BluePrint200
EARTHWORKS

Design and Implementation Booklet

Blueprint Alliance
Surplus Permaculture Design
Tamera Peace Research & Ecducation Center

November 2018

Preface

This document describes the design process of the Blueprint 200 site and the implementation of earthworks at Tamera Peace Research and Education Center. This implementation comes towards the end of the second phase of the Blueprint 200 project. It has involved close collaboration between many people, numerous iterations of schematic designs, and fundraising. Contributers included the Blueprint Alliance, Tamera, Surplus Permaculture Design and the Grace Foundation.

Special thanks to Alexander Lehmann, Bernd Müller, Brecht Deriemaeker, Christoph Ulbig, Friedemann Gasse, Geoffroy Godeau, Greg Crawford, Kyle Smith, Marcus Dittrich, Nick Tittle, Rabea Herzog, Jay Abrahams of Biologic Design, Chris Evans and Silvano Rizzi.

We would like to thank all those who were involved in completing this phase of the project including the 65 volunteers who helped to dig swales, mulch and seed slopes and plant trees.

All the documentation and photos were captured within the first month of implementation.

November 1, 2018

TABLE OF CONTENTS

Project overview

Blueprint 200 (BP200) is a regenerative settlement for 200 people, using holistic design to address water management, environmental regeneration, shelter design, appropriate technology, food production and ecological sanitation in safe, healthy, harmonious ways. BP200 will provide housing for guests in Tamera Peace Research and Education Center as well as a proof of concept for the accompanying Regenerative Settlement Toolkit currently being developed.

The demonstration site presents expression of the Regenerative Settlement Toolkit as it applies to this particular context. This double feedback loop improves the applicability of the tools (ethics, contradictions model, solutions continuum, pattern language) and encourages iterative development. The Toolkit is intended to be utilized by humanitarian aid and development actors, to support in strategizing and realizing regenerative solutions. Furthermore, the site will function as a living model and education center for stakeholders within the humanitarian field. It can host seminars on regenerative design strategies and technologies engaging aid and development workers in innovative alternatives.

Implementation of the design was divided into two steps. Step 1, September and October 2018, consisted of earthworks, water management, access and utilities. The construction of the road and terraces required 7 days with an excavator and bulldozer and a further week of handwork: building swales, ditches and brush berms.
5 terraces were constructed with scarified slopes for water infiltration. A new road connecting the terraces with the larger Tamera site was established in tandem with a temporary pond for water retention. Swales and drainage ditches were dug, soils were mulched, seeded and trees were planted with the beginning of the rainy season. Step 2 of implementation will commence in Spring 2019 comprising of the detailed design and construction of shelter and the living area.

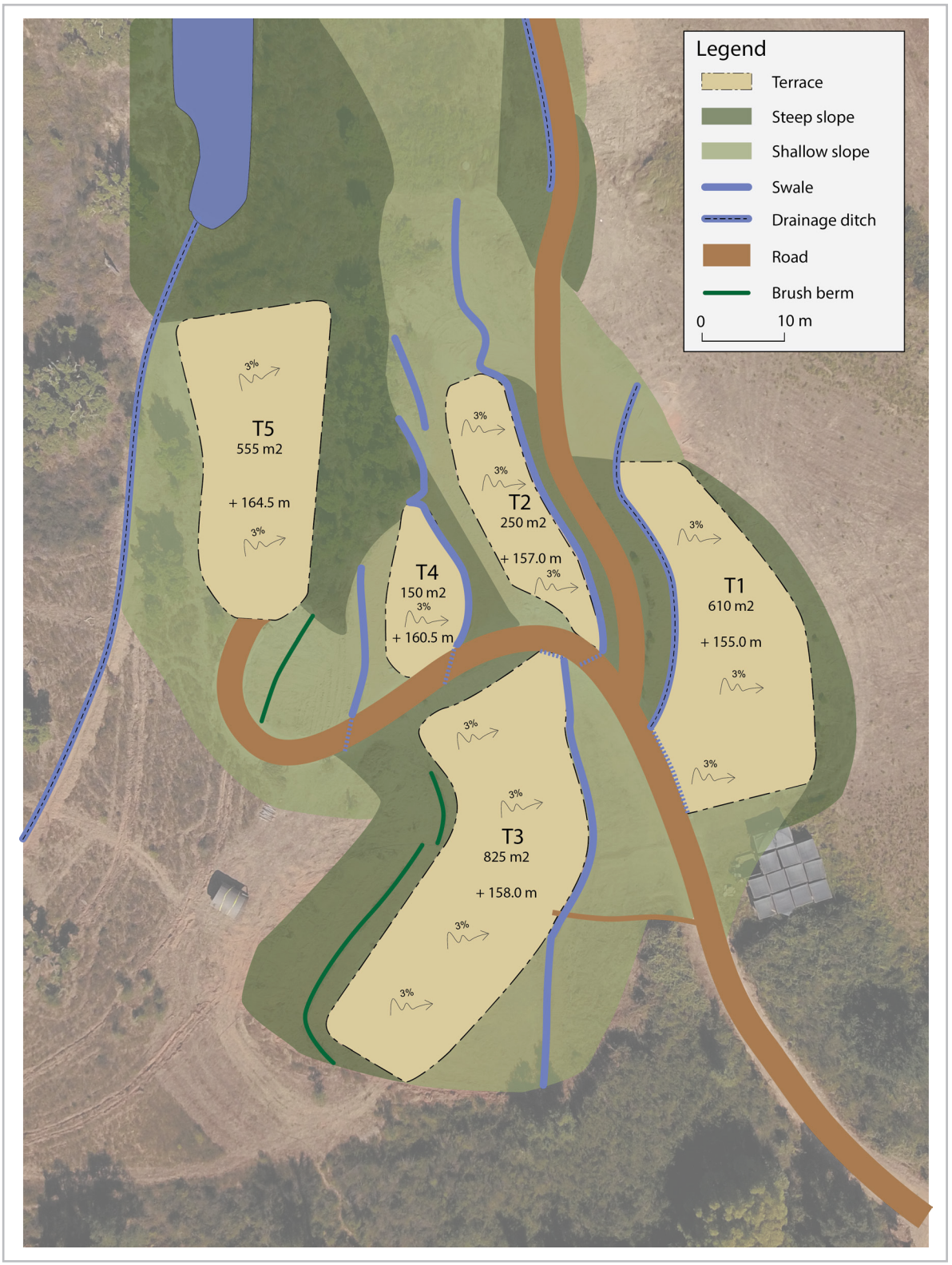


Figure 1. Earthworks basemap

In the design process we consider rain water harvesting measures, erosion control, sufficient access, fire risk reduction, the surrounding ecosystem, other stakeholders of the land, and planting patterns.

Connection to social region

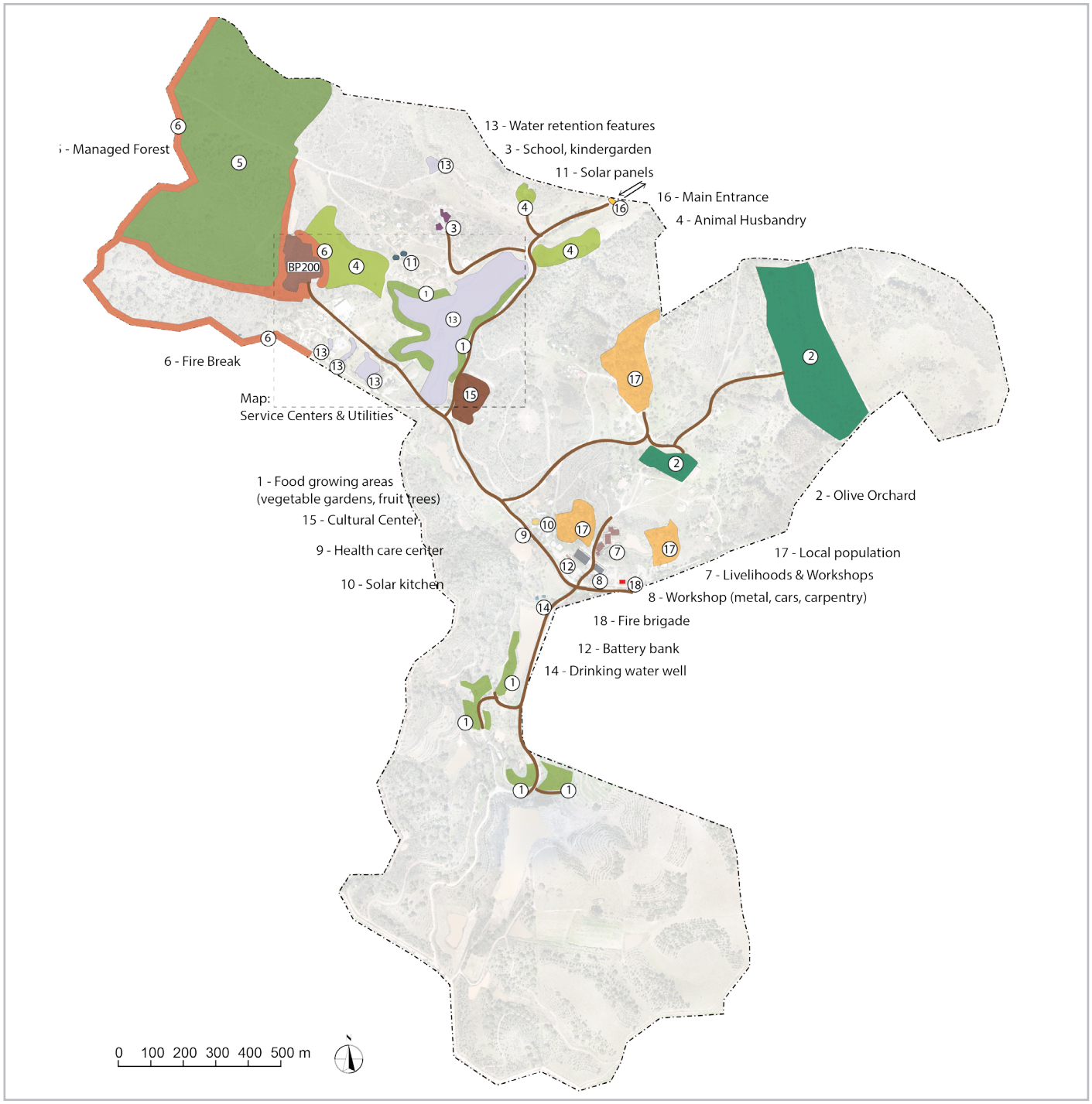


Figure 2. Access to services

Figure 2 illustrates the connectivity of the BP200 site to the wider region, and host community Tamera. Many services, such as a school, health clinic, and workshop already exist and therefore did not need to be developed on-site of BP200. This intimate connection to preexisting infrastructure is important for social cohesion and positive synergies.

A zoom-in of the larger connectivity-map highlights the existing infrastructure directly connected to the BP200 site, much of which is already serving the guests of Tamera's education campus.

Figure 3. Services in education campus

1	BP200 Camp	14	Community Hall
2	Adult Education, Dormitories	15	Dry Toilet
3	Workshop	16	Waste Water Purification
4	Dry Toilet Campus	17	Park, Sports & Playground
5	Showers	18	Kitchen
6	Meeting Space		
7	Water Tank		
8	Laundry		Living Area
9	Solar Panels		Food Growing Areas
10	Waste & Recycling		
11	Staff Office		Parking
12	Reception		
13	Dry Toilet		

Watersheds

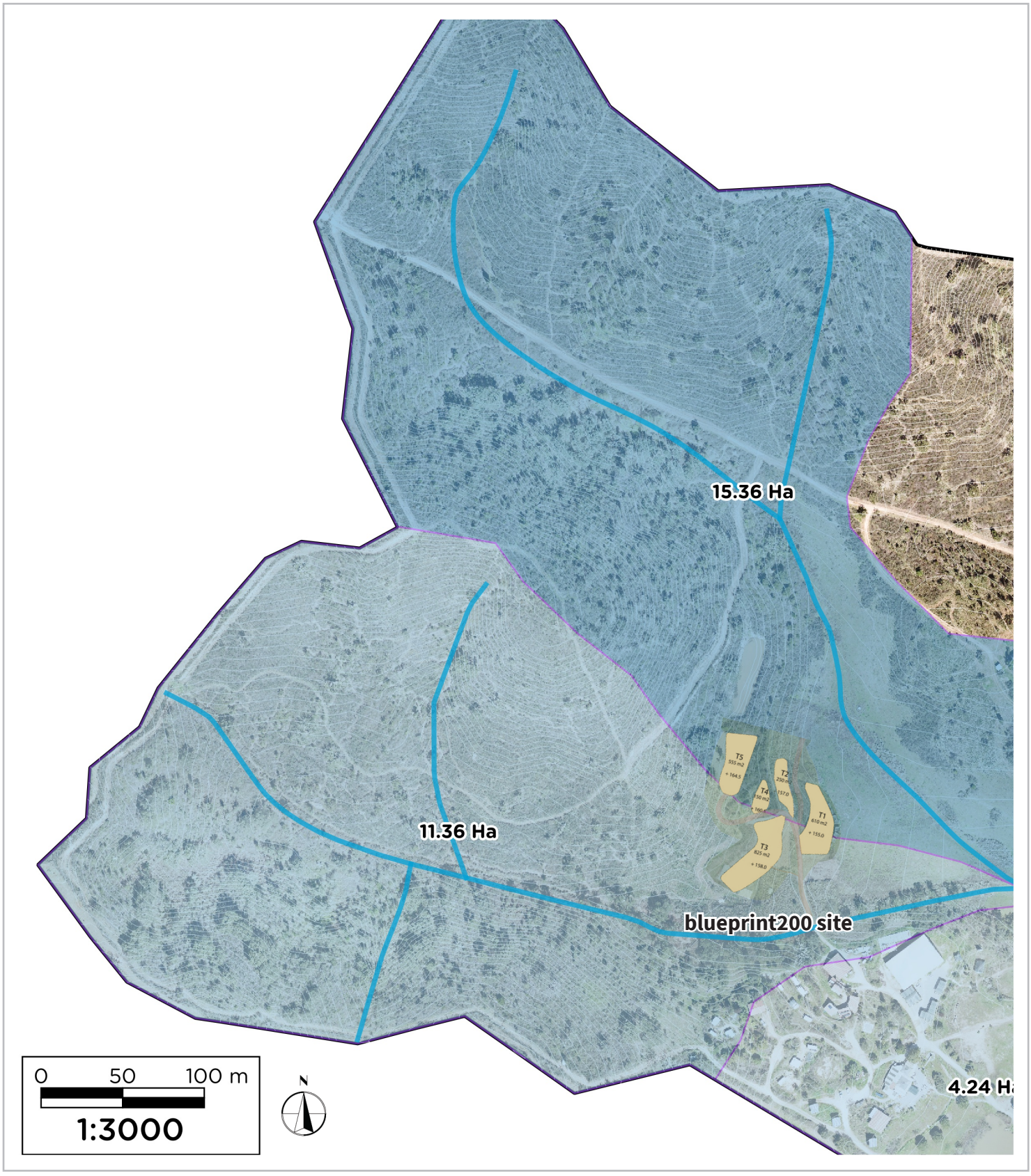


Figure 4. Tamera local watersheds and seasonal water lines

Contour map highlights the distinct watersheds of the Tamera site. Watersheds were analyzed for the potential impact from earthworks on BP200 site.

Figure 5. BP200 Contour map

Contour map of the BP200 site pre-earthworks intervention.

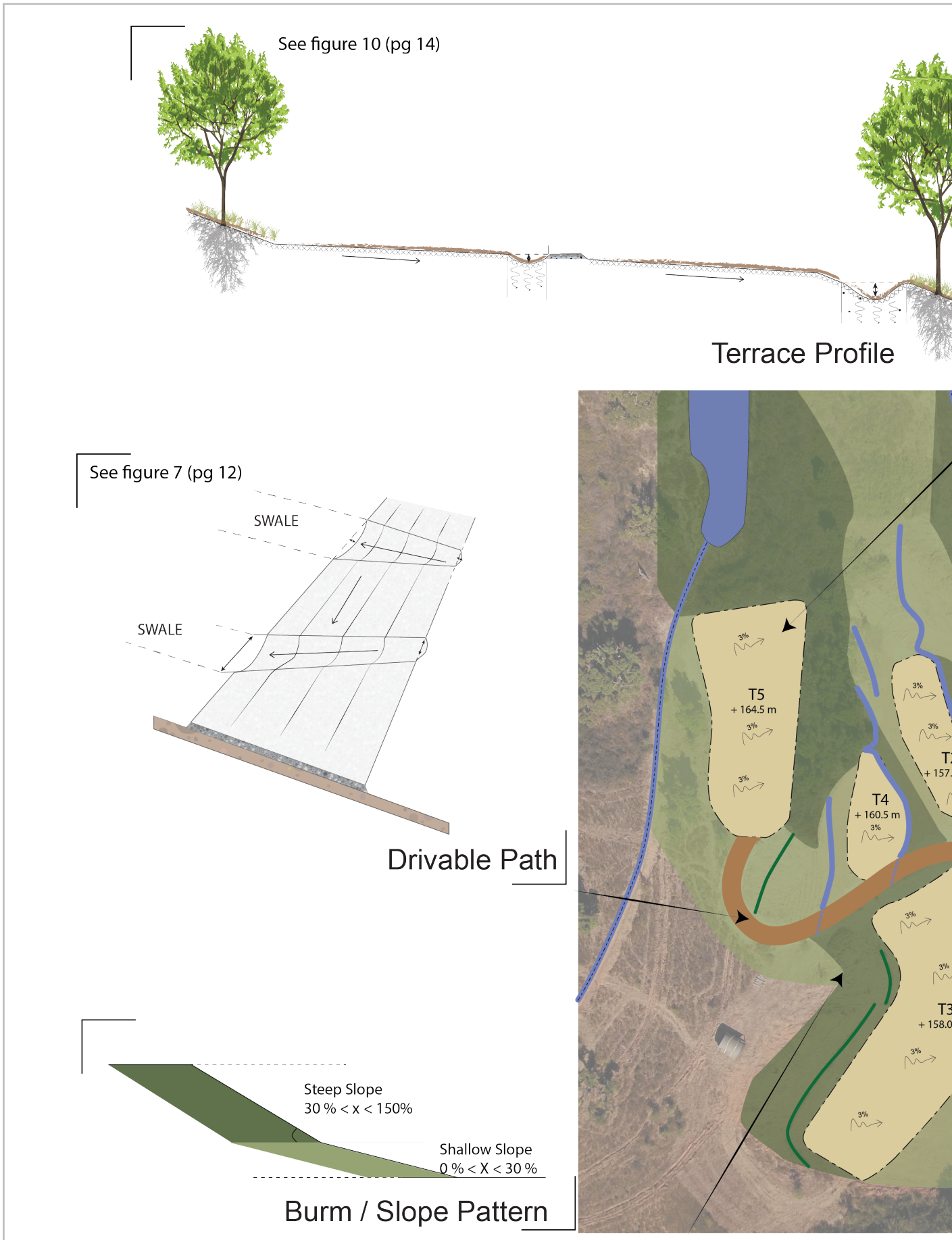
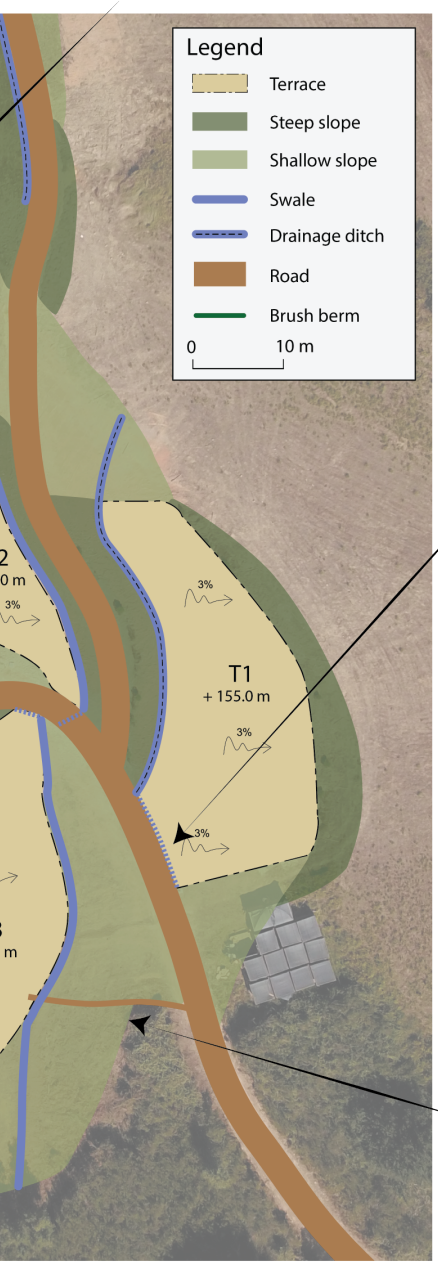
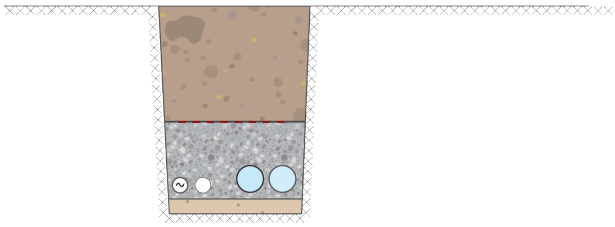


Figure 6. BP200 Earthworks Diagrams

Site Design

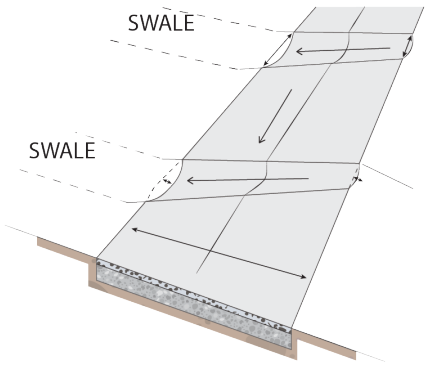


See figure 16 (pg 19)



Utility Trench

See figure 8 (pg 13)



Foot Path on > 5% Slope

Access

Road construction diagram for portions of road above five percent slope. Cross-ditches were designed to capture road runoff and feed into swales, while not impeding traffic on the road.

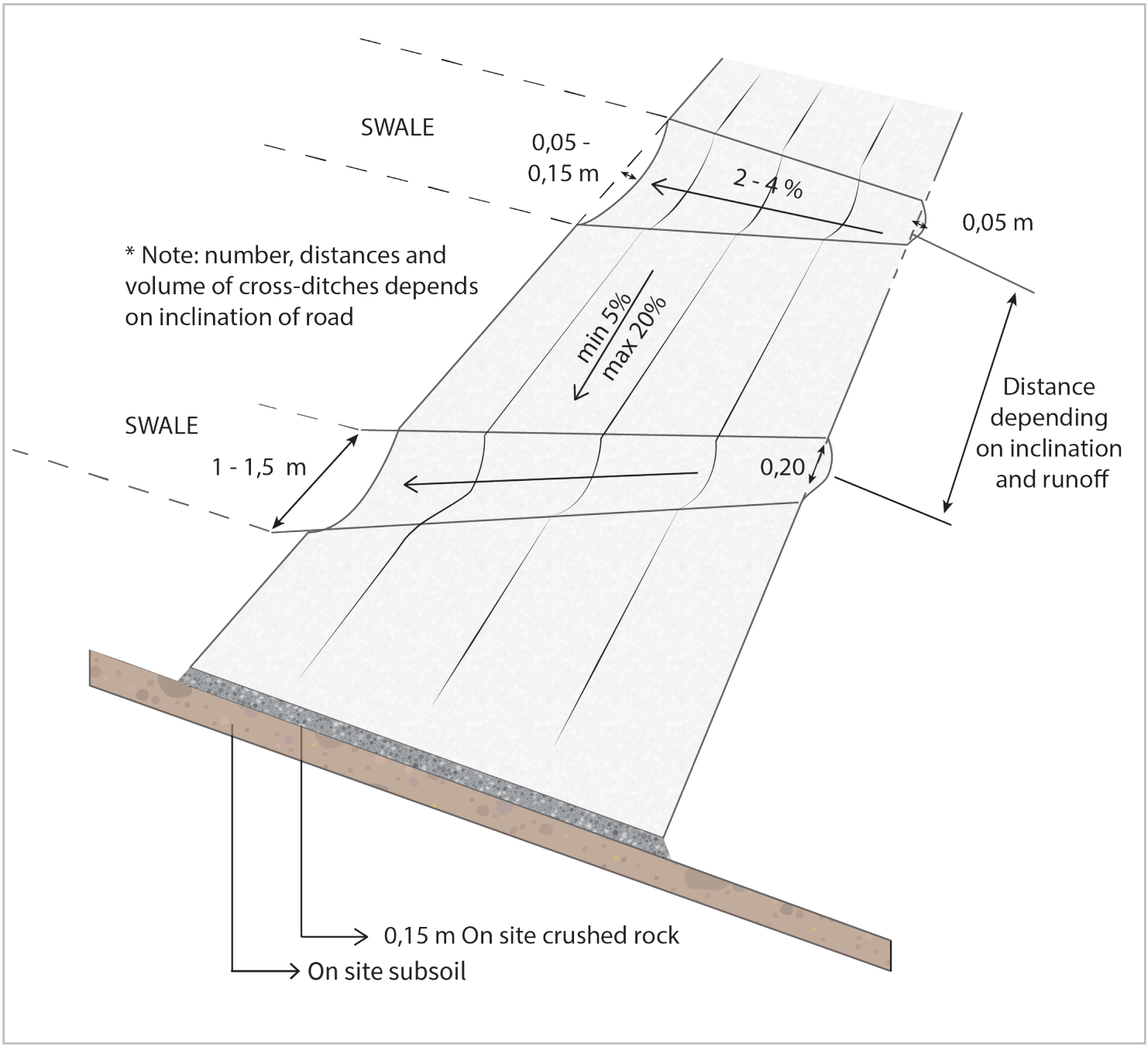


Figure 7. Road on slope diagram

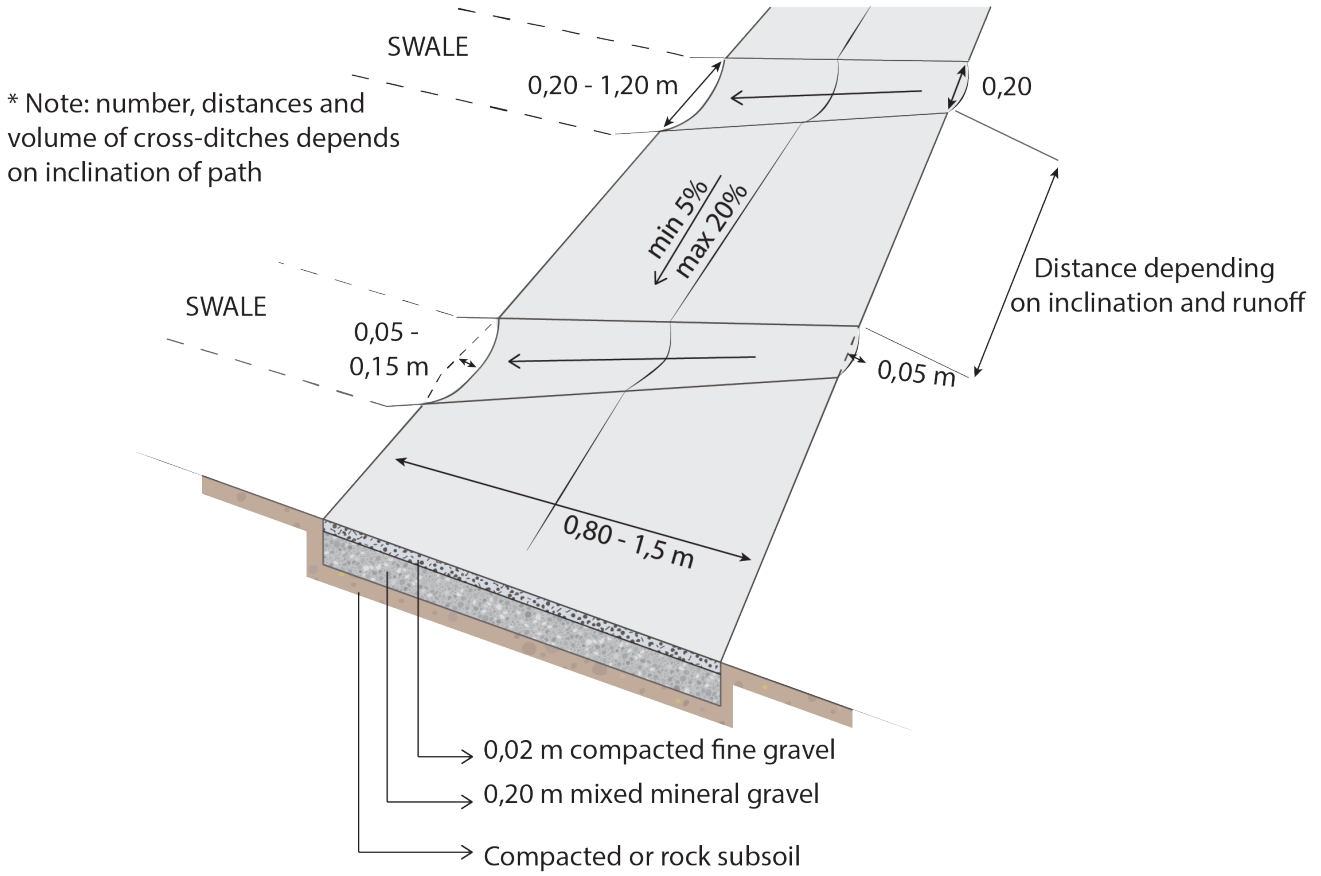


Figure 8. Path on slope diagram

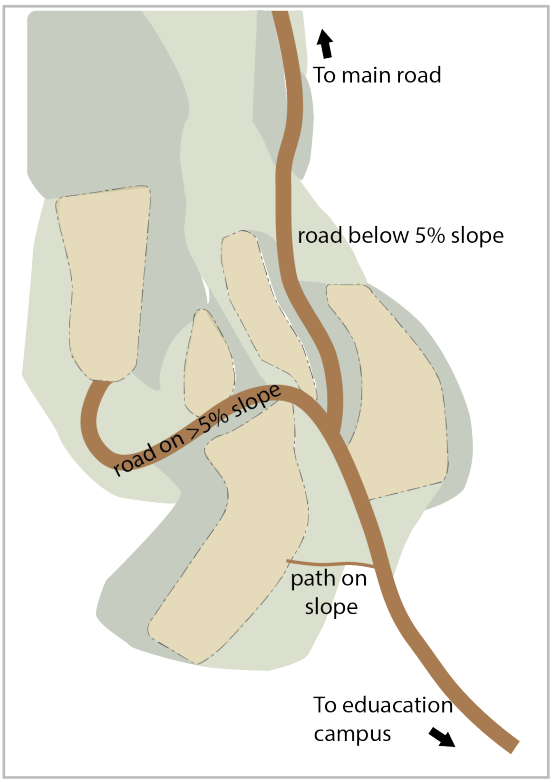


Figure 9. Road and path location

Similar to road construction, paths on slope require cross-ditches to stop path erosion.

Terrace design

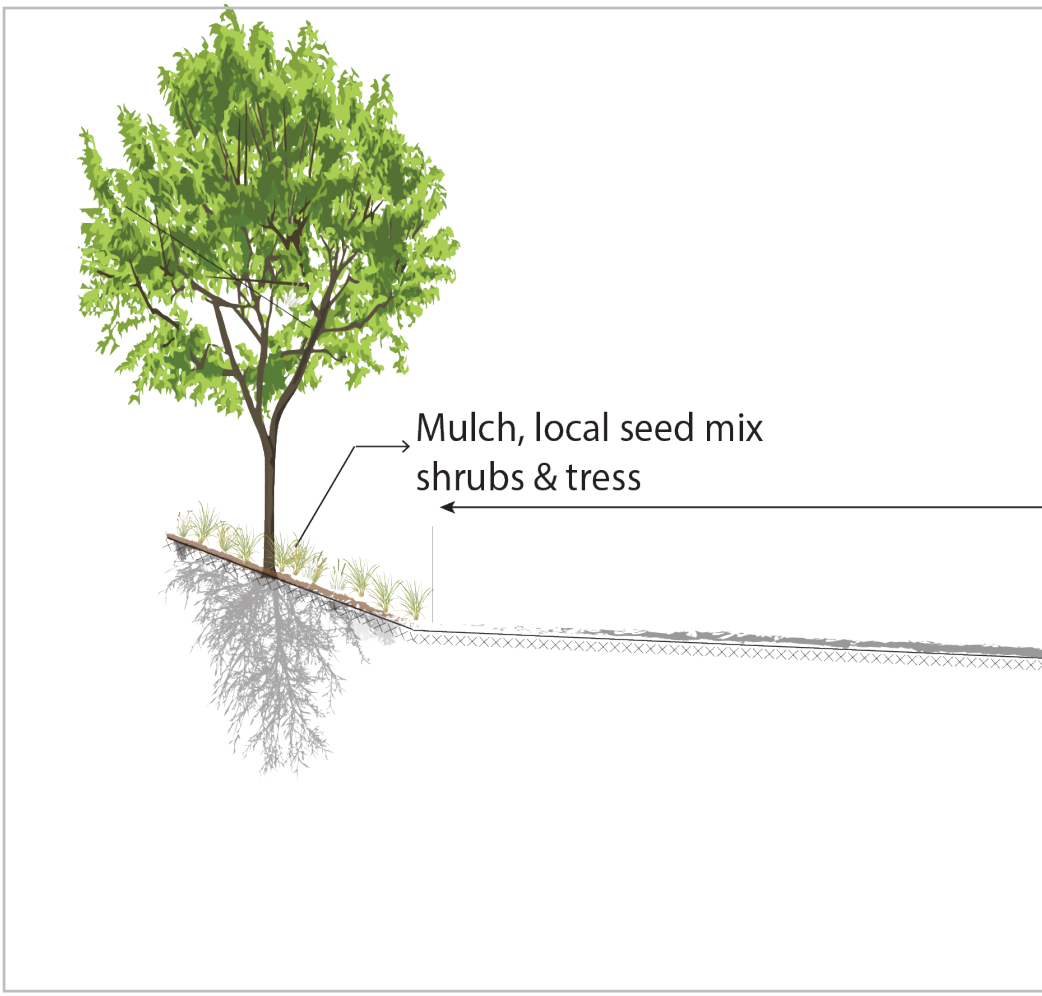
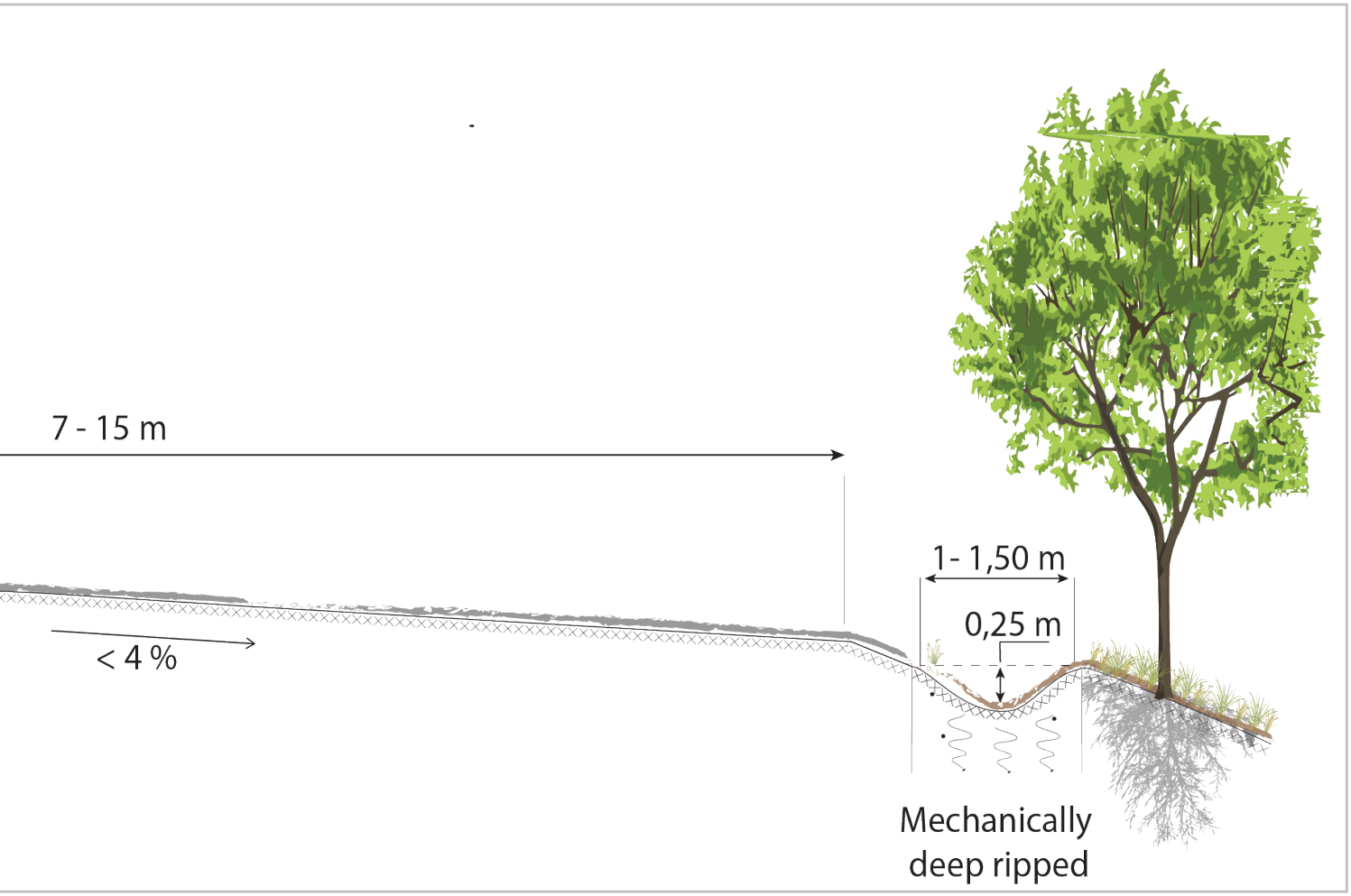


Figure 10. Terrace profile

Photo 1. profile of T2



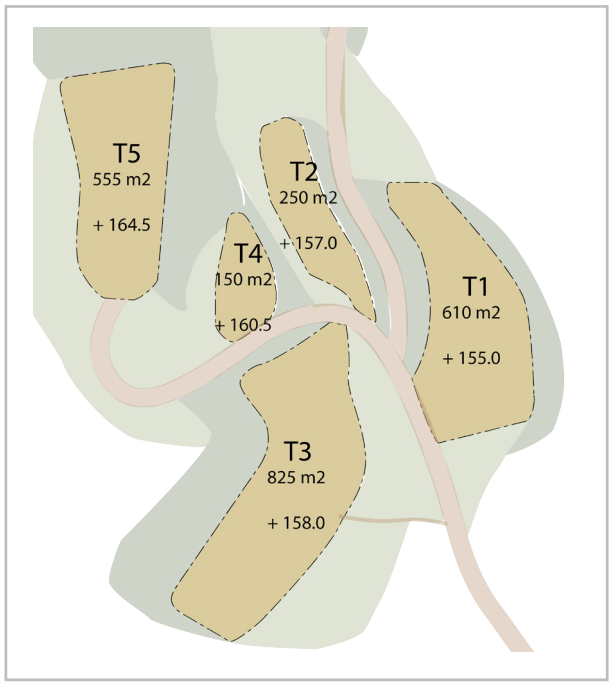


Figure 11. Terrace location and sq m

5 distinct terraces were formed utilizing the existing slope to create stable living zones for shelters and services. Although each terrace is different in size and shape, all are single sloped (around 4% gradient) allowing water to flow away from structures and towards infiltration swales on the downslope side of the terrace. Prior to construction, topsoil was removed to be spread on scarified slopes, which creates high infiltration capacity and fertile conditions for agriculture and other purposes.

Figure 12. Runoff diagram

Map depicting water flow across soil surface during rainfall events, including overflow points of swales and drainage ditches.

Water managment

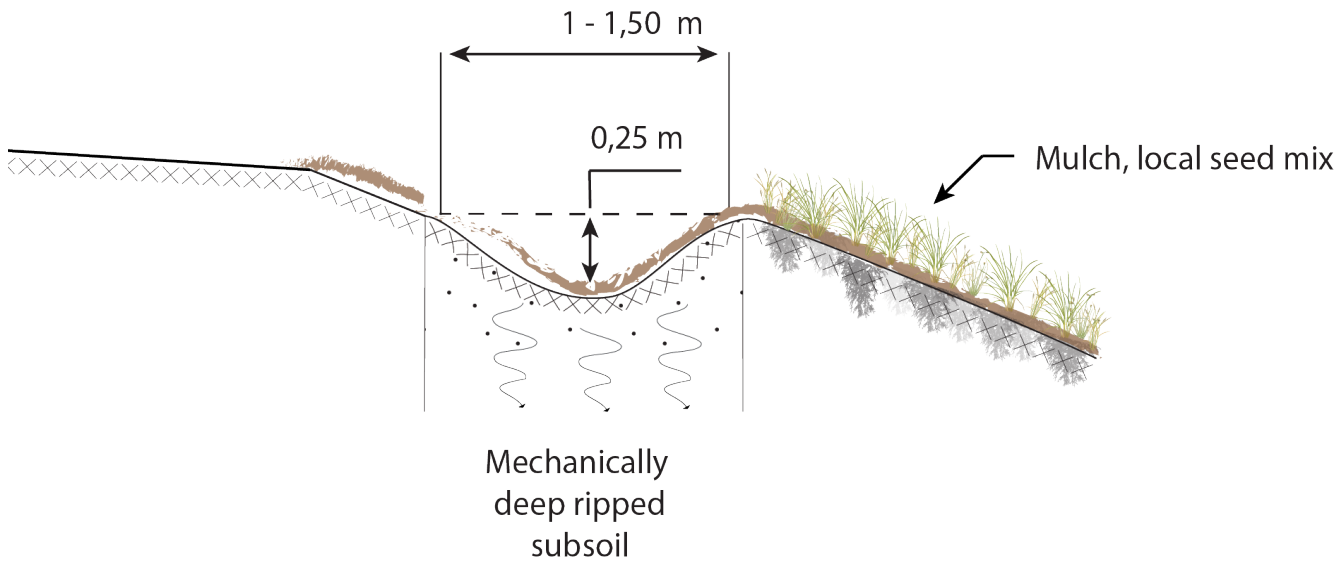


Figure 13. Swale diagram

Five infiltration swales and three drainage ditches help to control the water runoff from slopes and terraces. All swales have designed overflow outlets that link to other swales and eventually to existing riparian areas.

Photo 2. swale along T3

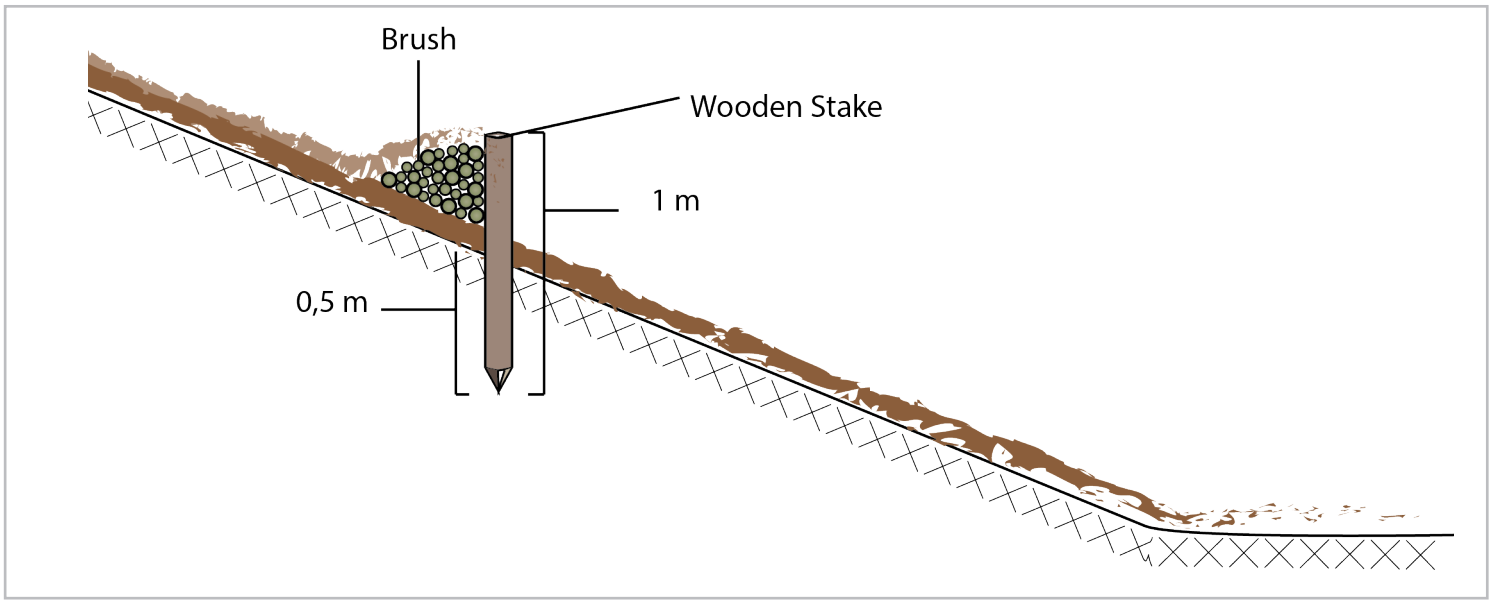


Figure 14. Brush berm profile

Two brush berms on contour serve to slow water flow down the steep slope, while also creating access pathway along the slopes. Local vegetation created by the earthworks was utilized to create the brush berms.

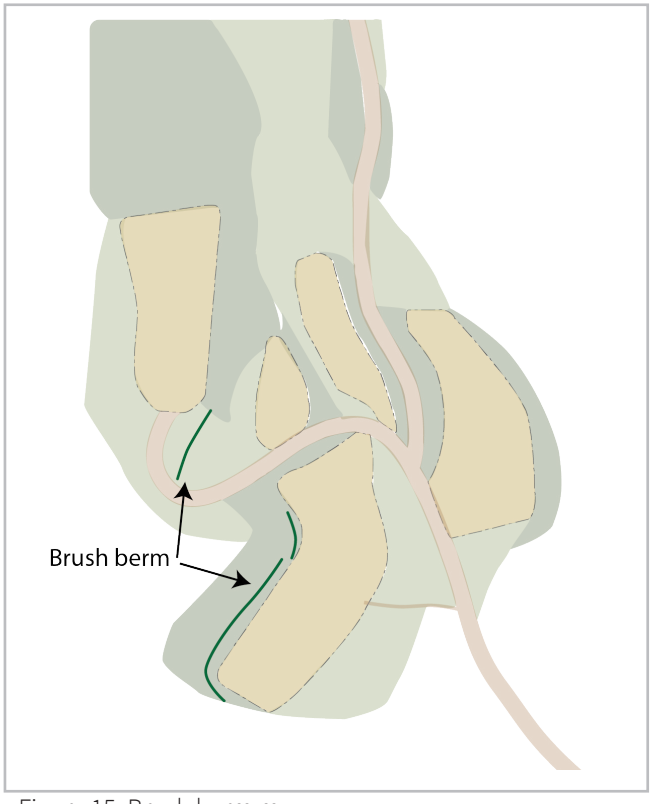


Figure 15. Brush berm map

Photo 3. brush berm above T3

Utilities

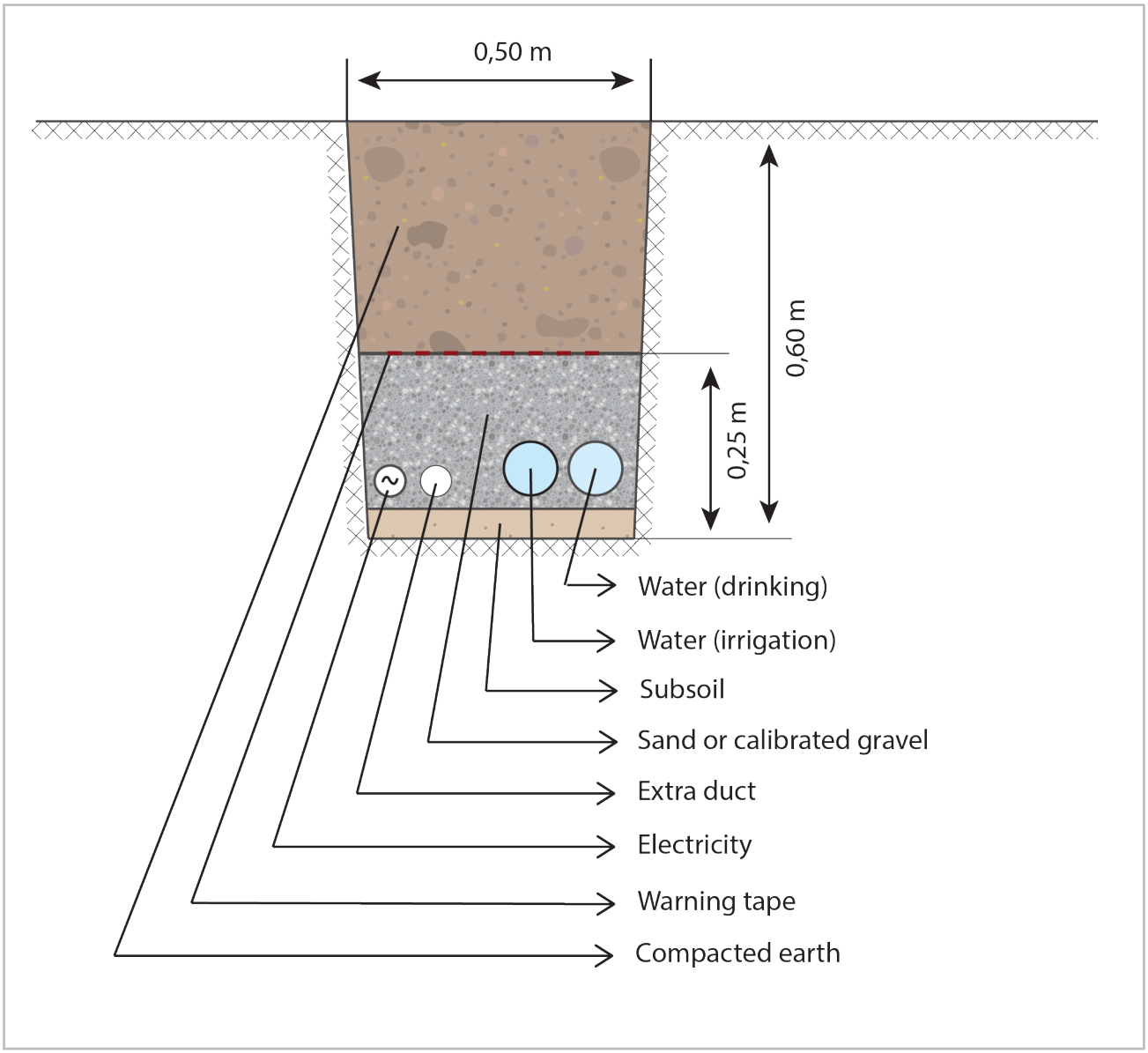


Figure 16. Utility diagram

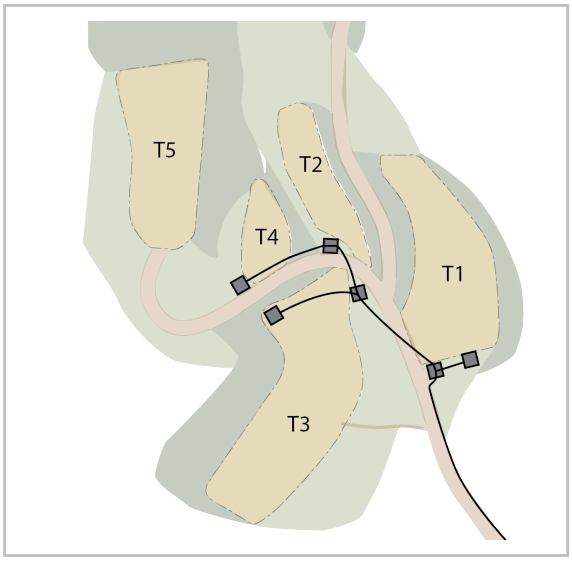


Figure 17. Utility map

In preparation for the next implementation step, utility lines were buried under the road, with access points on T1, T2, T3, & T4. Water supply comes from the local well, solar pumped and gravitiy-fed, with electricity being provided by solar panels

Photo 4. little boy in big digger

Photo 5. colors of the earth

Photo 6. drainage ditch on T1

Photo 7. mulched swales between T2 & T4

Photo 8. preexisting pond beside T5

Photo 9. View upslope from T1

Photo 10. view along road of T1 & T2

Photo 11. students measuring swale on T4

Photo 12. construction of T2

Photo 13. volunteer sculpting a swale

Photo 14. volunteer sculpting a terrace

Photo 15. volunteers seeding & mulching swale above T2

Education

Regeneration on a global scale cannot be achieved by excluding human beings from the work with nature. Humans must be addressed as agents within their own habitat if we are to restore the systems which sustain life on the planet. And of course the people who inhabit or tend to land are also one of the biggest resources in manifesting regeneration.

Intelligent and simple design, based on natural principles and innovative thinking is one of the big learning fields of our time. We believe that it's crucial to create hands-on learning experiences and so 65 students joined us for one week to immerse in the issues of building settlements following regenerative design principles and solutions. The following issues were covered:

- Introduction into BP200 - regenerative design in refugee camps
- The small and large water cycle - water management to regenerate landscapes
- The role of water, soil and vegetation in climate
- Sharing resources, networking

The theory complemented the handwork on site. This combination offered opportunities to work in teams and a thorough insight into responsible interaction with land and the earth's resources.

Together with the students we achieved the following water retention and soil-building measures:

- 170m of swales and ditches
- 70m of brush berms
- over 2000m^2 mulched and seeded
- 200 trees and bushes planted
- Irrigation system for agricultural zones
- cross ditches connecting to swales across dirt roads
- rehabitation of blocked well

Next steps

The next steps of BP200 is the ongoing development of the site design and detailed elements in coordination with the Regenerative Settlement Toolkit. Implementation of the next phase is expected to begin Spring 2019 and be ready for use by Tamera's education campus for the 2019 season. Continued design in the areas of access, appropriate technology, energy production, firebreak design, plants & agricultural systems, sanitation systems and shelters & community spaces.

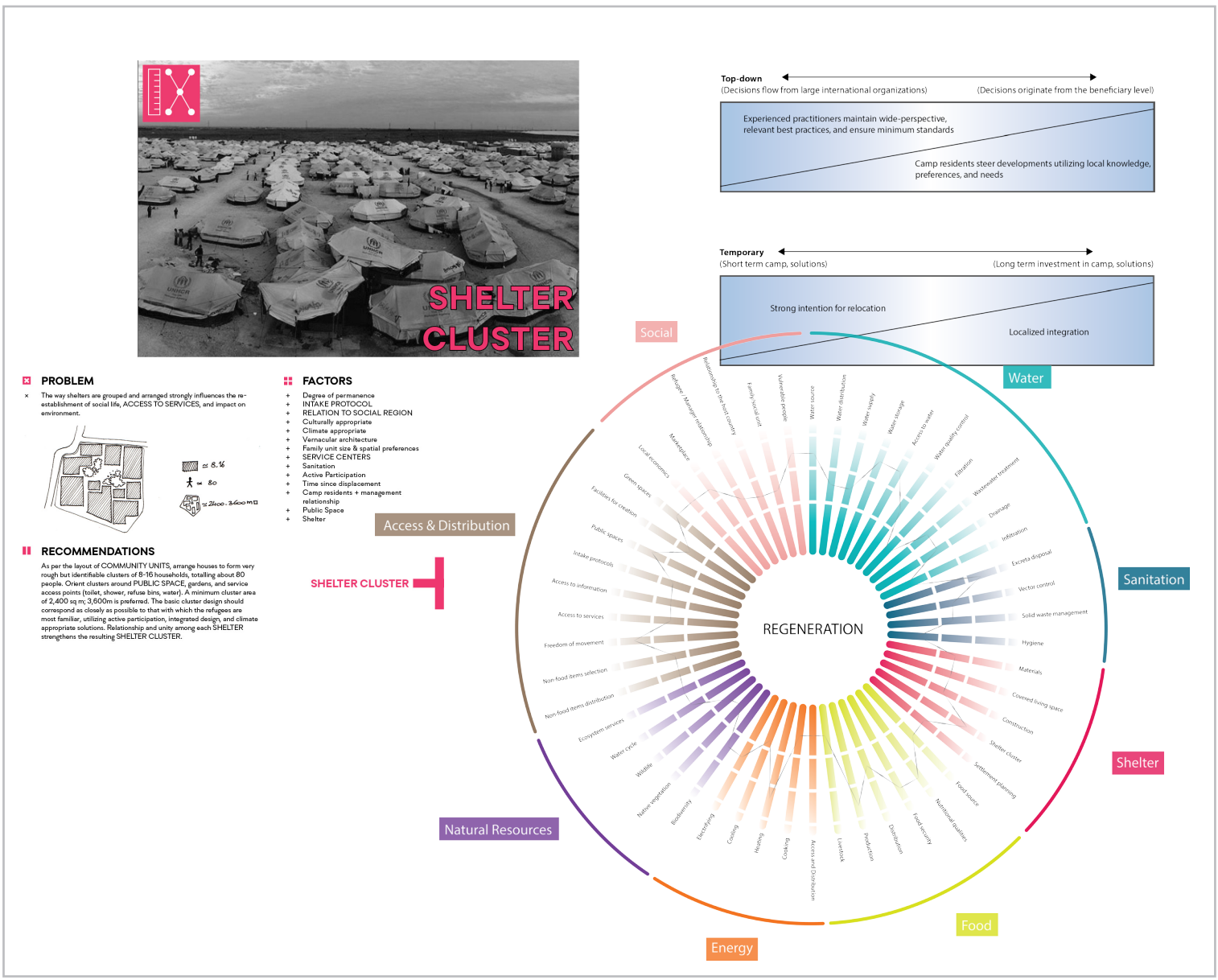
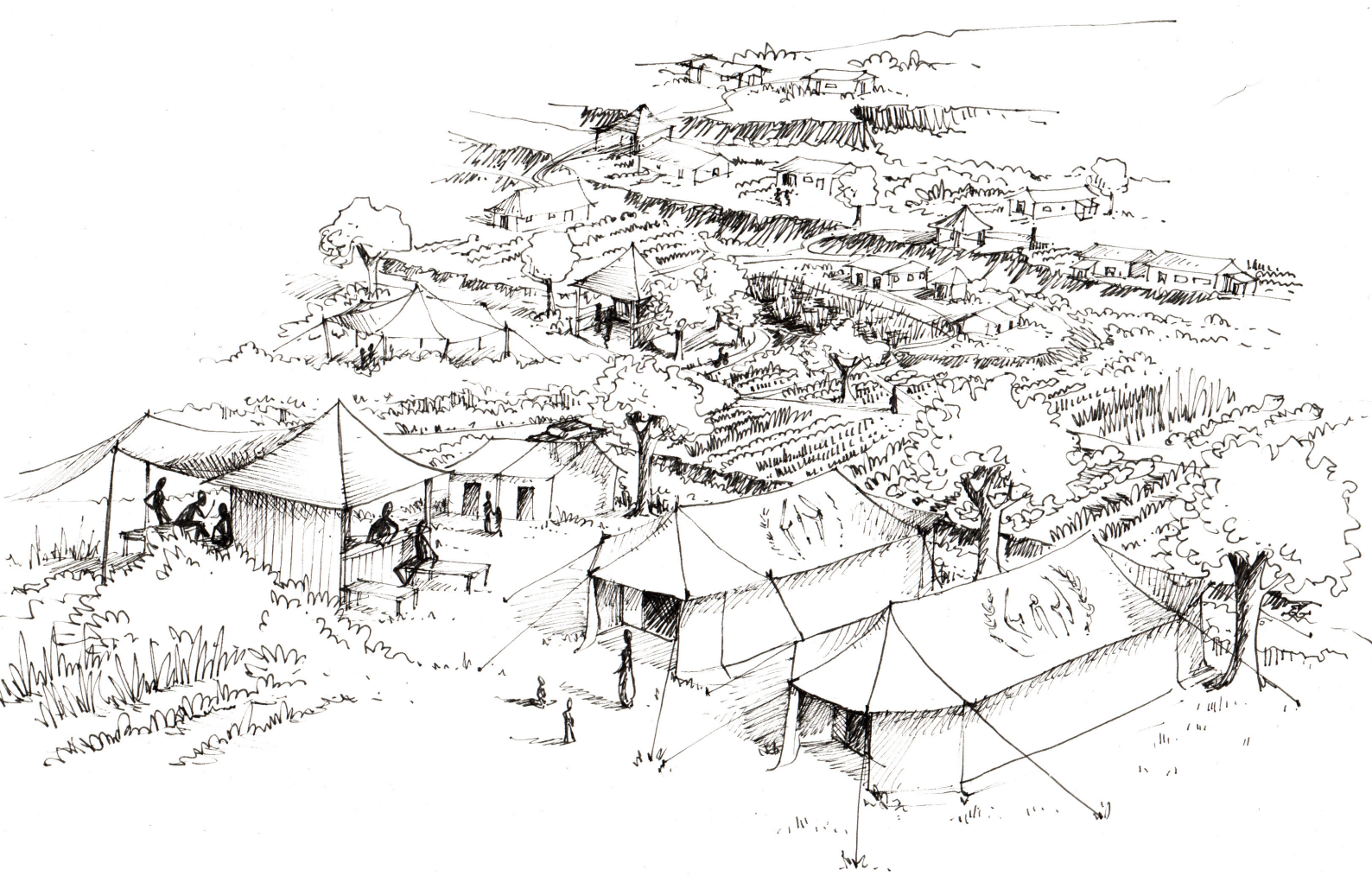


Figure 18. Preview of Regenerative Resettlement Toolkit



Tamera.org
Blueprint-Allinace.org
The-Grace-Foundation.org
SurplusPermaculture.org