*SENTINEL // marking energetic flows through time*

*Sentinel* brings to its harbor site and LAGI’s new typology of *Energy Overlays* a uniquely situated approach to “superimposing energy and art” onto St Kilda’s plan for “urban regeneration” where opposing *entropic processes* in which disorder and uncertainty tend to increase over time are central to its conception. Rather than treating these things as mutually exclusive, beneficial new types of energetic, programmatic, and experiential orders are proposed knowing the ‘tide of entropy’ and its effects, like those seen at the Great Barrier Reef, also have a significant role to play. The site’s systems— seen/unseen, social/ecological, biotic/abiotic—and their material processes and meanings are anticipated to evolve centuries into the future as they have throughout time, like the nearby limestone landforms continuing to erode until they are no more, the *Sow and Piglets* transforming into the majestic *12 Apostles*. In this regard *Sentinel* offers no enduring, ‘steady-state’ model but favors one of discovery and knowing in a future world of continually unfolding flux and change, marking and making visible its diverse life-processes and shifting horizons through time. As its name implies, it is a place of enhanced opportunities for ‘watching’ and ultimately, ‘seeing;’ inhabitable long into the future by those who would use it this way, to see what can be seen.

# multiple space-times

Many conceptions and practices of ‘space’ and ‘time’ have been developed by different world cultures over human history. These include at the social-ecological level models of so-called ‘enduring time’ of indigenous peoples in which time is continuous with the past projected into the present and future, as well of industrial societies and cities that mask unexpected crises and sudden ruptures, whereas at the natural- ecological level we have the models of diurnal/seasonal cycles and rhythms of life

and evolution. In modern physics, space-time models entail both ‘absolute’ types of classical, Newtonian physics independent of an observer alongside ones of ‘relativity’ in which observers are interrelated with systems and temporal processes that construct them. Sentinel is conceived of a place in which of all of these models and practices of space and time are present.

Interestingly, entropy, as accounted for by Physics laws of thermodynamics, is the only quantity at macroscopic levels linked to an apparent direction or flow of time,

sometimes called the ‘arrow of time’. Over its own ‘arrow of time’, Sentinel will be a site of multiple, evolving space-times of multiple thermodynamic systems and processes, defined initially by relatively ‘closed’ boundaries that allow energy but not matter

to pass through, but as time progresses and sea levels rise, by boundaries which become more ‘open,’ allowing both energy and matter to pass through them.

With the so-called ‘cosmological arrow of time’ vectoring toward the universe’s expansion, the related mental arrow in each of us emerges from our perception of a continuous movement from the known past to an unknown future which we anticipate

as something we are moving toward, paradoxically making whatever is actually already a part of our memory—desire, dreams and hopes—seem to be ahead us, literally and figuratively, like the shifting horizons framed through *Sentinel’s* space-time machine.

In the field marked by time and response, *Sentinel* seeks to optimize the immediate livability of the site at each point in time while offering solutions towards the site’s long- term survival by imagining decay towards reuse in relation to major threats, particularly flooding caused by torrential rainfall, long term sea-level rise which threatens to inundate the majority of the 200 square meter site within the next 100 years, and rising ambient temperature levels, a function of another driving problem, increased CO2 in both the air and water. In order to situate the observer in relation to these threat factors, various “parts” function to “mark” changes through time in relation to possible futures and past: what is, has been, or might have been based on the actions of those who came before and the innovations which change the way we approach the future.

*Sentinel:* parts and whole

# reed field

Serving as a divider between the world above, that of light and air, and the underworld ‘hypostyle hall,’ the reed layer questions what is natural and what is constructed, juxtaposing the previous reality of the site to a completely artificial layer. Elevated beams protrude through the slab surface to allow inhabitation along bands which direct / organize flows across the surface, making the water gathering function of

the surface apparent. Below, a simple free plan space allows adaptation of program through multiple event horizons. As water flows towards the collecting area the indigenous reeds and substrates serve as filtering media to purify storm-water.

# cone + spiral

An incision into the sedimentary rocks below the current ground level, the revealed surface performs from past to future, linking geological compression and process of the site to a human’s experience of the cone as a space frame machine. Towards future use, the revealed sandstone reacts with rainwater or encroaching seawater,

releasing CaCO3 which serves to reduce C02 absorbed in the water. Through time this scalable typology of ‘advanced weathering’ will reduce the acidity of the water, allowing the survival of native species in the Port Phillip Bay.

The hollowed section also allows a catchment basin for rainwater, providing large scale temporary storage for stormwater runoff from the site during violent thunderstorms.

The spiral path provides connections, visual, physical, and temporal, vectoring inwards and outwards, across the site’s natural and constructed stratigraphies. Most simply serving as a connector between the Upper Esplanade and Jacka Boulevard, it forces the experience of descent through constructed / revealed boundary conditions.

As the visitor moves in relation to a central event and the world beyond, the cyclical path both confutes and orients the action of moving across multiple layers and time places. Towards future metamorphosis, the extent to which the ramp is revealed beneath the rising water marks active flows through time.

# solar crown

The halo of elevated dye-sensitized solar cells functions across horizons as a beacon, in dialogue with the hidden lower dimensions and the site function of energy overlay typologies. Through the window / mirror dialectic of the semitransparent glass which compresses multiple horizons, the angled surface inverts the reading of plan and section, plotting the observers specific location in relation to time of day and the cardinal points. From the Upper Esplanade, the elevated halo frames views to the bay, retaining sight lines of the familiar vista and allowing a kaleidoscopic experience of place beneath colored glass projections.

Dye sensitized solar cells collect energy even in low light conditions, providing steadier energy flows and reducing the need for electricity storage capacity. The correlation between maximum solar radiation and daytime peak electricity demand further reduces the need for costly energy storage. The elevated array allows electrical collection well past the inundation of the Lower Esplanade level, but is viewed as framework into which new, more efficient, emergent technologies can be placed.

# the ‘whole’

Towards a long term arrangement of the site, multiple levels of energetic flows overlay to produce purposeful art of place. As the ramp spirals into the rising water, revealing / marking the stratigraphy below, the eroding structures frame an emergent ecosystem which understands the site’s entropic processes as a restoration process towards

the primordial experience. The site is both framed by water and a frame for water, marking change through multiple time scales. The reed field and the solar crown function in dialogue with each other, contrasting natural and man-made photosynthetic processes.

energy performance

# reed field

The reed field decelerates water flows towards the ground, decreasing ambient air temperature through evaporation. Lower surface temperatures diminish the need for cooling in surrounding buildings. The thickened section and vegetation also effectively shades the multi-use space beneath, insulating its functions through time. The photosynthetic process also converts CO2 to oxygen, improving livability.

solar crown

Dye-sensitized solar cells have a conversion efficiency of about 11%. We calculate an average solar radiation of 1313 kWh/m2 for our site and panel slope. The total DSSC

can be used to power the surrounding infrastructure such as the public restrooms and Palais Theater and can also be connected to the gird to provide clean energy in a larger Melbourne context.

The embodied energy in DSSC is a concern, but their fundamental window / mirror qualities, kaleidoscopic projections, and cast shadow ensure a multiplicity of function even after they degrade as a technology for electricity production. Silica functions towards entropic process, mirroring the erosion taking place below grade. As more efficient technologies emerge, new energy overlay typologies can be added to this fluctuating model, superimposing a future onto a sublime relic of the past.