KORÇARENA

NEW SKENDERBEU STADIUM

PRELIMINARY PROJECT IDEA
PHASE II (REVISED)

CEBRA
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CONTENT

SITE

URBAN CONTEXT

The new stadium will be in the sports park in the northern part of Korça, approximately 1 km from the city center. It offers easy access from the main Bulevardi Republika and the secondary Bulevardi Gjergj Kastrioti. The center is characterized as a charming blend of history and culture. It features elegant neoclassical buildings, cobblestone streets, and bustling squares adorned with cafes and artisanal shops, which offer attractive tourist destinations.

In the eastern neighboring area, there is a beautiful and expansive park, Parku Rinia, that serves as a green oasis in the city. Covering an area of 100,000 square meters, it is known for its diverse range of trees and plants. The park was established around 60 years ago and has become a popular spot for locals and visitors alike. The park features well-maintained walking paths, making it a great place for leisurely strolls, family outings, and sports activities. On weekends, it is especially lively with families, tourists, and young people engaging in various activities. The park's design and upkeep reflect European standards, contributing to its reputation as one of the most beautiful parks in Albania.

The site, therefore, has great potential to become a new cultural destination with rich natural surroundings, promoting a variety of cultural activities that enhance a sense of community and create greenery for recreational purposes. This will benefit the new stadium as the center of the new neighborhood, while allowing international matches to be held.

However, the current state of the sports park, which includes the Skënderbeu stadium, two football pitches, several smaller pitches for tennis, basketball, and futsal, indoor sports facilities, and an athletic games training area, does not offer optimal conditions for this vision. While it serves its primary purpose for athletic activities, it falls short in providing social and cultural events. This gap results in a less vibrant atmosphere, limiting opportunities for community interaction and engagement. The absence of social and cultural programming diminishes the park's potential to foster a sense of community and inclusivity, making it less appealing to a broader audience.

Therefore, the area needs to be reconceptualized, with the new stadium playing a crucial part in this transformation.

SITE

CURRENT SITUATION

The current state of the site and the “Skënderbeu” stadium, as documented in the photographs, is presented as below:

- The stadium tribune has not been reconstructed in recent years and has a low capacity for accommodating spectators, media and VIPs.
- Its internal space is insufficient to accommodate the teams.
- The infrastructure for the match broadcasting system is missing.
- There is no fixed and mobile audio system in the stands and along the perimeter of the field.
- There is no central information screen.
- The mechanical revolving doors do not work and are not connected to the electronic ticket control system.
- The perimeter stairs are in a dilapidated state, with vegetation growing between them.
- The benches are damaged and some of them are missing.

PHOTO OF THE SPORTS PARK

PHOTO OF THE SPORTS PARK

PHOTO OF THE SPORTS PARK

PHOTO OF THE EXISTING STADIUM

PHOTO OF THE EXISTING STADIUM

PHOTO OF THE EXISTING STADIUM

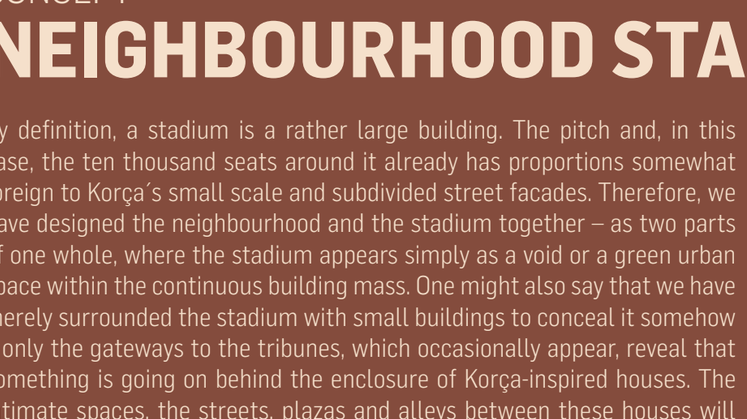
CONCEPT
STADIUM
TECHNICAL

CONCEPT

NEIGHBOURHOOD STADIUM

By definition, a stadium is a rather large building. The pitch and, in this case, the ten thousand seats around it already has proportions somewhat foreign to Korça´s small scale and subdivided street facades. Therefore, we have designed the neighbourhood and the stadium together – as two parts of one whole, where the stadium appears simply as a void or a green urban space within the continuous building mass. One might also say that we have merely surrounded the stadium with small buildings to conceal it somehow – only the gateways to the tribunes, which occasionally appear, reveal that something is going on behind the enclosure of Korça-inspired houses. The intimate spaces, the streets, plazas and alleys between these houses will offer cosy places to hang out for drinks before and after matches and other events. So will the continued Parku Rinia, which flows through the site and along the “camouflaged” stadium.

Comparing our Korça stadium to the Air Albania Stadium by the Sheshi Italia in Tirana clearly demonstrates the urban strategy described above. The latter appears as one monumental object with uniform facades, fitting for the denser context of Tirana, while the mass of our scheme is broken down into smaller units forming a kind of necklace embracing the arena space. Thus, our project is undoubtedly unique, but it is not monumental or out of scale. It is not just an icon for sports, but an asset to the neighbourhood.

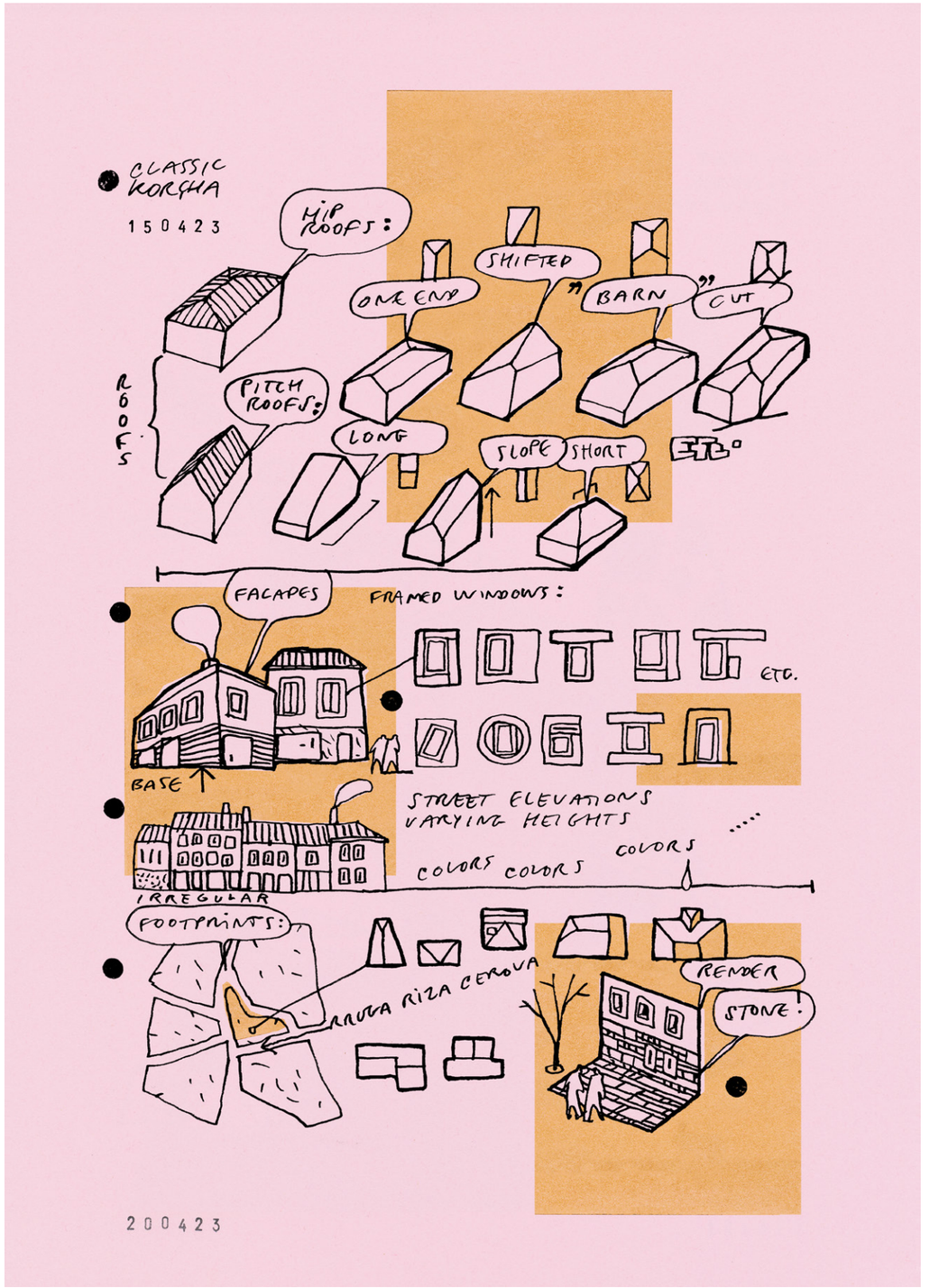


CONCEPT

LEARNING FROM KORÇA

To fit into the context of Korça and only subtly add contemporary traits, we have carefully studied particularly the old part of town and noted the most significant as architectural inspiration for the stadium:

- The city blocks and the streets between them are irregular, making the urban spaces interesting and varied.
- Many streets and plazas are paved with rough cobblestones.
- The street facades are divided vertically as the individual houses are short and vary in height. Many of them have a stone base.
- The facades are primarily rendered in colour with evenly distributed, portrait format windows, often graphically framed by light stone.
- Most buildings have red, sloping tile roofs with pitches in many variations.



CONCEPT

OBSERVATIONS

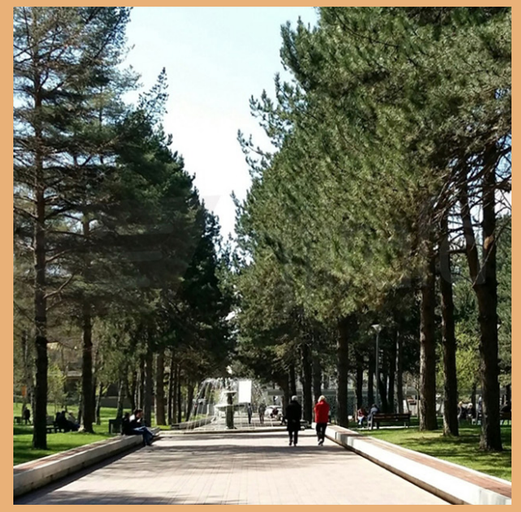
The pictures on the right are the examples of details from our "Learning from Korça," categorized under the following three topics.

URBAN DESIGN
The narrow streets and plazas of Korça are often paved with a wide variety of stones. It seems there is great attention to street life as there are many seating possibilities and different types of trees providing shade.

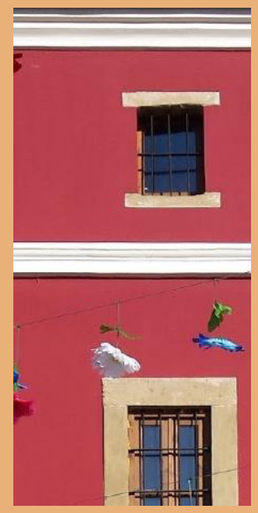
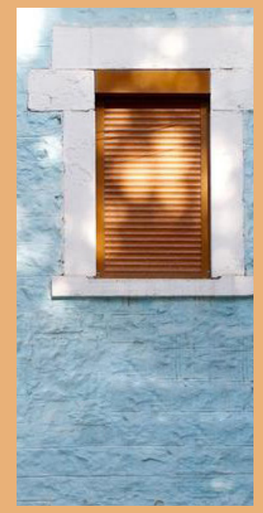
FACADE
Korça appears elegantly polychrome as the facades generally are rendered in different tones. Wide natural stone frames surround many windows.

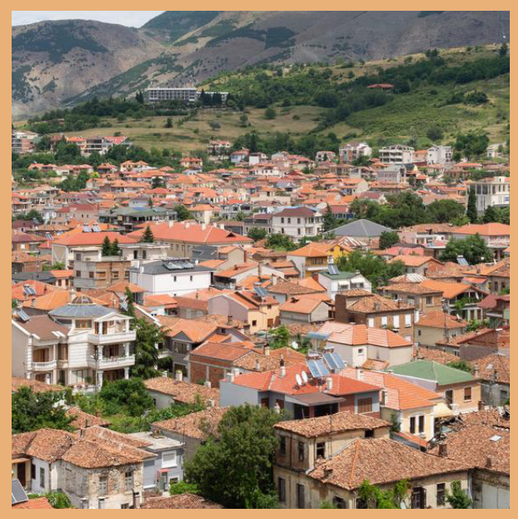
ROOFS
Roofs in Korça are mainly reddish, and nearly all buildings, particularly in the oldest part of town, are built with pitches and slopes.








CONCEPT

SITUATION PLAN

If the entire project implemented, the KorcArena as the new neighbourhood stadium, as imagined from the air, would look something like this.

CONCEPT

KORÇARENA

LOCATION

The new stadium will be situated almost in the same location as the existing one, offering an optimal position visible from the city center, Parku Rinia, and Bulevardi Rilindasit. It will be accessible to the public from the south via Bulevardi Republika from the city center, and from the east and north from the park side. The western side will be designated for players, staff, media, and VIP guests, with their entrance located on the basement floor for security and privacy reasons.

VOLUME AND HEIGHT

As previously mentioned, our concept aims to harmonize the stadium complex with the surrounding buildings. The stadium itself has three stories, while the adjacent buildings average three to four stories. However, to create a vibrant cityscape, the heights will vary from one to six stories. For instance, the one-story buildings will serve as small pavilions, functioning as kiosks or information centers, while the taller buildings will be connected to the stadium, clearly marking it as the center of the new neighborhood.
The roof shapes for all buildings are proposed as either pitched or hip roofs, inspired by the local architectural typology.

The illustration on the right demonstrates the stadium volumes within the context.

AERIAL RENDER

The main entrance to the new Skenderbeu Stadium is placed on the north-south axis of Bulevardi Republika, connecting to the roundabout with a new urban plaza – the bust of Skanderbeg remains!

CONCEPT

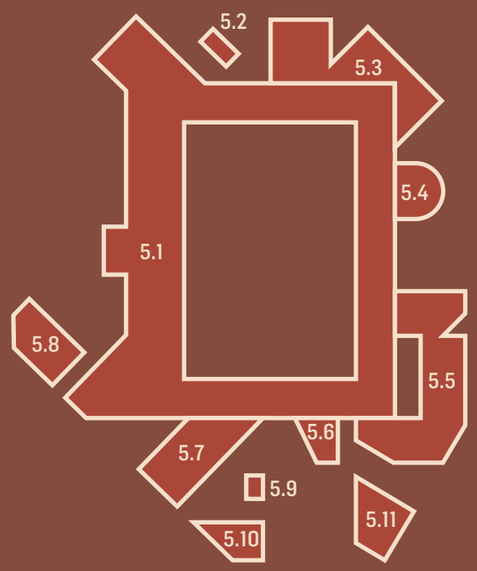
KORÇARENA

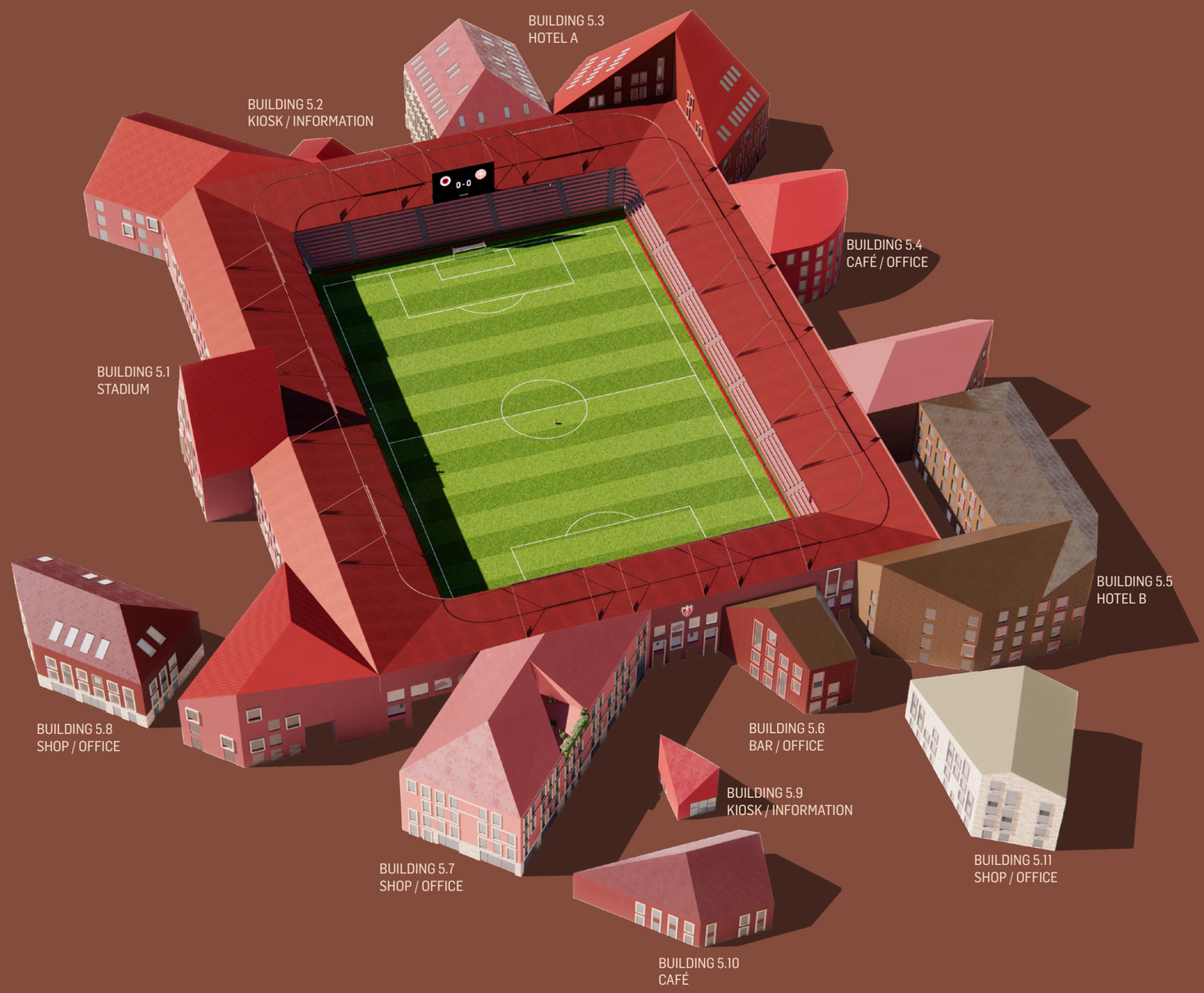
FUNCTION

STADIUM (BUILDING 5.1)
The new Skenderbeu stadium will have 8,214 seats, including 244 VIP seats, 64 media seats, and 88 spaces for individuals with disabilities, with an optional capacity extension to a total of 8,646 seats. It will feature underground parking for 188 cars and comply with UEFA regulations for Category 4 stadiums. The stadium will have four stories, including a basement, along with a small tower in the center of the main stand that features two additional floors.

ADJACENT BUILDINGS (BUILDING 5.2 - 5.11)
These buildings will support the stadium's functions. Their ground and first floors will feature various commercial establishments, such as cafés, bars, restaurants, kiosk, and shops, where spectators can enjoy a drink or a meal before and after events. These amenities will also cater to the daily needs of locals. The upper floors will house office spaces for these commercial functions and tenant leases. Additionally, there are two buildings with hotels designed to accommodate away team players and their staff, VIP guests, spectators from abroad, and tourists visiting Korça city.

Left and below are the illustrations showing the building numbers, functions, and areas of each building.





CONCEPT
STADIUM
TECHNICAL

RENDER

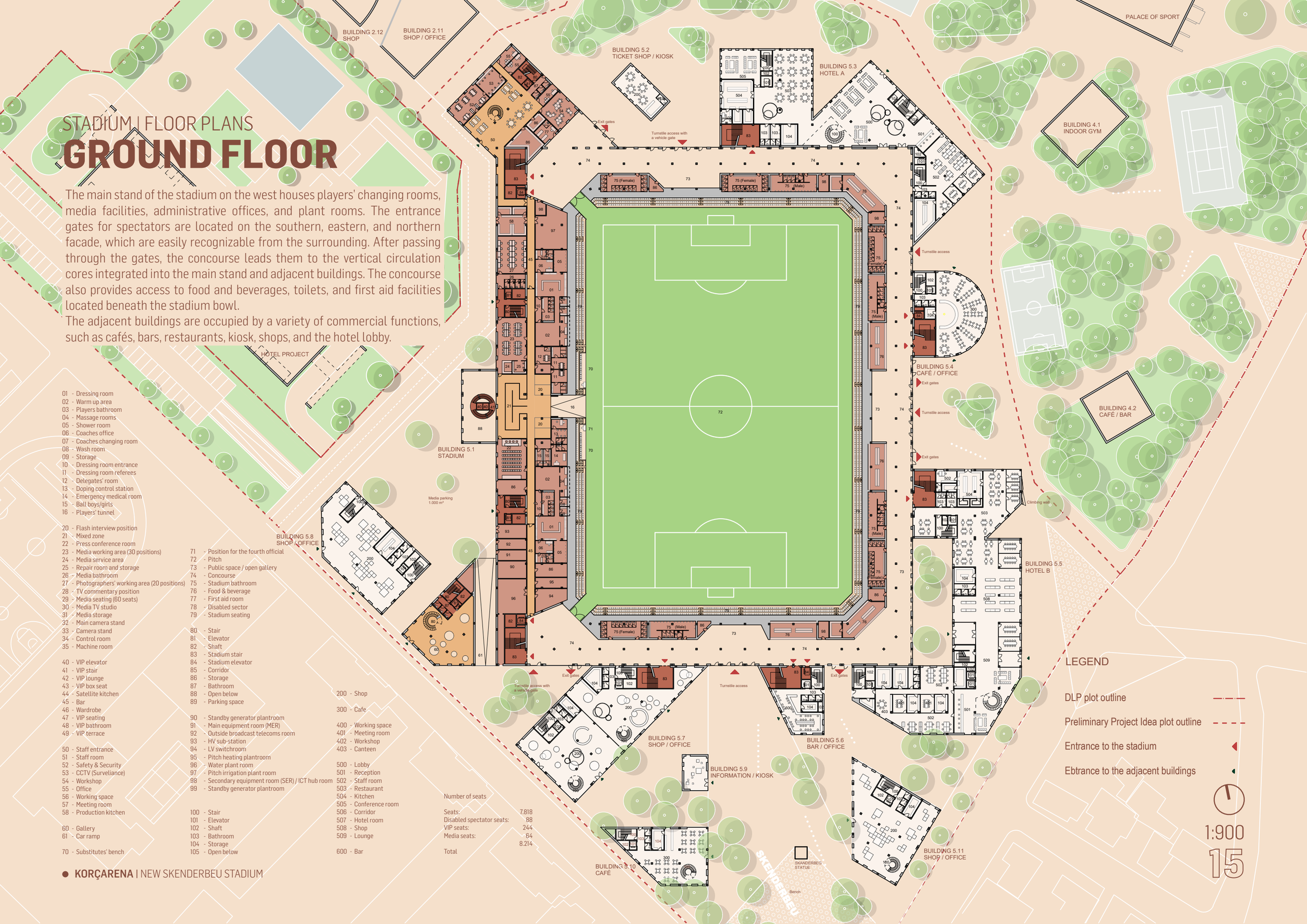
The arrival area, defined clealy as a square by the adjacent buildings, opens up towards the city center via Bulevardi Republika, inviting the crowd to the stadium entrance.

STADIUM | FLOOR PLANS

GROUND FLOOR

The main stand of the stadium on the west houses players' changing rooms, media facilities, administrative offices, and plant rooms. The entrance gates for spectators are located on the southern, eastern, and northern facade, which are easily recognizable from the surrounding. After passing through the gates, the concourse leads them to the vertical circulation cores integrated into the main stand and adjacent buildings. The concourse also provides access to food and beverages, toilets, and first aid facilities located beneath the stadium bowl.

The adjacent buildings are occupied by a variety of commercial functions, such as cafés, bars, restaurants, kiosk, shops, and the hotel lobby.



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02 - Warm up area
03 - Players bathroom
04 - Massage rooms
05 - Shower room
06 - Coaches office
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08 - Wash room
09 - Storage
10 - Dressing room entrance
11 - Dressing room referees
12 - Delegates' room
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14 - Emergency medical room
15 - Ball boys/girls
16 - Players' tunnel

20 - Flash interview position
21 - Mixed zone
22 - Press conference room
23 - Media working area (30 positions)
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27 - Photographers' working area (20 positions)
28 - TV commentary position
29 - Media seating (60 seats)
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31 - Media storage
32 - Main camera stand
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35 - Machine room

40 - VIP elevator
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54 - Workshop
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60 - Gallery
61 - Car ramp

70 - Substitutes' bench
71 - Position for the fourth official
72 - Pitch
73 - Public space / open gallery
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509 - Lounge

600 - Bar

Number of seats

Seats:	7.818
Disabled spectator seats:	88
VIP seats:	244
Media seats:	64
Total	8.214

LEGEND

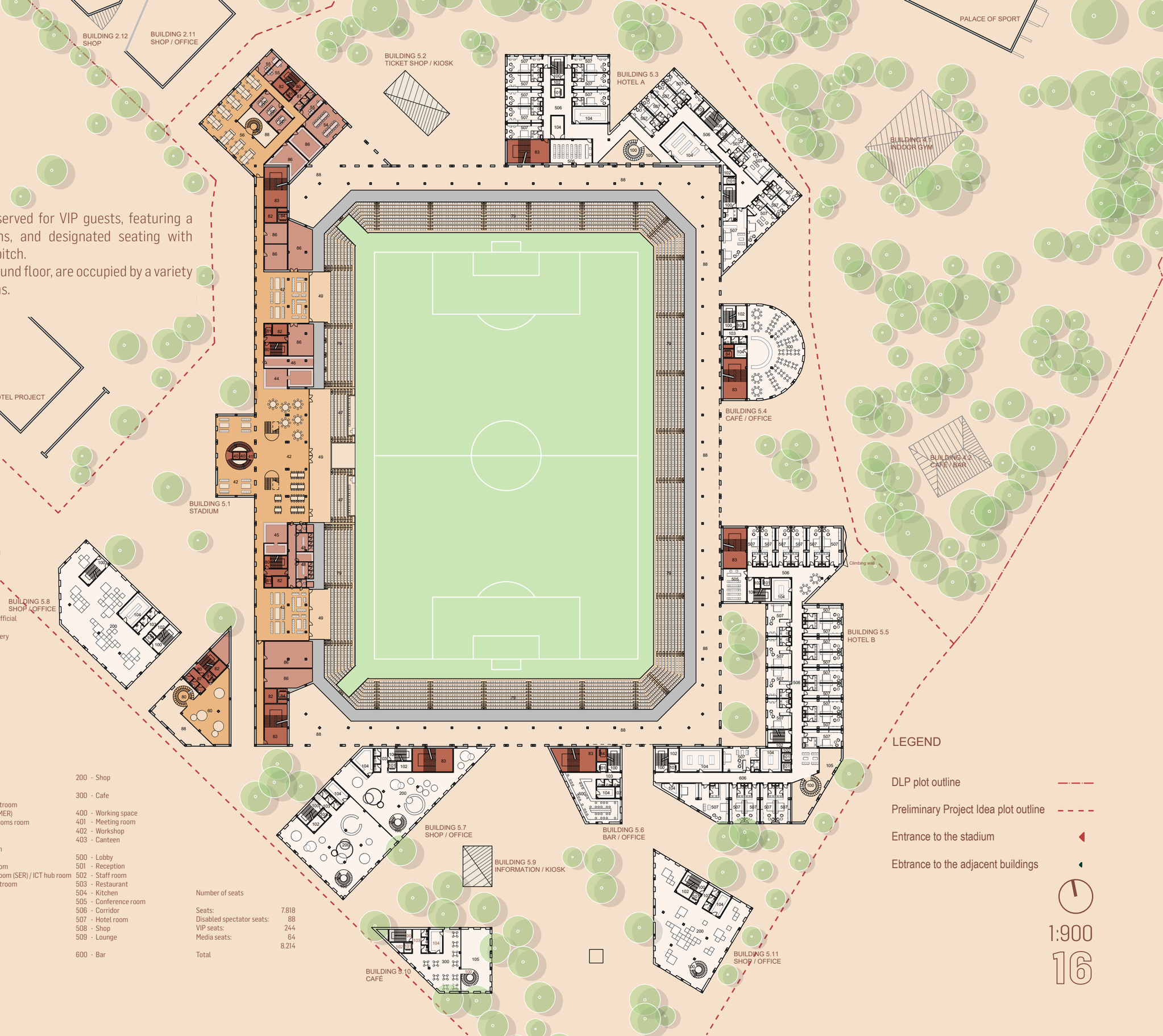
- DLP plot outline
- Preliminary Project Idea plot outline
- Entrance to the stadium
- Ebtrance to the adjacent buildings

1:900

STADIUM | FLOOR PLANS

1ST FLOOR

The main stand on the first floor is reserved for VIP guests, featuring a lounge, restaurant, bar, meeting rooms, and designated seating with terraces, all offering a close view of the pitch.
The adjacent buildings, similar to the ground floor, are occupied by a variety of commercial functions, and hotel rooms.



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DLP plot outline
Preliminary Project Idea plot outline
Entrance to the stadium
Ebtrance to the adjacent buildings

1:900

16

STADIUM | FLOOR PLANS

2ND FLOOR

After passing through the vertical circulation cores, spectators can access their seats from this floor via the concourse, which also provides access to food and beverages, toilets, and first aid. The concourse provides a clear view of the stadium seating, making it easy for spectators to find their destinations. The main stand accommodates media functions, including camera platform, TV commentary, TV studios and VIP box seats on the center.
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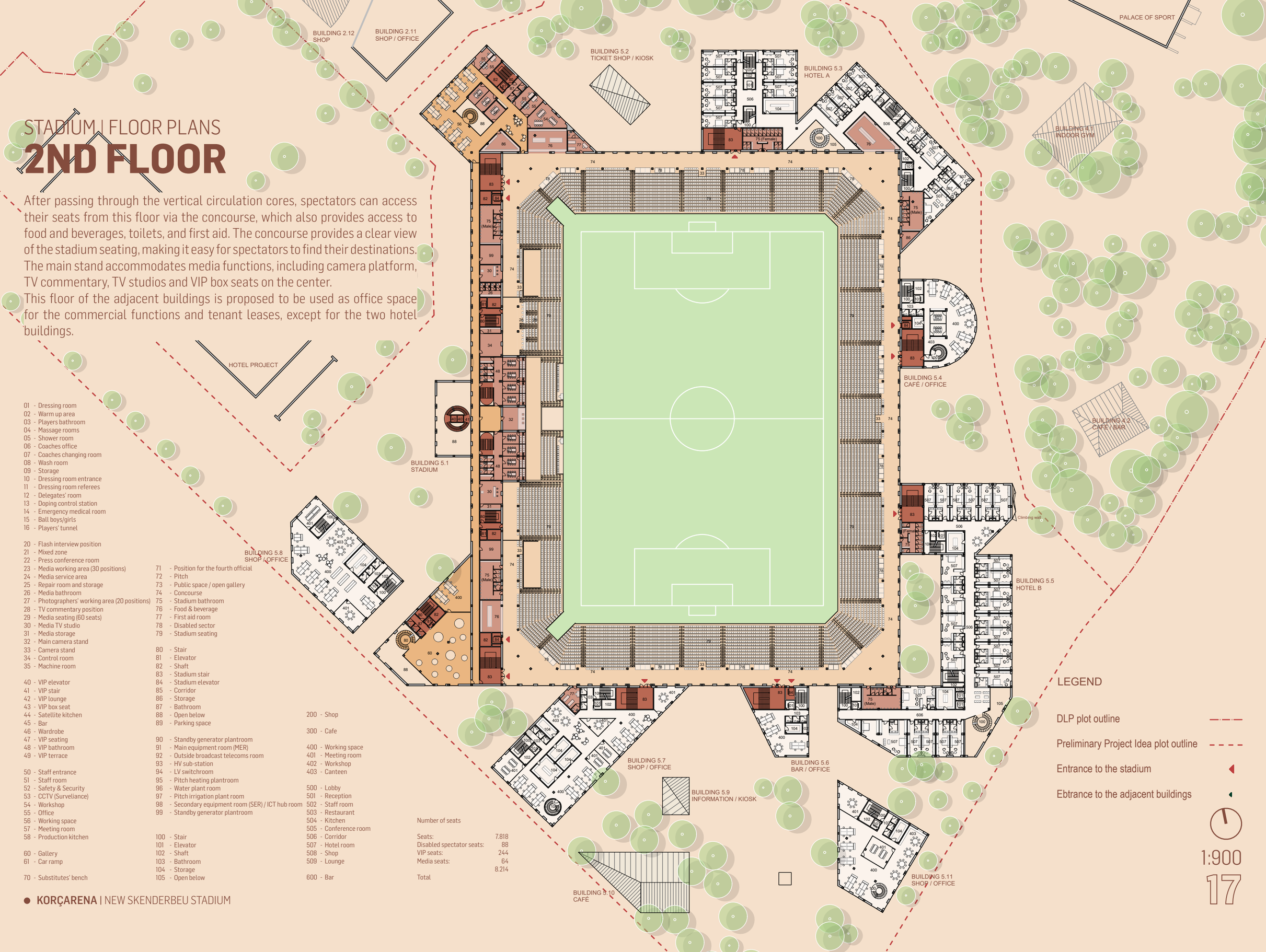

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1:900

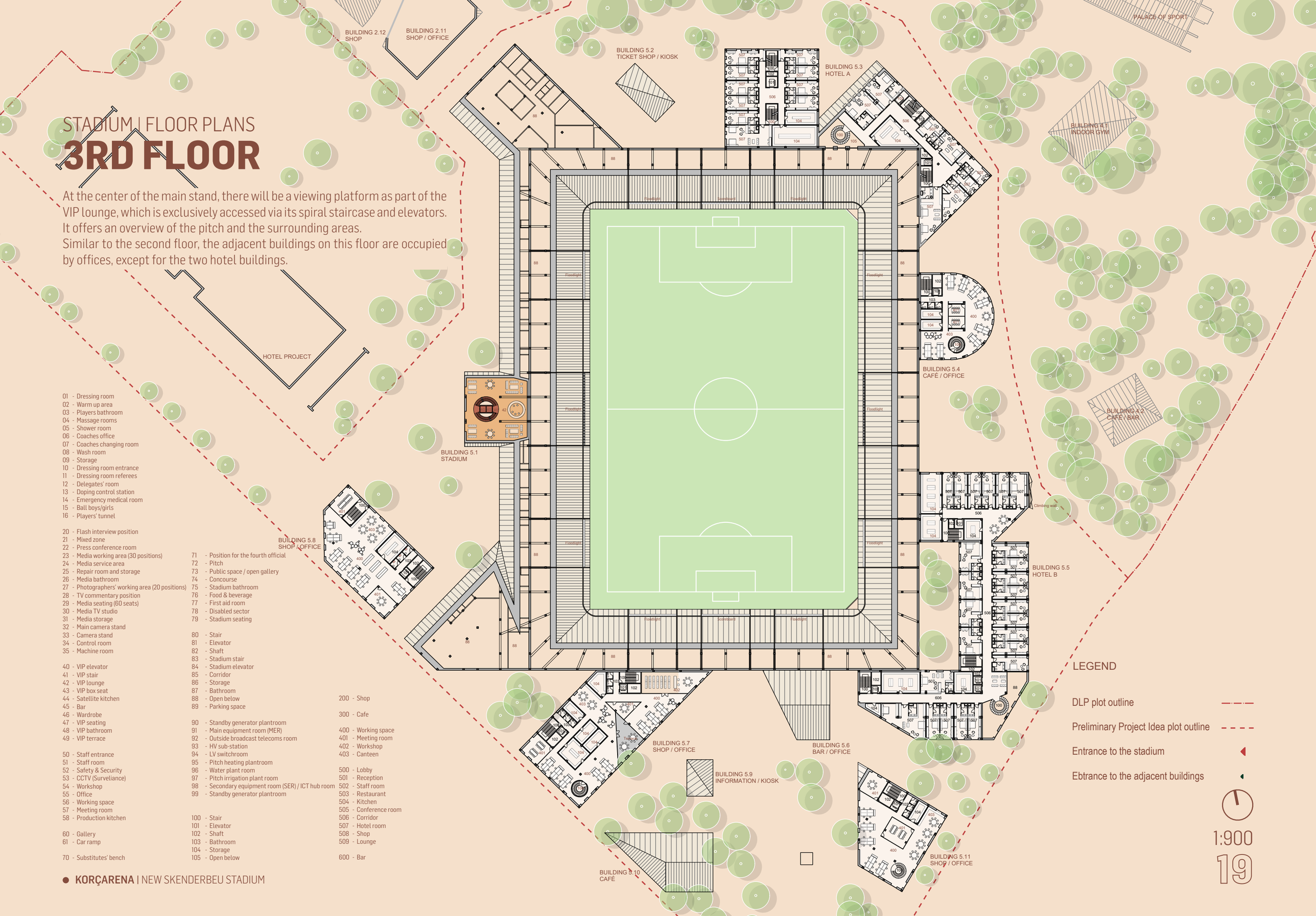
RENDER FROM INSIDE THE STADIUM

Inside the stadium, some of the surrounding buildings are still visible as they shoot up over the arena roof.

STADIUM | FLOOR PLANS

3RD FLOOR

At the center of the main stand, there will be a viewing platform as part of the VIP lounge, which is exclusively accessed via its spiral staircase and elevators.
It offers an overview of the pitch and the surrounding areas.
Similar to the second floor, the adjacent buildings on this floor are occupied by offices, except for the two hotel buildings.



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LEGEND

DLP plot outline
Preliminary Project Idea plot outline
Entrance to the stadium
Ebtrance to the adjacent buildings

1:900

STADIUM | FLOOR PLANS

4TH FLOOR

This floor of the stadium is the top level of the VIP lounge, offering spectacular views of the city, Park Parku Rinia, and the mountains behind.
The hotel, Building Number 5.3, has its upper floors dedicated to rooms and a lounge with a great view of the surroundings.

BUILDING 2.12
SHOP

BUILDING 2.11
SHOP / OFFICE

BUILDING 5.2
TICKET SHOP / KIOSK

BUILDING 5.3
HOTEL A

PALACE OF SPORT

BUILDING 4.1
INDOOR GYM

HOTEL PROJECT

BUILDING 5.4
CAFÉ / OFFICE

BUILDING 4.2
CAFÉ / BAR

BUILDING 5.1
STADIUM

BUILDING 5.8
SHOP / OFFICE

BUILDING 5.5
HOTEL B

BUILDING 5.7
SHOP / OFFICE

BUILDING 5.6
BAR / OFFICE

BUILDING 5.9
INFORMATION / KIOSK

BUILDING 5.10
CAFÉ

BUILDING 5.11
SHOP / OFFICE

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LEGEND

DLP plot outline

Preliminary Project Idea plot outline

Entrance to the stadium

Ebtrance to the adjacent buildings

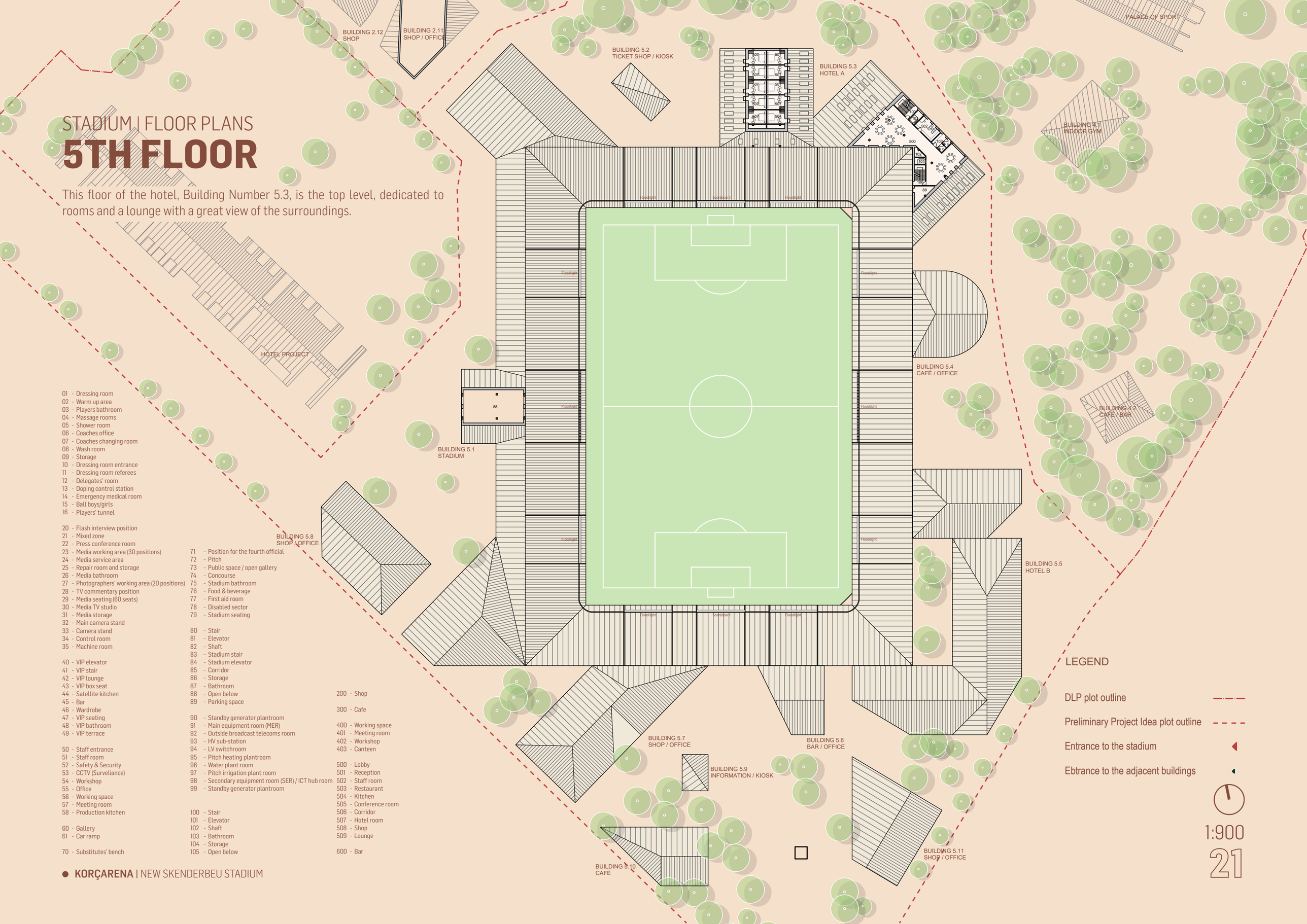
1:900

20

STADIUM | FLOOR PLANS

5TH FLOOR

This floor of the hotel, Building Number 5.3, is the top level, dedicated to rooms and a lounge with a great view of the surroundings.



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DLP plot outline

Preliminary Project Idea plot outline

Entrance to the stadium

Ebtrance to the adjacent buildings

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21

STADIUM | FLOOR PLANS

ROOF

BUILDING 2.12
SHOP

BUILDING 2.11
SHOP / OFFICE

BUILDING 5.2
TICKET SHOP / KIOSK

BUILDING 5.3
HOTEL A

PALACE OF SPORT

BUILDING 4.1
INDOOR GYM

HOTEL PROJECT

BUILDING 5.4
CAFÉ / OFFICE

BUILDING 4.2
CAFÉ / BAR

BUILDING 5.1
STADIUM

BUILDING 5.8
SHOP / OFFICE

BUILDING 5.5
HOTEL B

BUILDING 5.7
SHOP / OFFICE

BUILDING 5.6
BAR / OFFICE

BUILDING 5.9
INFORMATION / KIOSK

BUILDING 5.10
CAFÉ

BUILDING 5.11
SHOP / OFFICE

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DLP plot outline

Preliminary Project Idea plot outline

Entrance to the stadium

Ebtrance to the adjacent buildings

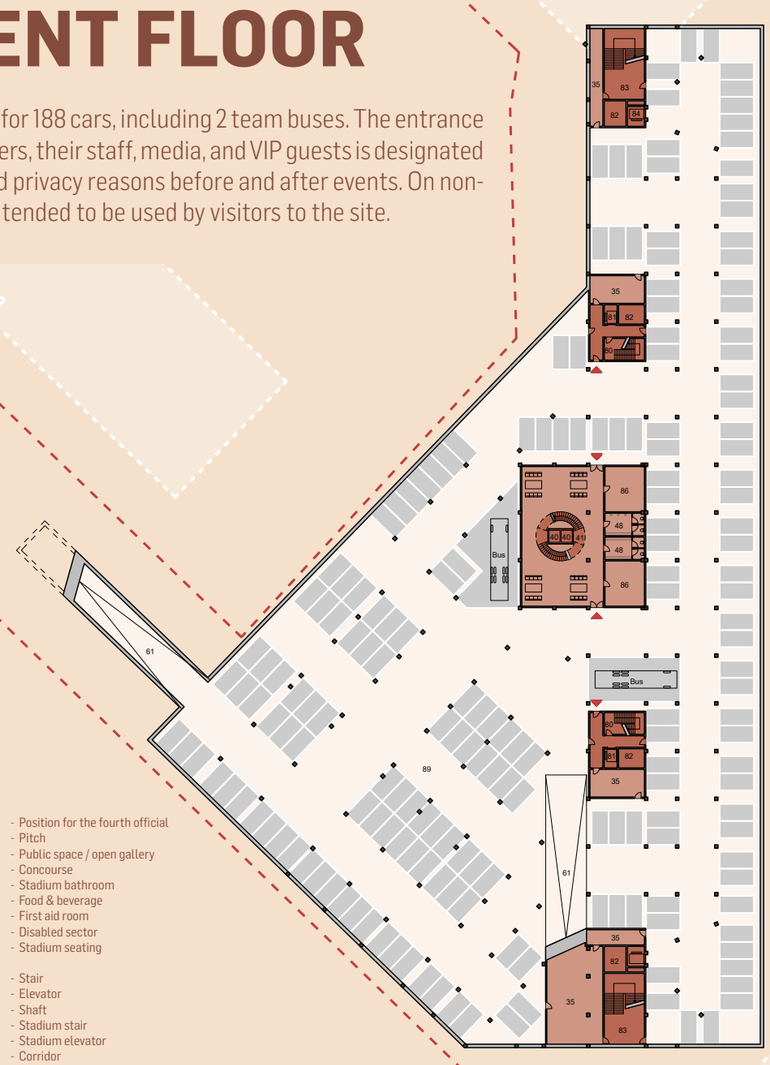
1:900

22

STADIUM | FLOOR PLANS

BASEMENT FLOOR

There will be parking space for 188 cars, including 2 team buses. The entrance for home players, away players, their staff, media, and VIP guests is designated on this level for security and privacy reasons before and after events. On non-event days, the parking is intended to be used by visitors to the site.



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Number of parking

Parking space:	186
Bus parking soace:	2
Total	188

1:900

STADIUM | FUNCTION

FUNCTION LAYOUT

PLAYER, TEAM, AND STAFF FACILITIES

Two changing rooms for the home and away teams are located on the ground floor of the main stand, with convenient access to the pitch. Each room is positioned on either side of the players' tunnel. Between them are the referee rooms, doping control room, medical room, and delegate's room next to the tunnel.

VIP FACILITIES

The main stand includes VIP areas, such as executive seating, lounges, and hospitality suites on the first floor and the exclusive box seats on the second floor. These areas offer enhanced amenities and services, providing a more luxurious matchday experience.

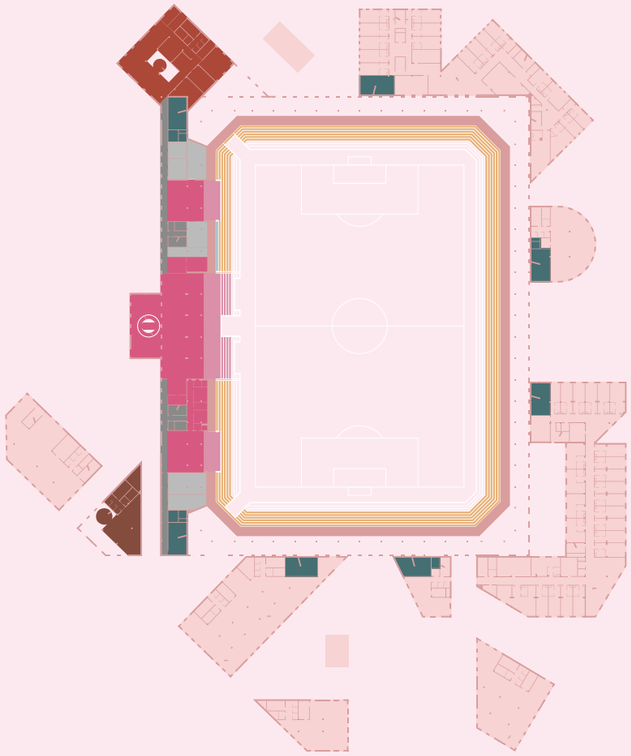
MEDIA AND BROADCAST FACILITIES

The media working room, conference room, and mix zone are located on the ground floor with easy access for players, while commentary positions, TV studios, and media personnel seating are on the second floor. This ensures that media personnel have a clear view of the pitch and can effectively cover the game.
There is 1,000 m² of parking space for broadcast vans outside, in front of the main stand.

FAN AMENITIES

Food and beverage concessions and restrooms for spectators are located on the second floor along the concourse, which is easily accessible from the seating area.

- Home team zone
- Away team zone
- Referee
- Mediacal / doping / delegates
- Flash interview / mixed zone
- VIP
- VIP seating
- Media
- Office
- Gallery
- Stadium seating
- Concourse
- Stadium core
- Stadium WC
- Service
- Flow



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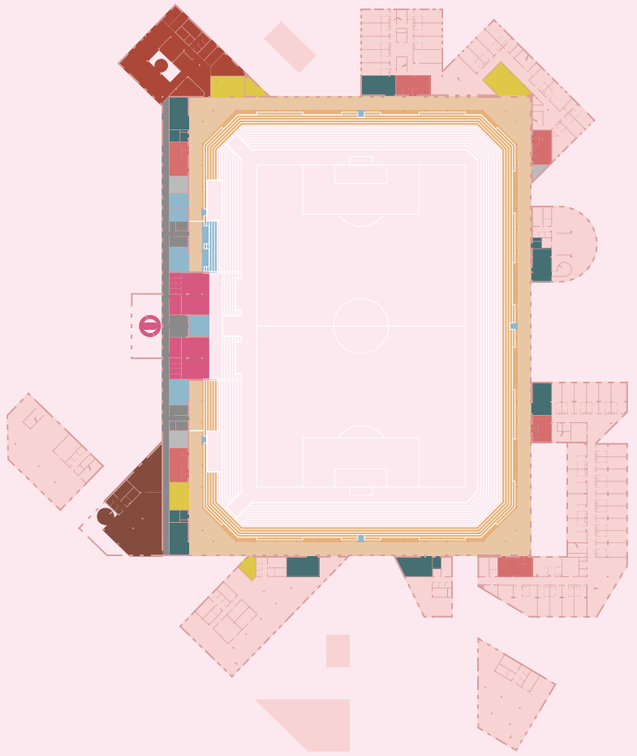
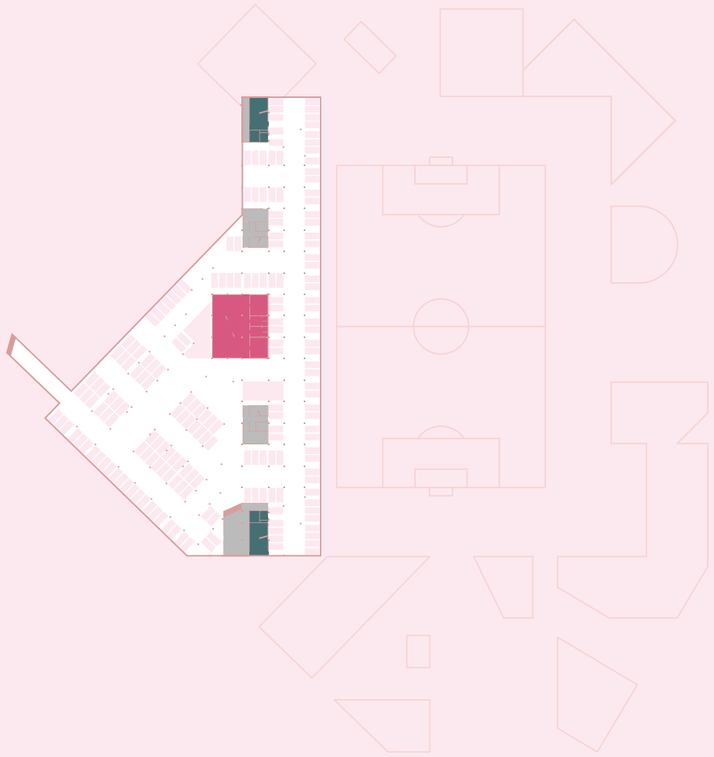
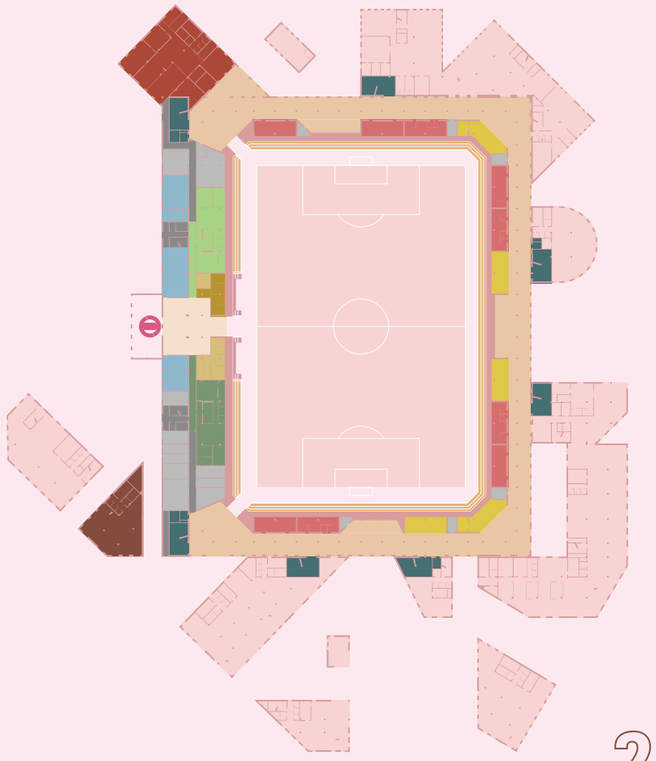


2ND FLOOR



BASEMENT



GROUND FLOOR

STADIUM | FUNCTION

FLOW

SPECTATOR

The entrance gates for spectators are located on the southern, eastern, and northern facade, which are easily recognizable from the surrounding. After passing through the gates, the concourse leads them to the vertical circulation cores integrated into the main stand and adjacent buildings. On the second floor, after passing through the cores, spectators can find their seats via the concourse, which also provides access to food and beverages, toilets, and first aid. The concourse offers a clear view of the stadium seating, making it easy for spectators to find their destinations.

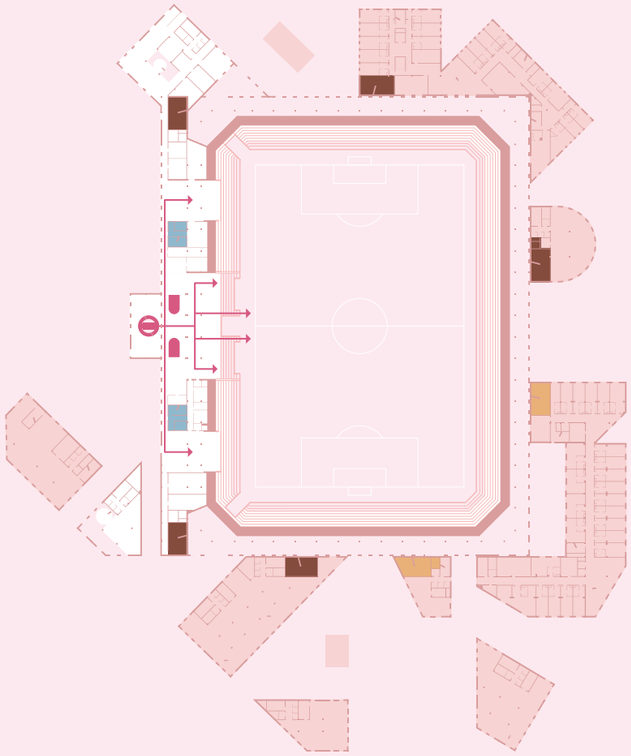
PLAYERS, STAFF, MEDIA AND VIP GUESTS

For the sake of safety and privacy, their entrance to the stadium is located in the parking basement, their entrance to the stadium is located in the parking basement, where they find their own entrance halls equipped with vertical circulation cores that lead to their respective areas on the upper floors of the main stand.

TO THE ADJACENT BUILDINGS

The entrances to these buildings are strategically proposed to be located on both the street side and the stadium side (close to the stadium gates.) This is intended to make the entire outdoor area around the stadium accessible, open, and vibrant for both event days and everyday use.

- Home team player
- Away team player
- Spectator (home team fan)
- Spectator (away team fan)
- VIP
- Media
- Entrance to the stadium
- Entrance to the adjacent buildings



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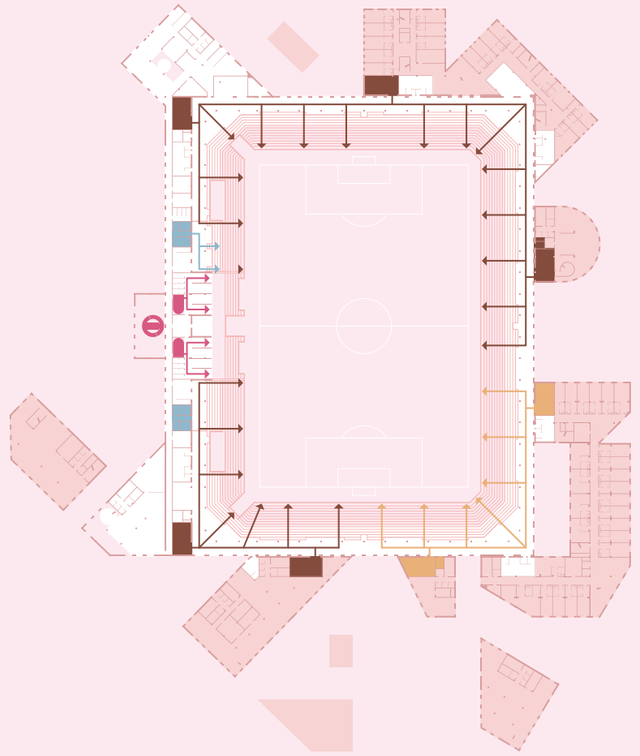

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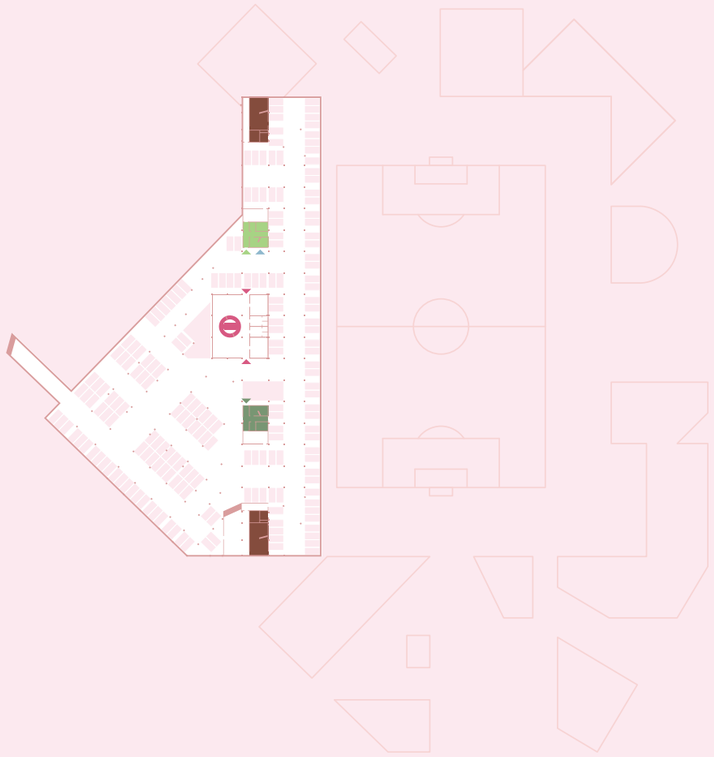

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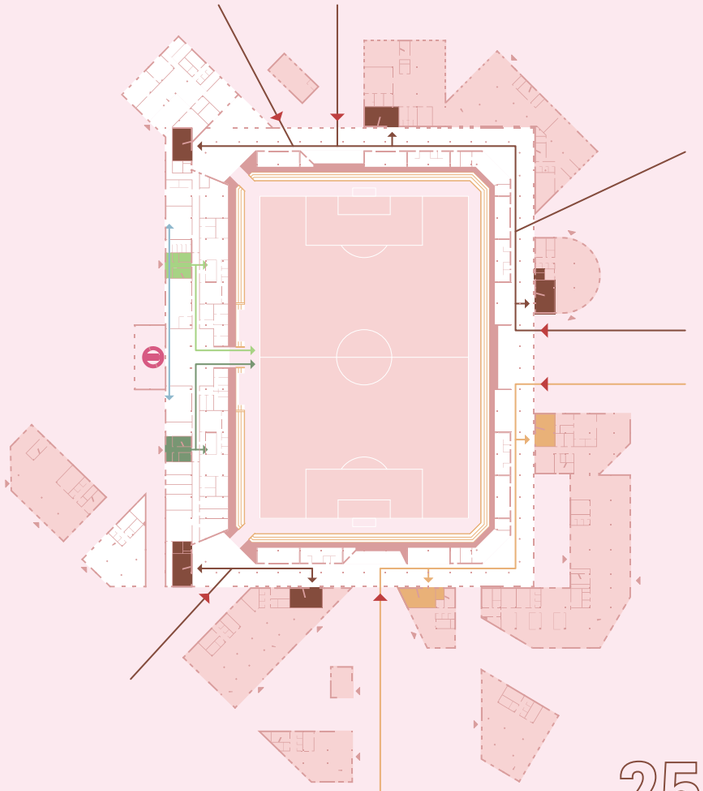


GROUND FLOOR

RENDER

The VIP section is accentuated by a golden "Korça frame" protruding under the triangulated stadium roof.

STADIUM | FUNCTION

MAIN STAND | BASEMENT FLOOR

PARKING (ROOM NUMBER 89)

All parking spaces for the stadium, which contains 188 lots, are located on the basement level to ensure security and privacy for players and VIPs on match days. This design also helps preserve greenery and sports fields at ground level. On non-match days, the parking area will be available for guests visiting the sports park.

ENTRANCE FOR PLAYERS (ROOM NUMBER 80 -82)

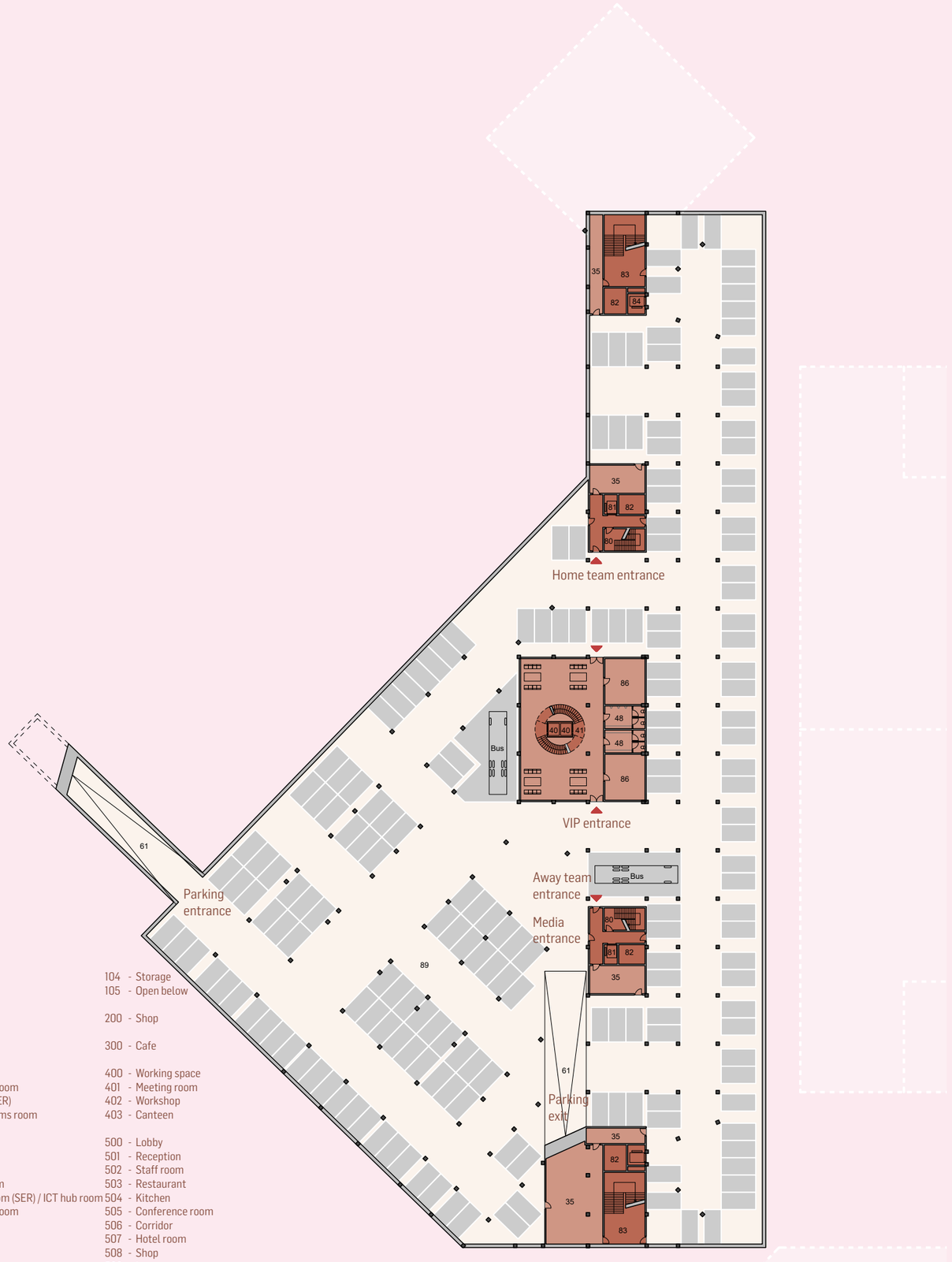
There are two cores, each containing a staircase and an elevator, serving as the entrances for the home and away teams. The bus parking area is arranged near the entrance doors. Teams access their dressing rooms on the ground floor through these cores.

ENTRANCE FOR VIP (ROOM NUMBER 40, 41 AND 48)

The VIP entrance core is located at the center of the floor and enclosed by glass walls. It features dedicated vertical circulation, including a spiral staircase and two elevators, which provide access to the VIP area on the first floor and the two upper levels. Additionally, it includes a foyer with sofas and restrooms.

ENTRANCE FOR MEDIA (ROOM NUMBER 80 -82)

The entrance for media is located on the same core as away teams. It leads to the media area on the ground and second floor.



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STADIUM | FUNCTION

MAIN STAND | GROUND FLOOR

DRESSING ROOM (ROOM NUMBER 01 - 10)

The main stand on the ground floor features two dressing facilities for the home and away teams, each with an identical layout. Positioned on either side of the players' tunnel, these rooms are easily accessible through dedicated circulation cores from the basement entrance.
Adjacent to the dressing room entrance, a foyer leads to three key areas. The first is a centrally located bathroom, ensuring convenient access from all other rooms. The second is a spacious changing area, accommodating up to 35 players, and directly connected to a shower room with a capacity for 14 people. A coach's room, equipped with its own changing facilities, is also linked to the main changing area.
The third space is a warm-up area where players can prepare before a match, accessible via a rear corridor from the changing area. Additionally, a massage room, furnished with three treatment beds, provides players with recovery and relaxation amenities

AREA FOR REFEREES, DELEGATES, DOPING CONTROL, AND MEDICAL (ROOM NUMBER 11 - 15)

These rooms are accumulated around the players' tunnel with easy access to the pitch.

MEDIA FACILITIES (ROOM NUMBER 20 - 27)

The flash interview position is located right next to the players' tunnel, allowing for immediate post-match interviews. Adjacent to this area, the mixed zone is centrally positioned, providing clear access from both the players' dressing rooms and the media area. This zone can be easily partitioned with fences to separate the players from the media during interviews.

The media area is directly accessible from both the media working area and the conference room. The photographers' working area, located behind the media working area, includes its own service facilities, ensuring that all media functions are concentrated along the east façade.
This layout ensures a clear separation of movement between players and media personnel: players primarily use the central corridor, while media personnel move between rooms via doors along the building's facade.

ADMINISTRATION (ROOM NUMBER 50 - 58)

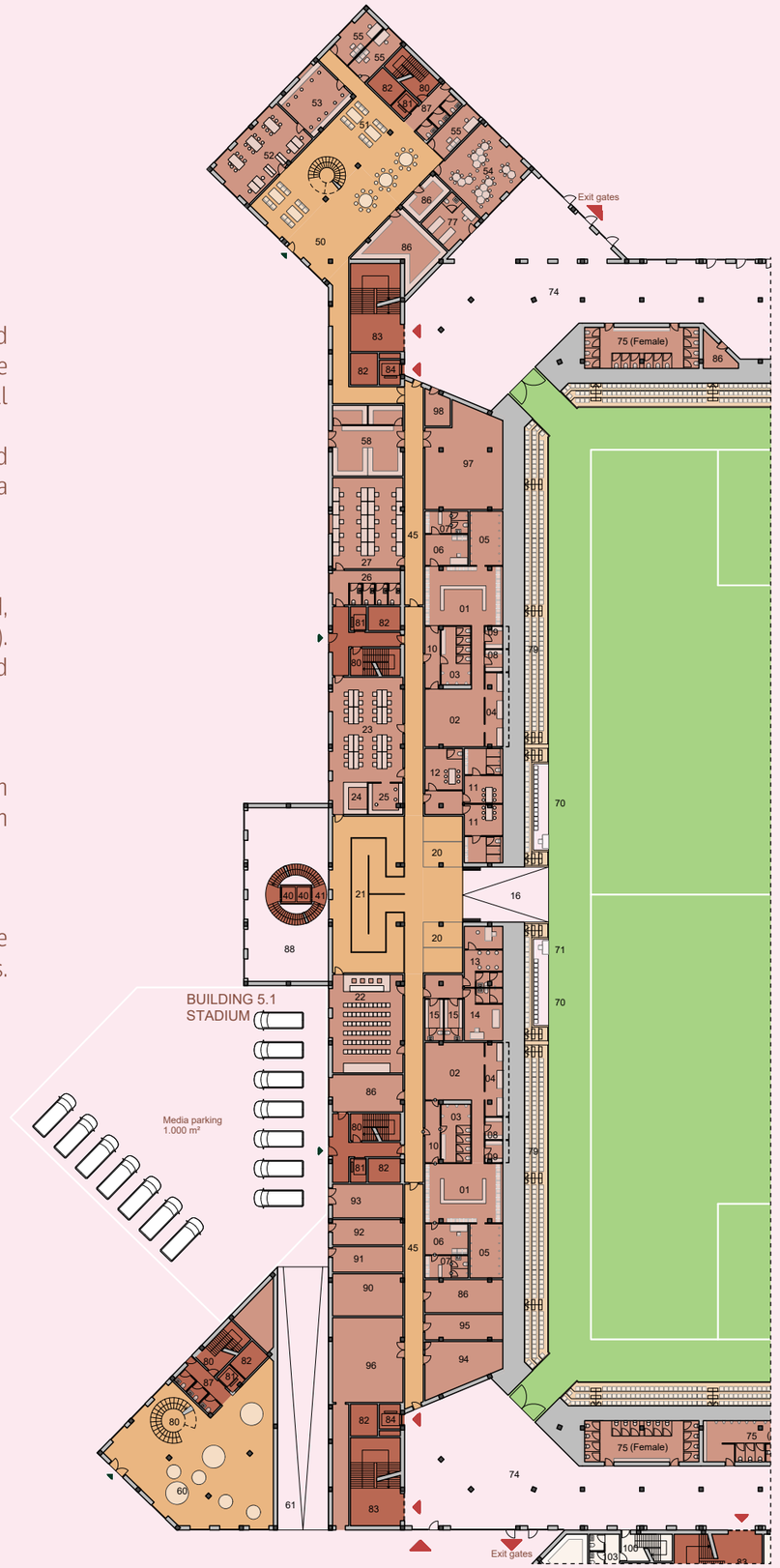
The administration wing is located on the northern side of the main stand, accommodating staff facilities, safety & security, and CCTV (surveillance). Additionally, there is a production kitchen between the administration and the media facilities, for dining in VIP facilities on the first floor.

MEDIA PARKING

The media parking area, covering 1000 m², is situated to the west of the main stand, in direct connection with the outside broadcast telecoms room (room number 93).

GALLERY (ROOM NUMBER 60)

The southern end of the main stand features a gallery space that is visible from the city side and Rruga Niko Kovaci, attracting both locals and visitors. It spans three stories, connected by its own spiral staircase and core.



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STADIUM | FUNCTION

MAIN STAND | 1ST FLOOR

Most of the first floor of the main stand is dedicated to the VIP area. It is exclusively accessible via the spiral staircase and two elevators from the basement, located inside the small tower attached to the main stand.

CENTRAL VIP AREA (ROOM NUMBER 42)

The central area of the floor features a spacious open space, designed to accommodate various dining arrangements and event opportunities. It provides direct access to the terrace, which offers a stunning view of the pitch.

On non-match days, the area can be rented for a variety of events, such as parties, conferences, and music concerts. In these instances, the pitch view creates a unique atmosphere and enhances the overall experience for guests.

The area includes two internal staircases that lead to the box seats on the second floor.

Service facilities—including bathrooms, wardrobes, a bar counter, and storage—are strategically arranged into two core sections, positioned in close proximity to this VIP area.

VIP LOUNGE (ROOM NUMBER 42)

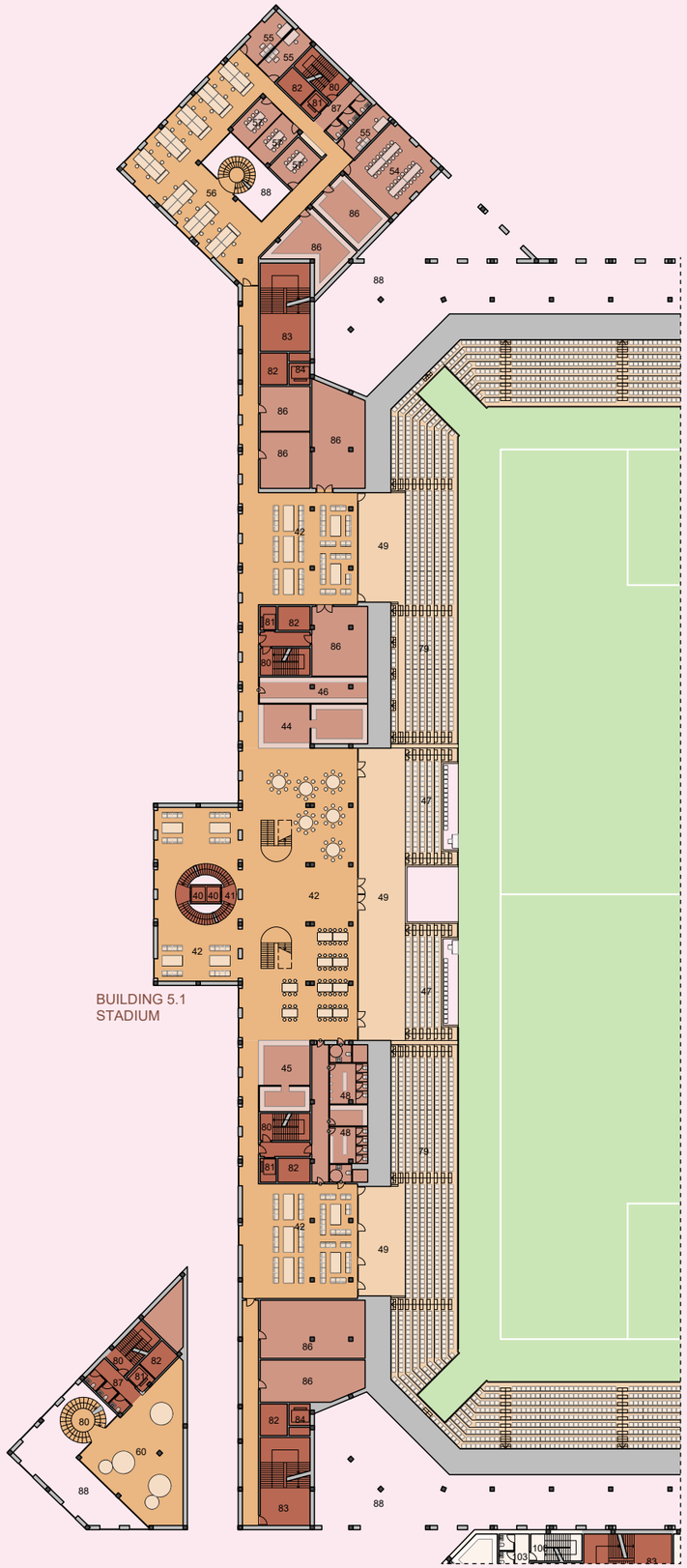
In addition to the central space, two smaller lounges are located on either side, behind the cores, offering a comfortable setting for informal meetings or small group gatherings. With direct access to the terrace overlooking the pitch, these lounges provide an exclusive environment and can be rented under the same conditions as the main VIP area on non-match days.

ADMINISTRATION (ROOM NUMBER 54 - 58)

The first floor of the administration wing primarily accommodates workspaces, including both open and cellular offices, as well as meeting rooms of various sizes. This floor is accessible via its own spiral staircase or through the circulation core at the back.

STORAGE (ROOM NUMBER 86)

A number of storage rooms are positioned close to the VIP lounge area, allowing them to store a large amount of furniture, equipment, and supplies for various events.



Legend

01 - Dressing room
02 - Warm up area
03 - Players bathroom
04 - Massage rooms
05 - Shower room
06 - Coaches office
07 - Coaches changing room
08 - Wash room
09 - Storage
10 - Dressing room entrance
11 - Dressing room referees
12 - Delegates' room
13 - Doping control station
14 - Emergency medical room
15 - Ball boys/girls
16 - Players' tunnel

20 - Flash interview position
21 - Mixed zone
22 - Press conference room
23 - Media working area (30 positions)
24 - Media service area
25 - Repair room and storage
26 - Media bathroom

27 - Photographers' working area (20 positions)
28 - TV commentary position
29 - Media seating (60 seats)
30 - Media TV studio
31 - Media storage
32 - Main camera stand
33 - Camera stand
34 - Control room
35 - Machine room

40 - VIP elevator
41 - VIP stair
42 - VIP lounge
43 - VIP box seat
44 - Satellite kitchen
45 - Bar
46 - Wardrobe
47 - VIP seating
48 - VIP bathroom
49 - VIP terrace

50 - Staff entrance
51 - Staff room
52 - Safety & Security

53 - CCTV (Surveliance)
54 - Workshop
55 - Office
56 - Working space
57 - Meeting room
58 - Production kitchen

60 - Gallery
61 - Car ramp

70 - Substitutes' bench
71 - Position for the fourth official
72 - Pitch
73 - Public space / open gallery
74 - Concourse
75 - Stadium bathroom
76 - Food & beverage
77 - First aid room
78 - Disabled sector
79 - Stadium seating

80 - Stair
81 - Elevator
82 - Shaft

83 - Stadium stair
84 - Stadium elevator
85 - Corridor
86 - Storage
87 - Bathroom
88 - Open below
89 - Parking space

90 - Standby generator plantroom
91 - Main equipment room (MER)
92 - Outside broadcast telecoms room
93 - HV sub-station
94 - LV switchroom
95 - Pitch heating plantroom
96 - Water plant room
97 - Pitch irrigation plant room
98 - Secondary equipment room (SER) / ICT hub room
99 - Standby generator plantroom

100 - Stair
101 - Elevator
102 - Shaft
103 - Bathroom

104 - Storage
105 - Open below

200 - Shop

300 - Cafe

400 - Working space
401 - Meeting room
402 - Workshop
403 - Canteen

500 - Lobby
501 - Reception
502 - Staff room
503 - Restaurant
504 - Kitchen
505 - Conference room
506 - Corridor
507 - Hotel room
508 - Shop
509 - Lounge

600 - Bar

STADIUM | FUNCTION

MAIN STAND | 2ND FLOOR

VIP BOX SEAT (ROOM NUMBER 43)
The 'Golden Box,' centrally located on this floor, features eight VIP box seats (as shown in the visualization on page 26). Each VIP box accommodates up to eight guests, offering an exclusive experience with a prime view of the pitch. Dedicated bathrooms are also available for added convenience. Access to the rooms is provided via two internal staircases or the spiral staircase inside the small tower attached to the main stand.

MAIN CAMERA STAND (ROOM NUMBER 32)
The main camera stand is in the middle of the 'Golden Box,' as it is the best position for broadcasting the match. As required by UEFA Category 4 stadium regulations, there will be space for three cameras on a platform larger than the minimum requirement of 6m x 2m.

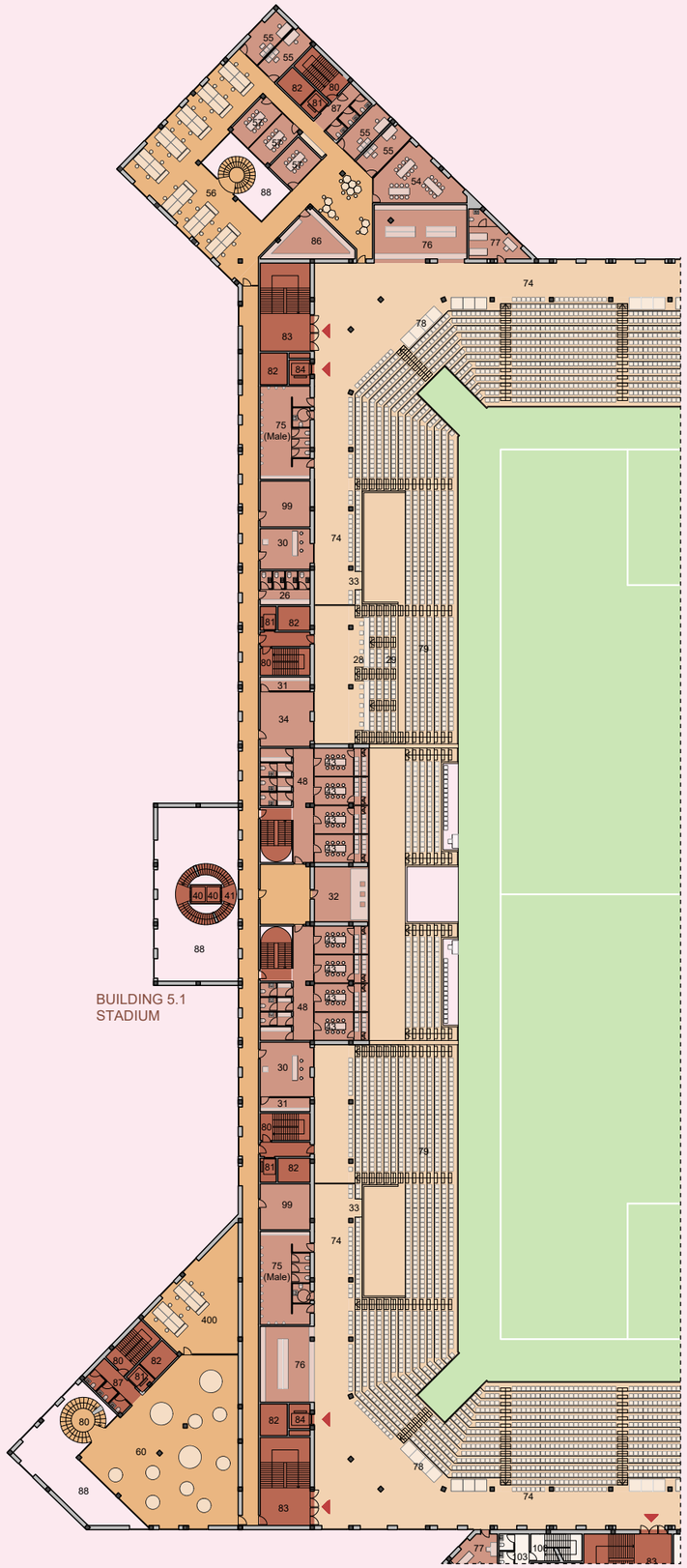
MEDIA AREA (ROOM NUMBER 30 AND 34)
Around the 'Golden Box,' there are two TV studios and a control room. Both rooms are equipped with a large window offering a view of the pitch.

TV COMMENTARY POSITION AND MEDIA SEATING (ROOM NUMBER 28 AND 29)
The ten TV commentary positions and media seating which include 60 spaces are situated in a section of the bowl, and are accessed through the media area. Both positions are centrally located and have a clear view of the pitch.

STADIUM BATHROOM AND F & B (ROOM NUMBER 75 AND 76)
Some of the stadium's bathrooms and food and beverage facilities are accommodated in the main stand, with access from the concourse.

ADMINISTRATION (ROOM NUMBER 54 - 58)
The second floor of the administration wing primarily accommodates workspaces, including both open and cellular offices, as well as meeting rooms of various sizes. This floor is accessible via its own spiral staircase or through the circulation core at the back.

PLANT ROOM (ROOM NUMBER 99)
This floor of the main stand also accommodates two standby generator plantrooms.



Legend

01 - Dressing room
02 - Warm up area
03 - Players bathroom
04 - Massage rooms
05 - Shower room
06 - Coaches office
07 - Coaches changing room
08 - Wash room
09 - Storage
10 - Dressing room entrance
11 - Dressing room referees
12 - Delegates' room
13 - Doping control station
14 - Emergency medical room
15 - Ball boys/girls
16 - Players' tunnel

20 - Flash interview position
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22 - Press conference room
23 - Media working area (30 positions)
24 - Media service area
25 - Repair room and storage
26 - Media bathroom

27 - Photographers' working area (20 positions)
28 - TV commentary position
29 - Media seating (60 seats)
30 - Media TV studio
31 - Media storage
32 - Main camera stand
33 - Camera stand
34 - Control room
35 - Machine room

40 - VIP elevator
41 - VIP stair
42 - VIP lounge
43 - VIP box seat
44 - Satellite kitchen
45 - Bar
46 - Wardrobe
47 - VIP seating
48 - VIP bathroom
49 - VIP terrace

50 - Staff entrance
51 - Staff room
52 - Safety & Security

53 - CCTV (Surveliance)
54 - Workshop
55 - Office
56 - Working space
57 - Meeting room
58 - Production kitchen

60 - Gallery
61 - Car ramp

70 - Substitutes' bench
71 - Position for the fourth official
72 - Pitch
73 - Public space / open gallery
74 - Concourse
75 - Stadium bathroom
76 - Food & beverage
77 - First aid room
78 - Disabled sector
79 - Stadium seating

80 - Stair
81 - Elevator
82 - Shaft

83 - Stadium stair
84 - Stadium elevator
85 - Corridor
86 - Storage
87 - Bathroom
88 - Open below
89 - Parking space

90 - Standby generator plantroom
91 - Main equipment room (MER)
92 - Outside broadcast telecoms room
93 - HV sub-station
94 - LV switchroom
95 - Pitch heating plantroom
96 - Water plant room
97 - Pitch irrigation plant room
98 - Secondary equipment room (SER) / ICT hub room
99 - Standby generator plantroom

100 - Stair
101 - Elevator
102 - Shaft
103 - Bathroom

104 - Storage
105 - Open below

200 - Shop

300 - Cafe

400 - Working space
401 - Meeting room
402 - Workshop
403 - Canteen

500 - Lobby
501 - Reception
502 - Staff room
503 - Restaurant
504 - Kitchen
505 - Conference room
506 - Corridor
507 - Hotel room
508 - Shop
509 - Lounge

600 - Bar

STADIUM BOWL LAYOUT

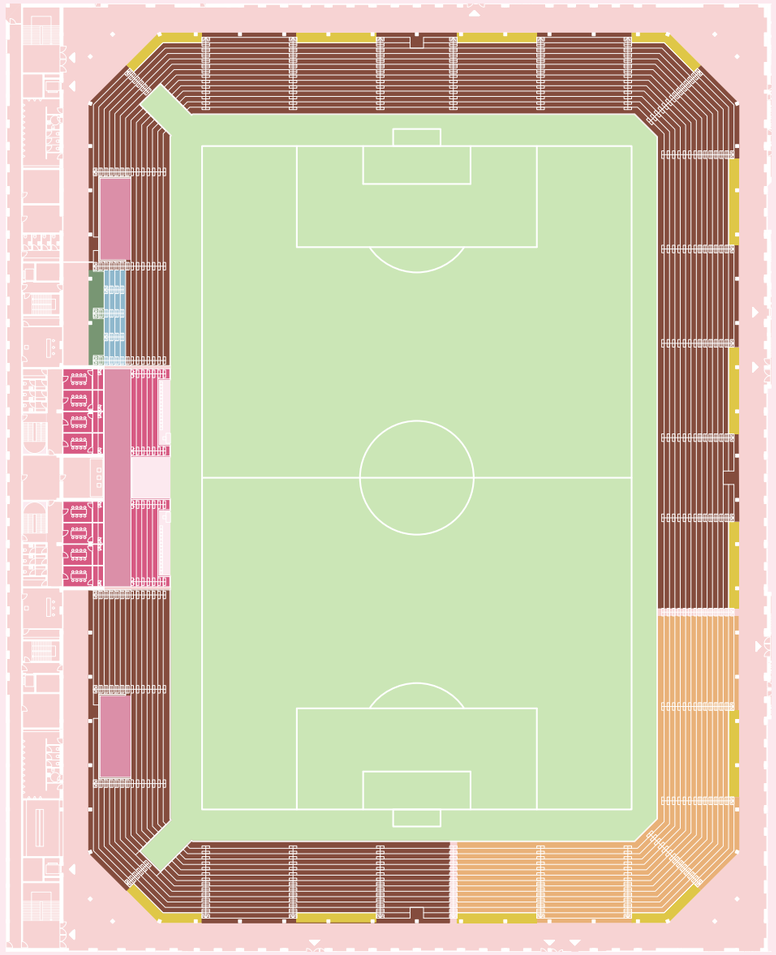
The stadium bowl is composed of a series of zones, including VIP seating, a VIP lounge with a terrace, box seats, and media seating located on the main stand. General admission and away fans are accommodated in the general stands on the south, east, and north sides.
The bowl is designed as a continuous 360-degree closed seating arrangement, allowing for flexible separation of the different zones. This design means the capacity of each zone can be adjusted based on demand, which may change over time.
The upper-level concourse is located around the periphery of the bowl, where spectators access it through the vertical circulation cores to reach their own seat. This ensures that all the seats has an unobstructed view, as the primary flow of the spectators occurs outside the bowl.

ACCESSIBILITY

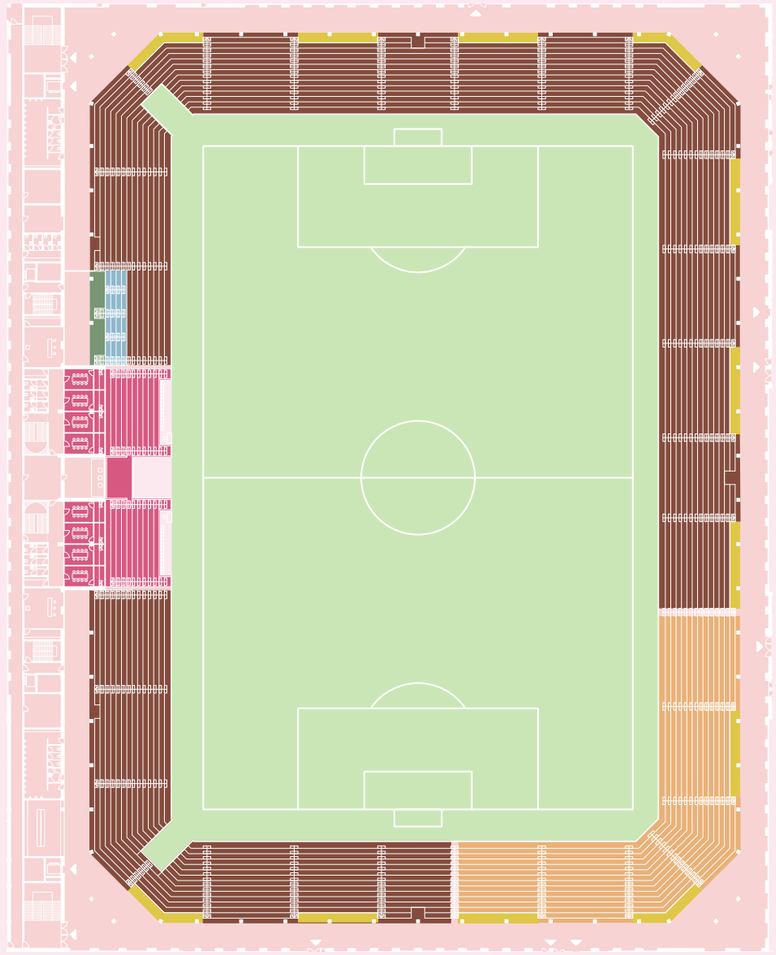
The accessible seating areas are located on the second floor, with convenient access from the vertical circulation cores. They are evenly distributed along the concourse to ensure equal access for spectators in every section of the stadium. These areas are elevated terraces, double the height of regular seating, providing an unobstructed view of the pitch over the seats in front.

CAPACITY EXTENSION POSSIBILITY

The currently proposed bowl contains 8,214 seats, meeting UEFA Category 4 stadium requirements. However, the VIP terraces in the main stand could be converted into regular seating, adding 432 extra seats (in total 8,646 seats), as shown in the illustration on the right below. This option will be further explored in subsequent design phases.



PROPOSAL



OPTION

- General admission / home team fan
- Away team fan
- VIP
- Media
- TV commentary postion
- Accessibility

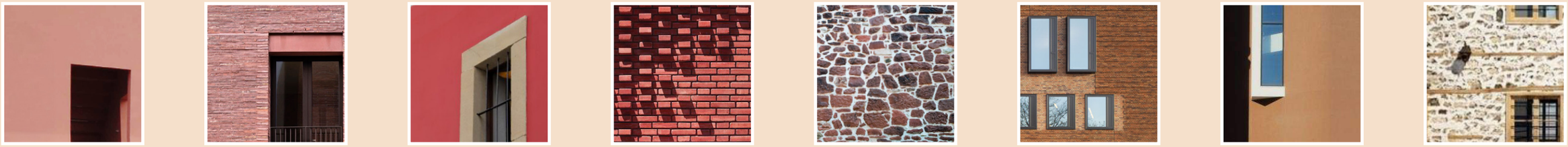
STADIUM I FACADE

KORÇARENA COLOR PALETTE

As described above, our project derives from careful studies of Korça and its architectural heritage. Thus, we propose a sharply detailed and contemporary architecture constructed with the same materials and colours. Building facades should be rendered and treated with colours from a carefully selected KorçArena palette, featuring various shades of red and brown, along with some darker and stronger tones, as specified in the illustrations and pictures below. Roofs should be clad in matching colours, and stone walls may be applied in certain places. Façade openings should, to some extent, be graphically framed. Thus, the new neighbourhood will have very few materials, but the room for variation is ample.

Light Coral	Sanguine	BU Scarlet	Crimson Red	Rosewood	Walnut	Amber Brown	Almond
RGB code R: 240 G: 128 B: 128	RGB code R: 188 G:63 B: 74	RGB code R: 204 G: 0 B: 0	RGB code R: 153 G: 0 B: 0	RGB code R: 101 G: 0 B: 11	RGB code R: 119 G: 63 B: 26	RGB code R: 167 G: 109 B: 84	RGB code R: 255 G: 228 B: 196

Examples



MATERIALS

ROOF
- Shape: pitched or hip roof
- Material: tile or metal (shade of red and brown color)


Tile


Zinc

FACADE
- Material: render or brick (shade of red and brown color)
- Frame: render or brick (lighter color,) constrcucted around all or selected windows


Red render


Light red render


Red brick

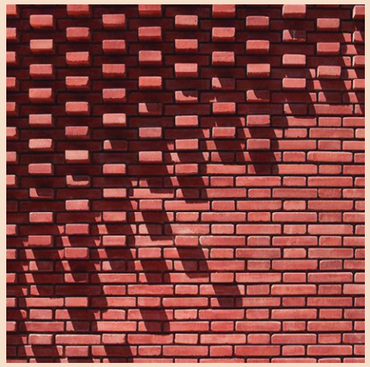

Brown render


Brown brick

BASE FACADE
- Material: render, brick, concrete, or stone (shade of red and brown color, and beige color on a few selected parts)
- Wholly or partially constucted


Red concrete


Red stone wall


Protruding brickwork


Stone wall with white mortal

* Material and color combinations are exemplified in the visualizations

ELEVATION I SECTION

HOTEL PROJECT

BUILDING 5.8
SHOP / OFFICE

BUILDING 5.7
SHOP / OFFICE

BUILDING 5.10
CAFÉ

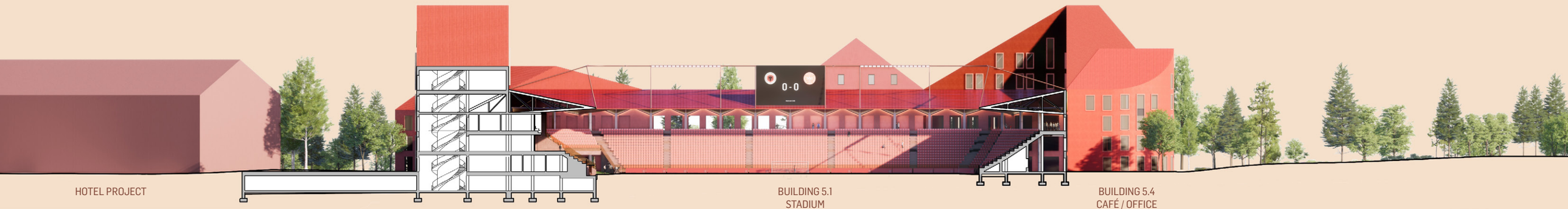
BUILDING 5.1
STADIUM

BUILDING 5.6
BAR / OFFICE

BUILDING 5.11
SHOP / OFFICE

BUILDING 5.5
HOTEL B

SOUTH ELEVATION



HOTEL PROJECT

BUILDING 5.1
STADIUM

BUILDING 5.4
CAFÉ / OFFICE

SECTION AA

1:750

STADIUM | SECTIONS AND ELEVATIONS

ELEVATION I SECTION

BUILDING 5.11
SHOP / OFFICE

BUILDING 5.5
HOTEL B

BUILDING 5.1
STADIUM

BUILDING 5.4
CAFÉ / OFFICE

BUILDING 5.3
HOTEL A

EAST ELEVATION

BUILDING 5.10
CAFÉ

BUILDING 5.6
BAR / OFFICE

BUILDING 5.1
STADIUM

BUILDING 5.3
HOTEL A

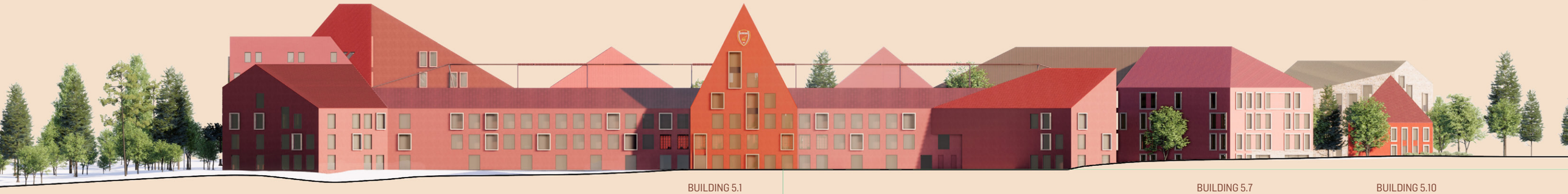
SECTION BB

1:750

RENDER

As the stadium slowly fills up, the first spectators get a good view over the "club colored" seats subtly toned in various reds.

ELEVATION I SECTION



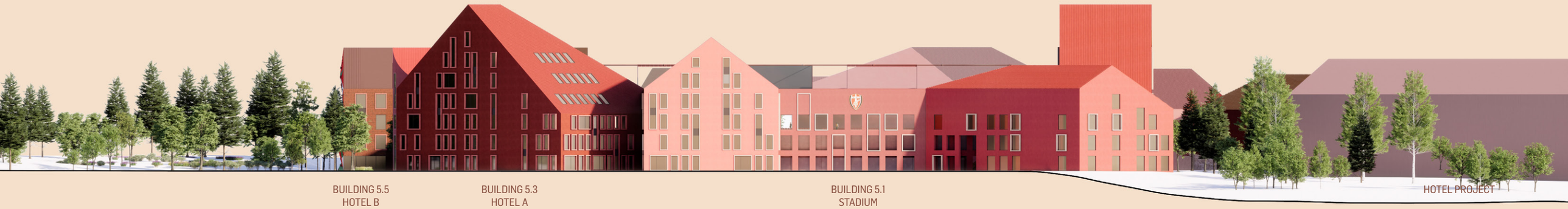
WEST ELEVATION

SECTION CC

1:750

STADIUM | SECTIONS AND ELEVATIONS

ELEVATION I SECTION



NORTH ELEVATION

SECTION DD

1:750

LANDSCAPE CONCEPT

As described above, our landscape architecture is based on sampling elements and materials from Korça and, in particular, the old bazaar in the city center and the nearby Parku Rinia – maybe on our side of Bulevardi Rilindasit, we should call it Parku Mini(a) or MiniParku.
The area will be dominated by greenery because this is the purpose of this area despite the densification that is being proposed. Greenery and recreational spaces will be carefully treated for each space, taking the “Rinia” park as a reference.
The system of paths in the park is paved with flat stones to promote rollerskating and cycling, while the streets between the proposed buildings have cobblestones to lower the speed of cars.

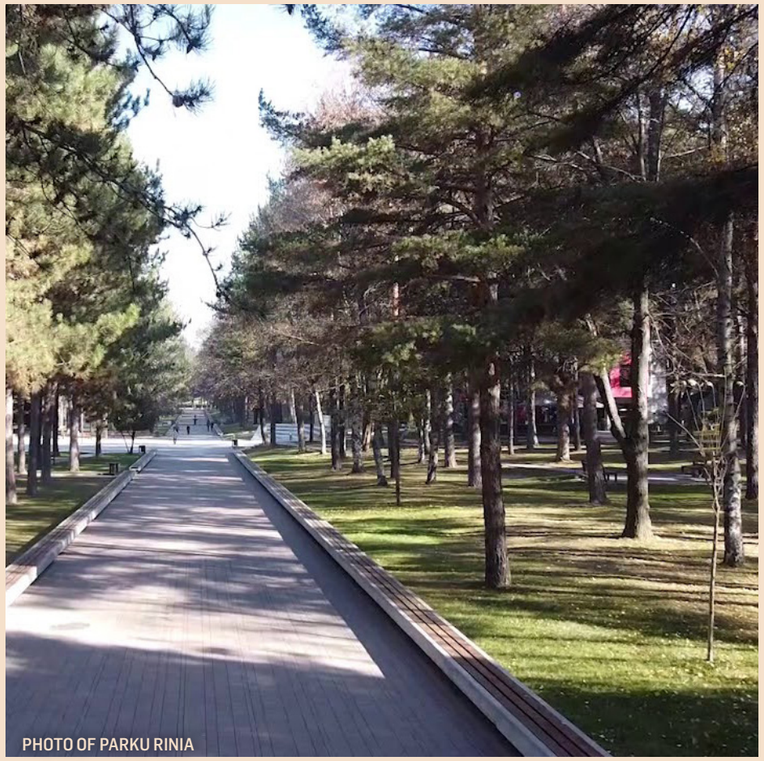


PHOTO OF PARKU RINIA


PHOTO OF PARKU RINIA


PHOTO OF THE OLD BAZAAR


PHOTO OF THE OLD BAZAAR

RENDER FROM THE PARK

On sunny days the park by the stadium should vibrate with life and activity. People of all ages should stroll, run or cycle by active sports pitches and occasionally stop for the obligatory Albanian coffee.

STADIUM | LANDSCAPE

GREENERY

All green elements, such as trees, bushes, grass, and flowers, should consist of species commonly found in the area, as shown in the pictures below. This will help harmonize the landscape with the surrounding nature, like Parku Rinia.
In the arrival square to the south, in addition to preserving as many existing trees as possible, medium-sized trees are proposed to blend into the spaces between buildings, clearly framing the square as the entrance to KorçArena from the city center.
On the east side of the stadium, along with keeping as many existing trees as possible, larger trees and flowering bushes will be planted to create a seamless connection with Parku Rinia. They will also provide shade and help create an intimate atmosphere for visitors to relax and socialize in this area.


ACER NEGUNDO L


PINUS SYLVESTRIS L


PINUS NIGRA ARNOLD


ABIES ALBA MILLER


ELAEAGNUS ANGUSTIFOLIA L


ELAEAGNUS ANGUSTIFOLIA L


TILIA TOMENTOSA MOENCH


AESCULUS HIPPOCASTANUM L


BETULA PENDULA ROTH


LIRIODENDRON TULIPIFERA L


ROBINIA PSEUDOACACIA L


PRUNUS CERASIFERA EHRH

STADIUM | LANDSCAPE

PAVEMENT

PAVEMENT TYPE

Three types of paved areas will be designated based on their function: flow, stay, and square, as illustrated on the right. These areas are designed to provide clear guidance to spectators approaching the stadium entrances and to create inviting spaces for gathering and socializing.

Cobblestone

The flow area will be paved with cobblestones, inspired by the rich history of Korça. These cobblestones are more than just a charming feature; they symbolize the city's cultural heritage. Walking through these streets, such as those in the old bazaar, evokes echoes of the past, from the Byzantine era to the Ottoman Empire. These lanes stand as a testament to Korça's enduring spirit, preserving its historical essence while embracing the modernity we aim to incorporate into our stadium.

Flat Stone

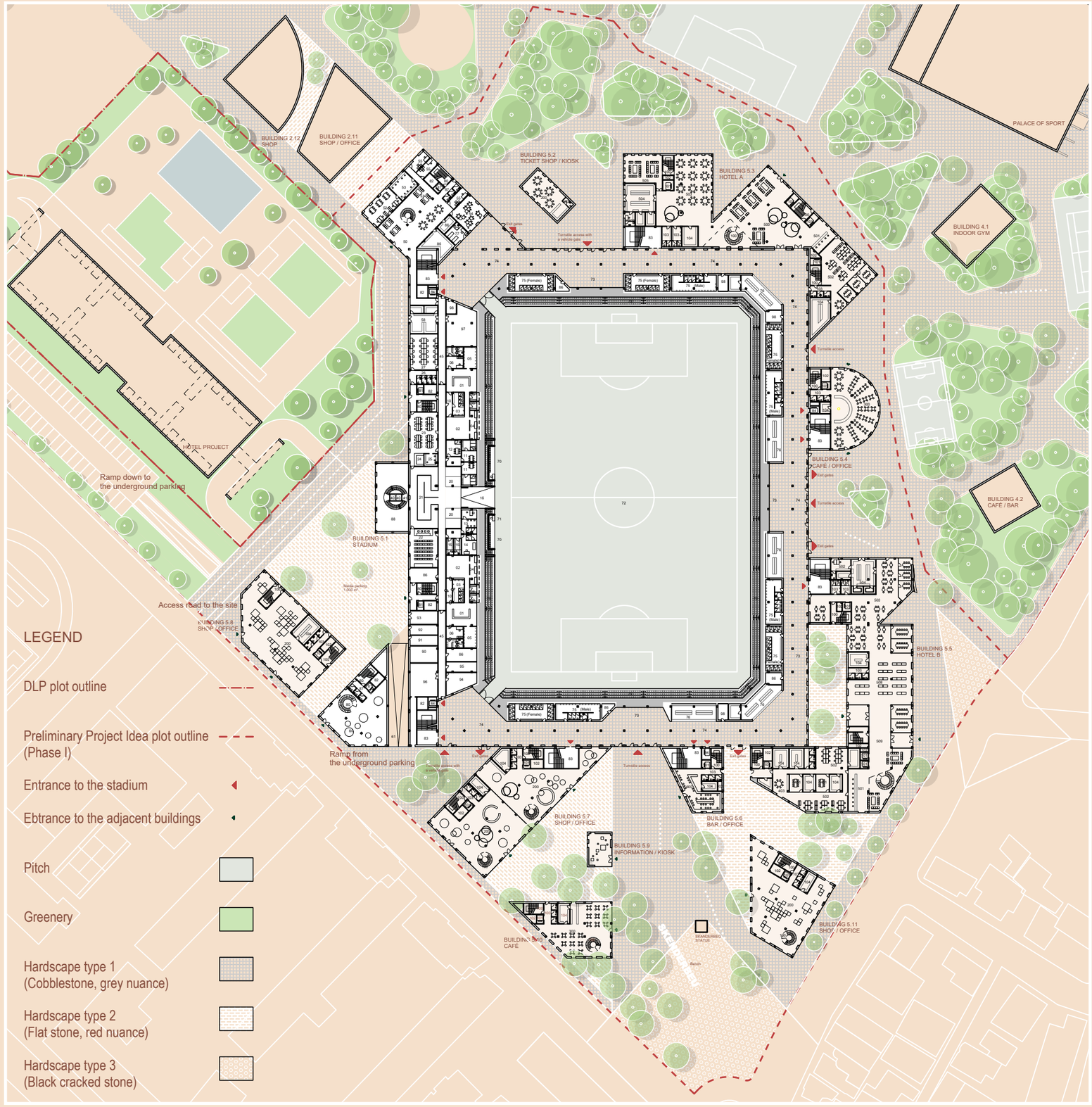
The spaces between buildings will be paved with red nuance stone, creating a cohesive link between the architecture and the landscape. This choice fosters intimate and cozy outdoor areas, enhanced with urban furniture such as chairs, tables, and benches, all shaded by trees.

Black Cracked Stone

The arrival square and other entry points will be clad in black cracked stone, similar to that found on Bulevardi Rilindasit. This ensures a harmonious transition from Parku Rinia and emphasizes the arrival area on the site.

CAR TRAFFIC

Cars access the parking basement through the existing parking along Rruga Niko Kovaci and exit via the ramp next to the gallery of the stadium. There is only one access road at ground level from Rruga Niko Kovaci, which leads to the ongoing hotel project and media parking.



STADIUM | TABLE

SPATIAL AND FUNCTIONAL PROGRAM

BUILDING 5.1 (STADIUM)					
Room no.	Function	Surface area (m^2)	Number	Total surface area (m^2)	Note
LEVEL -1					
35	Machine room	64,1	4	256,4	
40	VIP elevator	4,4	2	8,8	
41	VIP stair	12,7	2	25,4	
42	VIP lounge	211,5	1	211,5	
48	VIP bathroom	20,9	2	41,8	
80	Stair	20,7	2	41,4	
81	Elevator	6,4	2	12,8	
82	Shaft	13,9	4	55,6	
83	Stadium stair	67,1	2	134,2	
84	Stadium elevator	8,4	2	16,8	
85	Corridor	29,1	2	58,2	
86	Storage	41,1	2	82,2	
89	Parking space	7.193,3	1	7.193,3	188 cars
	Total surface area			**8.138,4**	
LEVEL 0					
01	Dressing room	69,9	2	139,8	
02	Warm up area	62,3	2	124,6	
03	Players bathroom	25,9	2	51,8	
04	Massage rooms	29,9	2	59,8	
05	Shower room	30,2	2	60,4	
06	Coaches office	20,0	2	40,0	
07	Coaches changing room	14,8	2	29,6	
08	Wash room	9,2	2	18,4	
09	Storage	9,2	2	18,4	
10	Dressing room entrance	14,4	2	28,8	
11	Dressing room referees	37,0	2	74,0	
12	Delegates room	23,5	1	23,5	
13	Doping control station	40,7	1	40,7	
14	Emergency medical room	33,3	1	33,3	
15	Ball boys/girls	11,7	2	23,4	
16	Players' tunnel	96,2	1	96,2	
20	Flash interview position	14,3	4	57,2	
21	Mixed zone	161,8	1	161,8	
22	Press conference room	104,7	1	104,7	
23	Media working area	111,3	1	111,3	30 positions
24	Media service area	17,6	1	17,6	
25	Repair room and storage	16,8	1	16,8	
26	Media bathroom	38,0	1	38,0	
27	Photographers' working area	97,5	1	97,5	20 positions
40	VIP elevator	4,4	2	8,8	
41	VIP stair	12,7	2	25,4	
47	VIP seating	43,1	1	43,1	
50	Staff entrance	86,2	1	86,2	
51	Staff room	186,3	1	186,3	
52	Safety & Security	74,5	1	74,5	
53	CCTV (Surveliance)	45,7	1	45,7	
54	Workshop	72,2	1	72,2	
55	Office	21,0	3	63,0	
58	Production kitchen	76,0	1	76,0	
60	Gallery	318,3	1	318,3	
70	Substitutes' bench	14,5	2	29,0	
71	Position for the fourth official	3,9	2	7,8	
72	Pitch	8.893,1	1	8.893,1	
73	Open gallery	87,5	3	262,5	
74	Concourse	3.167,5	1	3.167,5	
75	Stadium bathroom	83,0	9	747,0	
76	Food & beverage	92,3	5	461,5	
77	First aid room	28,5	1	28,5	
79	Stadium seating	973,4	1	973,4	
80	Stair	22,5	4	90,0	
81	Elevator	6,5	4	26,0	
82	Shaft	12,9	6	77,4	
83	Stadium stair	73,5	7	514,5	
84	Stadium elevator	12,2	4	48,8	
85	Corridor	412,6	1	412,6	
86	Storage	28,6	6	171,6	
87	Bathroom	25,0	2	50,0	
90	Standby generator plantroom	46,1	1	46,1	
91	Main equipment room (MER)	28,5	1	28,5	
92	Outside broadcast telecoms room	28,5	1	28,5	
93	HV sub-station	37,2	1	37,2	
94	LV switchroom	55,7	1	55,7	
95	Pitch heating plantroom	31,4	1	31,4	
96	Water plant room	90,9	1	90,9	
97	Pitch irrigation plant room	112,7	1	112,7	
98	Secondary equipment room (SER) / ICT hub room	19,2	4	76,8	
	Total surface area			**18.936,1**	

SPATIAL AND FUNCTIONAL PROGRAM

LEVEL 1					
29	Media seating	14,7	1	14,7	
40	VIP elevator	4,4	2	8,8	
41	VIP stair	12,7	2	25,4	
42	VIP lounge	988,0	1	988,0	
44	Satellite kitchen	70,3	1	70,3	
45	Bar	52,7	1	52,7	
46	Wardrobe	43,6	1	43,6	
47	VIP seating	95,2	1	95,2	Total: 180 seats
48	VIP bathroom	121,8	1	121,8	
49	VIP terrace	113,4	3	340,2	
54	Workshop	72,2	1	72,2	
55	Office	21,0	3	63,0	
56	Working space	297,6	1	297,6	
57	Meeting room	20,1	3	60,3	
60	Gallery	213,7	1	213,7	
79	Stadium seating	1.826,8	1	1.826,8	
80	Stair	22,3	4	89,2	
81	Elevator	6,5	4	26,0	
82	Shaft	12,9	6	77,4	
83	Stadium stair	73,5	7	514,5	
84	Stadium elevator	12,3	4	49,2	
85	Corridor	304,6	1	304,6	
86	Storage	60,0	8	480,0	
87	Bathroom	25,0	2	50,0	
	Total surface area			**5.870,5**	
LEVEL 2					
26	Media bathroom	29,8	1	29,8	
28	TV commentary position	40,2	1	40,2	10 positions
29	Media seating	43,9	1	43,9	64 seats
30	Media TV studio	43,4	2	86,8	
31	Media storage	11,7	2	23,4	
32	Main camera stand	47,8	1	47,8	
33	Camera stand	5,3	5	26,5	
34	Control room	30,4	1	30,4	
40	VIP elevator	4,4	2	8,8	
41	VIP stair	19,4	4	77,6	
43	VIP box sheet	23,3	8	186,4	64 seats
48	VIP bathroom	27,3	2	54,6	
54	Workshop	56,9	1	56,9	
55	Office	20,8	4	83,2	
56	Working space	349,5	1	349,5	
57	Meeting room	20,1	3	60,3	
60	Gallery	427,8	1	427,8	
74	Concourse	2.304,3	1	2.304,3	
75	Stadium bathroom	87,3	5	436,5	
76	Food & beverage	79,2	3	237,6	
77	First aid room	34,0	2	68,0	
78	Disabled sector	21,4	12	256,8	Total: 88 seats
79	Stadium seating	1.614,0	1	1.614,0	Total: 7.794 seats
80	Stair	22,9	4	91,6	
81	Elevator	6,5	4	26,0	
82	Shaft	12,9	6	77,4	
83	Stadium stair	73,5	7	514,5	
84	Stadium elevator	12,2	4	48,8	
85	Corridor	503,2	1	503,2	
86	Storage	31,8	2	63,6	
87	Bathroom	25,0	2	50,0	
99	Standby generator plantroom	36,5	2	73,0	
	Total surface area			**7.999,2**	
LEVEL 3					
40	VIP elevator	4,4	2	8,8	
41	VIP stair	26,6	1	26,6	
42	VIP lounge	313,7	1	313,7	
	Total surface area			**349,1**	
LEVEL 4					
40	VIP elevator	4,4	2	8,8	
41	VIP stair	26,6	1	26,6	
42	VIP lounge	240,8	1	240,8	
	Total surface area			**276,2**	
TOTAL SURFACE AREA OF STADIUM				**41.569,5**	

SPATIAL AND FUNCTIONAL PROGRAM

BUILDING 5.2 (TICKET SHOP / KIOSK)					
Room no.	Function	Surface area (m^2)	Number	Total surface area (m^2)	Note
LEVEL 0					
103	Bathroom	7,8	1	7,8	
200	Shop	102,2	1	102,2	
TOTAL SURFACE AREA OF BUILDING 5.2				**110,0**	

BUILDING 5.3 (HOTEL A)					
Room no.	Function	Surface area (m^2)	Number	Total surface area (m^2)	Note
LEVEL 0					
100	Stair	22,2	4	88,8	
101	Elevator	10,1	4	40,4	
102	Shaft	6,5	2	13,0	
103	Bathroom	31,8	2	63,6	
104	Storage	50,2	2	100,4	
600	Lobby	543,2	1	543,2	
601	Reception	26,2	1	26,2	
602	Staff room	231,9	1	231,9	
603	Restaurant	314,2	1	314,2	
604	Kitchen	125,4	1	125,4	
605	Conference room	109,6	1	109,6	
	Total surface area			**1.656,7**	
LEVEL 1					
100	Stair	22,2	4	88,8	
101	Elevator	10,1	4	40,4	
102	Shaft	6,5	2	13,0	
104	Storage	53,4	3	160,2	
605	Conference room	73,8	1	73,8	
606	Corridor	370,0	1	370,0	
607	Hotel room	46,4	18	835,2	
	Total surface area			**1.581,4**	
LEVEL 2					
100	Stair	21,8	5	109,0	
101	Elevator	10,1	4	40,4	
102	Shaft	6,5	2	13,0	
104	Storage	43,6		0,0	
606	Corridor	368,3	1	368,3	
607	Hotel room	43,5	17	739,5	
	Total surface area			**1.270,2**	
LEVEL 3					
100	Stair	21,8	5	109,0	
101	Elevator	10,1	4	40,4	
102	Shaft	6,5	2	13,0	
104	Storage	65,2	2	130,4	
606	Corridor	264,0	1	264,0	
607	Hotel room	53,0	18	954,0	
	Total surface area			**1.510,8**	
LEVEL 4					
100	Stair	23,0	4	92,0	
101	Elevator	10,1	4	40,4	
102	Shaft	6,5	2	13,0	
104	Storage	15,9	1	15,9	
500	Lobby	188,1	1	188,1	
506	Corridor	198,5	1	198,5	
507	Hotel room	44,8	17	761,6	
	Total surface area			**1.309,5**	
LEVEL 5					
100	Stair	27,0	2	54,0	
101	Elevator	9,1	2	18,2	
102	Shaft	8,3	1	8,3	
103	Bathroom	19,6	1	19,6	
500	Lobby	268,0	1	268,0	
502	Staff room	30,9	1	30,9	
507	Hotel room	26,6	10	266,0	
	Total surface area			**665,0**	
TOTAL SURFACE AREA OF BUILDING 5.3				**7.993,6**	

SPATIAL AND FUNCTIONAL PROGRAM

BUILDING 5.4 (CAFÉ / OFFICE)					
Room no.	Function	Surface area (m^2)	Number	Total surface area (m^2)	Note
LEVEL 0					
100	Stair	25,3	1	25,3	
101	Elevator	6,6	1	6,6	
102	Shaft	12,4	1	12,4	
103	Bathroom	24,3	1	24,3	
104	Storage	11,5	1	11,5	
300	Café	307,3	1	307,3	
	Total surface area			**387,4**	
LEVEL 1					
100	Stair	25,3	1	25,3	
101	Elevator	6,6	1	6,6	
102	Shaft	12,4	1	12,4	
103	Bathroom	24,3	1	24,3	
104	Storage	11,5	1	11,5	
300	Café	307,3	1	307,3	
	Total surface area			**387,4**	
LEVEL 2					
100	Stair	21,7	2	43,4	
101	Elevator	6,6	1	6,6	
102	Shaft	12,4	1	12,4	
103	Bathroom	24,3	1	24,3	
104	Storage	21,1	2	42,2	
400	Working space	274,4	1	274,4	
401	Meeting room	15,6	2	31,2	
403	Canteen	39,0	1	39,0	
	Total surface area			**473,5**	
LEVEL 3					
100	Stair	24,0	2	48,0	
101	Elevator	6,6	1	6,6	
102	Shaft	12,4	1	12,4	
103	Bathroom	24,3	1	24,3	
104	Storage	21,1	2	42,2	
400	Working space	231,5	1	231,5	
401	Meeting room	15,6	2	31,2	
403	Canteen	21,9	1	21,9	
	Total surface area			**418,1**	
TOTAL SURFACE AREA OF BUILDING 5.4				**1.666,4**	

BUILDING 5.5 (HOTEL B)					
Room no.	Function	Surface area (m^2)	Number	Total surface area (m^2)	Note
LEVEL 0					
100	Stair	28,2	4	112,8	
101	Elevator	7,2	4	28,8	
102	Shaft	9,9	3	29,7	
103	Bathroom	24,8	3	74,4	
104	Storage	33,9	4	135,6	
500	Lobby	417,4	1	417,4	
501	Reception	35,8	1	35,8	
502	Staff room	337,6	1	337,6	
503	Restaurant	482,1	1	482,1	
504	Kitchen	124,5	1	124,5	
506	Corridor	19,0	1	19,0	
508	Shop	256,0	1	256,0	
	Total surface area			**2.053,7**	
LEVEL 1					
100	Stair	24,9	4	99,6	
101	Elevator	7,0	4	28,0	
102	Shaft	9,9	3	29,7	
104	Storage	28,4	3	85,2	
505	Conference room	59,4	1	59,4	
506	Corridor	371,9	1	371,9	
507	Hotel room	51,3	25	1.282,5	
	Total surface area			**1.956,3**	
LEVEL 2					
100	Stair	24,7	4	98,8	
101	Elevator	7,0	4	28,0	
102	Shaft	9,9	3	29,7	
104	Storage	28,4	3	85,2	
506	Corridor	371,9	1	371,9	
507	Hotel room	51,3	25	1.282,5	
	Total surface area			**1.896,1**	

SPATIAL AND FUNCTIONAL PROGRAM

LEVEL 3					
100	Stair	24,7	4	98,8	
101	Elevator	7,0	4	28,0	
102	Shaft	9,9	3	29,7	
104	Storage	43,9	5	219,5	
506	Corridor	371,9	1	371,9	
507	Hotel room	51,3	25	1.282,5	
	Total surface area			**2.030,4**	
TOTAL SURFACE AREA OF BUILDING 5.5				**7.936,5**	

BUILDING 5.6 (BAR / OFFICE)

Room no.	Function	Surface area (m^2)	Number	Total surface area (m^2)	Note
LEVEL 0					
100	Stair	24,6	1	24,6	
101	Elevator	7,6	1	7,6	
102	Shaft	5,5	1	5,5	
103	Bathroom	24,9	1	24,9	
104	Storage	14,8	1	14,8	
700	Bar	124,3	1	124,3	
	Total surface area			**201,7**	
LEVEL 1					
100	Stair	24,6	1	24,6	
101	Elevator	7,6	1	7,6	
102	Shaft	5,5	1	5,5	
103	Bathroom	24,9	1	24,9	
104	Storage	14,8	1	14,8	
700	Bar	124,3	1	124,3	
	Total surface area			**201,7**	
LEVEL 2					
100	Stair	24,6	1	24,6	
101	Elevator	7,6	1	7,6	
102	Shaft	5,5	1	5,5	
103	Bathroom	24,9	1	24,9	
104	Storage	14,8	1	14,8	
400	Working space	124,3	1	124,3	
	Total surface area			**201,7**	
TOTAL SURFACE AREA OF BUILDING 5.6				**605,1**	

BUILDING 5.7 (SHOP / OFFICE)

Room no.	Function	Surface area (m^2)	Number	Total surface area (m^2)	Note
LEVEL 0					
100	Stair	19,5	4	78,0	
101	Elevator	6,6	2	13,2	
102	Shaft	11,3	2	22,6	
103	Bathroom	24,9	2	49,8	
104	Storage	26,5	2	53,0	
200	Shop	377,9	2	755,8	
	Total surface area			**972,4**	
LEVEL 1					
100	Stair	19,5	4	78,0	
101	Elevator	6,6	2	13,2	
102	Shaft	11,3	2	22,6	
103	Bathroom	24,9	2	49,8	
104	Storage	26,5	2	53,0	
200	Shop	377,9	2	755,8	
	Total surface area			**972,4**	
LEVEL 2					
100	Stair	21,9	3	65,7	
101	Elevator	6,6	2	13,2	
102	Shaft	11,3	2	22,6	
103	Bathroom	24,9	2	49,8	
104	Storage	28,8	4	115,2	
400	Working space	446,0	1	446,0	
401	Meeting room	34,1	5	170,5	
403	Canteen	56,2	1	56,2	
	Total surface area			**939,2**	
LEVEL 3					
100	Stair	21,9	3	65,7	
101	Elevator	6,6	2	13,2	
102	Shaft	11,3	2	22,6	
103	Bathroom	24,9	2	49,8	

SPATIAL AND FUNCTIONAL PROGRAM

104	Storage	36,8	4	147,2	
400	Working space	436,0	1	436,0	
401	Meeting room	36,6	2	73,2	
402	Workshop	117,1	1	117,1	
403	Canteen	56,2	1	56,2	
	Total surface area			**981,0**	
TOTAL SURFACE AREA OF BUILDING 5.7				**3.865,0**	

BUILDING 5.8 (SHOP / OFFICE)

Room no.	Function	Surface area (m^2)	Number	Total surface area (m^2)	Note
LEVEL 0					
100	Stair	29,3	2	58,6	
101	Elevator	6,3	1	6,3	
102	Shaft	11,7	1	11,7	
103	Bathroom	31,8	1	31,8	
104	Storage	44,8	1	44,8	
200	Shop	498,3	1	498,3	
	Total surface area			**651,5**	
LEVEL 1					
100	Stair	29,3	2	58,6	
101	Elevator	6,3	1	6,3	
102	Shaft	11,7	1	11,7	
103	Bathroom	31,8	1	31,8	
104	Storage	44,8	1	44,8	
200	Shop	498,3	1	498,3	
	Total surface area			**651,5**	
LEVEL 2					
100	Stair	29,3	2	58,6	
101	Elevator	6,3	1	6,3	
102	Shaft	11,7	1	11,7	
103	Bathroom	31,8	1	31,8	
104	Storage	44,8	1	44,8	
400	Working space	325,9	1	325,9	
401	Meeting room	44,6	2	89,2	
403	Canteen	83,1	1	83,1	
	Total surface area			**651,4**	
LEVEL 3					
100	Stair	29,3	2	58,6	
101	Elevator	6,3	1	6,3	
102	Shaft	11,7	1	11,7	
103	Bathroom	31,8	1	31,8	
104	Storage	44,8	1	44,8	
400	Working space	325,9	1	325,9	
401	Meeting room	44,6	2	89,2	
403	Canteen	83,1	1	83,1	
	Total surface area			**651,4**	
TOTAL SURFACE AREA OF BUILDING 5.8				**2.605,8**	

BUILDING 5.9 (INFORMATION / KIOSK)

Room no.	Function	Surface area (m^2)	Number	Total surface area (m^2)	Note
LEVEL 0					
200	Shop	78,8	1	78,8	
TOTAL SURFACE AREA OF BUILDING 5.9				**78,8**	

BUILDING 5.10 (CAFÉ)

Room no.	Function	Surface area (m^2)	Number	Total surface area (m^2)	Note
LEVEL 0					
100	Stair	19,1	2	38,2	
101	Elevator	6,1	1	6,1	
102	Shaft	8,9	2	17,8	
103	Bathroom	28,0	1	28,0	
104	Storage	24,6	1	24,6	
300	Café	265,3	1	265,3	
	Total surface area			**380,0**	
LEVEL 1					
100	Stair	19,7	2	39,4	
101	Elevator	6,1	1	6,1	
102	Shaft	8,9	2	17,8	

SPATIAL AND FUNCTIONAL PROGRAM

103	Bathroom	28,0	1	28,0	
104	Storage	24,6	1	24,6	
300	Café	144,5	1	144,5	
	Total surface area			**260,4**	
TOTAL SURFACE AREA OF BUILDING 5.10				**640,4**	

BUILDING 5.11 (SHOP / OFFICE)					
Room no.	Function	Surface area (m^2)	Number	Total surface area (m^2)	Note
LEVEL 0					
100	Stair	19,8	2	39,6	
101	Elevator	6,6	1	6,6	
102	Shaft	11,7	1	11,7	
103	Bathroom	24,9	1	24,9	
104	Storage	21,6	1	21,6	
200	Shop	464,6	1	464,6	
	Total surface area			**569,0**	
LEVEL 1					
100	Stair	19,8	2	39,6	
101	Elevator	6,6	1	6,6	
102	Shaft	11,7	1	11,7	
103	Bathroom	24,9	1	24,9	
104	Storage	21,6	1	21,6	
200	Shop	464,6	1	464,6	
	Total surface area			**569,0**	
LEVEL 2					
100	Stair	19,8	2	39,6	
101	Elevator	6,6	1	6,6	
102	Shaft	11,7	1	11,7	
103	Bathroom	24,9	1	24,9	
104	Storage	21,6	1	21,6	
400	Working space	320,4	1	320,4	
401	Meeting room	51,8	2	103,6	
403	Canteen	40,6	1	40,6	
	Total surface area			**569,0**	
LEVEL 3					
100	Stair	19,8	2	39,6	
101	Elevator	6,6	1	6,6	
102	Shaft	11,7	1	11,7	
103	Bathroom	24,9	1	24,9	
104	Storage	21,6	1	21,6	
400	Working space	320,4	1	320,4	
401	Meeting room	47,2	2	94,4	
403	Canteen	40,6	1	40,6	
	Total surface area			**559,8**	
TOTAL SURFACE AREA OF BUILDING 5.11				**2.266,8**	

LANDSCAPE SURFACE				
Division		Surface area (m^2)	Total surface area (m^2)	Note
Public space			17.860,0	Paved area
	Existing	1660,0		
	New	16200,0		
Greenery			2.320,0	
	Existing	570,0		
	New	1750,0		
Sports fields			0,0	
	Existing	0,0		
	New	0,0		
	Total surface area		**20.180,0**	
TOTAL SURFACE AREA OF LANDSCAPE			**20.180,0**	

RENDER

The facetted buildings framing the actual arena behind the stadium roof form a little skyline silhouette, making the space unique and recognizable.

STADIUM | TABLE

COST ESTIMATION

AN OVERVIEW OF THE ESTIMATED COSTS FOR EACH BUILDING

BUILDING 5.1 (STADIUM)		Surface area : 41.569.5 m^2		
No	Description	Euro/ m^2	Total value (euro)	Percentage
A	Structural works	355,55	14.780.023,90	49,2
B	Architectural works	267,55	11.121.830,44	37,0
C	MEP works	100,20	4.165.365,01	13,9
	Total	**723,30**	**30.067.219,35**	

BUILDING 5.2 (TICKET SHOP / KIOSK)		Surface area : 110,0 m^2		
No	Function	Euro/ m^2	Surface area (m^2)	Total value (euro)
	Commercial (shop)	500,00	110,00	55.000,0
	Total			**55.000,0**

BUILDING 5.3 (HOTEL A)		Surface area : 7.993,6 m^2		
No	Function	Euro/ m^2	Surface area (m^2)	Total value (euro)
	Hotel	1200,00	7.993,60	9.592.320,0
	Total			**9.592.320,0**

BUILDING 5.4 (CAFÉ / OFFICE)		Surface area : 1.666,4 m^2		
No	Function	Euro/ m^2	Surface area (m^2)	Total value (euro)
	Commercial (café)	500,00	774,80	387.400,0
	Office	700,00	891,60	624.120,0
	Total			**1.011.520,0**

BUILDING 5.5 (HOTEL B)		Surface area : 7.936,5 m^2		
No	Function	Euro/ m^2	Surface area (m^2)	Total value (euro)
	Hotel	1200,00	7.936,50	9.523.800,0
	Total			**9.523.800,0**

BUILDING 5.6 (BAR / OFFICE)		Surface area : 605,1 m^2		
No	Function	Euro/ m^2	Surface area (m^2)	Total value (euro)
	Commercial (bar)	500,00	403,40	201.700,0
	Office	700,00	201,70	141.190,0
	Total			**342.890,0**

BUILDING 5.7 (SHOP / OFFICE)		Surface area : 3.865,0 m^2		
No	Function	Euro/ m^2	Surface area (m^2)	Total value (euro)
	Commercial (shop)	500,00	1.944,80	972.400,0
	Office	700,00	1.920,20	1.344.140,0
	Total			**2.316.540,0**

BUILDING 5.8 (SHOP / OFFICE)		Surface area : 2605,8 m^2		
No	Function	Euro/ m^2	Surface area (m^2)	Total value (euro)
	Commercial (shop)	500,00	1.303,00	651.500,0
	Office	700,00	1.302,80	911.960,0
	Total			**1.563.460,0**

BUILDING 5.9 (INFORMATION / KIOSK)		Surface area : 78,8 m^2		
No	Function	Euro/ m^2	Surface area (m^2)	Total value (euro)
	Commercial (shop)	500,00	78,80	39.400,0
	Total			**39.400,0**

BUILDING 5.10 (CAFÉ)		Surface area : 640,0 m^2		
No	Function	Euro/ m^2	Surface area (m^2)	Total value (euro)
	Commercial (café)	500,00	640,00	320.000,0
	Total			**320.000,0**

BUILDING 5.11 (SHOP / OFFICE)		Surface area : 640,0 m^2		
No	Function	Euro/ m^2	Surface area (m^2)	Total value (euro)
	Commercial (shop)	500,00	1.138,00	569.000,0
	Office	700,00	1.128,80	790.160,0
	Total			**1.359.160,0**

LANDSCAPE SURFACE				
No	Function	Euro/ m^2	Surface area (m^2)	Total value (euro)
	Public space (new)	200,00	16.200,00	3.240.000,0
	Greenery (new)	200,00	1.750,00	350.000,0
	Total			**3.590.000,0**

* VAT is included in all cost figures.

COST ESTIMATION

DETAILED COST EVALUATING LISTS FOR THE STADIUM (BUILDING NUMBER 5.1)

NO	DESCRIPTION	STADIUM -TOTAL AREA = 41569.5 m2		
		Euro / m^2	Total value (euro)	Percentage
A	**STRUCTURAL WORKS**	**€ 355,55**	**€ 14.780.023,90**	**49,2%**
A.1	Demolition	€ 3,17	€ 131.660,51	
A.2	Excavation	€ 9,07	€ 376.876,11	
A.3	Concrete works	€ 92,38	€ 3.840.251,16	
A.4	Construction steel	€ 204,68	€ 8.508.340,40	
A.5	Formwork	€ 30,30	€ 1.259.514,46	
A.6	Climbing (seating)	€ 15,96	€ 663.381,26	
B	**ARCHITECTURAL WORKS**	**€ 267,55**	**€ 11.121.830,44**	**37,0%**
B.1	Foundation with hood, gravel layer, concrete layer for leveling	8,98	373.238,96	
B.2	Insulation and waterproofing	12,76	530.288,63	
B.3	Metallic constructions	44,47	1.848.606,42	
B.4	Finishing inole and steering	14,56	605.444,05	
B.5	Interior wall finishes	18,64	774.662,75	
B.6	Facade with fibrocement	4,41	183.505,80	
B.7	Roof cover	16,83	699.698,30	
B.8	Roof	38,20	1.587.921,73	
B.9	Doors	12,67	526.643,07	
B.10	Lifts	6,11	254.143,77	
B.11	Stadium seats	31,26	1.299.445,22	
B.12	Sports equipment	4,01	166.715,42	
B.13	Playing field	4,11	170.707,53	
B.14	Restoration of the monumental facade	2,49	103.347,01	
B.15	Façade works	48,05	1.997.461,79	
C	**MEP WORKS**	**€ 100,20**	**€ 4.165.365,01**	**13,9%**
C.1	Electric works	€ 75,53	€ 3.139.763,10	
C.2	Air conditioning system	€ 16,26	€ 675.985,34	
C.3	Hydric plant	€ 8,41	€ 349.616,57	
	TOTAL	**€ 723,30**	**€ 30.067.219,35**	

* VAT is included in all cost figures.

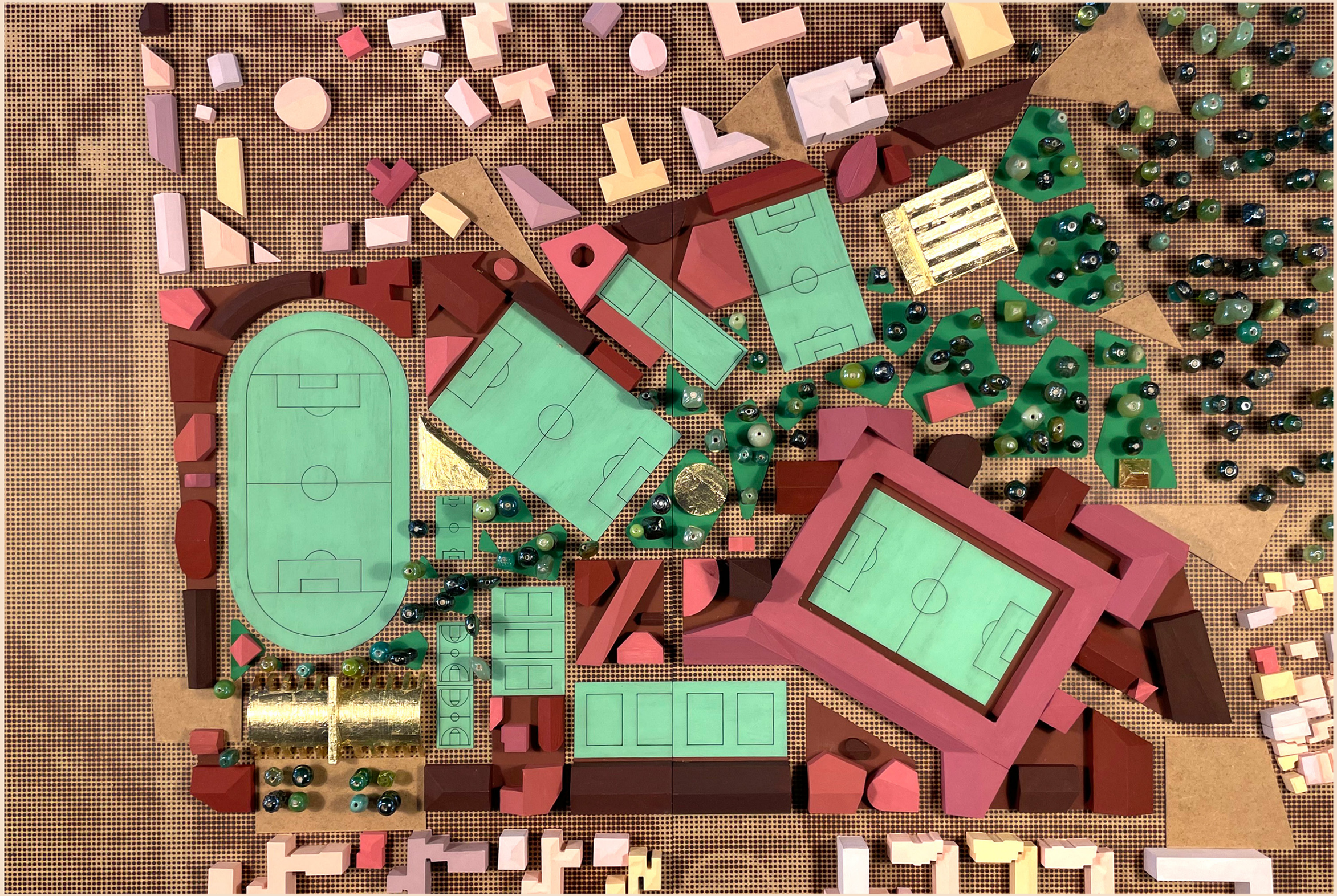
STADIUM | TABLE

COST ESTIMATION

DETAILED COST EVALUATING LISTS FOR BUILDING NUMBER 5.2 TO 5.11

NO	DESCRIPTION	COMMERCIAL- TOTAL AREA = 6393.2 m²			OFFICE - TOTAL AREA = 5445.1 m²			HOTEL - TOTAL AREA = 15930.1 m²		
		Euro / m²	Total value (euro)	Percentage	Euro / m²	Total value (euro)	Percentage	Euro / m²	Total value (euro)	Percentage
A	Site mobilzation	€ 0,52	€ 3.346,40	0,1%	€ 0,74	€ 4.053,49	0,1%	€ 0,54	€ 8.579,69	0,0%
B	Earth and reinforcement works	€ 39,85	€ 254.785,19	8,0%	€ 55,79	€ 303.801,41	8,0%	€ 43,97	€ 700.381,43	3,7%
C	Constrction shell, concreting , carpentery, reinforcement works	€ 174,56	€ 1.115.972,26	34,9%	€ 244,38	€ 1.330.665,83	34,9%	€ 277,05	€ 4.413.487,73	23,1%
D	Isolation works	€ 6,93	€ 44.316,22	1,4%	€ 9,70	€ 52.841,89	1,4%	€ 28,67	€ 456.699,54	2,4%
E	Masonery works	€ 28,38	€ 181.468,20	5,7%	€ 39,90	€ 217.259,49	5,7%	€ 96,00	€ 1.529.289,60	8,0%
F	Terrace works	€ 1,91	€ 12.182,93	0,4%	€ 2,67	€ 14.526,71	0,4%	€ 2,40	€ 38.232,24	0,2%
G	Floor works	€ 24,14	€ 154.334,05	4,8%	€ 33,80	€ 184.025,22	4,8%	€ 46,80	€ 745.528,68	3,9%
H	Doors and windows works	€ 8,19	€ 52.332,61	1,6%	€ 11,46	€ 62.400,49	1,6%	€ 24,79	€ 394.886,45	2,1%
I	Façade works	€ 163,11	€ 1.042.825,40	29,1%	€ 91,00	€ 762.314,00	13,0%	€ 116,61	€ 1.857.539,00	9,7%
J	Plastering and painting works	€ 5,80	€ 37.090,82	1,2%	€ 8,12	€ 44.226,45	1,2%	€ 13,92	€ 221.808,36	1,2%
K	Lifts	€ 6,95	€ 44.404,20	1,4%	€ 9,72	€ 52.946,80	1,4%	€ 17,41	€ 277.366,45	1,5%
L	Landscaping	€ 2,65	€ 16.936,04	0,5%	€ 3,71	€ 20.194,23	0,5%	€ 43,17	€ 687.665,63	3,6%
M	Mechanical and hvac works	€ 19,63	€ 125.526,95	3,9%	€ 91,00	€ 495.504,10	13,0%	€ 129,89	€ 2.069.147,31	10,8%
N	Electrcal works	€ 17,37	€ 111.078,73	3,5%	€ 49,00	€ 266.809,90	7,0%	€ 178,31	€ 2.840.569,05	14,9%
O	Furniture	€ 17,37	€ 111.078,73	3,5%	€ 49,00	€ 266.809,90	7,0%	€ 180,47	€ 2.874.938,86	15,0%
	Total	**€ 500,00**	**€ 3.196.600,00**		**€ 700,00**	**€ 3.811.570,00**		**€ 1.200,00**	**€ 19.116.120,00**	

* VAT is included in all cost figures.



STADIUM | TABLE

WORK SCHEDULE

NO	DESCRIPTION	YEAR 1												YEAR 2												YEAR 3												YEAR 4		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
STADIUM																																								
A	**Structural works**																																							
A.1	Demolition																																							
A.2	Excavation																																							
A.3	Concrete works																																							
A.4	Construction steel																																							
A.5	Formwork																																							
A.6	Climbing (seating)																																							
B	**Architectural works**																																							
B.1	Foundation with hood, gravel layer, concrete layer for leveling																																							
B.2	Insulation and waterproofing																																							
B.3	Metallic constructions																																							
B.4	Finishing inole and steering																																							
B.5	Interior wall finishes																																							
B.6	Facade with fibrocement																																							
B.7	Roof cover																																							
B.8	Roof																																							
B.9	Doors																																							
B.10	Lifts																																							
B.11	Stadium seats																																							
B.12	Sports equipment																																							
B.13	Playing field																																							
B.14	Restoration of the monumental facade																																							
B.15	Façade works																																							
C	**Mep works**																																							
C.1	Electric works																																							
C.2	Air conditioning system																																							
C.3	Hydric plant																																							

STADIUM | TABLE

WORK SCHEDULE

NO	DESCRIPTION	YEAR 1												YEAR 2												YEAR 3												YEAR 4		
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
COMMERCIAL AND OFFICE																																								
A	Site mobilzation			■																																				
B	Earth and reinforcement works				■	■																																		
C	Constrction shell, concreting , carpentery, reinforcement works						■	■	■	■	■	■																												
D	Isolation works							■							■	■																								
E	Masonery works										■	■	■	■	■	■																								
F	Terrace works																■																							
G	Floor works														■	■	■	■	■																					
H	Doors and windows works																		■	■																				
I	Façade works																	■	■	■																				
J	Plastering and painting works																		■	■	■																		
K	Lifts																	■																					
L	Landscaping																				■																		
M	Mechanical and hvac works												■	■	■	■					■																		
N	Electrcal works												■	■	■	■					■																		
HOTEL																																							
A	Site mobilzation			■																																				
B	Earth and reinforcement works				■	■																																		
C	Constrction shell, concreting , carpentery, reinforcement works						■	■	■	■	■	■	■																											
D	Isolation works						■														■	■																		
E	Masonery works													■	■	■	■	■	■	■																				
F	Terrace works													■																										
G	Floor works																			■	■	■	■																
H	Doors and windows works																						■	■																
I	Façade works																							■	■															
J	Plastering and painting works																								■	■														
K	Lifts																								■															
L	Landscaping																									■	■													
M	Mechanical and hvac works													■	■	■	■									■														
N	Electrcal works													■	■	■	■									■														
O	Furniture																									■	■													
LANDSCAPE																																							
A	Labdscape																									■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

CONCEPT STADIUM
TECHNICAL

TECHNICAL

BASIS OF STRUCTURAL DESIGN

1. Introduction

The purpose of this document is to set out the basis of design criteria for the Stadium Korca project to be used in the development of the Concept Design. The details in the document have been the subject of discussion in design meetings and workshops with CEBRA, with reference to the *Terms of Reference "Project Design Services for the Preparation of the Masterplan and Preliminary Project Idea"*.

This document is presented at the end of *Phase II – Preliminary Project Idea*. The Client should review the information presented in this report carefully and provide written comment and approval as it describes our understanding of the brief and the building performance limits, design assumptions and other important information to meet the required future use of the building. It will be used to develop the structural design further during any stages in which Arup is appointed to be responsible for the structural design before it eventually forms the basis for the handover to the local Engineer of Record, who will prepare and complete detailed design calculations on the project. It will be also useful for:

- Engineers reviewing the Building Control submission, or Albanian national equivalent regulations
- Engineers making alterations to the structure in the future.

1.1 Project Overview

The principal requirements of the *Preliminary Project Idea* include:

- Skënderbeu Stadium 10,000 seats (numbered 54 in Figure 5- 2).
- Surrounding and commercial buildings (numbered 37, 38, 39, 41, 42, 44, 46 and 49 in Figure 5- 2).

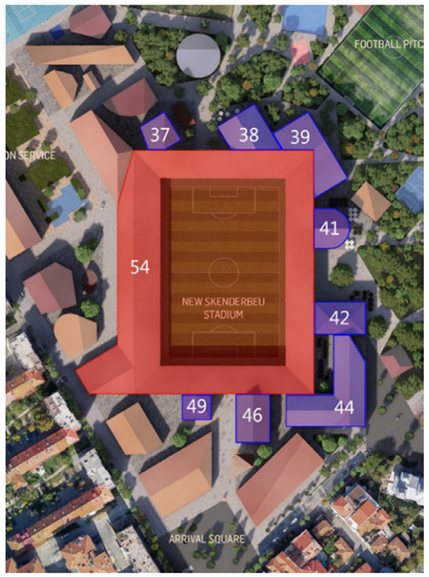


Figure 5- 2 from TERMS OF REFERENCE

1.1.1 Arup Scope

After analysing the requirement of *Terms of Reference "Project Design Services for the Preparation of the Masterplan and Preliminary Project Idea"* it has been agreed that Arup's scope for the structural design comprises the *Phase II Preliminary technical specifications* and *Preliminary technical calculation report* for Stadium Korca, which consists of the Skënderbeu Stadium and the buildings around the stadium shown numbered 37, 38, 39, 41, 42, 44, 46 and 49 as noted in Figure 5- 2 in the *Terms of Reference "Project Design Services for the Preparation of the Masterplan and Preliminary Project Idea"*.

The current scheme is based on the information provided by CEBRA on 4 November 2024.

1.2 Overview of the structural design concept

The stadium layout comprises four orthogonal stands. The North, East and South stands represent the bulk of the General Admission seating providing 10,000 new seats with supporting functions such as concourses, plant, concession spaces and toilets. The concourses are located at grade and level 2.

The West stand has circa 1125 VIP spaces and associated concourse space at level 1. The West stand also includes player spaces, media and control room. Outside broadcast (OB) is at the back of the West stand. Below the west stand there is also a basement level car park.

The roof across the four stands consists of a pitched roof with a valley at the interface with the surrounding buildings, which are considered to be structurally independent. The roof profile is integral to the architectural ambition and are achieved by cantilevering trusses of varying configuration. The trusses derive support from the structure below, which supports the bowl and there are differences between the stands in how the trusses are supported due to a number of architectural factors including bowl geometry, façade relationship etc. Loads induced by the roof are carried by the stand structures to ground piles.

1.2.1 Superstructure

The most appropriate structural form and materials for the superstructure should be investigated in future stages but it is anticipated that the bowl will be reinforced concrete with precast terracing units.

The roof structure will be structural steel.

1.2.2 Substructure

The basement will be constructed in reinforced concrete to appropriate standards for both strength and durability.

The substructure will be designed to provide a foundation to the stadium.

Construction below the water table should be avoided due to the following:

- Cost
- Effects on programme
- Durability of structures below water
- Environmental effects of dewatering during construction

The foundations will take into account likely soil and rock types as well as groundwater levels in determining the most economic foundation solution.

Groundwater protection strategy

BS 8102:2022, which is non-contradictory, complimentary information (NCCI) to EN 1992-3:2006 defines three grades of basement according to use – see Table 2

Table 2 — *Waterproofing protection – Grades of performance for below ground spaces*

Grade[A]	Performance definition
1a	Seepage[B] and damp areas[C] from internal and external sources are tolerable, where this does not impact on the proposed use of below ground structure. Internal drainage might be necessary to deal with seepage.
1b	No seepage[B]. Damp areas[C] from internal and external sources are tolerable.
2	No seepage[B] is acceptable. Damp areas[C] as a result of internal air moisture/condensation are tolerable; measures might be required to manage water vapour/condensation[D].
3	No water ingress or damp areas[C] is acceptable. Ventilation, dehumidification or air conditioning necessary; appropriate to the intended use[D], [E].

[A] The agreed grade should meet with the client's expectations for the intended use of the below ground space. Reducing the grade could increase the risk of not meeting the expectations of the client for the intended use of the below ground space.

[B] Seepage (sometimes referred to as weeping) is defined in 3.15. If there is seepage, there is a possibility of mineral deposits forming.

[C] Damp area is defined in 3.4.

[D] The scope of this document is limited to detailing the process and best practices that can be followed when creating a waterproof or water-resistant structure below ground. The additional considerations that are required to achieve the required environment are beyond the scope of this document.

[E] See BS 5454 for recommendations for the storage and exhibition of archival documents.

Table 2 from BS 8102:2022

In order to achieve these grades of basement, BS 8102:2022 describes three forms of waterproofing protection:

- Type A – tanking / barrier protection i.e. external waterproof membrane
- Type B – structurally integral i.e. limiting the crack width of the concrete to make it 'watertight'
- Type C – drained cavity i.e. providing drained cavity walls and floors with pumps to drain away any water / moisture ingress into the structure

The aggressivity of the groundwater is unknown at present. Type B and C protection systems may not be appropriate because they allow the groundwater to be in contact with the concrete. This will need to be investigated further at a later stage.

2. Design standards, guidance and other sources of reference

2.1 Codes of practice and standards

The structural design is to be undertaken utilising the Eurocode suite of design codes. The following codes of practice will be used for the detailed design for the project.

All Eurocodes used are first generation, and no country specific national annex has been used. It is implicit that all the relevant parts of a particular code will be utilised as required.

BS EN 1991 Eurocode 1: Actions on Structures

BS EN 1992 Eurocode 2: Design of Concrete Structures

BS EN 1993 Eurocode 3: Design of Steel Structures

BS EN 1994 Eurocode 4: Design of composite steel and concrete structures

BS EN 1995 Eurocode 5: Design of timber structures

BS EN 1996 Eurocode 6: Design of masonry structures

BS EN 1997 Eurocode 7: Geotechnical Design

BS EN 1998 Eurocode 8: Seismic Design

2.2 Other technical references

'The Green Guide', Guide to Safety at Sports Grounds – 6th Edition, Department for Culture Media and Sport (DCMS).

SCI Publication 076: Design Guide on the Vibration of Floors, Steel Construction Institute

SCI Publication 354: Design of floors for vibration

IStructE guide: Dynamic performance requirements for permanent grandstands subject to crowd action: Recommendations for management, design and assessment, Institution of Structural Engineers (2008).

BRE Special Digest 1 – Concrete in Aggressive Ground

CIRIA Technical Note 107: Design for Movement in Buildings, Construction Industry Research and Information Association

CIRIA Technical Note 139 - Water Resisting Basements, Construction Industry Research and Information Association

TR 67 - Movement, restraint and cracking in concrete structures, Concrete Society

Guidance on the design and construction of in-situ concrete basements, Concrete Centre

A design guide for footfall induced vibration of structures, Concrete Centre

Economic Concrete Frame Elements to Eurocode 2, Concrete Centre

3. Loading

3.1 Dead Loads

The following material densities given in BS EN 1991 Eurocode 1: Action on structures (EC1) have been used to calculate the self-weight of the structure:

- Normal weight reinforced concrete 2500kg/m³
- Steelwork 7850kg/m³

An additional allowance of 15-20% applied to steelwork quantities calculated node to node shall be made for connection self-weight.

3.2 Superimposed Dead Loads

The following sections outline the typical superimposed dead loads considered for the design. They are preliminary assumptions only to enable initial analysis to be carried out. The zoning and magnitudes are subject to change following development of the architectural scheme and will need to be reviewed and updated appropriately at each design stage.

Description	Load (kN/m²)
Stairs (no finish or epoxy resin, ceiling and services only)	0.75
Corridors	3.0
Typical concourse including toilets and concessions, ceiling and services (60mm screed and expoy finish)	3.0
General accommodation e.g. offices and conference / meeting rooms	3.0
Dining areas / Restaurants / Bars (60mm screed and tiled finish)	3.0
Kitchens (100mm screed on raised floor)	5.0
Retail areas (60mm screed and tiled finish)	3.0
Lobby / Reception	3.0
Tiered terracing (no finish or epoxy resin, including seats and services)	1.5
VIP accommodation e.g. boxes (60mm screed and tiled finish)	3.5
Plant	3.0
Storage	1.5
Car park (basement)	2.0
General external trafficked areas	2.0
Facade*	2.0 (on elevation)

Table to be updated once architectural finishes confirmed.

*This will need to be confirmed when drawings showing the façade build-up are available.

It is assumed that partitions will be lightweight except in areas where more robust construction is required such as in plant rooms and washrooms. In these areas, allowance should be made for partitions to be constructed in concrete blockwork by the Engineer of Record going forwards.

3.3 Imposed loads

The following live loads have been assumed for the design. They are based on Eurocode 1 Part 1-1 and the UK National Annex. The zoning and magnitudes are subject to change following development of the architectural scheme and will need to be reviewed and updated appropriately at each design stage.

Loading Type	Plan Load (kN/m^2)	Point Load (kN)
Stairs	4.0	0
Corridors (category C33)	4.0	4.5
Office / Meeting Rooms (including partitions)	4.5	2.7
Restaurant/Bar (including partitions)	4.5	3.0
Areas accessible to the public.	5.0	3.6
Common areas with partitions, general exterior, terracing seating and concourses		
Kitchens (including partitions)	4.5	4.5
Retail Areas (including partitions)	6.0	3.6
Boxes (including partitions)	6.5	3.6
General plant rooms (including partitions)	7.5	4.5
Heavy plant rooms (including partitions)	10	4.5
Storage (including partitions)	9.0	7.0
Lateral load on stadium stands (according to IStructE guide on dynamic performance of grandstands)	7.5% of live load applied horizontally	
Stadium roof – access for maintenance only	0.6	1.0
Gutters (100mm of water)	1.0	-
Access Gantries	3.0	-
Loudspeakers	-	7.0

3.4 Roof loading

The following assumptions have been made within the preliminary *Phase II* design.

- Self-weight is calculated explicitly with an extra 10% allowance for connections.
- Cladding (including purlins) $0.2kN/m^2$ ($20kg/m^2$)
- Services $0.05kN/m^2$ ($5kg/m^2$)
- Floodlights 0.75kN/m line load
- Advertising no allowance
- PV no allowance
- Gutters 1kN/m (empty)
- Speakers 1kN point load at speaker locations

3.5 Snow Loads

Snow loading will be calculated according to BS EN 1991-1-3:2003: Actions on Structures - General Actions - Snow loads. Due to the absence of a country specific national annex, the loads have been calculated for Greece at the border with Albania.

Key snow parameters:

Density of snow = $2kN/m^3$

a) For the undrifted design situations

$$S = \mu_i C_e C_t s_k \quad (5.1)$$

b) For the accidental design situations

$$S = \mu_i C_e C_t C_{esl} s_k \quad (5.2)$$

Snow load shape coefficient, $\mu_i = 0.8$

Stadium roof slopes are less than 30 degrees

Surrounding buildings' roof slopes are more than 30 degrees

$C_e = 1.0$

$C_t = 1.0$

Zone = taken as 2

Greece:

$$s_k = (0{,}420Z - 0{,}030)\left[1 + \left(\frac{A}{917}\right)^2\right]$$

- Altitude, Δs 850m
- S_k, Greece 1.51 (kN/m^2)
- S, undrifted (max) 1.21 (kN/m^2)
- S, Accidental (max) 2.41 (kN/m^2)

Snow loads will be included in factored and unfactored design combinations.

3.6 Wind loads

Wind loads are to be calculated according to Eurocode 1 – Part 1-4: General actions – Wind actions BS EN 1991-1-4:2005) and PD6688-1-4:2009. Below is a list of the main parameters assumed to calculate the design wind forces:

Map Wind velocity, $v_{b,map}$ = 30.0 m/s for Korca

Basic wind speed (10 minute mean), $v_{b,0}$ = 31.8 m/s

Annual risk of exceedance, p = 0.02

Probability factor, c_{prob} = 1.0

Seasonal factor, c_s = 1.0

Orography factor, co (z) = 1.0

Altitude, Δs	850m
Height	33.4m
Terrain Category (EC1 Part 1-4 Table 4.1)	II (area with low vegetation such as grass and isolated obstacles (trees, buildings) with separations of at least 20 obstacle heights
z_0	0.05m
z_{min}	2m
Upwind distance to shore of sea	20km
Distance inside town	0km

Pressure coefficients are to be considered in accordance with BS EN 1991-1-4:2005 to determine pressures for the structure.

3.7 Geometric Imperfections

Calculation of 'Equivalent Horizontal Forces' exist in the Eurocodes as a method to allow for geometric imperfections in frames and bracing systems. Historically these were referred to as Notional Horizonal Loads but the Eurocodes deal with them explicitly. The methods are outlined as follows:

- BS EN 1992-1-1:2004 5.2 for concrete structures and
- BS EN 1993-1-1:2005 5.3 for steel structures

For horizontal crowd loads, refer to section 5.5.3.5.5.2

3.8 Seismic loads

Seismic loads are to be determined in accordance with BS EN 1998-1:2004.

As the project is at concept design stage, a high-level approach has been taking to seismic analysis for the buildings, which will be conservative and give a worst case result. It is therefore anticipated that a multimodal response spectrum analysis will be used by the Engineer of Record to establish seismic design loads.

Key seismic parameters for the design:

Irregular in plan

Irregular in elevation

Importance class III

Ductility Class Medium

Subsoil class = C

Spectrum Type = Type 1

Reference peak ground acceleration, a_{gR} = 0.28g

Importance factor, γ_1 = 1.2

Behaviour factor, q = 1.5

Lower bound factor, β = 0.20

Acceleration due to gravity = 9.81 m/s^2

Conceptual design method:

For an assessment of the seismic capacity and to design for its affects at *Preliminary Project Idea* stage we have used the following method in our analysis models:

Factor x Vertical gravity forces (applied horizontally to the buildings)

Factor = Response Spectrum Acceleration / Acceleration due to gravity

Due to the construction of these buildings, the level of ductility anticipated is low, and the large concrete walls and ground supports take the majority of the seismic loading.

3.9 Thermal loads

Thermal actions due to variations in atmospheric temperature shall be determined in accordance with Eurocode 1: Part 5 for both the construction and operational cases. The following temperatures will be assumed.

- Maximum shade air temperature, T_{max} = 40°C
- Minimum shade air temperature, T_{min} = -20°C

For the design of the structure there will be the consideration of two cases for thermal loading:

- Construction case – the structure is exposed to the elements
- Permanent case – the internal structure is in a thermally controlled environment and the external structure may be shaded from direct solar radiation.

Construction case

The worst case of thermal expansion will occur when the structure is constructed during the winter at -20°C and the temperature rises to 40°C. Therefore:

- 40°C - -20°C = 60°C

For structure exposed to direct solar radiation there may be an additional thermal gain to be determined by the local Engineer of Record.

The worst case of thermal contraction will occur if the structure is built during the summer at 40°C and the temperature falls to winter at -20°C. Therefore:

- -20°C - 40°C = -60°C

Where the construction case thermal loads govern the design of the stability elements e.g. cores and shear walls, the use of construction sequencing and late pour strips are envisaged to mitigate these effects.

Permanent case

The following thermal loading on the structure will be assumed for the permanent case:

- Internal structures: +20°C/-10°C
- External structures shaded from direct solar radiation: +25°C/-20°C
- External structures exposed to direct solar radiation: +45°C/-20°C

Given that extreme temperatures are not sustained for longer periods and that the uptake of concrete structures to the ambient temperature lags considerably, the temperature variation applied to concrete structures is reduced by 5°C. This is on the basis that even relatively thin concrete structures must be continuously exposed to the most extreme temperature for several days before the concrete temperature reaches the ambient temperature.

Tensile stresses induced in concrete structures by thermal loads are restricted to the tensile capacity of the concrete.

3.10 Shrinkage

. The appropriate shrinkage strain should be determined in accordance with the guidance of Concrete Society Technical Report 67 Movement, restraint and cracking in concrete structures. Due to the relatively narrow floor plates, which are restrained by columns and walls approximately 15m apart, long term shrinkage effects is unlikely to be critical

Shrinkage effects will be limited to the long-term tensile capacity of the concrete, with creep effects providing some degree of relief to this.

In areas of the concrete structures where the structural width becomes very narrow a movement joint should be included, this will allow some movement of the concrete elements either side, without the slab developing high stresses. It is anticipated that a cast in slab connector would be used, such as a dowelled connection, to allow some force transfer but release any axial loading.

3.11 Horizontal loads acting on parapets and partitions acting as barriers

The horizontal loads to be applied to parapets and partitions acting as barriers are define in the Guide to Safety at Sport Grounds, 6th Edition. These loadings vary depending on location between 3.0kN/m for a barrier at the foot of a gangway and 1.0kN/m for barriers behind a row of seats. Structural members to which non-structural parapets / handrails / barriers are fixed such as precast components and the associated fixings shall be designed to resist the following horizontal loads from Chapter 11 of the Guide to Safety at Sports Grounds (Green Guide) – 5th Edition:

Types of barrier		Horizontal imposed load	Height of load applied
Type 3	Barriers for gangways of seating tiers aligned at 90 degrees to direction of spectator movement.	3.0kN/m	1.1m
Type 4	Barriers for gangways of seating tiers aligned parallel to direction of spectator movement.	2.0kN/m	1.1m
Type 5	Barriers to the end of seating tier rows.	1.0kN/m	1.1m
Type 6	Barriers behind the rear row of seats (Diagram 11.2).	1.0kN/m	1.1m
Type 7	Barriers within 530mm in front of a row of seats.	1.5kN/m	0.8m
Type 8	Barriers for stairways aligned at 90 degrees to direction of spectator movement.	3.0kN/m	1.1m
Type 9	Barriers for stairways aligned parallel to direction of spectator movement.	2.0kN/m	1.1m

3.12 Earth and groundwater pressures

A pressure coefficient, K_0 of 0.5 and a soil density of 20kN/m^3 shall be used in the design of the basement retaining walls.

3.13 Surcharge loads on retaining walls

Retaining walls will be designed for an unfactored surcharge / compaction load of 10kN/m^2. This allows for vehicle and construction loads that the basement walls are likely to experience. A line load representing a vehicle of up to 160kN in weight should also be checked.

3.14 Load combinations

Load combinations are in accordance with the relevant design code but will broadly be in line with the following combinations.

- DL – Dead load including the superstructure, floor mass, precast concrete units forming the spectator bowl.
- SDL – Super dead load, finishes and cladding.
- LLB – imposed live load on the buildings and concourses excluding the tiers
- LLT – imposed live load on the tiers and gangways
- LLTH – IStructE recommended horizontal crowd load to Section 5.5.3
- WL – Wind load acting horizontally on the building and/or vertically on the roof structures
- SL – imposed live load as snow on the roof. It has been assumed that snow cannot act simultaneously on the tiers with a spectator crowd but snow on the roof during an event is possible.
- GI – geometric imperfections

Thermal loads, which are not well covered by the codes, will be combined at ULS with dead, imposed and wind loads, factored by 1.2.

Seismic loads are included in load combinations as per the codes, but not combined with other horizontal loads.

3.14.1 ULS load cases

For strength analysis the combinations are as per Table A1.2(B) from BS EN 1990:

Table A1.2(B) - Design values of actions (STR/GEO) (Set B)

Persistent and transient design situations	Permanent actions		Leading variable action	Accompanying variable actions (*)	
	Unfavourable	Favourable		Main (if any)	Others
(Eq. 6.10)	$\gamma_{G,j,sup}G_{k,j,sup}$	$\gamma_{G,j,inf}G_{k,j,inf}$	$\gamma_{Q,1}Q_{k,1}$		$\gamma_{Q,i}\psi_{0,i}Q_{k,i}$

Persistent and transient design situations	Permanent actions		Leading variable action (*)	Accompanying variable actions (*)	
	Unfavourable	Favourable	Action	Main	Others
(Eq. 6.10a)	$\gamma_{G,j,sup}G_{k,j,sup}$	$\gamma_{G,j,inf}G_{k,j,inf}$		$\gamma_{Q,1}\psi_{0,1}Q_{k,1}$	$\gamma_{Q,i}\psi_{0,i}Q_{k,i}$
(Eq. 6.10b)	$\xi\gamma_{G,j,sup}G_{k,j,sup}$	$\gamma_{G,j,inf}G_{k,j,inf}$	$\gamma_{Q,1}Q_{k,1}$		$\gamma_{Q,i}\psi_{0,i}Q_{k,i}$

(*) Variable actions are those considered in Table A1.1

NOTE 1 The choice between 6.10, or 6.10a and 6.10b will be in the National annex. In case of 6.10a and 6.10b, the National annex may in addition modify 6.10a to include permanent actions only.

NOTE 2 The γ and ξ values may be set by the National annex. The following values for γ and ξ are recommended when using expressions 6.10, or 6.10a and 6.10b.

$\gamma_{G,j,sup} = 1,35$
$\gamma_{G,j,inf} = 1,00$
$\gamma_{Q,1} = 1,50$ where unfavourable (0 where favourable)
$\gamma_{Q,i} = 1,50$ where unfavourable (0 where favourable)
$\xi = 0,85$ (so that $\xi\gamma_{G,j,sup} = 0,85 \times 1,35 \cong 1,15$).
See also EN 1991 to EN 1999 for γ values to be used for imposed deformations.

NOTE 3 The characteristic values of all permanent actions from one source are multiplied by $\gamma_{G,sup}$ if the total resulting action effect is unfavourable and $\gamma_{G,inf}$ if the total resulting action effect is favourable. For example, all actions originating from the self weight of the structure may be considered as coming from one source; this also applies if different materials are involved.

NOTE 4 For particular verifications, the values for γ_G and γ_Q may be subdivided into γ_g and γ_q and the model uncertainty factor γ_{Sd}. A value of γ_{Sd} in the range 1,05 to 1,15 can be used in most common cases and can be modified in the National annex.

Table A1.1 - Recommended values of ψ factors for buildings

Action	ψ_0	ψ_1	ψ_2
Imposed loads in buildings, category (see EN 1991-1-1)			
Category A : domestic, residential areas	0,7	0,5	0,3
Category B : office areas	0,7	0,5	0,3
Category C : congregation areas	0,7	0,7	0,6
Category D : shopping areas	0,7	0,7	0,6
Category E : storage areas	1,0	0,9	0,8
Category F : traffic area, vehicle weight ≤ 30kN	0,7	0,7	0,6
Category G : traffic area, 30kN < vehicle weight ≤ 160kN	0,7	0,5	0,3
Category H : roofs	0	0	0
Snow loads on buildings (see EN 1991-1-3)*			
Finland, Iceland, Norway, Sweden	0,70	0,50	0,20
Remainder of CEN Member States, for sites located at altitude H > 1000 m a.s.l.	0,70	0,50	0,20
Remainder of CEN Member States, for sites located at altitude H ≤ 1000 m a.s.l.	0,50	0,20	0
Wind loads on buildings (see EN 1991-1-4)	0,6	0,2	0
Temperature (non-fire) in buildings (see EN 1991-1-5)	0,6	0,5	0

NOTE The ψ values may be set by the National annex.
* For countries not mentioned below, see relevant local conditions.

The following cases will be used for local and global analysis at ULS:

- ULS 1 (live leading):

  1.35DL + 1.35SDL + 1.5LLB + 1.5LLT + 1.5LLT (horizontally) + 1.5×0.5SL + 1.5×0.5WL + GI

- ULS 2 (snow leading)

  1.35DL + 1.35SDL + 1.5SL + 1.5×0.7LLB + 1.5×0.7LLT + 1.5×0.7LLT (horizontally) + 1.5×0.5WL + GI

- ULS 3 (wind leading)

  1.35DL + 1.35SDL + 1.5WL + 1.5×0.7LLB + 1.5×0.7LLT + 1.5×0.7LLT (horizontally) + 1.5×0.5SL + GI

- ULS 4 (worst case uplift)

  1.0DL + 1.0SDL + 1.5WL(up) + GI

- ULS 5 (overturning due to wind)

  1.0DL + 1.0SDL + 1.5WL + 1.5×0.7LLT + 1.5×0.7LLT (horizontally) + 1.5×0.5SL + GI

- ULS 6 (overturning due to crowd)

  1.0DL + 1.0SDL + 1.5LLT + 1.5LLT (horizontally) + 1.5×0.5WL + 1.5×0.5SL + GI

For each pf the above combinations there are multiple cases to take into account the differing directions of the horizontal actions.

3.14.2 SLS load cases

The following cases will be used for local and global analysis at SLS:

- SLS 1 (characteristic live leading):

  1.0DL + 1.0SDL + 1.0LLB + 1.0LLT + 1.0LLT (horizontally) + 0.5SL + 0.5WL

- SLS 2 (characteristic snow leading)

  1.0DL + 1.0SDL + 1.0SL + 0.7LLB + 0.7LLT + 0.7LLT (horizontally) + 0.5WL

- SLS 3 (characteristic wind leading)

  1.0DL + 1.0SDL + 1.0WL + 0.7LLB + 0.7LLT + 0.7LLT (horizontally) + 0.5SL

- SLS 4 (frequent live leading):

  1.0DL + 1.0SDL + 0.7LLB + 0.7LLT + 0.7LLT (horizontally)

- SLS 5 (frequent snow leading)

  1.0DL + 1.0SDL + 0.2SL + 0.6LLB + 0.6LLT + 0.6LLT (horizontally)

- SLS 6 (frequent wind leading)

  1.0DL + 1.0SDL + 0.2WL + 0.6LLB + 0.6LLT + 0.6LLT (horizontally)

- SLS 7 (quasi permanent)

  1.0DL + 1.0SDL + 0.6LLB + 0.6LLT + 0.6LLT (horizontally)

For each pf the above combinations there are multiple cases to take into account the differing directions of the horizontal actions.

4. Ground Conditions

4.1 Altea Geostudio Desk Study and Ground Investigation

Arup has reviewed the reports by local consultant Altea Geostudio. Two reports have been provided:

- Geological and Geotechnical Report (652)
- Seismic Risk Report (653)

A separate Desk Study has not been prepared.

Altea did not confirm their proposal for the intrusive ground investigation with Arup prior to execution of the intrusive ground investigation and subsequent seismic assessment. However, the scope appears to be adequate for pre-concept stage of design and includes, in summary, the following:

- 7no. rotary boreholes to depths of 15-40m (3 – 40m and 4 – 15m).
- Two lines of seismic refraction tests
- Insitu SPT tests
- Various laboratory testing

A total number of 8no. layers of material have been identified:

Layer	Material description
1	Top soil/Made Ground – Soft Silty CLAY
2	Soft to Firm Brown/Beige silty CLAY/clayey SILT with silty sand bands.
3	Soft green grey silty CLAY
4	Soft to Firm Green Grey clayey sandy SILT
5	Medium dense Green Grey silty sandy GRAVEL
6	Soft to Firm green grey silty CLAY/clayey SILT
7	Stiff brown/beige sandy silty CLAY
8	Very weathered to weathered v weak to weak grey to dark grey CLAYSTONE/SILTSTONE/SANDSTONE

A surface water level of 1 to 5.5m below ground level is reported. Altea Geostudio's recommendation is that pumps are used if excavation deeper than 5.5m below ground level is required.

Altea Geostudio's recommendations for side slopes of earthworks to 1:2 (V:H).

4.2 Arup commentary based on Altea Geostudio reports

4.2.1 Geology

Ground conditions are generally poor with significant extent of soft clay/silt with some firmer. Soft materials to minimum 8m below ground level suggests shallow pads are unsuitable except for light loads. Stiff clay is present at 26-28m in two locations (BH1 and 3). Bedrock was only confirmed in two locations 31 and 37m depths (BH1 and 3).

Strata 5, 7 and 8 are the more competent materials but are inconsistently present around the site. A 4-5m band of medium dense gravel encountered at the following depths in each borehole:

Borehole no.	Depth of medium dense gravel (mbgl)
1	8.0
2	8.4
3	10.0
4	8.4
5	Not encountered
6	Not encountered
7	8.6

There exists a possibility of piling in to this medium dense gravel layer. The bedrock is deep but reachable with conventional bored piles. CFA piling is unlikely be feasible at these depths.

4.2.2 Geo-environmental

The Altea Geostudio information did not include any contamination/geoenvironmental testing so this risk is unclear at present. There are no known Made Ground sources present but aggressivity of the natural ground is unknown.

4.2.3 Groundwater

All logs show water at 5.5m depth and this 5.5m is shown on all the geological cross sections in Altea Geostudio's information. Arup note that it is unusual for groundwater levels to be this consistent. Altea Geostudio conclude that the water level is between 1 and 5.5m depth. Arup suspects Altea Geostudio may be anticipating some perched waters above the main water table.

4.2.4 Ground levels

From the borehole surface levels it appears as though there is a 5m variation from BH1/4/5 in south 851m elevation down to BH7 in NW of site 846m elev. This matches the information provided by CEBRA and suggests there will need to be a cut/fill exercise and minor earthworks up to approximately 2.5m deep. Arup suggests side slopes of 1:2.5 either side of the development to balance these. The 5m level difference is over a plan distance of circa 240m so is not particularly steep.

4.2.5 Seismicity

The seismic report points to the relatively high activity in the region with several damaging earthquakes having taken place with magnitude 6+. The EC8 soil seismic class which is classed using the top 30m of data and rated from soil Class A (Rock) to E (Extremely soft slay/silt) is given as soil Class C, based on a shear wave velocity ($v_{s,30}$) of 268m/s noted in Altea Geostudio's information. Peak Ground Acceleration PGA are given as 0.138g and 0.280g for 95 yr and 475yr return periods.

5. Performance Criteria

5.1 Design life

The design life of the structure will not be less than 50 years in accordance with BS EN 1990:2002 – Table 2.1.

5.2 Robustness

Consequence class according to BS EN 1991-1-7:2006:

- Stadium: Class 3
- Offices: Class 2a
- Shops/Hotels: Class 2b

The requirements specified in Annex A of this code must be met.

5.3 Movements

The movements and tolerances to which the structure is designed will need to be accommodated in the detailed design of interfacing building elements, particularly architectural finishes and cladding.

Serviceability deflection criteria for the cladding interface will need to be reviewed and coordinated with the designer of the cladding system based on the final detailed design in case tighter tolerances are required.

5.3.1 Vertical deflections

The following deflection limits will be assumed in accordance with Eurocode recommendations:

- Steelwork:
  - L/250 (L/125 for cantilevers) under quasi-permanent loads
  - L/360 (L/180 for cantilevers) under characteristic variable loads only (UK NA to BS EN 1993-1-1 7.2)
  - L/100 roof deflection at cantilever tip due to wind uplift where span, L is measured from the front column to the leading edge.
- Concrete:
  - L/250 (L/125 for cantilevers) under quasi-permanent loads (BS EN 1992-1-1 7.4)
  - L/500 (L/250 for cantilevers) after construction under quasi permanent loads when deflections could damage adjacent parts of the structure (BS EN 1992-1-1 7.4)

5.3.2 Lateral displacements

- Building horizontal sway, δ: H/500 under wind loads where H = height of building above the top of foundations.
- Inter-storey drift:
  - h/300 under characteristic variable loads where h = storey height
  - h/400 under wind loads

  EC8 (BS EN 1998-1:2004) has no specific requirement to check inter-storey drift under seismic loads.

5.3.3 Foundation Settlements

The following imposed movements are to be allowed for in the design of the stand:

- Maximum settlement generally: 20mm
- Maximum differential settlement generally: 15mm

5.4 Tolerances

Tolerances are allowances made in the design dimensioning to cater for the anticipated accuracy of construction, including fabrication and erection. The values quoted in this report are the permitted deviations from design dimensions, as specified for the concrete and steelwork. Tolerances therefore relate to the theoretical position of an unloaded structural element at the time of its construction.

Allowable tolerances for the structure are as defined in the relevant material specification and shall comply with the more onerous of those below:

Concrete	National Structural Concrete Specification (4th Edition), which complies with;
	EN 13670: Execution of Concrete Structures
Steelwork	National Structural Steelwork Specification (7th Edition)
Piling	ICE Specification for Piling and Embedded Retaining Walls (3rd Edition)

Compatibility of tolerances between package elements is the responsibility of the Contractor.

5.5 Vibration

5.5.1 Roof

The long cantilevered steel roof of the stadium is to be designed to minimise possible wind excitation.

Wind tunnel testing could provide an opportunity to use surface wind analysis to confirm acceptable levels of windiness for spectators in the stadium and players on the pitch.

5.5.2 Dynamic Performance of Stadium Seating Terraces

The spectator seating and viewing areas will be designed so that they are suitable for viewing sports events.

The dynamic performance of the spectator seating areas is to be assessed using the internationally recognised Institution of Structural Engineers guide; ‘Dynamic performance requirements for permanent grandstands subject to crowd action: Recommendations for management, design and assessment’ (2008). This recommends an approach that limits natural frequency for the seating tiers (an alternative approach that limits accelerations could also be used):

- >3.5Hz for vertical modes for stadia hosting sporting events only
- >6.0Hz for vertical modes for stadia hosting multi-purpose events (e.g. concerts).
- >1.5Hz for overall sway (side-side/front-back) modes of the stadium frame to meet crowd comfort expectations by providing adequate lateral frame stiffness under all superstructure, roof and fit out mass but excluding crowd loading.

A ‘Route 1’ frequency-based approach will be adopted for IStructE Scenario 4 which has a combined system frequency limit of 6.0Hz plus 0.5Hz contingency to meet Section 4.3 of the aforementioned guidance. Any complex areas such as balcony units or cantilevers may be assessed using a Route 2 approach if deemed necessary:

In addition, areas that may be susceptible to footfall vibration (restaurants, TV studios etc.) will be designed in accordance with SCI Publication P354 and the Concrete Centre: A design guide for footfall induced vibration of structures, 2006.

Prior to Schematic Design, footfall vibration will be managed using span-depth and deformation limits rather than a full analysis. Crowd dynamic related (targeted frequencies) will be assessed using simplified analytical representations of the structure (simplified stiff core 1D models with representative masses and rigid links representing floor plates. Full footfall analysis and frequency analysis (or Route 2 acceleration analysis) will take place at later design stages.

5.5.3 Horizontal Crowd Loading

In addition to the base load cases for combined SLS and ULS criteria, an equivalent static horizontal crowd load is to be applied to the superstructure forming the seating tiers equivalent to 7.5% of the tier imposed load to comply with the IStructE documentation, shown below.

This load shall be applied to the superstructure forming the tiers in both side to side and front to back directions, but not simultaneously and shall be combined with other load cases with a recommended load factor of 1.5. If the operational requirements of the building should change to a lesser scenario, this crowd load could be reduced to 5.0% of the tier imposed load.

The equivalent static horizontal crowd load descried above shall not be applied on concourses or VIP areas and will be at the discretion go the engineer based on the seating configuration developed by the architect.

Table 2 Design for horizontal strength and stability		
To be used with both Route 1 and Route 2 methods of design and assessment In addition to the operational wind loading, grandstands should be capable of withstanding the following lateral loading due to crowd action. The loads should be incorporated in the static design for ultimate load of the structure in combination with other design loads.		
Type of use	**Additional static horizontal load as a percentage of the specified static live loading on the seating deck**	
	Side to side	**Front to back**
All grandstands except those used for pop-concerts or similar lively activity	±5%	±5%
Grandstands to be used for pop-concerts or other lively events	±7½%	±7½%
Notes i) The loads are specified as a percentage of the specified live loading on the seating deck. Note only loading on the seating deck needs to be considered. ii) The horizontal load should be applied in the plane of the seating deck in the way the people are situated according to the available seating. iii) The horizontal loads due to crowd action are additional to loadings from other causes and so should be applied in combination with operational wind loads. iv) The partial load factors to be used in each load case should be those specified for live loads in the appropriate Code of Practice for the structural material involved. A partial factor of 1.5 should be used with the given horizontal loads in load combinations with factored values of dead and imposed loads.		

5.5.4 Floor vibration

The following limits are to be observed for minimum natural frequency, f and maximum response factor, R, as defined in SCI Publication 076: Design Guide on the Vibration of Floors:

- Offices / restaurants and control room: f = 5Hz; R = 8

In calculating R, damping values should be based on fully fitted / furnished areas and assuming 10% of the design imposed live load.

5.6 Durability

All elements of the building shall be designed to be adequately durable under the relevant exposure conditions, to achieve the specified design life. Corrosion protection requirements are to be agreed with the client and subcontractors during the Detailed Design.

Structural steelwork shall be protected from corrosion. For areas that can be accessed periodically, protection providing a 'life to first maintenance' of not less than 15 years shall be specified. For other inaccessible areas protection providing a 'very long life to first maintenance' shall be specified. As a minimum requirement, the guidance in The Institution of Structural Engineers' 'Manual for the Design of Steelwork Building Structures' shall be used. For critical applications, in inaccessible areas, such as wall cavities (windposts, wall ties, etc) and where corrosion could result in damage to finishes, stainless steel elements of an appropriate grade shall be specified.

Concrete covers to generally be in accordance with BS EN 1992 Eurocode 2 and increased where required for fire resistance. As a minimum requirement for concrete elements, the guidance in The Institution of Structural Engineers' 'Manual for the Design of Reinforced Concrete Building Structures' shall be used. Where the face of a concrete element has the potential to be exposed to freezing and thawing or de-icing salts in service, an air-entraining admixture shall be specified in the concrete mix or a higher grade of concrete shall be specified.

5.7 Fire Resistance

The buildings should be designed to achieve the recommended fire resistance period, as defined by the project fire engineer.

From UK Building Regulations Approved Document B, the anticipated fire resistance period is:

- Stadium: 60 minutes
- Hotel: 90 minutes
- Roof without access: no fire resistance

This should be verified at the next design stage by the local consultant team.

6. Materials

Material grades and properties used are defined below:

6.1 Structural concrete property summary

The basic design concrete designations, strength grades and covers to be used on the project will be in accordance with BS EN 206 and BS 8500:2015.

The following minimum grades of concrete are to be adopted:

Application	Grade
Foundations and retaining walls	C32/40
Slabs and beams	C32/40
Rakers	C40/50
Precast concrete elements	C50/60
Columns and walls	C40/50
Blinding	C16/20

Further ground investigation and survey results will provide any information on required exposure classes, and other required properties, for the concrete mixes in contact with the ground once the aggressivity of the ground is better understood.

6.1.1 Reinforcement

Reinforcement detailing will be in accordance with BS EN 1992-1-1 and BS EN 1998-1-1. All Eurocodes used are first generation.

Reinforcement suppliers shall hold a valid Certificate of Approval from CARES.

Steel reinforcement shall be grade C500 (ductility grade C, minimum characteristic strength 500N/mm^2) type 2 deformed bars to BS 4449.

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6.1.2 Concrete finishes

All formed finishes should comply with the National Structural Concrete Specification.

All formed surfaces should be ‘Plain’.

6.2 Structural Steelwork

Steel grade to be S355 to EN 10025 or 10210 as appropriate.

7. Embodied Carbon

Embodied Carbon is most commonly referred to as a summation of all the greenhouse gases emitted by the materials and construction of our built environment. It includes the impacts of sourcing raw materials, manufacturing, transport, and any wastage along the process. Additionally, it includes the carbon impacts of installing, maintaining, repairing, or disposing of materials throughout the building lifespan and at end of life.

If we are to limit climate change to a 1.5^{o}C temperature rise as per the Paris agreement and create a net zero built environment, embodied carbon will have to sit at the forefront of designers’ minds. Furthermore, as signatories to Engineers Declare, we have made a commitment to take positive action in response to climate breakdown, therefore acknowledging and reporting the embodied carbon of our design brings awareness to the impact the construction industry is having.

No limits or guidance have been proposed for Stadium Korca to limit the project’s embodied carbon either in construction or in use. However, we would propose some adjustments to the structural design and specification of materials to help reduce the project’s embodied carbon, see below.

1. Cement Replacement materials

We propose to use a proportion of GGBS (ground granulated blast furnace slag) as a cement replacement material in all concrete mixes; subject to availability.

2. Recycled Steelwork

All steel reinforcement within the concrete should be made from recycled stock. Any additional steelwork members can be taken from recycled stock.

3. Design for deconstruction

When the buildings do eventually reach the end of their useful life deconstruction rather than demolition is a preferrable environmental outcome as it would allow reutilising the structural skeleton and save on the materials necessary to build a new one.

A deconstruction plan should be developed for handover stage

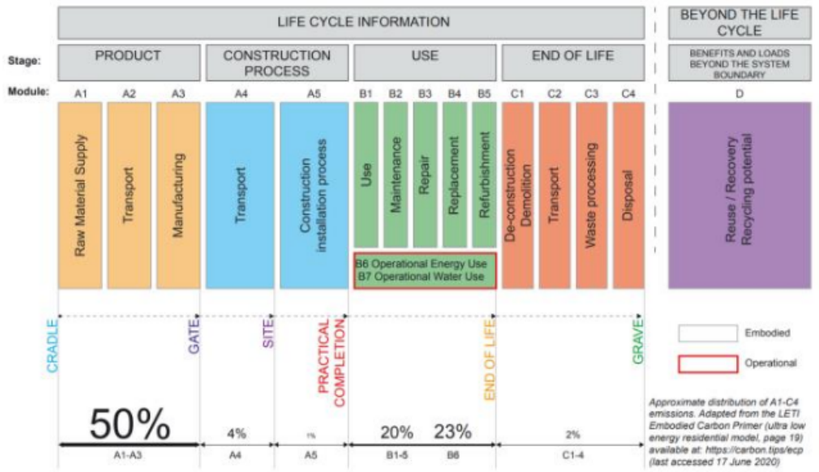


Figure 1 - Carbon lifecycle - adapted from the LETI model

For the buildings’ servicing, it could be reviewed to try and make the sites carbon zero in operation. This would involve designing the mechanical, electrical and public health elements to have a negligible effect on the environment. This will have the added benefit of improving occupant comfort and running costs.

8. Construction sequence

An indicative building construction sequence has been given below. This should be developed throughout the design by the local Engineer of Record and discussed with the main contractor and selected specialist subcontractors once appointed.

Note that temporary requirements for general concrete and steel frame erection have not been included. Arup is not responsible for temporary works.

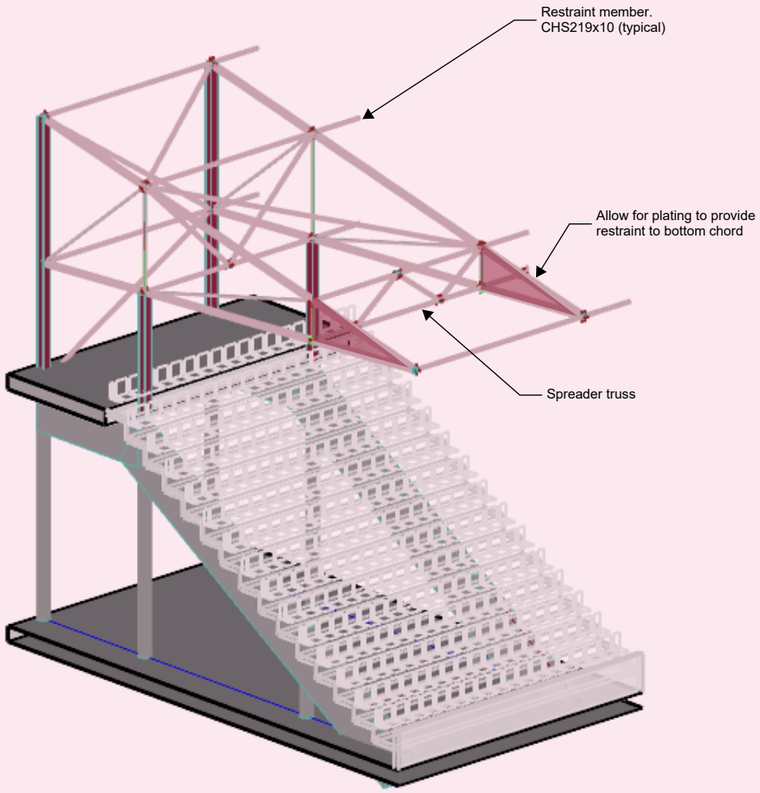
1. Enabling works, mobilisation.
2. Excavation for foundations, validation of the natural ground for the allowable bearing pressure assumed in design.
3. Casting of foundations.
4. Construction of concrete shear walls and cores.
5. Construction of superstructure columns and floors level by level.
6. Fix roof steelwork to surrounding buildings.
7. Fix stadium roof truss backspans (where applicable).
8. Place bleacher seating onto rakers starting from the front.
9. Place stadium roof truss cantilevers.
10. Casting of ground floor slabs.
11. Installation cladding and internal partitions.
12. Installation MEP, internal finishes and fitting out.
13. Commissioning.

TECHNICAL

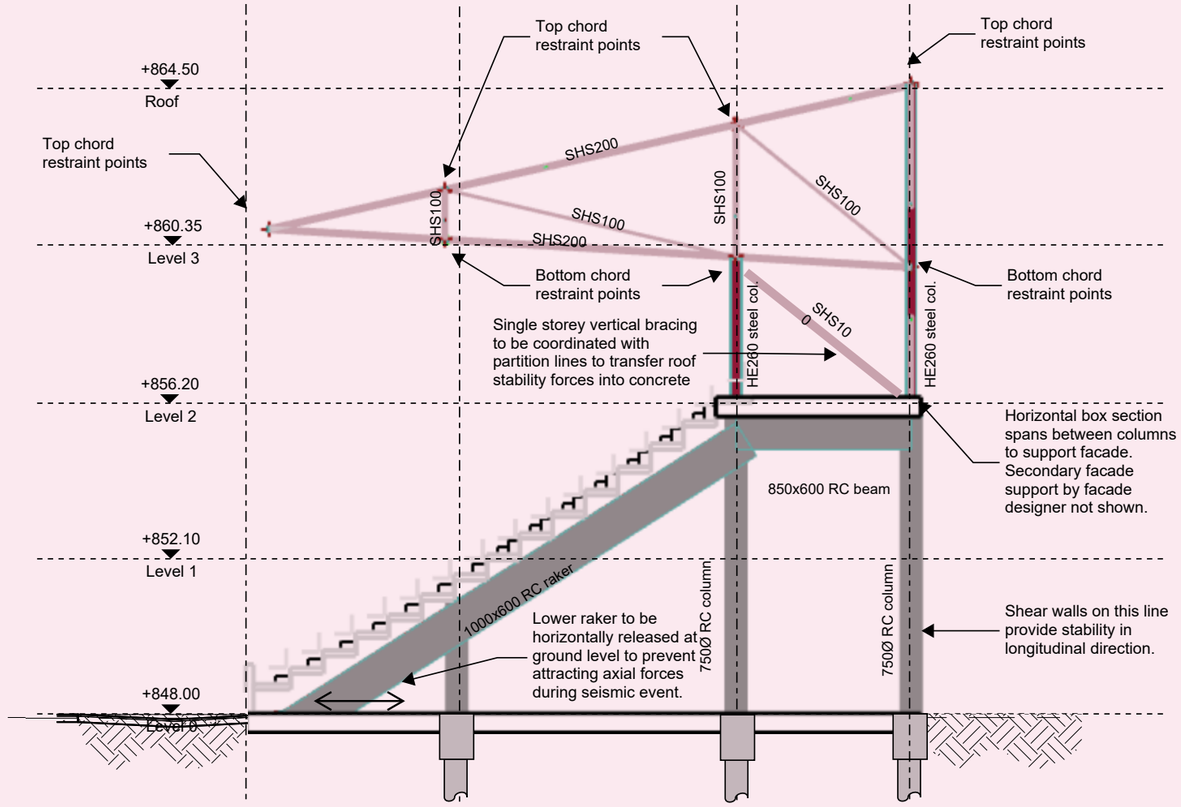
STRUCTURAL DESIGN PRINCIPLES

1. Refer to Structural Basis of Design Report for design input and General Notes.
2. This drawing is to be read in conjunction with all other Engineer's and Architect's information.
3. Dimensions are in millimetres unless noted otherwise.
4. All levels are relative to the ordnance datum and are measured in metres. Heights of RC upstand beams indicated exclude slab depth; depths of RC downstand beams indicated include slab depths.
5. All dimensions shown are to be confirmed by Architect. For setting out of grid refer to Architect's drawings.
6. Structural slab level (SSL) is the notional top surface of the concrete slab.
7. All steelwork is grade S355 unless noted otherwise.
8. The design shows a level of detail and information applicable to Preliminary Project Idea Design Stage. As such allowances should be made for items not yet covered by the drawings, that will be picked up at the next stage.
9. Refer to Architects drawings for exposed concrete finish requirements. 10. Allow 50mm blinding below all concrete cast against the ground.
11. Drawings show primary structure only. Elements of secondary/tertiary structure not shown on the drawings include:

- All secondary steelwork
- All temporary works
- Cladding secondary support systems
- Secondary steelwork for supporting rooflights and solar panels on roofs
- Steelwork associated with roof access systems
- Fall arrest systems
- Plant supports
- Guttering
- Barriers
- Balustrades
- Head restraints to glazed/stud/partition walls



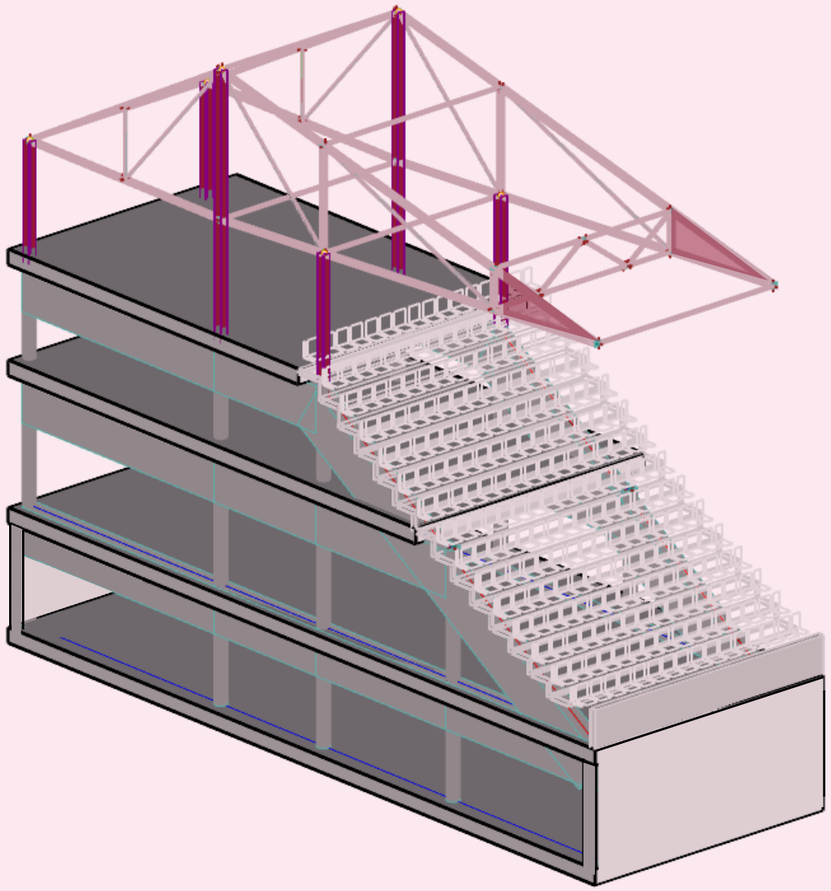
NORTH, SOUTH, EAST STANDS 3D



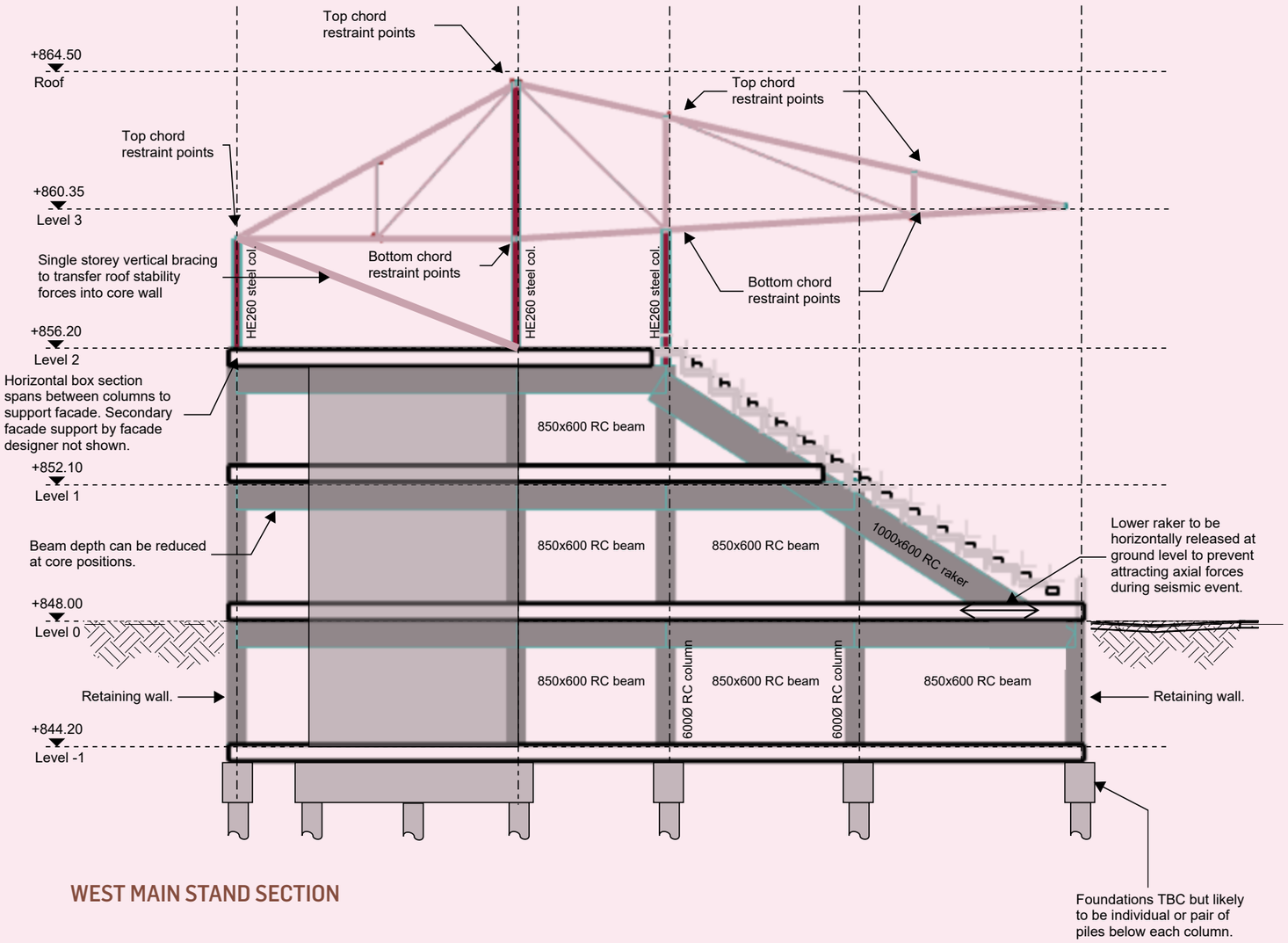
NORTH, SOUTH, EAST STANDS SECTION

TECHNICAL

STRUCTURAL DESIGN PRINCIPLES



WEST MAIN STAND 3D



WEST MAIN STAND SECTION

TECHNICAL

MEP DESIGN CONCEPTS

MEP Strategies and Basis of Design

Applicable Guidance and Standards

Through discussions with the project team, it is our understanding that there is no specific sports venue design standards in Albania.

In the absence of country-specific sports venue design guidance, it is recommended that the stadium is designed in compliance with the recommendations of the ‘Guide to Safety at Sports Grounds - 6th Edition’, commonly referred to as the Green Guide.

The document is the distillation of many years of research and experience and is updated periodically to take into account emerging issues and trends in the field. The Guide applies to the safety of all people present at any sports ground, whether or not a safety certificate is in force, during the course of an event.

It is assumed that the stadium will otherwise be designed in compliance with local codes and standards.

The stadium infrastructure is proposed to be designed in accordance with UEFA standards, specifically for a Category 4 stadium.

Incoming Utilities

Sitewide Utilities Proposals

It is recommended that separate utility intakes are provided for the stadium and the adjoined buildings, for the following reasons:

- Allows buildings to be constructed on different programmes without reliance on the stadium completion
- If adjoined buildings are owned, managed and operated by third-parties, then this simplifies metering and contractual billing arrangements
- Reduces the overall demand load on the stadium, which will be subject to more peak-based load profiles during events. Better utilisation of utilities infrastructure
- Allows for renewable energy sources such as photovoltaics to be integrated at a building-by-building level

The Korca stadium development forms part of a wider development masterplan and as such, the utilities strategy needs to be considered in the wider context. The following sections outline the recommended load allowances for the stadium and connected buildings at this stage.

Electrical Services

Stadium

Following a preliminary demand assessment, a dedicated 1.5MVA connection is recommended for the stadium at this stage. This figure should be reviewed at future workstages once engineering, broadcast and catering strategies are better defined.

It is assumed that a dedicated High Voltage connection from the local Distribution Network Operator will be taken to the stadium and terminated in a dedicated HV sub-station in the Main/West Stand.

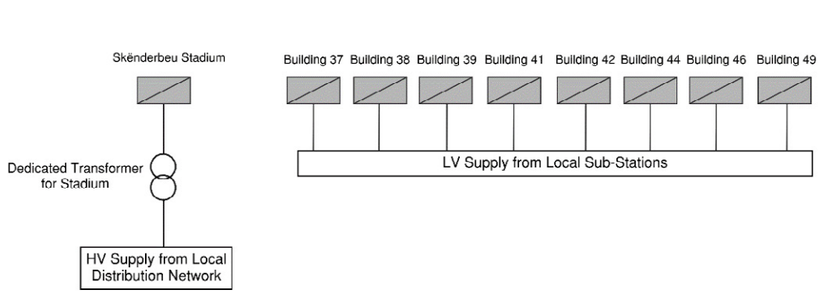
This supply will be backed up by standby and life safety generators.

Connected Buildings

A further 2.7MVA connection allowance is recommended for the connected building at this stage. This is based on a preliminary demand assessment that applies benchmarked load densities to the current schedule of accommodation. It does not consider coincidence factors, which could be considered as part of the wider masterplan. The building types and associated load densities used in the assessments are as follows:

- Offices – 100 W/m2
- Hotel – 40 W/m2
- Museum – 100 W/m2

It is assumed that the connected buildings will be served by independent electrical connections, served by local HV Sub-stations. Based on the estimated demand, it is recommended that 3 No. 1MVA sub-stations are allowed for to serve the connected buildings. Whether these are located within the stadium development boundary or elsewhere on site is to be determined as part of the wider utilities masterplan.



Water Services

Stadium

Following a preliminary demand assessment, a dedicated 8-10l/s water connection is recommended for the stadium at this stage. This figure should be reviewed at future workstages once engineering and catering strategies are better defined.

The incoming water main would connect in the Main water tank plantroom and connect to storage tank capable of providing 100% of the daily demand for the stadium and match day peak.

A separate, dedicated sprinkler intake may also be required, depending on local fire and water regulations.

Connected Buildings

It is recommended that the adjacent buildings are provided with their own dedicated utility connections separate from the stadium.

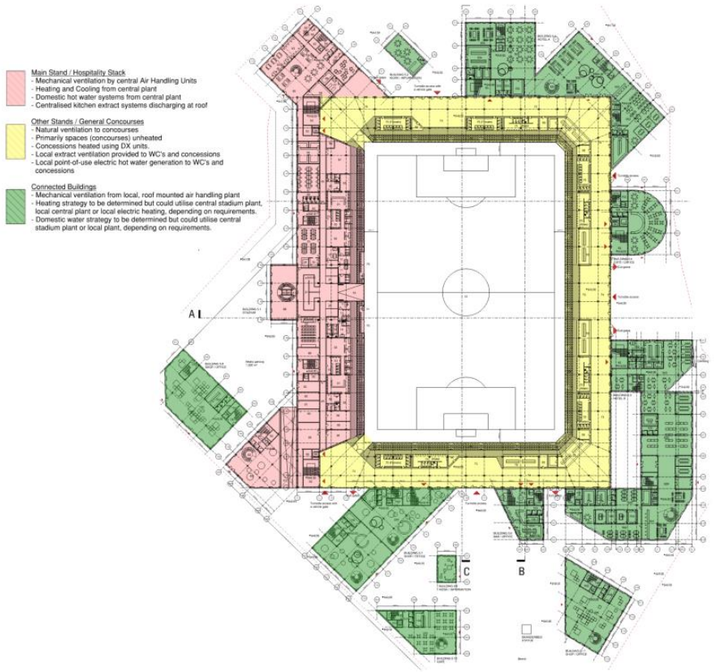
Gas

It is proposed that the stadium is a fully electric building with heating and domestic water provided by electric heat pumps. This would eliminate the requirement for natural gas in the building, reducing the number of incoming services and the risks associated with having natural gas in a building. This should be reviewed with the catering and pitch heating design as both can operate using electricity but are often supplied with a gas connection.

Without a gas connection to the main stadium any connected buildings requiring gas would require there own gas utility connection.

MEP Design Philosophy

From a building servicing perspective, the stadium can generally be split into two area types – hospitality and non-hospitality spaces.



Stadium Main Stand and Hospitality Stack

Hospitality spaces such as bars, lounges, media, players, officials and operations/security accommodation are generally located in the Main/West stand. These spaces will be conditioned spaces. Ventilation, heating and cooling will be provided by modular equipment located on the upper level of the Main/West stand, with primary services distribution by vertical risers provided throughout the floorplates.

Centralised hot and cold domestic water plantrooms will be provided to serve the toilets and kitchen areas in the main stand.

Stadium Secondary Stands and Concourses

The remaining stands (North/East/South) are primarily concourse spaces. It is proposed that these spaces are unheated and naturally ventilated spaces that open to the terrace seating. Where heating/cooling is required for F&B outlets in these areas, it is proposed that this is provided with local heating/cooling such as Split/DX units to minimise services running in the concourse. Ventilation for F&B and toilets in these stands will be provided via local exhaust fans. Domestic cold water will be provided by the central water plant located in the Main/West stand, with domestic hot water being provided by point of use water heaters where required.

Mechanical, Electrical equipment rooms will be naturally ventilated wherever possible. Where cooling is required to remove heat and maintain equipment functionality such as for Communication plant rooms energy efficient Split/DX systems will be used. For Communications rooms these will be provided with N+1 resilience.

Connected Buildings

The stadium is connected to surrounding buildings providing office, hotels, bars and shops. As these are to operate independently of the main stadium it is proposed that they are provided with their own dedicated plant, this would include:

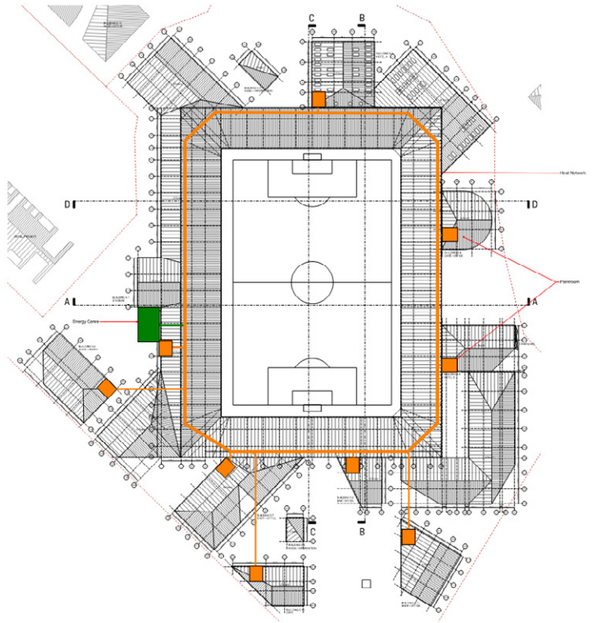
- Dedicated electrical connections to each building
- Separate mains cold water connection to each building
- Dedicated HVAC plant.

Some connections will be required between the stadium and connected buildings for communication purposes, for example fire alarm cabling.

Dedicated plant for each of the connected buildings provides a number of advantages:

- Reduces the risk of any maintenance or faults in the surrounding buildings affecting the stadium
- Easier metering and billing of any tenants in the surrounding buildings
- Increases the controllability and efficiency of plant serving the surrounding buildings and reduces the risk of low turndown when the stadium is not in operation.

Alternatively, to minimise the plant required for the adjacent buildings a district heating/cooling system could be use. This would have a central energy centre with air source heat pumps that would serve the stadium and the surrounding buildings. A central heating/cooling ring would run around the site and connect to each of the distributed buildings. Each building (including the Main/West Stand) would have a heat interface plantroom with plate heat exchangers connecting to the heating and cooling systems. This hydraulically separates each of the buildings from the central district energy systems, meaning any failures/maintenance within one of the buildings does not impact the rest of they system, whilst allowing the buildings to share central plant.



Sustainable Technologies

Rainwater harvesting technologies Should be considered to allow the capture and reuse of rainwater in building services. In particular rainwater could be used for processes where water quality is not of importance, such as W.C. flushing and cleaning purposes. The use of rainwater for the pitch irrigation system would also be targeted, subject to agreement with the pitch specialist.

The large roof areas of the stadium present an opportunity for the installation of Solar Hot Water panels or photovoltaic (PV) arrays. Solar hot water panels could be used for hot water generation in the Main/West stand, to provide some of the heating for domestic hot water, alongside the central heating system. However due to the low domestic water loads on non-event days, solar hot water system may not be appropriate as any generated heat would be wasted and need to be dealt with to prevent the system overheating.

Photovoltaic panels could provide on-site generation of low-carbon electricity. The size of PV array that can be installed is limited by the amount of usable roof area, although this would generally result in a generation capacity far in excess of the base building load on non-event days. For cost efficiency and to minimise pay-back periods, it is typically recommended to size the PV array to meet this base load only, although local battery storage is a technology that could be explored to allow more of the event day energy usage to be offset by on-site generation.

Conservation of Energy and Resources

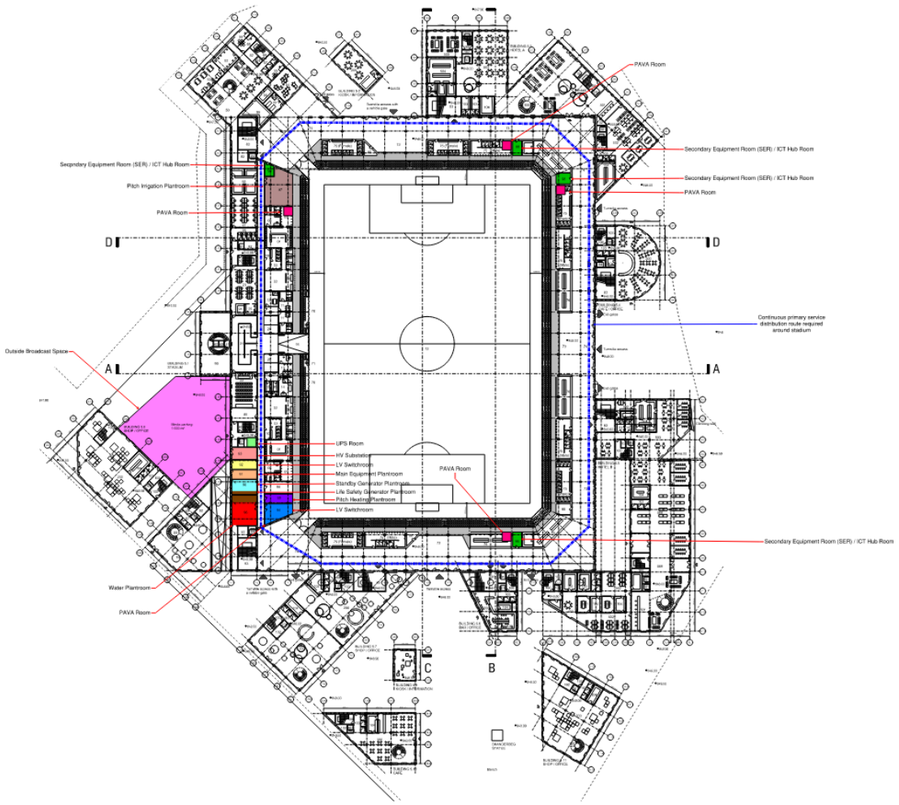
The following design principles are proposed as part of the low-energy building services approach:

- Fabric First - The heated and cooled spaces within the stadium should adopt a fabric first approach requiring the building envelope to be very well sealed (airtight) with a highly insulated fabric to minimise energy usage.
- Energy Recovery -Ventilation systems which are necessary for occupants to maintain air quality and removal of odours will incorporate energy recovery devices to minimise energy usage. Free' ventilation cooling will be utilised whenever outdoor conditions allow.
- Energy efficient cooling systems with heat recovery will be provided to ensure comfort conditions are maintained in the occupied rooms when free cooling cannot be utilised.
- All mechanical equipment will be selected with high efficiency/low energy motors incorporating variable speed drives to minimise energy usage
- Energy monitoring and optimisation of HVAC system controls will be provided by the BMS to manage and minimise energy usage
- The energy load/demand will be of the stadium will be reduced to minimise energy usage on non-event days
- Low flow, efficient sanitaryware will be used to reduce water consumption
- Natural ventilation will be adopted to the concourses and concessions wherever possible
- Energy efficient LED lighting and intelligent controls will be adopted to reduce energy usage.

MEP Plant Spaces

The recommended MEP plant space provision at this stage of the project is as follows:

Plant Space	Description/Location	Size / Area
HV Sub-station	Internal electrical plantroom housing incoming electrical supply 1No Located on ground floorIncoming electrical supply, 1No. required, external double door access required	5000x5000mm
LV Switchroom	Internal electrical plantroom housing main Low Voltage Switchgear 1No Located on ground Floor Main low voltage switchgear, Main stand with adjacency to HV sub-station is optimal	4000x8000mm
UPS Plantroom	Internal electrical plantroom housing batteries to provide uniterruptible powersupplies. 1No located on the ground floor with adjacency to the low voltage switchroom is optimal	3000x3000mm
Main Equipment Room (MER) / Incoming Telecoms	Internal electircal plantroom housing the incoming telecoms and IT racks. 1No located on the ground floor Main ICT room, location in Main stand on external facade is preferred for incoming services	3000x6000mm
PAVA Room	Internal electrical plantrooms housing IT racks for PAVA systems 1 per stand	3000x3000mm
Secondary Equipment Room (SER) / IT Hub Room	Satellite communications room housing ICT network switches, minimum 1No. per stand at each level	3000x3000mm
Pitch Heating Plantroom	Internal heat interface plant and associated pumpsets for under-pitch heating system.	3000x4000mm
Standby and Life Safety Generator Plantrooms	Standby generator for essential services and life-safety generator for life safety services. Location on external facade for exhaust discharge, natural ventilation and to allow local refueling. 2No. Rooms.	4000x8000mm
Outside Broadcast Telecomms Room	Room containing main OB broadcast panels for broadcasters to connect into the OB network. Adjacent to dedicated OB compound where vehicles will park/operate	3000x6000mm
Water Plant Room	Internal main Water Plant for domestic water services containing water tank and associated pumpsets. 1No located on ground floor	80m2
Pitch Irrigation Plant room	Internal main Water Plant for domestic water services containing water tank and associated pumpsets. 1No located on ground floor	80m2
Internal Heat	Internal mechanical plant for heating and cooling pumpsets and associated equipment. 1No internal, close proximity to the external heat pump compound is preferable.	30m2
External heat pump compound	External mechanical plant for air cooled heat pumps to provide heating and cooling to the building. 1No could be located at roof or ground floor.	70m2



Refer to Appendix A for further details.

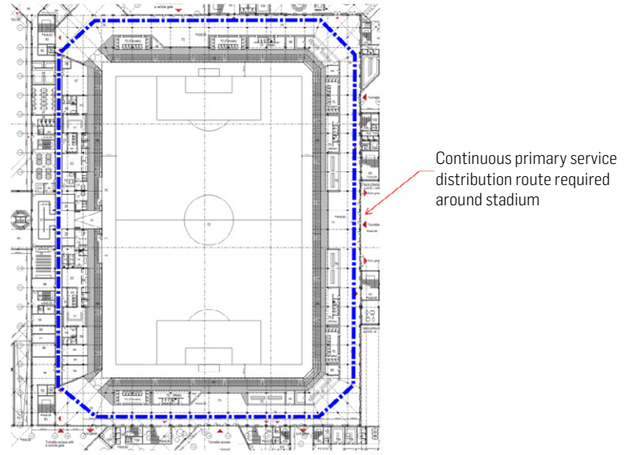
Primary Distribution Strategy

Horizontal Distribution

Horizontal distribution of services through the stadium will primarily be by raceway of containment routed around concourse levels in all stands. Dedicated containment systems will be provided for discrete cabling systems, particularly for life safety cabling.

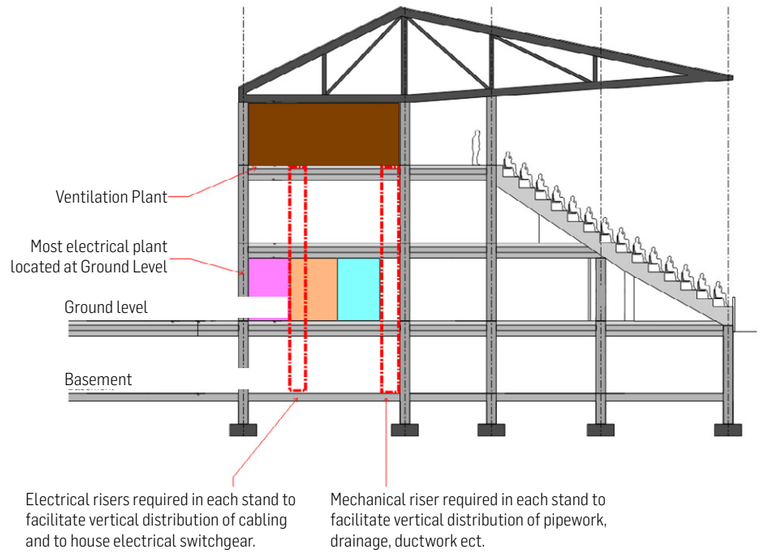
The stadium design should ideally allow for full continuity of the raceway containment around all four stands at high level, to avoid the requirement for primary services to be routed below ground.

Service distribution within the stadium is recommended to be for the stadium only, with limited connections between the stadium and adjoining buildings. This will allow for a simpler segregation of systems and reduce dependence on the stadium for servicing the more highly utilised adjoining buildings.



Vertical Distribution

Vertical distribution of services will be by means of dedicated service risers. Risers will primarily be required in the Main stand which has multiple levels of treated accommodation and plant located at both lower and upper levels.



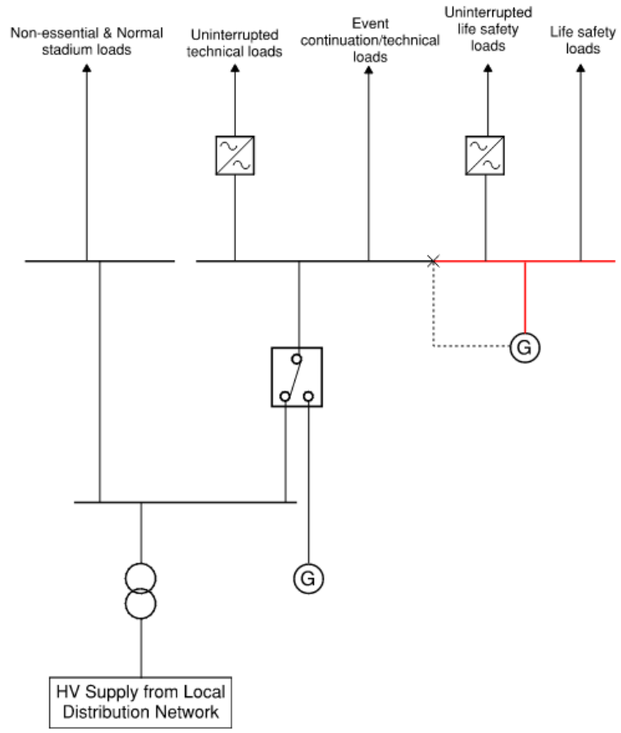
Standby Power and Resilience

UEFA Category 4 stadia are required to have a high level of electrical resilience. In particular, standby power systems are to be provided to a large proportion of the stadium loads to ensure matchday continuity

and event safety. This will likely be achieved by a mixture of generators for essential and life safety loads and additional UPS systems for critical, uninterruptible loads such as pitch lighting, stadium operations, life safety and critical IT infrastructure.

It is recommended generators for event continuation and life-safety are provided with 8-hour fuel tanks, to ensure sufficient fuel storage for pre-event testing without compromising event storage requirements.

The schematic shown below indicates a typical HV/LV arrangement.



Safety Systems

Guide to Safety at Sports Grounds - Green Guide

In the absence of country-specific sports venue design guidance, it is recommended that the stadium is designed in compliance with the recommendations of the 'Guide to Safety at Sports Grounds - 6th Edition', commonly referred to as the Green Guide.

This document provides guidance on measures intended to improve safety at sports venues, in terms of their design and safety management. The Green Guide refers to a number of sports venue specific electrical systems and requirements, including:

- Fire alarm and detection systems
- Public Address and Voice Alarm (PAVA) Systems
- Standby power requirements for safety systems
- Emergency lighting
- Turnstile monitoring systems
- Emergency Telephone Systems
- Security Systems
- Fire Safety Systems

Basement Sprinkler and Smoke Ventilation Systems

The current architectural proposal includes a basement car park under the Main/West Stand. As it is below ground it will require Smoke ventilation systems. It is proposed that an exhaust only system is provided within the car park to provide smoke ventilation as well as general car park ventilation, this would include high- and low-level extract points around the perimeter of the car park ducted to exhaust fans located within the car park. Make up air will be naturally provided, primarily provided by the car entrance opening, however due to the size of the car park, additional openings between the car park and ground floor will be required.

Typically below ground car parks require fire suppression systems such as sprinkler protection, initial discussions with local designers suggest this may be required for this building however the full strategy needs to be developed.

A sprinkler system would require an additional plantroom (the size would depend on the agreed hazard rating but is typically 120-150m^2) located at ground floor or within the basement itself, the plantroom would house the sprinkler tank and associated pumps and accessories. Whilst it is expected the sprinkler system will only be required in the car park, providing the sprinkler system to the hospitality spaces may provide additional benefits in safety and flexibility of design for the Main stand without significantly increasing the sprinkler plant requirements. It is not anticipated that sprinklers would be required in the concourse areas and is not proposed.

Broadcast Systems

Broadcast infrastructure will be required to support visiting broadcasters cabling requirements, for coverage of sporting events and associated activities. Broadcast infrastructure is an independent system

The broadcast infrastructure will consist of the following key components:

- Outside Broadcast (OB) Compound – Allocated space for broadcast providers to park and operate broadcast vehicles and satellite equipment. This is proposed to be an external area adjacent to the stadium.
- Outside Broadcast Telecoms Room (OBTCR) – Room containing main OB broadcast panels for broadcasters to connect into the OB network. Should be located adjacent to dedicated OB compound where vehicles will park/operate
- Broadcast Connection Points (BCP) – Strategically located broadcast connection boxes containing fibre, video, audio, data and power infrastructure connected back to the OBTCR.
- Broadcast Containment – Dedicated containment systems linking the OBTCR to strategic broadcast locations and BCPs.

Broadcast systems can either be permanently wired or installed using temporary overlay cable systems on an event-by-event basis. The value of a permanently wired system will depend on the frequency and type of broadcasted events. If broadcast events are likely to be infrequent, then it may be more cost effective to allow for broadcast containment only, with overlay cabling installed as required for events.

Specific locations for BCPs are to be defined based on camera and media positioning, which should be agreed with the relevant local and international broadcast operators in future workstages.

In addition to the fibre infrastructure, it is recommended that 'dark power' cabling between OB compounds and all associated camera positions be provided. This infrastructure will allow broadcasters to feed power to camera positions from mobile generators located outside the OB compound, as required.

In addition to broadcast infrastructure, large screens and advertising boards will likely also be required for events. These are noted to have significant load and power requirements and should be considered at future workstages.

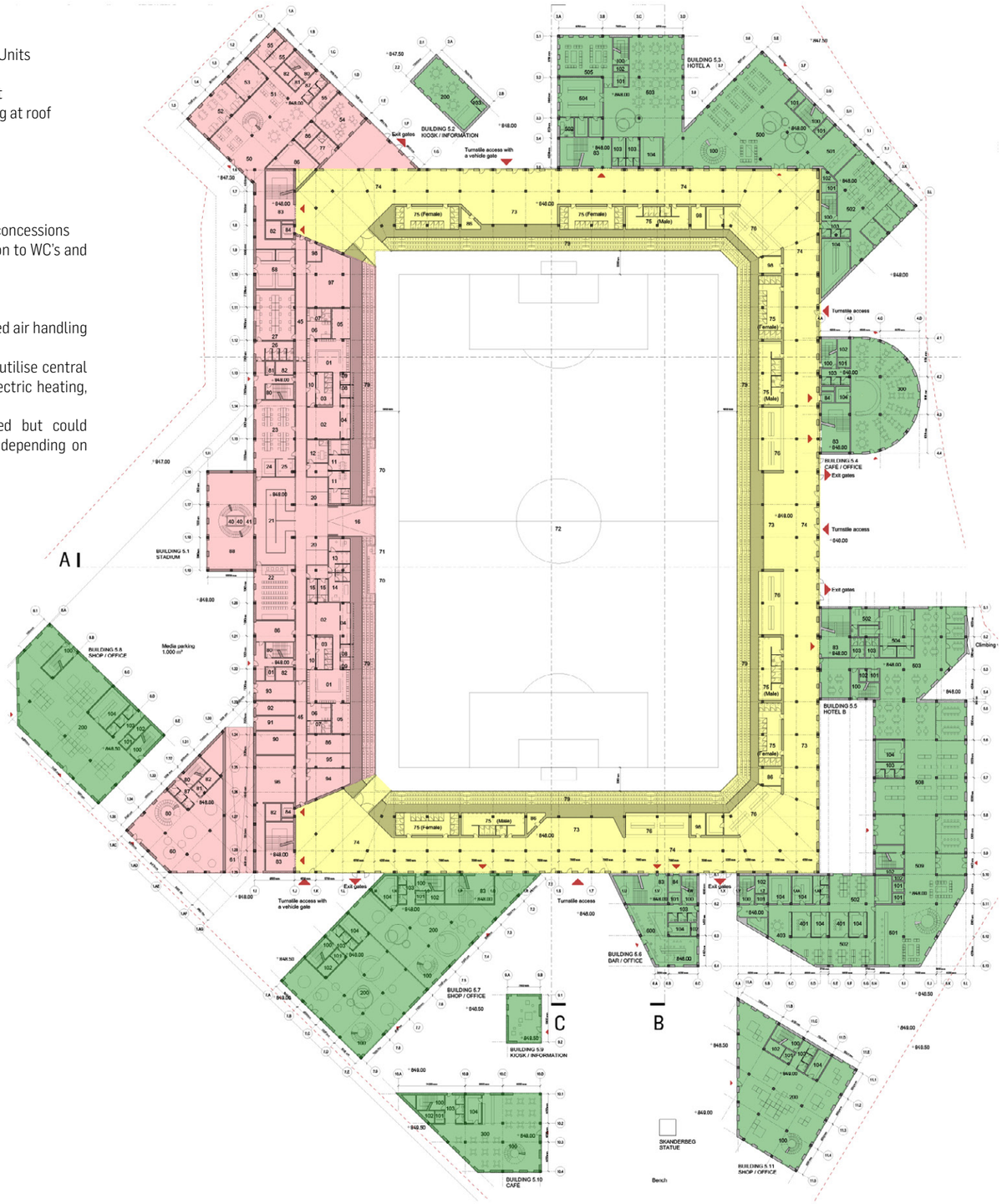
Roof Drainage

The stadium roof is pitched in two directions, towards and away from the pitch. To minimise drainage drops at the front face of the roof and reduce maintenance requirements from the pitch side a siphonic drainage system is proposed. From the roof rainwater outlets shall connect to downpipes, with each downpipe connected to the below ground surface water drainage system.

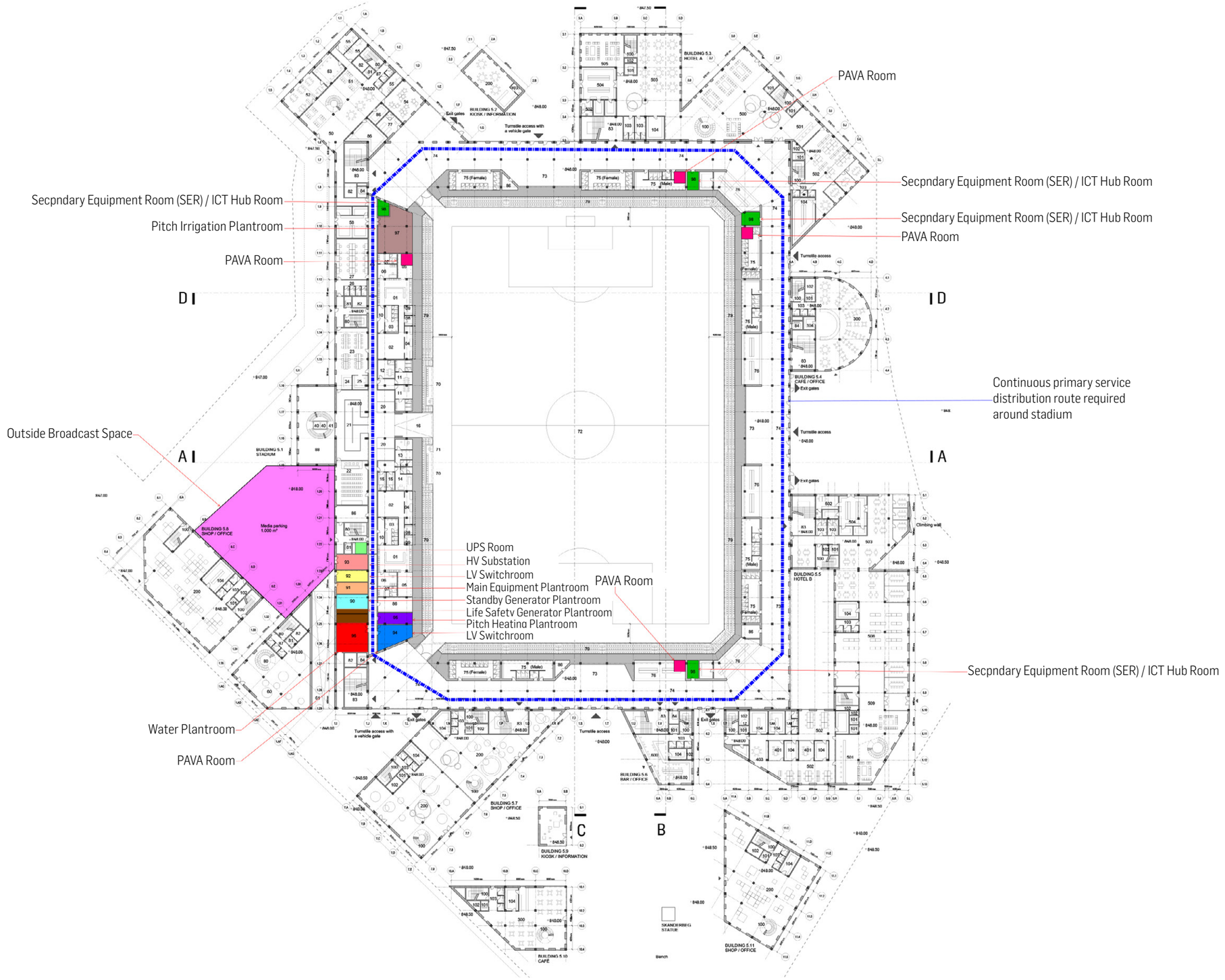
Main Stand / Hospitality Stack
- Mechanical ventilation by central Air Handling Units
- Heating and Cooling from central plant
- Domestic hot water systems from central plant
- Centralised kitchen extract systems discharging at roof

Other Stands / General Concourses
- Natural ventilation to concourses
- Primarily spaces (concourses) unheated
- Concessions heated using DX units.
- Local extract ventilation provided to WC's and concessions
- Local point-of-use electric hot water generation to WC's and concessions

Connected Buildings
- Mechanical ventilation from local, roof mounted air handling plant
- Heating strategy to be determined but could utilise central stadium plant, local central plant or local electric heating, depending on requirements.
- Domestic water strategy to be determined but could utilise central stadium plant or local plant, depending on requirements.

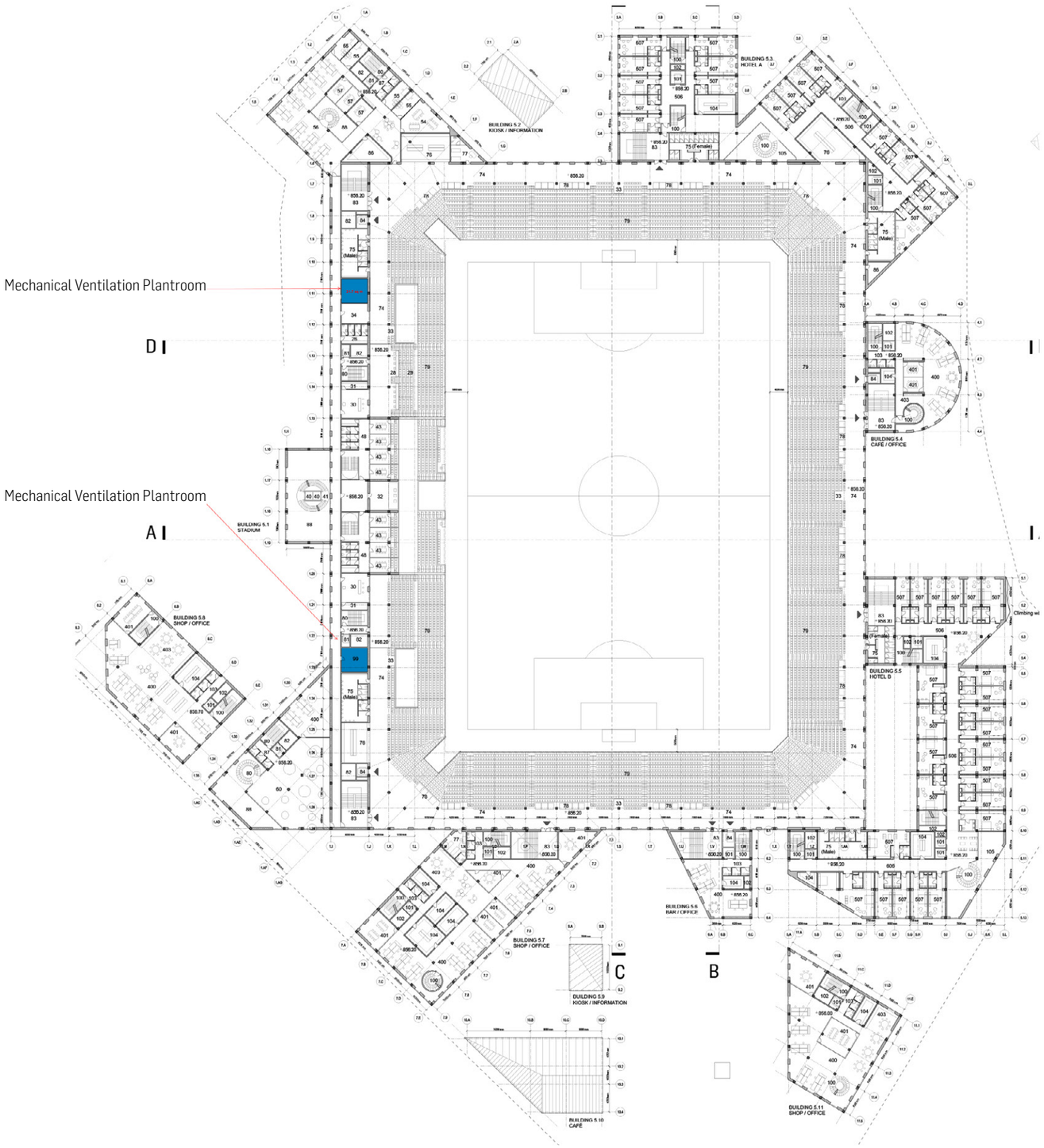


GROUND FLOOR PLAN

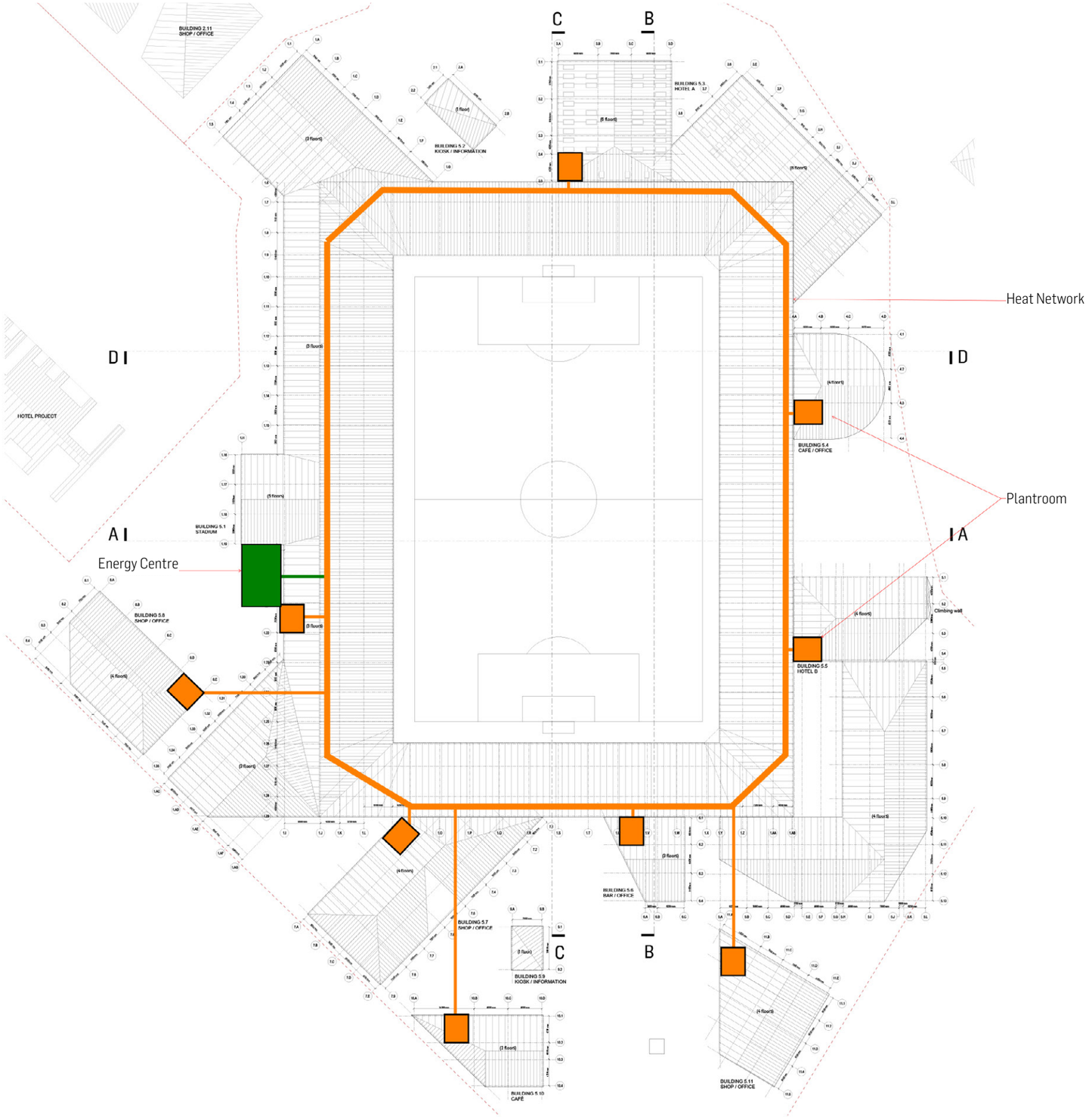


GROUND FLOOR PLAN

APPENDIX: MEP PLANT SPACES



SECOND FLOOR PLAN


C
B
D I
I D
A I
I A
Heat Network
Plantroom
Energy Centre
BUILDING 2.11
SHOP / OFFICE
BUILDING 5.2
KIOSK / INFORMATION
BUILDING 5.3
HOTEL A
HOTEL PROJECT
BUILDING 5.1
STADIUM
BUILDING 5.4
CAFE / OFFICE
BUILDING 5.5
HOTEL B
BUILDING 5.6
BAR / OFFICE
BUILDING 5.7
SHOP / OFFICE
BUILDING 5.8
SHOP / OFFICE
BUILDING 5.9
KIOSK / INFORMATION
BUILDING 5.10
CAFE
BUILDING 5.11
SHOP / OFFICE

ROOF PLAN

TECHNICAL

LIGHTING

The stadium roof will be equipped with two tiers of floodlighting: the main lights above the roof and the secondary lights below the roof for supplementary lighting.

The main floodlights are placed close to the roof edge to avoid shadows on the pitch, particularly along the touchline and near the corner flags. The lights are set up with a lower maximum tilt angle (70 ° aiming) to provide greater reach to the far side of the pitch and to reduce the potential for glare. Additionally, the position of the main floodlights is primarily designed to avoid the penalty box from the 15° zone. (Some of them can be located in the zone, but should avoid aiming into the penalty box.)

The secondary floodlights below the roof provide vertical plane illumination to the touchline. For the main stand, they are focused on the touchline and positioned at an angle greater than 45° above it, while those for the general stands are focused on the goal line. These lights require optical controls (cowls, louvres, etc.) to limit glare effects towards the center of the field of play. Additionally, shading devices may be necessary to avoid uncomfortable light spill onto the seating below. The location may need to be adjusted to move the lights forward, increasing the height offset from the seating and avoiding obstruction by spectator flags, etc.

FLOODLIGHTING REQUIREMENTS

Illumination Requirements, UEFA Class 3, Level C

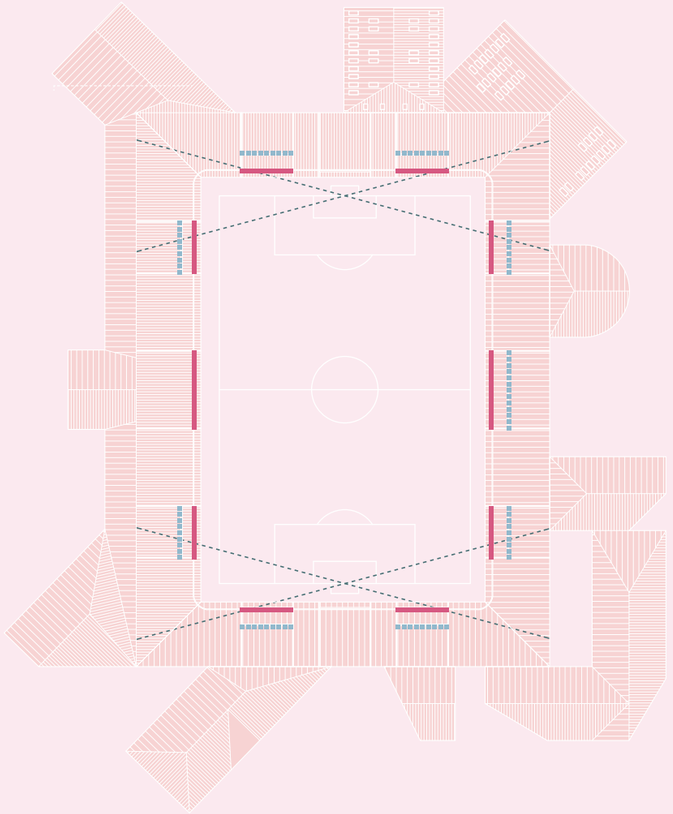
- 1,200lux horizontal plane (Eh) , >0.4min/max, >0.6min/ave
- 750lux vertical plane (Ev), >0.4min/max, >0.45min/ave on each orthogonal plane
- Match continuity mode 300lux horizontal, 200lux vertical
- Flicker Factor <1%
- Minimum adjacent uniformity ratio >0.5
- Colour temperature >5,000K
- Glare rating RG<50
- Power Supply security UEFA Level C

Typical floodlights

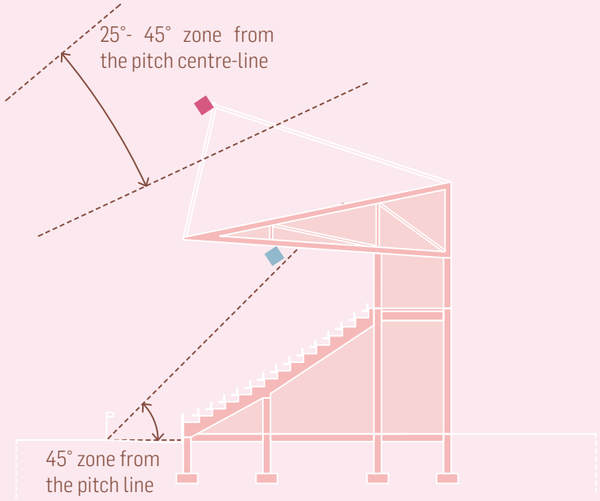
- Actual performance, weight, distribution and quantities will vary depending by manufacturer
- Approximately 160 floodlights:
  – 50 on each of the main stands
  – 30 behind each goal
- Typical floodlight weight: 35kg
- Typical power: 1,200W per floodlight, 190kW total system
- Recommend that floodlight drivers are placed below roof in an accessible location
- Safe access systems shall be provided to access all floodlights safely

Lighting Controls

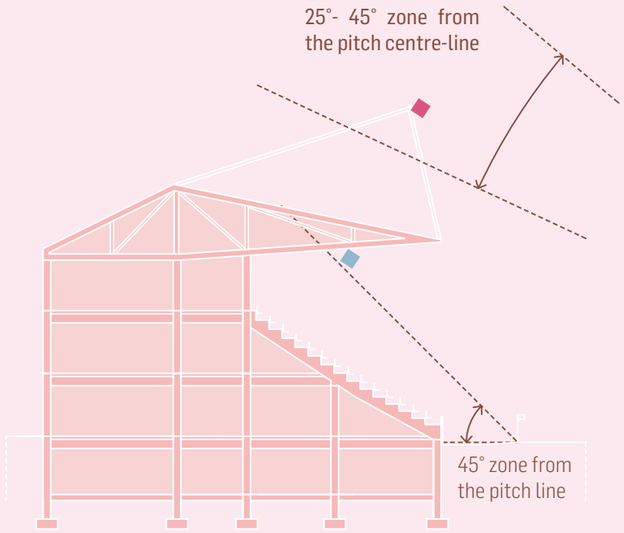
- Addressable floodlighting control system shall be provided, PC based user interface, password secured.
- Scenes setting for lower level performance, e.g.
  – 1200lux Eh for UEFA Category 2 TV
  – Dimmed to 800lux Eh for UEFA Category 2 TV
  – Dimmed to 500lux Eh for national, non-TV competition (EN 12193, Class I)
  – Dimmed to 200lux Eh for local competition (EN 12193, Class II)
  – Dimmed to 75lux Eh for training (EN 12193, Class III)
  – Selective switching may be considered for the lower illumination levels.
- Constant Lumen Output technology is recommended



ROOF PLAN WITH LIGHT LOCATIONS



NORTH, SOUTH, EAST STANDS



WEST MAIN STAND

Main floodlights above the roof

Secondary floodlights below the roof

15° zone from the penalty box

TECHNICAL

AUDIO VISUAL

LARGE FORMAT DISPLAYS

We propose two options for large format displays.

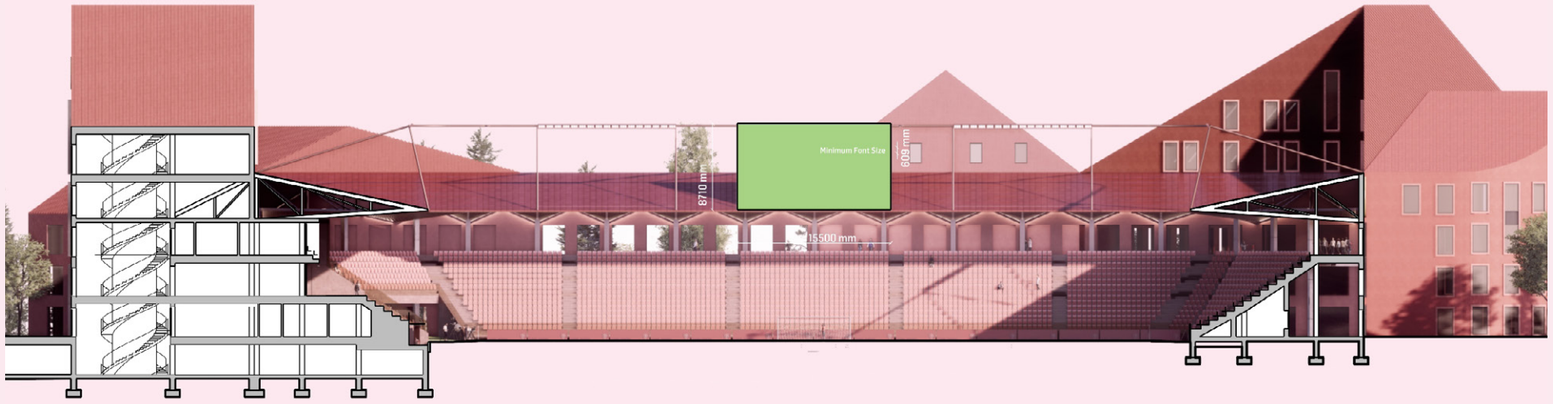
Option 1: 16:9 LED x 2
- Display size. 15.5m Width by 8.7m Height.
- Furthest Viewer 122m
- Closest Viewer 30m
- Character height 7% (609mm)

Option 2: 32:9 LED x 2
- Display size. 31.1m Width by 8.7m Height.
- Furthest Viewer 122m
- Closest Viewer 30m
- Character height 7% (609mm)

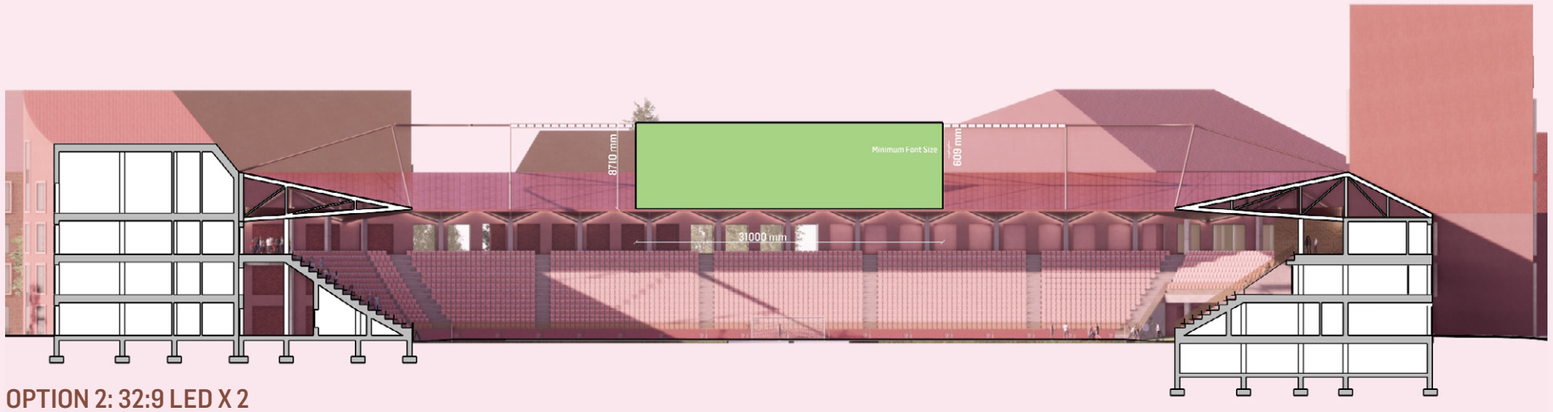
Option 2 offers the benefit of a super-wide 32:9 format, providing more flexible use of space compared to the traditional 16:9 format. This allows for the seamless display of match statistics, commercial advertising, and fan engagement elements without disrupting the broadcast feed, resulting in greater visual impact.

LED Mounting

A structural engineer needs to review the mounting support of large LED displays, as additional reinforcement might be required. The estimated weight for Option 1 is 5400 kg, based on 20 kg/m²



OPTION 1: 16:9 LED X 2



OPTION 2: 32:9 LED X 2

TECHNICAL

ACOUSTICS

SOUND SYSTEM

Design Considerations

Modern football stadiums are designed to be able to host sporting events by offering the best possible atmosphere to the attendees and players. The use of the in-house audio system for sports presentation and pre-event build-up is key to this.

The stadium sound system has a principal role for life safety within the stadium. It is of paramount importance that sound systems is clearly audible and intelligible, the latter of which is a function of the interaction between the building and sound system designs.

- Recommended that music capable, full range line array system is included (as pictured below)
- Additional considerations
  - Weight / additional structural load
  - Impact on sightlines / high ball line
  - Coordination with pitch floodlight

BROADCAST

Outside Broadcast

Broadcast connections should be available as a minimum in the following locations:

- Camera positions
- Media and press areas, including Media Room
- Outside Broadcast Compound

Each broadcast connection is assumed to include the following types of cabled connections, with the understanding that the exact selection of tie-line cable types will be coordinated with specific local broadcasters during the facility design:

- Single-mode and multi-mode fibre-optic connections (e.g. SMPTE)
- Coaxial connections
- Audio connections
- Power sockets on dedicated electrical circuits

Camera Positions

Broadcast infrastructure required to provide connectivity at –or near to all camera positions as required by the competing football league requirements. Cabling infrastructure should also provide for connectivity at several other key areas, positioned at various locations within the stadium so the stadium can adapt to potential changes in future broadcast requirements.

Control room

A control position with a view of the pitch is required for the announcer and video control of the large screen. The view from the current room could be a challenge, as it may be obscured by people using the concourse as planned. However, this could be solved by either widening the gold box, which contains VIP box seats and the main camera, to include the control room, or by moving the control room to the VIP box seats, which have a great view of the pitch.

AV / ICT / Broadcast

Depending on the detailed design and extent, additional space allowance is required for equipment associated with the following services:

- ICT
- AV
- Broadcast

TECHNICAL

LOGISTICS

LOGISTICS PRINCIPLES

The following principles were followed

The design team have provided the following guidance to support the development of the logistics strategy for the stadium and surrounding buildings:

- The stadium may host events other than football matches, such as concerts
- Although the stadium will be used only on match or event days, some of the surrounding uses such as the hotel, restaurants and cafes will operate on non-match days too
- The public realm around the stadium can be used by vehicles to access each building and unload/load goods
- There is a basement car park provided for part of the development, which may be suitable for accommodating deliveries
- The buildings and land uses should operate fairly independently, without reliance on a centralised estate management function to manage deliveries

ASSUMPTIONS

Key assumptions used to calculate the servicing requirements are:

The estimated daily delivery and servicing trips to the development were calculated using an Arup inhouse vehicle generation tool developed to utilise Arup research. The trip rates, which are expressed as vehicles per 100m2 per day, have been derived from survey data at relevant facilities, as well as design guidelines and local authority regulations.

Trip rates used are as follows:

- Office (Class E (g)(i)) deliveries calculated using a trip rate of 0.18 trips per 100m2 GIA;
- Non-food retail (Class E (a)) deliveries calculated using of a trip rate of 0.52 trips per 100m2 GIA;
- Food and beverage retail, including bar (Class E (b) / Sui generis) deliveries calculated using a trip rate of 1.80 trips per 100m2;
- Amenity and leisure (Sui generis) deliveries calculated using a trip rate of 0.10 trips per 100m2 GIA; and
- Hotel (Class C1) deliveries calculated using a trip rate of 0.17 trips per 100m2 GIA.
- All supplementary support areas provided in the area schedule with no direct causation for trips have been excluded from the vehicle generation calculations.

To divide up the anticipated delivery and servicing requirements into zones, we have clustered the buildings into the following clusters:

- Cluster 1 – B5.1, B5.2, B5.8
- Cluster 2 – B5.6, B5.7, B5.9, B5.10, B5.11
- Cluster 3 – B5.4, B5.5
- Cluster 4 – B5.3

To estimate the trips expected fluxing across the match schedule we have used the following assumptions to scale the base assumptions relative to demand changes.

On a **peak day** – i.e. to support the preparation required in the lead up to a match day:

- All food and beverage retail, bar, and nonfood retail have a doubled trip rate; and
- All other areas remain the standard trip rate.

On a **regular day** – i.e. a non-match day not in the lead up or post-match day period when you will require extra preparation and clean up vehicles:

- Building 5.1, the Stadium, requires no servicing vehicles;
- Building 5.2, the ticket shop, requires no servicing vehicles; and
- All other areas remain the standard trip rate.

On a **match day** – i.e. the day of the match:

- Servicing is highly restricted to all clusters (excluding the hotel) and limited to out of hours.

VEHICLE GENERATION

The number of vehicles estimated to site directly corresponds to the number of loading bays required to be provided , as shown in the graph below.

Cluster	Daily Deliveries			Loading Bays Required	
	Regular Day	Peak Day	Match Day	Permanent	Temporary (Additional)
1 Stadium	10	57	0	1 x 16.5m	2 x 8m 1 x 6m
2 South Cluster	32	61	0	1 x 10m* 1 x 8m 1 x 6m	1 x 10m 1 x 8m
3 East Cluster	32	56	0	1 x 10m* 1 x 8m 1 x 6m	1 x 10m 1 x 8m
4 Hotel	16	16	16	1 x 10m*	0

* Clusters 2, 3 & 4 are recommended to have access to the articulated bay (16.5m) located at the Stadium for the infrequent occasion that they are required.

TECHNICAL

LOGISTICS

APPROACH TO LOADING

We recommend a hybrid approach between permanent service yard loading bays, public realm loading bays & laybys.

LAYBY

- Deliveries happen off street
- Easy to access and egress
- Harder to control and ensure it is available when needed

OPEN SERVICE YARD

- A formal loading bay without being covered or enclosed
- Separated from pedestrian movements
- Allows some oversight and control, less likely to be misused

INTERNAL SERVICE YARD

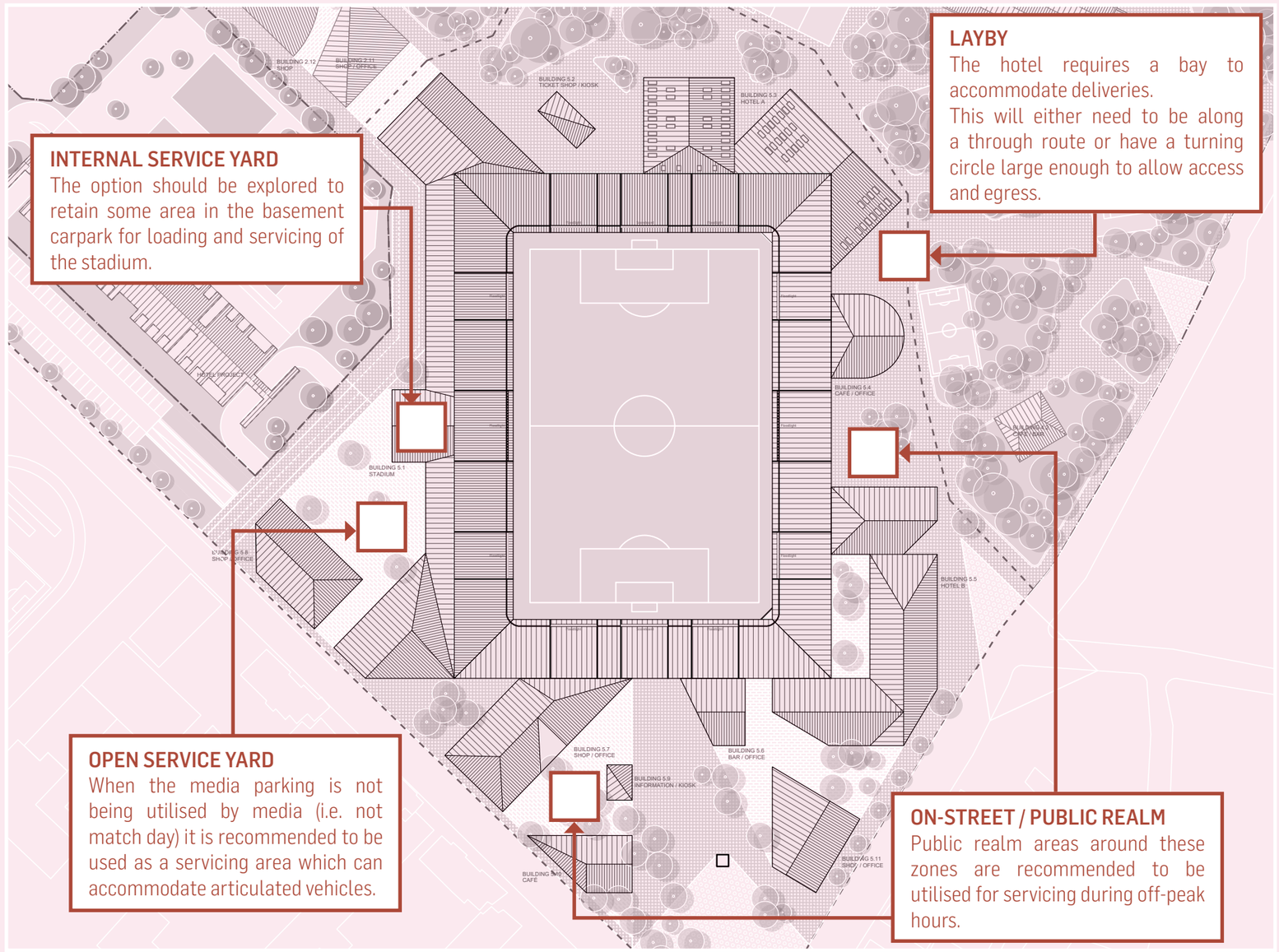
- Formal enclosed and covered service yard
- Usually used for commercial and mixed blocks
- Requires management and oversight

ON-STREET / PUBLIC REALM

- Deliveries happen from the street shared surface
- Examples include South Kensignton & Coal Drops Yard in London
- Often used in conjunction with time constraints (e.g. 7am-10am)

SERVICE LOCATIONS

Indicative locations for servicing areas are presented on the across figure.



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