

PIER LUIGI PENZO

FOOTBALL ON WATER AND THE STADIUM EXPERIENCE

ROYCE PICHETTI - NORTH DAKOTA STATE UNIVERSITY - ALA MASTERS PROGRAM

PIER LUIGI PENZO
FOOTBALL ON WATER AND THE
STADIUM EXPERIENCE

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PIER LUIGI PENZO
THESIS PROPOSAL

The stadium experience is one that has evolved and been enjoyed for centuries. Stadium architecture, technology, and the sporting event itself has changed greatly yet many events tend to miss out on the atmospheric and experience potential. Stadium size has contributed to this as fans have started to feel alienated at events. Smaller market teams have especially missed out on this atmosphere as most designers assume capacity is the only contribution to a positive experience. This thesis will investigate how a stadium contributes to the overall sporting event experience, the community as a whole, and will attempt to create a list of design considerations that can be applied to existing and future venues with an emphasis on limited market clients. The design principles will be derived from historical and case study research of a variety of venues and experiences worldwide. The principles described will be implemented in the design of the Pier Luigi Penzo stadium in Venice, Italy. The Pier Luigi Penzo, like other successful venues, can stand as an example for how architecture can influence the stadium experience and contribute to communities in a positive fashion.

TITLE: PIER LUIGI PENZO:
FOOTBALL ON WATER AND THE STADIUM EXPERIENCE

TYPOLOGY: SPORTS STADIUM, MULTI-USE

SITE: VENICE, ITALY

CLIENT: VENEZIA FC

CONTEXT

Sporting events have been key components to cultures and societies for centuries as they served as spaces for socialization, exhibitions, and were an opportunity to display various sporting events. Like the civilizations around them, the venues adapted and grew in complexity. Stadiums became event specific and advances in structural technology allowed stadiums to exceed capacities of 100,000. The desire to increase capacity and as a result profitability, have impacted the local communities and the stadium experience in many ways. Stadiums are now being developed on sites away from the fans that attend, security concerns have altered the way visitors experience an event, the increased capacity seats fans farther from the action, stadiums are inappropriately placed in communities, and improved television coverage has convinced fans to not attend the event and spectate from home.

The COVID-19 pandemic highlighted the impact fans have on sporting events as players and fans alike discussed the eerie atmosphere. Fans clamored for a return and the sporting experience had a period of rejuvenation as fans slowly returned to spectating. The absence of sporting events showed the value of sporting events in society and the importance of the stadium experience.

Local neighborhoods have been exploited and massively altered due to stadium construction. Stadiums must be integrated in the communities and positively contribute to the area economically, environmentally, and socially.

DIRECTION

Clearly fans have a large influence on the experience, but the stadium itself impacts how fans and performers interact. How can a stadium's architecture positively influence all involved? How can a stadium remain viable in a smaller market? How can stadiums be properly integrated into communities instead of being isolated destinations? Through case study and historical research, I hope to answer these questions and create a list of design principles that can improve the experience for all stakeholders. The list will then be used to redevelop the Stadio Pier Luigi Penzo in Venice, Italy. The development will include sustainable design strategies for the community, environment, and client.

The project typology will be a multi-use stadium for the city of Venice and Venezia FC. There are many examples of contemporary stadiums in Europe and abroad that are comparable, but many of these stadiums lack flexibility in their function, are an environmental burden, and are isolated from the communities they serve. This stadium will seamlessly integrate to Venetian life, much like the client, Venezia FC, has done in recent years. The Pier Luigi Penzo will be smaller than the new stadiums seen in the United States due to the context of the city and the needs of the client. The stadium will also include mixed-use features and overall flexibility to match the goals of the client and the city. This typology was selected to begin solving the issue as to why stadium architecture has negatively impacted the experience and why contemporary stadium design hasn't been applied to smaller markets.

Venice is one of the most important tourist attractions in Italy and is still one of the largest cities in the Veneto region. This city has a long history with soccer and was at risk of losing their team. The city is known for being a hub for art and innovation and their local stadium should match that sentiment. The current Pier Luigi Penzo is a neglected stadium that doesn't meet the Italian or European football requirements. The city has a revitalized interest in the sport and the team's recent success is in line with the support. The club is investing in its training facility and has a stable ownership which signals that stadium improvements are next to be addressed. Venezia FC and Venice are desperate for a new stadium that is sustainable and matches the spirit of the city and team.

Creating a stadium that is appropriate for the context and community is an important project for the sporting world as there is a lasting idea of stadiums being removed from the community and as a result, alienate their fan base. These outdated stadiums don't provide the atmosphere for many fans and lack the available amenities and infrastructure that is now available. Creating a modern, and curated stadium for Venezia FC can serve as an example for stadium design and set forth a list of design principles that can change stadium design for the better.

Personally, designing an innovative home for sport would sufficiently demonstrate my design skills and architectural knowledge due to the complexity of the project and many intricacies tied to stadium design. The balance of client needs, typology requirements, and site limitations would demonstrate a strong architectural understanding. I also have followed the client Venezia FC, and many other sports teams worldwide. Some of my best sporting experiences have been visiting various stadiums in the United States and Europe. Implementing my research and ideas for a team I support would be an extremely rewarding process.

A stadium design for Venezia FC immediately signals to high-points that are critical to a successful design. The values below are important aspects to consider and refer to in the design process.

COMMUNITY CONNECTION

This design will not only serve the client but also the city and its residents. The stadium must seamlessly fit into the existing area. It also should be appreciated and valued by visitors and locals. The development must also foster improvement in the community through provided amenities and master planning aspects.

STAKEHOLDER EXPERIENCE

The experience at the venue must be highly valued by fans, players, owners, and anyone affected by this development. Creating a fine experience will need to address the stadium atmosphere, sight lines, amenities, and overall character of the venue.

SUSTAINABLE DESIGN STRATEGIES

Historically, stadiums have created extreme burdens for the local environment and future of the area. Venice is already a city that understands the site's vulnerability and unique position. Aiming for a LEED Certification will be a strong indication of environmental awareness.

ICONIC & RELATION TO CONTEXT

Venice is an iconic city and their largest venue should match that attribute. The stadium should add to the charm and image of the city while not being a stark contrast to the historic architecture and design of the city. This isn't a quantifiable emphasis, but it can be achieved with strong design gestures and nods to the city and Venezia FC. The stadium should not be designed as if it could be exactly replicated in another city for a different client.

MAJOR PROJECT ELEMENTS

PEDESTRIAN ACCESS

Venice does not have any cars in the city. All residents and tourists are comfortable walking. The project must provide the necessary pedestrian paths to and around the stadium. The existing stadium has this infrastructure but is beginning to fail as the club grows. One aspect of a successful stadium experience is the travel and mobility while at the event.

TRANSPORTATION DOCKS

The teams, officials, and match-day media arrive to the stadium via boat or water ferry. There are existing docks on the north and east sides of the site. These docks are underutilized and inefficient for the increasing crowd size.

CLUB STORE

Venezia FC has a successful online merchandise presence but there is no on-site club store. There is no way for spectators to purchase apparel at the game and the club is missing out on a profit opportunity. Designing a club store will help Venezia FC and the Pier Luigi Penzo better align with some of the club's marketing goals.

CATERING AREA

The current Pier Luigi Penzo has limited dining and catering options. These must be integrated in the stadium design as an amenity for players, fans, and executives.

VIP AREA

According to the UEFA Guidelines, a VIP section is required. There are existing options on the limited east stand. These VIP options should be expanded and emphasized. Improving this will provide marketing opportunities for match-days.

SUSTAINABLE STADIUM FEATURES

In order to positively contribute to the local community and environment, the stadium should integrate sustainable design strategies. The project will include new technologies and materials. A 'green' stadium can create a positive user experience and lessens the environmental impact on the area.

SAFE STANDING FOR 'ULTRA' FANS

Venezia FC, like many sports teams, have a portion of fans that have organized to create "super fan" groups. These fans are identified by the club and are typically given a portion of the stadium to occupy. Usually their location is opposite the seating for the visiting team.

MAJOR PROJECT ELEMENTS

These fans are particularly boisterous and massively contribute to the stadium atmosphere. Since these fans stand during the entire match, their seating area is classified as a "safe standing". Safe standing is an old stadium feature that has returned.

RETAIN VIEWS

The unique location of the Pier Luigi Penzo is a key to the character of the stadium. The views and community connectivity should be maintained.

RETAIN STADIUM CHARM

Material considerations will be critical to retain stadium charm. Rightsizing and design will also contribute to the charm. An ultra-modern stadium may be an outcast in the context of the city.

LODGING OPTIONS

Visiting teams and fans have had difficulty booking travel accommodations for their travel to the stadium. Having a hotel on site may be extremely profitable and beneficial to the entire community.

RESEARCH DIRECTION

The theoretical premise for the research will be that stadiums have not maximized their potential for the fan experience and community connection due to missed design opportunities. My research will primarily include case studies of successful stadium designs. I will analyze the examples and extrapolate what design features improve the experience and community. I will approach the case studies with a set of questions and design investigations. I will also research various media and recorded experiences from the selected case studies. These reports will be from visitors, and local media coverage.

Another component of research I intend to use is written accounts of fan behavior. This research will inform how I design for fan safety as well as fan enjoyment.

Much has been documented about stadium technology. I will investigate the manufacturers and technological requirements to ensure that the design will meet environmental and federation requirements.

The typology researched will be stadiums of similar scale to the client and integrated stadium design with communities. Researching the typology will also start the development of programmatic requirements for the project.

Site analysis will be important for this design and there is plenty of documentation of the site due to the media coverage of the client and the popularity of the sport.

DESIGN METHODOLOGY

The stadium requirements outlined by the governing sport federations will provide early design directions. Once the requirements are met, I will design with the club's mission statement in mind. The design must constantly refer to the character of the client and city. Design decisions will be derived from the case study and investigation research and then articulated to fit the client and site. The design decisions will then be tested on site, eventually developing a combination of aspects that excel as a whole in the particular situation.

The types of analysis used will include:

Qualitative Analysis

Analyze the successful characteristics of case studies and compare it to the specific needs of the client.

Exploration

Investigate the leading stadium technology and how it can be implemented for this design.

Historical

Investigate documented accounts of fan experiences and uncover how design helped create these positive accounts.

GOALS

THESIS GOALS

1. Create a list of design principles to be used to improve stadiums
This developed list can be used as inspiration for future design.
2. To understand the variety of fan and client needs for a stadium
Not every city, club, or fan wants the same experience. I wish to fully understand the needs and character of the client to design accordingly.
3. Design sustainable
Stadiums must be beneficial to the local environment and this must be a goal of the project.
4. Iconic Design
The stadium should be a significant architectural piece to Venice and the typology as a whole. An iconic design will contribute to the marketability and vision of the club.

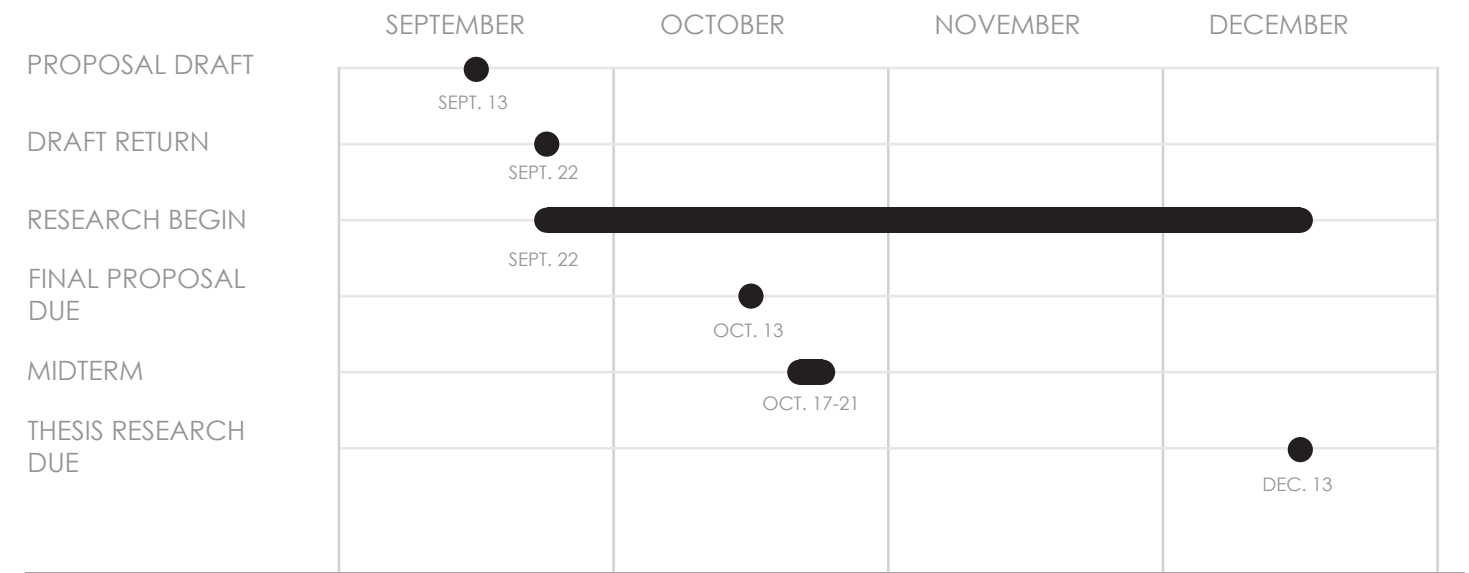
PERSONAL

1. Pride in my design
I want to be proud of my thesis work and final product. This can be achieved by continued dedication and by exploring every avenue for improvement.
2. Improve my graphic skills
Stadiums by nature are photographic and complex. I want to improve my graphic skills to properly display my project. This can be achieved by learning graphic skills online and asking for advice from peers.
3. Improve my presentation skills
The presentation of the thesis is critical to a successful project. I will improve my skills by watching successful speakers and presenters. I will pick up presentation tips from their examples.
4. Fully investigate my thesis
I want to ensure that all available and pertinent information is consulted before completion of the thesis project.
5. Be open to design changes
I noticed that I have a tendency to find a design solution and stick with it, ignoring major changes. I want to be accepting of the design process and understand that the first solution might not be the best or final solution.

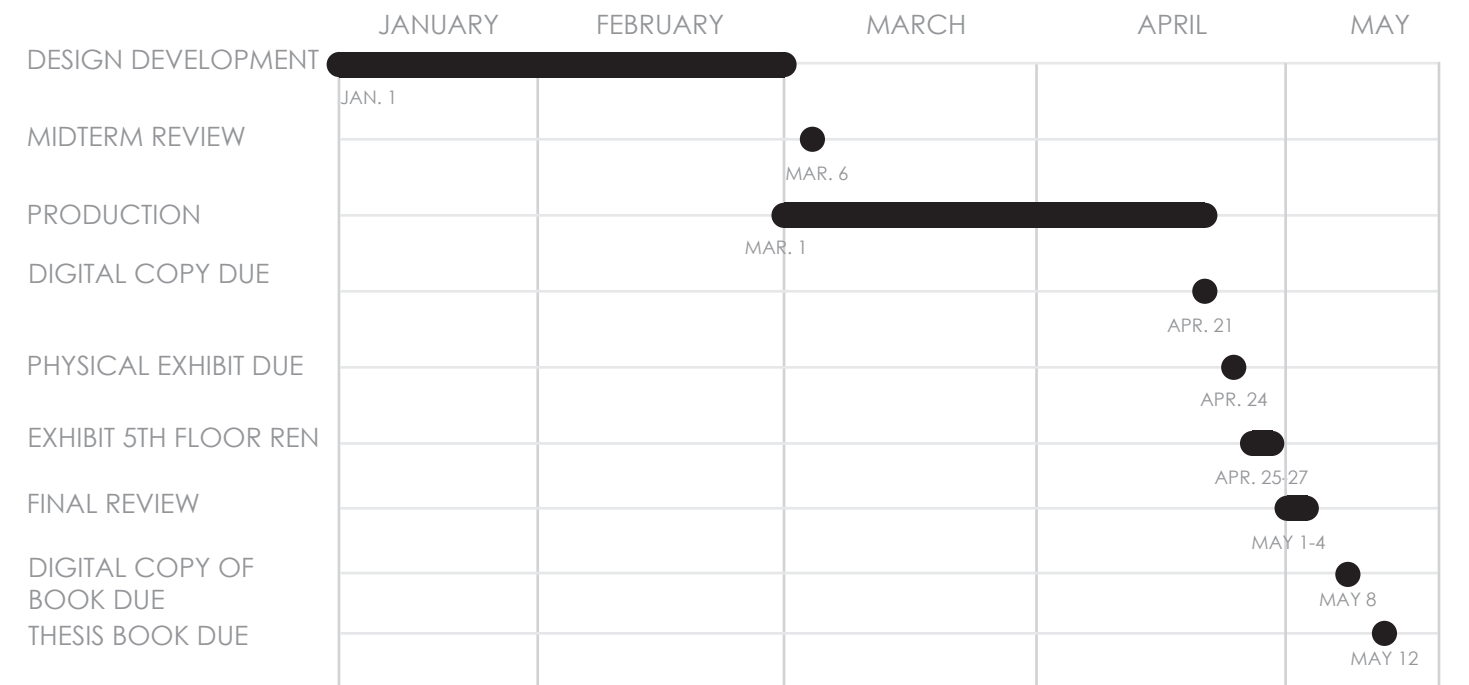
SCHEDULE

SCHEDULE

The project will achieve completion by following the Project Schedule



FALL SEMESTER



SPRING SEMESTER

PIER LUIGI PENZO
THESIS RESEARCH

RESULTS FROM RESEARCH

To best prepare for the design phase of the Pier Luigi Penzo stadium, a variety of research methods were used. Using historical research, an understanding of the value of stadiums can be reached. The historical research included articles, reports, and photos to capture the importance a stadium has on a community. It is well known that stadiums carry immense potential for change in the local community. Through various periods in history, the goals of stadium development have changed and the impact on the local community has also shifted. Some stadiums have uprooted and negatively impacted the city while also creating large financial burdens while newer developments are aimed at bolstering the community and seamlessly integrating the stadium. Examples of these developments will be highlighted in the case studies section.

The premise of the thesis is that existing stadiums do not always capitalize on the potential for fan experience and community connection. By investigating historical accounts and successful case study examples, a collection of design traits can be taken and implemented into the Pier Luigi Penzo. The case studies aim to understand design decisions made in similar situations as the Pier Luigi Penzo. While no case study can exactly compare to the Pier Luigi Penzo, key traits and tendencies can be extracted for potential use. The design features analyzed include style, spatial organization, technology, and community integration.

The investigation for Venice's needs lies in the Cultural Context, Client, and Site Analysis sections. The foundational question of why are stadiums needed in society is discussed in the historical context section.

RESULTS FROM RESEARCH

WHY IS THIS A PROJECT?

The redevelopment of the Pier Luigi Penzo stadium in Venice, Italy is viable for a variety of reasons. The current site is not suitable for the client or the client's goals which will be discussed in a later section. The need for a stadium in Venice ties to the fact that Venice lacks a large spectator venue. Many comparable cities in terms of size and tourism levels have medium to large scale venues. Venice has many tourist attractions but very few of them are large scale and virtually none are adequately profitable. Venice has no problem attracting tourists but struggles to fully capitalize on the tourism industry. A revitalized stadium can spark economic growth and be a large scale attraction that benefits the city.

It is well known that stadiums carry immense potential for change in the local community. Through various periods in history, the goals of stadium development have changed and the impact on the local community has also shifted. Some stadiums have uprooted and negatively impacted the city while also creating large financial burdens while newer developments are aimed at bolstering the community and seamlessly integrating the stadium. Examples of these developments will be highlighted in the case studies section.

HISTORICAL, SOCIAL, CULTURAL CONTEXT

HISTORY OF STADIUMS

The origin of stadiums leads to the societies of ancient Greece and Rome. There was a significant emphasis on community gathering and public displays of strength. The two societies developed types of venues that have design traits still seen in stadiums today. The Greeks developed the stadium and the hippodrome while the Romans created the amphitheater and circus. These venues could hold enormous amounts of spectators, amounts not seen again until the 19th century. A key feature of the Roman and Greek stadiums was the elliptical shape which focused the viewer's attention on the center. This design principle is essential to stadium design and has rarely been changed.

The stadiums of ancient times were also means of social integration and interaction. Spectators were urged to come together and enjoy the displays of power. The interactions created by the stadium connected the community which was an important goal of the Romans due to their frequent conquering of regions (Yaroni, 2012, p.15).

The development of stadiums went dormant for nearly ten centuries. The Middle Ages in Europe signaled a shift in large scale development as Christianity spread through Europe. Nearly all construction went to church construction as religion became the center of daily life (Yaroni, 2012, p.25).

Sports and non-religious community gathering returned with the Renaissance as Olympic sports such as running and swimming were resumed. While no permanent stadiums were built, temporary fields and spectating areas were constructed (Yaroni, 2012, p.25). The creation of stadiums would resume with the formalization of sports in Great Britain. The creation of the professional game in Great Britain would mark the beginning of a period of growth in stadium development and technology.

The formal organization of European football in Great Britain coincided with the industrialization in Western Europe. The era of modern stadia as described in *From modern to postmodern; the development of football stadia in Europe* (Paramio, Buraimo & Campos, 2008), is split into three sections. Each section is driven by architectural and economic factors. These generations of football stadium design lead to the fourth generation of stadia that is seen today.

In alignment with the industrial revolution and creation of an organized body for the sport, stadiums shifted from outdoor grounds to a specialized venue in an urban environment. Many of the stadiums used architectural and structural features found in factory construction. The stadiums primarily used wood for construction and were able to house large crowds. Aesthetic qualities of these stadiums were not valued. The vast majority of these stadiums were in Great Britain with Spain following closely (Paramio et al., 2008, p.519).

HISTORICAL, SOCIAL, CULTURAL CONTEXT

The second generation of stadium design was defined by World War II as the first permanent stadiums were heavily damaged by the war. Many of the leagues including the Football Association were halted. Any construction in this time was focused on the war effort. When the sporting events continued, major reconstruction efforts went into the stadiums as concrete and steel replaced wood. There was also a larger focus on providing spectator comfort and increased security (Paramio et al., 2008, p.520).

The third generation of stadiums lasted from the 1950s to the 1980s as technological improvements reshaped the stadium experience. Many of the European countries outside of Great Britain developed large scale stadiums as attendances soared. Importantly, the introduction of floodlights, extra tiers of stands, and overall cleanliness made the stadium experience attractive. The game of football had strong ties to the local communities in Europe which led to violent tendencies from the fans. The 1970s and 1980s were marred with violent conduct from fans and a series of stadium tragedies such as the Bradford fire and rampages at Ibrox Park, Heysel, and Hillsborough which resulted in hundreds of casualties (Paramio et al., 2008, p.525)

The tragedies at Hillsborough and Heysel led to government intervention in stadium design and management. The Taylor Report became a revolutionary doctrine in stadium regulations. Named after Lord Justice Taylor, the report's goal was "To inquire into the events at Sheffield Wednesday Football Ground (Hillsborough) on 15th April 1989 and to make recommendations about the needs of crowd control and safety at sports events" (*The Taylor Report - the Hillsborough Football Disaster*, 2020).

While controversial and selective in its research, the report criticized the policing of the fans, the use of caged pens to control sets of fans, and the overall communication in the stadium. The report ushered in a new era of stadiums. The 'classic British stadium' required large investments in safety and any new stadiums became "valued as postmodern cathedrals of consumption, tourist attractions, leisure centers, business centers or icons of city marketing" (Paramio et al., 2008, p.521).

The major stadium developments occurred in Great Britain while the other neighboring European countries followed the British model. Italian stadiums were no exception as many stadiums either followed the British model like the existing Pier Luigi Penzo in Venice, or incorporated ancient elliptical shapes in order to accommodate for track and field events like the Stadio Olimpico in Rome. Italy did experience a period of stadium revitalization in anticipation of the 1990 World Cup. Twelve stadiums were redesigned and upgraded to host the event (Stevens & Wootton, 1997, p.50). The Pier Luigi Penzo was not included in the event and was not refurbished.

THE STADIUM EXPERIENCE

Critical to a successful stadium is the presence of a strong sporting atmosphere. The term atmosphere originates from meteorology but is now almost exclusively used metaphorically. Atmosphere is a subjective term and can be difficult to accurately describe or identify. Jan Lorenz Wilhelm recently conducted a study to understand the sources of atmosphere in a soccer stadium and try to define the stadium atmosphere. Wilhelm did an analysis of in situ diaries of sixty-two college aged visitors of a soccer game. The event in particular was a soccer game of a German team, Hertha BSC, a team in similar stature to Venezia FC. Similar studies to Wilhelm's have created a consensus that "every space has an atmospheric quality" (Wilhelm, 2018, p.3), collective belonging is critical to atmospheric development (Wilhelm, 2018, p.4), and that "atmosphere is shared by both the subject and the object" (Wilhelm, 2018, p.7). Fan groups have even been organized to concentrate fan efforts and ensure a heightened atmosphere. Examples of these groups include the REDaction group in London, England and Atmosphere Action Group in Manchester, England (Wilhelm, 2018, p.5).

In Wilhelm's study, participants were to document their feelings and emotions at certain times and moments of the game. The descriptive nature of the responses created a wide range of definitions of atmosphere and revealed many of its sources. Many of the participants were impressed by the "organized scenery" "synchronized body movements" and felt like it was a "different world where you can forget everything else".

Participants also noted the "battle of the two fan blocks". This battle is common in Europe as visiting teams have many traveling fans which isn't common in the United States. Wilhelm was able to divide the stadium into sections based on the responses of participants. The three areas he defined were the large base of home supporters, the smaller visiting group, and a mixed transitional space composed of neutral or impartial fans (Wilhelm, 2018, p.14).



Fig. 1 Venezia FC Fans

Wilhelm unsurprisingly concluded that specific moments of heightened intensity were due to moments in the game. Interestingly, the participants selected were not identified as soccer fans but all participants found themselves losing their neutrality due to the fans in their spatial proximity. Wilhelm concluded that the "atmospheric quality inside a stadium may vary depending on the area one finds oneself in" (Wilhelm, 2018, p.16). Again, the value of the collective body was highlighted as a catalyst for the stadium atmosphere.

In the case of the Pier Luigi Penzo and Venezia FC, the fan base and rituals of the supporters already exist. The design of the stadium should be conducive to the collective body of the Venezia FC supporters and stadium visitors. Venezia FC has an existing atmospheric quality. The redesign of the Pier Luigi Penzo should raise the atmospheric potential.

Many stadiums have an intense atmosphere regardless of the design. There are examples of stadiums that are removed from the community and have a sterile environment. This has led to hesitations from the fan base. The fans may feel alienated by the ownership. This sentiment has led to the previously mentioned atmosphere action groups.

Stadium designs of the last decade have generally been well received by communities because the stadiums have been reintegrated with the fans and the experience has been prioritized. Christopher Lee, who is a Senior Principal for Populous' London Office wrote a list of architectural considerations for "designing a holistic fan experience" in his article titled, *5 Secrets of Great Fan Experience Architecture with Christopher Lee*.

Lee's first point is the importance of location for the design. Gone are the days where a stadium is built in isolation. Stadiums must now be moved back to the community and work with the community as a "sports-led master plan" (Lee, 2021).

Stadium authenticity is a nod to how a stadium must be a home to the team and fans. A deep understanding of the history and spirit of the team is key to creating an icon that is embraced by the community.

Atmosphere is present in every space but is especially prevalent in the stadium. Lee argues that the atmosphere can't be artificially made. The atmosphere is where "all the elements come together - to create something greater than the sum of its parts." (Lee, 2021).

Closely related to location and atmosphere is proximity. Lee notes that proximity to the event itself is a valuable design feature.

Innovation applies to stadium design much like other building typologies. The stadium should feature technological advances that enhance the experience for the client, fan, and environment.

Lee wraps up his design list with the encompassing idea of personalization. This idea applies to the site, client, fan, and experience. The previous five principles tie back to a high level of personalization and ultimately drive Populous' design decisions.

SUSTAINABILITY FACTOR IN STADIUMS

As part of the recent wave of stadium development, sustainability has become a design requirement. The FIFA Stadium Guidelines document highlights the importance for sustainability as it “aims to inspire greater awareness and best practice in sustainability standards in football globally” (FIFA, 2022, p.111).

The FIFA Guidelines note on the embodied carbon in the construction of a stadium and how a reduction in the embodied carbon amount is a key step in sustainable design. Some of the design considerations include changing material types to less carbon intense materials, optimizing the form of the stadium, and conducting life-cycle costing.

Stadiums require an immense amount of energy. Minimizing energy use and maximizing energy performance are touched on in the FIFA Guideline. Newer stadiums have started to implement renewable forms of energy including photo-voltaic panels, geothermal, wind power, and solar thermal.

One of the largest uses in a stadium is potable water. The reduction of potable water is where stadiums can make large impacts on the community. Venice's weather and flooding, noted in the site analysis, provides many opportunities for storm water capture and reuse.

FIFA adopted the United Nations' Sustainable Development Goals which outline how stadiums deliver a better future across all sectors of society. The FIFA guideline includes nine of the seventeen UN SGD goals.

7: AFFORDABLE AND CLEAN ENERGY

Requiring stadiums to run on clean energy promotes the growth of the renewable energy sector. Stadiums themselves can be a source of affordable, reliable and renewable energy.

8. DECENT WORK AND ECONOMIC GROWTH

The stadium can provide many procurement and employment opportunities during construction (contractor appointment) through to operations (operations and workforce). These should favor local, ethical and sustainable procurement that promotes inclusive and sustainable economic growth and decent work for all.

9. INDUSTRY, INNOVATION, AND INFRASTRUCTURE

Stadium developments can be a catalyst for development or regeneration that creates resilient infrastructure and fosters innovation, generating employment and income. The entire stadium should be designed to be a sustainable piece of infrastructure.

11. SUSTAINABLE CITIES AND COMMUNITIES

The master planning process considers the stadium within its location and community. Designing accessible, multi-use stadiums which include community facilities can help make cities inclusive, safe, resilient and sustainable.

12. RESPONSIBLE CONSUMPTION AND PRODUCTION

Efficient stadium design strives to minimize use of global resources and seeks to reduce waste. This is a responsible approach to consumption and production.

13. CLIMATE ACTION

Reducing embodied carbon and energy use will help combat climate change and its impacts.

14. LIFE BELOW WATER

Designing stadiums that avoid causing water pollution can help to sustain marine resources.

15. LIFE ON LAND

Stadium developments should improve the biodiversity value of their site. This will help to halt and reverse land degradation and halt biodiversity loss.

17. PARTNERSHIP FOR THE GOALS

Stadiums support influential clubs that could form strong local regional and global partnerships and promote all of the sustainable development goals. Stadiums are often high profile (in some cases globally recognized iconic landmarks), therefore they are an ideal platform for partners to promote sustainability and share best practice.

(FIFA, 2022, p.119-120)

GREEN BUILDING CERTIFICATION

Green Building Certification is an assessment system for recording the environmental performance of existing and new developments. Stadiums are assessed on a set criteria and given a score which results in a level of certification.

LEED USGBC is the primary certification system in the United States. FIFA encourages developments to follow the Green Building Certification designated for the specific country. Italy has two certification organizations.

Green Building Council Italia promotes the LEED certification system.

Protocollo ITACA is the primary certification model in Italy and functions similar to LEED.

The Pier Luigi Penzo design will aim to achieve LEED Certification which would simultaneously satisfy Protocollo ITACA.



HISTORY OF THE CITY

Venice is best known for its waterways and romantic aesthetic but was originally founded as a trading center. Venice grew into a trading power as it was perfectly positioned to conduct business with the Byzantine Empire, the Islamic world, and was the final link in the Silk Road. The island nature of the city protected itself from the warring states in Europe. The height of Venetian power was in the early 1400s. The city remained mostly autonomous as the Venetian Republic until Napoleon's French Army claimed the city in 1797. The city continued to decay into its adoption in the Kingdom of Italy where it remains today. As a trading city, many of the citizens didn't permanently reside in the city which led to little interest in a local sporting team. The land scarcity of Venice also contributed to the relatively low interest in sports. Many of the organized teams were located on the mainland where open grounds and land was available.



Fig. 2 Historic Painting of Venice

TOURISM

Tourism is now Venice's primary industry as about 19 million tourists visited the city in 2019. The tourism load has heavily impacted the city due to the increased foot traffic and environmental pressure. The city relies on tourism for the economic boosts, but must start to weigh the impacts it has on the city's longevity. Starting in January 2023, Venice will implement a tourism tax for visitors staying less than one-day in the city. The \$5-\$10 day pass will increase the city's tourism revenue and start to better manage the tourism industry in Venice (Press, 2022). Many of the tourist attractions center around the aesthetic beauty of the city, the art industry, and the charm of the region. Venezia FC have started to fill the sporting needs of the city and the tourists.

A successful stadium has the ability to invigorate a local economy through secondary spending. The day pass introduced by the city is an attempt to stimulate tourism profits because many of the existing attractions don't have attached costs, much less create secondary spending. Highlighted in the article, *Sports Stadia and Arena: Realising Their Full Potential* (Stevens & Wootton, 1997), "stadia can play a vital, often fundamental role, creating a vibrant image and contributing to the economic and social wealth of the community in which they are located (Stevens & Wootton, 1997, p.51). Venice, Italy already has a vibrant image but has clearly struggled to financially capitalize on the image. A redeveloped stadium would bolster the image while let Venice start to economically benefit from itself.



Fig. 3 Piazza San Marco

Stevens & Wootton's paper keys on the idea that stadium investment can attract major sports events which would be a "catalyst for regeneration and economic development" (Stevens & Wootton, 1997, p.51). Their investigation highlighted the success the city of Baltimore, Maryland had with their investment in the Camden Yards district. The city placed a new baseball stadium in the Camden Yards dock district which is a neighbor of the city's tourist district. The city reported that increased spending in the area exceeded expectations by 300% (Stevens & Wootton, 1997, p.51). The report also suggested that 80% of fans were more likely to spend additional time in the area before and after games. Venice struggles with visitor retention which suggests that a stadium as an attraction can urge tourists to spend more time and money in the city.

In a similar proposal to the Pier Luigi Penzo, Emily Adams' thesis titled *Capitalizing on Stadia Investment through Strategic Integration with the Urban Neighborhood* (Adams, 2018), uses the location of existing stadiums of Cincinnati, Ohio to explore the potential for building a new stadium for FC Cincinnati, a professional soccer team in the Major League Soccer. The thesis explored the idea of sharing a stadium with a team from another sport. This idea lowers the financial cost of the city and likely taxpayers. It has been accomplished by soccer teams in the United States because these franchises tend to lack the support and financial resources for their own stadium and can accommodate the schedules of the sharing NFL team. The best example of this is the Madison Square Garden located in New York City and Lumen Field in Seattle, Washington. Madison Square Garden is home to an NBA, WNBA, and NHL team and hosts around 320 events annually (Adams, 2018, p.8) while Lumen Field hosts NFL and MLS franchises. Adams rejected the idea of sharing a venue and rather used geographical mapping to locate a potential site (Adams, 2018, p.30)

Multi-purpose stadiums have financial incentive but have tended to struggle due to the unique sizes and sight lines of the various sports in the stadium. Venice lacks a variety of sports teams as American football, ice hockey, and basketball have no footing in the city. The Pier Luigi Penzo would primarily serve Venezia FC, Venezia FC Femminile, and the Venezia FC academy. The stadium was recently used as a venue for the local fashion show and can host similar events in the future. A level of flexibility in the stadium design would be a bonus in the Pier Luigi Penzo, but due to present clients, a mixed-use or shared stadium is not necessary.

LOCAL CONTEXT

The site is on the far west region of Venice on the Island of Sant' Elena. The island of Sant' Elena is just beyond the location of the Venice Biennale. Most tourists do not travel past the Biennale to Sant' Elena, which has left the island quiet and peaceful. The island is mostly residential and also hosts Venice's largest park. The island's main attraction is the Pier Luigi Penzo stadium and Venice's naval academy. The vast majority of structures are apartment blocks built at the end of the First World War. Many locals see Sant' Elena as the last home of the genuine Venetians (Brunton, 2022).



Fig. 4 Sant' Elena

CLIENT DESCRIPTION

Venezia FC is an Italian soccer team that is based in Venice and currently plays in the Serie B division of Italian professional soccer. The team has had recent success in competition and in media through its marketability and performance. While the team has seen rapid growth economically and on the field, the facilities are massively lacking the standards of a top professional soccer team. The club has made a massive impression on the sports world in recent years due to the club's fashion-forward jerseys and aesthetic scheme.



Fig. 5 Venezia FC Logo 2021

CLUB HISTORY

The club was founded in 1907 as Venezia Foot Ball Club by a group of sports fans that discovered the need for a team in Venice. The group merged two of the local sport clubs, Martial Gymnastics Society and Costantino Reyer. The team played its first games on the island of Sant' Elena which was then a forest. The team primarily played against the mainland teams of the Veneto region, and ship crews that arrived in the city.

Venezia FC went through a handful of name changes before World War II and stumbled in mediocrity through this period. The stadium name was also changed in this time frame to Pier Luigi Penzo who was an Italian fighter pilot in the First World War who was from the island of Sant' Elena.

The team experienced a golden era at the end of the war, winning the Coppa Italia in 1941 and retaining Serie A status for many seasons. Post-war was not as successful as Venezia limped between the three divisions while being plagued by financial uncertainty. Eventually the financial difficulties matched the on-field performance in the 1980's as the club fell into the fourth division in the Italian football pyramid.

Under new ownership with Maurizio Zamparini, Venezia was merged with mainland club Mestre, becoming the Venezia FC seen today. The change in ownership revived the team and they returned to the Serie A in 1998 but soon fell again in 2001. Zamparini left the club to join Palermo and took twelve of Venezia's players with him in 2002 which forced the club into a series of three bankruptcies in 10 years starting in 2005.



CLIENT DESCRIPTION

American lawyer Joe Tacopina who was known for representing some of the top celebrities purchased the club from bankruptcy and re-founded Venezia FC in the fourth division. Led by former Italian national team hero, Filippo Inzaghi, the club climbed back to Serie B. Tacopina laid the foundation for the club and was replaced by Duncan Niederauer who was the former CEO of the New York Stock Exchange. The club finally returned to Serie A in 2021 after 19 years and experiencing four promotions in five seasons.

The club failed to remain in the Serie A in 2022 but the support for the club was established and an influx of American players has given the club hope.

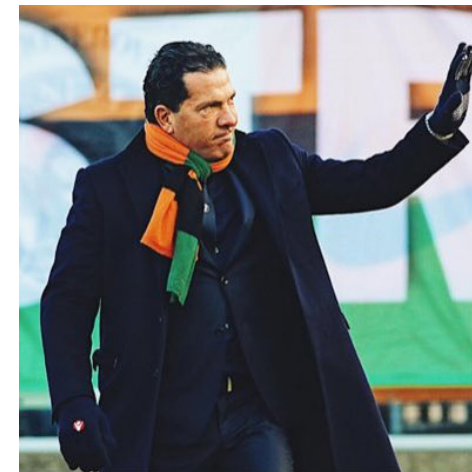


Fig. 7 Joe Tacopina



Fig. 8 Duncan Niederauer



Fig. 9 Venezia FC promotion in 2021





Fig. 10 Venezia FC Fans 2

CLUB ORGANIZATION

President
 Board Members

 Brand Director
 Finance and Administration
 Team Manager
 Director of Venezia FC Femminile
 Director of Media
 Communications

Duncan Niederauer
 Ivan Cordoba
 John Goldman
 Ricky Nardis
 Adrea Rogg
 John Tapinis
 Ted Philipakos
 Francesca Galletti
 Vincenzo Todaro
 Grazia Trentin
 Sonya Kondratenko
 Aurora Dell' Agli
 Nicolo Michielin

CLUB VISION & MISSION STATEMENT

SPORTING EXCELLENCE & INTEGRITY

We continually strive to represent Venice of the Serie A stage, competing with emphasis on youth development and best practices in sport, while remaining committed to principles of sporting integrity.

PRESERVE VENICE

We are committed to leveraging our position in the world's most popular sport to serve as a global ambassador of Venice, with a specific focus on:

- Advocating for the preservation and celebration of Venice's tangible and intangible cultural heritage
- Advocating for the safeguarding of Venice's natural environment and the redevelopment of Venice as a living city
- Advocating for sustainable tourism that is in harmony with Venice's environment and society

SOCIAL RESPONSIBILITY

We are committed to leveraging football's unique cultural power to serve as a vehicle for social progress, advocating for inclusion and harmony within our community and equality and justice within society.

COMMUNITY DEVELOPMENT

We are committed to contributing to social cohesion and quality of life in and around Venice, especially promoting education, health, and wellness in the lives of young people.

-Venezia FC Website (Venezia FC, n.d.)



Fig. 11 Venezia FC match-day

MARKETING PROWESS

Key to the rise of Venezia FC's recognition is their marketability and social media campaigns. Jersey design and overall aesthetic has been proven appealing to international markets including the United States. Merchandise sales and their fashion-forward approach have increased the clubs global visibility.

The worldwide support has increased the club's financial standing and has improved overall interest in the team and city (Abushahla, 2022). The club has also aligned with the famous Venice Film Festival by supporting and funding local filmmakers and documenting their stories.



Fig. 12 Venezia FC 2021 kit release featured local fashion models (Abushahla, 2022)

RECENT FUNDING

Under the guidance of Duncan Niederauer, Venezia FC introduced the Venezia FC Bond in May 2022. The bonding campaign has a minimum investment of 1,000 Euros with a 7.5% annual interest and a one-time 15% bonus if the club returns to Serie A. According to Duncan Niederauer;

“Central to our strategy, our most important investment in 2022 will be a significant enhancement to our training facility. Our dream is to see our new training center become a home for the entire Venezia FC family. The centerpiece of the project will be a state-of-the-art headquarters, which will change how we work, recruit, connect and perform every day.

As we transition from a period of rebuilding to a focus on our long-term future, we feel that the time is right to offer our partners and supporters an opportunity to share in our successes on and off the pitch through our first ever bond offering. The Venezia FC Bond invites you to invest in the future of the Club, alongside the ownership, by directly funding the construction of our new training center and headquarters.

We are proud of what we have accomplished in the last two years, and we look forward to an even brighter future ahead. We hope you elect to join us on this journey.”

(Un Bond Del Venezia Fc per Finanziare I Nuovi Impianti Sportivi, 2022)



Fig. 13 Proposed Talierico Training Facility

COMMUNITY SIGNIFICANCE

The rising sea levels and COVID-19 pandemic greatly altered the future of the city. The tourism industry had stalled and many locals were looking to move away from the city. The success that Venezia FC had in 2021 united the community and gave the locals a common goal. COPA90 Stories is a YouTube channel that covers important stories in soccer. Martino Simicik attended and covered the evening that Venezia completed their return to Serie A. The video collected that night showed the unifying power that the team had and how much excitement it brought to a struggling community.

The historic promotion to Serie A and subsequent coverage proved that Venezia FC had a place in Venetian culture.



Fig. 14 Fans before the promotion final



Fig. 15 Generations of Venetians supporting the team



Fig. 16 Club President and team celebrate with fans in the canal



Fig. 17 Fireworks and celebration at Piazza San Marco

HOW IS THIS SIMILAR TO OTHER PROJECTS?

Recent stadium developments in Italy and Europe have fit into Paramio et.al's notion of a fourth generation of stadiums where new developments create iconic designs with the help of specialized designers such as Populous, HOK, and Herzog and de Meuron or the stadium uses the existing charm of decades old stadiums and recreates the classic experience with updated technology and amenities (Paramio et al., 2008, p.527). The majority of stadiums in Italy have followed the latter model by investing in existing structures and pleasing the existing fan base. The Italian teams tend to lack the financial strength to justify an entirely new stadium. The exception to the Italian trend is the Allianz Juventus Stadium in Turin, and the proposed Cathedral Stadium in Milan. The Pier Luigi Penzo would use a hybrid of the development methods. The site restrictions explained later in this thesis suggest the need to redevelop existing structures while the existing stadium that does not meet federation or European standards suggests a need for a rebuild.

The size of the client and site place this design in a category of stadiums that are common in Europe but rarely include notable architectural features. This class of stadiums include the smaller market teams in Europe and the soccer specific stadiums in the United States. These clients can't justify creating a stadium larger than 50,000 in capacity but need their own home for identity and commercialization purposes.

The Pier Luigi Penzo will need to reach a balance between the innovations and requirements of stadium design and commercial success. The city has a distinct design character which must be accounted for as any major deviation may not be well received by the local fan base. The design movement involving the recreation of existing experiences and combining with modern technologies and strategies will suit Venezia FC and the city well. This combination of old and new experiences beautifully connects with the tourist attraction of Venice as a whole. Venice prides itself as a unique glimpse of the old world. The Pier Luigi Penzo stadium must honor the history and character of the region while integrating modern stadium standards and technologies. This powerful combination matches the idea of "nostalgia sports tourism" which ties the "emotional attraction that some historical European football stadia produce" with "contemporary stadia as areas of experience and tourist destinations"(Paramio et al., 2008, p.529).

EXISTING GUIDELINES FOR STADIUMS

Due to the public nature of stadium development and the potential for large attendances. Stadium design comes with sets of guidelines depending on the sport, location, and size. Italy follows the International Code Council for building safety regulations. Each municipality in Italy has their own version of the ICC.

In 2022 the International Federation of Association Football (FIFA) created a stadium guideline document to help universalize the stadium experience for safety, community, and overall stakeholder enjoyment. As stated by FIFA President Gianni Infantino, "Stadium developments should be in tune with local realities, and FIFA has taken care to list, in greater detail than ever before, the range of sustainability factors that need to be taken into account"(FIFA, 2022, p.6).

This document serves as best practice guidelines and is not a requirement for FIFA. Stadium design firms ARUP, HFP, and Populous contributed to the creation of this document. The stadium guideline resource covers every aspect of the stadium development process with special emphasis on sustainability, master planning, design, accessibility, and construction. While this document is comprehensive, it does not completely solve the unique design challenges of the Pier Luigi Penzo. The technical depth of this guideline will be key in the spacing requirements and programming of the Pier Luigi Penzo. As a starting point the guideline categorizes stadiums based on capacity. The intended capacity of the Pier Luigi Penzo places the stadium into Category 4. The FIFA Stadium Guideline will serve as a reference for technical aspects of the stadium design and as a guide for certain design decisions.

CASE STUDY RESEARCH

ASPECTS TO BE CONSIDERED

1. Building Typology
2. Local Context
3. Cost and Overall Impact
4. Experience & Atmosphere
5. Size
6. Client Similarity
7. Notable Design Aspects
8. Similar Site Challenges
9. Community Connection
10. Innovative Technology
11. Unique Event or Circumstance

CASE STUDY RESEARCH

SELECTED CASE STUDIES

- | | |
|-----------------------------------|----------------------------------|
| 1. Stade de la Tuiliere | Lausanne, Switzerland |
| 2. Q2 Stadium | Austin, TX, United States |
| 3. Allianz Field | St. Paul, MN, United States |
| 4. The Cathedral (proposed) | Milan, Italy |
| 5. La Bombonera | Buenos Aires, Argentina |
| 6. Bath Rugby Stadium | Bath, United Kingdom |
| 7. Yellow Wall, Signal Iduna Park | Dortmund, Germany |
| 8. LDLC Arena | Lyon, France |
| 9. Eco Park Stadium | Eastington, United Kingdom |
| 10. Grandstand Stadium | New York City, NY, United States |
| 11. Central Stadium Pisa | Pisa, Italy |
| 12. Stade Marcel-Tribut Stadium | Dunkirk, France |

The case studies examined contain images and information gathered from various internet sources including from the stadium designer and client.

All case studies examined contain successful aspects of stadium design that can lead to inspiration and guidance for this thesis project. These projects were designed in accordance to their respective sites and client needs.

STADE DE LA TUILLIERE

Location: Lausanne, Switzerland
Client: FC Lausanne Sport
Typology: Stadium
Year: 2020
Architect: MLZD, Sollberger Bögli
Capacity: 12,500



Fig. 18 Stade de la Tuilière corner condition

DESIGN

The Stade de la Tuilière is an ultra-modern soccer stadium designed by Swiss architects, MLZD and Sollberger Bögli for the FC Lausanne Sport soccer team. The stadium's design features a subtractive approach where the corners of the stadium were eliminated, leaving an angular overhang. The overhang designates the entrance to the stadium and was intended to enhance the anticipation of the event and give the team an identity. As the corners developed, the design team uncovered "functional advantages" and urban planning opportunities (Ravenscroft, 2020).



Fig. 19 Stade de la Tuilière approach

STADE DE LA TUILLIERE

ATMOSPHERE

The design team worked to divert focus to the match and not distract supporters. The seating area was built with the steepest gradient allowed so that fans would be as close to the action as possible.

The stadium roof was developed to trap noise in the stadium, enhancing the atmosphere and preventing noise pollution to the neighboring residences. The team took pride in their design by claiming the stadium is "pragmatic and direct: the architectural gesture, as well as the internal organization and the materials. Everything relies on the power of sport as the main protagonist" (Ravenscroft, 2020).



Fig. 20 Stade de la Tuilière interior



Fig. 21 Stade de la Tuilière exterior

TAKEAWAY

FC Lausanne Sport is a client of similar stature to Venezia FC. The stadium capacity requirements are also similar. The emphasis on atmosphere and architectural significance are important deliverables for consideration. The Stade de la Tuilière also found ways to integrate with the urban context through access and the angled corners. Grounding the stadium to the local community is critical to foster support and viability.

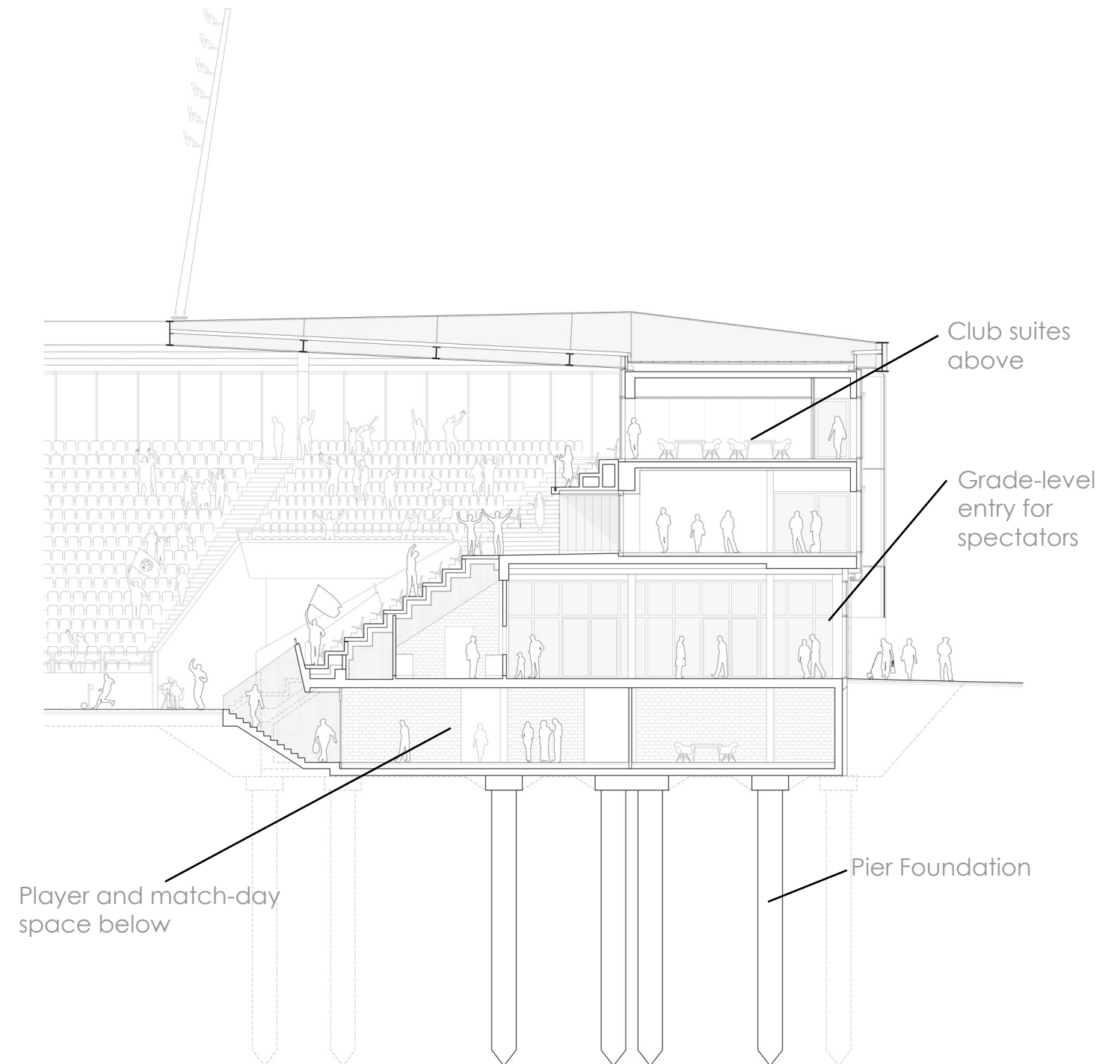


Fig. 22 Stade de la Tuilière section diagram

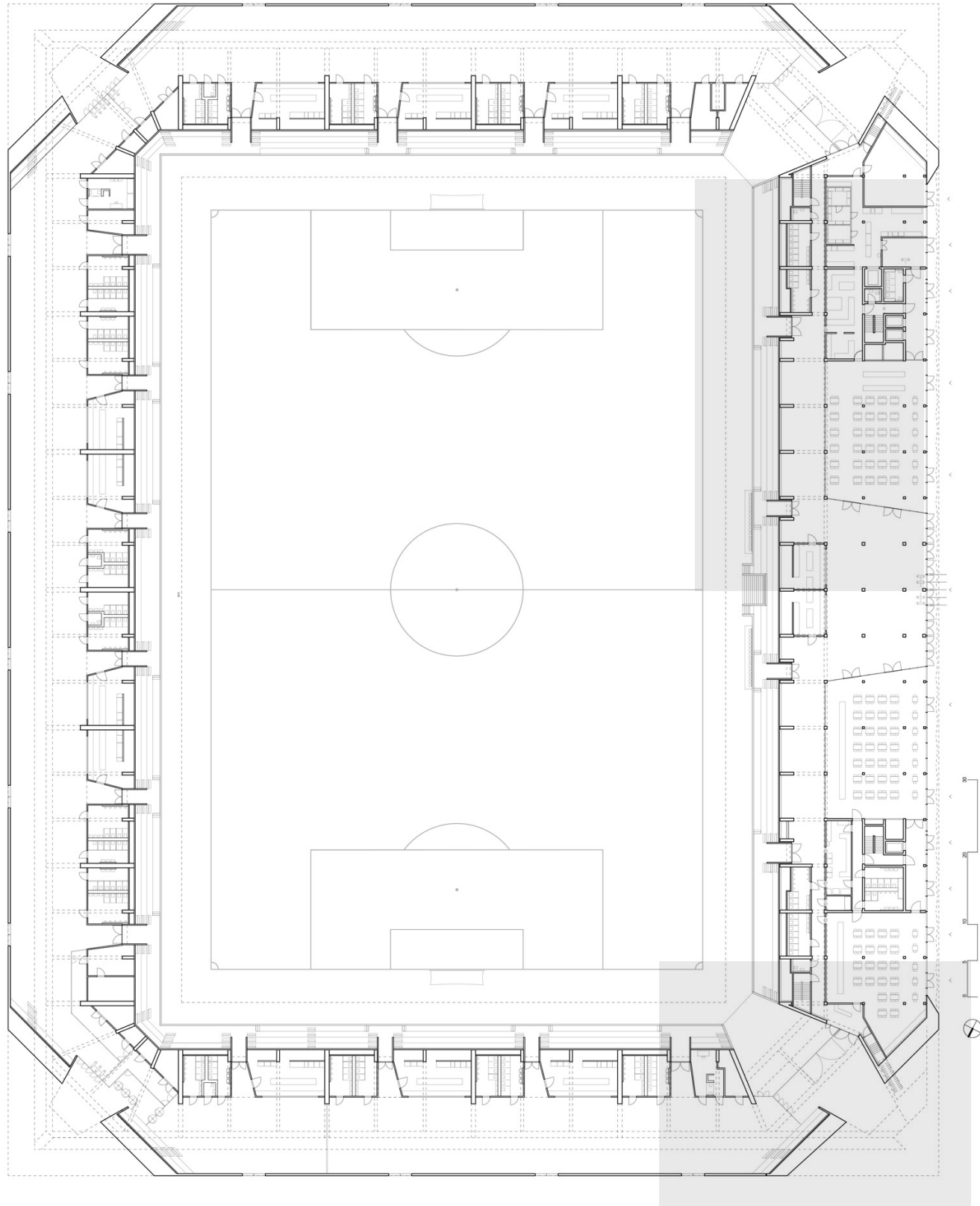
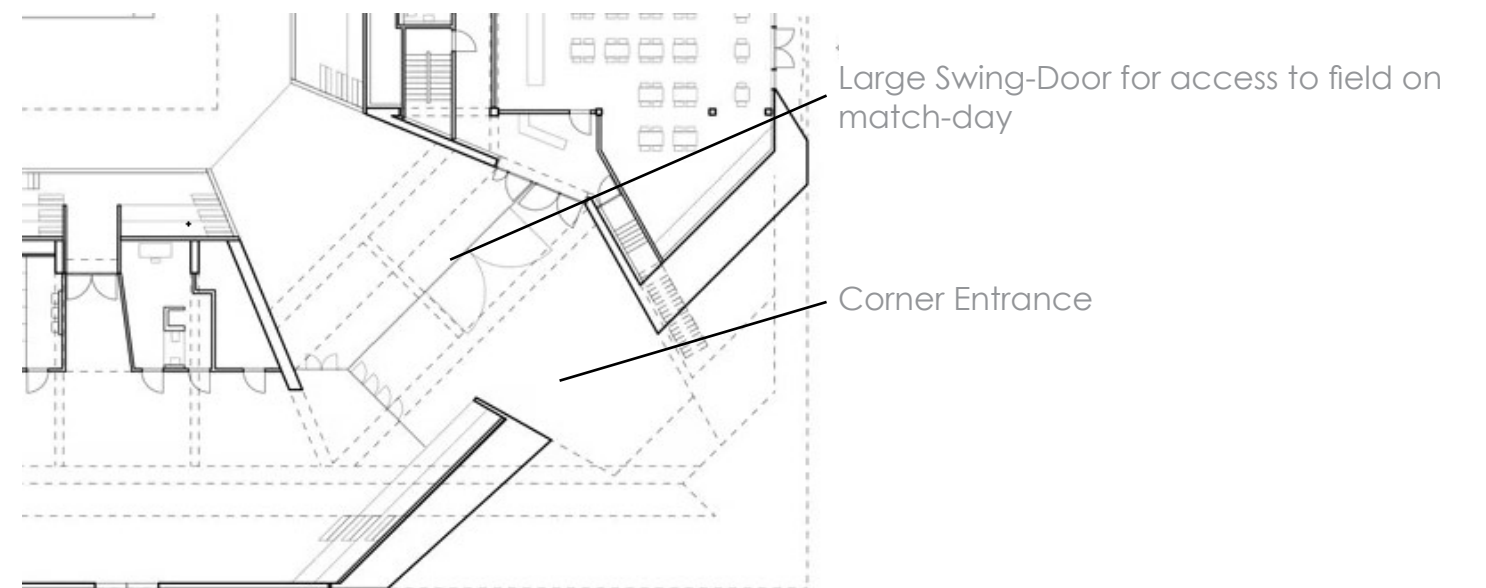
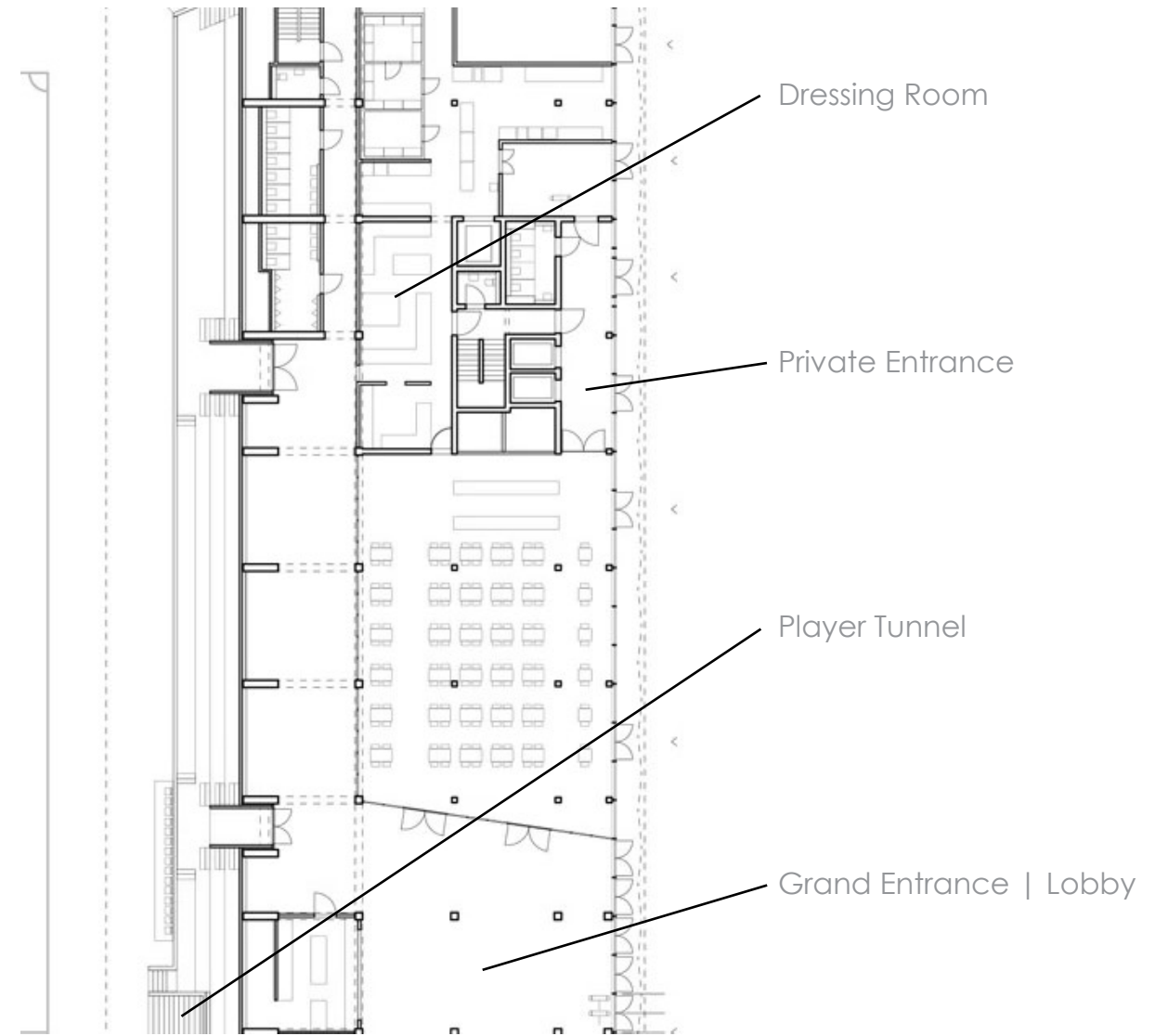


Fig. 23 Stade de la Tuileries plan



Q2 STADIUM

Location: Austin, Texas
Client: Austin FC
Typology: Stadium
Year: 2021
Architect: Gensler
Capacity: 20,500

DESIGN

The Q2 is a state of the art soccer stadium located in Austin, Texas. Austin FC joined the MLS in 2021 and the stadium accompanied their introduction. Designed by Gensler, the stadium taps into the cultural heritage of Austin while implementing the tech-forward sentiment of the city. The stadium orientation and open corners allows for natural breezes which are critical for the Texas heat. The design integrates many connective features which have proven successful with the fan-base and community (Q2 Stadium | Projects, n.d.).



Fig. 24 Q2 Stadium

Q2 STADIUM

USER EXPERIENCE

Q2 Stadium is a leader in providing amenities for sponsors and fans. The stadium allows space for local food vendors and socialization which promotes cohesion and the fan experience. The site also features landscaped outdoor spaces that are open to the public on non-game days. The site also creates functional flexibility as it frequently hosts farmer's markets and concerts (Q2 Stadium - *the Experience like No Other!, n.d.*). Gensler also designed an associated Performance Center to compliment the development.



Fig. 25 Q2 food trucks



Fig. 26 Q2 outdoor space

LOCAL ROOTS

Austin FC ensured their connection to the local community by involving local businesses and artists to develop the area and make the stadium their own. The club stresses the importance of being a club for the people which is a vital factor in creating stadium value and recognition.

TAKEAWAY

Venezia FC has started a similar fan involvement initiative which has increased public support. The Pier Luigi Penzo must follow that sentiment and incorporate local culture in the design.



Fig. 28 Q2 Dining



Fig. 27 Q2 Art Mural



Fig. 28 Q2 Suite

ALLIANZ FIELD

Location: Saint Paul, Minnesota
Client: Minnesota United FC
Typology: Stadium
Year: 2019
Architect: Populous
Capacity: 20,000



Fig. 29 Allianz street-scape

DESIGN

Minnesota United joined the MLS in 2017 but waited to build their stadium in St. Paul. When opened, Allianz Field became a nation-wide favorite because of its sustainable strategies, human scale, and creative LED lighting skin. The stadium is situated in a previously contaminated site and has completely revitalized the area. The stadium design is inviting to pedestrians due to its scale and urban development. A notable feature of the stadium is the safe standing terrace on the south-end of the stadium. This feature was common in early 20th century stadiums but was abandoned due to safety concerns. It is been reinventing at Allianz Field and is a facet to the stadium atmosphere.



Fig. 30 Allianz Field at night

ALLIANZ FIELD

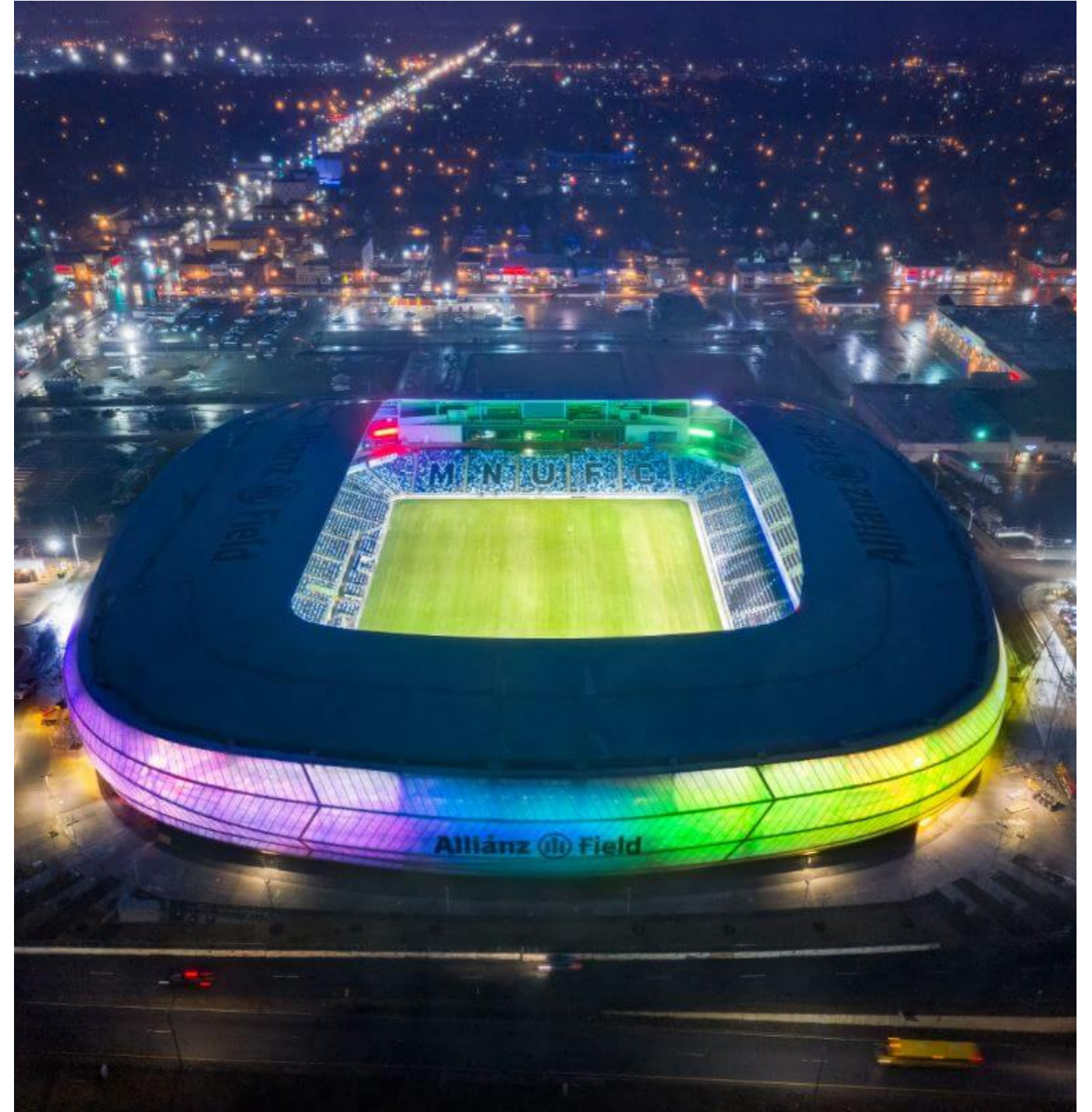


Fig. 31 Allianz Field LED Lighting

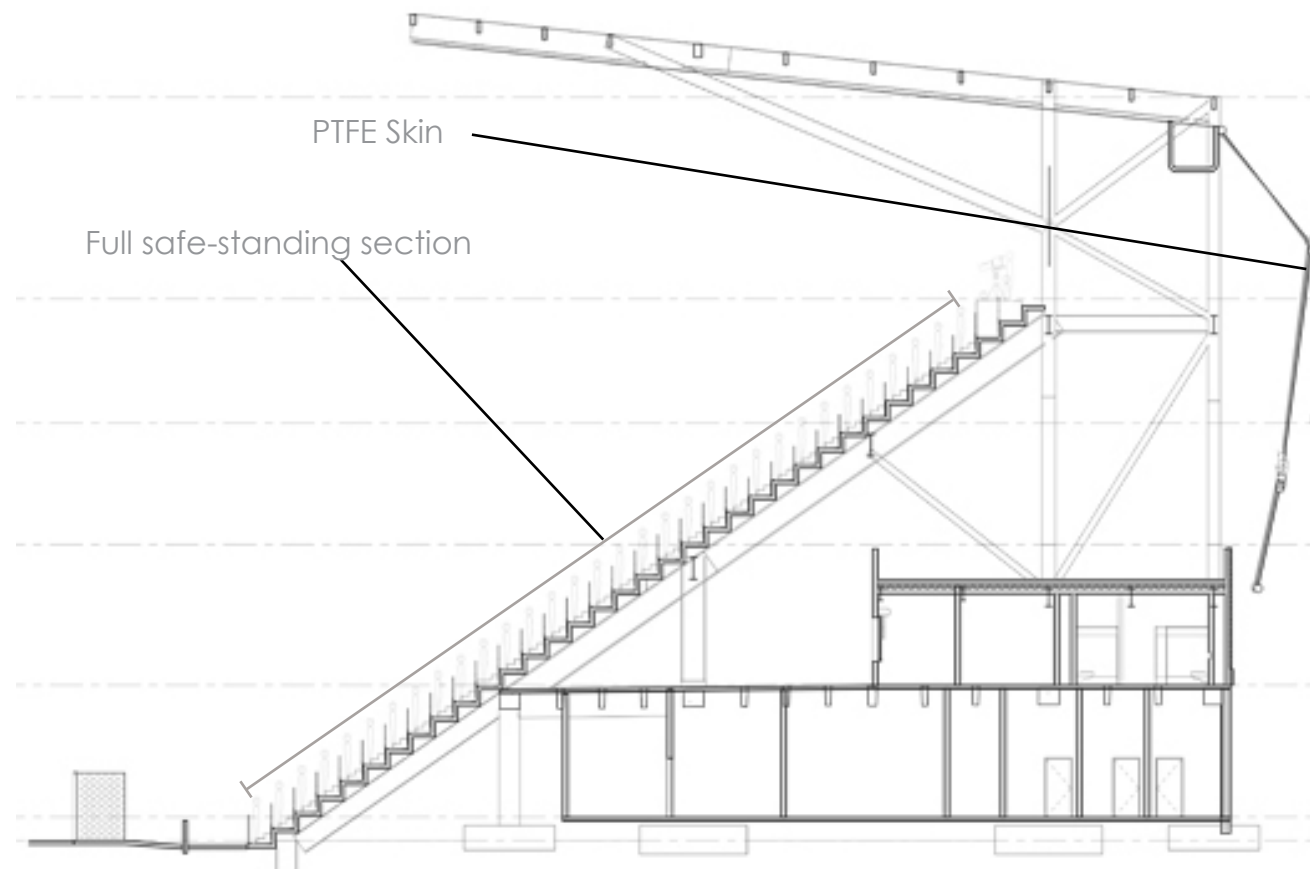


Fig. 32 Allianz Field Section (Jarvi, 2016)

INNOVATION

LED lights for a stadium's skin were first popularized by Allianz Field's sister stadium, the Allianz Stadium in Munich Germany. The 1,700 hand-placed LED lights can be activated in any pattern or design. This created an iconic feature for the stadium (Allianz Field, n.d.).

The lightweight PTFE skin lessened the structural demands of the design, ultimately saving 100 tons of steel and reduced the carbon footprint.

SITE

The site for Allianz Field was heavily examined as it sits between the cities of St. Paul and Minneapolis. It was designed to strategically take advantage of existing public transportation to lessen the burden for visitors. The site also features a 28,000 square foot lawn that contributes to game-day activities and the overall experience. Previous to development the area was a vacated brown field so any construction here would already have infrastructure present.



Fig. 33 Allianz Field Safe Standing



Fig. 34 Allianz Field Game Day

THE CATHEDRAL STADIUM

Location: Milan, Italy
Client: FC Inter Milan, AC Milan
Typology: Stadium
Year: Proposed
Architect: Populous
Capacity: TBD



Fig. 35 Cathedral Stadium corner

DESIGN

FC Inter Milan and AC Milan have been European icons for generations and have famously shared the San Siro Stadium since 1926. Populous will have an immense challenge in designing a stadium for not one, but two historic teams with passionate fan bases. The design takes inspiration from Milan's Duomo and Galleria and integrates a sports and entertainment district. The development claims to be creating the greatest stadium in Europe and it will become a global icon (*A New Stadium for Milano*, n.d.).



Fig. 36 The Cathedral Stadium Render

THE CATHEDRAL STADIUM



Fig. 37 Meazza Museum

SPORTS DISTRICT

This proposed stadium is accompanied by a sports and entertainment district. The district would be a massive tourism draw for the city of Milan and there are many successful examples of sports districts worldwide. A version of a sports district may work well for Venice. The city is lacking a sports hub and may benefit from a tourist attraction aside from the art and historic qualities of the city.



Fig. 38 Cathedral Stadium Concert



Fig. 39 Milan Sports Complex

SOCIAL UNDERPINNING

The two Milan clubs are known for their unique stadium sharing situation. Many safety and logistical obstacles arise with two fan bases sharing the same area. The Venice stadium won't have two teams sharing it, but there should be opportunities for alternate events such as concerts and fashion shows (which happened at the current Venice stadium in 2022).

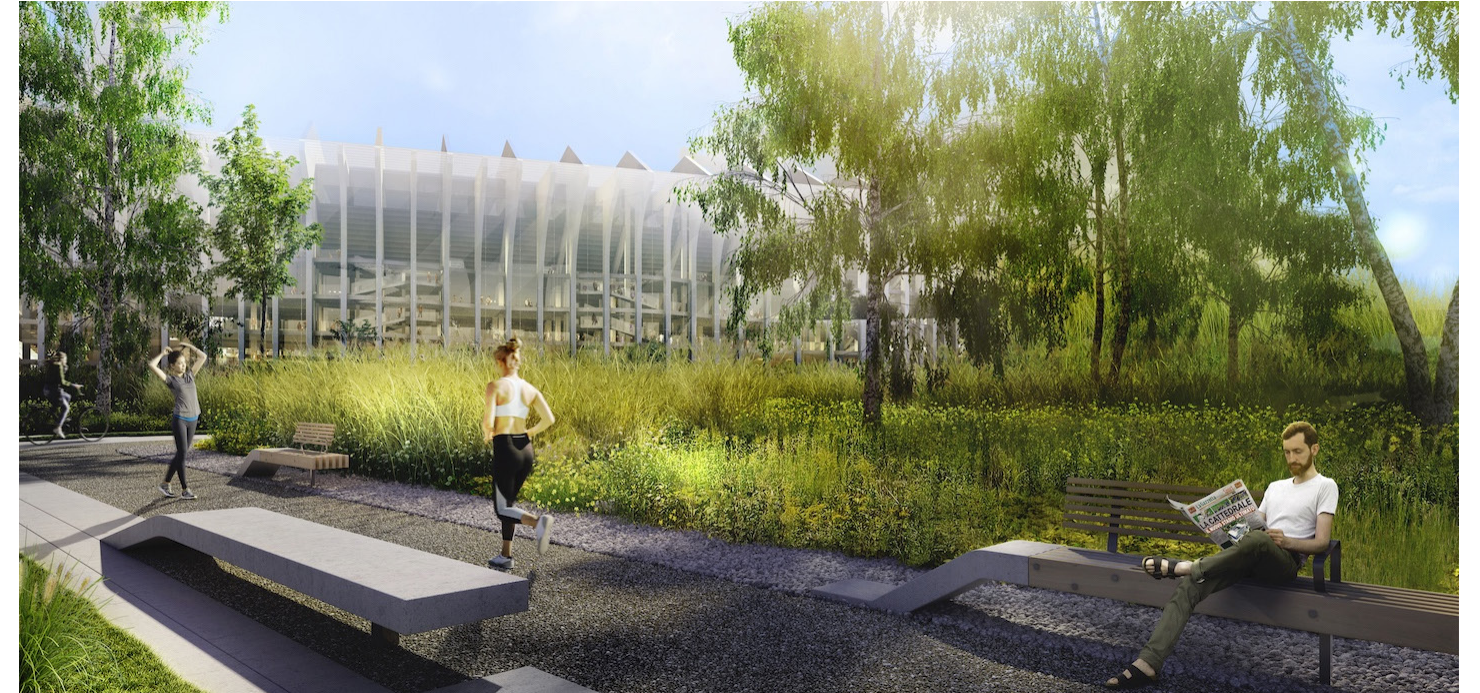


Fig. 40 Cathedral Stadium green space



Fig. 41 Milan Derby

LA BOMBONERA

Location: Buenos Aires, Argentina
Client: Boca Juniors
Typology: Stadium
Year: 1940
Architect: Jose Luis Delpini, Viktor Sulcic
Raul Bes
Capacity: 57,000

DESIGN

The legendary La Bombonera stadium in Buenos Aires, Argentina is known for its hostile environment. The stadium was designed in the era of stadium architecture where capacity was emphasized to increase profits. The stadium is situated in the Boca neighborhood which impacted the stadium form as only three sides have significant seating. The restrictive site forced the seating to be extremely steep. The steep seating has the spectators appear to stand over the playing surface. The unique fourth stand unintentionally reverberates the noise of the stadium (*La Bombonera - Boca Juniors - Buenos Aires - the Stadium Guide, n.d.*).



Fig. 42 Bombonera Vertical Stand

LA BOMBONERA

LOCAL PASSION

Argentina is known for their passionate fans and the passion is intensified for their local clubs. Historic clubs like Boca Juniors are a staple in the community. Attitudes and local commerce rely on the performance of the team. There is a balance to be found for creating passion between the team popularity or success and the stadium's design qualities. La Bombonera and Boca Juniors have established support and the stadium itself exhibits that support. The recorded atmosphere may be why the stadium has opted against a rebuild.

ATMOSPHERE

While the stadium condition at La Bombonera must be improved, the safe standing component can be an effective architectural feature to take inspiration from. Unlike sports in the United States, European and South American fans stand for the entire game and only rest during stoppages. The safe-standing section encourages fan interaction and movement.



Fig. 43 Bombonera Fan intensity

BATH RUGBY STADIUM

Location: Bath, United Kingdom
Client: Bath Rugby Club
Typology: Stadium
Year: 2020
Architect: Grimshaw
Capacity: 18,000

DESIGN

Similar to the site for the Pier Luigi Penzo, the Bath Rugby Stadium sits on a historic riverfront site. The designers at Grimshaw wanted to retain the stadium's charm while developing the area as an exciting destination by creating a master plan. The master plan created shopping, dining, and public spaces in addition to a new stadium. Critically, the design retains the views of the historic district and kept the existing riverside trees (*Bath Rugby New Stadium, n.d.*)



Fig. 44 Bath Rugby Stadium river view

BATH RUGBY STADIUM

MASTER PLAN & HISTORIC TIES

Grimshaw focused on optimizing the scale of the project by referencing the classic proportions of the city's Georgian architecture. The connection to the riverfront was kept which is also a key component to a successful design at the Pier Luigi Penzo.



Fig. 45 Bath Rugby section perspective



Fig. 46 Riverfront path



Fig. 47 Bath Rugby Game

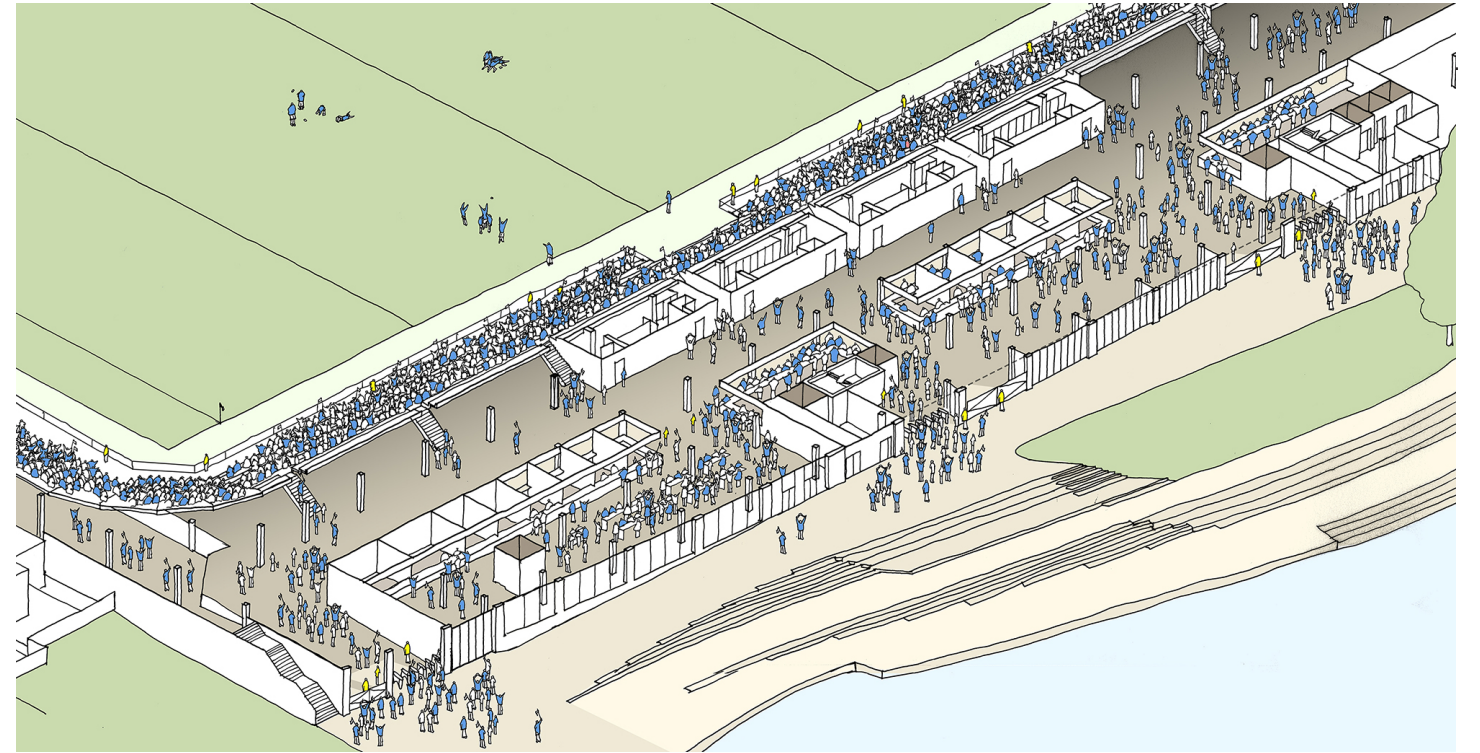


Fig. 49 Grimshaw game-day graphic (Bath Rugby New Stadium, n.d.)



Fig. 48 Bath Rugby Stadium site

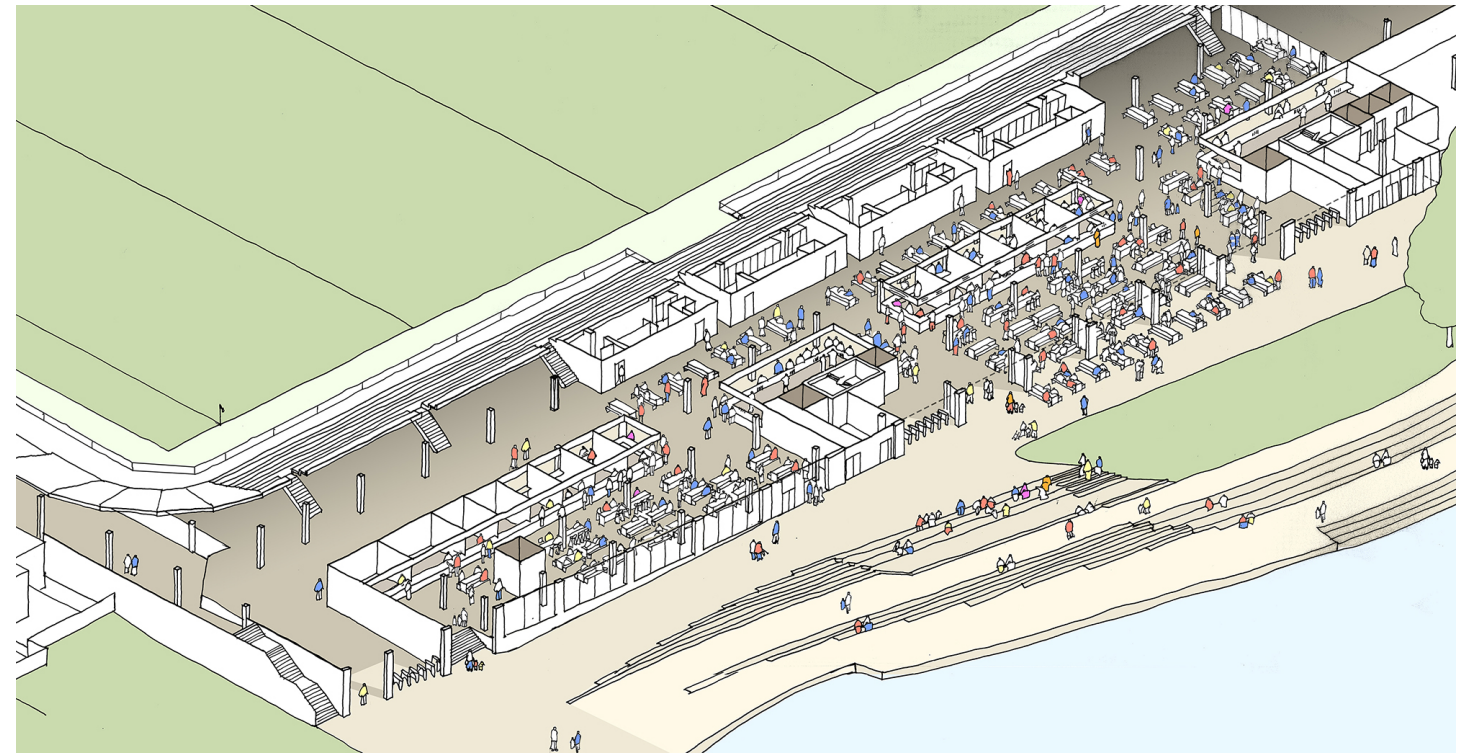


Fig. 50 Grimshaw non-game-day graphic (Bath Rugby New Stadium, n.d.)

YELLOW WALL, SIGNAL IDUNA PARK

Location: Dortmund, Germany
Client: Borussia Dortmund
Typology: Stadium Section
Year: 1974
Architect: Planungsgruppe Drahtler
Capacity: 83,000

DESIGN

The Yellow Wall at Signal Iduna Park is the south end of the stadium. This stand is the largest terrace for spectators in European soccer. The entire stadium capacity of 83,000 is the seventh-largest in Europe while the Yellow Wall seats 24,454. The Yellow Wall creates one of the most intimidating atmospheres in Europe as the immense size and collective body are the perfect home for Borussia Dortmund's ultra fans (*Borussia Dortmund's "Yellow Wall": A Crown Jewel of German Football, 2017*).

The stadium has little in common in terms of size and requirements with the Pier Luigi Penzo, but the atmospheric quality of the Yellow Wall is an inspiration for any stadium design.



Fig. 51 Yellow Wall

YELLOW WALL, SIGNAL IDUNA PARK



Fig. 52 Borussia Dortmund Champions League



Fig. 53 Borussia Dortmund Tifo

Location: Lyon, France
Client: Olympique Lyonnais Groupe
Typology: Multi-Purpose Stadium
Year: 2023
Architect: Populous
Capacity: 12,000-16,000

DESIGN

The LDLC Arena set to be completed in 2023 will become the largest arena in France outside of Paris. Populous was challenged to develop the area surrounding the existing Groupama Stadium which hosts the Olympique Lyonnais soccer team.

This stadium will hold a plethora of events including basketball, concerts, expositions, tennis, and Esports. Flexibility is key in the stadium's design as the arena uses all require different arrangements.



Fig. 54 LDLC Concert

INNOVATION

The arena includes a modular seating tier system. Various areas and stands are removable depending on the event which explains the flexible capacity between 12,000 to 16,000. Populous understands the need for sustainability in new stadium design and the LDLC includes a variety of sustainable strategies. The arena has an optimized layout to limit the building footprint. A notable design feature is the double-skin exterior. This skin helps regulate the interior temperature which limits the need for active control systems (LDLC Arena, n.d.).

The arena also has 6,000 square meters of photo-voltaic panels on the arena roof. The master planning for the sports district allows for 30% green space while retaining the existing tree lines in the area.



Fig. 55 LDLC Stadium

ECO PARK STADIUM

Location: Eastington, United Kingdom
Client: Forest Green Rovers Football Club
Typology: Stadium
Year: Proposed
Architect: Zaha Hadid Architects
Capacity: 5,000

DESIGN

The proposal of the ECO Park Stadium grabbed media attention because of the stadium's environmental awareness and wood construction. Forest Green Rovers FC is a unique client in that they have made it their mission to be the most green and environmentally-friendly soccer team in the world.

From a feasibility standpoint, Forest Green Rovers FC play in the fourth-division in England. Teams in this tier rarely have the financial strength to develop a new stadium and their on-field success is volatile.



Fig. 56 Eco Park wood construction

ECO PARK STADIUM

SUSTAINABILITY

Zaha Hadid Architects saw the vision of the club and contributed to the vision by proposing this stadium. The wood structure of the stadium is a revolutionary design decision because of the historic struggles with major wood construction. The relatively small capacity of 5,000 allows for the wood material selection. This selection has the lowest carbon footprint of any major building material (*Eco Park* | WE ARE FGR, n.d.).

Other sustainable strategies include on-site solar generation, organic playing fields, vegan dining options, electric vehicle charging, promotion of local biodiversity, and expansive pedestrian paths.



Fig. 57 Eco Park Stadium

GRANDSTAND STADIUM

Location: Queens, New York City, United States
Client: United States Tennis Association
Typology: Stadium
Year: 2016
Architect: Rossetti
Capacity: 8,125

DESIGN

The Grandstand Stadium built for the United States Tennis Association serves as a complimentary stadium to the Arthur Ashe Stadium and the 46-acre campus. The fan experience is pronounced in tennis due to the connection the player and fan has. The lower bowl of the Grandstand Stadium is recessed into the earth which brings the fan closer to the action (*Grandstand Stadium / ROSSETTI, 2017*).

The circulation in the Grandstand Stadium allows fans to freely move around the stadium while still being covered by the canopy overhead.



Fig. 58 Grandstand Stadium Entrance

GRANDSTAND STADIUM



Fig. 59 Grandstand Stadium

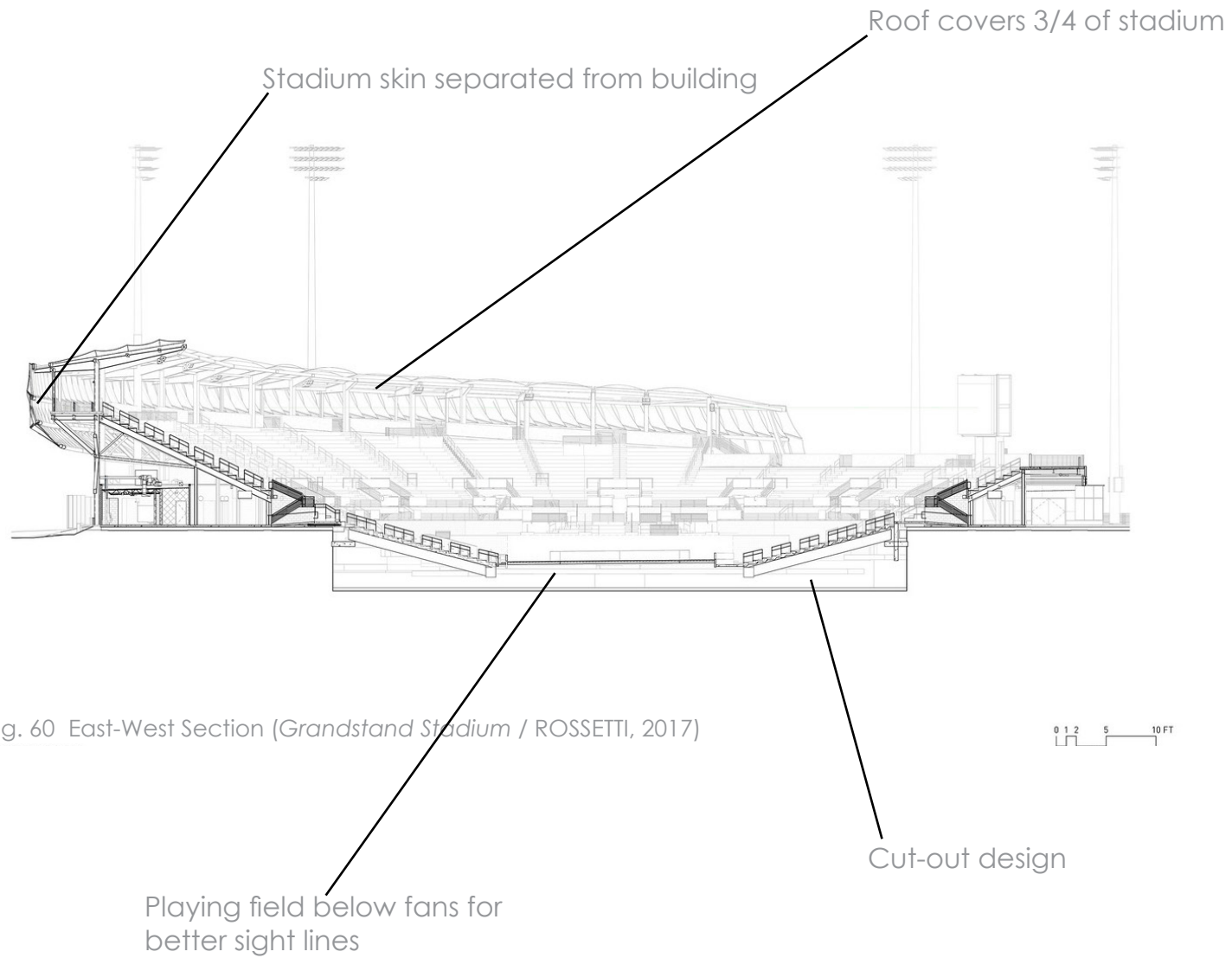


Fig. 60 East-West Section (*Grandstand Stadium* / ROSSETTI, 2017)

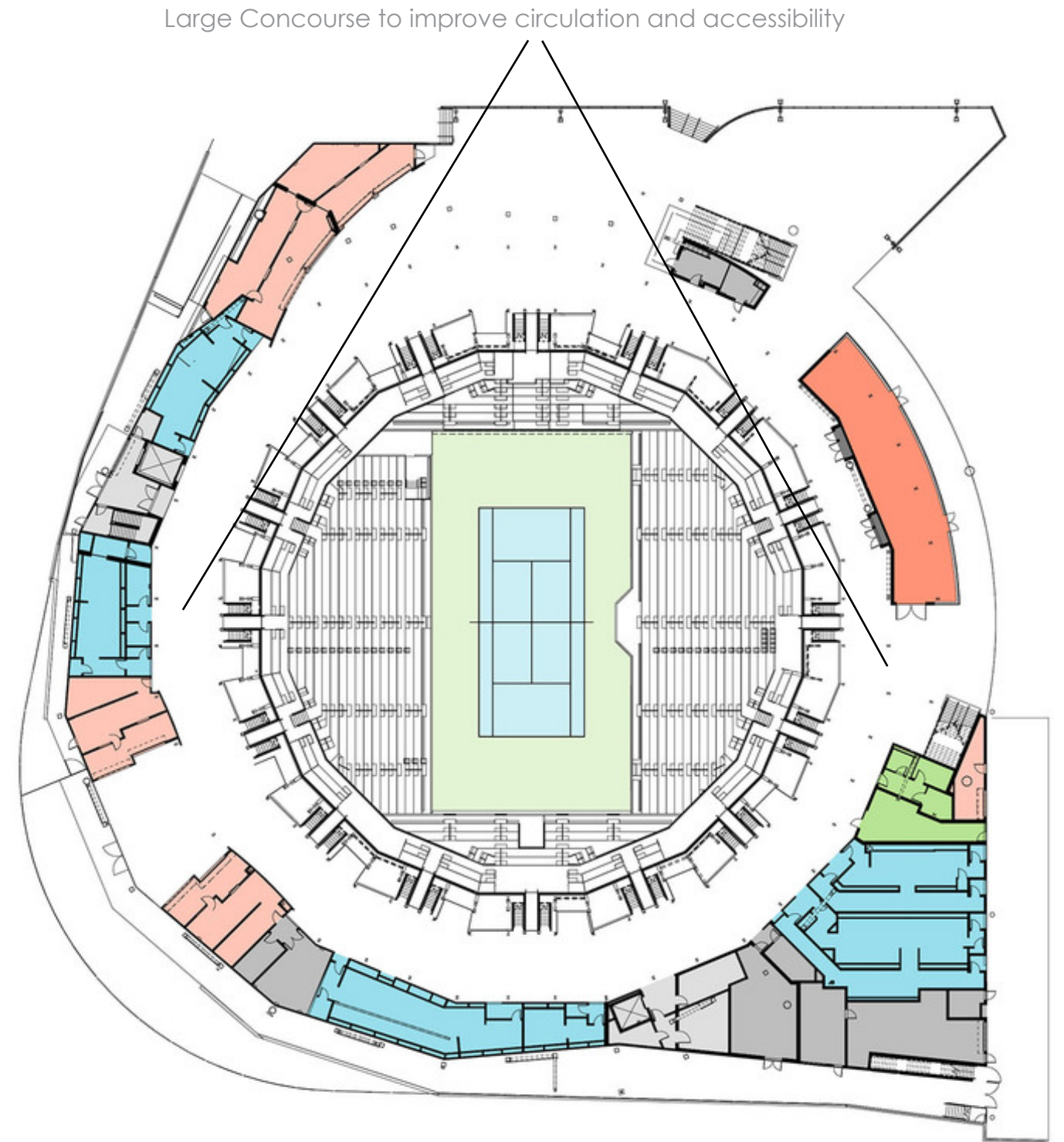


Fig. 61 Concourse Level Plan (*Grandstand Stadium* / ROSSETTI, 2017)

- Restrooms
- Retail + Concessions
- Guest Services
- Support
- Back of House

CENTRAL STADIUM PISA

Location: Pisa, Italy
Client: AC Pisa
Typology: Stadium
Year: Proposed
Architect: iotti + pavarani architetti
Capacity: 18,000

DESIGN

AC Pisa are direct rivals of Venezia FC and have similar goals. AC Pisa are also in a growth phase due to recent sporting success. The club hosted a restricted design competition in 2017 for a new stadium.

The winning design from iotti + pavarani was a light, and elegant stadium with a focus on the surrounding landscape. The design team sought to create a bright contrast to the historic region by designing a modern and sleek stadium in the traditional rectangular form. The idea of 'relaxed elegance' is pronounced in the design through the minimalist characteristics (IOTTI + PAVARANI, n.d.).

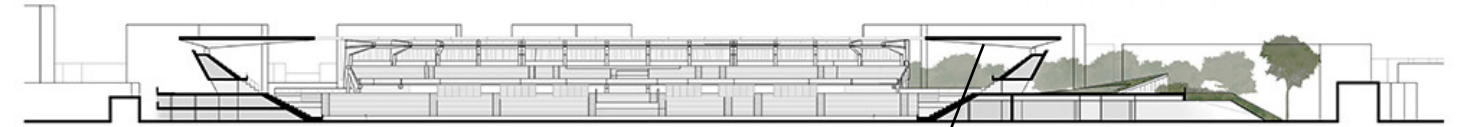


Fig. 62 A.C Pisa Stadium

CENTRAL STADIUM PISA

LOCAL COMPARISON

The new Pisa Stadium is a strong guide for the future of the Pier Luigi Penzo because of the client and regional similarities. AC Pisa opted for a contemporary design which appears successful in isolation but is yet to be seen when integrated in the community. The Pisa Stadium has few instances of authenticity and stylistic connection to Pisa. The Pier Luigi Penzo and Venice have a rare opportunity to share a unique site and harmoniously synchronize.



Modern angular stadium design doesn't match historic shapes of Pisa



Fig. 63 Pisa Section (IOTTI + PAVARANI, n.d.)



Fig. 64 Pisa



Fig. 65 Pisa Stadium shopping (IOTTI + PAVARANI, n.d.)

RETAIL INTEGRATION

The new Pisa Stadium has unveiled renders that include local retail and restaurants. While this isn't new to stadium design, appropriate integration greatly enhances the stadium experience. Pisa and Venice are known for their aesthetic qualities. The retail included in the stadium development should match the city's marketing direction and the client's goals.

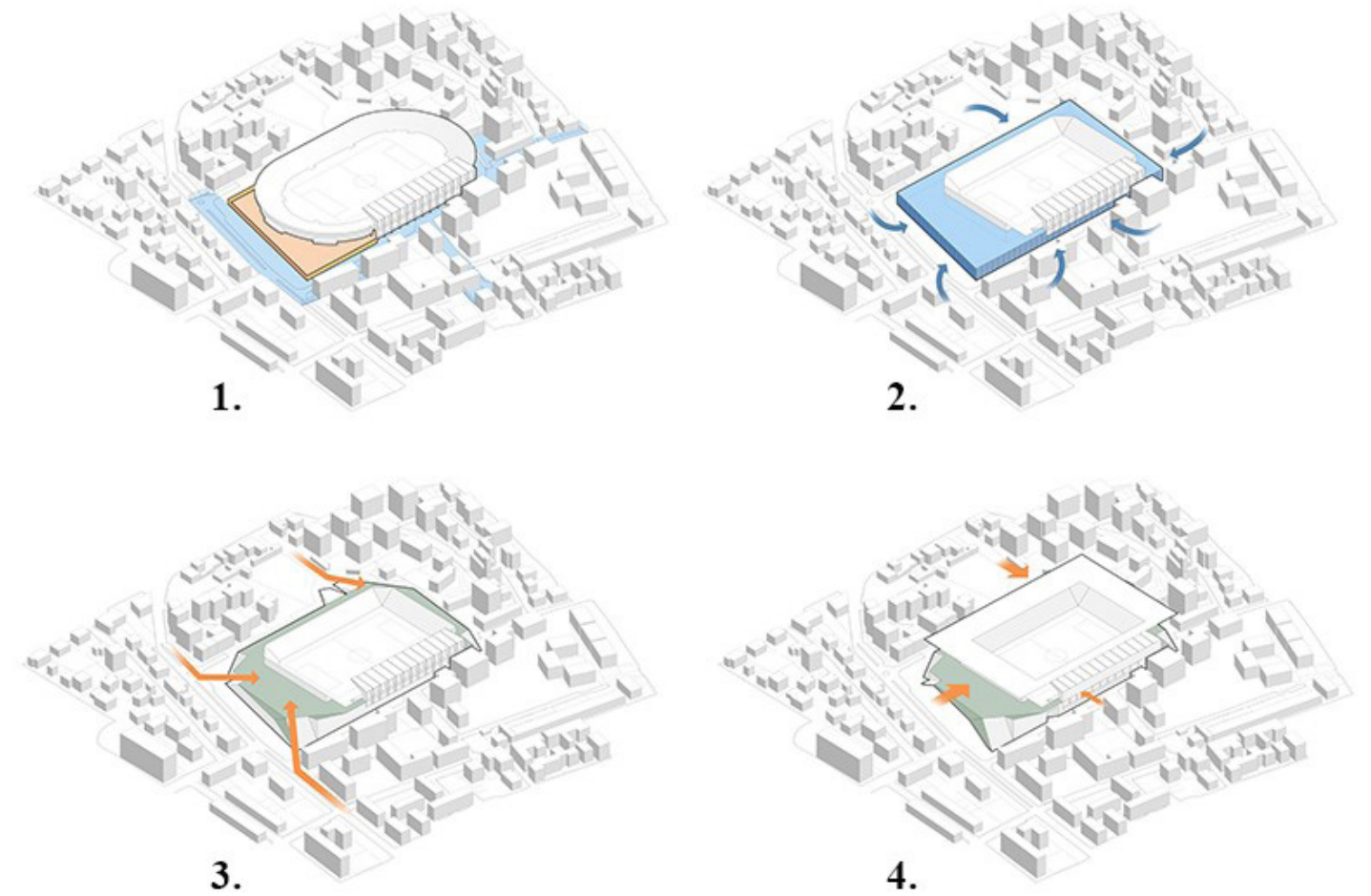


Fig. 66 Stadium Design Process (IOTTI + PAVARANI, n.d.)

STADIUM REMODEL

Much like the Pier Luigi Penzo plan, the AC Pisa stadium is a remodel of the existing stadium. The original Pisa stadium, the Arena Garibaldi was built in 1919 and is facing structural and expansion limitations similar to Venezia FC.

STADE MARCEL-TRIBUT STADIUM

Location: Dunkirk, France
Client: USL Dunkerque Club
Typology: Stadium
Year: 2022
Architect: OLGGA architectes, SOCKEEL Architectes
Capacity: 5,000

DESIGN

The new Tribut Stadium in Dunkirk, France is an example of how a stadium can be integrated in an urban center and be user-friendly. The stadium design emphasizes the entrance condition and connection with the river-bank. The walk-ability and connection to existing pedestrian paths is also a site factor for the Pier Luigi Penzo. The vertical timber elements that create the facade bring a sense of transparency in the stadium and connect the interior with the neighboring boulevard. The lightweight nature of the stadium and simple circulation increases accessibility and overall fit in the urban context (ArchDaily, 2022).



Fig. 67 Tribut Stadium

STADE MARCEL-TRIBUT STADIUM

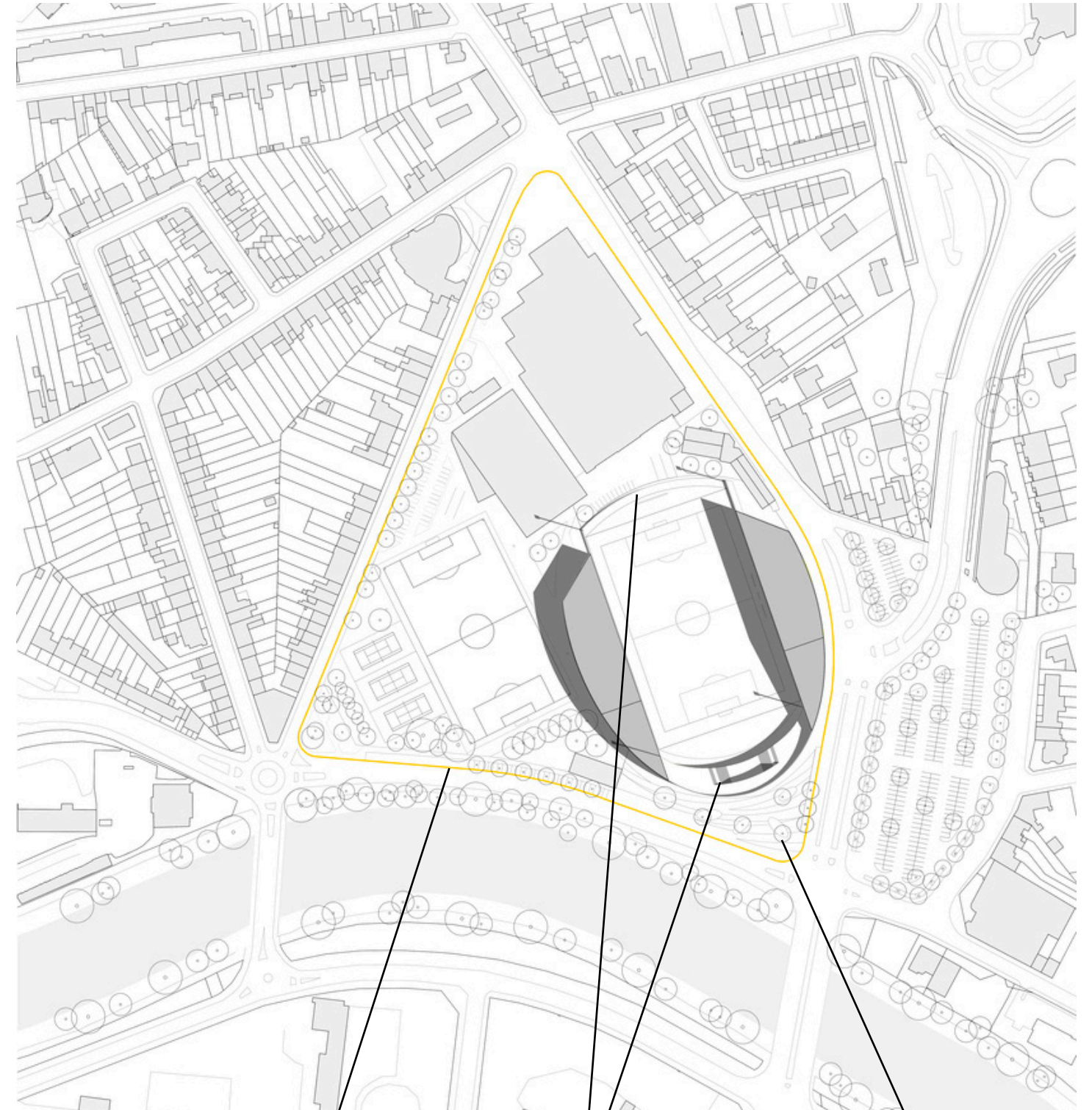


Fig. 68 Tribut Stadium Site (ArchDaily, 2022)

Entire Site developed as sports district

East-West views retained
Frames the river view
and city

Pedestrian Access

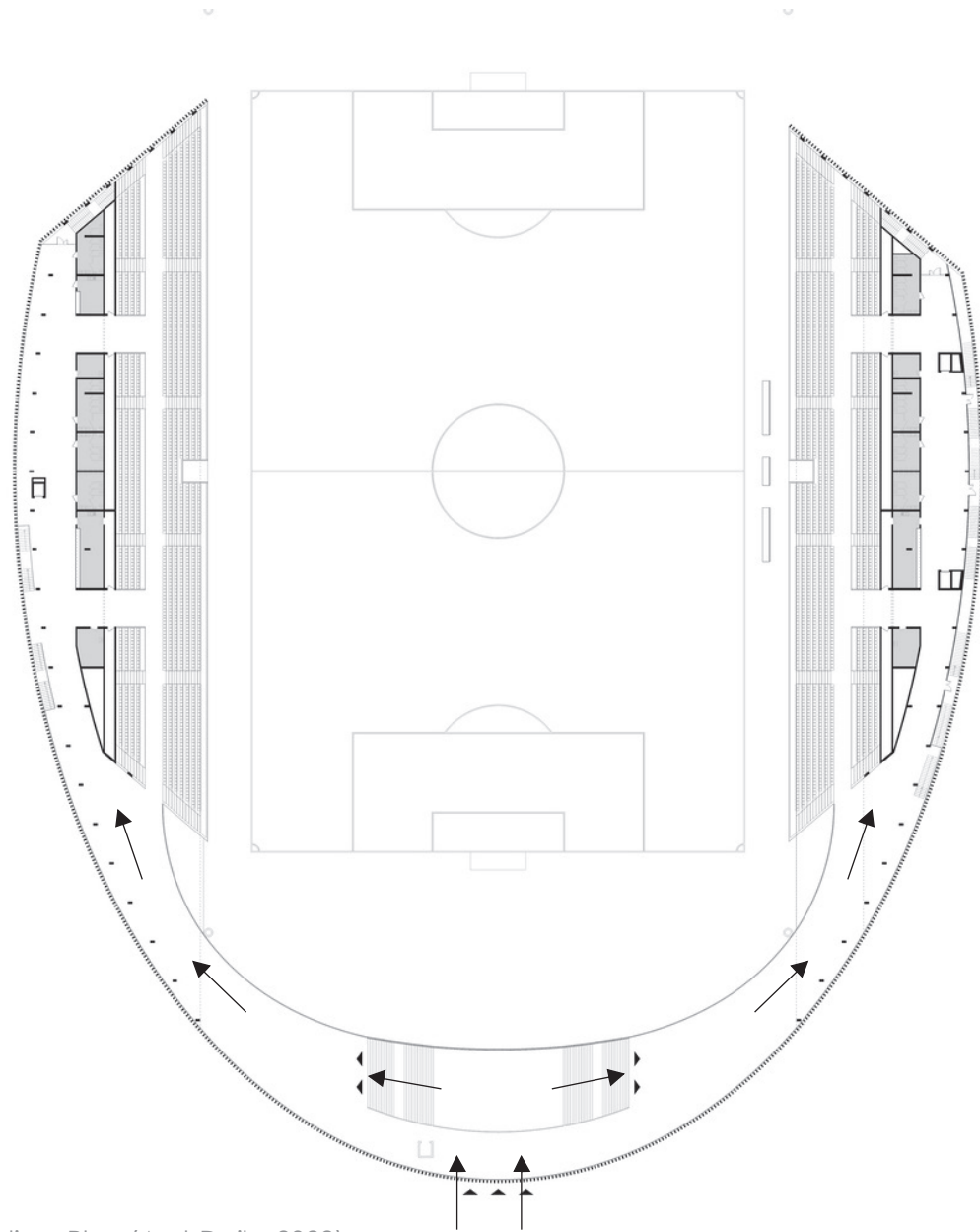


Fig. 69 Tribut Stadium Plan (ArchDaily, 2022)

Spectator entrance is minimal to limit congestion. Due to the stadium capacity and prior running track, spectators are required to commute a significant distance to seating.

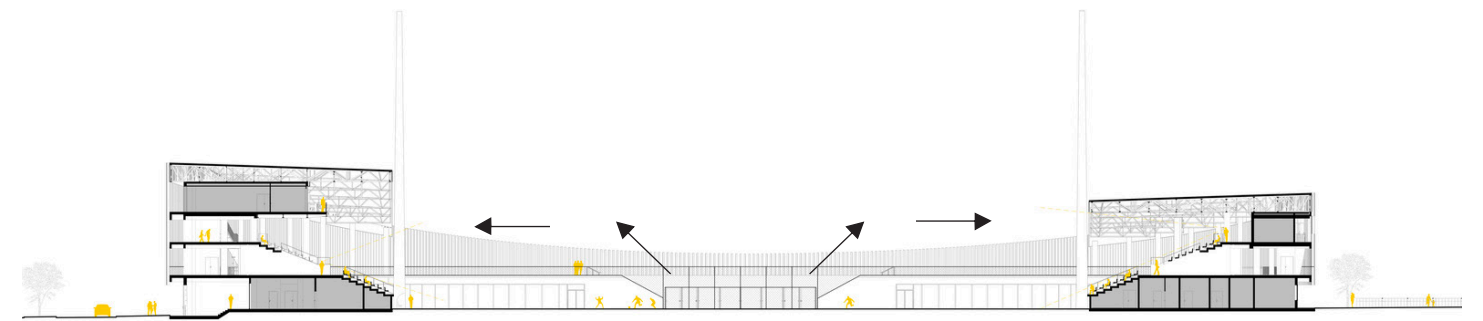


Fig. 70 Tribut Stadium Section (ArchDaily, 2022)

Fans are immediately directed to climb to the concourse level. Fan seating does not reach playing level elevation. The spectator distance to the action is a concern in stadium design but this decision is countered by the simplified circulation

SITE

PIER LUIGI PENZO

Originally built in 1913, the 11,000 capacity stadium is the second oldest remaining stadium in Italian football. The stadium has gone through a handful of renovations, especially after a tornado destroyed most of the site in 1970.

The stadium has recently seen a sharp decline in safety and quality. Parts of the stadium have fallen into disrepair and any remediation has been slow due to financial turbulence. The only permanent structure is the West Stand which borders the Sant' Elena neighborhood. The other seating areas are framed stands, much like the ones seen at high school stadiums in the United States.

The most recent phase of additions to the stadium occurred in 2021 after the team secured promotion to the Serie A. The stadium is accessed by pedestrian walking paths and a collection of docks along the north end of the stadium.



Fig. 71 Current Pier Luigi Penzo

STADIUM ISSUES

The interior of the stadium is dated and doesn't meet the UEFA and Italian Federation requirements. The Serie A requires a minimum capacity of 16,100, but Venezia FC received an exemption for the 2021 season. The stadium has no safe standing, which is a seating innovation that improves the general atmosphere and has been recently approved by UEFA. Many European stadiums require a designated visiting fan section for safety and logistical concerns. The Pier Luigi Penzo's visiting section is not well separated from the home supporters..

Residing on an island, the stadium has limited space for expansion, but the neighboring site is an unused boat storage facility. This limited site creates design challenges. The stadium also lacks adequate VIP seating, catering, amenities, and a team store. With the recent increase in attendance, the existing infrastructure is being stressed.



Fig. 72 Existing Stadium North Entrance



Fig. 73 Existing Dressing Room



Fig. 74 Existing Media Room



Fig. 75 Existing Pedestrian Bridge and Main Entrance



Fig. 77 Pier Luigi Penzo existing condition



Fig. 76 Graffiti

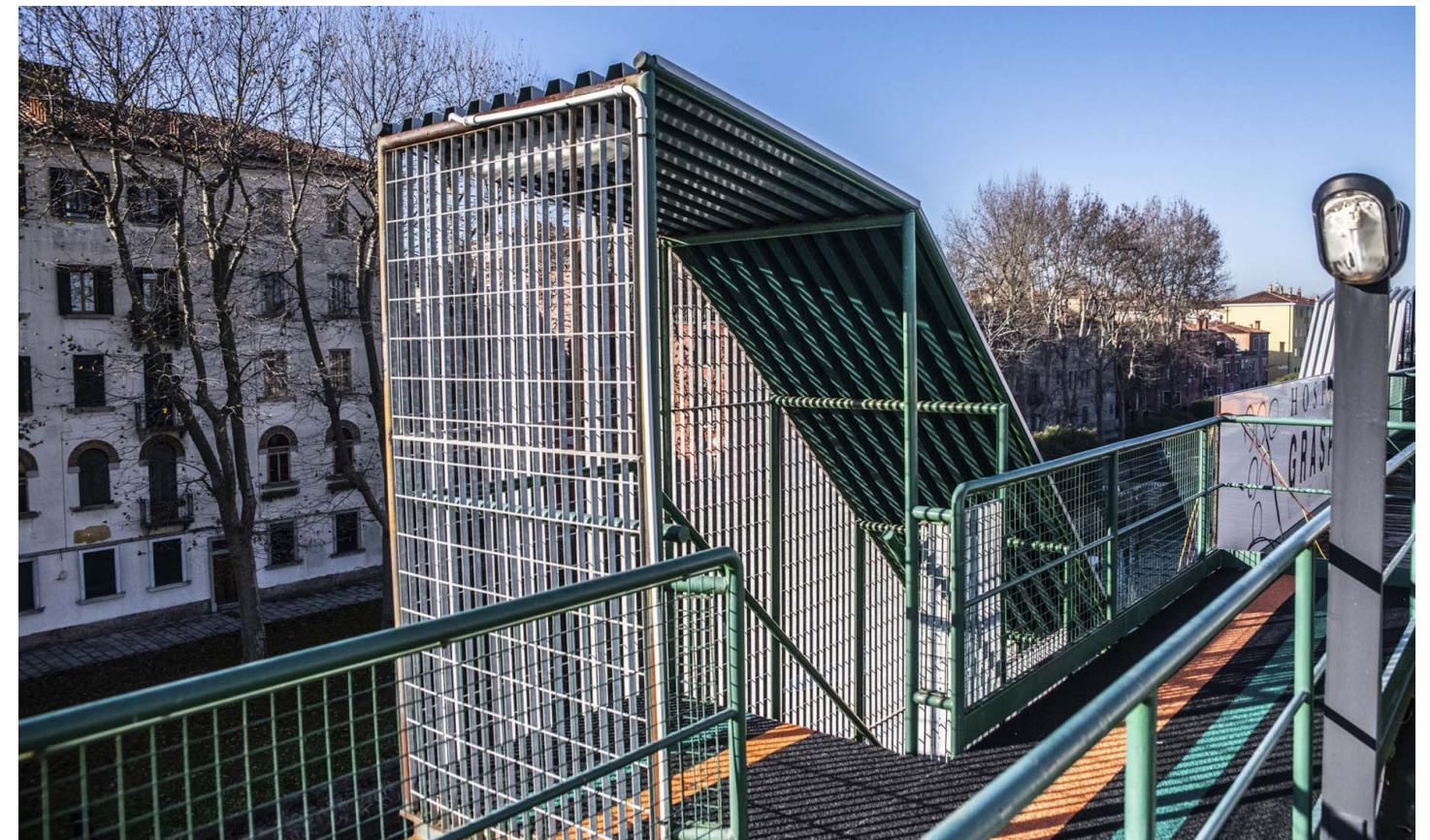


Fig. 78 Hospitality | VIP Entrance

LOCATION IN THE REGION

Venice is located in the Veneto region of Italy which is the northwest portion of the country. The city is situated on the northernmost point of the Adriatic Sea. Uniquely, the city is comprised of 120 islands that sit in the Venetian Lagoon. The city is protected from the harsh Adriatic Sea by the Lido di Venezia.

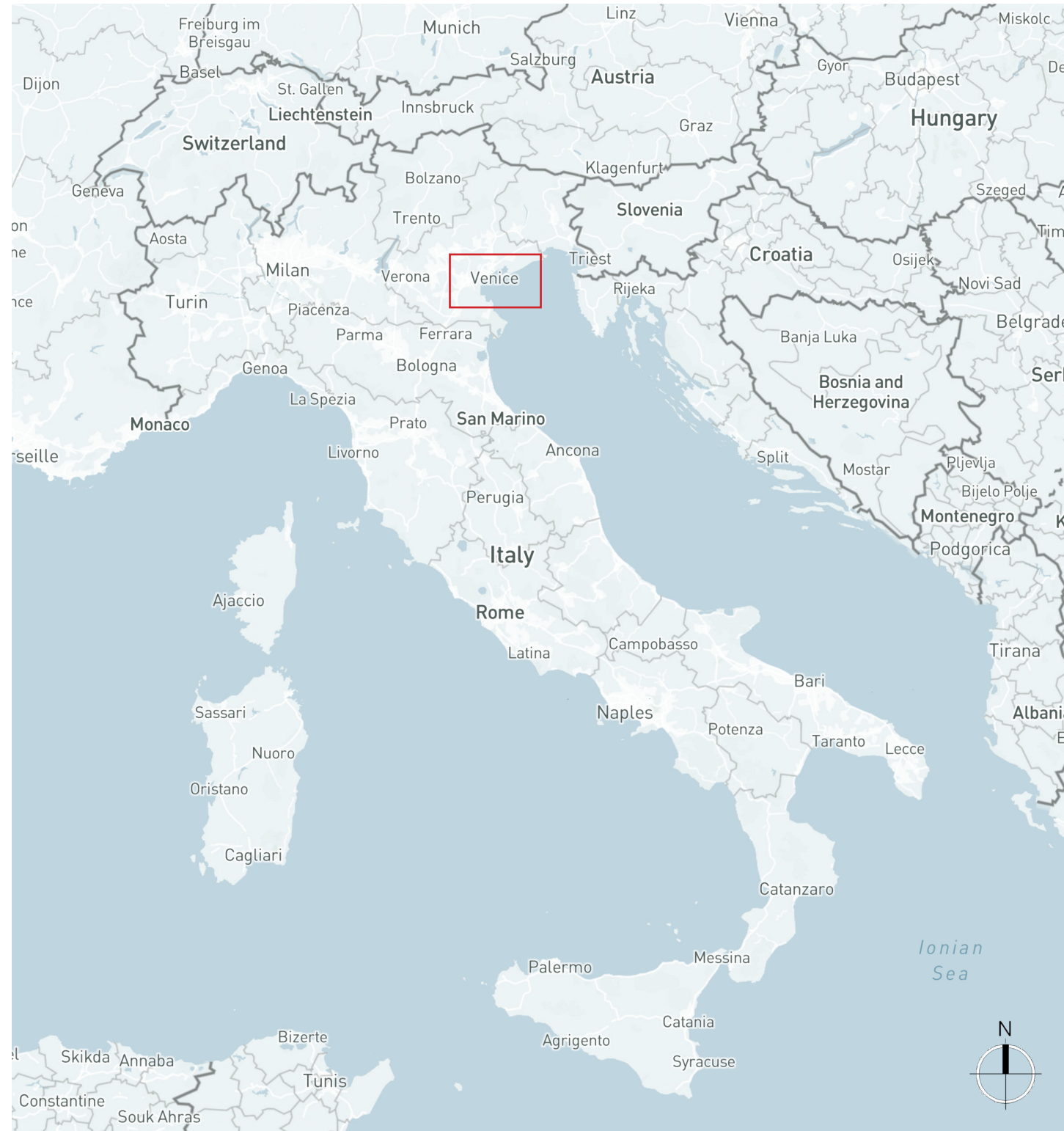


Fig. 79 Map of Italy

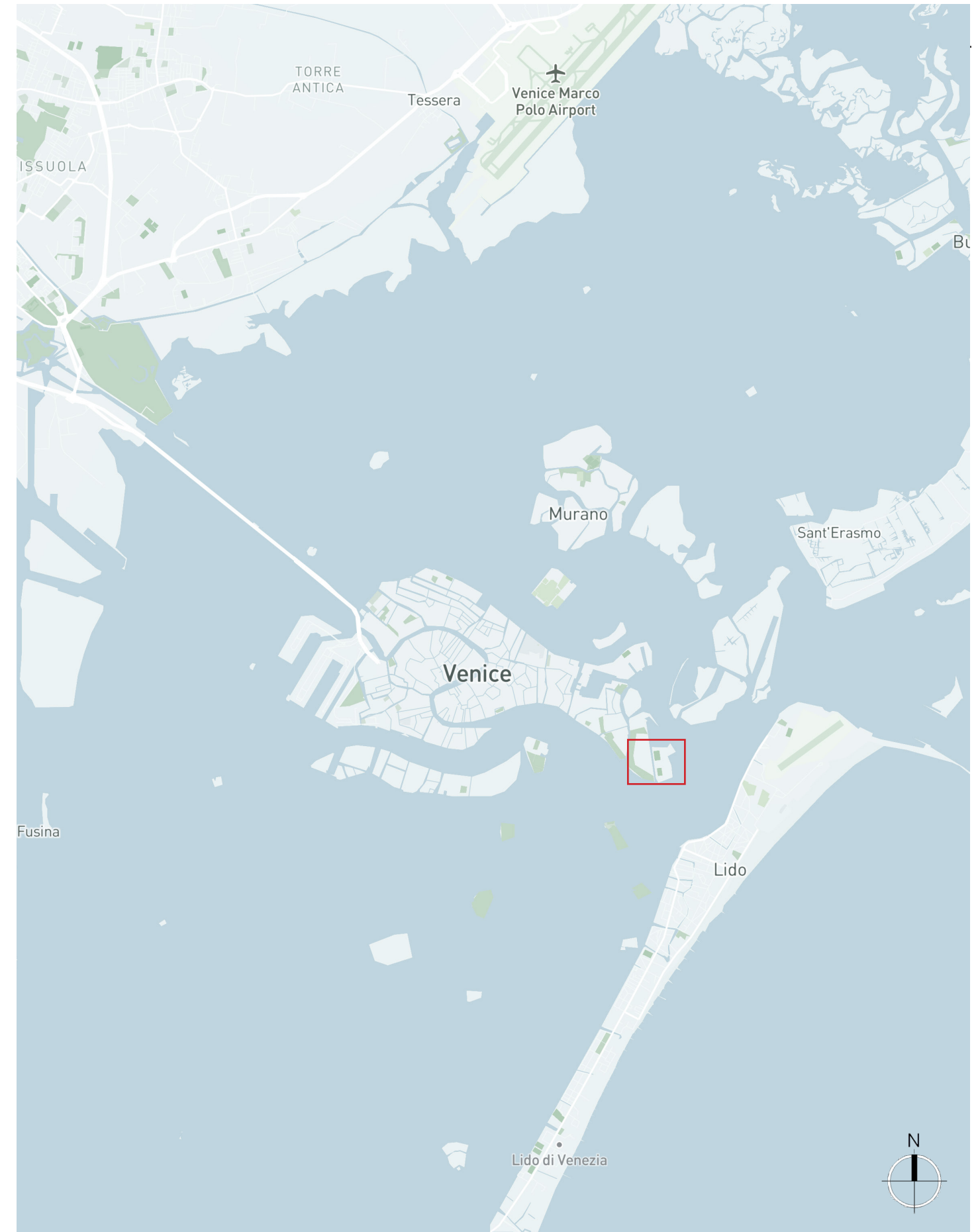


Fig. 80 Map of Venice

LOCATION IN THE CITY

The stadium sits directly east of the Sant'Elena neighborhood. The north access to the site is through an existing marina. Most spectators reach the stadium through pedestrian bridges connecting Sant'Elena or by water taxi. The Yacht Club Venice occupies the docks to the southeast.

The land on the eastern side of the site is not connected to the stadium but will be annexed for this development. This area is currently undeveloped and is used sparingly for boat storage.

The Sant'Elena Imperatrice Catholic Church and Francesco Morosini Naval Academy occupy the south of the island. The entire region is connected by water canals and walking paths.

The red outline signifies the area available for development in this design. The outlined area has a perimeter of 3,500 feet and an approximate area of 500,000 square feet.



Fig. 81 Site Boundary

CIRCULATION

The existing circulation paths are critical on Venezia FC match-days. With the increased attendance at matches, these paths are being stressed. The vast majority of pedestrian traffic arrives from the four pedestrian bridges to the west. The main ticketing area is on the northwest corner of the site.

Boating traffic also sees a sharp increase on match-days highlighted by the main docks in blue. All match-day personnel and teams arrive by water taxi on match day. Match-day boating mixes with the permanently docked ships in the marina.

Since the West stand is primarily locker rooms and private seating, the majority of spectators will travel around the stadium to the east or south stands. Visiting fans have historically been placed in the eastern quarter of the north stand.

Fans currently do not have pedestrian access to the grey area. Development in this area can expand the docking capacity on match-day and lessen the burden on paths in the area.

Minor traffic on the south side of the site occurs with the church members and the naval academy.

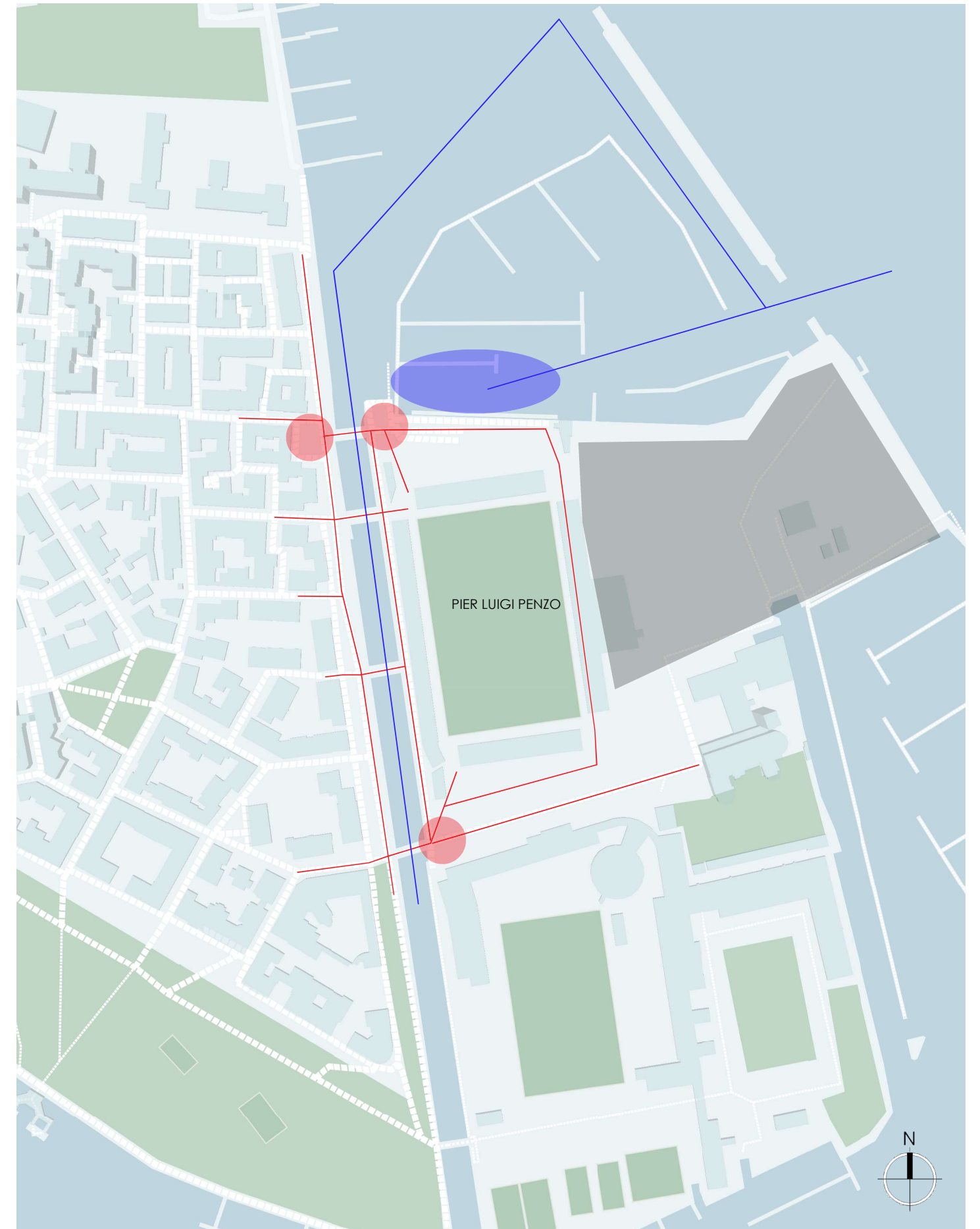


Fig. 82 Site Circulation

WIND, SOLAR & VEGETATION

Venice is a very dense city which has led to a limited amount of vegetated spaces. The majority of these green spaces exist in the residential districts like Sant'Elena. The park to the southwest of the stadium is one of the largest in the city. This park is a continuation of the famous Giardini della Biennale which is a part of the Venice Biennale site. This park is the most dense green space in the entire city.

The naval academy has a sporting field and various basketball and tennis courts. The canal that borders the stadium is lined with English oaks and various elm trees.

The prevailing wind in Venice comes from the south and the east. These winds are called 'sirocco' and originate in North Africa. The winds travel across the Mediterranean Sea and up the Adriatic Sea. These winds can be quite strong and a contributing factor to flooding in the region.



Fig. 83 Sant' Elena Greenery



Fig. 84 Site Vegetation

NOISE & VIEWS

Due to the lack of motor vehicles in the city, the site is quiet most days. There is minor boating noise on the north side of the site. The overwhelming majority of noise occurs on match-days due to the increase in pedestrian traffic.

Pedestrian noise on match-day is mostly along the north and west sides. The site has many notable views that are visible in the existing stadium. The views of the water, church, and Sant'Elena are views that should be maintained in the new stadium design.



Image 1: East Stand & Sant'Elena Church



Image 2: Permanent West Stand & Sant'Elena



Image 3: North side docks



Image 4: Northeast corner & lagoon



Image 5: West side pedestrian path & bridges



Image 6: Canal and Sant'Elena

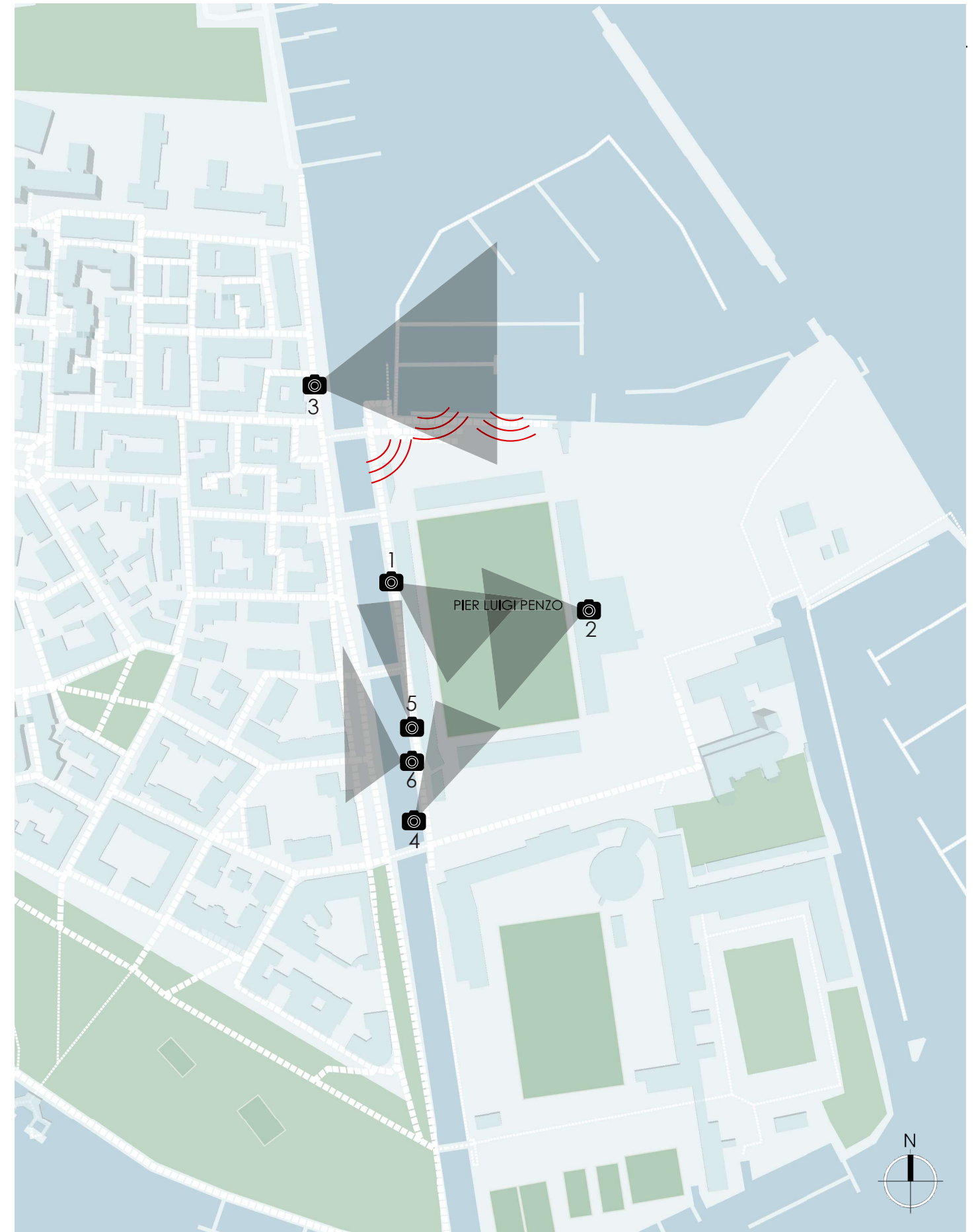


Fig. 85 Site Views and Noise

FLOODING & WEATHER

Weather is a factor in Venice as a strong south-east wind called the "sirocco" pairs with the predictable tide and creates flooding in the city. This flooding typically occurs in the fall months. The combination of the winds and tide is called 'acqua alta' or high waters.

The city has famously battled the flooding and has become the beacon for rising sea level and environmental awareness. The city was originally built over the Venetian Lagoon which has created structural concerns for buildings when the flooding occurs. The buildings are gradually sinking while the waters continue to rise.

Most of the flooding in Venice is minor due to flood protection walls at Lido di Venezia. Plazas are commonly flooded as visitors wade through a few inches of water.

Venetian weather when not impacted by the 'sirocco' is mild. The winter months bring the rain and cold. The summer and spring are the warmest months. Venice does not get the extreme heat that is common on the Italian mainland in the summer months. Tourism is strongest during the summer months.

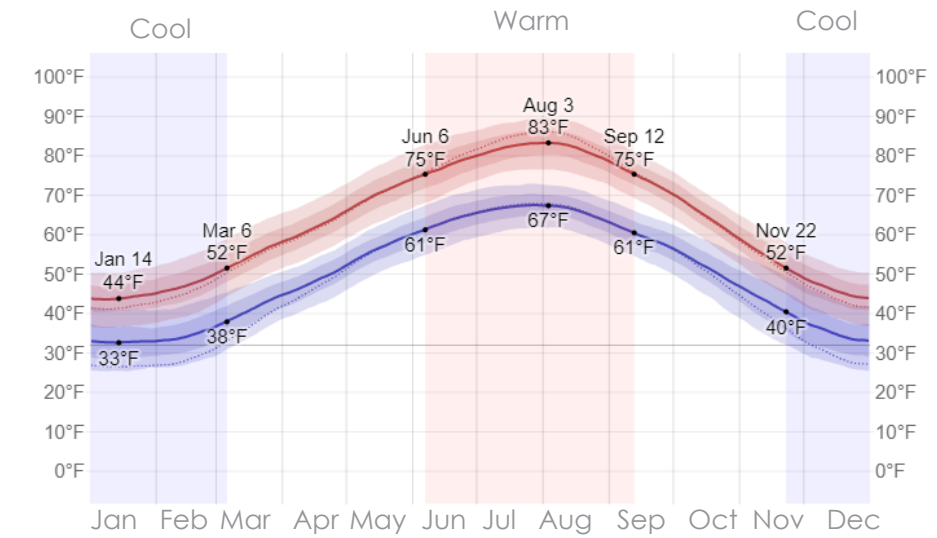


Fig. 87 Venice temperature

Due to the flat topography of the Venetian islands, a slight increase in flooding can lead to widespread flooding.

The site for the Pier Luigi Penzo is no exception to the flooding in the city. A strong draining system should be implemented in the design.

The stadium hasn't experienced the devastating flooding like other parts of the city.

Sea level increase	Area of Venice submerged in %
+90 cm	1.84%
+100 cm	5.17%
+110 cm	14.04%
+120 cm	28.75%
+130 cm	43.15%
+140 cm	54.39%
+150 cm	62.89%
+160 cm	69.43%
+170 cm	74.20%
+180 cm	78.11%
+190 cm	82.39%
+190 cm	86.4%

Fig. 86 Venice Flood Area



Fig. 88 Venice Flooding

CONTEXT & CULTURE

Venice's history as a trading center has created a unique architectural style for the city. Italian Gothic and Renaissance architecture is most prevalent in Venice with influences of Byzantine and Islamic architecture. These styles are almost perfectly uniform through the city due to the limited material selections during construction. Istrian stone and similar limestones were found on the mainland in Istria, now Croatia. These stones were used as finishes for walls and facades. Builders opted for timber beams which matched the timber piles below the structure. Flat roofs were preferred to arches because of the potential for the building to settle on the pile foundations.

The density of the city is a result of the limited land. The crowded city centers encouraged taller building heights in comparison to building standards of that time. The closely spaced columns and heavily decorated roof-line became a defining feature of the palaces and residences in the city. The largely uniform design is important to respect in a stadium design.

While it is impractical to replicate the Venetian Gothic style in a modern stadium, there are examples of contemporary interpretations that have been well received by locals and tourists. This influx of modern design and construction serve as encouragement that a new construction can be welcomed.



Fig. 90 Venetian Style



Fig. 89 Venetian columns



Fig. 91 Modern in Venice

Stadium design has an extensive list of programmatic requirements. These requirements pertain to stadium capacity, safety, amenities, and operations. The essential components of a stadium include the playing field dimensions and logistical spaces to conform with UEFA, FIFA, and Serie A regulations. Secondary programming requirements deal with the unique site and client goals. These spaces include circulation and amenities. The combination of the essential components, features that cater to the site and Venezia FC, and innovative design strategies derived from the research and case studies will result in a comprehensive solution.

ESSENTIAL COMPONENTS

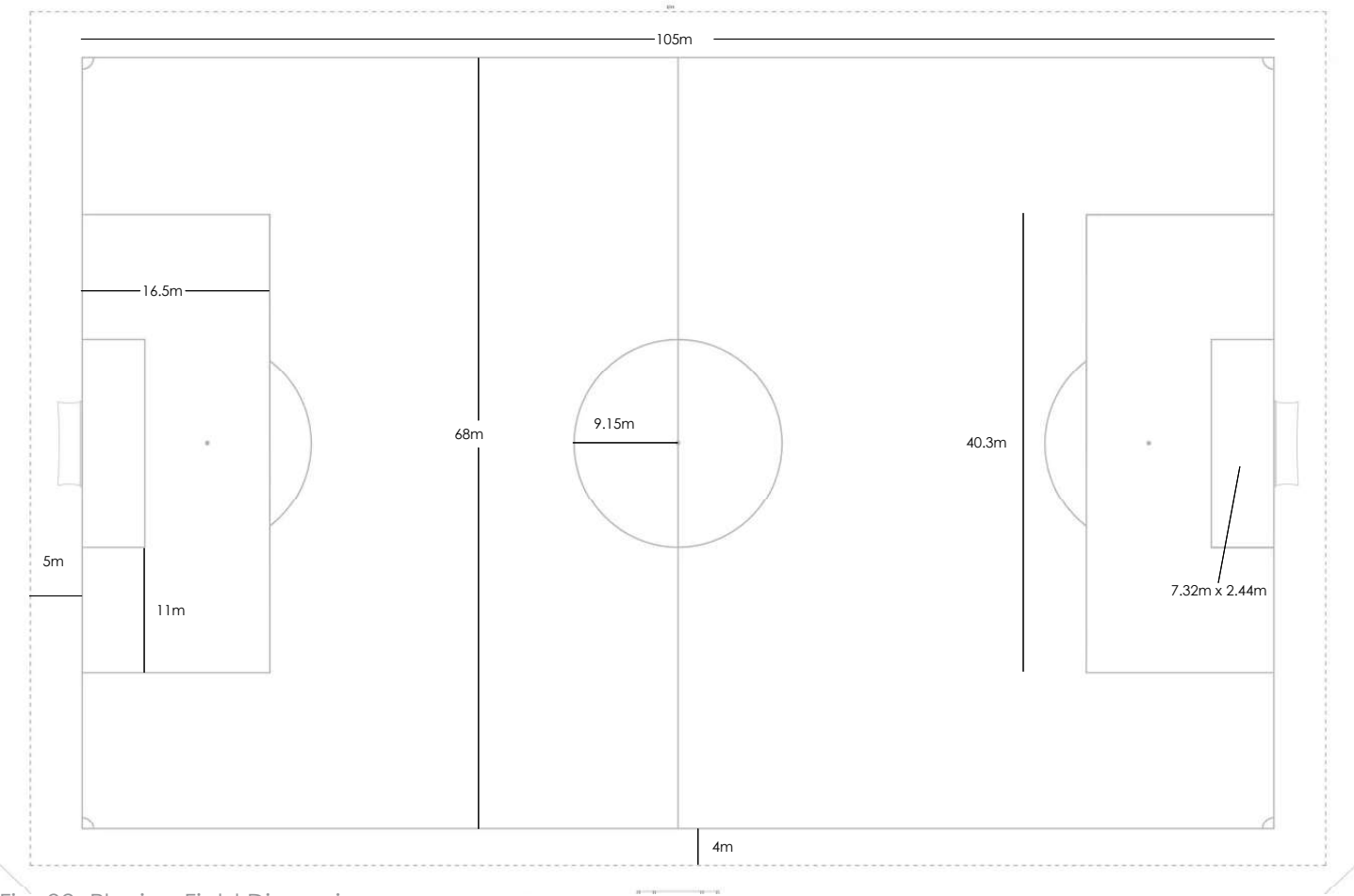


Fig. 92 Playing Field Dimensions

Playing surface dimensions are the foundation for the stadium design. There is a 4m boundary along the touchlines and a 5m boundary along the goal lines to allow for player runoff. The natural turf shall extend 3m along the field perimeter. The playing surface should be slightly elevated to allow for drainage and to improve sight lines for fans.

Other field requirements according to the UEFA Stadium Infrastructure Regulations include:

- 5.06 No object may be located less than 21m above the field of play
- 5.07 The area adjacent to the field of play must be safe for players and referees
- 6.01 Warm-up Area
- 8.01 Stadiums must be equipped with two covered benches at field level
- 8.02 Covered Area for the fourth official

The UEFA Stadium Infrastructure Regulations outlines other critical components to a Category 4 Stadium.

- 10.01 All rooms for players and officials must be well lit, ventilated, heated
- 11.01 One dressing room for each team with a minimum of five showers, two separate seated toilets, seating for 25 people, medical area
- 12.01 Delegate's room
- 13.01 Emergency Medical room
- 14.01 Doping Control Station
- 26.01 Parking for VIP, staff, guests
- 16.01 Floodlighting
- 17.01 Capacity minimum of 8,000 for Category 4 Stadiums (5% for visiting fans)
- 18.01 Seats must be individual, numbered, firmly fixed
- 18.04 Stadium Catering
- 19 Public Access
- 20 Emergency Lighting
- 21 Public Address System
- 22 Sanitary Facilities
- 23 First-aid facilities
- 24 Facilities for spectators with disabilities
- 25 VIP seats and hospitality area
- 27 Control Room
- 28 CCTV System
- 29 Media Areas
- 30 Photographer area
- 32 Camera Platforms
- 33 Commentary positions
- 34 TV Studios
- 37 Press Conference Room

The spaces listed above do not have required square footages. The operational spaces will tend to naturally form in the lower levels of the stadium. Amenity spaces such as the VIP spaces, studios, catering areas, and conference rooms will have more flexibility in terms of design and square footage. Those amenity spaces will be further described in the future sections.

CIRCULATION & CONCOURSE

The concourse of a stadium is a key part to a successful stadium experience. The concourse must be easy to access from anywhere in the stadium. It should be a short travel from entrance to seat. Stair locations should be in accordance with the ticketing area and major entries.

DOCKS & TRANSPORTATION

As a replacement for automobile parking and roads, the Pier Luigi Penzo will need a boating dock revitalization. These docks are the primary access for players, officials, and match-day personnel. There isn't a required number of boat slips, but the main landing should be able to dock a ferry-sized vessel.

CLUB STORE

Venezia FC's media and merchandise presence is well established online, but the club needs an on-site store. The store will need access to the main stadium entry. This space will also need an employee space and storage.

CATERING

The stadium will need a collection of vending areas along the concourse. These stores will primarily sell smaller food options and beverages. The VIP suites will require larger dining options.

LODGING

Venice has relatively few lodging options because the majority of tourists don't spend the night. With the increasing visiting spectators, a lodging option would improve the area and the experience. The empty land east of the stadium is the best location for lodging. The addition of lodging is key to the master planning portion of this design.

VIP SUITES

VIP suites are required for Category 4 stadiums. These spaces will need a lounge space and private seating as well as dining spaces. These suites will likely be in the same location as in the existing Pier Luigi Penzo.

BATHROOMS

The UK Football Stadia Design Advisory Council recommends 1 urinal for every 70 males, 1 Water Closet for every 600 males, and 1 Water closet for every 35 females.

LOCKER ROOMS

The locker rooms at the stadium will be a key location for match-day operations and will be connected to a variety of other spaces. A locker room must be provided for the home and away teams. Each room must have a minimum of 25 seats, 5 urinals, and 2 water closets. It is recommended that each locker room have an office space and a separate dressing area for coaching staff. It is not required for the two locker rooms to be of the same quality. The locker rooms should have direct access to the player entrance, medical services, and the playing surface.

MEDIA ROOM

In connection to the locker rooms, the media room serves as a base for match-day officials and game coverage. The main media room should hold a large capacity for conferences and interviews. There is also a need for small offices for reporters. These spaces should be connected to the locker rooms but also have a separate entrance for media.

MEDICAL SPACE

A neutral space for medical personnel is required. This space must be connected to the locker rooms and have direct access to the playing field. Various medical equipment will be located here and ample storage will be needed.

LOGISTICAL & SECURITY

As a result of the Taylor Report and fan tendencies of the 1970s, security measures have been increased as checkpoints, offices, and camera rooms are now required.

SEATING

The seating in the stadium will be a result of the circulation plan. The seating should have unobstructed views of the playing surface. Each seat must be firmly fixed and numbered.

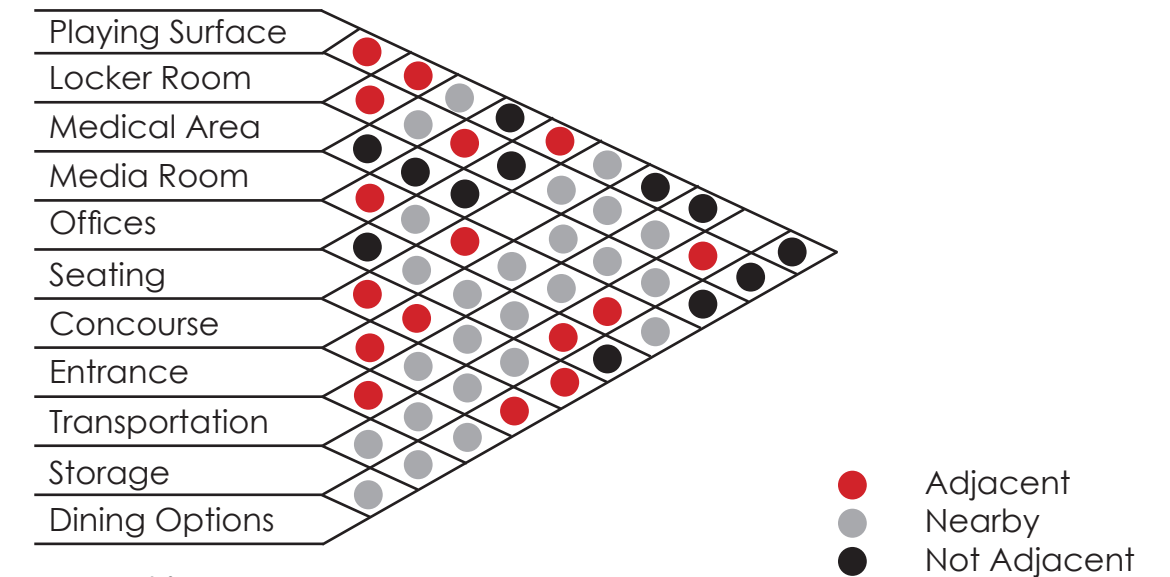


Fig. 93 Adjacency Matrix

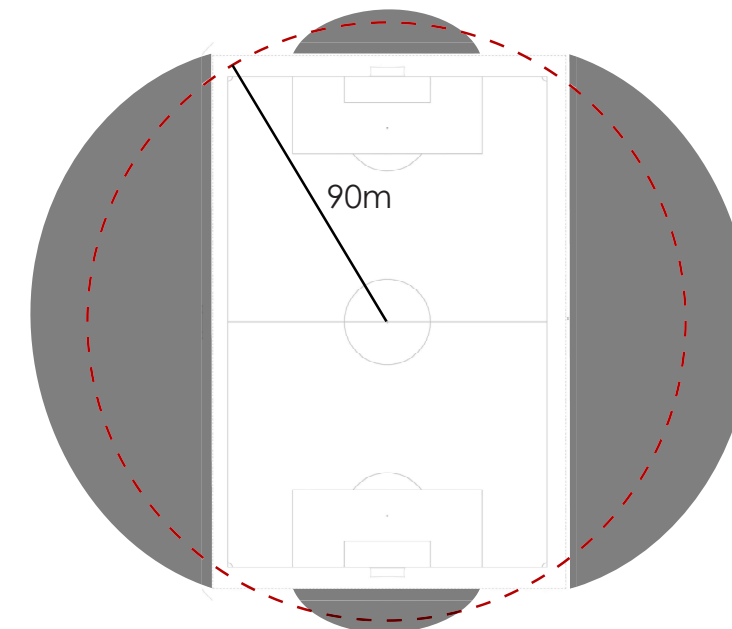


Fig. 94 Preferred viewing positions for European football. Optimum viewing distance of 90m radius (John et al., 1994/2007 p.129-130)

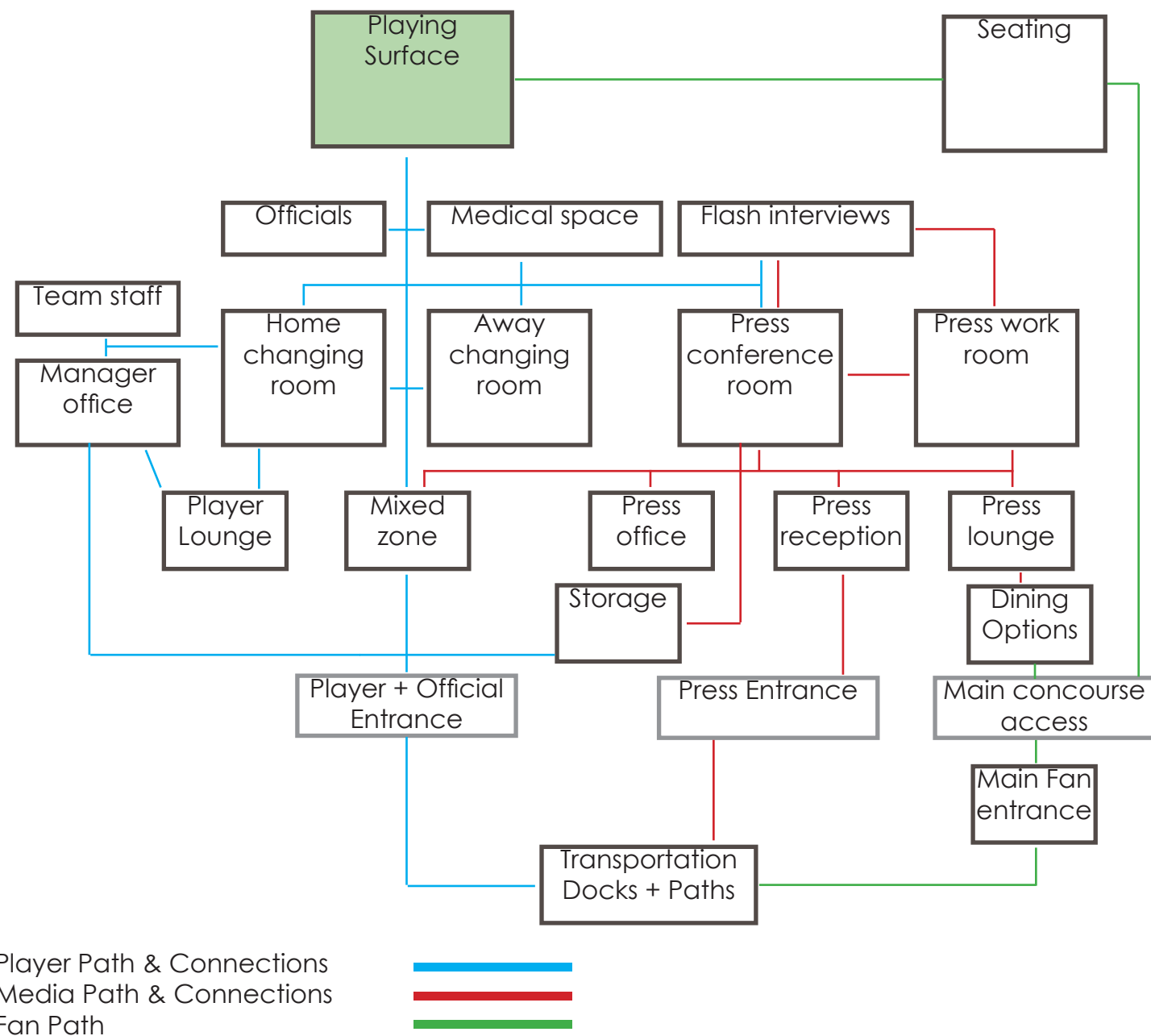


Fig. 95 Sample spatial relationship between stadium facilities (John et al., 1994/2007 p.207)

USAGE

The stadium will see heavy usage on match-days and in the hours leading up to the game. The vast majority of Italian Serie A and Serie B games occur on Saturdays and Sundays. There may be an occasional Coppa Italia match on a weekday. The Italian League runs from August to May. The stadium may be used for non-soccer events on weekdays and during the off-season.

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Use	Clean	None	None	None	None	Match Day	Match Day
Capacity	Minimal	None	None	None	Minimal	Maximum	Maximum
Requirements	None	None	None	None	Stadium Prep	Full Staff	Full Staff

Fig. 96 Stadium Usage

SPACE ALLOCATION

This table spells out the typical square footage and count for some of the defined spaces in a stadium.

SPACE	SQUARE FOOTAGE		COUNT
Playing Surface	76,712	SF	1
Medical	200	SF	1
Changing Room	500	SF	2
Official's Room	150	SF	1
Offices	80	SF	3-4
Lounge	200	SF	1
Press Conference	800	SF	1
Dining	2000	SF	2
Storage	400	SF	Multiple
Flash Interview	50	SF	1
Security	100	SF	1
VIP Suites	500	SF	8-10
Concourse	Flexible		Flexible
Club Store	2000	SF	1
Hospitality	Varies		Multiple
Dock	Varies		Varies
Seating	N/A		16,000
Restaurant	1500-2000	SF	1-3

PERFORMANCE MEASURE

The development's performance will be assessed holistically. The stadium should primarily meet the stadium capacity requirements. The stadium should compliment the site, city, client, environment, and fan base.

Space Allocation

A stadium has a wide variety of needed spaces. The required spaces deal with the match-day logistics. Two locker rooms with a minimum of 25 seats each are required as well as washrooms for these locker rooms. A medical room, offices, media room, safe entry, benches and security rooms all occupy the match day requirements. For the general stadium requirements, the stadium seating capacity minimum for the Italian Serie A is 16,000. Each seat must be fixed and numbered. Five percent of the seating must be reserved for visiting fans. Under UEFA regulations, the stadium must have catering areas, VIP suites which are typically around 500SF. For bathrooms, The UK Football Stadia Design Advisory Council recommends 1 urinal for every 70 males, 1 Water Closet for every 600 males, and 1 Water closet for every 35 females. Any other stadium spaces have a wide variety of square footages.

Environmental Performance & Impact

Stadiums are notorious for being environmentally detrimental. By following the LEED Certification Guidelines, the stadium will be environmentally friendly. The LEED Certification process also complies with the Italian version of LEED called Protocollo ITACA

Behavioral Performance

Behavioral performance is measured by the fan engagement and fan proximity to the playing surface. This category will also deal with fan safety as regards to behavioral tendencies of fans.

Code Compliance

Due to the large occupancies of stadiums, fire, structural, and accessibility requirements must be met. Modern stadiums also require an allocation of accessible seats. For project simplicity this project will follow IBC 2021.

Cost

The project does not have a strict cost guideline but an approximate cost range can be created by comparing the size and complexity of the stadium to similar designs that have been recently constructed.

PERFORMANCE MEASURE SOURCE

Space Allocation

Space allocation requirements will be found in the UEFA and FIFA Stadium Guideline book as well as from the IBC.

Environmental Performance & Impact

LEED will serve as the guideline for the Environmental Measurements.

Behavioral Performance

Behavioral Performance will be measured by finding the sight lines from each seating area as well as finding if the visiting fan section is properly separated from the home supporting section.

Code Compliance

IBC will be the book to measure code compliance.

Cost

Comparisons made from the case study portion of the research will serve as the measurement to create a cost range for the project.

PERFORMANCE ANALYSIS

Space Allocation

Square footages can be taken from the digital (Revit) model

Environmental Analysis

A rough estimation from the Revit model can be analyzed with the LEED BD+C checklist to determine the environmental performance of the stadium.

Behavioral

Measurements taken from the Revit model can determine sight lines for the fans. A circulation map can be created from the model's floor plans to determine the safety of visiting fans and predict overall fan tendencies.

Code Compliance

Using the International Building Code, the floor plans in the model can be analyzed and altered to fit compliance. There are also structural analysis tools inside of Revit to determine the structural abilities of the design.

Cost

Due to most stadiums being publicly funded, the total construction cost can be found from the architects website for the case studies analyzed. The RSMeans book can also be used to approximate a cost based on total square footage.

PERFORMANCE JUDGMENT

Space Allocation

Many of the required spaces will be a yes/no whether they are properly designed. Some of the non-required spaces will be judged based on their connectivity to the project, parti, and enhancement of the site

Environmental

Without submitting a real request for LEED Certification, the project will be judged based on the preliminary design meeting at least LEED Silver Certification.

Behavioral

The project will be deemed successful if each seat has a direct sight line to the playing surface, is no farther than 100m from the center of the playing surface, and the design promotes a safe experience for all.

Code Compliance

The project will be judged on if the major project elements meet IBC requirements.

Cost

The project will be financially successful if it is projected to not exceed 20% of the maximum for the project cost range. An estimation can be made based on projects of a similar size and complexity. The Stade de la Tuileries cost \$166M USD. The smaller Eco Park Stadium cost \$118.1M USD to construct. The Pier Luigi Penzo Stadium can be expected to cost between \$150M-\$200M. This cost does not include additional buildings on the site like lodging or external fan zone.

EXECUTIVE SUMMARY

Stadiums are a complex and expensive development that are heavily scrutinized by communities. The Pier Luigi Penzo will be designed to meet a list of performance criteria. If the criteria are met, the stadium will successfully meet the goals of the client and community while also meeting legal and environmental goals.

The design will have an extensive and complex list of spaces that will be critical to the development's function and success. These spaces will be defined by the existing requirements set by FIFA, UEFA, and the Italian Football Federation.

A stadium must be conscious of its environmental impact. By following the LEED Certification Process and subsequently the Protocollo ITACA, the stadium can be a sustainable feature of the community. The overall experience is critical to a stadium's success. Creating a safe and enjoyable experience for all is an important factor for a stadium.

Code Compliance is a requirement for all new construction, especially with the complexity and high occupancies of stadiums. This design will comply with the International Building Code.

Cost is a key consideration for developments. Stadiums are expensive and often publicly funded. Meeting a set cost range for this design will enhance the feasibility of the project and increase the local perception of the project. The cost range will be derived from similar projects of similar sizes and complexities.

If the Pier Luigi Penzo project meets the specified performance criteria and has a contextually appropriate design, the project will be a beneficial component to the community and solve the problems described by the client.

Creating a list of design principles and considerations that can be used for future stadium design is a major deliverable for this thesis project and will serve as guidance for the design of the Pier Luigi Penzo. The list contains five overarching ideas that lead to a successful stadium design and experience. This list was developed from the variety of sources and research done in this thesis project.

INTEGRATION & CONTEXT

A successful stadium is seamlessly integrated in the community of which it is being built. The design accounts for existing site conditions and the characteristics of the community. Like many architectural theories, a building is not designed in a void. Designers of stadiums must understand the goals of the client and community. Any deviation from the vision of the user will dissuade the client and the fans. Fan interaction with the stadium is the main factor in the stadium experience. Fans who haven't accepted the design will hamper the experience of everyone.

SUSTAINABILITY

Many stadiums now require sustainable features and certification in the design. By introducing sustainable features, the development can positively contribute to the local environment. This design principle aims to move stadiums away from their reputation of being carbon-intense and energy consuming masses. The selection of sustainable strategies depends on the context of the site, client, and budget. Exposure of these sustainable design strategies has a profound influence on the stadium experience, whether the spectator realizes it or not.

AUTHENTICITY

Closely tied to integration and context is authenticity. Christopher Lee says it best in that "if it doesn't feel like home, it won't be home" (Lee, 2021). The design team must understand the history and the intricacies of the supporters. Subtle nods to history doesn't fully capture the emotions of generations of experiences. A new stadium means that an old stadium is going away. The old stadium was personalized by the supporters and by creating an authentic design, the supporters are welcomed to claim the stadium as their own. An authentic stadium meshes what the club and fans are with what they want to become. It aligns with the goals of the club.

A non-authentic design destroys the spirit that connected the fans with the old stadium and therefore the club. It appears sterile and begs the question, why was this built here?

ICONIC

Grand gestures in the stadium design give the stadium and club an identity. The scale and emotional magnitude of a stadium already set stadiums apart from the rest of the city. An iconic feature can propel the development further. Many examples exist of public projects with a unique design that have stimulated economic and community growth. The 'it' factor in a design can start to become an identifying feature of not only the club but of the city as a whole. Players and supporters alike can rally behind the feature and take pride in the meaning behind it.

HARMONY

The principles listed above and the other design considerations that may fall under these categories must be implemented together. Each component of the stadium needs to contribute to the overall development.

Harmony also includes the non-stadium features of the development. Master-planning is a key design phase so that the project components can work together in reaching the project goals. Harmony is important in any building design, but is of the highest importance due to the scale and complexity of large public developments.

PIER LUIGI PENZO
DESIGN SOLUTION

PROCESS DOCUMENTATION

PRELIMINARY SKETCHES

The preliminary sketches started to explore the shape and materiality of the design. The sketches also started to define the scale of the stadium which is critical to respect the local context. A low profile matches the building height of the neighborhood. Modern appearing buildings haven't been well received in the city because of the stark contrast.

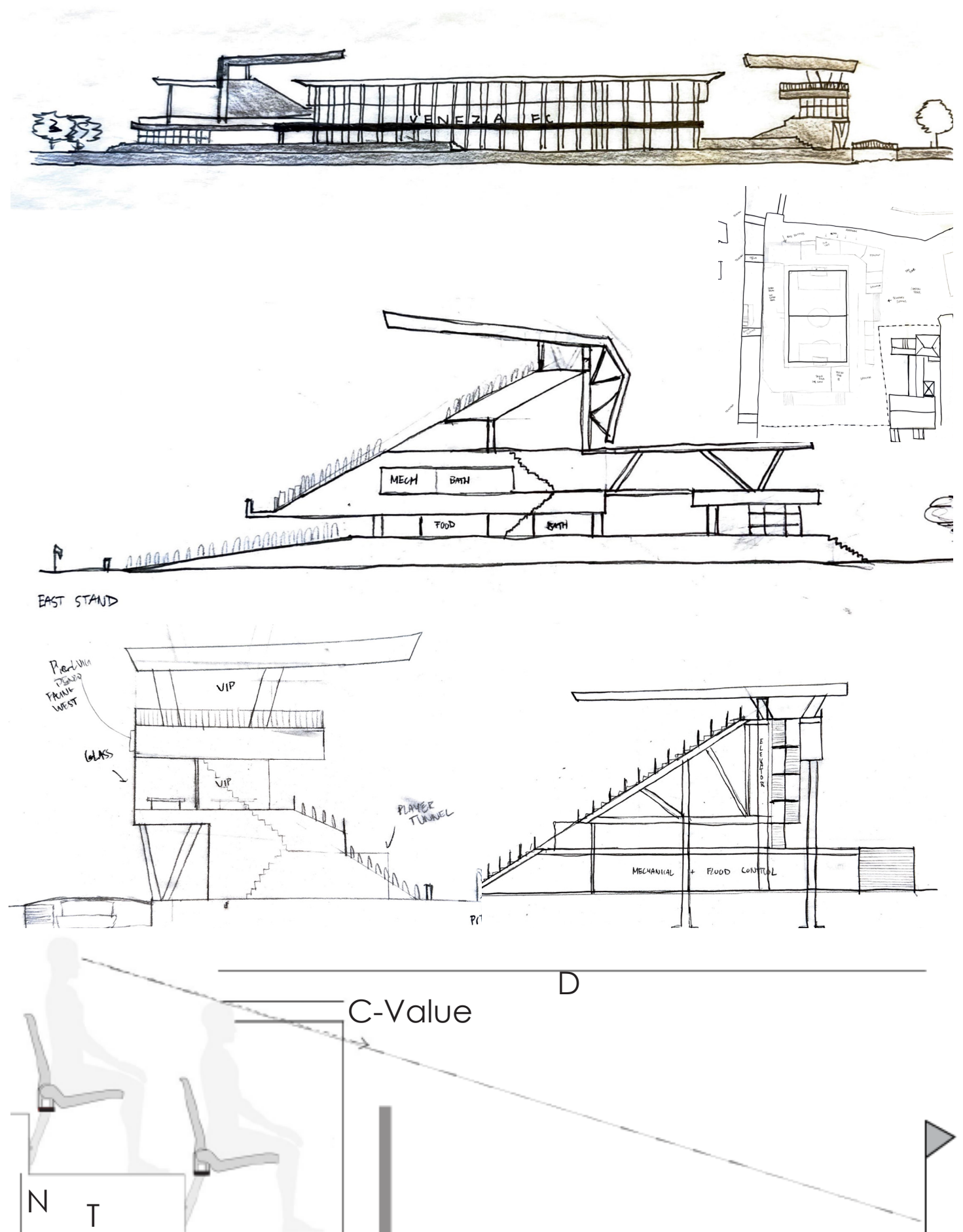
C-VALUE

Section views of the four stands are necessary investigation because of the design focus on spectator sight lines. The C-Value is a term used in stadium design which is the vertical distance from the spectators eye to where it intersects the sight line of the spectator directly behind. The ideal C-Value is between 120mm to 150mm. Using the sight line calculation below, the correct riser height can be determined. Due to the expected capacity of the stadium not exceeding 20,000 seats, there are fewer difficulties with achieving an appropriate C-Value.

$$C = \frac{D(N+R)}{D+T} - R$$

Fig. 97 C-Value Formula

Fig. 98 Process Sketches



RESPONSE TO SITE & CONTEXT

SITE DRIVEN DESIGN

Given the constrained and unique site of the Stadio Pier Luigi Penzo, the design must integrate the existing circulation. Pedestrian traffic is the predominant mode of transportation in Venice which justifies the expansion of the bridges connecting the site to the Sant' Elena neighborhood. The staging area on the north and south ends of the stadium were expanded to accommodate larger crowds and lessen overcrowding. The marina to the north was rebuilt to allow for larger water taxis.

TYPICAL BOWL MASSING

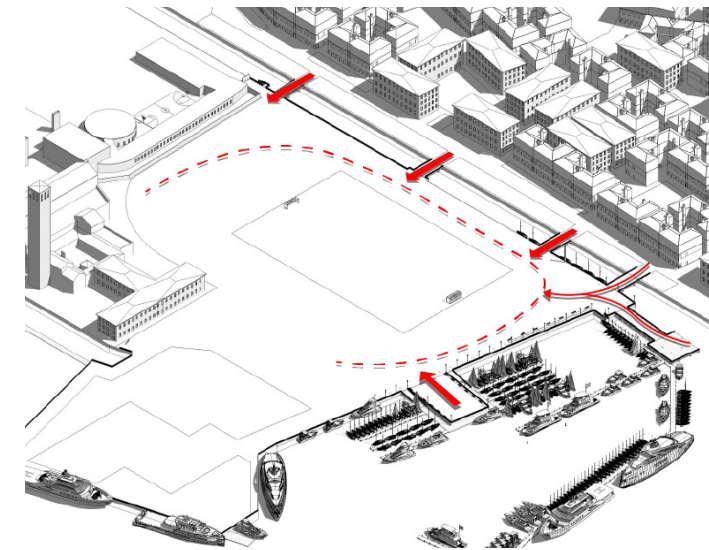
Bowl seating is a common practice in stadium because of its ability to maximize stadium capacity. The lower bowl of seating completely surround the playing surface. The second level of seating features open corners. These open corners retain the unique views that the old stadium featured. Views include the Sant' Elena region, the bell tower of the adjacent church, and the surrounding lagoon. The open corners also allow for natural airflow to move through the stadium. Fully enclosed stadiums struggle to maintain natural grass without the sunlight and natural airflow. A natural grass playing surface the preference for the players.

STADIUM AMENITIES

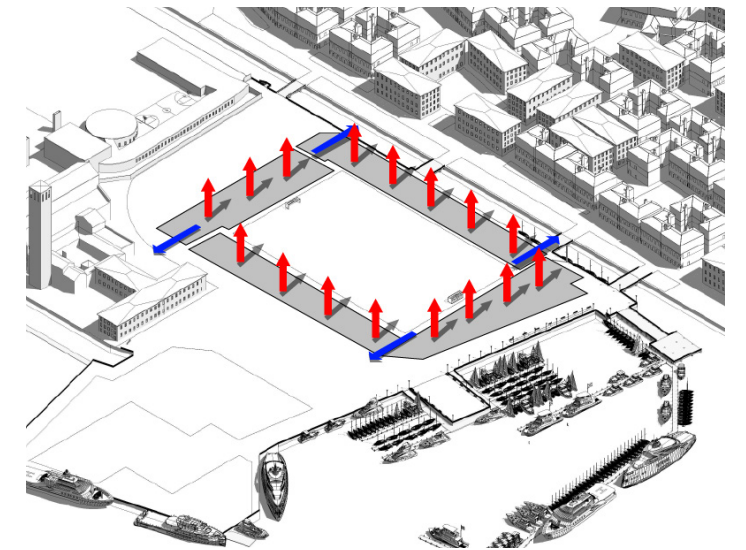
The typical European match-day experience is much different from that of the United States. Fans arrive at the stadium very close to the starting time. These fans would also not linger after the match and preferred to return to amenities closer to their homes. By adding various amenities like a fan zone, retail, and dining options, spectators will be encouraged to use the site for longer periods of time. This will increase the match-day revenue for both the stadium and the local businesses. This feature will also set the Stadio Pier Luigi Penzo apart from the other stadiums in Italy as this design component has only been recently introduced.

INCREASED GREEN SPACE

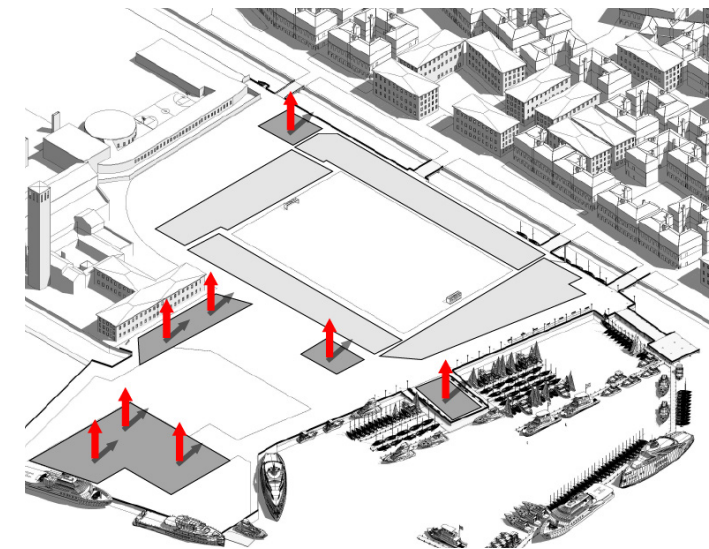
Venice has an extreme urban density and a finite amount of land. There are few designated public green spaces in the city and no new land is being created because of the island nature of the city. The stadium design adds green space in the fan zone, surrounding the canal, and inside of the stadium. This feature will attract both a tourist and resident population on non-match days. One critique of new stadiums is their inability to be used when there is no game. The addition of independent retail and the park space will draw users on all days. The added vegetation also increases the permeable square footage of the area to mitigate flooding which has impacted the city for centuries.



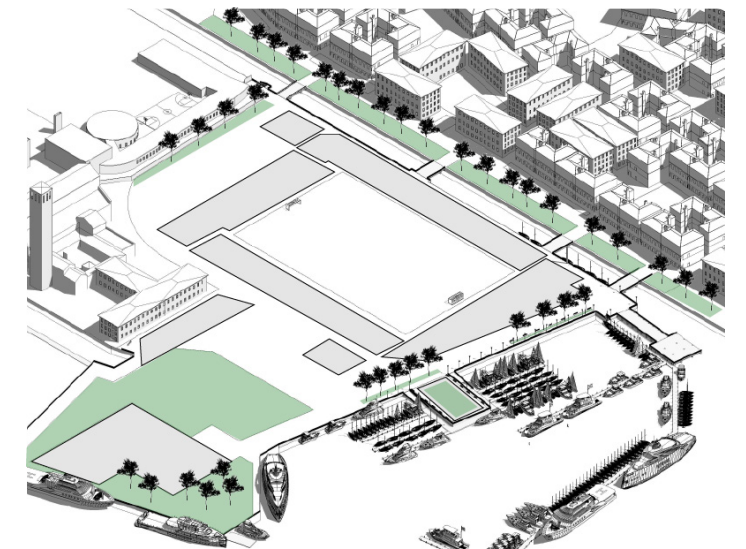
PEDESTRIAN CIRCULATION



TYPICAL BOWL MASSING



SITE AMENITIES



INCREASED GREEN SPACE

Fig. 99 Process Graphics

RESPONSE TO SITE & CONTEXT

PIER LUIGI PENZO SITE

The new design resides in the same position as the old stadium. The marina to the north has expanded its capacity and multiple landing docks have been added for larger taxis. The site now also has access to the Yacht Club to the south. The development to the east of the site has fantastic access to the lagoon and provides lodging for visitors.

Given the existing location of the stadium, the entire site is extremely walkable. The four pedestrian bridges have been rebuilt. The entire stadium can now be walked around. For increased security, visiting fans will now enter from the southwest corner at a controlled dock and entrance.

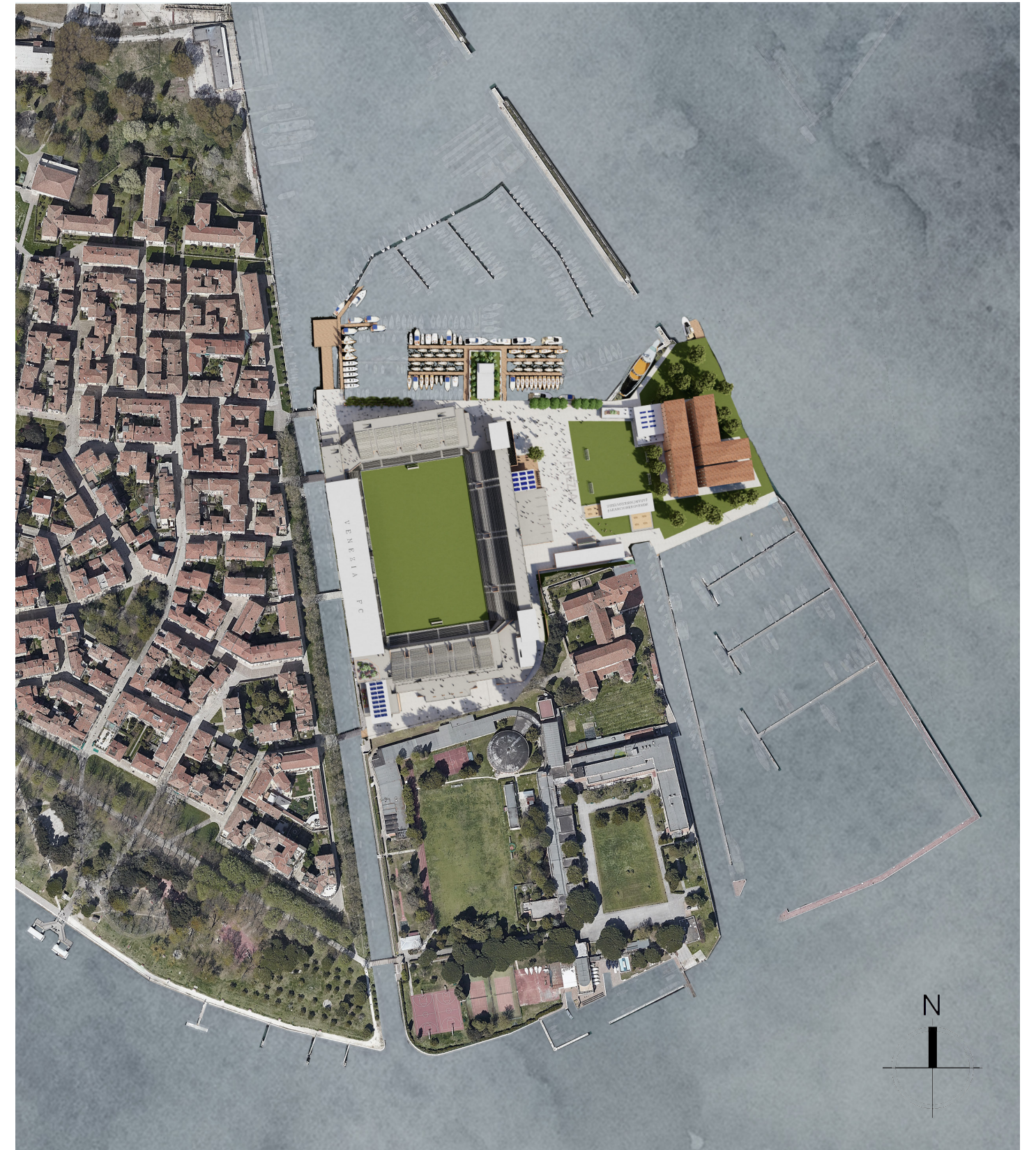


Fig. 100 New Site

RESPONSE TO TYPOLOGICAL RESEARCH

PIER LUIGI PENZO FINAL ITERATION

The final stadium design retains the Venetian scale while increasing the capacity. The stadium introduces modern technologies and creates an encompassing experience that was lacking in the previous stadium.

The West Stand features rooftop green space, a solar array, and the Venezia FC Museum. The annexed land to the east contains the flexible fan zone and lounge, retail, and hotel development space.

Ticketing occurs before the bridge to the site to stimulate local business in the neighborhood and to avoid a bottleneck crowd on the bridge. The northern marina and boardwalk was reconstructed to accommodate larger water taxis and more boating traffic. A transportation hub was implemented to better control the waterway and add security to that portion of the site.

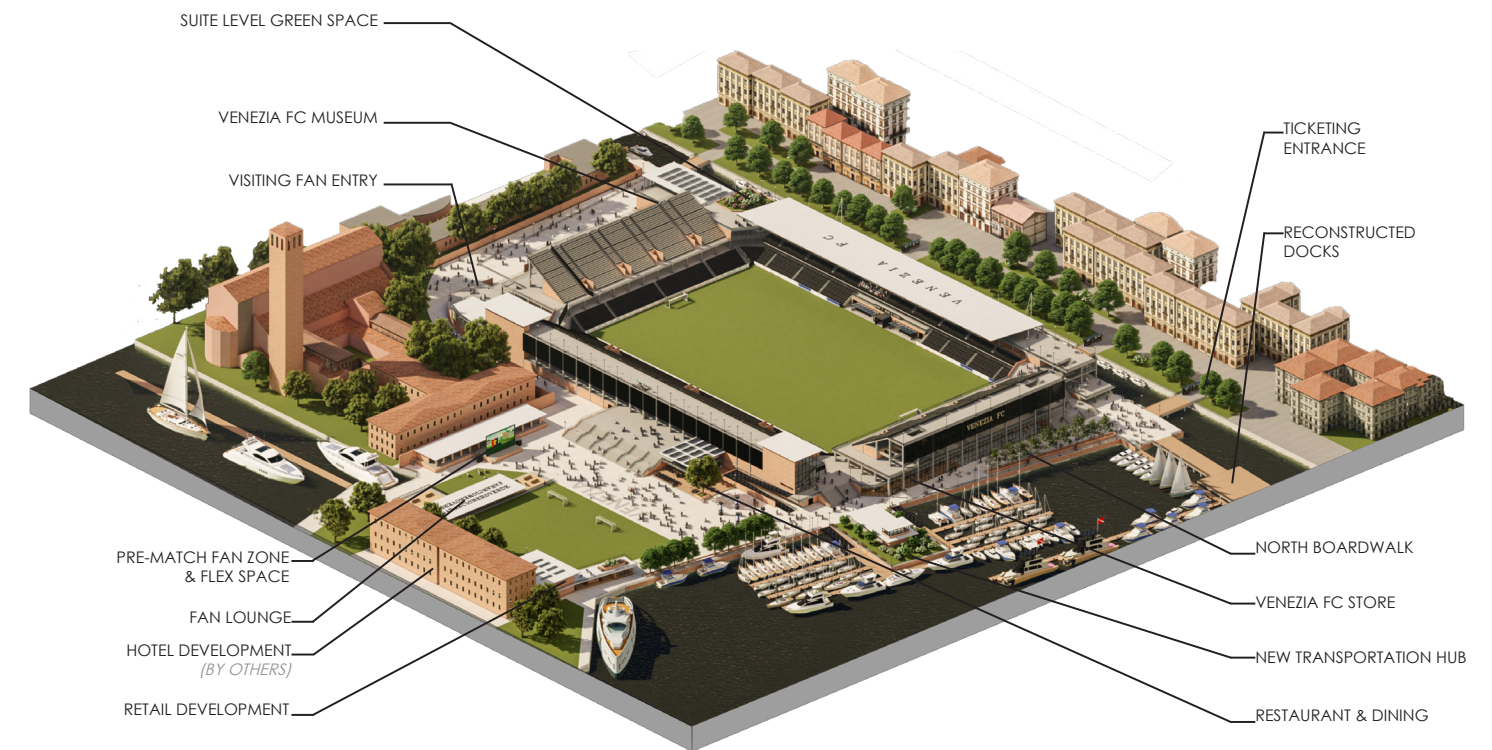


Fig. 101 Design Axon

RESPONSE TO TYPOLOGICAL RESEARCH

WEST STAND

The west stand at the Pier Luigi Penzo is similar to the other seating areas and contains four levels. The ground level is reserved for locker rooms, and the large mechanical spaces required for stadiums. This level also has water retention. The water can be re-purposed or carefully filtered to the canal. The main concourse is where most of the spectator traffic occurs, as well as restrooms and concessions. UEFA guidelines require hospitality seating which occupies the third level. This level also includes various lounges and larger dining options. The press level above includes camera positions, commentary spaces, and expanded exterior spectator spaces for suite level guests.

CONSTRUCTION & TECHNOLOGY

Similar to the other stands, the west stand is supported by 16" precast hollow core concrete slabs and 24" concrete columns. These piers are drilled deep into the ground because of the island nature of Venice. The existing shoreline is reinforced and lifted.

The roof is made up of steel bracing and a polytetrafluoroethylene cover, also known as Teflon. This light-weight material is used in stadium construction due to its flexibility, resistance to weather, and non-toxic properties. The stadium uses low spill LED floodlights to lower light pollution and LED advertising boards. A criticism of newer stadiums is the use of artificial turf because of higher injury risks. The Stadio Pier Luigi Penzo has always used natural grass and will continue to do so. This is made possible by the open roof design and open stadium corners to allow for natural airflow.

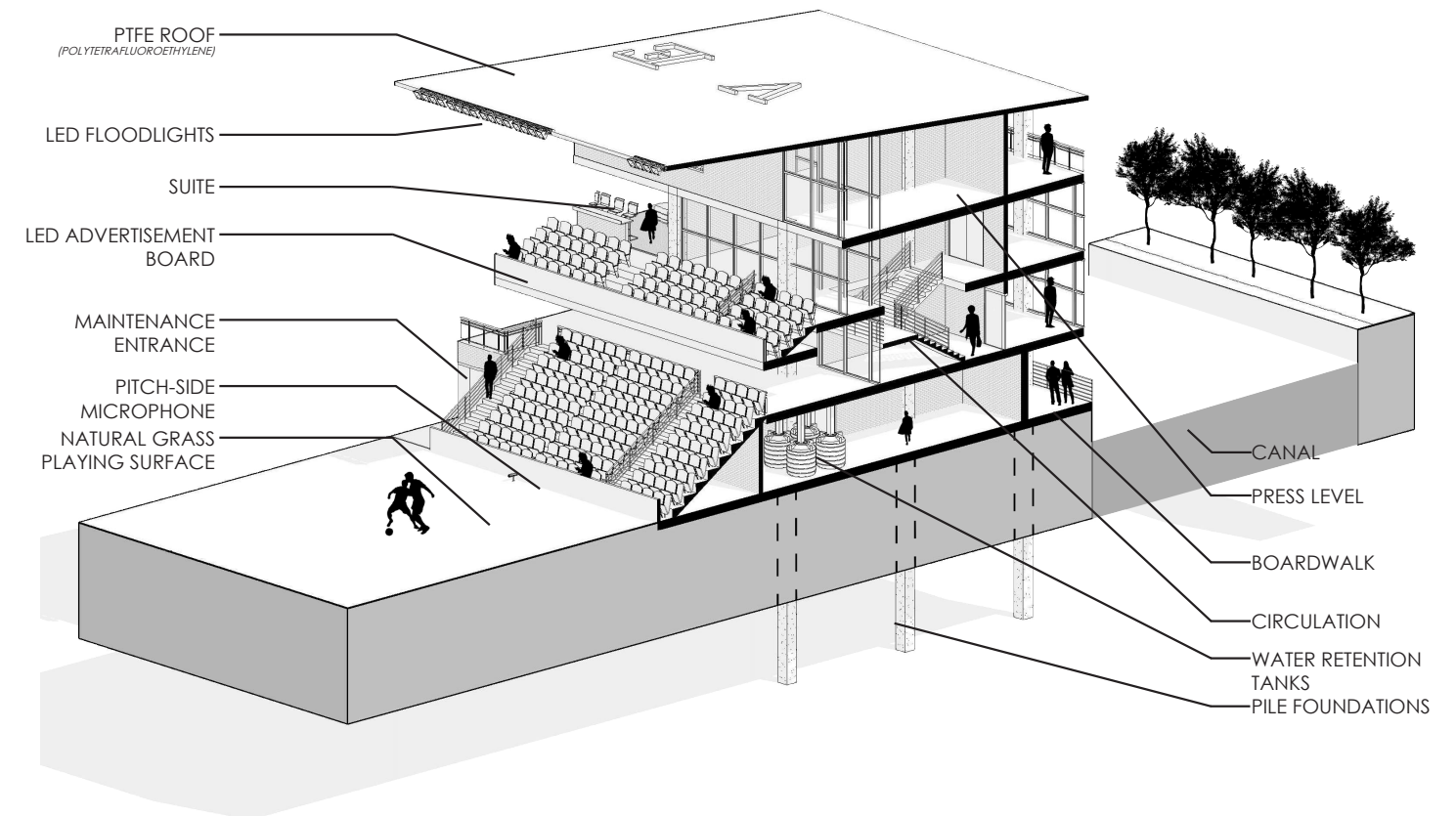


Fig. 102 West Stand Section

RESPONSE TO TYPOLOGICAL RESEARCH

ADJACENCIES

Using the spatial adjacency matrix from the research phase of the project created a strong guideline for the site plan and concourse plan. Fan circulation and the levels of security needed are critical components of stadium design. Sizing and space requirements were overhauled in the 1980s after various collapses and crowd stampedes plagued the sport. The players, press, officials, and fans all have different needs on match day.

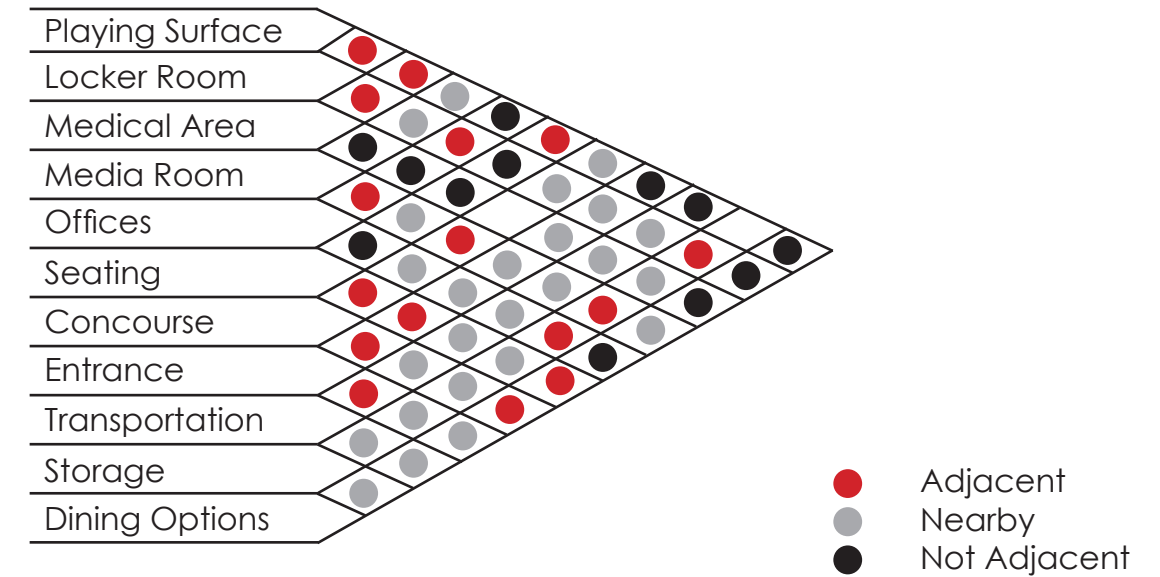


Fig. 93 Adjacency Matrix

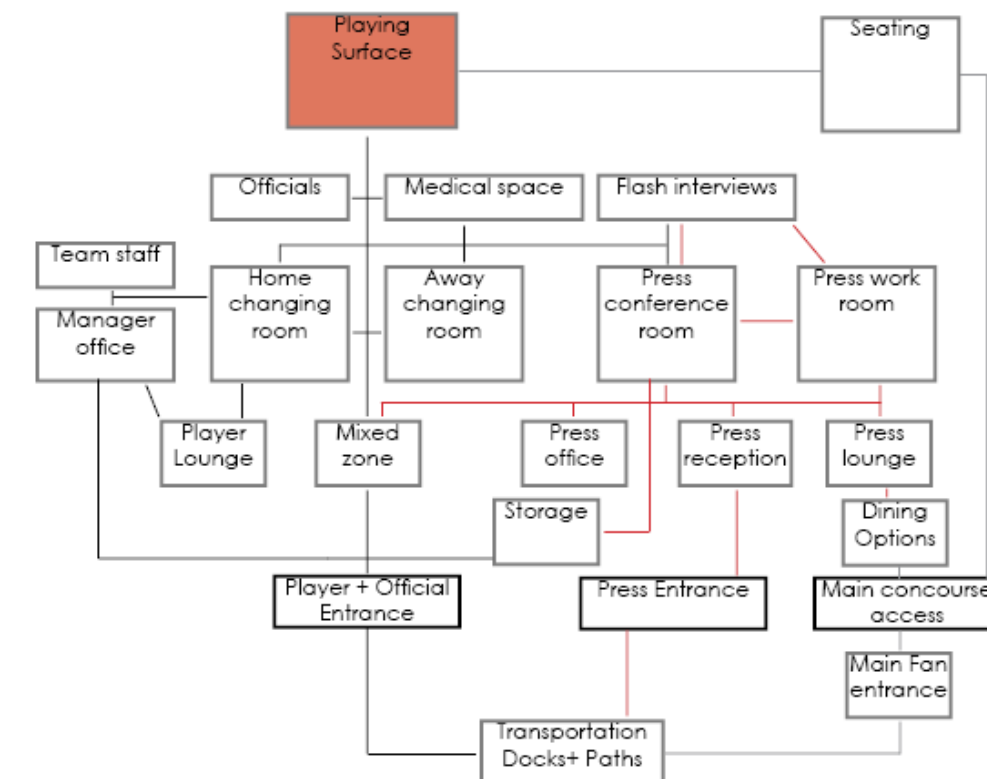


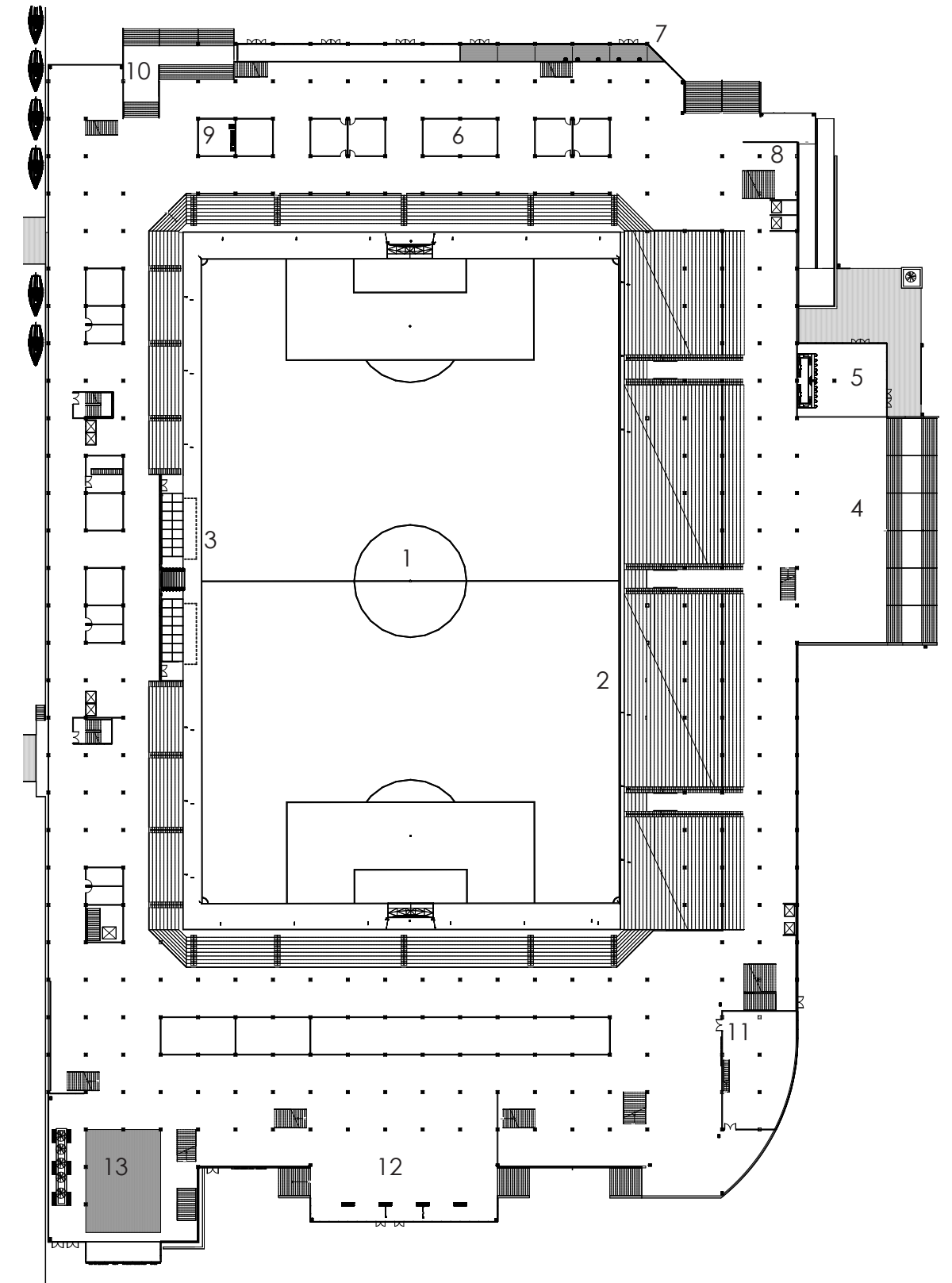
Fig. 95 Sample spatial relationship between stadium facilities (John et al., 1994/2007 p.207)

PROJECT SOLUTION

CONCOURSE PLAN

The main concourse plan fully encloses the playing surface and provides sufficient circulation. The playing surface below the main concourse is a FIFA standard 68 meters by 105 meters with a 4 meter safety boundary. There are numerous elevator banks and stairs to reach the seating areas and ground level amenities. Many of the stairwells are enclosed while some are open air with views of the lagoon and pitch. Dining and concession options are scattered throughout and reside under the main seating stands. Restrooms alternate with the vendors to ensure ease of access for spectators.

- 1 PLAYING SURFACE
- 2 MAIN STAND
- 3 BENCHES &
PLAYER ENTRANCE
- 4 EAST ENTRANCE
- 5 RESTAURANT
- 6 RESTROOMS
- 7 TEAM STORE
- 8 CIRCULATION
- 9 CONCESSIONS
- 10 NORTH ENTRANCE
- 11 SECURITY
- 12 SOUTH ENTRANCE
- 13 CLUB MUSEUM



CONCOURSE PLAN



Fig. 103

Concourse Plan

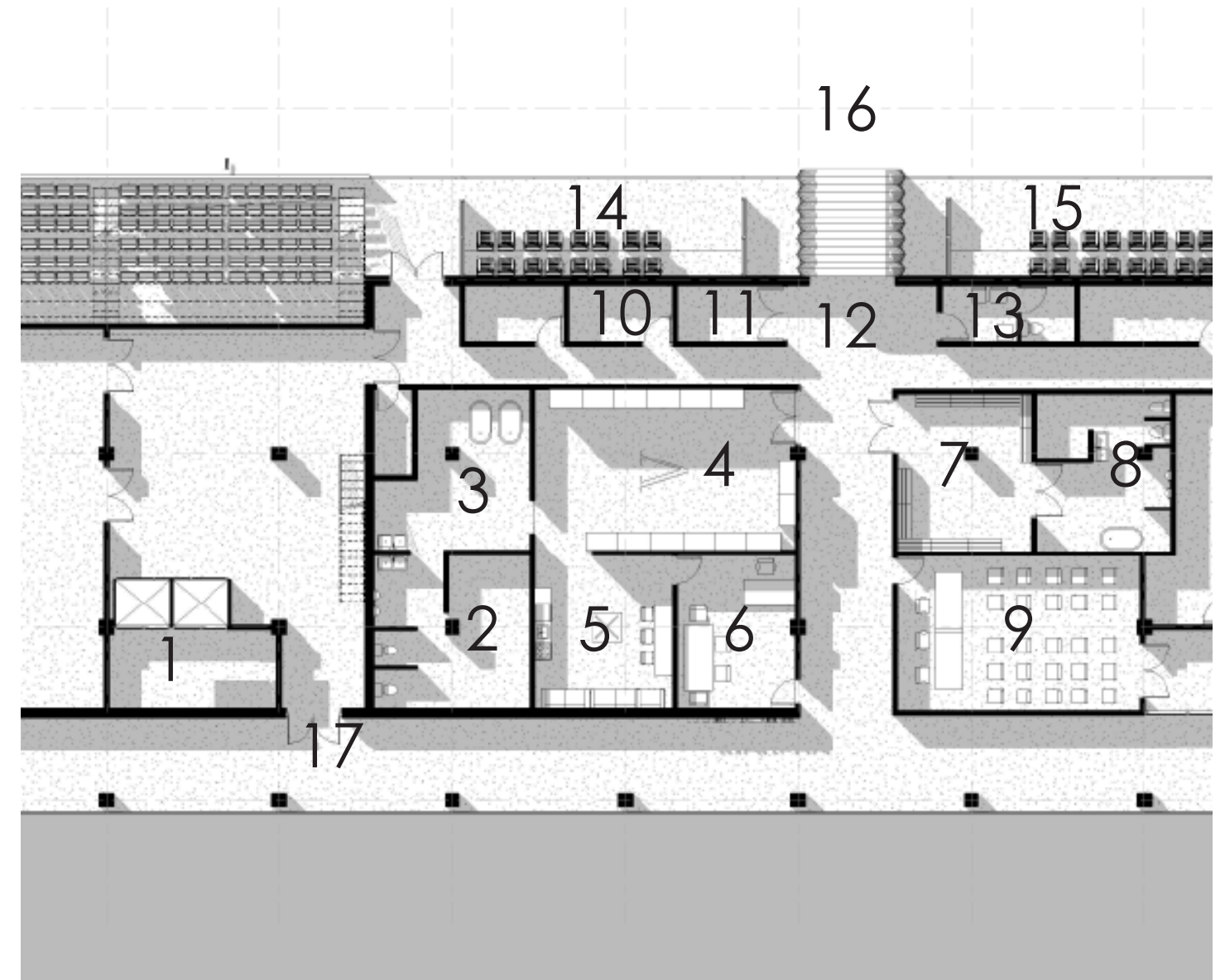
PROJECT SOLUTION

LOCKER ROOM PLAN

The locker rooms on the ground level of the west stand were one of the largest concerns with the old stadium. Players arrive by water taxi directly to a controlled dock and boardwalk. The Venezia FC locker room has the necessary seating and physio area as well as a player lounge and manager's office.

Teams align in the tunnel before the match which is a common practice in European soccer. This area also has referee and match-day delegation spaces. This image also shows the proximity the lower bowl seating has to the surface which intensifies the atmosphere and experience.

CIRCULATION	1
HOME SHOWER	2
HOME PHYSIO	3
HOME LOCKER	4
HOME LOUNGE	5
HOME OFFICE	6
GUEST LOCKER	7
GUEST SHOWER	8
MEDIA ROOM	9
STORAGE	10
ANTI-DOPING	11
TUNNEL	12
REFEREE	13
HOME BENCH	14
GUEST BENCH	15
PLAYING SURFACE	16
BOARDWALK	17



LOCKER ROOM PLAN



Fig. 104

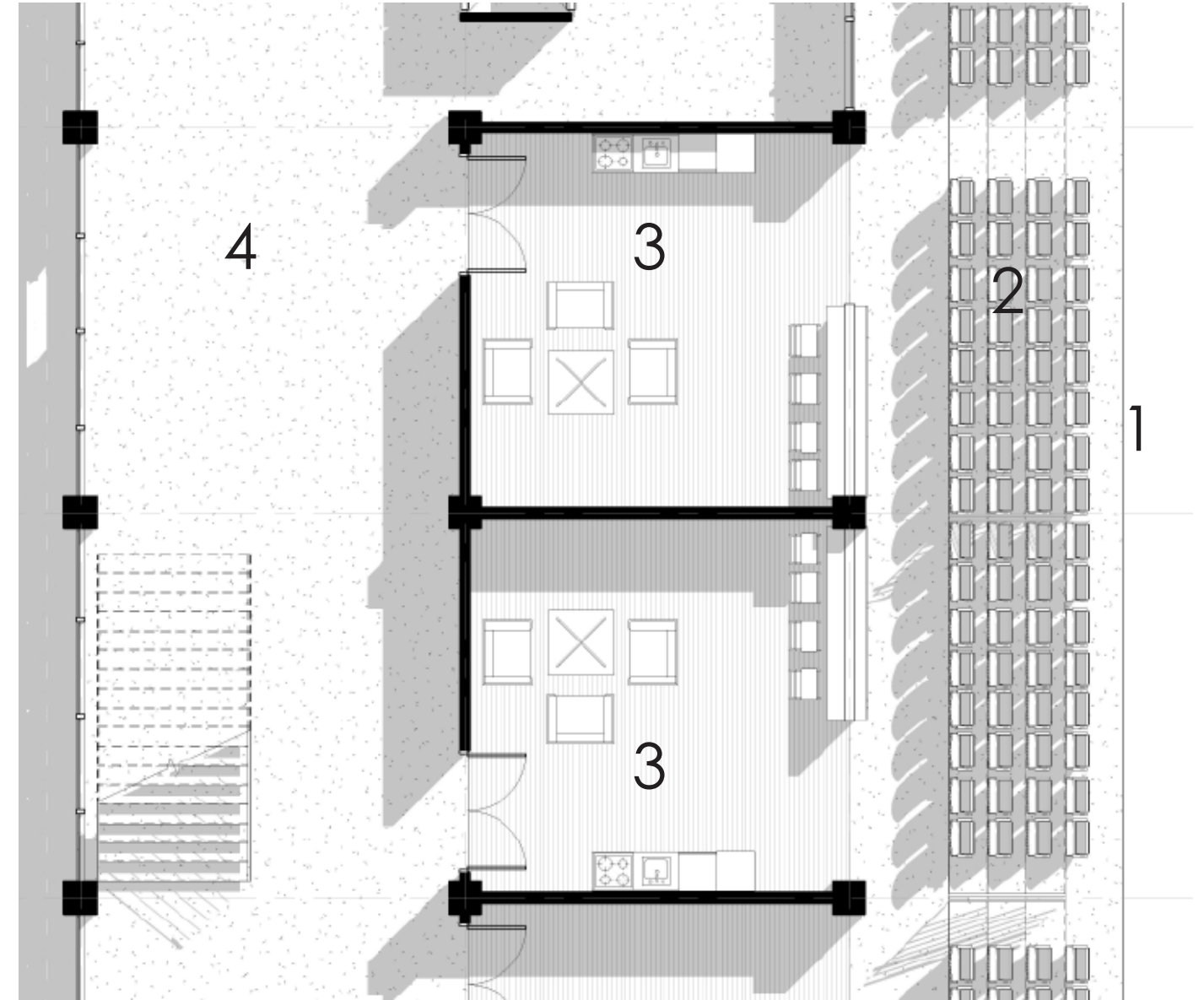
Locker Room Plan

PROJECT SOLUTION

SUITE PLAN

Private suites consist of flexible lounge seating, a kitchenette, bar seating, and up to 32 padded individual seats. Suite sponsors are able to customize their suite with the lounge configuration, decor, and dining options.

- 1 PLAYING SURFACE BELOW
- 2 SUITE SEATING
- 3 SUITE
- 4 PRIVATE CONCOURSE



SUITE PLAN



Fig. 105

Suite Plan

PROJECT SOLUTION

SEA LEVEL EXHIBIT

One of Venezia FC's mission statements is the preservation of Venice. Aside from the sustainable strategies implemented throughout, the Sea Level Exhibit allows visitors to visualize the rising sea levels in the city. The exhibit is near the fan zone lounge and is an extension of the southeast marina.

Visitors can walk on the tempered glass above the pit and observe the estimated sea level markers. Venice is famous for flooding. For reference, an increase of 170cm results in flooding of 75% of the city. The entire site has been lifted to delay flooding but the stadium and site have placed arrays of water retention cisterns and greywater reuse systems.

- 1 STORM WATER RETENTION CISTERNS
- 2 SEA LEVEL RISE MARKERS
- 3 TEMPERED GLASS ABOVE EXHIBIT
- 4 FAN ZONE LOUNGE

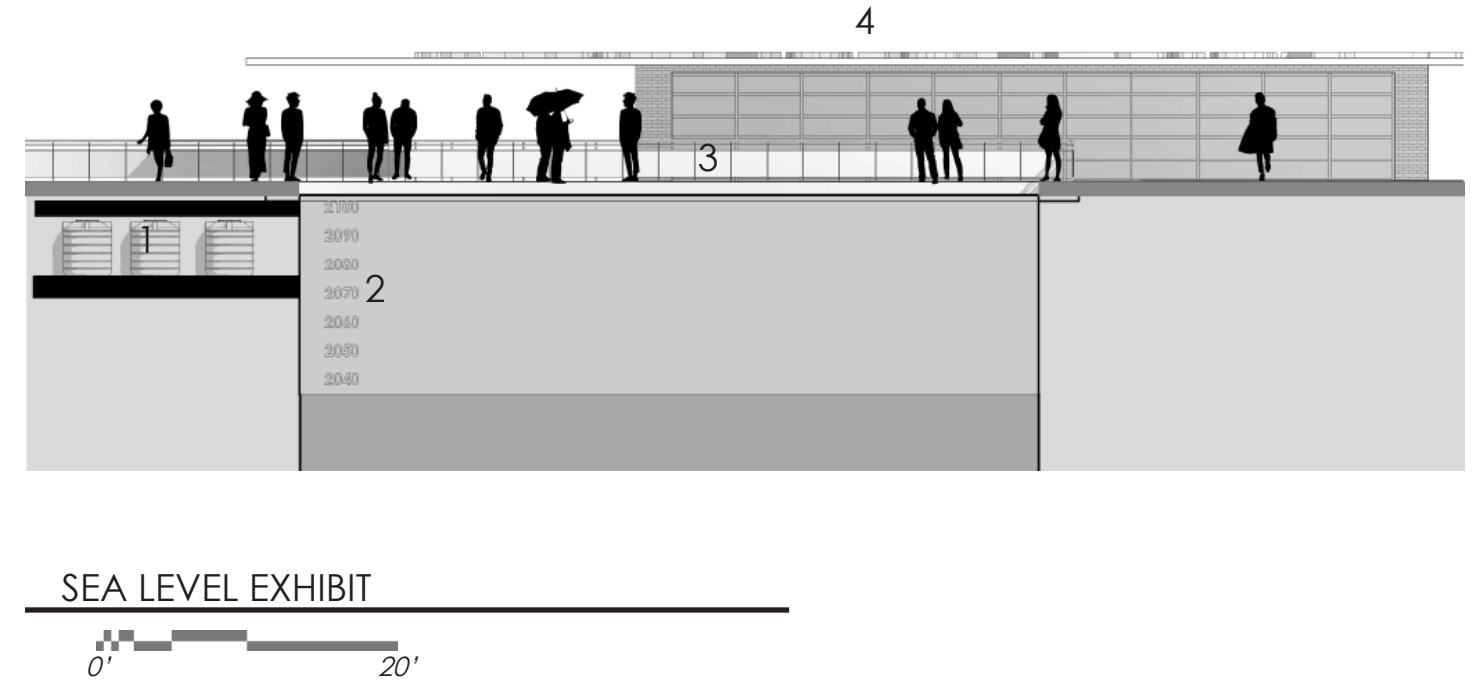


Fig. 106 Sea Level Exhibit

PROJECT SOLUTION

WATERFRONT PLAN

A once neglected space, the north boardwalk now has expanded dock slips, larger walkways, increased vegetation, a new transportation center, and the Venezia FC Store. Adding the on-site club store strengthens the marketing vision by adding a physical location for merchandise sales.

- 1 NORTH BOARDWALK
- 2 SECURITY
- 3 VENEZIA FC STORE
- 4 NORTHEAST ENTRANCE
- 5 TRANSPORTATION CENTER
- 6 DOCKS

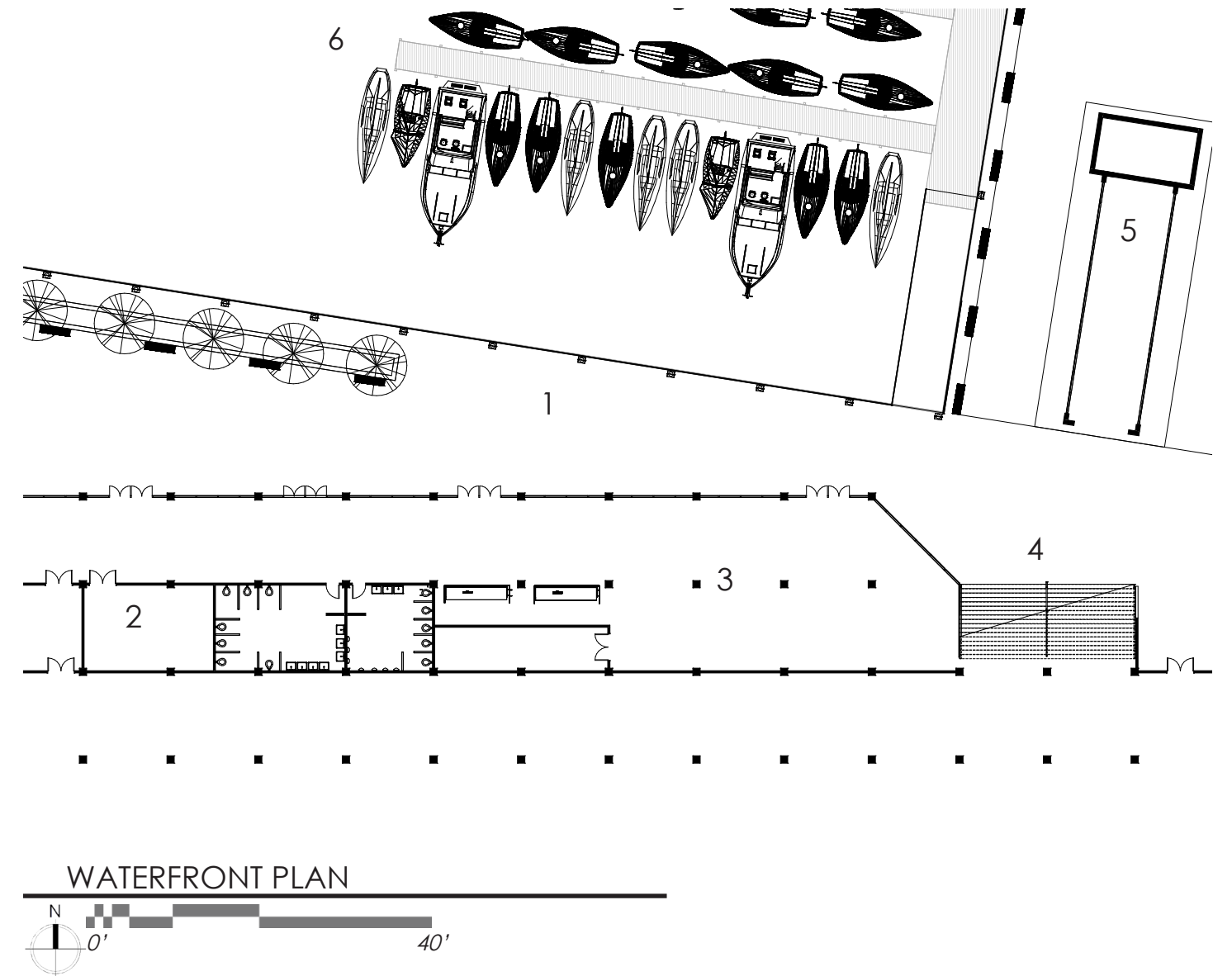


Fig. 107 Waterfront Plan

PROJECT SOLUTION

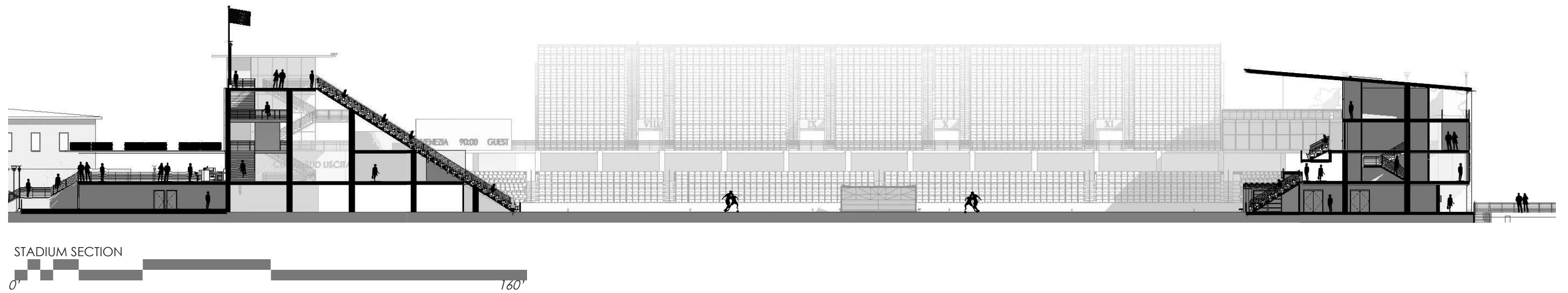


Fig. 108 Stadium Section



NORTH BOARDWALK



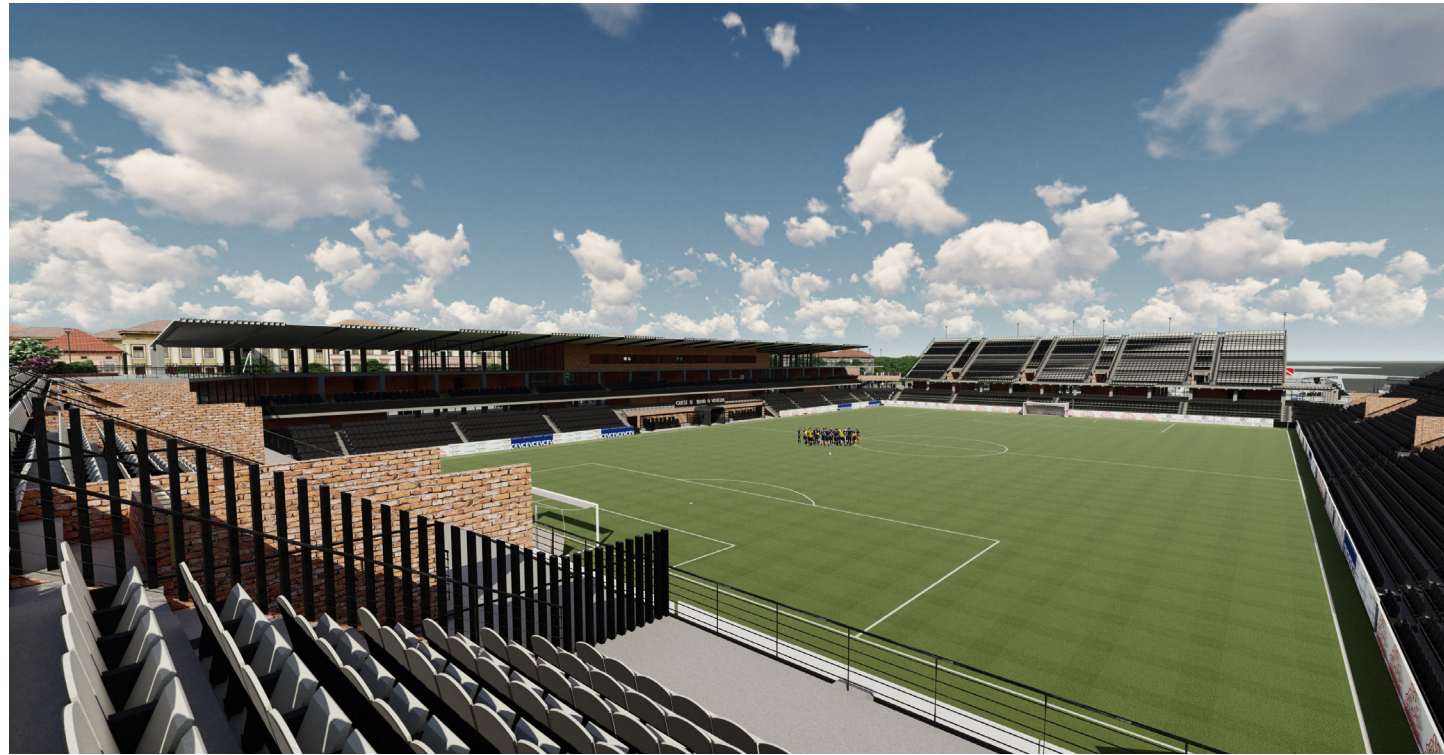
NORTH CONCOURSE



VENEZIA FC MUSEUM



NORTH STAND



VISITING STAND



FAN LOUNGE



MUSEUM



SEA LEVEL EXHIBIT



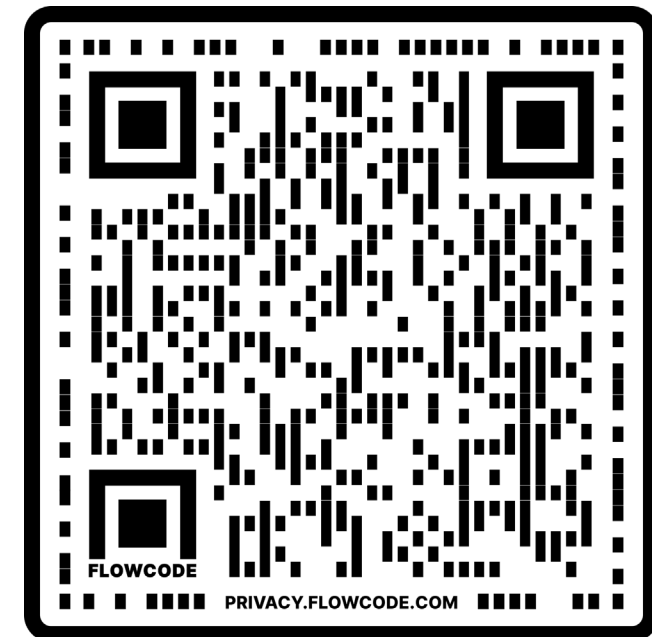
HOSPITALITY SUITE



HOME LOCKER ROOM



VENEZIA FC STORE



VIDEO QR CODE

THESIS GOALS

Creating a list of design principles for future stadiums and improvements to stadiums is noted on pages 122-123.

Integration & Context is clearly shown in the new Stadio Pier Luigi Penzo. The stadium is woven into the community due to the materiality, pedestrian access, scale, and the form's character.

The site implements many sustainable strategies from its water retention systems, solar arrays, increased green spaces, and public awareness programs.

The Stadio Pier Luigi Penzo is an authentic design. Few modern stadiums use local materials and welcome the unique features of the site. Most stadiums feature a consistent shape and roofing system. The Penzo uses stadium technology in its own way.

The new stadium design is iconic because of its relationship with the site. The canals and scale allowed for design opportunities that set the Stadio Pier Luigi Penzo apart. Unprecedented views and potential amenities will spark the local community and the experience of visiting the stadium will stand as an iconic part of the sport.

The previous stadium was noticeably lacking harmony with the built environment and the population. The new stadium introduces features that appeal to the community and now contributes to the unique Venetian environment. The master-planning overhaul bolsters the east end of the city and is no longer a hidden area of the city.

Understanding the variety of fan and client needs was achieved through the extensive programming, spatial investigations, and client research. Venezia FC has a new vision which was integrated in the design.

MAJOR PROJECT ELEMENTS & PROJECT EMPHASIS

The major project elements listed on pages 16 & 17 have been included in the stadium design. The project emphasis ties closely to the design principles. Community connection, the stakeholder experience, sustainable design, and iconic design are all included in the design principles that were the driving factor of the schematic design.

Pedestrian access to the stadium was greatly improved with the expansion of the bridges, walkways, and concourses. Transportation docks were rebuilt and expanded with an addition of a transportation hub. Venezia FC now has a physical home for club merchandise with the Venezia FC Store on the north end of the site. Catering and dining options were improved with the addition of a restaurant and in-suite dining. VIP and suite areas were increased and are now a desirable part of the stadium.

Sustainable design was implemented throughout with increased green space, solar panel arrays, greywater reuse systems, and storm water retention cisterns. Safe standing is an option for spectators on the north and south stand which increases the stadium capacity and improves the stadium atmosphere. The new Stadio Pier Luigi Penzo retains the views that the old stadium featured. This was done by opening the stadium corners and roof while maintaining the stadium scale in regards to the local context. The stadium charm was also retained through the material selection, form and scale. The design matches the local context and subtly nods to the historic industries of the city. Lodging options were also added to the site through hotel development on the east side of the site.

CRITIQUE OF METHODS USED

QUALITATIVE ANALYSIS - CASE STUDIES

Qualitative analysis through case studies of other stadiums and venues was an extremely useful and informative method of research. The various stadiums provided insight into what makes the building successful for the people, clients, and cities. Due to the immense public opinion of stadiums, much is documented about the design, construction, and reaction. Stadiums also tend to be generational structures which lets case studies show the longevity of projects.

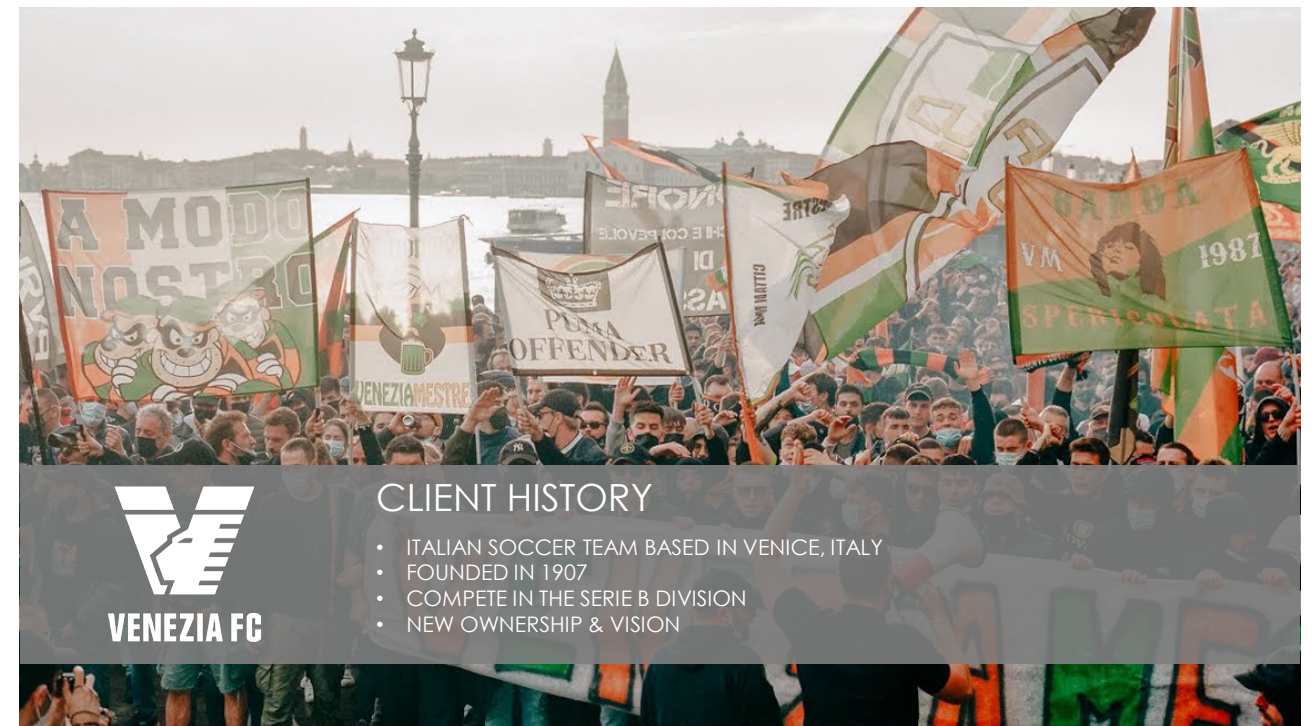
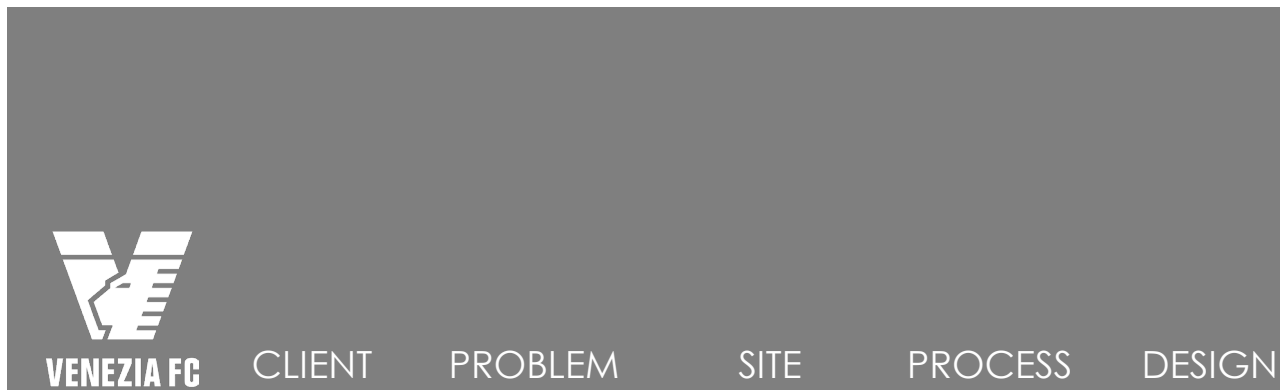
I was able to find unique design features from the most iconic stadiums around the world and use them for inspiration for the Stadio Pier Luigi Penzo. The qualitative analysis also yielded fan reports of the stadium experience and where the current site was lacking.

HISTORICAL & EXPLORATION

Historical research showed me the reasoning for stadiums in society and some of the major technological advances that are common in modern venues. This investigation also explained the safety features that are now required in stadiums. The tumultuous 1970s and 1980s greatly impacted the way stadiums operate as a result of violence and crowd control.

A combination of case studies and exploration led to a variety of options in building technology and form for this project. Stadium technology has improved the experience for all spectators. Exploring the various strategies used around the world helped the design better align with the goals of the project and the client.

The blend of Qualitative Analysis, Historical, and Explorations allowed for many design options throughout the project and let me make informed decisions about the design.





Founded in 1907 after Club Merger



Early Success



Joe Tacopina



Duncan Niederauer



Filippo Inzaghi



1963-64 Squad



Multiple Bankruptcies



2021 Promotion to Serie A



SPORTING EXCELLENCE & INTEGRITY We continually strive to represent Venice of the Serie A stage, competing with emphasis on youth development and best practices in sport, while remaining committed to principles of sporting integrity.

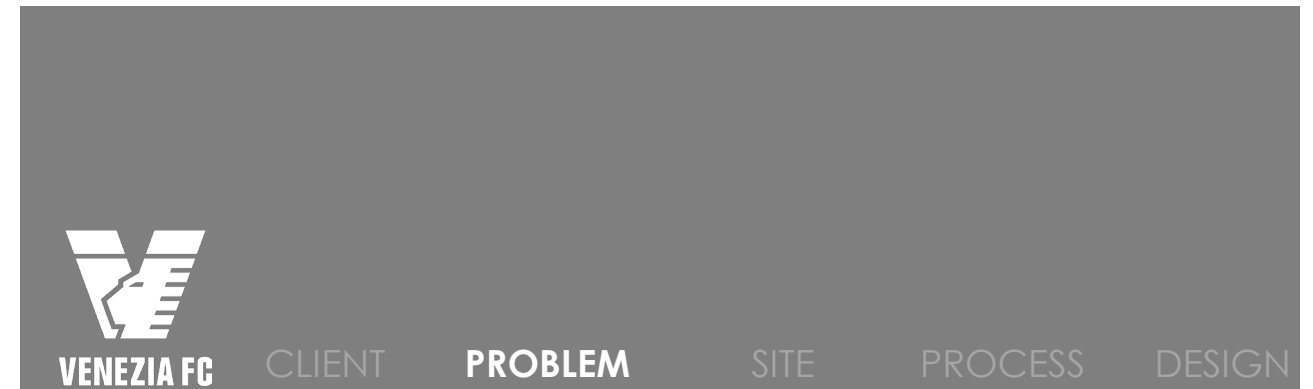
PRESERVE VENICE We are committed to leveraging our position in the world's most popular sport to serve as a global ambassador of Venice, with a specific focus on:

- Advocating for the preservation and celebration of Venice's tangible and intangible cultural heritage
- Advocating for the safeguarding of Venice's natural environment and the redevelopment of Venice as a living city
- Advocating for sustainable tourism that is in harmony with Venice's environment and society

SOCIAL RESPONSIBILITY We are committed to leveraging football's unique cultural power to serve as a vehicle for social progress, advocating for inclusion and harmony within our community and equality and justice within society.

COMMUNITY DEVELOPMENT We are committed to contributing to social cohesion and quality of life in and around Venice, especially promoting education, health, and wellness in the lives of young people

-Venezia FC Website





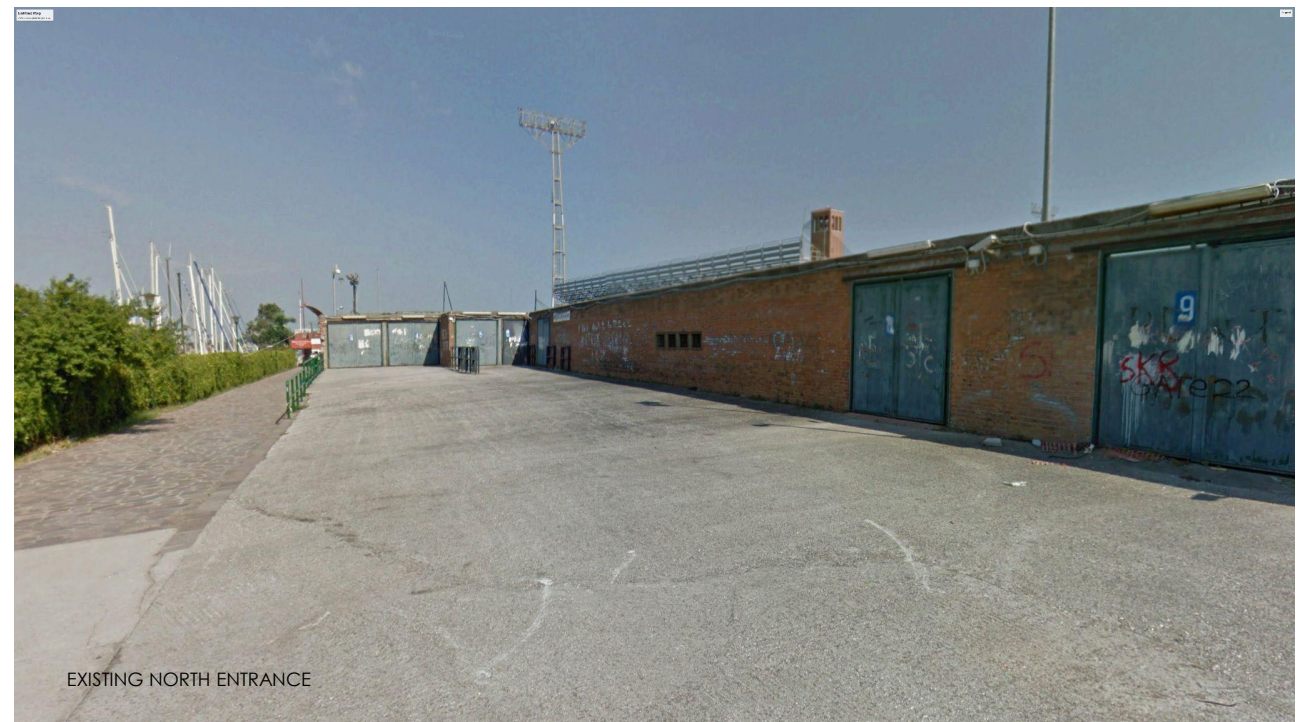
EXISTING WEST STAND



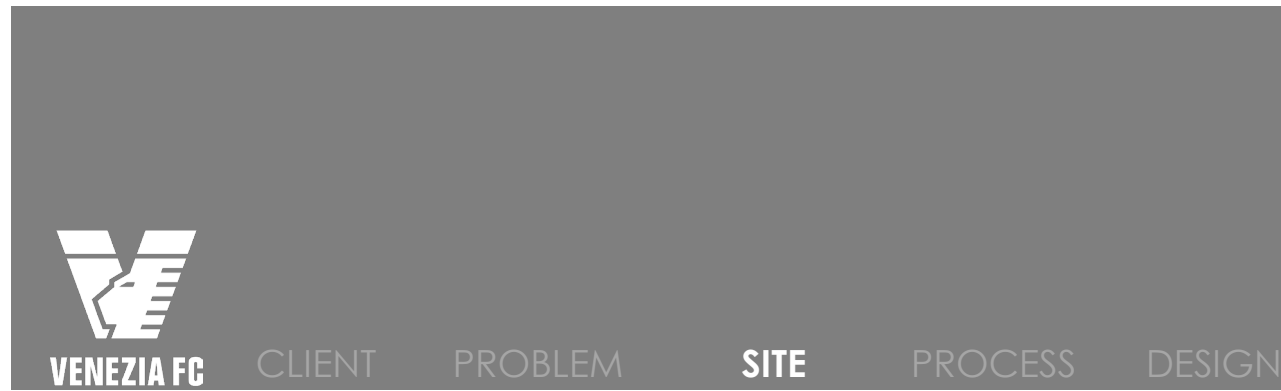
EXISTING WEST ENTRANCE BRIDGE

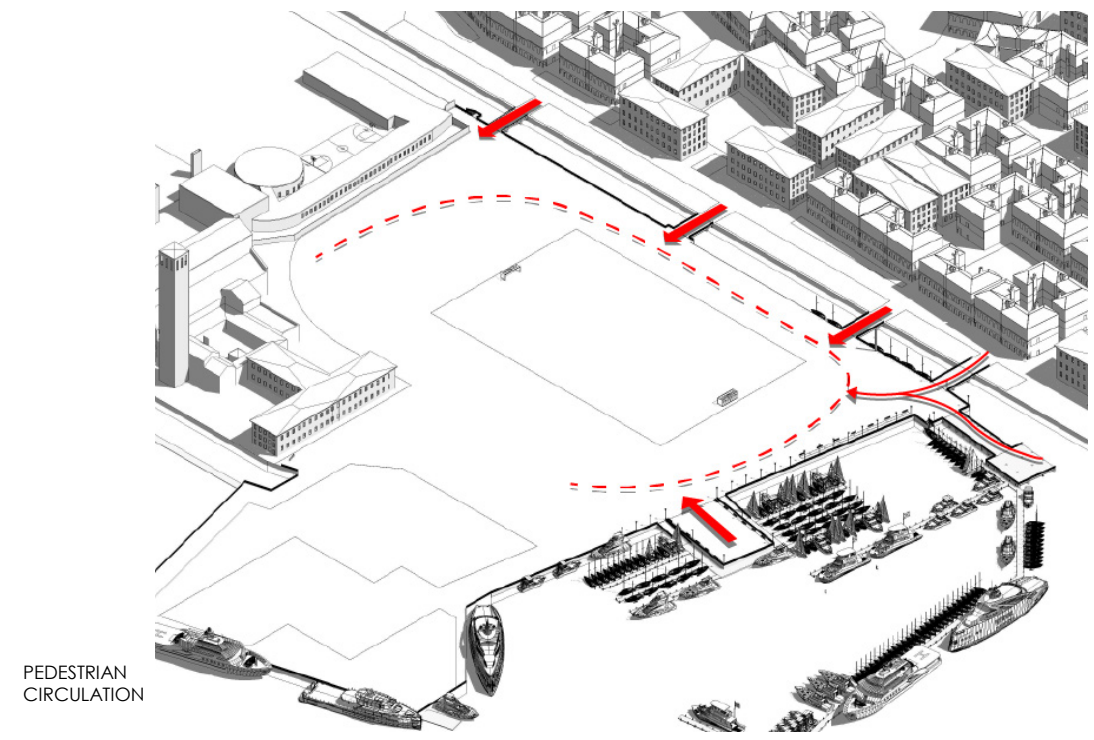
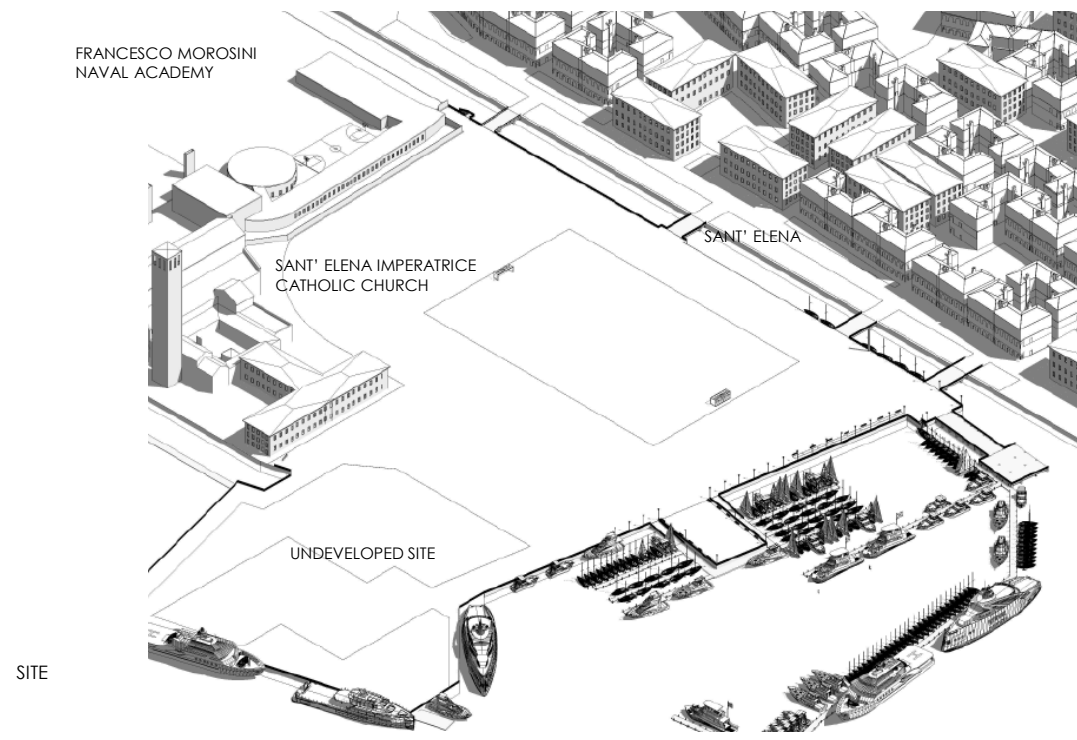
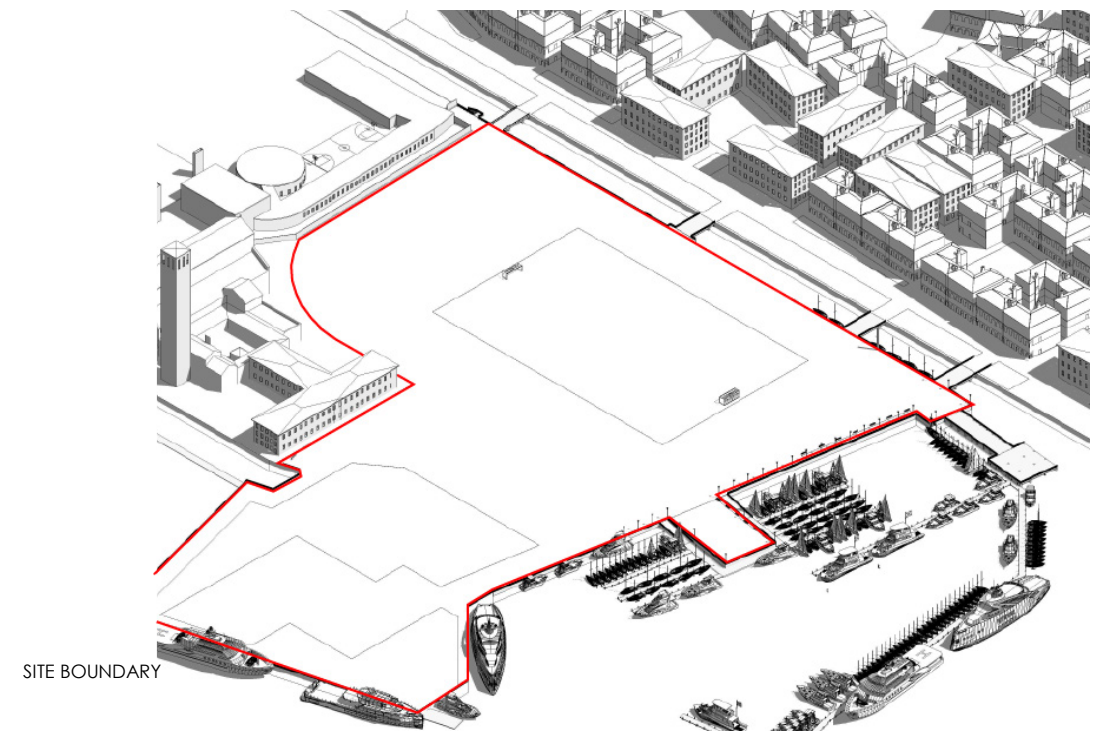


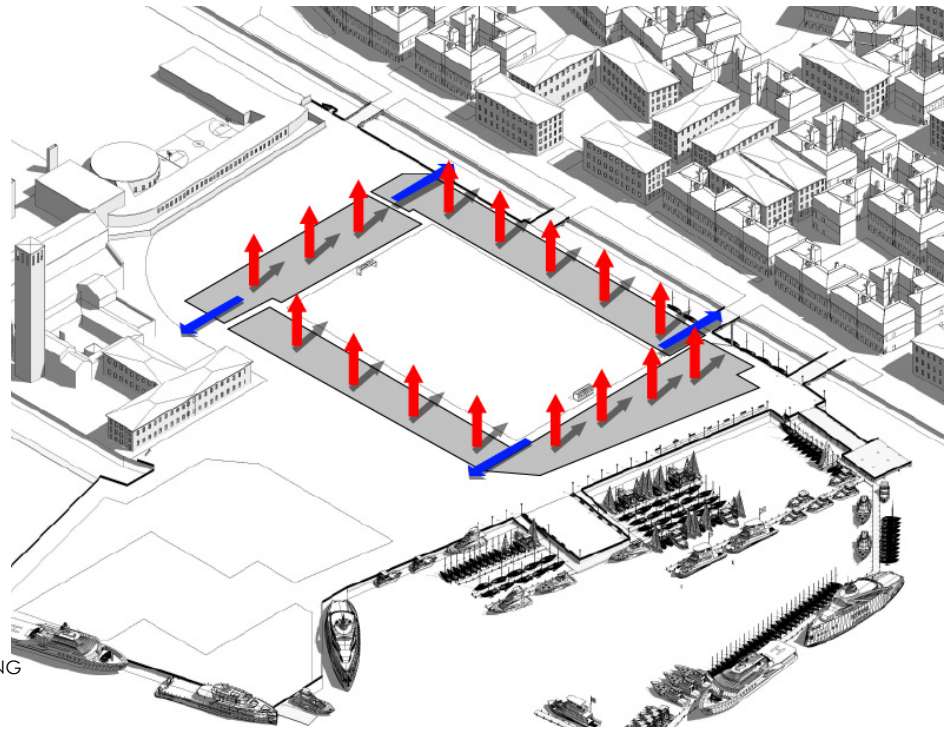
EXISTING NORTH ENTRANCE



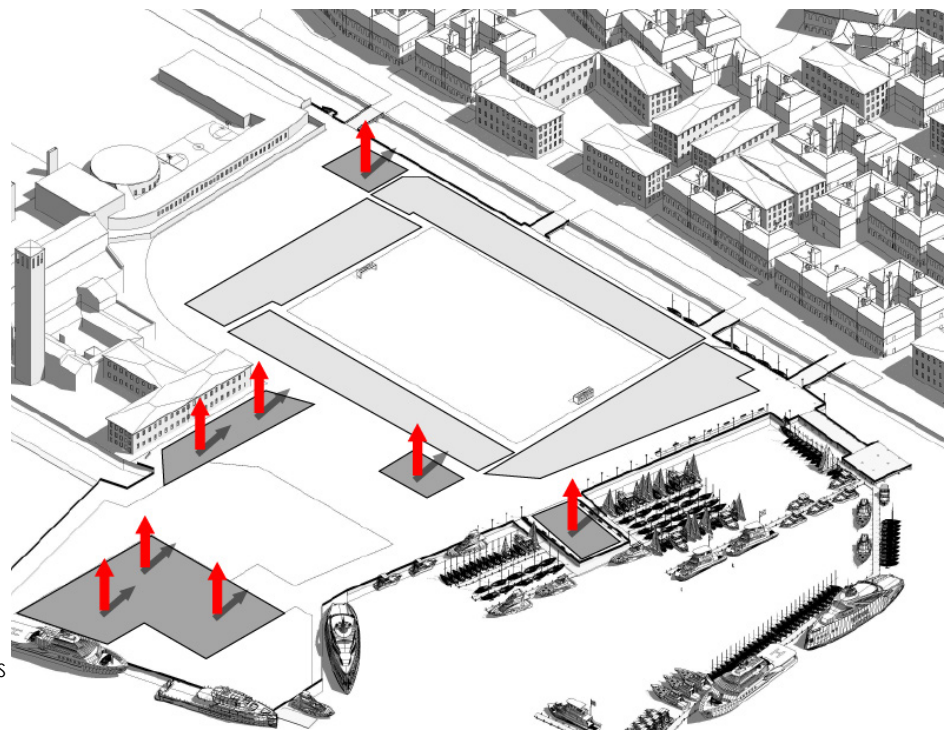
EXISTING NORTH ENTRANCE



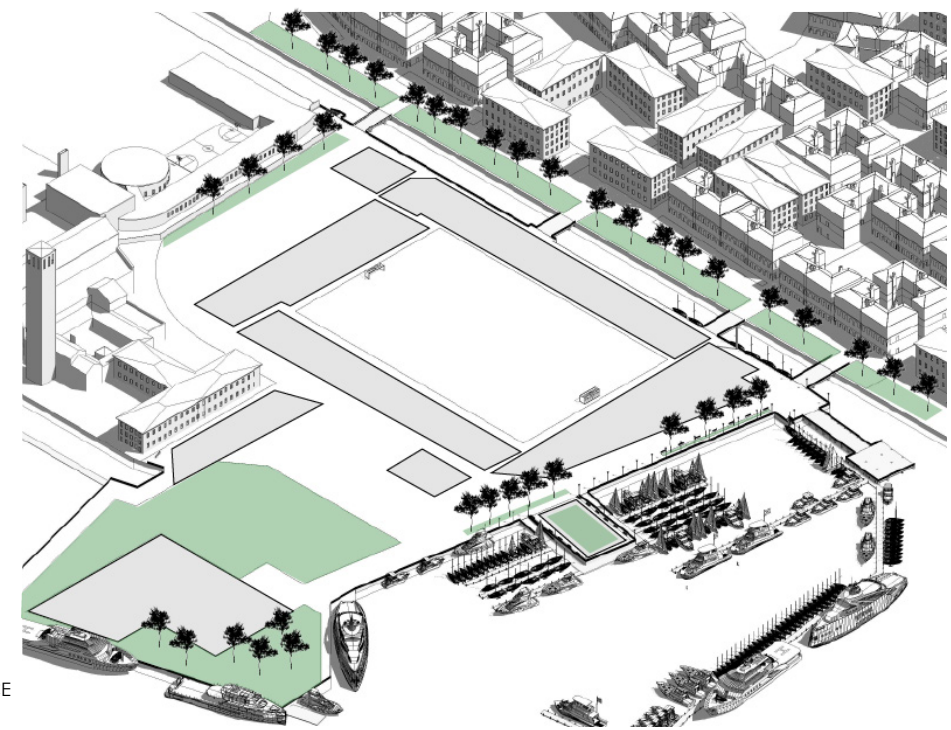




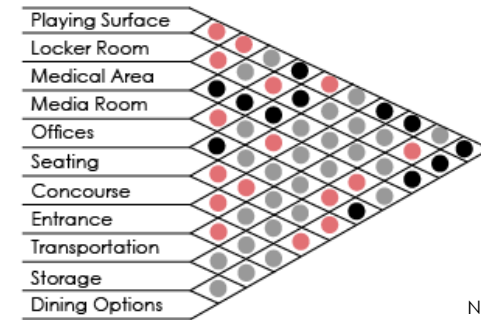
BOWL MASSING



SITE AMENITIES

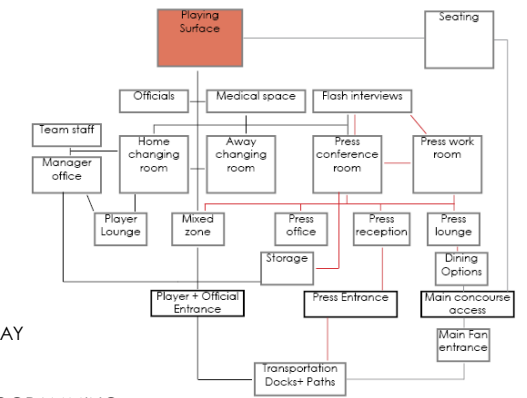


INCREASED GREEN SPACE



ADJACENCY MATRIX

ADJACENT ● PRESS
NEARBY ● GENERAL
NOT ADJACENT ● MATCH-DAY

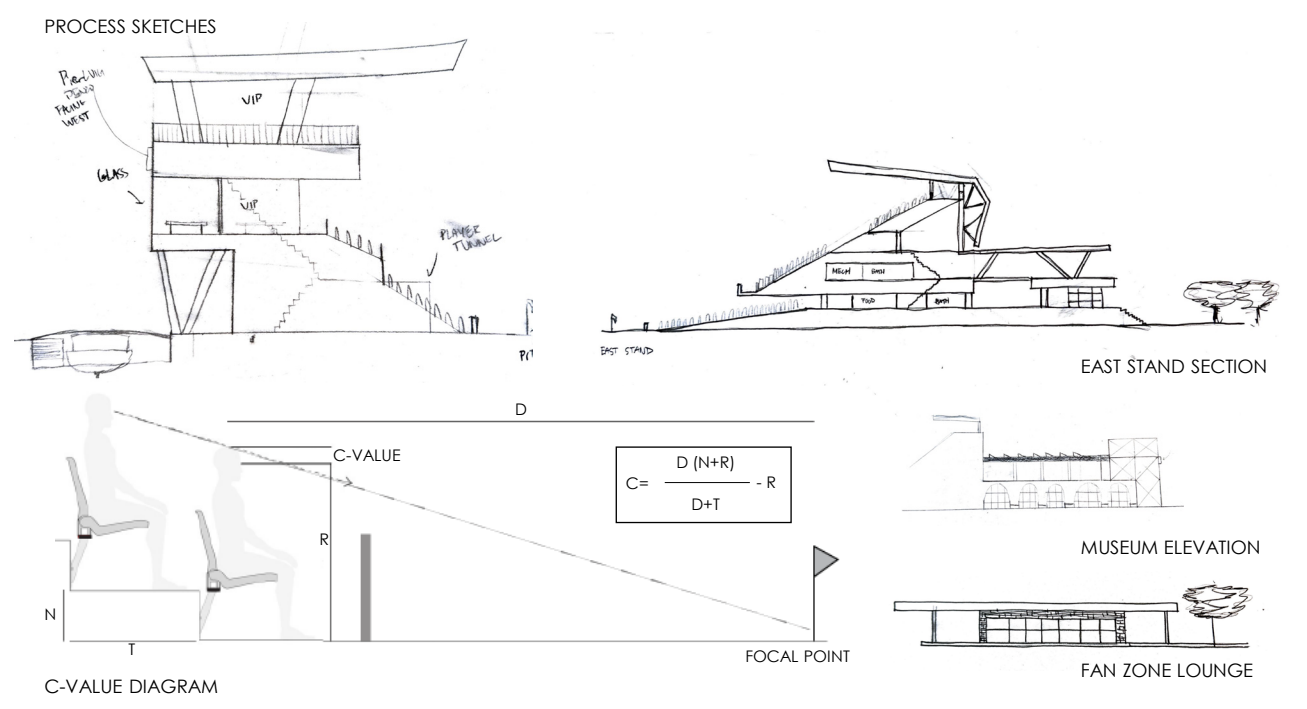
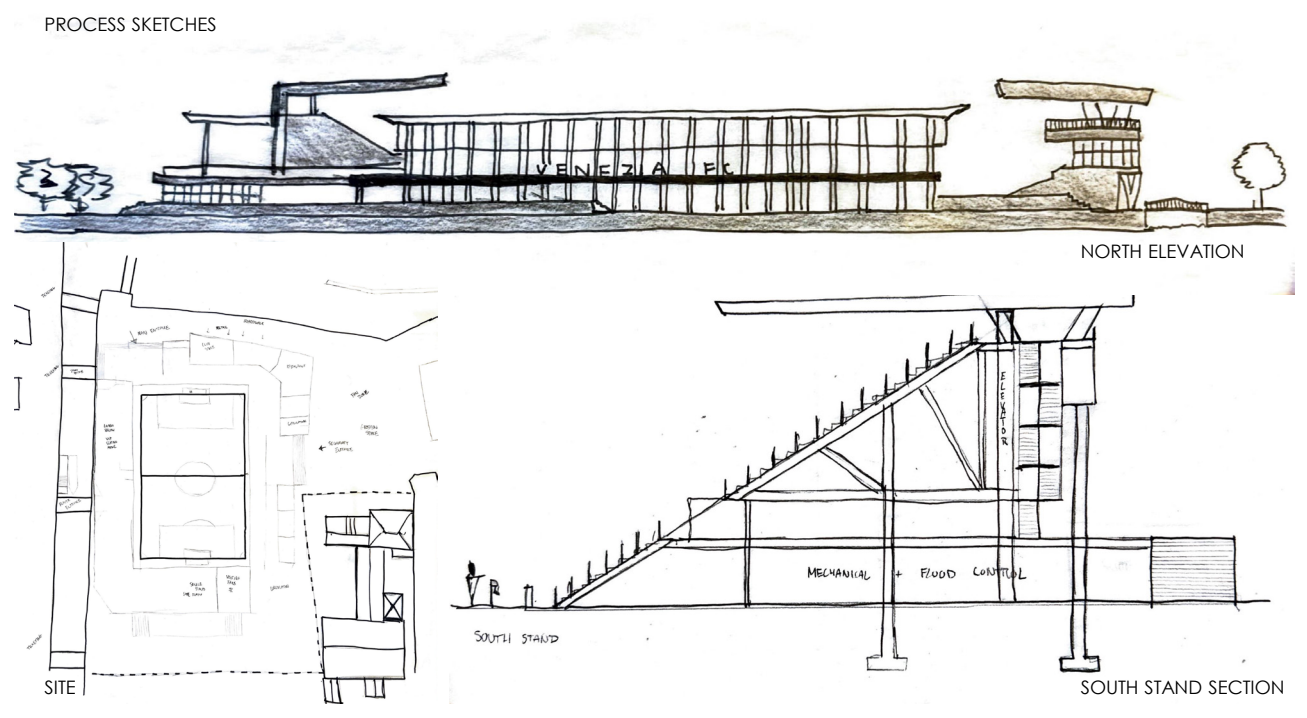


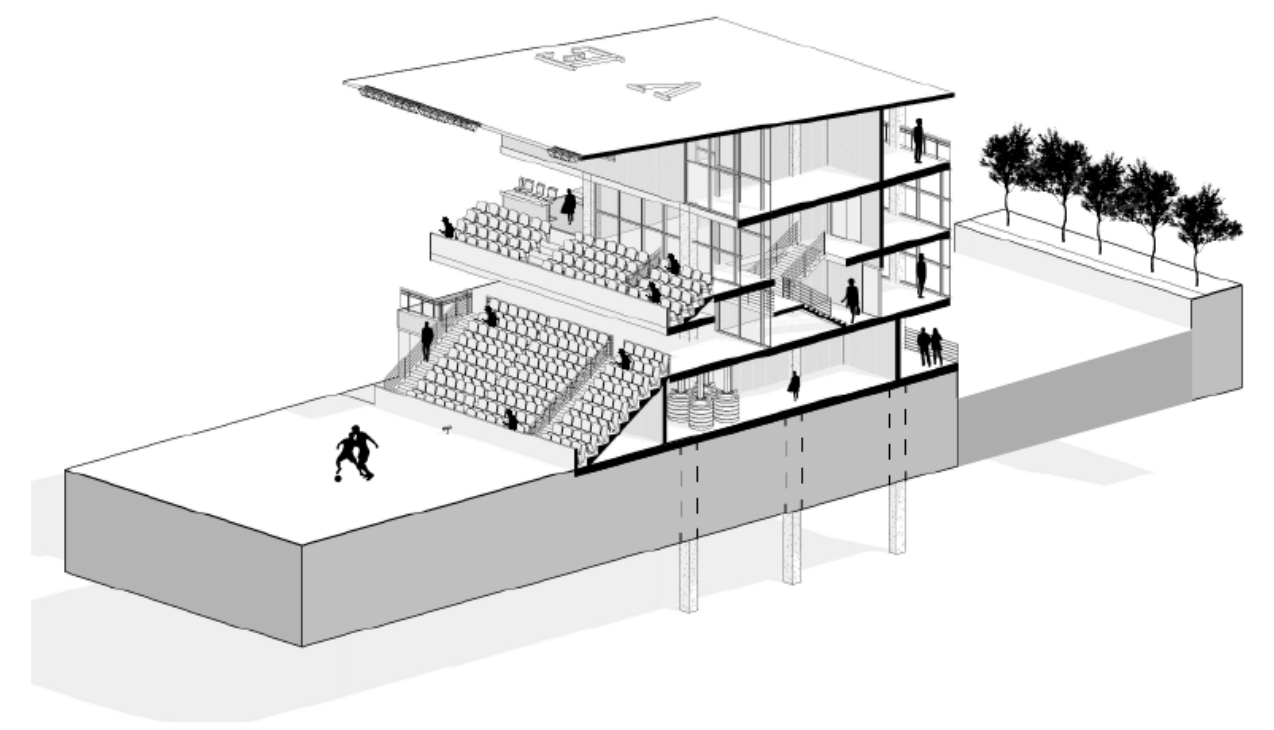
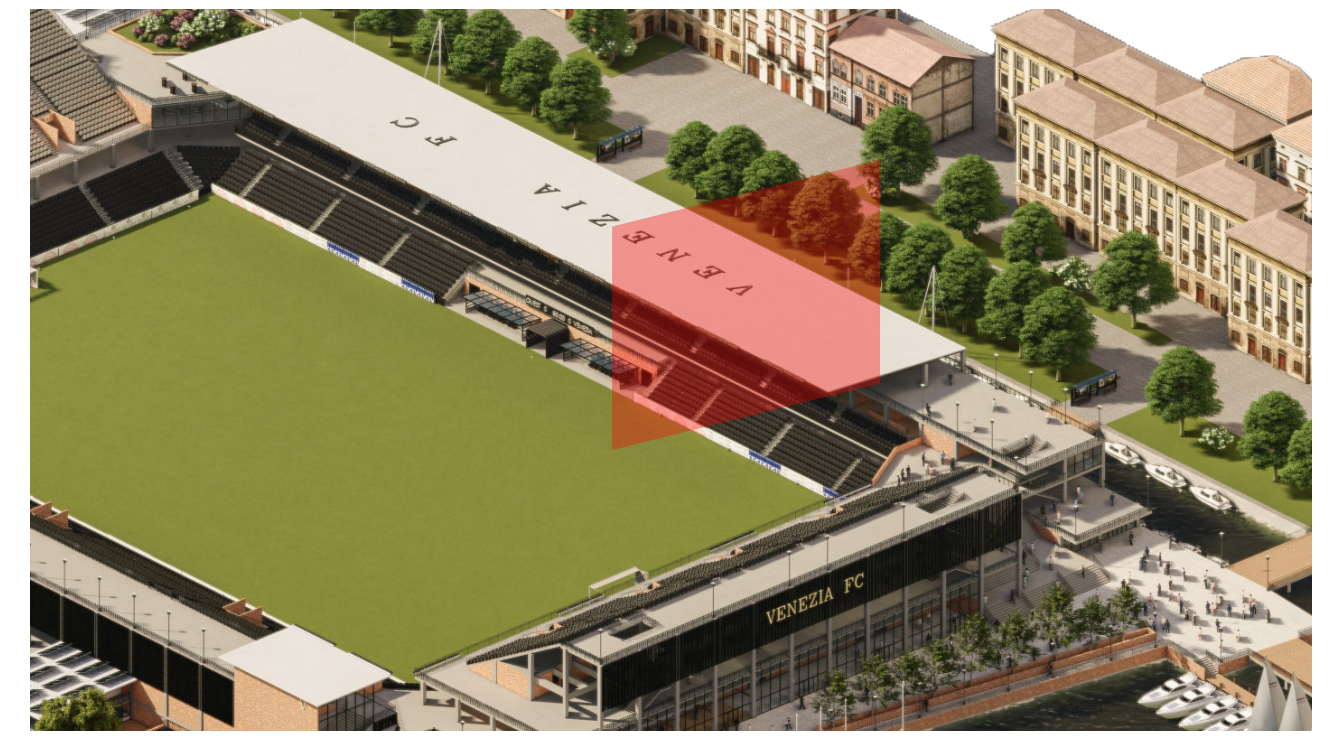
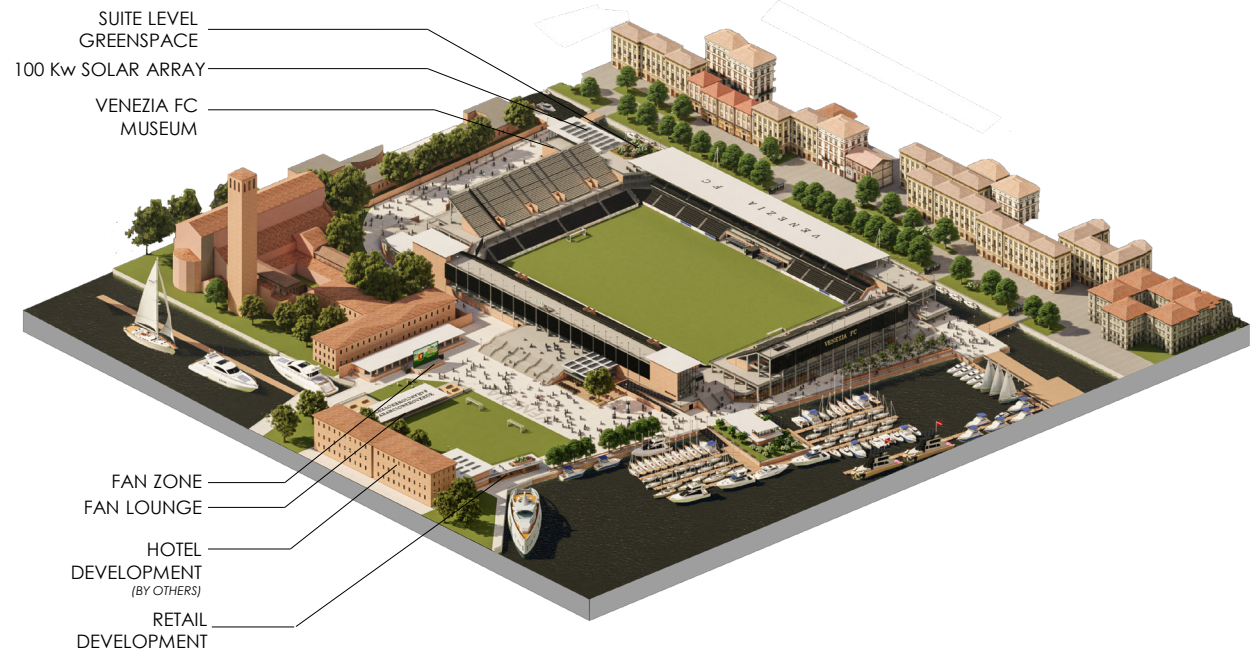
SPATIAL PROGRAMMING

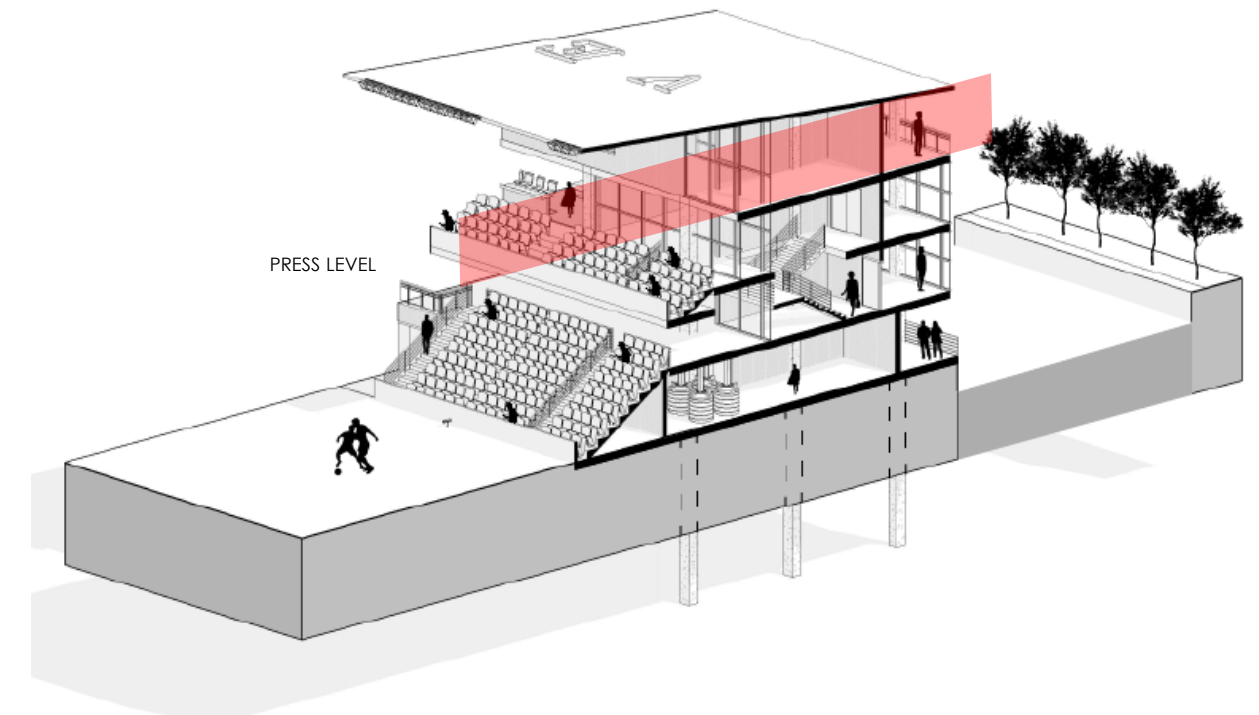
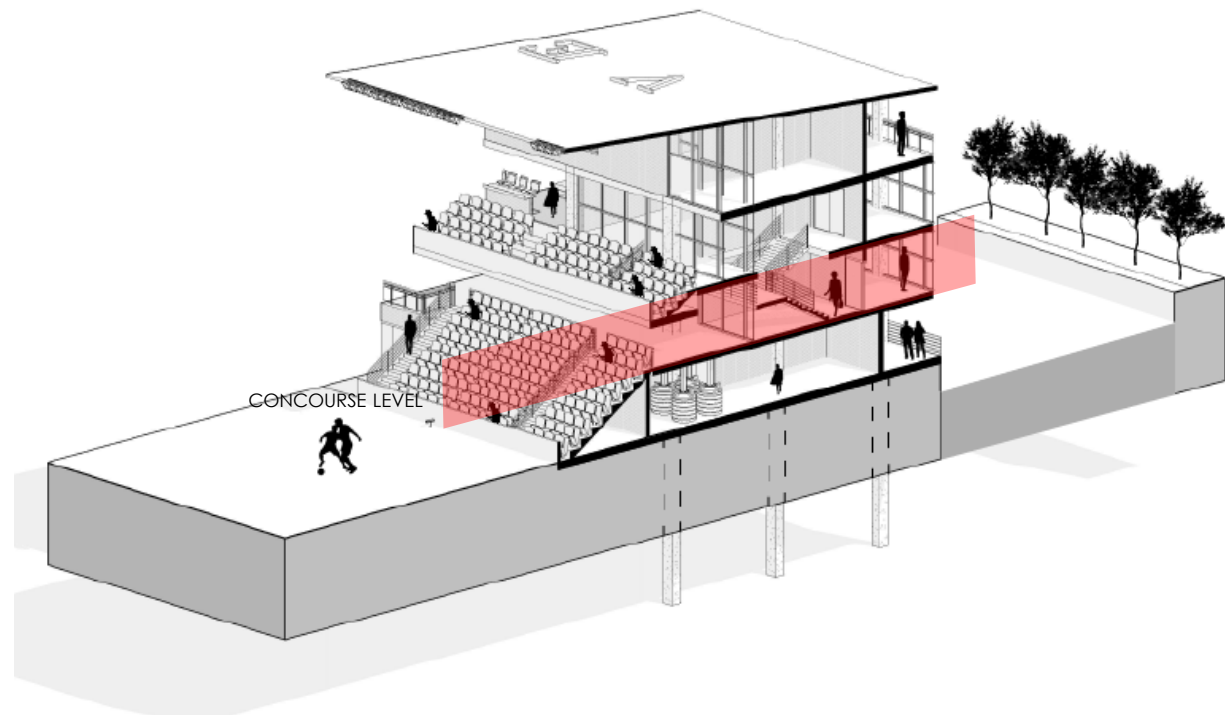
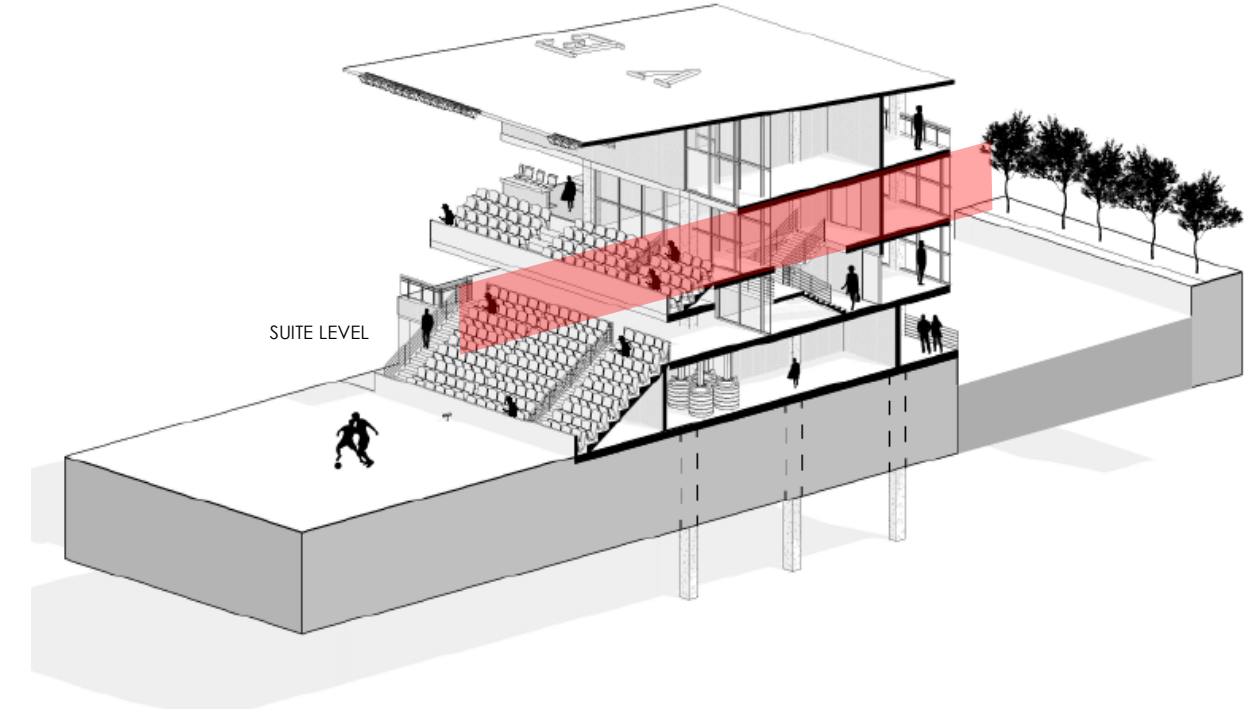
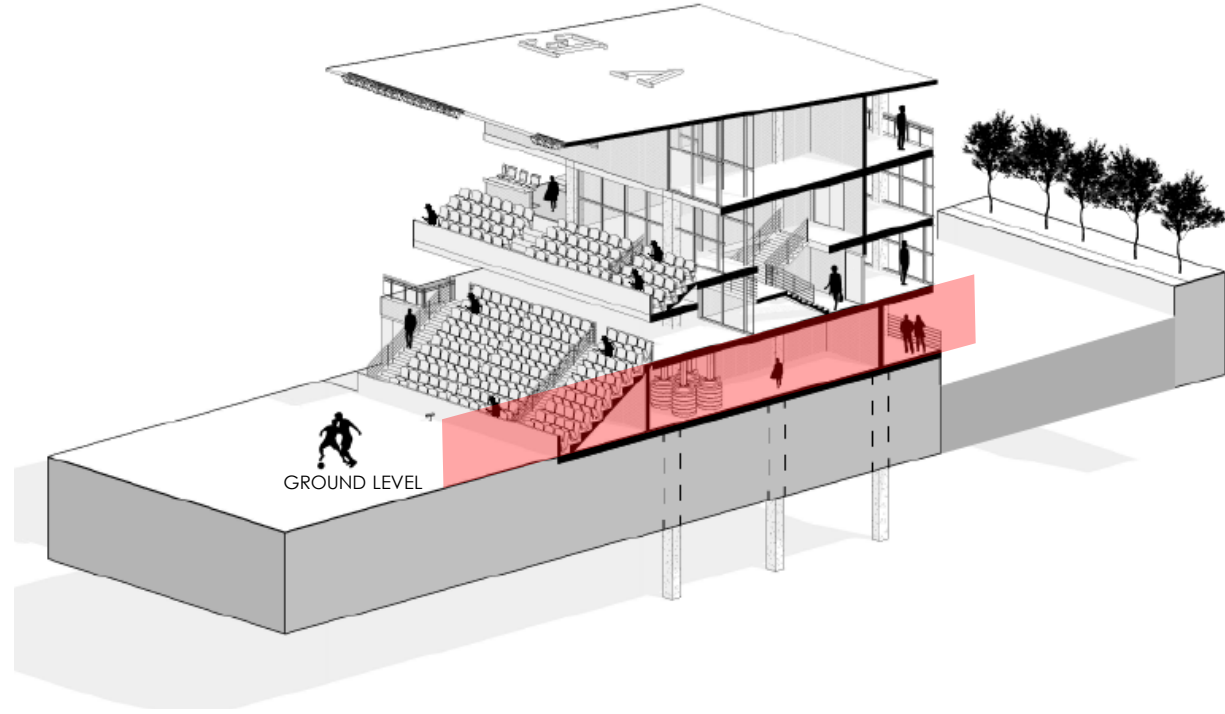


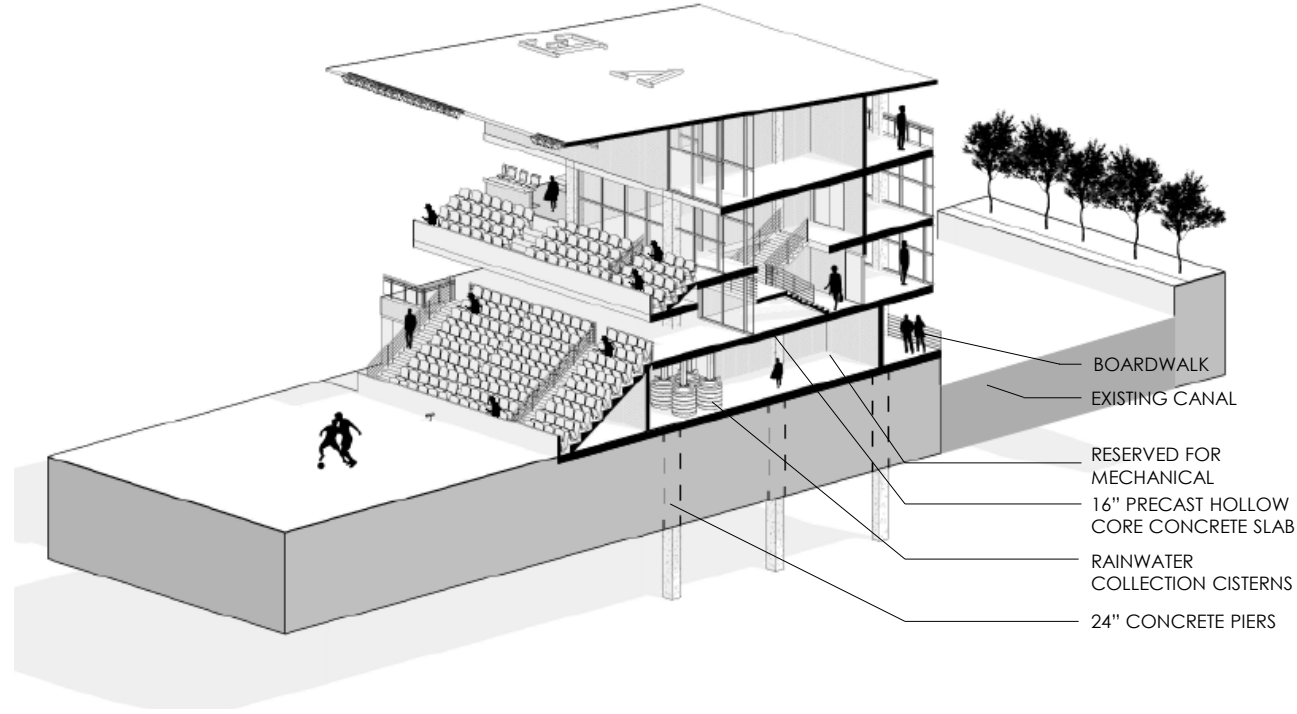
USER ANALYSIS & PROGRAMMING

- MATCH-DAY PERSONNEL, PRESS, GENERAL POPULATION
- SECURITY
- EASE OF ACCESS
- AMENITY CONSIDERATION

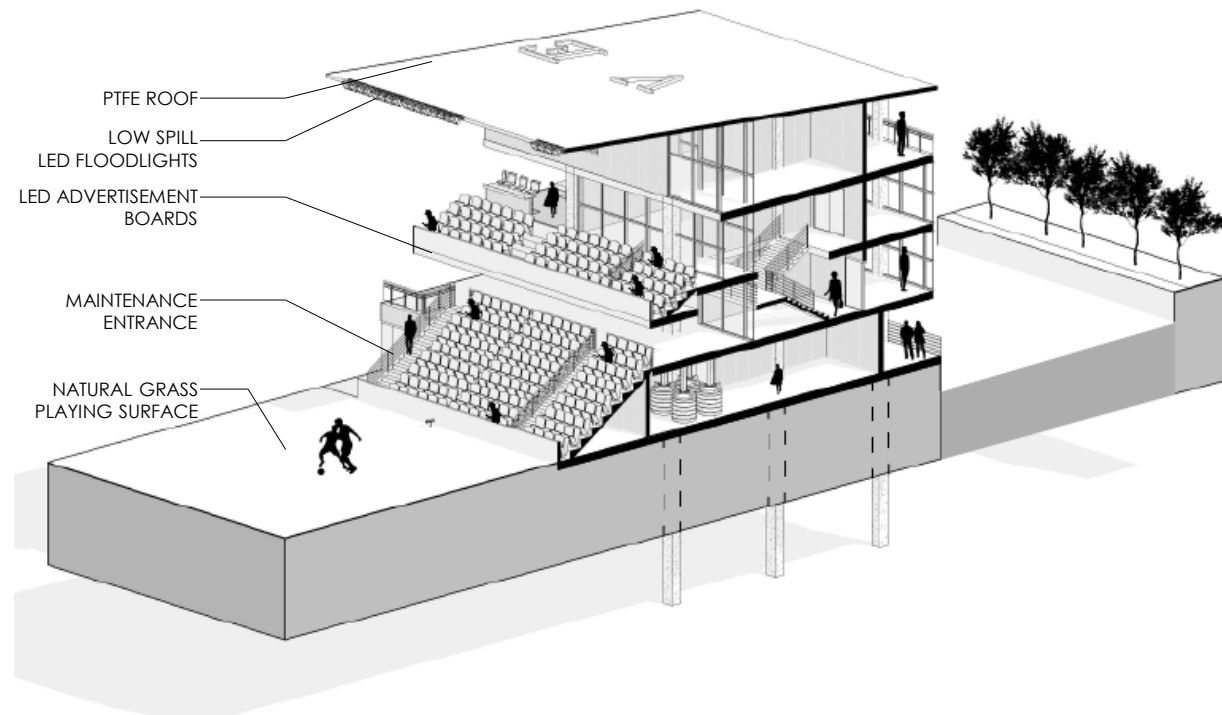
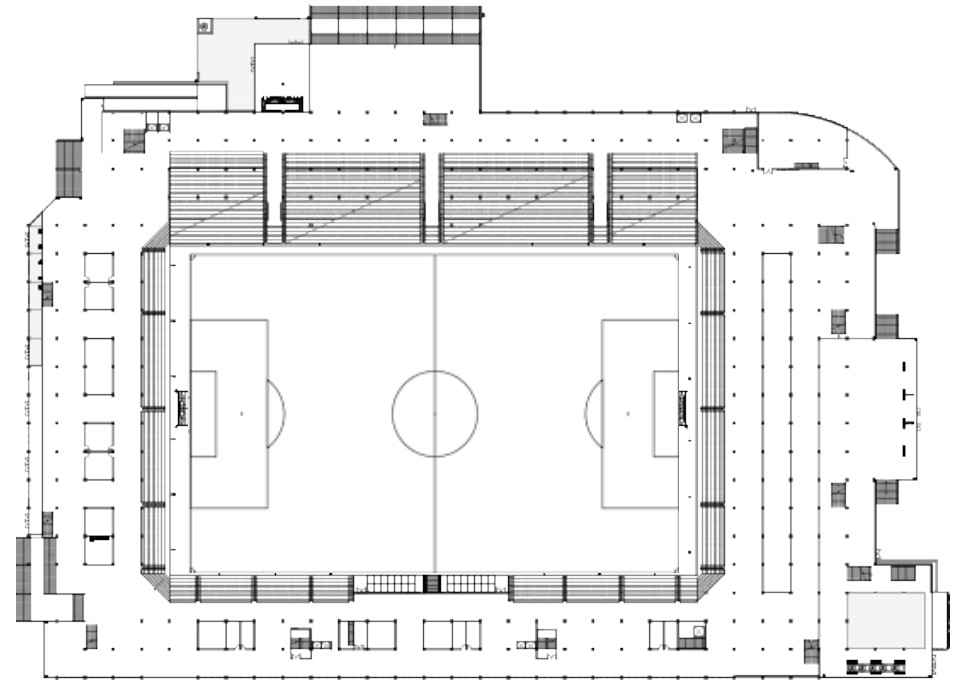
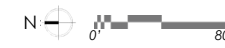






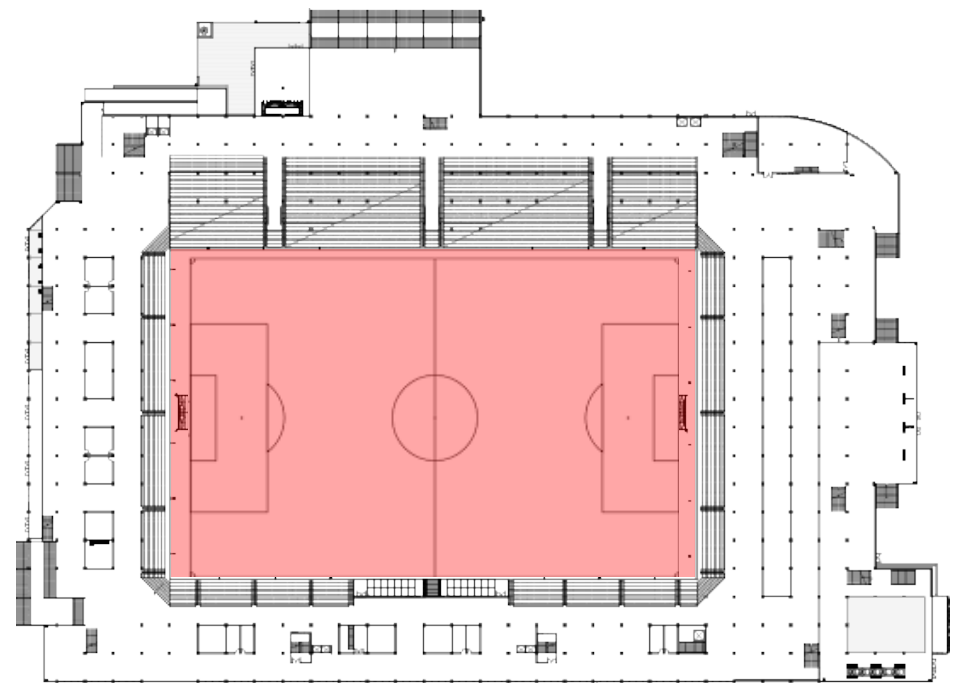
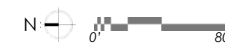


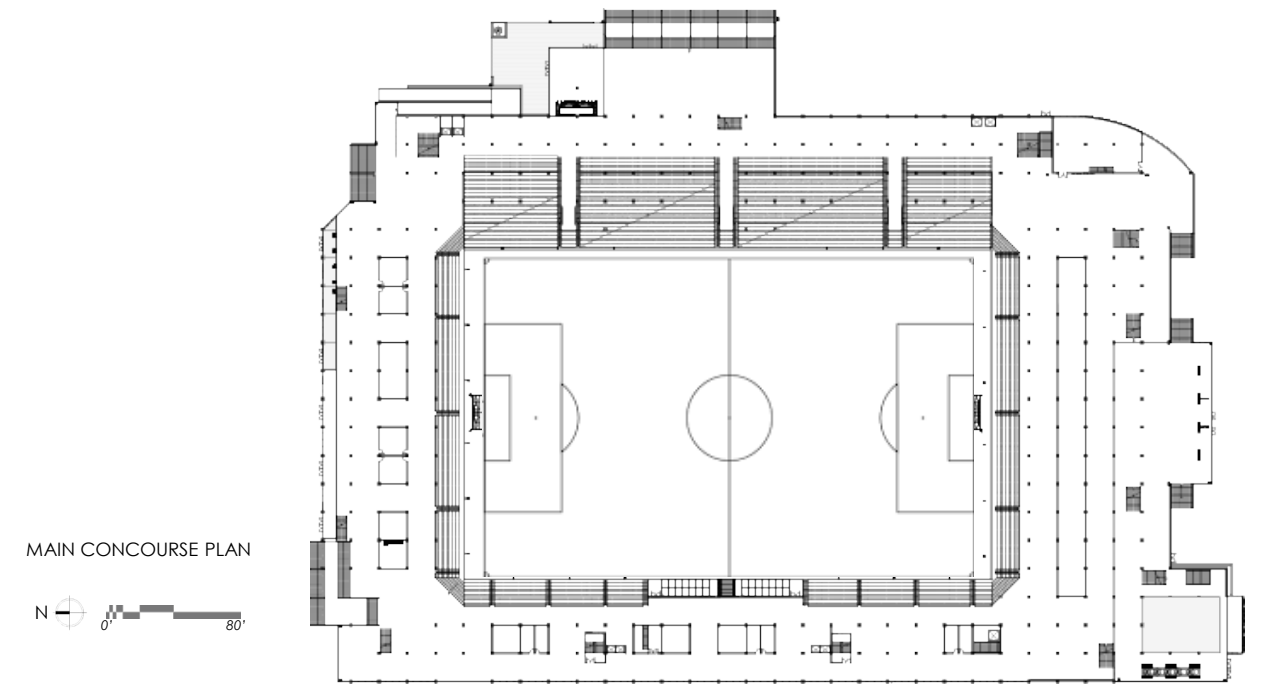
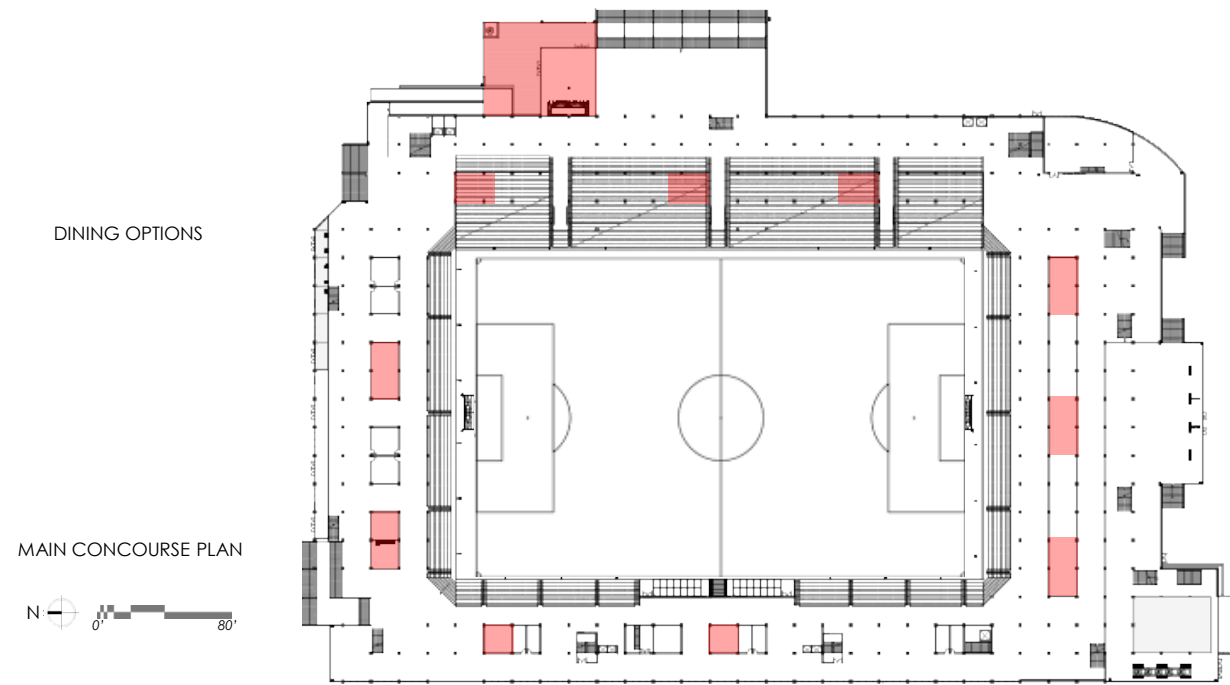
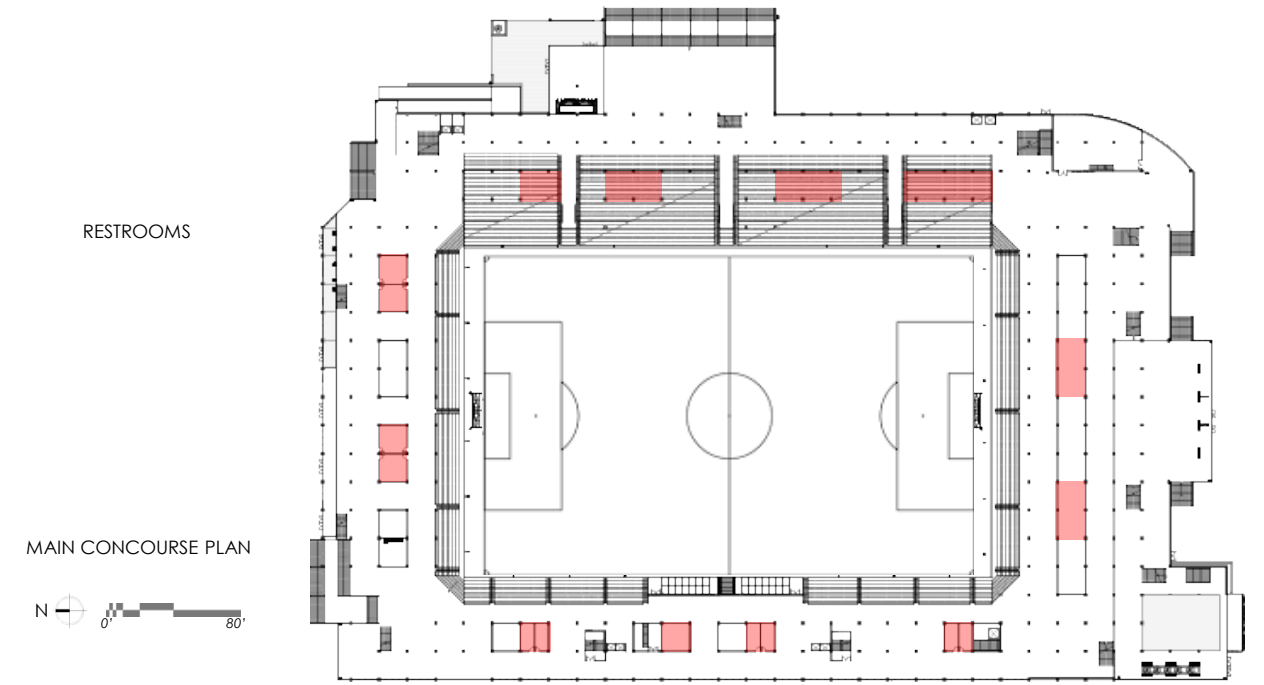
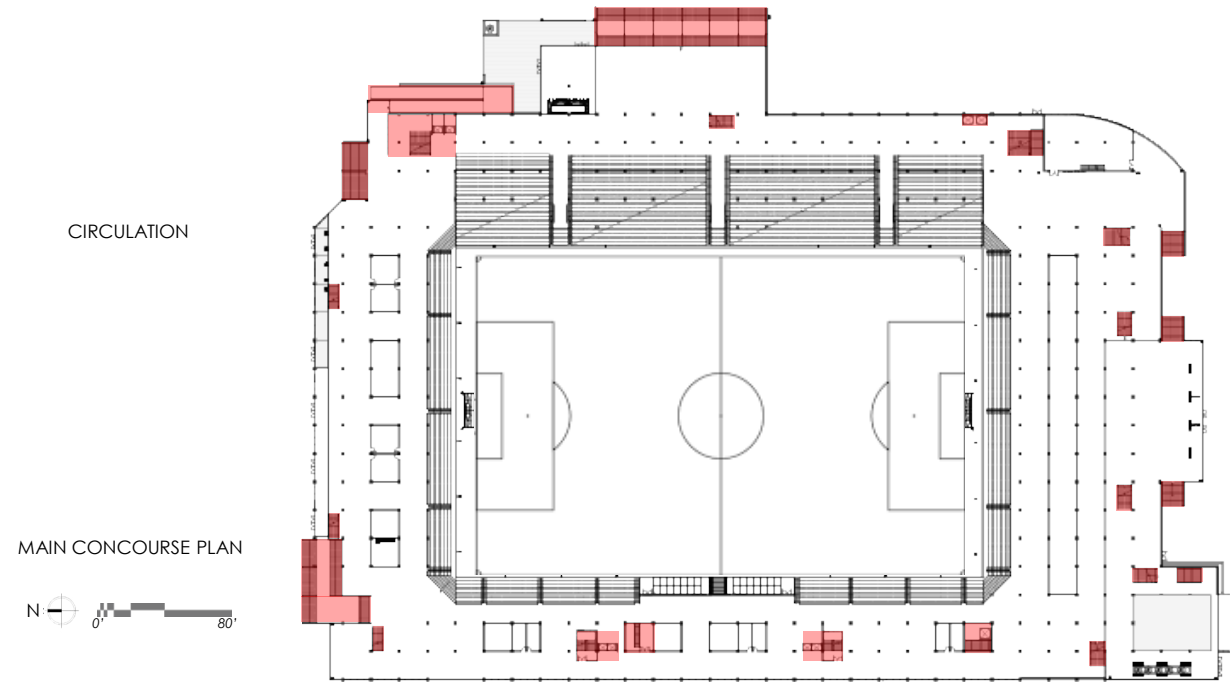
MAIN CONCOURSE PLAN

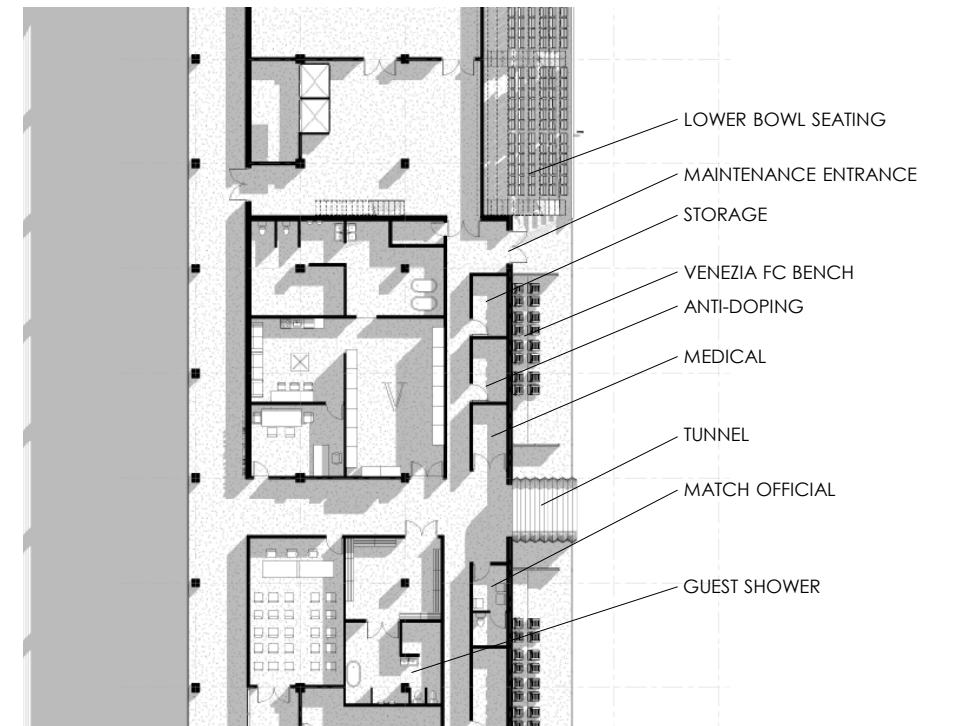
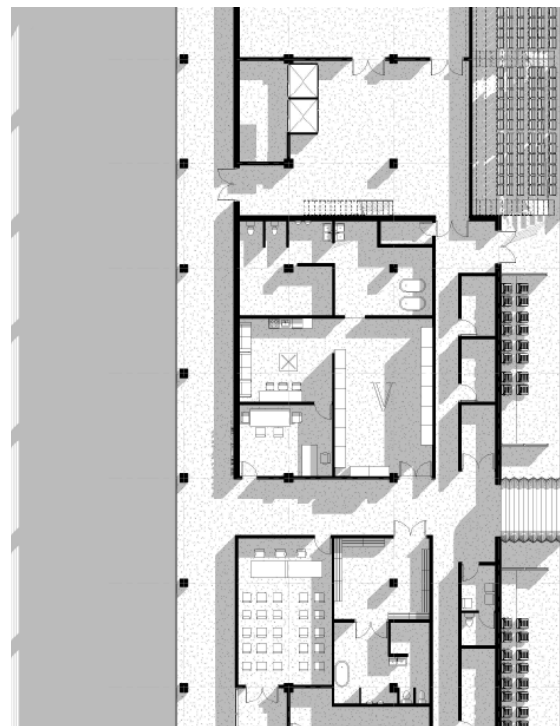
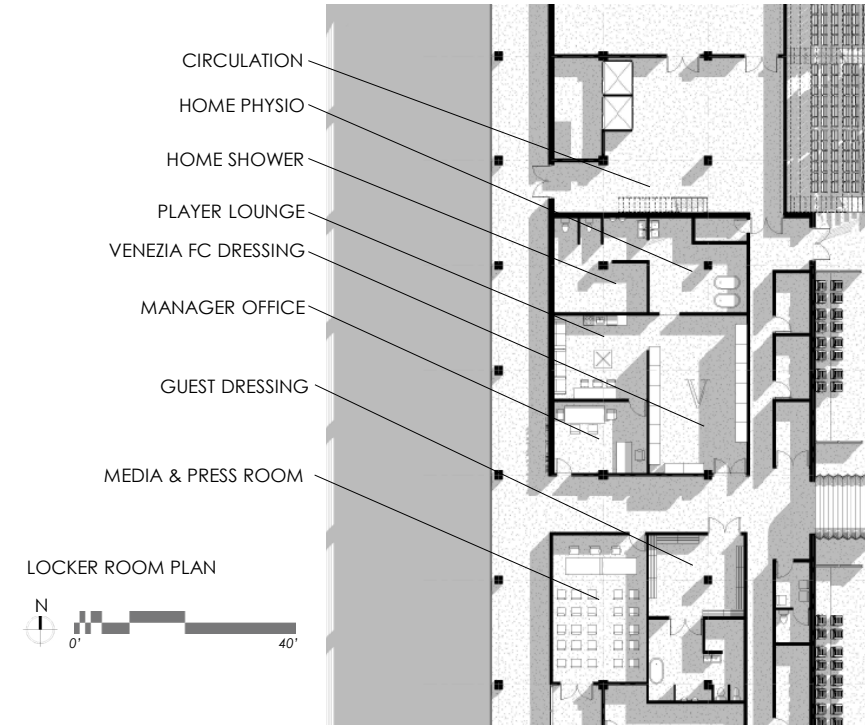


PLAYING SURFACE

MAIN CONCOURSE PLAN



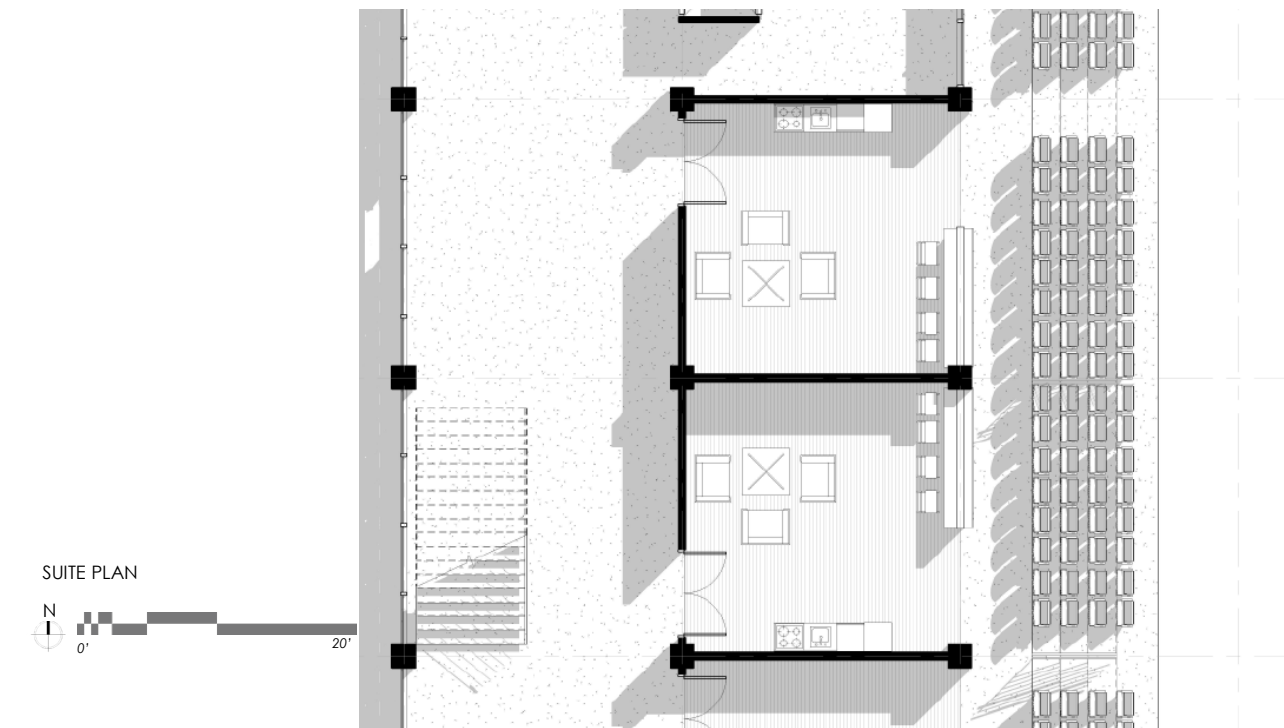
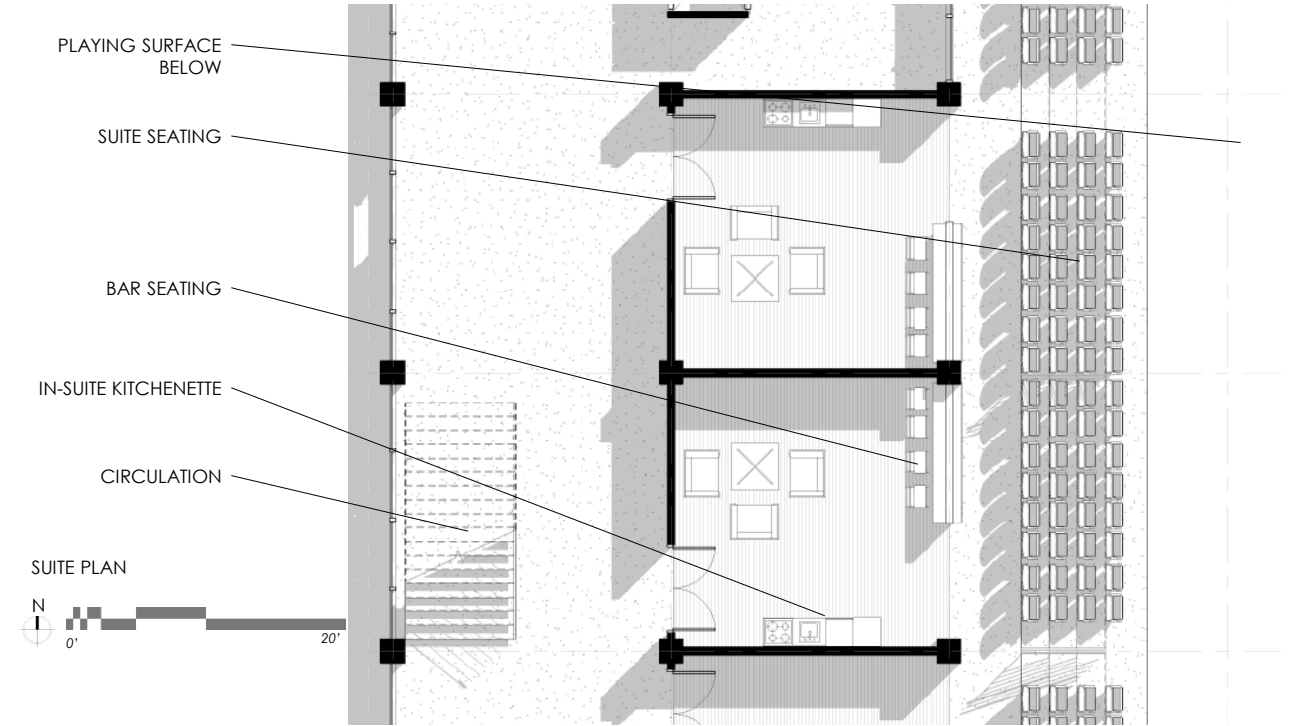


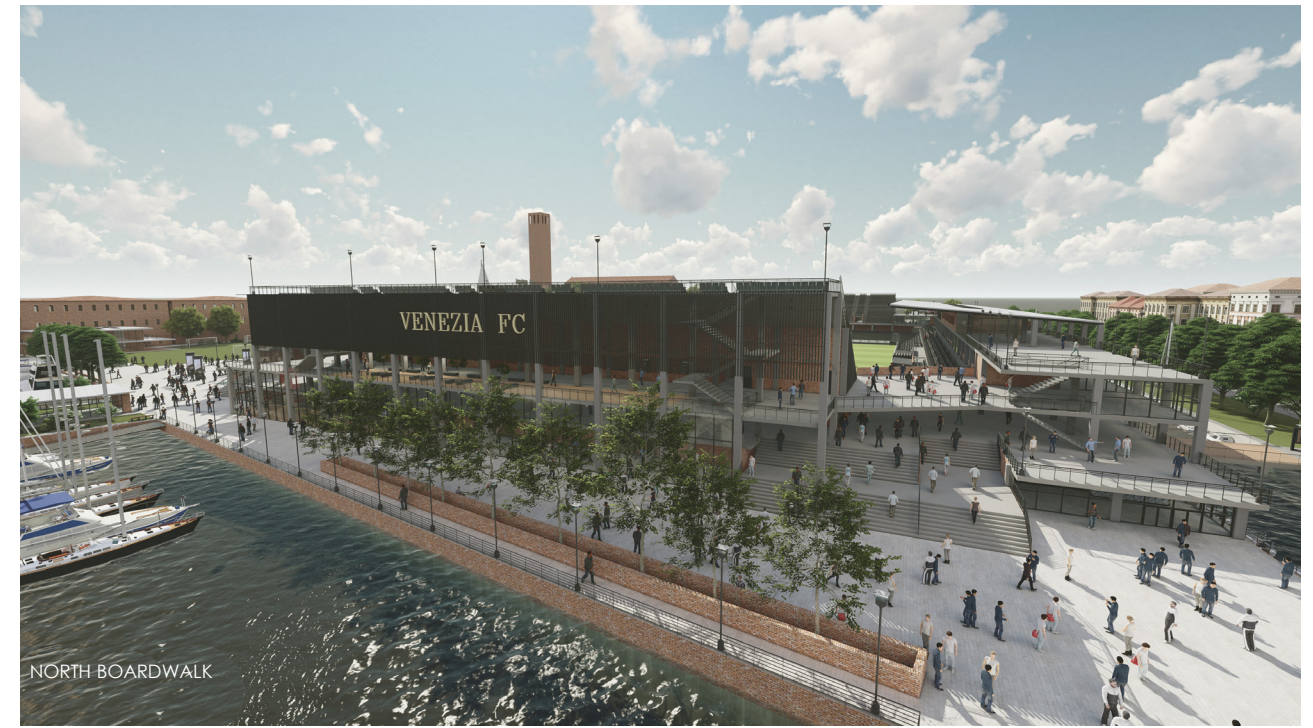
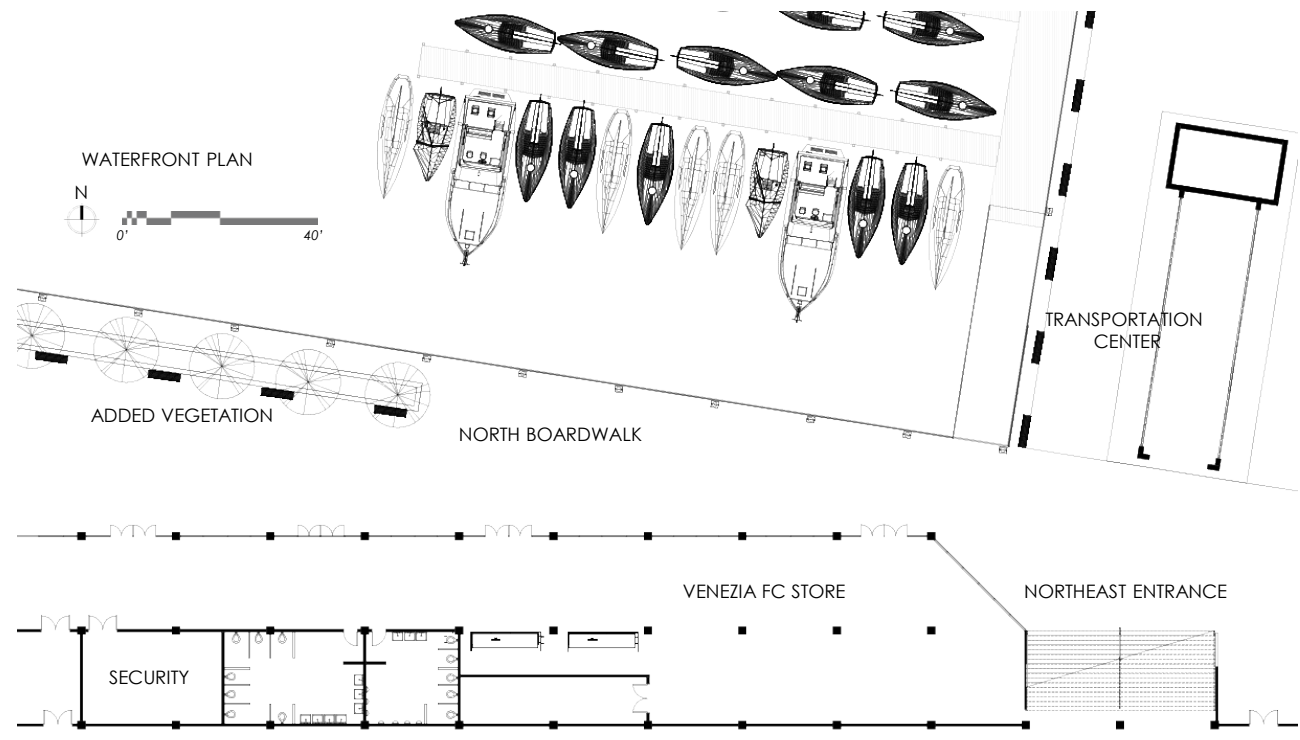
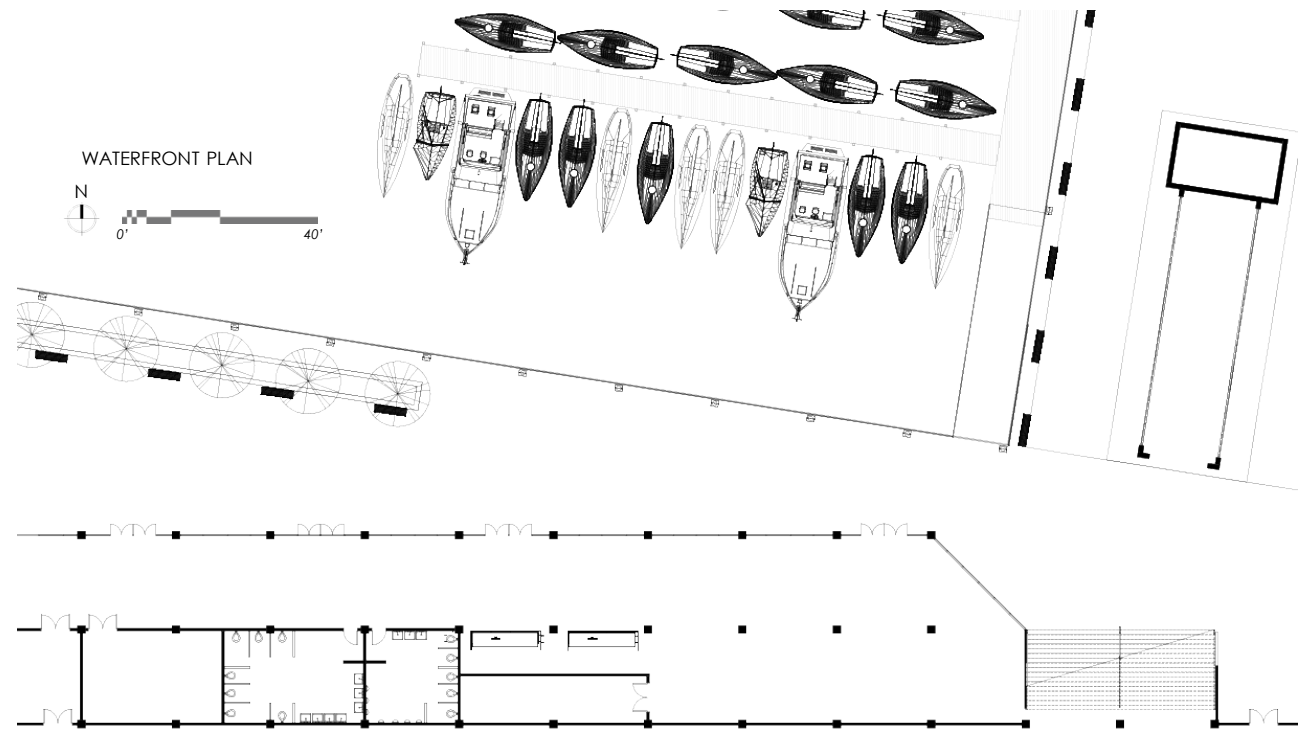


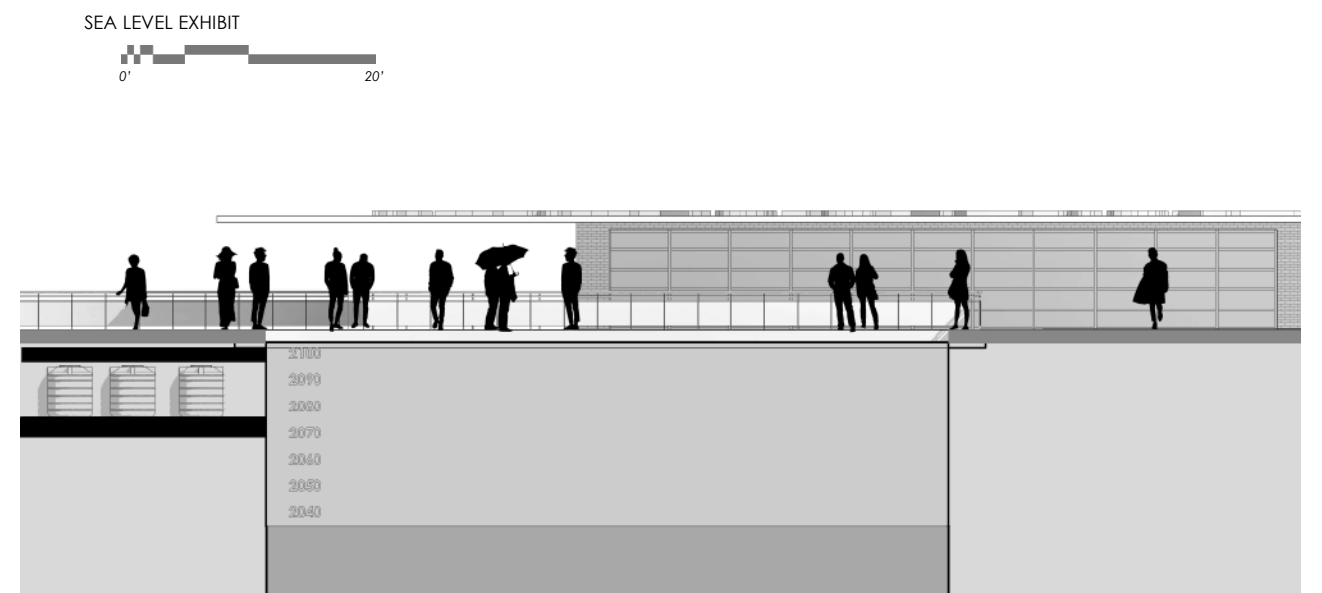
DIGITAL PRESENTATION

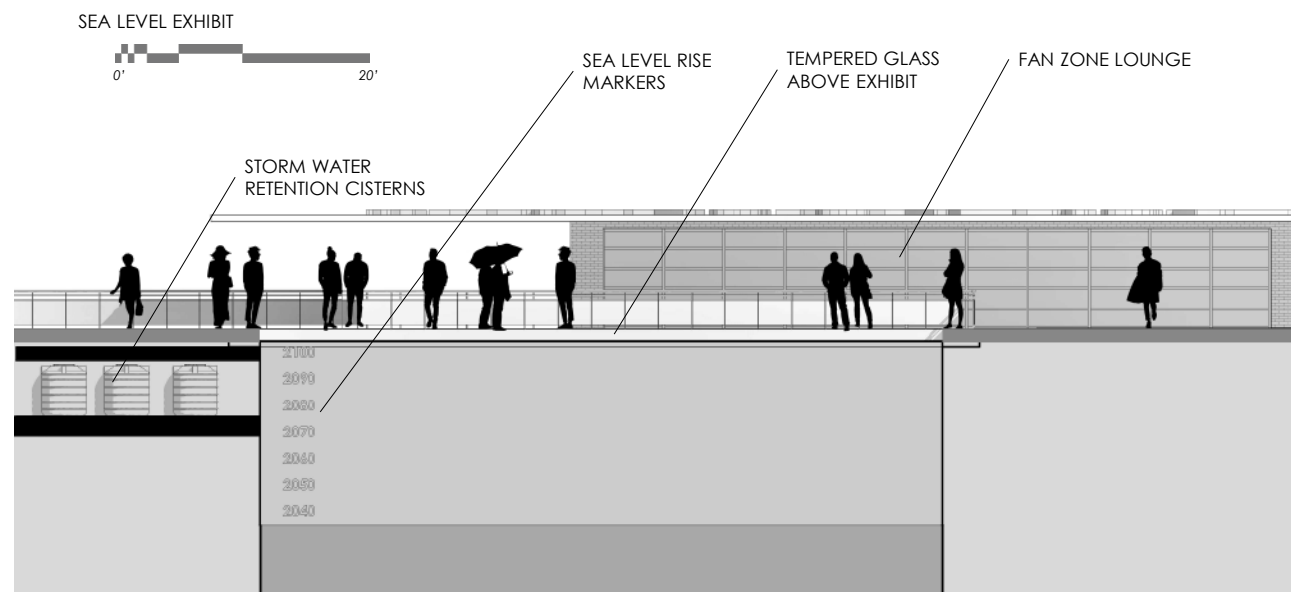


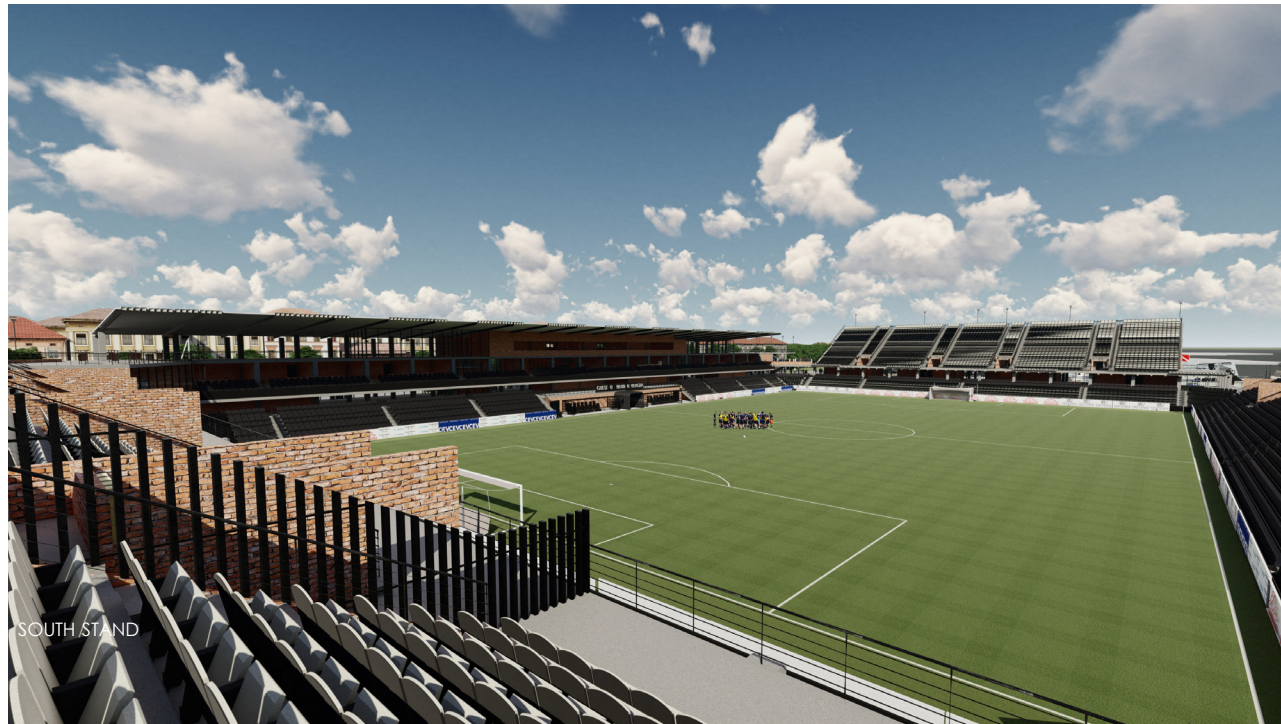
DIGITAL PRESENTATION

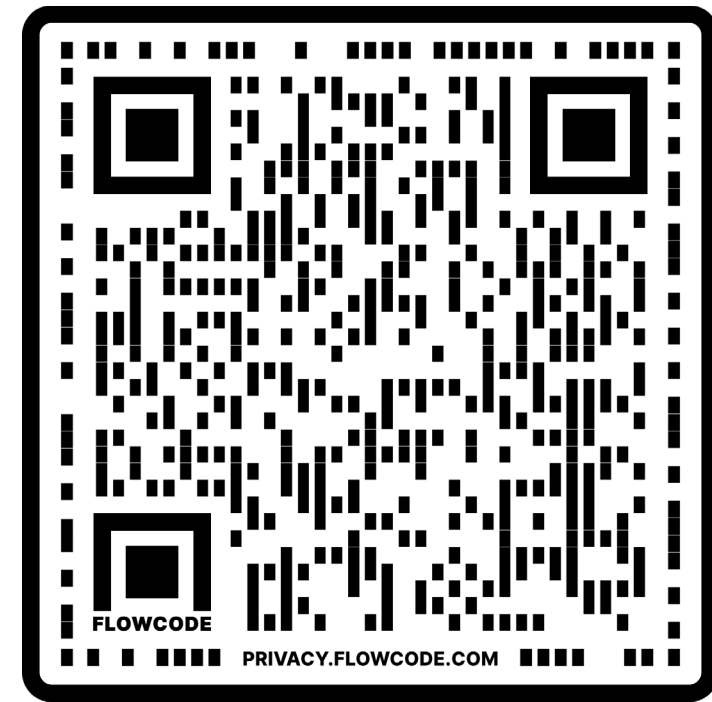












VIDEO QR CODE

PHOTOGRAPH OF PROJECT INSTALLATION



Fig. 109 Project Installation

STADIO PIER LUIGI PENZO Project Installation at Renaissance Hall 5th Floor, April 21 - May 5, 2023. Presentation occurred on May 1st, 2023

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APPENDIX

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PREVIOUS STUDIO EXPERIENCE

2nd Year

Fall 2019

Instructor: Milton Yergens
Project: Split River Studio, Residential
Project: Antient & Honourable Hiawathan Rowing Society, Boathouse

Spring 2020

Instructor: Ronald Ramsay
Project: Halden Residence, Residential
Project: 4th Avenue Lodging, Mixed-Use

3rd Year

Fall 2020

Instructor: Niloufar Alenjery
Project: The Pit, Theoretical Storytelling
Project: Venetian Sea Level Center, Research Facility and Exhibits

Spring 2021

Instructor: Emily Guo
Project: 425 East Randolph Street, Commercial Office Building
Project: Dennis Lanz Group Competition, Pavilion

4th Year

Fall 2021

Instructor: David Crutchfield
Project: One Omni Plaza, Highrise Capstone Project

Spring 2022

Instructor: David Crutchfield
Project: Lake Cormorant Residence, Residential, Marvin Windows Comp.
Project: 101 Fargo, Mixed-Use, Residential

5th Year

Fall 2022

Instructor: Cindy Urness
Project: Otte Wetland Research Center, Research Facility

PIER LUIGI PENZO

FOOTBALL ON WATER AND THE STADIUM EXPERIENCE

ROYCE PICHETTI - NORTH DAKOTA STATE UNIVERSITY - ALA MASTERS PROGRAM