and ships would cross and transport goods, tying Almada’s development with Lisbon’s. However, as Almada developed as a city, so did its relationship with the Tagus, changing its character, morphology, and connection. Almada’s riverside is currently a neglected territory, a memory of past encounters between the city and its river.

This dissertation intends to investigate and comprehend Almada’s relationship with the Tagus and its development over time. Several books about the relationship between city and river can be found in the architectural literature, describing the critical role of the river in the settling and development of a city. Written by Thaisa Way, the book *River Cities, City Rivers* (2018)¹ elaborates on how cities have reshaped rivers and their landscapes in the process of urbanisation, giving examples of City Rivers and their history. The book *Great River City* (2019)² focuses on the city of St. Louis and how it shaped the Mississippi River over time. In the case of the river Tagus, the book *Lisbon, the Tagus and the rest* (2017)³, written by Antonio Mega Ferreira and photographed by Mark Sarkis Gulbenkian, creates a photographic illustration of the memories and connection between Lisbon and the Tagus. Moreover, in his thesis *A Cidade e o Rio: Origem e evolução da frente ribeirinha de Lisboa* (2016)⁴, João Cruz develops an extensive analysis of the evolution of Lisbon’s riverside, with the development of cartographies that illustrates the morphological changes of this margin. Even though in 2020, the architects Luís Santiago Baptista and Paula Melâneo curated the exhibition *Almada: Um Território em Seis Ecologias*, which developed a substantial territorial, urban and architectural reading of the city, no specific literature was found regarding the relationship between Almada and the Tagus.

This investigation arises precisely from the need to understand the history of Almada’s relationship with the Tagus – from its first settlements on the margins to the present derelict riverside – in order to inform how to reestablish the city’s connection with the river. A historical reading of Almada was conducted, considering the physical and the visual connection with the Tagus, and an intervention is proposed to restore the river to its city, reestablishing and reinforcing their connection.

The thesis is naturally divided into three parts: the horizontal, the vertical, and, finally, the confrontation between both the horizontal and vertical.

The first part of the thesis consists of a historical reading of Almada’s riverside and its morphological evolution over time. This considers all the different activities that took place along the river margins and the eventual construction and expansion of an artificial platform to support the port activities, characterising the horizontal movement of Almada as it conquers the Tagus. This investigation was done through the study of cartographies, iconographies and historical descriptions of Almada and the Tagus, from which maps were chronologically drawn illustrating the morphological changes along the margin. Further analysis was conducted along the riverside in its present state, to understand the current relationship between the city and its river, also considering the possible conquest of the Tagus over Almada in the future, as its water moves towards the city as a consequence of sea-level rise.

The second part of the thesis consists of a historical reading of Almada and its visual connection with the Tagus. The city was established on top of the territory, granting protection and a panoramic view over Tagus and Lisbon. The research analyses Almada’s accentuated topography, built environment and the landmarks that punctuate the territory, giving the city its verticality.

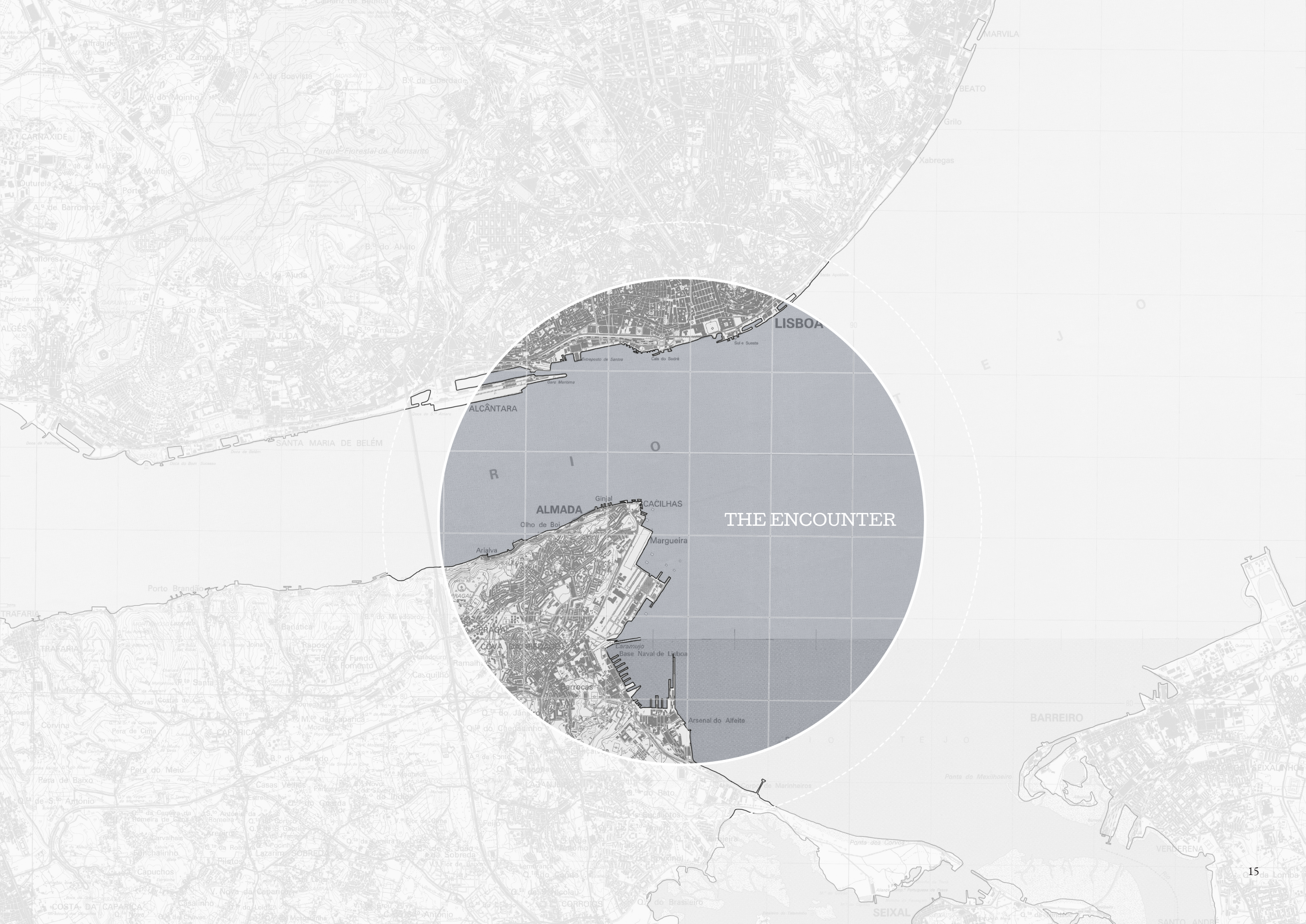
Lastly, the third part of the thesis, entitled The confrontation between the horizontal and the vertical, intends to deepen the comprehension of the platform as a horizontal urban element and the tower as a vertical architectural element. An intervention is proposed, where the vertical and horizontal, the visual and physical, confront one another to reestablish and celebrate the encounter between Almada and the Tagus.

1. Way, T. (2018). *River Cities, City Rivers*. Washington: Dumbarton Oaks Colloquium on the History of Landscape Architecture

2. Wanko, A. (2019). *Great River City: How the Mississippi Shaped St. Louis*. Missouri: Missouri Historical Society Press.

3. Ferreira, A. M. (2017). *Lisbon, the Tagus and the rest*. Lisbon: Clube do Autor.

4. Cruz, J. P. P. (2016). *A Cidade e o Rio: Origem e evolução da frente ribeirinha de Lisboa* (Master ‘s Thesis, Universidade de Évora, Évora). Retrieved from: <http://dspace.uevora.pt/rdpc/handle/10174/18756>



THE ENCOUNTER

Chapter I

The encounter between Land and Water



Image 1. Panoramic view of Cacilhas with Lisbon in the background, water colour painting by L'Évêque.

A horizontal reading of Almada

Humanity has shown throughout its history, a preference for settling in places near water, which encourages civilisations to develop and flourish. This relationship between human settlements and water was born out of the necessity of survival, as proximity to water not only provided means of subsistence but better connections for trade and protection.⁵ Thus, since the development of human settlements, water has played an integral role in shaping cities' identities and their morphologies.⁶

Naturally, the encounter between Almada and the Tagus is no different; the city's development and identity directly correlate with its connection to the river. The Tagus offered Almada a perfect location, providing water, food, protection and good trading connections, where the city would thrive and grow. In the Tagus' margins, where men would fish and kids would play, was also the place where boats met the land, connecting Almada with the world. However, this relationship is dynamic and susceptible to changes over time. As the relationship between the city and the river changed, so did the limit between both. This change resulted in the manipulation of the margins through the construction of an artificial platform, shaped and designed by man and according to its needs. Thus, this strip of artificial land became the place of mediation between the city and the river, defined physically by its relationship.

5. Castonguay, S. (2017). Rivers, Industrial Cities, and Hinterland Production in Quebec in the Nineteenth and Twentieth Centuries. In Knoll, M., & Lübken, U., & Schott, D. (Eds.), *Rivers Lost, Rivers Regained: Rethinking City-River Relations* (pp. 25–45). Pennsylvania: University of Pittsburgh Press.

6. Way, T. (2018). Introduction: River Cities, City Rivers. Way, T (Ed.). *River Cities: City Rivers* (pp. 1-14). Washington, DC: Dumbarton Oaks Research Library and Collection.

The morphological evolution of Almada’s riverside

7. Araujo, R. (1991). Almada – A identificação da cidade (pp. 44-58) cit. in Rogério, R. (Ed.), *Ver Almada crescer*. Almada: Galeria Municipal de Arte / Minerva do Comércio.

8. Machado, J. P. (2000). *O Topónimo de Al-mada..* Almada: Câmara Municipal de Almada. p. 8.

9. From XV to XVIII the region was referred as “Banda d’Além”. Flores, A. M. (2003). *Almada na história da indústria corticeira e do movimento operário : da regeneração ao Estado Novo 1860-1930*. Almada: Câmara Municipal de Almada. p. 38.

10. “A presença indissociável de Lisboa na margem Norte do rio Tejo também potenciou o desenvolvimento de Almada. Os primeiros registos de ligações entre as duas cidades datam de 1284 e a relação com a capital sempre foi um dos pilares económicos, sociais e culturais de Almada. Do ponto de vista económico, a maioria das mercadorias importadas e exportadas pelos portos de Almada eram negociadas em Lisboa.” Gonçalves, L. (2000) *Memórias do Ginjal*. Almada: Centro de Arqueologia de Almada. p. 15.

11. Oliveira, J. A., Osbernus, ., Castilho, J. ., & Corpus Christi College (University of Cambridge). (1936). *Conquista de Lisboa aos Mouros (1147): Narrações pelos cruzados Osberno e Arnulfô, testemunhas presenciais do cerco*. Lisboa: S. industriais da C.M.L. p. 40.

12. Referring to the farm-land.

13. “A outra-banda, como usualmente nomeamos a parte ao sul do Tejo mais directamente oposta à cidade, é uma das vastíssimas quintas de Lisboa, um dos seus recreativos passeios domingueiros, que oferece a variedade do trânsito pelo rio. e das excursões terra dentro pelo meio de fazendas deleitosas ou pela crista das alturas d’onde se desfrutam extensas e mui pitorescas vistas já de pais, já da cidade. Há nele [no Tejo] tanta abundância de peixe que os habitantes acreditam que dois terços da sua corrente são de água e outro terço são de peixe. É também rico de marisco como de área, e é principalmente de notar que os peixes desta água conservam a sua gordura e sabor natural sem os mudar ou corromper por qualquer circunstância.” Oliveira, J. A., Osbernus, ., Castilho, J., & Corpus Christi College (University of Cambridge). (1936). *Conquista de Lisboa aos Mouros (1147): Narrações pelos cruzados Osberno e Arnulfô, testemunhas presenciais do cerco*. Lisboa: S. industriais da C.M.L. p. 40.

14. Mickle, W. J. (1781). *Almada hill: an epistle from Lisbon* (pp. vi). Oxford: W. Jackson.

*Qual a outra margem de um rio que necessariamente tem duas? A «outra banda» pode ser a toponímia de uma relação de centro-periferia, que delega à margem sul do Tejo, em frente a Lisboa, um papel secundário perante o lado que se apresenta como centro, a capital. Mas pode ser também, se assim o quisermos, a expressão de uma identidade auto reflexiva, o outro, indispensável à definição do próprio eu, a «outra banda», que é ao mesmo tempo símbolo de ligação e de diferenciação, como partes de uma mesma unidade, que conjugam complementaridade e oposição, duas margens do mesmo rio.*⁷
Renata Araújo, 1991

Almada’s name derives from the Arabic words ‘Al-Madan’, meaning ‘mine’, echoing the exploration of gold that took place along the margins of the Tagus river during the Arabic domain of the lands,⁸ reflecting in its name the strong connection between the city and the river. Here, along Tagus’ Southern margins, the development of the territory’s military defence, agriculture, fishing, port activities, and industries materialized. Almada’s riverside was the chosen place for the settlement of many occupations throughout history, appreciating everything that the proximity with the river could provide.

The city of Almada is often referred to as ‘Outra banda’⁹, roughly translated as ‘the other side’, signifying its direct relationship with the capital, Lisbon. Although Almada has its own history, the ‘Outra banda’ has always maintained a strong connection with Lisbon’s centre, and its development reflects this relationship.¹⁰ Connected by fluvial means through the Tagus, Almada’s margins serve the capital, becoming an integral part of its development. Its geographical characteristics offered natural potentials, exploited through small commercial ports, connecting Almada with Lisbon, as well as an international trade route.

In the following translated segment of De expugnatione Lyxbonensi¹¹, the crusader describes the strong relationship between the two margins of Tagus: Almada and Lisbon. Almada is referred to in this segment as a “quinta”¹², emphasising the natural abundance of the land, a place ideal for recreational walks and that offers picturesque views.

The other-band, as we usually name the Southern part of the Tagus most directly opposite the city, is one of Lisbon’s vast estates, one of its recreational Sunday walks, which offers a variety of river traffic and excursions inland through delightful farms or along the heights of the crest from which extensive and very picturesque views of the city can be enjoyed.

*There is such an abundance of fish in it [the Tagus] that the inhabitants believe two-thirds of its current is water and another third is fish. It is also rich in seafood as well in the area, and it is especially important to note that the fish in this water retain their natural fat and flavour without changing or corrupting them under any circumstances [...]*¹³

By referring to Almada as one of Lisbon’s Quintas, the connection between the Southern and Northern margins of the river is affirmed and accentuated. The Tagus is presented here as a generous and rich river that can provide a bountiful supply of food. The Tagus also offers its waters as a ‘road’, providing a space for traffic and connection. Almada is illustrated as a rich and fertile terrain bathed by an abundant river.

Corresponding with this illustration of Almada is the drawing done by Luiz Gonzaga Pereira from 1809 (*Image 2*). The image depicts a rich natural cliff with some settlements along the river margins and others on the highest points of the terrain. It is clear here the advantages that these lands have for defence, food supply and trade connections. The Tagus is presented as a space for navigation, providing the boats and ships with a safe place for navigating. Almada meets the Tagus with its high and steep cliff in the Northern margins of the terrain, where small beaches are formed. As described by William Julius Mickle in 1781:

*The Tagus River below and opposite to Lisbon, is edged by steep and grotesque rocks, particularly on the south side. Those in the south side are generally higher and much more magnificent and picturesque than the cliffs of Dover.*¹⁴

Like Lisbon, Almada’s topography is very strong and composed of high cliffs. However, and unlike its northern counterpart, Almada encounters the river through its arduous cliff face on the northern margins and more gradually towards the east. The terrain curves into a peninsula, providing a safe and secure area of the river with weaker currents in its eastern riverside. In the cartography drawn by W. Chapman in 1806 (*Image 3*) becomes very evident the meeting of Almada’s northern cliffs with the Tagus river. Here the formation of the peninsula is also illustrated, showing the river bathing beaches along the eastern coast of the territory, providing a calmer zone of the river.



MONTEANHADA VILLA DE ALMADA
 Image 2. Montanha da Villa de Almada (1809).



Image 3. A topographical chart of the entrance of the river Tagus : the coast from Cabo da Roca to Sacavem [detail](1806).

Map 1. Natural coastline of Almada overlaid on the current plan of Almada.
(Drawing by the author)
Scale 1:15000

The map depicts the natural coast of Almada, where Tagus' water meets Almada's coastline following its natural formation, bathing its riverside. The Natural coast and topography of Almada are laid over the city's current plan, highlighting the growth of an artificial ground towards the river over time. The natural formation of the territory forms a peninsula that creates a calmer and safer part of the river that bathes its western margins. The northern margins of Almada meet the river with its steep cliffs.



15. Recent archeological excavations performed in the municipality suggest that non-sedentary nomadic tribes may have occupied this location sporadically. Barros, L. & Cardoso, J. & Sabrosa, A. (1993). *Fenícios na margem Sul do Tejo – Economia e integração cultural do povoado de Almaraz*. Almada: Instituto Oriental. pp. 295-298.

16. An ancient civilization composed of independent city-states located along the coast of the Mediterranean Sea.

17. Between II Century BC and VI century AC.

18. From 711 to 1249, much of the territory of what is now Portugal was colonized by Arab Muslims, and was called Gharb Al-Andalus. Rei, A. (2010). *O actual norte alentejano no período hispano-árabe (711-1230)*. Lisboa: Faculdade de Ciências Humanas e Sociais, Universidade Nova de Lisboa.

19. In 1981 the remains of two Roman fishing factories were found along the Tagus river, one in Casa dos Bicos and one in Cacilhas. Bugalhao, J. (2001). *Trabalhos de Arqueologia 15 - A indústria romana de transformação e conserva de peixe em Olisipo*. Lisboa: Núcleo Arqueológico da Rua dos Correeiros. pp. 51-52.

20. Vargas, S., & Henriques, F. (2010). *Catálogo Almada e o Tejo*; Exposição Almada e o Tejo, Museu Naval no Olho de Boi, 2010; coord. Maria Rosa Silva; Almada: Câmara Municipal de Almada.

21. Referenciado no século XII como “Hosnel-Madan” meaning “fortaleza da mina”. Almada Velha a caminhar e conhecer na visita guiada com um arqueólogo. (2014). Retrieved from: <https://quintaisisa.blogspot.com/2014/09/caminhar-e-conhecer-almada-velha-com-um.html>.

22. Cruz, C. L. M. C. (2015). *Castle of Almada. Florianópolis (Santa Catarina)*, Brasil: Projeto Fortalezas Multimídia/Universidade Federal de Santa Catarina/Secretaria de Cultura – SeCult/UFSC.

Almada’s first settlement is marked at the end of the Neolithic period, approximately 5.000 years ago.¹⁵ The river provided plentiful food and adequate land for agriculture. The Phoenician¹⁶ occupation was pronounced by the commercial relations granted by their trade routes along the mediterranean sea. Thus, the Tagus provided the Phoenicians with a safe and strategic placement for easy connection with these routes. The mark left by this settlement are the remains of supporting structures for the port activity found in Cacilhas, thus reflecting Almada’s port-like character. The geographic location allowed a safe entry and exit of embarkations from the sea into the land.

Later these lands were occupied by a Roman settlement¹⁷, followed by the Iberic occupation¹⁸. Through time and different occupations of the land, Almada always maintained its strong connection with the other side of Tagus – Lisbon, for survival and protection. This connection was created and strengthened by the river and the possibilities it brought. Until the construction of the “Salazar Bridge” in 1966, known today as “25 de Abril”, the Tagus’s waters were the only means of connection between its northern and southern margins.

The Roman occupation marked Almada with a Roman fish salting factory, now in ruins, depicting what could be the first intervention of an industrial occupation of Tagus’ southern margins.¹⁹ Later, the Islamic occupation left its mark in the form of a Castle.²⁰ Constructed in 1170, the Castle of Almada²¹ was positioned strategically, attributing defence and military use to the southern lands of the Tagus.²² The city of Almada grew around the city’s castle as well as within its walls, where protection could be provided. The primitive urban nucleus, now known as the historic centre, was founded during the occupation of the Islamic civilization. In Almada, they decided to build a fortress looking over the Tagus river, favoured by strategic position on top of the scarp. It resulted in the Islamic permanence in Almada’s initial development and character. Moreover, it establishes the military character of the city, reflecting the need for protection and defence. The Cartography drawn by Nicholas De Fer (**Image 4**), in 1715, delineates the development of the military field and its construction along the margins of the Tagus, taking advantage of the proximity with the water and the land’s topography.

In 1191 when Abu Yusuf al-Mansur²³ invaded Almada, the castle, an important symbol and structure of the city, was destroyed. It is not until D. Sancho I²⁴ reconquered Almada, and four years later, the castle was reconstructed. This period was marked by conflict and a stagnant development in Almada. In 1248 D. Afonso III became king, succeeding his brother Sancho I, bringing a period of peace and prosperity. Consequently, Almada slowly lost its military character, and became focused on agriculture, fishing and industries, favouring the city’s economy, with its port-like character, by means of trade of goods to the capital and serving as a support for the commercial trading of Lisbon.

In his article for *Gazeta de Notícias* in 1886, Ramalho Ortigão described Almada as a fruitful, fertile and abundant land. Here the territory of Almada is identified as a blessed land for production. Ortigão expresses the connection between agricultural production and the economy of Almada and its inhabitants:

*I am writing these lines about a small but very interesting town, where I came to spend the summer. Cova da Piedade is located south of the Tagus, twenty minutes from the Vapores bridge, on the road from Cacilhas to Cezimbra. From the Piedade basin there is the Caramujo beach to the east, and to the west the beautiful and fertile valley of Mourelas, all an orchard, in which the beautiful trincadeira grape, with berries thick and hard as cherries, ripens in huge bunches, for among the pomegranates, muscatel figs, apple trees and strawberry trees covered with fruit. It is a land blessed for production. In a narrow corner of a farm, a skilful and diligent family lives in a comfortable bourgeois way with no income other than that which results from the care of their vineyard and garden.*²⁵

Moreover, the rural zone of Cova da Piedade in Almada is illustrated in **Image 5**, where the territory is revealed to be rich and abundant, ideal for agricultural cultivation — leading Almada to become a zone of farmlands and production. Consequently, for the trade of agricultural produce the port zone along Almada’s riverside became more active. This resulted in a significant development of Almada and its river margins.

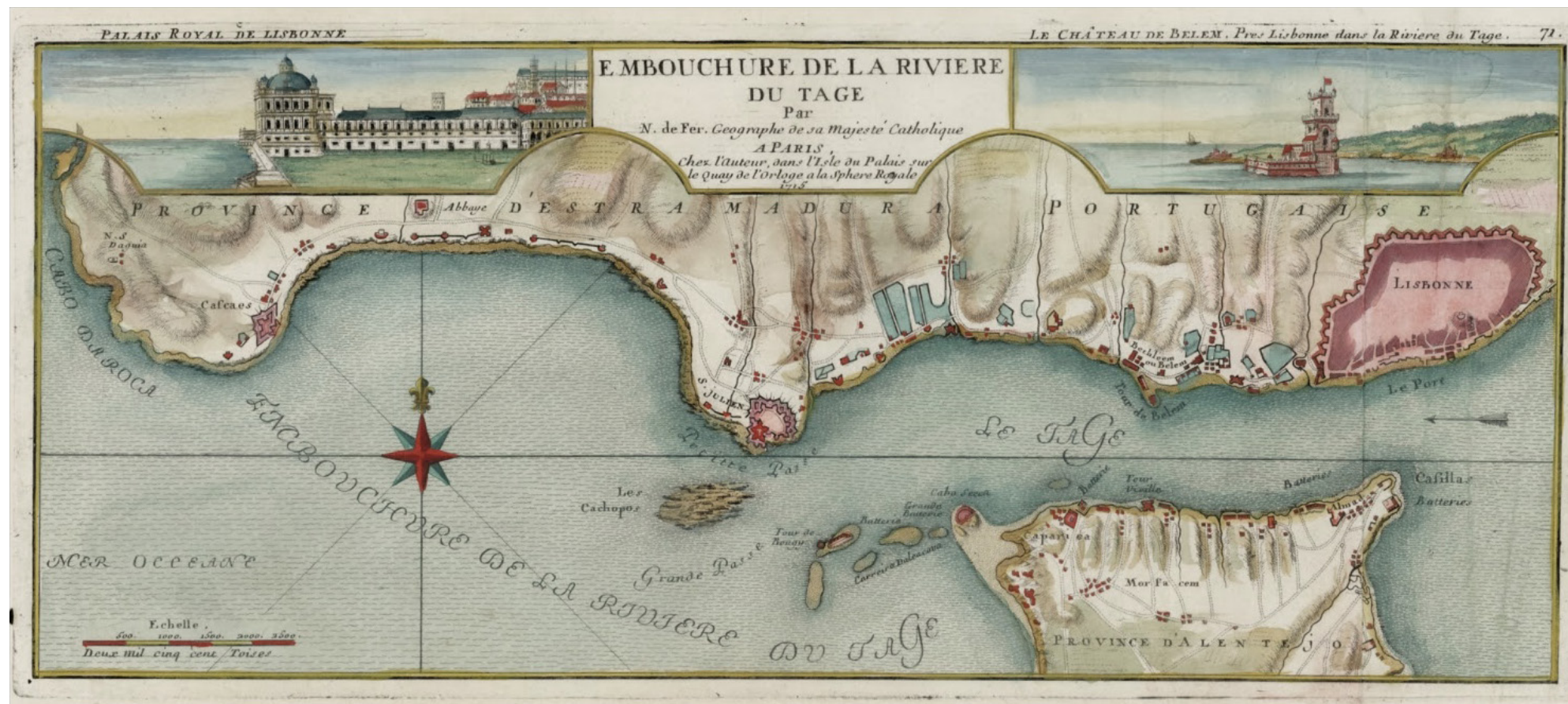


Image 4. Cartography: The mouth of the Tagus river (1710).

23. The head of state of the Almohad Caliphate of Morocco from 1184 to 1199.

24. King of Portugal (Coimbra, 11 November 1154 – 26 March 1211).

25. “Escrevo-lhes estas linhas de uma pequena, mas bem interessante povoação, onde vim passar o verão. A Cova da Piedade fica ao sul do Tejo, a vinte minutos da ponte dos vapores, na estrada de Cacilhas a Cezimbra. Da bacia da Piedade faz parte a praia do Caramujo para leste, e para oeste o lindo e fértil vale de Mourelas, todo ele um pomar, em que a bella uva trincadeira, de bagos grossos e duros como cerejas, amadurece em enormes cachos, por entre as romaneiras, as figueiras moscatel, as macieiras e os medronheiros cobertos de fructo. É uma terra abençoada para a produção. Numa estreita nesga de quinta, uma família habilitosa e diligente vive num confortável modo burguês sem outra renda além da que resulta do cuidadoso tamanho da sua vinha e da sua horta.” Ortigão, R. (1886, December). Cartas Portuguesas. *Gazeta de Notícias* n.º 341, p. 1.

26. Flores, A. (1990). *Almada Antiga e Moderna: a freguesia da Cova da Piedade*. Almada: Câmara Municipal de Almada. p. 35.

Almada started to store and concentrate many goods coming from the south of the country, thus making Almada’s riverside an intermediate space of support and supply to the main capital, Lisbon, and from there to the world. Consequently, from the 18th century, storehouses started to emerge along the riverside, especially along the Ginjal.²⁶ By the end of the century, the area of Ginjal had several storehouses dedicated to the trade of wine, olive oil and other goods, wherefore the need for barrels resulted in workshops for their constructions. The paintings created by Alfredo Keil at the end of the 19th century (*Images 6 and 7*) depict this change in the landscape of Almada’s riverside with the introduction of the storehouses along the margins. The river encounters the city through small portions of beaches and a platform that supports the manufacturing, storing and transportation of Almada’s produce, changing the relationship between the city, land and river.

Until the 19th century Almada lived exclusively from the exploitation of natural resources, agriculture and fishery. Its economy and population depended on the agricultural production, wherein the interior of the territory wine, olive oil, and cereals was produced. These goods were stored in storehouses along the riverside and eventually transported across the Tagus river to the capital by fluvial means. This development of the city’s riverside in the Ginjal area and the ports along Margueira beach is illustrated in the cartography ‘Rio Tejo e suas margens’ from 1883 (*Image 8*). Taking advantage of the proximity with Tagus, the warehouses and storehouses that were installed along the river margins resulted in a development of structures to support the port-like operation and changing the character of Almada’s riverside. Here, Cacilhas is presented as a well established port, providing a direct connection with Lisbon.



Image 5. Cova da Piedade: zona rural [Photograph] (1897).



Image 6. A praia das lavadeiras no Ginjal [Oil painting] (19th century).



Image 7. Cais do Ginjal [oil painting] (19th century).



Image 8. Plan of the Tgaus river and its margins [Cartography detail] (1883).

Map 2. Almada's coastline 1850.

Scale 1:15000

The map shows the changes in Almada's coastline. Artificial ground was constructed along the northern margins to aid fishing and port activities happening along the coast. The increase in port activities led to the development of supporting structures and ground along the beaches of the western margins. From this port, goods produced and stored in Almada can be transported and traded elsewhere, like Lisbon.



27. Introduced in 1765 on an industrial scale.

28. “A intensificação da industrialização nesta área do estuário tejo, levou a alteração e completa descaracterização da sua paisagem sócio morfológica, arrastando na voragem da evolução tecnológica, gentes, casario, artes e ofícios tradicionais.” O Farol. (2013). *Contributo para a História de Cacilhas – AS MARGUEIRAS*. Almada: Associação de Cidadania de Cacilhas. p. 11.

29. Santos, M. E. J. (2013). *Arquitetura e assentamentos fabris na margem sul do Tejo* (1851-1966) (Master ‘s thesis, Universidade técnica de Lisboa, Lisbon, Portugal), p. 54. Retrieved from: <https://www.repository.utl.pt/handle/10400.5/11763>

30. Santos, L. F. R. (1995). *Os Acessos a Faro e aos Concelhos Limítrofes na Segunda Metade do Séc. XIX*. Faro: Câmara Municipal. pp. 110-111.

31. Fábrica de moagem do Caramujo (antiga). Retrieved from: <http://www.patrimoniocultural.gov.pt/pt/patrimonio/patrimonio-imovel/pesquisa-do-patrimonio/classificado-ou-em-vias-de-classificacao/geral/view/73600>

32. In 1899, next to the port of Cacilhas.

33. Luzia, A. & Esteves, J. & Santos, M. J. (2012) *A indústria naval em Almada: na rota do progresso*. Almada: Câmara Municipal

34. Cardoso, A. & Luíza, A. (2020). *Almada: Um território em seis ecologias*. Almada: Câmara municipal de Almada. p. 110

35. “Cacilhas está se tornando um dos passeios mais lindos para a gente de Lisboa. A chamada Cova da Piedade acaba de ser elegantemente ajardinada com um coreto de música no centro. O local é encantador. Todos os domingos há música no jardim e é grande a concorrência do povo. Perto da Cova da Piedade há a magnífica quinta real do Alfeite, cujas portas el-rei deu ordem para estarem abertas para os visitantes passearem.” Notícias da Europa: Portugal (1874, july 7). *Diário do Maranhão* n.º 269, p. 1.

36. A terminology for donkey rides.

It is only in the mid 19th century, with the introduction of the steam machine²⁷ within Portuguese territory, that there is a gradual industrial shift in parts of Almada. Due to its easy accessibility and connections with Lisbon, the riverside is where most industries place themselves. The industrial development along Tagus’ margin resulted from the need for proximity of the industries with the existing port, storage equipment and activities for its support, making the riverside the ideal zone for the installation of industries. The Tagus offers its river margins as a safe place, protected from the strong sea currents and winds, providing easy and safe trade connections. Almada’s riverside became a place where industrial development and growth could flourish, providing many jobs and a better economy. Cacilhas became a vital port providing support to the Capital’s commercial trades, tying the development of Almada with Lisbon and transforming the cityscape. From the 19th and early 20th century onwards, elements emerged that began to change Almada’s riverside from a bucolic atmosphere into an urban setting, where the city is no longer seen as a ‘Quinta’ of Lisbon but as an important and integral part of the Capital’s economy. This change of the margin’s character was the consequence of the industrialization is explained in the book *As Margueiras* (2013):

*The intensification of industrialization in this area of the Tagus Estuary led to the alteration and complete mischaracterization of its socio-morphological landscape, leading to the vortex of technological evolution, people, houses, traditional arts and crafts.*²⁸

With industrialization, Almada’s riverside gradually became a ground for the city’s urban and economic development, with its privileged proximity to the river. Consequently, further construction and development of an artificial platform was needed to provide a stable ground for the industrial development along the river’s margin. It was on this strip of artificial ground, running along the Tagus, that most of the industries were installed.²⁹ Gradually this space along the riverside was slowly occupied by manufacturing, industrial and commercial facilities. A railway connecting the south of Portugal to the southern margins of Tagus was built in 1861,³⁰ contributing to the further industrialization of Almada. This meant that goods being transported from the southern parts of Portugal could use Almada as its base for commercial connection and distribution. In 1872 the first milling factory was installed in Caramujo, the first of many industries of Almada that kept growing and expanding.³¹

In the end of the 19th century Almada’s industrialization reached its pinnacle, which saw the shipyard Parry & Son established in Cacilhas.³² The shipyard was the first to construct private docks and the first dry dock for the construction and repair of ships.³³ Parry & Son marked the industrialization of naval activities in Almada, having a significant impact on the city’s economy.³⁴ The riverside of Almada, now industrial, is significantly pronounced by the Naval industry. Consequently, the further reshaping of the riverside line, with the use of artificial ground, alters the city’s physical character. The port of Cacilhas therefore suffered some alterations to accommodate the construction of the new shipyard – becoming the main connection between Almada and Lisbon.

Moreover, the physical connection that the Tagus provided between Almada and Lisbon was not only exploited for trading and commercial purposes but also for leisure. The privileged panoramic view over the Tagus, Lisbon and it’s beautiful landscapes became the reason why people would cross the river and visit the city of Almada. Consequently, the southern margins of Tagus received more visitors and the traffic in the river increased, resulting in significantly more movement and activity along the city’s riverside.

In 1874 it was published in the Illustrated Diary: “Cacilhas is becoming one of the most beautiful tours for the people of Lisbon. The so-called Cova da Piedade has just been elegantly landscaped with a bandstand in the centre. The place is charming. Every Sunday there is music in the garden, and there is a great contest between the people. Near Cova da Piedade there is the magnificent real estate of Alfeite, whose doors the king ordered to be open for visitors to walk around”.³⁵ This notice promoted attraction and raised interest in Almada, encouraging tourism into the city.

Another recreational activity during these times was the ‘Burricada’³⁶. These donkey rides became a great attraction in Almada and led many people to cross the Tagus from Lisbon. It quickly became a popular activity in the city, where people could explore the landscape, ‘Quintas’, hills and views of Almada. In his text for the book *Portugal de algum dia*³⁷ Gustavo de Matos Sequeira, the author, writes: “D. Fernando I ³⁸was an absolute lover of this cacilheiro fun activity”³⁹, revealing the enthusiasm of the king with the Burricada in Cacilhas. Sequeira further explains:

*When politics buzzed a lot and generals and politicians swarmed in the palace around the queen, the king preferred the donkeys to the guerrilla courtiers and, with three or four aulics, he rode the donkeys of the ‘Outra Banda’ and went to have fun in Almada, to Cova da Piedade, to Monte or Alfeite.*⁴⁰



Image 9. The english man in Cacilhas [Illustration] (1931).

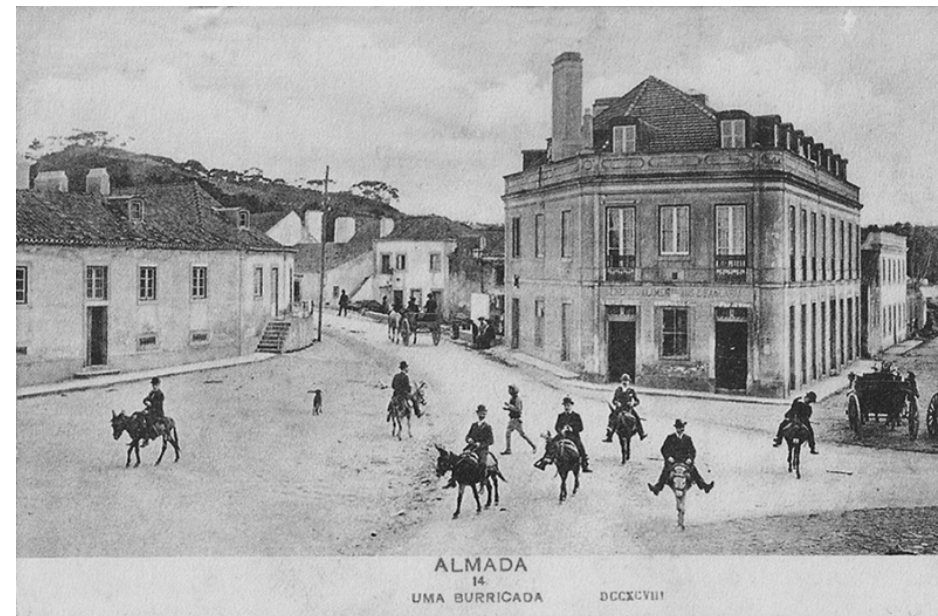


Image 10. Almada - Uma burricada [Photograph] (20th century).

37. Sequeira, G. M. (1931). *Portugal de algum dia*. Lisboa: Empreza Nacional de Publicidade. pp. 33-54.

38. The King of Portugal from 1367 until his death in 1383.

39. “D. Fernando 1.º era amador extreme dêsse divertimento cacilheiro.” Sequeira, G. M. (1931), *op. cit.*, pp. 33-54.

40. “Quando a política zumbia muito e os generais e os políticos fervilhavam no paço à volta da rainha, o rei preferia os burros aos cortesãos guerrilheiros e, com três ou quatro áulicos, cavalgava os jumentos da Outra-banda e ia divertir-se a Almada, à Cova da Piedade, ao Monte ou ao Alfeite.” *Idem, ibidem*, p. 38.

41. “A preferência régia impôs como moda a burricada de além-rio, e esta tornou-se um dos passeios obrigatórios de Lisboa para os seus naturais e até para os estrangeiros. Visitar então Lisboa e não andar de burro na Outra-banda, era como hoje não ir ao Jardim Zoológico ou à Estufa-fria do Parque da Avenida. Era por isso freqüente os estrangeiros alcandorarem-se até Almada a ver a vista sobre a cidade, e a marujada inglesa não faltava a essas excursões de turismo obrigatório, equilibrando-se sobre o tombadilho extravagante e movimentado das albardas mal seguras das cilhas.” *Idem, ibidem*, p. 38.

42. Baxter, W. E. (1852) *The Tagus and the Tiber*. London: R. Clay, Printer, Bread Street Hill. pp. 64-65.

Furthermore, the king’s fondness for the Burricada led the activity to become even more popular. Crossing the river to enjoy the donkey rides and all that Almada could offer was a must for people visiting Lisbon. As explained by Sequeira:

*The Royals made the Burricada on the other side of the river a fashion, and this became one of the mandatory tours of Lisbon for its natives and even for foreigners. Visiting Lisbon, then, and not riding a donkey in ‘Outra-banda’, was like not going to the Zoo or the Estufa-fria at Parque da Avenida today. For this reason, foreigners often climbed up to Almada to see the view over the city, and the English sailor did not lack in these mandatory tourist excursions, balancing on the extravagant and busy deck of the ill-secured saddlebags of the girders.*⁴¹

In 1852 William Edward Bexter, an English traveller who came to visit Lisbon, wrote in his travel journal about his and his friend’s visit to Almada:

*One day, after our return, we sailed across the Tagus to Cacilhas, the village in Alentejo, opposite the city. The landing place has been called “Jackass Bay” by the English sailors, from the crowd of donkeys and boys, clamorous for employment, which beset strangers arriving there. Mounted on stout asses, we rode up to the telegraph station, from which we had a most splendid panoramic view of ‘Old Lisbon’.*⁴²

The Burricadas eventually became an essential touristic activity, not only attracting the inhabitants of Lisbon but many foreigners visiting the capital. The illustration done by the artist Roque Gameiro in 1931 (*Image 9*) portrays the Burricada activity and the English men enjoying themselves as they ride across Almada and stop for a drink. This illustration also shows the movement and enthusiasm that this activity brought to the city. Moreover, a photograph from the early 20th century (*Image 10*), illustrates a group of men riding donkeys on the streets of Almada.

Map 3. Almada's coastline 1900.
(Drawing by the author)
Scale 1:15000

The map shows the extension of the artificial ground running along Almada's riverside. Cacilhas' port is reformulated and storehouses and warehouses are constructed along the strip of artificial ground with the industrialization of the coastline. Shipyards are established along the coast, mainly along the east coast, providing assistance to the construction and maintenance of boats and ships.



43. 50 anos da Companhia Portuguesa de Pesca. (1970, August). *Jornal do Pescador*, pp. 25-27.

44. Barão, F. & Mota, H. (1995) *Ginásio Clube do Sul – 75 Anos de Glória*. Cacilhas: Ginásio Clube do Sul.

45. Introduced in Lisbon in 1828 when the Arrow club by Abel Power Dagge and members of the British community residing in Lisbon.

46. Henriques, C. M. G. (2018). *O Remo em Portugal – 190 anos de história*. Lisboa: Comité Olímpico de Portugal.

47. Ninette (2019). Retrieve from: <https://almada-virtual-museum.blogspot.com/2019/07/ninette.html>

48. Jul 28, 1914 – Nov 11, 1918.

49. Cardoso, A. & Luiza, A. (2020). *Almada: Um território em seis ecologias*. Almada: Câmara municipal de Almada. p. 109.

50. “[...] alguns armazéns [...] foram adaptados a casas de pasto e/ou restaurantes, onde Planeamento e Gestão de Frentes de Água – a frente ribeirinha Norte de Almada, novos espaços, novos tempos as suas famosas caldeiradas, sardinhas assadas, mariscos, ostras abertas nos fogareiros junto às suas portas, fazia a delícia dos forasteiros que também utilizavam o grande divertimento local: as burricadas.” Flores, A. M. (1987). *Almada Antiga e Moderna : Roteiro Iconográfico Vol II* (pp. 156-179). Almada: Câmara Municipal de Almada. pp. 156-179.

51. “Depois, ficamos por momentos a observar os pormenores decorativos dos restaurantes típicos de margem: conchas coladas nas paredes, tanques contendo peixes ainda vivos, como nos mercados chineses, crustáceos de várias espécies marinhas, que dariam motivo para sobre tão expressivo terna se escrever vivas páginas naturalistas... Nota-se nos rostos e no ambiente característico que envolve este lugar de refúgio, certa expressão saudável e de desprendimento.” Marselha no Ginjal (1944, abril 15). *Mundo Gráfico* N.º 85, pp. 19-20.

During the 20th century, more industries continued to install themselves along the Tagus’ Margins. In 1920 the Companhia Portuguesa de Pesca (CPP), a trawl fishing company, was founded in Olho de Boi.⁴³ The company selected the old facilities of a cotton factory to install itself in a location with an existing embankment ideal for the mooring of the trawler boats. With the growth of the company, the embankment was later enlarged with the construction of a pier. Built on top of concrete pillars, the pier was long enough to reach a deeper area of the river where it was more favourable for the manoeuvring of the boats. The building and pier where CPP once operated can be seen in the aerial photograph in *Image 11*.

It is among these industries that in 1920 the Ginasio Clube do Sul was installed in Cacilhas, adjacent to the Tagus.⁴⁴ The Club focussed on a variety of sports, but having the river in the vicinity allowed for an opportunity to explore water sports - leading to the practice and training of rowing in the waters of the Tagus. Introduced by members of the British community of Lisbon, the practice of this sport on the Tagus river dates back to the 19th century.⁴⁵ Soon the sport was adopted by the elite, becoming a tradition, and the inrigger boats became part of the river’s landscape.⁴⁶ However, it was the Ginasio Clube do Sul that brought the sport to the southern margins of The Tagus. In 1926 the Club organised a baptism of one of their inriggers, a rowing boat built in their workshop in Cacilhas. *Image 12 and 13* are photographs of the event where the inrigger was baptised as Ninette and taken to the water.⁴⁷

Up until World War I⁴⁸ Lisbon did not have a consolidated Naval base. Small bases were spread in different locations throughout Lisbon along the river. It was only at the end of the 19th century that proposals for constructing a new naval arsenal arose. As a result, the Naval Arsenal – previously situated in Cais de Sodre in Lisbon – was transferred to the southern margins of Tagus, Almada. The arsenal’s construction began in 1928 and was inaugurated in 1939, concentrating all naval facilities in the same location. The consolidation of all the naval facilities created logistic practicality and a strategic position on the margins of the Tagus. Alfeite arsenal, as it was called, became one of the most modern shipyards for the construction and repair of ships of its time.⁴⁹ *Image 14* reveals the beginning of the construction of the arsenal and consequently the destruction of Alfeite beach and its smaller scale shipyards. An aerial view of the Alfeite arsenal built and fully integrated with the river’s margin and its protruding piers is revealed in *Image 15*. The platform supporting and housing the arsenal is the most significant and most extensive construction that occurred in the margins on Almada up until that date.

Furthermore, the implantation of industries along Almada’s riverside substantially impacted the city’s economy, its morphology and its connection with the river. The Tagus’ margin, where children once bathed and men fished, was now occupied by the production, storage, and trade of goods. However, at the beginning of the 20th century, transformations started to occur within the Ginjal area.⁵⁰ Some warehouses were transformed into restaurants, and inserted among the factories, storehouses and workshops. This area, with an industrial character, changed its dynamics with the introduction of the restaurants. The riverside was now a place of production and leisure, bringing these two urban aspects to confront each other and enjoy the margins of the beloved Tagus.

Thus, despite the Industrialization of the river margins, Almada’s inhabitants still utilised the area for leisure, maintaining its connection with the river. As expressed in the article below from *Mundo Gráfico* (1944), there was space for recreation among the industrial activity happening along Ginjal (*Image 17*). The restaurant’s connection with the river was not only defined by the location itself but from the food it served. The article highlights the abundance of seafood and refers to the restaurants as spaces of refuge. The text is accompanied by images that illustrate the lively and abundant energy along the industrial river margin and its connection with the Tagus, as described in an article from *Mundo Gráfico*:

*Afterwards, we stayed for a moment to observe the decorative details of typical restaurants on the banks: shells glued to the walls, tanks containing fish still alive, as in Chinese markets, crustaceans of various marine species, which would give a reason for such expressive tenderness to write vivid pages of naturalists... One notices in the faces and in the characteristic environment that surrounds this place of refuge, a certain healthy expression and detachment.*⁵¹

Furthermore, leisure was not the only activity taking place amid this industrial landscape within the river’s margins. When the river’s tides were low enough, exposing the small beaches along the industrial area, the space would become a place for washing clothing. As mentioned by Romeu Correia in his book, this tradition of women from the villa coming down to the river’s margins to wash clothing happened for more than a century:



Image 11. Companhia Portuguesa de Pesca, Olho de Boi [Photograph] (20th century).



Image 12. Ginásio Clube do Sul, the launch of the inrigger “Ninete” in Cacilhas [Photograph] (1926).

52. “... ficava entre o cais do velho Moreira e toda a muralha da fábrica de conservas de peixe La Paloma. Era nessas areias que há séculos as mulheres da vila vinham lavar a roupa. Cavavam com a enxada junto à muralha do cais, e logo a água doce e cristalina borbotar e fazia poça. Juntavam uma tábua, ou em vez desta uma pedra lisa, mais sabão, água, esfrega que esfrega, bate que bate.” Correia, R. (1982) *O Tritão*. Lisboa: Editorial Notícias, p. 29.

53. Correia, R. (1989) *Caís do Ginjal*. Lisboa: Editorial Notícias, pp. 29-30.

54. O Farol. (2013). *Contributo para a História de Cacilhas – AS MARGUEIRAS*. Almada: Associação de Cidadania de Cacilhas. pp. 37-39.

*[...] It was between the old Moreira’s wharf and the entire wall of the La Paloma fish canning factory. It was on these sands that for centuries the women of the village came to wash their clothes. They dug with their hoe along the quay wall, and soon the fresh, crystal-clear water bubbled up and made a puddle. They would put together a board, or instead of this a smooth stone, more soap, water, scrub that scrubs, beat that beats [...].*⁵²

Photographs taken by Fernando Barão and Garcia Nunes in the mid 20th century reveal the activity of the women along the riverbed washing clothing and the white sheets spread over the sand (*Image18 and 19*). Here, we can better understand the solid and traditional relationship between Almada’s inhabitants and the Tagus. Nevertheless, clothing was not the only thing women gathered by the river’s margin to wash. Women would gather along the Tagus to clean the fish that were discharged from the boats. As the boat reaches the river margin, it encounters a group of women waiting to wash the fish in the river’s water and take them back to the warehouses, as illustrated in *Image 20*.⁵³ This practice is described by a testimony from D. Augusta Simoes, who worked in Margueira in the 1940’s:

The Tagus River reached up to the doors of the warehouses where the fish canning industry operated. This simplified the unloading of fresh fish made by the boats. The fish was packed in wooden crates and taken by hand or over the head into the warehouses. [...] All these activities generated wealth and jobs for the population and Cacilhas.



Image 13. Inrigger “Ninete” [Photograph] (1926).



Image 14. Arsenal do Alfeite, new landfill for the arsenal [Photograph] (1928).



Image 15. Arsenal do Alfeite, Almada, Portugal [Aerial photograph] (1941).



Image 16. Zona de protecção das Instalações da Marinha no Alfeite [Cartography] (1994).



Image 17. Article from the magazine Mundo Gráfico, ano IV – N.0 85 (1944).



Image 18. Praia das Lavadeiras [Photograph] (1950).



Image 19. Lavadeiras junto ao Rio Tejo [Photograph].

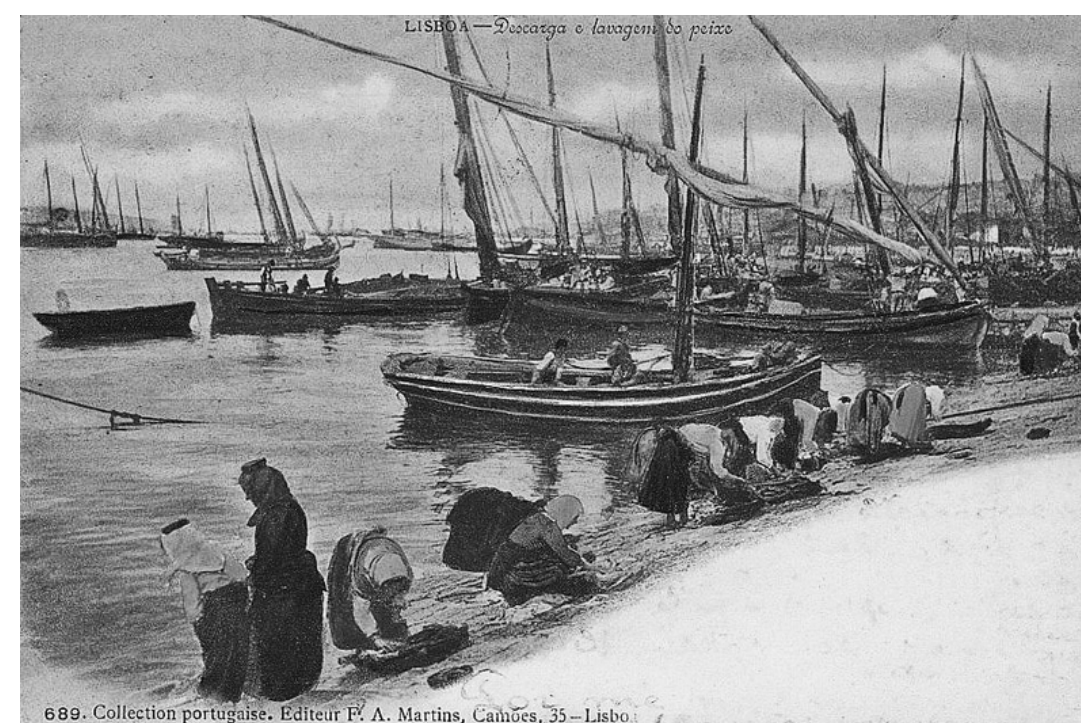
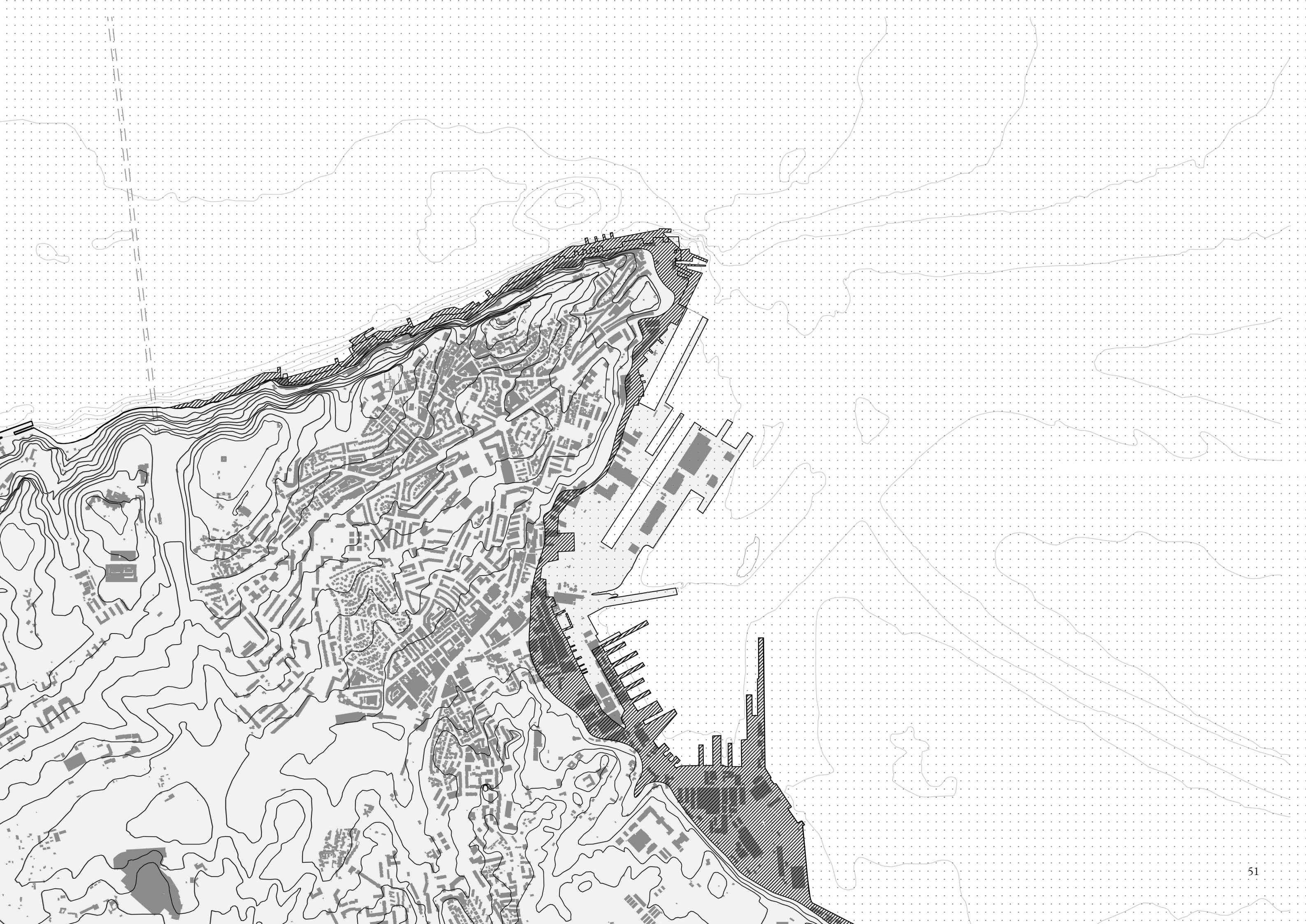


Image 20. Descarga e lavagem do peixe, Ginjal [Postcard] (1900).

Map 4. Almada's coastline 1940.
(Drawing by the author)
Scale 1:15000

The map depicts the reformulation of the port of Cacilhas with the construction of the Perry & son shipyard. The eastern margins grow towards the river with the construction of the Alfeite Arsenal for military activity. More industries, warehouses and storehouses are installed along the south coast, resulting in a reformulation and development of the artificial ground and addition of more piers for port functions.



55. “Para a doca da Margueira, / Iam os putos reinar, / Quais capitães da areia, / Para ali iam nadar. / Para o rio, na Margueira, / A muralha era um céu, / Acabou-se a brincadeira, / Quando a Lisnave apareceu. / Só em pelo, sem calção, / Todos nus, em ritual, / Mas sempre com atenção, / Ao mau do guarda fiscal.” In Tavares, J. L. (1994) *Alma da Almada*. Almada: Edição do autor.

56. “A desaparecida praia da margueira, era o local de recreio de todos os putos de Cacilhas, que ali brincavam, tomavam banho e aprendiam a nadar. Chegavam mesmo a vir pessoas dos arredores, e até de Lisboa, para aqui terem um dia bem passado.” O Farol. (2013). *Contributo para a História de Cacilhas – AS MARGUEIRAS*. Almada: Associação de Cidadania de Cacilhas. p. 139.

57. “O local aprazível que era a margueira, até ao aparecimento da Lisnave, teve sempre excelentes condições para estacionamento temporário de populações nómadas. Nos anos 40, 50 e princípios de 60 do século passado era frequente estacionar ali, próximo dos pinheiros e eucaliptos, grupos de ciganos, que montavam ali os seus acampamentos [...]” *Idem, ibidem*, p. 15.

58. *Idem, ibidem*, pp. 25-28.

59. *Idem, ibidem*, pp. 30-40.

As Tavares records his memories of Margueira beach in his poem, he depicts an image of children playing along the sand and swimming in the Tagus. The image created is a fond and playful memory of the beach and the children’s relationship with the river. The children swam naked, carefree and amused. Tavares explains in his poem that the fun was over once Lisnave shipyard was built, destroying Margueira beach. A photograph (*Image 21*) of a group of young boys after swimming in the river remains as a remembrance of the days where the margins of the Tagus was filled with people swimming in its water.

*To Margueira’s dock,
The kids would reign,
Which sand captains,
There they were going to swim.*

*To the river, in Margueira,
The wall was a sky,
The game is over,
When Lisnave showed up.*

*Only in fur, no shorts,
All naked, in ritual,
But always with attention,
To the mean tax guard⁵⁵*

Jose Luis Tavares, 1994

The book *Contributos para a história de Cacilhas: As Margueiras* also reflects on the memories of the former Margueira beach: “The disappeared beach of Margueira, was the place of recreation for all the kids in Cacilhas, who played there, bathed and learned to swim. People even came from the surroundings, and even from Lisbon, to have a good day here”⁵⁶. Moreover, The Margueira beach attracted more than swimmers, its margins offered the perfect conditions for nomadic groups to camp (*Image 22*), as recollected by the book:

*The pleasant place that Margueira was, until the appearance of Lisnave, always provided excellent conditions for the temporary parking of nomadic populations. In the ‘40s, 50’s and early 60’s of the last century, groups of gipsies frequently set up their camps there, near the pine and eucalyptus trees[...]*⁵⁷

In the end of the 1940s the Estrada Nacional 10 was constructed connecting Cacilhas to Cova da Piedade. The road was intended to provide connections between different parts of the Almada territory, but resulted in a disconnection between Almada and the Tagus. In the process of construction of the EN10 Margueira beach was destroyed (*Image 23 and 24*). The beach where many swam and fished was important for Almada’s identity, history, and for its inhabitants.⁵⁸ With the EN10 constructed and the beach now destroyed, the direct access and connection with the river dissipated. Due to this, many small shipyards responsible for the maintenance of timber ships disappeared, and with it all the activities that used to happen in Margueira.⁵⁹

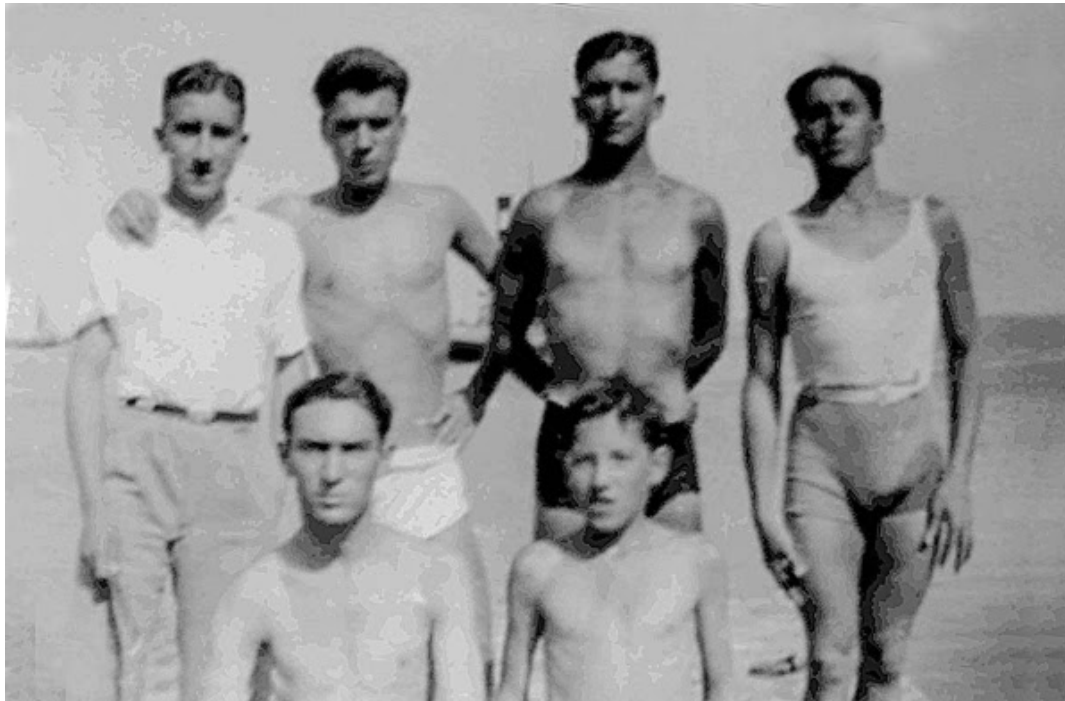


Image 21. Praia da Mangureira [Photograph] (1935).



Image 22. Gipsy moter in a camp in Margueira [Photograph] (1950).



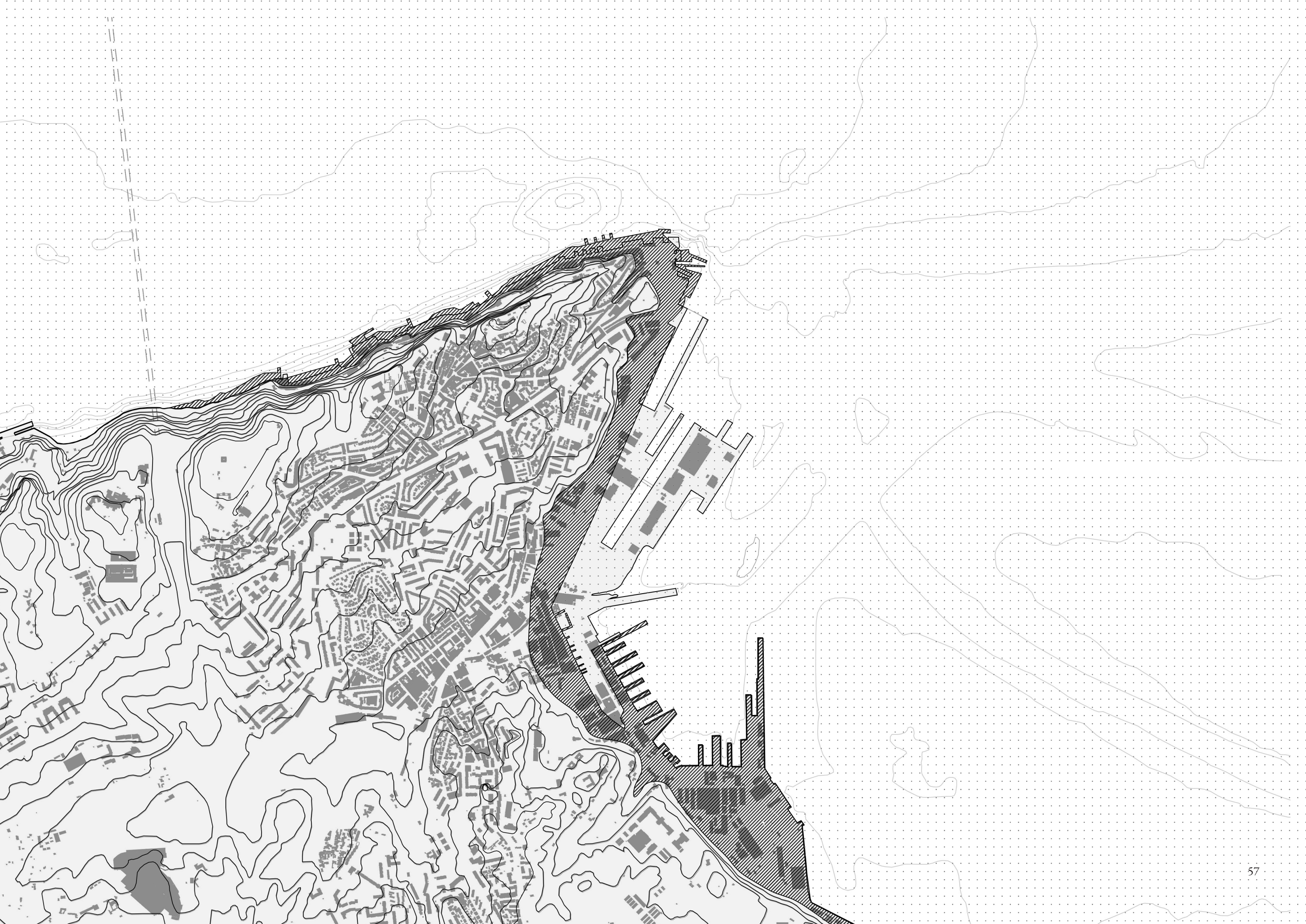
Image 23. Aerial view of Cacilhas, Margueira and Ginjal [Photograph] (1950).



Image 24. Aerial view of Margueira beach after the construction of the EN10 [Photograph] (1958).

Map 5. Almada's coastline 1950.
(Drawing by the author)
Scale 1:15000

Map 5 illustrates the change in Almada's riverside morphology with the construction of the EN10. Consequently Margueira beach was destroyed and whit it all the small-scale shipyards and port structures along the coast.



60. Administração-geral do Porto de Lisboa. (1960). *Relatório – Contas e elementos estatísticos do ano de 1960*. Lisboa: Ministério das comunicações. pp. 15-16.

61. Brito, J. M. B., & Heitor, M., & Rollo, M. F. (2004) *Momentos De Inovação E Engenharia Em Portugal No Século XX*. Lisboa: Centro de Estudos e Inovação, Tecnologia e Políticas de Desenvolvimento do IST. pp. 244-246.

62. Administração Geral do Porto de Lisboa. (1946). *Relatório – Contas e elementos estatísticos do ano de 1946*. Lisboa: Ministério das comunicações.

63. “Por outro lado, é urgente a melhoria das condições da margem entre Cacilhas e o Alfeite, com vários objectivos: o de permitir o traçado da variante da importante estrada de saída para o sul do País, ligando também à Base Naval e ao Arsenal do Alfeite; o de serviços comerciais indispensáveis naquela zona; e designadamente o do necessário aperfeiçoamento do serviço fluvial de embarque e desembarque de passageiros e veículos entre Lisboa e a margem esquerda, que cada vez mais se transforma em zona de expansão da cidade. Nessas obras do Alfeite há que contar com a colaboração do Arsenal e da Estação Naval, interessados no conjunto das instalações marítimas a projectar.” *Idem, ibidem*, p. 23.

64. Brito, J. M. B., & Heitor, M., & Rollo, M. F. (2004) *op. cit.*, pp. 244-245.

65. Cardoso, A. & Luiza, A. (2020). *Almada: Um território em seis ecologias*. Almada: Câmara municipal de Almada. p. 110.

As the industries flourished along Almada’s riverside, so did its population. Consequently, the water traffic of the Tagus increased, transporting not only commercial goods but also passengers from one margin to the other. During the 20th century, the number of passengers crossing the Tagus from the northern to the southern margins, and vice versa, increased each year.⁶⁰ **Image 25** is a table from a report done by the general administration of the port of Lisbon in 1960. The table reveals that the number of passengers who crossed the river only grew as the years passed, reaching an impressive number of 21,366,615 passengers. Moreover, the second table (**Image 26**) reveals that out of these passengers, the large majority were moving between Terreiro do Paço and Port of Cacilhas, making that port the busiest in the southern margins and the main connection with the capital.

With the growing movement of boats over the Tagus’ waters, the river margin needed support for the activities happening along the river. Considering this, in 1956, plans of improving the ports of Lisbon emerged.⁶¹ Among the planned interventions was the plan for an improvement of the port between Cacilha and Alfeite. The plan intended to reformulate the margins after the construction of the EN10.⁶² As highlighted on the annual report of accounts and statistical elements for the year 1946, done by the general administration of the Port of Lisbon:

*On the other hand, it is urgent to improve the conditions of the bank between Cacilhas and Alfeite, with several objectives: to allow the layout of the important exit road to the south of the country, also connecting the Naval Base and Arsenal do Alfeite; and that of essential commercial services in that area; and in particular the necessary improvement of the river service for embarking and disembarking passengers and vehicles between Lisbon and the left bank, which is increasingly becoming an area of expansion of the city. In these works at Alfeite, it is necessary to count on the collaboration of Arsenal and the Naval Station, interested in the set of maritime installations to be planned.*⁶³

The plan of intervention proposed the creation of a larger dock in Cacilhas consisting of a port and ferry-boat station extending over the former Margueira beach and connecting with Alfeite.⁶⁴ The calmer conditions of the river along Almada’s eastern coast are ideal for the navigation of boats and the perfect location for a port. **Image 27** shows the plan of improvement for the port between Cacilhas, Margueira and Afeite. The military dock on the left, incorporated both the arsenal and naval base, as well as a commercial dock intended for transportation of goods and passengers. However, the plan was never executed, instead plans of constructing a large commercial shipyard along the eastern margins of Almada started to be discussed.

Larter in the 1960s, where the Tagus once bathed Margueira beach, the shipyard Lisnave was constructed (**Image 28**). The large artificial base marks an unprecedented change in the morphology of Almada’s riverside.⁶⁵ Inaugurated in 1967, Lisnave was constructed in a precise drawing of dry docks and an orthogonal structure of warehouses and workshops housing all the activities. Lisnave is aimed at the repair of large ships, providing many jobs for the population. The shipyard takes an exceptional scale, becoming the largest shipyard of its time with the largest dry dock in the world. In **Image 29**, the scale of the artificial platform constructed to support the Lisnave shipyard can be seen compared with the scale of the city of Almada. Its large scale changes the character of Almada’s riverside and its connection with the river.

b) River passengers

The movement of passengers between Lisbon and the left of the river within the area jurisdiction of the Port of Lisbon Authority goes on increasing considerably.

In fact, the total attained by it was more than 21 million persons in 1960 as against about 20 millions in 1959 and less than 19 millions in 1958. This is indeed an important movement in continuous progress. The following chart is enlightening:

River passengers in the port of Lisbon	
1939	4,537,495
1951	11,189,626
1952	12,143,060
1953	13,631,822
1954	13,977,664
1955	14,928,792
1956	16,007,683
1957	17,887,634
1958	18,793,004
1959	19,910,257
1960	21,336,615

Image 25. Number of passengers crossing from Lisbon to the left margin [Table] (1960).

The distribution of the total figure for 1960 by ferry lines is the following:

Lines (both ways)	Totals
Terreiro do Paço-Alcochete	74,621
Terreiro do Paço-Barreiro	3,523,000
Terreiro do Paço-Cacilhas	14,006,827
Terreiro do Paço-Trafaria	153,646
Cais do Sodré-Montijo	245,883
Cais do Sodré-Seixal	397,684
Belém-Porto Brandão	1,205,195
Belém-Trafaria	1,729,759
	<u>21,336,615</u>

Cacilhas most especially, followed by Barreiro, Trafaria and Porto Brandão, are, as may be seen, the localities with the heaviest movement of passengers with Lisbon.

Image 26. The distribution of the number of passengers crossing from Lisbon to the left margin in 1960 [Table] (1960).

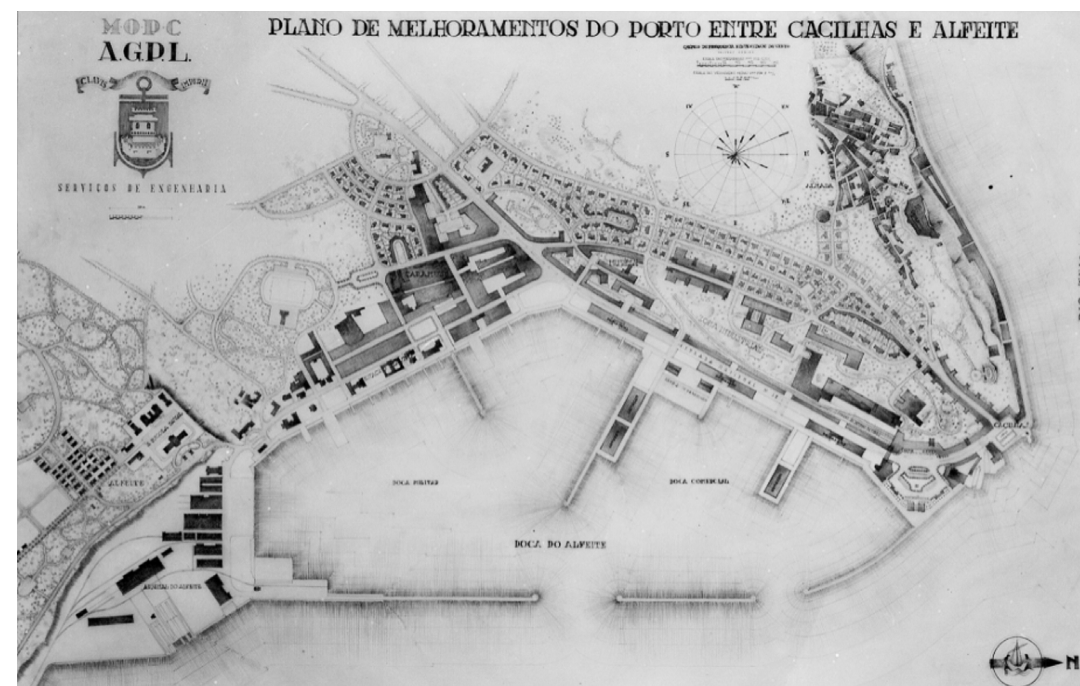


Image 27. Plan of improvement of the port of Cacilhas e Alfeite (1956).



Image 28. Lisnave Construction [Aerial Photograph] (1960)..



Image 29. Aerial view of Lisnave after inauguration [Photograph] (1960).

Map 6. Almada's coastline 1970.

(Drawing by the author)

Scale 1:15000

The map shows the construction of the Lisnave shipyard where Margueira beach once was. The scale of the platform that is created for the construction and support of the shipyard is comparable with the scale of the city itself. Lisnave becomes the larger area of the strip of artificial land along Almada's margins.



66. Renamed after the revolution of 1974.

67. Cardoso, A. & Luiza, A. (2020). *Almada: Um território em seis ecologias*. Almada: Câmara municipal de Almada. p. 198.

68. *Idem, ibidem*, p. 199.

In 1962 the construction of the Salazar Bridge, now known as ‘25 de Abril’⁶⁶ began, and it was inaugurated later in 1966. The implementation of the bridge, which directly connected Lisbon to Almada, had a drastic impact on both cities. The connection created by the bridge facilitated the transportation of both goods and people from one side to the other.⁶⁷ The bridge’s construction and increased car usage gradually made transportation through the river lose some of its importance and dynamism - leading to the decline of several companies engaged in the maintenance, construction and service of boats and ships. The interruption of cod fishing led to the bankruptcy of activities such as workshops and repair yards, fabrication of nets and storage, contributing to the abandonment of some buildings along the riverside.

Moreover, the combination of the constant fluctuations of the market, the successive oil crisis and the revolution of 1974 had a substantial impact on these industries. Consequently, many of Almada’s factories closed their doors at the end of the 20th century – including the affluent Lisnave shipyard, which closed in 2000.⁶⁸ As the industries started to close, their buildings were left vacant and abandoned, ill-fated to a gradual degradation over time.

Almada's conquest over the Tagus

The horizontal movement of the city towards the river

Almada's territory had many occupations throughout its history, each established and reinforced by the connection between land and river. This relationship allowed the city to settle and flourish. Like any relationship, it was susceptible to changes; from military, to agricultural, to industrial use. As the needs and activities along the riverside changed, so did the margin's morphology. This morphological change occurred through the construction of an artificial platform that extends into the river and along Almada's margins, expanding the city horizontally into the Tagus. The artificial platform was erected as a direct response to the dynamic relationship between Almada and the Tagus. In such a way, man conquered the Tagus by constructing a space between land and river, where he could take advantage of the proximity to the water.

Today, most of Almada's margins are enclosed by artificial ground, an area with military and industrial character which reflects the city's history and development. However, although the margins were a critical catalyst and support for the city's growth, as industries started to close, this space was left to decay. Today, the majority of its warehouse structures are derelict, a trace of Almada's grand industrial past. Consequently, the platform that once extended Almada into the Tagus is now obsolete – a neglected space that no longer serves the industries nor the city, weakening the relationship between city and river.

Despite the dilapidated state of its riverside, Almada still provides a visual connection with the other margin – which attracts many visitors, crossing the river to enjoy scenic views over the Tagus and Lisbon. Among the remains of the industrial buildings that accompany the artificial platform, one can find many visitors walking along the river. Although the riverside was never regularised as public space, the area is today used for recreational purposes, despite its hazardous state of deterioration.

Arriving in Cacilhas port, one walks into a small public square with restaurant tables spread around it. The movement coming from the ferries gives life to this part of the city. It is here in the square of Cacilhas where we find a vast array of public transport connecting the margin with the territory's interior. Continuing on from Cacilhas, towards the Northern margins, is Cais do Ginjal, Olho de Boi and Quinta da Arealva – the area where most storehouses were constructed through the 19th and 20th centuries. Connecting these spaces, is a narrow strip of the artificial platform, enabling the remains of the storehouses to run parallel to the Tagus. The facades are now covered with graffiti and street art, bringing colour to the space as well as visually reinforcing its state of abandonment.

Along the Ginjal, are remains of concrete piers, where one can always find people fishing – an activity practised since the first settlements within this territory. The silhouettes of fisherman standing on the edge of the pier which extend over the water creates a connection and continuation of Almada's history and tradition, reflecting the abundance that the river has always provided to the city. Among those piers in Olho de Boi are two restaurants, Ponto Final and Atira-te ao Rio, where traditional Portuguese cuisine is served and is best known for fresh seafood plates. The restaurant's tables run along the edge of the platform, near the river, where people can enjoy their meal and scenic views.

Past the restaurants is the Jardim do Rio, where the platform extends into a riverbank covered in grass and shaded by trees. Built in 2000, this garden is the only modern intervention along the riverside. It features the elevator Boca de Vento, which connects the historic centre of Almada with the northern margins of its territory. Jardim do Rio is then followed by the Fonte da Pipa⁶⁹ and the Nautical archaeological museum⁷⁰. Running adjacent to the artificial platform, it is still possible to see parts of natural beaches formed between the land and the waters of the Tagus.

The eastern margins of Almada are enclosed by the comprehensive platforms of Lisnave and Alfeite Arsenal. With the Lisnave shipyard no longer in operation, the buildings that once supported the naval and industrial activities were left to gradual deterioration. The shipyard's platform, composed of extensive docks that once gave access to the Tagus' waters, is currently desolated with no public access. On the other hand, both the arsenal and naval bases are still operating. As a private sector, the platforms of Alfeite are not accessible to the public. Thus, the extensive eastern coast of Almada is confined, cutting the connection between the city and the river.

⁶⁹ A fountain built in the name of D. Joao V in 1736.

⁷⁰ Inaugurated in 1991, the Museum safeguards one of the most important collections of Almada's history and identity – showcasing the traditional shipbuilding, iron and steel, artisanal fishing techniques and tools for working in shipbuilding and repair.



Image 30. Ginjal riverside [Photograph] (2021).



Image 31. Ginjal riverside 2 [Photograph] (2021).



Image 32. Concrete piers in Ginjal [Photograph] (2021).

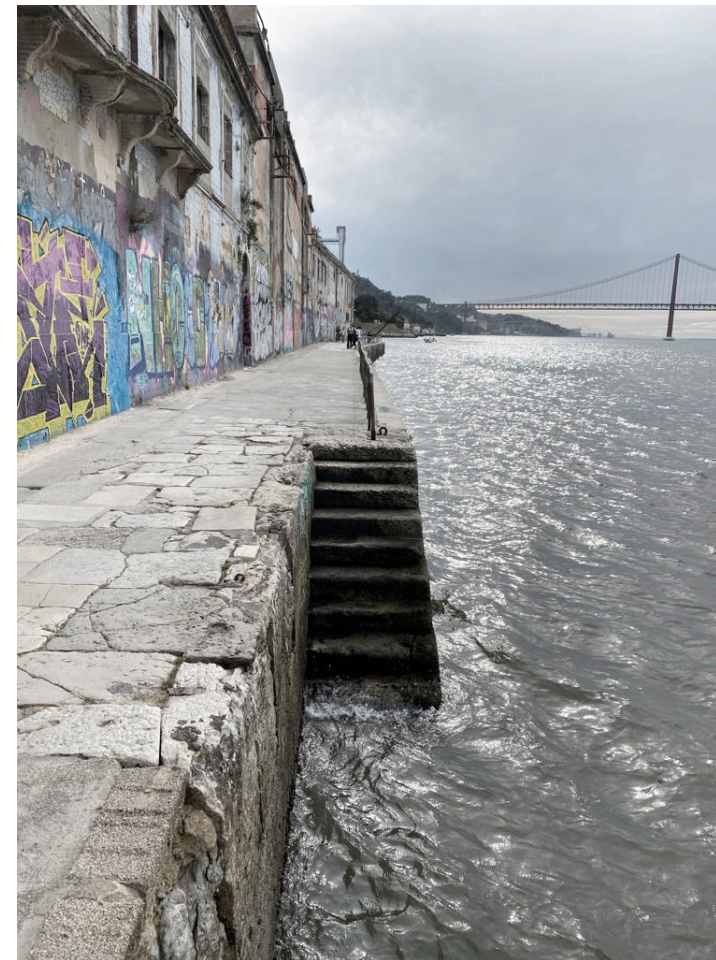


Image 33. Ginjal riverside 3 [Photograph] (2021).



Image 34. Restaurant Ponto Final in Olho de Boi [Photograph] (2021).



Image 35. Restaurant Ponto Final's view over the Tagus [Photograph] (2021).



Image 36. View of the Boca de Vento elevator and Jardim do Rio [Photograph] (2021).



Image 37. Garden Jardim do Rio [Photograph] (2021).



Image 38. View over the Jardim do Rio and the Tagus river
[Photograph] (2021).



Image 39. Beach in the Ginjal riverside [Photograph] (2021).

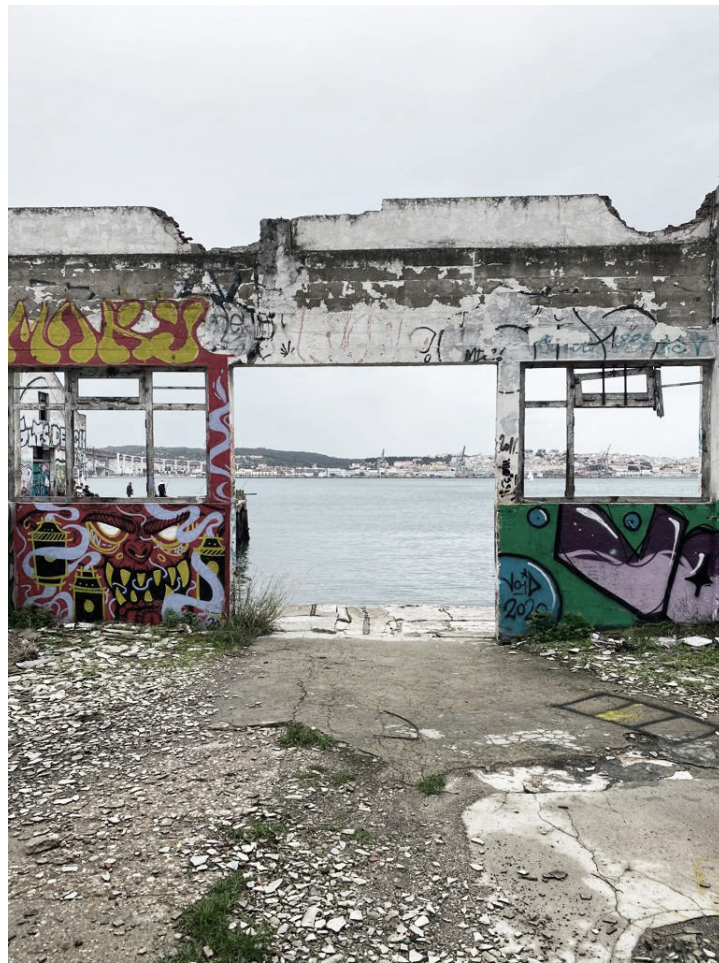


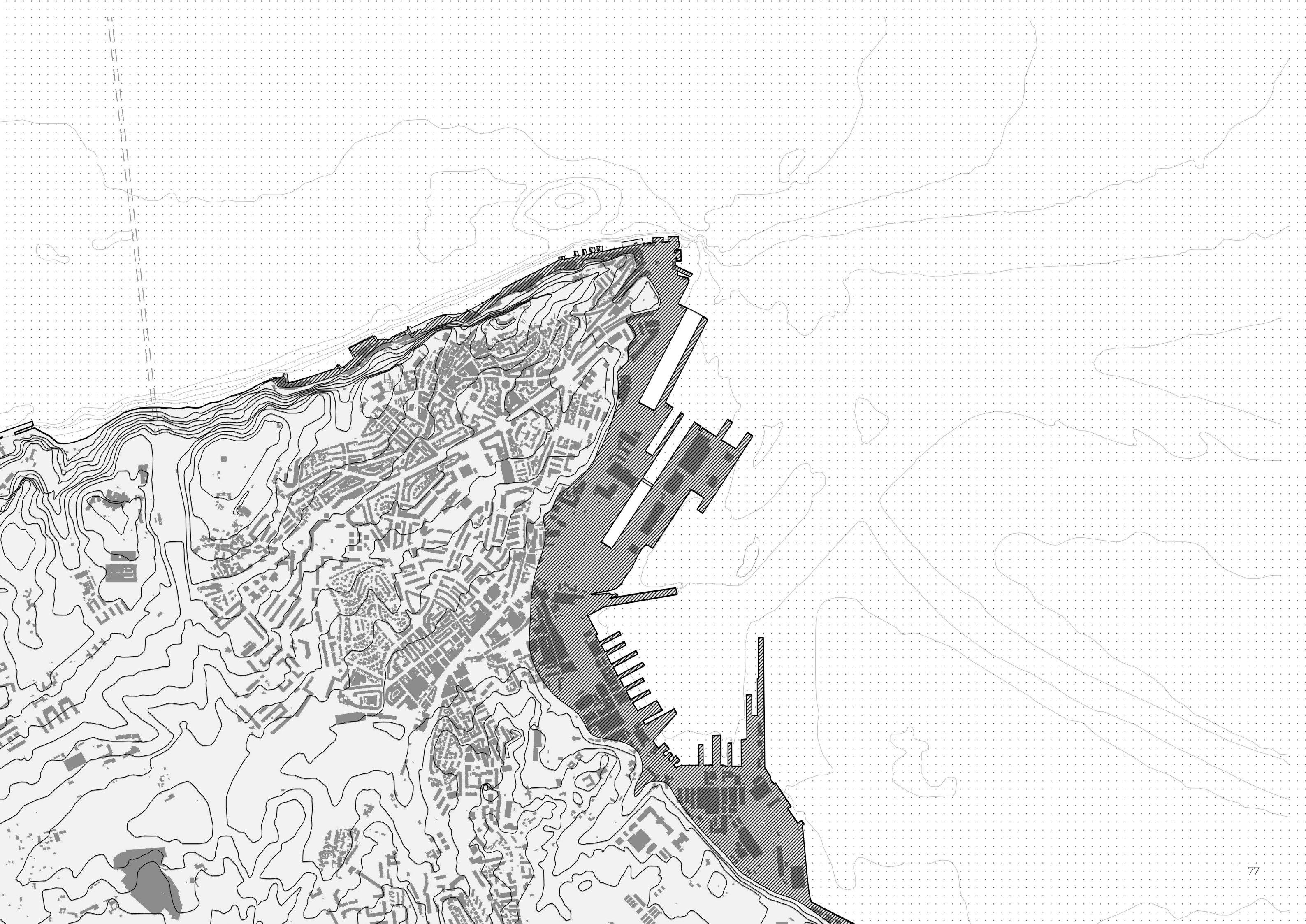
Image 40. Quinta da Arealva ruins and view over the Tagus
[Photograph] (2021).



Image 41. Poem written on the ruins of the former Quinta da Arealva
[Photograph] (2021).

Map 7. Almada's coastline 2000.
(Drawing by the author)
Scale 1:15000

The map reveals the current formation of Almada's coastline. This map shows the construction of a large area of artificial ground for the support of the industries and military service along the riverside, and to assist the growth of industries along the margins. After the construction of the bridge most of the industries along Almada's coast closed, resulting in the abandoned industrial area that we see today. The buildings that supported the industrial activities are now in ruins, changing completely the character of Tagus' southern margins and Almada's relationship with the river.



The Tagus’ conquest over Almada

The horizontal movement of the river towards the city

71. Paris agreement treatise, United Nations, Paris, 12 December 2015. In: https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en Retrieved on: 24/09/2021

72. Oppenheimer, M., B.C. Glavovic, J. Hinkel, R. van de Wal, A.K. Magnan, A. Abd-Elgawad, R. Cai, M. Cifuentes-Jara, R.M. DeConto, T. Ghosh, J. Hay, F. Isla, B. Marzeion, B. Meyssignac, and Z. Sebesvari, (2019) Sea Level Rise and Implications for Low-Lying Islands, Coasts and Communities. In: *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* [H.-O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, N.M. Weyer (eds.)]. In press.

73. Kulp, S.A., Strauss, B.H. New elevation data triple estimates of global vulnerability to sea-level rise and coastal flooding. *Nat Commun* 10, 4844 (2019). Retrieved from: <https://doi.org/10.1038/s41467-019-12808-z>

74. Plano Metropolitano de Adaptação às Alterações Climáticas – Área Municipal de Lisboa (2018) page: 51 Retrived from: https://www.aml.pt/susProjects/susWebBackOffice/uploadFiles/wt1wwpgf_aml_sus_pt_site/componentPdf/SUS5BD0A09029884/PMAAC_AML_P021_VOL1_CENARIO_BASE_ADAPTACAO

75. Antunes, C., & Rocha, C., & Catita, C. (2017) *Sea Level Rise Viewer – Coastal Flood Scenarios to Sea Level Rise for Portugal, in accordance with European Directive 2007/60/EC*. Lisboa: Faculdade de Ciencia da Universidade de Lisboa. Retrieved from: <https://smart.campus.ciencias.ulisboa.pt/portal/apps/MapSeries/index.html?appid=80ee9192b7ea46108aeb6da350c090b4>

76. Hauer, M.E., & Fussell, E., & Mueller, V. (2020) *Sea-level rise and human migration*. *Nat Rev Earth Environ* 1, pp. 28–39.

77. Nicholls, R.J. (2018). Adapting to Sea level Rise. In: *Resilience: The Science of Adaptation to Climate Change*. Oxford, UK: Elsevier. pp. 13-29.

78. Lee, Y. (2014). *Coastal Planning Strategies for Adaptation to Sea Level Rise: A Case Study of Mokpo*. Korea: Journal of Building Construction and Planning Research. pp. 74-81.

79. Building Futures and ICE (2010) *Facing Up to Rising Sea-Levels: Retreat? Defend? Attack? Report*. London. Retrived from: <https://www.ice.org.uk/getattachment/media-and-policy/policy/facing-up-to-rising-sea-levels/Facing-Up-to-Rising-Sea-Levels-Documents-Final.pdf.aspx>

Over the last two centuries, Almada’s margins have extended towards the river, resulting in a horizontal expansion of the city into the water. However, due to climate change, this horizontal movement may be reversed in centuries to come. This could see the river flood parts of Almada’s coast, extending the water further into the terrain, thus making a large portion of the city’s margins vulnerable to sea-level rise. In order to protect the riverside, strategic plans of adaptation need to be put in place.

The effects and consequences of climate change are becoming more evident over time. The rise in global temperatures, sped-up by human-induced emissions of greenhouse gases, directly affects the rise in global sea-level. The rising sea-level is primarily due to meltwater from glaciers and ice sheets and the thermal expansion of seawater as it warms – Resulting in an increase of the ocean’s volume. Aiming to reduce emissions and the effects of climate change, 191 countries met in Paris in 2015 to sign an international treaty for climate change (including Portugal), covering mitigation, adaptation and finance. The Paris Agreement’s primary goal is to avoid the dangerous consequences of climate change by keeping the Global Mean Temperature below 2°C compared to pre-industrial temperatures.⁷¹

Despite this initiative, sea-level is continuing to rise and accelerate. According to IPCC (Intergovernmental Panel on Climate Change), the global sea-level rise will be between 0.43m and 0.84m higher in 2100, and its impact will threaten coastal communities, cities, and low-lying islands.⁷² In the absence of adaptive and preventive measures along the coasts, storms, flooding, coastal erosion and salinisation are expected to increase significantly.⁷³

The following table, retrieved from the Metropolitan Plan of adaptation to Climate Change (for the metropolitan area of Lisbon), lists the potential impacts on the cost of the Tagus estuary with the rising sea levels.⁷⁴ Moreover, a Sea Level Rise viewer⁷⁵ was developed by the science faculty of the University of Lisbon, intended to create maps with coastal flood scenarios to sea level rise in Portugal. *Map 8* is a cartography of predicted tidal submersion levels in 2100, showing the vulnerability of the Eastern coast of Almada, more specifically on the Lisnave and Alfeite platform, as well as the neighbourhood Cova da Piedade. The coastal region is very vulnerable and will be directly affected by the rising water, likely causing partial submersion of the platform during high tides and storms. The submersion scenario predicts and indicates on the map that most of Lisnave’s platform will be partially submerged for 9 hours per year and a few areas for up to 88 hours per year. No part of Almada’s coast is predicted to be under permanent submersion. On the other hand, Cova da Piedade, located at the bottom of the valley, is expected to suffer many floods in the case of extreme climate events.

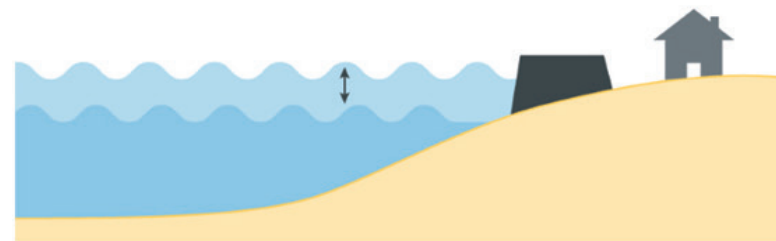
As a response to the possible consequences of the Sea Level Rise, it is crucial to develop plans of action to protect, reduce risk and build resilience along coastal areas.⁷⁶ The implementation of coastal protection measures can provide stability and preservation of the city’s coastline. To give some guidance about the response to the Sea Level Rise effects, IPCC developed reports on adequate responses and a framework of assessment. The report mitigates the effects of climate change and advises how communities and cities can adapt to the approaching impacts caused by the rising sea-level. Moreover, it is imperative to analyse both constraints and vulnerabilities of the areas at risk before deciding on the right response.

The adaptation strategies that focus on the anticipated risks to the vulnerable coastal areas fall into four categories: Protect, Retreat, Accommodate and Advance. *Protect* is a reactive strategy that intends to preserve people, properties and infrastructures from the effects of sea-level rise. This response reduces coastal risks by introducing a barrier that protects the coast from flooding, erosion and saltwater intrusion. This strategy protects facilities and critical infrastructure that would be difficult to move or relocate.⁷⁷ *Accommodate* is an adaptive strategy that allows a continued occupation of the coastal area through human behaviour and infrastructure changes.⁷⁸ This response often requires modifying existing infrastructure by raising the ground, improving drainage facilities, encouraging salt-resistant crops, restoring sand beaches, and improving flood warning systems. *Retreat* is another adaptive response which moves people, assets and human activities out of the coastal hazard zone. This strategy discourages any development in areas vulnerable to sea-level rise effects and includes withdrawal, relocation and abandonment of private and public properties located in high-risk areas. The final strategy *Advance*, also referred to as ‘Attack’, which extends facilities by building out onto the water with piers, docks, platforms or land reclamation. This strategy is only ideal for facilities requiring direct access to water.⁷⁹

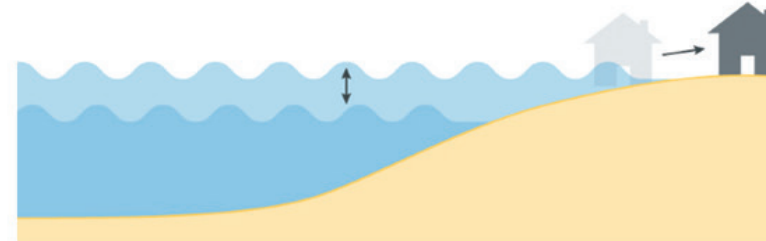
<i>Event</i>	<i>Potentially impactful climate events</i>	<i>Potential impacts resulting from the Sea Level Rise</i>
Sea level rise in the Tagus estuary	• Storms • Intense precipitation • Strong and persistent winds • Increased frequency and intensity of extreme events • Combined effect of different climate variables	• Increase in floods • Erosion of the margins • Erosion and flooding of the wetlands • Coastline retreat and migration of the ecological systems to land • Trend towards the artificialization of the coastline • Use and occupation of land/exploitation of resources (increased vulnerability and coastal risk): - Damage to urbanized/built-up areas (housing, commerce, services., etc.) - Damage to ports and marinas - Aquifer contamination and loss of agricultural productivity - Reduction in the capacity of the drainage systems (floods) - Impacts on sanitation infrastructure - Reduction of areas of high biodiversity (wetlands) - Silting of the lagoon body - Reduction/loss of landscape heritage (historic buildings, salt pans, among others)

Table retrieved from *The Climate Change National Adaptation Strategy* (ENAAC 2020)

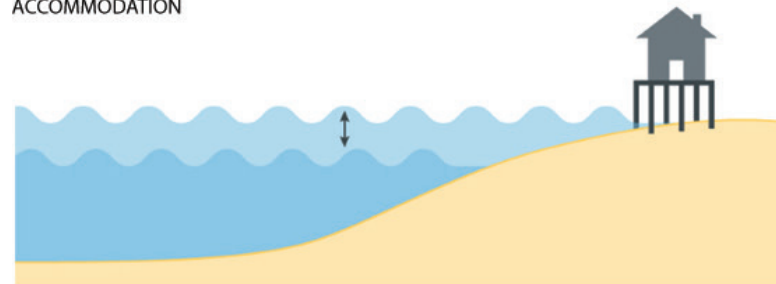
PROTECTION



RETREAT



ACCOMMODATION



ADVANCE

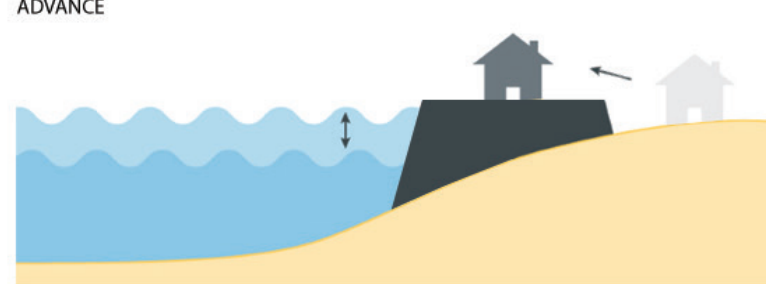
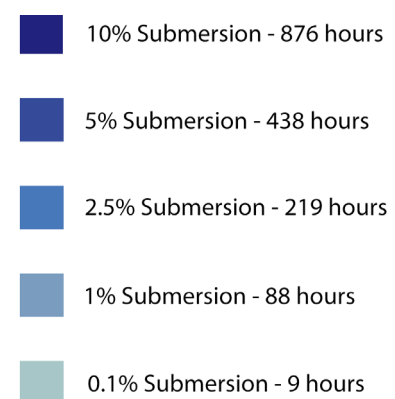
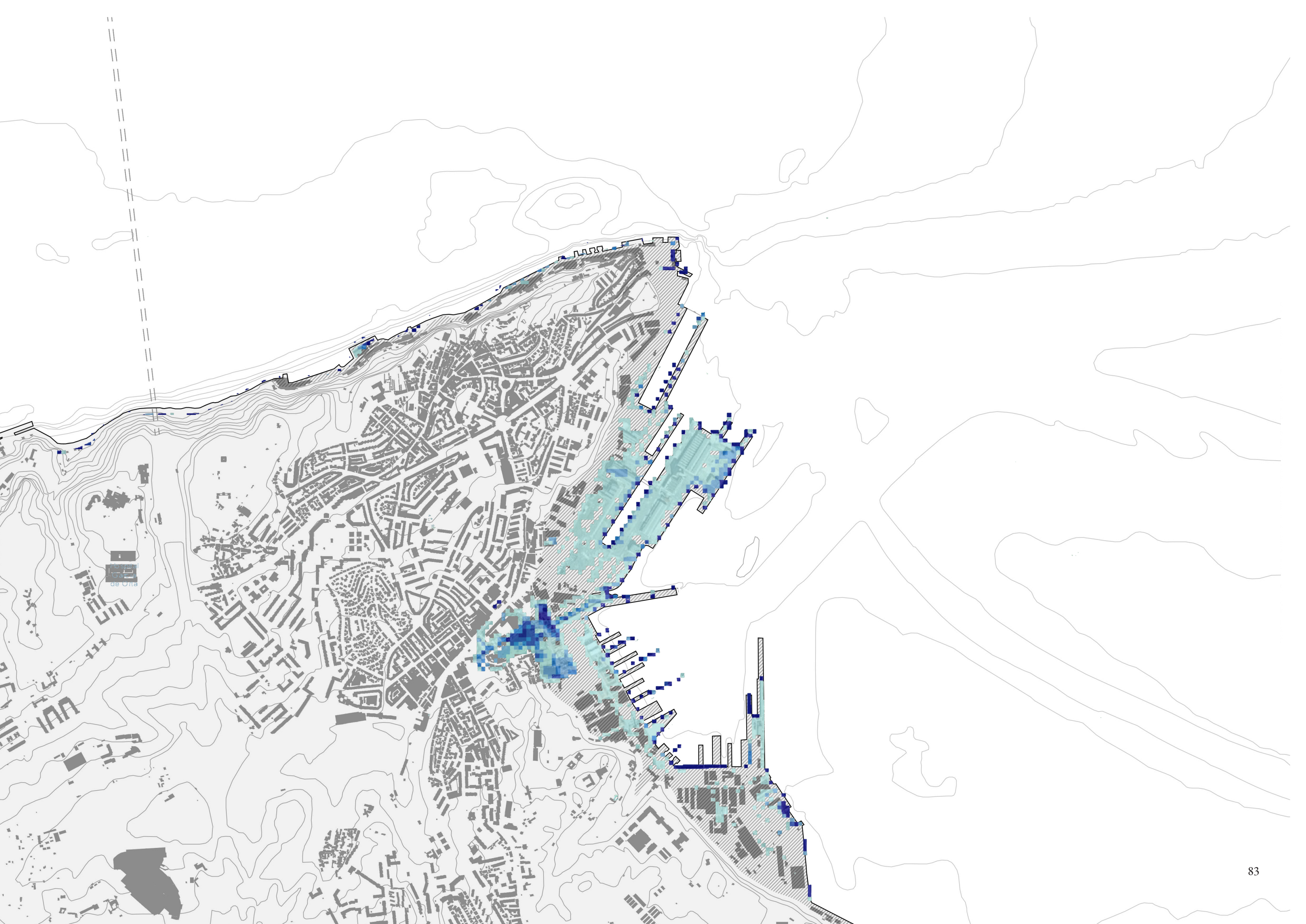


Diagram: Sea-level rise adaptation strategies.

Map 8. Almada's coastline 2100.
(Drawing by the author)
Scale 1:15000

Sea Level Rise Viewer – Coastal Flood Scenarios to Sea Level
Rise for Portugal, in accordance with European Directive
2007/60/EC.





Chapter II

The encounter between Land and Sky



Image 42. Aero view over Almada [Photograph]

A vertical reading of Almada

When one takes a first glance at Almada, the city's verticality is one its most prominent aspects. This verticality was a strategic incentive for many occupations in this territory throughout time. Looking over the Tagus river, the vertical condition of the territory provided both safety and protection for settlements. Furthermore, it provided a clear and beautiful panoramic view over the river and lands beyond, creating an exceptional visual connection between Almada and its surroundings.

When analysing the territory of Almada, the first vertical element that can be observed, with a substantial impact on the perception of the city, is its topography. The city was established on the top of the accentuated topography, taking full advantage of its benefits, towering above the Tagus and overlooking Lisbon. When looking at Almada from the northern margin on the other side of the river, the most distinctive aspect of its landscape are the tall cliffs emerging from the Tagus's water which face the city of Lisbon. These cliffs became the greeting card of Almada as one approaches the city from the river or the bridge.

One can also observe that the city's verticality is given by its built environment that further formulates and articulates the landscape. Considering that cities grow and develop not only through a horizontal expansion but also through vertical movement due to the construction of taller buildings and infrastructures. To broaden the vertical reading of Almada, it is imperative to understand the development of the city through the vertical growth of its urban fabric throughout time. The number of floors within a building substantially impacts the city's visual connections, spatial quality, density and skyline.

Lastly, the verticality of Almada is represented by its vertical landmarks. These landmarks have been used throughout history to commemorate significant events and establish particular points in spaces. They become important elements in the city's memory, identity, and spatial articulation. Moreover, the vertical characteristics of such elements create a strong spatial relationship with its surroundings. When incorporated within a city, it creates a spatial hierarchy and a visual orientation in space.



Image 43. Aero view over Almada, the Tagus and the bridge[Photograph] (2017).

Topography

Almada is positioned in a territory marked by its strong topography and connected visually with the Tagus and its counterpart, Lisbon. The strong accentuation of Almada’s topography is contoured by the cliffs that confront and follow the southern margins of Tagus. These cliffs not only define the edges of the territory’s northern margins but also, the encounter with the river. This continuous and steep escarpment runs along the Tagus’ margins for more than 7 km, from Cacilhas to Trafaria, and reaches altitudes above 100 m. Although continuous, these escarpments are interrupted by ditches created by the water lines that lead to the Tagus. Moreover, the cliffed northern coast of Almada has a slope percentage up to 60% with a very recent, rugged and unstable geological configuration with high risks of erosions.⁸⁰

In contrast with the rigorous cliff on the northern coast, there is a significant change in the topography of the eastern coast. The accentuated terrain of the northern margins becomes more moderate and less steep as it moves to the east, until it becomes a flat terrain in Cacilhas. The eastern river margins of Almada are characterised by a flat artificial platform that reaches towards Tagus and runs along its margins. Moreover, the ridge established in the northern coast gradually declines as it moves south, towards the centre of the terrain, reaching an altitude between 80 and 60 metres, and a slope of 20% to 15%. The topography slopes down until it reaches the bottom of a valley, forming a water line which connects the mainland with the river.

At the top of the northern cliffs, traces from both Roman and Moorish occupations have been found, revealing their settlement positions along the edge of Almada. The steep escarpments protect the south-facing slopes from strong winds coming from the river.⁸¹ The high cliffs granted the settlements a secure and defensive location by serving as a natural barrier and providing a clear view over the horizon. Moreover, Almada’s high topography provided more than the opportunity of surveillance but also with a pleasant view over its surroundings, as illustrated (*Image 44*) and eloquently described by William Miller in his text “Lisbon, from Almada”:

*Opposite to Lisbon stands Almada, on the summit, near the east end, of the high cliffs, which extend along the south bank of the Tagus, from there to the sea. From this elevated situation we have a panoramic series of views of incomparable grandeur. To the North, the whole expanse of Lisbon is seen covering the opposite hills, and forming a brilliant border to the Tagus. To the West, the noble river is seen continuing its majestic course, and flowing into the Atlantic Ocean, between the distant towers of St. Julian and Bugio. To the East, the river spreads out into a vast estuary, bounded by a long tract of level ground. To the South, the heights of Almada slopes down into a valley covered with vineyards [...]*⁸²

The visual connection that Almada forges with the river and the adjacent margin becomes an important aspect of the city’s identity. It later gave Almada a reputation of the viewpoint over Lisbon and the Tagus, becoming a tourist attraction, illustrated (*Image 45*) and disclosed in the Portugues magazine of art and tourism in 1943:

*This position on the left bank of the Tagus, from where Lisbon can be better understood and admired, is Almada. And if Almada is, due to its natural geographical situation, the only viewpoint over Lisbon, it is logical that the attention of tourism should be turned to it.*⁸³

80. “A arriba, classificada como Reserva Ecológica Nacional (REN), de exposição a norte, cujo declive dominante é superior a 60%, exibe uma configuração geológica muito recente, acidentada e instável em que o risco de erosão é elevado em toda a sua frente. PROA. (2015). *Estudo de Enquadramento Estratégico – Quinta do Almaraz.*” Retrieved from: <http://www.proap.pt/pt-pt/projecto/quinta-do-almaz-2/>

81. Departamento de Planeamento Urbanístico. (2011). *Revisão: Plano Diretor Municipal de Almada – Estudos de Caracterização do Território Municipal, Caderno 5.* Almada: Câmara Municipal de Almada..

82. Miller, W. (1832). Lisbon, From Almada. In R. Batty (Ed.), *Selected views of some of the Principal Cities of Europe*. London: Moon, Boys and Graves. p. 158.

83. “Pois este ponto da margem esquerda do Tejo, de onde Lisboa melhor se pode compreender e admirar, é Almada. E se Almada é, pois, pela sua natural situação geográfica, o único miradoiro sobre lisboa, é lógico que para ela se voltem as atenções do turismo.” In Pelayo, J. (1943, October 17). Varandas sobre Lisboa: Sugestões de um passeio a Almada. *Panorama: Revista Portuguesa de arte e turismo* n.º 17, pp. 42-43.



Image 44. Lisbon from Almada (1830).



VARANDAS SÔBRE LISBOA

SUGESTÕES DE UM PASSEIO A ALMADA

por Jorge Pelayo

O relevo de Lisboa permite que existam, espalhados pela cidade, alguns miradoiros. Integrados, por assim, dizer, no casario, sentimo-nos levados antes pelo sentido e gosto da orientação e localização. A vizinhança dos prédios distrai-nos, a cidade apresenta-se-nos, pela proximidade, mais como um aglomerado humano que como um conjunto, mais ou menos estético, de edificações. A visão é, por todos os aspectos, parcial e reduzida.

Mas existe um ponto que pela sua especial situação é o

único miradouro sôbre Lisboa. E o espectáculo dali não é só panorâmico, é também histórico. Podem apreciar-se os estratos da formação da capital: primeiro a parte ribeirinha, a mais antiga — que Lisboa nasceu com o mar; depois as épocas vão desfilando, concretizando-se em diferentes manchas de côr e aspecto; lá para o fundo, quasi a adivinhar-se já, a parte moderna, as novas veias que de há cerca de quinze anos se vem enriquecendo.

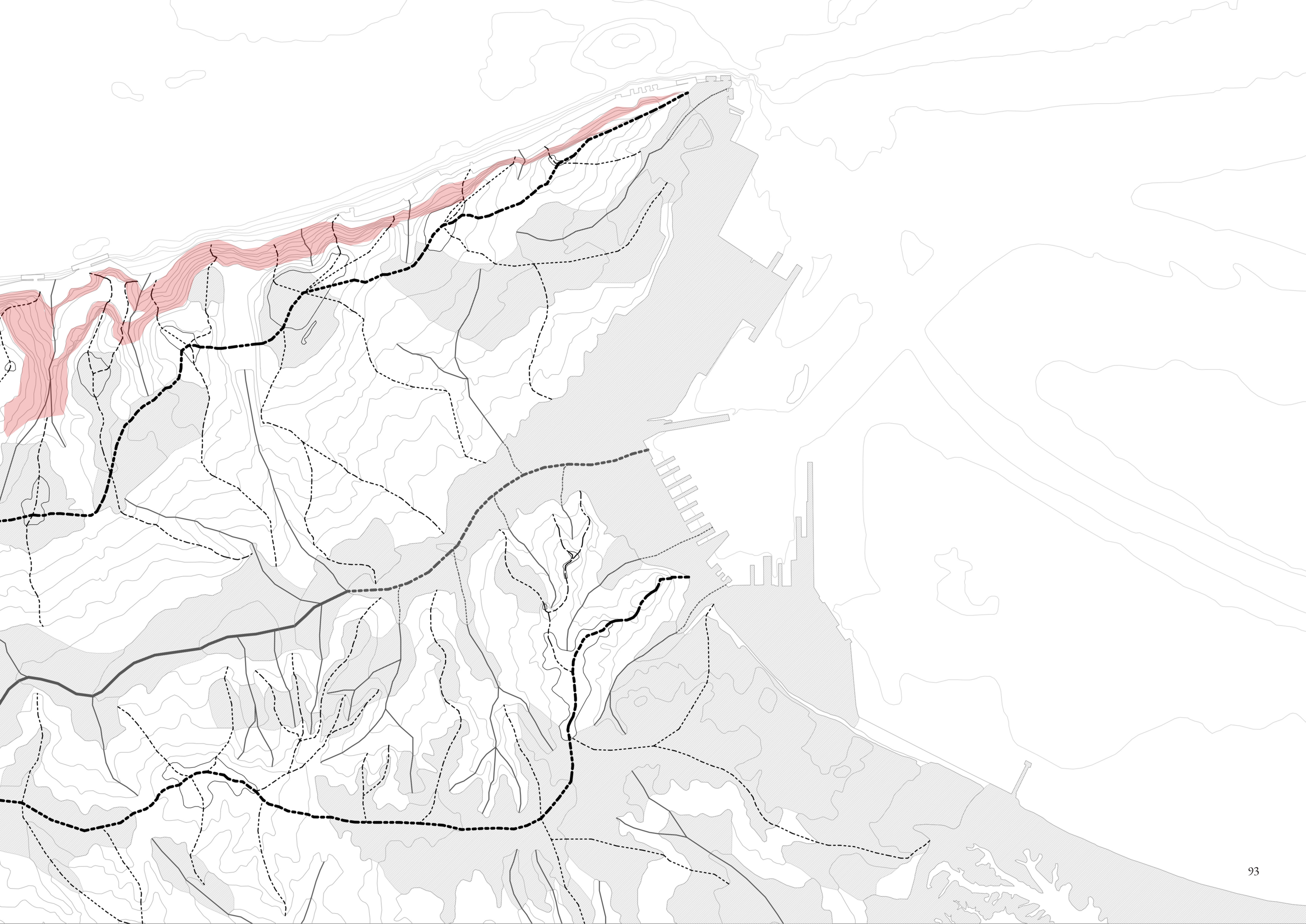
Acompanhando o colear da fita maravilhosa do Tejo, Lis-

Image 45. Illustration of the view of Lisbon from Almada (1943).

Map 9. Topographic analyses of Almada.
(Drawing by the author)
Scale 1:15000

A physiographic analysis of the territory of Almada. Here both the crest lines are represented, creating a comprehensive and deeper understanding of the topography.

A crest line is drawn in the northern region of the terrain; at some point, the altitude reaches above 100m. This crest line gradually descends as it reaches Cacilhas in the North-East terrain. The Map shows how the Northern cliff range is cut with water lines created by the valleys. The red section represents the areas with a slope equal to or greater than 50%. Moving South from the cliff range, the topography descends into a valley that extends into the Eastern margins of the terrain. The bottom of this valley is represented on the map with its waterline. The grey section describes the areas with a slope equal to or smaller than 5%.



Built Environment

The views from the Castle of Almada are in every direction fine: up the river towards Alhandra, right across it where the whole of Lisbon is spread before you, and down the tide to Belem, beyond and behind which rise the rocky, jagged heights of Cintra.

Dora Wordsworth, 1847

On the top of the hill, the Castle of Almada was founded during the Iberian occupation, enhancing the defence and surveillance over the river’s entry. Because of its strategic position and topography, Almada becomes an essential point of access to the Tagus estuary and part of the military’s defence of Lisbon. The cartography drawn by Alain Manesson Mallet in 1663 (**Image 46**) illustrates the Castle’s visual connection with the northern margins of the Tagus. Cacilhas on the other hand becomes a commercial port connection between Lisbon and Almada, due to its easy connection with the river.⁸⁴

The city developed from a cluster of dwellings constructed within the walls of the Castle of Almada, situated at the top of the territory. The potential for agricultural production and fishing was highly important for the development of the settlement. The city developed from the Castle towards the west, following the natural slope of the terrain.⁸⁵ Here, the settlement established itself as a villa, with an agglomerate of low and small houses, which is now known as the historic centre of Almada or Almada Velha⁸⁶. Both the village and the Castle are a vertical extension of the accentuated territory, extending the land upwards, creating a vertical movement, crowning the top of the cliff range. **Image 47** is an illustration from 1600 that depicts the village of Almada and how it originated from the Castle and followed the topography, along the top of the hill overlooking the river and Lisbon. The dwellings are low, with the exception of the Castle that marks its presence in the territory. As depicted by Alberto Pimentel in 1908, the city of Almada crowns the top of the hillcrest:

*Villa d’Almada, set on a plateau, which you climb from the Cacilhas pier, nobly crowns the county’s territory.*⁸⁷

The city’s location emerges from the top of the cliffs granting a direct and visual connection with the river and lands, across the water. The clifty terrains of Almada are ideal for defensive strategies, and the Castle of Almada became the foundation of it’s military character. Jose Giuseppe Baretti describes in 1896, the picturesque views of Almada in one of his letters to his family:

*From the windows of this small convent you can enjoy the most beautiful views in the world, because on one side you can see all of Lisbon, and Belém, the river, the sea, endless boats, different castles and forts, which defend the mouth of the Tagus, and on the other beautiful green and well-cultivated hills; so this, as for me. And a panorama far superior to the famous promontory I have already told you about, Mount Edgcombe, near Plymouth, England.*⁸⁸

In his description of what he can see through the convent’s window, Baretti recognizes the positioning of the fortresses and castles which protects the river and its land. The military’s influence on Tagus’ margins becomes evident here – taking advantage of the close proximity to the river and elevated topography, used for the city’s defence and protection. This is further reinforced in a painting ,by an unknown artis, of the view of Lisbon from Almada in the 18th century (**Image 48**). The painting reveals the elevated position of the two castles, overlooking the Tagus and one another. The river is a strong element in the painting and the boats give the scene life and movement. Here, the Tagus becomes a surface that connects the two lands. The construction of the castle delineates the development of the military field and its construction along the margins of the Tagus, taking advantage of it as well as the land’s topography. Ergo, the village of Almada became, during mediaeval times, an important Iberian military square until D. Afonso Henriques conquered the territory in 1147.⁸⁹

Almada did not suffer many alterations until a devastating earthquake in 1755 that caused considerable damage to the entire territory. The reconstruction of the city was prolonged until the 19th century. Moreover, the villa continued to benefit from agricultural production and fishing activities. Consequently, the territory’s interior was occupied by farms distributed according to the topography of the terrain, following its morphology and emphasising its accentuation. The farms incorporate a few small dwellings for housing and storage but create no clusters. The houses are low with no density, unlike the village. The presence of farms and their horizontal nature covering the territory creates a strong emphasis on the topographical characteristics of the land.

84. Cruz, M. A. (1973). *A Margem Sul do Estuário do Tejo – Factores e Formas de Organização do Espaço, Almada*. Lisbon: Livraria Portugal. p. 118.

85. Barros, L. (1983). *Cacilhas – uma experiência de arqueologia urbana, Al-Madan*. Lisboa: Instituto Oriental, Lisboa. p. 25.

86. Old Almada, in portuguese.

87. “A villa d’Almada, assente num planalto, para o qual se vai subindo desde o cais de Cacilhas, coroa nobremente o território do concelho”. Pimentel, A. (1908). *A Estremadura portuguesa. Volume II*. Lisboa: Empreza da História de Portugal. p. 244.

88. “Das janellas desse pequeno convento se desfrutam as mais belas vistas do mundo, porque de uma parte se avista toda Lisboa, e Belém, o rio, o mar, infinitas embarcações, diferentes castelos e fortalezas, que defendem a foz do Tejo, e da outra lindíssimas colinas verdejantes e bem cultivadas; por maneira que este, quanto a mim. E um panorama muito superior ao famoso promontório, em que já vos falei, o monte Edgcombe, perto de Plymouth, em Inglaterra.” Baretti, J. G. (1896, may 5). Portugal in 1760 – Cartas Familiares de Jose Baretti traduzidas do italiano (1760) *Occidente* n.º 625, p. 102.

89. Atkins; Partnership, Richard Rogers; Santa-Rita Arquitectos. (2006): *Almada Nascente (Vol. 1)*. Almada: Câmara Municipal de Almada. p. 42.



Image 46. Lisbonne (1663).



Image 47. View of Almada (1810).



Image 48. View over Lisbon from the S. Paulo Convent and Almada Castle (End of 18th century).



Image 49. Hydrographic Map of the Port of Lisbon (1847).



Image 50. Cacilhas (1809).

90. Gonçalves, A. (2002). *O Recreio e Lazer na Reabilitação Urbana – Almada Velha*. Lisboa: Instituto de Financiamento e Apoio ao Turismo. p. 67.

91. Almada velha publicação. (2012, january 31). *Diário da República*, 2.ª série, N.º 22.

92. Gonçalves, E., & Silva, F. (2012). *Cova da Piedade, Património e História*. Almada: Junta de Freguesia da Cova da Piedade. p. 71.

The agricultural production – provided by the fertile land and the fishing activity along the Tagus – combined with the strategic positioning of Cacilhas for commercial trading significantly impacted Almada’s economy.⁹⁰ Consequently, the city developed along the river margins, to support the commercial activities. The development of the urban fabric, following the connection axis, given by Rua Elias Garcia and Avenida Povo MFA, gave structure to the city, connecting the village of Almada with the port of Cacilhas. The axial trace of the connection of these two critical points can still be seen in the city’s urban layout today. A detail of a cartography (*Image 49*) from 1806 illustrates the village of Almada as a small cluster of buildings on top of the hill and the initial development of dwellings along its margins, which supported the city’s port activities. The cartography further depicts the structural axis of roads that connect the nucleus of the village and the port in Cacilhas. The village occupies the top of the terrain, whereas the city’s commercial and port-related elements were placed in the lower part of the topography, close to the river’s margin. Moreover, the map also illustrates the presence of farms in the interior of the territory, emphasising its topography.

After the 18th century, more dwellings took advantage of the opportunities that being close to the river could provide and, consequently, more warehouse and industrial installations were built along the margin.⁹¹ A drawing by Luiz Gonzaga Pereira from 1809 (*Image 50*) illustrates the construction of the storehouse and industrial facilities along the northern coast of Almada. This strip of buildings that follow the margin has a substantial impact on the city’s landscape, followed by the accentuated topography behind it. The buildings range from 2 to 3 stories high, and its aligned cluster creates a wall-like expression, mimicking the cliff range, integrating effortlessly into their environment. This results in a vertical continuation from the dwellings, into the topography and towards the sky. This second development of the city, unlike the village, is placed on the lowest part of the topography, where a physical connection with the river was possible.

During the 19th century, Almada started to undergo many alterations due to the growing weaving, shipbuilding, milling and cork industries along its margins. The growth of these industries provided a surplus of job opportunities, resulting in an increase in population.⁹² The industrialization of Almada induced growth in the village, resulting in an urban expansion, development of its nucleus and the introduction of industrial zones along the river. The detail from a cartography of the Tagus river and its margins from 1883 reveals the urban growth of Almada, as well as the development in Cacilhas, the establishment of industries along the margins and the expansion of the village. The two nuclei of Cacilhas and the village of Almada expand towards one another providing a strategic connection, establishing a better relationship between the top and the bottom of the territory.

A panoramic view of the village is shown in *Image 51*, where its high position within the terrain becomes clear. The image illustrates the urban development and the cluster of buildings which follows the topography. The dwellings are homogeneous in height, and although the village seems dense, the heights of the buildings are low. Here, the city’s verticality is accentuated by the bell towers of the churches as focal points in the landscape. Moreover, *Image 52* reveals a street from the village in 1890. The dwellings range from 2 to 3 stories high and follow the configuration of the road, creating a corridor and helping to define the urban space.

The installation of the industries and buildings to support the port activities caused a change in the landscape along the riverside (*Image 53*). The buildings along Cacilhas gives the flat terrain some verticality and creates a contrast with the horizontal nature of the river. The dwellings are relatively low in height, ranging from 1 to 2 stories. Their configuration follows the river margins and continues up the hill towards the village of Almada. This verticality is further accentuated by the introduction of the lighthouse, constructed on the edge of the port, in 1886.



Image 8. Plan of the Tgaus river and its margins [Cartography detail] (1883).



Image 51. Village of Almada (1905).

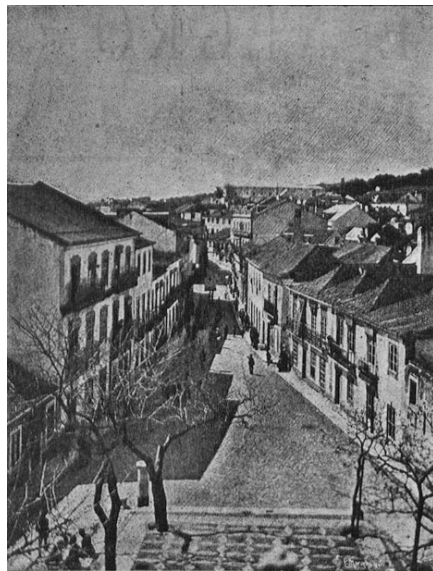


Image 52. Almada, Rua Direita (1890).



Image 53. Cacilhas and its light house (1932).

93. Almada velha publicação. (2012, january 31). *Diário da República*, 2.ª série, N.º 22.

94. Cardoso, A. & Luiza, A. (2020). *Almada: Um território em seis ecologias*. Almada: Câmara municipal de Almada.

95. Cavaco, C. (2011). Expansão Norte da Cidade de Almada, Planos de Pormenor e urbanizações de promoção pública. In N. Portas, N., Domingues, A., Cabral, J. &, Travasso, N. *Políticas Urbanas II – Transformações, Regulação e Projectos*. Lisboa: Fundação Calouste Gulbenkian. pp. 270-277.

96. Atkins; Partnership, Richard Rogers; Santa-Rita Arquitectos. (2006): *Almada Nascente* (Vol. 1). Almada: Câmara Municipal de Almada. p. 57.

97. Lamas, J. M. (2000). *Morfologia Urbana e Desenho Urbano da Cidade*. Lisboa: Fundação Calouste Gulbenkian. p. 71.

The industrialization of Almada started to gain momentum in the 20th century with the installation of shipping industries and shipyards along the river margins. This resulted in both a physical and an economical expansion of the city. The demand for labour led to an increase in employment opportunities and drastic population growth. There was extensive migration, from the mainland and south of Portugal, of people in search of jobs in Almada’s flourishing industries. With this surge in population, came the issue of habitation and lack of infrastructure to support the city’s expansion, which resulted in uncontrolled urban growth altering the rural nature that, for a long time, characterised the city’s landscape.⁹³

Portugal’s territorial and urban planning was established in 1934 with the PGU (Planos Gerais de Urbanização) legislation. Under the management of the engineer Duarte Pacheco, this legislation gave ground for the first urban intervention of Almada.⁹⁴ Almada’s urban expansion began in the 1940’s, due to the growth of industries and population, and resulted in a suburbanization of the city’s territory.⁹⁵ In 1943, the urbanists Étienne de Gröer and Guilherme Faria da Costa were invited to elaborate the Urban plan of Almada (Plano de Urbanização do concelho de Almada). The plan aimed to not only organise, articulate and connect the scattered developments in the territory, but also to provide housing. The plan is based on the trace of the roads which connected the village of Almada and the port of Cacilhas to support a further extension of the city.⁹⁶ Moreover, the urban plan strikes a resemblance with the concepts of the Garden city, with vast green spaces and a low-density urban fabric. A drawing of the Urban plan (*Image 54*) illustrates the organisation of new dwellings along the roads. The plan depicts scattered buildings within planned green spaces.

Section profiles (*Image 55*) of the proposed streets, reveals that, unlike the mediaeval nucleus of Almada, the new urban plan provided a substantial distance between the street and the buildings, implementing a narrow green space in between the dwellings. Furthermore, *Image 56* shows elevations of one of the typologies proposed, revealing that the new dwellings would be four stories high, creating a distinct relationship with the streets and articulation with the open spaces. As intended with the idea of the Garden City, this plan integrates slightly higher buildings and more open spaces between one another.⁹⁷

In Cova da Piedade, between 1940 and 1952, the neighbourhood Nossa Senhora da Conceição was built to address the need for housing for Alfeite arsenal workers. Designed by the architect Carlos Rebello de Andrade, the plan’s layout (*Image 57*) shows a very organic organisation, with two stories of single homes with their own private garden space. The neighbourhood still exists today consisting of dwellings reaching 1 to 2 levels in height with a low-density arrangement (*Images 58 and 59*).



Image 54. Urbanization plan of Almada (1950).

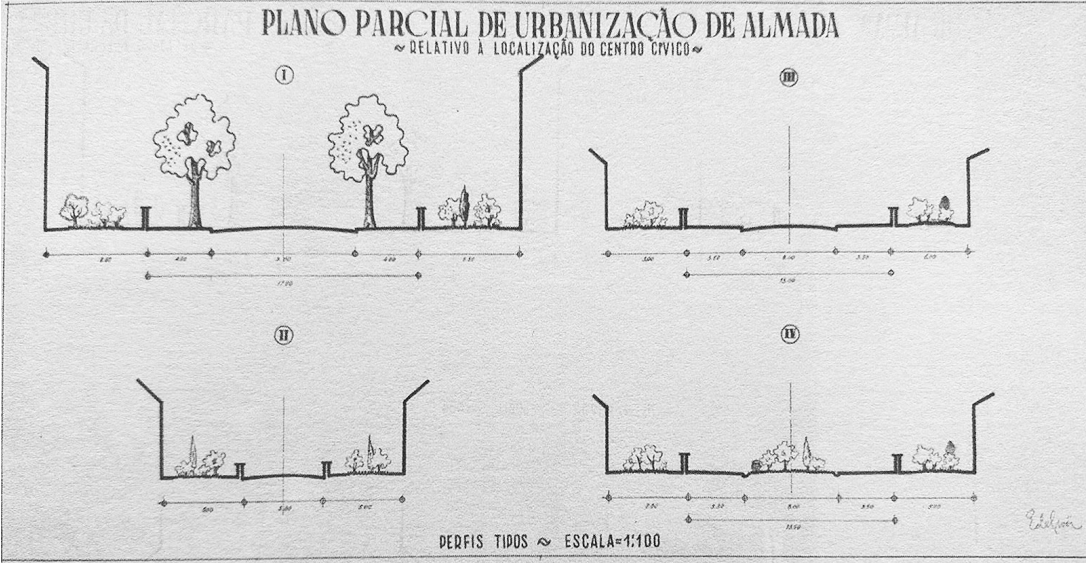


Image 55. Section profiles for the civic center of Almada (1950).

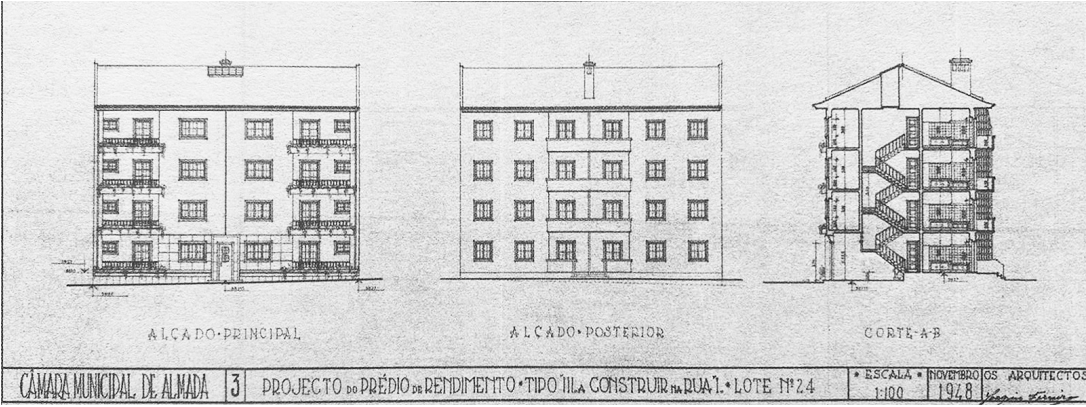


Image 56. Main elevations (1948).



Image 57. Almada Economic District Plan- Nossa Senhora da Conceição (1952).

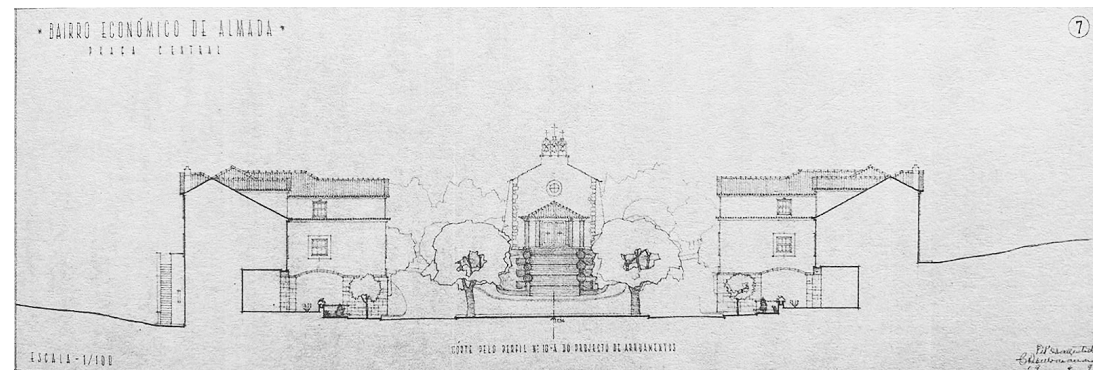


Image 58. Section through the main square of the Economic distric (1949).

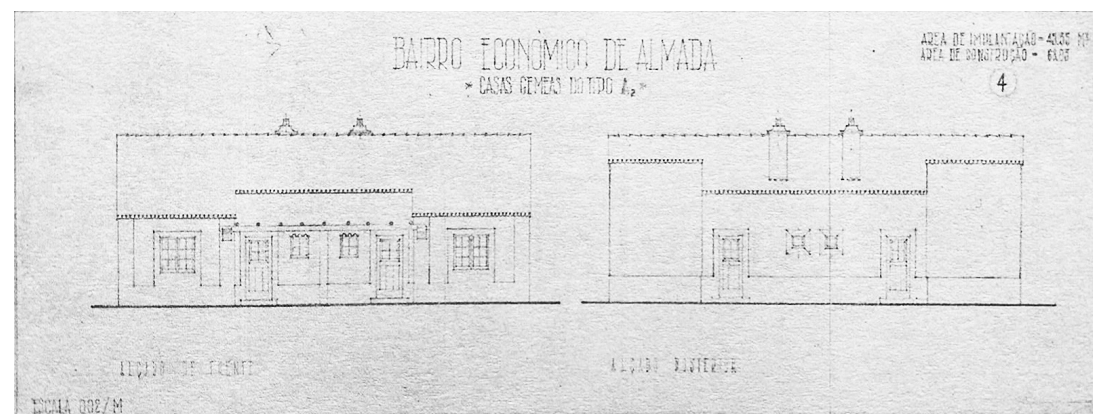


Image 59. Elevations (2021).

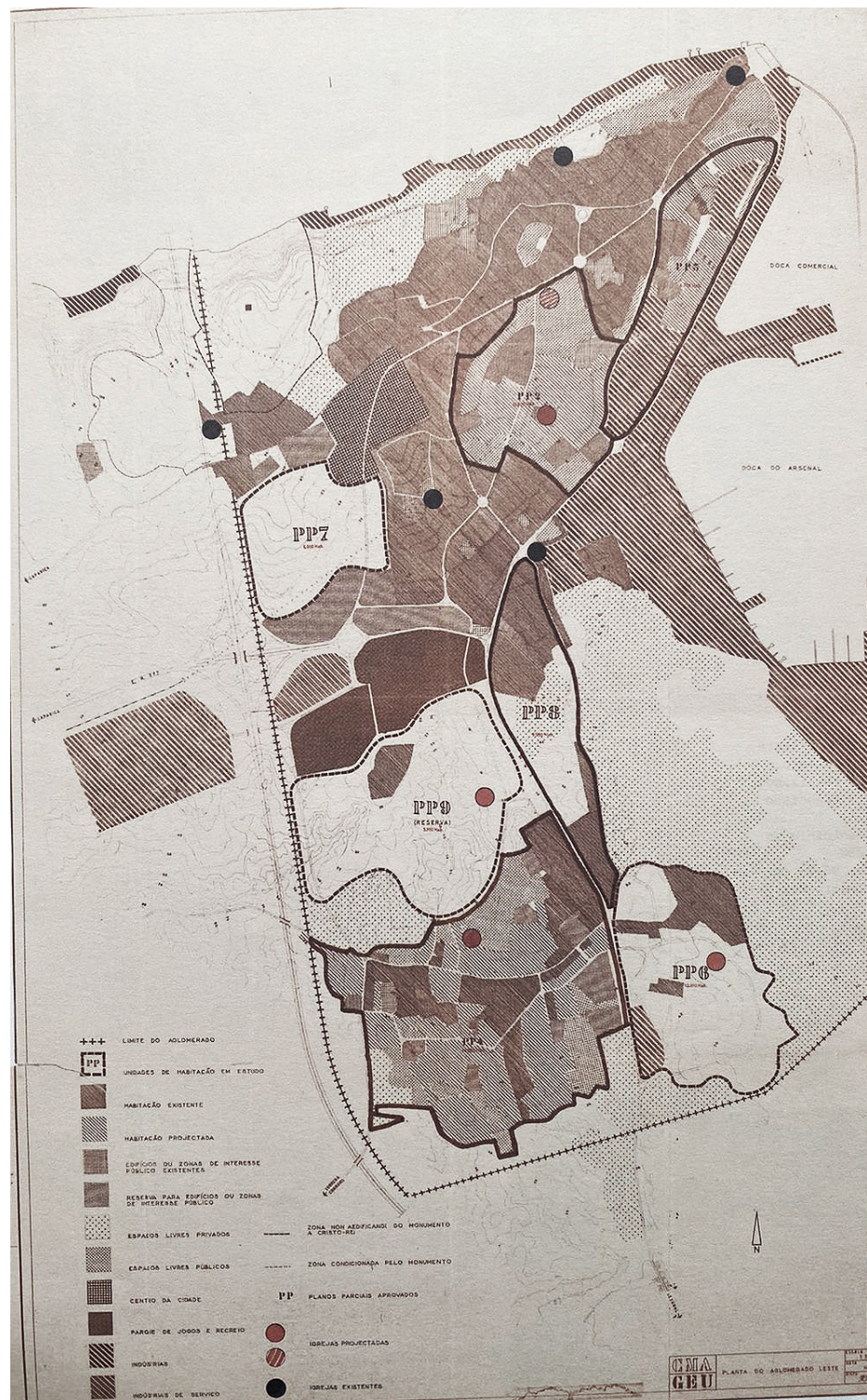


Image 60. Partial Plans of the East Agglomerate of Almada (1960).

A larger urban plan intended to give the city of Almada more autonomy from the city of Lisbon was developed by the Urban Cabinet of Almada (GU-CMA), formed in 1955. The GU-CNA developed a series of Partial Plans (PP) which followed the concepts of a modern city with less density, but with taller buildings, with collective housing that was more isolated and detached from the roads.⁹⁸ The new buildings in the Partial Plans included higher dwellings providing more levels and, therefore, more housing. The introduction of taller buildings in the city’s urban fabric addresses two issues: the lack of housing and the implementation of more green and open spaces.

The first Partial Plan (PP1) was executed in 1955 in the region of Torcatas. The plan proposed a series of modern blocks of a larger volume within the existing urban fabric (*Image 61*).⁹⁹ The buildings align with the existing roads and range between 3 to 4 stories high (*Image 62*). In the same year, the second Partial Plan (PP2) intervention was constructed in the south region from avenue D. Nuno Álvares Pereira. Like the first Partial Plan, the second also proposed a modern intervention and expansion of the existing fabric on a larger scale (*Image 63*). The buildings in this intervention become more autonomous and scattered — with more green spaces between them (*Image 64*). The buildings in PP2 take a larger scale and height than those in the PP1, reaching six stories. The following year, in 1956, the third Partial Plan (PP3) was formulated but only partially built. This plan intended to create buildings of collective houses in a zone previously intended for industrial use. The buildings in this plan were much taller than any previous construction and reached ten stories (*Image 65*).

The 1960s are marked by the bridge’s construction connecting the Tagus’ northern and southern margins and by the growth of the shipping industries with the construction of Lisnave. Consequently, there was a rise in population and densification of the city. Addressing the consequent and unsolved lack of habitation, the seventh Partial Plan (PP7) was developed in 1966 by the architects Conceição Silva, Maurício de Vasconcellos, Bartolomeu Costa Cabral, J. Paulo Oliveira and José Sommer Ribeiro.¹⁰⁰ The plan proposed a nucleus of a densified habitation complex articulated as towers within a vast green space (*Image 66*).

98. Cardoso, A. & Luiza, A. (2020). *op. cit.*, p. 15.

99. *Idem, ibidem*, p. 15.

100. *Idem, ibidem*, p. 16.

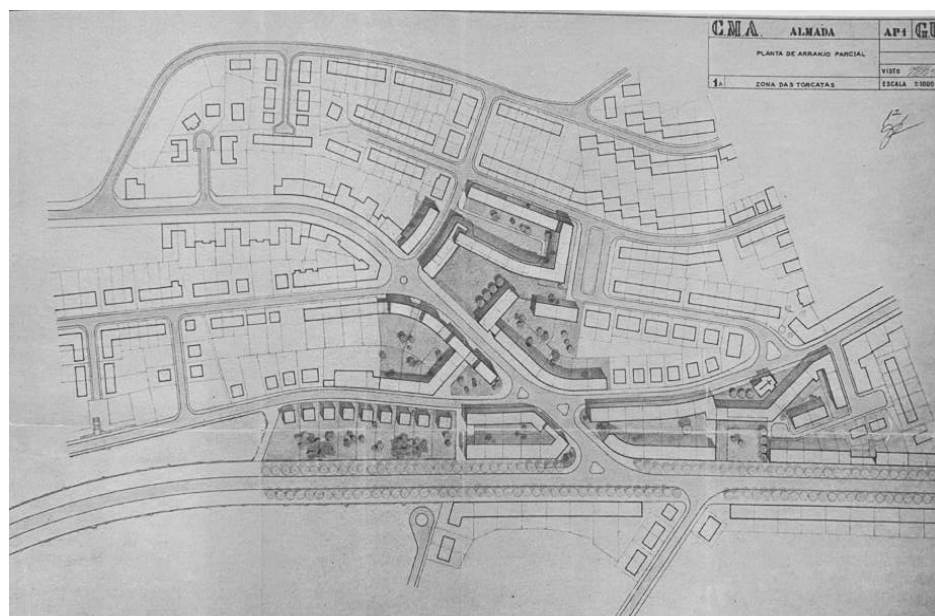


Image 61. Partial plan of arrangements in the Torcatas area, Cova da Piedade (1955).

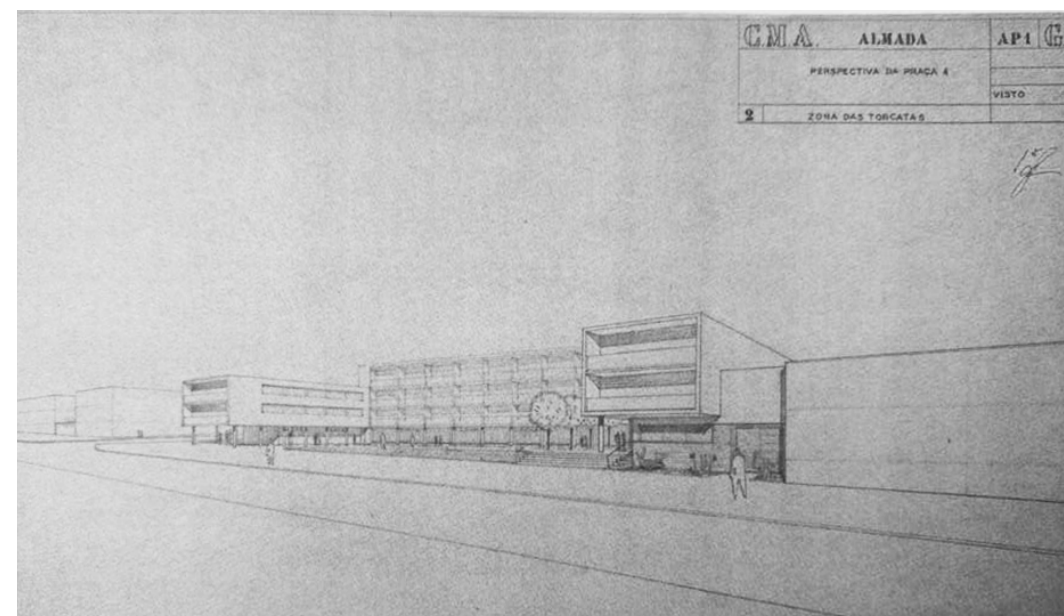


Image 62. Perspective of Torcatas, Cova da Piedade [Drawing]. (1955).



Image 63. Plan of the area south of Avenida Dom Nuno Álvares Pereira, Almada [Blueprint]. (1955).

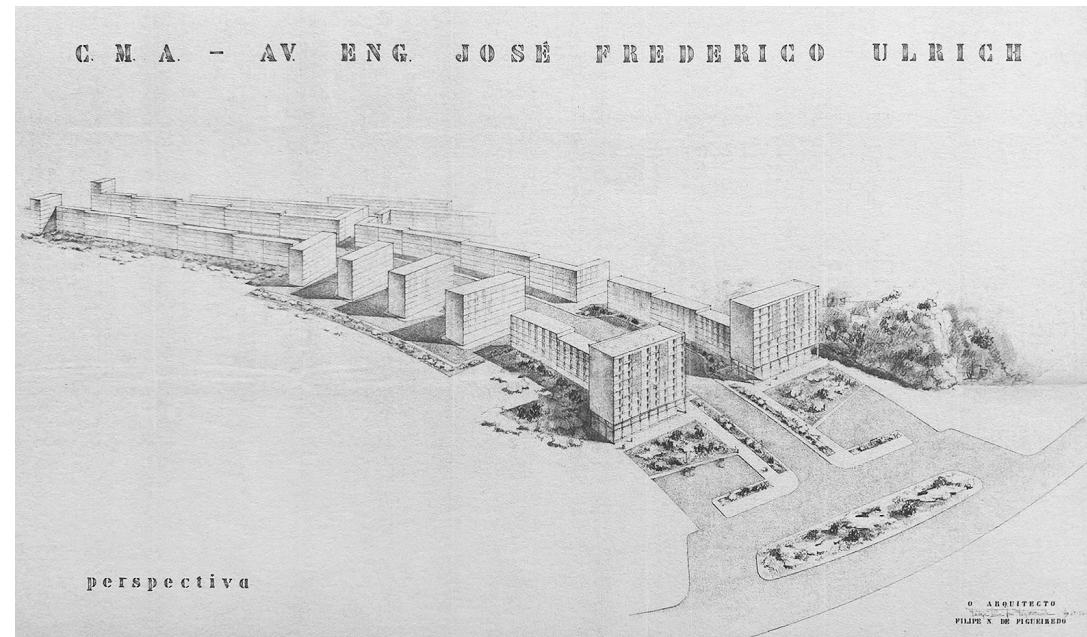


Image 64. Perspective of Av. Eng. José Frederico Ulrich, Almada [Drawing]. (1955).

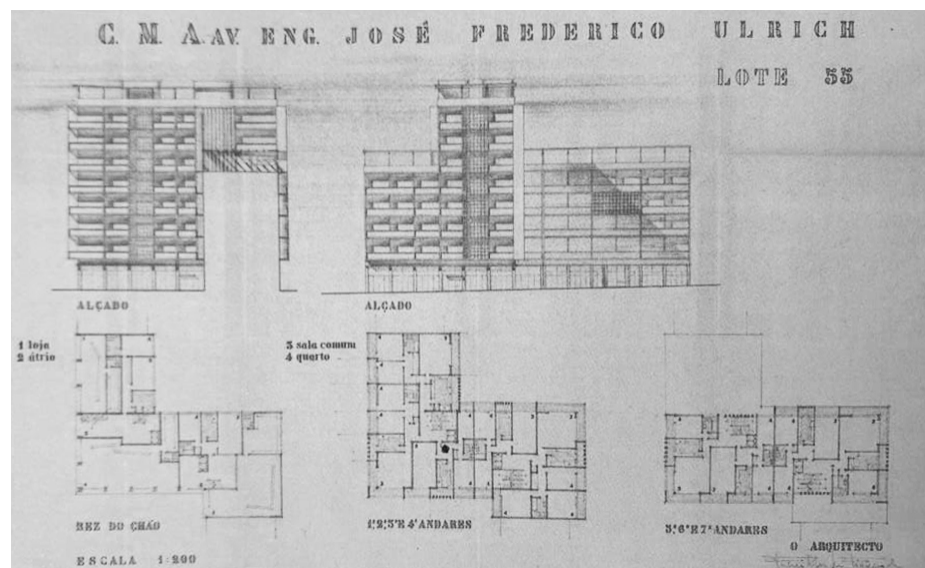


Image 65. Elevations of Av. José Frederico Ulrich, Almada [Drawing](1955).

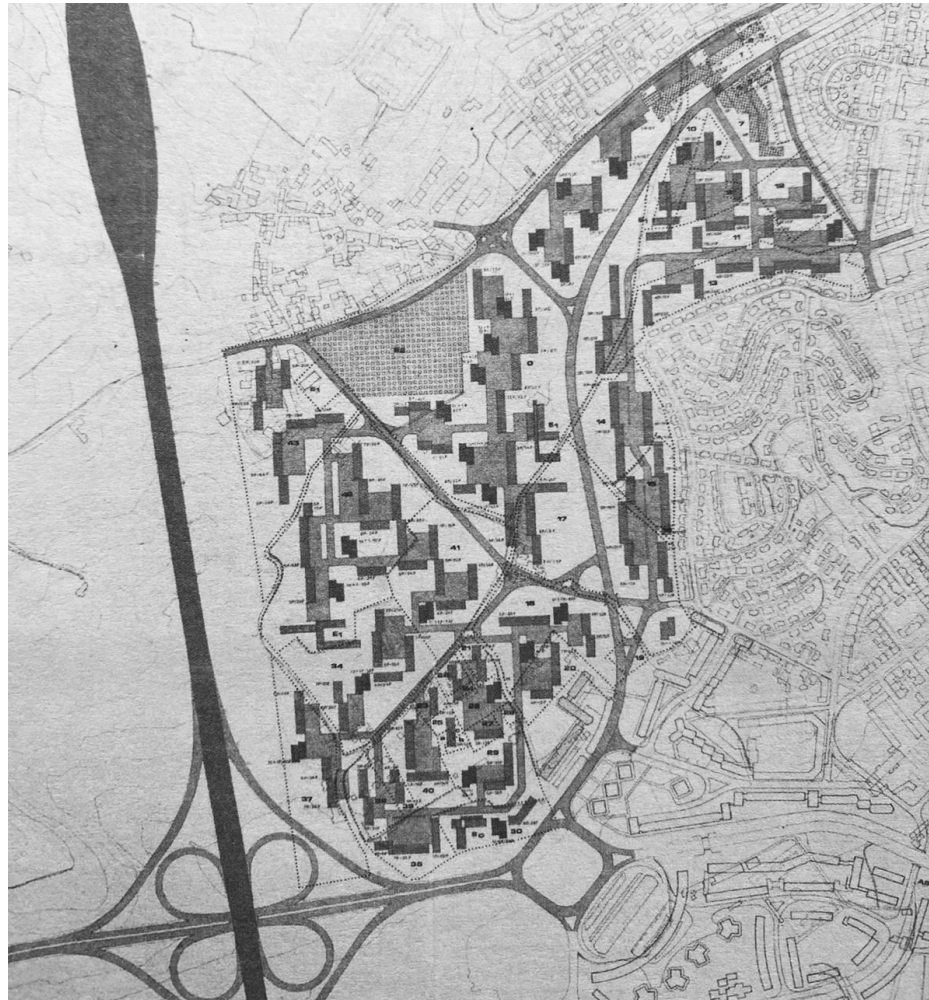
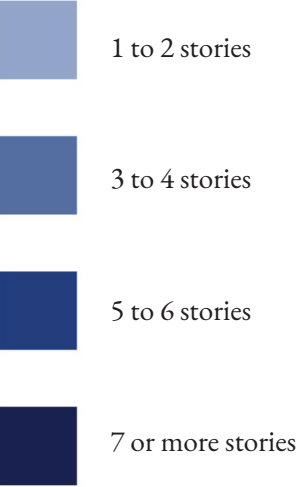
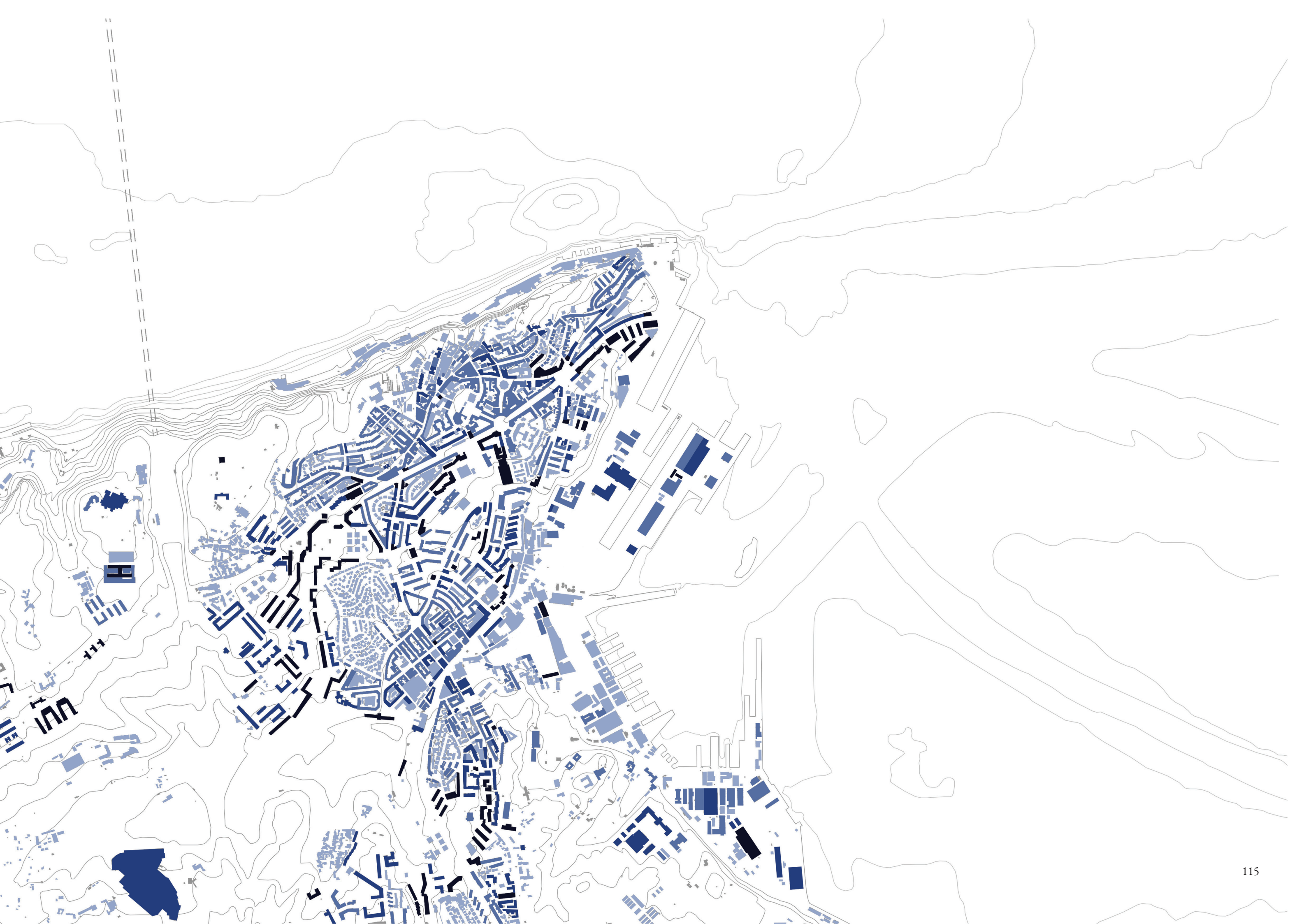


Image 66. PP7 - Plano Parcial 7, Zona Norte [Blueprint].(1966).

Map 10. Building heights
(Drawing by the author)
Scale 1:15000



The Map illustrates the height of the built environment, creating an analyses of how these vertical elements of varying heights interact with one another. The Map highlights the contrast between the cluster of low dwellings, in the historic centre, and the modern construction of tall buildings detached from one another.



Landmarks

Over time, a series of vertical landmarks were placed on the accentuated terrain of Almada. Each vertical element is established within the territory, standing out from its environment and creating a visual connection with its surroundings. The vertical elements of Almada have varied scales and different positions within the topography, providing different visual relations with both city and river. In relation to one another, these vertical elements complement the silhouette and profile of the city and its terrain. The landmarks are recognizable, marking the city's terrain as they become reference points which provide spatial orientation within the territory. The landmarks strongly impact the city's character, becoming part of its physical landscape and identity, generating its own space and often acting as tourist attractions. Each element has its history and holds memories, making them import landscape features, both visually and symbolically, influencing the visual language of the city and its skyline.

Cacilhas Lighthouse

The Lighthouse is located at the north-east end of Almada’s territory, in the region of Cacilhas along the margins of the Tagus river. The strategic placement of the Lighthouse creates a strong visual connection with the river, assisting the navigation of its waters. The Lighthouse started operations in 1886, with the purpose of indicating the southern limits of the anchorage area of the River Tagus, especially during foggy days. The Lighthouse is a red cylinder with a 1,7m diameter and a height of 12m, and is positioned on the edge of the port’s platform facing the water. ***Image 67*** is a section through Cacilhas showing the positioning of the Lighthouse and its relationship with the river and terrain.

Although currently red, the Lighthouse had different colour combinations for its structure and emitted light. When inaugurated, the body of the Lighthouse structure was painted red, with a white light. However, in 1935 the light was changed to green, to conform with international regulations, and to match its structure was also painted green (***Image 68***). This colour combination was kept until the eventual deactivation of the Lighthouse:

*It was all in iron, painted green, with green light according to international conventions, and beside it, in a small house, it had a bugle or “snore”, for fog signal, activated by compressed air.*¹⁰⁰

The Lighthouse was dismantled and removed in 1978, as it no longer served its original purpose. It wasn’t until 2000, at the request of Almada’s Municipality, that the Lighthouse was re-assembled and returned to its home in Cacilhas. The Lighthouse was then painted red, its original colour combination, as a symbol of the city’s history and a piece of Almada’s heritage.

100. “Era todo em ferro, pintado de verde, dispondo de luz verde conforme as convenções internacionais e, ao seu lado, numa pequena casa, tinha uma corneta ou “ronca”, para sinal de nevoeiro, acionada a ar comprimido.” Pereira de Sousa, R. H. (2003). *Almada, Toponímia e História*. Almada: Biblioteca Municipal, Câmara Municipal de Almada.

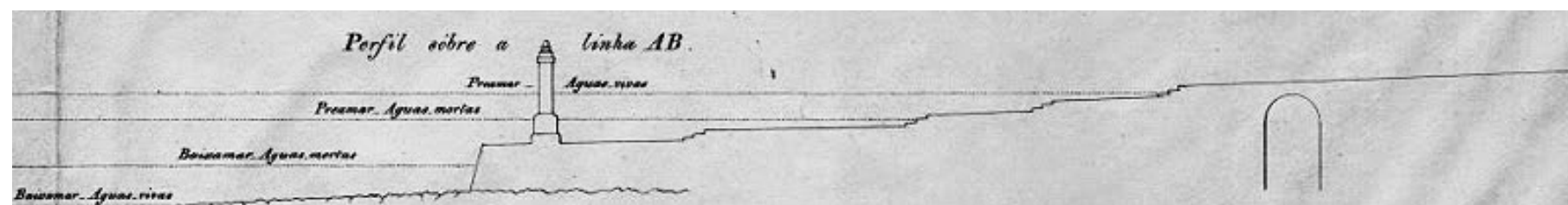


Image 67. Carta hydrographica do littoral de Cacilhas (detail) [Cartography]. (1838).



Image 68. Cacilhas, vista do farol e do Tejo [Photograph].



Image 69. Farol de Cacilhas [Photograph]. (2010).

Boca do Vento Elevator

Located between the river and the northern cliffs, Boca do Vento elevator was built in 2000, as part of a rehabilitation project of Almada’s riverside. The elevator connects the former industrial area along the river margins to the historic centre of Almada, located at the top of the cliff.¹⁰² The project intended to reactivate the space by creating an easier connection between the lower and higher parts of the city, which today brings more movement to the riverside. Works were also carried out to consolidate the unstable cliff by applying concrete covering to prevent further landslides.

The structure’s body consists of a concrete monolithic ‘U’ pillar, corresponding to the elevator’s shaft and housing the technical components. With a maximum occupancy of 16 people, the cabin comprises a stainless steel cylinder featuring a laminated glazed panel, providing a 180° view.¹⁰³ As an autonomous piece of architecture, the elevator’s base is located in the garden Jardim do Rio, rising 50 metres and connecting to a gangway which leads to a miradouro, overlooking the Tagus.

Designed by the sculptor Jose Aurelio and executed by the architect Fidalgo Mineiro, the elevator is considered a public art piece, operating as a means of transportation whilst marking Almada’s urban landscape. In the words of the sculptor:

*The Boca do Vento Elevator is a very interesting piece [...] it is a sculpture [...] I always thought of it as a sculpture and realised it as a sculpture that is [...] It has a curious history, because it started as a technical project, full of vicissitudes [...] at a certain point, Madam President wanted to give the elevator an aspect special and invited me to participate [...] my first formal proposal was a funicular that worked with a cement beam from top to bottom and which had the shape of a stylized bird’s head [...] I wanted it to be an innovative piece [...] it depended on great economic restrictions and the technical services of the Chamber. They argued that there was a danger that the cliff could fall [...] Basically, it is a project of consensus and balance that despite everything has a formal and plastic proposal [...] the idea of the cabin in that integrated and transparent sense, in which you see the Bugio, it’s a new solution [...] that cabin works outside the pillar, a series had to be created behind of counterweights so that he could be balanced on the emptiness [...] All the structural program of the elevator is my work, the implantation in a semicircle, precisely to create a zone of protection from possible landslides there [...]*¹⁰⁴

102. Vasconcelos, A. (2019, December). O Elevador Panorâmico da Boca do Vento. *Elevare*, nº12, 53.

103. Elevador Boca do Vento. (2011). Retrieved from: http://www.monumentos.gov.pt/Site/APP_PagesUser/SIPA.aspx?id=20536

104. “O Elevador da Boca do Vento é uma peça muito interessante [...] ela é uma escultura [...] sempre a pensei como uma escultura e realizei-a como escultura que é [...] Tem uma história curiosa, porque começou por ser um projecto técnico, cheio de vicissitudes [...] a certa altura a Senhora Presidente queria dar ao elevador um aspecto especial e convidou-me a participar [...] a minha primeira proposta formal era um funicular que trabalhava com uma viga de cimento lá de cima para baixo e que tinha a forma da cabeça de um pássaro estilizado [...] queria que fosse uma peça inovadora [...] dependia de grandes restrições económicas e os serviços técnicos da Câmara defendiam que havia o perigo da falésia poder cair [...] No fundo é um projecto de consenso e equilíbrio que apesar de tudo tem uma proposta formal e plástica [...] a ideia da cabina naquele sentido integrado e transparente, em que se vê o Bugio, é uma solução nova [...] aquela cabina trabalha fora do pilar, teve de se criar atrás uma série de contrapesos para que pudesse ficar em consola equilibrada sobre o vazio [...] Todo o programa estrutural do elevador é obra minha, aquela implantação em semicírculo, precisamente para criar ali uma zona de protecção de eventuais derrocadas, aquela escada de serviço [...]” A testimonial from the sculptor José Aurélio about his work on Boca do Vento Elevator. In Lima, F. A. F. F. (2016). *Escultura em espaços públicos de Almada [1936-2005]: da colecção à proposta de acção museal/educação patrimonial*(Master’s thesis, Universidade de Lisboa, Lisbon, Portugal). Retrieved from: https://repositorio.ul.pt/bitstream/10451/654/2/17919_ULBA006445_Tese.pdf pp. 128-129.

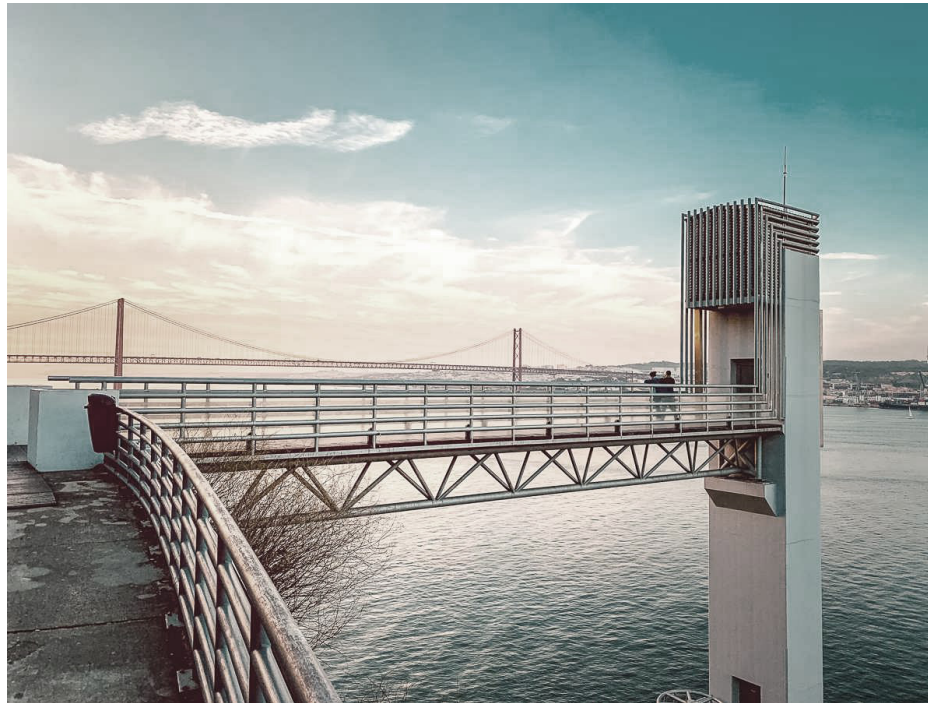


Image 70. Elevador panoramico [Photograph] (2018).

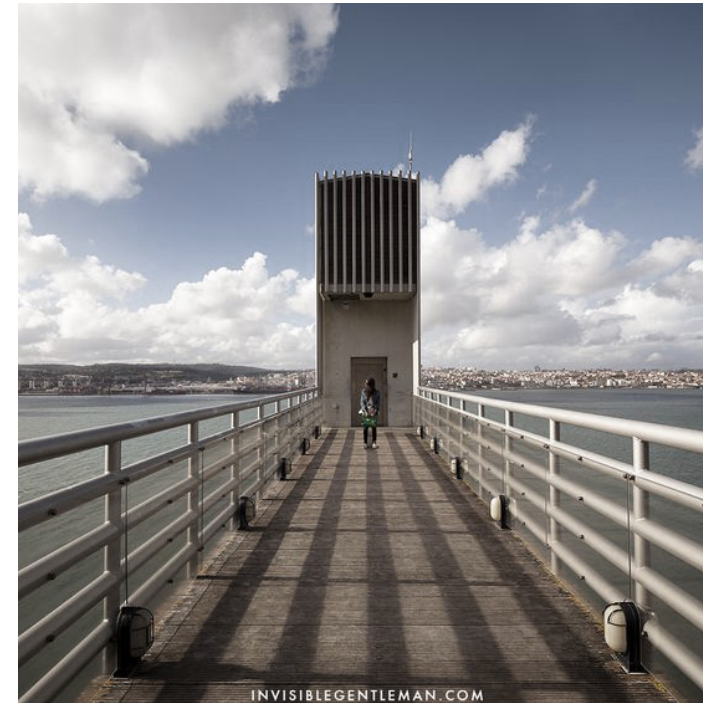


Image 71. Elevador da Boca do Vento [Photograph].

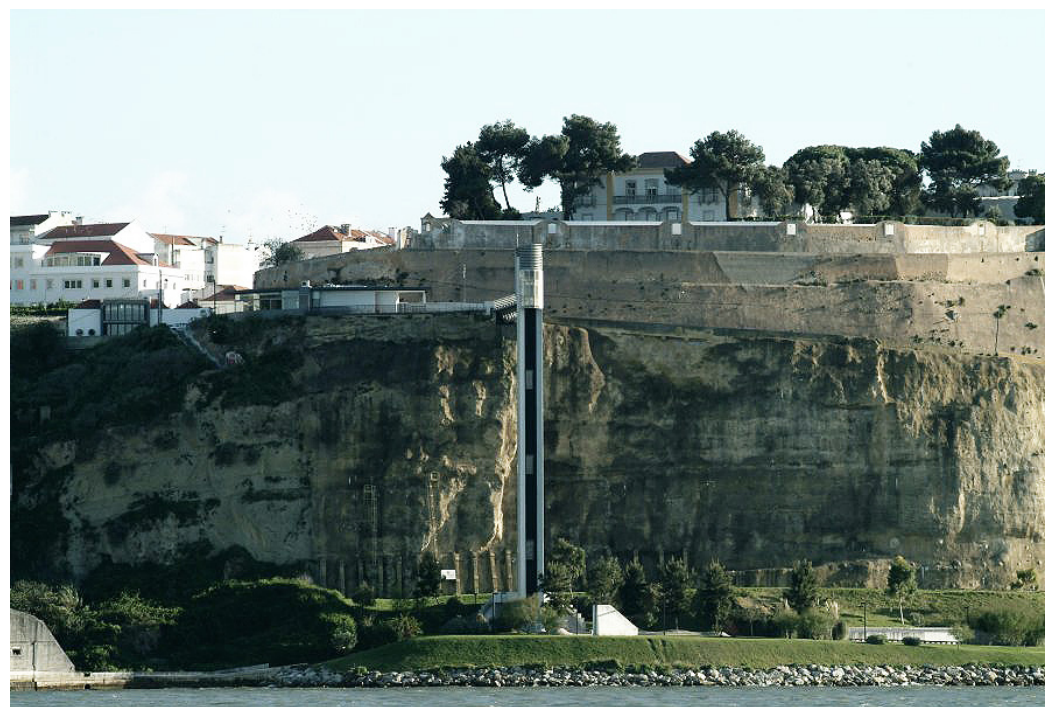


Image 72. Miradouro da Boca do Vento, Almada [Photograph].

105. Toscano, M. C. C. A. (2012). *A fábrica de moagem do Caramujo – património industrial da Cova da Piedade: Percursos de salvaguarda e reutilização* (Master’s thesis, Universidade Aberta, Lisboa, Portugal). Retrived from: <https://repositorioaberto.uab.pt/handle/10400.2/2099>

106. Incêndio na fábrica do Caramujo. (1897, June 11). *Vanguarda*, p. 2.

107. “O dia de hontem ficou assinalado por um acontecimento deveras lamentável passado no outro lado do Tejo, na pequena mas laboriosa povoação do Caramujo, onde não há muito tempo ardeu totalmente uma fábrica de cortiça [...] Um novo incendio, talvez mais pavoroso e sinistro, destruiu hontem, com uma rapidez digna de nota, a notável fabrica de moagens, talvez a primeira do paiz, pertencente à firma A. J. Gomes & Commandita, sucessora da viúva de Manuel José Gomes & Filhos.” Incendio na fábrica do Caramujo (1897, June 11). *O Século*, p. 1.

108. Flores, A. M. (1992). *António José Gomes. O Homem e o Industrial*. Almada: Edição da Junta de Freguesia da Cova de Peidade. p. 72

109. Santos, A. M. A.(1846-1918). *Para o estudo da arquitectura industrial na região de Lisboa* (Master ‘s thesis, Universidade Nova de Lisboa, Lisbon, Portugal), p. 43. Retrieved from: <https://www.passeidireto.com/arquivo/36524583/lisboa/27> .

110. “É a mais moderna das fábricas de moagem importantes em Portugal e uma das mais notáveis. Para em tudo ser digna d’exame aos que se interessam pelas causas industriais e pela sciencia do constructor, basta saber-se que, montada recentemente, em 1898, está dotada dos mais perfeitos machinismos d’esta especialidade que tanto se tem desenvolvido, e que a construção do edifício é o primeiro exemplar de valor da applicação do novo processo de construção em cimento armado, systema Hennebique.” Engineer J. M. d’Oliveira Simões portrayal of the Factory in: Simoes, J. M. O. (1899). *Fábrica de moagem no Caramujo. Gazeta dos Caminhos de Ferro*, 12º ano, p. 372.

111. Fábrica de Moagem do Caramujo. (2015). Retrieved from: http://monumentos.gov.pt/Site/APP_PagesUser/SIPA.aspx?id=10484

112. Fábrica de moagem do Caramujo (antiga). Retrieved from: <http://www.patrimoniocultural.gov.pt/pt/patrimonio/patrimonio-imovel/pesquisa-do-patrimonio/classificado-ou-em-vias-de-classificacao/geral/view/73600>

113. Santos, A. M. A.(1846-1918). *Para o estudo da arquitectura industrial na região de Lisboa* (Master’s thesis, Universidade Nova de Lisboa, Lisbon, Portugal), p. 297. Retrieved from: <https://www.passeidireto.com/arquivo/36524583/lisboa/27>

Caramujo Factory

The Caramujo factory, built in 1872, initiated a critical phase of the Portuguese milling industry, which took advantage of the growing industrialization of Tagus’ margins. The building of the factory was established in the neighbourhood of Caramujo, with easy access to the river’s water. By 1889, with the introduction of the steam engine, Caramujo’s manufacturing unit was a protagonist in the regional and national, technological and laboural development of the region and the country.¹⁰⁵

In 1897 the factory suffered a violent fire that almost completely destroyed it, only leaving behind the facades and some structural walls. The fire left more than 20 workers injured and more than 100 unemployed.¹⁰⁶ The devastating incident was reported by the newspaper *O Século* the following day:

*Yesterday was marked by a disastrous event that took place on the other side of the Tagus, in the small but laborious village of Caramujo, where not long ago a cork factory operated [...] A new fire, perhaps more dreadful and sinister, destroyed yesterday with remarkable speed, the remarkable milling factory, maybe the first from the country, belonging to the firm A. J. Gomes & Commandita, the successor of Manuel’s widow José Gomes & Sons.*¹⁰⁷

The destruction of the building due to the fire revealed the fragility of the former structure and the need for a new construction method that wouldn’t face the same tragedy.¹⁰⁸ The factory’s reconstruction project was initiated not long after its destruction and was completed in 1898, using a new constructive method: reinforced concrete, a process of French origins. This resulted in the first architectural construction in reinforced concrete in Portugal.¹⁰⁹ The system, patented by François Hennebique in 1892, is fire resistant and allows for the construction of larger spaces without the interruption of pillars, giving more functionality to the rooms. The building incorporated a terrace roof with a water reservoir which neutralised the material’s expansion caused by temperature differences. The fire incident, although unfortunate, resulted in the remarkable transformation of the Caramujo Factory, as explained by the engineer J. M. d’Oliveira Simões:

*It is the most modern of the important milling plants in Portugal and one of the most notable. [...] recently assembled in 1898, it is endowed with the perfect mechanisms of this speciality that has been greatly developed and that the construction of the building is the first valuable example of the application of the new construction process in reinforced concrete, Hennebique’s system. The fire of June 10, 1897, gave rise to a radical transformation in the old factory.*¹¹⁰

In 1960, to modernise the factory, the elevations were altered, and concrete storage silos were incorporated into the building.¹¹¹ In 1993 the factory closed its industrial activities, leaving the building neglected, like so many other former industrial buildings in the same area. In 2002 the factory was acquired by the municipal council of Almada to preserve the building,¹¹² as an emblem marked by the industrialization that occurred in the city, and a symbol of a constructive process that would eventually be celebrated in modern architecture: reinforced concrete.

*A pioneering work in the concrete cycle in Portugal, an emblematic example of industrial architecture [...] a continuous and steady evolution towards a modern expressiveness of forms and materials, the factory in Caramujo is, from time to time, a reference significant, even on the international scene.*¹¹³



Image 73. Fábrica Gomes, Caramujo [Photograph]. (1900 's).

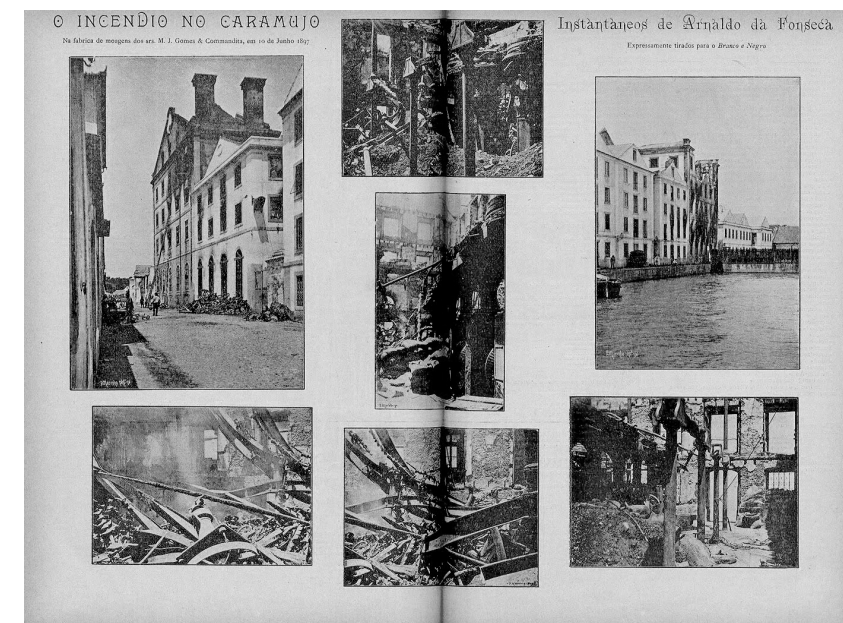


Image 74.. O incendio no Caramujo, Arnaldo Fonseca, Branco e Negro, *Semanário Illustrado*. (1897, June 20).



Image 75. Fábrica Gomes, Caramujo [Photograph]. (1900's).

‘25 de Abril’ Bridge

114. A ligação das duas margens do Tejo em Lisboa vai ser estudada por uma comissão agora nomeada. (1953, July 1). *Gazeta dos Caminhos de Ferro* n.º 1573, p. 174.

115. “O sonho de ligar as duas margens do Tejo por meio de uma ponte vae se encaminhando para se converter em realidade, graças à iniciativa e actividade do Snr. Bartissol e a intelligentsia arrojada do distincto engenheiro Sr. Seyrig, o construtor da ponte D. Luiz, no Porto.” Melhoramento de Lisboa: Ponte sobre o Tejo. (1889, July 11). *O Ocidente : revista ilustrada de Portugal e do estrangeiro* n.º 380, p. 153.

116. “Só quando a Lisboa da outra banda tomasse desenvolvimento uniforme de cidade, e as duas Lisboas, Direita e esquerda, desenroladas pelas margens do rio, proclamaram urgência da sua homogeneização num todo idílico, e que a ideia da ponte ou pontes monumentais de 9.00 contos deveria ser posta a amadurar.” Lisboa Monumental. (1906, November 19). *Ilustração Portuguesa* 2.ª série, n.º 39, p. 498.

117. Nascimento, A. F. (1959, April). Um sonho a caminho da realidade: A ponte sobre o Tejo. *Olísipo*, n.º 86, pp. 69-72.

118. Mendonça, A.Z. (1938, January 16). A construção da ponte sobre o Tejo em frente de Lisboa. *Gazeta dos Caminhos de Ferro*, n.º 1202, p. 45-48.

119. “Direi, pois, que ao projectar-se uma ponte que ligue as duas margens do Tejo, Lisboa – Almada, o problema impõe em primeiro lugar a escolha do sítio exacto do témino da directriz do seu tabuleiro Norte.” Branco, C. (1958, March 23). A ponte sobre o Tejo será a maior do mundo. *Diário de Lisboa*, n.º 12676, pp. 8-9.

120. Nascimento, A. F. (1959, April). *op. cit.*, p. 70.

121. Cardoso, A. & Luiza, A. (2020). Almada: Um território em seis ecologias (p. 198). Almada: Câmara Municipal de Almada.

122. Nascimento, A. F. (1959, April). *op. cit.*, p. 70.

123. O calendário do grandioso empreendimento. (1966, August 6). *Diário de Lisboa*, n.º 15674, p. 1.

For many centuries, the Tagus’s southern and northern margins were connected through the water by fluvial means. However, in the 19th-century, proposals of a bridge connecting the two margins started to be idealised. The engineer Miguel Pais made the first definite proposal in 1876, where he suggested a bridge connecting Lisbon and Montijo.¹¹⁴ Although Miguel Pais’s bridge didn’t come to fruition, the dream of the bridge over the Tagus didn’t die with him. Later in 1889, two French engineers, Bartissol and Seyrig, proposed a bridge connecting Cacilhas to Rocha dos Condes dos Óbidos (today known as Chiado).¹¹⁵ Other projects were proposed but never indeed considered as the costs of such projects were excessive, and the execution of some of the plans would have affected the river’s traffic. The need for such construction was not yet justified as expressed in the article Lisboa Monumental in the newspaper Ilustração Portuguesa in 1906:

*Only when the Lisbon on the other side took on the uniform development of a city, and the two Lisbons, right and left, unfolding along the riverbanks, proclaimed the urgency of its homogenization into an idyllic whole, that the idea of the monumental bridge or bridges, worth 9000, should be put into consideration.*¹¹⁶

It was only towards the end of the 20th century when a proposal for a bridge that connected the two cities started to be considered by the government. Once Lisbon and Almada were tied together through their industrial and economic growth, the dream of joining the two margins began to seem possible. It was through the hands of Duarte Pacheco that this possibility started to take shape. In 1933 necessary geological surveys were conducted for a plan of connection between Beato and Montijo, following the initial proposal from Miguel Pais.¹¹⁷ Another plan was considered, in the narrowest stretch of the river, between Santos and Bom Sucesso, on the north-bank, and from Cacilhas to Lazareto, on the south-bank.¹¹⁸ The real challenge for the construction was the bridge’s location, as explained by the architect Cassiano Branco in 1958: “I would say, therefore, that when designing a bridge that connects the two banks of the Tagus, Lisbon and Almada, the problem imposed in the first place is the choice of the exact location of the end in the north bank”.¹¹⁹ The following year, 1934, the minister launched a competition for the construction of the bridge. However, the Second World War put the dream on hold.¹²⁰

The need for a more efficient connection between the northern and southern margins became more urgent as Almada developed, and as the traffic within the Tagus increased.¹²¹ Consequently, in 1953 the government appointed a commission, led by the engineer Barbosa Carmona, to continue the studies regarding the railway and highway connections between Lisbon and its southern margins.¹²² The studies concluded that Almada provided the nearest link with Lisbon’s margin. In 1958 the architect Cassiano Branco proposed a solution that would join the margins, connecting Lapa and the centre of Almada with a bridge. However, it wasn’t until 1959, when the engineer Canto Moniz was nominated director of the *Gabinete da Ponte sobre o Tejo* (the cabinet of the Tagus Bridge), that the plans for the construction of the bridge started to materialise with the launch of an open competition.¹²³ Four proposals were presented, and the United States Steel Export Company won, using the Saint Francisco’s bridge as a reference. The bridges’ construction began in 1962 with its completion and inauguration in 1966. The bridge was named ‘Salazar’, but renamed ‘25 de Abril’ after the revolution in April of 1974.

The 25 de Abril bridge provided a connection between the two margins via roadways and railways, extending itself for 2.2 kilometres over the Tagus. Its platform runs along with a height of 70m above the river’s water, with its two main towers reaching a height of 190m. The bridge is made from carbon steel, and as the bridge of San Francisco, finished in a red shade, creating a strong contrast with the deep blue waters of the Tagus.

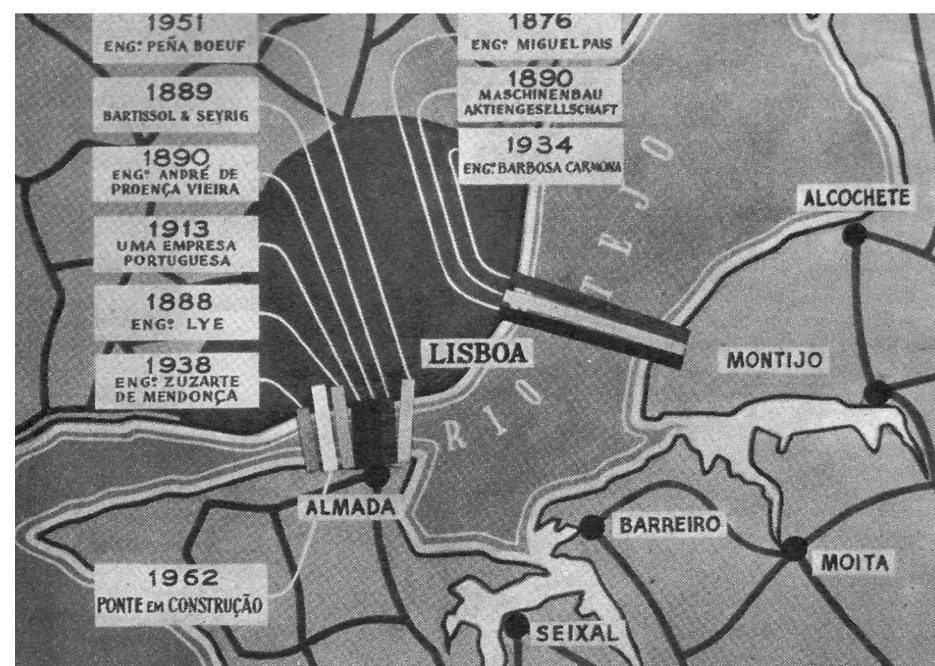


Image 76. Obras para construção da Ponte 25 de Abril

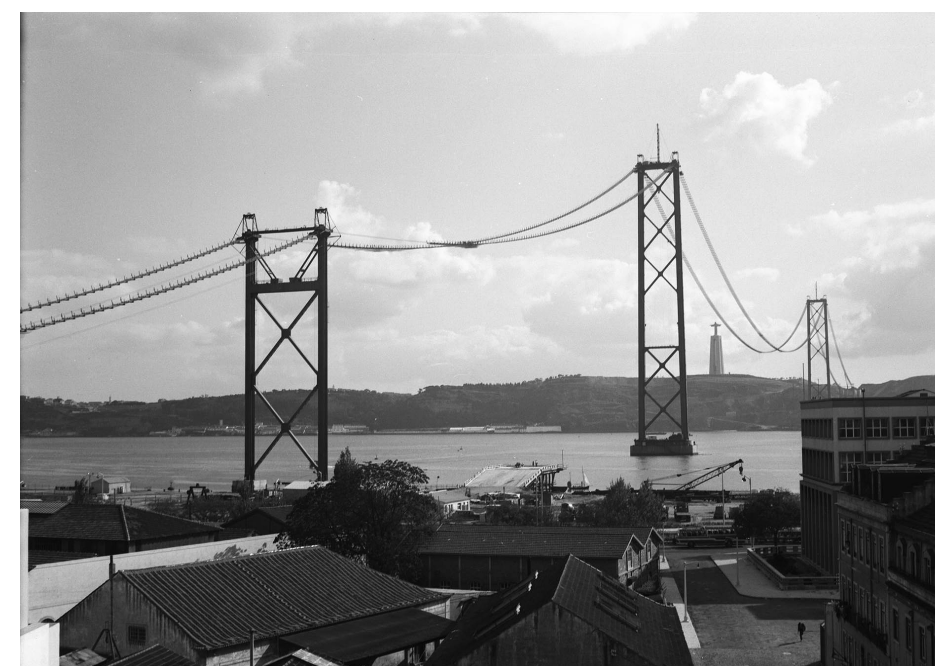


Image 77. Lisboa. As primeiras imagens (raras) da Ponte 25 de Abril [Photograph].



Image 78. Alcântara, 25 de Abril Bridge [Photograph].(2018).

Lisnave Portico

Inaugurated in 1967, where Margueira beach once stood, Lisnave became an international reference in ship construction and an important part of Almada’s identity.¹²⁴ Lisnave shipyard focused on repairing large scale ships, directing its efforts to the international market.¹²⁵ The chosen location for the large platform that supported the shipyard’s activities was the eastern margin of Almada, between Cacilhas and the Alfeite Arsenal, which benefited from the exceptional characteristics of the Tagus Estuary. The location was the crossing of the main routes for the oil tankers, which meant that repairing the ships in Lisnave did not take them out of their courses.

Moreover, two weeks before Lisnave’s inauguration, Egypt closed the Suez Canal,¹²⁶ which provided the shortest sea route between Asia and Europe. Consequently, all the traffic crossing the Canal would have to change its route, forcing it to take the old Cape Route bypassing South Africa. Lisnave majorly benefited from this event as its location was strategically part of this route.¹²⁷ The longer course that the ships were required to follow meant longer journeys, meaning larger ships would be required. Foresing the need for the construction and repair of larger ships, Lisnave started in 1969 the construction of a new dry dock consisting of monumental dimensions for ships up to 1000 tons. The dry dock 13, as it was named, was the largest in the world, 520m long and 90m, with a depth of 15m. The dock could support the largest ships of that time but could also support two or even three smaller ships simultaneously. A large portico was constructed, able to support 300 tons, to assist the ship repairs. The Lisnave portico, red in colour and 63 metres high, became a company symbol and can be seen across the river, from Lisbon.

The Lisnave shipyard marked a significant era for Almada’s economy and growth, whilst also becoming an important symbol of the city’s labour forces. On 12 September 1974, Lisnave’s workers marched to Lisbon in protest; their banners expressed the hunger that workers and their families suffered due to overdue wages.¹²⁸ From then on, Lisnave was at the frontier of many worker’s strikes and demonstrations in Almada. The ongoing protests and the proximity of the shipyard to the city led to many complaints from the residents. With the increasing number of cheap labour for ship repair that started to emerge around the world — as well as the crises in the naval industry in the 80’s,¹²⁹ the activities of Lisnave started to decline:

*The work demand decreased until in 2000 it closed its doors and completely moved to Setúbal. In Almada was left the portico, the empty buildings, the growing grass and the hope that one day the area will regain the dynamism it once had.*¹³⁰

124. O Farol. (2013). *Contributo para a História de Cacilhas – AS MARGUEIRAS*. Almada: Associação de Cidadania de Cacilhas. p. 40.

125. Cardoso, A. & Luiza, A. (2020). *Almada: Um território em seis ecologias* (pp. 110). Almada: Câmara municipal de Almada.

126. As the Six Day War began Egypt closed the Suez Canal. The canal remained closed from 1967 until 1975. Feyrer, J. (2009) The 1967-75 Suez Canal closure: Lessons for trade and the trade-income link. Retrieved from: <https://voxeu.org/article/1967-75-suez-canal-closure-lessons-trade>

127. Dordio, P. (2017, June 4). Lisnave. 50 anos depois, uns estaleiros que marcaram a história de Portugal. E da revolução. *Observador*. Retrieved from: <https://observador.pt/especiais/lisnave-50-anos-depois-uns-estaleiros-que-marcaram-a-historia-de-portugal-e-da-revolucao/>

128. Ferro, C. (2018, November 19). Lisnave: Memórias da empresa que até nas greves era referência. *Diário de Notícias*. Retrieved from: <https://www.dn.pt/edicao-do-dia/19-nov-2018/lisnave-memorias-da-empresa-que-ate-nas-greves-era-referencia--10196914.html>

129. Morais, M. J. (2020, December 21). 20 anos após o encerramento, a memória da Lisnave continua a marcar Almada. *Almadense*. Retrieved from: <https://almadense.sapo.pt/cidade/20-anos-apos-o-encerramento-a-memoria-da-lisnave-continua-a-marcar-almada/>

130. “As encomendas de trabalhos diminuíram, até que em 2000 fechou portas e transferiu-se totalmente para Setúbal. Em Almada ficou o pórtico, os edifícios vazios, a erva a crescer e a esperança de que a zona volte a ganhar um dia o dinamismo que já teve.” Ferro, C. (2018, November 19). Lisnave: Memórias da empresa que até nas greves era referência. *Diário de Notícias*. Retrieved from: <https://www.dn.pt/edicao-do-dia/19-nov-2018/lisnave-memorias-da-empresa-que-ate-nas-greves-era-referencia--10196914.html>

CONSTRUÇÃO DA NOVA DOCA

Aquando da reunião do Conselho de Administração, realizada no dia 10 do corrente, foi decidida a construção da nova doca (N. 13), para navios até UM MILHÃO de T. D. W., que terá as dimensões de 320 metros de comprimento e 90 metros de largura.

Este grandioso empreendimento foi adjudicado a uma firma portuguesa e os trabalhos de construção, a iniciar imediatamente, contese que deverão estar concluídos dentro de 20 meses, isto é, em Junho de 1971.

... e para a construção da sua nova doca a LISNAVE encomendou

UM PÓRTICO GIGANTE

Com as seguintes características:

Vão	125 metros
Altura total	78 metros
Carga máxima	300 toneladas

dimensões do pórtico comparadas com as da Praça do Comércio

Image 79. Scale of Lisnave Portico compared with the scale of Praça do Comercio



Image 80. Lisnave shipyard in operation with Dock 13 and the Portico.[Photograph].(1973).



Image 81. Lisnave Portico [Photograph].(2008).

131. Noé, P. (2013). Santuário do Cristo Rei. Retrieved from: http://www.monumentos.gov.pt/Site/APP_PagesUser/SIPA.aspx?id=10276

132. Vasconcelos, A. (2019, December 20). O novo elevador do monumento de Cristo Rei. *Elevare*, n.º10, p. 57. Retrieved from: https://issuu.com/cie-comunicacao/docs/57_a3f72cacd00d88

133. “Se Portugal fosse poupado da Guerra, erguer-se-ia sobre Lisboa um Monumento ao Sagrado Coração de Jesus, sinal visível de como Deus, através do Amor, deseja conquistar para Si toda a humanidade.” História do Santuário Nacional de Cristo Rei. Retrieved from: <https://cristorei.pt/historia/historia-do-santuario>

134. Afonso, B. (2009, May 15). Um sonho que nasceu no Brasil e se realizou em Almada. Retrieved from: https://rr.sapo.pt/informacao_detalhe.aspx?fid=1&did=31885

Cristo Rei National Sanctuary

Erected 133 metres above sea level, on the highest point of Almada,¹³¹ the Cristo Rei Sanctuary is a monument integral to Almada’s landscape and identity. Although inaugurated in 1959, the idea of constructing the Monument appeared in 1934, when D. Manuel Gonçalves Cerejeira, the Cardinal Patriarch of Lisbon at the time, visited Rio de Janeiro and saw the Cristo Redentor statue. There, a dream to build a similar statue overlooking Lisbon was born.¹³² In 1939, when the Second World War began, the Monument truly started to be idealised and took on a whole new meaning. On April 20 of 1940, the national bishops met in Fatima Sanctuary, where they pledged: “If Portugal were spared from the War, a Monument to the Sacred Heart of Jesus would be erected over Lisbon, a visible sign of how God, through Love, wishes to conquer all humanity for Himself.”¹³³ Portugal kept its neutrality during the War, and in 1941 the land, where the Monument would be erected was acquired, and in 1952 the construction began.

The project was signed by the architect António Lino and the engineer D. Francisco de Mello e Castro, and the execution of the statue was done manually by the sculptor Francisco Franco. The main structure, a trapezoidal base with four pillars, was made with reinforced concrete, reaching a height of 82m. This forms a platform on the top as a pedestal for the Christ Statue and a viewpoint with a 360 view over the two margins. In between the base’s pillars are four arches, each facing a cardinal point. On this platform, facing the Tagus, the Cristo Rei statue rises, 28m high, standing with open arms towards Lisbon. Attracting many visitors, the Monument became an important religious symbol for Portugal, and together with Fatima and Santiago de Compostela it forms the “Golden Triangle” of pilgrims in the Iberian Peninsula.¹³⁴



Image 82. The sculptor working on the Cristo Rei statue [photograph].



Image 83. Cristo-Rei, Almada, Portugal [Photograph].(2017).



Image 84. Aerial view from behind of the Cristo Rei statue in Almada, looking over the Tajo river with Ponte 25 de Abril bridge [Aerial photograph].(2018).

Water towers

Despite its proximity to the river, Almada had many problems with water supply and distribution through its territory. During the 18th century, most of the population had an inadequate water supply as uncovered wells were exposed to weather, and the water was extracted with rusty buckets.¹³⁵ Wells and springs in Almada were derived from groundwater, subjected to infiltration from unsealed ditches and the soil. The water supply for the village of Almada came from a public fountain, Fonte da Pipa, which was located at the base of the cliff bordering the river. As the only water supply, the fountain kept the population dependent on water workers, who transported it from the bottom of the ridge all the way up to the village.¹³⁶

In 1923, the City Council installed an electric generator near Fonte da Pipa. With the energy produced, the water was transported to a deposit located in the village. Then, by the force of gravity, the water was conducted to a fountain built in Largo do Catita and to the households of the wealthiest families.¹³⁷ Later in 1930, more fountains were built, but the issues with the generators prevented a continuous supply. The following year, a bacteriological analysis of the water from the Fonte da Pipa was considered “suspicious”, and Almada inhabitants could not use it without first boiling it.¹³⁸ This problem only grew with time, and in 1934 CMA’s Administrative Commission decided to buy water from a private company. The problem was solved momentarily, but the strategy was highly laborious and costly.¹³⁹

Later on, in 1949, groundwater was found in Quinta da Bomba, and Almada became one of the country’s first municipalities to develop a water supply project that would extend through its entire territory.¹⁴⁰ In 1951 the SMA (Municipal Water Service) began its operations, which faced many problems through the following decade, especially the difficulties of providing continuous water supply to the highest points of Almada.¹⁴¹ Almada experienced a large urban expansion and population growth during the last half of the century, and water supply concerns became more pressing. Only after the revolution, in 1974, the infrastructural needs of Almada became a political priority. In 1976, the municipality put forward a Municipal Sanitation Plan, building new water reservoirs, pump stations and kilometres of sewers and drainage systems.¹⁴²

Placed in the highest locations of the terrain, the elevated water reservoirs connected to the pumping stations provided a constant supply of fresh water throughout Almada.¹⁴³ The water towers that punctuate Almada’s territory became a symbol of the difficulties the city has overcome. Today the municipality provides a direct supply of water ready for consumption to all its inhabitants.

135. Coisas da nossa terra — uma carta. (1930, May 4). *O Almadense*, p. 2.

136. Rodrigues, J. S. (2000, September-December). Infra-estruturas e urbanização da margem sul: Almada, séculos XIX e XX. *Análise Social*, Vol. XXXV, 156, p. 556.

137. *Idem, ibidem*, p. 556.

138. Água de Almada. (1931, December 20). *O Almadense*, p. 3.

139. Flores, A. M., & Canhão, C. (1994). *Chafarizes de Almada*. Almada: Câmara Municipal de Almada. p. 19.

140. Um lugar de primeira água. (2016, November). *Boletim Almada*, 232, p. 17.

141. *Idem, ibidem*, p. 18.

142. Infraestruturação básica e saneamento. (2013, August 1). *Almada - Tempos de Progresso e Desenvolvimento*, p. 2.

143. Almeida, P. J. M. (2014). *Análise e avaliação do estado de conservação dos reservatórios elevados dos Serviços Municipalizados de Água e Saneamento de Almada*(Master’s thesis, Universidade Nova de Lisboa, Lisbon), pp. 30-34. Retrieved from: <https://docplayer.com.br/64203035-Analise-e-avaliacao-do-estado-de-conservacao-dos-reservatorios-elevados-dos-servicos-municipalizados-de-agua-e-saneamento-de-almada.html>



Image 85. Reservatório Elevado do Laranjeiro [Photograph].(2009).



Image 86. Reservatório Elevado do Lazarim [Photograph].(2016).



Image 87. Vista aérea parcial do Parque Industrial do Feijó [Aerial photograph]. (2011).

Map 11. Almada's Landmarks location
(Drawing by the author)
Scale 1:15000

The Map illustrates the height of the built environment, creating an analyses of how these vertical elements of varying heights interact with one another. The Map highlights the contrast between the cluster of low dwellings, in the historic centre, and the modern construction of tall buildings detached from one another.



25 de Abril Bridge

Cacilhas Lighthouse

Boca do Vento Elevator

Lisnave Portico

Cristo Rei

Caramujo Factory

Chapter III

The spatial encounter between horizontal
and vertical elements

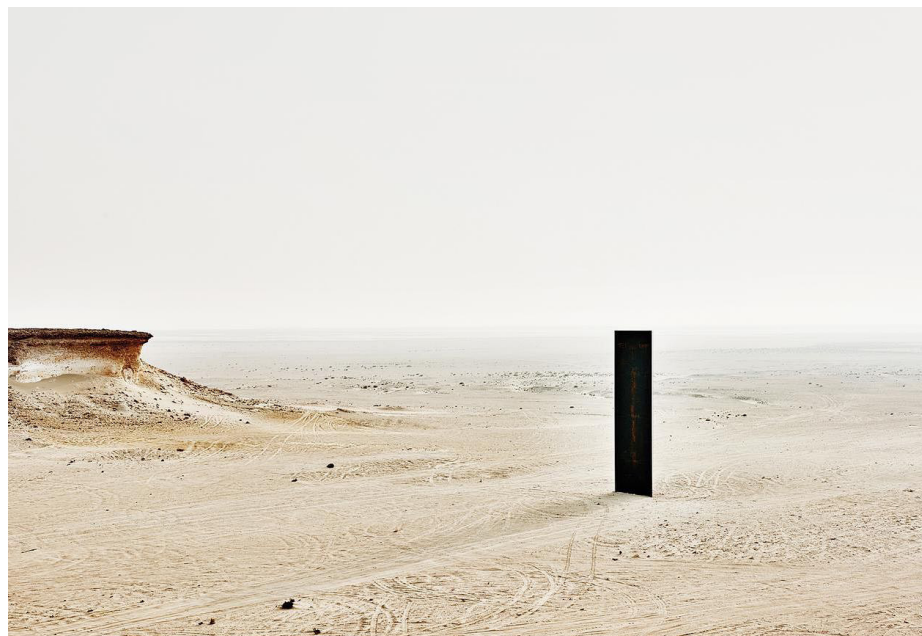


Image 88. EAST-WEST/WEST-EAST, Land art by Richard Serra. [Photograph].(2015).

The vertical and horizontal nature of spaces.

Horizontality and verticality are the dynamic orchestrators of the physical world we inhabit. One complies with the law of gravity, rooting itself, as the other defies the law as it conquers the sky. Both imply a sense of movement that distributes and connects space, creating a system of spatial organisation. In the natural as well as the built world, horizontal and vertical elements can provide connection, both physically and visually between different spaces. It is through both the horizontal and vertical planes that an environment expands and articulates itself. The merging of spatial verticality and horizontality can create a complex system of connection and spatial hierarchy. It is through the understanding and consolidation of these two elements that an intervention to restore the connection between Almada and the Tagus bases itself.

The Platform

144. Ingold, T. (1987) *The Appropriation of Nature: Essays on Human Ecology and Social Relations*. Iowa City: University of Iowa Press. pp.130–164.

145. Thiis-Evensen, T. (1988). *Archetypes in Architecture*. Oxford: Oxford University Press. pp. 35-114.

146. Aureli, P. V. &, Tattara, M. (2019). *Platforms: Architecture and the Use of the Ground*. Retrieved from: <https://www.e-flux.com/architecture/conditions/287876/platforms-architecture-and-the-use-of-the-ground/>

147. Moore, J. D. (2012). *The prehistory of home*. California: University of California Press. p. 127.

148. Mark, J. J. (2009). *Byblos*. Retrieved from: <https://www.worldhistory.org/Byblos/>

149. German, S. (2014). *Çatalhöyük*. Retrieved from: <https://www.khanacademy.org/humanities/prehistoric-art/neolithicart/neolithic-sites/a/atalhyk>

150. *Idem, ibidem*.

151. Hodder, I. (2010). *Religion in the Emergence of Civilization: Çatalhöyük as a Case Study*. Cambridge: Cambridge University Press. p.2.

152. Bradley, R. (2003). *A Life Less Ordinary: The Ritualization of the Domestic Sphere in Later Prehistoric Europe*. Cambridge: Cambridge Archaeological Journal, pp. 5–23.

153. McIntosh, J. (2008). *The Ancient Indus Valley: New Perspectives*. California: ABC-CLIO. p. 389.

154. Aragon, L. (2020). Life of the Gila: Hohokam Worlds. Retrieved from: <https://www.archaeologysouthwest.org/2020/02/27/life-of-the-gila-hohokam-worlds/>

155. Cavallarin, D. (2019). How Venice’s canals were built: how was built on water? Retrieved from: <https://venezialines.com/blog/venices-canals-built-city-built-water/>

When man establishes the horizontal plane, he does something more important than just satisfying a physical need for stability demanded by the universal laws of gravity. When primitive man settles and takes possession of a place, the first thing he does is construct the flat horizontal plane. Accordingly, from that first moment, in order to control and possess it, he tends to look for places that are already flat, so that they are found first, and afterwards shaped, fenced-in, and delimited. The plane is the earth itself, clearly a stereotomic plane.

Alberto Campo Baeza, 2014.

The word ‘platform’ originated in the 16th century from the French plateforme, meaning ‘a flat form’. According to the Oxford dictionary, a platform (*noun*) is “a flat raised area or structure on which people or things can stand”. The conception of a platform is enacted by the manipulation of the ground plane, intended to provide stable ground. As an architectural element a platform defines space, without the need for enclosure, and supports the activities happening upon it. Throughout the history of human settlements, ground manipulation was utilised in agriculture and general domestication of the land.¹⁴⁴ This became a highly effective process that redefined the manner in which man made the ground habitable.

Generally, the ground is considered as a membrane that both covers and composes the surface of the earth. Through time man was able to manipulate this surface in order to adapt it to its needs and provide stability. Thus, providing a horizontal plane where one could easily walk, rest and settle on. The raising of the ground plane delimits a space from its surroundings and provides support above that is independent of the ground, forming a platform.¹⁴⁵ With its horizontal nature, a platform provides both stability and stillness to man, reflecting a sensation of balance in relation to its gravitational force. Parallel to the horizon, this plane delimitates the space between earth and sky.

The act of levelling the ground as a primary form of inhabitation, can be considered to be one of the earliest forms of permanent living.¹⁴⁶ This gesture of elevating ground to provide a stable, horizontal plane for dwelling, agriculture and burial spaces dates back thousands of years.¹⁴⁷ One of the first indications of such a gesture was found in Byblos (8,000 BCE), an ancient Phoenician port city, one of the oldest continuously inhabited towns in the world.¹⁴⁸ Archaeological excavations revealed an extensive settlement developed in the area, where the ground and floors were carefully flattened to provide foundation for the dwellings. (*Image 89*)

Another precedent of creating platforms as a form of ground domestication was found in Çatalhöyük, in southern Anatolia (*Image 90*). Inhabited between 6,500–5,500 BCE, this settlement marked man’s transformation from nomads to settlers.¹⁴⁹ The city had no streets, nor paths and houses were built right next to each other. Dwellings had flat roofs and their proximity and connection formed a large platform. This became a surface where people would walk through the city, and could access their homes through a small hole in the roofs.¹⁵⁰ This platform became a public ground, supporting the city’s movement and activities. Within these dwellings, spaces were organised not by vertical enclosures, but by platforms of varying heights (*Image 91*). This created a distinction between different zones of the house such as sleeping, cooking, leisure, and even burial platforms, where deceased household members were buried.¹⁵¹ The floor became more than a functional element in the homes; it became a symbolic stage for the ritualization of life.¹⁵²

Moreover, platforms — as an element of both urban configuration and the gathering of communities — can be seen in many other settlements across the world. Mohenjo-Daro (*Image 92*), located in Pakistan and built in 2500 BCE, had its city constructed entirely on top of gigantic platforms made of mudbrick which provided both a sturdy foundation and protection against flooding.¹⁵³ A similar approach can be found in the Hohokam settlement in the Phoenix Basin along the Gila and Salt Rivers of southern Arizona (2000 BC), where public architecture was created in the form of built platform mounds (*Image 93*).¹⁵⁴ A more recent precedent of a city that was constructed on top of a platform is Venice (*Image 94*). Founded in 420 AD, the city was built on wooden platforms in the middle of the Venetian lagoon, which promised protection to its settlers from the barbarians who would not cross the water.¹⁵⁵ However, it is important to mention that the city’s platform is often subjected to flooding.



Image 89. Byblos ancient phoenician city 8000 bce [Photograph].(2015).



Image 90. An artist's impression of Çatalhöyük [Illustration].



Image 91. Neolithic Site of Çatalhöyük [Photograph].



Image 92. Mohenjo-Daro [Photograph].(2013).



Image 93. A reconstruction of life on a Hohokam platform mound in the Sonoran Desert in the 13th century A.D. [Illustration].



Image 94. Panoramic aerial cityscape of Venice with Santa Maria della Salute church, Veneto, Italy [Aerial photograph].

156. Aureli, P. V. &, Tattara, M. (2019). Platforms: Architecture and the Use of the Ground. Retrieved from: <https://www.e-flux.com/architecture/conditions/287876/platforms-architecture-and-the-use-of-the-ground/>

157. Cohodas, M. (1980). *Radial Pyramids and Radial-Associated Assemblages of the Central Maya Area*. Journal of the Society of Architectural Historians, 39(3).

158. Acropolis, Athens. Retrieved from: <https://whc.unesco.org/en/list/404/>

159. Utzon, J. (1962). Platforms and Plateaus: Ideas of a Danish Architect. *Zodiak*, nº 10, pp. 114-117.

160. *Idem, ibidem*, pp. 114-117.

161. *Idem, ibidem*, p. 114.

162. *Idem, ibidem*.

163. *Idem, ibidem*, p. 115.

164. *Idem, ibidem*.

165. *Idem, ibidem*. p. 117.

Supporting life's activities by levelling ground to form a solid foundation, was not exclusive to domestic houses found in our early history. The erection of platforms has been a meaningful gesture in the conception and configuration of sacred and monumental buildings. A spatial hierarchy can be created by erecting important buildings on a raised horizontal plane, resulting in a strong visual emphasis of the building. This can be seen in Sumer Uruk, where the White Temple is raised on a platform and sets itself apart from the rest of the city, reflecting the building's importance (**Image 95**).¹⁵⁶ Another precedent are the Mayan Pyramids, where the main structure is composed of a radial pyramid that supports a ceremonial platform (**Image 96**).¹⁵⁷ The rising of the platform created a contrast between the building and its surroundings which gave significance to the sacred space.

Perhaps the most remarkable use of a platform, as a support for ceremonial grounds, is the Acropolis in Athens (**Image 97**). This monument complex is located at the top of a hill 150m above sea level which looks over Athens. In the 13th century, a fortification wall was erected in order to create a platform to support the monuments by extending the horizontal plane.¹⁵⁸ The perception of this platform is even more evident due to its contrast with the steep topography of Athens. Furthermore, the use of a raised horizontal plane can also be seen in the construction of the temples themselves; Its stepped platform, referred as Crepidoma, is used as the support of the Monument's erection, raising it above the surrounding ground.

The raising of important and sacred buildings creates a strong relationship between the ground and the sky and a visual connection between the top of the structure and the surrounding environment. Machu Picchu is an excellent example of the use of elevated horizontal planes that terrace the mountain ridge, raising spaces that grant different views over the surrounding landscape (**Image 98**). In his essay *Platforms and Plateaus* (1962)¹⁵⁹, the architect Jorn Utzon highlights the power a platform as a means of connecting it with its surroundings:¹⁶⁰

*The platform as an architectural element is a fascinating feature. I first fell in love with it in Mexico on a study trip in 1949, where I found many variations, both in size and idea of the platform, and where many of the platforms are alone without anything but the surrounding nature.*¹⁶¹

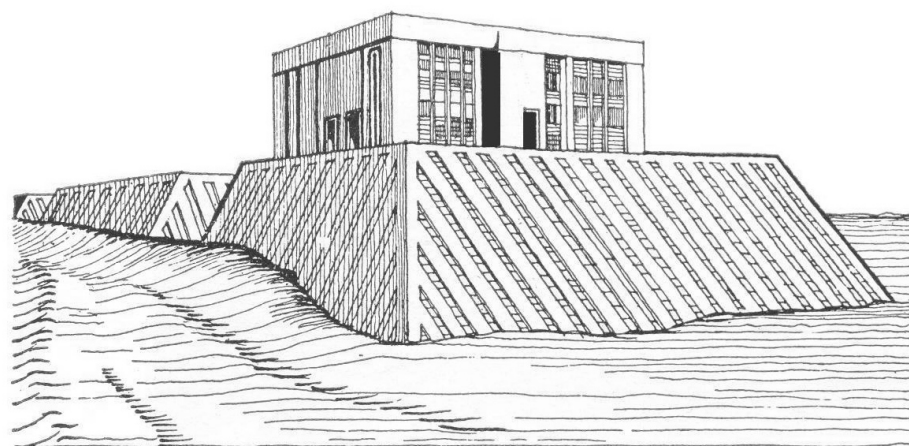
In his writing, Utzon explains that the positioning of the platforms in Mexico were formed with a remarkable sensibility towards the landscape. He illustrates this by describing Yucatan as an example:

*Yucatan is a flat lowland covered with an inaccessible jungle, which grows to a certain uniform defined height. In this jungle the Mayans lived in their villages with small pieces of land cleared for cultivation, and their surrounding, background as well as roof, was the hot, damp, green jungle. No large views, no up and down movements. By introducing the platform at the same height as the jungle top, these people had suddenly obtained a new dimension of life, worthy of their devotion to their Gods. On these high platforms - many of them as long as 100 metres - they built their temples. They had from here the sky, the clouds and the breeze, and suddenly the jungle roof had been converted into a great open plain. By this architectural trick, they had completely changed the landscape and supplied their visual life with a greatness corresponding to the greatness of their Gods.*¹⁶²

Thus the raised platforms are visually connected with the horizon and its vastness.

Utzon also acknowledges the use of platforms as the backbone of architectural compositions throughout various civilizations. In India, he uses the example of the Old Delhi mosque (**Image 99**), where a red sandstone platform was raised approximately 3 to 5 metres and enclosed on three sides by an arcade, which provided “a strong feeling of remoteness and complete calmness”.¹⁶³ In China, platforms grant houses and temples firmness and stability. Whereas in Japan, Utzon explains, the traditional houses are “a delicate bridge-like platform. This Japanese platform is like a table top and you do not walk on a tabletop. It is a piece of furniture”.¹⁶⁴ This light plane in the Japanese dwelling has very different expressions to the grounded stone platforms in Mexico. Later in the text, he discloses that many of his projects were based on platforms as an architectural element. He believes that this element can answer today's traffic problems. Utzon ends his Essay with the following:

*To express the platform and avoid destroying it is a very important thing when you start building on top of it. A flat roof does not express the flatness of the platform.*¹⁶⁵



THE WHITE TEMPLE & ZIGGURAT,
AT WARKA ARCHAIC PERIOD B.C. 3500-3000

Image 95. The White Temple 'E at Uruk [Drawing]. (1898).



Image 96. Chichen-Itza pyramid [Photograph]. (2014)



Image 97. The Acropolis and surrounding area, Athens [Photograph].



Image 98. Machu Picchu, Cusco - Perú [Photograph]. (2020).



Image 99. Aerial view of the Old Delhi Mosque, India
[Photograph]. (2019).

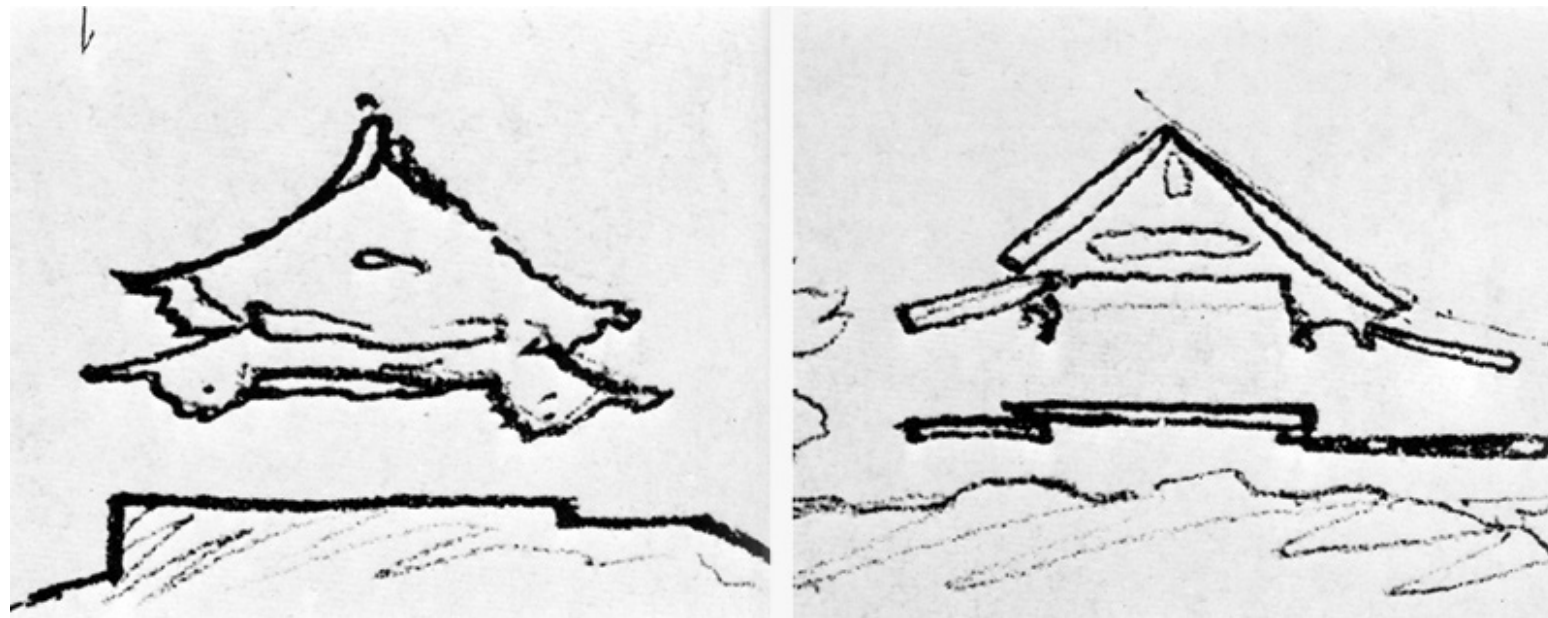


Image 100. Utzon's sketches illustrating the difference between the Chinese and the Japanese platforms [Drawing]. (1962).

166. VILLA D’ESTE - *Istituto Villa Adriana e Villa d’Este* · Villae.
Retrieved from: <https://europeanhistoricgardens.eu/en/portfolio-item/villa-deste-2/>

167. Aureli, P. V. &, Tattara, M. (2019). *Platforms: Architecture and the Use of the Ground*. Retrieved from: <https://www.e-flux.com/architecture/conditions/287876/platforms-architecture-and-the-use-of-the-ground/>

The horizontal plane grants a visual continuity between itself and its context, but it also provides a spatial continuity, providing physical connections between spaces. The raised platform creates a strong domain within a larger spatial ground, facilitating the organisation and articulation between different areas. A notable example is the connection between the Piazza di Spagna with the church of Trinità dei Monti in Rome (**Image 101**). The horizontal plane of the church is raised and connected to the lower level of the piazza through a monumental staircase designed by Alessandro Specchi, the ‘Spanish Steps’ (1725). Moreover, The Mortuary Temple of Hatshepsut is composed of three platforms with different dimensions terraced against a cliff and connected by a ramp that rises towards a sanctuary positioned at the top (**Image 102**). This connection between terraced platforms can also be seen in Villa D’este, built in Tivoli in the 16th century. This garden was divided into different horizontal planes, of different dimensions, and stands a remarkable example of Renaissance culture and became a model for the design of many gardens all over Europe.¹⁶⁶

The expression of the raised plane can also define a transitional space between the interior and exterior of a building. This is evident in Mies Van de Rohu’s design for the Farnsworth House; Platforms of different proportions are stacked vertically, providing a spatial procession that starts from outside, the most public, to the inside, the most private (**Image 103**). Moreover, the use of raised horizontal planes to organise space are explored within the interior of buildings, where a section of the floor is elevated to establish a spatial hierarchy within the larger space. This can be seen in the interiors of churches, where the altar demarcates a sacred and consecrated place, and in the theatre, where the raised stage provides a clear visual connection between the audience and the performance (**Image 104**).¹⁶⁷

Today, the implementation of platforms as a supporting element as well as infrastructure can be seen all over the cities, enabling and regulating the use of the ground. These horizontal planes provide a stable ground for the city’s activities and generate a spatial articulation between different zones, connecting and organising the urbanscape. Thus, the platforms assist in the coordination of the collective and become the stage for a city’s everyday activities. This was the case of Almada, where during the 20th century, the erected platform along its riverside became the stage for the city’s industrial activities and economic growth.

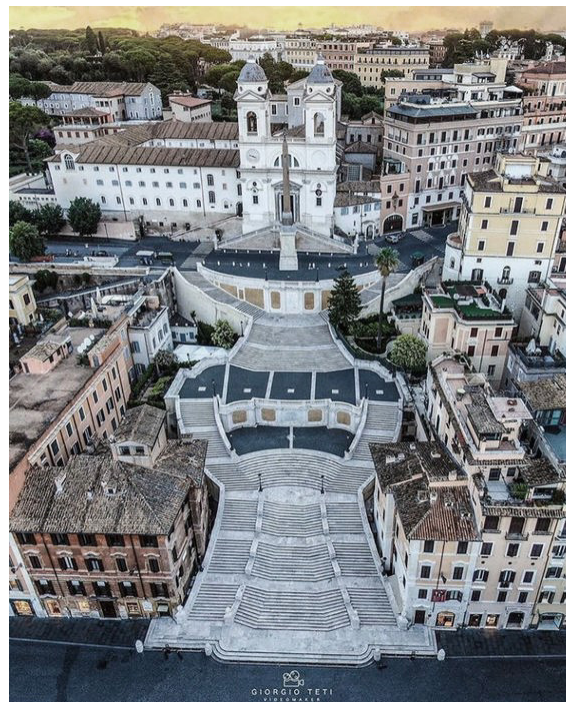


Image 101. Piazza di Spagna with the church of Trinità dei Monti in Rome [Photograph]. (2020).

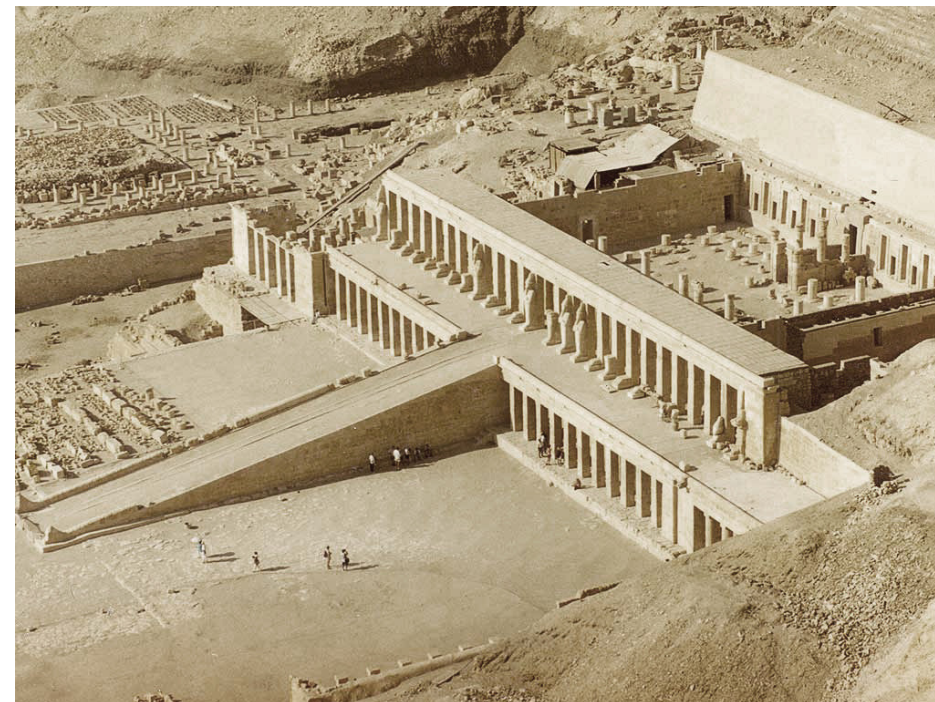


Image 102. Deir el-Bahari with temples of Hatshepsut, Thutmosis III and Mentuhotep II, Luxor, Egypt [Photograph]. (2016).



Image 103. Farnsworth House by Mies Van Der Rohe [Photograph]. (2013).



Image 104. High altar of St. Michael's Church, Munich, David Iliff [Photograph]. (2006).

The Tower

168. Definition provided by the Oxford Dictionary of Architecture and Landscape Architecture.

169. The story is found in the first book of the Old Testament.

170. Genesis 11:1 -9.

171. Carved from a single stone.

172. Mark, J. J. (2016). *Egyptian Obelisk*. Retrieved from: https://www.worldhistory.org/Egyptian_Obelisk/

173. *Idem, ibidem*.

174. Ancient Egyptian characters used in a system of pictorial writing.

175. “In the present state of our knowledge it seems reasonable to adopt as a working hypothesis the suggestion that the ziggurats developed out of the earlier temples on platforms and that small shrines stood on the highest stages [...]” Crawford, H. (1993). *Sumer and the Sumerians*. New York: Cambridge University Press. p. 85.

176. *Ziggurat of Ur* (2014). Retrieved from: <https://www.khanacademy.org/humanities/ancient-art-civilizations/ancient-near-east1/x7e914f5b:neo-sumerian-ur-iii/a/ziggurat-of-ur>

177. Blench, R. & Spriggs, M. (2003). *Archaeology and Language I: Theoretical and Methodological Orientations*. Oxfordshire: Routledge. p.125..

178. “Bells came into use in our churches as early as the year 400, and their introduction is ascribed to Paulinus, bishop of Nola, a town of Campania, in Italy. Their use spread rapidly, as in those unsettled times the church-bell was useful not only for summoning the faithful to religious services, but also for giving an alarm when danger threatened. Their use was sanctioned in 604 by Pope Sabinian, and a ceremony for blessing them was established a little later. Very large bells, for church towers, were probably not in common use until the eleventh century.” Smith, R. J. (1997). *Church Bells*. Retrieved from: http://www.awakentoprayer.org/church_bells.htm

Within the architectural discourse, a tower is considered a tall vertical element, with a height larger than its lateral dimensions, freestanding or attached to another structure.¹⁶⁸ Since the beginning of human civilization, man has used towers as an architectural component, reflecting man’s desire to build upwards and reach the sky. The Tower of Babel (***Image 105***), as depicted in Genesis, manifests humanity’s quest to reach heaven.¹⁶⁹ The narrative claims; to reach the heights of heaven, the human race unites itself to build the tallest building ever erected. “Come, let us build ourselves a city and a tower whose top reaches to the heavens. And let us make a name for ourselves, lest we be scattered over the face of the whole earth”.¹⁷⁰ Concerned with the growing pride among humans as they erected the tower, God decided to confuse their language. Unable to understand one another, they were incapable of finishing the construction. However, as we know, man’s ambition to build the tallest of the building’s still alive today.

The connection between earth and heaven has been explored by integrating towers within many religious and sacred buildings throughout history. In religious architecture, towers were used to symbolise places of worship. For example, at the entrance of their temples, the ancient Egyptians built a monolithic¹⁷¹ pillar, the obelisk. According to the ancient Egyptian belief, the obelisk represented the primordial mound that god Atum stood at during the creation of the world.¹⁷² Always raised in pairs, the obelisks reflected the Egyptian value of balance and harmony.¹⁷³ The four sides of the structure were embellished with hieroglyphs¹⁷⁴ dedicated to the sun god, Ra. The pillar ends with pyramidion, intended to catch the first and last sun’s rays. The oldest surviving obelisk, still standing in its original position, is Senusret I (c. 1971-1926 BCE), located in Heliopolis, where the temple of Ra once stood (***Image 106***).

The Ziggurats are large temples built in ancient Mesopotamia, from approximately 2200 until 500 BCE, dedicated to the patron god or goddess of the city. The building took the form of a terraced pyramid with successively receding platforms, ranging from two to seven stories. At the top of the structures is a shrine to the city’s God where the priests could perform sacrifices and other rituals.¹⁷⁵ The best preserved ziggurat is at Ur, Iraq, and its construction dates back to 2100 BCE. The temple is oriented to true North and constructed with three levels of terraces reaching originally a height between 20 and 30 metres.¹⁷⁶ The largest ziggurat structure was found in Chogha Zanbil, Iran. The temple was built in 1250 BC in honour of the great God Inshushinak (***Image 107***). Constructed mainly with mud bricks, the building is terraced in five levels and originally reached the height of 53 metres.¹⁷⁷

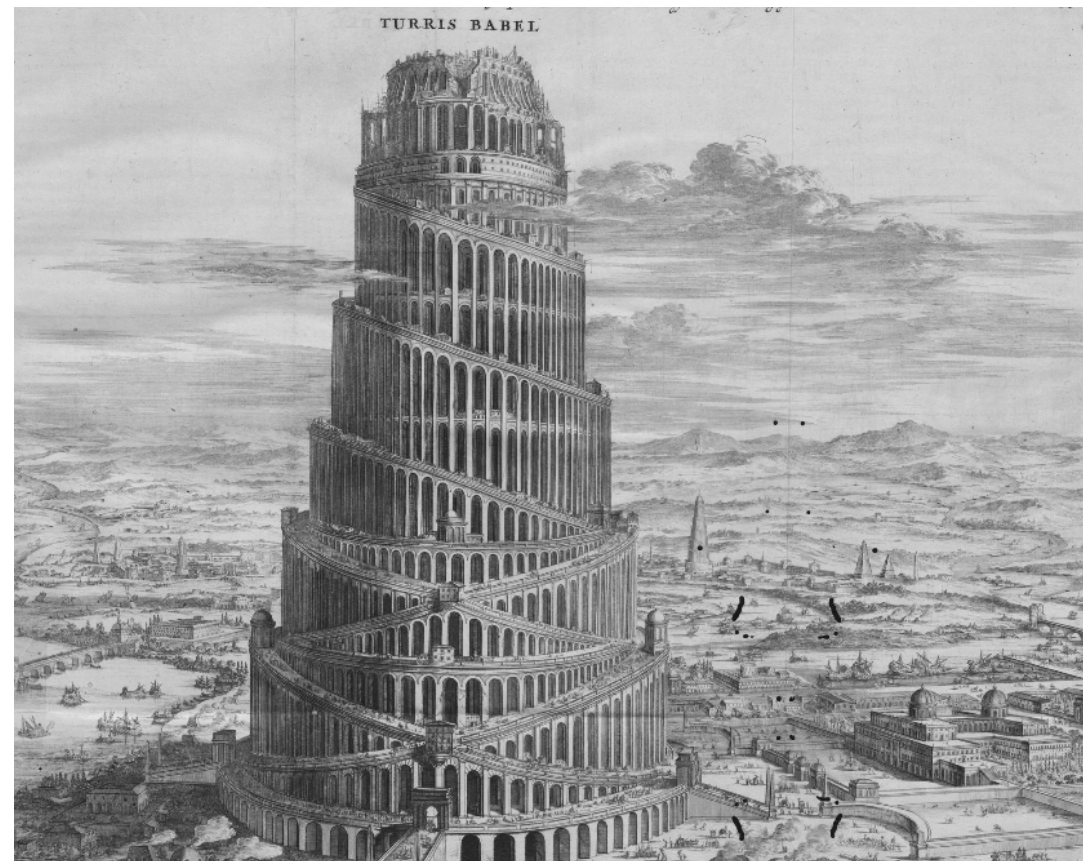


Image 105. Illustration of the Tower of Babel, published in *Turris Babel* by Athanasius Kircher [Illustration]. (1679).

179. *Venice and its ‘caskets’: the bell towers.* Retrieved from: <https://www.visitvenezia.eu/en/venetianity/discover-venice/venice-and-its-%E2%80%98caskets--the-bell-towers->

180. “Begun on pre-existing Roman foundations in the 9th century and rebuilt several times between the 12th and 14th centuries, the campanile took on its definitive appearance, after much restoration and reworking, between 1511 and 1514.” *The Campanile.* Retrieved from: <http://www.basilicasanmarco.it/basilica/campanile/?lang=en>

181. *Leaning Tower of Pisa.* (2011). Retrieved from: <https://www.britannica.com/topic/Leaning-Tower-of-Pisa>

182. Sarkar, D. (2021). *The Leaning Tower of Pisa Wasn’t Supposed to Lean.* Retrieved from: <https://www.discovermagazine.com/planet-earth/the-leaning-tower-of-pisa-wasnt-supposed-to-lean>

183. Spire. (2007). Retrieved from: <https://www.britannica.com/technology/spire>

184. Bork, R. (2003). *Great Spires: Skyscrapers of the New Jerusalem.* Cologne: Kolner Architekturstudien. pp. 58-75.

185. Muezzin, Arabic mu’addin, in Islam, the official who proclaims the call to prayer..

186. AlSulaiti, A. (2013). *Minaret.* Retrieved from: <https://www.worldhistory.org/Minaret/>

187. *Minaret.* (2020). Retrieved from: <https://www.britannica.com/art/minaret-architectur>

188. UNESCO is mobilized for the protection of the Minaret of Jam (Afghanistan) with funding from ALIPH. (2019). Retrieved from: <https://whc.unesco.org/en/news/1993>

189. Alfarra, J. (2020). *Discover the Malwiya Minaret of Samarra, Iraq.* <https://www.middleeastmonitor.com/20201003-discover-the-malwiya-minaret-of-samarra-iraq/>

Furthermore, during the Romanesque and Gothic periods, towers became an important feature for churches and cathedrals. Bell towers, introduced to the Cristian church in 400 AD, are slender structures that are often attached to (or near to) a church and house a bell at the top. The tower’s height enables the bell to be heard at a distance, calling worshipers to religious service.¹⁷⁸ Additionally, due to its verticality, the tower becomes a focal point standing out from its surroundings, and marking the place of worship within its city or landscape. This is evident in Venice; The city is very flat, with low buildings never exceeding four storeys. The horizontality of Venice allows the bell towers to become the protagonists of the city’s skyline and become reference points in the island (**Image 108**).¹⁷⁹ The most famous of them is the Bell Tower of San Mark’s Basilica, in Venice, built in 1514;¹⁸⁰ the structure reaches a height of 98.6 metres (**Image 109**). An epitome of bell towers is the Tower of Pisa, completed in 1372 in Italy (**Image 110**). Situated behind the Pisa Cathedral, the freestanding tower has a height of 55.86 metres.¹⁸¹ It became notorious because of its four-degree lean due to an unstable foundation that could not adequately support the structure’s weight.¹⁸²

The ambition of building even higher towers reached an apex during the Gothic period. Originated in the 12th century, the Gothic spires are a pyramidal structure with four sides placed on top of the church tower.¹⁸³ Through time the spires became taller and slimmer, and by the 13th century, the element became more ornamented.¹⁸⁴ The slender element gives verticality to the building, leading the gaze upwards, visually connecting the cathedral with the sky. Ulm Minster Cathedral, completed in 1890 in Germany, is the tallest church in the world, with its spire reaching a height of 161.5 metres (**Image 111**).

A significant feature of every mosque is the minaret, a tall slender tower from which muezzins¹⁸⁵ call the faithful to prayer five times a day. Although minarets were not featured in the earliest mosques, they eventually became one of the most characteristic forms of Islamic architecture.¹⁸⁶ These towers soon became part of the skylines of Muslim cities, as a ‘landmark of Islam’, where different regions developed their own signature style.¹⁸⁷ One of the oldest surviving minarets in the world is the Minaret of Jam (1194 BC), located in Afghanistan (**Image 112**). The tower is 65 metres tall and punctuated the rugged landscape of Shahrak district.¹⁸⁸ Moreover, The minaret of the Great Mosque of Samarra (**Image 113**), with its unique ascending spiral design and a height of 52 meters, is believed to have been designed to create a strong visual statement of the presence of Islam in the Tigris Valley.¹⁸⁹



Image 106. Obelisk of Senusret I
[Photograph]. (2016).

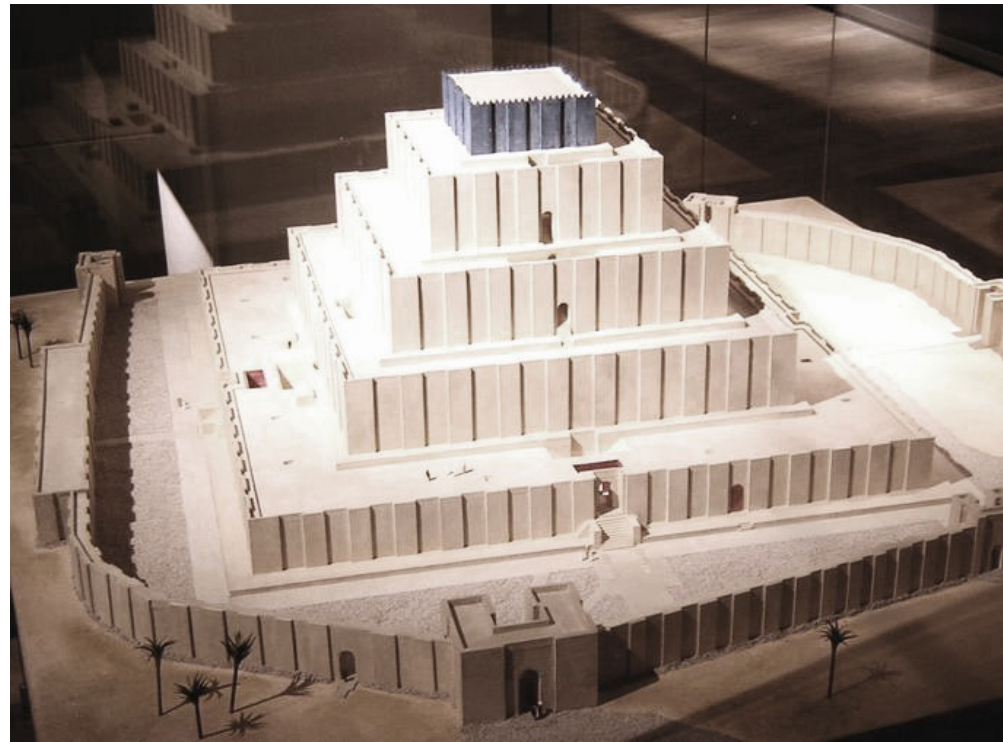


Image 107. Choga Zanbil, Ziggurat, Model [Photograph of a model].



Image 108. Rooftops and bell towers of Castello in Venice Italy [Photograph]. (2017).



Image 109. San Marco Bell Tower, Venice - Italy [Photograph]. (2016).



Image 110. Leaning Tower of Pisa, Italy [Photograph]. (2004).



Image 111. Ulm Minster Cathedral, Martin Kraft, [Photograph]. (2008).



Image 112. Minaret of Jam [Photograph]. (2006).



Image 113. Al-Malwiya Minaret of the Great Mosque Samarra Source Hattstein and Delius [Photograph]. (2000).

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In Eastern Asia, Buddhists constructed pagodas - a tall tiered tower - as their temples. Initially, these structures symbolised sacred mountains and were used to store religious relics and remains of Buddhist monks.¹⁹⁰ The pagodas were often built in the courtyard of Buddhist temples and were designed based on divine numbers; even numbers were considered unlucky, so the structure was divided into uneven floors.¹⁹¹ Its overhang roof curves up in the corners, channelling the rainwater away from the structure's foundation. It was believed that the sharp pointed ends of the roof channelled evil spirits away from the temple. Initially, pagodas were never built higher than 30 metres, as the priests believed it would hurt the spirits and gods flying above the temple.¹⁹² However, in time, the structures were built with higher dimensions, reaching its pinnacle in 2007 with the completion of the Pagoda of Tianning Temple that stands at 153.7 m in height (**Image 114**). In the old town of Dali, in China, the famous Three Pagodas of the Chongsheng Temple stand, visible from miles away, is a national treasure. Made of brick and covered with white mud, the structures reflect China's ancient Buddhist architecture. Honouring the use of divine numbers in its composition, the three towers are arranged to form an equilateral triangle.¹⁹³

Another characteristic inherent within towers and their verticality is the surveillance over its surroundings. The structure enables a person to observe everything from a superior point of view. Ergo, towers were often used as part of defensive strategies for cities and even on battlefields, where one could easily see the enemy approaching. Fortified towers were used as part of the defence for castles and along the curtain wall, demonstrating strength and solidity. In the historical Georgian region of Svaneti, tower houses, also referred to as Svan towers, were built as defensive dwellings that protected its inhabitants and the city.¹⁹⁴ The necessity of fortifying the homes resulted from the dwellings' scatteredness, making it challenging to build a fortified wall around them all.¹⁹⁵ The towers range from 20 to 25 metres in height and served as living quarters and a fortress for defence (**Image 115**).

As a defensive approach, towers were strategically positioned within the city and its landscape. The Belem tower was erected on the Tagus's northern margin as part of a defence system and gateway to Lisbon. Furthermore, Watchtowers were implemented in the construction of defensive walls to provide protection to the city. The height of such towers increased the visibility of the surroundings for defensive purposes. An imprecise example is the Great wall of China, a fortification built on the crestlines of hills and mountains along China's countryside. The wall runs for more than 21 000 kilometres and has a total of 25 000 watchtowers varying from 3 to 5 metres in height.¹⁹⁶ The towers were placed in the highest locations along the landscape and were used to watch the enemy's movement and to send smoke or fire signals.¹⁹⁷

Moreover, the presence of the tower within a landscape creates a reference point in space and is often used as an element of spatial orientation. Lighthouses, for instance, are built near water (sea or river) and emit a light from the top of its slender structure, serving as an aid to maritime coastal navigation.¹⁹⁸ The tower can warn mariners of hazards and guide them to their destination. One of the most notorious lighthouses in antiquity is the Lighthouse of Alexandria (280–247 BC). The monumental structure stood on the island of Pharos in the harbour of Alexandria and estimated to have been higher than 100 metres tall originally (**Image 116**).¹⁹⁹ Another tower typology which is used for orientation is the clock tower - which houses a turret clock on the face of the tower. The height of the structure improves the visibility of the clock and becomes a landmark that provides orientation within its surroundings. The most well-known clock tower is Big Ben, in London, which became famous for its time accuracy and its enormous bell.²⁰⁰ Completed in 1859, the tower is 96 metres tall and is an important landmark of the city (**Image 117**). The clock's continual striking is said to be a reminder to Judges to administer true justice.²⁰¹

The form of the tower is assertive, it dominates its surroundings and creates order. The act of erecting a tower is often a symbol of power and creates a statement. This can be seen in the city of San Gimignano located in the Tuscany region of Italy (**118**). During two centuries the city experienced conflicts between families within its walls. The rivalry resulted in a competition of which family could build the tallest tower, becoming a symbol of triumph.²⁰² Eventually in San Gimignano, there were 72 tower houses marking the city's landscape.²⁰³ The dispute was only over when the local council prohibited the construction of any tower taller than the Palazzo Comunale's tower, which stood with a height of 52 metres. A similar dispute to prove which family is more powerful occurred in Bologna during the 12th and 13th century. It is estimated that more than 180 towers were built within the city.²⁰⁴ The most prominent and still standing towers are known as the Two Towers of Bologna, located at the intersection of the roads that lead to the five gates of the old ring wall.



Image 114. Tianning Pagoda in Changzhou [Photograph]. (2007).



Image 115. Svan towers [Photograph]. (2016)



Image 116. Engraving depicting the Phare d'Alexandrie (Egypt) [Engraving]. (1721).



Image 117. The Big Ben, London, view from across the Thames [Photograph]. (2017).



Image 118. The towers of San Gimignano [Photograph]. (2000).

Humanity’s quest of building the highest of the structures is perpetual throughout history; It reached its pinnacle in the late 19th and early 20th century with the introduction of mass produced steel. The use of steel frames enabled buildings to reach precedent heights.²⁰⁵ The construction of the Eiffel Tower (1889) in Paris revealed the true vertical potential of steel construction.²⁰⁶ With a height of 324 metres, the lattice tower is the most famous Parisian landmark and provides a panoramic view of the city (*Image 119*). These engineering advances led to the construction of a number of skyscrapers in New York and Chicago, providing more housing and office spaces within the city.²⁰⁷ The first skyscraper to be built was the Home Insurance Building (1885) in Chicago (*Image 120*). Although the building had only 10 stories, reaching a height of 55 metres, the structure marked the beginning of a typology that would eventually punctuate the urban landscape of many cities around the world. The tallest skyscraper built to date is Burj Khalifa, in Dubai (*Image 121*). The structure was completed in 2009 with a height of 828 metres with 163 floors.

The french architect Jean Nouvel, with the intention of building an endless tower connecting the ground to the sky, designed the Tour Sans Fins (1989-1992). The slender cylindrical tower, reaching a height of 425 metres, was intended to be the tallest tower in Europe and the tallest concrete skyscraper in the world (*Image 122*). In order to create the effect of the tower fading into the sky, and therefore becoming endless, a dematerialization of the structure is created. The lower part of the building is granite and gradually changes to glass in the higher parts. The dark granite solidifies the footing of the structure whereas the transparent glass makes it blend in with the sky. The project was never built, but remained an important concept and symbol of a structure that could connect earth and sky, as explained by the architect:

The Esthetics of a Double Disappearing Act: an Endless Tower

*The human mind is obsessed with infinity. Fascinated.
It’s on a neverending metaphysical quest: where did it begin? Where will it
end?*

The tower is a metaphysical object.

It’s a question about limits.

*The usual answers of architecture are all too familiar: the important points in
a tower are the base and the cut-off point of the top floors...*

American architects know this...

*The proposal set out here is based on erasing the limits and opting instead for
an expression of vertical tension that’s conceptually infinite.*

The proposed tower is endless:

It disappears into the ground...

It disappears into the sky.²⁰⁸

Jean Nouvel, 1992.

205. “The use of metal and the possibility of vertical movement(elevator), in combination with the whole growing demand for space, led to “Invention”, but also in direct application of growth in height, in the appearance of skyscrapers.” Koolhaas, R. (1994). *Delirious New York: A Retroactive Manifesto for Manhattan* . New York: Monacelli Press. p. 87.

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Image 119. The Eiffel Tower [Photograph]. (2010).



Image 120. W.L. Jenney's Home Insurance Building, LaSalle and Adams Streets [Photograph]. (1995).



Image 121. Burj Khalifa Skidmore, Owings & Merrill LLP [Photograph].



Image 122. Tour Sans Fins [Photomontage]. (1989-1992).

Emerging and submerging spaces

The consolidation between the vertical and horizontal

The proposal emanates from the reflection of the development of Almada's and the Tagus' relationship over time. Given that this connection, between city and river, is established visually and physically, the project assimilates a juxtaposition of a horizontal and a vertical architectural element to reinforce and celebrate this relationship. The aim is to provide a space where this connection can take a different form, going from a place of storage and production of goods to a place for leisure and recreation. Here, the Tagus becomes an important and catalytic urban element for the city, which is integrated in its urban fabric, providing a public space that contributes to the city's quality of life. To achieve it, a proposal was developed, capable of evoking and enhancing the site's character, and also exploring the limits of the space and its new use, maintaining its connection with Almada's inhabitants.

The intervention takes place along the east coast of Almada, on the platforms of the former shipyard of Lisnave. The site is currently found in a derelict state, emblematic of its noble industrial past. The space that was initially designed to provide easier connection between land and water is now an obstacle between Almada and the Tagus. The proposal focuses on the transformation of the limit between the city and the river, encompassing all scales, from the territory to the detailed architectural elements. The project centres on the reconfiguration of the riverside, generating a water square as a public space that grants Almada and its inhabitants a direct connection with the water. The development of such urban space allows a better articulation between the consolidated city and the river. Thus, the platform becomes a stage for the inhabitants to develop and renew their relationship with the river.

Lisnave was a shipyard constructed with unprecedented dimensions, aimed at the construction and repair of large scale ships. The platform that assisted these activities had an area of 300,000 square metres, of which 260,000 were conquered from the river, and two dry docks, one of them with a capacity for ships up to 300,000 tons. Since its closure in 2000, the site has been inactive and left to decay. The warehouses that assisted the construction and repair of ships remain, but in a dilapidated state.

Moreover, just like the water that surrounds it, the platform is horizontal in nature, connected to the vastness of the estuary and open to the sky. This strong horizontality is very contrasting with the accentuated topography of Almada. The docks were introduced to provide an easier connection between the platform and the river, creating a strong linearity and movement throughout the site. In order to preserve and emphasise the horizontal nature of the space the intervention proposes the removal of the obsolete warehouses, keeping the Lisnave portico as the only vertical element as a reminder of the former shipyard and its grandiosity. In this proposal, part of the platform that suffered the most degradation is removed, enhancing the morphological linearity of the platform. The water canals that are formed by the docks are extended, bringing the river and its limit closer to the city and further accentuating its linear nature. The canals have different depths, coordinated with the different tides experienced by the river. The parts of the canal closer to the city are shallower and only filled with high tides. The parts of the canal closer to the river are deeper and filled even with the lowest tides. This way the vertical movement of the water, stipulated by the tidal differences, can be observed as horizontal movement. With this intervention, the former platform of Lisnave becomes a water public square, a moment of connection between the city and the river, celebrated by the vastness of the Tagus estuary.

Furthermore, anticipating the future sea level rise due to climate change, the entire platform is raised 0,5 metres as a protective measure of the coast of Almada. A drainage system is introduced within the raised 0,5 metres, diverting any flooding, particularly in the region of Cova da Piedade, towards the river. The canals become stormwater reservoirs as a mediation method in the case of extreme weather conditions. With climate change and its consequences in mind, this measure will not only physically protect the east coast of the city but also provide aid to the areas prone to flooding.

The architectural intervention is materialised along the slender 500 metres long pier that encloses the larger dry dock, the Doca 13. The pier has a strong sense of movement and directs itself towards Praça do comércio, on the other side of the river, creating this visual connection with Lisbon. Walking along the structure, openings and staircases reveal the voids within the platform's structure. The spaces inside the pier were designed to assist the repair and construction of ships within the dry dock. The project takes advantage of the existing underground voids to create a sequence of horizontal spaces within the pier. This sequence of spaces gradually submerged below ground and eventually below the water line. These spaces are designed and organised in consideration with the existing concrete structure and existing voids of the pier's platform.



Low-tide



Medium-tide



High-tide

The tidal movement of the river:

As the water rises it moves towards the city through the water chanel, tranforming the vertical movement of the river into a horizonttal movement, bringing the river closer to the city.



Lisnave pre-intervention.

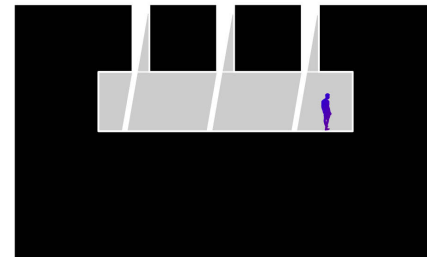
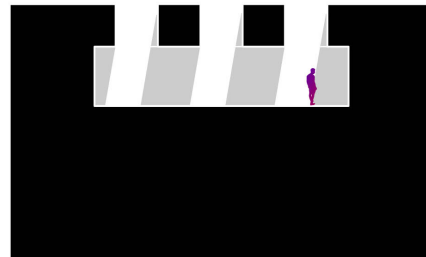
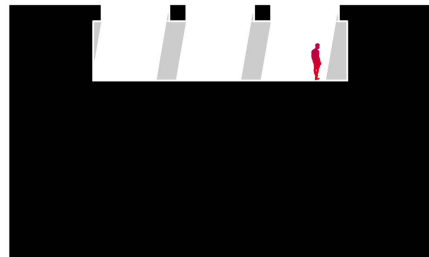


Lisnave post-intervention:

The warehouses and the compromised portion of the platform are removed, emphasising the linear and horizontal nature of the space. The only vertical element left is the Lisnave portico. The canals are extended, bringing the river closer to the city. The vast space of the former Lisnave shipyard now becomes a water square, a moment of connection between Almada and the Tagus.



Photos along the pier, reflecting the linear nature of the space, and revealing the existing voids within the structure.

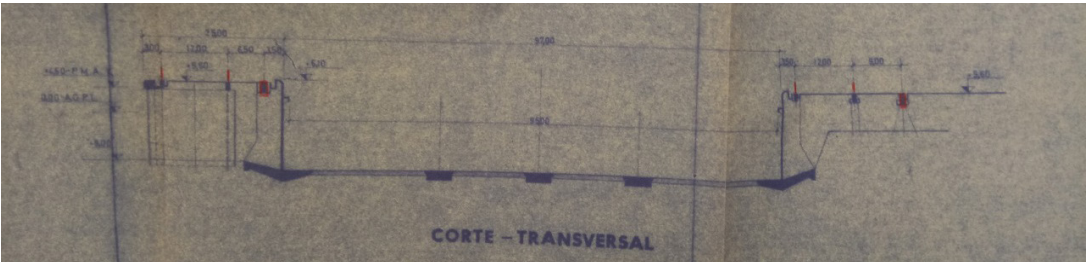
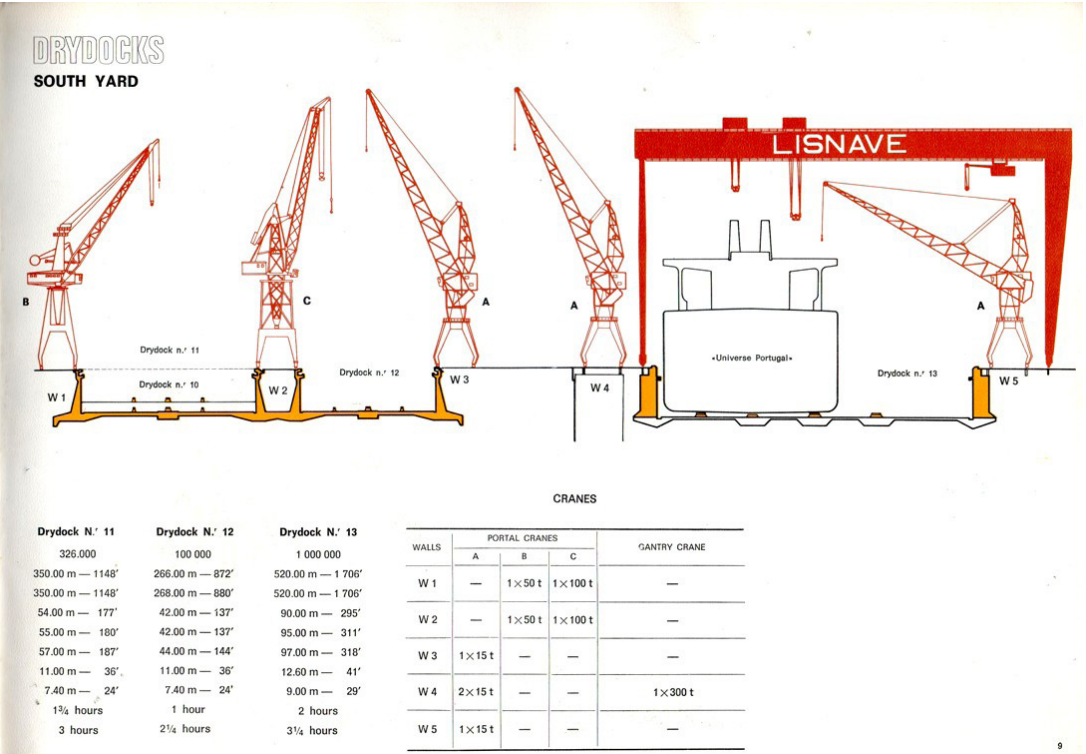


Spatial and thermal procession through the pier.

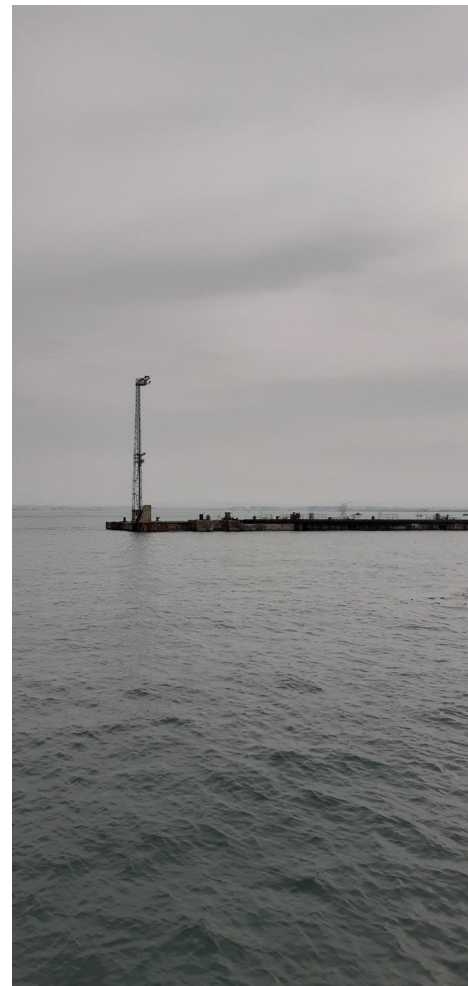
Due to its density, the concrete structure acts as thermal mass, meaning that it stores heat and slowly releases it again. Underground, these temperature changes are blunted and delayed, termed thermal lag, resulting in a smaller thermal fluctuation throughout the day and throughout the seasons - meaning that in Winter the temperature below the surface will be higher than the surface air temperature, and in Summer the underground temperature will be lower than the surface air temperature.

Furthermore, the intervention proposed for Lisnave takes advantage not only of the existing concrete structure of the platform but also the environmental conditions that it provides. By carving out the concrete structure underground, spaces can be formulated with a more stable temperature. Taking into consideration that the deeper the space the greater the thermal stability, the intervention proposes a sequence of underground spaces that generates a thermal procession. As the space becomes deeper, the more thermal stability it acquires. Thus, there is a slight thermal difference between the spaces, resulting in a progrecive change in spatial quality and temperature as one moves through the sequence of spaces.

To further enhance the perception of the submersion of the spaces there is a gradual decrease in dimension in the roof opening. Consequently the thickness of the beams gradually increases, reflecting the descending movement of the spaces. This creates a progressive diminish of light penetrating the underground spaces as well as the connection between the space (interior environment) and the sky (exterior environment). The spatial quality given by the depth, temperature and brightness of the spaces are perceived by a linear procession and movement through the spaces, This results in the visual and sensorial spatial experience through the building. This linearity is further reinforced by the slender beams, giving it a strong sense of movement and direction.



Construction drawing of Doca 13 in Lisnave.

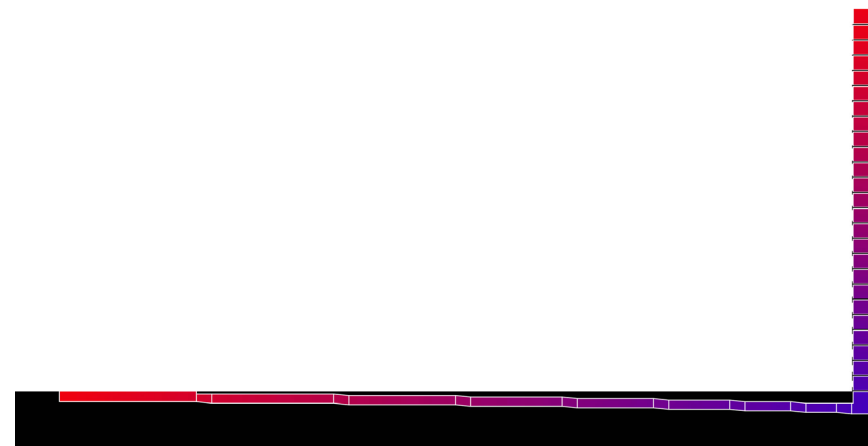


The final gesture of the intervention is an ascending movement that is given by the placement of a tower emerging at the end of the pier, as a final gesture. The verticality of the tower juxtaposes the horizontality of the pier. Thus, complementing the submerging movement with an emerging one, leading the sequence of spaces from a horizontal linear organisation to a vertical stacking of spaces. This sequence of spaces is finalised with the rooftop of the tower that becomes a viewpoint with a strong 360 visual connection with the surrounding landscape.

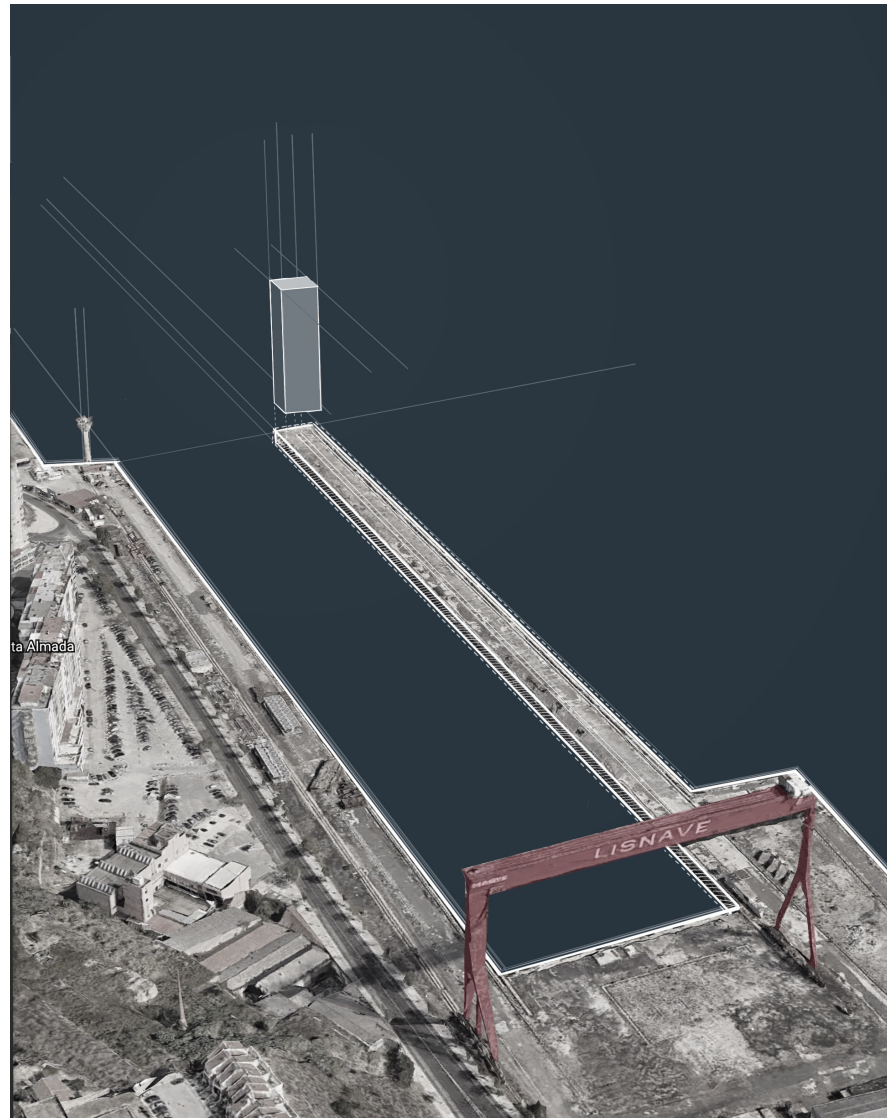
Moreover, the tower as an element incorporates a very similar strategy of the roof openings in the underground spaces of the pier, creating a strong sense of a procession. The strategy follows the logic that the lower part of a tower, its foundation, is heavier, and as the spaces progress upwards they become lighter. In order to create this effect of a heavier bottom and a lighter top, so light that it almost disappears in the sky, the dimension of the openings of the tower gradually changes in size. The tower, as a continuation of the pier, is constructed in concrete and the openings seem to be carved out of the thick wall. The openings start at the bottom with a dimension of 2,7m by 2,7m. As the spaces ascend, the openings increase gradually and proportionally by 100mm until reaching a dimension of 4,6m by 4.6m at the rooftop, the highest point of the tower. This strategy creates a lightness at the top of the tower and a heaviness at the bottom, both in exterior composition as well in the interior spaces and their atmosphere. The larger opening introduces more sunlight to the inside of the spaces, and consequently more heat. Thus, resulting in an atmospheric and compositional gradual change as the spaces ascend in the tower, creating a procession of spaces and a sensorial experience. This also affects the visual connection between the interior of the tower and the exterior landscape, providing, as the spaces progress, a more open aperture and greater visual connection. The top of the tower is crowned with the most benevolent space, a miradouro, connecting, once again, Almada, Lisbon and the Tagus.



Spatial procession diagram: Light



Spatial procession diagram: Thermal

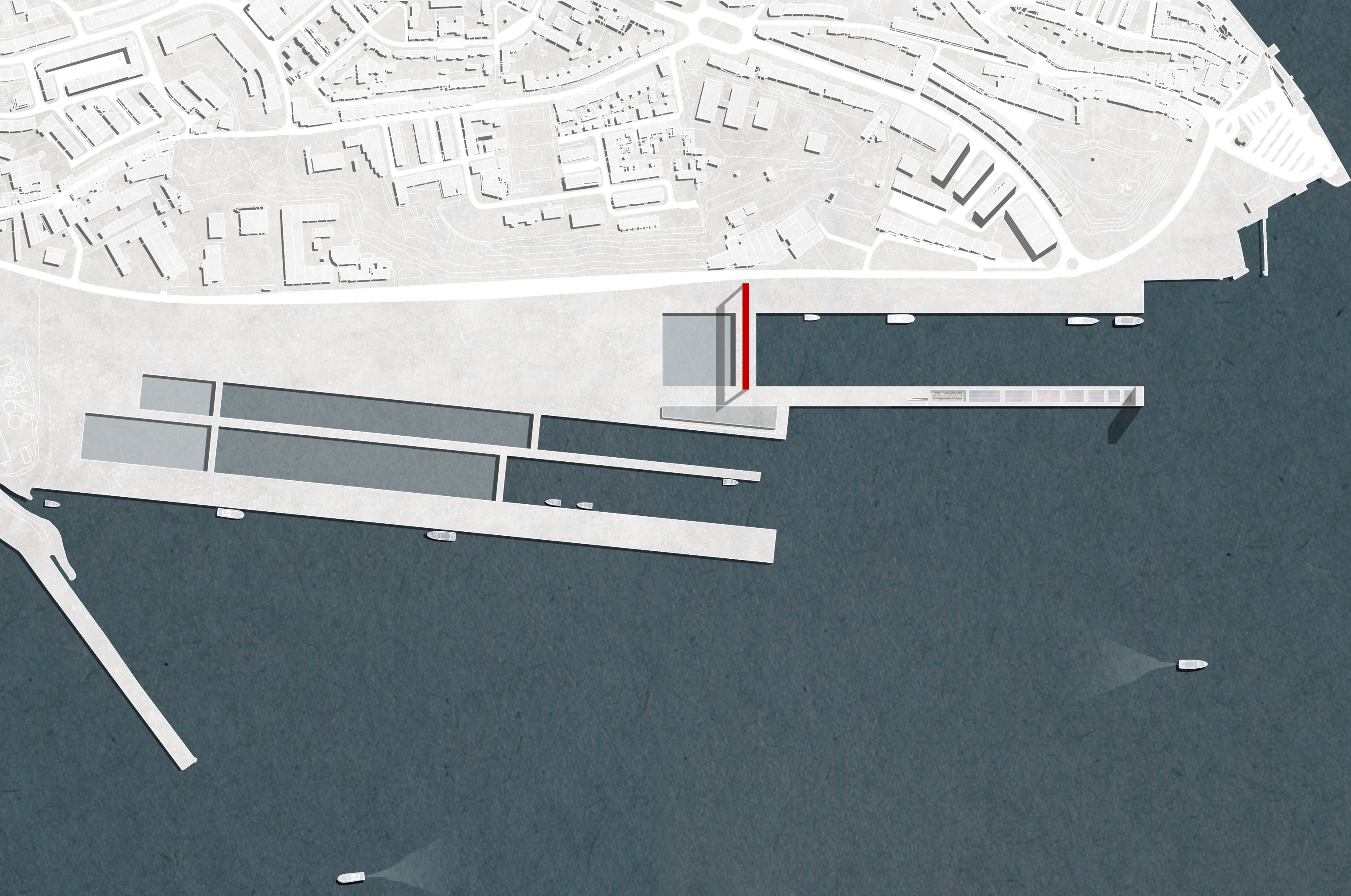


The tower as the final gesture of the linear pier, as the moment of conversion between horizontal and vertical



Territorial section diagram through Almada and Linave, comparing the scale of the tower versus the city's verticality.

THE BENT TOWER





TOP VIEW
SCALE 1:1000



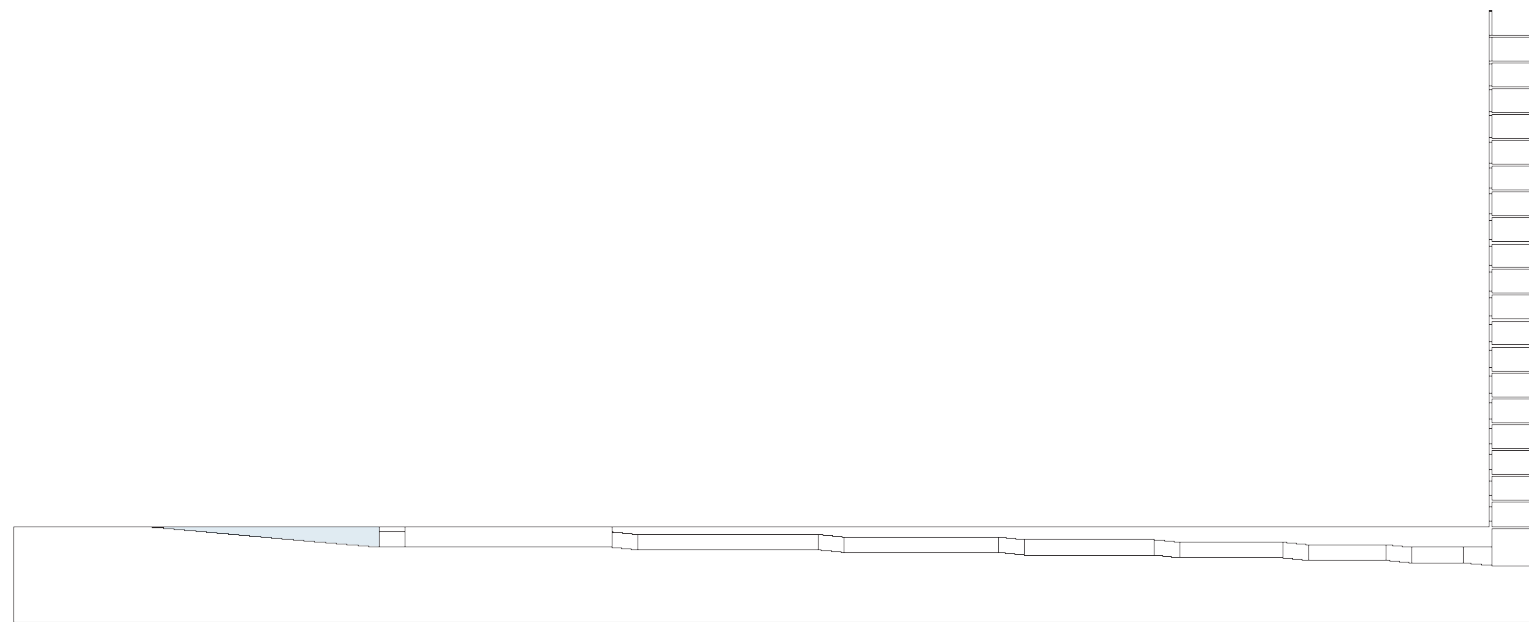




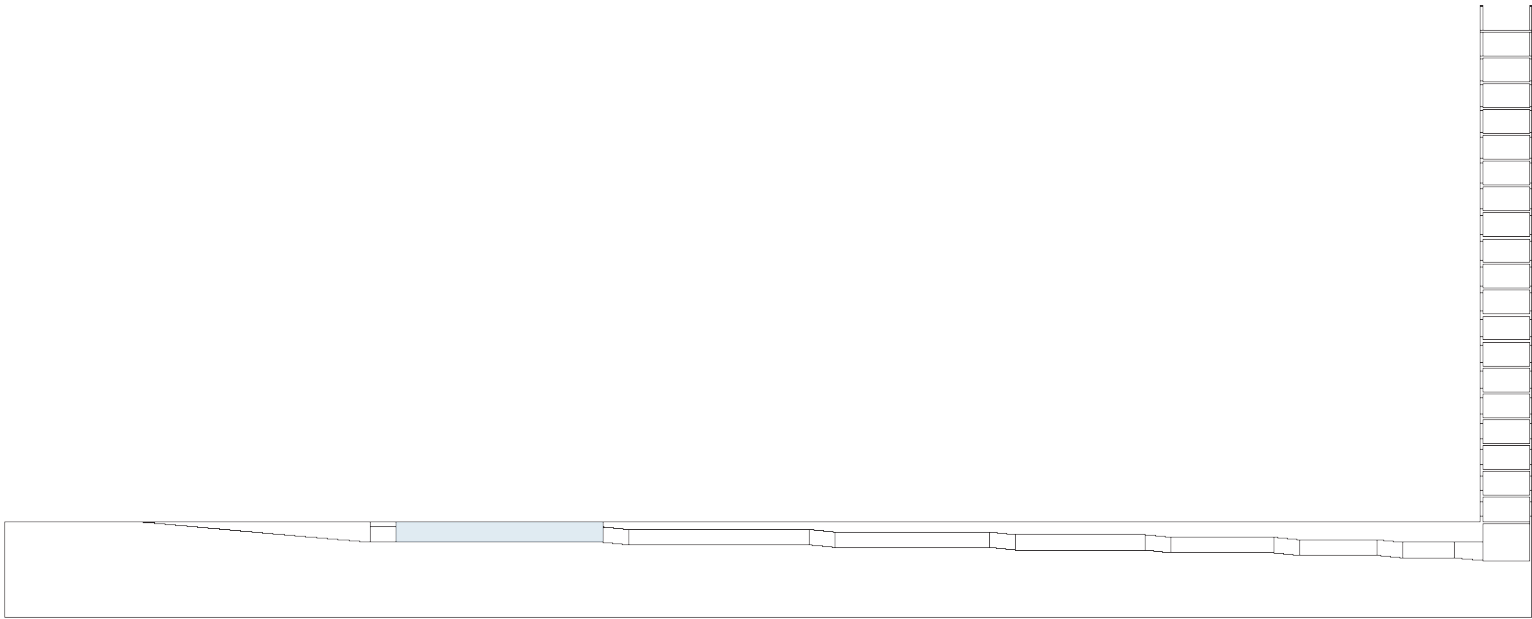


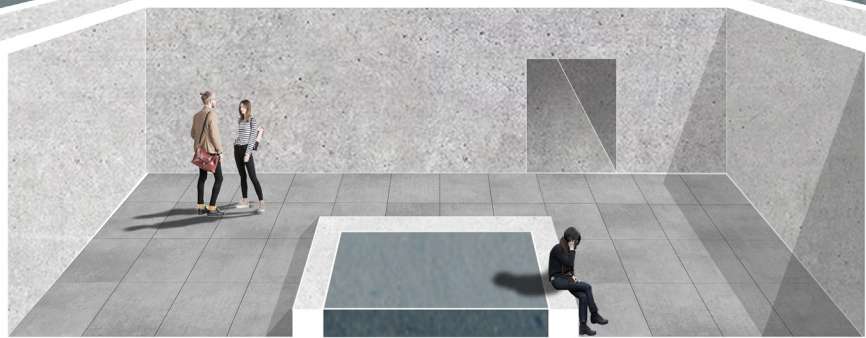
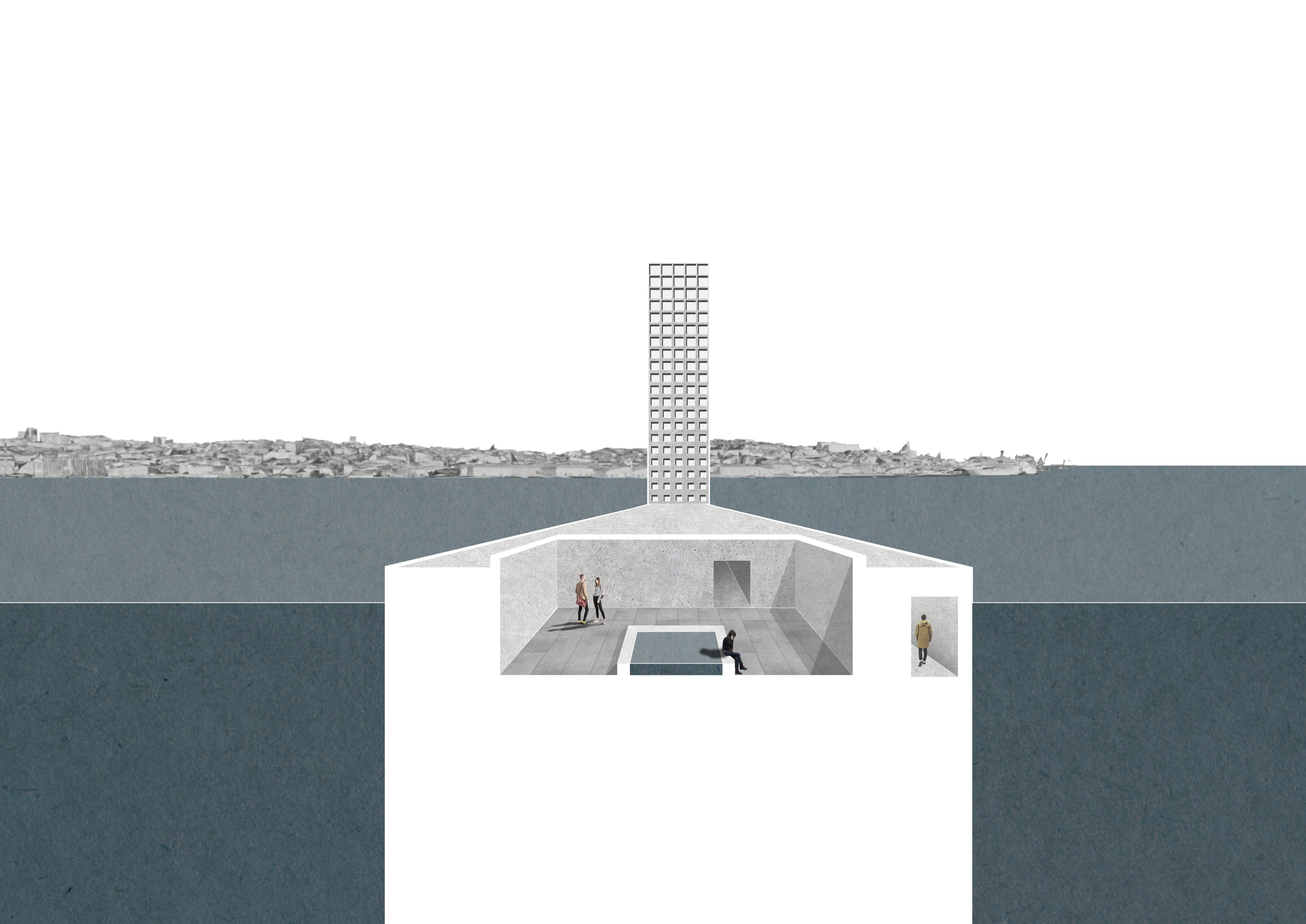


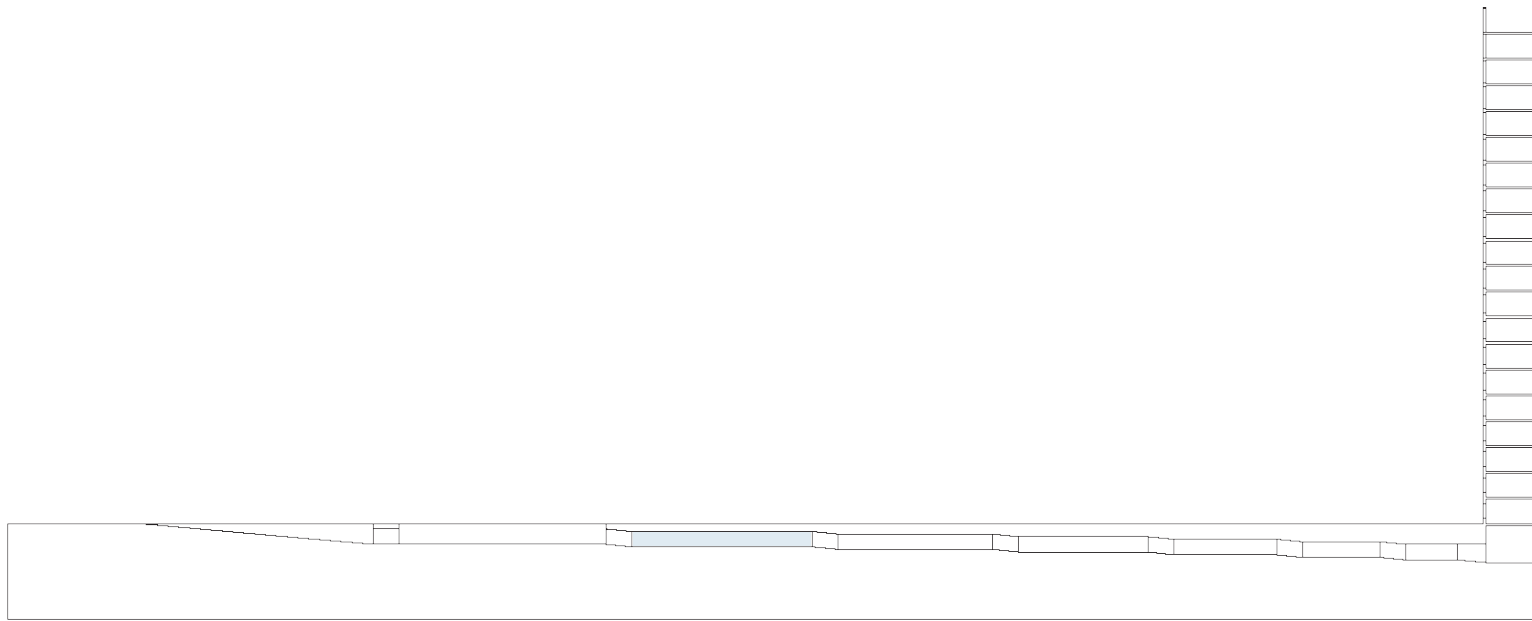
SPATIAL PROCESSION

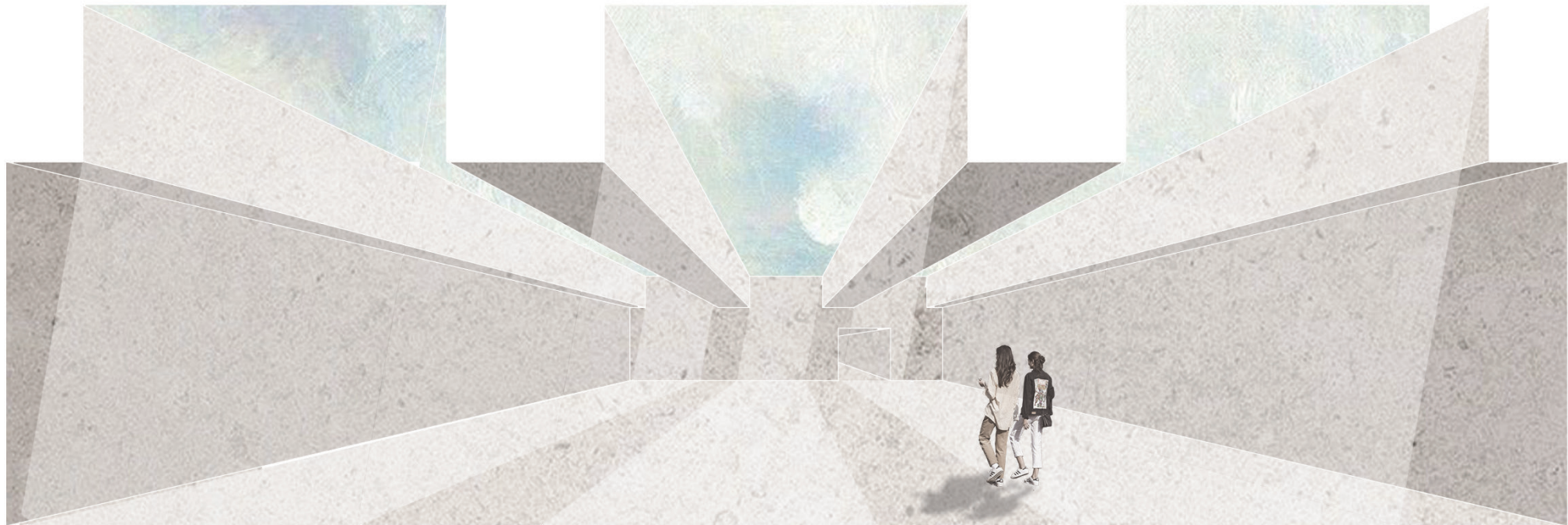


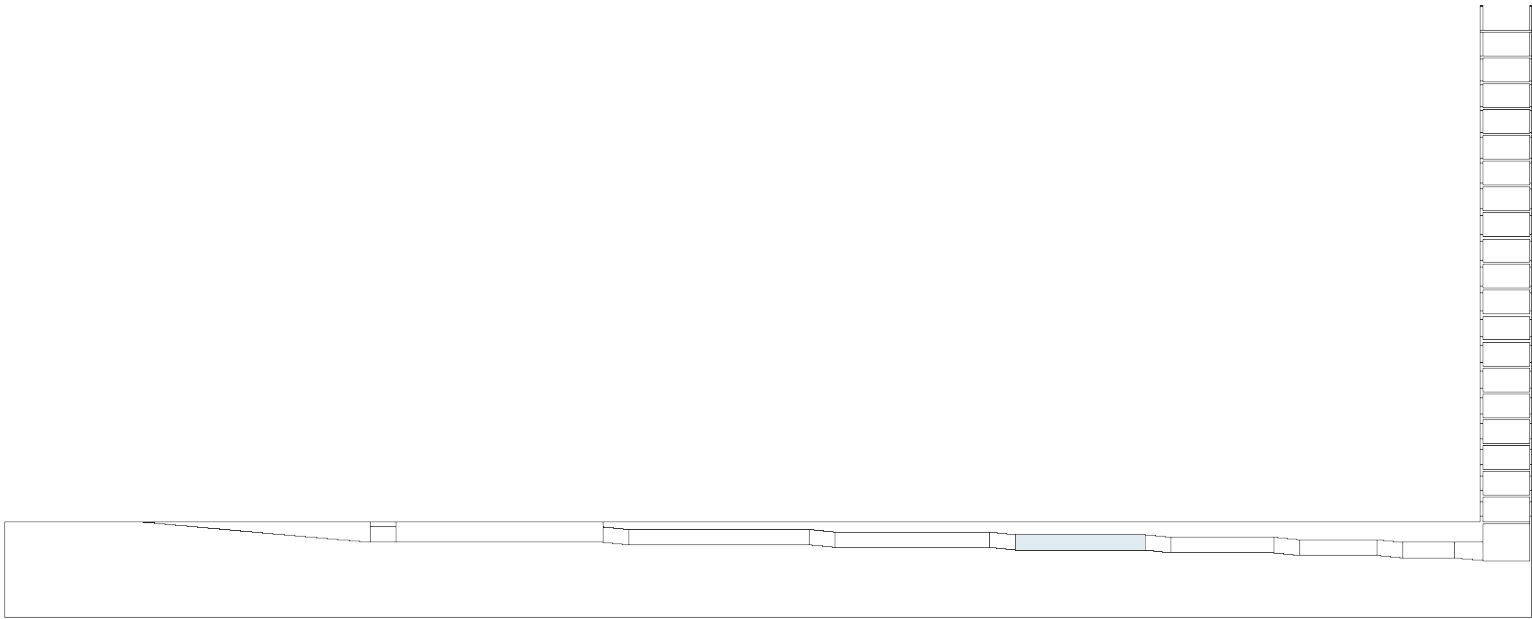




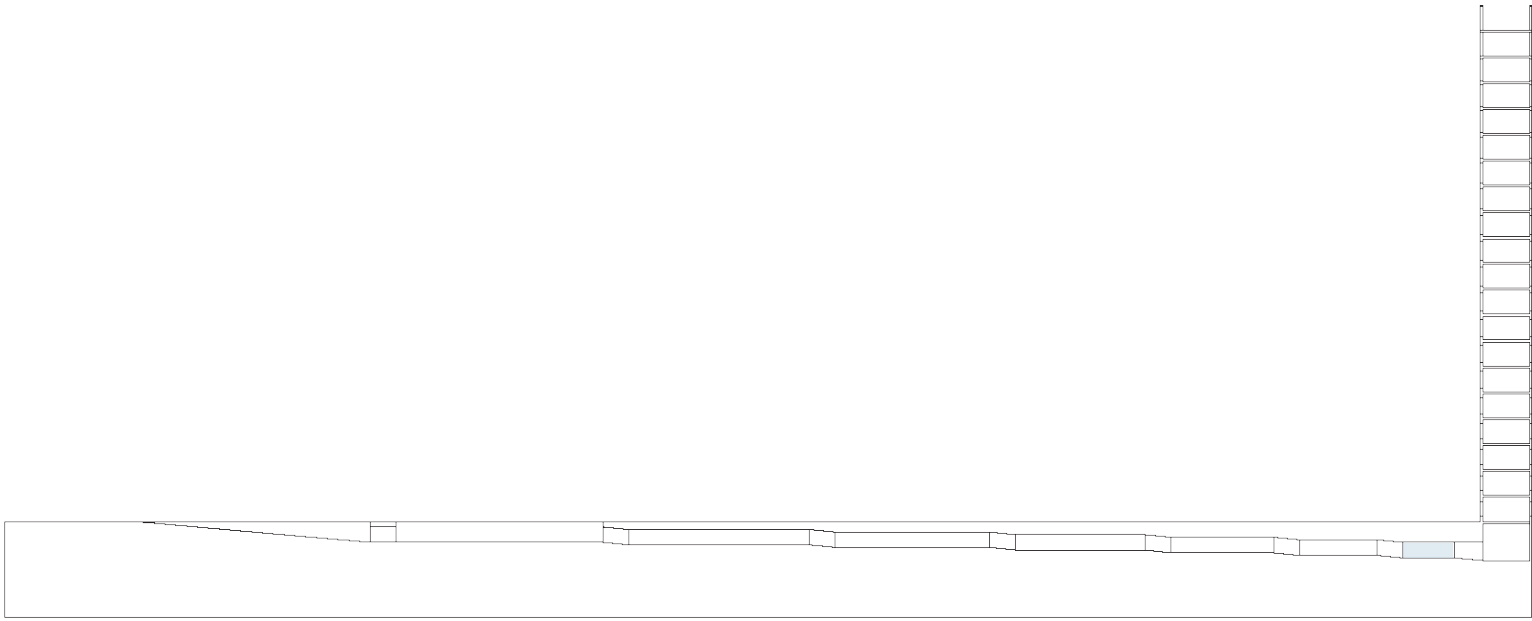




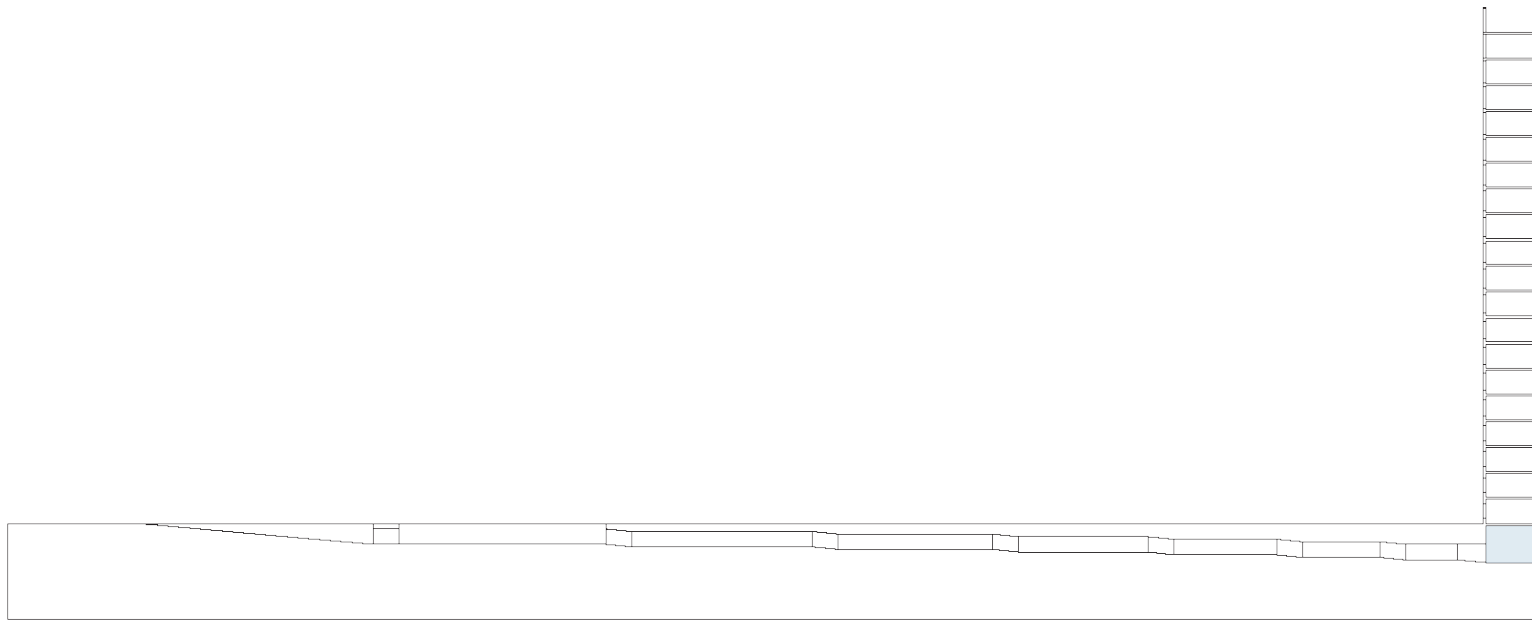


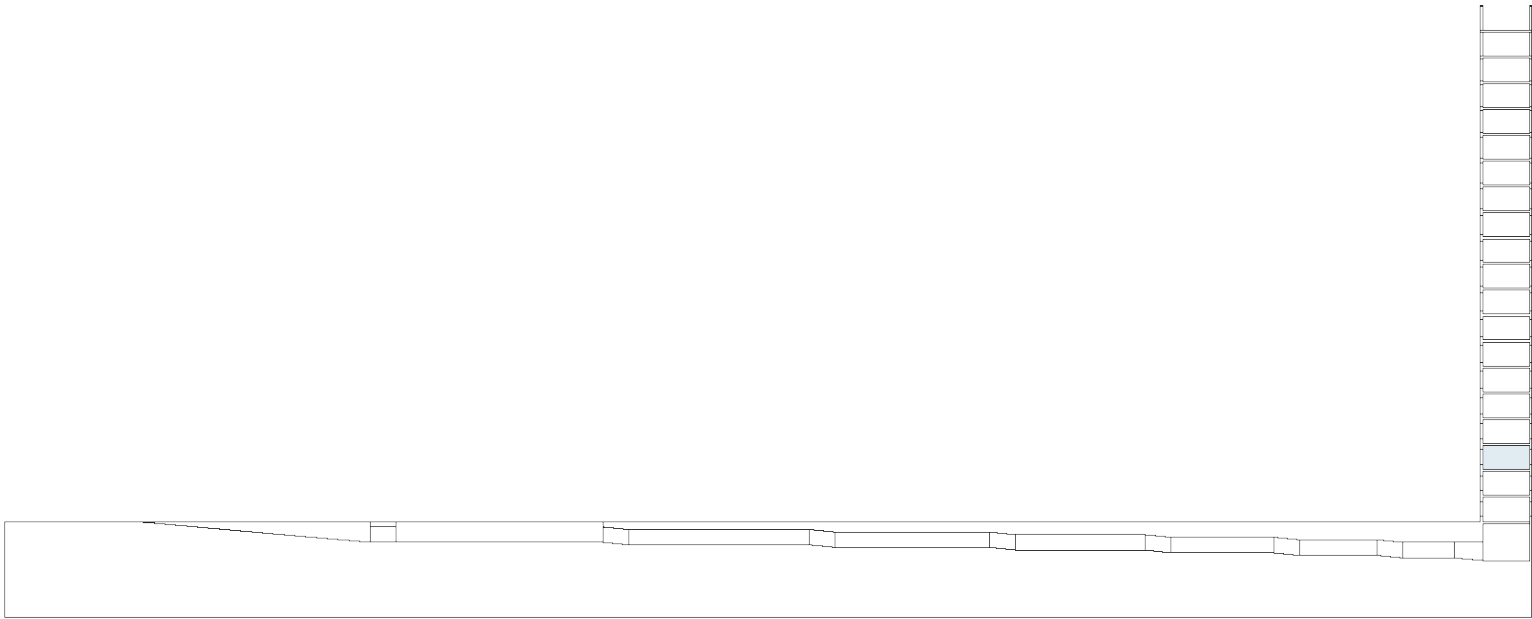




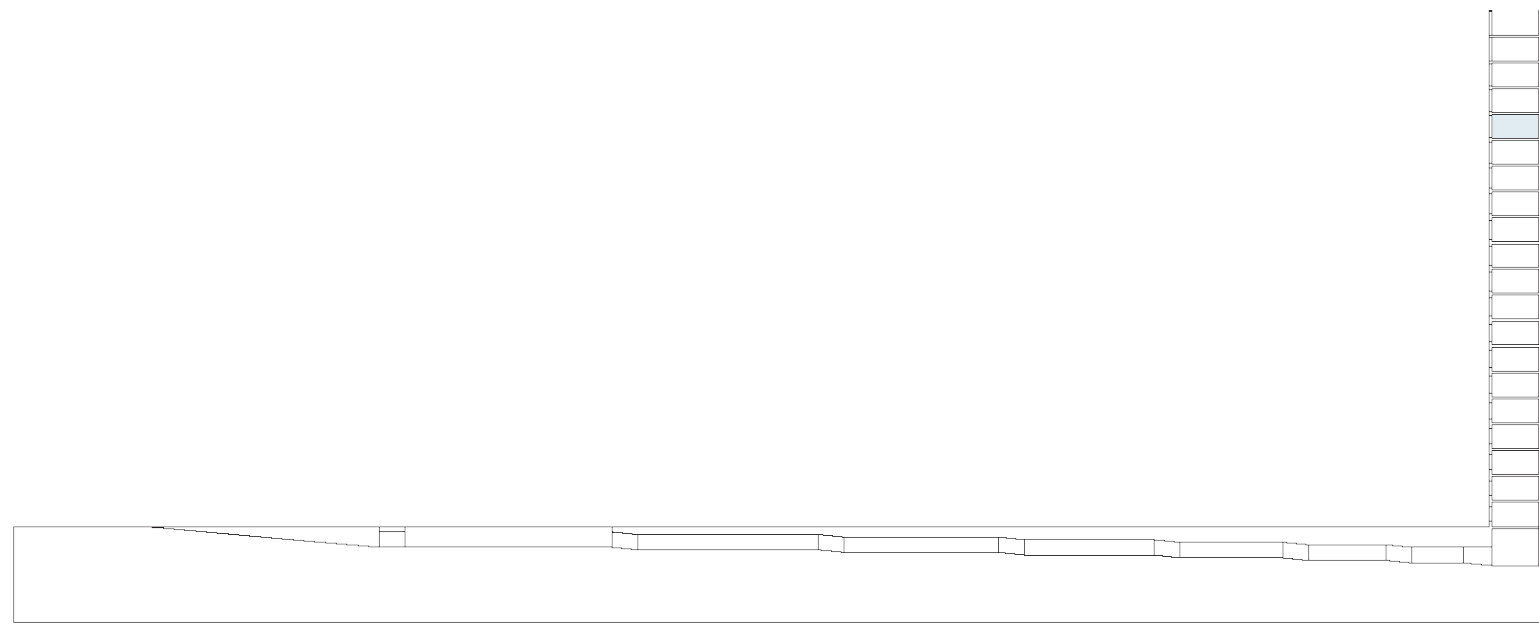




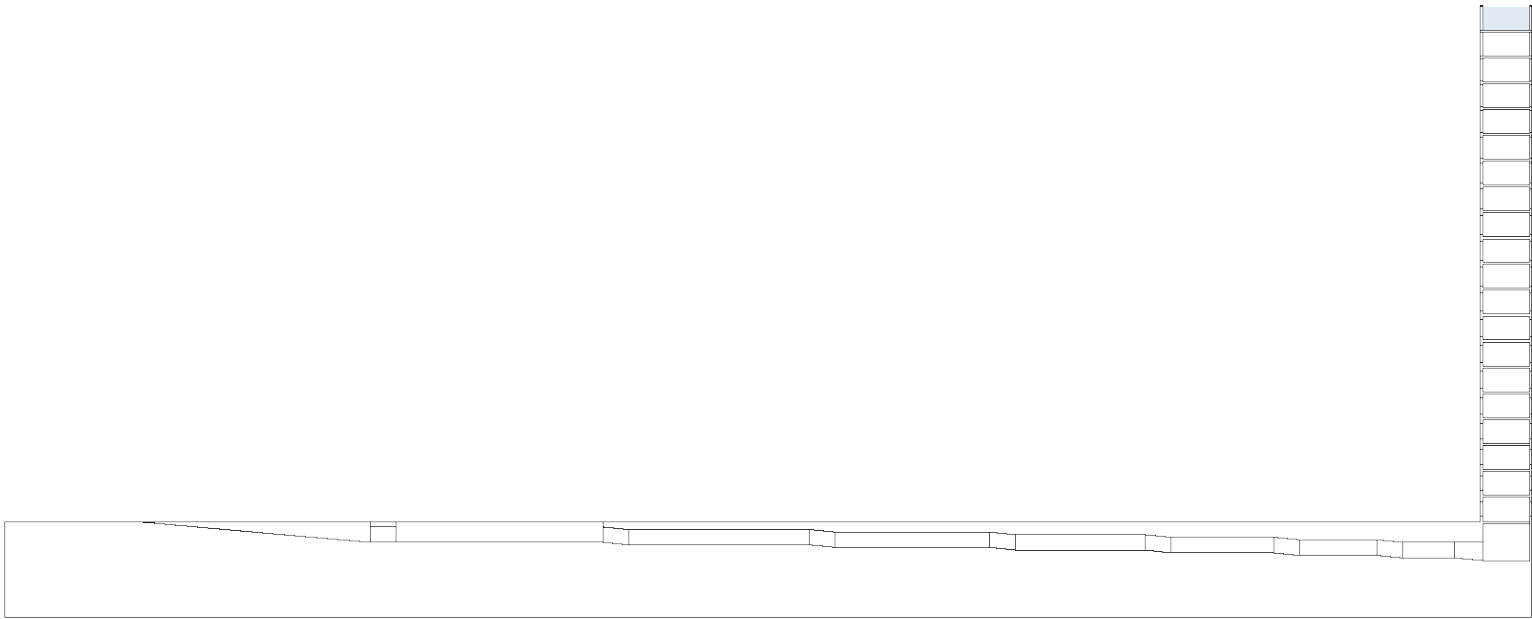


















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