

CHAPTER 9 CONCLUSION

REFLECT



flowing forward

Figure 9.1. Sketch showing qualities of water, structure, nature and light in formulating appropriate river space. Author, 2016.

9.1 REVIEW: ISSUES AND INTENTIONS

9.1.1 GENERAL ISSUE

How do designers facilitate 21st century water needs and how do we remain cognitive about its importance or relevance in a world where natural resources are becoming increasingly polluted and scarce?

South Africa is considered an arid country with threatened eco-systemic river networks as illustrated by Action Aid South Africa (see Chapter 1.). Centralised urban water planning will continue in social practice according to Sedlack (2014: 244). If urban water networks are strategically updated with innovative bio-technologies, our current water systems and infrastructure would better serve urban and rural settlements. Each city should guide its own criteria regarding a sustainable pathway for its local water distribution and usage, Sedlack (2014: 244).

In the urban realm, water can be conserved and appreciated by providing public urban river space that exposes issues confronting water pollution or scarcity and showcase technological solutions regarding water as a valuable resource in the 21st century (see Figure 9.2 and 9.5). Water should not only be seen as a resource requiring consistent conservation. Water should be celebrated and functionally exposed as per the dissertation's balanced architectural solution of water purifying technologies with therapeutic pool spaces.

9.1.2 URBAN ISSUE

How do we positively integrate river space in an urban environment?

Historically, flood control, water supply, water quality and urban riverfronts were treated as isolated design responses in order to facilitate transitional urban growth, as stated by Robert France and James Macbroom (2002: 379). In the 21st century, an appropriate response would be to synthesise these layered programmatic responses into an integrated whole that facilitates human and ecological needs (France and Macbroom, 2002:379). Urban river spaces require design potential that allows for public access, historical and cultural narratives, and recreational opportunities (France and Macbroom, 2002:379).

The dissertation applied a regenerative water method (see Chapter 3) that contributes a therapeutic, water purifying function, spatially allocated as a connecting urban riverfront to the surrounding isolated programs (see Figures 8.15 and 8.16).

It is considered as an additive and synthesised response based on the Apies River's previous natural and historical layers. The design response is intended to maintain and to operate the qualities of the site according to regenerative design principles (see Chapter 3) Prinshof Medical District and along the Apies River.



Figure. 9.2. Connect communities to waterways. www.epa.gov. 2016.

9.1 REVIEW

9.1.3 ARCHITECTURAL ISSUE

How does architecture engage with basic water infrastructure towards a regenerative intervention that is both poetic and functional?

An architectural response regarding the engagement with the Apies River channel arises out of mapped hydrological elements as found on site (see Chapter 2 mapping exercises). The mapped exercises may extend, as per this dissertation's instance to the natural, human and experiential layers as identified on site. The Apies River was seen as the primary spatial element requiring a substantial amount of focus (see Chapter 6).

The riverfront space forms part of a spatial response that would relate the open site to the river and mediate linkages to the surrounding buildings which were identified as operating in isolation. The building program (see Chapter 4) required the combination of an appropriate functional response to the Prins Hof Medical District, as well as to mediate a potential regenerative impact that could be drawn from the water of the Apies River. Water mediates the role of therapeutic, medical and leisurely water healing spaces. This informed the architectural intervention as it was embedded in the hydrological cycle of the site. The architectural intervention

combines an integrated water strategy involving collection, purification, storage and distribution which draws on the site's potential for river water, rainwater, groundwater and atmospheric harvesting (see Figure 8.31).

These strategies inform the architectural approach of employing and showcasing functional water technologies with the poetics of experiencing architectural space that manipulates building surfaces to embed the building within the hydrological cycle. This was architecturally expressed in the 'tectonic' lightness of an ETFE roof system that conveys rainwater via drainage channels towards water storage tanks. Rammed earth construction expresses 'stereotomic' heaviness of the harvested groundwater.

Eco-Living Machine technologies would systematically and spatially form part of the architectural intervention. Atmospheric harvesting nets passively collect water from the atmosphere and was inserted in allocated green spaces. The architectural response embeds the building in the hydrological cycle and appropriates the building's exterior pool spaces which open up to the Apies River (see Figure 9.3 and 9.4). This approach synthesises water's infrastructural requirements required for a building to function and in principal, to enhance the spatial experience of the hydrological cycle by the user.

9.2 THE WAY FORWARD

9.2.1 URBAN ISSUE

How do we positively integrate river space in an urban environment?

9.2.2 URBAN ISSUE: THE WAY FORWARD

Returning rivers to a natural state is not feasible in most scenarios according to Robert Speed et al. (2016:54). Many early river restoration initiatives promoted the concept of reforming rivers to a natural state. Many projects were successful and many riverfronts were not realised. Accordingly, many river restoration approaches and guidelines have planned restoration objectives based on historical or similar precedents as argued by Speed et al. (2016:57).

The acceleration of physical change in global urban river conditions frequently makes river naturalisation impractical due to physical and economical limitations (Speed et al., 2016: 54).

In China, the concept of returning a river to pre-development conditions is irrelevant for the local populace given the historical background of man-made alterations made to the river (Speed et al, 2016: 54). As a result, water resource

organisations need to revise their approach in achieving river restoration objectives (see Figure 9.3). The scale and complexity of river management and restoration issues is challenging the capacity of scientific concepts of rivers to identify when and what action is necessary to best address declining river health according to Speed et al. (2016:57). Strategic river restoration requires a robust approach that factors societal demands which are gradually evolving.

In order to ensure the advantages of river restoration are perpetually in operation, it requires financial sustainability to seamlessly integrate with ecological responsibility Speed et al. (2016:54). They are seldom maintenance free and require ongoing management budgets as stated by Speed et al. (2016:54). Sustainability requires a river ecosystem to acquire an adaptive capacity to maintain its restored condition, by being self-sustaining Speed et al. (2016:56).

River restoration needs to tolerate different functions that a river performs and determine which needs to be prioritised. It requires the acknowledgement that a river will perform different functions or hydro-social contracts at different geographic locations at the core or perimeter of river catchment basins Speed et al. (2016:57).

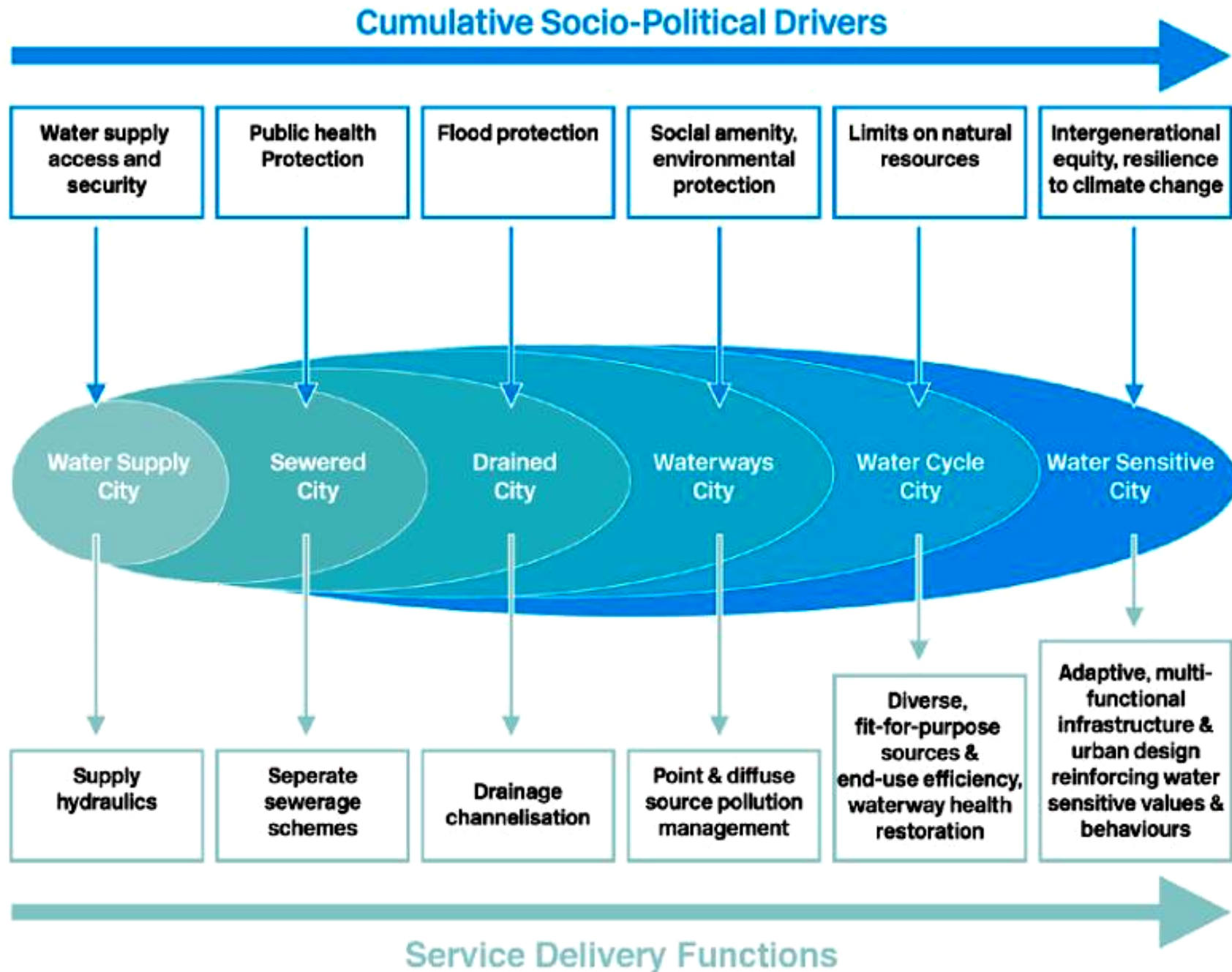


Figure 9.4. Typology framework of different city-states in transition towards sustainable water development.p.152, Speed et al., 2016.

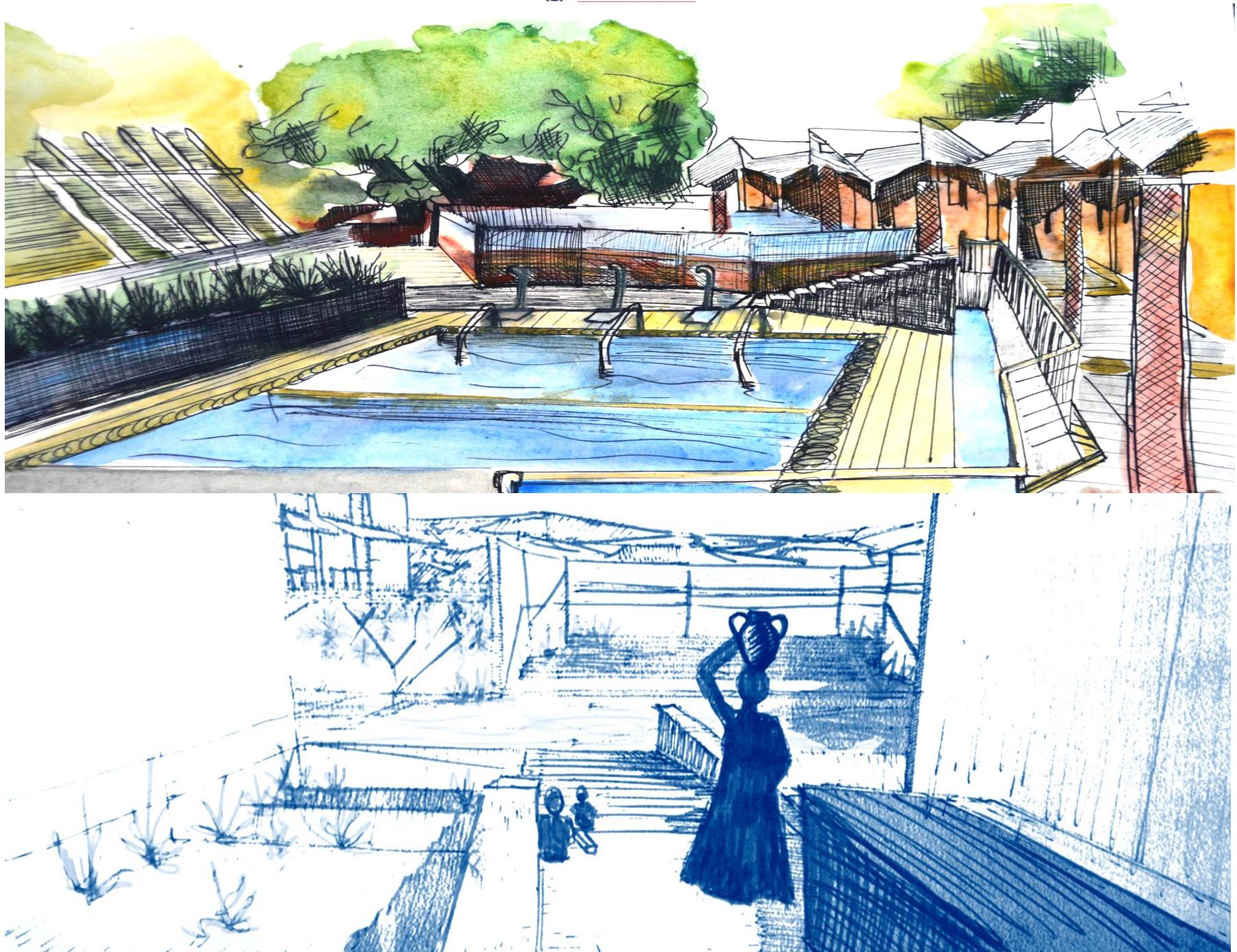


Figure. 9.5. Bio-historic approach to project dissertation: final iteration in comparison to conceptual iteration. Author, 2016.

9.3 SOLUTION: SYNTHESIS

9.3.1 WATER IN THE FUTURE

Water has supported the landscapes of our civilisations as explained by Anthony Wylson (1986: 3). Earth's evolution and transformation is due to water (Wylson, 1986: 20). Nowadays we are facing complex urban development processes leading to completely new challenges concerning the management and design of urban infrastructure systems and landscapes according to Wylson, (1986:20). The eco-systemic narrative for the 21st century has resulted from historically additive layers of how human settlements have approached natural resources for benefits regarding economic or social development (see Figure 9.4). Water should be 'seen beyond its tap' potential in a manner that is exposed and sought after to improve spatial quality by creating attractive spaces (see Figure 9.5).

9.3.2 APIES RIVER AS AN URBAN REGENERATIVE FORCE

In terms of urban river restoration, Pretoria is a water-sensitive city, that has added biological, drainage, flooding, water supply, water quality and water purification infrastructure typologies in successive layers over time (see Chapter 2, Figure 2.31 and Figure 9.4). Each design response is appropriated to its corresponding natural or man-made issue. Important elements of urban river corridor planning include

their relationship with adjacent urban spaces, active programmatic requirements, environmental education (Saw Mill River Precedent, see Figure 5.3), habitat linkages and recreational potential.

9.3.3 WATERSCAPES IN ARCHITECTURE

Waterscapes are constructed water features in public urban spaces that allow people to experience the qualities of water through touch, sight and sound (see Figure 9.6). The rationale behind this way of treatment of water resources is to produce sustainable and beautiful urban spaces where people can engage with the pleasures of water.

Water should be seen not only for its functional aspects in sustaining a building' water needs. Opportunities exist for a poetic approach to be expressed, as per the location of water infrastructures and surfaces that receive water in different locations of the building, i.e. ground, roof, programmed interior spaces and water storage (see Figure 8.20). These are identified as architectural opportunities that have the potential to be dynamically or integrated into the therapeutic experience of 'water spaces'. As pieces of urban infrastructure, waterscapes respect and celebrate the hydrological cycle of nature while simultaneously expressing the valued importance of water for humankind (see Figure 9.7).



Figure 9.6. Waterscapes conclusion to project dissertation and spatial outcome. Author, 2016.

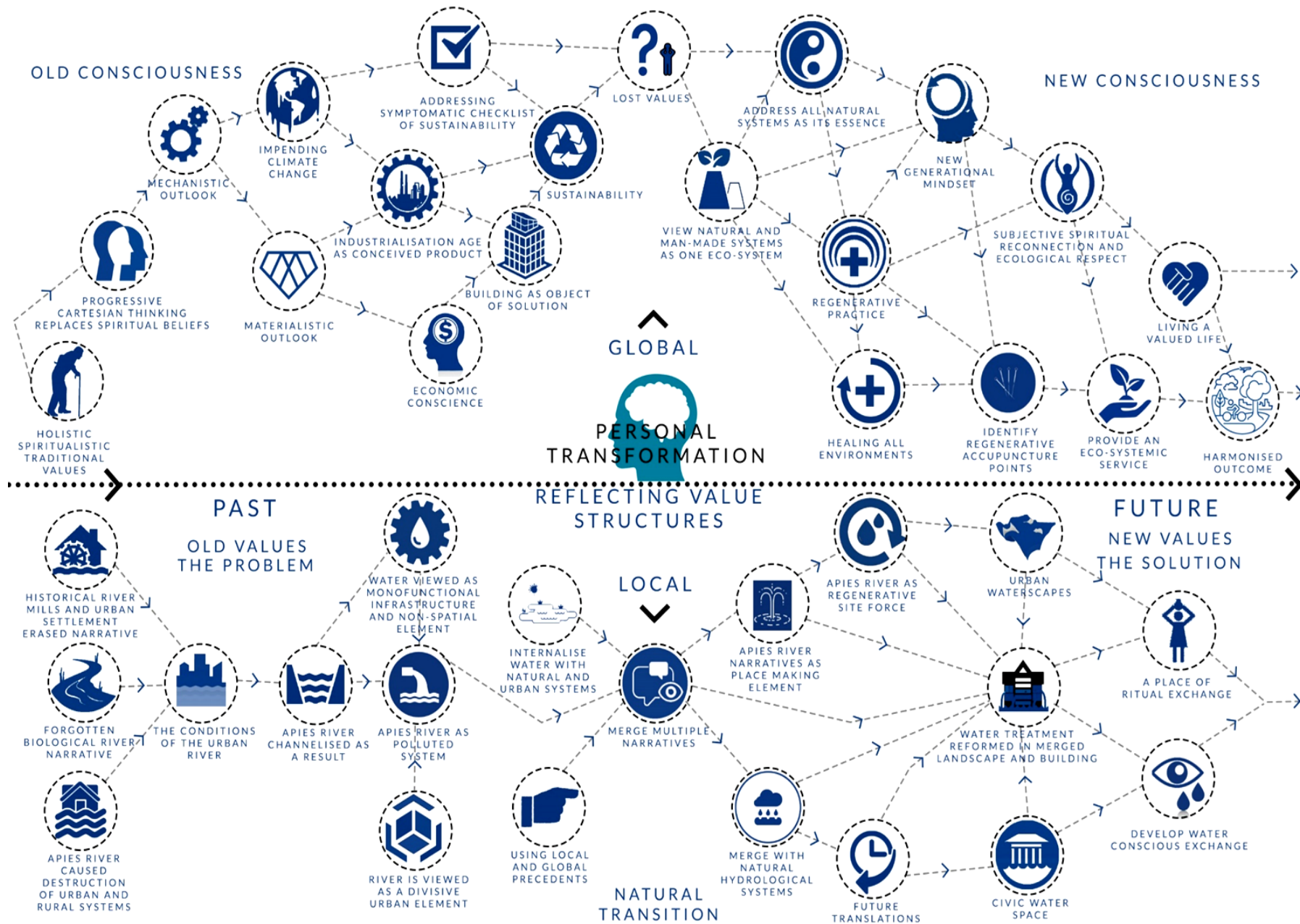


Figure 9.7. Abstract Diagram demonstrating the Apies River Narrative over time. Author, 2016.

9.4 FINAL PRESENTATION

THE SOURCE

REGENERATIVE BIOHISTORIC WATERSCAPES

"We live in a world defined by 19th century water law, 20th century infrastructure, and 21st century water needs." - Jennifer Pitt, (medium.com, 2015).

MAIN ISSUE

How do designers facilitate 21st century water needs and how do we remain cognitive about its importance or relevance in a world where natural resources are becoming increasingly polluted and scarce?

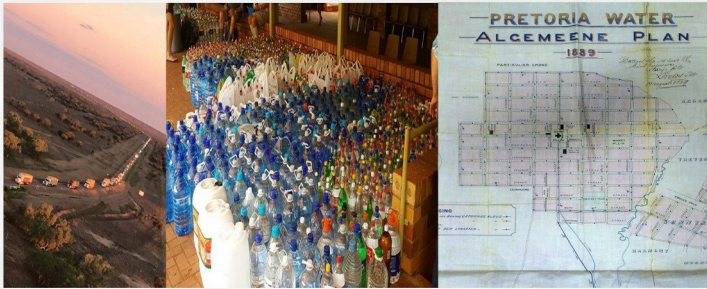


Figure 5. Concept design. www.architectmagazine.com, 2017.

Figure 6. Project display. www.architectmagazine.com, 2017.

Figure 7. Project Water History. www.architectmagazine.com, 2017.

URBAN ISSUE

How do we positively integrate a segregated and forgotten bio-historical resource in an urban environment?



Figure 8. Mapping Context. Project by the British City of Exeter. www.architectmagazine.com, 2017.

Figure 9. Photo of the Apies River. Photo: David Gossel. www.architectmagazine.com, 2017.

ARCHITECTURAL ISSUE

A key concern arises – how should designers manage and develop future urban water projects with environmental consciousness in mind in order to realise a sustainable future scenario?

How do we make river space functional and poetic?



Figure 10. Water Group Urban Vision Framework Scenario. www.architectmagazine.com, 2017.

Figure 11. Water Group Urban Vision Framework Scenario. www.architectmagazine.com, 2017.

identify the issue

APIES RIVER

NATURAL AND ARTIFICIAL INTERFACES

UNCURATED RIVER SPACE

DISCONNECT



Figure 12. Apies River. www.architectmagazine.com, 2017.

Figure 13. Apies River. www.architectmagazine.com, 2017.

Figure 14. Apies River. www.architectmagazine.com, 2017.

ECO-SYSTEMIC SERVICES

MAPPING SITE POTENTIALS

INTEGRATION WITH THE URBAN GRAIN

PASSIVE AND ACTIVE

WATER INFRASTRUCTURE TYPOLOGIES

ANALYSE RIVER SPATIAL CONDITIONS

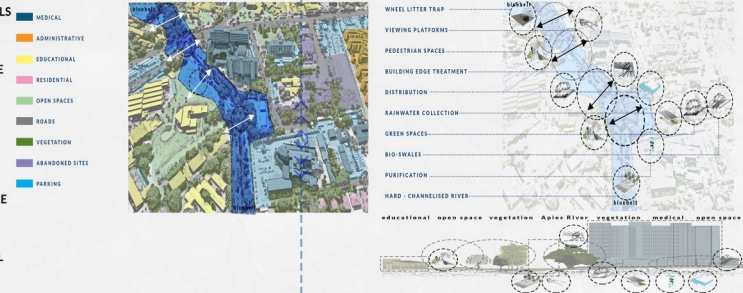


Figure 15. Water Group Urban Vision Framework Scenario. www.architectmagazine.com, 2017.

Figure 16. Water Group Urban Vision Framework Scenario. www.architectmagazine.com, 2017.

MEMORY + IDENTITY

THE RIVER'S IDENTITY

PAST PRESENT FUTURE LAYERS

BLUEBELT

ECOLOGICAL

RITUAL

INTERFACES

NODE

RAINWATER

MOVEMENT

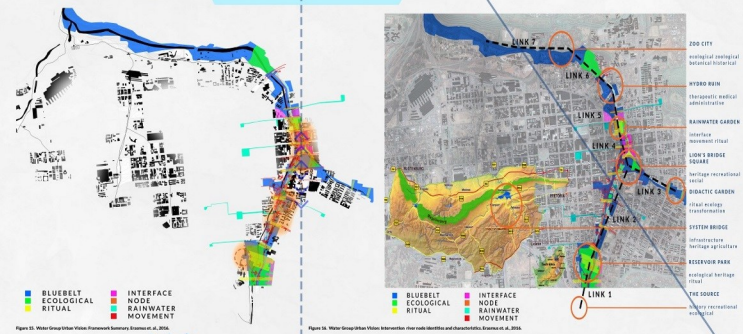


Figure 17. Water Group Urban Vision Framework Scenario. www.architectmagazine.com, 2017.

Figure 18. Water Group Urban Vision Framework Scenario. www.architectmagazine.com, 2017.

CONTINUUM IN TIME

HISTORICAL CONNECTIONS

NATURAL SETTING

AGRICULTURAL SETTING

PROCESS OF REBUILDING

MEDICAL DISTRICT

CHANNELISATION

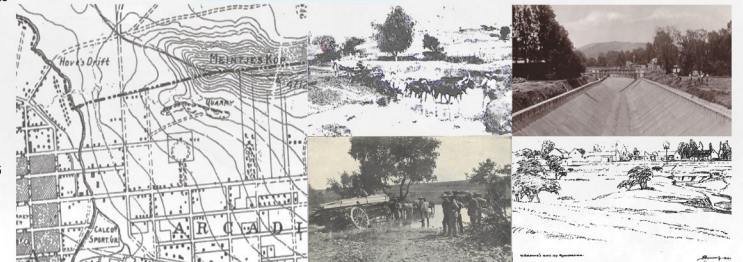


Figure 19. Water Group Urban Vision Framework Scenario. www.architectmagazine.com, 2017.

Figure 20. Water Group Urban Vision Framework Scenario. www.architectmagazine.com, 2017.

develop a framework

9.4 FINAL PRESENTATION

MAN MADE + NATURAL SYSTEMS

THE MAKING OF PLACE

SYNTHESISE HYDROLOGY WITH USER NEEDS

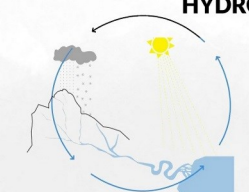


Figure 20: The hydrological cycle. © P. R. Shroff, 2012.

HYDROLOGY

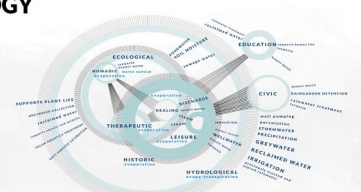


Figure 21: Regenerative approach for project identification and spatial outcomes (adapted from: From Healing and Health, Author, 2016).

APPLY A SYSTEM OF TECHNOLOGIES AND STRATEGIES BASED ON WORKING OF LIVING SYSTEMS

EXTEND TO LANDSCAPE ELEMENTS STRUCTURAL AND DESIGN ATTRIBUTES

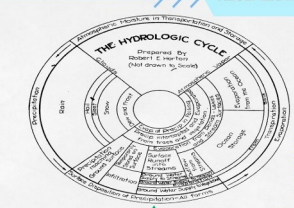


Figure 20: Regenerative thinking for a comprehensive study. © P. R. Shroff, 2012.

REGENERATIVE PRACTICE




Figure 22: Application of the hydrologic cycle by Robert E. Horton, 1939, reimagined by 2016.

GENERATE HEALTHIER PATTERNS ON SITE

TECHNOLOGICAL ADAPTATION

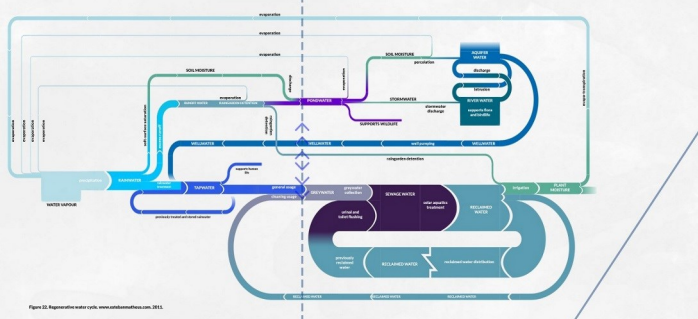


Figure 22: Regenerative water cycle. www.regenwater.com, 2015.

REGENERATIVE WATER THEORY

SYNTHESISE NATURAL AND HUMAN SYSTEMS

MAKING THERAPEUTIC WATER SPACE

CONTINUE SITE IDENTITY THROUGH HYDROLOGY ECO-SYSTEMIC NARRATIVE

NET POSITIVE SUPPLY AND EFFICIENT RE-USE OF WATER FOR SURROUNDING DISTRICT




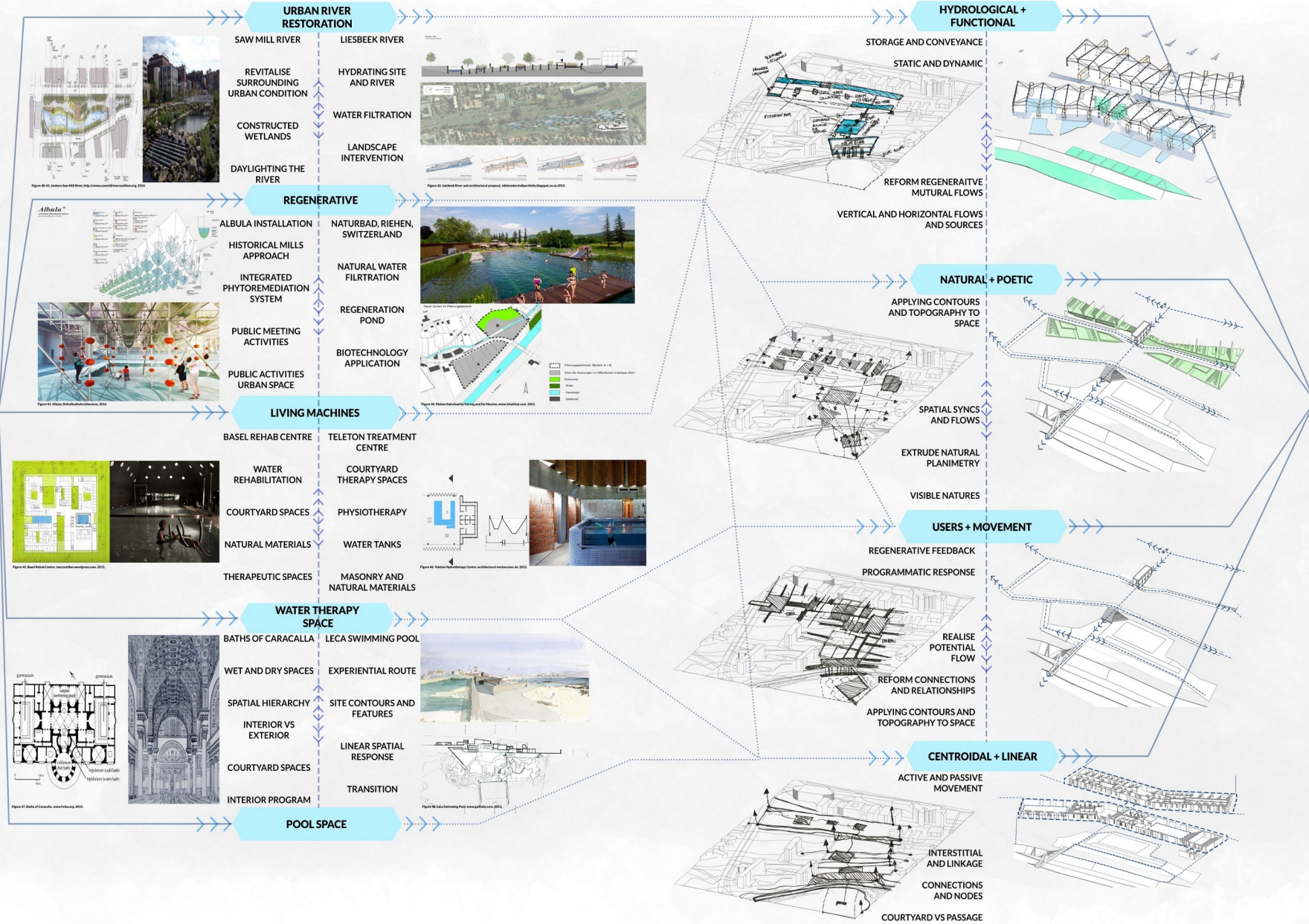
Figure 23: 2015, March 2016, River Management Collaborative, 2016.

Figure 24: 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 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9.4 FINAL PRESENTATION

THE COURSE

RIVER VEINS



research examples

derive spatial informants

9.4 FINAL PRESENTATION

REFLECT

MAIN RESPONSE

How do designers facilitate 21st century water needs and how do we remain cognitive about its importance or relevance in a world where natural resources are becoming increasingly polluted and scarce?

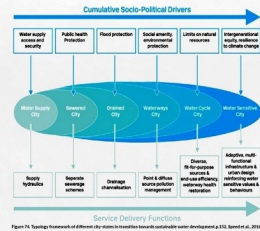


Figure 74. Towards framework of different city types to translate towards sustainable urban development, J.L. Smit et al., 2016.



Figure 75. Connect communities to waterways, van der Stoep, 2016.

URBAN RESPONSE

How do we positively integrate a segregated and forgotten bio-historical resource in an urban environment?

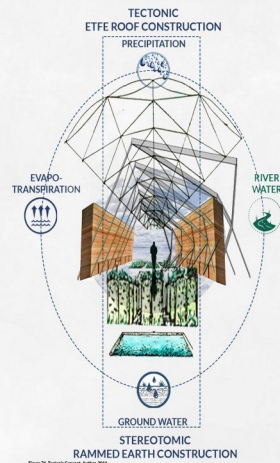


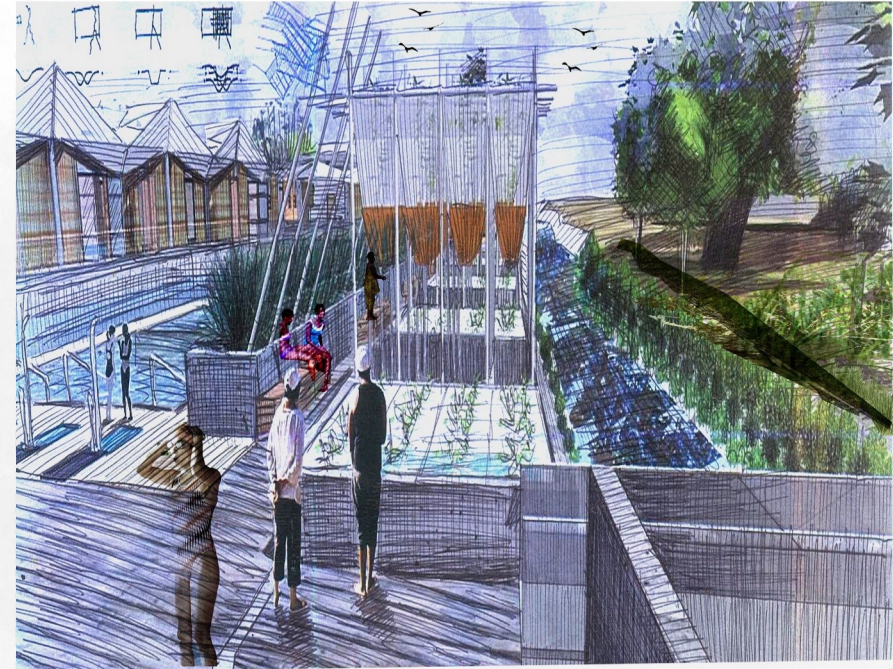
Figure 76. Tectonic Construction, van der Stoep, 2016.

ARCHITECTURAL RESPONSE

A key concern arises – how should designers manage and develop future urban water projects with environmental consciousness in mind in order to realise a sustainable future scenario?

How do we make river space functional and poetic?

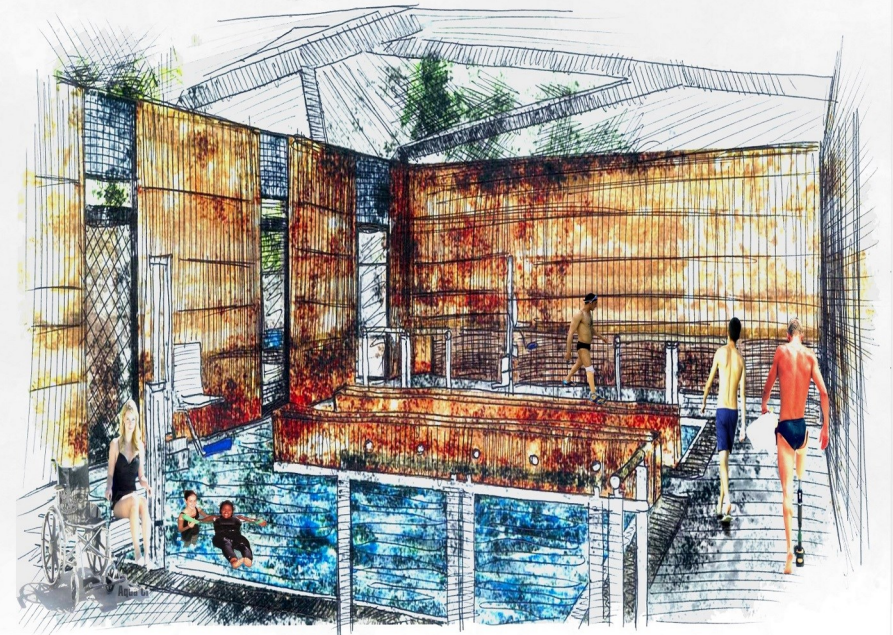
Layers of the past, present and future needs and requirements of water need to be approached in a manner that synthesises hydrosocial contracts would enable designers to facilitate 21st century needs and make it relevant in today's context where water is becoming increasingly polluted and scarce.



By using a regenerative water approach in conjunction with site derived spatial informants as a method to connect the river with the surrounding urban grain.

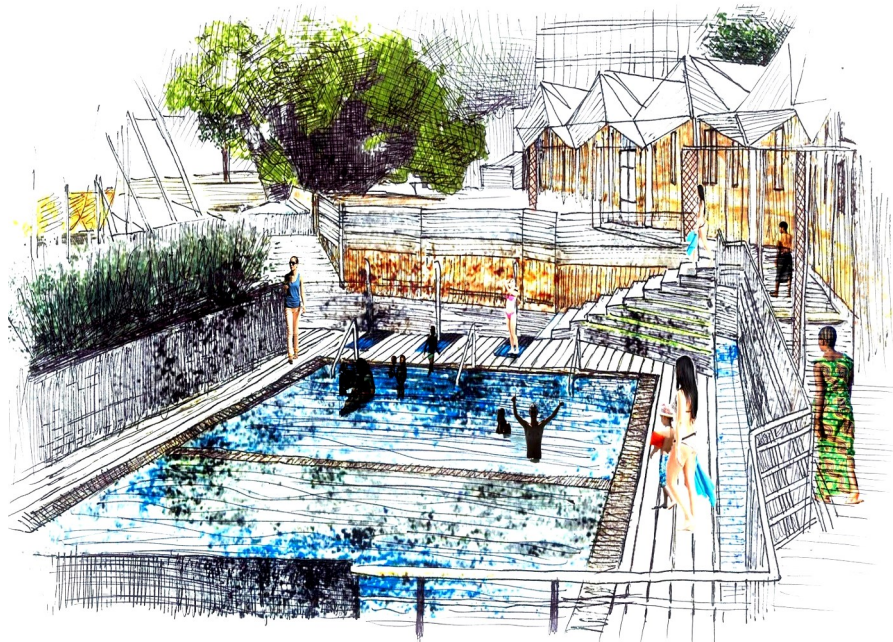
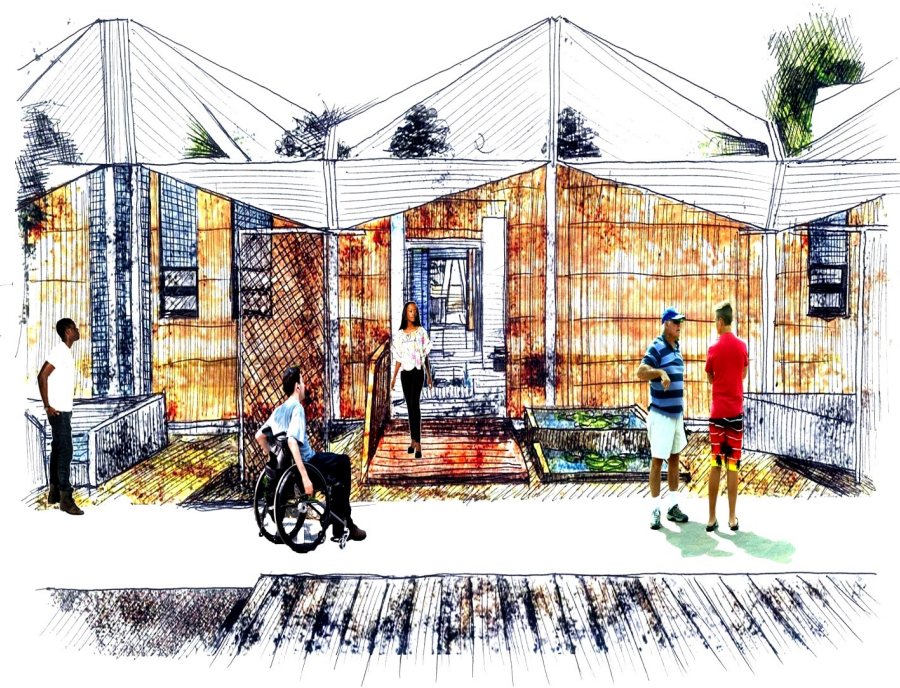
Systemic eco-systemic limitations exist in addressing the totality of the Apies River.

Embed an adjacent architectural intervention in the hydrological cycle as a design strategy for making river space functional and experiential.

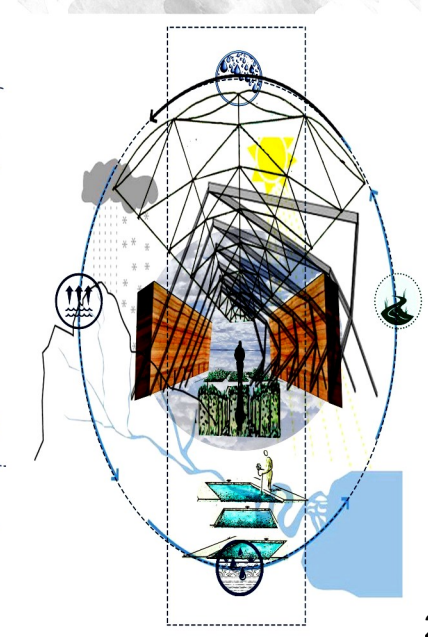
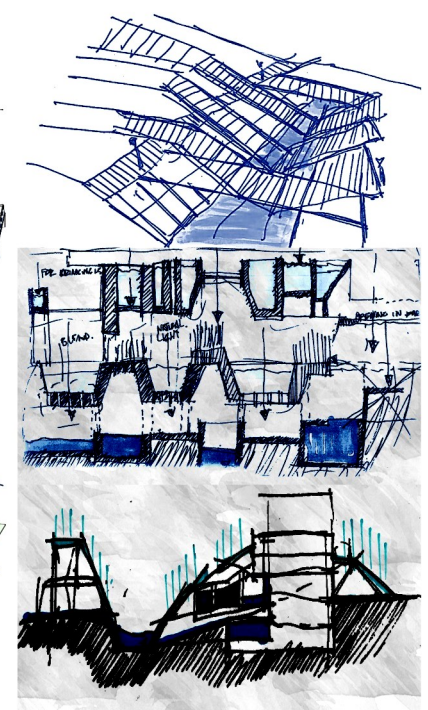
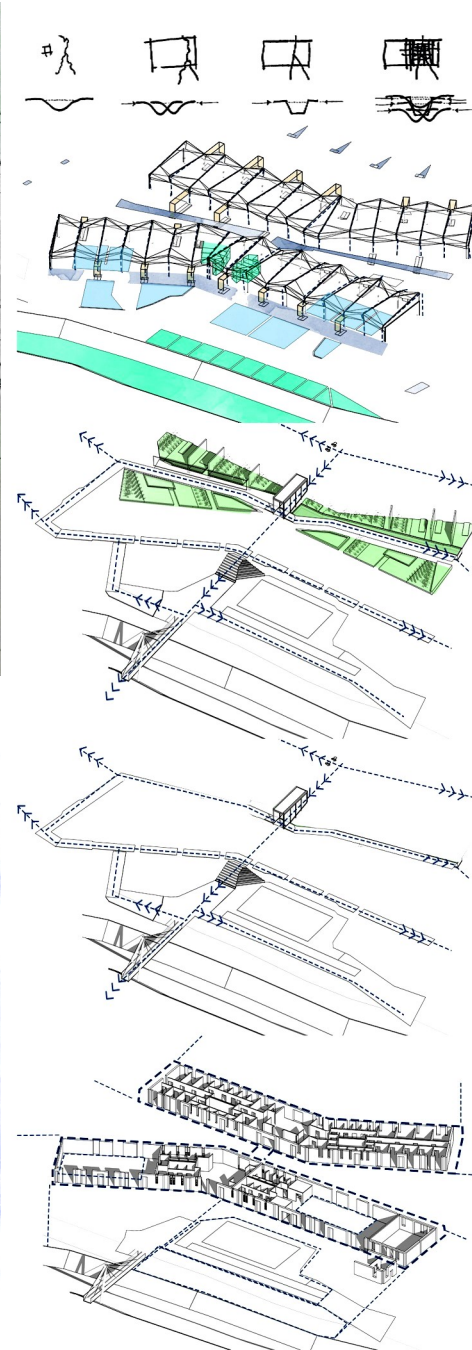
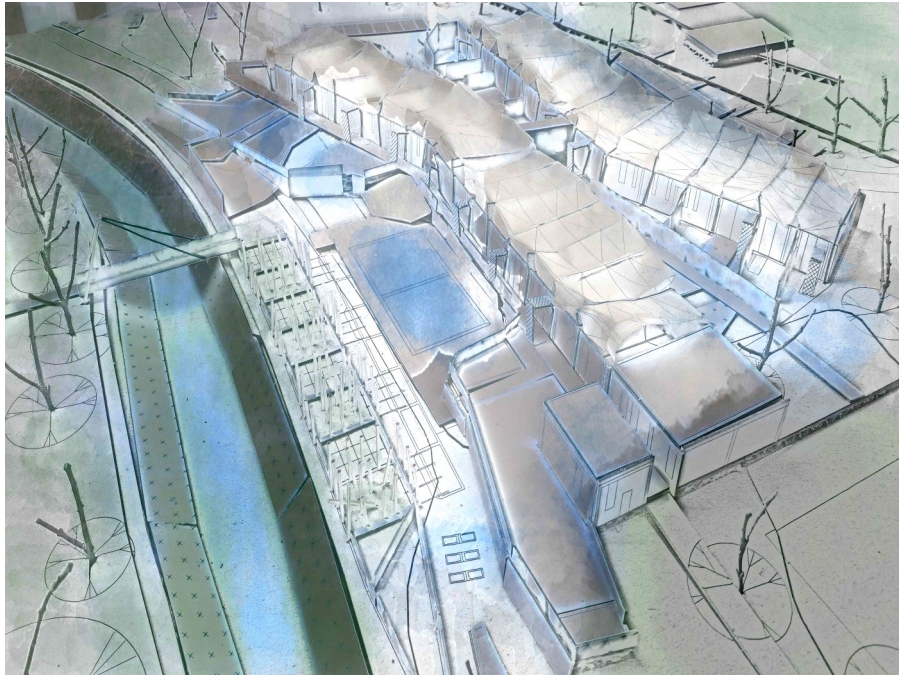


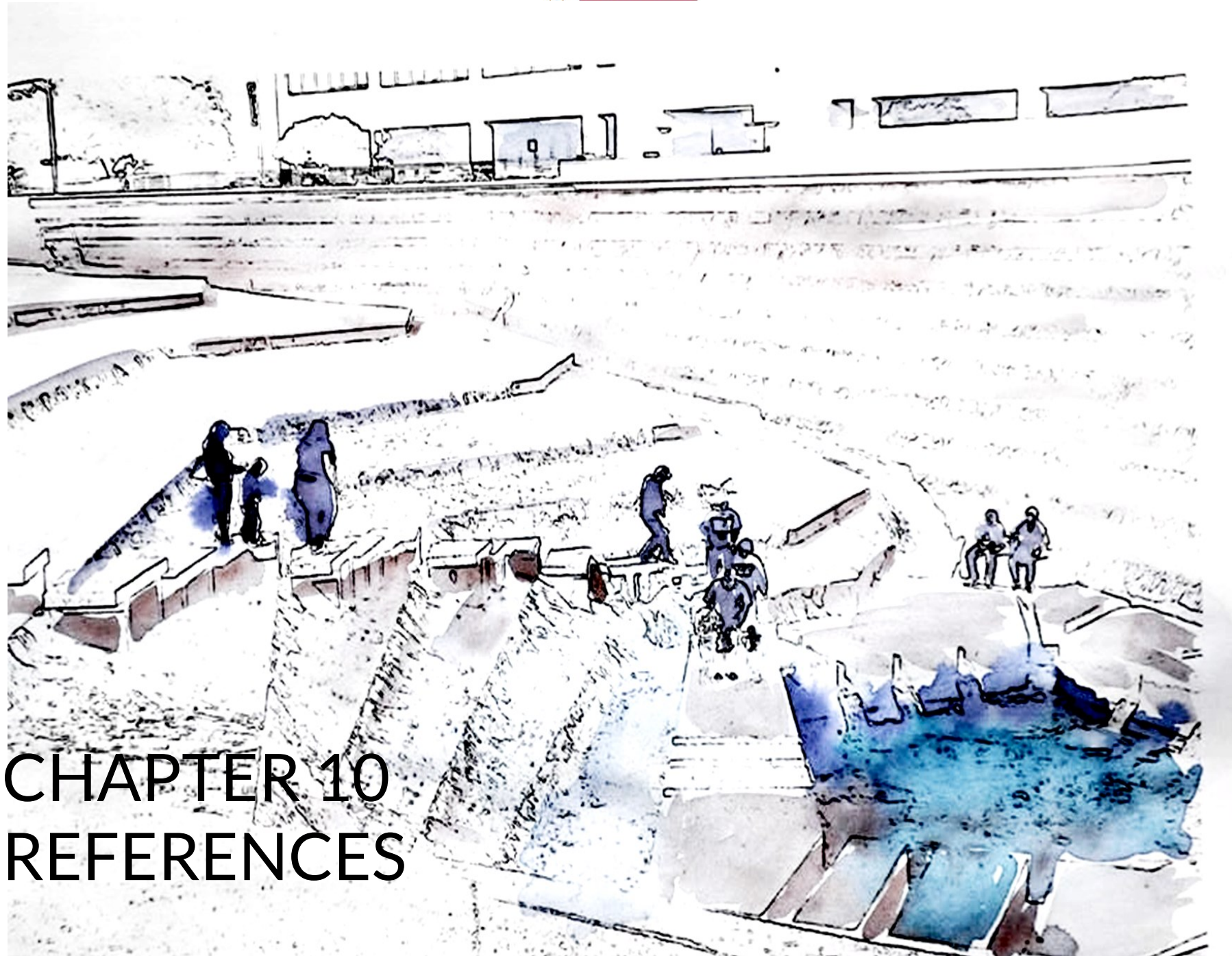
flowing forward

9.4 FINAL PRESENTATION



9.4 FINAL PRESENTATION





CHAPTER 10 REFERENCES

Figure 10.1. Adapted watercolour sketch. Author, 2016.

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