

TAB TALLINN ARCHITECTURE BIENNALE 2017 BIOTALLINN

Vision Competition “Re-metabolizing Paljassaare”

Competition Brief

Paljassaare Peninsula.
Wastewater Treatment Composting Product



1. COMPETITION STATEMENT

We look for proposals working at the intersection between biology, computation, and urban ecologies to define a new urbanity of the Paljassaare Peninsula in Tallinn.

In the Anthropocene age, no ecosystem is unaffected by human action: the aim of the Vision Competition is to rediscover potential interconnections between the artificial and natural landscape of Tallinn by addressing the conflictual relationship found in the Paljassaare Peninsula between land and coast, development and conservation, wastewater treatment and protected ornithological areas.

Tallinn Vision Competition calls for new hybrid scenarios represented as simulations of potential future coexistence. Proposals should be in the form of short videos or simulation frames where spatial articulation is a clear function of time. All kind of simulation methods are welcome from the most abstract digital computation to analogue material experiments. A specific set of data is provided upon registration and participants are invited to engage with this information as starting point for their simulations.



Paljassaare Peninsula Satellite view

TAB 2017 bioTallinn for Paljassaare

The Tallinn Architecture Biennale 2017 will undertake a non-anthropocentric investigation of the city of Tallinn, conceived as a territory of self-organisation and co-evolution of multiple dynamic systems which are at the same time ecological, infrastructural, technological and social in nature.

TAB 2017 explores the notion of 'collective intelligence' as it has recently emerged in scientific studies of nature, to envision a resilient and adaptive interpretation of the city.

The curatorial team will invite local as well as international artists and scientists to engage with this notion through original works that will inspire visitors with a vision of the city as 'new nature', conjuring scenarios of urban symbiosis and co-evolution.

Building on this vision, TAB 2017 explores a new format of 'design and research based' Biennale for which artists, architects, and their experimental practices are invited to propose design solutions for a specific part of the city of Tallinn, the Paljassaare Peninsula, located in the northern district of Tallinn. The site can be considered as a prototypical illustration of the contemporary conflictual relationship between the urbansphere and

the biosphere. Urbansphere refers to the global apparatus of contemporary urbanity, a dense network of informational, material and energetic infrastructures that sustain our increasingly demanding metabolism.

TAB 2017 proposes a radical revision of the contemporary urbansphere by suggesting novel terms for its sustainable co-evolution with the biosphere.

The TAB 2017 Vision Competition is formally and conceptually articulated as an inquiry into the potential future of the Paljassaare Peninsula.

The Paljassaare Peninsula hosts an ornithological protected park and the main wastewater treatment plant of Tallinn. The two systems are formally separated but materially interconnected, for example, through the flow of migratory birds flying from the sea to the inland and the flow of water and nutrients from the land to the sea.

We challenge participants to propose a new urbanity for the Peninsula which takes into consideration these types of dynamics and other co-evolutionary exchanges present on the site.

We ask participants to propose architectural devices able to provide material and operational frameworks to support interaction between heterogeneous social, infrastructural, architectural and environmental systems.



Paljassaare Peninsula. Wastewater Treatment Plant composting fields



Paljassaare Peninsula. Panoramic view of the marine radar on the cape of Väike-Paljassaare



Paljassaare Peninsula. Panoramic view of the a military rest in Suur-Paljassaare

2. COMPETITION SITE

The Paljassaare Peninsula

The Paljassaare Peninsula, located in the northern district of Tallinn, is characterized by a rich variety of trans-scalar dynamic systems; it is constituted by productive infrastructures as well as defensive artifacts which co-exist, at times as segregated environments, in other occasions as overlapping landscapes.

This part of the city of Tallinn represents a prototypical case study of a landscape that is at once rich in biodiversity and heavily anthropic. As such it is currently shaped by two forms of conservative ideology: environmentalism that strives to maintain the site as it is in a state of illusionary wilderness, and commercial development that envisions its transformation into an ideal green city.

Participants are invited to deal with the Paljassaare Peninsula through different interpolated territorial and material scales:

1. Baltic Region
2. City Region
3. Peninsula Region
4. Architectural Scale
5. Material Scale / Micro landscape



Paljassaare Peninsula. Drone view of the Marshland between Suur-Paljassaare and Väike-Paljassaare



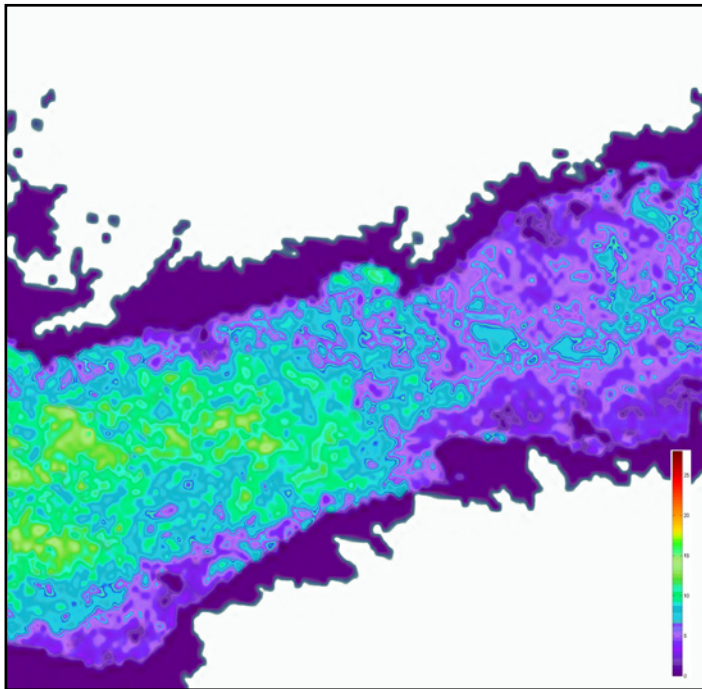
Paljassaare Peninsula. View from Water Treatment Plant bio-fermentation tower



Paljassaare Peninsula. View from bird watching tower, reeds and internal lakes, towards Water Treatment Plant



Paljassaare Peninsula. Close up of a Waste Water Treatment Pool



Baltic Region. Cyanobacteria Blooms

1. Baltic Region

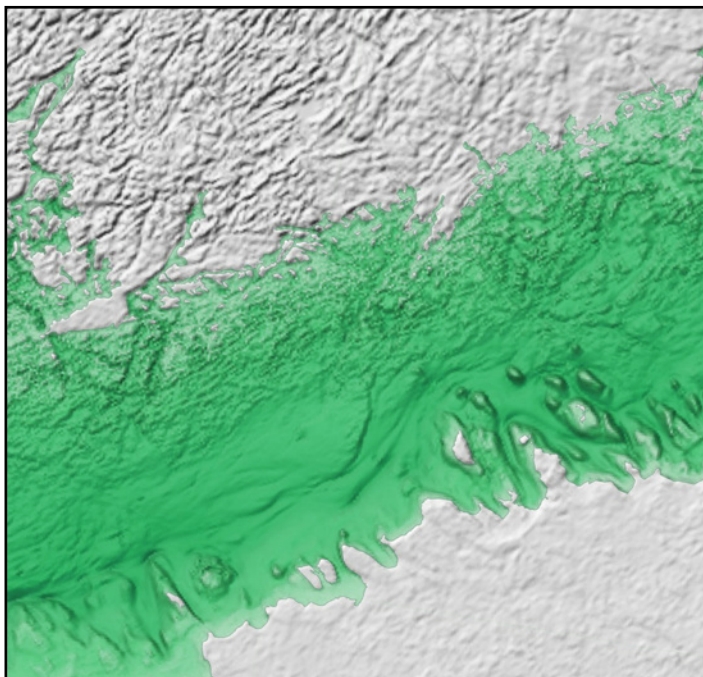
Narrative:

The Baltic Sea is a relatively shallow body of open water with low salinity, whose hydrology is constantly changing due to human activity, as it serves as the host for many shipping routes for the ports of the Baltic Region. Active oil drilling sites are scattered across it. The shipping and drilling network of oil have caused widespread pollution due to illegal dumping of oil, accidents and pump emissions into the air and waters of the Baltic Sea.

The ecology of the Sea is heavily affected by human activity. Run off chemicals leach from the land into the sea that put the cycle of Eutrophication in motion. As a result, massive cyanobacteria blooms engulf the ocean seasonally.

In the main Curator's Exhibition, this layer is rendered as a large scale projection onto the exhibition floor of an area of 15x15 meters and at a resolution of 5mm per pixel: such resolution will directly index the corresponding portion of Baltic Sea of 150x150km with a pixel size of 50m.

The projection is an animated video of a large scale territorial simulation describing the process of eutrophication of the sea and the related episodes of algae blooming.



Baltic Region. Bathymetry

The Algorithm:

INPUT is the location and quantity of pollutants introduced in the sea, the wind patterns, the currents and the salinity gradients.

OUTPUT is the blooming dynamics and the related biochemical transformation of the Baltic Sea body.

The project considers a frame of Baltic Sea that includes the portion connecting Tallinn with Helsinki; this is one of the most trafficked portions of it and, as a result, the one whose biochemical equilibrium has been altered the most. Within this frame points of introduction of artificial chemical agents are identified.

In the Curator's Exhibition, a simulation will show how these chemicals are spread and diluted by wind, currents and salinity gradients; their distribution alters the biochemical equilibrium of the sea thus triggering reactions which in turn generated new conditions of growth and blooming. The process continues in loops producing ever changing patterns of biomass growth and decomposition. Such patterns, in turn, affect coastal like and the evolution of marshlands such as Paljassaare.

Research:

HELCOM is the Baltic Marine Environment Protection Commission - Helsinki Commission) is the governing body of the Convention on the Protection of the Marine Environment of the Baltic Sea Area.

www.helcom.fi

Windity is an interactive weather and wind map.

www.windity.com

Finnish Environment Institute SYKE is both a research institute and a centre for environmental expertise.

www.syke.fi

The EU Strategy for the Baltic Sea Region (EUSBSR aims to save the sea, connect the region and increase prosperity.

www.eu.baltic.net

The Air Pollution and Climate Secretariat is a joint venture between four Swedish environmental organisations with the chief purpose of promoting awareness of the problems associated with air pollution and climate change.

<http://airclim.org/>

2. City Region

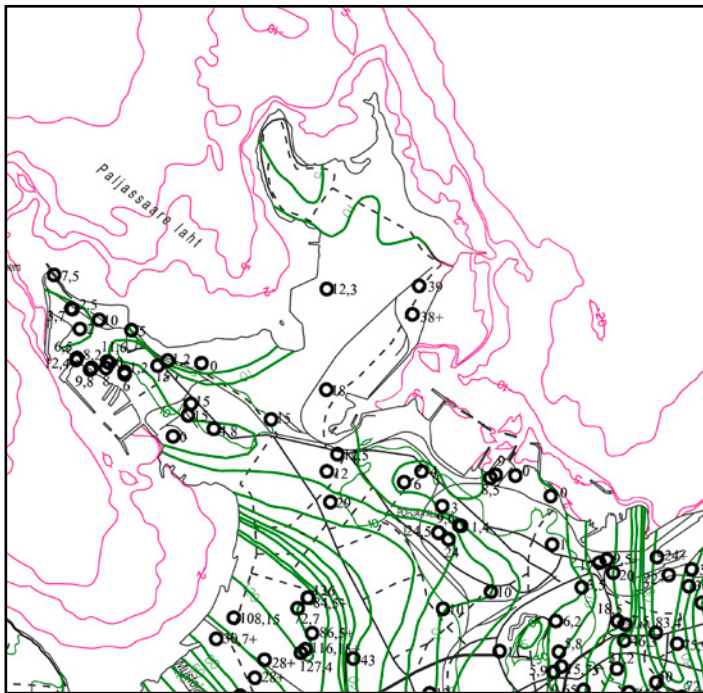
Narrative:

One of the most significant factors of anthropization of the Baltic Sea is given by the biochemical transformations produced by the releasing of wastewater from urban agglomeration in the sea itself. All wastewater from the city of Tallinn converges to one point in the end of the Paljassaare peninsula where it is treated before being released into the sea. This process is complex, nonlinear and has clear effects on the political and economic future of the city of Tallinn as a whole. At the same time, it has direct effects on the Paljassaare Peninsula and on the Baltic Sea.

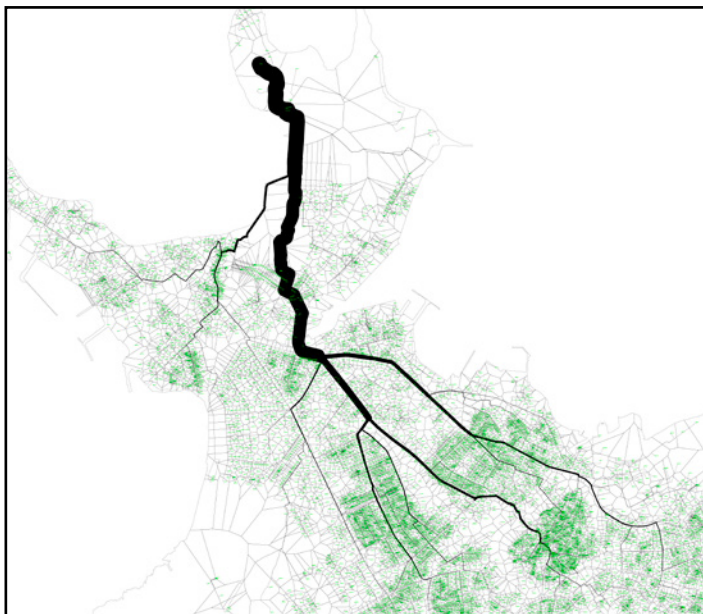
Every household is connected with the wastewater treatment plant and contributes to its bacterial load daily with a rhythm that depends on multiple factors, including weekly routines, rain and weather patterns, evolving cultural habits and economic growth.

The wastewater treatment plant reacts to these changes by adapting its operational protocols in an attempt to neutralise all bacteria that are harmful to human and animal life. In some occasions, when that is not possible, the wastewater is released into the sea and the company managing the system has to pay penalties.

The output of the treatment process is natural gas, used locally to heat the system or otherwise released into the atmosphere and deactivated sludge; this is piled up in large stocking areas and occasionally given away for free.



City Region. Infrastructure - Thickness of quaternary deposits



City Region. Infrastructure - Network with increasing width.



City Region. Infrared Summer (Source: ESA)



City Region. Water Index Spring (Source: ESA)

The Algorithm:

In the main Curator's Exhibition, the city wastewater infrastructure is described as a minimal network of paths joining every household with the discharging point in Paljassaare. Along these path quantities are computed in relationship to amounts of wastewater in time; the geology is also overlapped to compute rainwater patterns and their effect on the paths system load. The dynamic simulation of the network is materialized as a real-time network model of 7.5x7.5 meters, of fibers and LED lights.

INPUT parameters include the households density and geolocation, their wastewater production, the shortest path to treatment, the local weather patterns and rain flow patterns on the surface of the urban crust.

OUTPUT parameters include energy produced, nutrients produced, and their spatiotemporal distribution.

Research:

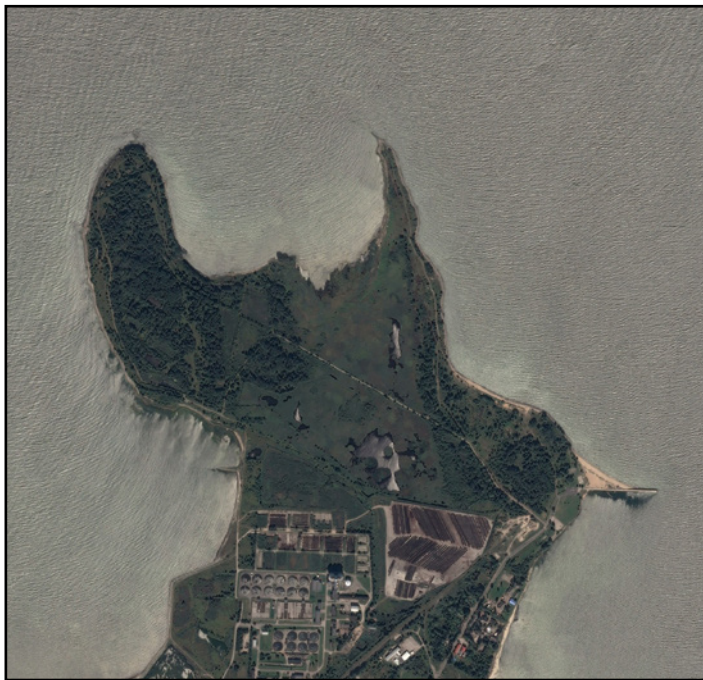
The Estonian Land Board Geoportal allows finding direct links to thematic web applications, through which the ELB mediates various spatial data managed by different owners. <http://geoportaal.maaamet.ee/eng/Maps-and-Data/GeologicalData/Geological-Base-Map/Using-terms-and-ordering-p375.html>

The official website of the city of Tallinn is the main source to find more about past and present activities of it. www.tallinn.ee/est/ehitus/Pohja-Tallinna-linnaosa-uld-planeering

Tallinn Environmental Strategy is a conceptual source document that plans the long-term future of sustainable development for the city environment. www.tallinn.ee/strateegia_ingl



Peninsula Region. Time-based - 03 June 2004



Peninsula Region. Time-based - 23 September 2013

3. Peninsula Region

Narrative:

The Paljassaare Peninsula was originally composed of two separate islands, still visible in its current form. It was terraformed in the last 150 years as a consequence of two phenomena; the deposition of dredged material from the construction of the Tallinn city ports, and the release of pressure accumulated in the crust of the earth during the glacial age which is pushing the surface of the city upwards by 2 mm a year.

In recent times, during Soviet domination, it was a military base and has such it was heavily infrastructured and all its original vegetation removed. It was also erased by any map of the city and became off limit to anyone not authorized.

Since the last 20 years, it has reopened and it has since become the dump site or most of Tallinn's solid and liquid waste. Years of neglect and underdevelopment from human have contributed to the return of many natural species, especially birds and reeds. They are now sharing their space with heavy infrastructure and with the biological waste of the city of Tallinn.

In particular, the wastewater treatment plant of the city now occupies the core of the Peninsula and borders with the newly established natural reserve, located at the top end of it. The two systems embody two forms of contrasting but also strangely similar forms of conservative ideology. As such they not only refuse to collaborate, despite their intense molecular exchanges, but also both refuse to recognize and embody an active role in the future of the city of Tallinn. This condition has prevented the Peninsula to evolve an urban identity and therefore to become an engine of renewal for the future city of Tallinn.

In the main Exhibition, this layer will propose a model for the morphological re-computation of the landscape of the Peninsula in relationship to the infrastructural terminals of the city's waste-water infrastructure; flow-lines of contaminated water will negotiate the soil composition, wetness, and topography and restructure it into a landscape of bio-digesters. Constantly monitored by Satellite technology, this synthetic urban landscape will feedback to the city's real-time wastewater network to provide a constant update on its current capacity of adsorption and molecular processing. Each molecular transaction will have its spatial location, morphological effect, informational address and economical value.



Peninsula Region. Time-based -01 June 2011



Peninsula Region. Time-based - 29 June 2015.

The Algorithm:

ESA (European Space Agency) and Level1 data from Satellite Sentinel2 provide us a high-resolution monitoring of Paljassaare Region at a resolution of 10x10 meter. Each pixel is representing a degree of biochemical processes on the ground and water through NDWI (Normalised Difference Water Index) and reveals its dynamic changes throughout the time. The degrees of wetness are algorithmically computed creating a flow between different ground materials that possess a different water content.

In the Curator's Exhibition, Paljassaare Peninsula is represented by a model of 3x3 meters using various digital technologies of laser cutting, CNC, 3D printing, etc.

The model will represent the morphological implications of the large-scale urban bio-computational process associated with the development of a real-time wastewater treatment infrastructure and its embedding within the material substratum of the city.

INPUT NDWI monitoring of the peninsula, wastewater treatment terminals, bio-digesting capacity of adopted bio-technological systems.

OUTPUT morphogenesis of the new wastewater treatment landscape.

Research:

Tallinna Vesi is the largest water utility company in Estonia, providing drinking water and wastewater disposal services.

<http://klient.tallinnavesi.ee/aastaraamat2013/eng/kka10.html>

The Paljassaare Peninsula is a pan-European Important Bird Area, with 233 recorded species of birds. The Tallinn Bird Club aims of drawing up a plan of activities and resources for the Paljassaare Special Conservation Area Protection.

http://www.tallinna-linnuklubi.ee/?page_id=166

In the 1980s 174 Soviet military units were based on 872 hectares of military area. The presence of military heritage in post-military landscapes raises interesting questions regarding the contemporary use and the dynamic interpretive frames related to such heritage.

www.rug.nl/research/kenniscentrumlandschap/mscripties/ma_scr_wvanvliet_2016.pdf



Architectural Scale. Eutrophied lake in the ornithological reserve

4. Architectural Scale

Narrative:

In the past 20 years, the wastewater treatment plant has expanded thus incorporating and eventually erasing a large part of wetland terrains constituting the core of the peninsula. In particular, the plant struggles to process the output of the wastewater treatment process, the so-called active sludge; after bio-digestion the sludge still needs one and half year of processing to become usable compost. And even after this further treatment, the current legislation prevents anyone to buy such nutritious material to fertilize public areas or other large crops. Large stocking yards have therefore emerged and on them long piles of compost. When rain hits those yards it dissolves molecules of phosphates and nitrates and percolates them into the soil or into the adjacent wetland and lakes. As such those molecules enter the jurisdiction of the natural reserve and affect its metabolism.

The main central lake of the reserve has become eutrophic and the reeds that populate its shores have grown to an extent that they almost entirely occupy its surface; this has pushed a great deal of wetland flora and fauna to the edges of the peninsula. Also, it has forced wetland plants to adapt to this condition favouring the strongest species of reeds that now occupy a great part of this portion of the peninsula.

Migrating birds too have been forced to the edges of the peninsula while resident ones have in many cases favoured the mechanical pools of the wastewater treatment plant, further trespassing the invisible line that separated the two systems.

The mechanical pools of the wastewater treatment plant not only provide constantly changing highly nutritious water in very accessible, vegetation free containers but are also artificially heated which makes them frost free all year. The energy for heating comes from the bio-gas generated in the bio-digestion process and is an integral part of the water treatment process. This layer of the matrix provides a 1:1 materialization of a prototypical bundle for wastewater purification and sludge biodigestion. The prototype integrates active bio-technological units operating on an artificial substratum; the system is monitored in real-time sending info about the status of its internal metabolism and receiving updates from the wastewater network. Its operations are constantly altered and adjusted by distributed sensing /feeding machines (drones) and resident birds.

The Algorithm:

The thickening and articulation of wastewater flow-lines generate filtering surfaces and bio-digesting volumes. The articulation of the existing landscape determines directions of flow and purification. The overall performance of each bio-digestor / bio-reactor is evaluated in real time and activates specific drones trajectories; drones then set in motion monitoring / feeding the system to guarantee its sustained operations. Growing plants and insects attract and feed resident as well as migratory birds.

INPUT: wastewater flow, nutrients, and seeds, bacterial ecologies

OUTPUT: morphologic articulation, bio-digestion data, natural gas, fertilizer, bird's food.

Research:

The eutrophication level of the lake situated in the centre of Paljassaare Peninsula is denoted to be variably high due to the nutrients that have accumulated over the last decade and this process of growth is accelerated periodically.

http://www.kirj.ee/public/Ecology/2010/issue_2/ecol-20102-83-98.pdf



Paljassaare Peninsula. Wastewater Treatment Composting Product

5. Material Scale / Micro Landscapes

Narrative:

The extreme eutrophication of the internal wetlands of the peninsula combined with similar tendencies in the overall Baltic frame is leading to a considerable increase in biomass growth and algae blooming. That combined with reduced oxygen and lighting levels cause widespread contamination of coastlines and waters due to such organisms decomposing; currents then accumulates in areas where large quantities can be found and intense smell detected.

The introduction and creation of a new microbiota embedded into the proposed bio-informational matrix accelerate processes of bio-digestion and phyto-depuration, able to release pure water and precipitate heavy pollutants as well as absorb excessive nutrients.

This biochemical unit also releases bio-gas that can be collected and deployed as a form of energy.

The micro-biochemical units are embedded into the informational substratum of the matrix, thus sending the signal of information to the other layers, to the bio-digesting units, to the morphogenetic stratum, to the city network, and to the Baltic body.

That enables the whole matrix to operate as an embedded mega-computer, evolving a form of self-awareness and self-regulation.

In the main Curator's Exhibition, a catalog of micro-biochemical units will be exhibited, sampling the diversity of the peninsula and testing the potential of multiple bacterial colonies into processing such samples. Hosted into Petri dishes and connected to an array of sensors the system will feed real-time information to the swarm of drones operating the across the two layers of the matrix.

The Algorithm:

INPUT substratum morphology, material samples / nutrients, bacteria cultures, light, heat, water.

OUTPUT microscopic images, biogas, oxygen, temperature and ph data, biomaterials.

3. COMPETITION AIMS

Due to the connection with local and global ecologies as well as to the presence of contemporary and past activities, which coincide with high biodiversity in flora and fauna, historical traces and waste treatment plants that determine the richness as well as the complexity of its landscapes, the Paljassaare Peninsula could become a terrain of experimentation of new models of interaction between the natural/maritime ecosystems, the social/cultural realm and the urban sphere of Tallinn; defining new forms of productive, cultural and economic metabolism for the city as well as new scenarios of coexistence between multiple agents.

Evaluation Criteria

Capability to interpret the bioTallinn brief: the Vision Competition calls for design solutions with a clear interest in experimentation and engagement with emergent digital design or biotechnologies.

Capability to articulate the themes of the overall brief in an urban proposal for the Paljassaare Peninsula: the Vision Competition challenges participants in considering Paljassaare as a potential hinge point and interface of new local and international dynamics which include distributed economies of production, heritage as a process, tourism as a material practice.

Capability to computationally re-interpret the maps and datascape provided and to propose a set of simulations which re-describe the morphology of the site

Capability to present the work and to articulate the exhibition value of the work.

Competition Format

TAB 2017 Vision Competition is an open international one-stage vision competition.

It is open to all architects and students of architecture.

Jury members and their family, relatives and business partners are not eligible to participate.

4. PRACTICALITIES

Competition entries

Concept and vision should be illustrated in the following formats:

A.

an **abstract** of 1000 characters maximum (spaces included)

B.

a **cover image** accompanying the abstract representing the vision of the proposal.

Image format: 4266x3200 px, JPEG (RGB) (longest size) not compressed (resolution 300 dpi).

C.

a **3 minutes video** illustrating the proposed concept and vision.

Video format: 1920x1080 px, .mov (codec H.264) / Maximum file size 500Mb / English voiceover or subtitles.

and / or

10 images illustrating the proposed concept and vision. Image format: 4266x3200 px, JPEG (RGB) (longest size) not compressed (resolution 300 dpi).

D.

an **A5 booklet** in .pdf format discussing how the brief have been approached, illustrating the design proposal and potential contribution to the main curator exhibition.

Booklet format: A5 layout in single pages in a multiple of 4 (resolution 300 dpi).

The A5 booklet should be submitted also in a physical printed format (See Competition Entry Form and Submission of Entries for more details).

The written explanation, drawings, diagrams and 3D visualisations of the proposal should be presented as clearly as possible.

The scale of the drawings and schemes may be chosen freely (subject to the objective of the proposal), as well as the graphic layout of the A5 booklets.

Participants grant the Estonian Centre of Architecture and TAB curatorial team the full permission to reproduce, translate, publish, exhibit, distribute and circulate the material related to TAB 2017 Vision Competition.

Schedule

Competition Launch: **21st of December**

Deadline for submission of competition entries: **25th of April.**

Selected winners will be announced by the **end of May 2017** and will be invited to take part with their videos to the Curator Exhibition and will be invited to the Symposium in September 2017.

All submitted projects will be exhibited as part of TAB 2017 bioTallinn.

Jury

- A. Rachel Armstrong, Newcastle University
- B. Liam Young, SCI-Arc
- C. Claudia Pasquero, Bartlett UCL / ecoLogicStudio
- D. Veronika Valk, Estonian Academy of Arts
- E. Toomas Tammis, Estonian Academy of Arts

Prizes

First Prize:	4.000 €
Second Prize:	2.000 €
Third Prize:	1.000 €

+ Five honorable mentions

Competition Entry Form and Submission of Entries

The competition is anonymous. The competition language is English.

Competition entries shall be submitted in digital format as a .zip or .rar folder (max 2GB) to through the following WeTransfer link:

<https://wetransfer.com/?to=vision@tab.ee&msg=vision>

Folders and files must named as follows:

TAB 2017_Vision Competition + the proposal motto

ex: "TAB2017_VisionCompetition_AdMaiores.zip"

ex: "TAB2017_VisionCompetition_AdMaiores_video.mp4"

ex: "TAB2017_VisionCompetition_AdMaiores_image.jpg"

The A5 booklet should be submitted also in physical printed format and sent to:

Eesti Arhitektuurikeskus

Põhja pst 27A
10415
Tallinn
ESTONIA

Competition entries (both digital entries and the printed booklets) must be received on or before the **25th of April 2017 at 11.59 pm (Time zone: GMT +2)**

Entries that are not DIFOT (Delivered In-Full, On-Time) will not be considered.

Competition entries will not be evaluated for the following reasons:

- The competition entry was not submitted by the deadline
- The competition entry does not meet the competition conditions
- The condition of anonymity has been broken
- The Jury deems the submitted entry to be unprofessional

The Jury is also capable of making a decision in the event of fewer members.

The Jury will decide which entries move forward to evaluation.

Registration

To download the competition package including images and cad maps as well as drawings, please proceed to the free-of-charge registration at:

Registration form at: <https://goo.gl/dNjVRA>

Submitting Questions

Participants may ask clarifying questions about the architecture competition.

Questions will be answered within a week. Answers will be sent directly to the person sending an inquiry and will also be published on the website of Tallinn Architecture Biennale (tab.ee).

Competition participants may submit relevant questions to the e-mail address **vision@tab.ee**.

Organisers

The competition is organised by the non-profit organisation Estonian Centre of Architecture and the brief has been proposed by TAB 2017 head curator Claudia Pasquero together with the assistant curator for architecture and urbanism Alice Buoli.

Project producers are Eve Arpo and Maria Kristiin Petersen from the Estonian Centre of Architecture.

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