

ELIZAYO • STUDENT SELF-BUILD PROJECT IN SOUTH AFRICA • FEBRUARY 2018



INTRODUCTION

Encouraged by the success of the preceding year, the self-building activities carried out in a township near the South African coastal city of Port Elizabeth were continued in February 2018, forming part of a three-weeks practical workshop of Wismar University of Applied Sciences. Together with students from the local "Port Elizabeth TVET College", 16 students of the Faculty of Architecture and Design established and implemented their own design for an extension of a typical township home, provided within government-subsidized housing programs for families in need.

These residential areas are usually located far away from city centres, without adequate transport facilities, thus forming long-term impediments to secure employment and self-sufficient livelihoods. The overall project is therefore based on the approach to sustainably improve the economic situation of the poor majority of South African citizens, especially by creating jobs locally, within townships for the local community.

The applied self-construction methods, using recycled materials and basic technical equipment, allow for prototypical extensions to individual residences, which are providing space for the implementation of existing business ideas by individual local entrepreneurs. The residents partaking in the programme are offered the opportunity to gain basic skills within preceding educational programs in close relation to the requirements of their microeconomic activities, allowing them to get directly involved in the planning and construction process of the business extensions. The individual projects thus create a basis for individual business activities, offering the opportunity to be economically successful on the long run and - as reference

projects - encourage the beneficiaries involved as well as members of other communities to develop further initiatives.

The subject of this year's self-build project was the implementation of a typical small township store, in South Africa known as „Spaza Shop“, serving as a point of sale as well as a central meeting point within the township community of „Joe Slovo West“. For the small annex a timber frame structure was chosen, again using „green“ technologies and recycled materials, mainly by converting outsourced timber elements.

To practically meet the real needs of a family of township residents, the small business unit was first designed as a residential extension within a practical seminar at the University of Wismar, subsequently being implemented on site by the team of German and South African students.

For the first time this year, the international cooperation of the participating educational institutions was extended to the level of employees, thus strengthening the existing international partnership. The workshop manager of Wismar's Faculty of Architecture and Design, Wolfgang Dörk, therefore joined the project. He got involved in all building activities on site and in the workshops, where - together with his colleagues of Port Elizabeth College - he significantly supported the international student team and immensely contributed to the efficiency of the whole building process.

Within the self-construction project, all members of our student team could benefit from a unique practical experience, but also from valuable personal interaction with fellow students from a different

cultural background, having had very limited opportunities for education and social advancement. Enthusiasm for the country and its people in combination with the overall project approach lead some of the students to re-attend this self-building workshop. Within this, they had the opportunity to further develop and deepen their experience, contributing to the benefit of this year's project with their previous valuable experience.

The established international cooperation promotes technical and social skills of all participants, in particular those of the South African students involved, mostly originating from underprivileged township communities themselves. One of the key achievements of the project is those students' professional and personal development, sharing and passing on their experience within their families and communities. Their enthusiasm and continuing volunteering contribution under the guidance of our local partner Kevin Musembi Kimwelle, ensure the project's long-term success.

The project is based on a holistic, interdisciplinary approach, which does not only consider technological, ecological and energetic aspects, but above all the social components as an essential aspect of real sustainability. Thus reaching far beyond the workshop activities, the overall project promises to generate momentum for sustainable Social Change in South Africa.



photo: Christian Bauer

ACKNOWLEDGEMENTS

My gratitude goes to the Rectorate of Wismar University of Applied Sciences, lead by Prof. Dr. Bodo Wiegand-Hoffmeister, whose personal interest has been encouragement to continue this project.

I would also like to thank the Department of Research and Innovation under the direction of Prof. Dr. Marion Wienecke, for substantially supporting this project within the in-house research funding. The future-related topic of this research in the field of sustainable development as well as its close connection between teaching and practice, as expressed in this self-building project, are thus specifically highlighted.

Thanks to my project partner Kevin M Kimwelle, whose dedication and great personal commitment to self-building in a social context are unprecedented. As a community architect, the multidisciplinary work within his PhD research creates the basis required for a successful implementation and securement of the project's sustainable objectives. His engagement, guided by foresight and boundless idealism, deserves our full support and utmost respect.

I would like to sincerely thank all sponsors and supporters for their generous donations and thereby expressed confidence into the ideas of our project activities. Very personal thanks go to Mr. Heinz Georg Ruffert and his wife, as well as to the employees of his engineering practice R&P Ruffert Ingenieurgesellschaft for their generous financial support, which has substantially contributed to the success of this project.

A big thanks also goes to Mr and Mrs Höfer from Wismar, for their spontaneous and generous donation and the thereby expressed belief in the

project's promises. I would also like to thank my esteemed colleagues and friends Björn Füchtenkord and Lorenz Haspel as well as Gerhard Schüßler. Their enthusiasm for the wonderful country of South Africa and their understanding of its great challenges are reflected in these generous contributions.

Our gratitude also goes to the *Norddeutsche Stiftung für Umwelt und Entwicklung* (NUE), for once again supporting our self-building project - like the previous one in 2017 - from the proceeds of the lottery *BINGO! Die Umweltlotterie*. These funds have been of essential importance in our effort to ensure that the success of the project can be sustained and even enhanced.

Special thanks go to the families and friends of our students as well as to all the other supporters who have contributed to our project account at www.betterplace.org/p51290 with small and large donations, thus allowing us to achieve our goals. With the remaining funds, even the much needed continuation of project activities by our local team was achievable.

I would like to thank my esteemed colleagues at the Faculty of Design, in particular Prof. Achim Hack as Dean of our Faculty of Architecture and Design, for constructive discussions of the objective and methodology of the project as well as for the support in the acquisition of funding. I would also like to thank particularly our workshop manager Wolfgang Dörk, who - after spontaneous „rescheduling“ of his 40th wedding anniversary - brought his invaluable experience and his boundless enthusiasm into the collective work from the first to the last day of the workshop.

I would also like to thank Mrs. Regina Krause, Managing Director of the Robert Schmidt Institute of our university, for her willingness to share her immense experience in international cooperation and project management throughout all phases of this project, thus offering non-bureaucratic support at any time required.

Last but not at all least the gratitude of our entire team goes to the residents of Joe Slovo West, in particular Thembakazi „Thembi“ Thelma and her husband Eric „Rasta“ for their patience in waiting for the desired and much needed extension, for their active participation and great hospitality as well as their enthusiasm and great trust into our team. Bob Marley's rhythms will continue to echo in Wismar for a long time.

My final thanks go to all participating students whose enthusiasm for the project, expressed in preparation, implementation and documentation of this workshop, has been a great source of motivation. Regardless of their cultural origin, social background or personal experience, they have contributed all their special skills to the team's work. Their tremendous and - in the true sense of the word - tireless dedication have made the project a success, unfolding its effects here and in particular on the less privileged side of the world.

Silke Flaßnöcker, April 2018



»GREEN« EXTENSIONS IN JOE SLOVO WEST

There is a global acceptance on the urgency of sustainable development. However, the “green trend” seems to further marginalise the poorer population that cannot afford mainstream “green technology” (e.g. wind turbines, solar panels, amongst other technologies). There is an urgent need to connect these communities to more sustainable solutions, so that they can be empowered to harness its socio-economic and environmental benefits. There are few green developmental models that have managed to directly connect the benefits of the Green Agenda to poor local communities in South Africa.

This project combines a participatory approach and co.design with the Green Agenda in order to promote sustainable social impact that creates greener alternatives to livelihoods within poor and marginalised communities. The multidisciplinary work combines design with sustainable social development strategies to bring about localised low-tech alternatives that can be replicated by other local communities, while supporting livelihoods within Joe Slovo Community in Port Elizabeth.

The project also promotes the communities’ acceptance and ownership of alternative technologies - this is vital using a bottoms-up approach, and a shift advocating a direct involvement and buy-in by local communities into the use of alternative green technologies.

The social impact of the project is seen through 3 entrepreneurs whom the project supports. These are three SME’s (small micro enterprises), strategically supported to promote livelihoods through green entrepreneurship at a micro-enterprise level which in turn should sustain the social-economic impact created.

The project is also successful in its collaborative thinking in the cooperation between academic institutions in Germany and South Africa, by promoting a hands-on methodology from which the students directly benefit. The international team raises up to a global challenge by providing localised greener solutions as replicable prototypes.

At the same time cultural barriers and beliefs are further broken down, while tolerance, understanding and friendship are further advanced. The project gives a glimpse of the great potential in the different layers of activities (right from the green challenge, via academic methodology, to a social and developmental approach), hinting towards newer ways provided by this globally thinking collaboration. This opens greater possibility and excitement on how the project will advance.

Kevin M Kimwelle



Hilda with PE College students after installation of a sliding door
photo: Kevin M Kimwelle, May 2017



photo: Silke Flaßnöcker

STUDENT SELF-BUILD PROJECTS IN SOUTH AFRICA

Since winter semester 2015/16 future architects and interior designers of our faculty are dealing with planning and housing design in South Africa. Cultural-historical and socio-cultural context of the local population play an important role, as well as African building traditions, availability of regional and more ecological building materials as well as individual user requirements.

Why? The students have a goal - they are working on the extensibility of the locally-built, mostly uniform homes, which are currently being built in large numbers as part of the South African housing program. In cooperation with the South African partners, students develop modular building concepts for urgently needed space for the development of microenterprises, and thus for the creation of new jobs in the township.

For the first time in February 2017, a two-week international self-building workshop took place in the South African township „Joe Slovo West“ near the coastal city of Port Elizabeth. Seventeen students of the Faculty of Design built an extension for a typical „Mandela“ house, based on their own design, together with students from Nelson Mandela University (NMU) and Port Elizabeth College.

Built mostly from recycled materials, the small building creates quality business and leisure areas. There was room for the recycling business operated by the owner „Mama Hilda“, as well as for the accommodation of her gaming equipment used by children of the neighbourhood.

For a second structural extension, prototypes were created, preparatory measures were taken and built

materials purchased. The project was subsequently implemented and completed by our local team. Further extensions and new public buildings are currently in the design phase, executed by Wismar students in close collaboration with their local partners.

PROJECT »A WORKSHOP FOR HILDA« 2017



photos: Evelina Boger



photo: Silke Flaßnöcker

PROJECT »SPAZA SHOP« 2018

The objective of this year's student project was to design a so-called „Spaza Shop“ as an extension to an existing residential building of a family residing in the township „Joe Slovo West“, lead by the intention to self-build and implement the intervention on site.

The owner had been offering goods for sale for quite some time in extremely limited space. Inexpectation of the project's implementation, she has been trained within microeconomic education programs, in order to successfully implement her creative business ideas.

The new shop – apart from improving and expanding business activities – is also capable to accommodate one person, e.g. a possible tenant or a guest of the family.

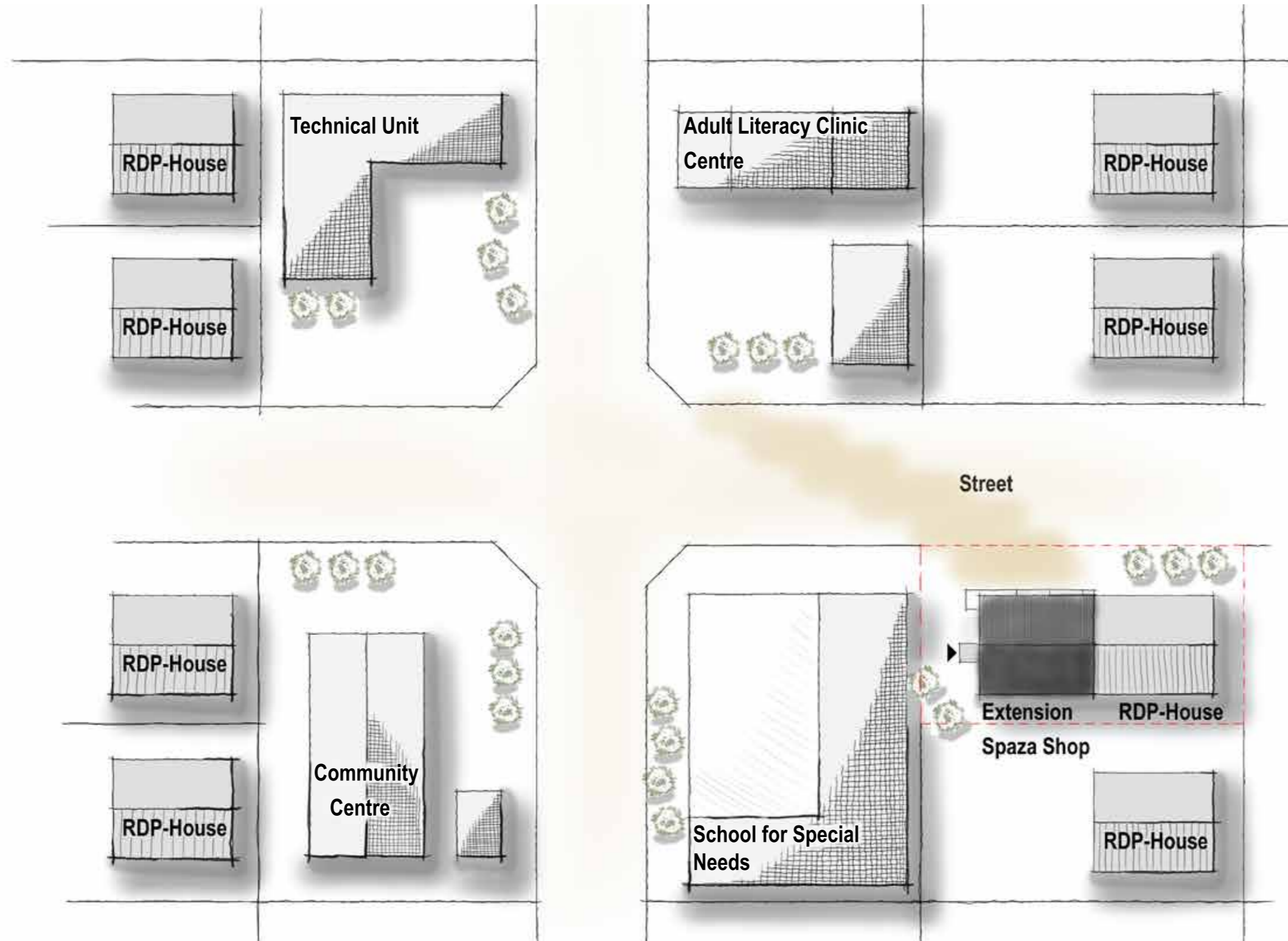
The extension also reacts to its function as a „meeting point“ within the township's Community Centre, without neglecting the important aspect of security against crime.



photo: Christian Bauer



photo: Lukas Frangart



Site Plan of the „Community Centre“ in Joe Slovo West

DESIGN

The new building, located in close proximity to the townships' new Community Centre, is approached from the street via an open space, oriented towards the public square. By means of two steps, a customer or visitor reaches the raised, covered porch, in South Africa known as „stoep“, marking the transition between street and shop, between public and private area. At the same time, the covered outdoor space allows for valuable social interaction, offering a place to stay and have a chat with neighbours and friends while sitting comfortably on a bench. Two large openings, which can be closed by writable flaps, provide access to the counter top as the point of contact between customer and seller, as a typical township scenario.

On the gable side of the building, a robust metal-clad entrance door provides access to the indoor space for the shopkeeper as well as for the delivery of goods. The ramp located there also allows barrier-free access for customers with disabilities.

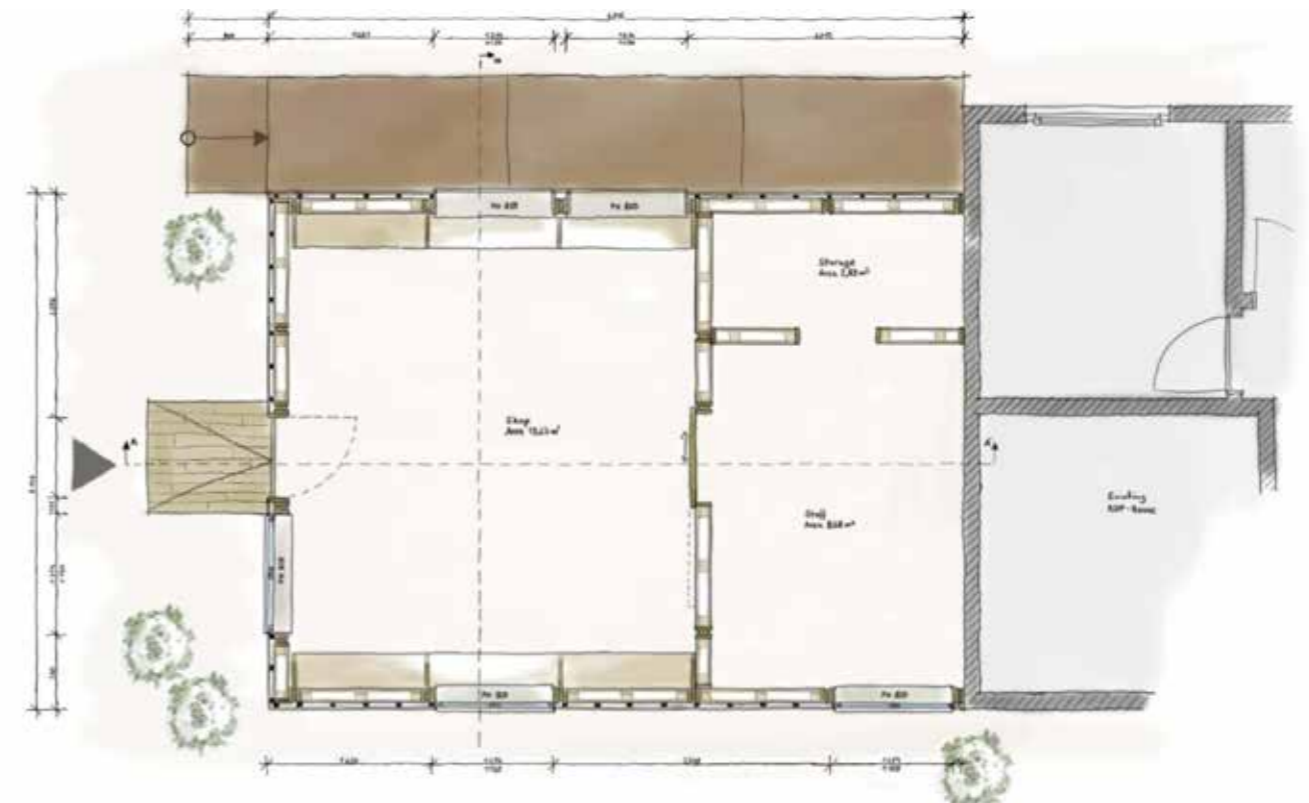
The extension takes over the height and width of the existing RDP building and continues it in a way that enhances the new building's geometrical adaptation to the existing structure. However, with its differing timber construction and cladding, it keeps and emphasizes its specific use and architectural independence.

Meeting the sustainability requirements of the project, recycled material was used for the construction wherever possible - mainly from industrial pallets.

The sales area as the largest room provides generous space for storage and display of goods, as well as for filling up small quantities of goods, for preparation of drinks etc. On the previous-

ly outer wall of the RDP house a small bedroom and a storage room are placed. If needed, a toilet and shower can be installed for an upgrade into a simple sanitary room.

Alternatively to its intended use as a Spaza Shop, the owners have the option to rent out the new extension as a small residential unit, in which the central space would be used as the living room with a kitchenette. This alternative way of making profitable use of the new premises increases the economic potential for the owners, thus responding to the requirements for sustainable development.



Plan and Elevation of the Extension (by Ben Schuster)



photo: Christian Bauer

CONSTRUCTION

In order to meet the tight time frame of the three-week practical workshop, an efficient modular construction method had to be developed for the timber construction. This allowed for pre-fabrication of individual components in the workshops of PE College, which is located on the outskirts of Port Elizabeth's city centre, about half an hour's drive from the building site in the township.

Initially designed for wooden boxes, the source for the basic module of the extension had to be redefined due to lack of availability, and was replaced by larger transport pallets. The recycled industrial pallets were joined in the workshop by use of locally available timber profiles, together forming rigid wall panels as transportable units. The inside-facing open joints between the pallets were closed by means of additional recycling planks.



Structure consisting of recycled pallets and structural timber members



FOUNDATION AND BASEPLATE

For structural support and tie-down of the wall panels, a U-shaped strip foundation was established, complemented by a point foundation underneath the position of the central column, serving as the main support. The trenches were manually excavated off the two-way sloping terrain, levels were checked by means of a tube scale before reinforcement was installed and connected at coupling points.

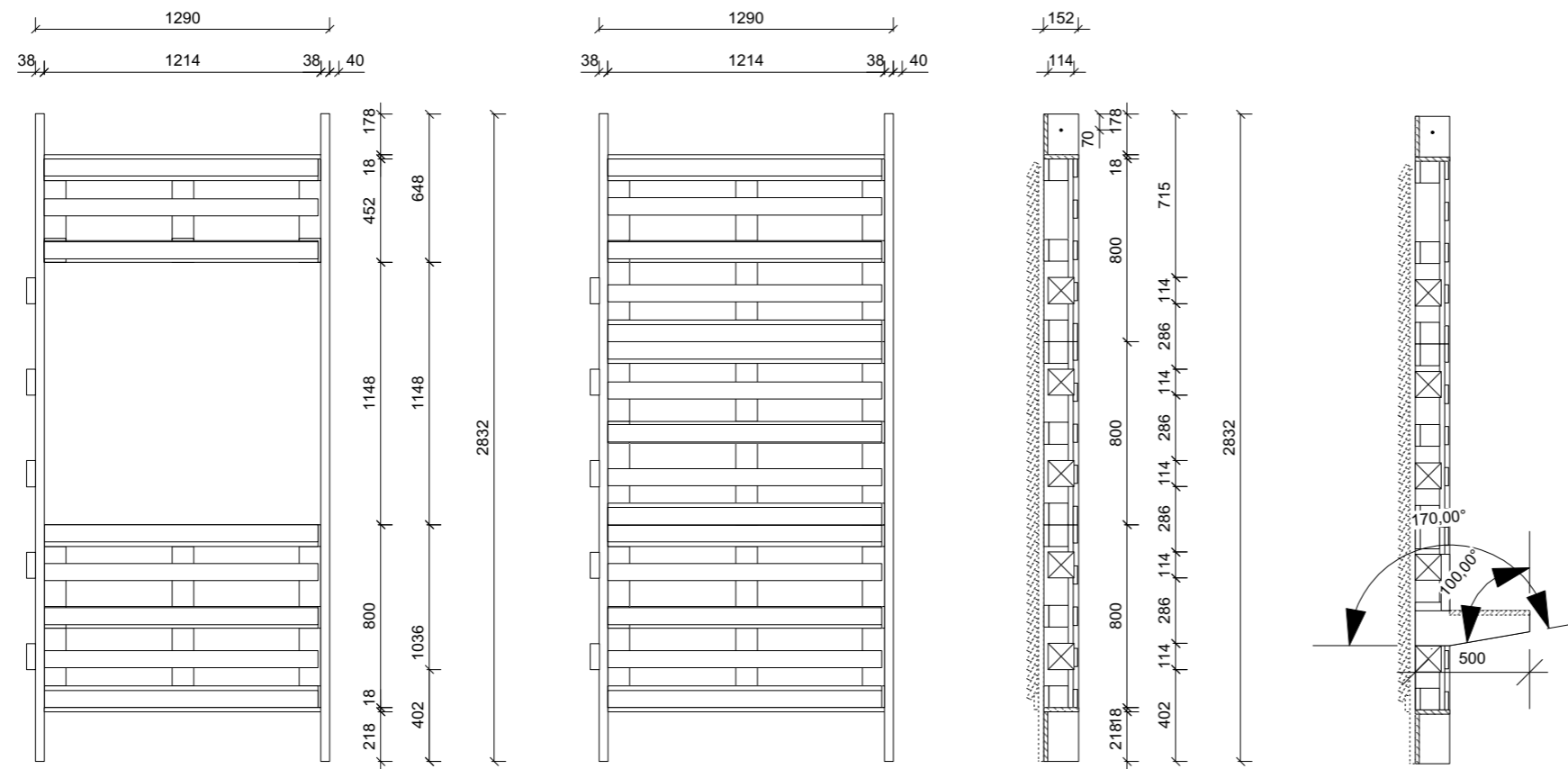
Still in the workshop, the prefabricated formwork elements were equipped with perforated metal strips, fixed in position during the concreting process for later alignment and anchoring of the floor beams.

The support for the central column was subsequently assembled on the point foundation, fixed by stiffening members below the structural beams of the timber floor.

Plywood sheets were attached to these beams as a floor covering. A protective stain was finally applied to the plywood, protecting from moisture during the building process and in its final use.



photos: Lukas Frangart



Wall panels - Drawings for execution (by Merle Neumann)

PREFABRICATION OF WALL PANELS

In the meantime, all wall modules were pre-assembled in the workshop. A frame for each wall panel was formed by timber profiles in a predefined, consistent outer dimension, responding to partially large tolerances of the pallets. Within this frame, the industrial pallets were joined and fixed by means of screws in order to form a rigid wall element.

Due to different wall heights on street and garden side, also required due to the asymmetrical division of the elements on the gable wall, different wall module types named A to H were established. Accordingly, pallets had to be cut both in length and partly in width.

Provision was made for ventilation elements as well as recesses for later installation of windows.

The pallet structure of each external wall module was filled with insulation material. The inward-facing joints between the modules were filled with suitable boards, also made of recycled pallet wood.

For later connection of the modules, cut-to-size timber elements („spacers“) were screwed to one side of the vertical posts, also used for later finishes such as shelving.



photo: Christian Bauer



photo: Christian Bauer

ASSEMBLY

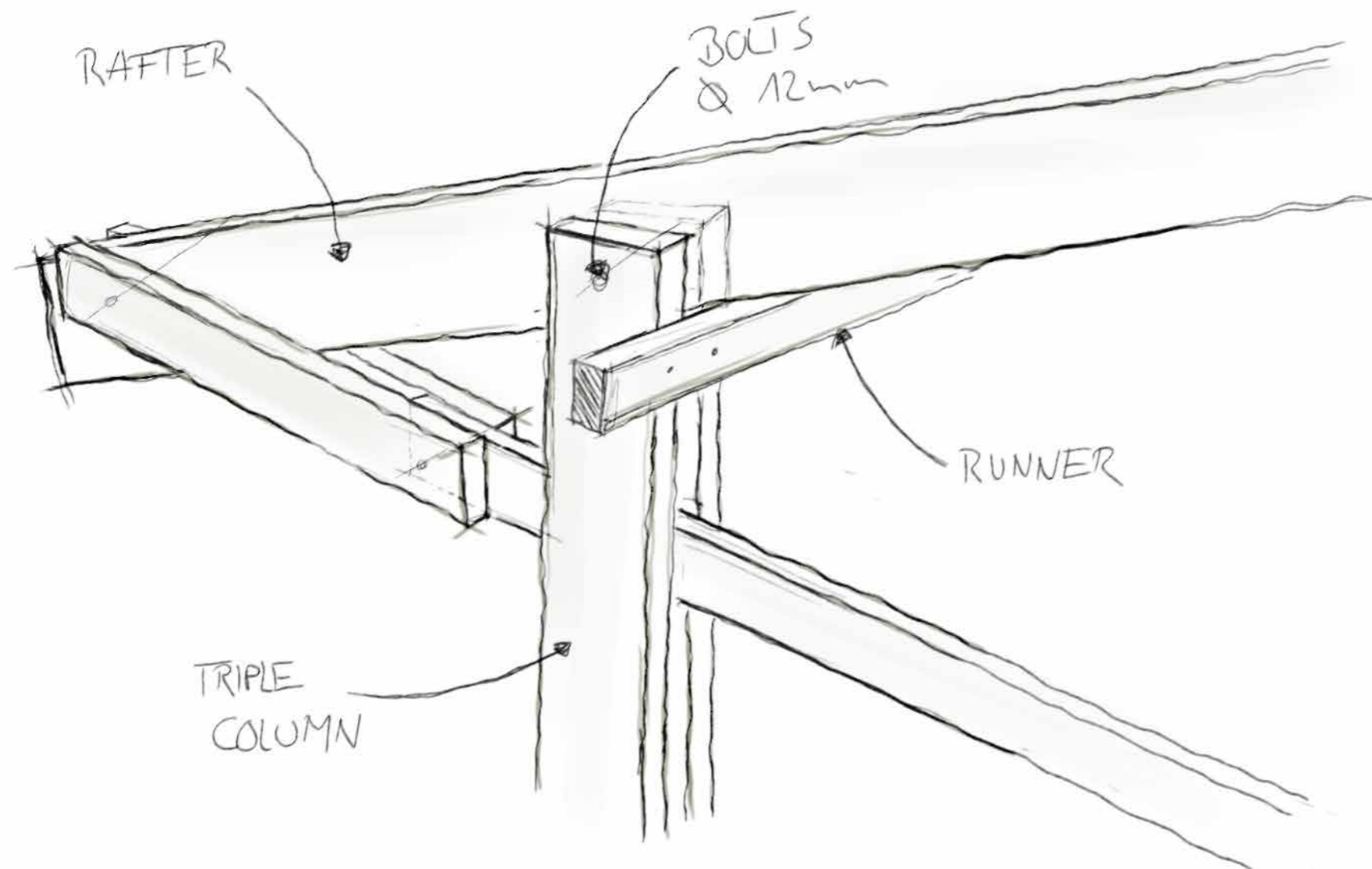
After completion of the foundation and the timber floor, the prefabricated pallet modules were transported to site and installed by means of temporary supports, forming longitudinal and transverse walls. The vertical posts of the wall elements are bolted to the floor beams, filling the space between two of them.

The lowest pallet of each wall module rests on the wooden base plate. Timbers members connect the modules in the height of the floor joists, jointly forming a stiffening wall.

In the central part of the building, the main column was assembled as a support to the ridge beam. Later, the inner walls were fixed to this column, finally dividing the extension into three different spaces.



photos: Lukas Frangart



Detail of structural members of the roof

ROOF CONSTRUCTION

After assembly of the wall panels, the rafters could be slid into the spaced columns of the precisely prefabricated elements. The ridge beam, being the main structural member in longitudinal direction of the building, is supported by the central column and the spaced post of the gable wall. On the side of the existing building, made of concrete hollow blocks, the required support for the beam was provided by a joist hanger.

The originally envisaged sequence was to mount the individual layers of the roof structure from bottom to top, but due to a weather change - accompanied by strong winds and heavy rain - a rainproof covering had to be installed before assembling other layers of the roof structure. Before being hit by a storm, a rainproof membrane was therefore installed on top of the rafters, fixed by means of horizontal battens. After the storm had slowed down, holes in the membrane were repaired and the final cover of corrugated iron sheeting could be mounted onto the battens.

This is why only later spaces between the rafters („bays“) could be filled with insulation, being mounted from inside the already covered building, introducing an additional layer of battens to fix the sheets. The stiffening formwork made of plywood was screwed to these battens, thus closing the roof structure from inside after installation of electrical ducts and fittings within the insulation layer.

Indoor and outdoor luminaires do not only allow a safe use of the building after dawn, but also create a warm and friendly atmosphere in the new „Spaza Shop“.



photos: Lukas Frangart



photo: Kevin Kimwelle



photo: Silke Flaßnöcker



photo: Silke Flaßnöcker



photo: Silke Flaßnöcker

THE INTERIOR

The interior impresses with its generous ceiling height and material consistency. Through the specifically designed roof construction, the usual A-framed trusses projecting into the internal space could be avoided. Since suspended ceilings were left out completely, the geometry of the gable roof with its layer of plywood underneath the structure is consistent. Door-height partitions separate the three different functional areas and continue the materiality of the outer facade made of timber pallets.

The wall-mounted shelving in the sales room, also made of wood, provides storage space for products and goods. In the centre of the room there is space for another shelving or stand usable for display.

The „burgler bars“ of each window opening, as typical in South Africa, were manufactured and installed by a neighbouring carpenter also capable to do welding works. Joshua Pumzile, as a resident also supported by this project, had received a roof structure in the previous year, marking an essential starting point for his now economically flourishing carpentry and metalworking workshop.

FACADE

Simultaneously to the roof works, the outer walls were covered with a water-repellent membrane, fixed to the wall structure by means of battens, allowing for the required vertical ventilation of the wooden facade. In the preassembled openings of the wall elements standardized timber windows were installed. In the gable part on the entrance side, the load-bearing timber structure was instead clad with a translucent corrugated sheeting, thus accentuating the generosity of the interior space by means of daylight.

Meanwhile, works on the timber cladding were executed. In preparation of this cladding, hundreds of pallets had been taken apart in the workshop before. Individual boards were cut into three different widths and lengths, painted with a protective coating. Since each recycled piece of wooden board had a different degree of weathering and use, colour and surface would vary immensely, finally giving the cladding an interesting play of colours. Especially in the evenings, the façade stands out with its irregular pattern.



photo: Lukas Frangart



photo: Christian Bauer



photo: Silke Flaßnöcker



photo: Silke Flaßnöcker



photo: Silke Flaßnöcker

ACCOMPLISHING WORKS

Concluding the intense working period, final works on the interior and exterior of the building were completed. A sliding door between the business area and the bedroom was installed, providing the required privacy. A wooden counter top offers a solid base for sales and communication, the remaining windows were sealed and equipped with windowsills.

On the covered „stoep“, a small bench was installed as an elevated and comfortable place to rest. Access through the door on the gable side was facilitated by a ramp, consequently also made of pallets. After the short construction period of three weeks, the completed shop could thus be handed over to the owners.

