

# Training and community involvement: perspectives of remote builders in Australia's Northern Territory

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**Abstract:** *Construction of houses in remote communities faces a range of challenges, many of which would be reduced by the involvement of local community members during the construction process. Remote housing demand is high, and under-resourcing in existing houses impacts the health of the occupants. This research investigates and evaluates ways to improve community engagement in remote housing projects. Builders with experience delivering remote housing projects were asked for insight relating to community members' potential training and involvement during construction. It was found that builders have major challenges with different work values, poor numeracy and literacy, and language barriers in remote areas, all of which hinder community engagement in remote projects. Some building techniques such as slab on ground and steel wall framing were found to be more effective for community engagement. Results also show that the training of community members could be improved by setting staged goals to be achieved throughout a project to provide immediate benefit to participants. This means there is an opportunity for housing projects in remote communities to improve on essential training and employment through better involvement of local community members during construction, with the support of builders. In turn, this will lead to better maintenance and understanding of houses.*

**Keywords:** Builders' survey, Community involvement, Remote Aboriginal housing, Training for construction

## 1 INTRODUCTION

Our research is focused on understanding the issues that need to be developed in both-way learning. For Aboriginal people to engage in construction of their own houses, people need to access the language of construction, and the builders need to understand the aspirations of the community. We first ran a literature search and collected government and organisational reports (Rajabipour et al. 2023) in the construction and design of housing, which dealt with community aspirations and experience. The focus of these resources was more on design and community consultation than the construction process and the support needed for community to engage. Hence, our approach to advancing the construction process was to look at the work being done to transfer knowledge on construction to Aboriginal people and the perceived difficulties faced by those doing this work. This involved interviewing builders involved in remote construction on their views of the factors that have been located as significant in terms of engagement and optimum construction. The next stage of the research will be to evaluate the present Aboriginal understanding of construction, and how the training may be tailored to existing knowledge and ways to develop a more appropriate training framework. First, we present the main issues that led to this research project.

### 1.1 Why we need to improve remote housing

Building houses in remote communities in Australia has historically had high construction costs. As a result, the level of housing renewal is too low and leads to poor health conditions (Seemann and Marinova 2010; Cox 2014; Stewart et al. 2019). In some cases, more than 20 people have had to live in a three-bedroom house (Burgelt et al. 2017). It is anticipated that up to 12,000 more houses are needed in Northern Territory (NT) communities (Northern Territory Government 2020). Studies show that many current housing challenges in remote communities stem from policies around building and maintenance in these communities (Altman 2007; Altman et al. 2008; Lea and Pholeros 2010; O'Rourke and Nash 2019).

Community engagement is considered a vital aspect of the design phase that, if improved, will deliver houses that meet the needs of the community and Northern Territory Government (Seemann and Marinova 2010; Cox 2014; Stewart et al. 2019) and possibly reduce the rate of replacement of houses. Yet the poor living conditions of remote houses, whether it be from substandard original construction or lack of ongoing maintenance, are attributed to the occupants of the houses.

Challenges surrounding remote housing have often been identified (Fien and Charlesworth 2012), but the issues remain (Altman et al. 2008). Projects face many challenges which are often associated with the remoteness of the locations. This can be combated by promoting local trades and businesses in these areas, based in hub towns to service surrounding communities. In turn, the local economy will benefit and create potential for more job opportunities (Robertson 2018).

Current Northern Territory Government policy places a focus on community engagement, with over 600 community consultation visits since they began their housing program: "Our

Community. Our Future. Our Homes" (Northern Territory Government 2020). The Northern Territory Government is also dedicated to developing Aboriginal business enterprises, promoting economic growth, and stable local employment. As of 31 July 2021, 58 contracts have been awarded to Aboriginal business enterprises. This makes up just under 50 % of contracts awarded, with a value of \$155.2 million (Department of Territory Families 2021). Northern Territory Government's HomeBuild NT program has allocated \$500 million to build new homes from 2017-2018 to 2026-2027 (Department of Territory Families 2021).

A major benefit of remote housing projects is from community involvement throughout the construction process (Moran et al. 2008; Porter 2009; Stewart et al. 2019), which is discussed in a broader report from this research (Rajabipour et al. 2023).

## **1.2 Options for community members**

Community engagement in the projects will generate local jobs (Moran et al. 2008; Department of Regional Development 2016; Hay et al. 2017), improve adults' literacy and numeracy (Moran et al. 2008), and could reduce boredom by making community people more physically active (McDermott et al. 1998; Burgess et al. 2008; Rowley et al. 2008). Tertiary and Further Education (TAFE) prepares remote community members for such work, and there is a growing number of community members taking part. However, there is not a notable translation from participating in TAFE to employment outcomes (Guenther et al. 2017). Elements of a training program that contribute to success include increased confidence of the students, essential skills developed, and connection established between culture and local knowledge and employment to ensure the study environment is safe. Then, better employment prospects are achieved (Guenther et al. 2017) assuming there are ongoing projects being managed within the community.

Training and community involvement during construction can be difficult due to the limited prior experience of community members, the methods of construction being used, project deadlines that need to be met, and available funding for each project. This research paper has focussed on the delivery of training in remote communities as it is an important aspect of remote housing. The research project investigates ways of increasing community engagement during the construction of remote housing projects through many factors, and first we consider how training can be improved for the community members.

At present, the literature has no data collected on community involvement in projects or employment and whether it has a positive or negative impact (Aboriginal Peak Organisations of the Northern Territory 2017). And whilst a measure for community involvement is difficult to establish, it is evident that at least the training progress for community members into employment in construction projects can be monitored. We hope this might start to be collected to help us validate the policy changes in this area.

## **2 APPROACH**

A case study approach was implemented through direct communication with industry professionals who have experience with remote houses. This was to provide realistic goals with respect to community involvement and training ability with respect to the method of construction, as perceived by those running these projects. Builders were selected to be

interviewed as they provide insight that is not found in the literature or provided by the Northern Territory Government. The builders answered a set of questions about the levels of involvement of community members throughout the construction process. The set of questions was developed from the findings in the literature review to explore a gap in the research. The questionnaire contained a combination of open and specific questions.

Qualitative data was obtained from builders only, not involving decision makers involved during the design/consultation phase of a project, as builders are ultimately left with the responsibility of involving community members in the construction process. By going directly to the builders, greater insight into the issues surrounding training and involvement during construction can be established.

The provision of training is directly related to the method of construction, in terms of the options for training and level of skill required. Such results would help select construction methods that are the most beneficial to the community for local involvement and end-use.

According to Building Practitioners Board data (Building Practitioners Board 2022), there are 746 active certified builders in NT. From our findings, only a few builders have long and continuous experience in remote areas, while many have some remote projects throughout their career. There is, however, no reliable figure on the number of experienced remote builders to the best of our knowledge. We have a large network of connections with people working in remote areas since three authors have extensive experience in remote housing projects. Despite this, we could not list more than 15 experienced remote builders, of which 10 builders from Aboriginal and non-Aboriginal companies were happy to contribute to this study. We did not approach more builders since the input we received from interviewees showed significant consistency to claim the data is saturated. Further, the input information was in complete agreement with our personal communication with other builders and people employed in this area.

The views presented might not be comprehensive since they reflect one group of the stakeholders' views, but could indicate the real challenges on the ground. While the prescription of an exhaustive training method is not possible if only the results and discussions presented here are consulted, the outcomes provide insight into the factors for local engagement in remote projects from builders' point of view.

### **3 RESULTS**

The data gathered has provided insight into the construction methods that are more suitable for increasing community involvement, providing a formulation of a remote housing design. The builders' views on specific matters are graphed, then the common views captured through interviews are presented.

#### **3.1 Difficulties with community engagement**

According to literature, the role of engagement has often fallen to the architect or construction partners, rather than the government (Building Practitioners Board 2022). This is better done by government as the funding authority. In this paper, data from the builder participants provide a range of responses relating to difficulties with involving the community in projects. Figure 1 below provides the top 4 responses.

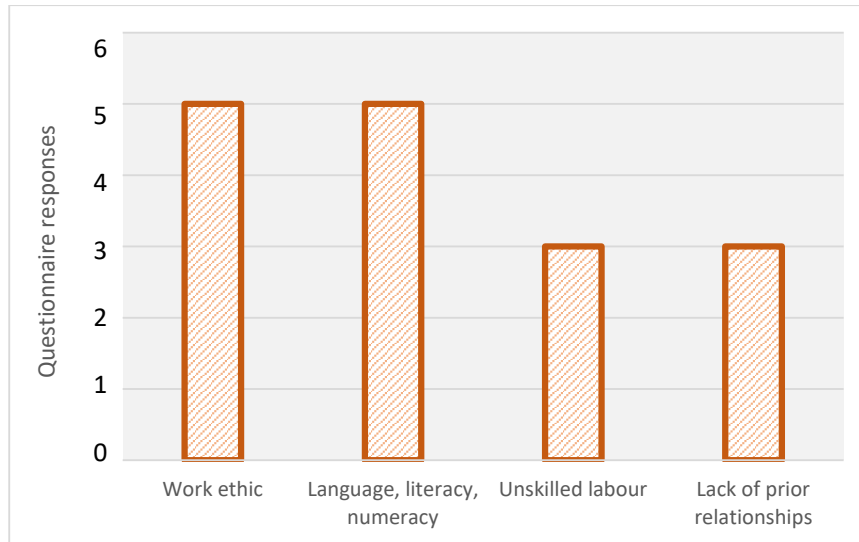


Figure 1: Difficulties with community involvement.

Builders face a wide range of challenges when constructing remote houses, which can result in poor housing outcomes if not addressed. The ability to engage community relies on many factors. For instance, to assess the skillset of community members can be difficult due to language barriers. Language is a challenge when it comes to training, so the majority of training needs to be based on visual and practical instructions. With time and budget in mind, builders find training becomes unviable.

Incorporating the unskilled labour into the construction process challenges remote builders. The specialised nature of construction processes means the community members without a basic understanding of the task to be completed will have few opportunities to participate, especially if they have no safety qualifications. The lack of time for training means community members become bored of the simple tasks they can be engaged in; hence, they will typically begin to be absent from work. Similarly, other cultural priorities will lead to absenteeism, which builders consider a poor work ethic. The term was used not as a judgement, but as a feature of work that is valued by the one culture, but not so much by the employees.

These challenges faced by builders need to be addressed before construction. Within the range of available formal pieces of training, the Certificate II in Construction Pathways is recommended to teach to students before the employment opportunity. The literature review found that TAFE has a growing rate of participation. However, there is no translation through to employment (Guenther et al. 2017). This may mean the training being delivered is not appropriate for real-life situations and does not provide a stepping-stone into employment, or students are attending for purposes other than employment, maybe just to manage their own house. Therefore, training provided to community members needs to be practical and easily linked to employment opportunities through suitable skill development and funding community building projects.

Developing relationships with the broader community was also identified as a challenge for builders. This means that builders may not have successful community engagement unless they spend the time and resources to develop the relationships, and if based in community.

### **3.2 Housing supply pipeline**

The number of houses constructed in a remote housing project is important when looking at community involvement. It has been found that the remote housing contracts vary depending on the community's needs. Having a 'pipeline' of projects is beneficial for community involvement because of the greater opportunity for training linked to ongoing employment. The community members can develop skills and repeat these multiple times on the job to improve competency. At the same time, the building process can develop greater integration with community through local procurement when a stronger relationship is developed with those on the building projects (Building Practitioners Board 2022).

Results from questionnaires indicate that community members work well when they can be independent. Having multiple houses to build means the community members can develop skills and begin to do this work independently. This will prove beneficial for ongoing community involvement, as attendance to work will be stronger and enable projects to be completed on time and budget. In the town of Wadeye, for instance, a tilt-slab factory was developed and utilised for construction in the area (Guenther 2013; Building Practitioners Board 2022). Also, Wadeye is a large central hub which has developed outstations or homelands for people to move closer to their country, providing a larger pool of projects.

### **3.3 Areas of construction for community members**

Community members will often need direct supervision or training and experience to undertake more challenging tasks, leading to independence in their work. This also requires a commitment to ongoing work to provide the opportunity to develop supervisory skills (Building Practitioners Board 2022). During the Strategic Indigenous Housing and Infrastructure Program (SIHIP) in the early 2000's, a 35% community employment rate was achieved within the ongoing nature of these projects (Building Practitioners Board 2022).

The questionnaire results show that general labour is currently the task community members can do satisfactorily. This is quite broad and does not enable the community members to train and gain experience in a specific aspect of construction. Data showed a range of areas where community members demonstrate poor performance. Typical responses were noted among participants, with the top three answers shown in Figure 2 below.

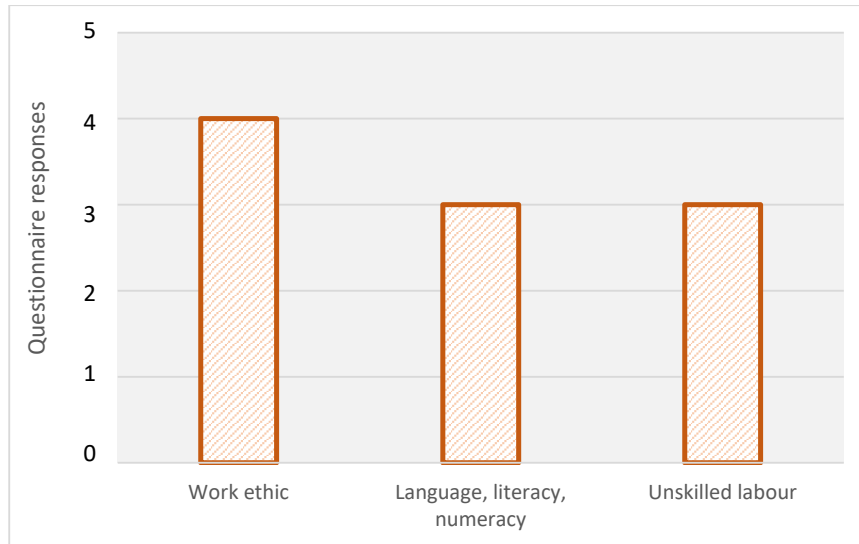


Figure 2: Main areas where community members have shown low performance, according to the survey.

The surveyed population of builders believed that community members in the communities they had projects in did not have the required training and knowledge to undertake skilled tasks such as electrical, plumbing, tiling, and block laying. For work that community members complete, the quality of workmanship can be lacking. Further, the scarcity of skilled construction jobs in communities that only open short-term job opportunities to community people every few years demotes communities' motivation to learn construction skills.

Due to language, numeracy, and literary requirements, involving community members in skilled and qualified trades such as electrical and plumbing works is hard. The ability to read construction plans and carry out on-site measurements is uncommon for people who never speak English and have been out of school for many years, if they ever went to school. This is an argument for adequate training of community members before the commencement of a housing project.

Whilst TAFE courses are being completed, there is still a large gap between the course and onsite construction work. The result is that more focussed training is required to bring the level of competency up for the community members and ensure the training programs will provide the participants with confidence in their newly learnt abilities and pride in their work (Guenther et al. 2017). This may also increase their ability to remember skills between the rare skilled opportunities.

### 3.4 Scope of training

When developing training for remote communities, due to the strong clan relationship within each community, there is a limited range of communities where any one worker can be employed. Those who are trained cannot be moved around to just any other local community and may not be able to work in other communities associated with a main hub (Guenther 2013). Hence, any training framework needs to consider how to provide a large workforce to support construction across a region, with trainees from many clans working as close as possible to

share skills, or even share jobs.

The data obtained showed a wide range of results when it comes to the benefit of different construction methods. This may be influenced by the builders' experiences, communities worked in, or knowledge of alternative forms of construction. New designs suitable for remote communities need to be developed and promoted. The results also showed that three out of 10 participants do believe that a change in construction methods will yield better community involvement. This relates to making construction simpler or more labour intensive to include more community members in the construction process.

However, seven out of 10 participants believed a change in construction methods would not yield better community involvement, due to an underpinning need for training before employment. Once the construction basics are learned, then an appropriate method of construction can be determined. There is no point in changing the methods of construction if the basic construction skills, language, literary, and numeracy skills are not addressed before the commencement of employment. The design of the houses in remote communities must be able to accommodate community involvement. The rest of the survey looked at how some changes in construction methods might affect community involvement.

### 3.5 Flooring system

The type of flooring system needs to be suitable for use, practical for the local climate, and provide a long-lasting low maintenance solution. The literature review found that in most of the top end of the Northern Territory, a slab on the ground is not the best climatic option due to the concrete high thermal mass. This may affect the occupants' thermal comfort, which is highly important in remote construction (Altman 2007; Fien et al. 2008; Altman and May 2011; O'Rourke and Nash 2019). However, the concrete's strength, fire resistance, and low maintenance qualities make it the ideal solution.

In Figure 3 below, data showed that builders viewed the ideal flooring system to support community involvement according to the survey done in this study. The results show a concrete slab on the ground will give the best solution for the flooring system due to the ability for community involvement and longevity.

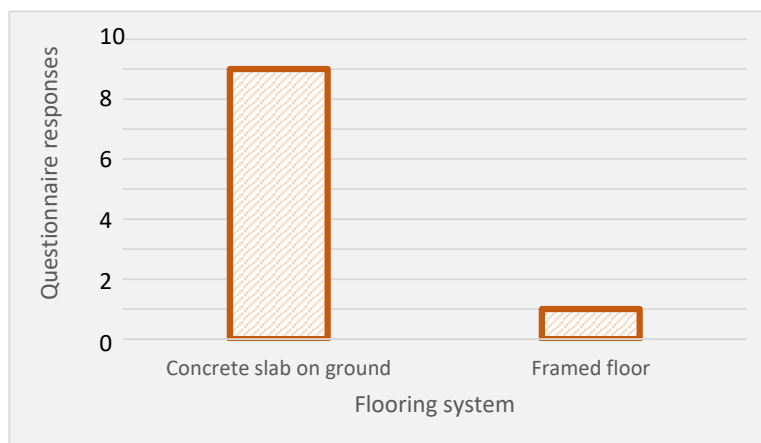


Figure 2: Flooring system for community involvement.



The labour-intensive aspect of a concrete slab on ground is ideal for community involvement during the construction. There are a variety of tasks that can be undertaken, the majority of which do not require a skilled tradesperson. The variety of tasks means community members can stay interested and not become bored with the work.

It is also noted that a compliant energy-efficient design can still be done with a concrete slab on the ground for Climate Zone 1 in the Northern Territory, as the National Construction Code (NCC) does not consider the type of flooring used. However, the concern of this work is the comfort of the occupants.

### **3.6 Prefabricated wall frames and roof trusses**

Prefabricated framing systems have been investigated to determine if a simpler construction method will create more opportunities for community involvement (Green 2011). We found that prefabricated wall frames will allow for more community involvement in the work during installation. Results of the survey showed that around eight out of 10 builders believe that prefabricated wall frames and roof trusses are among the best options to attract community engagement. There are few technical tasks for community members to do in blockwork, as block laying is a skilled trade area.

When compared to blockwork construction, the longevity of a prefabricated wall framing system needs to be considered. It has been found that, although community involvement will be higher when using prefabricated wall frames, using blockwork construction will provide a stronger, low-maintenance option, particularly in cyclone-prone areas. The possibility of moisture and vermin ingress into stud walls needs to be considered with major cases of failure in blue stud steel frames due to wet area waterproof membrane failure. Further, as the typical cleaning process is via a garden hose, substantial floor and wall scupper drain systems are provided in Northern Territory Government current designs. Generally, blockwork has many advantages, but needs as much shading as possible because of heat retention.

Community involvement during the installation of prefabricated roof trusses is possible. However, community members will need to have completed a working at heights training course. Such relatively easy training could also help local industries. For example, a local company in Nhulunbuy manufactures timber trusses from sustainably logged local timber and manufactures 200 series blocks to Australian Standards, which are also used around the Gove Peninsula. Results from questionnaires identified that practical short training, such as working at heights training, is not generally offered in communities.

## **4 DISCUSSION OF RESULTS**

The qualitative results obtained showed there is a strong belief that an increase in community involvement during construction will benefit the overall community (Aboriginal Peak Organisations of the Northern Territory 2017). When people are working, they are less likely to engage in anti-social behaviours (Moran et al. 2008; Porter 2009; Stewart et al. 2019). At the same time, we consider the cultural value of this approach. Indigenous people have close ties with land and the environment around them (Memmott 2007; Page et al. 2021). When a community can develop close ties with a house, and the construction melds more with community practice and local materials, then there should be a lower chance of mistreatment

of the house (Wunungmurra 2021). Community members will also benefit from the ability to be involved in future work, such as maintenance, as they increase their construction knowledge and skill set. To gain a sense of respect, ownership, and pride, community engagement must be undertaken well. This will ensure the community members involved in the construction process build houses that they and their families want to live in.

The options of mudbrick and modular or panel construction is being investigated (Rajabipour et al. 2023). Mudbrick offers more opportunity for local semi-skilled labour and utilises local material to provide a more aesthetically-pleasing construction. Whatever the construction material and process, a well-structured training framework for community members embedded in the construction process, which provides a guideline for the builders and promotes continued learning and improvement, is a necessary component for remote housing projects.

#### **4.1 Remote housing framework**

The delivery of remote housing needs to carefully consider the construction methods to be used to build the houses. The houses built in remote communities do not all need to be the same design, particularly the same design as urban dwellings. The way houses are built is not greatly changed when working remotely, apart from steel wall frames being used instead of single leaf reinforced masonry walls.

We believe there is a need to completely change the framework of construction methods to provide for more work on site and delivery of remote housing, or the time needed during construction to provide adequate training for community members. However, most builders did not believe a change in construction methods would yield better training and involvement of community members, for even mudbrick constructions require skills in setting up the framework and bricklaying. This indicated the basic skillset required to work on a construction site is the first barrier to overcome before choosing different construction methods.

However, housing contracts are being awarded to builders that are large enough to establish themselves in a community for several years, so construction times could decrease over time as community members become more trained.

We found that the builders are expected to train the community members by engaging them in the construction process, and the extent to which they are trained is up to the builder and not a construction trainer. This puts builders in a difficult situation, where they are tasked with delivering several houses on time and on budget while trying to train and up-skill community members. The literature review and data received from builders suggest that the Northern Territory Government are placing more focus on the quantity of employment of the community members employed, rather than the quality of their work.

#### **4.2 Establishing goals**

It could be argued that a benefit to the community is demonstrated when the community members learn skills that can be used again within the community. Often people prefer single units rather than a full certificate. We can measure the success of community involvement and training throughout the construction process by evaluating progress of members through the project using staged goals. Charles Darwin University TAFE is implementing such an approach. Northern Territory Government could improve on their side by setting training goals

for the community members involved. This would give the builders a better understanding of the training expectations and allow for time and budgeting to accommodate their progress.

The benefits of establishing progressive goals for the community members employed include sense of accomplishment and satisfaction, visible progress made, and an opportunity to work towards a specialised goal once a preference is established and fundamental skills are adequate.

### **4.3 Training options**

The literature review found training courses, such as TAFE courses, did not necessarily impact on future employment (Guenther 2005). Developing skills through on-the-job training offers community members long-term employment, remuneration, and work-life balance (Moran et al. 2008; Hay et al. 2017). However, it is evident that the training provided through employment needs to be appropriate for the individual's skill level. Training of community members should include areas where prior training is required, such as working at heights qualification to work on a roof.

Training of community members is improved by having a plan of construction projects, simpler methods of construction, and management that allows for an appropriate time to be taken to complete tasks. To develop skills that will be sufficient to build houses with minimal external help, community members need to be trained in specialist areas. It is evident that not all community members are going to enjoy each stage of construction the same. By having a pipeline of work, community members will be able to develop their desired trade by continuously working on one aspect of construction. For example, once the slab is completed for one house, the same team moves to the second house to commence slab preparation works.

### **4.4 Relationship between builder and community**

The analysis of results has shown the importance of builders being established in a community and having existing relationships with community members before the commencement of construction work. Communities are put at risk due to reduced frequency of maintenance teams attending and a high deterioration rate of houses if an established builder discontinues working in a community, highlighting the importance of skilled local workers and locally-run businesses.

### **4.5 Design of houses**

The preferred general design for houses by builders is slab on the ground with prefabricated wall frames and roof trusses. There is an opportunity for cost saving and time saving with this design. However, the time-saving aspect is not crucial and should not be to the detriment of the skill development of community members. Northern Territory Government's experience shows that prefabricated walls struggle to meet robustness requirements and do not provide longevity in the long term, especially in cyclone areas. The qualitative data demonstrated that slab on the ground footing is the ideal flooring system for remote housing regarding community involvement. Training of community members can involve a wide range of tasks, such as batching (manufacture) and delivery of concrete, slab set out, excavation, formwork, placement of a moisture vapour barrier, and installation of steel reinforcement.

Whilst the frames are proposed to be made offsite, there is an opportunity for larger communities to run roll forming machines. These machines are reasonably priced to set up manufacture in larger communities/regions with pre-punched material shipped more economically and screwed together onsite. A similar setup can be done for aluminium window systems creating cottage industries. In addition to manufacturing wall frames and windows, a short training on wall installation would engage communities in installing the wall frames and wall cladding. This training will improve the technical knowledge of construction with respect to measuring, setting out, and reading from construction plans.

The literature review did not provide any insight into the design of remote houses to promote community involvement during construction. A carefully considered design is the beginning of a successful project concerning community involvement and needs to be factored into the design phase. In this regard, the Room to Breathe (renovation and extension) program, Territory Families, Housing and Communities (TFHC 2019) can be considered a stepping stone to allow skill progression to building complete dwellings.

## **5 CONCLUSIONS**

To increase the benefit to the community, long-term goals should be developed and a framework with specific objectives made, so that Government and other providers can be held accountable for the impacts of their program. In particular, careful on-the-ground negotiations should be done before making an agreement over housing allocation and maintenance.

The key findings from the research are: a training framework for community members needs to be established; builders need to establish relationships within a community; give preference to Aboriginal Business Enterprises; the lack of prior education relating to language and numeracy is a significant factor; houses can be designed to promote community involvement, however basic skills need to first be established.

There were few findings from a builder's perspective during the literature review, hence builders' views were directly studied in this research and aligned with previous work on design and consultation. The findings of this research were limited, and there is a need to obtain further data from a community member perspective in developing engagement frameworks.

We identified the need for staged goals for community members to guide them through the training process, and the appropriate progressive goals and suitable time frames for each goal needs to be researched. The study also found that we need to investigate how the gap between appropriate education and practical employment levels can be bridged.

## **6 ETHICS APPROVAL**

The research group received approval H21010 from the Charles Darwin University Human Ethics Committee to conduct the interviews.

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