CHAPTER 8
TECHNICAL DEVELOPMENT

Figure 8.1. Initial technical sketch. Author, 2016.
Figure 8.2. Technical iteration 01 - process drawings, Author, 2016.

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Figure 8.3. Technical iteration 02 - process drawings, Author, 2016.
Figure 8.4. Technical iteration 03 - process drawings, Author, 2016.
Figure 8.5. Technical iteration 04 - process drawings, Author, 2016.

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8.1 TECHNICAL CONCEPT

8.1.1 INTEGRATED WATER ARCHITECTURE

Professor Herbert Dreiseitl (cited in Margolis & Chaouni, 2014:7) contends that water has played a major technical role in the design of structures in both the natural and urban landscape. Margolis and Chaouni (2014:19) states that an integrated water cycle management (IWCM) system draws on multiple sources of water, as found in the hydrological cycle, and forms part of an inclusive, redundancy factored strategy that can be adapted to conventional building construction. This system makes a closed-loop water system more effective than standard water management practices (Margolis & Chaouni, 2014:19).

The aim of the study is for the proposed building to be integrated into the natural water cycle, which was explored in technical process iterations 01-04 (see Figure 8.2-8.5) and later revised in iterations 04 and 05 (see Figures 8.8-8.20). This aim is expanded and architecturally translated in a manner which expresses the building’s embeddedness in the hydrological cycle, as shown in Figure 8.6. The tectonic solution expands further to accommodate eco-living machine services which would form an integral part of the building’s water reticulation and which would close the building’s regenerative water loop. The ETFE roof system (tectonic), passive and active and reticulation are integrated in the building’s floor system.

The technical concept thus translates the hydrological cycle and how it physically circulates water. An integrated water system should include purified river water, water harvested from the atmosphere, rainwater collected from the building’s roof, and fresh groundwater according to Margolis & Chaouni, (2014:19).

The building’s relationship with the hydrological cycle can be understood in terms of the surfaces (tectonic) and sources (stereotomic) relative to the water cycle. This principle can be understood as the manner in which walls, floors and roofs are related to the hydrological cycle, as shown in Figure 8.7. The tectonic concept functionally expresses the manner of exposing and using rainwater, river water, evaporation, and the site’s groundwater in order to meet the building’s water requirements and to further regenerate the surrounding urban context.

The building expresses tectonic lightness through the use of an ETFE roof that factors climatic conditions (daylight and shading) to provide the necessary lighting and thermal comfort for making an indoor pool environment habitable. The ETFE roof system also possesses integrated shading technology, and its surface is able to collect rainwater in an articulate manner (see Figure 8.31).
Figure 8.6. Tectonic Concept. Author, 2016.

Figure 8.7. Building axonometric showing the various building components. Author, 2016.
Figure 8.8. Technical Iteration 04 - Site Plan. Author, 2016.
Figure 8.10. Technical iteration 04 - Ground Storey Plan. Author, 2016.
Figure 8.11. Technical iteration 04 - Basement Plan. Author, 2016.