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Sustainable Ephemeral: Temporary Spaces with Lasting Impact

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Sustainable *Ephemeral*

Temporary Spaces with Lasting Impact

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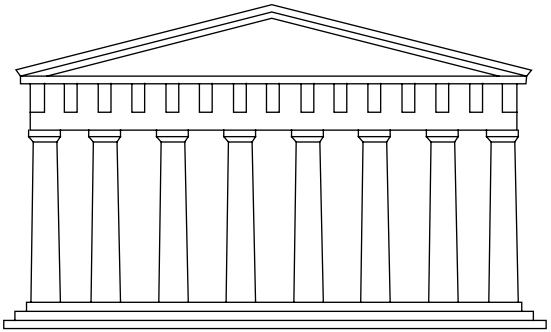
Thesis Statement

From the Far East to the Western world, architecture has historically strived toward permanence and monumentality. Recent "sustainable" design practice is likewise concerned with preservation, seeking to maintain quality of life for future generations by conserving both built and natural environments. However, in an age of rapid technological advancement, designed objects and buildings are quickly rendered obsolete, and in effect, our culture has become disposable. Buildings are designed to be replaced or updated according to technological progress, and that which is no longer useful or relevant is simply discarded.

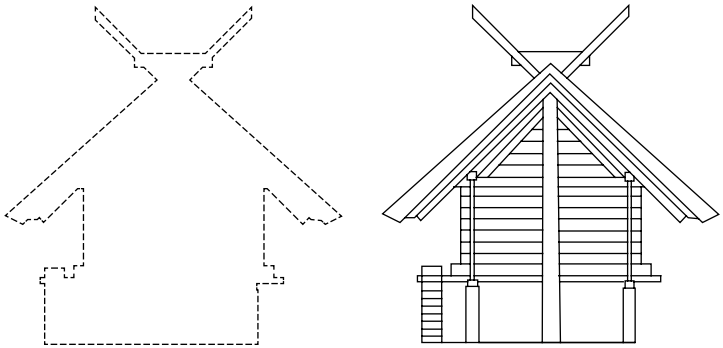
An *ephemeral architecture* has the ability to mediate between aspired permanence and inevitable change, sustaining cultural meaning despite a short existence. Framing a moment in time through construction processes and lingering fragments, a building designed to disappear can foster a potent communal memory. The fleeting experience created by a temporal architecture can serve a didactic purpose within its community. The tectonics of the building will be telling of its mutable nature not only as urban furniure, but also as a dynamic marker of place and time, showcasing the potential sustainable value in impermanence.

An amenity for the 2013 America's Cup sailing regatta in San Francisco will test the sustainable potential of an ephemeral architecture. The building will not only enhance the experience during the race, but also frame a historical moment for the city. Located on a waterfront site, the building will embrace the unique climate of the bay, as well as contribute to a collective coastal identity at the scales of site, neighborhood and city.

Issues of Permanence



The Parthenon, Rome



Ise Shrine, Mie Prefecture, Japan

Permanence & Monumentality

Throughout history, architects have been concerned with issues of permanence and monumentality, seeking to create and preserve meaning in buildings and the rituals surrounding them. Such attitudes may be found throughout the world, although they manifest themselves in different ways. Buildings that have survived (or not survived) over the centuries reveal different cultural attitudes toward permanence which transcend issues of architecture alone and go on to demonstrate a philosophy toward the world and life itself.

1 The Parthenon in Rome epitomizes architecture as monument.

Architecture of the ancient Western world demonstrates humankind's quest for immortality and godliness through monumental buildings that strive for perfection. In an essay entitled "Metaphysical Beliefs and Architectural Principles", architectural historian Clay Lancaster contrasts Western architecture with that of the East. He writes, "The first principle that comes to mind is that of solidarity in the West as opposed to fragility in the East. The Western edifice is composed of thick masonry walls as against Eastern construction of slender timbers."[1] The materiality of Western architecture, along with idealized proportional systems, created what they believed was architecture worthy of the gods.

In contrast, Eastern architecture embraced the impermanence of the natural world. Lancaster relates how the fragility of Oriental architecture stems from the Eastern philosophy and mindset:

> Buddhist doctrine is permeated with awareness of the impermanence of physical phenomena. Objects disintegrate and individuals die, and although their components continue to exist, the thing itself has ceased to be.[2]

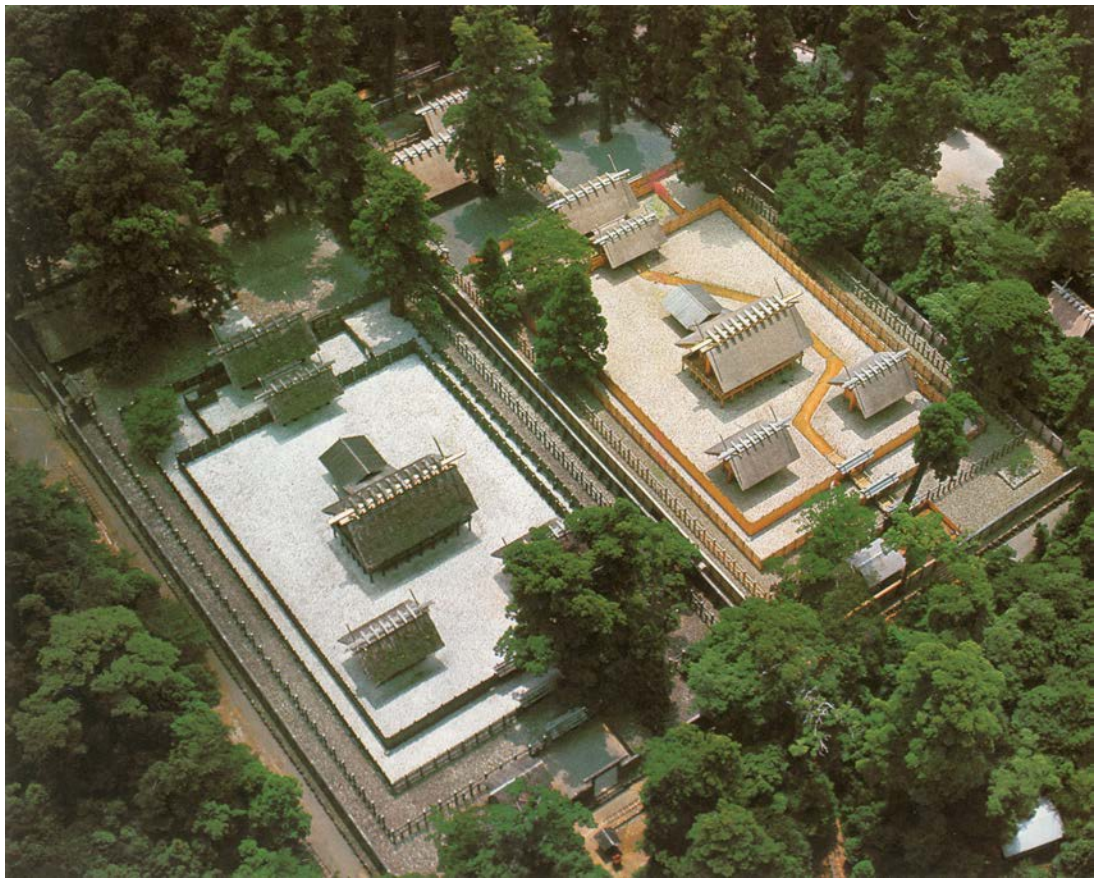
1 Clay Lancaster, "Metaphysical Beliefs and Architectural Principles," *The Journal of Aesthetics and Art Criticism* 14, no. 3 (1956): 292.
2 Ibid., 291.

Although it embraces the temporality of the tangible world, architecture of the East in many ways still aims for preservation. Immortality is achieved through cycles and rebirth as opposed to the physical permanence aspired to in the West.

The Ise Shrine in the Mie prefecture of Japan is a Shinto shrine[3] that shows this alternative way of achieving permanence and immortality. The building celebrates death and renewal; a new shrine is built alongside the existing one ev-

3 Closely tied to Buddhism, Shinto is an indigenous religion of Japan that celebrates rebirth and renewal.

2 The Ise Shrine in the process of renewal, which takes place every 20 years.



ery 20 years and the old building is deconstructed. Designed to house a holy mirror indefinitely, the building has been reconstructed continuously for centuries, the original date of the building unknown.[4]

Both Eastern and Western architecture of antiquity are able to achieve continuity successfully because of the cultural meaning associated with the built form. The significance of the Parthenon and the Ise Shrine will last longer than the objects themselves as long as people continue to see meaning in them.

The quest for permanence and continuity can be traced all the way to modern times:

"Sustainability" is our generation's iteration of permanence or immortality.

Although not based on metaphysical beliefs, the overarching goal of sustainabiliy is to sustain life for future generations. However, with its growth over recent years, 'sustainability' has become a loaded term which has different meanings to different people. To some it simply means eco-friendly, to others it is an entire lifestyle, and yet others believe that it is yet another passing fad.

4 Gunter Nitschke, "Architecture and Aesthetic of an Island People," in *In Detail: Japan; Architecture, Constructions, Ambiances*, ed. Christian Schittich (Berlin: Birkhauser, 2002), 15.

Disosability & Obsolecense

Rapid advancements in technology have transformed our culture into a fast paced society of trends and immediacy, revolving around disposability and obsolescence. New technologies are invented everyday that render old ones obsolete, and our capitalist culture requires this constant consumption and disposal.

Contemporary architectural practice acknowledges its place in a consumer society, and buildings are now designed under the notion of 'planned obsolescence'. In order for architects to maintain their practice, buildings must be updated or demolished to make way for new ones. The irony is that, although architects may be sustaining their relevance and demand, buying into the notion of planned obsolescence is sustainable neither in the ecological sense, nor in terms of culture. When investments are simply thrown away, nothing is preserved, wasting natural resources and energy as well as a continuity of a culture through design.

On the other hand, attempting permanence in the traditional monumental sense, in some cases, can be futile or even extremely detrimental in our world of constantly shift-

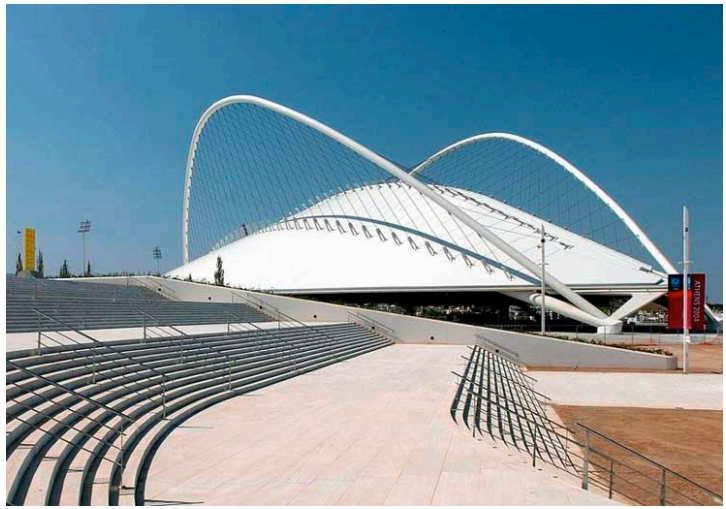
ing in trends and ideas. Architecture that fails to acknowledge the passing of time can put inappropraite demands on future generations in terms of maintenance or use.

Olympic complexes are notorious for failing in this regard. Monumental structures are often built for the purpose of bringing pride and grandeur to the host city for an event that lasts a matter of weeks. The Athens Olympic Complex of 2004 and the Montreal Olympic Stadium of 1976 are two examples of architecture that naively sought permanence without thinking about the consequences. Future generations were forced to deal with maintenance or repair costs after the buildings were no longer used.

The reality of a world where change is constant and even increasing in speed is that nothing lasts.

In a capitalist society, novelty and trends will always succeed over straight forward sustainable practice. Even if architecture acknowledges a dynamic model of society and responds with a tranformable and adaptive architecture, that

3 The Montreal Olympic Stadium aims still exists but as an uncomfortable memory for the people who know of its structural failures



4 The stadium at the Athens Olympic Complex designed by Calatrava in 2004 was monumental but now mostly unused

technology can still be updated.

The Japanese Metabolist movement of the 1960's, although based on the notion that the Japanese city was constantly changing and growing in a post-war era, failed to foresee that it too would become outdated. The Nakagin capsule tower in Tokyo, designed by Kisho Kurokawa, although designed as a modular system where pods could adapt to use and move in and out of a core structure, the building failed to actually

5 The Metabolist Capsule Tower designed by Kisho Kurokawa was more of a symbol of adaptivity, and wasn't actually very flexible

adapt and transform to the needs of society.[1] In fact the capsules plugged into the core proved extremely expensive and dif cult to move, and they have never been moved since they were first put in place in 1972. The building is now slated for demolition, even though the building does represent a part of architectural history and memory. People have complained about its dilapaidated state and the uncomfortable living spaces of the capsules. Higher priority has been given to developing the site which is considered prime real estate within the city.[2]

Although architecture traditionally strives toward permanence and the preservation of culture in built form, current architectural practice is in constant conflict in an age where technological progress and change are inevitable. The questions are raised:

Can architecture mediate between permanence and obsolescence? Can architecture teach or promote an attitude toward permanence that will promote sustainability both ecologically and culturally?

1 Nicolai Ouroussoff, "Future Vision Banished to the Past," *The New York Times*, July 6, 2009.
2 Ibid.

The Ephemeral

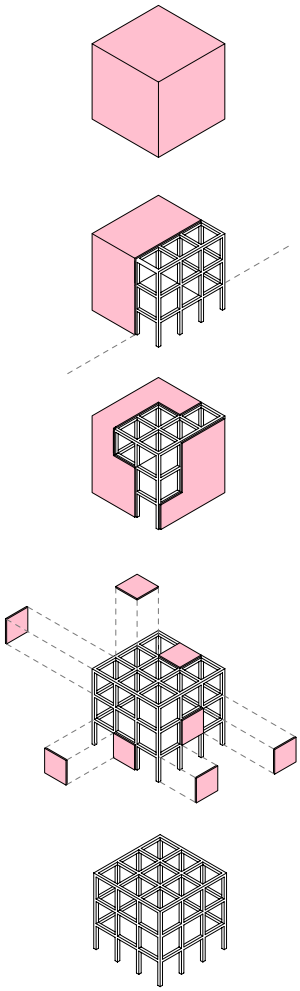
An architecture that sustains meaning yet is temporary can mediate the conflict between the quest for permanence and inevitable obsolescence. An ephemeral architecture is one that is design to exist for a short period of time and then disappear, providing a fleeting experience and leaving behind a memory. Like an ephemeral stream or an insect whose life lasts only a day, the experience will be unique and more meaningful precisely because of its acknowledged time limit.

The brief existence of an ephemeral architecture is in response to the increased speed and acceleration of our world. A society that demands immediate gratification will find a sense of immediacy in an architecture that can quickly slip in and out of existence.

The priotrity will be to create a lasting cultural impact through the expression of ephemerality, but the building will also have a positive effect on ecology, responding to the excessive waste created with our current model of planned obsolescence. The building will provide a didactic experience, showcasing the sustainable value and elegance in that which is impermanent.

Ephemeral Architecture

Deconstruction & Fragmentation



The expression of temporality in architecture can be physically measured in tectonics, specifically in its potential to be deconstructed and fragmented over time. In order to create a fleeting experience, the building must have a brief existence and then disappear. Lingering fragments of the building will preserve the meaning after the comprehensive whole is broken down. Thus the tectonic objectives of an ephemeral architecture are:

1. to maximize ease and efficiency of deconstruction, and

2. create a system in which entire fragments of the building may be reclaimed and preserved

Designing for anticipated deconstruction is a technique used in ecologically sustainable practices but is also appropriate for an ephemeral architecture. Acknowledging that buildings do not last forever, architects involved in the Design for Deconstruction movement simplify building construction so that materials can easily be salvaged and reused after the building is no longer useful.[1] Proponents of this method encourage flexibility and adaptability, minimization of building components and materials, and the simplifica-

1 Brad Guy and Nicholas Ciarimboli, *Design for Disassembly in the Built Environment: A Guide to Closed-loop Design and Building, (University Park, PA: Pennsylvania State University, 2005), 1.*

tion and standardization of connection details,[2] all of which can likewise be used to create an architecture that slips in and out of existence as smoothly as the passage of time.

For an ephemeral architecture, the process of deconstruction is a means of expressing decay, as a natural process of aging and disappearing. This process can be beautiful in itself, alluding to the truth of the transience of the natural world. Impermanence and decay are reoccurring motifs in music and art. Graphic designer Martin Venezky relates his perspective on transience and decay and how it translates into his work in his book *It is Beautiful... Then Gone*. He writes,

"I don't encourage my work toward permanence. The materials I use-tape, cardboard copy paper, pencil, wax-practically beg to disintegrate. If pieces flutter off, what remains means more to me. It can come apart. It ages. It is more alive than a digital file, whose permanence and fidelity have no precedence in our organic decaying wonderful world."[3]

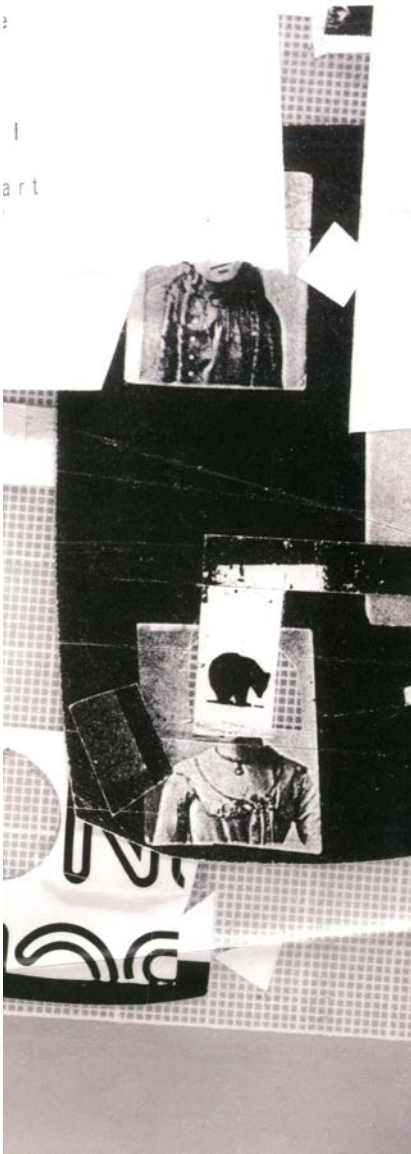
Through deconstruction, architecture can contribute to this creative discourse and a cultural meaning without being monumental and permanent.

Fragmentation often remains as a byproduct of decay and is thus a natural supplement to deconstruction as well, preserving a memory or moment in time through pieces of a whole.

Throughout history, fragments of everything from buildings to human bodies have been preserved because of cultural significances they are said to carry.

Christianity's cult of relics in the fourth century demon-

6 Fragments in Martin Venezky's graphic design



2 Ibid., 3-4.

3 Martin Venezky, *It is Beautiful... Then Gone*, (New York: Princeton Architectural Press, 2005), 15.

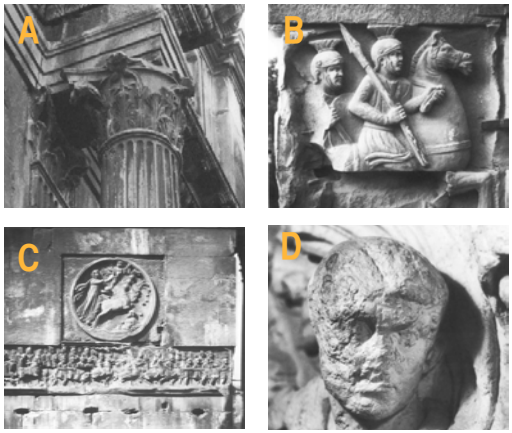
strates the tendency to associate meaning with pieces of objects from the past. Human bones said to belong to saints were preserved, and people would worship these objects ritually, contributing to a consolidation of a religious culture and people.[4]

The concept of fragmentation is especially established in architectural history, as building elements are some of the most permanent of human creations. Spolia, fragments taken from historical monuments, which included figural reliefs, column elements, and pieces of entablature, were both incorporated into new structures and used as free-standing pieces of historical memorabilia. Spoliation was used to communicate various meanings, from triumph and grandeur to piety and tradition,[5] all associated with antiquity and the significance of the past. Although the original use and meaning of the fragment may have been lost, an adapted cultural meaning took its place.

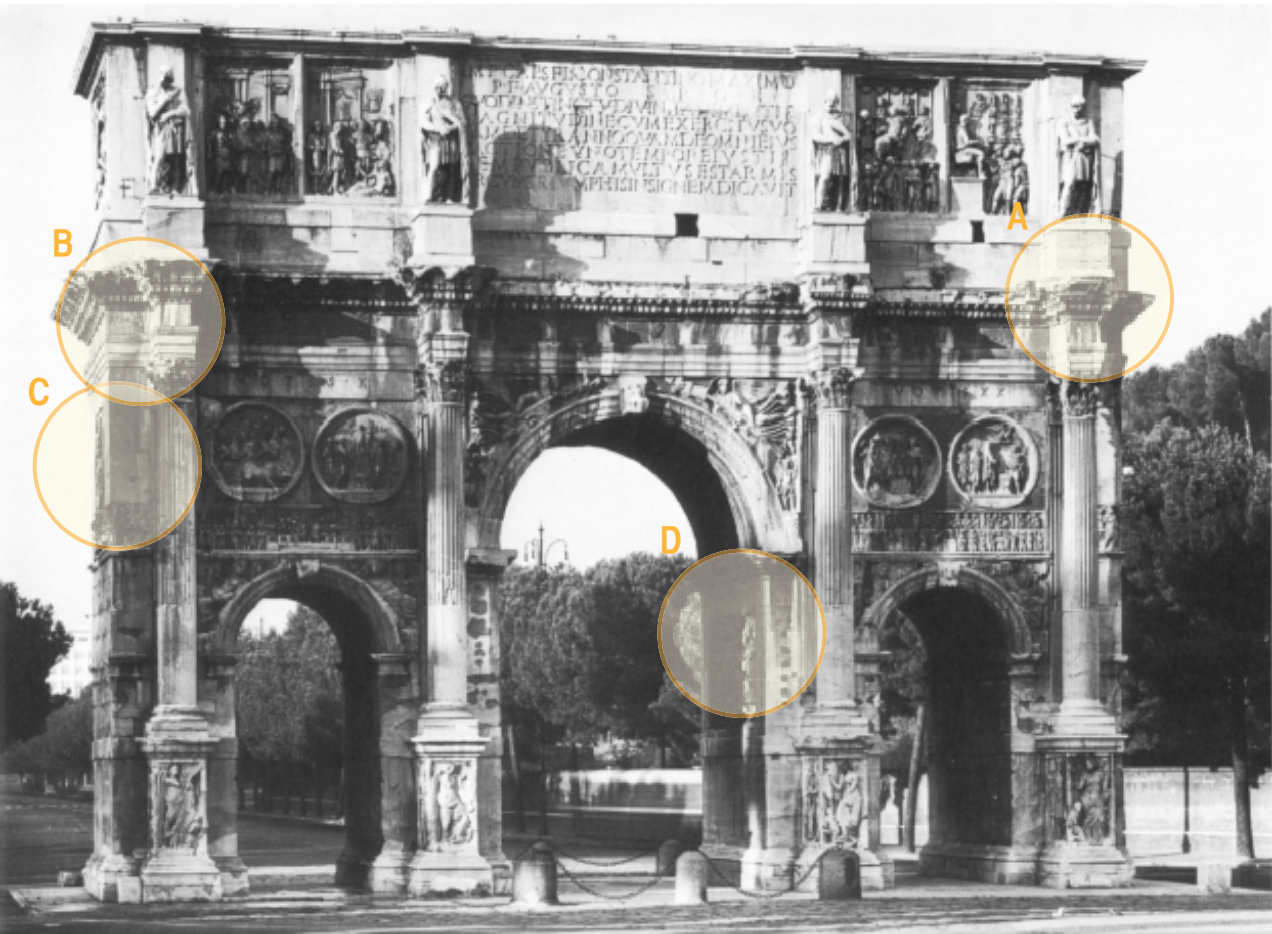
The Arch of Constantine in Rome features a collage of spolia, fragments taken from other buildings. These fragments, at the time the arch was built, conjured memories from the past and appealed to Romans' emotions. The conglomeration of the fragments in a new form transformed the parts into sacred elements equivalent to Christian relics. The arch served as a symbol of Roman triumph and history.

4 Jas Elsner, "From the Culture of Spolia to the Cult of Relics: The Arch of Constantine and the Genesis of Late Antique Forms," *Papers from the British School in Rome* 68, (2000): 150.

5 Ibid., 155.



7 The Arch of constantine and details of individual fragments



Prefabrication & Furniture

The memorializing effects of deconstruction and fragmentation can be effectively articulated through prefabricated furniture elements inserted or attached to a more static structural frame. In this system each fragment has meaning individually but also transforms spatially when integrated into a comprehensive whole.

Fragmentation in this project is not as much about reuse for ecological sustainability as translating and sustaining a cultural meaning. With a designed hierarchy of furniture-fragments, the project is not concerned with creatively reusing every deconstructed element, but infusing cultural significance into selected remnants.Additional elements will be truly fleeting, being individual members ra ther than composed fragments, but furniture-inspired connections will allow for easy deconstruction and high possibility for reuse.

Prefabrication is an appropriate method for creating an ephemeral architecture because it allows for a swift construction process on site. Building elements, often modular in design, are preassembled in a controlled environment with greater precision and planning. Actual time spent on site is minimized and simplified, creating a smooth transition process from one stage to another during construction.

Likewise, furniture elements allow the building to transform easily. The Merriam-Webster Dictionary defines furniture as "equipment that is necessary, useful, or desirable: as moveable articles used in readying an area (as a room or patio) for occupancy or use."[1] The key word in this definition is 'moveable' as this is what distinguishes furniture from architecture.

1 Merriam Webster Online, s.v. "furniture," accessed Dec. 5, 2011, http://www.merriam-webster.com/dictionary/furniture.

In the *Design for Disassembly Guide*, Guy and Ciarimboli describe the importance of the precision and craft to deconstruction that is made possible through prefabrication. Comparing prefabricated elements to furniture, they report:

A well made furnishing object can sustain many lives of reuse through the stoutness of its construction, the quality of wood and other materials, and as it ages, the associations that become attached to it from ownership and use. Ultimately the most highly prized DfD components will exhibit high quality of craft and material that encourages additional efforts to support their reuse and remanufacture for an extended life.[2]

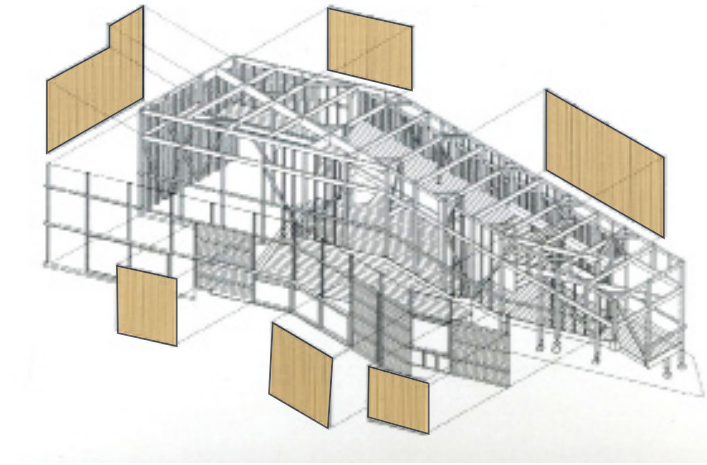
Because the crafted prefabricated element acts more as a piece of furniture than a mere building component, it has that ability take on the meaning that is necessary for fragmentation.

The "Furniture House" in Yamanashi, designed by Shigeru Ban in 1995, features floor-to-ceiling pieces of furniture that act as structural elements within the house.[3] Both bookshelf units and cupboards were used. Because the pieces were ac-

8 House in Kobe, Japan by Go Yoshimoto features prefabricated facade made of metal panels and wood slat panels

2 Guy and Ciarimboli, *Design for Disassembly*, 51.

3 Matilda McQuaid, *Shigeru Ban* (London: Phaidon Press, 2006), 164-169.



tually manufactured by an outside source, there was a predetermined module for the spaces and construction was simplified. A unique effect is created where the building reads as continuous open space which is punctuated with furniture only.

If a prefabricated element literally serves as a piece of furniture that people can interact with, its capacity to become a meaningful fragment is further increased. Users can move furniture elements and transform spaces as they see fit, creating a more intimate condition or relationship between user and building.

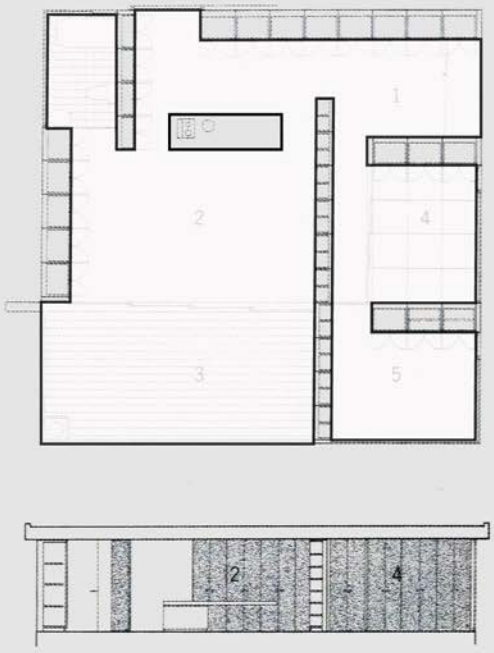
This mobility supports a temporal architecture because both interior and exterior spaces can transform constantly when building elements are though of as furniture. Usually furniture is thought of at the scale of a room, but with prefabrication, entire spaces can act as furniture both within the whole of the building and as a movable object within the city.

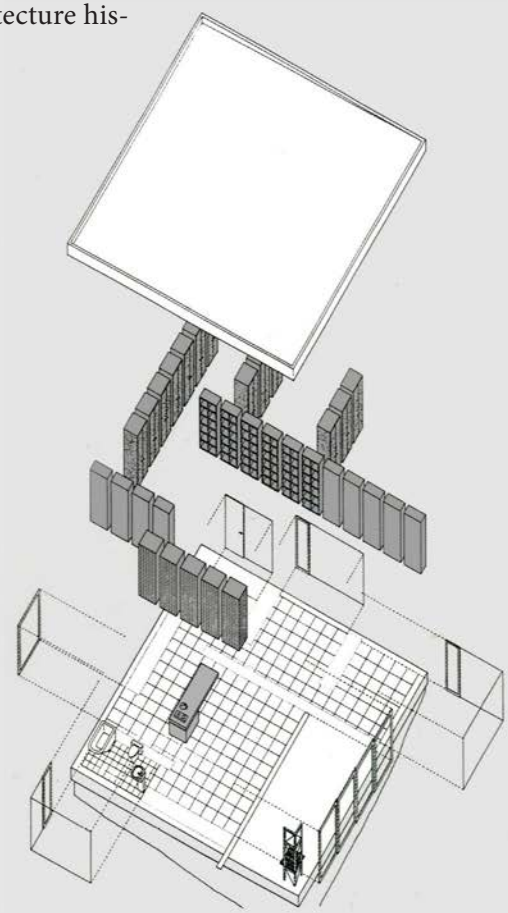
9 Furniture house by Shigeru Ban, view of the moduled bookshelves, both furniture and structure.

Shigeru Ban's "Naked House", built in Kawagoe in 2000, is an elegant example of how entire spaces can act as furniture.[4] The dwelling is essentially one large space, but interior spaces are created with moveable and inhabitable boxes. On wheels, the boxes may be moved within the house to form different relationships with one another and with the space of the larger box. Space is constantly transformed within the large box of the building, The spaces can even be moved out into the garden, transforming the exterior space as well.

With a swift construction process of prefabricated furniture, the sequence of the construction and deconstruction becomes as much a part of the temporal experience as the movement through the building itself. In his book, Building Lives: Constructing Rites and Passages, architecture his-

4 McQuaid, *Shigeru Ban*, 202-207.





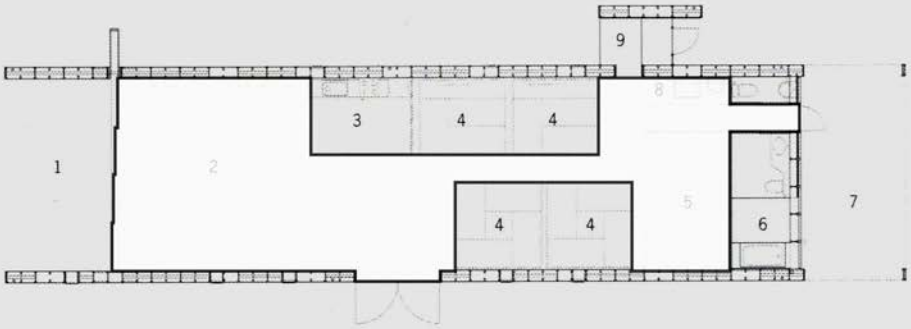
10 Furniture House by Shigeru Ban, with the flow of space highlighted

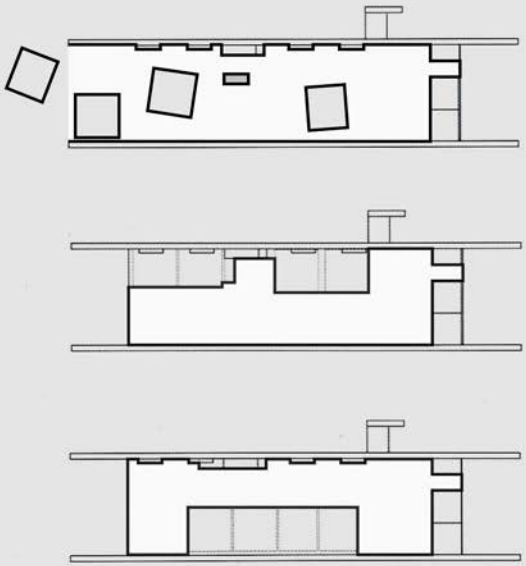
11-12 Naked House: the same view at two different time, with the space transformed by the furniture/ rooms.

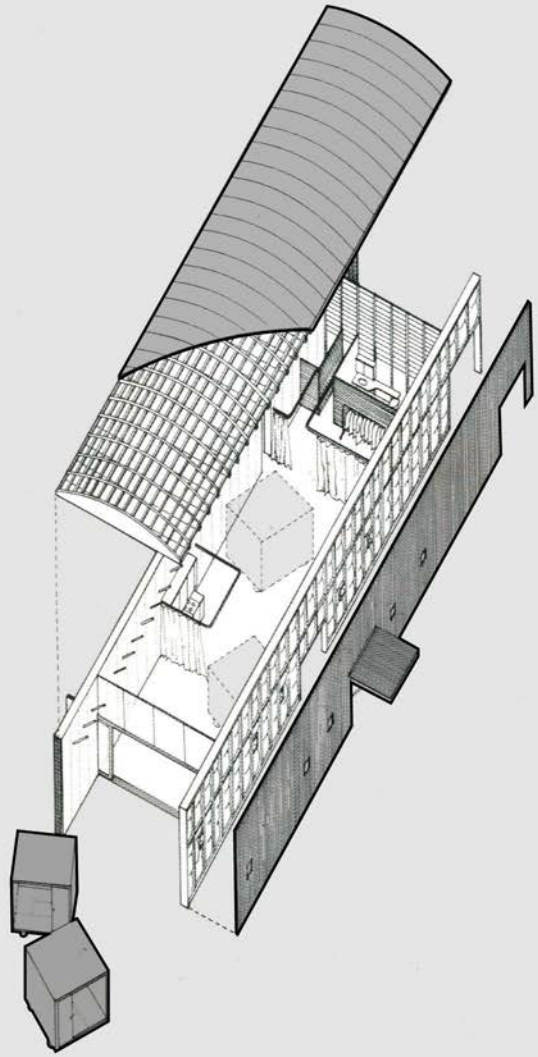
torian Neil Harris conceives of buildings as having lives or narratives that are embodied in the physical object.[5] Three stages, birth, life, and death, are linked to psychological experience of the building.

Community participation added to the richness of lives and stories of buildings. Harris writes of the effect on communal memory in construction rituals such as barn raising, relating, "The whole population participated in these public events, producing a common experience that was reinforced and made retrievable by means of the created landscape."[6] Communitiy interaction in building process infuses meaning into the those built objects. Thus, a construction of highly mobile prefabricated furniture elements will allow for a tangible connection between people and built elements.

5 Neil Harris, *Building Lives: Constructing Rites & Passages* (New Haven, CT: Yale University Press, 1999), 2-3.
6 Ibid., 7.







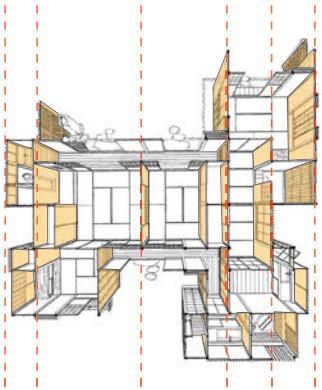
13 Naked House, Shigeru Ban (above): diagrams highlighting the public space manipulated by the moveable rooms.

14 Exploded axon of the Naked House (left), with furniture and skin exploded out

Philosophy & Aesthetic: Learning from Japan

"In contrast to the European ideal of a city as urbs aeterna, or eternal city, with its durable architecture and very rigid urban structure, Japanese cities of today still bear witness to a very different urban ideal, a place characterised [sic] by by dynamic vitality, rapid change, the cyclical renewal of its components and a general tendency to ephemeral structures"[1]

In fact, in no place other than Japan is sensitivity to time and the temporality of experience most acute and consistent, manifesting itself both tangibly and metaphysically. From traditional Japanese joinery and its corresponding modulating system to the modernist Metabolist movement of the 1960's, Japanese architecture embodies a physical flexibility while design approaches to place and experience reveal a cultural mindset that appreciates life in the here and now.



15 The layering principle seen in the traditional japanese home

The culture embraces life on the edge so to speak, and the transition from one state to another. Physical edge conditions are celebrated in Japanese architecture as carefully articulated interfaces between human and nature, interior and exterior. *Engawa* is the Japanese term for the edge of a traditional house, the space that is protected by wide eaves yet open to the outdoor air. More than just a porch though, this ambiguous indoor-outdoor space is a buffer zone that blurs the boundary between interior and exterior of the building, regulating public/private space as well as climatic conditions.[2] The light shoji screens further this ambiguity, allowing diffusion of light and circulation of outdoor air into the building.

This *oku* principle, or spatial layering, can contribute to an ephemeral experience, producing not only a series of transitory spaces,[3] but also the potential for deconstruction

1 Nitschke, "Architecture and Aesthetic," 15.
2 Naonori, "Japan's Traditional Houses," 312.
3 Christian Schittich and Andrea Wiegelmann, "Japan's Modern

in layers. Peeled like an onion, spaces and their relationships with the environment transform until nothing is left except for fragments of what was.

Appreciation of the edge is also seen in Japanese 'hanging-style' buildings, kaze-zukuri, which literally hang off the edges of cliffs. Temples such as the Nageire-dou express an adaptability to the nature that surrounds them and a fragility associated with the mortality of the natural world. The structure, Nute writes,

"acts as a mediator between the human logic of the horizontal floor plane and the natural lie of the land. The two coexist in close proximity and in so doing help to define one another. Again, there is a real sense in which the built form seems to belong to the place, the identity of which, far from being destroyed by the building, is actively reinforced by its presence,"[4]

16 The Nageire-dou hangs off the edge of a cliff, adapting itself to its location.

Architecture - From the Beginnings to the Present" in *In Detail: Japan; Architecture, Constructions, Ambiances*, ed. Christian Schittich (Berlin: Birkhauser, 2002), 15.

4 Kevin Nute, *Place, Time and Being in Japanese Architecture* (London: Routledge, 2004), 33.

17 The shoji screens in this traditional Japanese house are light partitions between indoor and outdoor.

With structural members that must adapt to unique topography these cliff buildings could exist nowhere else, and they show a distinct approach to site and place.

"To exist is to have a particular materiality in a specific part of space at a given moment in time."[5]

Thus, having a pointed experience is as much about the transitory experience of where as when. Establishing place in Japanese culture revolves around framing natural objects that are unique to specific geography. This makes sense considering geographic conditions are what determine locations of cities and the consequent developments of peoples. In Japan, objects such as mountains, trees, or rocks, are framed and made into icons, instilling a sense of meaning in the places associated with those objects.

18 The wedded rocks in Mie, Japan feature a taboo rope that frames the natural objects and makes them sacred

In many instances, place-framing is as minimal as mark-

5 Nute, *Place, Time and Being*, 3.

ing natural objects with taboo ropes.[6] Such as in the case of the 'wedded rocks' at Futamigaura in the Mie prefecture, simple rope and paper is enough to establish a place that is distinguished from any other natural location.

The issue of 'place' is essential to an ephemeral architecture that aims to embrace a unique moment and leave a cultural memory. Although environments, both built and natural, change with seasons or trends, 'place' may be sustained and is necessary for true sustainability of a people. Globalization has naturally been in opposition to this notion, giving rise to universalities with little sensitivity to place and time,[7] but an ephemeral architecture can counter this, increasing awareness of the differences in places, times, and experiences.

6 The *shimenawa* ropes marked edge conditions in themselves as the boundary between the human and the spirit world. These spirits were called kami and were the reason behind the framing of natural objects. Nute, *Place, Time and Being*, 12.

7 Ibid., 127.

Temporal Sensation

Architecture that seeks to create a fleeting experience is rooted in phenomenal change of a tangible world. Thus, physical sensation must be emphasized, drawing attention to changes that go unnoticed in a culture that finds permanence and stability in a realm isolated from nature.

As mentioned by Venezky, the digital world is static and in direct opposition to ephemerality. The internet and its seemingly limitless expanse allows for the continuous archiving of information and interactions that are no longer fleeting. This has created a condition of staticness that is in contrast to the natural world. This static condition, I believe, is also what creates disposablity, because existing technology cannot develop organically.

Likewise many sustainable architectural practices aim to create conditions in which indoor climate is as static as possible throughout the seasons. Architects design under the assumption that indoor conditions should be separate from the exterior.

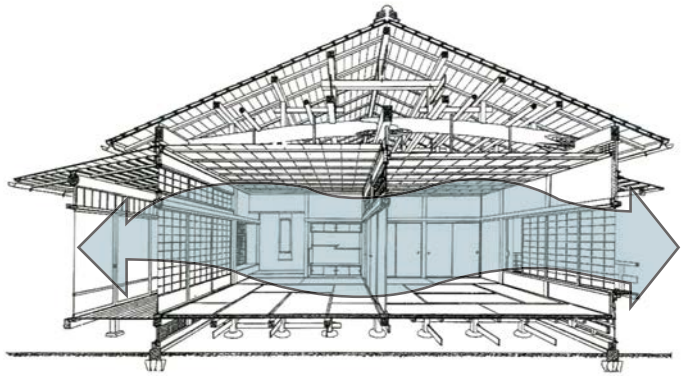
However, this mindset is not universal, as in many cultures throughout the world, this conditioning is either not possible or not a priority. In the book *Asia's Old Dwellings: Tradition, Resilience, and Change*, Matsuda Naonori describes the adaptive mindset of the Japanese, in both historical and modern times. Traditional Japanese minka had extremely thin envelopes which was great in summer for natural ventilation but extremely permeable to the cold in winter. Naonori writes,

"Japanese people actually preferred the seasonal changes of weather and vegetation in spite of the associated physical discomfort during extreme weather. This situation is one that continues to puzzle Western observers."[1]

1 Naonori, "Japan's Traditional Houses," 309.

An ephemeral architecture likewise seeks to blur the boundaries between interior and exterior climate, connecting people with the temporality of nature, and in direct response to the static conditions created by a digital world.

Maximizing sensation will also serve to maximize the emotional impact that a temporal building creates. Because it is in existence for a limited amount of time, possibly being seen or experienced only once, it must have an immediate effect. The building will play into our society's need for immediate gratification, yet have lasting cultural impact because of the memorable experience.



19 Connection between indoor and outdoor conditions is made in the traditional Japanese house: air is allowed to flow in and out through *shoji* and bamboo screens

Iron

Materiality is a way of showing temporal change in architecture. While some materials express permanence and show aging over time, other materials express lightness and deteriorate easily.

Corten Steel

These material studies contrast materials used to express monumentality with those that are ephemeral and light, lasting a short amount of time or are flexible and sensitive to change.

Stone

Bangladesh Parliament
Louis Kahn, 1982
Dhaka, Bangladesh

Uses marble tiles to express a solidity and monumentality

Marble

Concrete

Church of Light
Tadao Ando, 1989
Ibaraki, Japan

Expresses weight and monumentality through the use of concrete and its manipulation of light

Brick

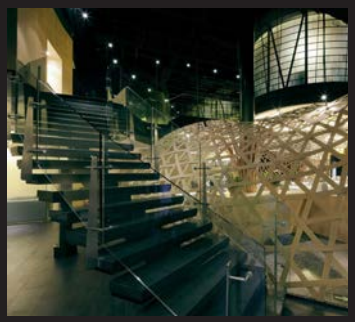
Ephemeral Qualities	Physical Properties	
• transforms with weathering • reacts to air and the elements	• joined with welding • used to create structures before the invention of steel	
• rusty texture already looks weathered • irregularities and uniqueness	• pretreated to create rusty effect • pieces are welded together • corrosion resistant • built in protective coating	
• can be irregular • expresses weight or heaviness	• varied types of masonry construction • slow process • labor by hand	
• expresses grandeur and weight • smooth finished texture • uniqueness in patterns	• sedimentary rock • comes in slabs	
• texture can show imperfections • variety of consistencies and effects • usually expresses solidity	• poured in place or precast • shell structures • can get different textures with different framework	
• expresses weight • rough , inconsistent texture, depending on the brick	• laid by hand • usually just a skin rather than actually built of bricks in contemporary building	

Hannover Pavilion
Shigeru Ban, 2000
Hannover, Germany

Uses cardboard tubes for structure and tensile fabric for large enclosure

Paper

Cardboard



Tang Palace
FCJC, 2011
Hangzhou, China

Interior space is defined with a triaxial woven geometric frame within the Tang Palace

Canvas

Weaving

Cellophane House
Kieran Timberlake, 2008
New York City, New York

Prefabricated design for the New York MoMa exhibit 'Home Delivery' using plastic as the building enclosure

Plastic

Carabanchel Housing
Foreign Office Architects, 2007
Madrid, Spain

Features bamboo screens as operable shading devices and second skin for the exterior of the building

Bamboo

Ephemeral Qualities	Physical Properties	
• translucent • lightweight • fragile • ephemeral shadow effects	• recycleable • joined with glue or other adhesive • suitable for interiors	
• easly affected by the elements • lightweight	• can be structural (tubing) • recycleable • needs to be treated for exterior use	
• flexible • sturdy for a fabric	• needs structure to hold it up • can be draped	
• lightweight materials • flow of space and light through screen	• structural (can be 3D) • triaxial weave resistant to shearing • different densities	
• lightweight • completely transparent	• easy for prefabrication • potential application of photovoltaic elements	
• untreated raw look • allows circulation of air and a little bit of light • ages quickly if untreated • inconsitency of texture	• tied together with cords • renewable material • various sizes of bamboo	

Metz Centre Pompidou
Shigeru Ban, 2007
Paris, France

Uses a teflon coated tensile fabric for the roof to create a translucent, temporal effect

Tensile Fabric

Loblolly House
Kieran Timberlake, 2007
Chesapeake Bay, Maryland

Uses wood slats as a part of the prefabricated "kit of parts" that compose the building

Wood Slats

Thatch

Straw Bale Houses

Staw modules span void spaces between structural members, almost like shoji screens

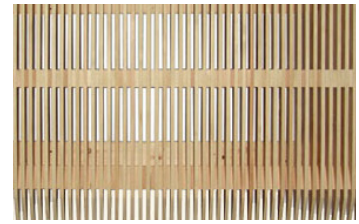
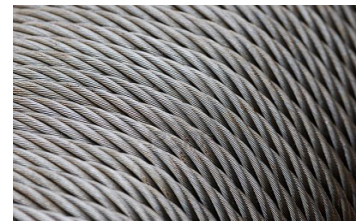
Straw Bale

Sake Bar
Architects Eat, 2008
Melbourne, Australia

Uses ropes in tension to define this interior space within a building

Rope

Metal Cable

Ephemeral Qualities	Physical Properties	
• translucent • flexible to any shape • lightweight • light transmitting • looks like sails of a boat	• can be held with steel frame or with cables • can span large spaces • stretchable	
• recyclable material • allows circulation of light and air • ages well • interesting shadow effects	• reuseable elements • can be attacted without nails and fixtures • various textures that can be made	
• raw texture • rustic feel • assembled quickly • irregularity of texture	• made up of dry plants • layered up to block out the elements • uses local materials found on site	
• stackable modules • raw texture if not covered	• densely packed straw bound with a cord • stacked to fill in spaces between structural members • insulating properties • finished with exterior wall material	
• raw texture that weathers • connection to sailing	• can be tied with knots • can be stretched to form straight lines of tension or draped • biodegradable • works in tension	
• expression of lightness • looks like lines rather tahan solids	• fittings are metal, but simple • works in tension • can work in series to form screens	

Testing the Thesis:

The America's Cup meets San Francisco: AC 34

In 2013 the city of San Francisco will host the 34th America's cup, the international sailing regatta which boasts the oldest active trophy in international sport. This intersection provides a unique time and place in which an ephemeral architecture may be tested, framing the experience and preserving the memory of the event while the building itself may fade out of existence after the event is over.

1851

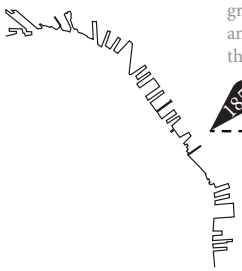
New York Yacht club's America beats the Royal Yacht in England's 100 Guinea Cup, establishing the America's Cup as a perpetual challenge competition.

1870

Englishman James Ashbury challenges the Cup for the first time but loses.

1899

The Lipton Era: Sir Thomas Lipton challenges 5 times from 1899 to 1930 but to no avail. The J-class boat series is introduced in this time.



1851

The Gold Rush spurs the growth of San Francisco and the development o the waterfront.

1856

San Francisco has grown to a few thousand and is the principle American port on the Pacific.

1889

The State Belt Railroad of California is created along the Barbary Coast (now the Embarcadero).

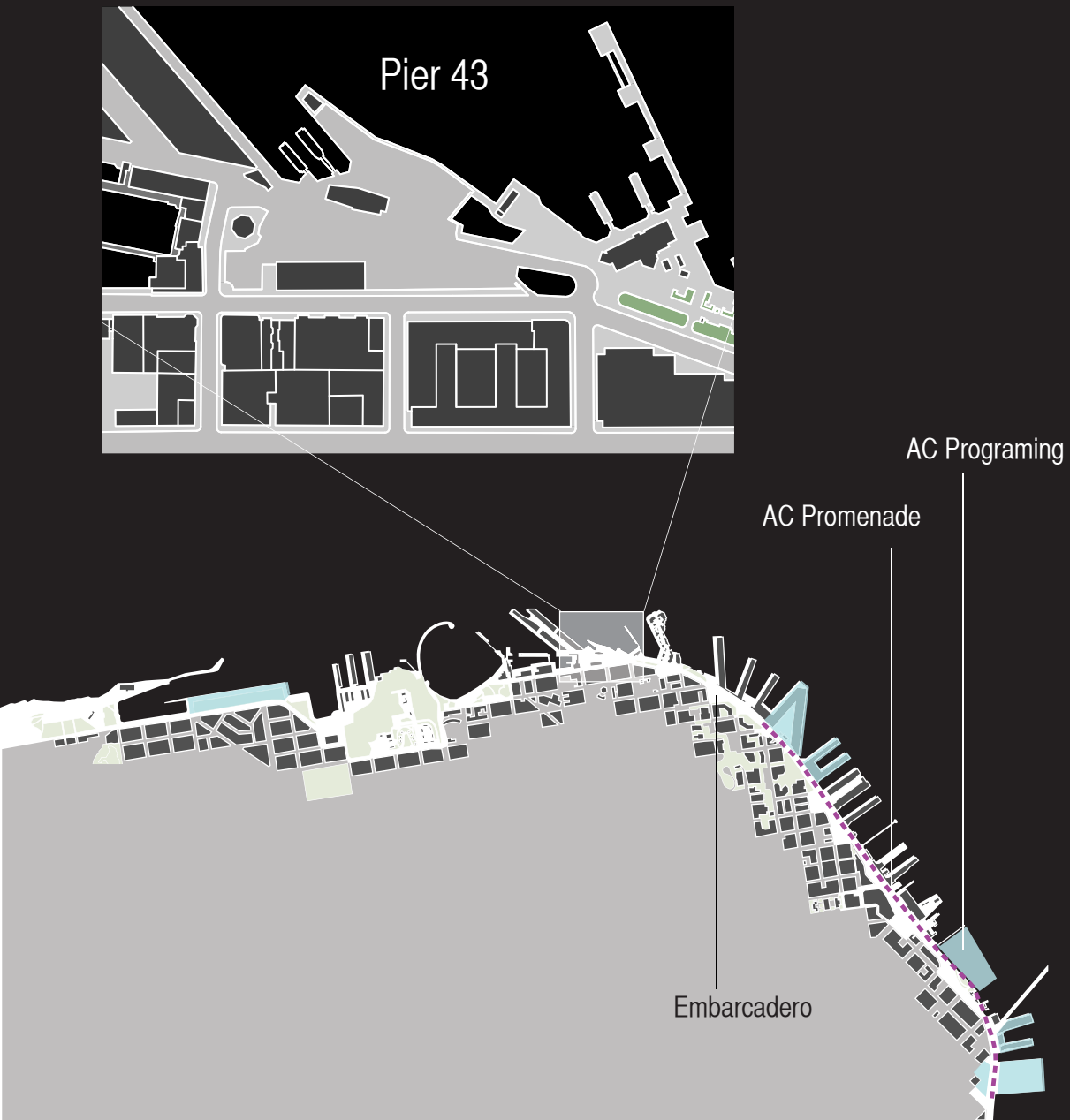

The America's Cup meets San Francisco.
2013
A Switzerland team beats New Zealand, bringing the Cup to Europe for the first time since the Cup's inception.
2003
Larry Ellison's BMW Oracle team wins the cup from Switzerland in the AC 33 in Valencia, Spain.
2010
1995
New Zealand's Black Magic beats the US.
2012
The Louis Vuitton Cup is held in San Francisco.
Two types of boats race against one another, causing much controversy and lengthy litigations.
1988
The Ferry Building at the end of Market Street is restored, becoming a popular waterfront destination.
2004
1993
The Belt Railroad is put out of service.
1991
The Cup is brought back to the US, to San Diego.
1987
The Australia II, an innovative boat defeats the US and the Cup is brought to Australia, ending the US' 132 year winning streak.
1983
The double decker freeway is removed, sparking revitalizaiton of the waterfront area.
1989
The Loma Prieta Earthquake damages the Embarcadero freeway
1970
The Louis Vuitton Cup is founded. The sole challenger to face the defender is determined in these races.
1971
The historic street car service is introduced with the F line running the length of the waterfront.
1906
The 1906 Earthquake and resulting fire destroy much of the city, including some of the waterfront.
The Panama Pacific Exposition takes place, located along the northern waterfront.
1915
1953
The double decker Embarcadero freeway is built.
1930
The Embarcadero suffers a decline with the opening of the Bay Bridge

Because San Francisco's development was dependent on its bay geography, which fostered maritime activity, the city's waterfront growth has a dynamic history. In fact both the America's Cup and the San Francisco waterfront have undergone transformation since their beginnings in the mid 1800's (see timeline on preveious page). While San Francisco's waterfront has shifted from its industrial roots to a public pedestrian, if not tourist, promenade, the America's cup has overseen an evolution in sailing technology and culture, including a parallel shift from function to spectator sport.

These changes are highlighted with the program of the project, which includes an America's Cup history museum and a grandstand with a view to the race and the ever-changing conditions of the bay. The individual site for the project is located on Pier 43,

Below: The San Francisco Bay with America's Cup racing route outlined along side the area of focus: the waterfront.

an existing pier at Fisherman's Wharf, separate from the city's proposed America's Cup village, promenade, and extensive programming along the Embarcadero, San Francisco's waterfront pedestrian corridor. The project will be supplemental to the city's actual plans for waterfront development.



The San Francisco Bay as Stage

The San Francisco Bay has been regarded by many as the perfect location and home for the America's Cup due to its geography and climate. "Oracle Racing has praised the natural amphitheater provided by San Francisco Bay in the hopes that it will allow many more people to witness the capabilities and technology of these boats and their crews."[1] This arena condition extends even outside of racing events. The bay is constantly a stage on which maritime activity may be viewed.

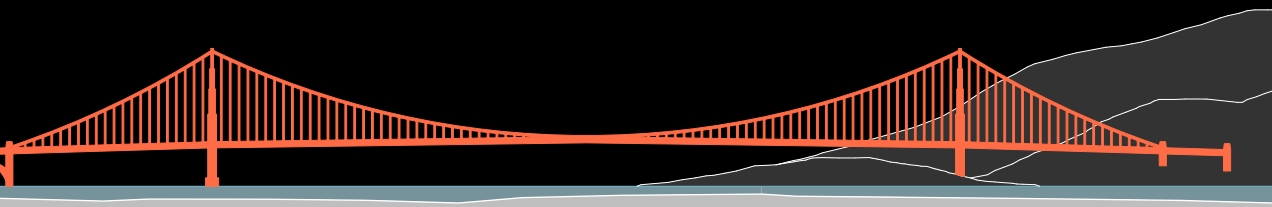
The movement of sailboats, ferries, and shipping boats contribute to the picturesque landscape of the bay while the hilly topography and empty piers provide viewing platforms for audiences.

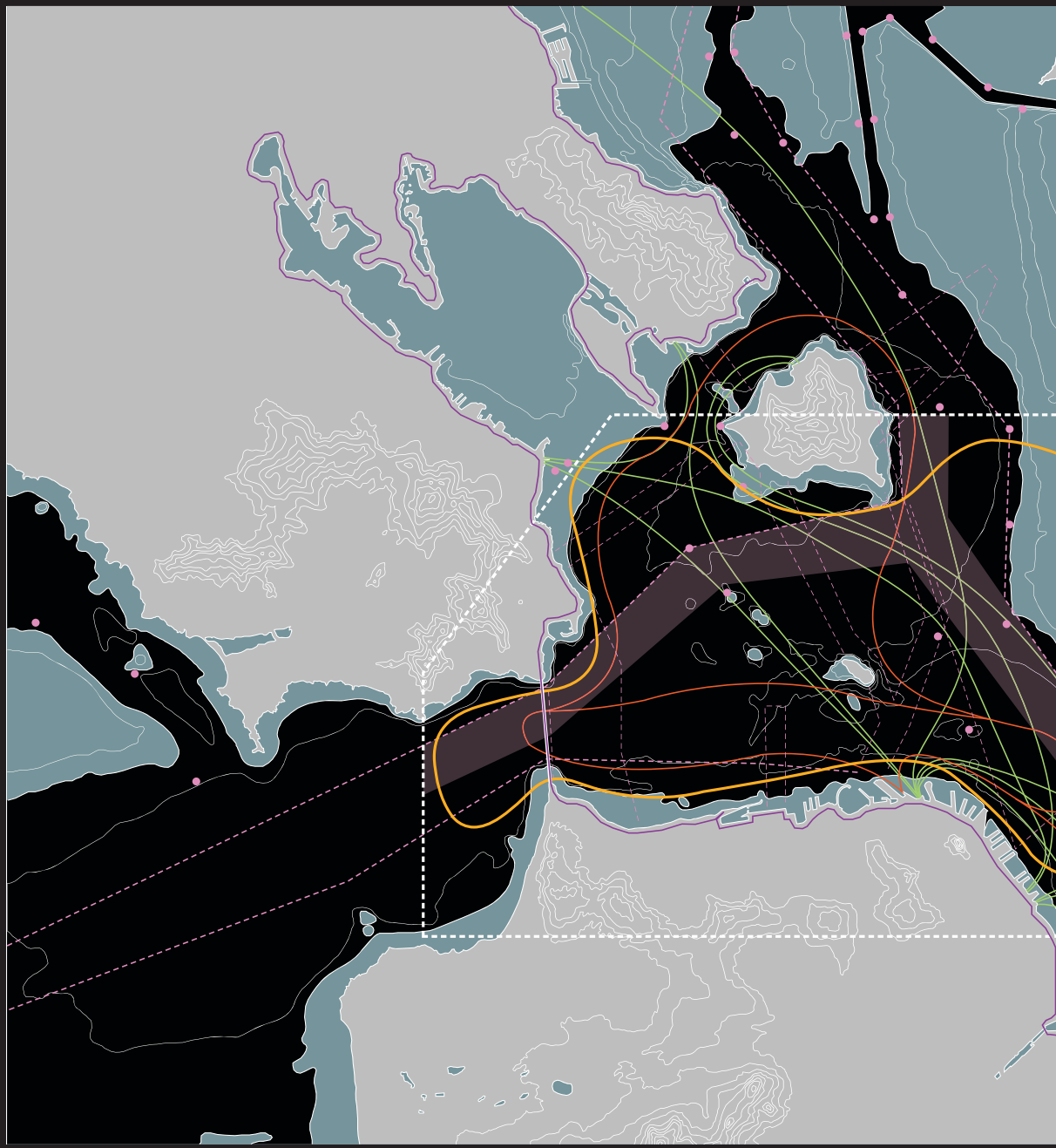
City planners have played up this spectacle of the bay with the development of the Embarcadero and the Bay Trail, a bike and pedestrian trail that loops around the entire bay along the waterfront.

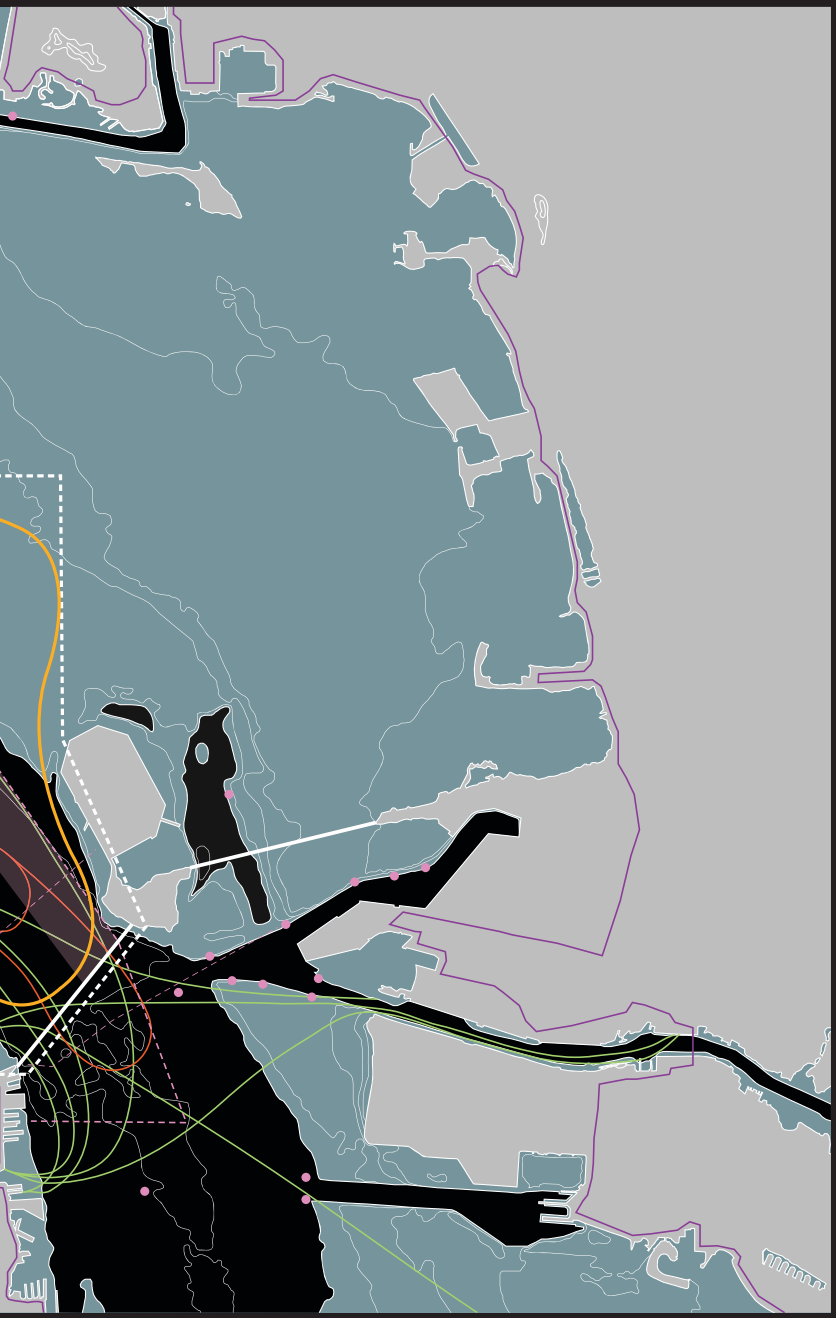
This section shows the hilly topography of San Francisco and how it looks out onto the arena of the Bay, including the iconic Golden Gate Bridge.

1 Augie Martin, "Oracle Racing Catamaran Capsizes in San Francisco Bay, *CNN*, June 14, 2001.

20 This drawing maps the locations and view vectors of all photographs taken of San Francisco that are uploaded on photosharing website flickr.com. The waterfront and race area are among the most photographed locations in the city.







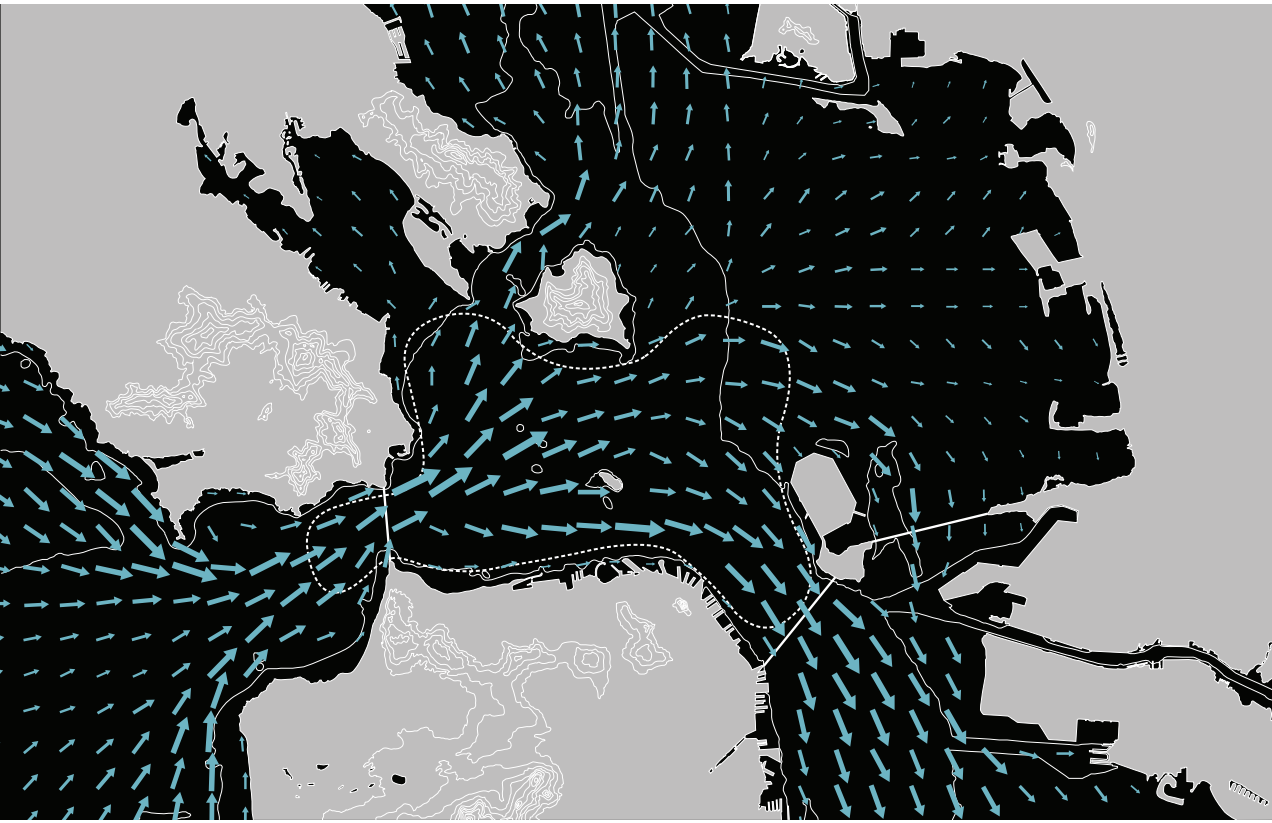
The Bay as Stage: a composite map showing the maritime activity to be viewed on the bay and its relationship to the America's Cup race route and event boundaries.

- AC Race Route
- AC Event Boundaries
- Transportation Ferries
- Red & White Ferries
- Bay Trail
- Cable Routes
- Shipping Channel
- Buoys
- Water - Below 30 ft.
- Water - Above 30 ft.
- Land Mass

In addition to ship activity, climate conditions also provide a temporal phenomenon that may be observed on the bay. San Francisco is known for its unique microclimate where weather conditions may change drastically throughout the day or even from block to block.[1] These temporal climate conditions translate to a unique, ephemeral experience, shaping both the design of the building and the user's individual experience of it. Acknowledging climate, the architecture can not only take advantage of the bay's natural resources with standard sustainable design strategies, but also enhance the experience of the event by embracing these unique conditions and bringing users closer to the sensation of being on the water, with the same conditions that the sailors themselves must work with.

21 San Francisco is notorious for its foggy conditions that are inconsistent throughout the day

1 Harold Gilliam, "Weather as varied as the people / Land and fog build summer microclimates," *SF Gate*. July 9, 2001.



Current in the San Francisco Bay

Various fog conditions layered over San Francisco Penninsula

Sun Conditions

Prevailing Winds on the Bay

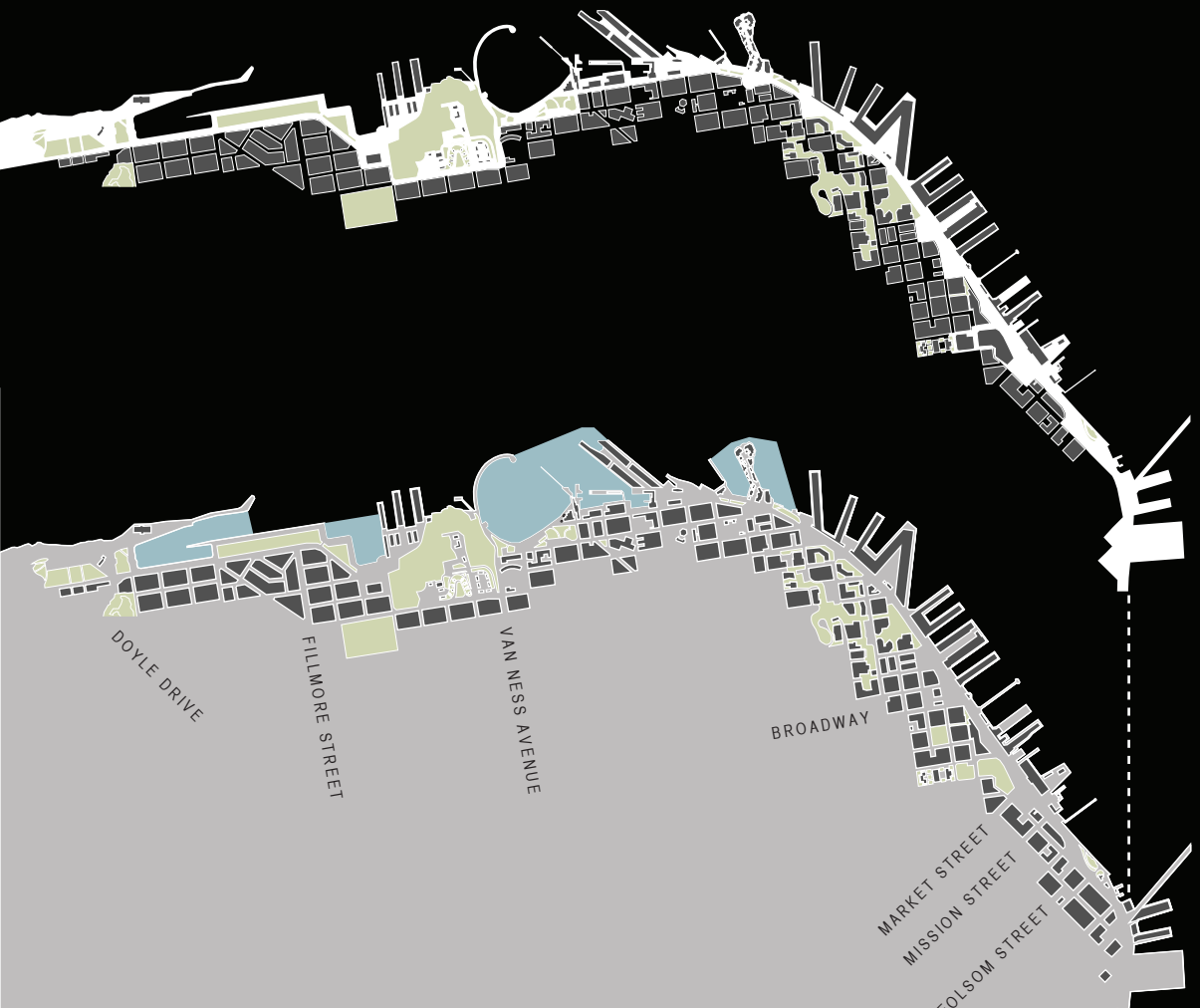
Waterfront as Interface

The San Francisco waterfront itself can be seen as transient, both as a transition zone between the urban environment and the nature of the bay, and in its historical transformation (see timeline).

In the 1800's, the waterfront was vital to San Francisco's development, providing access to trade routes and transportation across the Pacific and throughout the Bay Area. Growth of the the city was marked by the developing waterfront distric. However, subsequent advancements in transportation rendered the area a marginalized industrial zone.[1] And

22 The waterfront is the marginal zone that stitches the city to its surrounding landscape.

1 Bonnie Fisher, "Close Up: The Embarcadero," *Planning* 71, no. 1 (2005): 16.


DOYLE DRIVE
FILLMORE STREET
VAN NESS AVENUE
BROADWAY
MARKET STREET
MISSION STREET
FOLSOM STREET

the existence of the Embarcadero as a railway and then a double-decker freeway furthered this disconnect between city and water.

It wasn't until 1991 when the freeway was demolished* that city planners aimed to transform the Embarcadero into a connective interface between the city and its natural landscape. However, while much development has taken place, fragments of its industrial state still exist in the form of piers, wharves, and bulkheads, and connectivity between the city and the bay is still in question.[1]

Thus, the San Francisco waterfront now exists as a historical palimpsest, still in a state of transition with future plans for development.

23-26 The following layered transparencies are historical maps showing the development of the northeastern waterfront in the years 1853, 1859, 1915, and 1954, respectively.

1 Bonnie Fisher, "Close Up," 16.


U. S. COAST SURVEY
A.D.BACHE Superintendent
51
CITY OF SAN FRANC
AND ITS VICINITY
CALIFORNIA
From a Trigonometrical Survey by R.D.CUTTS
Topography by A.F.RODGERS Sub-assist
Hydrography by the Party under the comma
Lieut. JAMES ALDEN U.S.N. Assistant
Published in 1853
Public Square


hrd.
North Pt.
hrd.
hrd.
hrd.
sft.
sft.
Rincon


FISHERMEN'S WHARF
LOMBARD ST. WHARF
GREENWICH ST.
FILBERT ST. WHARF
UNION ST.
BROADWAY
PACIFIC ST. WHARF
KEY ROUTE
SO. PAC. RY.
OAKLAND
ALAMEDA
MISSION ST. PIERS
HOWARD ST. PIERS
FOLSOM ST. PIER
HARRISON PIER

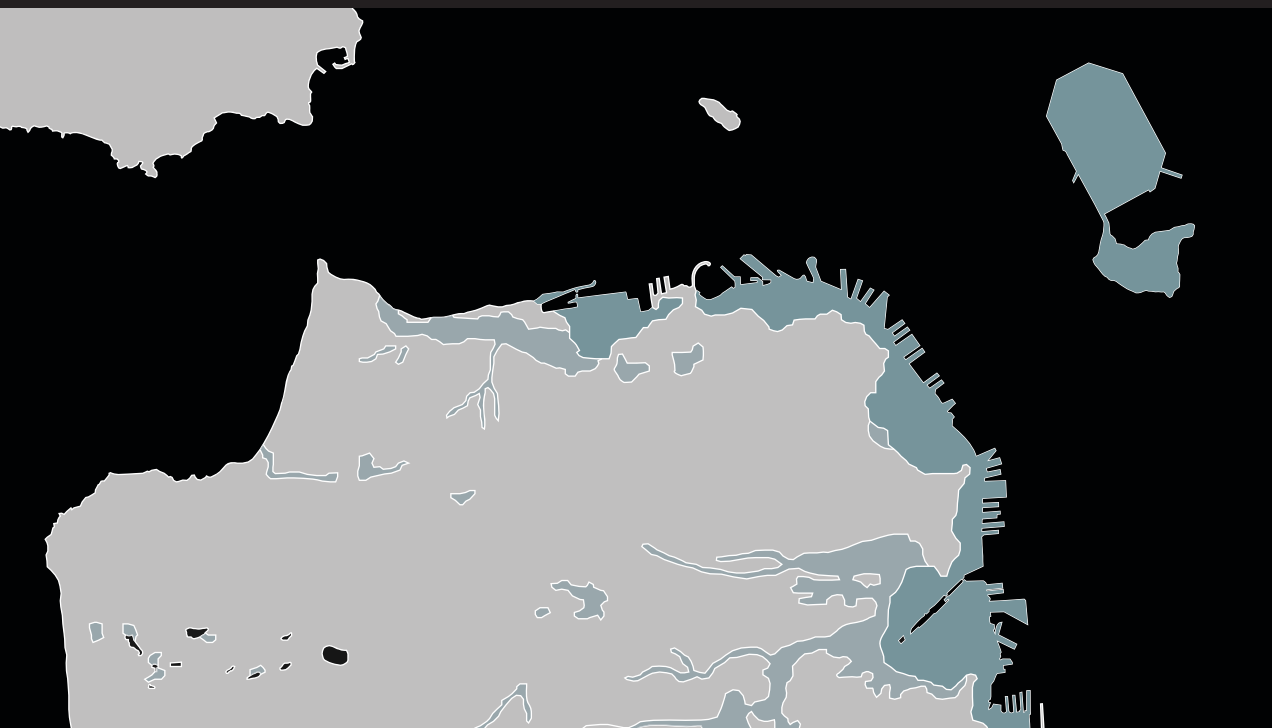

SAN FRANCISCO
PIER HEAD LINE
THE EMBARCADERO
FIRE BOAT
BELT LINE OFFICE
PILOT BOAT
CHIEF WHARFINGERS OFFICE
FERRY BUILDING
POST OFFICE
RINCON
SHIPPING CENTER
FINANCIAL DISTRICT
CHINATOWN
NOB HILL
RUSSIAN HILL
NORTH BEACH
TELEGRAPH HILL
BELT LINE ROUNDHOUSE
NORTHWESTERN PACIFIC RR. YARDS
WESTERN PACIFIC RR YARDS
CAR LOADING DEPOT
FISHERMENS
HOTEL MARK HOPKINS
FAIRMONT HOTEL
HOTEL SIR FRANCIS DRAKE
HOTEL ST. FRANCIS
UNION SQUARE
PALACE HOTEL
EAST BAY TRAIN TERMINAL
RINCON HILL
CIVIC CENTER
FIRE BOAT
THE EMBARCADERO

While the historical growth of the waterfront may be seen as beneficial to the city or beautiful in its layered transformation, many are concerned about the ecological effect that such development has had on the bay. Although expansion provides more land for ports, industry, and residences, the gradual filling of the bay is harmful to both local ecology and our interaction with the water.

According to the San Francisco Bay Conservation and Development Commission (BCDC), the bay has reduced in size by over 200 square miles since the Gold Rush in 1949 due to diking and filling.[1] And San Francisco is especially susceptible to future land fill because two thirds of the bay is less than 18 feet deep. The BCDC predicts that if this area were filled, it would reduce the bay to just a small river.

Bay Fill: The marshlands and creeks that have been filled in since the Gold Rush in 1849

1 Laura Tam, "Strategies for Managing Sea Level Rise," *Spur*, Dec. 2009, pg 3.



Additionally, the natural shoreline consisting of tidal marshes has reduced to about 5 percent of what used to exist, detrimental to the bay as the marshes, "protect shorelines from floods and erosion by absorbing waves, and slowing the flow of high water."[2] While 100,000 acres of tidal wetlands would be necessary for a healthy bay, according to a study in 1999, only 44,000 acres existed at that time.[3]

Meanwhile, and somewhat ironically, there is also concern over flooding in San Francisco and expansion of the bay due to global warming. The BCDC predicts a sea level rise of 55 inches by the year 2100.[4] This would flood most waterfront development in the bay area and even damage downtown areas. Although this change can be seen as counteracting the bay fill that has taken place historically, the waterfront development has little flexibility to change that the marshes would

2 Tam, "Strategies," 3.
3 Ibid.
4 Ibid.

The Rising Bay: Projection of Water Level in the year 2100

have.

Whether the bay is expanding or shrinking, it's clear that the San Francisco waterfront is in a constant unstable state

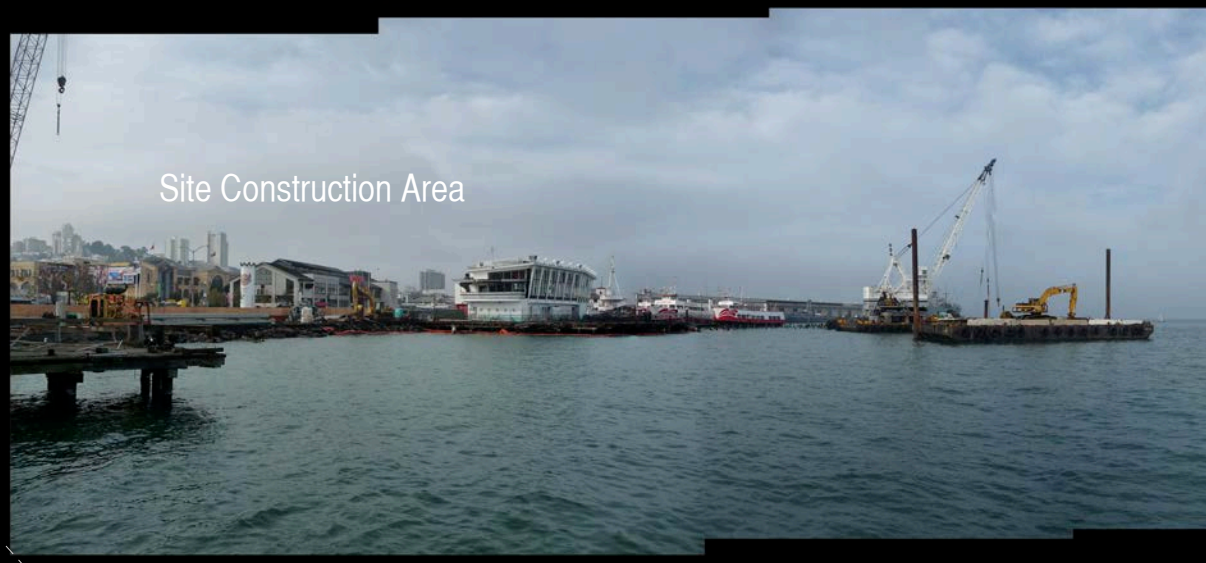
In reaction to ecological changes, much action has been taken over the past 40 years by the BCDC and Save the Bay organization to stop bay fill and restore marshlands and access to the waterfront. Furthermore, the BCDC has created sustainability plans for the city in regards to transportation, green building, and recycling. Such efforts to preserve the natural landscape of the bay and the community's interaction with it demonstrate the city's conscientious attitude toward environmental change. Indeed, San Francisco was ranked first in the US and

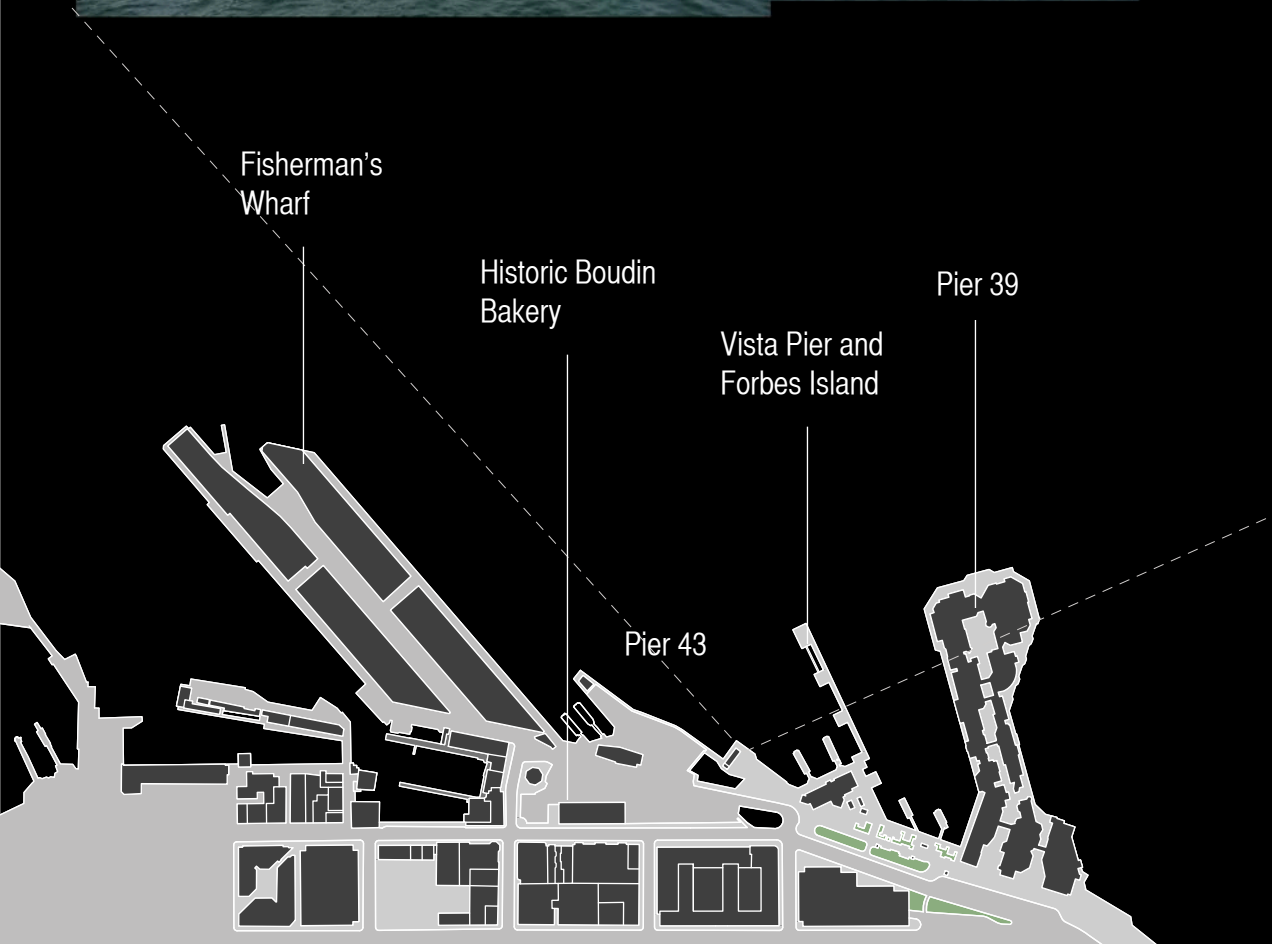
Liquefaction zones: the areas in danger in the event of an earth quake

Canada Green Cities Index conducted by German technology company Siemens AG.[5]

This distinction may be interpreted as indicative of the city's receptivity to an ephemeral architecture. The temporal building would expand and transform the waterfront yet have the ability to be deconstructed, not contributing to the land fill of the bay. Drawing attention to the ecological issues surrounding the bay and it's transformation, the project

5 Indexes the 27 cities in Canada and the US in terms of their environmental sustainability, studying their waste and recyle systems and city development plans

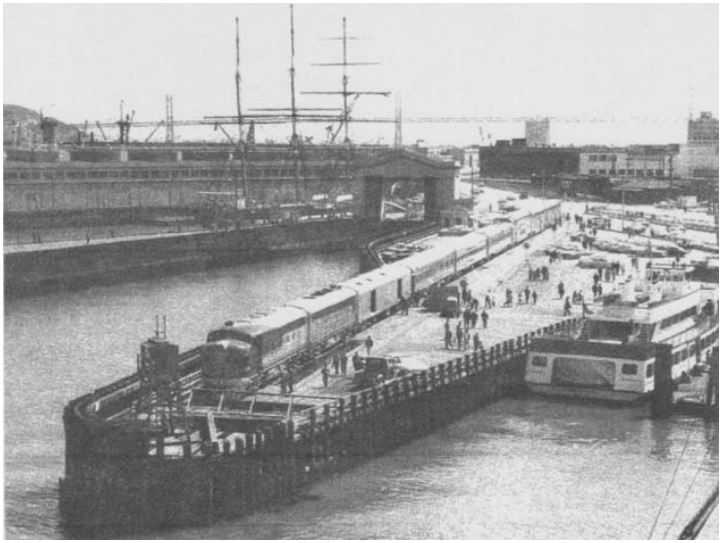

Site Construction Area


Fisherman's Wharf
Historic Boudin Bakery
Vista Pier and Forbes Island
Pier 39
Pier 43

Just as the bay may be seen as a stage, the site can be seen as the audience seating and the building as the procenium that frames the view.

The site features broad views out to the race, but also boasts a clear view of Alcatraz, one of San Francisco's primary tourist destinations. Along with Pier 39, neighbor to pier 43, these are some of the most photographed views of San Francisco.

The entrance of Pier 39 from the Embarcadero

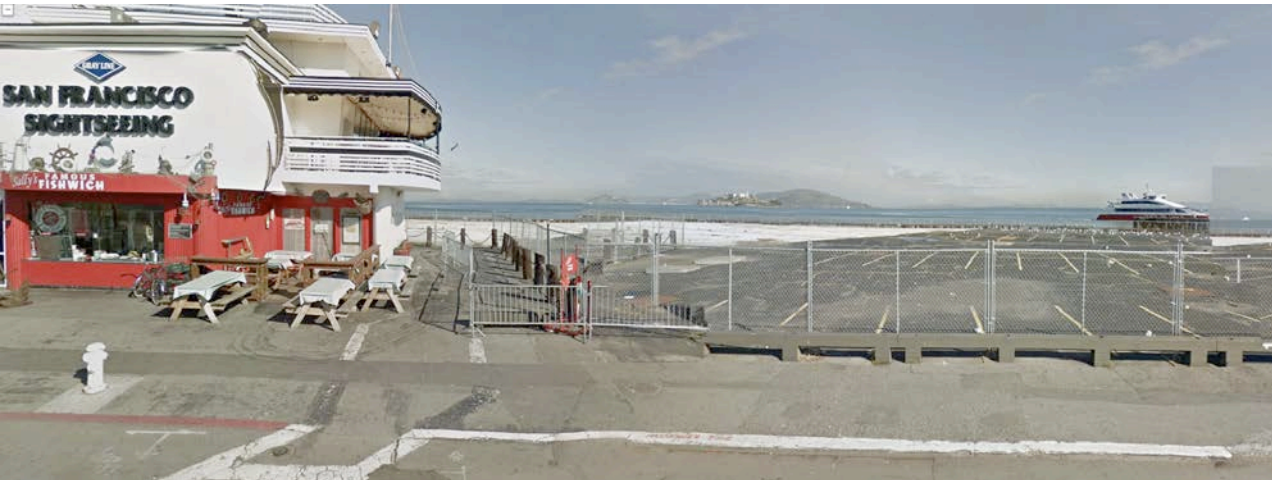


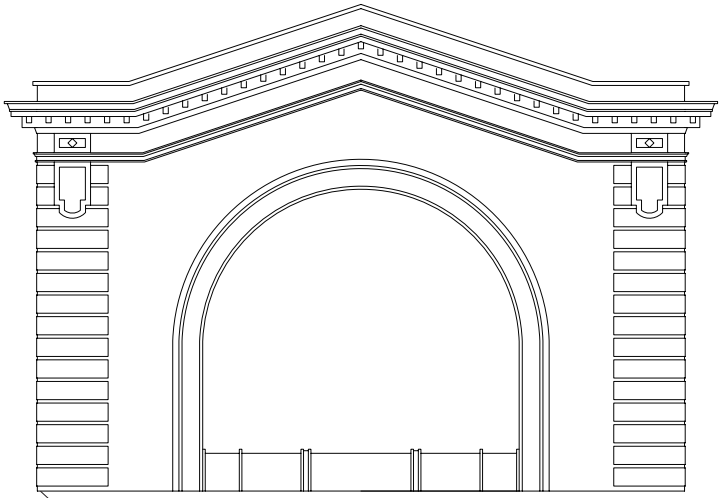
23 The historical Pier 43 when it was used as a ferry slip for the Belt Railroad

Pier 43 has a significant place in the history of the San Francisco's waterfront development.

When the Belt Railroad was in operation, Pier 43 served as the ferry slip that would tranfer the freights onto ferries at the end of the line. In fact the site still exists as teh end of the Embarcadero.

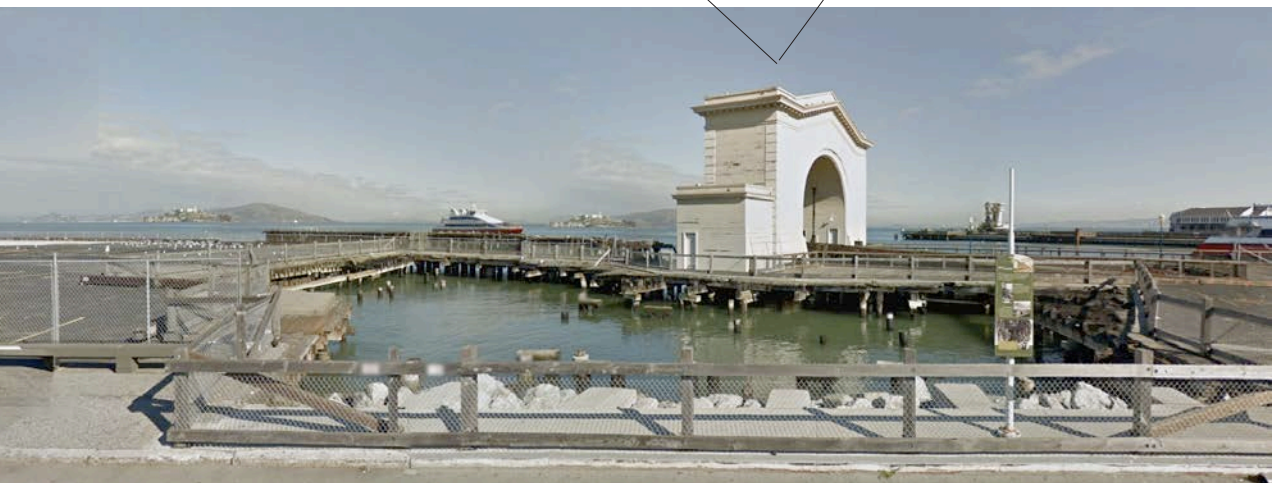
Despite its historical importance as a transition zone between the city and the rest of the bay, it has in recent years





24 The ferry slip that still exists on the site

become a parking lot, and then just a derelict abandoned pier. The ephemeral development of the site will not only address the history of the site, but also fertilize it for future use The ferry slip of Pier 43 still exists on the site as a fragment the history of San Francisco and the Belt Railroad. Future development on the site will leave similar fragments and these may be built up on the site acting as a historical palimsest like the rest of the waterfront.



The America's Cup Museum: A Tribute to Change

The America's Cup requires large amounts of amenities along the waterfront to support the thousands of spectators that visit the city during the short period of the event as well as the teams that stay and train in the preceding weeks. All programs exist along the waterfront promenade that extends from just south of the Bay Bridge to piers 27-29 where the America's Cup village and finish line will be.

The America's Cup village contains most of the public programs for the event. The wedge shaped pier that it will be located on is extra large and somewhat isolated from the city. The city plans to reuse the developments of this pier for the

25 San Francisco's map for the amenities planned for the America's Cup

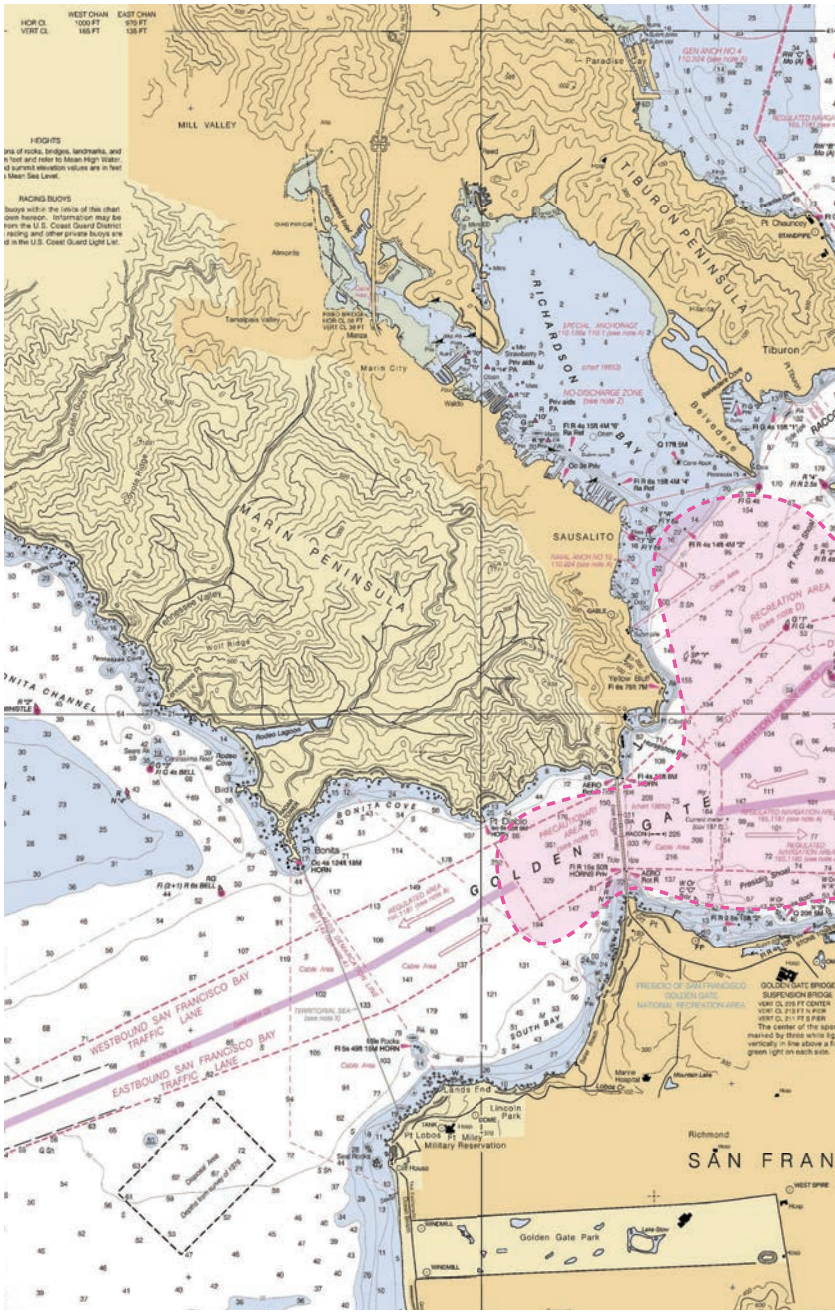
America's Cup as a cruise ship terminal.

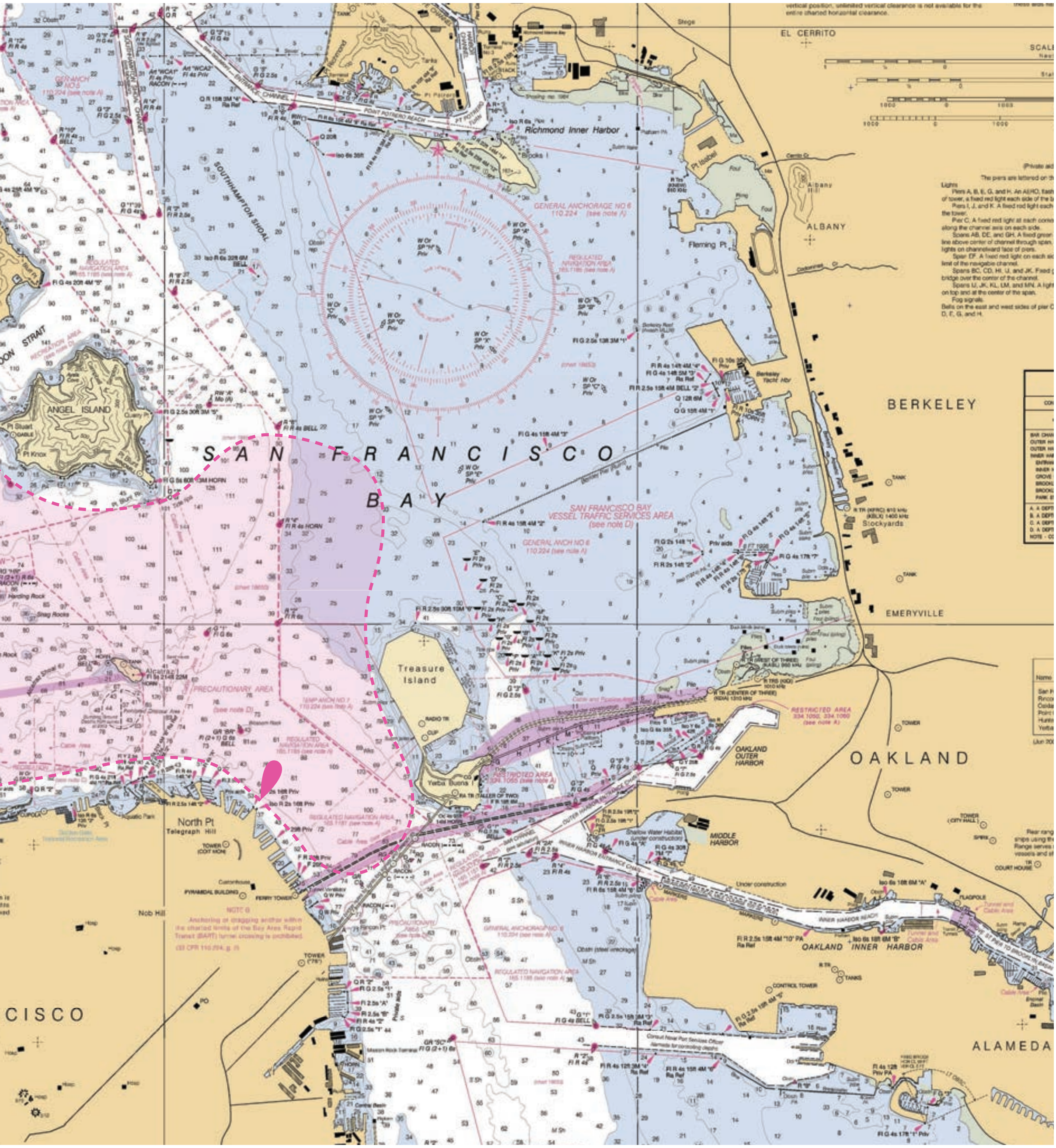
Because this programing is too extensive to take on, with sites equally large, The project will select a few programs from the America's Cup village and relocate them on pier 43, extending the AC promenade a few blocks further north.

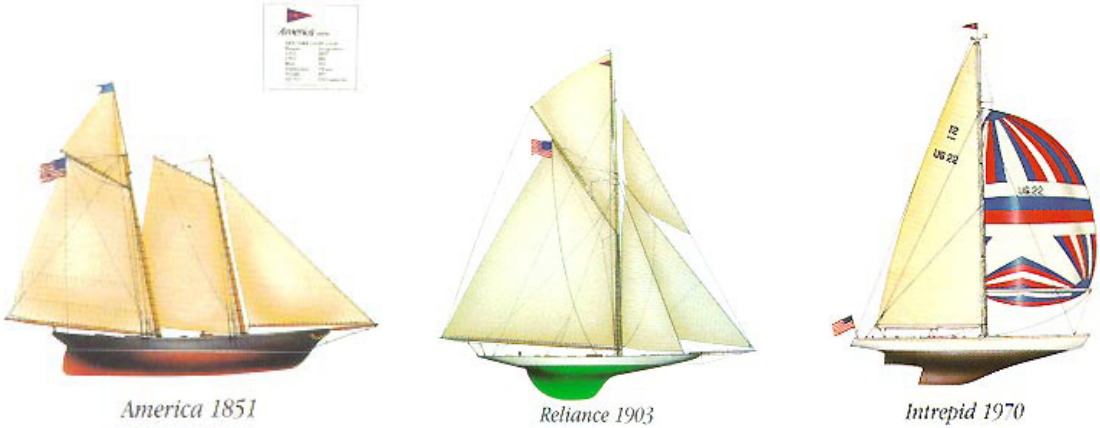
26 TheAmerica's Cup village on Piers 27-29 which will become a cruise terminal eventually

27 The plans for the Louis Vuitton Cup are temporary tents located on the marina green, separate from the AC promenade

28 This image is taken from a functioning nautical chart that points out appropriate routes for sailing or other water activity. Added in are the route of the America's Cup and the finish line at piers 27-29.




EL CERRITO
Richmond Inner Harbor
ALBANY
Fleming Pt
BERKELEY
EMERYVILLE
ANGEL ISLAND
SAN FRANCISCO
BAY
SOUTHAMPTON SHOAL
Treasure Island
Yerba Buena I
OAKLAND
OAKLAND OUTER HARBOR
MIDDLE HARBOR
OAKLAND INNER HARBOR
North Pt
Telegraph Hill
Nob Hill
CISCO
ALAMEDA
PRECAUTIONARY AREA
GENERAL ANCHORAGE NO 6
SAN FRANCISCO BAY VESSEL TRAFFIC SERVICES AREA
Stockyards



29-35 Various ships that sailed in the America's cup, starting with the *America*, the ship that beat the England and started the Cup in 1851

Since its inception in 1851, the America's Cup has evolved and come to represent a competetive design challenge, as opposed to a simple boat race. The innovative and secretive design of the *Australia II*, the first boat to beat the US in over 130 years in 1987, changed the entire game and yacht designers have been thinking differently ever since.

This constant optimization of boating technology is one of the processes that an ephemeral architecture hopes to make a spectacle of, alongside the changing nature of the bay.

Robert Kronenburg, in *Living in Motion*, points out how boats were a precedent for mobile architecture, and the new technologies of yacht design are influencing architects even today:

> Carbon fibre and epoxy resins are used in their construction and computer-aided design is employed to model their performance prior to building. The engineering skills of the manuracturers of world class sailing yachts are influencing architects because of their skill in the production of precision lightweight structures and fittings.[1]

Traditionally, boats were closely tied to architecture because of the mobile lifestyle of users, but even today boat design is all about movement, speed and progress. The design of the building can call attention to this sequence or evolution. Thus, the primary programs of the ephemeral architecture will include:

1 Kronenburg, *Houses in Motion*, 33.

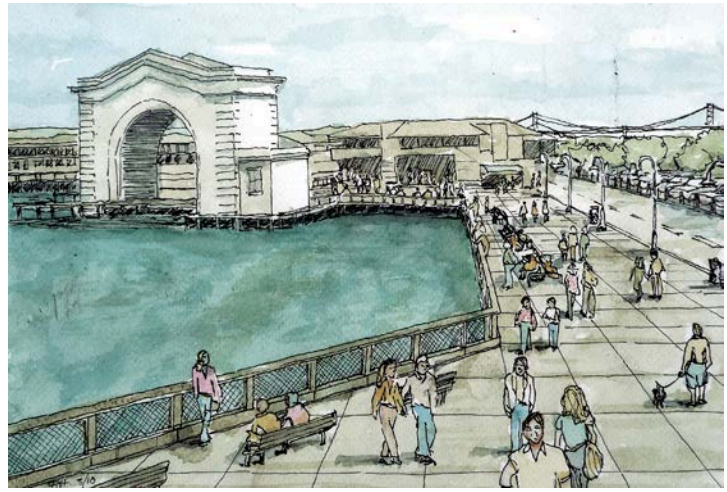
Australia II 1983

America's Cup Museum: 15,000 square feet
Boat Display: 10,000 square feet
Grandstand: seating for 1000 people

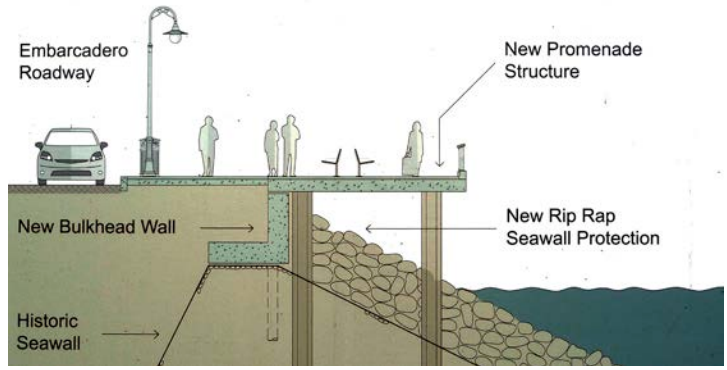
Additional programs will include public circulation space and lobby, merchandizing area, and back of house and restrooms.

While the America's Cup museum and boat display will spell out the history and progress of sailing and its technology for audiences, the grandstand will also be a viewing platform to change and the constant movement of the bay, both in maritime activities and surrounding ecology.

36 The America's Cup museum in Australia features Cup memorabilia and history



37 San Francisco's plans for pier 43 featuring a public promenade



38 A section of the plan for the promenade

Just as the America's Cup is a unique and possibly a one-time experience for the people of San Francisco, the program for the project will highlight the fleeting nature of boat culture. Jut as boats symbolize movement and a journey, so too will the ephemeral architecture in that it will come and go depending on the timing of the event.

After the America's Cup is over, the building must transform both physically and programatically. Incidentally, San Francisco developers have plans for Pier 43, the site on which the ephemeral building will exist for a limited amount of time.

The pier will become an extension of the public promenade of the Embarcadero and a vista pier that will bring visitors out onto the water. In the case of this project, the pier will also serve as a relic and the physical remains of a communal memory.

Aside from leaving remains of the event on site, fragments of the building itself will also change in program. Units that make up the interior of the museum will become urban furniture that is dispersed throughout the city and the Bay Area.

Fragments dislocated to the various marinas spread throughout the bay and the museums of San Francisco will preserve the memory of the event while the comprehensive whole ceases to exist.

The transformation of program into fragments that get dispersed to the marinas throughout the bay and/or the museums of San Francisco.

List of Figures

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