CATHOLIC RELIEF SERVICES

HOW-TO GUIDE

Managing Post-Disaster (Re)-Construction Projects

ACKNOWLEDGEMENTS

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Cover photo: Project Participants working together in CRS shelter fabrication yard, Haiti 2011 Photo credit; CRS/Chris Frey

Back cover photo: Shelters assistance in Darfur 2011, Photo by Andrew Lokong

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Destroyed housing after ethnical violence and flooding in Kyrgyzstan, 2010, Photo Credit: Andrew Schaefer for CRS

WHAT CAN I DO WITH THIS GUIDE?

Humanitarian organizations such as CRS often embark on (re)-construction projects after destructions caused by a natural disaster or due to humanitarian needs created by conflict. This How-to Guide: "Managing Post-Disaster (Re)-Construction Projects" has been developed as a step-by-step management guide for the two main construction modalities; owner-driven (Book B) and contractor-built (Book C) construction projects.

When CRS becomes involved in (re)-construction, the advantage against private sector is created when social mobilization is involved and the (re)-construction project empowers the affected population. "Value is added" in more ways than receiving a structure: livelihoods generation, education, capacity building and disaster risk reduction (DRR) are key considerations to reduce overall vulnerability of the affected population.

This document aims to give practical guidance on how to implement construction projects within the international relief sector/post-disaster situations. It gives best practice process to follow when engaging in a construction project either as part of emergency/transitional shelter, permanent housing or community infrastructure projects (roads, sewer, hospitals and schools). This document offers guidance in order to achieve appropriate quality construction and

Destroyed home after earthquake in West Sumatra, Indonesia, 2009, Photo Credit: CRS

Destroyed urban houses after earthquake in Port-au-Prince, Haiti, 2010, Photo Credit: Benjamin Depp for CRS

Guerdy Charles, left and Jenne Venson right, temporary CRS workers, construct a section of a transitional shelter at a prefabrication yard, Haiti, 2010, Photo Credit: CRS

to promote shelter solutions that provide adequate protection, privacy, health and safety, ultimately contributing to rebuilding the affected populations' livelihoods.

This document includes practical advice, templates and examples to help improve and safeguard the overall quality outcome, with attention to conditions and challenges in construction management which implementers may face in post-disaster (re)-construction.

This guide does not replace the need to employ or approach building environment professionals (architects, engineers, construction managers) to implement construction projects. Nor does it replace the countries' construction sector and industry best practices, protocols, standards and process often set out by professional bodies and government departments. This guide focuses on the construction management phase (feasibility to completion) of a project.

WHAT THIS GUIDE DOES NOT INCLUDE

This document does not include any guidance on making programmatic decisions nor cover the initial needs assessment and proposal writing stage.

For further guidance on these issues, refer to CRS guidelines for shelter and settlement programming.

Specifically excluded in this document is guidance on:

WHAT to construct

- Decisions connected to the phase of response (i.e., whether to construct emergency, transitional or permanent structures).
- Decisions connected to the type of building to construct (i.e., whether to construct shelters or community infrastructures).

WHO to construct for

- Decisions connected to selecting program participants and communities to serve and assist.
- Decisions connected to prioritizing vulnerable groups.

WHERE to construct

- Work connected to housing, land and property issues (i.e., housing dispute resolution, land tenure issues, urban design, physical planning).
- Decisions connected to selecting and negotiating appropriate land.

WHO SHOULD READ THIS GUIDE?

This document is written to inform those planning and managing construction programs. The primary audiences are:

A. Non-construction professionals: Country representatives, generalists, managers and program support staff and managers who would like to get a general understanding of how construction programs should be managed.

Particular interest: Book A, chapter B.15 and C.15 (identify appropriate staff)

B. Construction professionals new to international relief: Private sector construction professionals who have no humanitarian experience, but have technical knowledge and experience in working in the advanced construction industry.

Particular interest: Book A, inset boxes in Book B (owner-driven construction) and C (contractor-built)

C. Field staff, engineering and construction staff: Staff who will be running and monitoring construction works and will be particularly looking for detailed knowledge, templates and references.

Particular interest: Book B (owner-driven construction) and Book C (contractor-built)

CRS shelter advisor during evaluation of shelter program in the Philippines. 2012, Photo Credit: CRS

HOW SHOULD I READ THIS GUIDE?

The document aims to facilitate individual readers to use the document in various ways and encourages "cross-reading" for quick and easy way to find specific information.

Book A gives general knowledge and background information about (re)-construction projects in post-disaster situations, typical challenges, technical assessments, construction types and construction approaches currently used within the shelter sector and general factors that influence the feasibility of the construction project.

Book B gives detailed guidance in **how to manage owner-driven construction projects.** The sequential work stages are explained and structured in:

- **Tasks – activities** that should be undertaken.
- **Outcomes – "check points"** that ideally should be achieved at the end of each work stage before progressing to the next.
- **Examples** of field experience to illustrate specific aspects of this work stage

Point B.15 gives guidance on the human resources that are required to manage owner-driven construction projects effectively.

Book C gives detailed guidance in **how to manage contractor-built projects.** The sequential work stages are explained and structured in:

- **Tasks – activities** that should be undertaken.
- **Outcomes – "check points"** that ideally should be achieved at the end of each work stage before progressing to the next.
- **Examples** of field experience to illustrate specific aspects of this work stage

Point C. 15 gives guidance on the human resources that are required to manage contractor-built projects effectively.

Frequently within the document, **insert boxes** are placed to give notes on specific post-disaster experiences that may be particularly helpful to technical professionals unaccustomed to working in post-disaster contexts. In addition, **black-outlined insert boxes** for CRS-specific information are placed within the text.

Throughout the document cross references are given to other chapters within the document, references to templates in the appendix and references to other relevant documents.

WHAT OTHER DOCUMENTS ARE IMPORTANT?

- The Sphere Project, Humanitarian Charter and Minimum Standards in Humanitarian Response, Water Supply, Sanitation and Hygiene Promotion chapter and the Shelter, Settlement and Non-Food Item chapter
- CRS guidelines for shelter and settlement programming
- CRS Pro Pack I and II
- CRS Purchasing Policy
- CRS Finance Procedures and Logistics/ Warehouse Procedures, Transitional Shelter Guidelines

The diagram below illustrates the overall structure and content of the document:

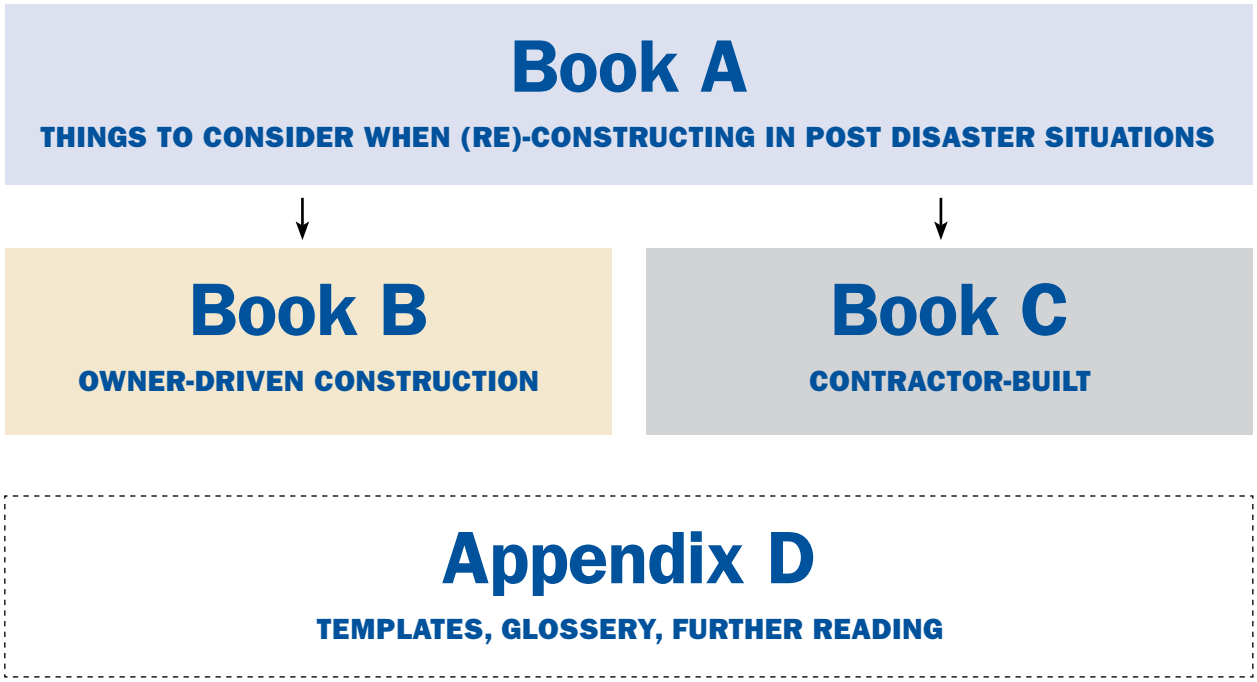


Diagram 1, book structure

BOOK A
Things to consider when (re)-constructing in post-disaster situations

A.1 WHAT IS SPECIFIC ABOUT (RE)-CONSTRUCTING IN POST-DISASTER SITUATIONS?

Working in post-disaster situations on behalf of CRS or other non-profit organizations brings with it a specific position and outlook compared with operating within the commercial/private sector construction industry.

Specific positions non-profit organizations take are:

- No commercial interest.
- The clients are the affected populations and host communities.
- Accountable to the affected population and host community.
- Aims to deliver appropriate quality construction without creating inequity within an existing social structure or community.
- The participation of the affected community is an essential component of any (re)-construction project. The degree of participation can vary widely depending on the type of disaster and the post-disaster specific situation.
- Capacity building and livelihoods regeneration is an integral part of the project.
- Aims to support the most vulnerable population (program participant selection criteria and targeting are not included in this document).
- Final product is often donated to program participant or community, be it a shelter or health facility.

After a disaster, national and local government administration, with their staff and physical infrastructures, often become overstretched or are lost. Becoming aware of key issues contributes to the effectiveness of the project. Every disaster will bring specific challenges and each will have to be addressed on a case-by-case basis.

The following is a checklist of some of challenges to look out for:

Post-disaster specific challenges:

1. **Political environment** is unstable, lack of adequate capacity to respond to disaster.
2. **Security issues, political unrest and frequent changes of protocols** may lead to low productivity and high cost, limits access to sites (material delivery, labor, assessments).
3. **Authorities' ability to operate** may have been affected; ministries (public works, housing infrastructure, urban planning departments) may not be able to offer clear guidance and leadership.
4. **Transportation channels** can be blocked, damaged or destroyed (ports, roads).
5. **Material and labor market** prices inflate due to restricted access, destruction of infrastructure, shortage of supply, etc.
6. Demand for local construction materials exceeds the availability of **sustainable** local materials.
7. **Lack of qualified technical staff/skilled manpower/professional expertise.**
8. Some countries **lack building regulations/codes or resources** to enforce them, including land contamination regulations and procedures and debris clearance mechanisms such as landmines/ unexploded ordinance (UXO).
9. **Land ownership:** Demarcation of land boundaries erased by disaster (floods, tsunami); property documents have been lost/destroyed due to disaster, creating challenges in property land restitution.
10. **Lack of security of tenure** for displaced populations. Forced relocation decisions can be made due to political reasons after disaster without the consent of the population.
11. **Emergency proposal writing process** at times dictates us to commit to projects before conducting technical assessment.
12. Deliver appropriate quality construction without creating **inequity between program participants and host communities.**
13. Different protocols and management structures in refugee/IDP (internal displaced people) Camps.
14. Influx of companies/contractors with technologies/ready solutions on housing **undermining local markets/small contractors.**
15. **Risk of exploitation** of local labor/local skills by contractors after emergency.

Book A cover photo: Port au Prince after 2010 earthquake, Photo by Benjamin Depp

CRS partner Divine Ministries employees load a truck with sections of a transitional shelter at pre-fabrication yard in Batimal, Haiti, 2010, Photo Credit: Benjamin Depp for CRS

A.1.1.1 THE SPHERE PROJECT – HUMANITARIAN CHARTER AND MINIMUM STANDARDS IN HUMANITARIAN RESPONSE

The Sphere Handbook is designed for use during humanitarian response to meet the urgent survival needs of disaster-affected populations. The Sphere is based on two core beliefs:

1. That those affected by disaster or conflict have a right to life with dignity and, therefore, a right to assistance.
2. That all possible steps should be taken to alleviate human suffering arising out of disaster or conflict.

For construction-based projects, the Water Supply, Sanitation and Hygiene Promotion chapter and the Shelter, Settlement and Non-Food Item chapter offer minimum standards, key actions, key indicators and guidance notes.

Refer to www.sphereproject.org/handbook

A.1.1.2 IASC CLUSTER APPROACH

The Cluster Approach aims to strengthen overall response capacity as well as the effectiveness of the response. The system has been developed since the beginning of the Interagency Standing Committee (IASC) Humanitarian Reform process in 2004 to ensure partnerships between UN agencies, the International Red Cross and Red Crescent Movement, international organizations and Non-Government Organizations (NGOs) all work together towards common humanitarian objectives. The approach aims to improve strategic field-level coordination and prioritization in specific sectors of response by placing responsibility for leadership and coordination of these issues with the competent operational agency. Depending on the needs of a specific crisis, a combination of the following cluster maybe activated in country: Agriculture, Camp Coordination and Camp Management, Early Recovery, Education, Shelter, Emergency Telecommunications, Health, Logistics, Nutrition, Protection and Water Sanitation and Hygiene.

Refer to http://oneresponse.info and www.sheltercluster.org

A.1.1.3 CROSS-SECTOR ACTIVITY

Construction is a cross-sector activity; most activities needs a physical space to carry out the tasks, and in post-disaster contexts, some or much of the physical infrastructure may have been lost. Thus this document can be used across sectors for the construction component of the project. Below are listed some of the common construction activities within each sector.

Sector	Construction Activities
Shelter	Emergency, Transitional and Permanent Shelters, Evacuation Centers
Water, Sanitation and Hygiene	Emergency, Transitional and Permanent water facilities and excreta disposal systems
Camp Coordination and Camp Management	Fencing, site levelling, site drainage
Early Recovery	Debris removal and drainage canal
Agriculture	Silo, grain stores, warehousing
Health and Nutrition	Health centers, hospitals
Education	Emergency, Transitional and Permanent schools
Logistics	Warehousing
Protection	Safe houses

Construction is a resource-intensive activity in terms of human capital and finance. Connecting the need for resources for the construction project with the need for livelihoods and employment of an affected community can be doubly rewarding. As can be seen in the above table, many (re)-construction activities may be required in a post-disaster situation. It is essential that an integrated and coordinated approach is planned from the outset for a successful outcome. For example, a house without water supply is not livable; a school without a latrine will jeopardize the health of children.

Meeting with CRS field staff - wash and protection- planning for refugee influx at the Niger-Mali border,2012, Photo Credit: Seki Hirano for CRS

A.1.2. ORGANIZATIONAL RISKS

In general, construction work carries inherent risks due to the large sums of money involved relative to the local economies; there is a risk of collusion, theft and threat of bodily injury. These risks vary widely depending on the socio-economic conditions, such as national building codes and standards, and the monitoring capacity and level of professional experience of contractors/local building industry.

Roles and responsibilities – The organizational structure of a construction team should provide clarity as to roles and responsibilities and lines of authority, and provide adequate management oversight in order to manage the project with efficiencies.

Collusion – CRS/NGO construction staff may be approached and compensated by contractors to falsify inspection, progress or quality control reporting. Having adequate supervision and a system of counter-checks, including unannounced quality control visits from senior managers, helps to mitigate this potential risk.

Theft – CRS/NGO is more at risk of theft where large quantities of materials and equipment are to be purchased and warehoused to supply owner-driven construction projects. It is essential to set up a clear warehouse management/control system with full-time, dedicated warehouse management staff to mitigate potential risk of theft.

Refer to task 5, construction supervision work stages, B.10/C.9

Threat – Local CRS/NGO construction staff are at greater risk to being threatened by contractors or others to falsify reporting as they are usually members of the community. Staff may be under incredible pressure from contractors to falsify records and facilitate the theft of CRS assets, especially when there is limited support from their supervisors. Providing adequate supervision and reporting procedures to senior management alongside good communications between staff members helps protect field staff from potentially threatening situations.

Site safety – CRS/NGO managers need to ensure that field teams have the proper skills and knowledge to supervise onsite construction and mitigate any potential risk of injury to laborers or program participants during construction projects. This is addressed by recruiting and retaining qualified staff that understand both the social and technical aspects of the program, and ensuring that construction teams have the appropriate tools and equipment to complete the task in a safe manner.

Refer to task 3, B.10/C.9 construction supervision work stages

A.1.3 WHAT TYPE OF CONSTRUCTION

CRS's involvement in post-disaster (re) construction activities range from emergency shelter, such as distribution of emergency shelter kits (i.e., tarpaulin sheets, etc.), and transitional shelter construction programs/ projects (i.e., timber structure with CI sheet wall covering) to permanent housing and complex infrastructure projects (i.e., housing, hospitals, schools, community centers, roads, water and sanitation projects, etc.).

A.1.3.1 EMERGENCY SHELTER

UNHCR tents in refugee camp in Niger, 2012
Photo Credit: Seki Hirano for CRS

Tarpaulin-covered simple wooden structure in Niger, 2012
Photo Credit: Seki Hirano for CRS

Emergency shelters are intended as first-response structures that provide life-saving protection from the elements ensuring safety, health and privacy. It has a life span of 1-6 months and conforms to Sphere[1] standards. These structures are often tents, simple pole structures (timber, bamboo, steel) with tarpaulin covering, rope and pegs.

A.1.3.2 TRANSITIONAL SHELTER

Transitional shelter in Philippines, Sendong Typhoon, 2012
Photo Credit: Andrew Schaefer for CRS

Transitional shelter in urban area of Port-au-Prince, 2011
Photo Credit: Benjamin Depp for CRS

Transitional shelters are *"rapid, post-disaster household shelters made from materials that can be upgraded or re-used in more permanent structures, or that can be relocated from temporary sites to permanent locations. Transitional shelters can support disaster affected people between the emergency and the time*

1 Sphere Handbook – Humanitarian Charter and Minimum Standards in Humanitarian Response; 2011 Edition, The Sphere Project, http://www.sphereproject.org/

when they are able to rebuild longer term housing. If well designed, the structure or materials from the transitional shelters should be re-used for permanent housing. Transitional shelters respond to the fact that post-disaster shelter is often undertaken by the affected population themselves, and that this resourcefulness and self-management should be supported."[2]

Transitional shelters:

- Are intended as more robust structures compared to emergency shelters.
- Conform to Sphere standards (particularly for shelter/water supply, sanitation and hygiene).
- Remain intact and inhabitable for approximately 6-24 months.
- Are constructed with structural and/or sheathing materials which are re-useable.
- Are either upgradeable to become permanent structures or can be disassembled for transport and re-use for program participants' permanent housing.
- Integrate construction techniques that improve resistance to natural hazards (i.e. more durable wooden structures, steel frame structures).

A.1.3.3 PERMANENT HOUSING

Permanent housing is a durable solution that provides long-term shelter. For construction of permanent housing, the security of land tenure is important, as the structures will tend not to be easily re-locatable and village or urban planning becomes essential. Many permanent housing projects have used concrete frame with brick or block infill. However, this is not necessarily the only solution. Successful housing design is specific to the climate, culturally appropriate and responds to the natural hazards of the area.

Permanent housing:

- Conforms to national housing standards and building codes.
- Remains intact and inhabitable for a minimum of 10 years.
- Is constructed with durable materials and construction techniques.
- Integrates construction techniques that are resistant to known natural hazards.

Permanent housing project in Sri Lanka, post-tsunami, 2006
Photo Credit: CRS

Permanent housing construction in progress in Sierra Leone, 2004
Photo Credit: CRS

2 Transitional shelter- eight designs, IFRC, 2011

A.1.3.4 COMMUNITY INFRASTRUCTURES

Permanent school building in Sierra Leone, 2004
Photo Credit: CRS

Community infrastructures such as roads, sewers, hospitals and schools can either be transitional or permanent. Construction management processes are similar to others with varying degrees of complexities. Specific design standards exist for each type of building.

Refer to Sphere, www.sphereproject.org handbook

Refer to UNICEF, Compendium of transitional learning spaces, www.unicef.org/education/index_56204.html

A.1.4 HOW TO IMPLEMENT CONSTRUCTION PROJECTS – CONSTRUCTION MODALITIES

Within this document, there is a focus on the two main construction modalities: owner driven and contractor built. The two approaches are explained separately in detail in:

Book B: **Owner-driven construction**

Book C: **Contractor-built**

Both approaches have been used by CRS in the past and are commonly implemented throughout the sector. It is important to understand that these two main construction approaches are not exclusive of each other and, in many cases, combinations have been designed to respond most effectively to the specific post-disaster situation.

A.1.4.1 BOOK B: OWNER-DRIVEN CONSTRUCTION

Local laborers built temporary shelter at Batimat factory, Haiti, 2010, Photo Credit: Benjamin Depp for CRS

In general, CRS has more frequently implemented owner-driven construction programs in post-disaster situations. This approach has proven to be effective in responding to post-disaster situations, especially in emergency and transitional shelter responses, where, for example, shelter kits or simple design solutions were implemented.

In general, there is a CRS policy focus on this approach, as it is aligned with the overall CRS Mission and Program Quality Standards. Key aspects, such as participation of the affected community and "value added" activities, as well as promoting ownership, are often more effectively achieved though employing skilled and unskilled labor from the affected communities with the construction works directly supervised by CRS program staff/ engineers and partners.

In an **owner-driven construction project,** the program participants are at the center of the construction activities. The program participants are engaged in all stages of the construction project, from site selection and quality/progress monitoring to final inspection of the completed structure. In many cases, program participants give their unskilled labor as contributions.

Several variations of owner-driven construction are listed below. These are not exclusive of each other. In many (re)-construction projects combinations have been designed to suit the particular post-disaster context. Several examples of past construction projects are given in the beginning of Book B to illustrate particular variations.

- **Self-built construction,** where the program participants undertake the construction works themselves with technical assistance/construction training/supervision by CRS/NGO. The construction materials are either sourced /distributed by CRS/NGO or, in a voucher/ cash, approach the program participants are sourcing the construction materials themselves on the local market. The program participants and/or CRS take on material delivery and material quality control responsibilities.
- The program participants may opt to **employ skilled laborers and craftsmen** instead of undertaking the construction work themselves. In this case, the program participants take a managerial and monitoring role. The construction materials are either distributed by CRS/ NGO or, in a voucher/cash approach, the program participants are sourcing the construction materials themselves on the local market. CRS/NGO provides technical assistance/supervision to monitor quality, progress and compliance with the intended scope of the project.
- CRS/NGO may **directly implement** the construction works by employing craftsmen and skilled/unskilled laborers from the affected communities. In this case, CRS/NGO is responsible for sourcing the construction materials, supervising the labor force and monitoring quality and progress. The affected communities are engaged in site selection, design solutions and monitoring, but not all program participants may be involved in the construction activities.

A.1.4.2 BOOK C: CONTRACTOR-BUILT PROJECTS

Permanent housing after one year of occupation in Cot Seumerang in Meulaboh, Indonesia, Photo Credit: Ariel Sadural for CRS

In a contractor-built projects, CRS/NGO engages a building contractor to carry out all building works. The contractor is responsible for managing the day-to-day, on-site construction activities, material sourcing, material quality control, site supervision and quality construction within a contract-specified program. The CRS engineer's role is to produce the technical design and specification, to oversee the contractor's construction performance (quality/time/within budget) and compliance with the contract (technical drawings/specifications), and to liaise with communities and government authorities.

A.2 WORK STAGES OF CONSTRUCTION PROJECTS

Every construction project is split into a sequence of work stages to simplify the management of the overall project and to structure the large variety of activities.

The individual work stages vary in scope and importance according to scale and type of (re)-construction project and the post-disaster specific conditions. Not every (re)-construction project requires activities from all work stages or is able to conduct all the listed activities due to the specific post-disaster situation. **An experienced construction professional is required to lead the process.**

Diagram 1 illustrates the overall structure of the guide.

Book A includes technical assessments, initial design, costing and selecting a construction modality.

Book B (left side of the diagram) focuses on owner-driven construction work stages.

Book C (right side of the diagram) focuses on contractor-built construction work stages.

DIAGRAM 1: OVERALL WORK STAGE DIAGRAM FOR OWNER-DRIVEN AND CONTRACTOR-BUILT APPROACH

Book A

THINGS TO CONSIDER WHEN (RE)-CONSTRUCTING IN POST DISASTER SITUATIONS

Book B

OWNER-DRIVEN CONSTRUCTION

Book C

CONTRACTOR-BUILT

Book A and B outline owner-driven construction approach, whereas Book A and C describe contractor-built route

A.3 TECHNICAL ASSESSMENTS

Common to development and humanitarian relief activities, construction projects should be started with a study into the factors that determining the projects feasibility. This needs to be undertaken by experienced and qualified staff to execute high-quality assessments that facilitate informed decisions.

This chapter focuses on construction-specific assessments – technical assessments. Overall programmatic decisions (who, where, what) are not included in this document. Refer to introduction chapter for more explanation.

The **feasibility stage** is essential to be able to make informed decisions regarding budget, timeframe, scope, quality, staffing, construction material, construction modality/approach and managing the construction process.

Several factors determine the project design and most appropriate construction approach: The scale, type and complexity of the proposed project; the availability of labor, materials and other external factors specific to the post-disaster situation, such as security, accessibility, available infrastructure (i.e., roads, communications, water, electricity, etc.); and funding.

The following assessments are part of the feasibility and need considerations. The depth to which technical assessments are carried out depends on the specific post-disaster situation. Not all projects need all the below tasks to be carried out.

Construction is a site-specific activity; thus, one must visit each site, as conditions at each site will be different.

SUMMARY OF TASKS

Task 1: Market survey – Capacity/availability of local construction labor/materials/support services

Task 2: Land ownership and property disputes

Task 3: Local knowledge and construction practices

Task 4: Local building codes and laws

Task 5: Technical assessments

TASK 1: MARKET SURVEY – CAPACITY AND AVAILABILITY OF LOCAL CONSTRUCTION PROFESSIONALS, LABOR, MATERIALS AND SUPPORT SERVICES

Assess local contractors, labor and suppliers according to their availability, experience and good quality performance as well as financial/material assets and management capacity. In addition, a market survey of construction materials and their availability in quantities, quality, supply times and transport is important to design within the project budget, timeframe and specific post-disaster context.

This assessment is important as labor markets, material availability and financial capacity can be severely disrupted, partially or even completely destroyed by the effects of the disaster. Consider long lead times for importing materials and the high cost of transportation.

Material and labor market prices inflate due to restricted access, destruction of infrastructure, shortage of supply, etc. Demand for local construction materials may exceed the availability of sustainable local materials

Contact the emergency livelihoods advisor for market assessment questionnaire templates

Refer to emergency market mapping analysis (EMMA)3, www.emma-toolkit.org

3 EMMA focuses on single elements (i.e., cement); contact emergency livelihoods advisor for advice

Example: Cagayan de Oro, Philippines, 2011:

The coconut trees for the structural frame for the transitional shelter were sourced from local suppliers. From the outset, farmers were hesitant to cut down mature coconut trees (more than 60 years old) because the global price of coconuts was very high. There was no shortage of trees, but farmers felt that they could earn more income from selling the coconuts rather than cutting down the trees and selling the timber. Normally, older mature coconut trees are cut to be sold for construction, as they do not grow as many coconuts anymore and are replaced by younger more productive trees.

Coconut timber delivery to construction site
Photo Credit: Chin Lovi for CRS

TASK 2: LAND OWNERSHIP AND PROPERTY DISPUTES

It is essential to assess the up-to-date land ownership situation of the prospective sites by contacting the local authorities and surrounding communities. For permanent construction projects, a clear land ownership arrangement is essential before any construction starts to avoid future property disputes.

Transitional shelter (T-shelter) projects do not necessarily need formal land ownership. In some circumstances, this would be even harmful to the informal land-use arrangements that are in existence (or were in existence before the disaster). An agreement of the right to temporary occupation of land may be more suitable. This allows the T-shelter projects to avoid lengthy land-ownership disputes or negotiations.

In some instances, verbal statements can be the most one can anticipate. If this is the case, be sure to record such verbal agreements in the form of meeting minutes.

Contact shelter advisor for land use agreement template (digital format)

Refer to B.4 for details

Land-ownership disputes or boundary disputes are not uncommon in post-disaster situations, especially if no clear land registration structure existed prior to the disaster, or if demarcations have been erased or property documents have been lost, creating challenges in property land restitution. Land disputes can be very lengthy and expensive. It is important to have legal advice on land-ownership issues.

Lack of security of tenure for displaced populations: Forced relocation decisions can be made due to political reasons after disaster without the consent of the population.

Example: Port-au-Prince, Haiti, 2010

The T-shelter program did not have to wait until land titles were obtained. CRS accepted one of several documents as a proof of the program participant's right to occupy land on which to erect a T-shelter, including:

- Land title
- Land tax payment receipt
- Land rental agreement
- Proof of renting the house on the land before the disaster – even if now destroyed
- A document signed by the community leader and two witnesses that stated that the family had been occupying the plot pre-disaster.

Legal land titles exist within established formal neighborhoods in Haiti. Even in informal neighborhoods, some legal land title documentation exits. However, for some affected populations, legal land title documents were lost in the rubble of the earthquake.

Also, because government departments that kept land documents on file were destroyed in the earthquake, it was difficult to obtain proof papers. Thus, in order to be best able to help affected families, CRS T-shelters were designed to be easily re-locatable. This had the benefit of shifting emphasis from land ownership to rights for temporary land occupation.

Supporting the affected population to return to their plots of origin reduced the need to resolve land tenure challenges with concerned government entities. In Haiti, there were large unoccupied pieces of land, but land tenure was impossible to establish, and the Government of Haiti did not support it. The vast majority of T-shelters were built in neighborhoods, with relatively few built in temporary resettlement sites (camps), such as Terrain Toto.

Transitional shelters were built on the same land after rubble was cleared, Port-au-Prince, Haiti, 2010
Photo Credit: Benjamin Depp for CRS

TASK 3: LOCAL KNOWLEDGE AND CONSTRUCTION PRACTICES

Local culture and traditional/vernacular building practices should be assessed, as it is preferable to work with culturally accepted and practiced construction techniques. This will influence the architectural/engineering design, the appropriate construction techniques and the most suitable construction modality within this cultural context. In addition, it often influences the range of available materials, skilled labor and their knowledge/experience in construction. There is often a very strong link between design, local practices and relevant local labor skills.

In some cases, specific construction techniques may be mandated or restricted by local government[4].

Where local materials and labor skills do not meet the required design needs, training must be considered as part of introduced unfamiliar construction techniques/designs. The challenges may be quality, supervision and training time.

4 Local government restrictions of certain constructions materials should be determined (i.e., use of local timber may be restricted as part of a local forest protection program).

TASK 4: LOCAL BUILDING CODES AND LAWS

Where local building codes and construction laws exist, it is important to assess the necessary permits and approvals, and the anticipated time this could take, as this impacts the overall project timeframe.

In some cases, local building codes may dictate a level of design complexity that precludes an owner driven construction modality or mandate specific post-construction liability requirements. In addition, donor requirements (if any) may or may not be aligned with local government requirements (i.e., local labor laws, materials selection and structural design).

T-shelter projects: In many cases, T-shelter projects are not required to comply with local building codes and laws. It is important to confirm this with local authorities. T-shelters must be constructed to be structurally safe and improve resilience to natural hazards.

Where more than one code or regulation exists, it is important to determine which is the governing code and clearly identify the local agency with approval authority and jurisdiction. Never assume that external building codes would automatically govern.

In the absence of appropriate local building codes, building standards should be determined in close collaboration with local government authorities, international best practices, the shelter cluster and CRS' disaster risk reduction policies. This process should be supported by engineering and construction professionals and local and/or HQ-based legal counsel.

Example: Post-disaster (re)-construction often takes place in earthquake, flood, landslide or hurricane/typhoon areas, meaning humanitarian organizations need special engineering advice to "build back safer".

TASK 5: TECHNICAL ASSESSMENTS

It is important to undertake all necessary field investigation and site survey work to establish the technical (engineering) parameters that will be the basis of the detailed technical design. The following technical assessments should be considered:

A. Number and proximity of construction sites

B. Site topographic surveys

C. Soil type test (soil type has impact on required foundation design and cost)

D. Water table/source tests (i.e., flood water level will have impact on the plinth design to be promoted)

E. Transportation: Can sites be easily accessed for material/equipment supply/labor?

F. Environmental impact assessment, sustainable building materials

G. Land contamination, landmines, hazardous waste, large amount of debris, etc.

H. Hazard mapping (assessment of potential disaster risks, such as flooding or earthquake zones)

I. "No build zones" created after a flooding/tsunami/landslide

J. Climate conditions (i.e., when best to construct, need for insulation, ventilation, flood protection)

Field assessments are important, as existing field information, surveys and site data may not be accurate after a disaster. The sites may have experienced landslides, erosion, flooding or large amount of debris.

SUMMARY OF OUTCOMES

Outcome 1: Understanding of available construction materials/labor/construction companies

Outcome 2: Understanding of site ownership situation and approach to be taken

Outcome 3: Understanding of local construction practices and design

Outcome 4: Understanding if local building codes exist and how they apply

Outcome 5: Understanding of the existing site conditions (soil, climate, natural hazards, etc.)

A.4 QUALITY, QUANTITY, COST AND TIMESCALE

The understanding gained from the assessments, technical and socio-economic should define the initial design quality, quantity, cost and timescale. These aspects are closely interrelated and common to all construction projects. It is essential to prioritize in line with the overall project goals and consider the effects and relationship to other sector projects. This prioritization process informs, to a great extent, the most suitable design and construction modality that will be most effective in the specific post-disaster context.

The spider diagram below illustrates the relationship between cost, quality, quantity and time. It is a useful tool to illustrate their effects on each other and assists in establishing a project-specific balåance.

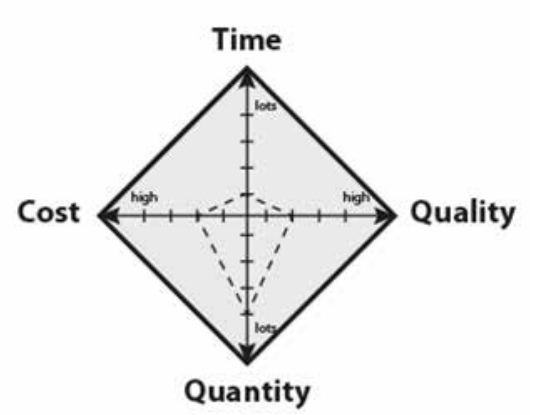


Fig. 1: Relationship diagram – cost, time, quality, quantity

SUMMARY OF TASKS

Task 1: Establish project budget

Task 2: Establish project timeframe

Task 3: Develop initial design

Task 4: Identify risks and liability

TASK 1: ESTABLISH PROJECT BUDGET

A clear understanding of the available budget and funding is crucial and should be undertaken in the feasibility stage. Assessing the available funds in relation to the (re)-construction needs is essential; it is largely instrumental in determining the scale of the construction activities, the materials and especially the construction approach, such as owner-driven or contractor-built construction. The initial budget develops into the Bills of Quantity in a later work stage.

In large responses where needs exceed the resources available, considering questions of equity is important. If a few high-quality houses are built for a limited number of families, what does the rest of the affected receive? If low-quality structures are spread across large number of families, how long with these structure last? Do they conform to humanitarian standards?

TASK 2: ESTABLISH PROJECT TIMEFRAME

The timeframe is specific to the post-disaster context and determined by many interrelated factors, such as overall need for (re)-construction, security situation, political stability, donor requirements, availability of funds, local government capacity and political will, and availability of materials and skilled/unskilled labor.

The emergency shelter timeframe is often with range of 0 – 6 months; transitional shelter, 3 months – 2 years; permanent (re)-construction, 6 months and up. Construction projects associated with longer term development programs may be more flexible on completion times.

TASK 3: DEVELOP INITIAL DESIGN

Initial technical drawings and material selection should be developed reflecting budget and timeframe decisions. This stage includes site layout drawings. These activities need to be undertaken by both technical and program staff.

This stage should include field investigation and site visits to the proposed construction sites(s) by engineers/architects to verify design assumptions.

Initial design decisions should consider:

- Use of locally appropriate construction techniques and materials that will ensure protection from the various weather conditions and withstand natural hazards events (plinth, walls, roof and pillars remain intact).
- Sphere recommended standards
- Shelter cluster (if active) recommendations and decisions
- Coordination with other sector activities, especially WASH

Refer to sphere, www.sphereproject.org/handbook

Refer also to point B.3 concept design, owner-driven construction

Refer also to point C.3 technical design development – contractor-built construction

TASK 4: IDENTIFY RISKS AND LIABILITY

Identifying and mitigating risk to CRS, partners and stakeholders is best done during the feasibility stage. It is important to assess short- and long-term liability to CRS, partners and program participants in the early planning phase, especially when health and safety implications are associated with the project scope of work[5].

SUMMARY OF OUTCOMES

Outcome 1: Outline project budget established and agreed upon

Outcome 2: Outline project timeframe established and agreed upon

Outcome 3: Initial designs sketched out and agreed upon

Outcome 4: Understanding of potential risks to the project and CRS

Human Resources

- Depending on the project scope, it may be necessary to contract local professionals and construction support services (i.e., soil testing, surveying, design engineers and management consulting companies).
- Consider the following when hiring staff: Expertise and experience in professional technical knowledge, field experience in managing construction activities within the development context and understanding of participatory construction work with program participants.

5 Construction of a large community water supply system could be in complete alignment with overall program development goals, but a design incorporating a water treatment system with many mechanical systems and chemical processes could cause serious community health problems if not operated properly. Similarly, a small footbridge designed to carry motorcycle traffic might be within the limits of liability for CRS, but a larger bridge design to handle car traffic could be potentially misused by heavily laden trucks to the point of structural damage, creating an unacceptable future risk to CRS.

A.5 HOW TO CHOOSE BETWEEN OWNER-DRIVEN OR CONTRACTOR-BUILT APPROACHES

Selecting the method for *how* the structures should be built is a key decision, as it has significant impact on the overall construction process. Each post-disaster (re)-construction project requires a context-specific arrangement for how to build most effectively and suitably.

The decision on the **most suitable construction modality** needs to be made in close consultation with CRS construction staff, CRS management, social team and program participants. Program participants' buy-in is a key aspect that requires time, access and appropriate ways to communicate technical issues.

SUMMARY OF TASKS

Task 1: Selecting an appropriate construction modality

TASK 1: SELECTING AN APPROPRIATE CONSTRUCTION MODALITY

The list below covers important considerations that can assist in selecting the most suitable construction approach. To make an informed decision on the construction modality, these issues should be assessed and prioritized in line with the overall project objectives.

However, the advice and skill of a professional engineer/architect with post-disaster experience is essential to tailor a construction approach suitable for the specific post-disaster situation. As stated previously (point 1.3) owner-driven or contractor-built construction approaches are not exclusive of each other and, in many cases, the most effective response has been a combination of the two.

- What are the project objectives? Do they include income generating activities for the affected communities?
- What structures are required? Which construction types: Emergency shelter, T-shelter, permanent housing or community infrastructures?
- What is the targeted timeframe (0 – 6months, 3 months – 2 years, +3 – 25 years)?
- Scale of the project: How many structures are required?
- Project budget (cheaper to use owner-driven approach, but more monitoring intensive)
- Socio-economic conditions – Community level of acceptance of project
- Accessibility of the (re)-construction sites (transportation)
- Security situation and political stability
- Availability of local construction capacity – Contractor/skilled labor/craftsmen capacity (i.e., management, financial and material assets, design-relevant experience, etc.)
- Availability of construction material on the local market, cost/proximity to site (market survey)
- Introducing new construction techniques or materials that may be unfamiliar to the local community and craftsmen
- Complexity of the project in regards to sophisticated or uncommon construction techniques
- In-house capacity (to train, monitor and manage owner-driven construction), specifically the program support functions (i.e., Administration, Finance, Procurement, Logistics and Warehousing) and ability to meet project support needs in the short term.

Aspects to consider for owner-driven construction projects:

- This approach may require a greater CRS/NGO management investment (i.e., in terms of staffing and systems management) to supervise the labor workforce; procure the materials and equipment; reach agreements with vendors; assess quality of material; manage transport, logistics and warehousing; provide training to program participants and builders; and oversee day-to-day on-site construction activities.
- Essential for owner-driven construction is a close working relationship between the construction team (engineers/architects, technician) who will produce the necessary technical information, and the social mobilizing team (community officer, etc.) to create strong working relationships with owners and community.
- In this approach, community is placed at the center and the choice of design, material, etc., depend heavily on the local context and practices. This approach tries to integrate local technical knowledge with improved practices. Communities are at ease as not many alien materials/techniques are used.
- This approach brings in higher community participation and a greater sense of ownership. The community can monitor the quality of construction on their own. They can repair their houses if damaged in future disasters.
- This approach has the scope to modify designs/material choices depending on program participant needs.
- Past experiences have shown that this approach tends to be more cost effective in the long term and can be a tool to minimize large-scale corruption and exploitation specifically in countries where this is a key challenge. The chances to collude with every program participant are much smaller than with a single contactor.

Aspects to consider for contractor-built construction projects:

- This approach requires CRS/NGO engineers/ architects skilled in construction contract management.
- In general, the construction cost is higher for contractor-built projects, due to the added contractors' profit margin.
- Very complex buildings, such as hospitals, etc., may need the technical expertise of an experienced contractor.

Note: The internal management configuration will differ between contractor-built and owner-driven/community-built construction projects.

Refer to B.15 and C.15

SUMMARY OF OUTCOMES

Outcome 1: Project-specific construction approach is established and agreed upon

Outcome 2: Project team in place, including technical/social and operational support staff

BOOK B
How to manage an owner-driven construction project

In an **owner-driven construction project,** the program participants are at the center of the construction activities. The program participants are engaged in all stages of the construction project from site selection and quality/progress monitoring to final inspection of the completed structure.

Several variations of owner-driven construction are listed below. These are not exclusive of each other. In many (re)-construction projects, combinations have been designed to suit the particular post-disaster context:

In **self-built construction,** the program participants undertake the construction works themselves with technical assistance/ construction training/supervision by CRS/NGO. The construction materials are either sourced / distributed by CRS/NGO or, in a voucher/cash approach, the program participants are sourcing the construction materials themselves on the local market. The program participants and/ or CRS take on material delivery and material quality control responsibilities.

The program participants may opt to **employ skilled laborers and craftsmen** instead of undertaking the construction works themselves. In this case, the program participants take a managerial and monitoring role. The construction materials are either distributed by CRS/NGO or, in a voucher/cash, approach the program participants are sourcing the construction materials themselves on the local market. CRS/NGO responsibility is to provide technical assistance/supervision to monitor the quality, progress and compliance with the intended scope of the project.

CRS/NGO may **directly implement** the construction works themselves through employing craftsmen and skilled/unskilled laborers from the affected communities. In this case, CRS/NGO takes on overall responsibility for sourcing the construction materials, supervising the labor force and monitoring quality and progress. The affected communities are engaged in site selection, design solutions and monitoring, but not all program participants may be involved in the construction activities. (Also in this case, the program participants may source some locally available materials, such as river sand, thatch, etc.)

Book B cover photo: Comutee de ciblage monitoring owner driven construction in Madagascar 2012, Photo by Jeanne Ella Andrianambinina

Example 1: Piloting community-based disaster preparedness innovations in West Bengal and Orissa, India, 2008- ongoing

Flooding is a way of life in much of rural India, where annual monsoon rains swell the river systems that crisscross large areas of the nation's vast landscape. Years of deforestation, coupled with poor land planning and overcrowding, have left millions of India's rural poor facing recurrent disaster, as flood waters wash away their livelihoods, their material possessions and their homes, most of which are built of a simple mud construction without safe structural frame that is highly vulnerable to flooding. Many villagers have lost their homes several times in recent years, in some cases up to 10-15 times in their life, creating a cycle of poverty that becomes inescapable.

The flood-resistant shelter project was one of three components of a comprehensive disaster risk reduction program in these villages. CRS' emergency shelter expert worked with communities to identify their vulnerabilities to disasters and to determine priority actions to increase their resilience to future flooding.

A critical determinant of the ability to withstand floods is the presence or absence of a structural frame to support the roof. Without a solidly grounded structural frame, the mud walls collapse when they are saturated with water.

In response, a shelter design – "concrete pillar model" – was developed with the community to make houses more resistant to floodwaters. Normal construction practices were studied and community discussions were held to identify appropriate ways in which to modify and improve the homes of the poorest families. One-hundred and fifty-seven such shelters were built acrosstwo states of West Bengal and Orissa at a cost of $730/house.

Completed flood-resistant shelter.
Photo by CRS

The shelter design used affordable, locally available materials and promotes five disaster resilient construction techniques:

1. **Pillar fabrication:** Prefabricated reinforced concrete pillars anchored on stone footing at least 2 feet below ground level to provide greater resistance;
2. **Raised plinth:** Compacted raised earth plinth at the main occupied space of the shelter. The plinth has a chicken wire-concrete finish to make it more resistant to water immersion that accompanies extensive flooding;
3. **Cross-bracing** in perpendicular directions at two opposite corner pillars for lateral resistance;
4. **Roofs anchored** into the main pillar structure with "J" hooks, nails and washers;
5. **Hipped roof,** a four-sided roof that provides greater resistance to high winds.

The construction was partly done by skilled masons and partly by the participating households themselves. The concrete pillars were prefabricated by local vendors and the structural frame was erected by local masons and skilled labor. This included the fixing of the trusses and roof sheathing. The participating households gave labor contribution in form of transporting the mud to site, compacting the earth for the raised plinth, excavating for the concrete pillars, lattice fastening and daubing of the wall infill, and application of mud plaster finish to the walls. CRS and partner technical teams managed the procurement and distribution of construction material, and no cash or vouchers were distributed.

A neighbor helps CRS program participant Purna Chandra Dalai prepare a mud and straw mixture for his new home, built to be flood resistant using techniques and materials taught and provided by CRS. Photo by CRS

The communities were entrusted with the responsibility of safekeeping and storage of the construction materials – especially the prefabricated concrete pillars and bamboos – in the villages, as the affected area was not accessible during the rains.

To insure safe quality construction, CRS and partner technical teams took on the quality control of the prefabrication of the concrete pillars. Construction training was conducted in disaster resilient building techniques for the mason and skilled labor while constructing a first demo shelter for the most vulnerable households of the communities. The participating households were also trained on key construction techniques to be able to monitor their own construction quality. A detailed, step-by-step, illustrated construction guide – with photos and diagrams showing the five key flood-resistant elements – was used to communicate the important issues.

The construction guide is available from shelter advisor.

Reflections:

- The visible change in circumstances to program participant households, the poorest households in the four target villages, motivated and convinced others with greater resources to replicate the design (Orissa: 18 new homes, 44 retrofitted).
- As a result of this pilot project, CRS and partner staff increased their capacity to develop resilience- focused shelter responses.
- Constructing the model shelters in front of the government offices led to government acceptance of the design and buy-in. A result of strategically involving the government is that more vulnerable households will benefit via the government housing scheme.

Reinforced concrete pillar prefabrication site for the structural frame of flood resistant shelter.
Photo Credit: CRS

A neighborhood child looks on as CRS program participants Dukhiram Dalai and his wife, Sukanti, decorate the doorway of their new home in the village of Raipur in Orissa state.
Photo Credit: CRS

Owner creating the raised plinth around the concrete pillars.
Photo Credit: CRS

Example 2: Transitional Settlement program in Cagayan de Oro Philippines, 2011-2012

Tropical Storm Washi, locally known as Sendong, made landfall on December 16, 2011, in Surigao del Sur province on the north-eastern coast of Mindanao. The tropical storm unleashed heavy rains, which caused flash floods to a height of a two-story building and landslides across the region. CRS launched a transitional settlement program housing up to 2,000 households to bridge the gap between emergency and permanent settlement solutions.

For the physical design of the transitional shelters, it was essential that the shelters were moveable and made minimal impact on the land. Thus CRS worked with a local architect and engineer to design an adapted *amakan* house. This type of house is an icon of Philippine culture, as it represents the Filipino value of "Bayanihan", which refers to a spirit of communal unity or effort to achieve a particular objective. The Amakan House is inspired from the traditional Filipino house called the "Bahay Kubo" (Nipa hut). It is an indigenous house made from locally sourced materials, which is ideally suited to the rural traditions and cultures. This pre-Hispanic architecture was adapted to the tropical climate of the Philippines and can be easily repaired or rebuilt if damaged by typhoon, flood or earthquake, which frequent the country. The house is predominantly made up of amakan (bamboo or palm leaf weave; CRS used palm) for the walls, and coco lumber, which is durable and inexpensive, for the structural frames.

The following design parameters were important:

1. **Culturally appropriate:** Allowed families more privacy, used local materials, protected from rain and heat.
2. **Re-locatability:** A shelter can be carried from one place to another by 20 persons or can be easily dismantled and re-erected in another location.
3. **Speed of construction:** The shelter can be constructed in approximately 2-3 days
4. **Economical:** Total shelter cost, including all labor and materials, is approximately 17,000 PHP (410USD)
5. **Flexibility:** Versions of the model can be applied to relocated families and those returning to original sites.
6. **Upgradeable:** Shelter can be easily upgraded into permanent homes, or dismantled and moved if necessary.

The effectiveness of a transitional settlement program heavily relies upon the timeliness of response, cost efficiency, quality of outcomes and quantity of program participants assisted. Thus the logistics, procurement and financial systems are crucial to the outcome of the program. In this response, locally and regionally procured material were ordered at a massive scale, and systems had to be put in place. After a tropical storm in the rainy season, drying timber is an issue; also, limited road access affected the delivery time and costs.

Transitional shelter on site in Cagayan de Oro
Photo Credit: Seki Hirano for CRS

House destroyed by flash floods
Photo Credit: Charisse Mae Borja for CRS

Pilot construction of transitional shelter
Photo Credit: Andrew Schaefer for CRS

Children playing in front of transitional shelter on relocation site
Photo Credit: Seki Hirano for CRS

Example 3: Special Operations Appeal (SOA) for Tsunami affected communities, Sri Lanka, 2005

In response to the Indian Ocean tsunami in 2005, CRS implemented a re-construction program in Sri Lanka in Batticaloa, Ampara, Galle and Matara districts. The response included a transitional shelter phase where 12,616 T-shelters were built within the first year, and a three-year permanent shelter phase in which 10,713 permanent homes were constructed. Water and sanitation facilities, community halls and school rehabilitations were also provided.

CRS, with its Caritas partner, engaged in a participatory design process with the community and designed different model T-shelters, keeping in mind the local traditions and cultural practices. Households had the flexibility to move the doors/windows/select the roof type, etc., and a series of design variation were evolved in the process. Pilot constructions were built to test the different designs and materials performance. The designs were refined through community feedback, and considerations were given to local capacity, supply chains and feasibility of scaling-up.

The program participants received cash grants in installments and were in charge of the construction of their T-shelter, either by constructing it themselves or by employing local craftsmen. In a few cases, program participants invested additional resources and added extensions or finishes such as tiling or false ceilings, etc.

Initially, a contractor-built approach was used to construct the permanent homes. However, unsatisfactory quality of construction and lack of timeliness, as well as observations that local labor was exploited by the contractors, led to a shift towards an owner-driven approach.

Subsequently, the community led the identification of the required skilled workforce. They identified material supply chains and suggested improvements to the procedures. Homeowners and local skilled workers procured and stored the construction materials locally.

The site planning and design process was also led by the homeowners. CRS/partner technical staff used their technical expertise to review the design and specifications, as well as the timeframe and associated payment procedures. The building works were carried out by local skilled craftsmen for the reinforced concrete frame, brickworks walls and timber roof structure. The homeowner monitored the quality and timeliness of the construction, and together with CRS/partner technical staff, signed off each construction stage, which triggered the release of payments. To safeguard the quality of the construction, local craftsmen received training in good quality construction practices by CRS/partner.

Construction transitional shelter
Photo Credit: CRS

Completed transitional shelter
Photo Credit: CRSt

CRS and partners worked with community members to establish a system for release of payments, monitoring and quality control at agreed construction stages of foundation, sill, lintel and roof level, roofing, internal wiring/finishes and completion. To be able to do this effectively, homeowners received technical assistance in monitoring the quality of the construction.

To facilitate accountability and transparency of payments, program participants were encouraged to open bank accounts. Making payments through bank accounts had a number of advantages. It helped to set up an efficient management and accounting of payments. It created greater awareness among program participants regarding the overall cost of their houses and how project money was being spent. It also minimized opportunities for corruption.

CRS and partners experiences showed that the shift towards the owner-driven approach helped to revive the local economy and support local construction skills. It reduced exploitation of local labor experienced during the contractor-built approach. Challenges of material supplies and time delays were addressed through contingency plans developed by CRS/partners.

The main challenges experienced were in quality control of materials and construction, such as educating the homeowners on quality issues and rejecting substandard materials.

Reflections:

- Providing maximum flexibility and choice to participants of re-construction programs is beneficial to the success of the project.
- Supporting families who had experienced devastating loss to be active managers of their recovery. Educating homeowners, as the ultimate "end-user", on their responsibilities in monitoring the construction process was key. Homeowners were at first passive program participants, feeling they should accept whatever was given; project team encouraged their role in managing the process, which helped increase sense of ownership.
- CRS/partners can add value to reconstruction program by building upon available local skills and resources as opposed to contracting work to contractors.

Training carpentry skills
Photo Credit: Mehul Savla for CRS

Permanent shelter in construction
Photo Credit: Mehul Savla for CRS

B.1 STAFF COMPOSITION

Typically the shelter team is led by a CRS program manager and is composed of staff with distinct skill sets at the CRS level and implementing partner level. It is important to highlight that an owner-driven construction project will need a higher management and staff input for project management. For example:

A stronger processing team to process finance payments to program participant/more supervisors to guide and provide technical support, etc.

- **Technical/engineering/construction:** Architect, engineer, foreman, construction and material quality control supervisors (example: bamboo supervisors), etc.
- **Social mobilizer:** Community mobilizers (often at implementing partner level) explain the program, resolve disputes, encourage program participants and ensure that vulnerable groups are not being overlooked.
- **Operational support team:** This is often the most overlooked team, but these team members (logistics, procurement, finance, warehousing) are critical players to the success of the team.

Refer to B.15 for organizational structure diagram/job description

Diagram 2 gives an overview of all owner-driven work stages in sequential order.

DIAGRAM 2: OWNER-DRIVEN WORK STAGE DIAGRAM

Book A

THINGS TO CONSIDER WHEN (RE)-CONSTRUCTING IN POST DISASTER SITUATIONS

↓

Book B

OWNER-DRIVEN CONSTRUCTION

SUMMARY OF TASKS

B.3 CONCEPT DESIGN
Task 1: Make field visits

Task 2: Initial community mobilization- Conduct focus group discussions

Task 3: Reflect market assessments

Task 4: Draw up design solutions

Task 5: Develop detailed Bill of Quantities for pilot construction

Task 6: Develop draft construction manual for pilot structure

B.4 PILOT/DEMONSTRATION (DEMO) STRUCTURE
Task 1: Construct a pilot structure

Task 2: Conduct an “open house” and evaluate pilot structure

Task 3: Seek approval/agreement

B.5 SCALING-UP
Task 1: Community-led site planning and selection

Task 2: Obtain permission to build

B.6 TECHNICAL DESIGN – PRODUCTION INFORMATION AND BOQ
Task 1: Produce technical design drawings and specifications

Task 2: Produce Bill of Quantities (BoQ) /Unit Cost Analysis (UCA)

Task 3: Produce a construction brochure / finalize construction guide

Task 4: Review technical design – Local building codes

Task 5: Develop monitoring plan

B.8 COMMUNITY MOBILIZATION AND TRAINING
Task 1: Cluster program participants into neighborhood groups

Task 2: Agree on scope of participation with program participants

Task 3: Develop construction training and information/education material

B.9 PROCUREMENT – TENDER SELECTION AND PURCHASE ORDER
Task 1: Compile a tender package for materials/supplies

Task 2: Set up consistent tender templates

Task 3: Conduct a tendering selection process for procuring materials/supplies

B.11 SITE SUPERVISION
Task 1: Set up regular meetings

Task 2: Set up feedback system – Accountability

Task 3: Set up site safety measures

Task 4: Facilitate changes and improvements

Task 5: Equipment and Materials Management and Warehousing

B.12 PROJECT CONTROLS – TIME, COST AND QUALITY
Task 1: Set up a project schedule (progress tracking)

Task 2: Set up cost control (budget tracking)

Task 3: Set up quality control (assures construction quality)

Task 4: Set up document control (records management).

B.13 COMPLETION AND HAND OVER
Task 1: Conduct final inspection

Task 2: Re-verify the original target program participant group

Task 3: Hand over certificates

B.14 AFTER COMPLETION
Task 1: Introduce maintenance activities

Task 2: Introduce disaster risk reduction procedures

Task 3: Evaluation and program participant satisfaction

SUMMARY OF OUTPUTS

B.3 CONCEPT DESIGN

Outcome 1: Field assessments completed and documented

Outcome 2: Understanding of program participants capacity/ preferences to (re)-build

Outcome 3: Market survey for construction material and labor evaluated

Outcome 4: Design for pilot structure completed, including BoQ, cost, material specification, equipment, labor requirements, draft technical construction guide

B.4 PILOT/DEMONSTRATION (DEMO) STRUCTURE

Outcome 1: Appropriateness of proposed structure demonstrated and evaluated

Outcome 2: Improvements made and approved final design

B.5 SCALING-UP

Outcome 1: Reached site layout agreement with stakeholder and community

Outcome 2: Gain permission/agreement to construct project by local authority, government, community

B.6 TECHNICAL DESIGN – PRODUCTION INFORMATION AND BOQ

Outcome 1: Completed engineering package for tender action/material procurement

B.8 COMMUNITY MOBILIZATION AND TRAINING

Outcome 1: Program participants/community agree on their scope of participation

Outcome 2: Program participants have access to technical assistance

Outcome 3: Clear feedback system is set up and agreed upon with community

B.9 PROCUREMENT – TENDER SELECTION AND PURCHASE ORDER

Outcome 1: Quality supplier selected and purchase order awarded

Outcome 2: Cost and delivery time clarified

B.11 SITE SUPERVISION

Outcome 1: Good communication and feedback systems set up

Outcome 2: Site safety measures agreed upon and followed

Outcome 3: Procedures to control construction changes set up

Outcome 4: Material management/ warehousing is staffed and set up

B.12 PROJECT CONTROLS – TIME, COST AND QUALITY

Outcome 1: Project schedule set up

Outcome 2: Progress/cost reporting/ tracking procedures set up and agreed upon

Outcome 3: Quality control set up and agreed upon with program participants

Outcome 4: Filing system set up

B.13 COMPLETION AND HAND OVER

Outcome 1: Final inspection completed and accepted

Outcome 2: Ownership certificate handed over

B.14 AFTER COMPLETION

Outcome 1: Maintenance procedure agreed upon and established

Outcome 2: Disaster risk reduction training set up

Outcome 3: Evaluation conducted

B.2 WORK STAGE: PLANNING AND DESIGN

The initial design process of an owner-driven construction program is an iterative process and will have to go through several stages. The goal is to move from the concept design to a demonstration structure/pilot as soon as possible to be able to test design ideas within the specific post-disaster context.

"Who to target" program participant selection criteria: As explained in the introduction, this document does not include program participant selection processes/criteria. However, clear, participatory and transparent program participant selection is absolutely essential and should have been conducted during the feasibility stage or even prior to that. Past experiences have shown that absence of a clear program participant selection process can lead to serious conflicts between program participants and communities. This process should be as participatory as possible. PRA (participatory rural appraisal) tools like social mapping could be used to see that vulnerable HHs (households) are given priority.

Refer to Introduction

This stage includes the following sub-stages:

Sub-stage: Concept design	refer to B.3
Sub-stage: Pilot/demonstration structure	refer to B.4
Sub-stage: Scaling-up: Technical design matched with social mobilization	refer to B.5
Sub-stage: Technical design: Production information, details and BoQ	refer to B.6

B.3 CONCEPT DESIGN

At the start, a construction program needs a concept design to solicit input from key stakeholders (government, IASC cluster, program participants, etc.) and to be able to evaluate initial designs and assumptions formulated during the feasibility stage. The aim is to design **simple and achievable structures** without compromising the inhabitants' safety and dignity.

Also refer to initial design A.4

Refer to "Building Back Better", www.sheltercentre.org/library

SUMMARY OF TASKS

Task 1: Make field visits

Task 2: Initial community mobilization – Conduct focus group discussions

Task 3: Reflect market assessments

Task 4: Draw up design solutions

Task 5: Develop detailed Bill of Quantities for pilot construction

Task 6: Develop draft construction manual for pilot structure

TASK 1: MAKE FIELD VISITS

Identify basic structure types in the selected communities through site visits and/or transect walk. Field assessments are essential. If they have not been conducted in the feasibility stage, they must be conducted now (i.e., soil type/ testing, hazard mapping, land contamination, landmines, "no built zones", flood zones, topographic data, etc.).

Refer to A.3 technical assessments

Considerations:

- What do people build with locally and why?
- Visit temporary structures that may have already been constructed by owners or other actors.
- Investigate the type and value of materials purchased, and find out how they were procured.

- Understand plans and capacities the affected populations have in improving their temporary living conditions.

TASK 2: INITIAL COMMUNITY MOBILIZATION – CONDUCT FOCUS GROUP DISCUSSIONS

Engaging with the community and the program participants from the beginning is essential. Initial community mobilization should introduce the project to the community, collect feedback, and discuss and agree upon roles and responsibilities. This could be done through a household participation agreement.

Template of household agreement in Appendix 1

Template of household agreement, decline of participation in Appendix 2

Conducting focus group discussions with affected community members is a useful tool to gain important information on: what their previous structures looked like, material used to build them, and their cultural preferences. Find out how they live: Understand aspects such as women/men, different generations sleeping in different areas, household size and family structures, WASH facilities indoor or outdoor, cooking methods, climatic conditions, religious requirements, etc.

- Identify and talk to households that have not rebuilt temporary houses and find out why.
- Identify and talk to household who have rebuilt and find out how they started and why.
- Identify availability of skilled/unskilled labor (market survey should establish labor availability).
- Identify community organizations/NGOs familiar with the area and communities.
- Identify whether there is confidence in the local construction practices after a disaster. Are there changes required to make the new construction more hazard resistant? How can it be improved?

Example: Kyrgyzstan, 2010

In Kyrgyzstan, following ethnic violence and flooding resulting in damage to 2,000 homes in Osh and Jalalabad provinces, a winterized shelter project constructed 203 winterized transitional shelters that could be converted into permanent homes.

Some of the program participants were trying to build a 50 sqm house with the construction materials that were designed for a 28 sqm house. These families decided it was more important to them to recover their original house than to follow the 28 sqm transitional house instructions. This was a challenge, as the end result was not a safe and inhabitable house.

Reflection:
Make clear agreements with the program participants on the scope of their participation, their responsibilities and the scope of the project.

Winterized extensions to existing structures
Photo Credit: Andrew Schaefer for CRS

Example: Nicaragua, 2012

Community meeting to discuss site selection and design for a flood evacuation center in Kum, Nicaragua
Photo Credit: Seki Hirano for CRS

TASK 3: REFLECT ON MARKET ASSESSMENTS

Conduct market assessments on the availability of construction materials on the local markets. If a market survey has been conducted during the feasibility stage, use this information to select materials that are readily accessible in large quantities, acceptable quality, affordable, familiar to local craftspeople, environmentally safe and culturally accepted for construction. Identify multiple vendors and assess their willingness to participate. Having multiple vendors helps to ensure uninterrupted material supply and avoids monopoly. Regardless of the planned construction approach, a market assessment is essential; the more in-depth the better, but even a rapid assessment will suffice. In addition, look for ways to use salvageable materials in construction.

Timber market survey:

Sourcing large quantities of timber can be a challenge, especially when procuring responsibly.

- Are there any local, and then national, timber suppliers?
- Do they have in-stock supplies?
- Inspect the quality and request price for such quantity.
- Where was the timber sourced? Do sustainable reforestation programs exists in country?
- Do legal timber certification systems exist in country? (UNEP/UNDP may know.)
- If there is no certification system, an option is to procure internationally. This can incur additional costs for transport and import tax. Also, the time scale can be greatly extended.
- If sourcing timber becomes a major challenge, consider alternatives, such as steel, bamboo, etc.

Example: RCC (reinforced concrete) column production:

Market assessment should identify the existing vendors in the local area and their willingness to participate in the program.

Try to set up a prefabricated column production unit in the affected area so that monitoring and quality check can be done by the program participants.

Refer to example 1 in India for details

Also refer to A.3 assessments

Contact the emergency team for market assessment questionnaire templates

Refer to emergency market mapping analysis (EMMA), www.emma-toolkit.org

Refer to www.humanitariantimber.org

TASK 4: DRAW UP DESIGN SOLUTIONS

Technical sketch drawings of possible design solutions should have been made by the engineer/architect during feasibility. These need to be revised according to understanding gained from the community and site visits. At this stage, a “one size fits all” approach is not necessary; it is best to make multiple design solutions for different construction types, and it is important to retain some level of flexibility in terms of materials, size and layout to cater to different needs. (This can be done through design options.)

Design options should give consideration to people with disabilities (ramps/handrails), children, cultural practices and opportunities for housing improvements by the inhabitants (i.e., adding of internal partition to give more privacy/extensions, etc.).

Example: Haiti, 2010

Technical drawing for transitional shelter in Port-au-Prince, Haiti

It is essential to clearly define what disaster-resilient construction techniques are to be used. Design solutions must be safe structures that are resistant against future disasters as much as practically possible; consider flooding, earthquake, landslides, high winds. The principles of "build back better" and "safe, adequate, durable" are touchstones for (re)-construction.

Refer also to initial design-budget, timeframe A.4

Refer to Sphere Project, shelter and settlement section, www.sphereproject.org

Reference for shelter projects for case studies, www.sheltercasestudies.org

TASK 5: DEVELOP DETAILED BILL OF QUANTITIES FOR PILOT CONSTRUCTION

The engineer/architect needs to develop a detailed Bills of Quantities (BoQ) for the chosen pilot structure and share it with the procurement team to help them understand exactly what materials need to be bought. It is best to get the help of a local person/partner to get local rates of material and to establish a realistic cost estimation in order to prepare the BoQ. The BoQ is an exhaustive list of material specification, quantity and tools required to construct the design. It also gives an estimated cost per shelter. The BoQ is finalized/confirmed only after construction of a pilot structure.

Bill of Quantities (BoQ) template in Appendix 4

TASK 6: DEVELOP DRAFT CONSTRUCTION GUIDE FOR PILOT STRUCTURE

The engineer/architect and social staff should develop a draft technical assistance guide manual on how to construct the structure, which needs to be revised after the pilot has been tested. This should include step-by-step construction processes in pictorial format with examples of “dos and don’ts” in local language, highlighting critical junction details and contacts for advice and assistance.

Example: Bangladesh

Extract from construction guide for transitional shelter construction in Bangladesh

SUMMARY OF OUTCOMES

Outcome 1: Field assessments completed and documented

Outcome 2: Understanding of program participants capacity/preferences to (re)-build

Outcome 3: Market survey for construction material and labor evaluated

Outcome 4: Design for pilot structure completed, including BoQ, cost, material specification, equipment, labor requirements, draft technical construction guide

B.4 PILOT /DEMONSTRATION (DEMO) STRUCTURE

The purpose of the pilot construction is to:

- Show stakeholders a real, tangible sample of what is to come. It is a method to ensure buy-in from different stakeholders. In some contexts, it may be appropriate to have multiple variations of pilot models.
- Seek program participant and craftsmen feedback on the structure, ease and difficulties in making such structures, any modifications required, etc.
- Demonstrate the appropriateness of the structure in regards to meeting Sphere standards.
- Test the speed that these shelters can be built and the labor and skill requirements, as well as the technical assistance that is needed to scale-up quickly.
- Identify improvements that should be made after feedback/testing.
- Finalize exact BoQs.
- Reconfirm the level of skills required for construction.
- Use as a training opportunity for builders. DEMO shelters are frequently built by villages or groups of villages to train skilled labors on construction techniques and orient the community and program participants on key construction features (useful for community/ program participants monitoring).
- Evaluate the safety and storage issues when scaling-up (mapping of distribution schedules for material/cash).

When planning for a large scale project, it is always worth investing time and funds towards a pilot. If any improvements are identified, either in terms of design, BoQ or construction technique, the benefit of this finding will be multiplied by the number of repetitions, resulting in better quality construction, cost savings and increased program participant satisfaction with the structures.

Example: Madagascar, 2012

Pilot construction of shelter for training local community and craftsmen on cyclone resistant construction
Photo Credit: Rumana Kabir for CRS

"It is one thing to look at design drawings but it cannot compare with being able to look, touch and walk around in a real structure."

SUMMARY OF TASKS

Task 1: Construct a pilot structure

Task 2: Conduct an "open house" and evaluate pilot structure

Task 3: Seek approval/agreement

TASK 1: CONSTRUCT A PILOT STRUCTURE

The pilot construction should be built on the actual site (or a program participants land), if possible, by a group of skilled and unskilled laborers, under the same conditions and with the same equipment as planned for all following construction. This will achieve a more realistic assessment of the suitability of the structure, actual cost, construction time and labor requirements, and highlight what needs to be improved before scaling-up.

"Will program participants move into these kinds of shelters? It is the occupancy rate not the amount of completed structures that is the goal."

Example: Sri Lanka, 2006

Pilot construction of transitional shelter in progress for post-tsunami shelter response, Sri Lanka
Photo Credit: CRS

TASK 2: CONDUCT AN "OPEN HOUSE" AND EVALUATE PILOT STRUCTURE

- Once completed, it is important to get feedback from different groups, including:
- Government officials (politicians, zoning folks, city planning/construction department)
- Program participants: men, women (different age groups), vulnerable groups, etc.
- Shelter Cluster: To ensure understanding, coordination and harmonization of other construction projects (e.g., shelter) and the wider context, such as WASH and other sector intervention.
- Implementing partners
- CRS staff (social and technical)

Appropriate feedback mechanisms should be developed for each of these stakeholder groups. Smaller groups or different approaches at soliciting feedback in different forums may be necessary. It is not uncommon and should be accepted that there will not be a universal acceptance of the structure. In this respect, it is helpful to **evaluate the pilot on:**

- The acceptance of the structure by the program participants.
- The time it took to construct.
- The cost, including improvements, that may be necessary to make it suitable and safe.
- The construction skills required and the usability of the draft construction guidelines.
- The structure's compliance to Sphere standards. If there is a deviation, document the reason why. This can be shared with partners, the cluster and government agencies to ensure that there is a clear reason as to why Sphere is not achievable.

In urban settings where land is scarce, it may be difficult to achieve site area standards.

Contact shelter advisor for tools on feedback mechanisms

Refer to Sphere Project, shelter and settlement section, www.sphereproject.org

T-shelter: It is important to remember that the shelter is not intending to replace homes in their original state, but to provide a "bridge" to more durable solutions. Consider the reusability of material and/or possibility to extend the structure.

TASK 4: SEEK APPROVAL/AGREEMENT

Once verbal approval is given by any authority, follow up by getting written approval, especially from government authorities (local, municipal, federal, state, etc.). Written approval is advisable particularly for permanent construction, through in many situations it would be ideal. These document need to be retained and filed.

T-shelter construction: In many past experiences, in the absence of local authority approval mechanisms, the Shelter Cluster and affected community reviewed and endorsed the proposed design.

Seek written agreement from the land owners in the form of a signed Memorandum of Understanding. However, in some instances, verbal statements can be the most one can anticipate. If this is the case, be sure to record such verbal agreements in the form of meeting minutes.

Refer to B.5 for details

The evaluation/approval process can take time and planning; the scaling-up process should be done in parallel. Factors that need consideration are:

- In kind material distribution: In this case, tenders for construction materials should be prepared as soon as possible.

Refer to B.6 Production information, details and BoQ

- Vouchers distribution: Has a robust market assessment been done? Tender for construction materials/vendors should be prepared as soon as possible.
- Cash distribution: How will the cash be distributed? Consider security risks.

Contact emergency team for detail on in-kind material distribution, voucher or cash approach

Refer to B.7 for detail

SUMMARY OF OUTCOMES

Outcome 1: Appropriateness of proposed structure demonstrated and evaluated

Outcome 2: Improvements made and final design approved

B.5 SCALING-UP

Scaling-up owner-driven construction programs is not a precise science, rather it is a social process that will take time to refine to ensure high-quality programming and management quality systems are correctly integrated into the program. The social and technical units will need to work together to be able to scale up, addressing issues and helping troubleshoot problems as they come up. Effective teamwork between the social and technical teams is a key ingredient for a success.

Scaling-up needs:

- Adequate staff
- Clear role and responsibility between CRS and community
- Good assessment on capacity of the community and staff
- A clear mechanism to receive complaints and feedback from community

SUMMARY OF TASKS

Task 1: Community-led site planning and selection

Task 2: Obtain permission to build

TASK 1: COMMUNITY-LED SITE PLANNING AND SELECTION

Planning of the exact location of the structures on the site is very important. Past experience has shown that it is extremely important to invest effort into this stage. The program participants should lead this process with support from CRS/partner technical and social staff to include their knowledge and feedback into the proposed design. Key items to keep in mind when selecting a suitable location are:

- Geo-hazard vulnerability (Is this new site prone to landslides, flooding, etc.?)
- Does the new site have drainage (storm runoff, grey water, flooding)?

- Site leveling or clearance of debris required (e.g., destroyed structures, contamination, landmines).
- WASH considerations: Were WASH facilities destroyed/damaged during the disaster? If yes, to what extent can we rebuild or integrate construction program around these WASH services?
- Existing vegetation, prevailing wind directions and sun path.
- Current use of site by the community.
- Accessibility (roads, path, electricity, water, etc.).
- Ownership of land.

Example: Nicaragua, 2012

Transect walk with the community to select appropriate site for flood evacuation center project in Kum located in the estuary of Coco River, Nicaragua
Photo Credit: Seki Hirano for CRS

In an owner-driven construction project, it is essential to develop the site layout, plot sizes and other consideration mentioned in close partnership with the program participants, government officials and surrounding communities (host communities) to benefit from their local knowledge, get program participants' buy-in and mitigate future grievances and disagreements.

Tools to consider: transect walk

TASK 2: OBTAIN PERMISSION TO BUILD

To the extent possible (especially for permanent construction), written permission should be obtained from government, local authorities and communities (program participants/host communities) to build on the proposed site to the scope intended. In some cases, this formal process is not always possible, because:

- Not all local contexts have formalized building permission procedures and timeframes.
- In many cases, after a disaster the local administration is understaffed, government systems collapse or are not functioning, etc.

Therefore, it is important that CRS assists program participants with needed documentations of the project for submission according to the local laws. This could include: Site plans/survey plans with property boundaries/plot numbers and technical drawings of the construction (plans/sections/ technical specification).

T-shelter construction: In the case of transitional shelters/buildings, permission may take more informal formats as official processes are too lengthy and/or connected to formal landownership. In the past, this has been a strategic reason why CRS to opted for T-shelter construction. Furthermore, it is important to consider in the design the possibility to demount and rebuild the structures while leaving the building structurally safe.

Example: Philippines

In Philippines shelter response, the transitional shelter was designed to be re-locatable and demountable
Photo Credit: Charisse Mae Q. Borja for CRS

LAND USE AGREEMENT FOR TRANSITIONAL SETTLEMENT

Seek written agreement from the land owners in the form of a signed Memorandum of Understanding. However, in some instances, verbal statements can be the most one can anticipate. If this is the case, be sure to record such verbal agreements in the form of meeting minutes.

Important clauses to be included in agreements:

Project Documents. The land of the Land Owner shall be used exclusively for the purpose of building transitional shelters; inclusive of toilets, bathing cubicles, hand washing stations, clothes washing area, and cooking area; and according to the goal and objectives as set forth in the attached project design.

Period of Agreement. The project shall be implemented by CRS and the Church on behalf of the Archdiocese of Cagayan de Oro. The Land will be used for a period of six months, renewable in six month increments.

Safety. It is the responsibility of the Church to comply with all applicable laws, ordinances, rules, regulations and orders of any public authority having jurisdiction over the safety of persons or property or to protect them from damage, injury or loss.

Injury or Damage. It is understood that the personnel/workmen hired, engaged or contracted in connection with this project including employees of CRS or its donors shall not hold the Land Owner responsible for personal injury or damage caused or sustained by said personnel/workmen.

Sale, Transfer and Mortgage. The Land Owner agrees that the subject Land shall not be sold, transferred or mortgaged to parties outside of this agreement until such time as permanent housing is available for program participants residing in transitional shelters built on the Land.

Site Preparation. All site preparation, including construction of access road and necessary culverts and brush clearing shall be the responsibility of CRS. Large trees will not be removed from the land during site preparation.

Utility Connection. Provision of metered water and electrical connection will be the sole responsibility of CRS.

Drainage and WASH Facilities. Proper drainage and WASH facilities are the sole responsibility of CRS. Drainage will be designed and tested before construction to ensure suitable run-off of water. All latrines constructed will have properly sealed septic tanks.

Also refer to land ownership issues task 2 under point A.3

Land use agreement template (digital copy) available on share point

With squatters, sometimes “formalizing” an informal agreement can actually put the program participant at risk of losing access to that land. For example, in many situations, people have informal agreements such as “This land belonged to my wife’s uncle and I have been given verbal permission to use this land.” Formal interference into these relationships may cause more harm than good, violating these informal but recognized agreements. The program needs to take a clear position on this issue and communicate effectively to all stakeholders.

SUMMARY OF OUTCOMES

Outcome 1: Reached site layout agreement with stakeholder and community

Outcome 2: Gained permission/agreement to construct project by local authority, government, community

B.6 TECHNICAL DESIGN – PRODUCTION INFORMATION AND BOQ

SUMMARY OF TASKS

Task 1: Produce technical design drawings and specifications

Task 2: Produce Bill of Quantities (BoQ)/Unit Cost Analysis (UCA)

Task 3: Produce a construction brochure/finalize construction guide

Task 4: Review technical design – Local building codes

Task 5: Develop monitoring plan

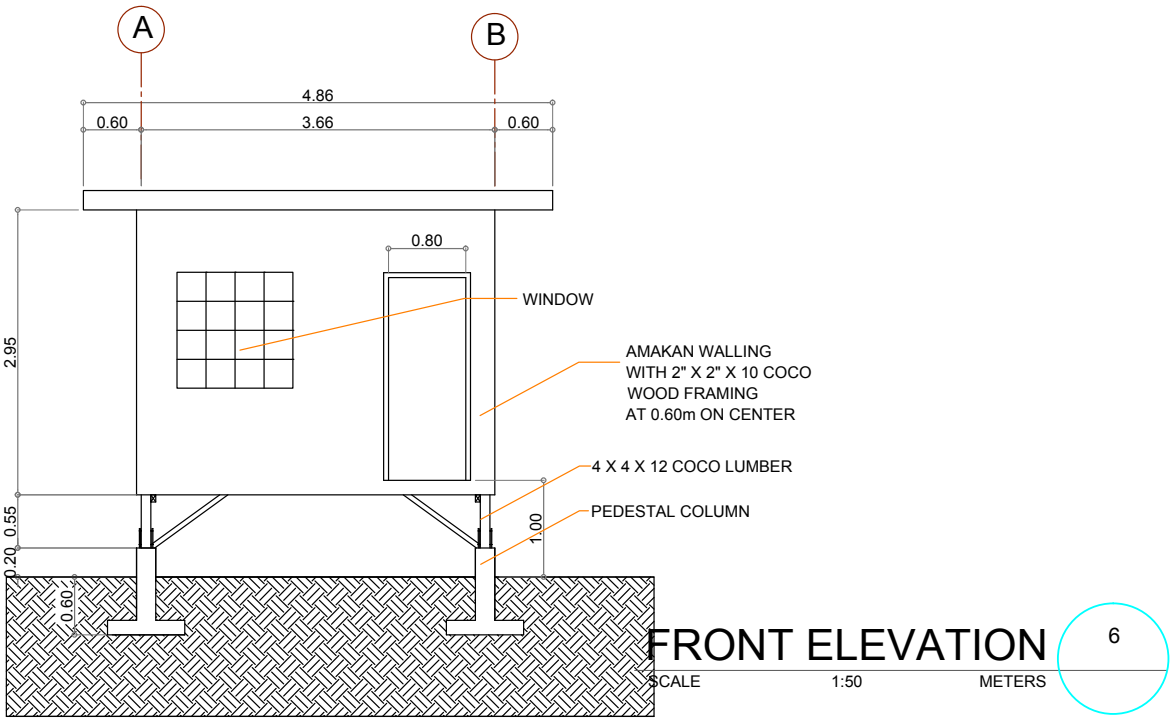
TASK 1: PRODUCE TECHNICAL DESIGN DRAWINGS AND SPECIFICATIONS

Defines what is going to be built. Produce the architectural and engineering drawings and structural requirements for the proposed structure following the improvements made to the pilot structure. Produce the engineering package (see below for explanation). The completed engineering package is the basis for the next work stage.

If the project is in a new settlement where new plots are created, then the site planning and infrastructural scope of work is essential (WASH, site drainage, access roads/paths, etc.).

In projects where the constructing is within the owner's plot of land, then an architectural and structural package may be sufficient.

Example: Philippines, 2012



Example of technical drawing, front elevation of transitional shelter in Philippines, 2012

What are technical design documents?

Design parameters

- List of design parameters (size, structural loading and resistance), list of drawings and assumptions

Site plans and infrastructure plans

- Civil drawings (roads, drainage, bridges, WASH, etc.)
- Site plan (showing site boundaries, location of structure on the site in plan, access, north direction, any water/drainage/electrical supplies, topographical information, vegetation, neighboring structures, etc.)

Architectural and structural package

- Architectural/structural drawings (plans, elevations, sections)
- Electrical, mechanical drawings (lighting circuits, ducting, ventilation)
- Material specification /equipment schedules
- Detail drawings (showing important junctions, i.e., foundations, wall/roof junction)
- Design Bill of Quantities (BoQ)
- Structural calculations

What is part of the specifications?

Specifications describe the **minimal** construction requirement to be achieved and describe the approved design in words and construction sequence. It must reflect the **design quality, material quality/characteristics** (i.e., concrete mixing strength, alignments tolerances) and the construction methodology (i.e., prefabrication versus on-site construction).

For example contact CRS Shelter advisor

What is part of the engineering package?

It collates all information relevant to the project and is the core documentation for overall construction project management, budget and timeframe control. It is essential to proceed to the next work stages. It includes:

- Technical assessment, field investigations, site planning and requirements
- Scopes of work, technical design drawings, material specifications, BoQ
- Construction modality – owner-driven or contractor-built or a combination of the two
- Monitoring plan

Note: The construction project manager/the engineering team should verify the accuracy and completeness of the engineering package to be able to manage the construction works effectively.

Purchasing of design software (i.e., STAAD, ETabs, EPANET, AutoCAD, etc.) may be required. A common problem associated with AutoCAD and other drawing software, especially in countries with limited professional education and regulating bodies, is the ease of "cutting and pasting" design drawings and details from one design to another without review. Design drawings should be signed and stamped by a licensed engineer/ architect, who will in turn assume the liability for any errors and/or omissions in the design.

What is a Bill of Quantities (BoQ)?

The final BoQ is based on the final approved design drawings and specifications. The BoQ lists out all the materials and quantities required to build the structure as drawn on the technical drawings. It determines unit costs. The BoQ is needed to calculate total project costs and monitor the budget.

What is a Unit Cost Analysis (UCA)?

UCA is part of the BoQ. It itemizes material cost, labor cost and equipment cost.

These estimated costs can be derived in several ways:

1) Use of a standard construction cost index (i.e., R.S Means Construction Cost Index, etc.) generally provides a lower accuracy estimate and is not always available.

2) Unit costs based on an up-to-date actual local area market price survey are more accurate, but will require more time and staff resources.

The total estimated construction cost = quantities x unit costs (materials, labor and equipment). In addition to the construction cost, make allowances for staffing /overheads/ contingencies.

The BoQ should be very specific so that the procurement teams can procure the right materials. Many procurement staff will never have purchased construction materials before, and they do not know the difference between different kinds of cement, rebar, GI sheeting, etc.

Example: Philippines, 2012

PROJECT TITLE: Construction of 18 sqm elevated T-Shelter
PREPARED BY:
SUBJECT: DETAILED ESTIMATE 3.66 x 4.88 m

ITEM	DESCRIPTION	QTY	UNIT	UNIT PRICE	AMOUNT
1	**Concreting of Pedestal Col.**				
	Materials				
	Portland Cement	5	bags	210	1050
	Mixed Gravel	1	mixed	800	800
	3/16" x 4' x 8' Ord Plywood	1	sht	220	220
	2 - 2" x 2" x 12' coco lumber	8	bdft	14	112
	10mm x 6.0 m Def. bar	12	lngth	140	1,680.00
	8mm x 6.0m Def bar	3	lngth	80	240.00
	# 18 Tie wire	2	kls	60	120.00
				Material cost	4,222.00
	Labor (1 day)				
	2 Carpenter	2	mds	300	600.00
	2 Helper	2	mds	250	500.00
				Labor cost	1,100.00
				Sub total	5,322.00
2	**Wooden Post /Girt**				
	Materials				
	4 - 4" x 4" x 12' Coco Lumber	64	bdft	14	896
	6 - 2" x 4" x 8' Coco lumber	32	bdft	14	448
# 4" Cwnails		1	kls	50	50.00
	# 2-1/2 cwnails	1	kls	56	56.00
				Material cost	1,450.00
	Labor (1 day)				
	2 Carpenter	2	mds	300	600.00
	2 Helper	2	mds	250	500.00
				Labor cost	1,100.00
				Sub total	2,550.00
3	**Fabrication and Installation of amakan Walling**				
	Materials				
	18 - 2" x 2" x 12' Coco Lumber Hor Stud	72	bdft	14	1008
	28 - 2" x 2" x 8 ' Coco Lumber Vert Stud	74.67	bdft	14	1,045.38
	Bamboo slats	2	bundles	80	160.00
	4' x 8' amakan	13	sht	160	2,080.00
	# 4" Cwnails	1	kls	50	50.00
	# 2-1/2 cwnails	1	kls	56	56.00
				Material cost	4,399.38
	Labor (1 day)				
	2 Carpenter	2	mds	300	600.00
	2 Helper	2	mds	250	500.00
				Labor cost	1,100.00
				Sub total	5,499.38

ITEM	DESCRIPTION	QTY	UNIT	UNIT PRICE	AMOUNT
4	**Installation of FloorJoist / Plywood Flooring**				
	Materials				
	14 - 2" x 3" x 12' Coco lumber Joist	84	bdft	14	1,176.00
	3/4" x 4" x 8" plyboard	6	sht	750	4,500.00
	# 4" Cwnails	2	kls	50	100.00
	# 2-1/2 cwnails	1	kls	56	56.00
	#1-1/2" cwnails	1	kl	55	55.00
				Material cost	5,887.00
	Labor (.5 days)				
	2 Carpenter	1	mds	300	300.00
	2 Helper	1		250	250.00
				Labor cost	550.00
				Sub total	6,437.00
5	**Roof framing / Roofing works**				
	Materials				
	8 - 2" x 3" x 12' coco lumber raffter	48	bdft	14	672.00
	10 - 2" x 2" x 12' coco lumber purlins	40	bdft	14	560.00
	Gage 26 x 10' corr g.i sht	14	shts	270	3,780.00
	Vulcaseal	1	pint	110	110.00
	# 4" Cwnails	2	kls	50	100.00
	# 2-1/2 cwnails	1	kls	56	56.00
	# 2 " umbrella nails	1	kls	75	75.00
				Material cost	5,353.00
	Labor (.5days)				
	2 Carpenter	1	mds	300	300.00
	2 Helper	1	mds	250	250.00
				Labor cost	550.00
				Sub total	5,903.00
6	**Windows/Door/Stair**				
	Materials				
	Bamboo Slat	1	bundle	80	80.00
	2 -2" x 2" x 12" coco lumber (doorframe)	8	bdft	14	112.00
	2" x 3" x 12 coco lumber (Stair	6	bdft	14	84.00
	3/16" x 4' x 8' ord. plywood	1	shts	220	220.00
	3" x 3" loosepin hinges ord.	1	pair	45	45.00
				Material cost	541.00
	Labor (.5 days)				
	2 Carpenter	1	mds	300	300.00
	2 helper	1	mds	250	250.00
				Labor cost	550.00
				Sub total	1,091.00
				Grand Total	26,802.38

BoQ with unit cost of 18 sqm transitional shelter in Cagayan de Oro, Philippines

TASK 2: PRODUCE BILL OF QUANTITIES (BOQ)/UNIT COST ANALYSIS (UCA)

Improve and finalize the pilot structure BoQ to be very detailed: Include a list of all materials, material quantities, equipment and labor required to build the structure. The labor requirements should include number of carpenters, masons, etc.; labor days are required for each phase.

UCA: Determine the unit cost for construction materials, equipment and labor.

The CRS in-house engineer/architect and procurement staff will revise the current market cost per item after the pilot construction. It is important that technical staff explain the BoQ in detail to the procurement staff.

Example: West Sumatra, 2009

Illustrated technical guide for transitional shelter construction in Padang, West Sumatra, Indonesia, 2009

Program participant with T-shelter technical guide poster
Photo Credit: CRS

TASK 3: FINALIZE TECHNICAL ASSISTANCE GUIDES

A construction brochure and/or manual should be finalized after feedback from the pilot project has been used to improve the design. This technical assistance is very important to illustrate in a very simple and clear way how to construct the shelter and how to monitor the quality. This could include photos of the pilot shelter with annotations, drawings, illustrations and diagrams. It should highlight key monitoring stages and give attention to key details, such as safe joining of materials. Contacts for help and assistance are a very important component of this document.

It is essential to use communication methods that program participants, who are building their own houses, understand. Many methods have been developed and tested. Contact shelter advisor for examples.

TASK 4: REVIEW TECHNICAL DESIGN – LOCAL BUILDING CODES

Permanent construction: Technical designs and specifications should be reviewed for compliance with local building codes and regulations or accepted international codes where local codes and regulations are not available or are below acceptable standards. This can include a combination of in-country local and international professional engineers and a wider review via email/internet utilizing the CRS network of construction professionals/shelter advisor.

Emergency/T-shelter construction: "Build Back Better" principles must be emphasized. Emergency/transitional structures must be designed so that if they do fail in a future disaster, they do not cause injury to the people. Evacuation procedures should be known and practised. An emergency shelter advisor should be consulted if there is not sufficient technical expertise available in-country.

This is particularly important in earthquake, high wind or flooding zones, where special construction techniques and detailing are essential to build safe and hazard-resistant structures.

Reference: Uniform Building Code (UBC), www.iccsafe.org

Reference: hazard resistant construction, www.sheltercentre.org/library

Contact shelter advisor for review of technical drawings/specification

TASK 5: DEVELOP MONITORING PLAN

This is a **tool** that defines the procedures to be used to **monitor the quality** of the construction works and the **progress.** Ideally, it is divided into the different construction stages (foundations [plinth], wall structure, roof, finishes and completion). It is developed on the basis of the technical design, material specifications and specific considerations for owner-driven construction (i.e., time for training in safe construction techniques, flexible timeframe, etc.).

What is part of a monitoring plan?

It sets the basic requirements and defines inspection standards of the construction works by the engineering team/program participants and community. It is a very important tool to monitor the quality of the construction.

- **States the responsible individual** for each of the inspection activities.
- **Includes verifying documents** for each inspection activity consisting of inspection forms/construction checklist (i.e., Daily Inspection reports that monitor day-to-day activities).
- **Includes breakdown of overall construction process** into different phases such as completion of ground works (drainage/sewers), foundations/plinth, wall structure (RCC columns/timer, etc.), roof structure (safe connection to wall structure) and finishes (internal/external).
- **Includes construction "Dos and Don'ts" poster** with pictures posted at the construction site to inform/educate the construction workforce on good and bad practices witnessed during construction. Past experience has proven that pictures help to communicate safe construction practices.

The monitoring plan defines:

- **"Hold points"**– critical stages of the construction work where construction is stopped until inspection and quality certification is provided from the engineering team and program participants. The hold points clearly describe what requires inspection. They are particularly important where on-going construction would otherwise conceal completed works (i.e., reinforcement and pouring of foundations, columns and support beams; installation of electrical, septic tanks, etc.).
- **"Monitor"** – random checks, by direct or indirect inspection, to verify conformance with specification and quality control.

Permanent construction:

- Owner-driven permanent construction should include a "defect liability period" of 6 months with a retention withheld (5%) to repair any minor issues that arise during this period.

A monitoring plan is a **communication tool** to use with the local community/program participants/skilled laborers to agree on the inspection procedures, assist them in achieving accountability and raise awareness for safe construction. An induction meeting with the community should explain the process carefully.

Reference to B.12 for more details on quality monitoring/program/budget controls

Contact shelter advisor for examples and template

SUMMARY OF OUTCOMES

Outcome 1: Completed engineering package for tender action/material procurement

It includes the scope of works, technical design drawings, specifications, BoQ/UCA, construction brochure building, code compliance note and monitoring plan.

B.7 WORK STAGE: PROCUREMENT AND WORKFORCE MOBILIZATION

This stage includes the following sub-stages:

Sub-stage: Community mobilization	refer to B.8
Sub-stage: Procurement –Tender selection and purchase order	refer to B.9

The procurement work stages are necessary steps to establish:

- The **appropriate labor** arrangement to construct (this could include combinations of the program participants themselves, skilled craftsmen and local labor).
- The tendering for **construction materials** to establish availability, cost and lead times.
- Placing **purchase orders** and developing consistent **contract templates** (Memorandums of understanding [MOU], service contracts).

In the past, CRS has used different options to source the materials and labor necessary:

A. CRS directly built, by procuring material and labor employed by CRS

In situations where land tenure is not certain, such as in formal/informal camps or temporary relocation sites, program participants may not be able to build their own shelters. In these instances, CRS/NGO/partners will need to directly hire skilled laborers/craftsmen to construct and to procure and store construction materials.

B. In-kind material distribution to program participants with labor contribution by the program participants and/or cash for work

In post-disaster situations where construction materials are not readily available on local markets or it is necessary to have a very prescriptive design and material selection, it may be necessary to procure materials and distribute items in-kind to program participants (refer to market assessment).

In this case, it is essential to asses if the community has the necessary skilled labor. If this is not the case, some form of cash grant can be considered for the program participants to manage the construction and payment of skilled laborers. The program participants often are in a position to negotiate better rates; however, technical advice on safe construction needs to be disseminated.

C. Material voucher distribution to program participants with labor contribution by the program participants and/or cash for work

This approach is most applicable in situations where there are several design solutions required (e.g., urban (re)-construction) and the local markets are functioning and will be able to cope with the increased demand of construction materials with consideration of inflation.

It is advisable to consider pre-selecting vendors or approaching vendors on how the process will work, especially in regard to cash flow and payment schedule to the vendors in order for them to have the materials available (i.e., payment every month or every 2 weeks).

D. Cash distribution to program participants with labor contribution by the program participants and/or cash for work

As explained under "material voucher", cash is most applicable where there are several design solutions required and the local markets are functioning and will be able to cope with the increased demand of construction materials. In addition, security situations and logistics allow for the distribution of cash to the program participants.

The cash-for-work approach is valuable as a mechanism for supporting disaster-affected households to rebuild their houses while also providing cash injections into the affected local economies. It provides waged labor opportunities to other laborers in the community in need of work.

Example: West Sumatra, 2009

Cash distribution to program participants by the post office in Padang, west Sumatra
Photo Credit: CRS

Each of these options requires variation in how construction materials are procured, necessary labor (skilled/unskilled) selected and construction supervised and quality monitored. **It is essential to tailor the shelter response to the specific post-disaster situation and shelter needs of the affected population.**

B.8 COMMUNITY MOBILIZATION AND TRAINING

Community mobilization is one of the most essential activities within any form of owner-driven construction modality. The engagement and participation of the program participants, community leaders and affected communities is vital, as they are either building the structures themselves, procuring the materials from local markets and/or employing local craftsmen or labor to build the structures.

Many shelter projects are assessed on their occupancy rate and not on the completion rate of the shelters. Consequently the participation of the affected communities is an essential component.

SUMMARY OF TASKS

Task 1: Cluster program participants into neighborhood groups

Task 2: Agree on scope of participation with program participants

Task 3: Develop construction training and information/education material

TASK 1: CLUSTER PROGRAM PARTICIPANTS INTO NEIGHBORHOOD GROUPS

Once the target group has been established, it is advisable to divide the program participants into smaller neighborhood groups or clusters. This assists in organizing the construction supervision and monitoring. The clusters can inform the program team about "special needs" within their cluster group, such as elderly households that require a hand rail to get in and out of the shelter or a wheel chair ramp, etc.

In the case of a voucher or cash process neighborhood members can take up organizational responsibilities such as, material sourcing, etc.

Example: Padang Earthquake, West Sumatra, Indonesia, 2009

Incentive approach: In some instances, it is may be prudent to offer a "solidarity" incentive bonus for the households. This helps ensure that community members support one another in the re-building of their communities. In the Padang earthquake response, 10% of the total cash grant was withheld until all households in the cluster safely completed the construction of their homes.

CRS team monitors the progress of T-shelter construction in Padang, west Sumatra, earthquake response
Photo Credit: CRS

Program participant list is posted on wall within the community
Photo Credit: CRS

TASK 2: AGREE ON SCOPE OF PARTICIPATION WITH PROGRAM PARTICIPANTS

At this stage, a clear agreement with the program participants/community on their scope of participation should be in place. In general, this is a form showing that the program participants have agreed to participate in the construction of their own houses. If they are disabled or do not have the ability, then they are responsible for "recruiting" other people to assist. In this respect, the clustering of neighborhood into work teams is beneficial to set up a community-based assistance model. When possible, the local community should be looking out for the "most vulnerable" group members, but the degree to which this happens is dependent upon community cohesion.

Template of household agreement in Appendix 1

Template of household agreement, decline of participation in Appendix 2

Shelter program participant card in Appendix 3

TASK 3: DEVELOP CONSTRUCTION TRAINING AND INFORMATION/EDUCATION MATERIAL

In addition to the construction brochure/guide (refer to B.6), a construction training and feedback process should be developed with the program participants. This is often done during the DEMO construction. This information should be inclusive of all groups of program participants, such as women, elderly, etc.

Refer to B.4 for pilot construction as training on safe construction techniques

References on gender in construction contact shelter advisor

Example: Niger, 2012

Construction training for host and affected communities and CRS staff of emergency shelter, Niger, 2012
Photo Credit: Seki Hirano for CRS

Example: Haiti, 2012

Prefabrication yard for T-shelters employed 50% women and 50% men. The manager reported that this created a balanced work environment and that women's productivity was equal to others, Haiti earthquake response, 2010
Photo Credit: Benjamin Depp for CRS

The pilot shelter is constructed to teach safe construction techniques and provide first available shelter to the most vulnerable. It also provides the opportunity to improve the design and material specification.

Risk: It is possible that the most vulnerable receive the least well-constructed shelter in these cases, as they are test constructions.

SUMMARY OF OUTCOMES

Outcome 1: Program participants/community agree on the scope of their participation

Outcome 2: Program participants have access to technical assistance

Outcome 3: Clear feedback system is set up and agreed upon with community

B.9 PROCUREMENT – TENDER SELECTION AND PURCHASE ORDER

There is a formal purchasing process for CRS to purchase construction materials directly for in-kind material distribution or CRS direct implementation of construction projects.

On the other hand, if program participants will be purchasing construction materials with CRS funds themselves on the local markets, a formal tender process is not required. However, it is essential that a market survey for construction materials has been conducted during the feasibility stage.

Refer to assessments point A.3

In general, it is the task of the tender process to establish material cost and delivery time clarity for this construction project. Consequently, it is important that the tender documents are as clear and detailed as possible and that the bidder understands the tender documents to be able to give realistic prices.

CRS note:

Please refer to agency CRS procurement policy and procedures and EFOM and Baltimore Purchasing Manuals

SUMMARY OF TASKS

Task 1: Compile a tender package for materials/ supplies

Task 2: Set up consistent tender templates

Task 3: Conduct a tendering selection process for procuring materials/supplies

TASK 1: COMPILE A TENDER PACKAGE FOR MATERIALS/SUPPLIES

The tender package should be consistently applied to all potential bidders and include:

- The BoQ with the UCA without the prices for bidders to complete for submission
- A clear description and specifications of the materials/equipment, their quality and quantity (part of BoQ)
- Clearly state delivery location, process, responsibilities and dates
- **Payment terms**
- **Tender condition/procedure and schedule –** outlining the specific conditions/procedures to follow for bid submission, submission dates, selection date
- Any performance bond or bank guarantee (if required)

TASK 2: SET UP CONSISTENT TENDER TEMPLATES

It is advisable to use standard CRS construction material supply tender templates and to keep them as simple as possible in bi-lingual format.

Tender form template material supply in Appendix 5

Tender supplier profile cover letter in Appendix 6

Tender cover letter in Appendix 7

In some instances, it may be necessary to seek advice from local host country legal advisor in regard to laws, tax, customs and other regulations.

TASK 3: CONDUCT A TENDERING SELECTION PROCESS FOR PROCURING MATERIALS/SUPPLIES

It is helpful to conduct an initial "pre-qualification process" that shortlists potential suppliers that have the capacity (financial/managerial, quality) to participate in the formal tendering process. This may have been done already during the market survey.

Refer to assessments point B.3

These background checks assist in mitigating time loss or supply problems during later stages in the project by filtering out suppliers who are not suitable or reliable.

Vendor Survey and Pre-Qualification checklist in Appendix 8

Example: Haiti, 2010

It is important to consider the specific post-disaster context. The local markets, the capacity of suppliers, their workforce, supply chain and transportation may be disrupted or even destroyed. It may be necessary to import a large amount of the construction materials from abroad. The time and extra cost implications need to be taken into consideration during the planning stages.

Imported plywood from USA
Photo Credit: Jean- Daniel Lafontant for CRS

A. Tender announcement:

It is a good practice to use local media resources (i.e., radio, TV, newspapers) to notify local suppliers of the planned construction work and where/when to participate in the tendering, or if feasible, to conduct an open information meeting for potential suppliers to promote openness and transparency

B. Tender submission:

The pre-qualified suppliers need to be informed of the tendering schedule and submission requirements (the completed tender package), including clarification period, submission date, evaluation period and tender announcement date to promote openness and emphasize that fair competition will be guaranteed between bidders.

Tendering schedule:

- 5-7 days to bidders to answer tender package
- 5-7 days to procurement/engineering staff to evaluate received bids and obtain required clarifications
- 5-7 days for final contract negotiation with the selected supplier
- 7 days to finalize contract and all necessary reviews and authorization

C. Tender evaluation/selection:

A Bid Selection Committee shall be formed within the Country Program to participate in the bid selection.

The **submitted tender returns** need to be analyzed and tabled (comparison worksheet) in regard to:

- completeness of information
- compliant with the tender package, as tabled in task 1 by engineering staff price

In general, the **best price/quality/reliability ratio should dictate selection.** Unless actual costs have already been determined by the UCA and market survey, then performance rather than price becomes a more relevant selection criteria.

The technical staff should review the returned BoQ with the procurement team during the tender return evaluation. This will assure that the right materials are purchased. The technical team typically knows if the prices that are being quoted are commensurate with market rates/in the correct price range for the quality of materials being requested.

Bid comparison worksheet template in Appendix 9

It is highly advisable to select multiple vendors and not to sole source your procurement purchases. One practice is to sign smaller contracts with multiple vendors, evaluate performance and then increase contracts with vendors that deliver high-quality materials on time at a reasonable price.

It is not uncommon to find the returned tender prices higher than the estimated material price established during the market survey and design phase. This can cause a substantial overall cost increase, especially in cases of a large number of repetitive designs. In this case, consider alternative material or material specifications (i.e., different grade of plywood, timber), individually sourcing (or excluding) nonstructural elements or building with salvaged materials.

D. Sole sourcing – In cases where the availability of good performing suppliers is limited or security is a concern, and CRS has identified and tested suppliers/contractors of higher performance, selection outside a formal bidding process may be appropriate. Documenting the justification for sole sourcing must be completed for audit purposes.

Contact shelter advisor for advice and templates.

CRS internal note:

POLICY STATEMENT CRS, Baltimore Purchasing Manual states:

CRS' headquarters, regional offices, and country program offices Purchasing departments or designated personnel will purchase all goods and services on the best terms consistent with the required quality and delivery, and at the lowest total cost. Acquisition will be without favoritism and on a competitive basis, whenever practical, to obtain maximum value for each dollar spent. All interested suppliers shall receive fair and impartial consideration.

The bid selection committee is formed from designated CRS Staff (i.e., Administrative, Finance managers, and senior managers). As per CRS purchasing policy, the engineering and procurement staff are to be excluded from the bid selection committee, but can provided a technical support role as required.

E. Placing orders/contract

Depending on the size and scope of required material/equipment or services, either a standard purchase order or service contract may be required. In general, singular purchases require only a purchase order as the administrative tool. However, if a more complex service or supply of materials is required, a service contract would be needed. This may include materials delivery in compliance with a specific schedule, multiple delivery sites, equipment rentals, etc.

Contact shelter advisor for service contract template and assistance

Purchase order should include:

- Tender information (BoQ with UCA, material specification), refer B.6
- Payment schedule (outlining when progress payments should be made after delivery)
- Suppliers prices, as submitted in the tender (including expiration date)
- Project/delivery schedules
- Advanced payment (to be avoided if possible, otherwise kept to minimum)
- Retention withheld (if required, such as tax requirements, material warranty)
- Performance Bond/Bank Guarantee Requirements[6] (if required)

Past experiences have shown that it is advisable to avoid advance payments to supplier if possible.

Example: Kyrgyzstan, 2010

Past experience has shown that the receiving department is not always familiar with the quality standards of construction materials. This is why the technical team needs to develop a specifications checklist for the receiving department or be present when material is delivered.

Construction vendors may well try to sell CRS their inferior products because we are not a traditional construction company/contractor. It is important for the receiving department to REJECT inferior quality products. In Kyrgyzstan, a material quality checklist was developed to assist the receiving staff for material delivery with assessing that the materials are to the specified quality.

Contact shelter advisor for complete material quality checklist

Extract of material quality checklist developed for winterized T- shelter response

SUMMARY OF OUTCOMES

Outcome 1: Quality supplier selected and purchase order awarded

Outcome 2: Cost and delivery time clarified

6 Performance Bond/Bank Guarantee Requirements: Performance Bonds and Bank Guarantees are issued by a bank or other financial institution and held in escrow pending confirmation from the client that contract terms have been met.

B.10 WORK STAGE: CONSTRUCTION SUPERVISION

Includes:

Sub-stage: Construction supervision — refer to B.11

Sub-stage: Project controls: time/cost and quality — refer to B.12

Sub-stage: Completion and hand over — refer to B.13

B.11 SITE SUPERVISION

In an owner-driven construction project, the owner or community is responsible for carrying out the works.

CRS is directly responsible for supervising the safety and quality of construction, as well as training and managing the required labor, in the form of program participants' own construction and skilled/unskilled laborers.

Advice: Keep it simple!

SUMMARY OF TASKS

Task 1: Set up regular meetings

Task 2: Set up feedback system – Accountability

Task 3: Set up site safety measures

Task 4: Facilitate changes and improvements

Task 5: Equipment and materials management/ warehousing

TASK 1: SET UP REGULAR MEETINGS

It is advisable to continue regular community meetings from the planning stage throughout construction to encourage transparency, develop good working relationships and provide a forum to address issues that may arise during construction. Specific discussion topics that may come up:

- Agreement on the specific responsibilities of all parties; refer B.3
- Ambiguity regarding roles and expectations; introduction of feedback system (hotline, help desk, etc.); refer to task 2 below
- Initial construction training and other technical advice; refer to B.4 for pilot construction and task 3 point B.8
- Agreement on site safety measures; refer to task 3 below
- Explanation of the intended project schedule; refer to B.12
- Explanation the site inspection process and progress reporting; refer to B.11

TASK 2: SET UP FEEDBACK SYSTEM – BEING ACCOUNTABLE TO PROGRAM PARTICIPANTS

It is good practice to set up a feedback mechanism to ensure that the right people are targeted (display program participant list at the start of the project) and that grievances or concerns can be address in a timely fashion. This could include:

- Setting up telephone hotlines or a help desk
- Posters, leaflets and notice boards

In some cultures it would be most appropriate to have feedback for men/women separately (i.e., individual conversations with women).

Refer to B.4 for pilot construction

Example: Haiti, 2012

Notice boards displaying the complaints and feedback process erected in all communities, Port-au-Prince, Haiti, 2010
Photo Credit: CRS

Example: West Sumatra, 2009

24-hour hotline service for feedback mechanism posted within the community, Padang, west Sumatra
Photo Credit: CRS

TASK 3: SET UP SITE SAFETY MEASURES

It is essential that safety measures protect laborers, building program participants and surrounding communities from harm during construction. Construction works are inherently dangerous activities and can lead to injury or loss of life if not taken seriously. Consequently, safety procedures need to be developed and monitored with the community.

Safety measures include:

- Develop site safety training and awareness campaigns for workforce and communities
- Consider barriers to enclose the construction site
- Consider climate and weather conditions or specific hazards related to the post-disaster situation (i.e., further landslides, aftershocks, etc.)
- Protection from falling; using barriers when excavating or working at higher levels
- Protective clothing for workforce: Shoes, helmets, vests, harness
- Safe storage of materials
- On-site safety – Do they have the proper tools to do the work?

CRS internal note:

Catholic Relief Services are fulfilling their legal and moral obligation to maximize awareness of safety in the workplace and to minimize the potential for accidents on their projects.

Example: Japan, 2012

Construction site safety in Japan for construction of a training center in Nasushiobara, 2012
Photo Credit: Seki hirano for CRS

TASK 4: FACILITATE CHANGES AND IMPROVEMENTS

Changes, alterations and improvements are part of almost all construction projects. Especially in post-disaster (re)-construction, it is essential to be able to respond to unforeseen events, market price fluctuations and challenges that may arise. These changes may be initiated by either the community or staff and should be discussed and mutually agreed upon before making any changes to materials, design or procedures, as changes may have an impact on cost and safety.

Any corrective action or design change identified by the field engineer should be reported clearly on the **construction monitoring form.** It is also possible to use **change order forms,** if an adequate amount of monitoring staff is available. After the changes/corrections have been made, they should be re-inspected and approved by the field engineer/community representative prior to proceeding with additional construction activities. This guards against unsafe construction being "covered up" and hidden from view.

Refer to point B.12 for details on quality control

Construction monitoring form in Appendix 10

Refer to B.12 for change order form explanation, in Appendix 11

TASK 5: EQUIPMENT AND MATERIALS MANAGEMENT/WAREHOUSING

In the case of CRS directly building or in-kind material distribution, it is necessary set up warehousing and stock management procedures to distribute materials and avoid delays that may occur in the supply chain. To do this, set up a warehouse management system with full-time, dedicated warehouse management staff.

The following steps will be required to provide adequate controls of and accountability for construction materials:

- Warehousing: Ideally the location of the materials and equipment warehouse should be within close proximity of the construction site, be easily accessible and have adequate security to reduce the threat of theft.
- Stock management system: Establish a warehouse management system that monitors equipment/material receipt/ inspection, storage, inventory and dispatch. This would include forms and documents (i.e., stock cards, good received notices [GRN], inventory database, etc.).
- Transport and logistics: Establish logistics documentation to track delivery and dispatch with CRS-owned or contracted transport (i.e., waybills).
- Financial accounting: Goods purchased for constructions should be in compliance with CRS financial accounting practices. This implies adequate financial tracking of pre-positioned purchased materials.
- Contracts administration: Establish procedures and contract templates for transport and logistics requirements.
- Safety/security: Establish safety/security protocols to reduce risk of fire, bodily injury and theft.

Contact emergency team for advice on setting up warehousing and logistics

Example: West Bengal in India, 2008

If social mobilization is strong and community organizations are functional, warehouse/storage could be done in the village itself. This minimizes cost of transport and chances of damage during transportation as well as encourages ownership of the project by the community.

This experience was made in the state of West Bengal as part of the flood-resistant shelter response. At the very beginning of the project, Village Development Committees (VDC) were promoted to ensure community participation in all key decisions, but mainly the program participant selection process. These committees were also entrusted the responsibility of safekeeping the shelter materials, especially the RCC pillars and bamboo. The decision to store materials locally was made firstly because the VDC were very active and engaged, and secondly because the affected areas were not accessible by road during the rainy season. By doing so, the community/VDC became accountable and took ownership of the project.

The vendors were asked to deliver to village points where program participants collected their materials. Any damage during transport to the village points was the responsibility of the vendor. Consequently, there were no costs incurred for local transport.

Reflections:
The CRS/partner should identify scope of storage/ warehousing during planning stages. This is particularly important where all-weather roads are not available.

Example: Kyrgyzsta, 2010

In Kyrgyzstan, in response to ethnic violence and flooding, transitional winterized shelter were constructed. A dissimilar warehousing approach was taken by CRS. The construction materials for the winterized t-shelter were procured and warehoused by CRS. Security guards were hired to monitor the site and warehouse during the day and especially during the night.

Reflections:
In some circumstances, it can be beneficial to have two security companies to do this to reduce risk of collusion and theft.

Winterized t-shelter with insulation layer under construction
Photo Credit: Andrew Schaefer for CRS

SUMMARY OF OUTCOMES

Outcome 1: Good communication and feedback systems set up

Outcome 2: Site safety measures agreed upon and followed

Outcome 3: Procedures to control construction changes set up

Outcome 4: Material management/warehousing staffed and set up

B.12 PROJECT CONTROLS – TIME, COST AND QUALITY

Project Controls are the monitoring and evaluation (M&E) processes, tools and protocols that facilitate the supervision of construction activities in respect to their safety, quality, cost and progress.

Specific attention should be given to **quality control.** In general, CRS will need to manage the workforce, which will be either skilled laborers or the program participants themselves, most of whom are not construction specialists. Community and program participants should participate in the inspection process as well as daily and weekly reporting to encourage ownership and responsibility for the project.

The tools and procedures listed below have been developed to assist in:

A. Constantly monitoring the safe and quality construction.

B. Tracking construction progress and cost expenditures, as progress may vary and expenditure is linked to progress made.

C. Monitoring material inventories and costs (if not procured by program participants themselves).

D. Pro-actively identifying problems and making improvements in projects design and budget expenditures.

These schedules need to be set up to be **project specific** using the information documented in the technical design phase as base information, refer to B.6:

- Technical assessment, field investigations, site planning and requirements
- Scopes of work, technical design drawings, material specifications, BoQ
- Market survey for labor and material availability and cost

SUMMARY OF TASKS

Task 1: Set up a project schedule (progress tracking)

Task 2: Set up project cost control (budget tracking)

Task 3: Set up quality control (assures construction quality)

Task 4: Set up document control (records management)

TASK 1: SET UP A PROJECT SCHEDULE – A TIMELINE

It lists the work activities and enables project managers to monitor construction progress against time. The Monitoring Plan is particularly important to the project schedule as it sets out the most important phases of construction and key inspection points.

Regular reporting from the site inspection teams is used to update the schedule. The project schedule is a working document. It is best updated on **a weekly base** with actual field measurements and observations of the construction works completed. This procedure is important to allow the project managers to foresee problems, such as cost increases, substandard construction, disagreements, etc., and be in a position to take action.

Note: The project schedule has to be project and emergency specific. It has to factor in many overlapping issues and also uncertainties, such as actual performance capabilities after disaster, availability of craftsmen, training of community, site conditions (debris, contamination, landmines) and climate, hazards, access, security situation and program participants' capacity to participate.

Project tracking and reporting
Weekly site inspections are recorded on the project schedule; cost is normally reported monthly by showing the current (Job to Date) cost of completed work and a current estimate of final cost at project completion (Estimate at Complete). A tracking curve diagram can be used to graphically represent the status of the project's actual progress/expenditure against planned progress/expenditure.

Project schedule/project tracking templates:
Templates can be developed using scheduling software such as MS Project, Primavera or MS Excel that organize information in a Gantt chart format.

Digital project schedule templates available on share point

Example: Orissa in India, 2008

As experiences during the low-cost flood-resistant shelter project in rural villages in Orissa have shown, in a case where construction works are stopped (due to various reasons), the workers tend to leave to outside places in search of work. The non-availability of workforce and high drop-out rate could become a challenge and cause delays in the progress of construction.

Reflection:

In absence of any formal binding or contract, these trained workers leave the construction site for personal or other reasons, affecting the project progress. Further, the project loses trained/skilled workers and must invest time and resources to train another group, which also hinders progress.

It is advisable to agree on a fixed-term contract/ formal contract from the beginning between partner/CRS and the workforce.

Example: unit cost analysis

Unit Price Analysis
Project title: **Date:**

title of construction activity

No	Description	Unit	qty	Unit Price	TOTAL			
					MATERIALS	LABOR	EQPT.	TOTALS
A	**Material**							
B	**Labour**							
	Skilled labour	day						
	Helper	day						
C	**Equipment**							
	Misc. Tools	lot						
	Sub -Total							
	Profit & OH 15 %							
	TOTALS							

Unit cost analysis example template itemizes materials, labor and equipment requirements

TASK 2: SET UP PROJECT COST CONTROL

Track the progress of the project by keeping an updated weekly project cost. Add a tracking line into the Bill of Quantities as materials are used. Use regular weekly reporting from the site inspection teams to assure the BoQ remains up-to-date.

The **Bill of Quantities (BoQ)/Unit Cost Analysis (UCA)** developed in the technical design stage are the documents needed to track budget expenditures over the life of the whole project.

Tip: Dividing the cost of completed work to date by the overall contract cost is an accurate and industry standard method of tracking and reporting overall project progress. Trends in actual cost expenditure versus planned expenditure can be analyzed to estimate budget over/under expenditures.

BOQ/UCA template in Appendix 4

CRS internal note:

Budget requests to allocate funds for the purchase of materials or to finance construction should comply with the standard CRS purchasing policy and procedures as well as any specific donor requirements. The construction project manager should track budget expenditures in close collaboration with the CRS country program finance department.

TASK 3: SET UP QUALITY CONTROL

Quality control is an inclusive process that involves the program participants, the technical staff and the social staff equally. The pilot construction, technical assistance brochure/ training, feedback system, regular community meetings and change procedures are all part of ensuring safe and quality construction.

In addition, the following inspection procedures are available, which need to be adapted to suit the specific emergency context (i.e., available timeframe).

A. Establish **key inspection points.** These mark the completion of key work stages where the field engineer assesses the safety and quality of construction before it can continue. Generally, these key inspection points are:

- Foundation/floor slap
- Foundation/wall structure junction
- Wall/roof structure junction
- Completion of roof

Cash advance for subsequent work should only be released if work has been completed to adequate standards.

B. Daily inspection by site foremen
In this model, one foreman will supervise a couple cluster of homes (depending on the geographic proximity). The site foreman will oversee site safety, keep the construction moving forward, report back any problems or observations to the field engineer, answer technical questions and make sure materials are present.

C. During **weekly inspections** by field engineer/architect, the social team records progress and defects on **quality construction monitoring form.** Ideally, the field engineer should take photos with the date and put them into the monitoring form.

Construction monitoring form in Appendix 10

Program participant identification card/ inspection points in Appendix 3

Adequate technical staff and social team staff is required to monitor and inspect effectively.

Example: Dafur, 2011

Sub-standard quality construction in a school made from stabilized earth blocks in Dafur, 2011
Photo Credit: CRS

TASK 4: SET UP DOCUMENT RECORDING PROCEDURE

This includes recording matrix and filing system. All documents relevant to the project should be recorded to reduce risk and confusion, especially in multiple sites and various revisions. This facilitates the retrieval and consolidation of information from regular progress reports for reporting to project management and donors.

Documents that should be included:

- Design plans and specifications
- Site inspections, surveys, soil and water testing results
- Land titles or other land ownership/ occupancy rights documents
- Building permits and certifications, other government approvals
- MOUs/agreements and contracts, including contract variations or amendments
- Progress report, quality control inspection reports
- Budget expenditure/liquidation tracking documents, progress billing/payments to contractors, invoices
- Relevant incoming and outgoing correspondence

Filing system includes:

- Labeling and indexing
- Filing by date of hardcopies
- Filing of all relevant soft copies of documents listed above
- Filing of superseded/revised documents

SUMMARY OF OUTCOMES

Outcome 1: Project schedule set up

Outcome 2: Progress/cost reporting/tracking procedures set up and agreed upon

Outcome 3: Quality control set up and agreed upon with program participants

Outcome 4: Filing system set up

B.13 COMPLETION AND HAND OVER

This includes completing the construction works and facilitating the safe occupation of the structure by the program participants.

SUMMARY OF TASKS

Task 1: Conduct final inspection

Task 2: Re-verify the original target program participant group

Task 3: Hand over certificates

TASK 1: CONDUCT FINAL INSPECTION

Once the construction works have been completed a final inspection of the structure is necessary to make sure that it is built according to the intended design and quality specified, and to verify that it is safe for the program participants to occupy. Ideally, any construction defects/mistakes should have been found during a previous inspection, and it is important to verify that all previous mistakes have been fixed.

If required a "mistake list" can be made to record all the outstanding mistakes that require attention.

The final inspection should be documented in a final inspection report (including the "mistake list" and accepted by the program participants).

TASK 2: RE-VERIFY THE ORIGINAL TARGET PROGRAM PARTICIPANT GROUP

It is not uncommon for program participant conditions to have changed during the construction period (i.e., moving away, change of family circumstances, etc.). Consequently, it is important to re-verify that the original target program participants are the occupants of the completed shelter. Ideally, the regular community meetings and close supervision procedures should have noted these changes and facilitated proper re-allocation of the shelter.

TASK 3: HAND OVER CERTIFICATES

Once shelters are complete, it is necessary to officially hand over shelters to program participants, inform local officials and report this accomplishment to cluster leaders. A simple form can be used, indicating that these materials (in the case where they don't have land ownership) belong to the program participants. Ensure clauses such as "All future repairs are the responsibility of the owners" are included in hand over certificates.

Attention and advocacy should be given to shared ownership between husband and wife and sole female ownership.

Example: Philippines, 2012

Program participants standing in front of their completed transitional shelter in Cagayan de Oro, Philippines, 2012
Photo Credit: Seki Hirano for CRS

SUMMARY OF OUTCOMES

Outcome 1: Final inspection completed and accepted

Outcome 2: Ownership certificate handed over

B.14 AFTER COMPLETION

The time after completion is often overlooked in a construction project, as the actual construction activities have been completed and the end-users are occupying the structure. Especially in areas that are prone to reoccurring hazard events, such as flooding, earthquake, fire, high winds, etc., it is important that the inhabitants know how to take care of their structure to remain safe.

SUMMARY OF TASKS

Task 1: Introduce maintenance activities

Task 2: Introduce disaster risk reduction procedures

Task 3: Evaluation and program participant satisfaction

TASK 1: INTRODUCE MAINTENANCE ACTIVITIES

Different construction materials require different ways to maintain them in a good condition. These should be explained to the end-user through meetings, maintenance leaflets, etc. Good maintenance has a significant impact on the safety and longevity of a structure. Maintenance procedures could include:

- Seasonal maintenance before rainy seasons, typhoon seasons, etc., such as checking for roof leaks, that drainage channels are not blocked, roof trusses are secured, roof sheeting has no missing nails, etc.
- General maintenance such as checking for termite infestation, root, corrosion

TASK 2: INTRODUCE DISASTER RISK REDUCTION PROCEDURES

Simultaneously with maintenance procedure, disaster risk reduction (DRR) must be addressed. This could include:

- Fire safety, especially for highly flammable materials such as bamboo, wood, etc.
- Evacuation meeting points, routes and procedures to be agreed upon
- Community-based risk mapping
- Setting up community evacuation drills

Refer to B.6 Technical design

Refer to hazard resistant construction, PASSA (Participatory Approach for Safe Shelter Awareness), www.sheltercentre.org/library

Giving consideration to DRR is critical during the site selection, site planning and technical design of the construction.

TASK 3: EVALUATION AND PROGRAM PARTICIPANT SATISFACTION

To be in a position to learn from past experiences and challenges, an evaluation is an important part of the overall project. In areas with extreme weather conditions, a midterm evaluation is good practice. An essential part of the evaluation is to include the program participants in the process through interviews, questionnaires or other feedback systems to evaluate the performance of the construction project.

SUMMARY OF OUTCOMES

Outcome 1: Maintenance procedures agreed upon and established

Outcome 2: Disaster risk reduction training set up

Outcome 3: Evaluation conducted

B.15 IDENTIFY APPROPRIATE STAFF

An important lesson-learned from CRS construction activities is that project success depends on the qualifications, skills and experience of the technical and management resources engaged to manage the project. Careful but expeditious vetting of potential candidates is critical in creating highly performing teams.

Within the engineering and construction industry, a four/six year engineering degree normally represents the foundation on which individuals will build different levels of experience and skills[7], especially in post-disaster situations. Beyond that, the years of experience and breadth of exposure to different construction designs of varying complexity develops the needed qualifications to manage different types of construction projects.

Senior staff will be required to have a balance of the technical skills and social skills to lead a program, and the ability to think creatively about resolving conflict and technical issues without losing sight of the overall project goals: rebuilding livelihoods and reducing vulnerability.

B.15.1 DETERMINING THE ORGANIZATIONAL STRUCTURE

Staff recruitment should follow Country Program protocols; however, there are a number of internal and external risks that CRS teams should consider when staffing up a construction program. Staffing plans and management structure should seek to mitigate these risks.

> Owner-driven and contractor-built projects will require different organizational structures.
>
> The diagram under B.15.2 gives a generic sample for owner-driven construction, which can be adapted according to the project scale, complexity and context.

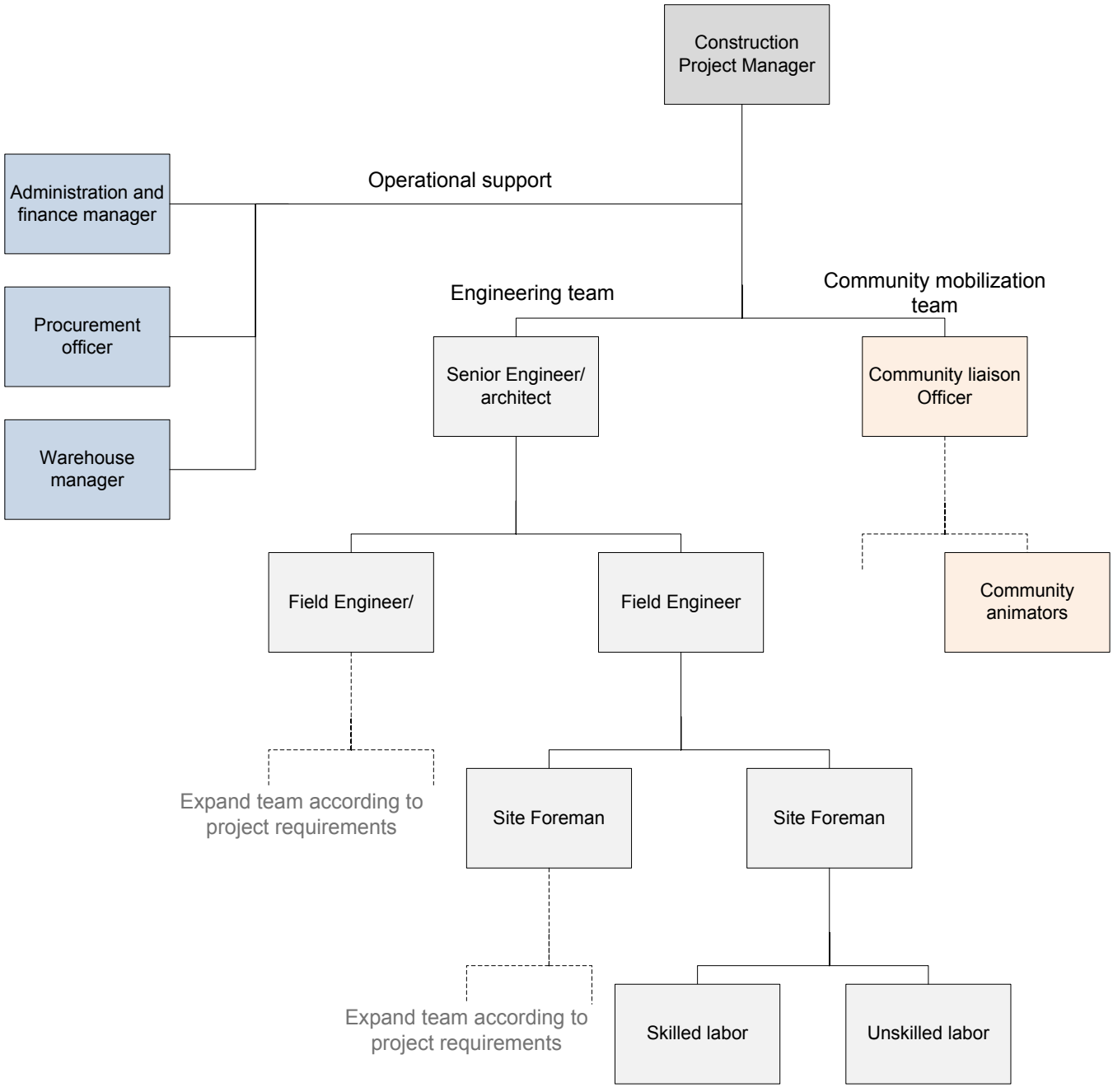
For sample job descriptions, refer to digital versions available on share point.

B.15.2 ORGANIZATIONAL STRUCTURE FOR OWNER DRIVEN PROJECT

The structure below offers an example for owner-driven projects where CRS is responsible for ensuring the project is carried out by the program participants themselves. There are three main functions to this structure, which is lead by the **construction project manager.** There is an **engineering team** (light grey color), **community mobilization team** (light pink color) and **operational support team** (dark grey color). all fulfill important roles in the project.

7 Engineers and architects generally specialize in design, construction management or contract management. Engineers often focus on one or more disciplines such as structural engineering, water and wastewater, geotechnical engineering, architectural design, among others.

DIAGRAM OF ORGANIZATIONAL STRUCTURE FOR OWNER DRIVEN PROJECT



RESPONSIBILITIES

Construction project manager
The project manager is responsible for the overall effective implementation of the construction project. This includes: budget control and program control (cost and time), purchase requests (materials, equipment, etc.), overall quality control (site audits), change control (changes to the design/ agreements while constructing), effective staff communications (technical, community mobilization and support staff), health and safety issues and document control.

Engineering staff:

Senior engineer
The senior engineer is responsible for supervising the field engineers, managing the engineering team and developing the design, specifications, Bill of Quantities (BoQ) and Monitoring Plan, and works with procurement team to source materials, equipment, etc. The senior engineer is responsible for the appropriate design decisions that have developed through the design process with the program participants/community mobilization team/ procurement team and senior management. The senior engineer oversees development of construction manuals/accountability processes and encourages good working relationship between technical and community mobilization staff.

The scope of work of this position will depend on the amount and complexity of engineering/ design required (i.e., this could be an architect or engineer with experience in (re)-construction in post-disaster, best with an owner-driven construction project).

Field engineer
Closely monitors day-to-day construction activities; reports deviations from design and/ or work plan; identifies corrective action; gives both verbal and written instructions to the site foreman; provides daily/weekly progress reporting; monitors quality and progress of construction. The field engineer gives construction training and safety instruction. This position is the day-to-day liaison with the site foreman, program participants and laborers.

Site foreman
This position works closely with the field engineer, organizing skilled and unskilled labor, and needs to be on site with the workforce. Site foreman is responsible for reporting on site activities and keeping records (photos/ drawings/reports).

Program support staff

If CRS is managing the construction activity directly, contract management, material and equipment supplies, logistics and warehousing are the responsibility of the CRS program support department. Adequate staffing and administrative systems are required to ensure accountability and control over material and equipment assets. Program support staff needs to communicate frequently and closely with the technical and community mobilization teams.

Procurement officer
The procurement officer is responsible for preparation of tender actions (tender packages for materials, suppliers, tender evaluations, etc.), purchase orders, and monitoring material and equipment cost, delivery and quality.

Administration and finance manager
The administration and finance manager is responsible for preparing contracts, bid selections, labor payments, contract and payment tracking.

Warehouse manager
The warehouse manager is responsible warehousing/logistics of materials and equipment that support construction activities.

Community liaison staff

Community liaison officer

The community liaison officer is responsible for managing relations with recipient communities, ensuring accurate and timely information sharing, and ensuring community expectations are aligned with project objectives. This position oversees complaints and feedback processes, helps resolve conflict with the communities and works closely with the technical team.

Community animators

Community animators are responsible for maintaining communications with the community and ensuring information is channeled to the correct place. They are important contact points for feedback from the program participants and ensure that people are targeted with the appropriate intervention. These staff can assist in identifying vulnerable pockets of the community and help tailor specific aspects of the program for those with spectial needs (elderly, disabled, women, single headed HHs, PLWHA, etc.).

BOOK C
How to manage a contractor-built construction project

In a contractor-built construction project, CRS/NGO engages a building contractor to carry out all construction works. The contractor is responsible for managing the day-to-day on-site construction activities, material sourcing and site supervision.

CRS engineers/architects will need to undertake the following activities:

1. Produce the technical documents required by the contractor to build what is needed.
2. Maintain a managerial and monitoring role to supervise the contractor's activity.
3. Maintain a good working relationship between the contractor and the program participants/affected communities and ensure protocols are respected (e.g., any agreement to hire local labor or use local materials).

C.1 STAFF COMPOSITION

These activities require adequate qualified staff with different skill sets:

- **Engineers/architects:** Producing the technical information, managing construction contracts and monitoring the contractor's activity.
- **Social staff:** Community mobilizers explain the program, resolve disputes and keep close communication between communities and contractor.
- **Support team:** This is often the most overlooked team, but these team members (logistics, procurement, finance) are critical players to the success of the team.

These are often two distinct skill sets comprised of different staff but these teams must work together to communicate challenges and identify solutions to both technical and social issues. A successful construction (shelter) program will successfully marry technical and social issues.

Refer to chapter C.15 for identifying appropriate staff and organizational structure

Book C cover photo: CRS built 45 shop houses in Panggong, National Road, Meulaboh, NAD, Indonesia. two-storey row building, ground floor will serve as store/shops, other use it as canteen/eatery and the second floor is a 2 bedrooms residential area. The total floor area is 96 m2 (48m2 per floor). Photo Credit: Ariel Sadural for CRS

Example 1: Permanent housing project in Aceh, Indonesia, in the village of Cot Seumerang in Meulaboh, 2006

After the tsunami in 2004, CRS developed a standard 45m2 permanent house for Aceh, Indonesia. In total CRS constructed nearly 5,000 of these permanent shelters. The design was slightly adapted depending on the specific location. In some instances, the design was elevated with stairs and handrail to be more flood resilient.

In the village of Cot Seumerang in Meulaboh, CRS provided 98 of these permanent houses on 120m2 lots. The house design included two bedrooms, a living room, dining room, one toilet and bathroom, and a kitchen.

The house structure is a concrete frame construction with concrete foundation, columns and roof beam. The external walls are made of masonry block wall with steel bars, and the internal partitions are made of light gauge steel (LGS) vertical and horizontal studs with cement board over. The roof is an LGS truss structure with roof sheeting. Internal ceilings are gypsum board on LGS steel support.

The land for the permanent housing project was donated by the Government of Indonesia (GOI). CRS undertook the design for the housing and for civil works, such as roads/drainage and community Infrastructure (Mushola, community hall). Once the construction was completed to 95%, the GOI started the construction of service connections such as electrical post, etc. The GOI was responsible for connecting the power line and issuing individual land title certificate to each CRS program participant/house owner.

Completed permanent houses in the village of Cot Seumerang in Meulaboh at hand over
Photo Credit: Ariel Sadural for CRS

The construction project was procured through a contractor-built route. The design and planning was done by CRS internal engineering staff, as was the quality control. A CRS internal quality control technical team was responsible to oversee the contractor's activities. One full-time field engineer and one site foreman were employed for this project. They were supervised directly by the project engineer (PE), and the PE reported directly to the construction manager.

Quality control procedures were put in place with specific inspection forms for each construction stage. The site foremen and field engineer conducted the daily on-site quality control. In addition, an independent quality assurance engineer was making site visits to monitor compliance with the design and material specification. He also provided a final "punch list" – a list of defective items that needed repair before the house was handed over from the contractor to the new owner.

As part of the quality control procedure and contractual obligations of the contractors, a one-year defects liability period was included in the construction contract. Within this defects liability period, CRS community liaison officers were in direct contact with the community to report any defects or repairs that were needed on the new houses. After one year, the contractor and the QA engineers visited the site to determine any defective works. The contractor was obligated to repair all defects before CRS concluded the contractor's responsibilities.

The quality control procedures put into place were successful and there have been no defect issues with the CRS projects in Aceh. A newly constructed three-story hospital building that was struck by a 7 magnitude earthquake after completion withstood the earthquake without structural defects. The permanent houses are in good condition after the one-year inspection, and individual house owners have started to make personal improvements.

Permanent housing after one year of hand-over
Photo Credit: Ariel Sadural for CRS

Example 2: Permanent housing project in the mountain village of Nias, Aceh, Indonesia

As part of the re-construction efforts after the tsunami in 2004, the CRS standard 45 sqm houses were also constructed in the mountain village of Nias to support the local partner, Caritas Sibolga. During a period of one year and four months, 103 permanent houses were built by a single, reliable contractor. Within all the construction projects in Aceh, this was the most challenging, due to its inaccessibility. The main challenge was to manually deliver all construction materials by foot to the mountain village located at 640 m altitude, along 2-km-long foot track.

The construction materials were re-packed into 20kgs-40kgs packages for the workers to carry and deliver to the mountain village from the warehouse at the bottom of the mountain. The materials included cement, LGS, plywood, metal roof sheet, cement board, metal wall siding, paints, plumbing pipes and accessories, gutter and tuff tank water storage for rain water catchment. Gravel and sand was supplied by each house owner (program participant). Many of the workers were CRS program participants and were paid per kg of material that they carried and delivered to each individual area.

To facilitate this delivery process, a warehouse controller was stationed at the bottom warehouse and another material controller was stationed at the construction site. A detailed material list was issued, and once the worker arrived at the final destination, the material controller checked and signed the delivery list acknowledging receipt of the materials. On the following day, the worker brought down the signed shipping list and to the finance staff at the warehouse to claim payment. Upon receipt of payment, the worker again collected materials and delivered them to the top of the mountains. This process continued until delivery all the materials for one house was completed.

To facilitate the successful completion of this challenging work, 11 CRS staff were assigned to the project, including project engineer, field engineer, quality control engineer, material controller, finance staff and community liason officers. Training of all staff was conducted prior to the start of the project, and quarterly inspections were carried out by a CRS construction manager.

To train the contractor, CRS built one prototype at the contractor's compound using the contractor's workers. This prototype served to determine the actual materials needed, train workers and show to our partners (Caritas Sibolga) and program participants the actual material components of the proposed permanent housing.

Construction in progress of 45sqm permanent housing in mountain village of Nias
Photo Credit: Ariel Sadural for CRS

45sqm permanent housing in mountain village of Nias
Photo Credit: Ariel Sadural for CRS

DIAGRAM 3: CONTRACTOR-BUILT WORK STAGE DIAGRAM

Book A

THINGS TO CONSIDER WHEN (RE)-CONSTRUCTING IN POST DISASTER SITUATIONS

Book C

CONTRACTOR-BUILT

SUMMARY OF TASKS

C.3 TECHNICAL DESIGN DEVELOPMENT

Task 1: Community-led site planning and selection

Task 2: Initial community mobilization – Conduct focus group discussions

Task 3: Develop technical drawings and material specification

Task 4: Obtain permission to build

Task 5: Develop cost estimate

C.4 PRODUCTION INFORMATION, DETAILS AND BOQ

Task 1: Produce final set of technical design drawings and specifications

Task 2: Produce Bill of Quantities (BoQ)/Unit Cost Analysis (UCA)

Task 3: Review technical design – Local building codes

Task 4: Develop monitoring plan

C.6 TENDER SELECTION

Task 1: Compile a tender package

Task 2: Conduct a "pre-qualification process"

Task 3: Conduct a tendering selection process

C.7 CONTRACT AWARD

Task 1: Prepare the construction contract

Task 2: Award contract to selected contractor

C.9 CONSTRUCTION SUPERVISION

Task 1: Arrange "kick off" meeting with contractor

Task 2: Define site supervision procedure

Task 3: Establish site safety and security measures

C.10 PROJECT CONTROLS – TIME, COST AND QUALITY

Task 1: Set up a project schedule (progress tracking)

Task 2: Set up cost control (budget tracking)

Task 3: Set up quality control (assures construction quality)

Task 4: Set up document control (records management)

C.11 PAYMENT PROCEDURES

Task 1: Verify progress/ making progress payments

C.12 CHANGE MANAGEMENT

Task 1: Set up change management processes

C.13 PRACTICAL COMPLETION AND HAND OVER

Task 1: List outstanding defects/work – "punch list"

Task 2: Issue practical completion certificate

Task 3: Manage warranty period

Task 4: Hand over to end-users

Task 5: Issue final completion certificate

C.14 AFTER COMPLETION

Task 1: Introduce maintenance activities

Task 2: Introduce disaster risk reduction procedures

Task 3: Evaluation and program participant satisfaction

SUMMARY OF OUTPUTS

C.3 TECHNICAL DESIGN DEVELOPMENT

Outcome 1: Propose design solutions specific to post-disaster context

Outcome 2: Site layout and design agreed upon with stakeholder community

Outcome 3: (Written) permission/agreement obtained to construct project by local government

Outcome 4: Cost estimate and technical design/specification developed

C. 4 PRODUCTION INFORMATION, DETAILS AND BOQ

Outcome 1: Completed engineering package for tender action

C.6 TENDER SELECTION

Outcome 1: Tender package completed

Outcome 2: Short-list of potential contractor drawn up

Outcome 3: Tender selection process completed

C.7 CONTRACT AWARD

Outcome 1: Construction contract agreed upon, awarded and signed by all parties

Outcome 2: Contactor is in a position to start site preparation work

C.9 CONSTRUCTION SUPERVISION

Outcome 1: Site supervision procedures set up

Outcome 2: Good communication and feedback mechanism set up

Outcome 3: Site safety measures implemented and monitored

C.10 PROJECT CONTROLS – TIME, COST AND QUALITY

Outcome 1: Project schedule set up and included in contract agreements

Outcome 2: Progress/cost reporting/ tracking procedures set up and agreed upon

Outcome 3: Construction quality procedure set up and agreed upon with contractor

Outcome 4: Filing system set up

C.11 PAYMENT PROCEDURES

Outcome 1: Payment procedure set up

C.12 CHANGE MANAGEMENT

Outcome 1: Change procedures are clearly defined in contract and agreed upon

C.13 PRACTICAL COMPLETION AND HAND OVER

Outcome 1: Defects/outstanding work list set up

Outcome 2: Practical completion certificate issued

Outcome 3: Warranty period completed

Outcome 4: Ownership certificate handed over

Outcome 5: Final completion certificate issued

C.14 AFTER COMPLETION

Outcome 1: Maintenance procedures agreed upon and established

Outcome 2: Disaster risk reduction training set up

Outcome 3: Evaluation conducted

C.2 WORK STAGE: FRONT END ENGINEERING & DESIGN (FEED)

The **Front End Engineering & Design (FEED) work stage** cannot begin until 1) the scope, size and goals of the construction project have been clearly defined with the inputs from the feasibility study/assessments (refer to book A.3 for assessments), and 2) an agreement or Memorandum of Understanding (MOU) has been made among the stakeholders about the objectives and scope of the construction project.

Note: By this stage, an MOU should have been signed between involved stakeholders (program participants, affected communities, local government) to clearly define their roles and responsibilities. Also at this stage, a project team is set up including technical, social and support staff.

"Who to target" program participant selection criteria: As explained in the introduction, this document does not include program participant selection processes/criteria. However, clear, participatory and transparent program participant selection is absolutely essential and should have been conducted during the feasibility stage or even prior to that. Past experiences have shown that absence of a clear program participant selection process can lead to serious conflicts between program participants and communities. This process should be as participatory as possible. PRA tools like social mapping could be used to see that vulnerable HHs are given priority.

Refer to Introduction

Front End Engineering & Design (FEED) is an iterative process intended to generate comprehensive engineering documentation that defines the technical requirements to build the buildings/shelters, etc.

The main output from the **FEED** process is the **"engineering package"** (refer to C.4 for detail) which provides clear and concise information about the entirety of the construction work.

It is important to ensure adequately qualified engineers/architects and support staff are employed to accomplish the technical design work according to the complexity of the project scope of work.

It is possible to outsource the work required for the FEED to a consulting architects/engineering firm. However, outsourcing still requires technically skilled staff and project management within CRS to supervise the consultant.

Includes:

Sub-stage: Technical design development refer to C.3

Sub-stage: Production information, details and BoQ refer to C.4

C.3 TECHNICAL DESIGN DEVELOPMENT

The technical design process requires several cycles of development before an appropriate, context-specific solution can be established.

The understanding and knowledge gained from the feasibility stage (refer to book A.3) needs to be developed into technical information. The aim is to design **simple, safe and achievable structures.**

Also refer to Book A.4 – Quality, quantity, cost and timescale

SUMMARY OF TASKS

Task 1: Community-led site planning and selection

Task 2: Initial community mobilization – Conduct focus group discussions

Task 3: Develop technical drawings and material specification

Task 4: Obtain permission to build

Task 5: Develop cost estimate

TASK 1: COMMUNITY-LED SITE PLANNING AND SELECTION

Planning of the exact location of the structures on the site is very important. Where possible, the program participants should lead this process with support from CRS/partner technical and social staff. In many cases, the local authorities need to be consulted on site planning/selection issues. Key items to keep in mind when selecting a shelter location are:

- Geo-hazard vulnerability (Is this new site prone to land-slides, flooding, etc.?)
- Does the new site have proper drainage (storm runoff, grey water, flooding).
- Site leveling or clearance of debris required (destroyed structures) .
- WASH considerations: Were WASH facilities destroyed/damaged during the disaster? If yes, to what extent can we rebuild or integrate our shelter program around these WASH services?
- Existing vegetation, prevailing wind directions and sun path.
- Current use of site by the community.
- Accessibility (roads, path, electricity, water, etc).
- Is the site near conflict or high risk borders?
- Will occupying the site create tension with the host community?

It is essential to develop the site layout, plot sizes other considerations mentioned in close partnership with the program participants and surrounding communities to use their local knowledge, get program participants' buy-in and mitigate future grievances and disagreements.

Example: Conflict between the host community and the program participants, due to possible difference in housing standards.

Example: Orissa and West Bengal, India, 2008

CRS was in discussion with the local government from the beginning of the project. Approval was sought from the authorities for site selection, planning and the design. In some cases, a model shelter was constructed in front of the government offices to encourage local government support and buy-in. As a result of strategically involving the government, the more vulnerable households were included into the government housing scheme.

In other cases, the local government gave financial (part contributions) support or land was identification for permanent shelter construction.

Plinth of flood-resistant shelter is being reinforced with chicken wire and concrete
Photo Credit: Kirtimayi Mishra for CRS

TASK 2: INITIAL COMMUNITY MOBILIZATION – CONDUCT FOCUS GROUP DISCUSSIONS

Engaging with the community and the program participants from the beginning is essential. Initial community mobilization should introduce the project to the community, collect feedback, and discuss and agree upon roles and responsibilities.

Template of household agreement in Appendix 1

Template of household agreement, decline of participation in Appendix 2

Conducting focus group discussions with affected community members is a useful tool to gain important information on: what their previous structures looked like, material used to build them, and their cultural preferences. Find out priorities in how they live. Understand aspects such as women/men, different generations sleeping in different areas, household size and family structures, WASH facilities indoor or outdoor, cooking methods, climatic conditions, religious requirements, etc.

- Identify and talk to households that have not rebuilt temporary houses and find out why.
- Identify and talk to household who have rebuilt and find out how they started and why.
- Identify availability of skilled/unskilled labor (market survey should establish labor availability).
- Identify community organizations/NGOs familiar with the area and communities.
- Identify whether there is confidence in the local construction practices after a disaster. Are there changes required to make the new construction more hazard resistant? How can it be improved?

TASK 3: DEVELOP TECHNICAL DRAWINGS AND MATERIAL SPECIFICATION

The design development of the structures requires input and buy-in from the program participants who are going to inhabit the structures. **Engineers/architects must not design the structures in isolation, but with the specific post-disaster context in mind.** Technical drawings and specification need to be developed with consideration to other sectors, such as WASH, protection and livelihoods.

The shelter standards of host communities and before the disaster are important considerations, as well as contractor capacity, timeframe and material availability and cost.

What are technical design documents?

Design parameters

- List of design parameters (size, structural loading and resistance), list of drawings and assumptions

Site plans and infrastructure plans

- Civil drawings (roads, drainage, bridges, WASH, etc.)
- Site plan (showing site boundaries, location of structure on the site in plan, access, north direction, any water/drainage/electrical supplies, topographical information, vegetation, neighboring structures, etc.)

Architectural and structural package

- Architectural/structural drawings (plans, elevations, sections)
- Electrical, mechanical drawings (lighting circuits, ducting, ventilation)
- Material specification /equipment schedules
- Detail drawings (showing important junctions, i.e., foundations, wall/roof junction)
- Design Bill of Quantities (BoQ)
- Structural calculations

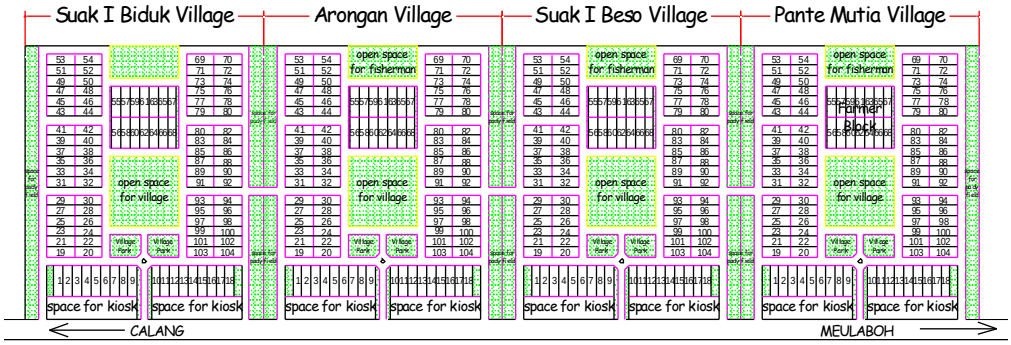
What is part of the specifications?

Specifications describe the **minimal** construction requirement to be achieved and describe the approved design in words and construction sequence. It must reflect the **design quality, material quality/characteristics** (i.e., concrete mixing strength, alignments tolerances) and the construction methodology (i.e., prefabrication versus on-site construction).

For example contact CRS Shelter advisor

Example 4

Housing Type 45m²

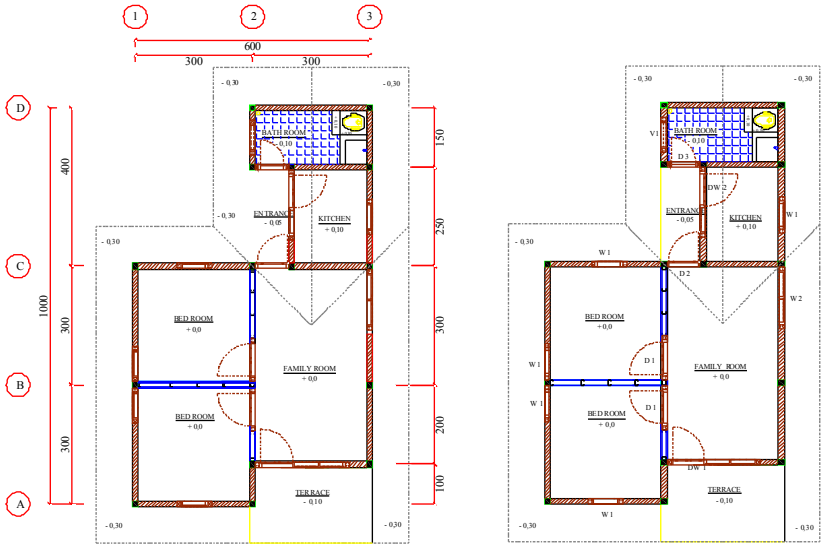


SEUNEUBOK TENGOH RELOCATION AREA
(392 HOUSEHOLDS)

MASTER PLAN

Technical drawing of site layout for Seuneubok Tengoh relocation area, Aceh, 2004
Photo Credit: CRS

Housing Type 45m²



FLOOR PLAN

Technical drawing of ground plan for 45 sqm permanent house, Aceh, 2004
Photo Credit: CRS

TASK 4: OBTAIN PERMISSION TO BUILD

To the extent possible (especially for permanent construction), written permission should be obtained from government, local authorities and communities (program participants/host communities) to build on the proposed site to the scope intended. In some cases, this formal process is not always possible, because:

- Not all local contexts have formalized building permission procedures and timeframes.
- In many cases, after a disaster the local administration is understaffed or government systems collapse are not functioning, etc.

Therefore it is important that CRS assists program participants with needed documentations of the project for submission according to the local laws. This could include: Site plans/survey plans with property boundaries/plot numbers and technical drawings of the construction (plans/sections/technical specification).

T-shelter construction: In the case of transitional shelters/buildings, permission may take more informal format as official processes are too lengthy and/or connected to formal landownership. In the past, this has been a strategic reason why CRS to opted for T-shelter construction. Furthermore, it is important to consider in the design the possibility to demount and rebuild the structures while leaving the building structurally safe.

Land use agreement for transitional settlement

Seek written agreement from the land owners in the form of a signed Memorandum of Understanding. However, in some instances verbal statements can be the most one can anticipate. If this is the case, be sure to record such verbal agreements in the form of meeting minutes.

Important clauses to be included in agreements:

Project Documents. The land of the Land Owner shall be used exclusively for the purpose of building transitional shelters; inclusive of toilets, bathing cubicles, hand washing stations, clothes washing area, and cooking area; and according to the goal and objectives as set forth in the attached project design.

Period of Agreement. The project shall be implemented by CRS and the Church on behalf of the Archdiocese of Cagayan de Oro. The Land will be used for a period of six months, renewable in six month increments.

Safety. It is the responsibility of the Church to comply with all applicable laws, ordinances, rules, regulations and orders of any public authority having jurisdiction over the safety of persons or property or to protect them from damage, injury or loss.

Injury or Damage. It is understood that the personnel/workmen hired, engaged or contracted in connection with this project including employees of CRS or its donors shall not hold the Land Owner responsible for personal injury or damage caused or sustained by said personnel/ workmen.

Sale, Transfer and Mortgage. The Land Owner agrees that the subject Land shall not be sold, transferred or mortgaged to parties outside of this agreement until such time as permanent housing is available for program participants residing in transitional shelters built on the Land.

Site Preparation. All site preparation, including construction of access road and necessary culverts and brush clearing shall be the responsibility of CRS. Large trees will not be removed from the land during site preparation.

Utility Connection. Provision of metered water and electrical connection will be the sole responsibility of CRS.

Drainage and WASH Facilities. Proper drainage and WASH facilities are the sole responsibility of CRS. Drainage will be designed and tested before construction to ensure suitable run-off of water. All latrines constructed will have properly sealed septic tanks.

Also refer to land ownership issues task 2 under point A.3

Land use agreement template (digital copy) available on share point

TASK 5: DEVELOP COST ESTIMATE

The initial budget (refer to A.4) needs to be developed and updated to reflect scale, design, material selection and specification (unit prices and quantities/Bill of Quantities [BoQ]) and should be calculated with contingencies between 5-15% to account for operating uncertainties. In general, the contingency should increase with increased uncertainty.

Refer to B.6 for BoQ example

What is a Bill of Quantities (BoQ)?

The final BoQ is based on the final approved design drawings and specifications. The BoQ lists out all the materials and quantities required to build the structure as drawn on the technical drawings. It determines unit costs. The BoQ is needed to calculate total project costs and monitor the budget.

What is a Unit Cost Analysis (UCA)?

UCA is part of the BoQ. It itemizes material cost, labor cost and equipment cost

These estimated costs can be derived in several ways:

1. Use of a standard construction cost index (i.e., R.S Means Construction Cost Index, etc.) generally provides a lower accuracy estimate and is not always available.
2. Unit costs based on an up-to-date actual local area market price survey are more accurate, but will require more time and staff resources.

The total estimated construction cost = quantities x unit costs (materials, labor and equipment). In addition to the construction cost, make allowance for staffing and overheads.

SUMMARY OF OUTCOMES

Outcome 1: Propose design solutions specific to post-disaster context

Outcome 2: Site layout and design agreed upon with stakeholder community

Outcome 3: (Written) permission/agreement obtained to construct project by local government

Outcome 4: Cost estimate and technical design/ specification developed

C.4 PRODUCTION INFORMATION, DETAILS AND BOQ

SUMMARY OF TASKS

Task 1: Produce final set of technical design drawings and specifications

Task 2: Produce Bill of Quantities (BoQ)/Unit Cost Analysis (UCA)

Task 3: Review technical design – Local building codes

Task 4: Develop monitoring plan

TASK 1: PRODUCE FINAL SET OF TECHNICAL DESIGN DRAWINGS AND SPECIFICATIONS

Defines what is going to be *built*. Produce the final set of technical drawings, structural requirements and material specifications (define the material quality). This set of technical drawings and the BoQ/UCA constitutes the **engineering package** that is required for selecting a contractor.

What is part of the engineering package?

It collates all information relevant to the project and is the core documentation for overall construction project management and budget and timeframe control. The engineering package is essential to proceed to the next work stages. It includes:

- Technical assessment, field investigations, site planning and requirements
- Scopes of work, technical design drawings, material specifications, BoQ
- Construction modality – owner-driven or contractor-built or a combination of the two
- Monitoring plan

Note: The construction project manager/ engineering team should verify the accuracy and completeness of the engineering package, as its accuracy and completeness contribute to their ability to manage the construction works effectively.

TASK 2: PRODUCE BILL OF QUANTITIES (BOQ)[8]/UNIT COST ANALYSIS (UCA)

BoQ: Develop a list of all materials, material quantities, equipment and labor required to build the structure.

UCA: Determine the unit cost for construction materials, equipment and labor.

Refer to B.6 for BoQ example

TASK 3: REVIEW TECHNICAL DESIGN – LOCAL BUILDING CODES

Technical designs and specifications should be reviewed for compliance with local building codes and regulations or accepted international codes where local codes and regulations are not available or are below acceptable standards. This can include a combination of in-country local and international professional engineers, a wider review via email/internet utilizing the CRS network of construction professionals/shelter advisor, and/or a professional design review conducted by an architect and engineering consultant firm.

Transitional structures: "Build Back Better" principles must be emphasized. Structures must be designed so that if they do fail in a future disaster, they do not cause injury to the people. Evacuation procedures should be known and practised.

This is particularly important in earthquake, high wind or flooding zones, where special construction techniques and detailing are essential to build safe and hazard-resistant structures.

Reference: Uniform Building Code (UBC), www.iccsafe.org

Reference: hazard resistant construction: "Battling the storm", "Learning how to live with floods", http://www.sheltercentre.org/library/search/hazard%20resistant%20construction?filters=type:resource

Contact shelter advisor for review of technical drawings/specification

8 This UCA should be done by the CRS Procurement Officer with technical support from the engineers in order to ensure separation of duties. Once the UCA is determined, it should be kept confidential to reduce the risk of collusion in the procurement and/or contracting phases.

TASK 4: DEVELOP MONITORING PLAN

This is a **tool** that defines the procedures to be used to monitor the quality of the construction works and their **progress.** Ideally divided into the different construction stages (typically foundations, walls, roof, finishes and completion). It is developed on the basis of the technical design, material specifications and sets out the key inspection stages.

A monitoring plan is a communication tool to use with the local community/program participants/skilled laborers to agree on the inspection procedures, assist them in achieving accountability and raise awareness for safe construction. An induction meeting with the community should explain the process carefully.

SUMMARY OF OUTCOMES

Outcome 1: Completed engineering package for tender action

What is part of a monitoring plan?

It sets the basic requirements and defines inspection standards of the construction works by the engineering team/program participants and community. It is a very important tool to monitor the quality of the construction.

- **States the responsible individual** for each of the inspection activities.
- **Includes verifying documents** for each inspection activity consisting of inspection forms/construction checklist(i.e., Daily Inspection reports that monitor day-to-day activities).
- **Includes breakdown of overall construction process** into different phases such as completion of ground works (drainage/sewers), foundations/plinth, wall structure, (RCC columns/timer, etc.), roof structure (safe connection to wall structure) and finishes (internal/external).
- **Includes construction "Dos and Don'ts" poster** with pictures posted at the construction site to inform/ educate the construction workforce on good and bad practices witnessed during construction. Past experience has proven that pictures help to communicate safe construction practices.

The monitoring plan defines:

- **"Hold points"**– critical stages of the construction work where construction is stopped until inspection and quality certification is provided from the engineering team and program participants. The hold points clearly describe what requires inspection. They are particularly important where on-going construction would otherwise conceal completed works (i.e., reinforcement and pouring of foundations, columns and support beams, installation of electrical, septic tanks, etc.).
- **"Monitor"** – random checks, by direct or indirect inspection, to verify conformance with specification and quality control.

Permanent construction:

- Owner-driven permanent construction should include a "defect liability period" of 6 months with a retention withheld (5%) to repair any minor issues that arise during this period.

C.5 WORK STAGE: TENDER

In general, it is the task of the tender process to establish the most suitable contractor (best price/quality/time offer) for the construction. Consequently, a comprehensive engineering package is essential to gain a clear understanding and definition of what is being tendered to allow the bidding contractors to give realistic prices.

The tender work stages include necessary steps to:

- **Select the appropriate contractor(s)** with the necessary capacity and reliability (management, financial and construction skill) through a fair and transparent bidding process.
- **Award the contract** to the selected contractor(s) to construct the structure(s) within agreed timeframe, budget and specified quality.

CRS note:

Please refer to agency CRS procurement policy and procedures and EFOM and Baltimore Purchasing Manuals.

Includes:

Sub-stage: Tender selection refer to C.6

Sub-stage: Contract award refer to C.7

C.6 TENDER SELECTION

SUMMARY OF TASKS

Task 1: Compile a tender package

Task 2: Conduct a "pre-qualification process"

Task 3: Conduct a tendering selection process

TASK 1: COMPILE A TENDER PACKAGE

A tender package includes all relevant information and project documentation that will allow the bidders to make informed decisions on construction costs, labor requirements and work plans.

It should include and be consistently applied to all potential bidders:

- **Tender condition/procedure and schedule:** Outlining the specific conditions/procedures to follow for bid submission, submission dates and selection date
- **Engineering Package:** Technical drawings, specifications, Bill of Quantities/Unit Cost Analysis without the prices to provide a common format for contractors to submit their price quotes (developed during the FEED process). Refer to C.4 for detail
- **Project scope:** Number and location of construction sites, site preparation requirements, environmental impact requirements, access restrictions, specific donor requirements
- Any performance bond or bank guarantee (if required)

"The success of the project is ultimately linked to the contractor capacity and reliability in regards to their construction skill, financial and managerial capacity to build to a consistent and agreed quality within the timeframe and cost."

TASK 2: CONDUCT A "PRE-QUALIFICATION PROCESS"

This review provides insight into the availability and experience of local contractors. It draws up a short-list of suitable contractors that have the capacity to participate in a formal tendering process. It is a continuation of the market surveys conducted during the feasibility stage and aims to safeguard against unrealistic tender returns, as well as assist in mitigating problems during later stages in the project by filtering out contractors that are not suitable or reliable.

The pre-qualification assessment process should include the following steps:

A. Tender announcement:
It is a good practice to use local media resources (e.g., radio, TV, newspapers) to notify local contractors of the planned construction work and where/when to participate in the tendering, or if feasible, to conduct an open information meeting for potential contractors to promote openness and transparency

B. Pre-qualification checklist:
Interested contractors are required to submit the pre-qualification checklist to be invited to the formal tender process.

Pre- qualification checklist in Appendix 12

C. Review submission and draw up short-list:
The submissions are reviewed in regards to completeness, capacity, experience and reliability of the interested contractors. A short-list is drawn up, and selected contractors are invited to participate in the formal tender process.

TASK 3: CONDUCT A TENDERING SELECTION PROCESS

There are two tender process options:

1. Open tender process – one in which any company can bid.
2. Invitational/closed tender process – one in which only certain companies are invited to bid.

In either of these cases, CRS might choose to have a public bid opening in which those who bid are invited to attend a meeting at which the bids will be opened and recorded.

The process includes the following steps:

A. The short-listed contractors are provided with the complete tender package (Task 1). This is best done in an **information meeting** with the technical staff to clarify questions.

The contractors need to be made aware of the tendering schedule and submission requirements (the completed tender package), including clarification period, submission date, evaluation period and tender announcement date to promote openness and emphasize that fair competition will be guaranteed between bidders.

B. Recommended tendering schedule:
The timeframe must be clear to all contractors:

- 7 days to bidders to answer tender package.
- 7 days to procurement/engineering staff to evaluate received bids and obtain required clarifications.
- 7 days for final contract negotiation with the selected contractor.
- 7 days to finalize contract and all necessary reviews and authorization.

C. Tender evaluation/selection:
It is advisable to form a Bid Selection Committee including technical and procurement staff.

The **submitted tender returns** need to be analyzed and tabled **(comparison worksheet)** in regard to:

- **Technical evaluation will appraise:** The commitment to safety and quality, the contract schedule proposed by the company, the resources (equipment and labor), the proposed management organization
- **Contractual and legal evaluation will appraise:** Contractor registration, validity of bonds, track record, financial capacity
- **Financial evaluation:** Unit costs for each line item from the Bill of Quantities to be entered into the bid comparison worksheet
- Only complete tender returns should be considered.

Note: Experience shows that calculation mistakes are common even in automated Excel spreadsheet. Reconfirming calculations is important.

In general, the contractor offering the best price/quality /reliability ratio should be selection. It is important to keep the comparison worksheet on file for reasons of transparency and fair process.

CRS internal note:

Tender selection process must comply with CRS Purchasing Policy.

SUMMARY OF OUTCOMES

Outcome 1: Tender package completed

Outcome 2: Short-list of potential contractors drawn up

Outcome 3: Tender selection process completed

C.7 CONTRACT AWARD

It is recommended to use an approved construction contract template to draw up the **construction contract.** This construction contract is the official agreement between CRS and the contractor. All details concerning the project must be contained within the document. Any disputes will be referred to this document in the first instance. It is imperative that a construction contract is signed as it has clauses specific to complexities associated to the construction industry. The contract must be completed and signed between both parties. The contract documents must be completed with the contractor's returned tender information and other negotiated term. Once a contract is signed, the contractor is obligated to initiate the construction activities within the contract-mandated period of time. During construction start-up, the contractor mobilizes resources by securing the site and bringing labor, materials and equipment to the designated worksite. The contractor must make the construction site safe (fenced off, supervised). It is at this point that the working relationship with the contractor begins.

SUMMARY OF TASKS

Task 1: Prepare the construction contract

Task 2: Award contract to selected contractor

TASK 1: PREPARE THE CONSTRUCTION CONTRACT

It is advisable to use standard CRS construction contract templates in bi-lingual format. The contract templates should be reviewed by local legal counsel within the host country to assess the cultural and legal appropriateness and adapted as needed.

For contract templates/requirements and advice contact shelter advisor

Note: A common error during contract preparation is a failure to update information in the contract template gained during the tender negotiations.

TASK 2: AWARD CONTRACT TO SELECTED CONTRACTOR

Contract documents include the:

- Engineering package – design, specifications, BoQ and monitoring plan
- **Payment schedule –** outlining when progress payments will be made against verified work completion
- **Contractors prices** as submitted in the Unit Cost Analysis format
- **Approved project schedule** and any negotiated terms (i.e., performance bonds)
- **Change procedures,** refer to C.12

Locked tender submission box in CRS office, Nairobi, Kenya
Photo Credit: Annika Grafweg for CRS

Contracts should be clear regarding the terms and conditions for payment. In general, **contract payment schedules** should:

- **Clearly define the responsibilities and procedures** of payments. Progress payments are made after invoices have been submitted **based on progress completed.** This is monitored through signed progress spreadsheets indicating the used materials in the BoQ and co-signed by the project manager.
- **Avoid the use of pre-payments –** It is advisable to avoid advance payments to contractors. If necessary for small contractors, payment should only cover site mobilization.
- **Include details on payment retentions –** Retention is money retained for tax requirements and to a cover warranty period after

In post-disaster situations, ensure that the contractor is realistic in their time planning and has considered labor shortages or delays in the delivery of materials and equipment to site.

SUMMARY OF OUTCOMES

Outcome 1: Construction contract agreed upon, awarded and signed by all parties

Outcome 2: Contactor is in a position to start site preparation work

C.8 WORK STAGE: CONSTRUCTION CONTRACT MANAGEMENT

This stage includes all phases of the construction project from signature of construction contract with the contractor until hand-over of the completed building.

Includes:

Sub-stage: Construction supervision — refer to C.9

Sub-stage: Project controls: time/cost and quality — refer to C.10

Sub-stage: Payment procedures — refer to C.11

Sub-stage: Change management — refer to C.12

Sub-stage: Practical completion and hand-over — refer to C.13

Sub-stage: After completion — refer to C.14

C.9 CONSTRUCTION SUPERVISION

The primary activity of this work stage is to assure safety and quality of construction by monitoring the contractor's construction performance and contract management. The contractor is accountable for the day-to-day management of the on-site construction activities under the construction contract.

SUMMARY OF TASKS

Task 1: Arrange "kick off" meeting with contractor

Task 2: Define site supervision procedure

Task 3: Establish site safety and security measures

TASK 1: ARRANGE "KICK OFF" MEETING WITH CONTRACTOR

To establish a good working relationship with the contractor, an initial "kick-off" meeting should be held including the community and any other stakeholders (i.e., local government officials). It is advisable to have the construction project manager chair the meeting. The following points should be considered:

- Introductions of all stakeholders
- Roles and responsibilities including communication protocols
- The construction supervision procedures
- Site safety and security
- Review of key contract documents, including the construction design and specifications
- Format of subsequent weekly meetings

As part of the kick-off period, training and induction in the project controls procedures, weekly meetings, inspection reports and minute keeping, etc., may be required. Even though the best-qualified contractor should have been selected, it should not be assumed that all contractor staff is professional or have the management capacity to meet contract obligations.

TASK 2: DEFINE SITE SUPERVISION PROCEDURE

The tools and protocols for effective site inspection (cost, time and quality) are detailed under C.10 –Project controls.

In addition:

- **Weekly site meetings** should address any concerns from the community, construction progress updates and quality or performance issues. It is important to maintain good communications between the contractor's management team, the CRS engineering team and the community/program participants. Minutes should be recorded by the contract manager or community liaison officer.
- It is good practice to set up a **feedback mechanism** to ensure that the appropriate people are targeted; grievances or concerns can be address in a timely fashion, in form of hotline, notice board, etc. Refer to B.8
- **A resource and equipment schedule** must be provided by the contractor to the engineering/ project management team and needs to be approved before construction begins.
- **Construction materials' quality** (sourced by the contractor) need to be checked and approved by construction manager prior to any purchases.
- **Any items designed by the contractor,** such as railings or drainage culverts, must first be approved by the engineers before manufactured and installed to be structurally safe.

It is important to review materials considered by contractors to ensure that restricted materials (i.e., restricted wood, asbestos, etc.) are not used.

Mon Ikuen, Banda Aceh, Indonesia

Shortly after a contractor was awarded a contract for construction of over 100 houses in Mon Ikuen Village, the villagers blocked the contractor from starting activities. Villagers felt that the contractor should purchase materials (i.e., sand, gravel, rocks and rebar) directly from them rather than sourcing these items at a better price outside the community. The contractor was under no contractual obligation to do so. A lengthy and time consuming dispute with the villagers ultimately was resolved by using some materials from the community while still allowing the contractor to source the best prices elsewhere.

Reflections:
Weekly meetings with communities are essential to ensuring expectations are being discussed.

TASK 3: ESTABLISH SITE SAFETY AND SECURITY MEASURES

It is essential that safety measures protect the workforce and surrounding communities from harm during construction. Construction works are inherently dangerous activities. Contractor must follow proper safety procedures and protocols under their contract. If not adequately monitored and managed, safety issues can contribute negatively to quality, schedule and cost. It may also lead to injury or loss of life.

Safety measures include:

- Develop site safety training and awareness campaigns for workforce and communities
- Provide barriers to enclose the construction site, create safe access to site (i.e., from roads, etc.)
- Consider climate and weather conditions or specific hazards related to the post-disaster situation (i.e., further landslides, aftershocks, etc.)
- Protection from falling, using barriers when excavating or working at higher levels
- Protective clothing for workforce: Shoes, helmets, vests, harness

Withhold payment to contractor in cased of non-compliance to safety measures. A very complex project may require a site safety coordinator to monitor and report on site safety.

Construction materials are unsafely scattered over construction site
Photo Credit: CRS

Site safety hazard
Photo Credit: CRS

Safety is a matter of communication and is closely related to the country's culture. Finding the most appropriate communication method to explain the importance of on-site safety is an essential part of site supervision.

CRS internal note:

Catholic Relief Services are fulfilling their legal and moral obligation to maximize awareness of safety in the workplace and to minimize the potential for accidents on their projects.

SUMMARY OF OUTCOMES

Outcome 1: Site supervision procedures set up

Outcome 2: Good communication and feedback mechanism set up

Outcome 3: Site safety measures implemented and monitored

C.10 PROJECT CONTROLS – TIME, COST AND QUALITY

Project controls encompass the **monitoring and evaluation (M&E) processes** (i.e., procedures, tools and protocols) that are essential to achieve safety and quality of construction. Project controls facilitate the construction team to **track project performance** in respect to **quality, cost** (expenditures, payments to contractor) and **progress,** as well as the projects' compliance with donor requirements, agreements with local governments, communities and/or institutions associated with the construction activity.

The below listed **tools and procedures** have been developed to:

A. Constantly track **construction progress** and cost expenditures against project schedule and budgets.

B. Monitor **material inventories and costs** (coordination with procurement officer).

C. Pro-actively **identify problems** and make decisions regarding changes in project completion dates design and budget expenditures.

D. Constantly monitor the **safety and quality** of construction.

These documents and schedules should be set up to be project specific using the information in the engineering package as base information, refer to C.4

- Technical assessment, field investigations, site planning and requirements
- Scopes of work, technical design drawings, material specifications, BoQ
- Monitoring plan

In general, there are four main tasks to assist **effective construction management:**

SUMMARY OF TASKS

Task 1: Set up a project schedule (progress tracking)

Task 2: Set up cost control (budget tracking)

Task 3: Set up quality control (assures construction quality)

Task 4: Set up document control (records management)

TASK 1: SET UP A PROJECT SCHEDULE – A TIMELINE

It lists the work activities and enables project managers to monitor construction progress against time. The monitoring plan is particularly important to the **project schedule** as it sets out the most important phases of construction and key inspection points.

Regular reporting from the site inspection teams is used to update the schedule. The project schedule is a working document. It is best updated on **a weekly base** with actual field measurements and observations of the construction works completed. This procedure is important to allow the project managers to foresee problems and be in a position to take action, in most cases in regard to delays, cost increases and quality issues.

Note: It is important that the project managers take the time to review the project schedules before the start of construction to ensure they respond to the post-disaster situations, such as actual performance capabilities of the contractor, craftsmen, site conditions and climate, access, security situation and program participants' needs.

Project tracking and reporting

Weekly site inspections are recorded on the project schedule; cost is normally reported monthly by showing the current (Job to Date) cost of completed work and a current estimate of final cost at project completion (Estimate at Complete). A tracking curve diagram can be used to graphically represent the status of the project's actual progress/expenditure against planned progress/expenditure.

Example: Orissa in India, 2008

As experiences during the low-cost flood-resistant shelter project in rural villages in Orissa have shown, in a case where construction works are stopped (due to various reasons), the workers tend to leave to outside places in search of work. The non-availability of workforce and high drop-out rate could become a challenge and cause delays in the progress of construction.

Reflection:

In absence of any formal binding or contract, these trained workers leave the construction site for personal or other reasons, affecting the project progress. Further, the project loses trained/skilled workers and must invest time and resources to train another group, which also hinders progress.

It is advisable to agree on a fixed-term contract/ formal contract from the beginning between partner/CRS and the workforce.

Project schedule/project tracking templates: Templates can be developed using scheduling software such as MS Project, Primavera or MS Excel that organize information in a Gantt chart format.

Digital project schedule templates available on share point

TASK 2: SET UP PROJECT COST CONTROL

Track the progress of the project by keeping an updated weekly project cost. Add a tracking line into the Bill of Quantities as materials are used. Use regular weekly reporting from the site inspection teams to assure the BOQ remains up-to-date.

The **Bill of Quantities (BOQ)/Unit Cost Analysis (UCA)** developed in the FEED stage (refer to C.2) are the documents needed to track budget expenditures over the life of the whole project.

Unit Price Analysis

Project title: **Date:**

title of construction activity

No	Description	Unit	qty	Unit Price	TOTAL			
					MATERIALS	LABOR	EQPT.	TOTALS
A	**Material**							
B	**Labour**							
	Skilled labour	day						
	Helper	day						
C	**Equipment**							
	Misc. Tools	lot						
	Sub -Total							
	Profit & OH 15 %							
	TOTALS							

Unit cost analysis example template itemizes materials, labor and equipment requirements

Tip: Dividing the cost of completed work to date by the overall contract cost is an accurate and industry standard method of tracking and reporting overall project progress. Trends in actual cost expenditure versus planned expenditure can be analyzed to estimate budget over/under expenditures.

BOQ/UCA template in Appendix 4

CRS internal note:

Budget requests to allocate funds for the purchase of materials or to finance construction through contracts or agreements should comply with the standard CRS purchasing policy and procedures as well as any specific donor requirements. The construction project manager should track budget expenditures in close collaboration with the CRS country program finance department.

TASK 3: SET UP QUALITY CONTROL PROCEDURES

To assure construction quality to safe and specified standards, it is essential to set up a procedure to verify and check the quality of the construction works as part of construction supervision. This needs to be done on a regular basis to avoid dangerous construction practices being covered or hidden as the construction progresses.

A **monitoring plan** should be developed with the contractor and sets out:

- **Inspection reports:** daily, weekly inspection schedule of construction progress and quality
  - **Day-to-day inspection** by contractor on daily inspection report (include sphotographs with date)

Daily site report in Appendix 14

  - **Weekly inspection** by engineer/architect, construction manager on weekly inspection report (includes photographs with date)

Weekly site report contact shelter advisor (only digital)

- **Staffing required:** adequate technical staff required to monitor and inspect effectively
  - Staff should have at least contractor foreman, contractor engineer, field engineer/architect, construction manager and project manager
- Establish **"hold points"/key inspection points:** Which elements/construction work require inspection at which times (i.e., foundations, connection foundation to main structure, connection roof structure to wall/ columns, etc.)?
- **Posters of safe construction methods:** with pictures and illustration to be posted on construction site.

Note: Outsourcing project supervision to partners or management companies should not be substituted for in-house supervision staff.

Example: West Sumatra, 2009

Safe construction poster from west Sumatra earthquake, Indonesia
Photo Credit: CRS

TASK 4: SET UP DOCUMENT RECORDING PROCEDURE

This includes recording matrix and filing system. All documents relevant to the project should be recorded to reduce risk and confusion, especially in multiple sites and various revisions. This facilitates the retrieval and consolidation of information from regular progress reports for reporting to project management and donors.

Documents that should be included:

- Design plans and specifications
- Site inspections, surveys, soil and water testing results
- Land titles or other land ownership/ occupancy rights documents
- Building permits and certifications, other government approvals
- MOUs/agreements and contracts, including contract variations or amendments
- Progress report, quality control inspection reports
- Budget expenditure/liquidation tracking documents, progress billing/payments to contractors, invoices
- Relevant incoming and outgoing correspondence

Filing system includes:

- Labeling and indexing
- Filing by date of hardcopies

SUMMARY OF OUTCOMES

Outcome 1: Project schedule set up and included in contract agreements

Outcome 2: Progress/cost reporting/tracking procedures set up and agreed upon

Outcome 3: Construction quality procedure set up and agreed upon with contractor

Outcome 4: Filing system set up

Example 10, Lan Lumpu, Banda Aceh, Indonesia, 2005

Lan Lumpu is one of several villages devastated by the Indian Ocean Tsunami in 2004. CRS made a commitment to villagers to rebuild over 240 houses. A consultant was commissioned by CRS to develop a design and specification for a 45 m2 house. Once completed, CRS presented the design and specification to contractors as part of a bid solicitation process. Two contractors were selected to carry-out the construction work, roughly dividing the number of houses between them. A management consulting firm was contracted at the same time to monitor the construction quality and contractor performance. The CRS engineering team, led by one international engineer supervising a team of five national field engineers, monitored the consulting firm through regular on-site inspections. Several months into the construction, it was discovered that contractors were not being adequately supervised by the consulting firm and poor quality construction was detected in over 200 houses under construction. It was later determined that neither CRS engineers nor the management consultant were providing adequate oversight of the project and collusion was suspected. The contractors were asked to make the needed improvements but refused to do so. The ensuing dispute between CRS and the contractors lasted more than a year. During this time, CRS engaged another construction firm to make the needed improvements. Access to the site was temporarily impeded by the original contractor, and the performance of the second contractor was poor. The community became increasingly angry with CRS for creating delays in the construction on structural issues that were not immediately apparent to them. A third contractor was engaged to complete the work, which was finally achieved almost 7 months behind schedule at a cost almost double to the original estimates. In addition, a final settlement was reached with two contractors costing CRS an additional $250,000.

Reflections:

Extensive research should be conducted to assess contractor and consultant financial and management competency as part of a pre-qualification process.

Adequate oversight should be provided by qualified CRS staff to monitor consultants and contractors.

Contracts need to be clear and hold contractors and CRS staff accountable to a well-defined inspection process that is counter-checked and documented on a regular basis.

C.11 PAYMENT PROCEDURES

Payment procedures are defined in the contract payment schedules as part of the contract document.

Refer to C.7 for details

SUMMARY OF TASKS

Task 1: Verify progress/making progress payments

TASK 1: VERIFY PROGRESS/MAKING PROGRESS PAYMENTS

Payments can only proceed after receiving invoices from the contractor in an agreed format and verifying it against progress. Signed and approved progress reports become the primary supporting documents for progress payments to the contractor. The contracts manager should work closely with the finance manager to track payments to contractors.

In post-disaster situations, access to site may make it difficult to verify progress and authorize subsequent payments to the contractor. Delaying payment often results in delays in completing the project or works being stopped. Using dated site photographs and training community members in assisting with monitoring can help CRS staff remotely monitor quality and progress.

Contact shelter advisor for standard invoice format and payment tracking data sheet

Contact shelter advisor for digital payment tracking data sheet

SUMMARY OF OUTCOMES

Outcome 1: Payment procedure set up

C.12 CHANGE MANAGEMENT

In post-disaster situations, it is almost inevitable that during construction, changes to the design, material or construction processes will be required, and consequently to the contract documents.

This could be due to:

- Social, political or economic changes – social unrest, security issues, market prices, labor disputes, land ownership
- Environmental conditions – including unforeseen soil conditions, contamination, landmines, unusual weather patterns
- Structural design changes – where original designs need to be changed to satisfy unforeseen conditions
- Changes in material specifications and quantities – resulting from design changes or availability of materials
- Changes in material prices – a function of local markets, access, transportation costs, inflation, etc.

SUMMARY OF TASKS

Task 1: Set up change management processes

TASK 1: SET UP CHANGE MANAGEMENT PROCESSES

It is important to anticipate and to include change procedures – change orders – within the construction contract. Generally, variations fall into several categories:

- Changes in design scope
- Quantity variations
- Time variations
- Changes in material specification
- Changes in unit price

Change orders can either be requested by the contractor or by the project team. In all cases, the changes must be priced and must indicate the time delay they may cause. The change can only be implemented after it is approved in writing by the construction management team. To mitigate future disputes in regards to time delay and cost overrun, it is important that all related correspondence be clearly documented and filed.

Change order template in Appendix 11, for digital version contact shelter advisor

Note: In addition, changes should be assumed in the project cost estimates and budget (i.e., within the BoQ), **normally in the form of a 10% contingency.**

A common source of claims originates from ambiguity in contract documents, especially if working under changeable market condition and within a limited timeframe to conduct assessments. To the extent possible, it is good practice to anticipate changes by thinking through possible scenarios.

SUMMARY OF OUTCOMES

Outcome 1: Change procedures are clearly defined in contract and agreed upon

C.13 PRACTICAL COMPLETION AND HAND OVER

As the contractor progresses toward completion of the construction, several steps should be taken to ensure the construction works are completed to the quality intended and no substandard construction is accepted and paid for, which could cause problems in the future use of the structure. This stage completes the contractual relationship with the contractor.

SUMMARY OF TASKS

Task 1: List outstanding defects/work – "punch list"

Task 2: Issue practical completion certificate

Task 3: Manage warranty period

Task 4: Hand over to end-users

Task 5: Issue final completion certificate

TASK 1: LIST OUTSTANDING DEFECTS/ WORK – "PUNCH LIST"

It is good practice to list outstanding defects in the construction when the contractor has completed about 90% of the work. This list, called a "punch list", enumerates any outstanding work and substandard work that requires fixing before the contractor leaves the construction site. Quite often, contractors may not focus on small detail work until larger work is completed. The intention of this list is to focus both the field engineers and contractor engineering team on completing outstanding work concurrently with other work to avoid any delays in the issuance of the practical completion certificate and any final payments that may be due.

The "punch list" should:

- List all defects and outstanding work by date, how to remedy, with pictures.
- Be updated weekly.
- Be attached to the practical completion certificate to document work completion.

"Punch list" – defects/outstanding works template in Appendix 13

TASK 2: ISSUE PRACTICAL COMPLETION CERTIFICATE

Field engineers, site inspectors and the construction project manager must ensure that the contractor has **completed all outstanding work and remedied all defects** listed **before issuing a practical completion certificate,** which states that the contractor has met the established contract obligations.

The contracts manager should review any amendments, past payments and any outstanding warranty retention to determine the final balance due to the contractor. A final payment should only be made after verification with the CRS finance manager. Retention of usually 5% of the contract value is retained.

Practical completion templates in Appendix 15

TASK 3: MANAGE WARRANTY PERIOD

The practical completion certificate establishes the beginning of the warranty period. The contractor is obliged to make good any defects that arise during this (usually) 6 month period. The 5% retention is held back to give an incentive for the contractor to make good any defects or, in the case that he refuses, the money is used for another contractor to do the needed repair work. To manage this transition period effectively, it is important to retain the engineers/architect until the structure has been handed over, and maintenance and DRR procedures established.

TASK 4: HAND OVER TO END-USERS

In general, the structure(s) may be handed over to the program participants once practical completion has been given and the program participants have accepted the quality of the construction. This document requires the signature of the program participants, local authority or community leaders and CRS.

Attention and advocacy should be given to shared ownership between husband and wife and sole female ownership.

TASK 5: ISSUE FINAL COMPLETION CERTIFICATE

The last contractual step is to issue a final completion certificate when all detected defects have been repaired. This releases the retention to the contractor and documents the final settlement between CRS and the contractor.

All contract documentation, final inspections and defects list should be filed and kept for the duration of the defects liability period (usually 10 years). This documentation could be important in determining liability for any construction defects or catastrophic failures after construction is completed and turned over to the user.

Refer to example 1 front of Book C

SUMMARY OF OUTCOMES

Outcome 1: Defects/outstanding work list set up

Outcome 2: Practical completion certificate issued

Outcome 3: Warranty period completed

Outcome 4: Ownership certificate handed over

Outcome 5: Final completion certificate issued

C.14 AFTER COMPLETION

The time after completion is often overlooked in a construction project, as the actual construction activities have been completed and the end-users are occupying the structure. Especially in areas that are prone to reoccurring hazard events, such as flooding, earthquake, fire, high winds, etc., it is important that the inhabitants know how to take care of their structure to remain safe.

SUMMARY OF TASKS

Task 1: Introduce maintenance activities

Task 2: Introduce disaster risk reduction procedures

Task 3: Evaluation and program participant satisfaction

TASK 1: INTRODUCE MAINTENANCE ACTIVITIES

Different construction materials require different ways to maintain them in a good condition. These should be explained to the end-user through meetings, maintenance leaflets, etc. Good maintenance has a significant impact on the safety and longevity of a structure. Maintenance procedures could include:

- Seasonal maintenance before rainy seasons, typhoon seasons, etc., such as checking for roof leaks, that drainage channels are not blocked, roof trusses are secured, roof sheeting has no missing nails, etc.
- General maintenance such as checking for termite infestation, root, corrosion

TASK 2: INTRODUCE DISASTER RISK REDUCTION PROCEDURES

Simultaneously with maintenance procedure, disaster risk reduction (DRR) must be addressed. This could include:

- Fire safety, especially for highly flammable materials such as bamboo, wood, etc.
- Evacuation meeting points, routes and procedures agreed upon
- Community-based risk mapping
- Setting up community evacuation drills

Refer to C.4 Technical design

Refer to hazard resistant construction, PASSA (Participatory Approach for Safe Shelter Awareness), www.sheltercentre.org/library

TASK 3: EVALUATION AND PROGRAM PARTICIPANT SATISFACTION

To be in a position to learn from past experiences and challenges, an evaluation is an important part of the overall project. In areas with extreme weather conditions, a midterm evaluation is good practice. An essential part of the evaluation is to include the program participants in the process through interviews, questionnaires or other feedback systems to evaluate the performance of the construction project.

SUMMARY OF OUTCOMES

Outcome 1: Maintenance procedures agreed upon and established

Outcome 2: Disaster risk reduction training set up

O**utcome 3:** Evaluation conducted

C.15 IDENTIFY APPROPRIATE STAFF

An important lesson-learned from CRS construction activities is that project success depends on the qualifications, skills and experience of the technical and management resources engaged to manage the project. Careful but expeditious vetting of potential candidates is critical in creating highly performing teams.

Within the engineering and construction industry, a four/six year engineering degree normally represents the foundation on which individuals will build different levels of experience and skills[9], especially in post-disaster situations. Beyond that, the years of experience and breadth of exposure to different construction designs of varying complexity develops the needed qualifications to manage different types of construction projects.

Senior staff will be required to have a balance of the technical skills and social skills to lead a program, as well as a sound knowledge of contract administration and the ability to think creatively about resolving conflict and technical issues without losing sight of the overall project goals: rebuilding livelihoods and reducing vulnerability.

C.15.1 ORGANIZATIONAL STRUCTURE FOR CONTRACTOR-BUILT PROJECT

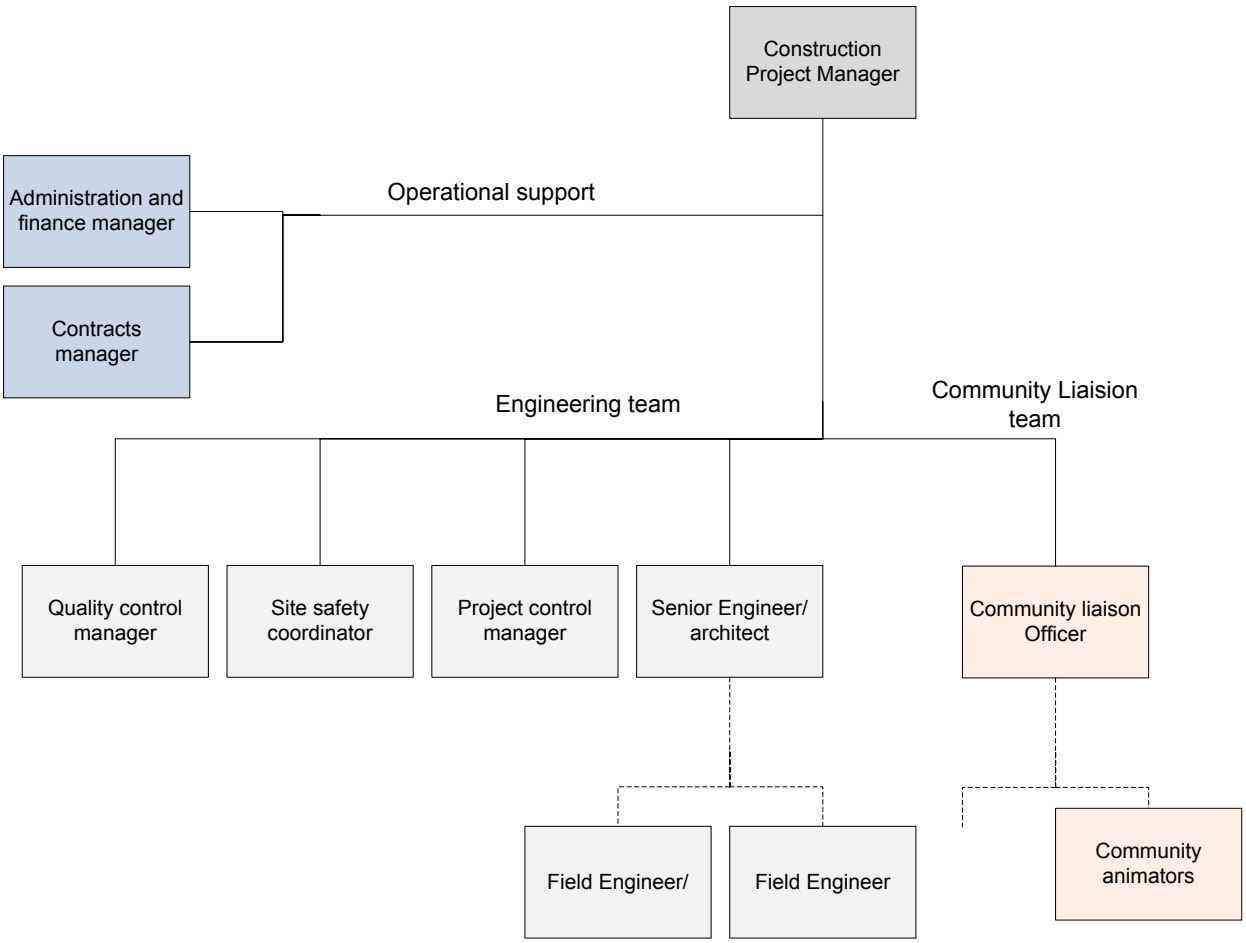
Staff recruitment should follow Country Program protocols; however, there are a number of internal and external risks that CRS teams should consider when staffing up a construction program. Staffing plans and management structure should seek to mitigate these risks

The structure below offers an example for contractor-built projects where the contractors are responsible for carrying out the project to the correct standard and managing the day-to-day construction activities. CRS is responsible for managing the contract (monitoring the contractor's quality/progress), payments and establishing good community relationships through the CRS community liaison officer.

For sample job descriptions refer to digital versions available on share point.

9 Engineers and architects generally specialize in design, construction management or contract management. Engineers often focus on one or more disciplines such as structural engineering, water and wastewater, geotechnical engineering, architectural design, among others.

DIAGRAM OF ORGANIZATIONAL STRUCTURE FOR CONTRACTOR BUILT PROJECT



Responsibilities
All positions may not be needed, depending on the amount and complexity of the engineering/ design work required for the project.

Construction project manager
The project manager is responsible for the overall effective implementation of the construction project. This includes: budget control and program control (cost and time), overall quality control (site audits), change control (changes to the design/ agreements while constructing), effective staff communications (technical, community mobilization and support staff), health and safety issues and document control.

Engineering team

Quality control manager
Independently monitors construction quality audits as a second tier review over field-based engineers and site inspectors; ensures implementation of the monitoring plan by the contractor. The quality control manager is responsible for the site quality audit, corrective actions and follow-up as well as the quality assurance audit.

Project control manager
Closely monitors construction progress against project schedule and tracks and projects costs against the project budget; also can assist with materials and equipment checks. The project control manager is responsible for budget maintenance, purchase request, master schedule, project tracking and reporting.

Site safety coordinator (large projects)
Is responsible for safety training, inspection and reporting.

Senior engineer/contracts manager
Is responsible for supervising the field engineers and provides the design, specifications and Bill of Quantities.(There are options for contracting to an external consultant to produce design documents.) Manages the contracting process including contractor selection, development of contracting strategies, development of contract templates and tender packages, and support of procurement staff in the tender process. Conducts bid analysis; monitors contract compliance. Contracts manager is responsible for preparing contract templates, contractor survey, preparation, tracking, variation management and payment requests.

Field engineer (very large projects)
Is responsible for site instruction, progress monitoring, quality monitoring, safety training inspections and reporting, and variation management.

Administration and finance manager
Is responsible for preparing contracts, bid selections, contract and payment tracking.

Community liaison staff

Community liaison officer
The community liaison officer is responsible for managing relations with recipient communities, ensuring accurate and timely information sharing, and ensuring community expectations are aligned with project objectives. This position oversees complaints and feedback processes, helps resolve conflict with the communities and works closely with the technical team.

Community animators
Community animators are responsible for maintaining communications with the community and ensuring information is channeled to the correct place. They are important contact points for feedback from the program participants and ensure that people are targeted with the appropriate intervention. These staff can assist identifying vulnerable pockets of the community and help tailor specific aspects of the program for those with special needs (elderly, disabled, women, single headed HHs, PLWHA, etc.).

Appendices

PROJECT NAME

Household Agreement for receiving assistance from Project

Household Name

Date

In immediate assistance to people affected by _____, **Project** _____

is providing the following _____.

Project (insert scope of works/ technical assistance, etc. here):

The above named household agrees to the following (give details here):

Project:	Program Participant:
_____ ___/___/ 2012	_____ ___/___/ 2012
Head of Office / Date	Household Representative / Date
_____	_____
Signature	Signature

CRS Hotline for Questions, Comments or Suggestions (Tel number here):

PROJECT NAME

Household Agreement for receiving assistance from Project

Household Name

Date

In immediate assistance to people affected by _____, Project _____

will provide the following _____.

I, _____, understand that I qualify for Project _____

assistance _____ (detail of project here)

and of my own free will, decided to **DECLINE** the assistance of CRS.

Project:	Household Program Participant:
_____ ___/___/ 2012	_____ ___/___/ 2012
Head of Office / Date	Household Representative / Date
_____	_____
Signature	Signature

CRS Hotline for Questions, Comments or Suggestions (Tel number here):

APPENDIX 3: SHELTER PROGRAM PARTICIPANT IDENTIFICATION CARD

Name of the program participant CARD NO-

Address

Identity Type and No

The proposed shelter involves (e.g.: improved techniques and locally available materials. The five disaster resilient construction techniques are as follows)

Paste Photo here

Detail description

Support from the Project		Program participant contribution	Program participant responsibilities
Skilled Labor @_____	_____workdays	List here	List here
Labor @ _____	_____workdays		
Materials	Quantity		

Material received by the program participant:

Date	Type of material/ work	Quantity			Signature of the recipient	Witness
		Pcs.	Length/weight	Money for labor payment		

Monitoring of Construction Progress:

Sl No	Item of work	Date of completion	Signature of Project staff	Remarks
1	e.g: layout			
2	e.g.: foundations			
3	e.g.: plinth			
4	e.g: main structural fame			
5	e.g: wall infill			
6	e.g: roof structure/ connections			
7	e.g: roofing			
8	e.g: internal finishes			

This card is valid for the registered program participant with the attached photograph and the identification proof mentioned here.If the card is lost, charges will be made for reprinting of the same.

Signature of Program Participant (Director) Signature of Issuing Authority & Seal

Project Location _____ Project Title _____

Project _____ Date _____

NO	ITEM OF WORK PLUS SPECIFICATION	UNIT	QUANTITY	MATLS.	LABOR	EQPT.	UNIT PRICE	TOTAL COST
A	**Preliminary Works**							
	e.g: Land Clearing, Site Preparation, Mobilzation and Demobilization	m^2						
	Sub Total A							
B	**Excavation and Backfilling**							
	Supply of Labor, Materials, Tools, Equipments and Supervision including all accessories (compaction if necessary) to complete the following							
	Sub Total B							
C	**Masonry Works and Internal Partition**							
	Supply of Labor, Materials, Tools, Equipments and Supervision including all accessories to complete the following							
	Sub Total C							
D	**Reinforced Concrete Works**							
	Supply of Labor, Materials, Tools, Equipments and Supervision including all accessories to complete the following							
	Sub Total D							
E	**Tinsmithry Works**							
	Supply of Labor, Materials, Tools, Equipments and Supervision including all accessories to complete the following							
	Sub Total E							
F	**Ceiling Works**							
	Supply of Labor, Materials, Tools, Equipments and Supervision including all accessories to complete the following							
	Sub Total F							
G	**Sash Work**							
	Supply of Labor, Materials, Tools, Equipments and Supervision including all necessary Ironmongeries/accessories and finishes to complete the following							
	Sub Total G							
H	**Plumbing System Work**							
	Supply of Labor, Materials, Tools, Equipments and Supervision including all miscellaneous work to complete the following							
	Sub Total H							

NO	ITEM OF WORK PLUS SPECIFICATION	UNIT	QUANTITY	MATLS.	LABOR	EQPT.	UNIT PRICE	TOTAL COST
I	**Concrete Floor Work**							
	Supply of Labor, Materials, Tools, Equipments and Supervision including all miscellaneous work to complete the following							
	Sub Total I							
J	**Painting Work**							
	Sub Total J							
K	**Electrical Work**							
	Supply of Labor, Materials, Tools, Equipments and Supervision including all accessories to complete the following							
	Sub Total K							
	Estimated Cost							
	Estimated Cost (rounded)							
	Contingency for Estimating Error							
	Grand Total Cost							

Total cost for _____(multiple by number of structures):

Bid Form for

Material to be delivered to

ref. #	Description	Specification	Quantity Required	Units	Cost (Delivery to)	Units	Quantity currently in Stock
1							
2							
3							
4							
5							
6							

Note:

1) All costs must be inclusive of delivery to sites _____

2) All cost must be inclusive of VAT (___)

Indicate when the required quantities can be delivered: (Delivery Date) _____

Expiration date of the quotes (Expiration Date)_____

Prepared By: _____

(Name) (Signature) (Date)

APPENDIX 6: COMPANY PROFILE
(to be returned with the bids)

Company Name

Owner Name

Complete Address

Tel. Number Fax. Email

TIN

Do you give official receipt? ☐ Yes ☐ No

Bank Account ☐ Yes ☐ No

Payment mode (Check all that apply)

Wire transfer ☐ Yes ☐ No

Bank check ☐ Yes ☐ No

Can purchased items be stored and delivered only on request? ☐ Yes ☐ No

What is your company's storage capacity? Please note volume in units: _____ units.

What are the number of trucks that can be mobilized to deliver simultaneously?_____

Other : (Past experience – references):

Prepared By: _____

(Name) (Signature) (Date)

Catholic Relief Services (CRS) is a US-based emergency relief and development organization which has been working in description here

_____

CRS aims what ,number, location, timeframe _____.

Materials:_____.

CRS is looking for **interested suppliers** for the supply of_____.

All interested suppliers must fill in the information requested in the attached
1) Supplier Profile Form and 2) Tender Form.

All tender packages must be return it to CRS properly filled in and signed by date, time, place

_____

BID AMOUNT

- Offers must be inclusive of taxes.
- Offer prices must be inclusive of transportation to delivery sites.

COMPOSITION OF BIDS

- The Bids are to be submitted in a **sealed envelope** and addressed to _____and **marked "Bid for Construction Materials."**

SUBMISSION DATES

All tenders must be submitted in sealed envelope and signed by an authorized representative of the company.

Delivery must be made to the following address:

_____

Hours for delivery of tenders is _____. No tenders will be received after 5:00 p.m.

PAYMENT TERMS

CRS will make payments within 3 to 5 working days upon full and complete delivery of materials, inspection and acceptance by CRS and submission of invoice by the supplier.

OTHER

CRS reserves the right to reject, negotiate or accept any offer regardless of the proposed rates and to proceed with all or part of this tender.

Sincerely,

_____

Name Job Title Catholic Relief Services

Identification of qualified goods and services suppliers is critical. Reliable suppliers are essential in meeting construction deadlines on time and budget.

The following points form part of the check list:

- Legal entity definition
- Business license, registration, insurance
- Business type (import, wholesale, retail)
- Materials and services provided and available
- Source of importation, frequency and lead time
- Storing capacity and minimum storage quantity
- Time required to deliver the materials after placing order
- Delivery terms
- Payment terms (cash, check, bank transfer, credit)
- Credit facility and time
- Production capacity per day
- Indication that Bridger Confirmation has been completed

APPENDIX 9: BID COMPARISON FORM

ITEM NO	ITEM DESCRIPTION	QUANTITY	UOM	SUPPLIER 1		SUPPLIER 2		SUPPLIER 3		SUPPLIER 4	
				UNIT PRICE (currency)	TOTAL PRICE (currency)	UNIT PRICE (currency)	TOTAL PRICE (currency)	UNIT PRICE (currency)	TOTAL PRICE (currency)	UNIT PRICE (currency)	TOTAL PRICE (currency)
	Terms of Payment										
	Delivery Time										
	Delivery Included/Cost										
	Distribution Point										
	After Sales Service/Warranty										
	Grand Total										

Comments:

_____

_____

Recommended Supplier:_____

Reasons:

_____

Prepared By:

_____

Name & Signature
(Procurement Officer)

Date _____ (MM/DD/YY)

Verified & Approved By:

_____

Name & Signature
(FOD)

Agreed by the following
Tender Committee:

_____

_____

_____

_____

CONSTRUCTION MONITORING FORM

CRS Field Engineers and Social Mobilization Team to complete this form for each shelter, checking the "complete" boxes to confirm completion of work and obtaining signatures indicated.

Program Participant Household Name Program participant Household Number Village/Hamlet Name

Phase One:

Step	Work to be performed for completion of this phase	Complete
1.A		
1.B		
1.C		
1.D		
1.E		
1.F		
1.G		

Phase One Completion Sign-off

Program Participant Household

CRS Field Engineer

Phase Two:

Step	Work to be performed for completion of this phase	Complete
2.A		
2.B		
2.C		
2.D		
2.E		
2.F		
2.G		

Phase Two Completion Sign-off

Program Participant Household

CRS Field Engineer

Phase Three:

Step	Work to be performed for completion of this phase	Complete
3.A		
3.B		
3.C		
3.D		
3.E		

Phase Three Completion Sign-off

Program Participant Household

CRS Field Engineer

Phase Four:

Step	Work to be performed for completion of this phase	Complete
4.A		
4.B		
4.C		
4.D		
4.E		
4.F		
4.G		
4.H		
4.I		

Phase Four Completion Sign-off

Program Participant Household

CRS Field Engineer

Social Mobilization Team

CRS Shelter Supervisor

Project _____ Variation Order No. _____

Contractor _____ Contract No. _____

Contract _____ Date _____

General Condition (Subject Contract is hereby amended to incorporate the following changes or additional work.)

Description _____ Amount _____

Quantity:

No.	Description	Unit	Qty	Unit Cost	Total Cost
	Totals				

Additive Cost _____ currency (VAT EXCLUSIVE)

Total _____ currency (VAT EXCLUSIVE)

EFFECT ON SCHEDULE:

ADDITIVE AMOUNT DUE TO THIS CHANGE ORDER: (VAT EXCLUSIVE)
Amount in words:

REVISED CONTRACT AMOUNT INCLUDING THIS CHANGE ORDER:
Original Contract (VAT EXCLUSIVE)
Revised Contract Amount

Totals _____ (VAT EXCLUSIVE)

VAT _____

Grand Totals _____ (VAT EXCLUSIVE)

REFERENCES/CONDITIONS OF CHANGE ORDER:

Except as otherwise provided above all other terms and conditions of the Contract remained unchanged.

Prepared by:	**Initiated and Inspected by:**	**Signed by:**	**Noted by:**
Contract Manager, CRS	Field Engineer, CRS	Construction Manager, CRS	Engineering Manager, CRS

Approved by:		**Accepted by:**
Head of Program Catholic Relief Services	Field Office Director Catholic Relief Services	Director

APPENDIX 12: CONTRACTOR PRE-QUALIFICATION CHECKLIST

The following points should form part of the contractor evaluation checklist:

- Evidence of registration
- Tax registration number
- National business license
- Company or organization profile
- List of work undertaken
- List of current projects; magnitude of contract/project load the contractor/partner could undertake (request national classification for contractors)
- Letter of authorization (in case of signature delegation)
- Latest financial report
- Organizational structure
- List of equipment and assets
- Indication that Bridger Confirmation has been completed

The relevancy of the above items may vary between countries. Document relevance should be ascertained before sending request for interests.

Ref. number | Date | Rev

Name of project | By

IT. N°	DWG N°	DESCRIPTION OF WORK	COMMENTS	STATUS
1				in %
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

No. | Form no.: Daily report 001

Project Title | Day

Project Location | Date

Contractor

A. Description of Work

No.	Item of Work Plus Specification/Activities	Unit	Quantity	% Item	Remark

B. Description of Manpower

No.	Manpower	Quantity	Equipment	Quantity	Material	Quantity
1	Manager		Excavator		Cement	
2	Engineer		Plate Compactor			
3	Supervisor		Concrete Mixer			
4	Foreman		Compressor			
5	Mason		Vibrator			
6	Carpenter		Generator			
7	Blacksmith		Water pump			
8	Electrician					
9	Plumber					
10	Unskilled labor					
11	Others					

C. DESCRIPTION OF WEATHER

Time	06.00	07.00	08.00	09.00	10.00	11.00	12.00	13.00
Weather								
Time	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00
Weather								
Time	22.00	23.00	24.00	01.00	02.00	03.00	04.00	05.00
Weather								

C Clear

D Drizzle

R Rain

F Flood

For Contract ___/CRS-__/PROG/__/date

PRELIMINARIES

- Whereas, CRS (Catholic Relief Services) and _____ (Contractor) have entered into Contract referenced ___/CRS-__/PROG/__/date on date _____ for the construction of _____ *(Detail the SOW)*.
- Whereas the referenced Contract was further amended on _____ *(List all amendments as necessary).*
- Whereas, CRS confirms completion as per clause _____ of the referenced Contract of the following items of the SOW: *(List items)* _____ to the satisfaction of referenced Contract specifications and drawings.
- Whereas, CRS has released a Practical Completion Certificate as per clause _____ of the referenced Contract to Contractor on _____.
- Whereas, CRS confirms completion of the _____ months defect liability period as defined by clause _____ of the Contract starting from date of the Practical Completion Certificate *(dated)* _____.
- Whereas, Contractor acknowledges that the following previous payments were made to the credit of the Contractor for compensation of previous progress and Practical Completion Certificate. *(List payment tracking as necessary)*
- Whereas, CRS agrees to pay within _____ days of the signature of this Final Completion Certificate the sum of _____ in compensation of the defect liability withholding defined as per sectio _____ of the Contract and as per the attached final payment calculation certificate.
- Whereas, Contractor confirms receipt from CRS of withholding taxes *(break down all different taxes)* certificate as per _____ *(country)* government regulation for an amount of _____ paid by CRS on behalf of Contractor for the execution of the Work.

FINAL COMPLETION CERTIFICATE

- Based on the above preliminaries, Contractor hereby releases CRS of any claim for additional compensation under the referenced Contract and certifies that all subcontractors and sub-suppliers have been paid and releases CRS from any unpaid debts which may have been incurred in the performance of the Work.
- Based on the above preliminaries, CRS hereby releases Contractor of any claim for additional services pertaining to the execution of the Contract Scope of Work as defined in the referenced Contract.

For CRS	For CONTRACTOR

D. Instruction (Safety, Remark, Others)

Checked by:	Rechecked by:	Acknowledge:
Site Supervisor	Field Engineer	Construction Manager

FURTHER READING

- **CRS guidelines for shelter and settlement programming**
- **CRS pro pack I and II**
- **CRS purchasing policy**
- **CRS EFOM and Baltimore Purchasing Manuals**
  www.global.crs.org/communities/EmergencyResponse/ShelterCommunity/Pages/ShelterinEmergency.aspx
- **Camp Management Toolkit**
  Norwegian Refugee Council (NRC), 2008 edition
  www.nrc.no
- **Guidelines for Assessment in Emergencies**
  International Federation of Red Cross and Red Crescent Societies (IFRC), 2008.
  www.ifrc.org
- **Owner Driven Housing Reconstruction Guidelines (ODHR)**
  Guidance on the planning and implementation of assisted Owner-driven reconstruction projects.
  International Federation of Red Cross and Red Crescent Societies (IFRC), 2010.
  www.ifrc.org
- **Shelter after Disaster**
  Strategies for transitional settlement and reconstruction,
  Shelter centre, UN, DfID, 2010
  www.shelterlibrary.org
- **Safer homes, stronger communities**
  A Handbook for Reconstructing after Natural Disasters
  The World Bank, 2010
  www.gfdrr.org
- **Shelter projects, 2008-2010**
  UNHCR, IFRC, UNHABITAT, 2008-2010
  www.sheltercasestudies.org
- **The IFRC Shelter Kit**
  International Federation of Red Cross and Red Crescent Societies (IFRC), 2009
  www.ifrc.org
- **Uniform Building Code (UBC),**
  International Conference of Building Officials: “1997 Uniform Building Code – Volume 2”
- **The Sphere Project, Sphere**
  Humanitarian charter and minimum standards in humanitarian response, 2011
  www.sphereproject.org

CATHOLIC RELIEF SERVICES

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crsprogramquality.org