PUBLIC GAINS: A STADIUM FOR THE PEOPLE
Public Gains: A Stadium for the People

Joseph Andrew Iwaskiw

This Thesis was submitted to the faculty of Virginia Polytechnic Institute and State University for partial fulfillment of the requirements for the degree of Masters in Architecture

Paul F. Emmons [Chair]

Susan C. Piedmont-Palladino

Jaan Holt

May 6th, 2013
Alexandria, VA

Keywords:
stadium, public, DC, flexibility, pedestrian street
The stadium, in its purest form, is a structure that holds tiered seating arrangements built for mass viewing of sports, competitions, and public events. However, over the years, it has become much more than that. The stadium provides the spiritual need of community, allowing individuals to connect to others by sharing common beliefs and goals. This allows the stadium to become a source of civic pride to the people it serves. This combination of purpose and pride makes the stadium one of the most important archetypes ever created. It is the physical representation of human connectivity, a city's symbolic soul, the modern day cathedral. A symbiotic relationship is formed between the stadium and the public.

In the modern era, viewing live sports has become big business. Taking advantage of the situation, team owners have designed stadiums to capitalize financially as much as possible. These newly designed stadiums, along with the rise of the automobile, have been moved from downtown to the suburbs, providing owners more space for seats, larger parking lots, and ultimately more revenue. These larger, disconnected stadiums have led to waning attendance, heavy pollution, and an overall lack of use. The once spiritual experience of the arena has now been watered down as the stadium has become a detractor of public good.

Sports leagues now run as unopposed monopolies, with each major league having approximately 30 teams. With supply low and demand high, private entities essentially blackmail the public into building and funding stadiums to attract highly coveted sports teams. Desperately desiring to call a team their own, the public agrees to the deal. The end result is that the public funds a major project that provides no socioeconomic benefit to anyone other than the team’s owner. The once symbiotic relationship between the stadium and the city has become perverted.

Although public subsidies are now frowned upon due to the growing awareness of the damage they cause cities, the major sports leagues will always have a significant hold over the distribution of teams and demand will always remain high. Therefore, if the public continues to foot the bill, it is up to the architect to find a balance between public and private benefit through design. We must create a stadium that functions as a revenue generating event venue, as well as a public serving entity that enriches the community around it and repair the once great harmony between the public and their stadium. My thesis will look at designing a public soccer stadium in downtown Washington D.C. This is Public Gains: A Stadium for the People.
sport: noun
a source of diversion : recreation

com•mu•ni•ty: noun
a unified body of individuals

Defined literally, sports are just organized recreation, yet they have affected so much throughout history. Sports have been used to unite nations and bring about peace, such as the Olympics and World Cup. Sports have also been seen as the catalyst used to heal community psyches after tragedies such as the Boston Marathon Bombing, Hurricane Katrina, and 9/11. Each week, millions of families watch as their favorite athletes compete, hanging on their every success and failure. There is no doubt that sports have a strong influence over society, but why?

It turns out that sports fan psychology comes from our ancestors. Athletes are the modern version of ancient warriors, who would protect the tribes they represented from harm. While winning and losing is no longer life or death, our bodies are hard-wired to feel some of the same emotions our ancestors felt during times of war. Daniel Wann, a psychologist at Murray State University, has done several studies showing that an intense interest in a team can buffer people from depression and foster feelings of self-worth and belonging. Robert Cialdini, a professor of psychology at Arizona State, said about sports fans. “This is not some light diversion to be enjoyed for its inherent grace and harmony. The self is centrally involved in the outcome of the event. Whoever you root for represents you” (McKinley).

With so many diverse opportunities throughout society, sports represent one of the last institutions that everyone can identify with in a community. Stadiums are the physical manifestation of this institution, the modern day cathedrals and town halls. They are one of the most important archetypes a city can have, going as far back as Ancient Greece.
sta•di•um noun  a large usually roofless building with tiers of seats for spectators at sports events

The stadium has a prestigious past. The Ancient Olympic Games of Greece were held on the sacred grounds of Olympus, the first ever stadium, a place where the Greeks believed the Gods lived. The ancient Romans built the most famous stadium of all time, the Roman Colosseum, which remains the most iconic symbol of the Roman Empire.

In the late 19th century, sports and stadia saw explosive growth. The quality of life that resulted from increases in technology allowed more and more people to be involved in recreational activities. This, combined with the rise of intercollegiate athletics and the revival of the Olympics in 1896, spurred an increase in spectators and the building of new stadia.

After tough times such as World War I, the Great Depression, and World War II, the escape sports provided allowed spectator sports to become more popular than ever. Stadia had to become larger and larger to accommodate the burgeoning crowds, as demand was at an all time high. People loved their sports and they loved their stadiums. However, the added demand of sports started to take its toll on the stadium (Columbia University Press).
With the popularity of sports booming in the last century, the stadium has evolved to meet the needs of a major industry rather than the needs of the common fan. There is a large disconnect between a privately focused design and a publicly focused design. The following are what I have found to be the major problems with modern stadium design:

**INCREASE IN SIZE:** There is a dehumanization process going on with stadiums. They have become too big, too hollow, too sterile in nature. A fan paying for a ticket could end up so far away from the field that they need binoculars to watch the action.

**REMOVAL FROM CITY:** As suburbanization spread throughout America in the mid 20th century, surface area was needed for parking at major sporting events. This caused a majority of stadia to leave the urban location where their communities were based. A sea of parking and a few highways now separate the public from the stadium. This has crippled any off-hour benefits a stadium might be able to generate.

**LACK OF USE:** The removal of the stadium from downtown has also caused the stadium to be used less and less. Although some stadia are used for major events such as concerts and speaking arrangements, the majority do not get used unless there is a game scheduled. The less it is used, the less it can do for the public.

**EXPERIENCE:** Going to a game has become an expensive, time-consuming chore that is not always rewarded with the emotional release the stadium had once provided. Society has also shortened its attention span, making sitting through a game more of a hassle than an enjoyment.

**TELEVISION:** Television has capitalized on this lack of experience by providing a more comfortable and cheaper option for watching the big game. Why drive all the way out to an expensive, cold venue when you could watch the game for free at home from the comfort of your couch?

**POLLUTION:** Stadia are one of the most unsustainable building structures around. One college football stadium reports an average of 50 tons of waste generated each gameday (United States Environmental Protection Agency). Electrical bills for one NFL stadium top out at $200,000 a month. The NFL only plays 8 games a month (Glubiak).
Over the years, the stadium has evolved, but the relationship between sport and community has remained more intertwined than ever. With social media platforms like Twitter and Facebook, sports figures are more accessible to the public. The thirst for a local team has never been so high, and the major sports leagues have taken notice. Stadium deals have become the chief bait to lure a professional franchise, with the public footing the bill through subsidies. Leading sport economist Andrew Zimbalist says it best, “As a monopolist [professional sport leagues] artificially reduces the number of franchises relative to the demand for franchises from economically viable cities. With excess demand for teams, cities are thrust into competition with each other to obtain or retain a team. This competition leads cities to offer public funds for facility construction and more favorable lease terms” (Zimbalist 123-124).

Teams now hold cities hostage until they build them a new stadium, threatening to leave their old cities to find a better deal. Along with the design of the stadium being catered to franchise owners, there is now added pressure on the stadium-public relationship because of this offering of public funds. Politicians, only in office for a few years and looking for as much approval as possible, see providing a stadium to the public an easy approval bump. They sell the stadium as a public economic boon, but what exactly is the public paying for? Economist Andrew Zimbalist has said, “There are very few fields of economic research that produce unanimous agreement. Yet every independent economic analysis of the impact of stadiums has found no predictable positive effect on output or employment. Some studies have even concluded that there is a possible negative impact” (Zimbalist 125). In summary, the public is funding a project that has no design qualities that serve them, nor any added economic benefits. In essence, the stadium has gone from the sacred space of Olympus, revered by the public, to a massive community cancer, draining resources from city coffers. Privately-funded stadiums work well as a model, but with professional sport leagues ever growing, the public subsidy system seems to be here to stay.
Quite a mess, right? The stadium is a revered public space, but has become exposed as of late. I believe to solve this problem, we must design a new stadium, one that promotes 24/7 activity and connectivity. I believe to achieve this, three factors must be looked at: urban re-location, instantaneous programmatic flexibility, and self-sustainability. These three elements hold the key to designing a public serving functioning stadium.

Although there are many design issues that were discussed in the previous pages, the removal and placement of the stadium in the suburbs is the most damaging. It is hard to make a connection to a space that you only interact with during sporadic events with varying times. To truly have a public serving stadium, we must have it activated during off hours as well as on. We must place the stadium back into the heart of the city.
Many of the most successful stadiums are located downtown (Boston’s Fenway Park, Pittsburgh’s Heinz Field and PNC Park, and Baltimore’s Camden Yards to name a few). I truly believe that having the stadium become an everyday piece of architecture that the public can interact with goes a long way in bolstering the identity of the community.

The test case used for this thesis is Washington D.C. D.C. is home to a robust sports fan base that is strengthened by residents of both Maryland and Virginia. The Verizon Center built downtown has proven that success can be achieved in the district with an urban sports presence. The thing the city now needs is an outdoor sporting venue to house the MLS team DC United.

DC United currently plays at RFK stadium, which is slowly becoming obsolete. Designed in 1961, RFK housed a number of D.C. sports teams by use of a flexible infrastructure that allowed seating layouts to be shifted around (Munsey & Suppes). This feature ultimately led to a lack of quality both in the available seats and in the overall design. Many of the teams moved away to the suburbs to newer stadiums, leaving DC United looking for a new home.
The site that was chosen is located downtown, close to the Verizon Center and the vibrant nightlife that accompanies it. It was once the home of the convention center, which has since been torn down and moved approximately a quarter of a mile north. Currently, the site is being used for parking and has been tabbed to become a mixed-use development in the near future. It was chosen because of its location downtown, as well as the size of the plot and the lack of use.

Analyzing the current conditions, we can see the site is surrounded by office buildings and very few residences. Outside of normal business hours, the current site has little to no activity. It can also be seen that the site is adjacent to a multitude of public areas, such as parks, public transportation hubs, and museums. By creating the proposed stadium here, it will provide a central hub that will be able to serve both the 9-5 and casual crowds, as well as sports fans.
The strategy that I have chosen to attack the site is to bisect the lot into two separate parcels. On the east side of 10th Street, the stadium will be placed, while on the west side, a mixed-use property will be provided. This will allow for a vibrant pedestrian walkway to split the two sides that will integrate the site within the current city grid.

The urban location leaves no room for mass parking (there will be select parking underneath the mixed-use area for workers and athletes). This is on purpose: people that need transportation to the stadium will now use public transportation, making the journey to the stadium an experience in itself. By re-locating the stadium, a deeper level of connection to the public and a prime spot for urban development is created.
Flexibility is a term that gets tossed around a lot in architecture. In the 1960's and 70's, many stadiums were made "flexible" so that they could accommodate multiple teams in one facility. Many of these stadiums could shift seating patterns to accommodate both football and baseball on the same playing field. This led to some of the worst stadium architecture of all time, and many of these facilities have either since been replaced or demolished. What I desire in this new stadium is an instantaneous programmatic flexibility, which is not a changing of form, but a changing of edge, privacy, and use.

Stadium events, such as games and concerts, are the main program of the stadium. We need a program that can benefit the public during non-event times. What if the stadium could become a public park, taking advantage of the large amount of green space that a stadium provides in an ever-densifying city landscape?

The edge of the stadium needs to also be very fluid. While a hard edge is needed for more private, ticketed events, a softer edge is needed for the public park time and any public event that is created due to the public park. The edge condition allows the stadium to be flexible in its program, making opportunity to take advantage of the stadium's infrastructure.
The modern stadium has a lot of infrastructure that is not being put to its best use. We must find a way to put some of these items to better use.

**Parking Lot**
- In an urban location, parking is no longer needed. However, most fans love the act of "tailgating" even more than going to the game. A tailgating plaza must be created that can accommodate both rentable grills and a way to still be connected to the game, such as giant video boards.

**Concessions**
- Who wants to pay for an eight-dollar hot dog? The edge flexibility in the new stadium will allow mobile vendors to set up shop both outside of the stadium and on the running track during events, which will drive down prices and support local businesses.

**The Jumbotron**
- These large screens connect fans within the stadium to the game. But what if they were turned around to face the city rather than the stadium? This could allow the city to feel connected to the game even though they are not inside.

**Running Track**
- The running track is usually at the field level and is used for track and field events. In the new stadium, the track will be at the public level, which will serve two purposes. One, it will let the public interact during times of public use. Two, it will allow for circulation during ticketed events.

---

**EVENT TYPES**

The flexible edge and program now allows for a variety of events, which fall into three categories:

**PUBLIC**
- These events would include open park time, but also events for vendors and community offerings.

**PRIVATE**
- These are the standard ticketed events that a stadium hosts in modern times, such as games and concerts.

**LIMITED PRIVATE**
- These events could use the surrounding plazas and sell different experiences to users. The edge is fluid. Certain levels of access would require a ticket, but overall it is a public event. Amateur games, certain concerts, local college and high school events are examples.

**ABOVE: The three event types in diagram form.**

**BELOW: A possible schedule of events during a given week. Note how the stadium is in constant use throughout each day.
The stadium definitively starts to take away from the city when it pollutes the environment. The carbon footprint of a stadium is enormous, and on game days, where thousands of people produce waste via food and drink, the effect is only magnified. The last key to creating the stadium of the future is to make a stadium that is self-sustainable in energy and waste. The stadium must take advantage of its size and magnitude. Rather than viewing large footprints and a massive amount of people as a bad thing, we should consider this a benefit. The large amount of surface area allows the stadium to act as a pseudo-power plant, harvesting natural resources and putting them to good use. The stadium can become an economic boon for the city and also can set an example for a sustainable future.

SELF SUSTAINABILITY

Power the City
GIVING BACK

One of the most inspiring projects I found in my precedent studies was the World Games Stadium in Taiwan, designed by Toyo Ito. The stadium will hold the record for largest solar array on a stadium, with 114,155 square meters of panels. The stadium roof will generate enough electricity to power 80% of the surrounding neighborhood (Pham). The design gives a tangible economic benefit to the city. The stadium should be an energy philanthropist to almost thank the public for its subsidies.

HARVESTING RESOURCES

By taking advantage of the natural stadium infrastructure, we can start to harvest natural resources to self-maintain the stadium.

Solar power: the roof of the stadium that is being used to protect spectators from rain can also be used as a solar power generation.

Water collection: the roof may also be used to collect large amounts of rainwater that can be used for field and landscape irrigation.

Recycling plant: to minimize the effects of large amounts of trash produced, the stadium becomes one of the city’s largest recycling plants.

Piezo electricity: harvesting human energy from movement can be accomplished via the use of piezo electrical panels at the users feet. Public plazas can now become large generators of electricity, making crowd participation a visible metric. Although this is a new technology, ID Tech Ex, a market research company, projects piezoelectric units to expand from 100 million units to 300 million units by 2022 (ID TechEx).

SOLAR ELECTRICITY
RAIN IRRIGATION
PIEZO ELECTRICITY
TRASH COLLECTION

Solar Stadium (Diane Pham)
The design process never goes the way you want it to. Most of us would like a linear process, where one thing builds off the last. I spent the last three years refining this process. The truth about the design process is that it is an absolute mess, where the right answer is never attained and hard work sometimes goes to waste. However, only through failure can one charge through to the other side. Although this thesis was definitely one of the hardest things I have ever done, I am much stronger for it.

The following pages are a compilation of studies, sketches, and models that were vital in the execution of my final thesis proposal.

Putting Together the Parts

Preliminary sketches of the stadium's structure.
PLAN STUDIES:
Preliminary sketches of edge conditions within the context of the site.

SECTION STUDIES:
Studies showing how the street meets the stadium back of house, playing field, running track, and seating.
EARLY SKETCHES:
Studies of how the stadium could achieve instantaneous programmatic flexibility and self sustainability.

FLEXIBLE ROOF:
- Model study of how the roof of the stadium could move and protect not only spectators, but also the public beyond the boundary of the arena.
PHYSICAL MODELS:

Physical models were crucial in the final design. Models were placed in the context of the site model and started to lay the basis of form.

ROOF AND STRUCTURE:

Iterations of how the roof and structure would be formed
ROOF SYSTEM:
Studies of how the roof could start to harvest resources as well as protect spectators.

PEDESTRIAN STREET:
Model of how the pedestrian street could be formed and modulated.
FINAL PROPOSAL
One Answer of Many

24 Iterations of the stadium form.
The size of the proposed stadium is a bit smaller than other MLS stadiums. It was challenging to lay on the site and really only occupied half of the site.

When the stadium was placed, it made the site division simple. There would be a plaza/pedestrian street to the west and a plaza to the north. On the other half of the site, a mixed use building is placed to tie the site into the urban fabric.
THE FIELD IS PRESSED DOWN TWO STORIES INTO THE SITE. THIS CREATES THE LOWER BOWL BELOW STREET LEVEL, PROVIDING PRIVACY AND FOCUS FOR THE EVENT AT HAND.

THE LOWER BOWL’S TWO LONG SIDES HAVE MOVABLE SEATING THAT CAN CONFORM TO EVENTS THAT ARE SMALLER THAN A SOCCER GAME, SUCH AS TENNIS, INTIMATE CONCERTS, AND VOLLEYBALL.
A running track is placed at street level. This is the facilitator that connects the public plazas with the more private stadium green space.

The risers at the corners of the lower bowl are turf amphitheater seating. This finishes the connection the track started between the field and the public street level, making the entire site available for public use.
Stairs are created to lower the stadium back of house (BOH) functions, such as public rest rooms and concessions. By lowering BOH functions, you get much clearer site lines and a more pleasurable viewing experience, whether it’s during an event or during the day.
A series of large concrete piers surround the stadium edge to create a boundary between stadium and city.

The upper deck is supported by the newly placed columns. The northwest corner towards the plaza is blown away to create an inviting look in from the city.
A flexible, transparent facade is added to the pier boundary. This is the portion that allows the stadium to have instantaneous programmatic flexibility. The Wyckoff Exchange in New York provides a basis for design of this edge. These large steel panels can either open or close very quickly and are also perforated, allowing transparency when stadium is "closed". These panels will span in between the existing piers, creating the desired flexible edge.
THE PEDESTRIAN STREET IS TO BE TIED INTO THE CURRENT CITY GRID. WHEN THIS IS DONE, IT LEAVES A SMALL PLAZA OF LEFTOVER SPACE ADJACENT TO THE STADIUM. THIS IS WHERE THE TAILGATING PLAZA WILL BE PLACED.

THE IDEA BEHIND THE TAILGATING PLAZA IS ADDING EXPERIENCE. INSTEAD OF CHARGING FOR TICKETS FOR A LESS THAN DESIRABLE UPPER DECK SEAT, THE STADIUM CAN UP CHARGE THE GOOD SEATING, WHILE ALSO SELLING TICKETS FOR THE TAILGATING EXPERIENCE. ITS A WIN WIN.
The tailgating experience would not be complete without visual connection to the event. Large outdoor screens are placed on the existing piers that can shift heights.

A plaza that mirrors the tailgating plaza is created, taking away some of the space that was previously being used for mixed use. This space will be fronted by bars and restaurants.
A NUMBER OF DIFFERENT EXPERIENCES CAN NOW BE FOUND FOR VIEWING EVENTS, ALLOWING THE PUBLIC TO CHOOSE WHICH ONE WORKS BEST FOR THEM.

THE COMBINATION OF THESE TWO PLAZAS ALLOWS FOR CLEAR SIGHT LINES TO THE GIANT SCREENS. THIS CONNECTS THE TAILGATING PLAZA, THE PEDESTRIAN STREET, AND THE OPPOSING PLAZA.
A roof is placed over both the stadium and the tailgating plaza. This roof is translucent, allowing sunlight to come through but also protecting spectators from the elements.

The structure of the roof will be a lattice system. Each pier will have two trusses that will hold up the structural lattice. Large trusses will span from corner to corner to provide lateral bracing as well as allowing the corner to be covered.
THE ROOF WILL BE COVERED IN TRANSLUCENT SOLAR PANELS. COLLECTING ENERGY WHICH IS USED FOR STADIUM FUNCTIONS AS WELL AS POWERING THE PARK. THE FORM OF THE ROOF WILL ALLOW RAIN WATER TO BE COLLECTED AND USED FOR IRRIGATION.

THE LARGE PIERS WILL ALSO BE USED AS RECYCLING BINS, WITH THE BASE BEING USED AS A RECYCLING PLANT. PIEZO ELECTRICITY PANELS WILL BE PLACED IN THE SURFACES OF THE STADIUM AND PUBLIC WALKWAYS. WHEN THE STADIUM IS ROCKING, MORE ELECTRICITY WILL BE COLLECTED INTO THE GRID, GIVING THE FANS SOMETHING TO CHEER ABOUT.
The surrounding plazas are broken down into modular pieces. This creates a human scale interaction with the park and stadium.

The various modular pieces feed off of the energy and irrigation the stadium provides. These will be 2'-0" x 8'-0" panels, with the spaces in between allowing for electrical wires and plumbing.
LEFT: SITE PLAN

RIGHT: PLAN SHOWING INTERACTION DURING PUBLIC EVENTS.
LEFT: PLAN SHOWING INTERACTION DURING PRIVATE EVENTS.

RIGHT: PLAN SHOWING INTERACTION DURING LIMITED PRIVATE EVENTS.
PERSPECTIVE FROM PEDESTRIAN STREET
DIAGRAMS SHOWING HOW GATES AND SCREENS CAN OPEN/CLOSE FOR VARIOUS EVENTS
PHYSICAL MODEL SHOWING NORTH EAST ENTRANCE PLAZA
ACKNOWLEDGEMENTS

This thesis was over 3 years in the making. Over that time, I have learned a lot about myself. This is the hardest thing I have ever accomplished.

That being said, it couldn’t have been done without the following people:

First and foremost, to the Lord God almighty, for giving me the strength and perseverance needed in this process.

To my family, who have given me unbridled support over the years even though the timetable was less than ideal.

To my committee, Paul, Susan, and Jaan, thank you for your wisdom and patience with me.

To my friends, Gui, Ace, Allie, Andrew, Ivan, Ryan, Suzette, Negar, Ben, Jason, and all the others... I am ever indebted to your service.

And finally, to the WAAC, a great and wonderful institution, thank you for the memories, the trials, and the education.
“Let your light shine before men in such a way that they may see your good works, and glorify your Father who is in heaven.”

- Matthew 5:16