FIGURE 9.1: BUILDING OPPOSITE THE STATION FROM *PRACA DE TRABALHADORES* (DEVENISH, 2011)

CHAPTER 9_
THEORY APPLICATION: DESIGN RESOLUTION

FIGURE 9.2: WATER FOUNTAIN ON EASTERN ESCARPMENT (AUTHOR, 2011)

9.1 FOUNDING

The final step in the *four tracing concepts* is *founding*. This is probably the most durable and significant. Girot states that it comes at the moment when the preceding three acts are synthesised into a new and transformed construction of the site. It may either be constructive (referring to past events) or innovative (importing something new) always a reaction to something that was already there. It can also be understood as bringing something new to a place, something that may change and redirect a particular site. It inevitability happens each time something new occurs, staking out the ground for future events. A well-founded project will thus remain clear in its approach and resolution, extending the legacy of a place toward a productive future (Girot, 1990).

9.2 CITY-WIDE SCALE OBJECTIVE

On city scale, the main objective is to create a number of water-holding sites to which where water can be diverted. As mentioned in Chapter 4, the catchment of the site has a large influence on the water system regarding everything from water channelling, capacity and discharging.

For this reason, a thorough catchment management plan needs to be implemented. The catchment management plan includes the following to be proposed and implemented:

- The entire catchment is divided into smaller catchments. These would allow water to be intercepted and encourage water flow into different, strategically placed,

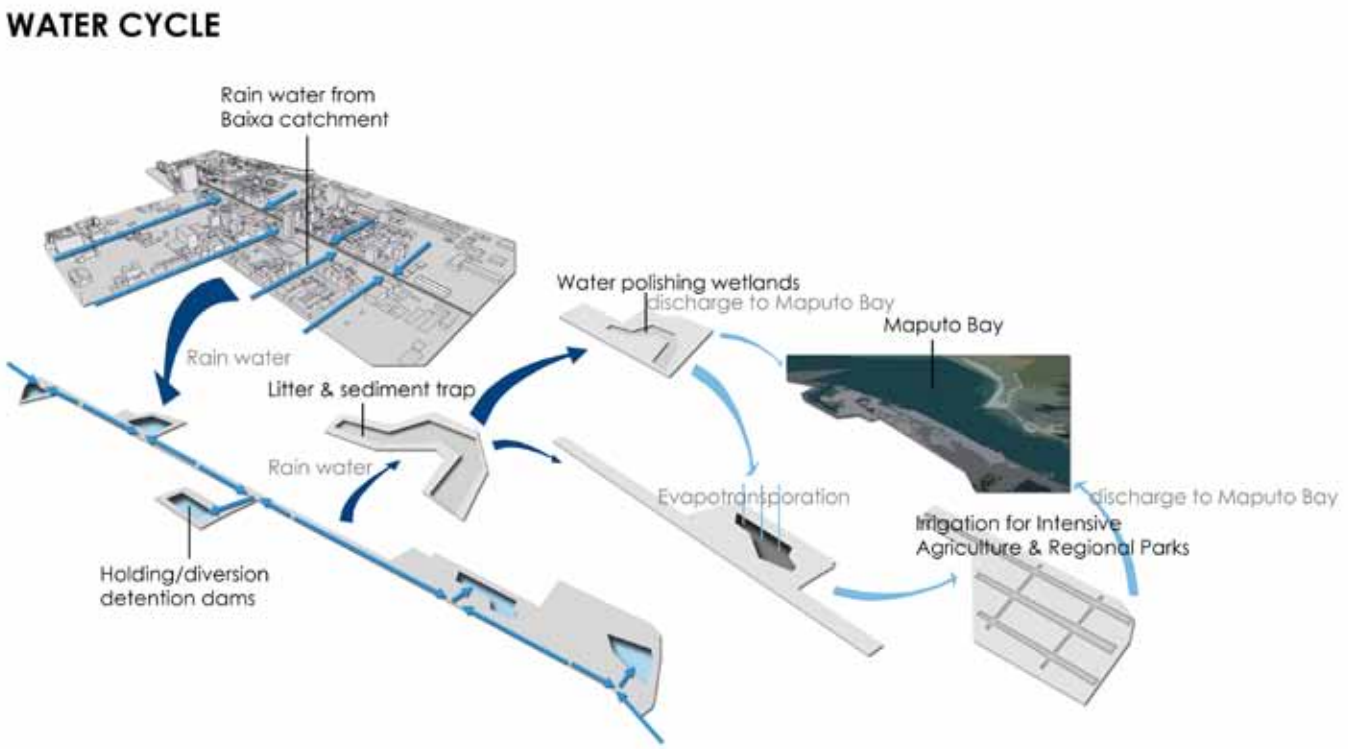


FIGURE 9.3: CITY SCALE WATER MANAGEMENT DIAGRAM (AUTHOR, 2011)

water-holding sites.
- This is done through manipulating *Avenida 25 de Setembro*. As soon as water reaches the street, it will be directed to a specific allocated site. Different areas (inner catchments), will have different destinations allocated to them.

- Quantities will be calculated to allow for efficient storage volume. This means effective volume control and management of water as it enters the sites. Excess water will overflow to either other sites, or be discharged into the bay.
- The author will be able to address and propose different requirements for each site, as the needs may differ according to location and immediate surroundings. An example of this, is the decision to implement sedimentation traps, litter traps, grease/oil traps, wetlands, irrigation, water needs and so forth.
- The plan will also allow for sufficient planning to exactly determine the height at which water channels would enter the different water-holding sites. A general slope of 1:500 was determined and used throughout the channel system in *Avenida 25 de Setembro*.
- All water in the catchment will go through the water system and will thus be cleaned before being discharged into the bay. This will in effect create a sustainable water environment, enhancing the water quality. Figure 9.3 diagrammatically illustrates the water process that is planned and has to be implemented.

Figure 9.4 illustrates the different catchments and places the site in context. It also illustrates the other four water-holding sites of which the discussed project forms part of.

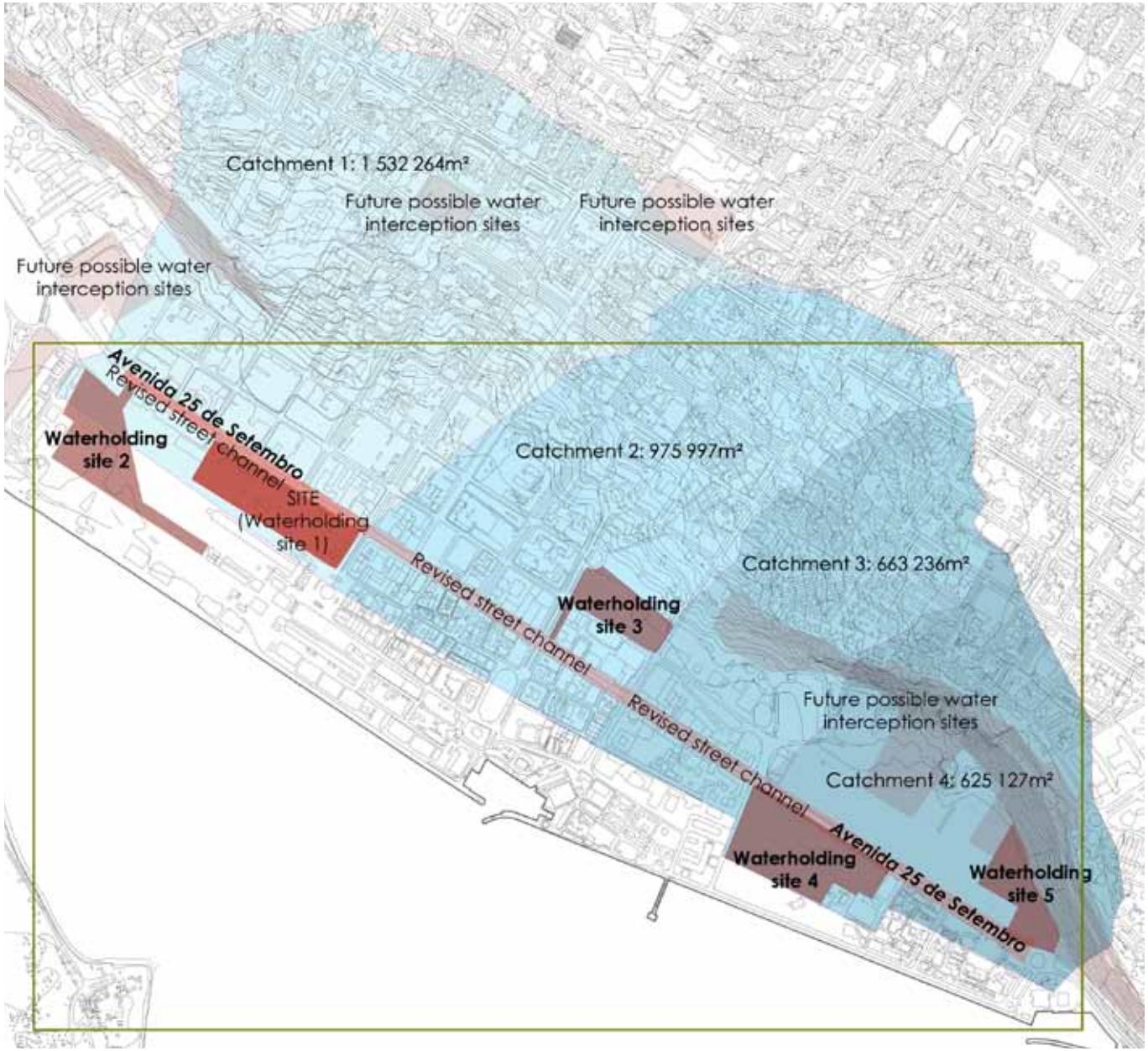


FIGURE 9.4: CATCHMENTS, WATER-HOLDING SITES AND OTHER POSSIBLE SECONDARY SITES (not to scale) (AUTHOR, 2011)

As extra option, the figure also shows other possible future sites where water can be intercepted, channelled or stored (apart from the five named interventions along the street).

These "possible future sites" will have the main function of lowering pressure and quantities on the lower gradient-located, major five retention dams (due to the large area and run-off coefficient). The reason why this is currently not analysed to further extend, is that it would require huge infrastructural alterations. Required changes larger than those done in *Avenida 25 de Setembro*.

To conclude: It becomes clear that the relevant site cannot be seen as a separate entity, but part of a larger water-management system. The proposed project will also serve as possible *Baixa* regeneration and will offer an additional designed, green, landscape space.

Figure 9.5 identifies the final proposed city scale intervention. It consists of a collection of projects along the *Avenida 25 de Setembro* that is proposed to be implemented by the author. It consists of a water-channel system and the water-holding sites on current open plots. These water-holding sites are listed and compared in the table (Figure 9.6). In-flow and out-flow level will differ.

9.3 SKETCH PLAN

Figure 9.7 illustrates the project's sketch plan. The follow-on figures will illustrate how the different layers interact and function as a whole.

FIGURE 9.5: FINAL CITY SCALE PLAN (not to scale) (AUTHOR, 2011)

Water holding site	Water holding site 1 (the SITE)	Water holding site 2	Water holding site 3	Water holding site 4	Water holding site 5
Traps	Litter trap, Sediment trap, Oil/Grease trap, Wetland, Water body	Litter trap, Oil/Grease trap, Water body	Litter trap, Sediment trap, Oil/Grease trap, Water body	Litter trap, Sediment trap, Oil/Grease trap, Wetland, Water body	Litter trap, Sediment trap, Oil/Grease trap, Wetland, Water body
Site funtions	Urban park, Public square, Water storage, Irrigation & other uses, New buildings	Urban agriculture, Water storage, Irrigation & other uses	Urban park, Water storage, Irrigation & other uses (Pott's building)	Urban park, Water srorage, Irrigation & other uses, Trim park	Urban park, Public square, Water storage, Irrigation & other uses, New buildings

FIGURE 9.6: WATER-HOLDING SITES COMPARED (AUTHOR, 2011)

FIGURE 9.7: SKETCH PLAN (not to scale) (AUTHOR, 2011)

9.4 MOVEMENT

The movement patterns within the design vary according to the following categories:

- Vehicle movement which include the streets and grass parking space at the business complex.
- Primary pedestrian movement which is illustrated by red arrows. The own the identity of being the main movement patterns where faster pedestrian movement will take place.
- Secondary pedestrian movement, which is illustrated by yellow arrows. It illustrates lingering spaces of slower movement and includes seating under trees and shade.

A number of important nodes are also identified within the design. These are mainly located at entrance points, along the perimeter of the site. Nodes within the design context becomes important places of focus and energy. The occur everywhere on site and act as important threshold to and from the site.

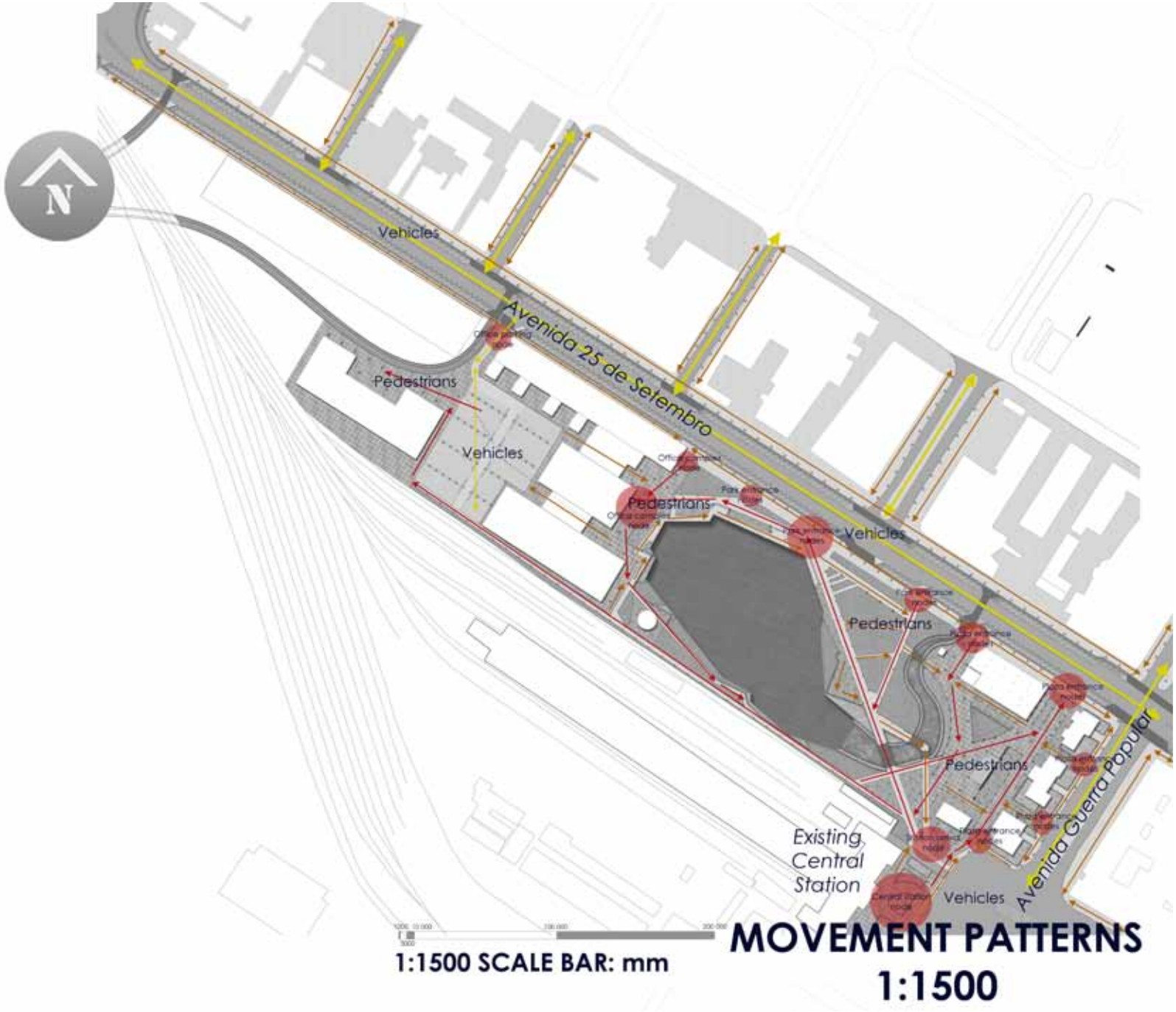


FIGURE 9.8: NODES (not to scale) (AUTHOR, 2011)

9.5 ZONES

The park can be divided into three main zones being:

- East: Public square consisting of outdoor restaurant seating, open-plan market area, small grass lawn, graffiti wall, historical wall kept as heritage layer, seating and a zero-depth water feature for children.
- Central: Mainly public park consisting of grass lawns or common green, pathways, a wetland and retention dam and finally a waterfront area.
- West: New high-rise office buildings, waterfront (deepest end of retention dam), cafeteria and concrete grass blocks parking area.

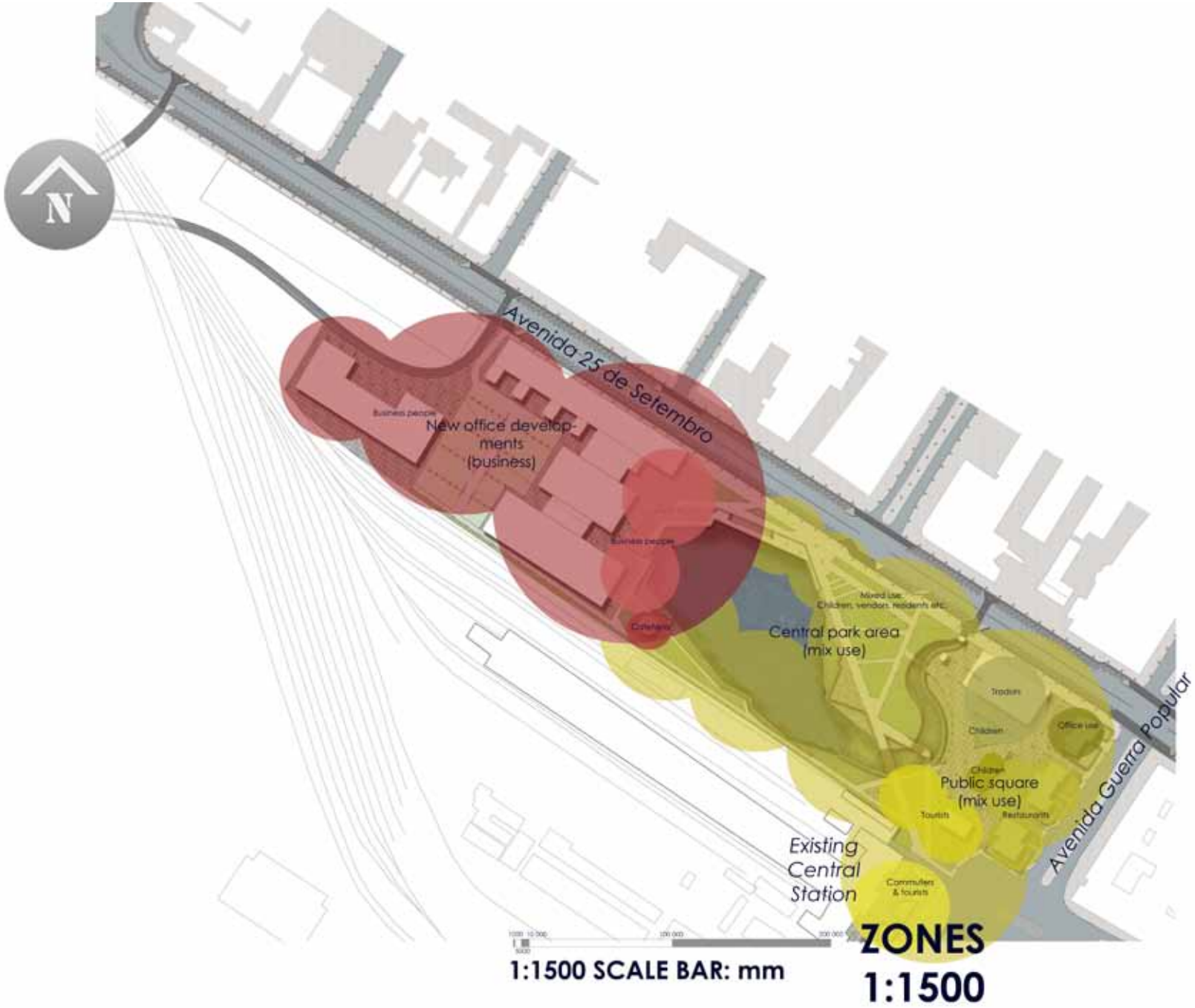


FIGURE 9.9: ZONES (not to scale) (AUTHOR, 2011)

9.6 WATER STRATEGY

Water will be circulated by means of submerged water pump. Energy will be provided by solar panels located on the new office building's roof.

Water is circulated in order to keep water moving and clean, and to disallow stagnant water in order to discourage mosquito infestation and to keep wetland plants alive.

Excess water will overflow to Intervention 2 (Water-holding Site 2), which is located to the south-west. Storm water flowing to the site will follow one of the following routes.

It will either:

- Slowly flow to the retention dam via the wetland (the wetland receives water from a manhole in the centre of the site and releases water through a small pipe).
- Flow directly into the retention dam via a sub-surfaced, 300 mm concrete pipe (the pipe is also connected to manhole).
- Surpass this site's water system and exit to the north-east of the site via the street channel (excess water will thus not be used in the site, but will rather flow to water-holding Site 2).

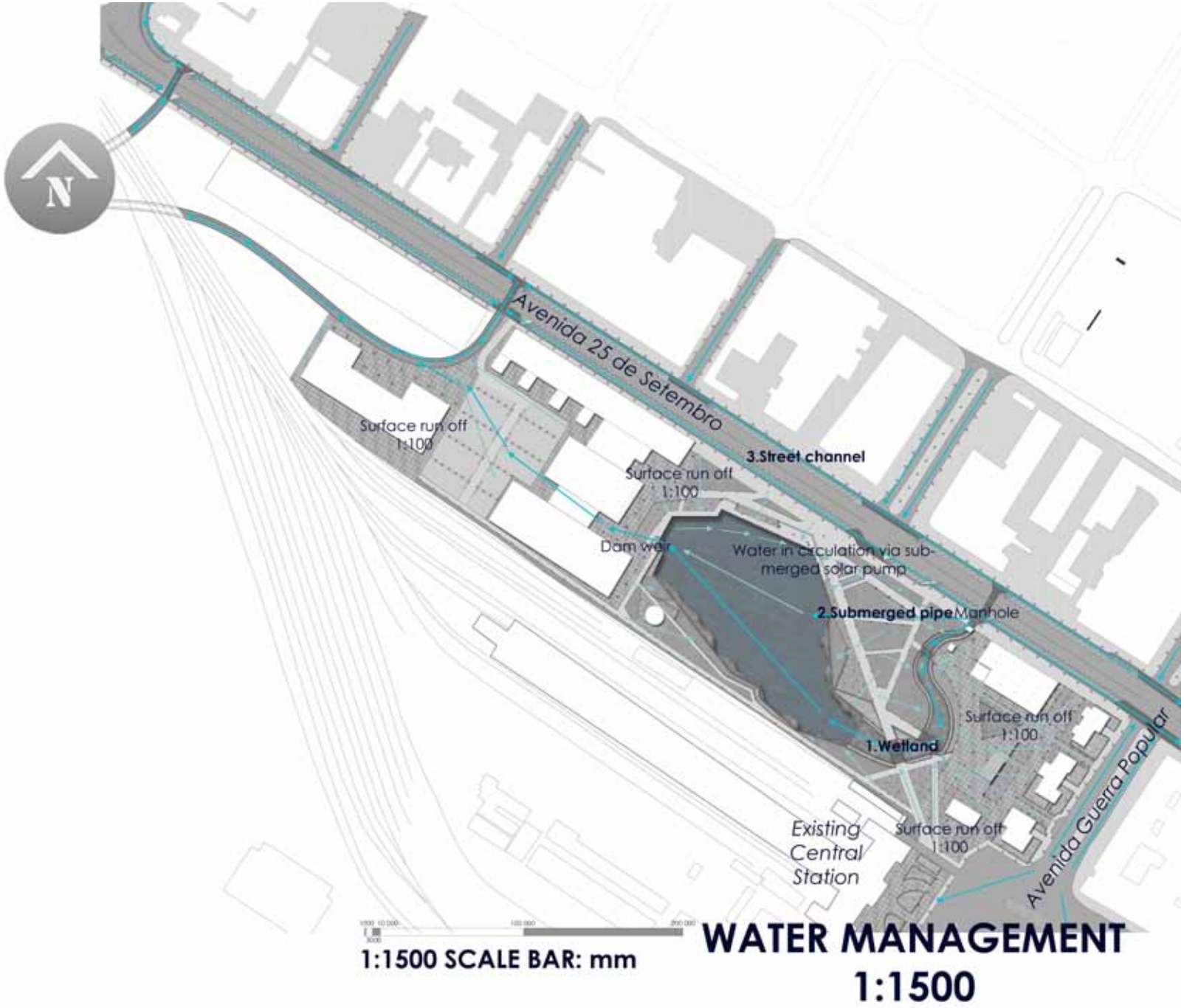


FIGURE 9.10: STORM-WATER MANAGEMENT (not to scale) (AUTHOR, 2011)

9.7 PLANTING STRATEGY

The planting strategy consists of four different zones. A collection of plant images are shown by the images bordering Figure 9.35.

- Planting Zone 1: Street planting (exotic trees kept to blend in and keep historical layer).
- Planting Zone 2: Public square (evergreen indigenous trees to create a comfortable micro environment).
- Planting Zone 3: Park area (indigenous evergreen and deciduous trees).
- Planting Zone 4: Wetland and dam perimeter (indigenous water plants).

FIGURE 9.11-9.34: COLLECTION OF PLANTING IMAGES (GOOGLE, 2011)
FIGURE 9.35: PLANTING STRATEGY (not to scale) (AUTHOR, 2011)

9.8 MATERIAL SELECTION

The following materials are used:

FIGURE 9.36: *SALIGNA EUCALYPTUS*

FIGURE 9.37: EXPOSED AGGREGATE CONCRETE

FIGURE 9.38: CONCRETE GRASS BLOCKS

FIGURE 9.39: COBBLESTONES (WITH PATTERNS)

FIGURE 9.40: SLATE (WITH PATTERNS)

FIGURE 9.41: RENO MATTRESS

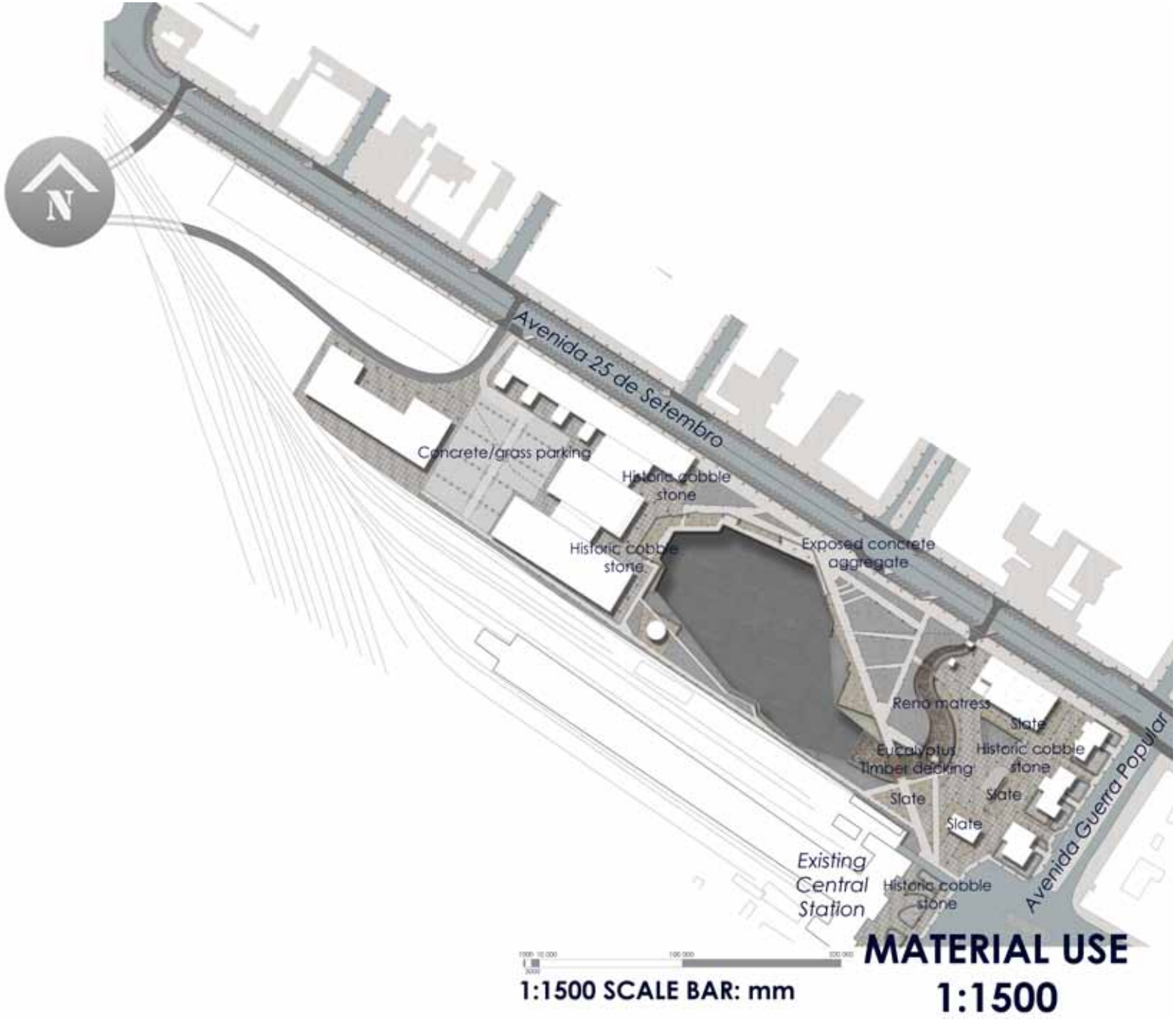


FIGURE 9.42: MATERIAL SELECTION (not to scale) (AUTHOR, 2011)

9.9 LIGHTING STRATEGY

The following lighting elements are used:

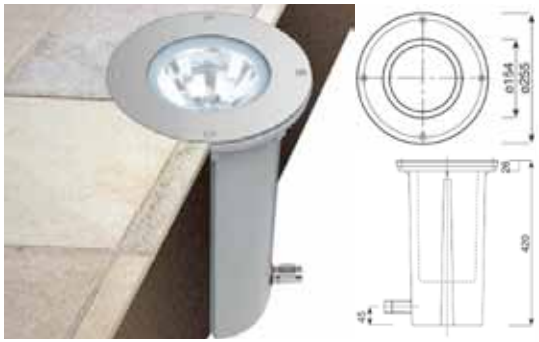


FIGURE 9.43: BEKASPIKE UP-LIGHTER

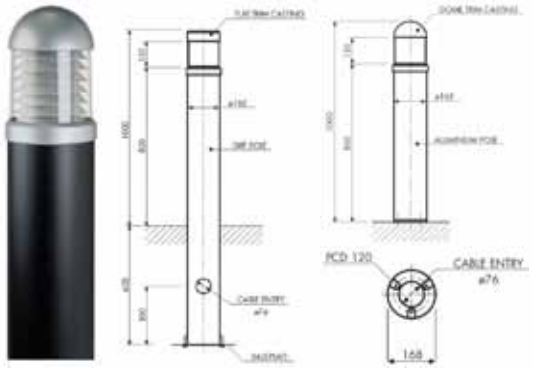


FIGURE 9.44: BEKABRITE BOLLARD LUMINAIRE

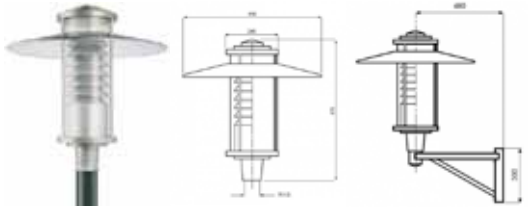


FIGURE 9.45: BEKASHINE POST TOP LUMINAIRE

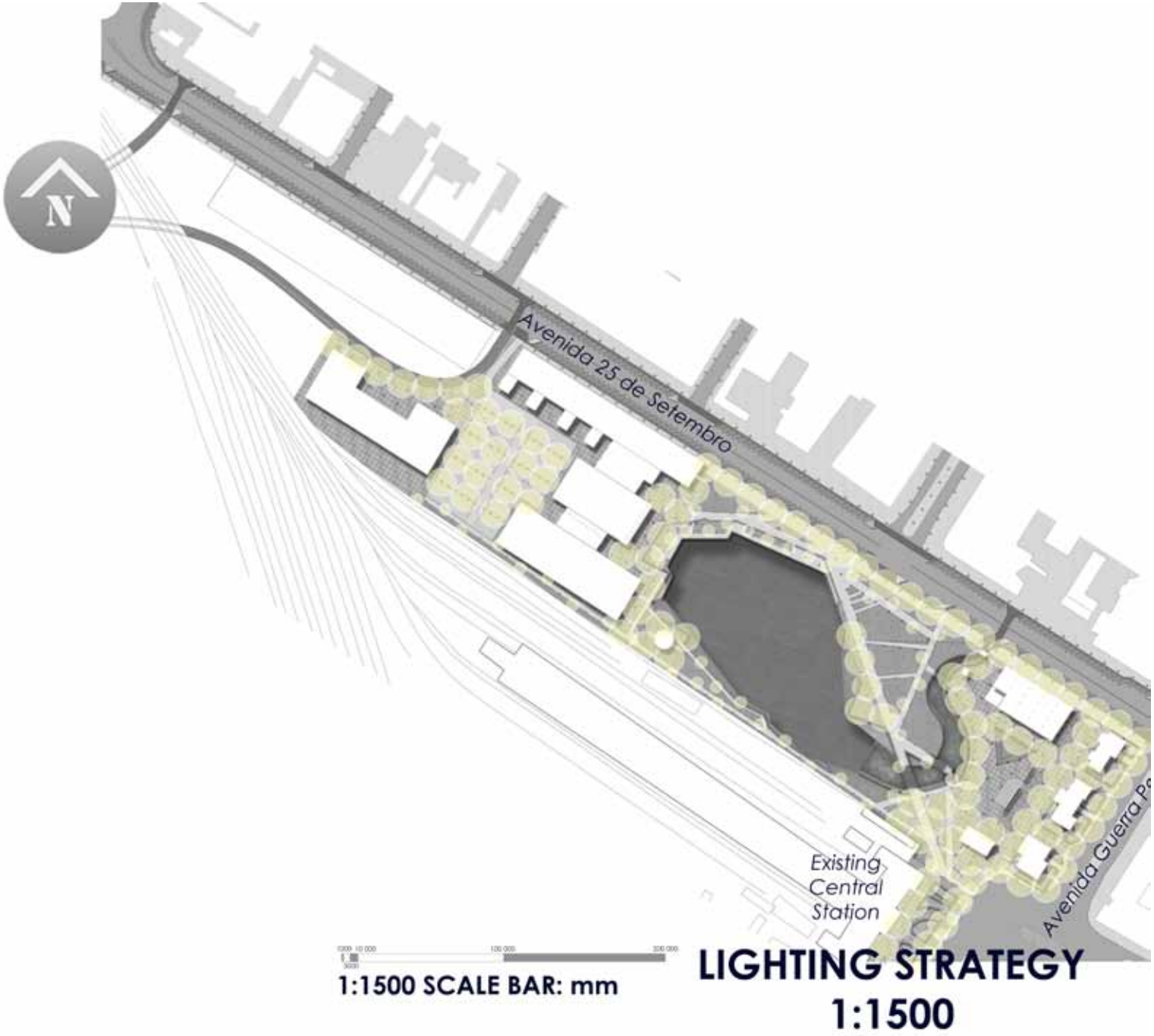


FIGURE 9.46: LIGHTING STRATEGY (not to scale) (AUTHOR, 2011)

9.10 CONTOURS & HEIGHTS

The site is generally located on the 4000 contour. Water channel enters the site at 3470. Water then goes through a sediment trap (3000) and overflows into the wetland.

Water enters the top of the wetland at 3300 and exits the wetland weir at 2800. It flows into the water-holding site at 2700 (water level). Water thus overflows at 2700 (top of weir) and flows into the pipe system to Water-holding Site 2.

The dam's base level is at 0 (mean sea level) and 2700 meters at its deepest (to the west). The pedestrian area to the north and west of the dam is lowered to level 3000, to allow a closer link between the site user and water (300 mm). The same concept is used where the wetland flows past the public square. Stairs, forming a seating area, allows the user to sit 500 mm above the wetland level.

FIGURE 9.47: SITE CONTOURS AND HEIGHTS (not to scale) (AUTHOR, 2011)

9.11 SITE PLAN

FIGURE 9.48: SITE PLAN (not to scale) (AUTHOR, 2011)

FIGURE 9.49: SITE PLAN ZOOM 1 (not to scale) (AUTHOR, 2011)

FIGURE 9.50: SITE PLAN ZOOM 2 (not to scale) (AUTHOR, 2011)

FIGURE 10.1: PRACA 25 DE JUNHO (P. DEVENISH, 2011)

CHAPTER 10_
THEORY APPLICATION: TECHNICAL RESOLUTION

FIGURE 10.2: PLANTER BOX (AUTHOR, 2011)

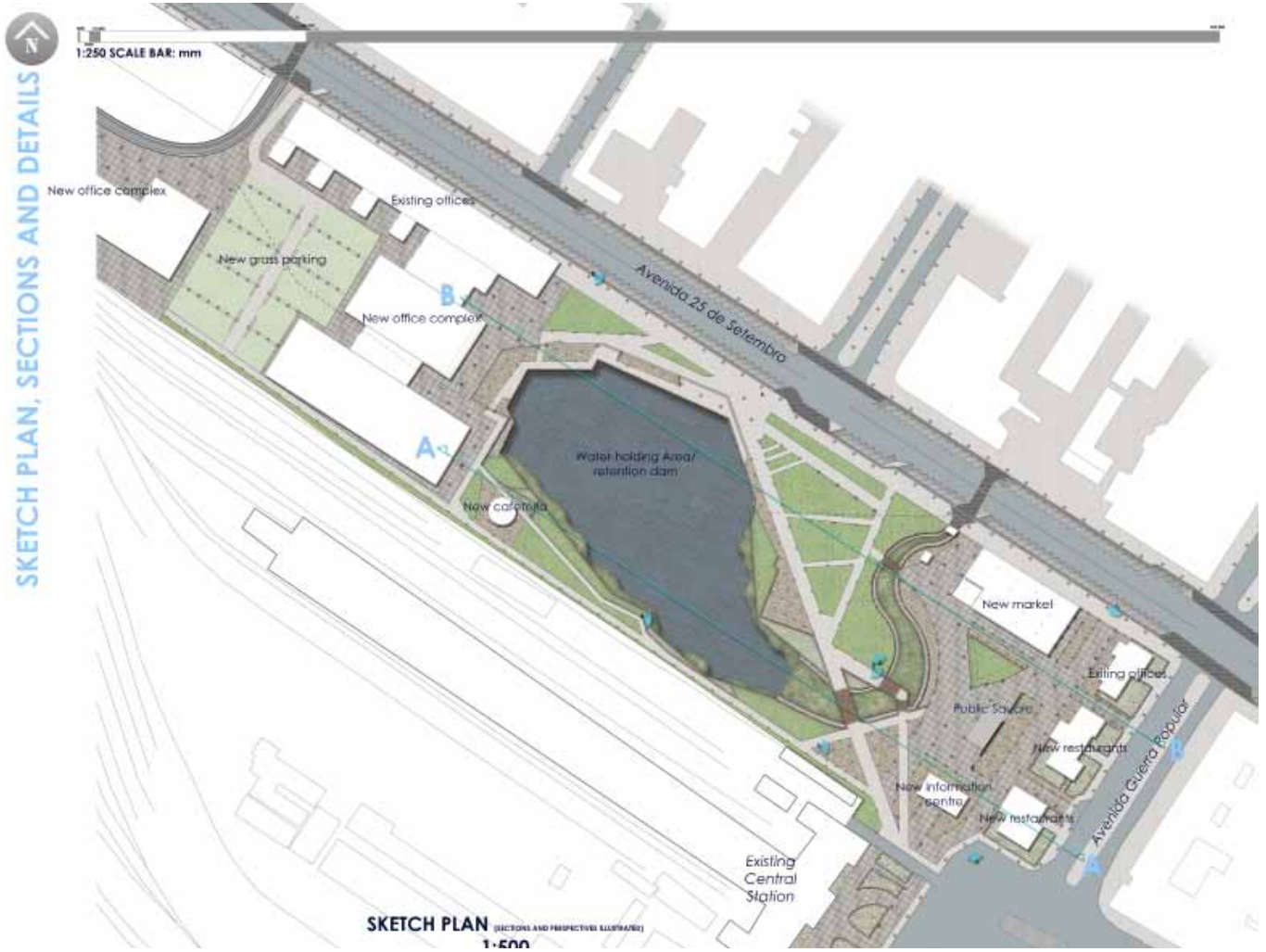


FIGURE 10.3: SKETCH PLAN ILLUSTRATING SECTIONS (AUTHOR, 2011)

10.1 INTRODUCTION

Figure 10.3 illustrates the sketch plan and shows the sections (AA and BB), shown on Figures 10.12 and 10.13. It also shows the perspective-images, illustrated by Figures 10.4 to 10.11.

Appendix C includes full technical development and details investigated.

10.2 PERSPECTIVES

FIGURE 10.4: PERSPECTIVE FROM SOUTH-EAST ENTRANCE (AUTHOR, 2011)

FIGURE 10.5: PERSPECTIVE OF PUBLIC SQUARE AND WETLAND (AUTHOR, 2011)

FIGURE 10.6: PERSPECTIVE OF ARRIVAL NODE (AUTHOR, 2011)

FIGURE 10.7: PERSPECTIVE OF WATER HOLDING AREA (AUTHOR, 2011)

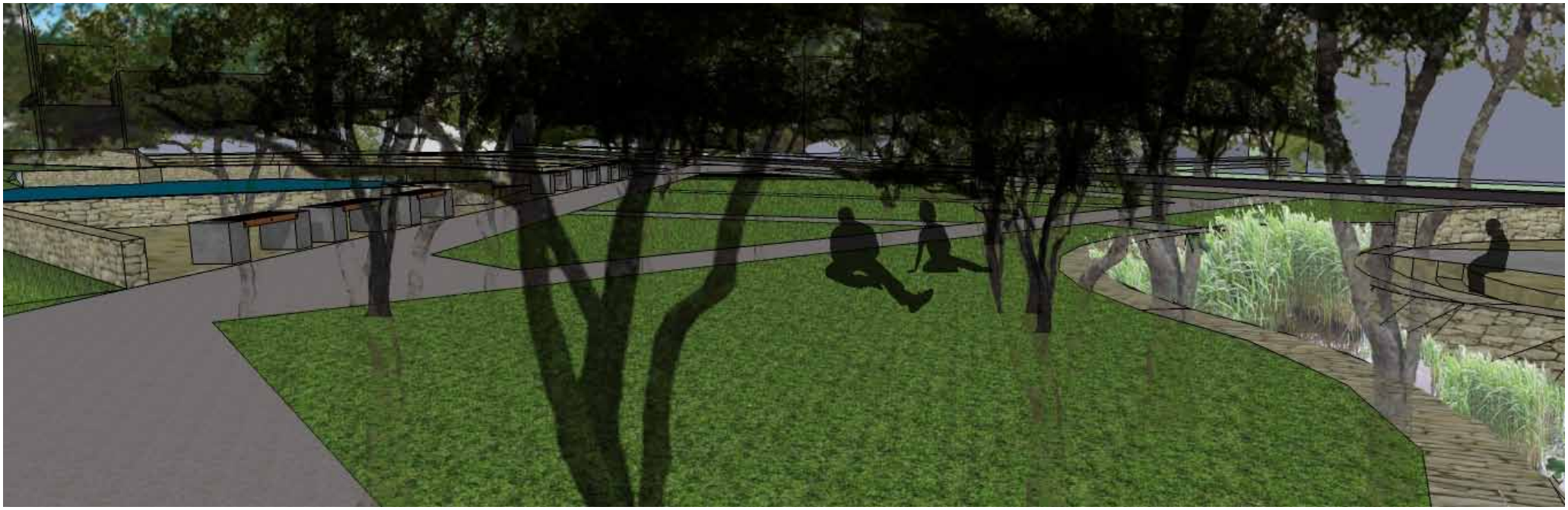


FIGURE 10.8: PERSPECTIVE OF COMMON GREEN AREA (AUTHOR, 2011)

FIGURE 10.9: PERSPECTIVE OF NORTH ENTRANCE (AUTHOR, 2011)

FIGURE 10.10: PERSPECTIVE FROM NORTH-EAST ENTRANCE (AUTHOR, 2011)

10.3 SECTIONS

FIGURE 10.12: SECTION AA (not to scale) (AUTHOR, 2011)

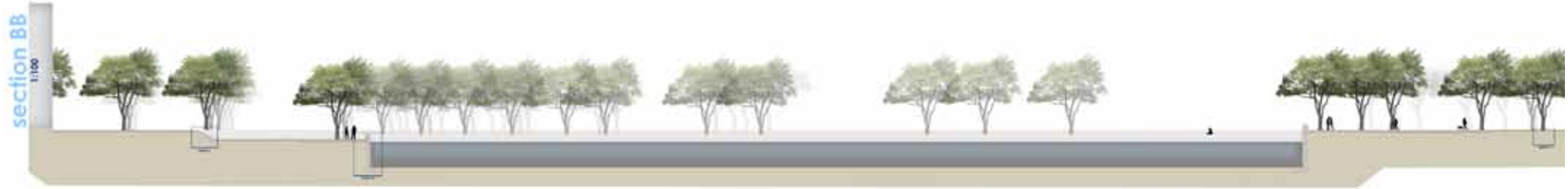
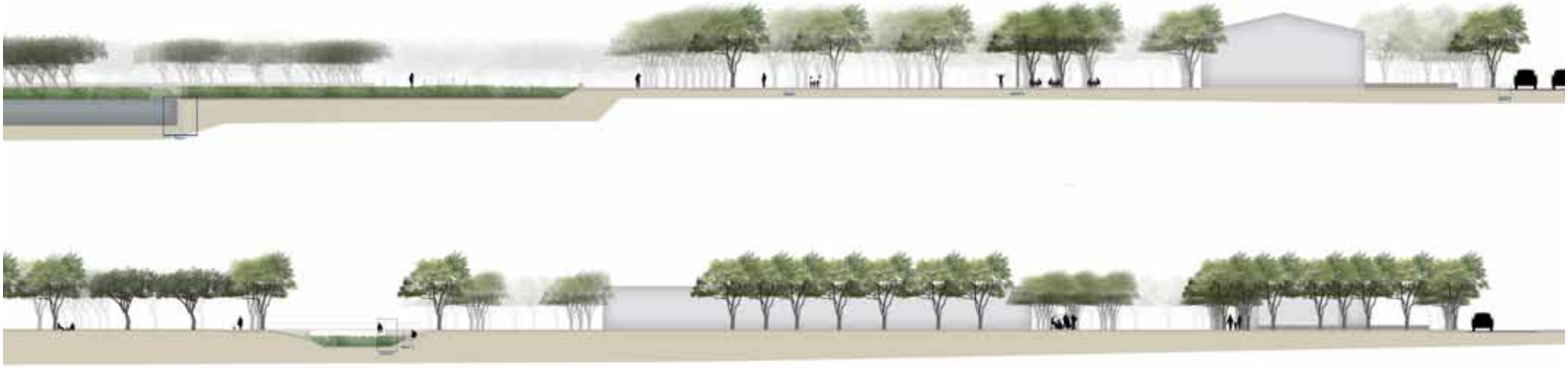


FIGURE 10.13: SECTION BB (not to scale) (AUTHOR, 2011)

FIGURE 10.11: PERSPECTIVE OF WATER CHANNEL *AVENIDA 25 DE SETEMBRO* (AUTHOR, 2011)



10.4 DETAILS

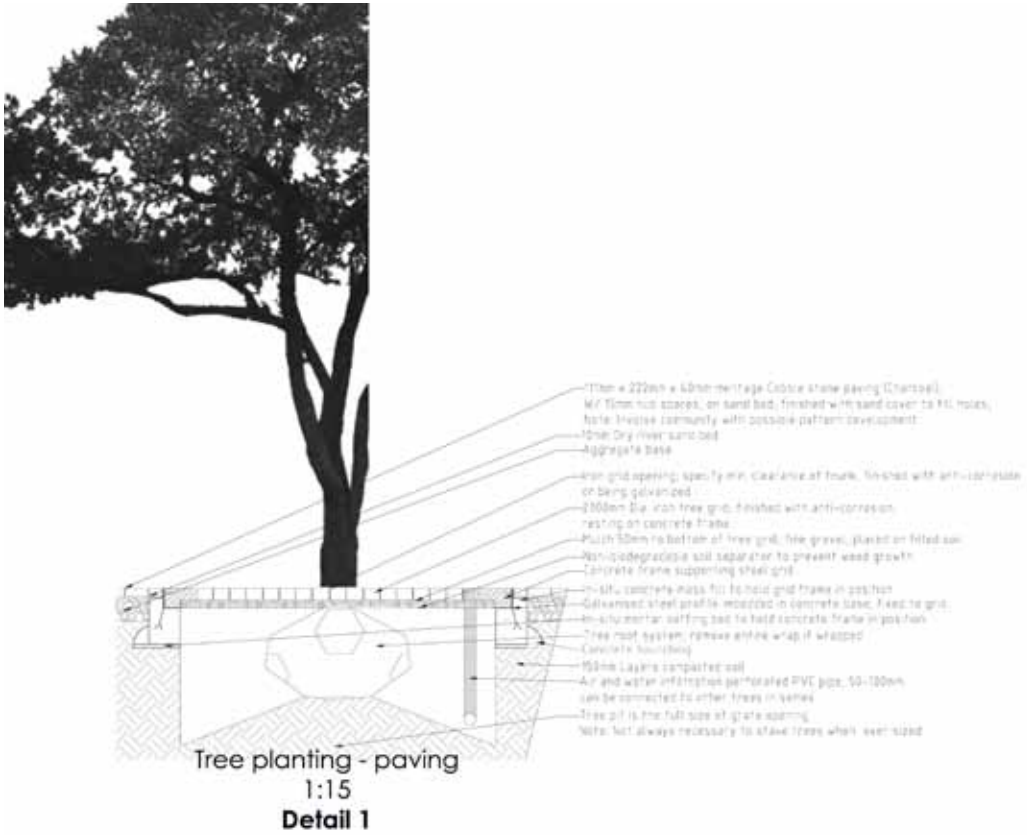


FIGURE 10.14: TREE PLANTING - PAVING (not to scale) (AUTHOR, 2011)

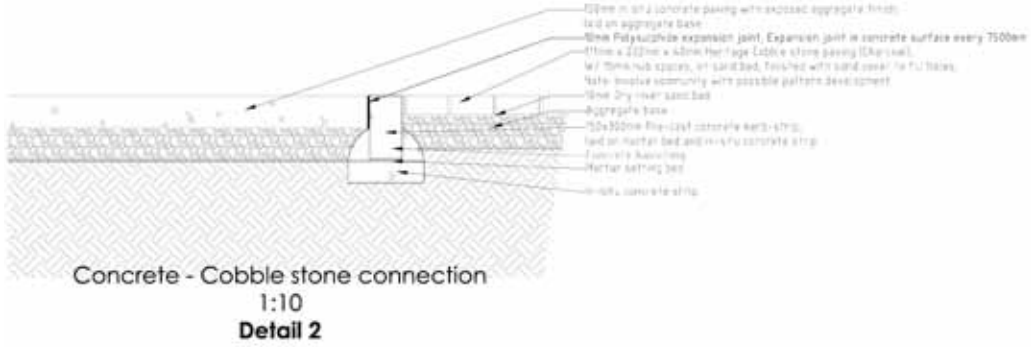


FIGURE 10.15: CONCRETE - COBBLESTONE CONNECTION (not to scale) (AUTHOR, 2011)

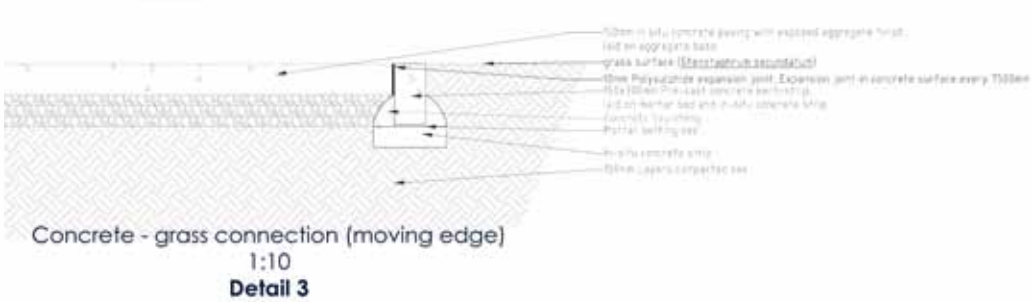


FIGURE 10.16: CONCRETE - GRASS CONNECTION (MOVING EDGE) (not to scale) (AUTHOR, 2011)

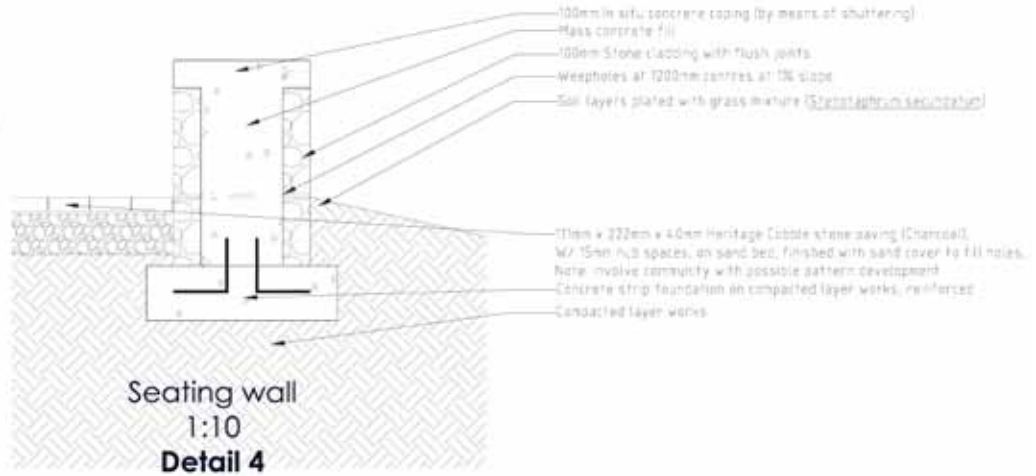


FIGURE 10.17: SEATING WALL (not to scale) (AUTHOR, 2011)

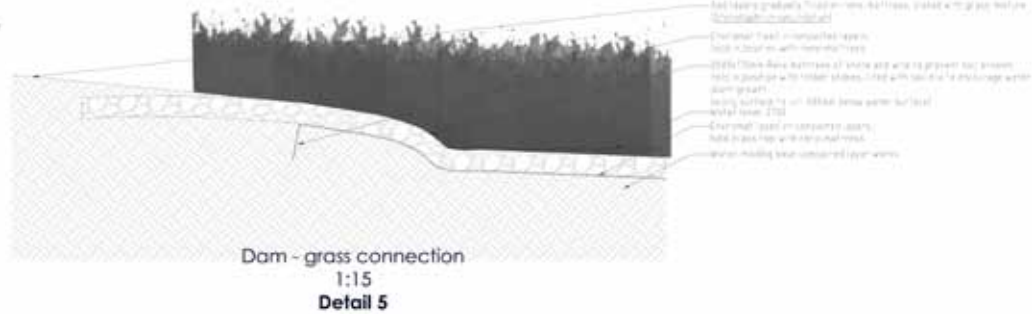


FIGURE 10.18: DAM - GRASS CONNECTION (not to scale) (AUTHOR, 2011)

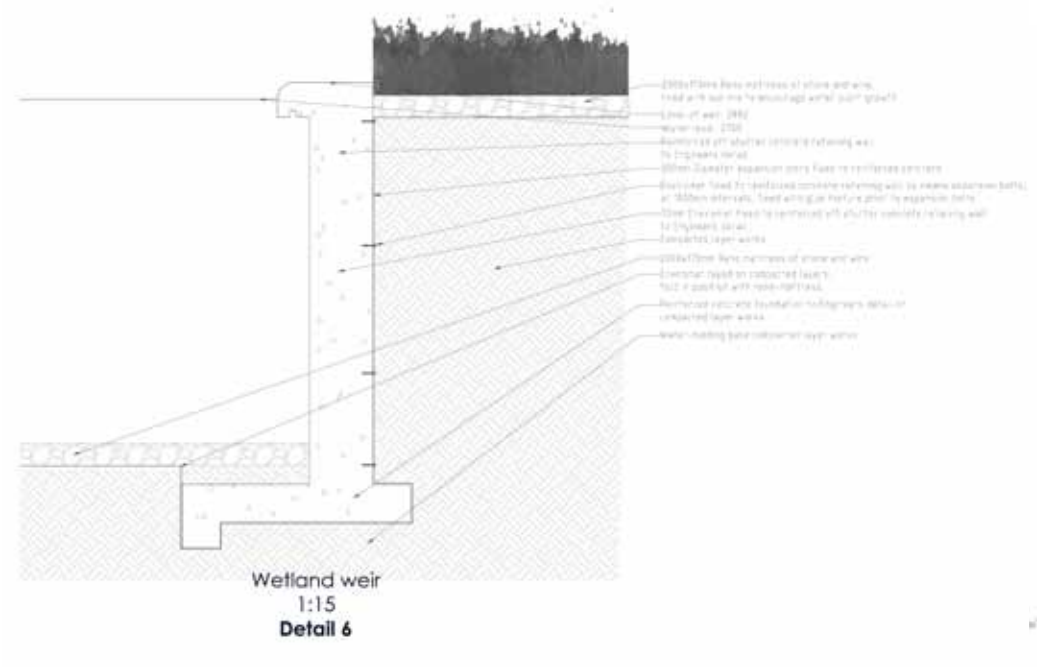


FIGURE 10.19: WETLAND WEIR (not to scale) (AUTHOR, 2011)

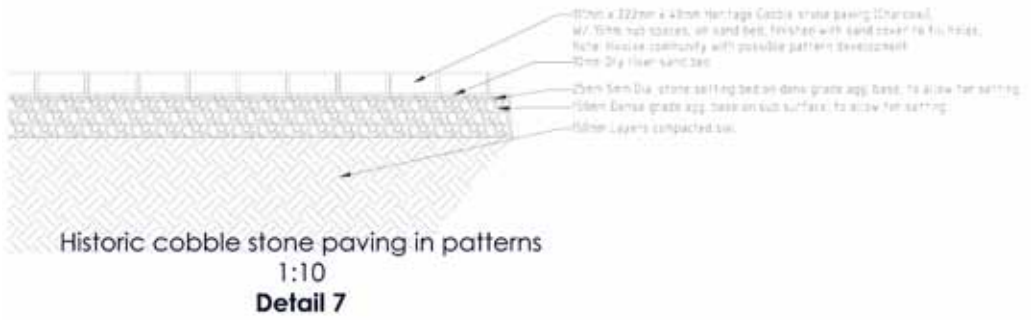


FIGURE 10.20: HISTORIC COBBLESTONE PAVING IN PATTERNS (not to scale) (AUTHOR, 2011)

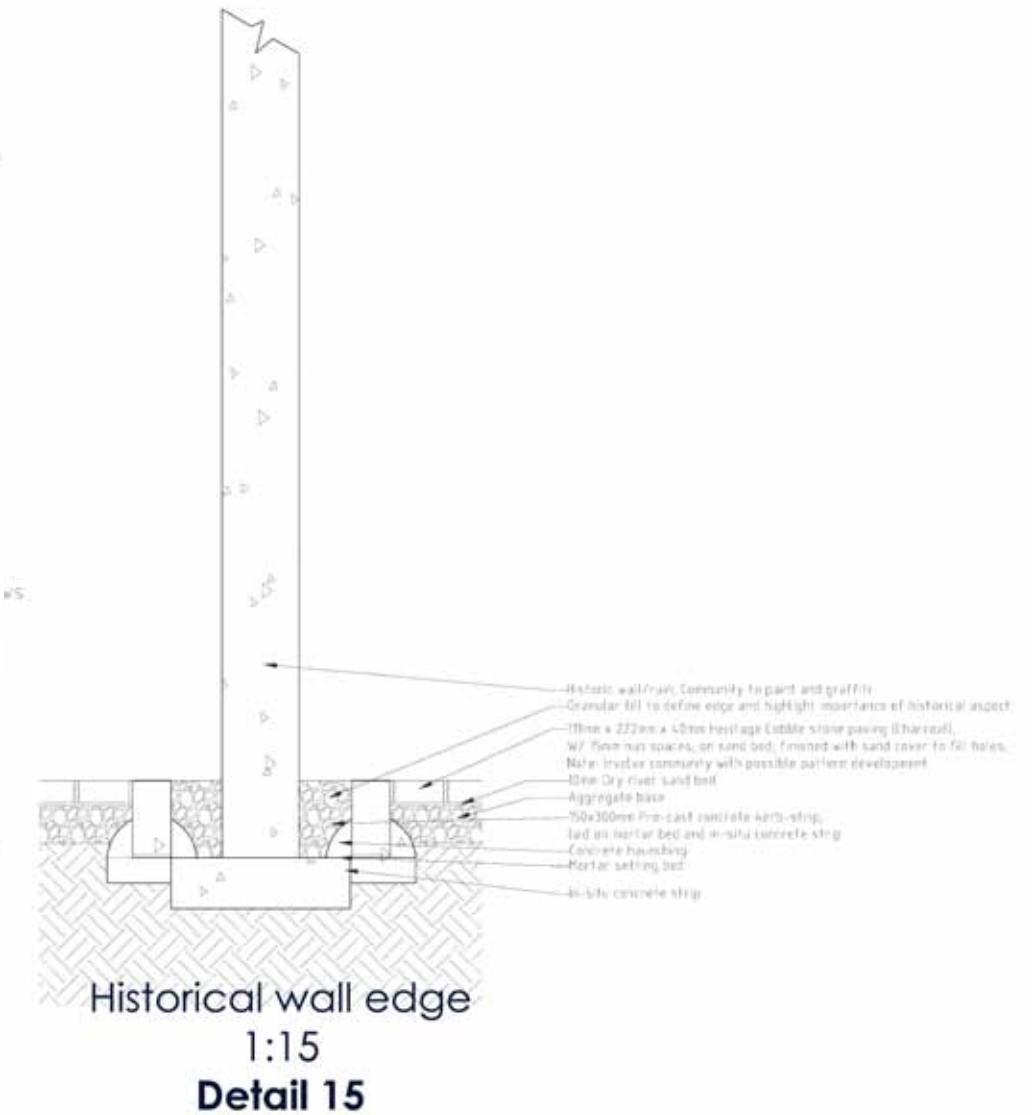


FIGURE 10.21: HISTORICAL WALL EDGE (not to scale) (AUTHOR, 2011)

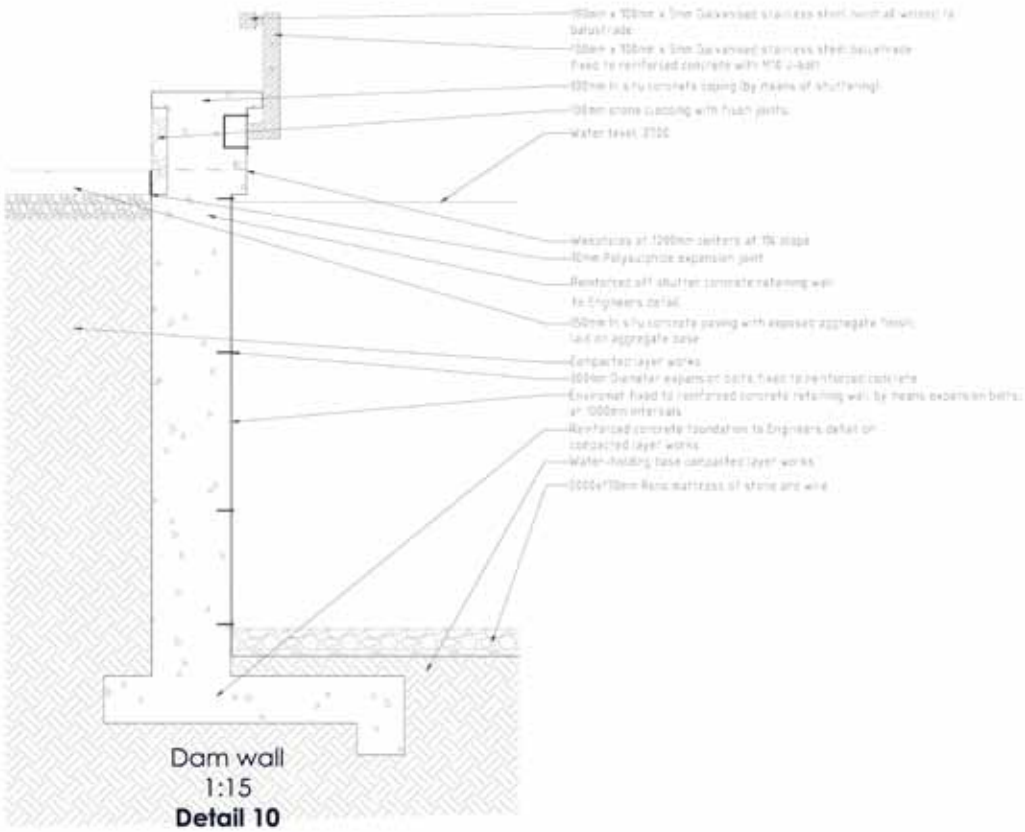


FIGURE 10.22: DAM WALL (not to scale) (AUTHOR, 2011)

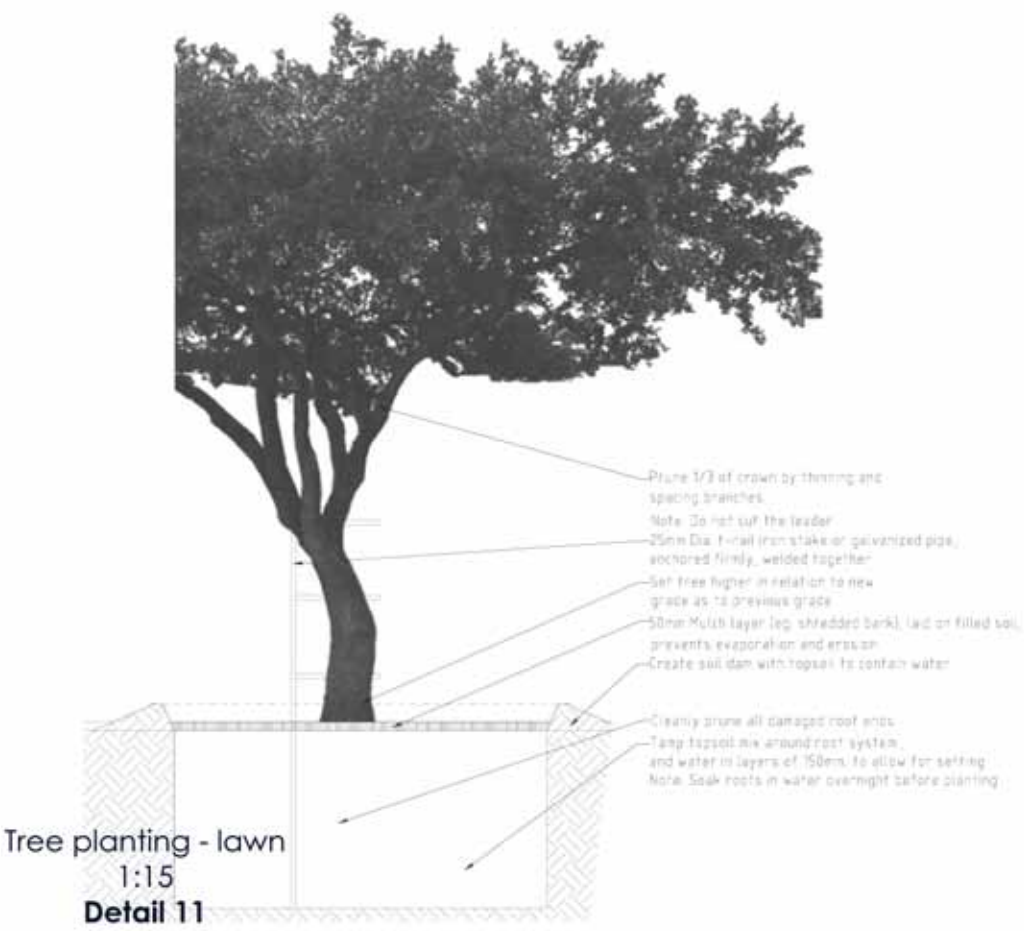


FIGURE 10.23: TREE PLANTING - LAWN (not to scale) (AUTHOR, 2011)

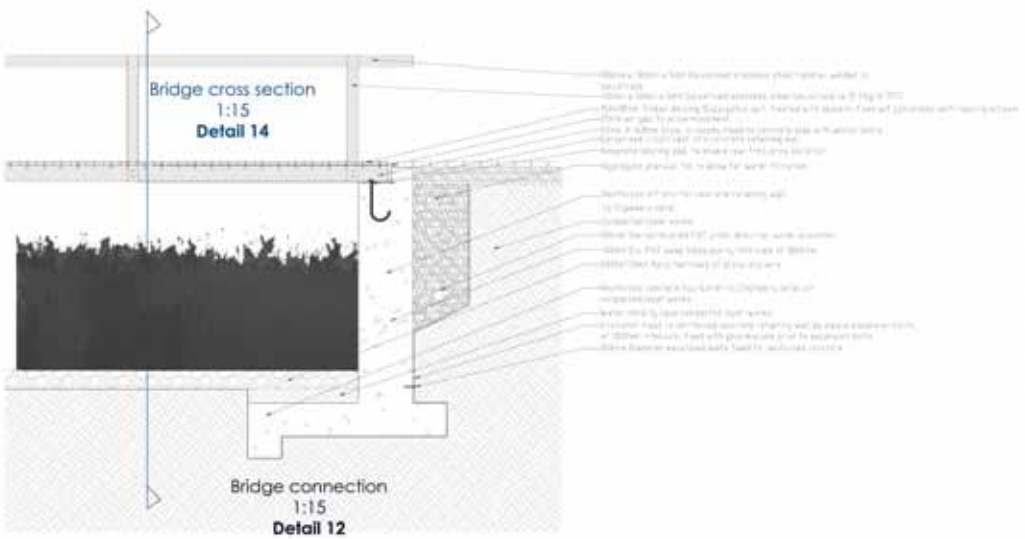


FIGURE 10.24: BRIDGE CONNECTION (not to scale) (AUTHOR, 2011)

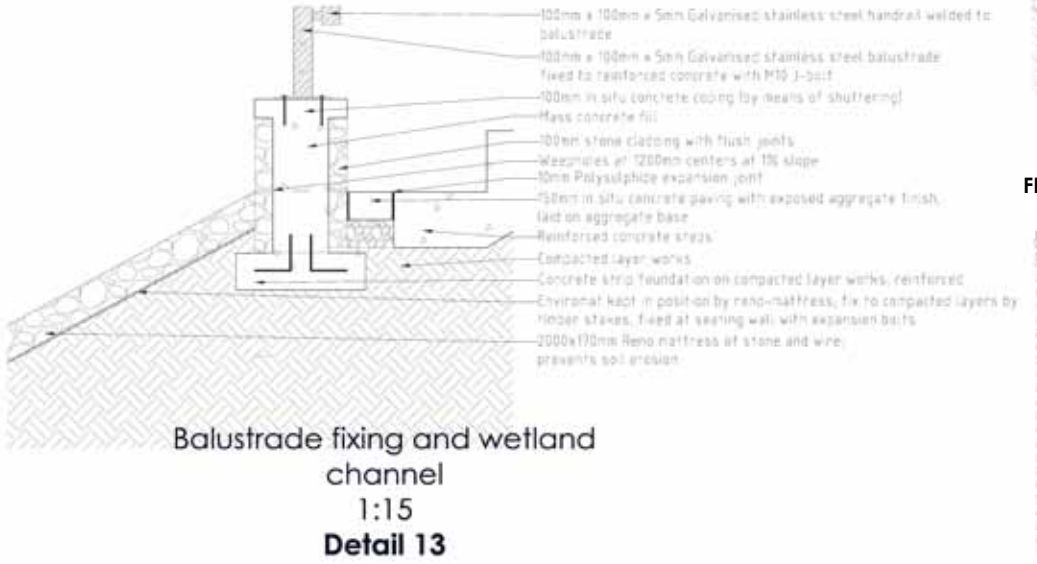


FIGURE 10.25: BALUSTRADE FIXING AND WETLAND CHANNEL (not to scale) (AUTHOR, 2011)

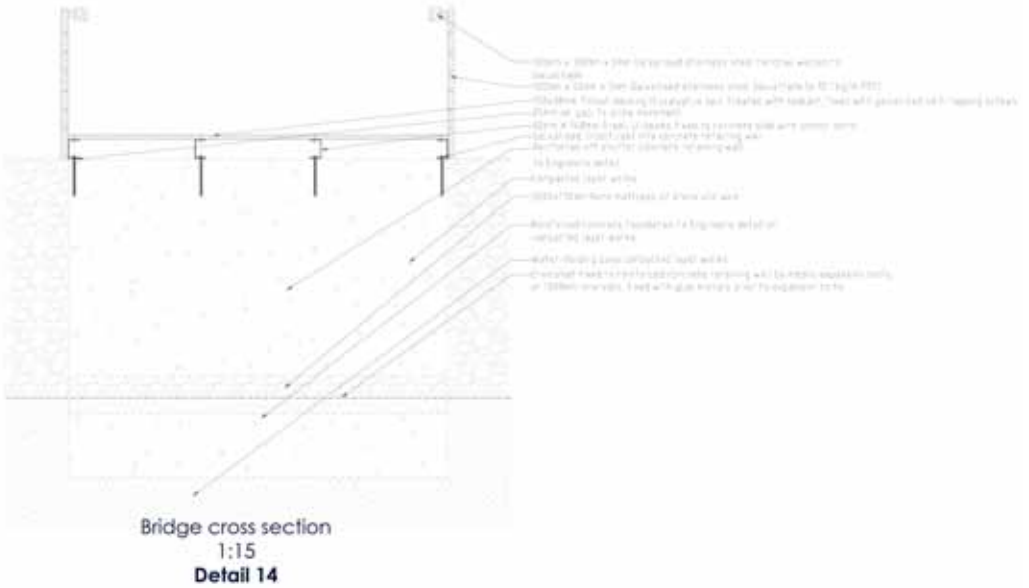


FIGURE 10.26: BRIDGE CROSS SECTION (not to scale) (AUTHOR, 2011)

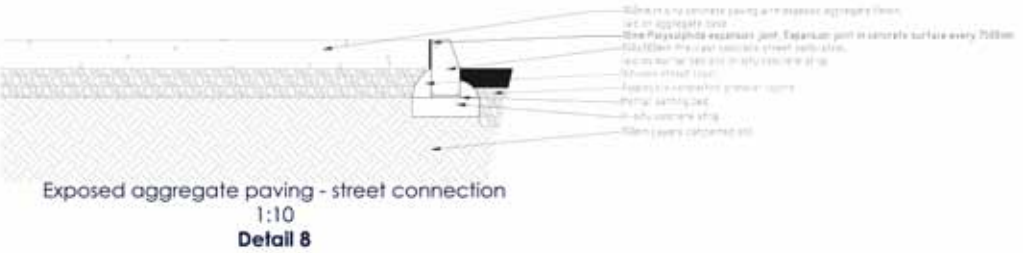


FIGURE 10.27: EXPOSED AGGREGATE PAVING - STREET CONNECTION (not to scale) (AUTHOR, 2011)

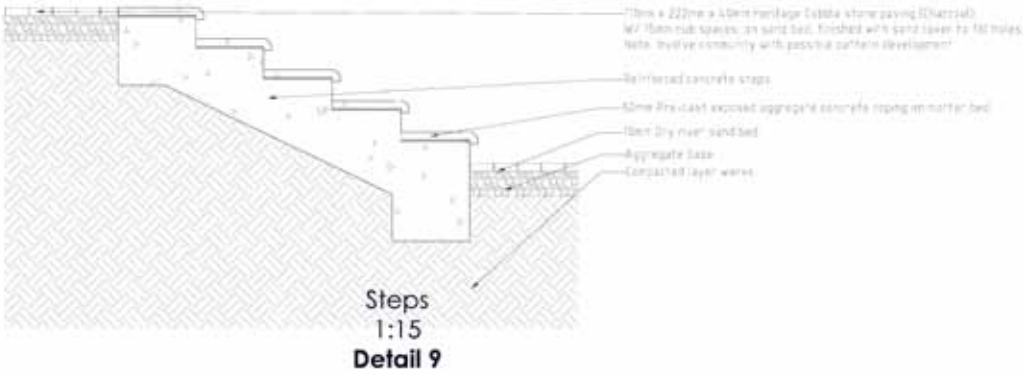


FIGURE 10.28: STEPS DETAIL (not to scale) (AUTHOR, 2011)


VEGA

CHAPTER 11_

CONCLUSION

11.1 SUMMARY AND CONCLUSION

The design goals of the project, will address the following citywide and site specific issues:

Citywide scale:

- Designing the vision of the Maputo *Baixa* student urban design framework (the framework, 2011), of which the author is part of. Achieving this by proposing, the public is provided with urban green spaces along *Avenida 25 de Setembro*. These sites will act as cultural, historic and social nodes within the city.
- Create and introduce a green linkage system. This system will consist of green-urban parks along *Avenida 25 de Setembro* and bisecting the *Baixa* with a green corridor. This will also encourage more efficient pedestrian movement and crossing.
- Analysing the catchment and storm water management of the total area. Factors influencing the amount of water includes the percentage of hard urban surface and total area of catchment. It is due to this extend, that a larger system is designed on city scale level. A system that will allow the entire catchment of water to be allocated, cleaned, treated, harvested and discharged. A series of water holding/urban parks are identified and implemented.

Site specific:

- One of the main issues in terms of the site specific design, is the amount of water that will flow into the site system. The suggested park's water holding capacity will only be able to accommodate an estimation of 22 123.39 m³ of water. The amount expected within this one catchment can add up to 196 321.72 m³ in the rainy month of January. There should thus be efficient structures and systemsin place to accommodate for these large amounts of quantities. These include from the inflow of water from the street's channel to the outflow of water to the next site of discharge.
- A second issue is cleaning all the water that enters the site. This is done through a series of traps which account to litter, sediment and oil traps.
- Another issue that should be attended to is the seasonal change of water flow and water amounts. The aims is to keep water in circulation and prevent still standing, stagnant water. During the dry seasons, water should still be the main aesthetic feature within the park. This means that the "dam" should be full during the most of the time.
- It should be aimed to restore an ecological unit within the park
- Implementing robust furniture and park elements.
- In regard to *Avenida 25 de Setembro*, it should be attempted to create a multi-functioning water channel, that will allow for water channelling during rainy seasons, but parking during dry the season.
- From a design perspective, *Avenida 25 de Setembro*, should be altered in such a way that is does not inhibit movement across or within its perimeter.