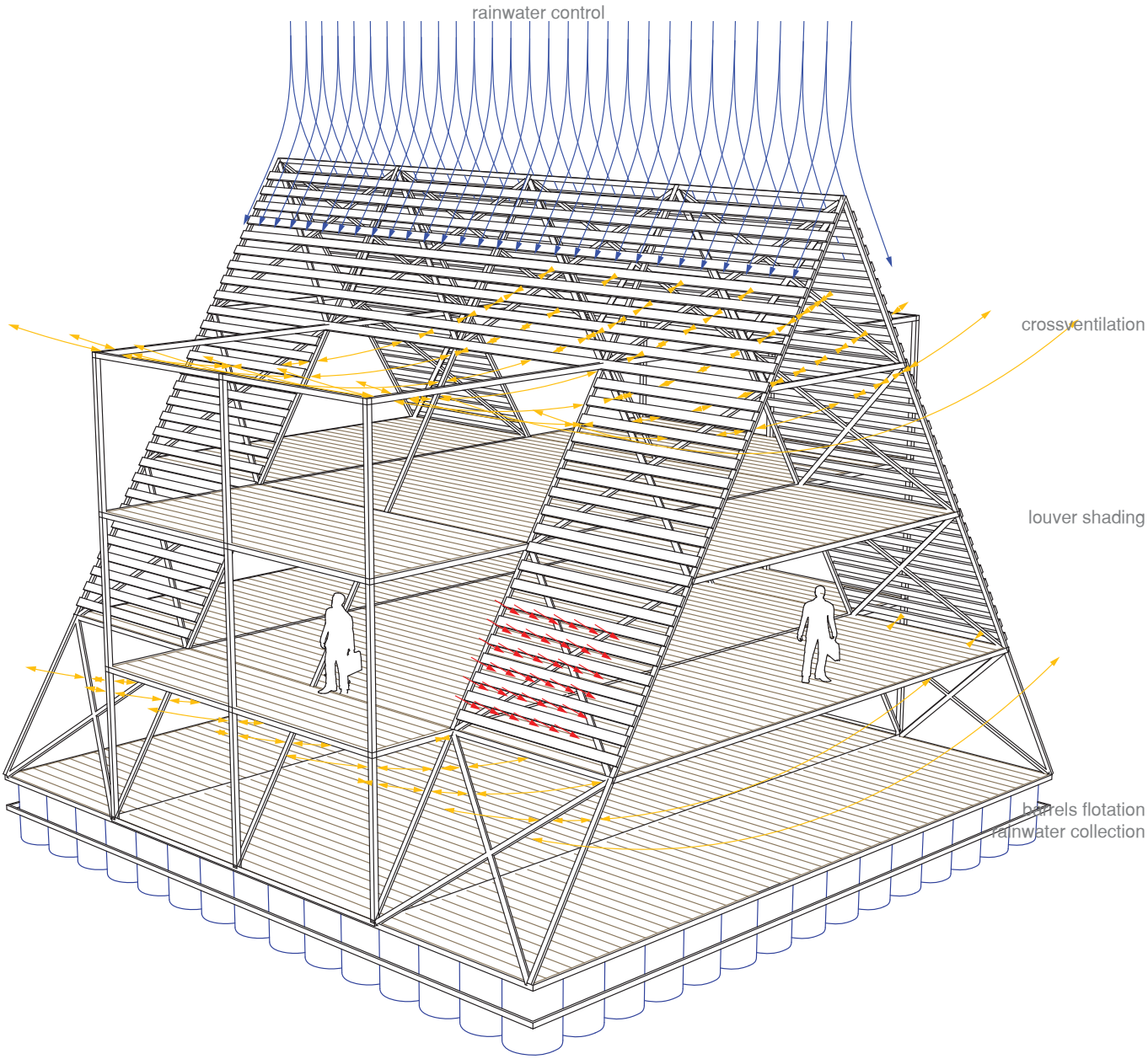
Spring 2014

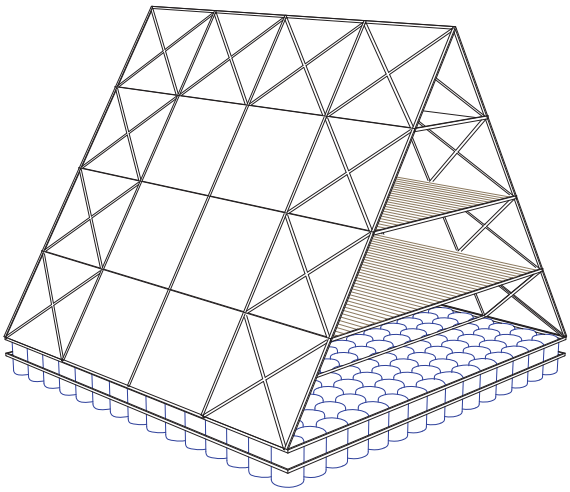
Borderline- Part 2

Francis McKloskey

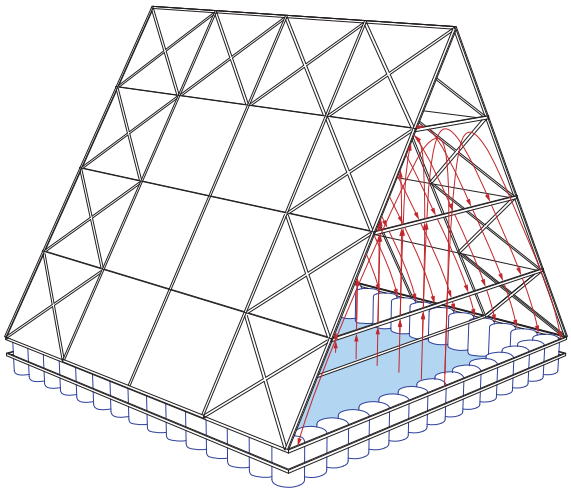
Environmental Control



Possible Morphological Adaptations

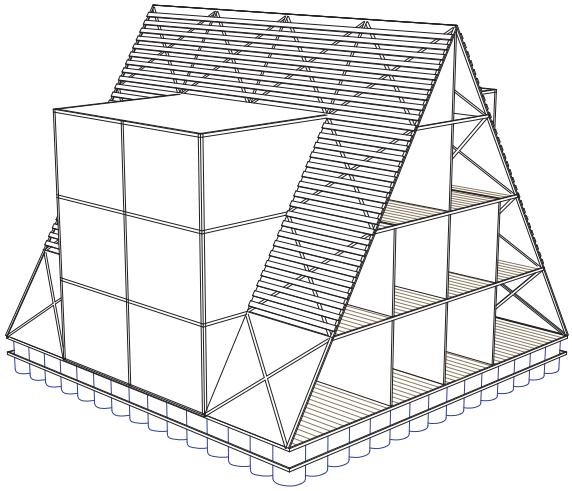


Aquaponics: Fish Farm + Greenhouse

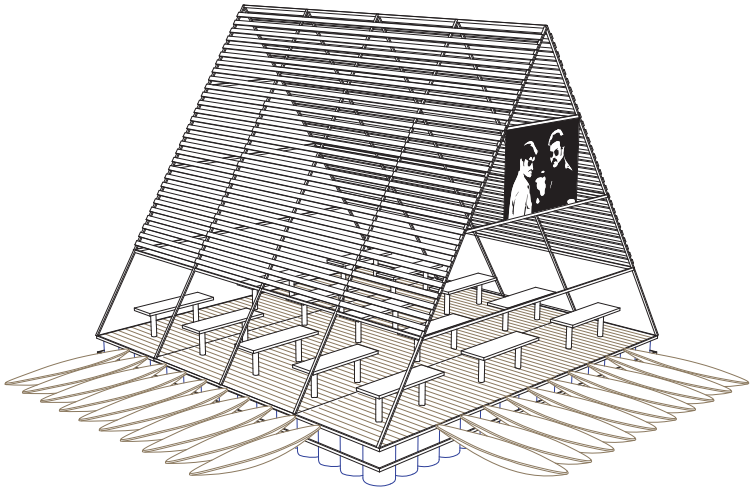


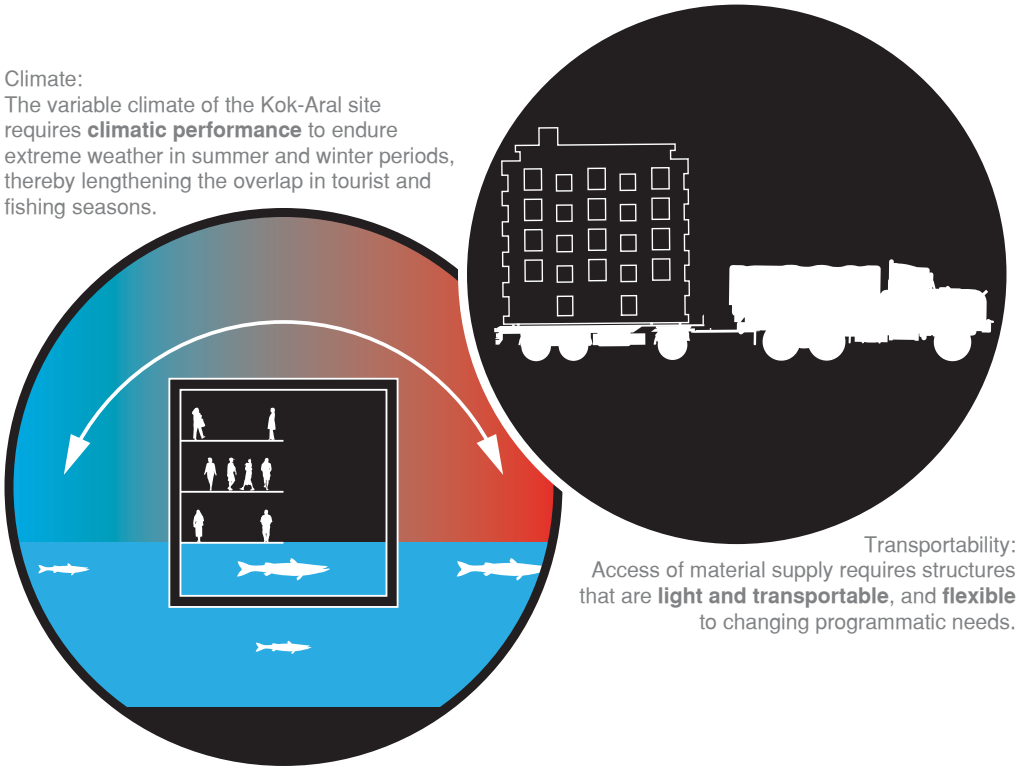
Desalination Still

Housing/Healthcare Typology



Market &Public Space





The Kok-Aral site is rich in resources, but is remote and inhospitable. The creation of habitable community spaces is key to creating a more durable community. Air Cushion cladding is therefore an ideal for an architectural unit to be transported to site. This technology is light and performative with relation to climate control.

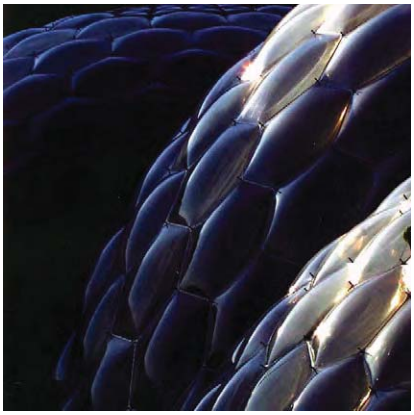
Technology:

In recent years, ETFE has emerged as the material of choice for air cushion cladding for technologically innovative buildings such as the Media TIC in Barcelona, the Eden Project in Cornwall, the National Space Centre in Leicester, and the Khan Shatyr in Astana, Kazakhstan. The advantages of ETFE are its thinness and light weight, with resistance to tear and environmental performance.

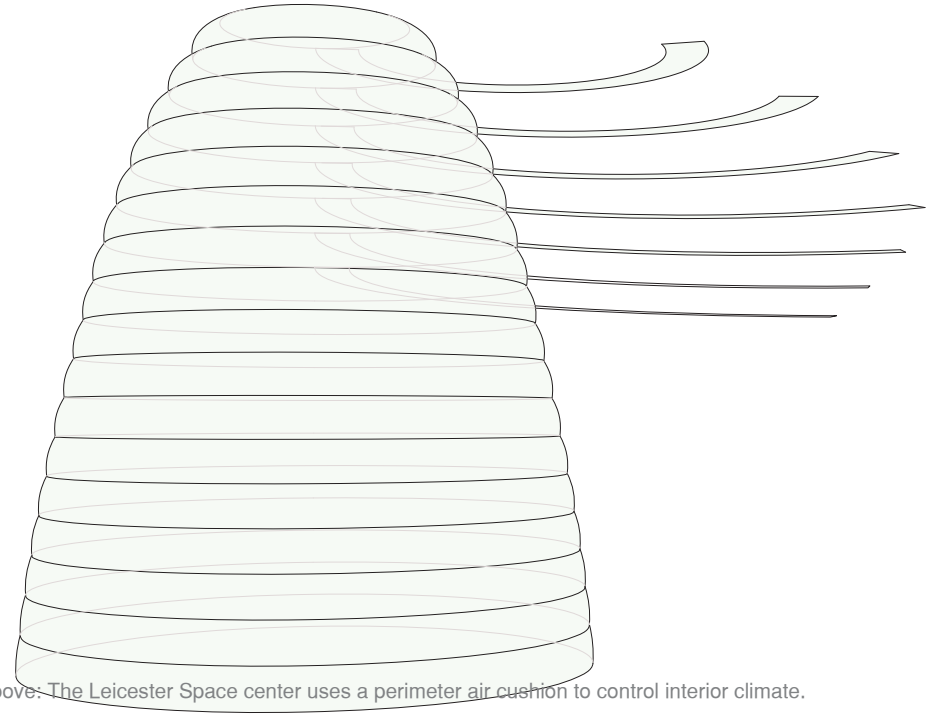
Media-TIC; Barcelona
Enric-Ruiz Geli, Cloud 9, 2008

Air Pavilion, Magna Project, Rotterdam
Wilkinson Eyre Architects, 2000

National Space Centre, Leicester,
Grimshaw, 2001

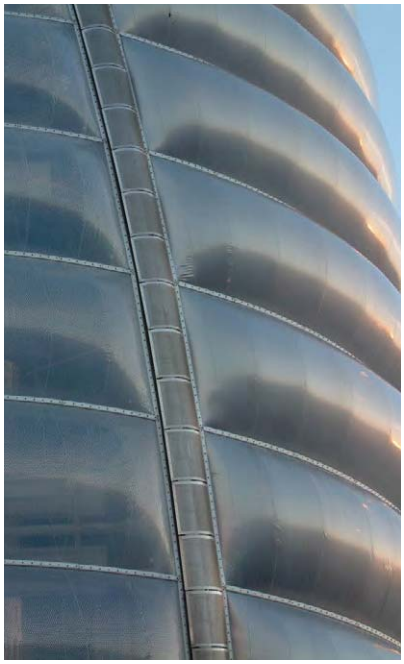


Eden Project, St. Austell,
Grimshaw, 2001



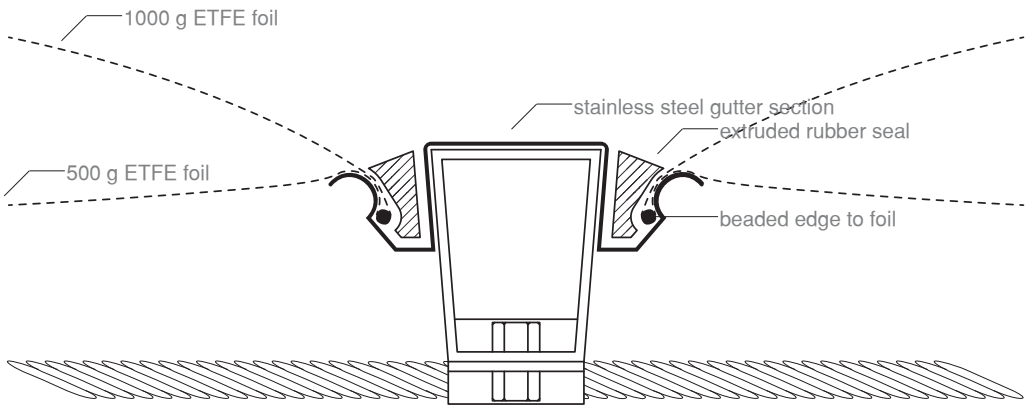
Above: The Leicester Space center uses a perimeter air cushion to control interior climate.

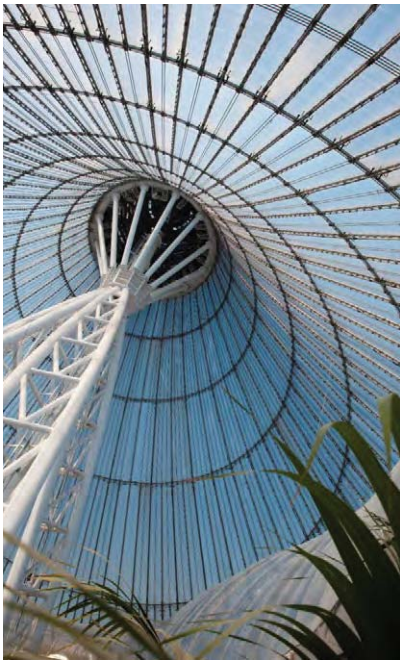
Below: Typical details of external wall with ETFE cladding

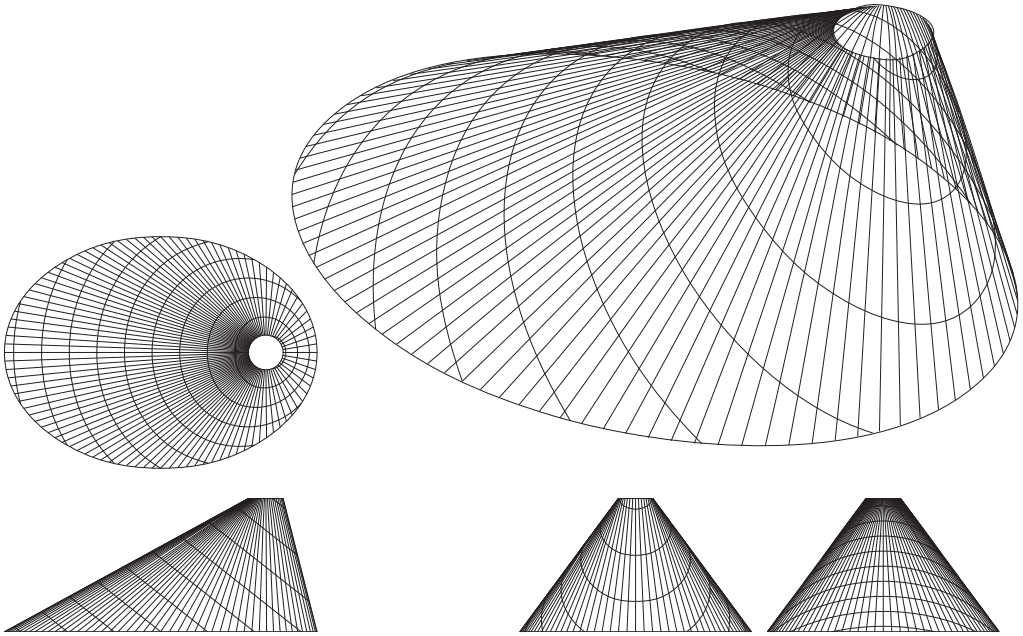


lightness

Leicester Space Center, Leicester, UK
Nicholas Grimshaw

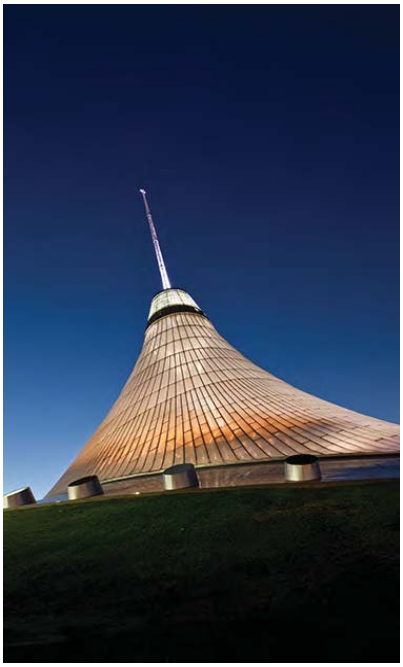


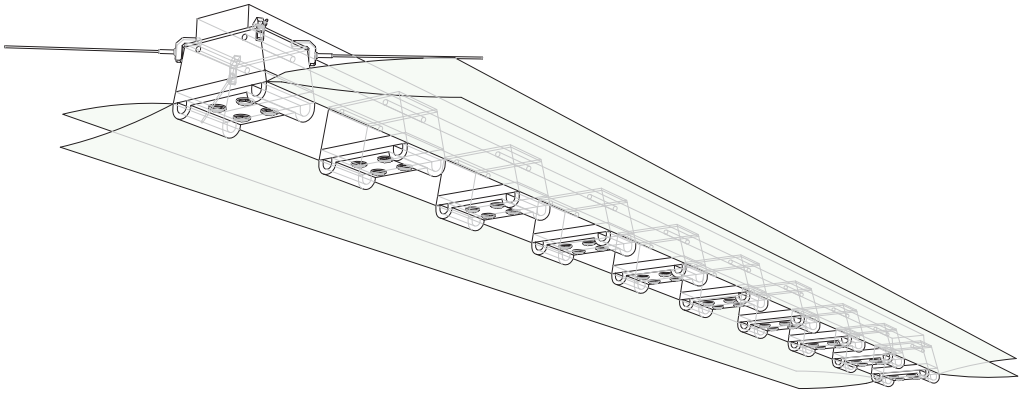


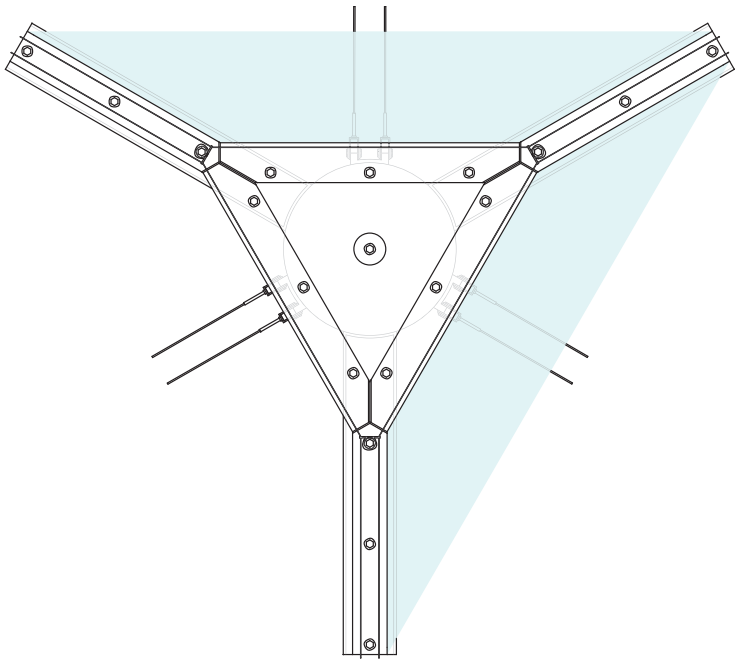


the climatic envelope
Khan Shatyr, Astana, Kazakhstan
Norma Foster

Above: Adapted from the yurt typology, the the radial cables supported by a large mast counteract lateral wind forces, and held together by circumferencial cables for suction.
Below: detail of cable from below.

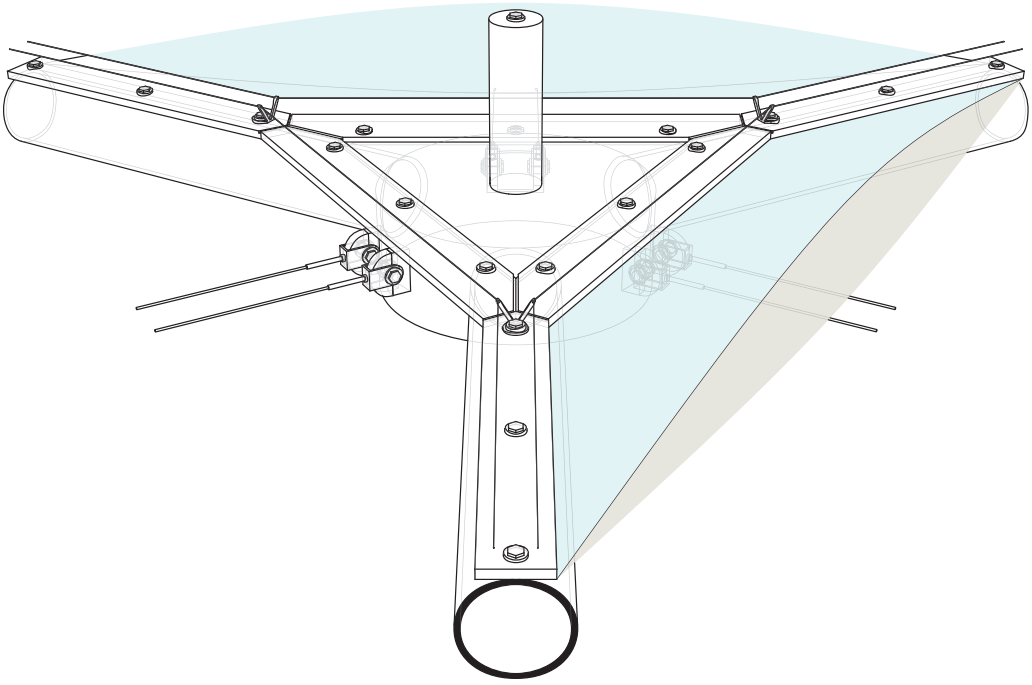


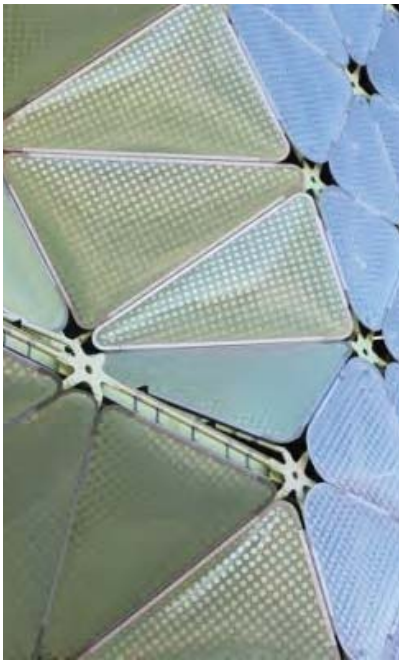


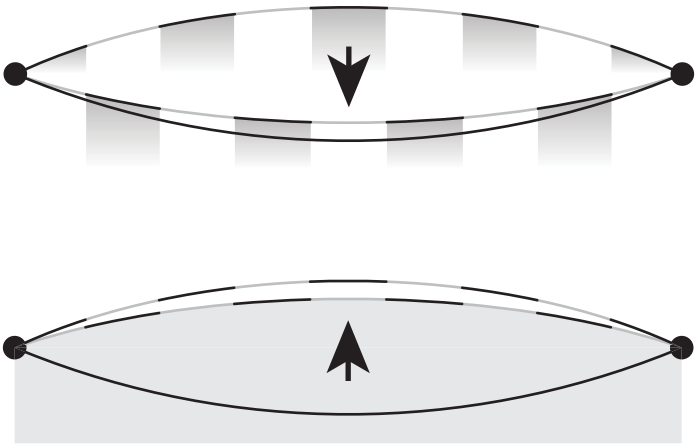


Node detail of ETFE cushions at the Eden Project
The ETFE cushions are fixed directly to the primary structure. The structure and ETFE cushion envelope of the world's largest plant enclosure weighs less than the air contained inside.

soft structure
Eden Project, Cornwall, UK
Nicholas Grimshaw

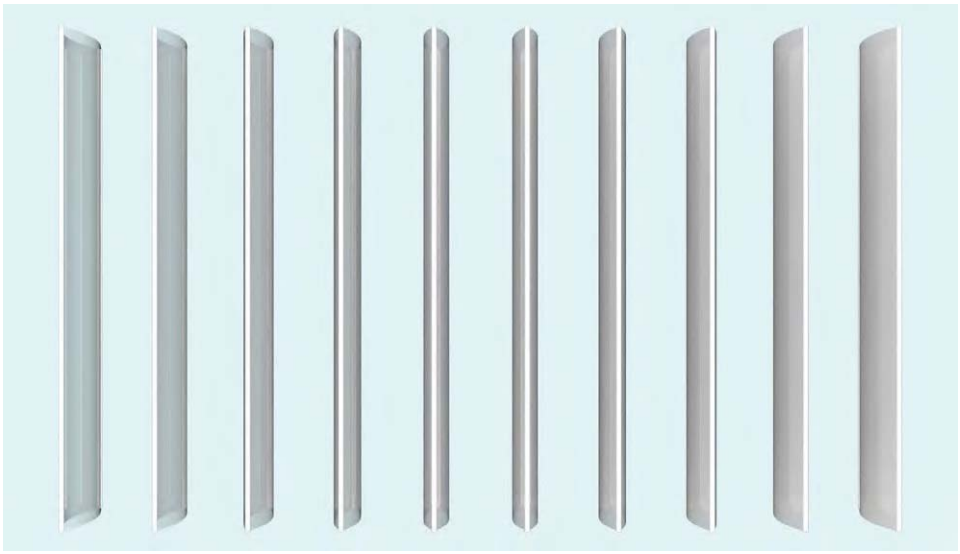






performance
Media TIC, Barcelona, Spain
Enric Ruiz-Geli [Cloud 9]

Above: Daylighting strategy at the MediaTIC building in Barcelona, Air Cushions have three membranes that react to current lighting conditions. Below: Southwest facade of the building features long hanging air cushions that fill with nitrogen gas to opaque the facade and make it more reflective.



Formal Strategies: the Definition of a Unit

Incrementalism:

Community construction on a **unit by unit basis** allows equitable and integrated participation in community development. The community becomes the sum of individual contributions rather than the single architectural feat.

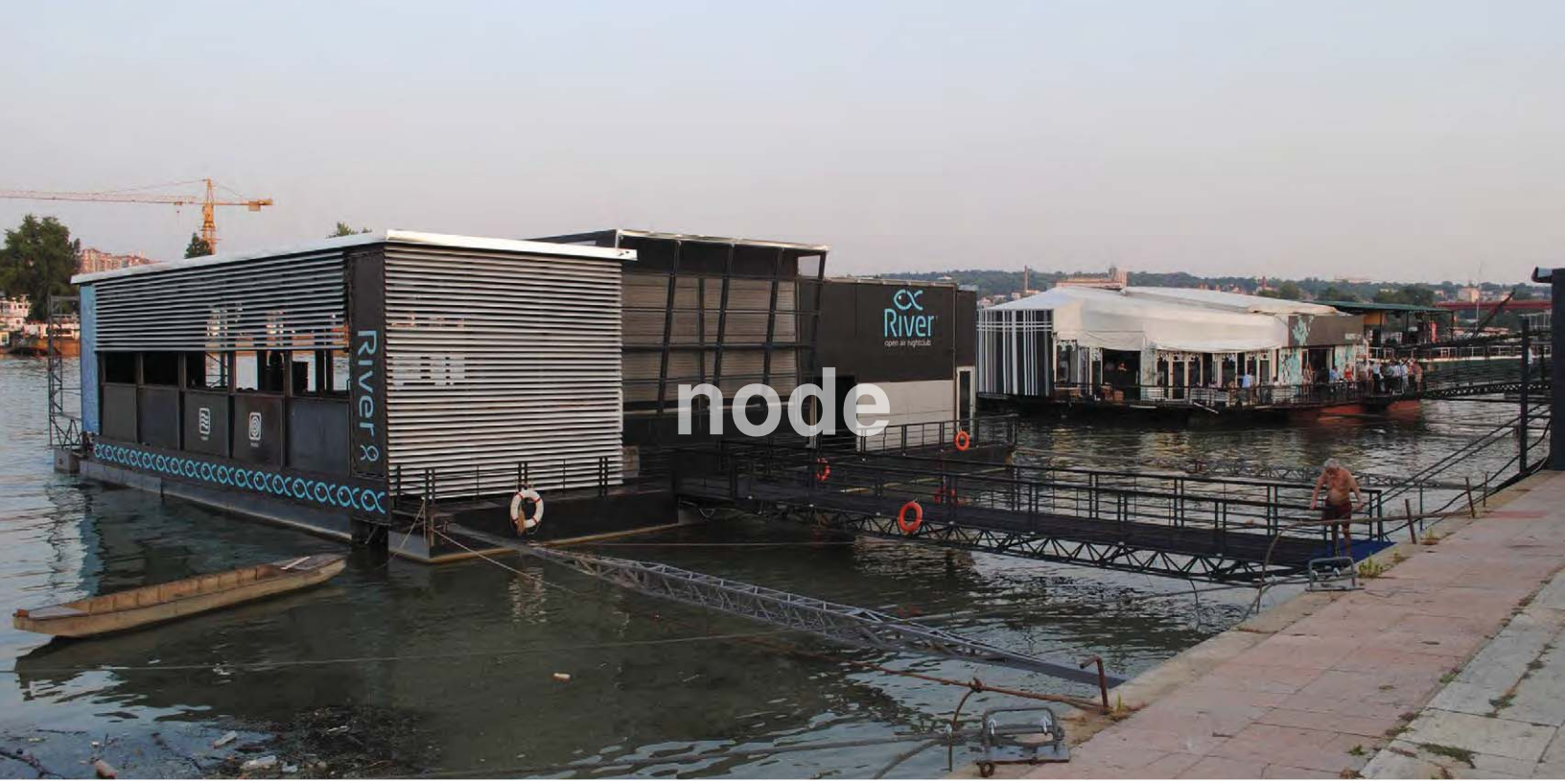
Flotation and Interchangeability:

Flotation offers interchangeability of the unit, as a method for **shrinkage/growth** of individual businesses and measures for their competitiveness. Ease of adaptations to scale of operation will create businesses that otherwise would exist on land.

Form:

A study of conventional typologies provides a basis for generating architectural forms that relate to exchangeability.

[form] **conventional water-based vernacular**


River
River
node


network

splavs [splavovi], floating river clubs

Before the 1990's, a "splav," or barge, was a privately owned lakeside or riverside getaway, for friendly get togethers and private parties. After the nineties, with a changing political climate in Serbia, they have changed into popular destination venues, where the Serbian elite spends the night time until the hours of the morning.

As these units line the edge of the Danube river in Belgrade, they are grounded by platforms that swivel, allowing the structures to adapt quickly to changes in water level. These structures are also quickly moved about and replaced on the basis of business competitiveness. Construction and deconstruction happens quietly offsite.

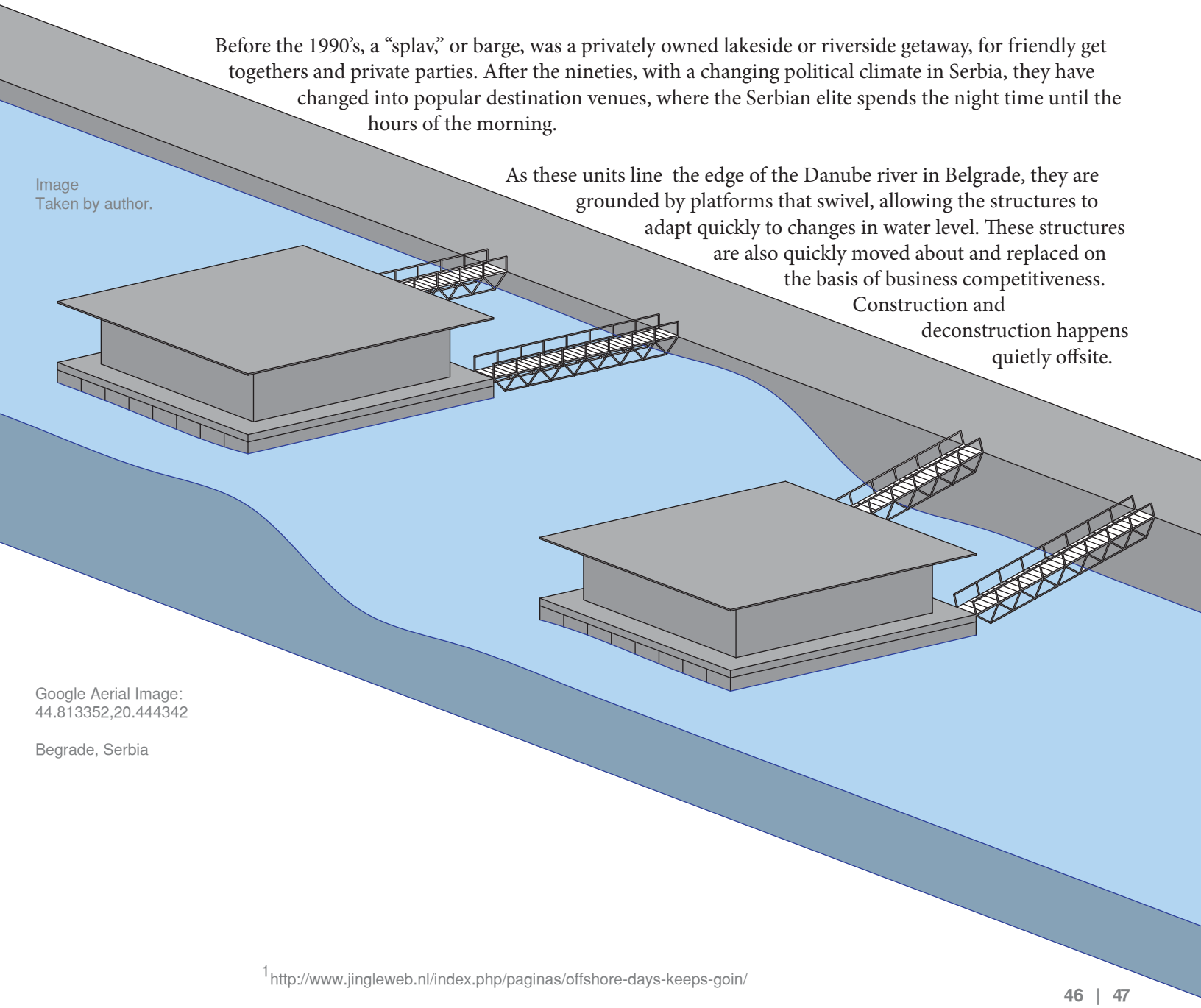


Image
Taken by author.

Google Aerial Image:
44.813352,20.444342

Begrade, Serbia

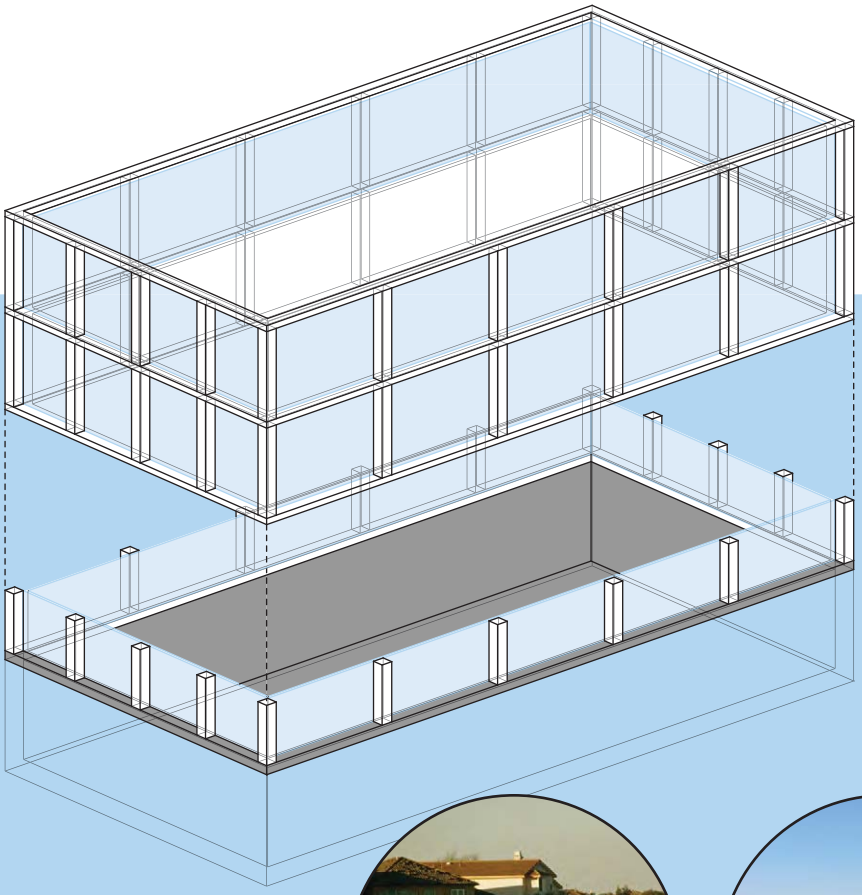
[1] http://www.jingleweb.nl/index.php/paginas/offshore-days-keeps-goin/


water in land


land in water

Google Aerial Image:
37.901059,-121.610798

Discovery Bay, 1964.
Planned waterfront
community by
Sacramento-San Joaquin
River Delta, built on
land previously used
for growing barley and
potatoes.



Google Aerial Image:
53.039496,5.775326

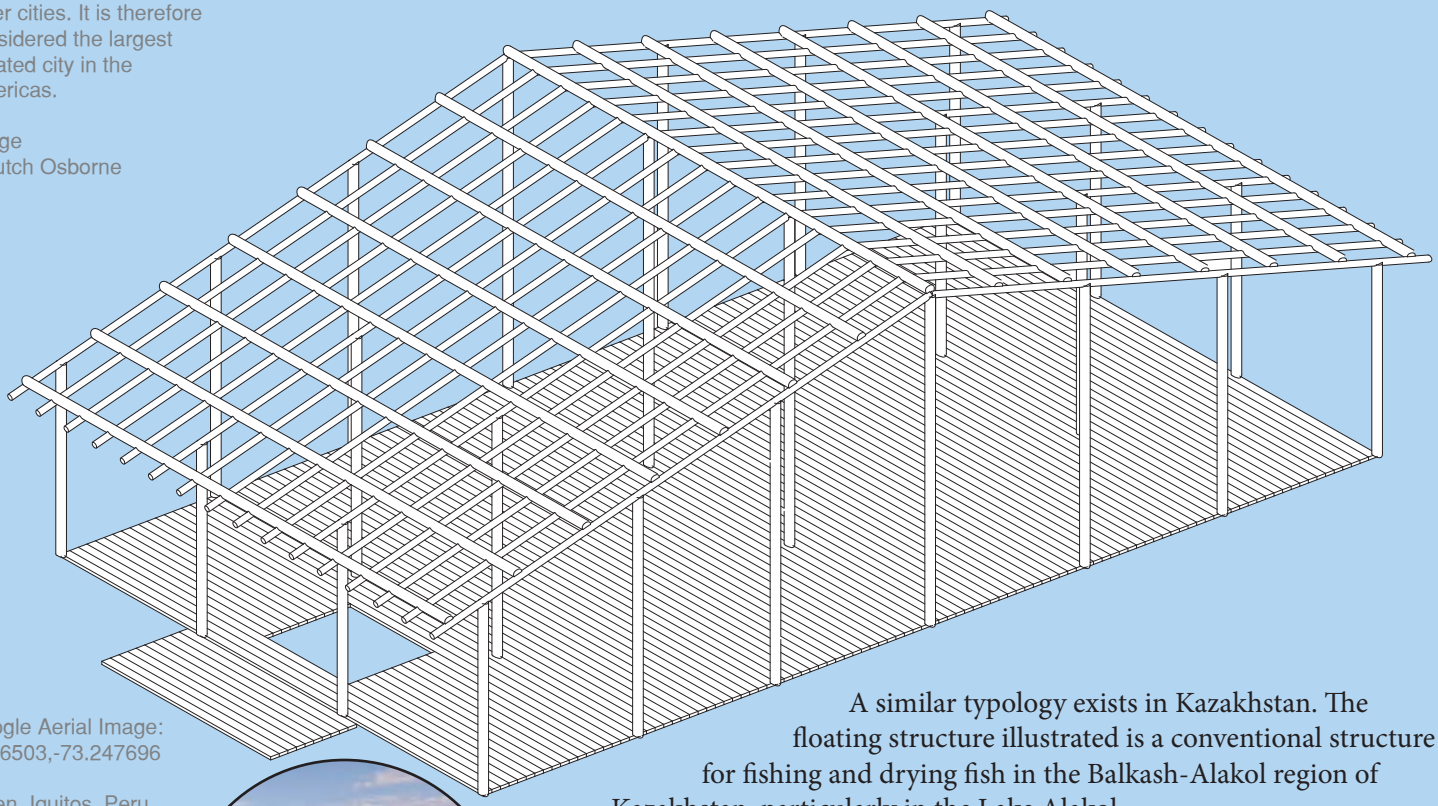
Waterpark Sneekermeer
by Waterstudio.NL


resiliency


settlement

The floating city of Belen is an informal mestizo settlement along the Upper Amazon river. Due to the seasonal rise in water level, the structures are built on balsa logs as a floating mechanism. Iquitos does not have any roads connecting to other cities. It is therefore considered the largest isolated city in the Americas.

Image
 Butch Osborne

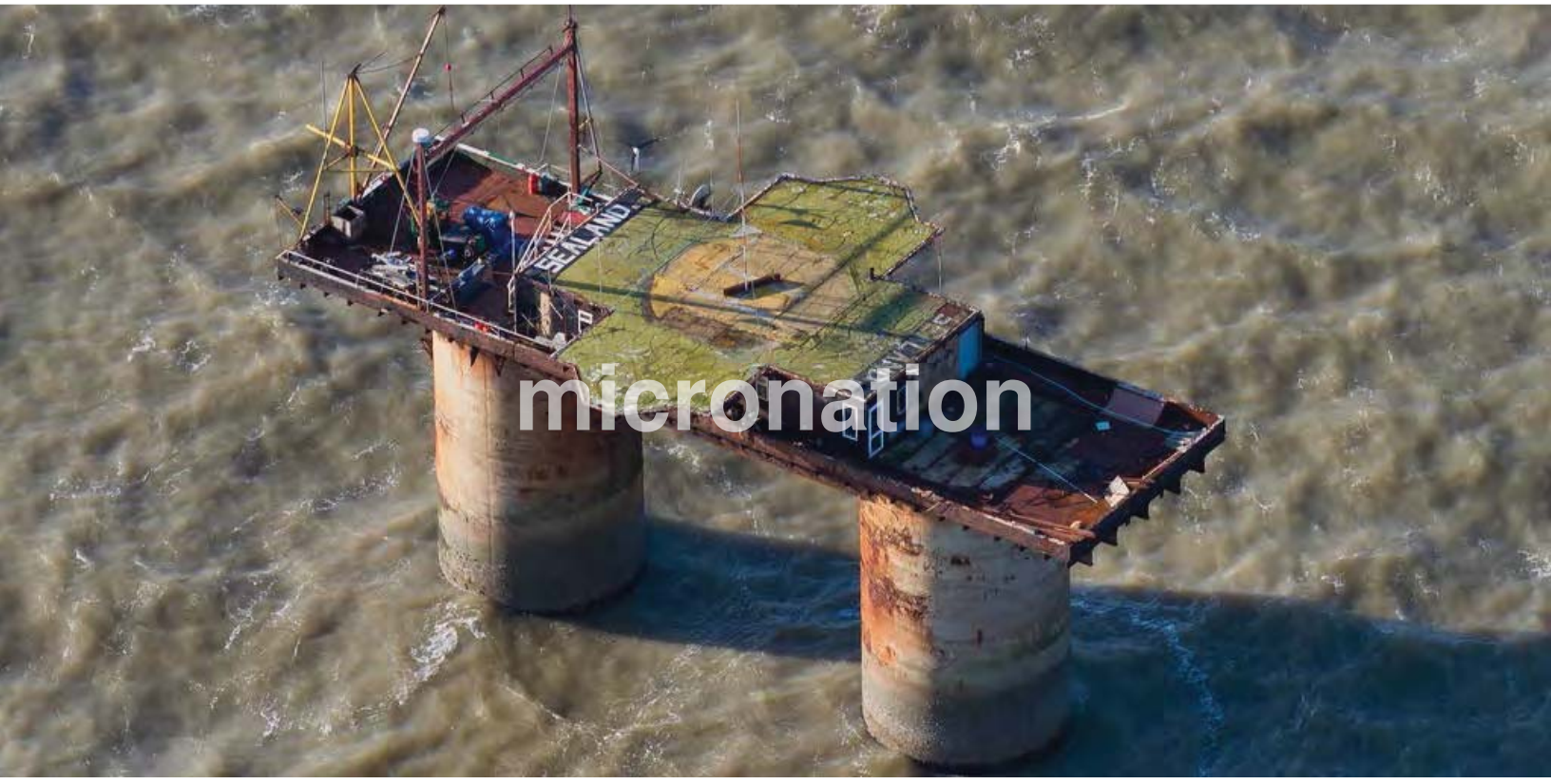


Google Aerial Image:
-3.76503,-73.247696

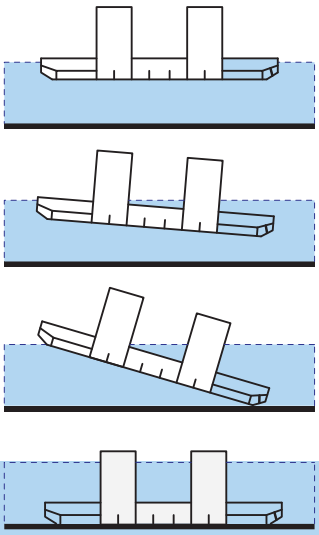
Belen, Iquitos, Peru, Upper Amazon River Basin

A similar typology exists in Kazakhstan. The floating structure illustrated is a conventional structure for fishing and drying fish in the Balkash-Alakol region of Kazakhstan, particularly in the Lake Alakol.


fortification

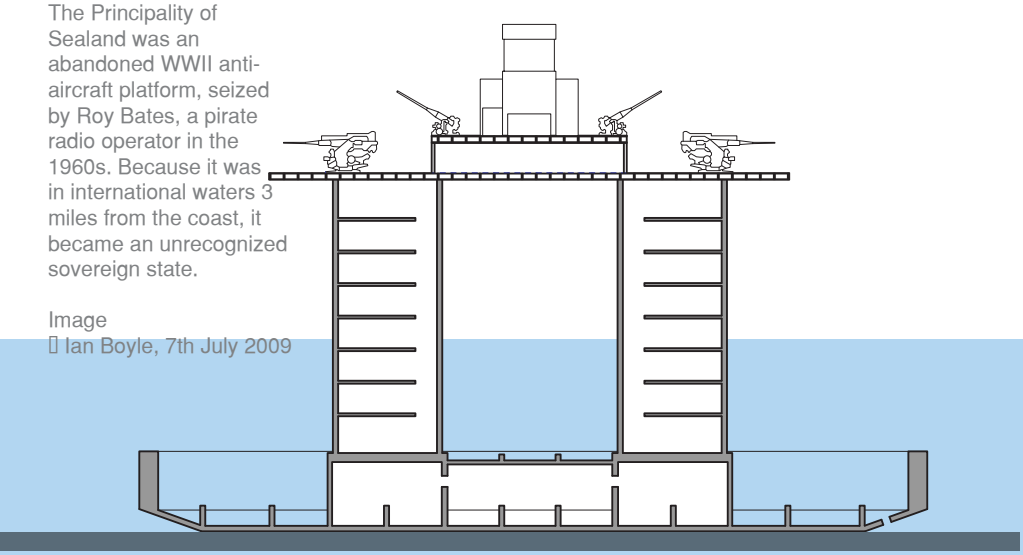

SEALAND
micronation

Sea Forts



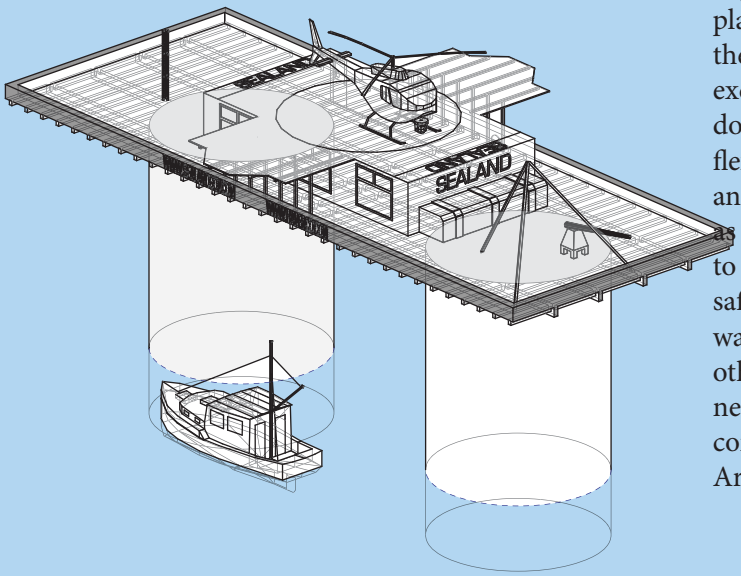
The Principality of Sealand was an abandoned WWII anti-aircraft platform, seized by Roy Bates, a pirate radio operator in the 1960s. Because it was in international waters 3 miles from the coast, it became an unrecognized sovereign state.

Image
 Ian Boyle, 7th July 2009



Roy Bates became King Roy, created passports and a currency. Several legal incidents supported Sealand's claims of sovereignty, in which the British government ruled that it was out of their jurisdiction. The first incident involved Sealand firing warning shots at a nearby boat. A second incident occured as some Germans seized the platform, and were captured in a helicopter raid, after which they were held prisoners for several weeks, without the British government being able to get involved.

Image
 Tony Crowe



The Sea Fort typology offers a method for deployment. Once it is deployed it is fixed into place, which defeats the purpose of the exchangeable unit. It does, however, offer a flexibility of placement, and may then operate as a node of activity: to provide moorage, safely control electricity, water purification, and other technical aspects necessary to sustain community on the Kok-Aral.

[1] http://www.jingleweb.nl/index.php/paginas/offshore-days-keeps-goin/

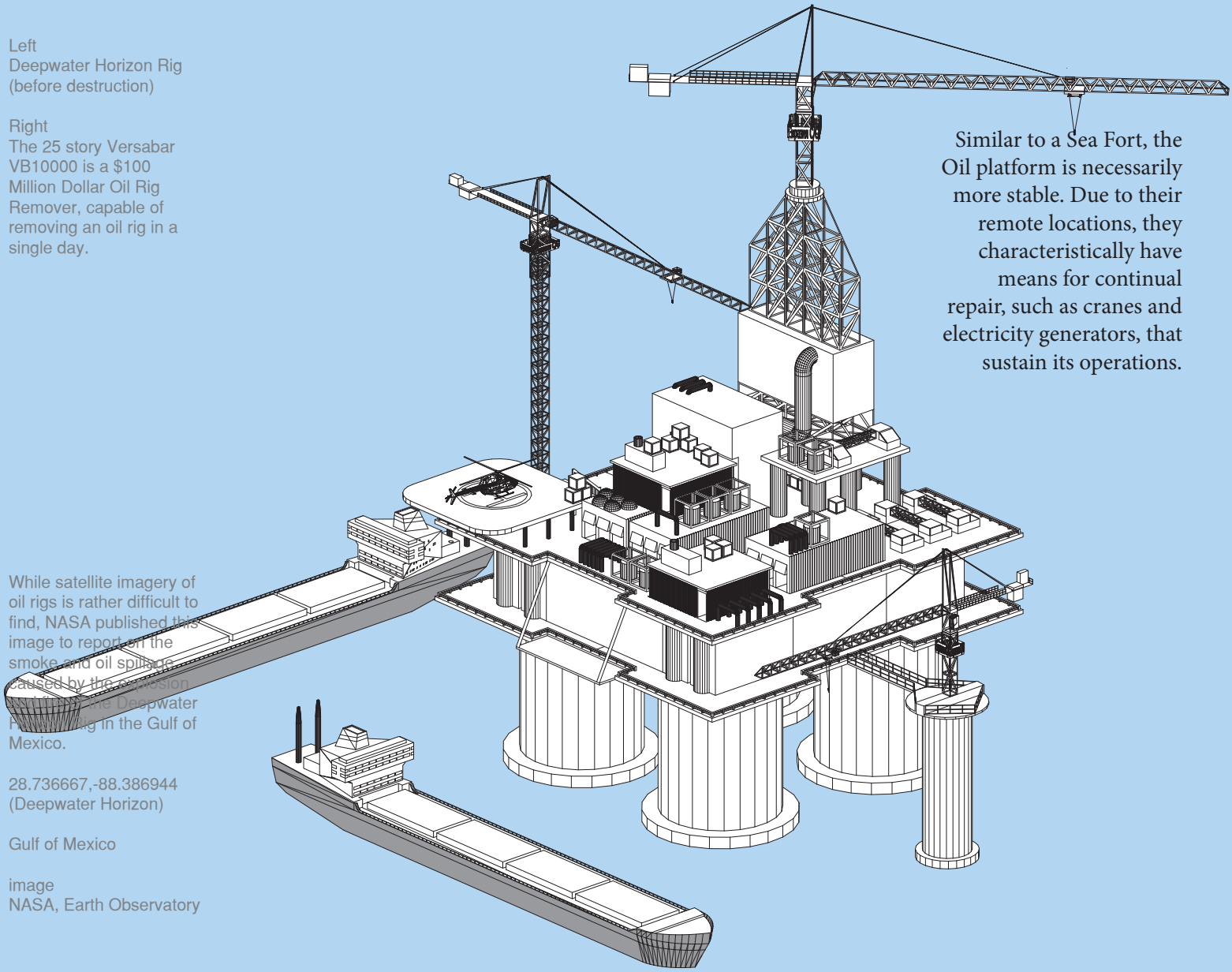
community

isolation

Left
Deepwater Horizon Rig
(before destruction)

Right
The 25 story Versabar VB10000 is a $100 Million Dollar Oil Rig Remover, capable of removing an oil rig in a single day.

Similar to a Sea Fort, the Oil platform is necessarily more stable. Due to their remote locations, they characteristically have means for continual repair, such as cranes and electricity generators, that sustain its operations.

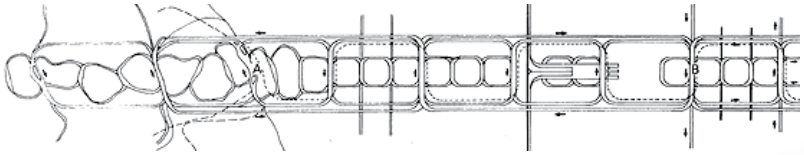


While satellite imagery of oil rigs is rather difficult to find, NASA published this image to report on the smoke and oil spillage caused by the explosion [illegible] Deepwater [illegible]g in the Gulf of Mexico.

28.736667,-88.386944
(Deepwater Horizon)

Gulf of Mexico

image
NASA, Earth Observatory



How to deploy mobile architectures?
"mobility, urban structure, linear civic axis, and city as process"

How to deploy mobile architectures?As a waterfront linear expansion with a growing population, an appropriate precedent for the Kok-Aral site is Kenzo Tange's proposal for Tokyo Bay.

With postwar Japan as a backdrop, Kenzo Tange's 1960 proposal for Tokyo bay was born in a time where industrialized cities all over the world were experiencing urban sprawl. The scheme accomodated Tokyo's continued expansion and provided a method for it to internally regenerate: effectively imposing a new order for the city that united the part and the whole within an architectural language. It featured a linear series of interlocking loops that would allow Tokyo to expand towards the bay, a gesture that is understood by various authors to have started the decade-long megastructure movement.

According to Zhongije Lin, who has authored various texts on Tange and the Metabolists, Kenzo Tange was somewhere between the Western and the Eastern mentalities[1]. His mentor, Kunio Maekawa had been trained by Le Corbusier. Later Tange had attened the CIAM meetings since 1951, where he connected with Louis Kahn and Team X. Lin argues that his western colleagues inspired the notion of mobility and urban structuring: the notion of infrastructure. The Metabolists, a group of young architects that he mentored, viewed the city as an organic human process, and not a mechanical object as the modernists would have it. He also demonstrated a strong alliance to the idea of Metabolism as city as process, which resonates with Japanese notions of permanence through continual deconstruction/reconstruction cycles such as Ise Shrine's 60 year lifespan.

1 Lin, Zhonjie. "Urban Structure for the Expanding Metropolis: Kenzo Tange's 1960 Plan for Tokyo." Journal of Architectural and Planning Research 24.2 (2007): 109-124. Print.

[deployment] Plan for Tokyo; Tokyo, Japan
Kenzo Tange, 1960

pt.II: organization

Lin, Zhongjie. Kenzo Tange and the Metabolist movement: urban utopias of modern Japan. New York: Routledge, 2010.

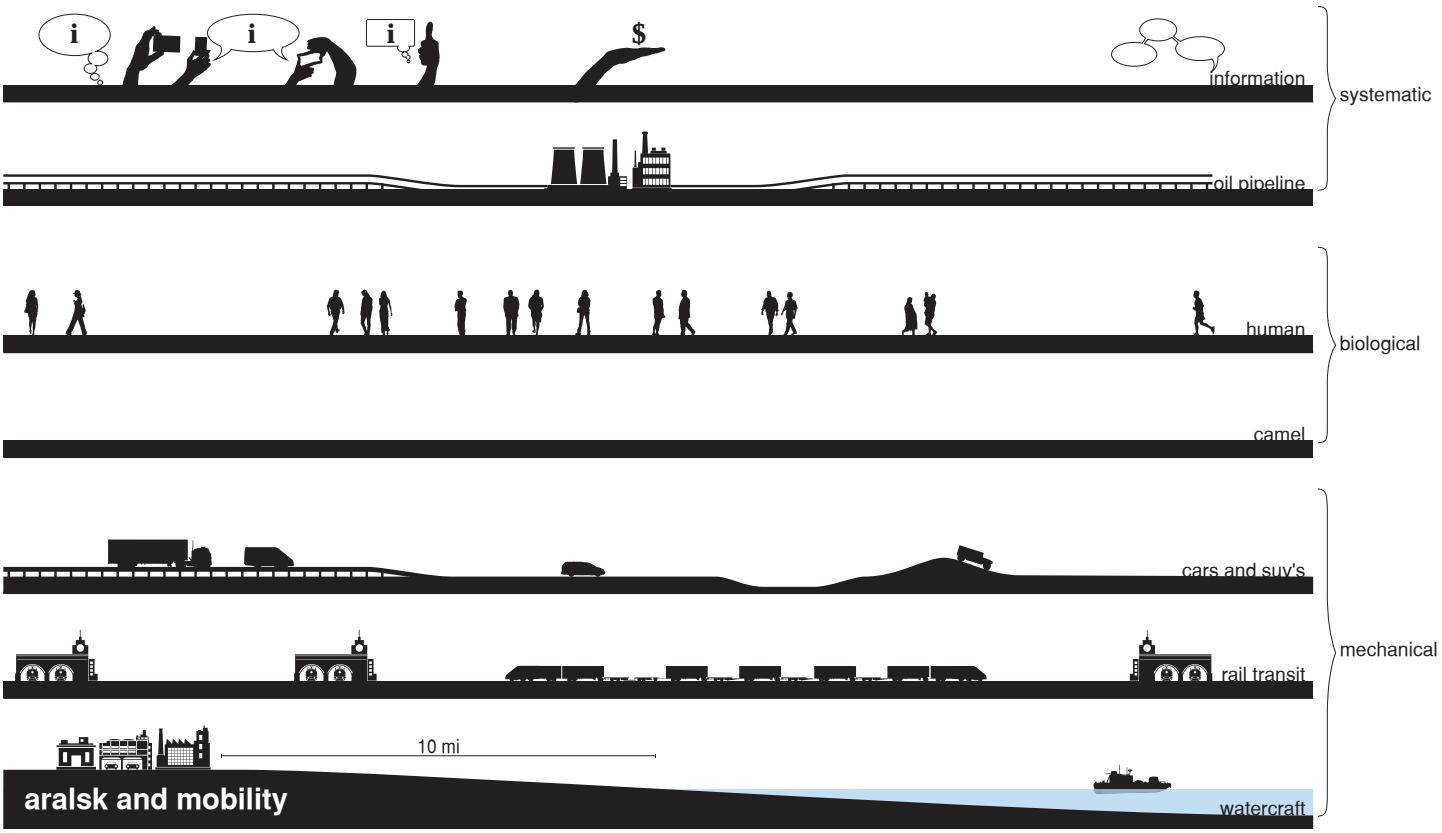
mobility

Tange defined cities with populations of ten million or more as “pivotal cities.” The reason for this term is for the state of confusion in which he found cities such as his contemporary Tokyo, New York and London: they had “grown too old to cope with the current rate of expansion.[1]” He stressed much importance on the communication systems of a city, but also on the automobile, as it was rapidly proliferating in urban life and changing transportation networks and the relationship between architecture and street. Speed and scale, according to Tange, were changing space itself and its conception.

1 Lin, Zhonjie. "Urban Structure for the Expanding Metropolis: Kenzo Tange's 1960 Plan for Tokyo." Journal of Architectural and Planning Research 24.2 (2007): 109-124. Print. p112

traffic as generator of design

Obviously, this is **not** the case we find in the Aralsk and Kokaral regions, it is in fact, quite the opposite. We find a desolate landscape, but like pivotal cities, at a point of transition. The "formerly-former" fishing town of Aralsk is lucky to be finding a resurgence. As the North Aral sea is "coming back," Aralsk, which used to be 64 miles away from the nearest coast at its worst in 2007 is now at about 10 miles, a coast line that will presumably stay there thanks to the Kokaral Dam. We see a repopulating town. As pipelines and railways (re)connect Aralsk with Kazakhstan and Central Asia, the infrastructure will be in place to create a hub of commerce: if not of fish, it is of the exchange of goods, ideas and people.

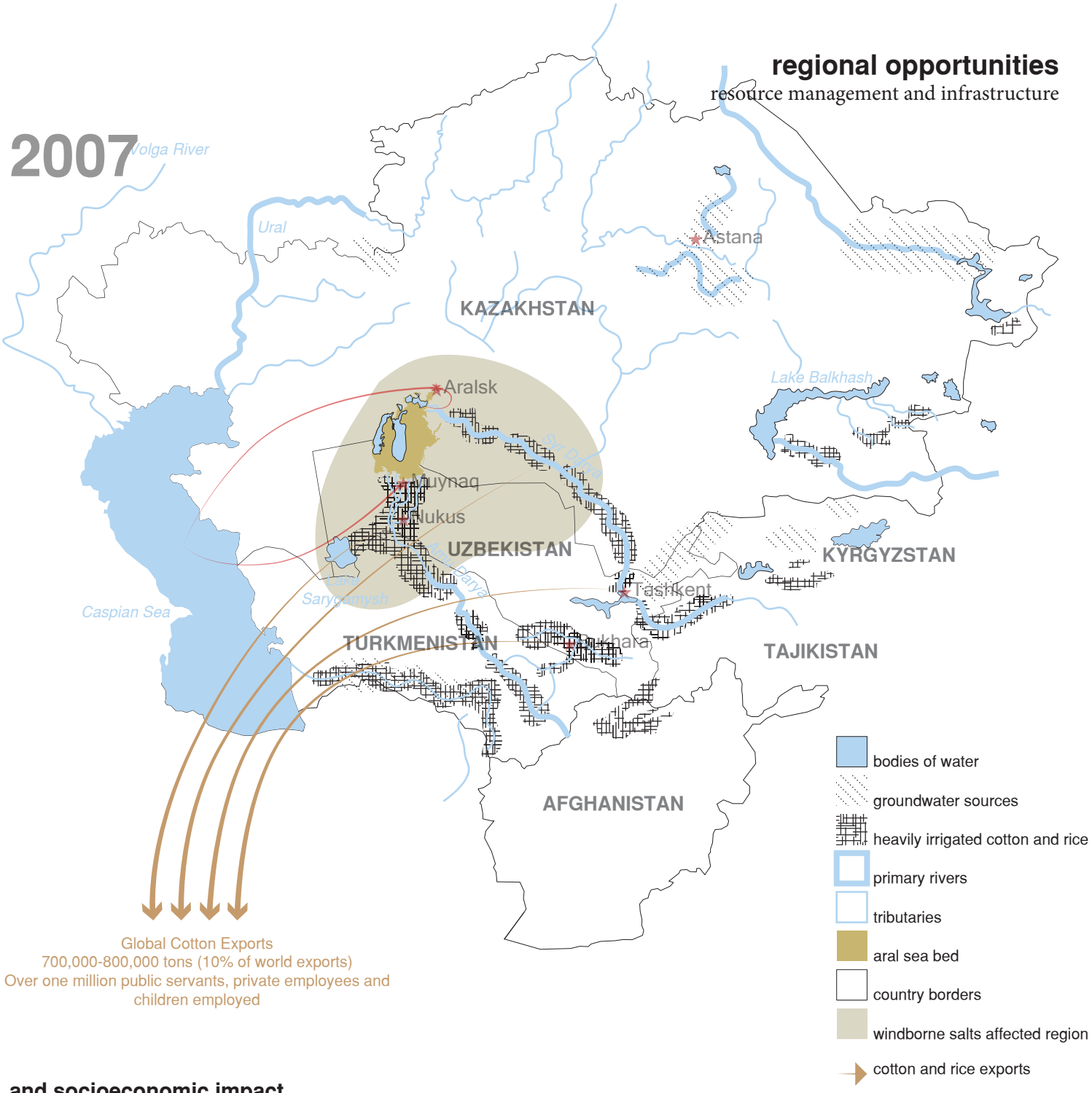


watershed management...

regional opportunities

resource management and infrastructure

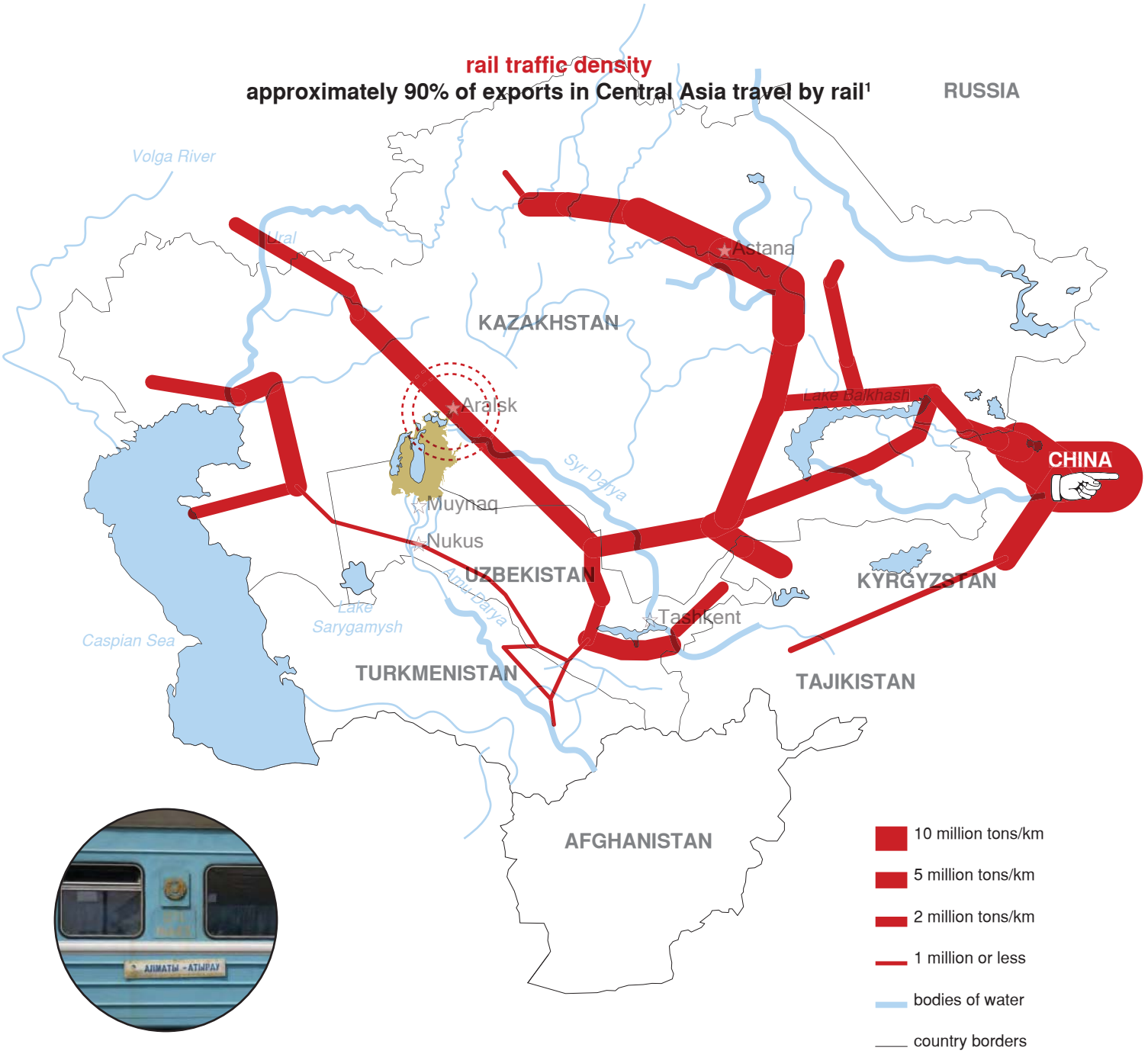
2007



and socioeconomic impact

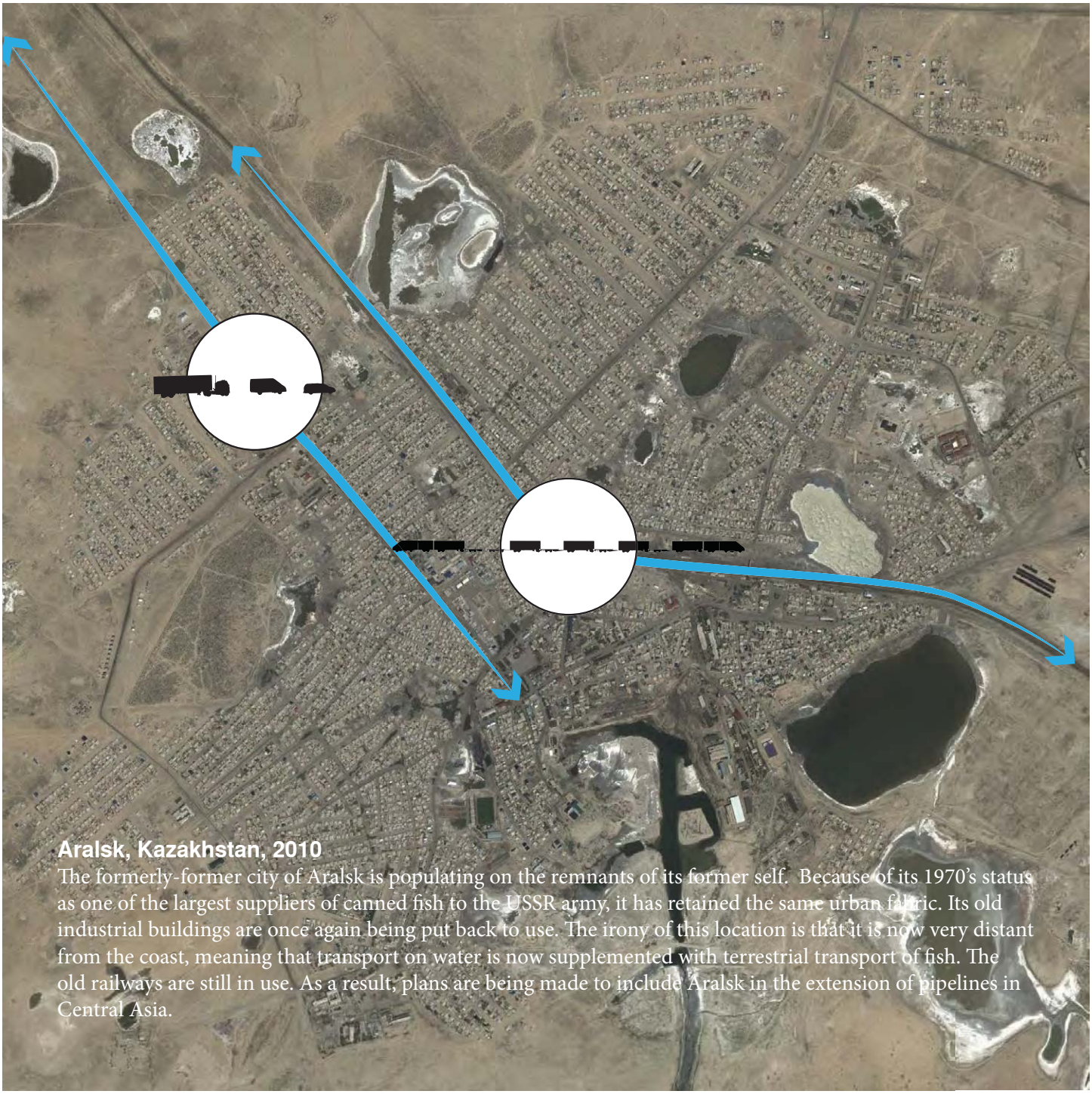
rail traffic density

approximately 90% of exports in Central Asia travel by rail[1]



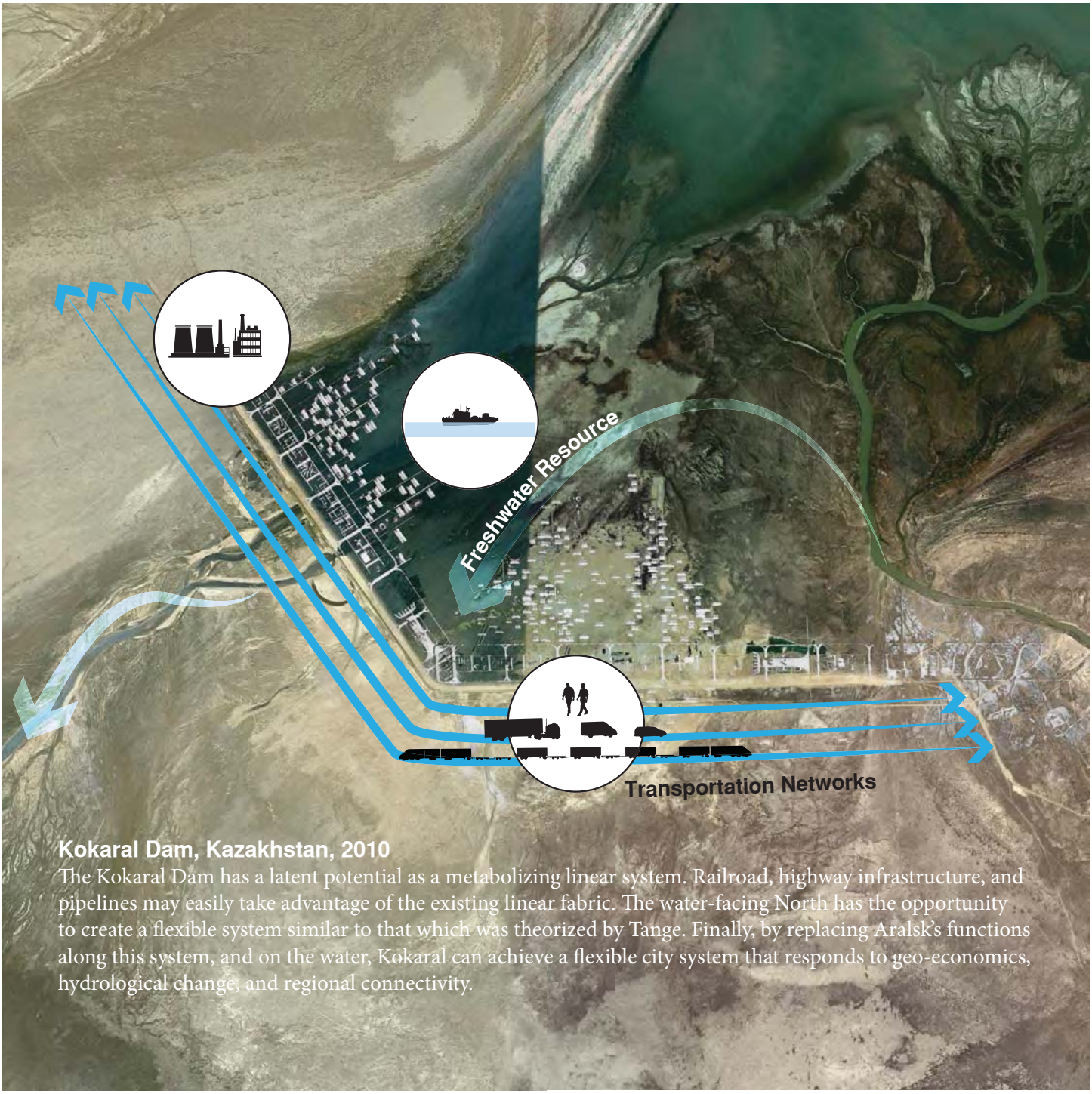
1 http://www.realinstitutoelcano.org/wps/portal/rielcano_eng/Content?WCM_GLOBAL_CONTEXT=/elcano/elcano_in/zonas_in/dt59-2009


Pipelines, Existing and Proposed
RUSSIA
Volga River
Ural
Astana
KAZAKHSTAN
Aralsk
Lake Balkhash
Syr Darya
CHINA
Muynaq
Nukus
UZBEKISTAN
KYRGYZSTAN
Amu Darya
Lake Sarygamysh
Caspian Sea
Tashkent
TURKMENISTAN
Bukhara
TAJIKISTAN
IRAQ
IRAN
AFGHANISTAN
PAKISTAN
SAUDI ARABIA
Persian Gulf
existing pipeline
proposed pipeline
railroad
refinery
tanker terminal
country borders



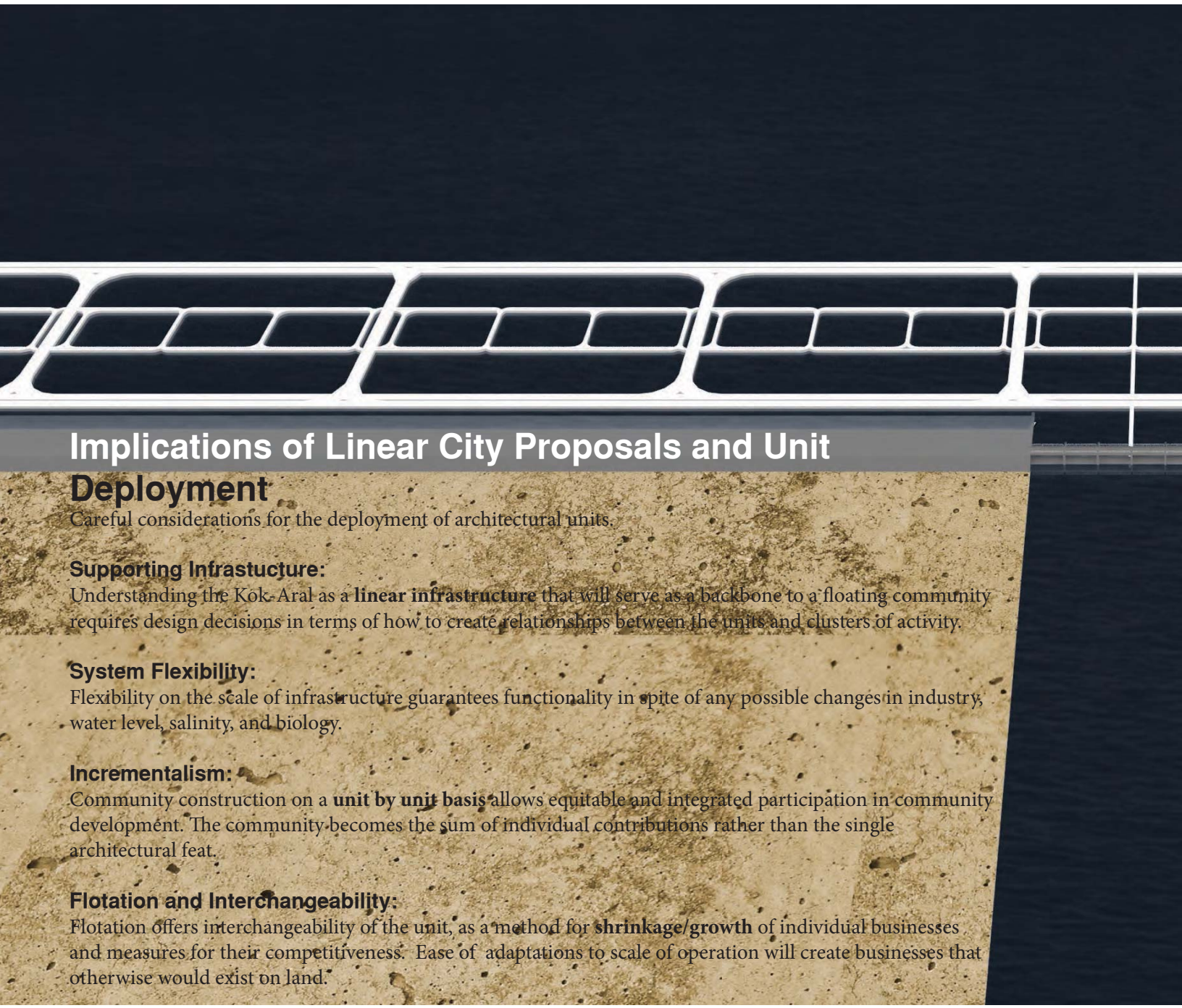
Aralsk, Kazakhstan, 2010

The formerly-former city of Aralsk is populating on the remnants of its former self. Because of its 1970's status as one of the largest suppliers of canned fish to the USSR army, it has retained the same urban fabric. Its old industrial buildings are once again being put back to use. The irony of this location is that it is now very distant from the coast, meaning that transport on water is now supplemented with terrestrial transport of fish. The old railways are still in use. As a result, plans are being made to include Aralsk in the extension of pipelines in Central Asia.



Kokaral Dam, Kazakhstan, 2010

The Kokaral Dam has a latent potential as a metabolizing linear system. Railroad, highway infrastructure, and pipelines may easily take advantage of the existing linear fabric. The water-facing North has the opportunity to create a flexible system similar to that which was theorized by Tange. Finally, by replacing Aralsk's functions along this system, and on the water, Kokaral can achieve a flexible city system that responds to geo-economics, hydrological change, and regional connectivity.



Implications of Linear City Proposals and Unit Deployment

Careful considerations for the deployment of architectural units.

Supporting Infrastucture:

Understanding the Kok-Aral as a **linear infrastructure** that will serve as a backbone to a floating community requires design decisions in terms of how to create relationships between the units and clusters of activity.

System Flexibility:

Flexibility on the scale of infrastructure guarantees functionality in spite of any possible changes in industry, water level, salinity, and biology.

Incrementalism:

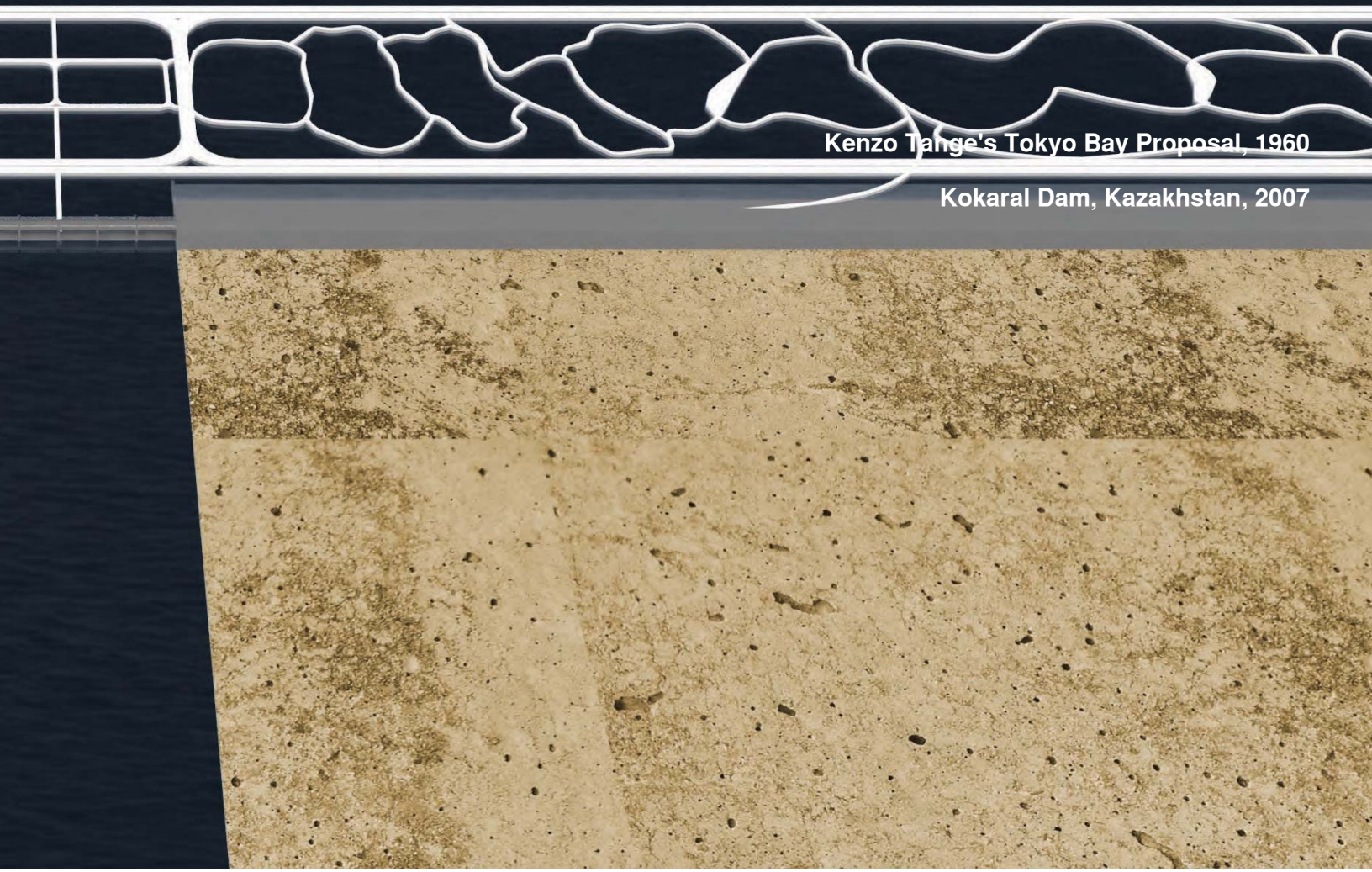
Community construction on a **unit by unit basis** allows equitable and integrated participation in community development. The community becomes the sum of individual contributions rather than the single architectural feat.

Flotation and Interchangeability:

Flotation offers interchangeability of the unit, as a method for **shrinkage/growth** of individual businesses and measures for their competitiveness. Ease of adaptations to scale of operation will create businesses that otherwise would exist on land.

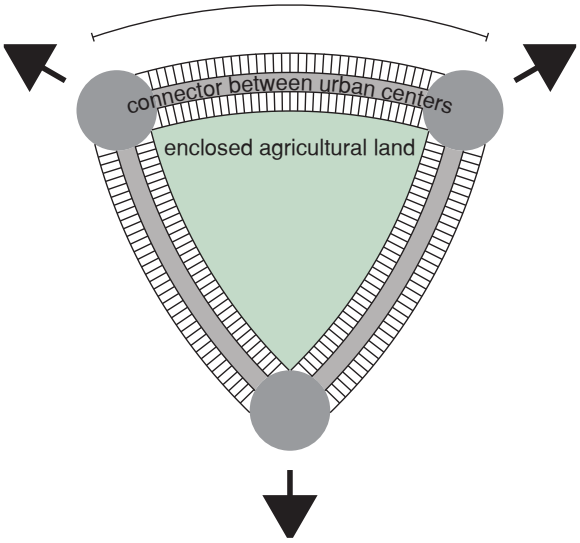
Tokyo Bay, Kenzo Tange, 1960

Tange critiqued the "closed system" nature of pivotal cities, which were and are predominantly organized centripetally, with a civic center at its core. Instead, he proposed an open civic axis, which was emblematic of modern society's spontaneous mobility. For this reason, the linear expansion strategy boldy started at the existing center of Tokyo, imagining a drastic mutation of the existing city fabric as a consequence of a new unity of city, transportation, and architecture.



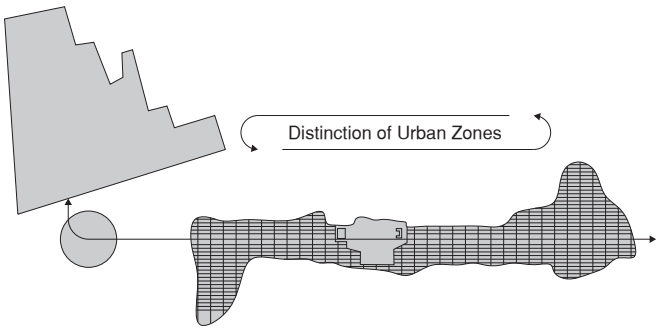
Kenzo Tange's Tokyo Bay Proposal, 1960

Kokaral Dam, Kazakhstan, 2007



Arturo Soria, Ciudad Lineal, 1883

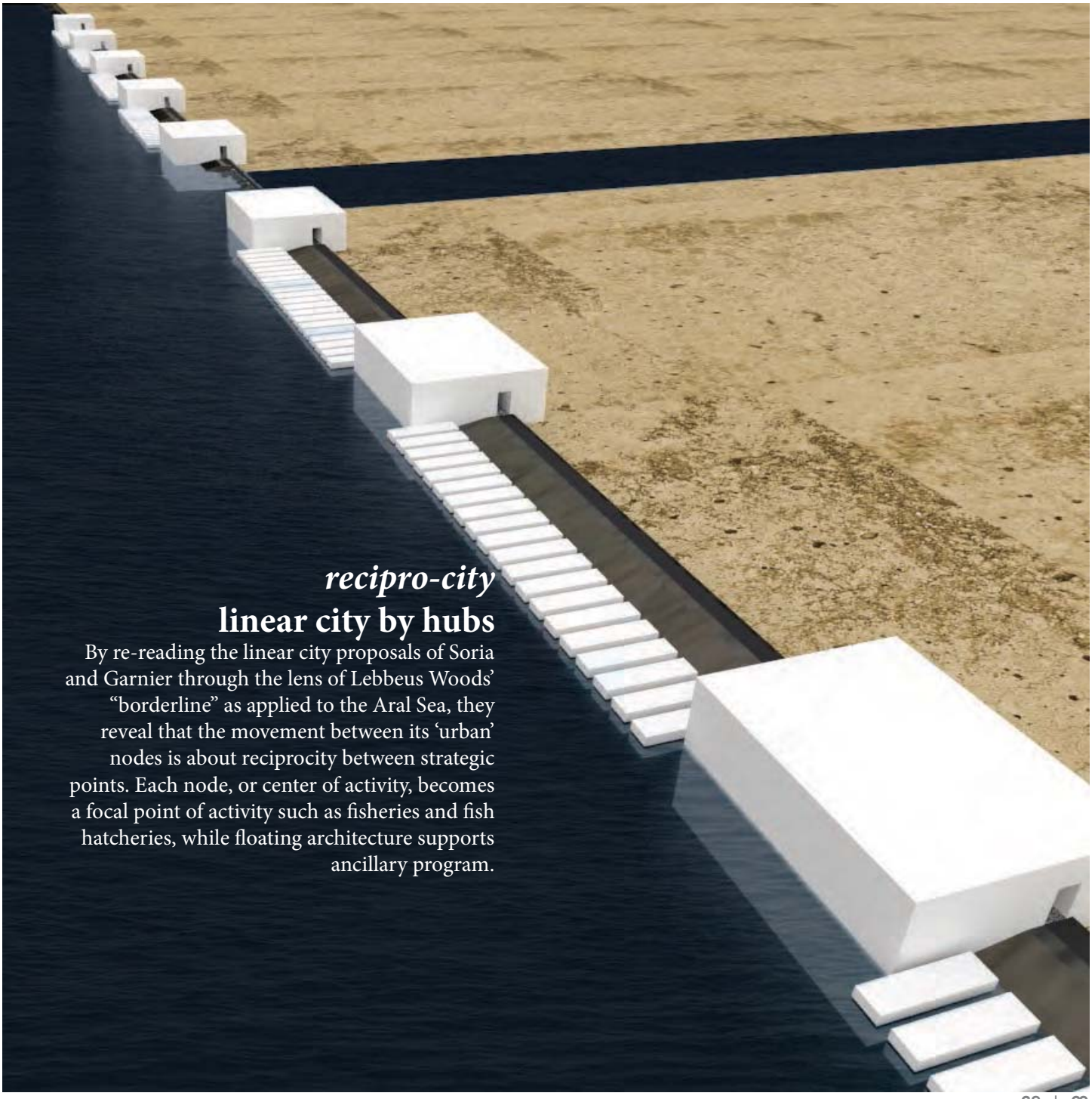
Linear system proposals have been around since the 1880's, and became popular after WWII, as a method to control urban sprawl and the decentralization of the city. The earliest known example of a linear city proposal was Soria's proposal for Madrid. This system would connect dense urban centers, and the space enclosed would be devoted to a maximizing of agricultural production. The main backbone, of 50 m width, was to be occupied with a tram, as the commercial automobile was not yet in use. Soria and his partners kept active by promoting the Ciudad Lineal idea in Spain and abroad.



Tony Garnier, Cite Industrielle, 1901-4

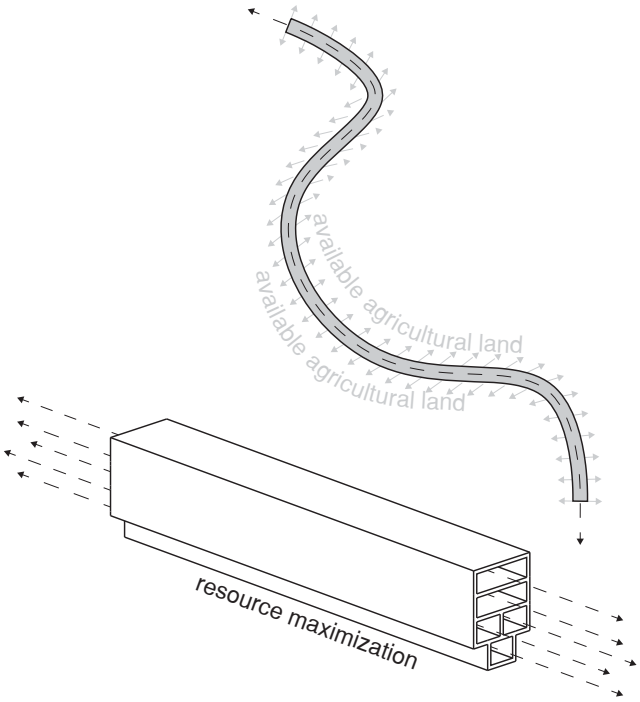
Tony Garnier proposed a socialist utopian ideal of living, a city of 35,000. It was located between a mountain and a river, which provided hydroelectricity. This plan allowed vocational schools to be located near their respective industries, and in proximity to all methods of transportation. The arterial avenue connected a linear set of courtyard housing, civic center and port. [1]

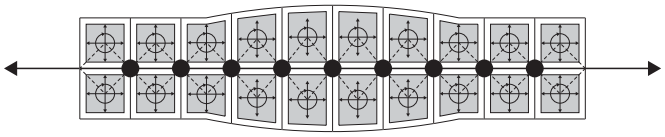
1 [1966] George R. Collins, The Linear City, in Pedestrian in the City: Architect s Yera Books, V. 11, ed. David N. Lewis (London: Elek Books), 204-217



recipro-city
linear city by hubs

By re-reading the linear city proposals of Soria and Garnier through the lens of Lebbeus Woods' "borderline" as applied to the Aral Sea, they reveal that the movement between its 'urban' nodes is about reciprocity between strategic points. Each node, or center of activity, becomes a focal point of activity such as fisheries and fish hatcheries, while floating architecture supports ancillary program.





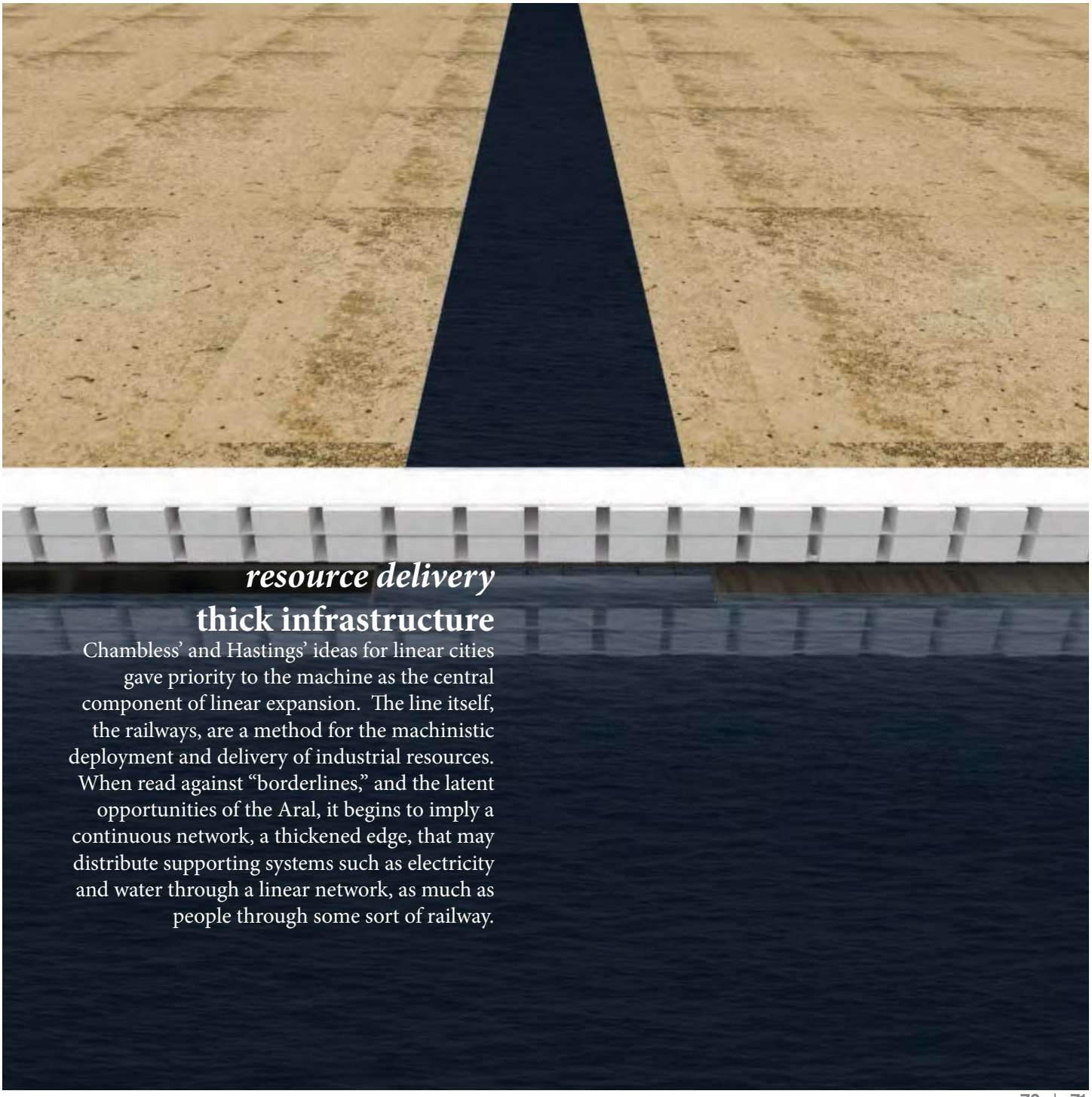
Roadtown, Edgar Chambless, 1910

It was conceived as an economy of means and construction, maximizing energy, pipes, wires and transportation on a continuous two dimensions, transcontinentally if need be. As a linear city, the proposal established that it was to be surrounded by farmland, so they travel its length to find particular products, but only need the building to gather food. Two stories of living and working spaces were stacked above three lines of railway, with a continuous promenade on the roof. Similar to Arturo Soria's concept, it was the a transportation spine surrounded by massive agricultural production. Differently, however, it was about creating a megastructure to maximize construction systems.

Milo Hastings, Solution to Housing, 1919

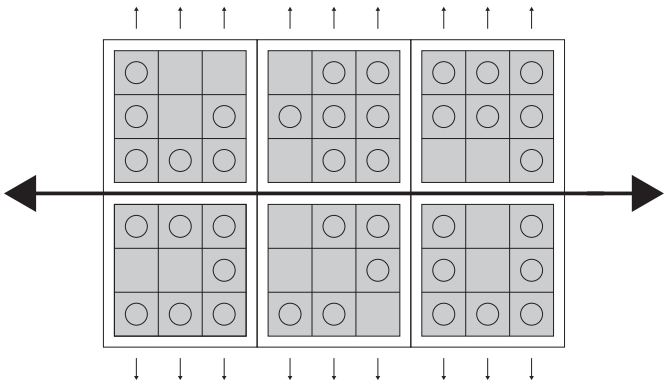
A separate line of thought evolved from Soria's Ciudad Lineal. While Roadtown sought to maximize and densify to achieve an economy, Tony Garnier in England and Milo Hastings in the USA felt that the slow transportation methods of the past led to congestion and crowded living areas, where modern trains required only living near a trainstation. This sought to decentralize industry, with nearby housing for workers, intensification of agriculture, and "an increase in productivity through living conditions.[1]" Hastings proposed U-roads that would contain communal parks.

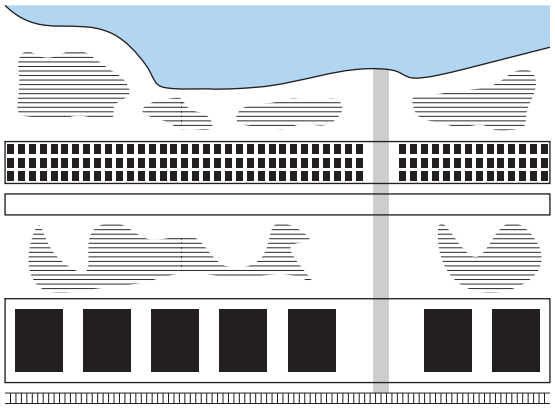
1 [1966] George R. Collins, The Linear City, in Pedestrian in the City: Architect s Yera Books, V. 11, ed. David N. Lewis (London: Elek Books), 204-217



resource delivery
thick infrastructure

Chambless' and Hastings' ideas for linear cities gave priority to the machine as the central component of linear expansion. The line itself, the railways, are a method for the machinistic deployment and delivery of industrial resources. When read against "borderlines," and the latent opportunities of the Aral, it begins to imply a continuous network, a thickened edge, that may distribute supporting systems such as electricity and water through a linear network, as much as people through some sort of railway.



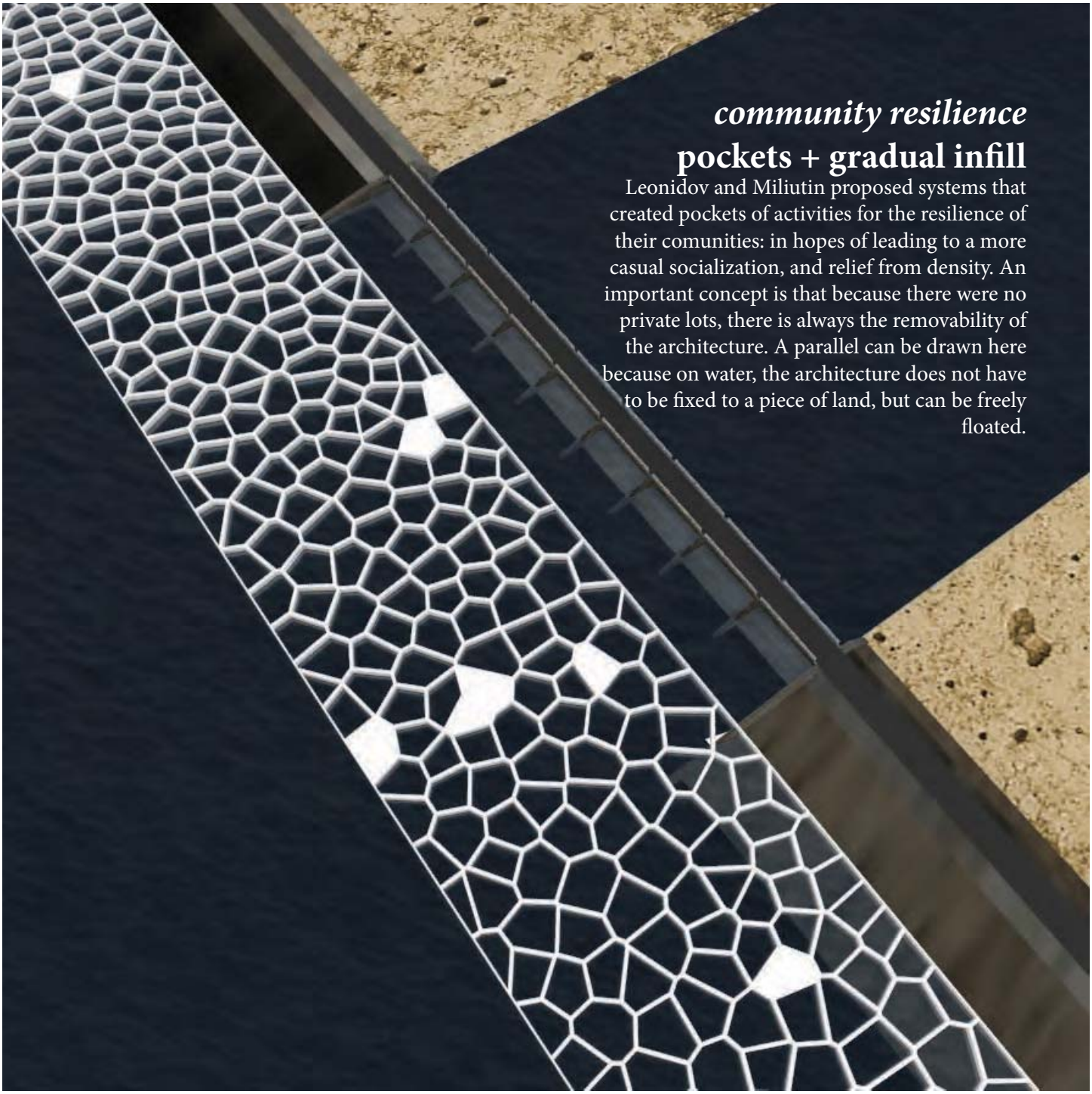


Ivan Leonidov, Magnitogorsk, 1930

Soviet urbanists' superblocks were programmed wih nurseries, gymnasia, sports halls, and large cafeterias. Their counterpoint "de-urbanists" argued that the massive scale of such proposals was dehumanizing, and as such, an alternative was the continuous strip of smaller neighborhoods had social amenities distributed at regular intervals. Each neighborhood had eight communal houses of sixteen people. In Leodinov's proposal for Magnitogorsk, group living was arranged for a more casual socialization instead of excessive density. Architecture and nature were more close by removing private lots. Living arrangements were more free, and allowed for more interpersonal relationships. Finally, the planned organization of discrete territories provided a sense of resilience.

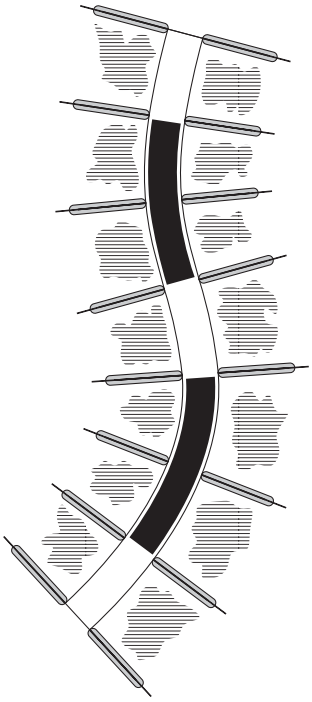
Miliutin, Plan for Stalingrad, 1931

Drawing from Garnier, this Marxist adaptation of the linear city ideal was proposed by professor N.A. Miliutin, for a linear city of 100-200,000. The use of parallel zones along the Volga (6) was used to break down the social distinctions between the urban and rural proletariat. Though it was ultimately not adopted for practicality and lack of industrial capacity, it promised the abolition of centralized cities in favor of collectivism, decentralized industry, and mechanized agriculture throughout the indefinite length of the linear city (with collective dwellings). First came the railway (5), then industry (3), green buffer zones (2), highwas (4) and residences (1).



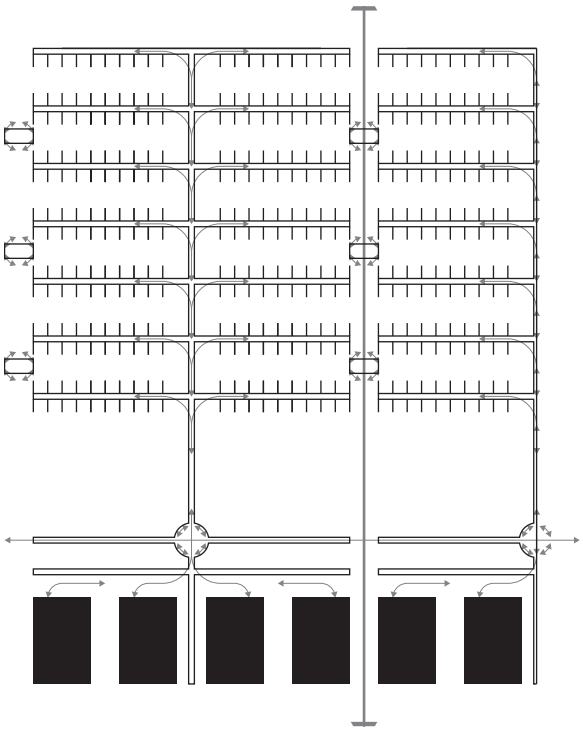
community resilience
pockets + gradual infill

Leonidov and Miliutin proposed systems that created pockets of activities for the resilience of their comunities: in hopes of leading to a more casual socialization, and relief from density. An important concept is that because there were no private lots, there is always the removability of the architecture. A parallel can be drawn here because on water, the architecture does not have to be fixed to a piece of land, but can be freely floated.



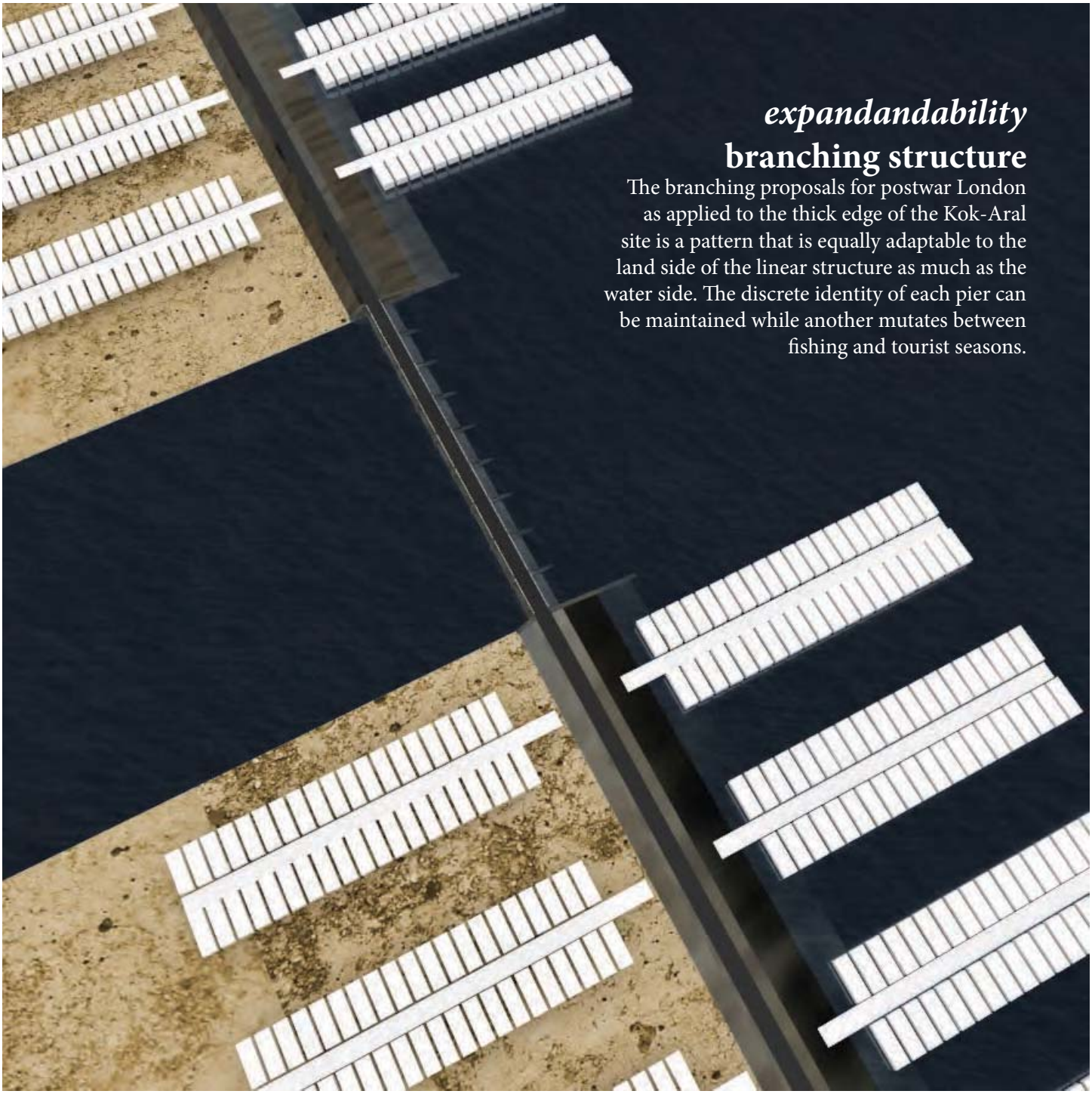
MARS plan for London, 1938-1942

MARS, or the Modern Archicetural Research Group, developed the idea of a master plan for Greater London on linear principles. The intention was to control the expansion of London, by organizing industry, commerce, and administration east-west along the Thames and railroads, where residential zones were to be placed in sixteen perpendicular ribs, each a mile wide, separated by two miles of country side. North-south highways would connect the city to the rest of the nation. Historic london is indicated at the center of the drawing, to be retained. With the County of London schemes of 1943-44, the plan was abandoned.



Ludwig Hilbersheimer*, the New City, 40's*

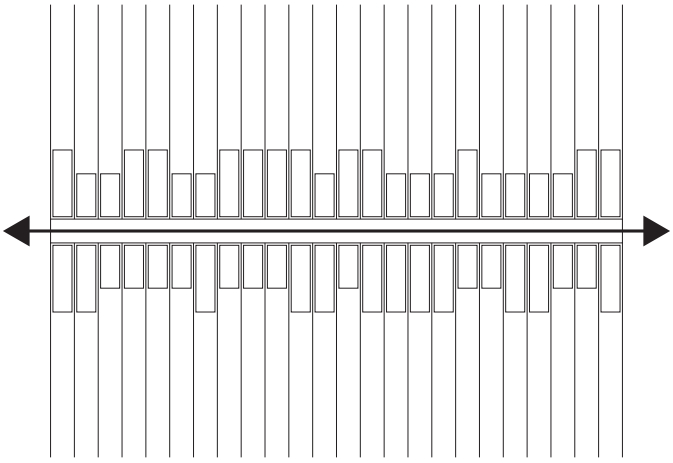
All of the previous examples, save for Tony Garnier's, concentrate industry on the main trunk of a linear proposal. As a response, Ludwig Hilbersheimer developed a more open system, with what he claimed to be a more efficient transportation system due to the closer proximity of home (above) and working area (below). This creates distinct neighborhood zones. It also incorporates both a main highway, and a local highway, commercial areas, and schools placed in parks between distinct neighborhoods.



expandandability
branching structure

The branching proposals for postwar London as applied to the thick edge of the Kok-Aral site is a pattern that is equally adaptable to the land side of the linear structure as much as the water side. The discrete identity of each pier can be maintained while another mutates between fishing and tourist seasons.

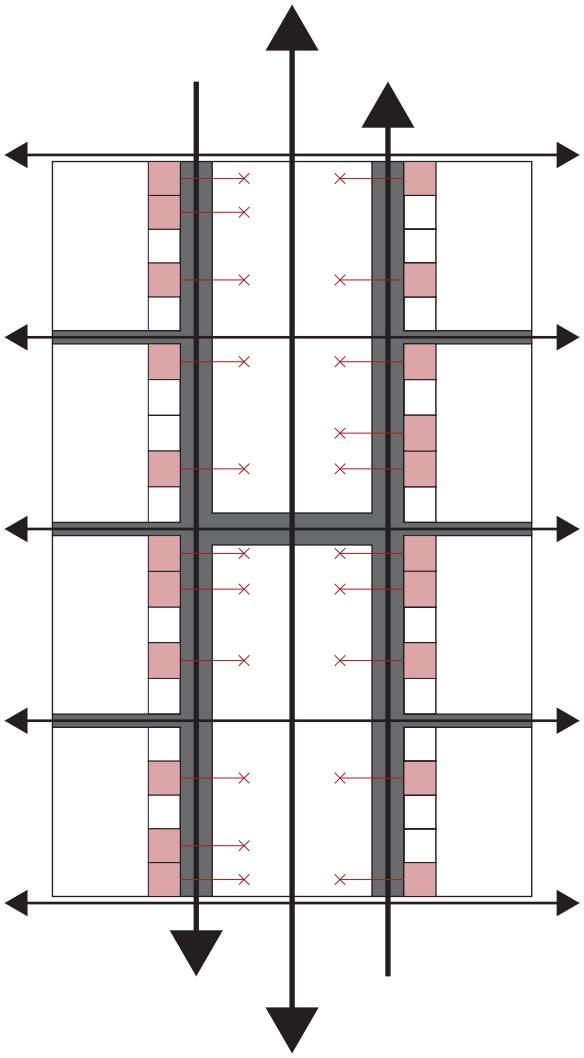
Linear Urban Systems in Vernacular



Linear Village, Iga, Japan

Fumihiko Maki, a member of the Metabolists that often theorized with vernacular settlements, published this image in his Investigations in Collective Form book[1]. His point was that the house was the generator of village form, and the village was the generator of house form, **where the house may be replaced without changing the character of the village.** What is also useful about this example, as an idea embodied by both Chambless and Soria, is that it condensifies and maximizes human space and effort, to then maximize productive space on its exterior.

1 Lin, Zhonjie. "Urban Structure for the Expanding Metropolis: Kenzo Tange's 1960 Plan for Tokyo." Journal of Architectural and Planning Research 24.2 (2007): 109-124. Print.

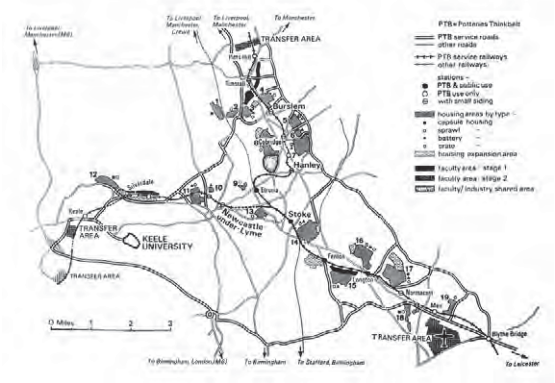


La Rambla, Barcelona, 1377 - present
La Rambla was originally a streambed whose function was tocarry sewage out to sea, and for stormwater management from the nearby hills. In 1377, the city walls enclosed la Rambla, and in 1440 the stream was diverted towards the new walls, and La Rambla slowly became a street. Over the next centuries, it became the 1.2 km-long center of city life in Barcelona. As a thoroughfare it is the heart of the city's festivals, markets and sports, as well as several religious buildings built along its length. Trees were planted in 1703,.

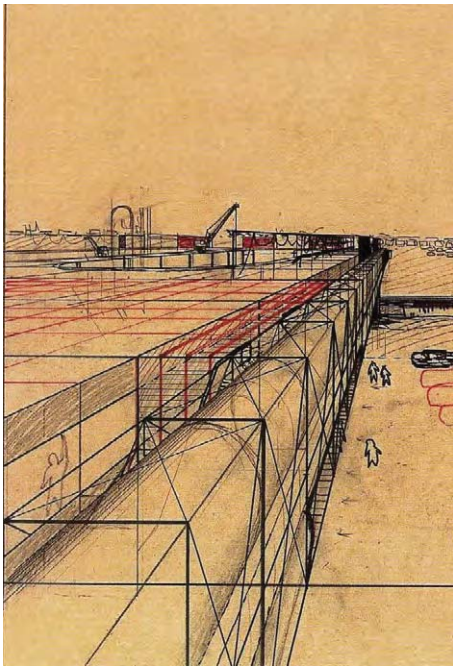
city as process

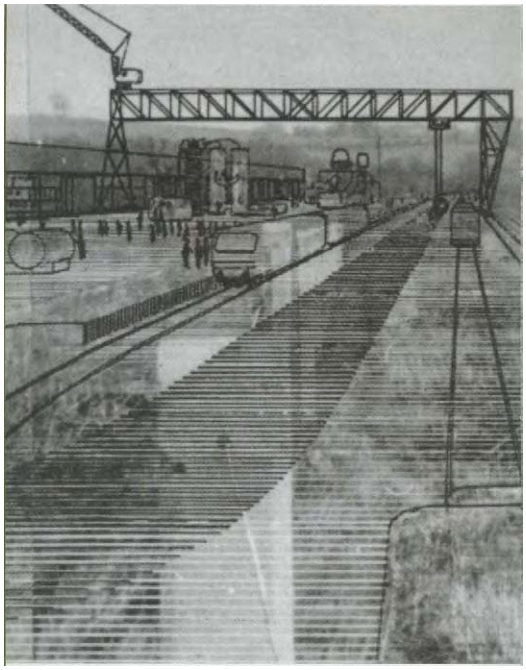
"Architecture is situated between the biological and the geological - slower than living things but faster than the underlying geology."
-Stan Allen[1]

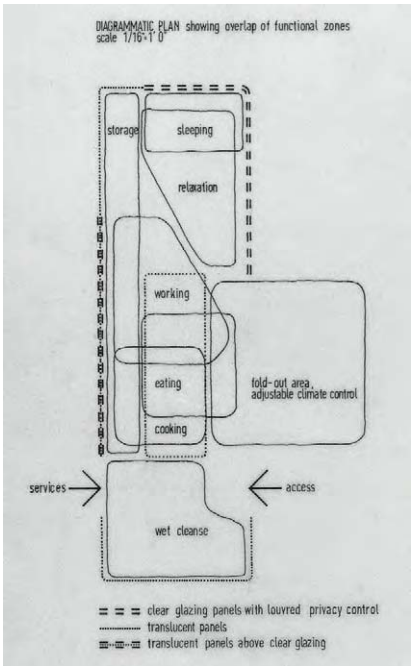
1 Allen, Stan. Landform building: architecture's new terrain. Baden, Switzerland: Lars Mu ller Publishers ;, 2011. Print.



Cedric Price, Potteries Thinkbelt, 1964.

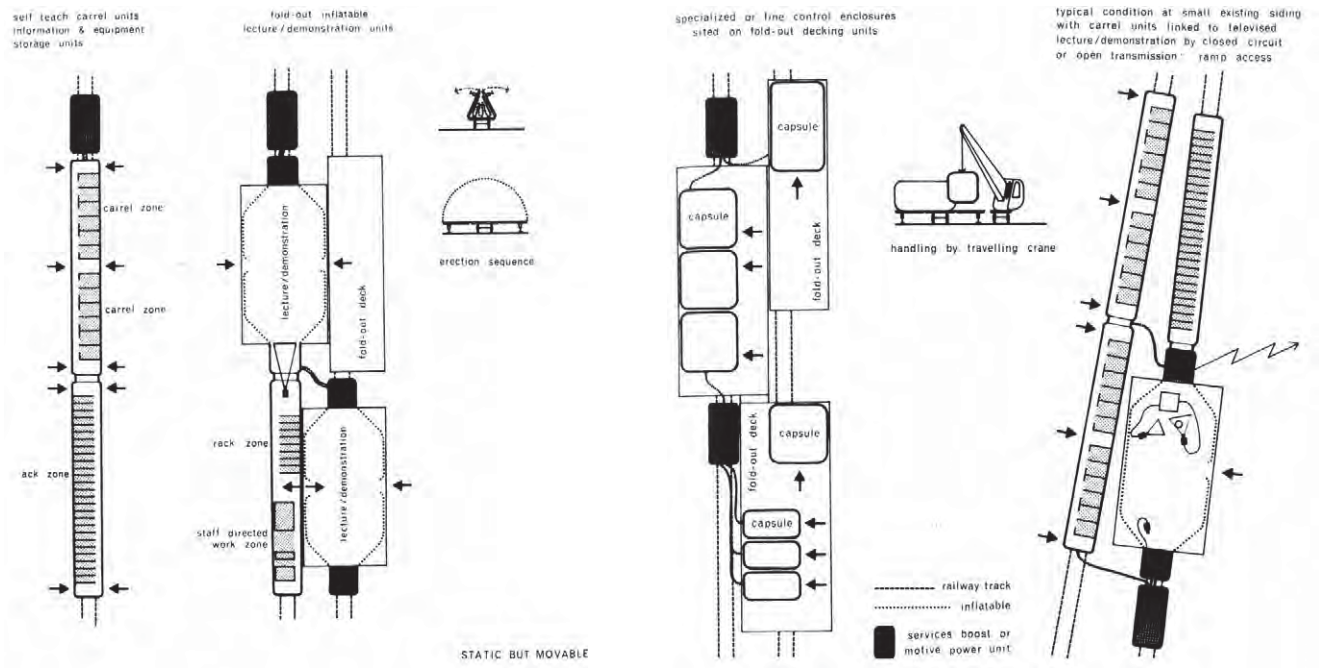






Cedric Price, Potteries Thinkbelt, 1964

The Potteries was the industrial center of the ceramic industry in England for 250 years before WWII. As the global economy changed from industrial production of commodities to the production of technological and scientific goods, the Potteries failed to adapt and instead largely fell in disuse. Frustrated with the dilapidated industrial infrastructure that was reduntant all over the North Staffordshire Potteries, Cedric Price proposed turning the infrastructure into a high-technology university on rails: a Thinkbelt. **Price contended that architecture was too slow**, and it could therefore not



solve issues like the Potteries' state immediately, and were limited to their programmed functions. Primarily, he argued that buildings should be built for adaptability, for unforeseen futures. Architecture should be able to be dismantled. Price thus atempted to rebrand the Potteries as a symbol for science and innovation as the concept for a constantly mutating university. This campus had no single building, but had all of its components displaced in a network of mobile classrooms, laboratories, and supporting spaces on the pre-existing industrial rail lines. The movement allowed constant variation through various transfer points. Architectural strategies for these structures included portable decking and inflatable walls.

info: http://citymovement.wordpress.com/2012/08/03/cedric-prices-potteries-thinkbelt/
images sourced from http://hacedordetrampas.blogspot.ca/2010/10/potteries-thinkbelt-de-cedric-price.html

Water and Borders in the Global Context

As scientists predict that natural hazards and disruptive events will continue to escalate in frequency, there is a global need to address the capacity of architectural and urban systems to actively recover, mitigate and manage risk, not just to passively perform sustainably. Resilience is defined as the ability of complex systems to adapt to changing conditions. Hydrological change is quickly emerging as an agent of the risk of fixed urban forms due to (1.) floods/ droughts originating from inland watershed interventions and (2.) rising sea levels. On a global scale, this is a timely and relevant effort as it makes today's rapidly urbanizing and populating coastal zones most prone to change.

Global Scope

global scope

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Zhongije's book traces the evolution of Metabolism from 1960 until its demise in the World Expo of 1970.
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The authors are also concerned about the fact that cities are expanding worldwide. Natural spaces such as forests, meadows and wetlands are being consumed and displaced.
Water is rarely thought of as a polluted, though "we drink it everyday, use it to keep clean, to promote a sense of well-being, and for recreation… it is generally and constantly available, naturally and through technology, the frequent precipitation in our latitudes, and running water in our homes all seem to give the lie to the idea that water could be a problem." (p. 130)
This attitude is certainly useful in terms of thinking about water-based architectures in terms of exploiting programs and details that would otherwise take these things for granted.
Problem of quantity and of quality
People have become accustomed to the fact that rivers are not suitable for bathing, or springs for drinking. Even tap water is distrusted. Air-conditioning, cleaning cars, and flushing toilets.
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