



# GAZA

## Repair Strategies



American Friends  
Service Committee

*Quaker values in action*

architecture for humanity



Tens of thousands of homes in Gaza remain in ruins following Israel's 2008–2009 military assault, Operation Cast Lead. Nearly **50% of Gaza residents are unemployed, 80% of families depend on international aid for their survival**, and a siege of Gaza's borders has **blocked access to building materials**. **This is a humanitarian crisis.**

### How will Gaza recover?

**We encourage your organization to act now.** The rainy season is approaching and roofs and windows are desperately needed to prevent another winter of flooded rooms, and the proliferation of cold and moldy conditions.

### With small steps, we can repair critical damage.

**\$330,000 would provide the materials to repair all 333 houses** (in 6 neighborhoods) in this study to their original condition. A little bit more would not only return the homes to their previous conditions, but enable the improved use of sustainable, durable materials and systems.

**\$70,000 could completely repair the 40 most damaged homes.**

**\$18,000 could provide windows for the 40 most damaged homes.**

**\$7,000 could replace broken solar water heaters and water storage tanks in 40 homes.**

### With surveying tools, we can evaluate + prioritize needs.

**Use our database template for evaluating other neighborhoods** in Gaza to help document the current conditions.

**Use our system of ranking the conditions to help prioritize** beneficiaries from your donated funds and services!

### We can help restore human dignity.

**Providing these basic human needs** - protection from the weather, toilets, drinking water - to our neighbors is essential not only for their dignity, but for ours.

### **How to Read This Report**

The findings of this assessment are presented simply and visually. Where they exist, significant differences in conditions between the neighborhoods in Gaza City and those in Beit Lahia are noted.

Following the data, we suggest strategies to repair and improve the conditions in which families live. Many of these suggestions are immediately feasible, while others are ambitious and possibly uncommon, and will require new materials and funding—and the political will to make both available. The final two sections offer recommendations on community engagement and the selection of beneficiaries. Appendixes provide the summary reports of the completed questionnaires. Individual household interviews and photos can be made available upon request.

## Team

**Unitarian Universalist Service Committee (UUSC)** is a nonsectarian organization that advances human rights and social justice in the United States and around the world. UUSC envisions a world free from oppression and injustice, where all can realize their full human rights. UUSC's Rights in Humanitarian Crises unit works to defend the rights of marginalized groups to relief assistance, participation in reconstruction, and full recovery. UUSC forms partnerships with local or national organizations working with marginalized people and works together to strategize about how to best defend their rights to relief and recovery. UUSC seeks to support those people who continue to struggle against the structural inequalities rooted in their societies and exacerbated by emergencies.

**The American Friends Service Committee (AFSC)** is a Quaker organization that includes people of various faiths committed to social justice, peace, and humanitarian service. AFSC was founded in 1917 and today has programs that focus on issues related to economic justice, peace-building and demilitarization, social justice, and youth. AFSC currently has programs in 43 locations around the world. AFSC's presence in the Middle East began in 1949 in the Gaza Strip when the UN asked AFSC to organize the provision of humanitarian assistance to Palestinian refugees prior to the establishment of UNRWA (UN Relief Work Organization). AFSC/Gaza now carries out a youth civic engagement project with local partner organizations. Limited humanitarian assistance projects are implemented by AFSC through these partners.

**Architecture for Humanity** is a non-profit organization that seeks architectural solutions to humanitarian crisis and brings design services to communities in need. With 80 chapters in 25 countries and more than 4,650 volunteer design professionals, Architecture for Humanity brings people who care about sustainable development together and provides a range of design and construction administration services to partners and clients through a global network of design, development and construction professionals with local expertise and knowledge.

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**Water** Sanitary

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**Data Analysis Spreadsheet** available at:  
[www.openarchitecturenetwork.org/projects/repair\\_gaza](http://www.openarchitecturenetwork.org/projects/repair_gaza)

# Palestine

West Bank & Gaza

-  Palestine Authority
-  Gaza City



# Background

## Scant Rebuilding + Abundant Need

The 2008-2009 Israeli led “Operation Cast Lead” offensive caused extensive death, injury, and destruction in the Gaza Strip. Since the offensive, little repair and even less rebuilding has occurred.

Concurrently, the Gaza Strip is one of the most densely populated areas in the world, and residential zones suffered significant damage during the offensive. Over 61,000 homes were damaged and more than 20,000 people were newly displaced. Thousands of families were left living in sub-standard conditions.

Gaza has suffered under a severe Israeli-imposed blockade since June of 2007 that keeps all goods out of Gaza except those that Israel determines to be unconditionally humanitarian. According to a 2009 United Nations fact-finding mission, the blockade amounts to collective punishment and is likely a war crime and a crime against humanity. In the aftermath of Operation Cast Lead, needed construction materials were prevented from entering Gaza legally, and most organizations prepared to help rebuild have been unable to do so. As a result, much of Gaza remains in ruins.

The few repairs that have been made are mostly undertaken by families themselves, with cash assistance through the UNDP (United Nations Development Programme) and UNWRA (United Nations Relief and Works Agency). The cash, up to US\$5,000 per family, was provided to over 54,000 families experiencing minor levels of damage to their home. With the dispersal, families were considered fully compensated. Some measures were taken to see that the funds were used for repairs, but only anecdotal information suggests that repairs have actually been made. Few organizations have assisted in carrying out actual repairs to damaged or destroyed homes. It is likely that families have used the money to prioritize other needs. This highlights the importance of including monitoring the repairs as an integral part of the rebuilding process.

Today, the Gaza economy remains stagnant, **unemployment is nearing 50%**, and poverty is widespread. 80% of the people in Gaza depend on humanitarian aid for their survival. Much of the infrastructure, schools, hospitals, and factories in Gaza are unable to function. **This is a crisis of human dignity.**



## Identifying Vital, Viable Repair Options

Considering the severity of the crisis in Gaza and the sluggish rate of home repairs, this report details the most common and critical damage to residential homes, and suggests viable, safe, and dignified repair options. Many of the suggestions can be easily replicated with tools and resources available locally. A few of the suggestions are ambitious, and are meant to challenge the building sector to consider alternatives—some of those will require the importation of new materials.

This report emphasizes repairs that restore some measure of safety and dignity to people’s lives and that are also sensitive to both gender and culture. **This report is a resource for those who plan to carry out or organize repairs to homes in Gaza, including families, communities, and organizations.** It is also a resource for those interested in learning more about the current condition of homes in Gaza.

**We hope that this report will not only raise awareness but will also spur donor organizations to increase access to resources for the many communities in Gaza that are in need of repair.**

## Methodology

### Data Collection

A preliminary report identified those areas of the Gaza strip included in the survey (Appendix A). Houses that were destroyed to an uninhabitable point were not considered in this report. Priority was given to lower income neighborhoods that sustained a large amount of moderate-to-minor damage during Operation Cast Lead. The focus narrowed to six neighborhoods. The assessment focuses on a sample of homes within these neighborhoods. AFSC, one of the sponsors, is active and known within these communities.

Our report includes an assessment, carried out between May and July, 2010, of 333 homes within these six neighborhoods in Gaza and North Gaza Governorates. The assessment began with a review of previous assessments by international organizations and UN agencies.

A three-person team of civil engineers and architects conducted interviews at the 333 households. The team interviewed families, inspected homes, and photographed the damage.

*Summary reports from these interviews are included in Appendixes D-F.*

#### Information collected in the assessment includes the following:

**Identification:** Name of the household head, ID, refugee status, age, address, telephone number, and sources and types of assistance previously received. This information allows for cross-reference with other assessment databases (including the Shelter Cluster Gaza and Ministry of Housing and Public Works databases) and sharing with other organizations.

**Socioeconomic indicators:** Total family members, number of children under 18 years old, family members over 60 years old, number of injured or disabled family members, and number of employed members and total monthly income.

**Housing conditions:** Area, ownership, building and roofing materials, number of rooms, drinking water sources, sanitation connections, types of cooking fuel/s used.

**Damage:** Concrete and block structures, roofing, windows, internal and external walls, floors, electrical installations, water and sanitation, stairways, kitchen and bathroom installations, and water and sanitary works.

#### Classification of Damage

The surveyed damage was classified into four categories, decreasing in relative severity, according to impact on health, safety and family dignity. This gave more weight to basic human needs and life safety issues than cosmetic damage, so that quantity of damage didn't override severity. *Example: 10m<sup>2</sup> of missing roof weighed more strongly than 10m<sup>2</sup> of broken floor tile.*

Basic	Damages to essential elements including roofing, water, and sanitation
Life Safety	Structural damage, and presence or absence of handrails and entry ramps
Improved Conditions	Damage to electrical installation, windows, and internal and external doors
Cosmetic	Surface conditions, including small internal cracks, plastering, tiling and painting

#### Prioritizing Home Repairs

Using a numeric ranking system, the assessed damage and socioeconomic information was entered into a database that then prioritized the households from most severe need to least. The socioeconomic status of the families was a very important consideration. Families with lower incomes and denser living conditions received a higher ranking, as well as those with more children, injured, disabled, and chronically ill persons. These socioeconomic factors act as proxies for vulnerability and need.

Other priorities include assistance already received, and the team's overall impression of the living conditions. We also considered estimated restoration costs to their pre-Operation Cast Lead condition (excluding labor). These estimates assume no alternative materials (as suggested in section 3 of this report) or additional improvements. It is understood that the actual costs may differ widely depending on the repairs undertaken and materials used.

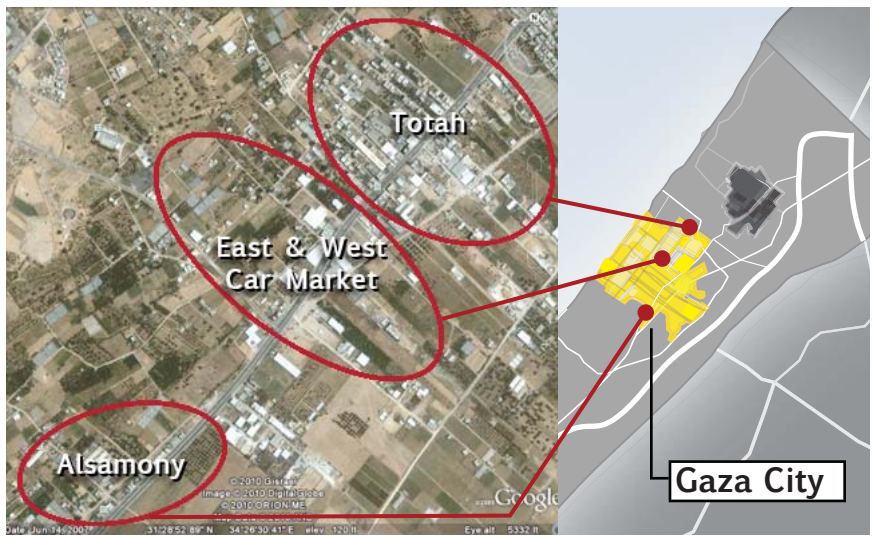
*Material availability and relative costs can be viewed in Appendix C*

Priority	# of Homes
1 Basic Needs	40
2 Life Safety	97
3 Improved Conditions	98
4 Cosmetic	98
Totals	333

Go to <http://openarchitecturenetwork.org/node/7427> for the full database

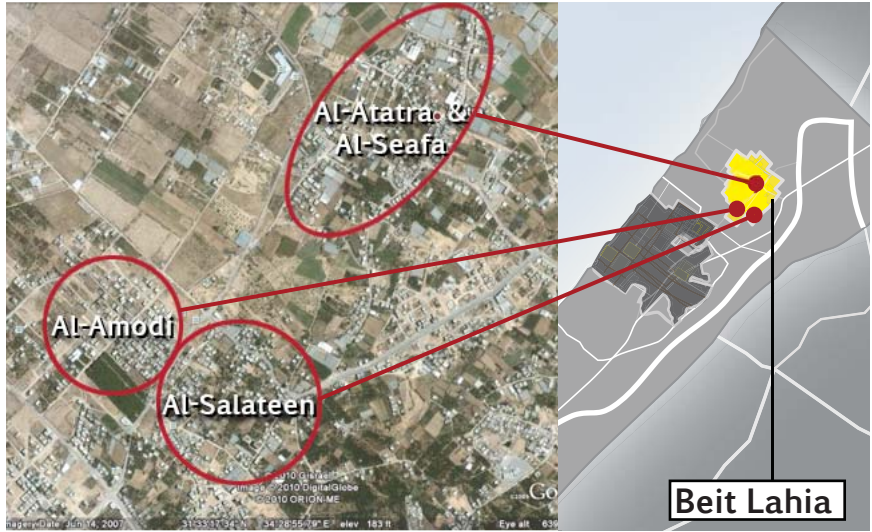
<b>Gaza City</b>			
<i>Three neighborhoods within Al-Zayton, south of Gaza City region</i>			
Neighborhood	Alsamony	Totah	East & West of Cars Market
Area (km <sup>2</sup> )	1.7	1.2	1.8
No. homes	70	170	100
No. inhabitants	400	1600	700
No. destroyed homes	34	108	71
No. surveyed homes	27	62	29

**Gaza City**  
 Many inhabitants depend on agriculture as a main source of income. Factories and agricultural land were damaged as a result of the war. All existing homes suffered minor or moderate damage.



<b>Beit Lahia</b>			
<i>Three neighborhoods within Beit Lahia region</i>			
Neighborhood	Al-Atatra & Al-Seiafa	Al-Salateen	Al-Amodj
Area (km <sup>2</sup> )	1.2	0.8	0.8
No. homes	250	200	180
No. inhabitants	1800	1500	1300
No. destroyed homes	109	157	165
No. surveyed homes	141	43	15

**Beit Lahia**  
 This is a low-income and largely unemployed population. All existing homes suffered partial or moderate damage.





## Salvage + Sort

In order to efficiently sort through debris, the usable rubble from war damaged houses is removed, and separated into four parts:

- Damaged Block elements
- Damaged Concrete elements
- Steel bars
- 'Kamkha': tile waste product

After the rubble is separated, the usable materials are being recycled to create materials suitable for use in domestic repairs.



Building in the middle of debris and rubble | Michael Loadenthal  
flickr.com/photos/michaelimage

## Recycled Materials

### Concrete Blocks

Damaged block elements are used to manufacture concrete blocks after crushing them into small, fine pieces.

*Cost: See Appendix C*

### Aggregate

Damaged concrete elements (columns and beams) are used to manufacture aggregate to be used in concrete mixture after crushing them into small, fine pieces.

*Cost: See Appendix C*

Manufacture of concrete blocks and concrete mixture has begun in Gaza and this has led to an increase in some construction activities. These blocks and mixtures use a combination of recycled crushed rubble from war damaged houses and tunnel cement. However, the blocks are often manufactured from poor quality cement and there are no quarries or sources of aggregates in Gaza.

In other disaster areas, mobile concrete recycling systems and products are available. According to the supplier, 90% of the concrete rubble can be reused. *See: <http://envirock.net/base/haiti>*



Man straightening steel rebar from used concrete | Gloucester2Gaza

## Recycled Reinforced Steel

Once straightened, damaged steel bars are used in new concrete beams. The longest of these bars is 3 meters. Most Engineers in Gaza prefer not to use recycled reinforced steel in the buildings' main structural elements. If it is to be used, to meet current codes, it should be grade 60 rebar (60 ksi). The strength of concrete/steel assembly depend upon the bond between the two. The reinforcement should be free from mud , oil or nonmetallic coatings at the time concrete is place. ASTM A615 outlines allowable levels of rust and scale that can be on the rebar at time of pouring concrete. To help establish what grade re-bar you have:<http://www.crsi.org/rebar/id.cfm>  
minimum overlap distance is 16".

*Cost: See Appendix C*

## Kamkha

Kamkha is a waste product of tile manufacturing. It is mixed with cement and sand to be used for floor tiling and plastering, thus replacing lime. In the past, kamkha was dumped in open areas, contaminating the soil. Today, it is an important construction material and sells for approximately \$20 per cubic meter.



Used Steel Bars | UUSC

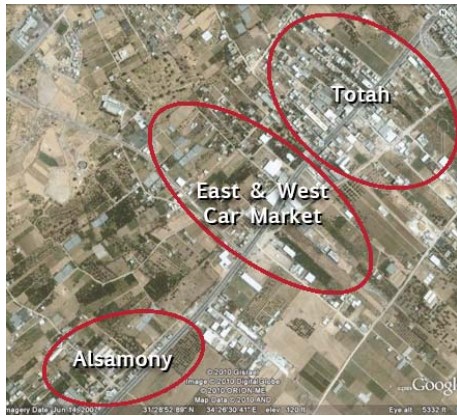


Concrete Blocks w/Recycled Aggregate | UUSC



Collection of Concrete and Metal Debris | UNDP

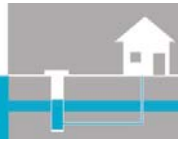
## Gaza City



### Source of Drinking Water

57.5%

private water well



42.5%

municipality water network



### Water Well Issues

Underground septic tank close to proximity of result in contamination of the well water.

Chloride levels as high as 1,000 - 1,500mg/l are found in Gaza. Nitrate concentrations of 290 - 380mg/l have been found. Both exceed WHO safe levels of drinking water of 250mg/l for chloride, and 50mg/l for nitrates.

In 2003, it was estimated that only 10% of wells met drinking water standards established by the WHO.



Damage in Gaza City | UUSC

## Gaza City and Beit Lahia



### Contaminated Water

Municipal water is sourced from groundwater wells owned by the municipality. The water is usually pumped from the groundwater well directly into the network, but sometimes it is first pumped to reservoirs.

The quality of the water from the network is considered fair, but most people do not use it for drinking water because of the high rates of chloride and nitrates. The contaminated water can cause severe health problems, including kidney ailments -- especially for children, elderly, and the infirm.



### Potable Water

Neither the private nor the municipal water network systems provide sustainable drinking water. Therefore, many families are forced to purchase bottled water or water from tankers, an expensive and unsustainable practice.



Damaged Solar Hot Water Units in Gaza City | UUSC



### Water Fixtures

Many of the water fixtures, such as sinks, faucets, and hot water heaters, have been destroyed. Because of this, households have a difficult time using what water they may actually have.

The most overt damage to the domestic water supply was to the elevated water storage tanks and their associated solar water heating system. Most of the households are using one to three water storage tanks with the capacity of 1000 liters each. These tanks are locally manufactured of PVC and placed on the top of buildings together with a solar water heating system.

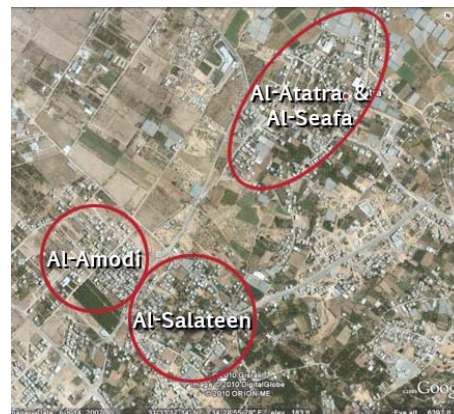
Region	Water Basin Damage	Faucet Damage	Water Storage Tank Damage
Gaza City	39	10	98
Beit Lahia	10	5	29
<b>Total</b>	<b>49</b>	<b>15</b>	<b>127</b>

Figures represent the 333 houses surveyed with damage.



Man in a Water Well | UNDP

## Beit Lahia



### Source of Drinking Water

15%

private water well



85%

municipality water network



### Municipal Water Issues

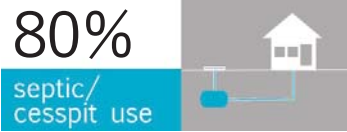
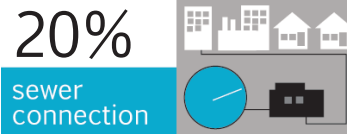
- potential Israel blockades
- lack of monitoring of treatment plants
- unpredictable supply (can be as infrequent as 1 hr water/ day)



Damage in Beit Lahia | UUSC

### Sanitary Water Network

In Gaza City, 51% of households were reported to have damage to the connection of the house sanitary fixtures to the street sewer or septic tank. However, repairs were made immediately after the war by family members. These repairs were done quickly and may not be adequate as a long term solution.



In Beit Lahia, no damage was found to the Network.



Sanitary Water Issue | UNDP

## Gaza City and Beit Lahia

Sanitary Water Network includes the pipes connecting homes to municipal network or individual septic systems. 50% of Gaza wastewater is collected through the network and sent to a fairly efficient wastewater treatment plant, which then feeds treated water to the sea. In areas without storm water or wastewater systems, the storm water and wastewater is disposed of directly into the sea, causing contamination.

The UNEP estimates that 70-80% of domestic wastewater is discharged into the environment without treatment.



Sanitary Water Damage in Beit Lahia | UUSC



### Adjacent Well Contamination

The prevailing use of cesspits, which do not have a concrete liner, enables direct percolation of effluent into the soil and groundwater. Ground water then travels to nearby wells. This contamination causes illness to persons using the well water. The health ramifications have been robustly documented, by WHO, UN and other agencies.



### Cesspits and Septic Tank Systems

80% of households depend on underground cesspit or septic tank systems that need to be cleaned every 4-5 years. This is a very costly process.



### Fixtures

In both regions, regardless of whether the sanitary water pipes have been damaged, the lack of toilet fixtures makes the system irrelevant. The need to replace toilets is urgent as its impact on the household's functioning and sense of dignity is immense.



Sanitary Water Damage in Gaza City | UUSC



Pipe Damage | UUSC



Gaza - Street with Open Drain | John Whitaker - Flickr

**Cooking Fuel**

Every analyzed household in Gaza City and Beit Lahia uses natural gas for cooking.

100%

natural  
gas

Natural gas is usually imported, in 12kg cylinders, from Israel through Palestinian traders.



Damaged Kitchen in Gaza City | UUSC

**Gaza City and Beit Lahia**

\$

costs

**Natural Gas**

A gas cylinder of 12kg costs approximately \$16 and lasts three weeks for a household with six. This represents over 10% of a household's monthly income, creating financial hardship for low-income families.

The high cost of natural gas is caused by multiple stops in the import process. In comparison, a 12 kg cylinder in Egypt costs about \$1.



access

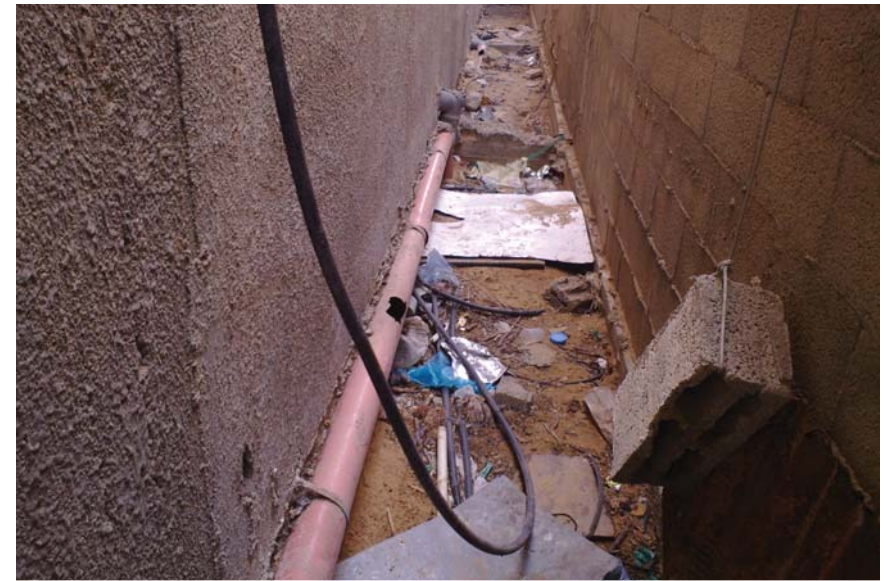
**Electricity**

The majority of damage to electrical systems was to the lighting fixtures. This occurred in 53 of the analyzed households.

10 houses of the 330 surveyed had damage to the electrical cables and electrical distribution panel.

**Number of houses with specific electrical damage**

Lighting Switch	Power Socket	Lighting Fixtures
13	17	53



Damage in Beit Lahia | UUSC



### Data

A recent poll found that 96% of the entire Palestinian population has telephones, 57% lives in a household with a computer, and 32% has internet access.

Wireless is uncommon except for in public places or in wealthy households.

Many households have satellite television receivers.

*The statistics regarding data are general and include all Palestinian households. This assessment did not survey the damage done to data services of the analyzed population.*



Former Kitchen in Gaza | Marius Arnesen



Damaged Kitchen in Beit Lahia | UUSC



Damaged Kitchen in Beit Lahia | UUSC



The main life safety issues depend on the housing type, age of building, roofing type and range from damage to structural elements, exterior wall damage, and cracking. Accessibility issues involve staircase and handrail damage.

### Housing Types

Approximately 55% of buildings in this area are one or two story structures while the rest of the investigated buildings are three to five story buildings.



Structural Damage in Gaza City | UUSC

## Gaza City and Beit Lahia

### Age of Buildings

Approximately 82% of structures were built after 1980 and their structural conditions are acceptable.

### Roofing Types

Approximately 91% of families live in a house with a concrete roof. Around 5% are living in houses with roofs made of asbestos and 4% in houses with roofs made of metal sheets (zinc).



Of the homes that withstood shelling, concrete roofs held up well, while metal and asbestos roofs sustained damage. This damage is extensive in many households and creates a critical quality of life issue.

Asbestos, when disturbed, releases toxins that cause respiratory problems. This damage also permits rainwater to enter homes, which makes areas of the house unusable. With continued moisture, mold develops. Mold can cause series allergic reactions and respiratory problems.



Room with Structural Damage | UUSC

## Damage to Structural Elements

There are 12 houses with damage to different structural elements such as floor and/ or roof slabs, columns, beams, and staircases. The needed repair work requires around 1.5 m<sup>2</sup> of on-site concrete.

### Exterior Wall Damage

Area of the damaged wall in (m <sup>2</sup> )	Number of houses
01 - 10	78
11 - 20	14
21 - 40	8
40 - 90	4
<b>Total number of houses</b>	<b>104</b>

Wind and water can enter through openings or cracks in an exterior wall, causing cosmetic and/or structural damage as well as lead to toxic mold growth. Additionally, exterior wall damage can cause/ enhance emotional stress.



Damaged Stairs in Beit Lahia | UUSC

## Cracking

40% of the investigated houses have cracks in exterior and interior walls. Approximately 12% of these houses have cracks measuring over 20 meters in length. As cracks continue to spread, portions of the wall can fall out and cause injury and unsafe conditions.

57%

disabled, injured  
& chronically ill



## Accessibility

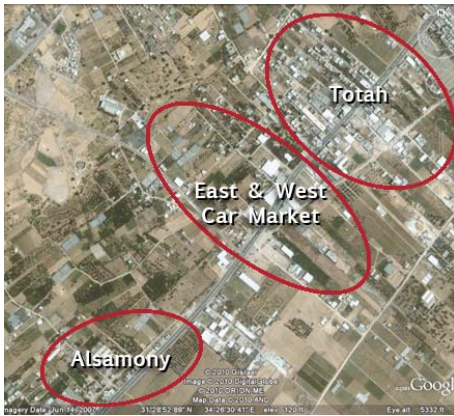
There were three houses in the analyzed population that sustained damage to their staircases' handrails totalling 28 linear meters of damage, which creates an increased risk of injury for children as well as elderly, injured, disabled, and chronically ill family members. But many households have staircases that were originally built without guardrails. With increased numbers of disabled family members, due to Operation Cast Lead, the safety issue this presents becomes much more acute.

Making ground floor modifications, such as installing ramps at entries, door handles and faucets that are accessible, and handrails in the 157 households with disabled, injured, or chronically ill family members could be considered repair in the context of the 2008/2009 offensive.



Cracking Wall in Gaza City | UUSC

## Gaza City



Approximately **70%** of households have no income-generating members.

Approximately 16% of households in Beit Lahai have one senior member (60+) and 8% of households have two senior members. The remaining households are without senior family members. This reflects the ongoing short life-expectancy due to poor access to medicine and medical care in Gaza. Training young members of the community is a constant, urgent issue as households lose their knowledgeable and skilled elderly family members.

Over half of the families include between one and five family members who are injured, disabled, or chronically ill.

### Density

A typical household has 9.5 family members, and is 171 m<sup>2</sup> in area. This results in 18m<sup>2</sup> per person. Families living in higher density were prioritized in our ranking system. In comparison, a typical urban dwelling in the U.S. would provide approximately 50-60 m<sup>2</sup> per person.

### Income

Approximately 70% of families have no income-earning members. Most women work inside the home and are therefore not direct income-earners. Approximately 75% of these families have less than \$200 as monthly income. The poverty threshold in Palestine is \$300 per month for a family of six.

In Gaza City, **134** households were surveyed and analyzed.

### Household Members

Most household heads are men, but 6% of households are headed by women. Approximately 36% of families have more than four female members and nearly 7% of families have more than eight female members.

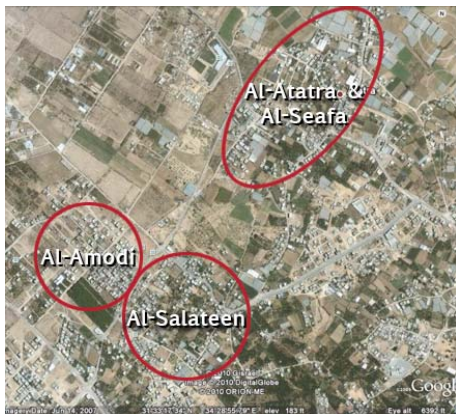


Child | Rafah Kid of wikipedia commons



Palestinian Children on Rooftop | Justin McIntosh of wikipedia commons

## Beit Lahia



Approximately **18%** of households have no income-generating members.

Approximately 12.5% of households have one senior member (60+), 18% of households have two senior members and 1.5% of households have three senior members.

Nearly 60% of the families include between one and five family members who are injured, disabled, or chronically ill.

### Density

A typical household, on average, has 10 family members, and is 177 m<sup>2</sup> in area. This results in 17.7 m<sup>2</sup> per person. Families living in higher density were prioritized in our ranking system. In comparison, a typical urban dwelling in the U.S. would provide approximately 200 m<sup>2</sup> per person.

### Income

Around 18% of families have no income-earning members. Most women work inside the home and are therefore not direct income-earners. Approximately 75% of these families have less than \$200 monthly income. The poverty threshold in Palestine is \$300 per month for a family of six.

In Beit Lahia **199** households were surveyed and analyzed.

### Household Members

Most household heads are men, but 4.5% of households are headed by women. Around 42% of families have more than four female members and around 8% of families have more than eight female members.



Photos from Drijat | Yoavd of wikipedia commons



Family in Yanoon | Armon of wikipedia commons

## Domestic Water Issues



Municipal and private water supplies, when available, suffer from biological and mineral contaminants that pose severe health risks.



Due to associated health risks, many families are forced to purchase bottled water, an expensive and unsustainable practice.



Though households may have an available water source, many storage tanks, supply lines, and fixtures have been damaged beyond use.

New, innovative, and alternative systems need to be implemented in order to reduce the dangerous contamination and nitrogen content. The close proximity of septic systems and domestic well sources is a major issue.



Clean Tap Water | ScienceHealth

## Alternative Systems

### Rainwater Harvesting

Summers in the Gaza Strip are hot and dry. Mild winters produce an annual rainfall in Gaza City of 350-400 millimeters. This equates to an annual volume of 350-400 liters for every meter<sup>2</sup>.

### Well Water Filter

There are many types of water filters designed for wells. The most popular are charcoal filters, water distillers, ceramic filters, reverse osmosis filters, atmospheric water generators, ultraviolet filters, magnetic filters, infrared filters, catalytic filters, ionized filters, and home-made filters.

### Reverse Osmosis Treatment

Also known as hyperfiltration, reverse osmosis is the most common technology used by premium bottled water companies. Of all the technologies used to treat drinking water in residential applications, it has the greatest range of contaminant removal, effectively removing chloride and nitrates, which are commonly found in the municipal water supply. In order to be effective against bacteria, viruses, and cysts, it should be paired with an ultraviolet system and/or a water softener and iron filter.

## Suggestions

### Repair or Replace Damaged Supply Lines, Faucets + Sinks

Check for leaks. Broken plumbing systems should be repaired/replaced. Install low-flow fixtures whenever possible.

### Materials + Methods

- Toilets can be converted to lowflow by putting a waterproof solid mass (ie, a brick) into the tank to displace some of the water
- Install faucet aerators. They reduce flow without reducing pressure

### Repair or Replace Damaged Solar Hot Water Systems

To reduce fuel demands, repair or replace damaged solar hot water systems.

## Rainwater Harvesting

Rainwater can be collected and directed to storage tanks for later reuse. Not only does this provide a valuable resource, but reduces the potential for flooding or drain system overload in dense, urban environments with little permeable area.

### Materials + Methods

- Sheet metal for gutters is available at local markets
- It is advisable to redirect the rain water to the drainage system during the first rain of the season to eliminate potential microbial growth (ie, fecal matter from birds) and other toxic buildup
- Water storage tanks are manufactured locally. Available sizes: 500, 1000, 1500, 2000 liters

### Cost

Approx. \$150 per household

## Well Water Filter

All households that rely on wells for their domestic water should install a filter system. There is a range of small household water filters available. They can serve an entire house or be installed at the point-of-use.

### Materials + Methods

- Whole house filters can be installed anywhere along the main line. Keep in mind security and ease of access for future maintenance
- Point-of-use filters are installed at the supply side of an individual fixture. Keep in mind ease of access for future maintenance

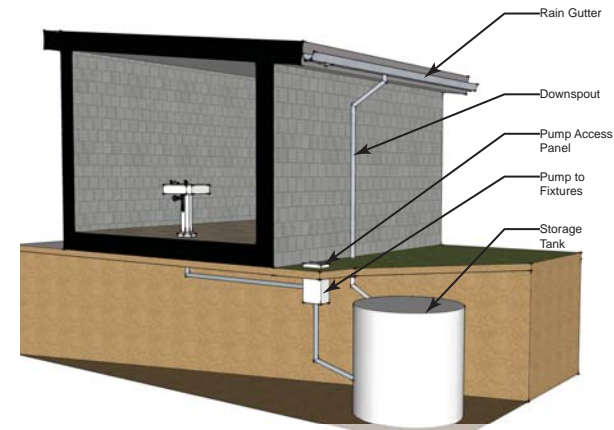
Filters typically require annual maintenance. Check manufacturer recommendations.

## Reverse Osmosis Filter

Currently available in Gaza markets, are common and accepted. They require annual maintenance.

### Cost

\$400per unit



Rainwater Collection | Architecture for Humanity

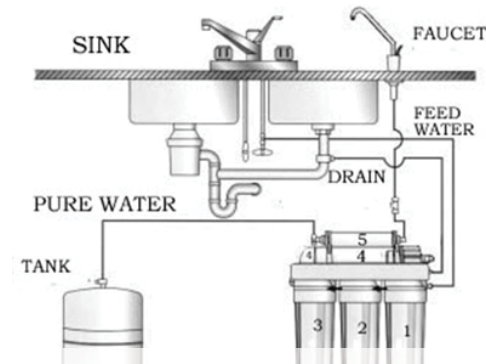
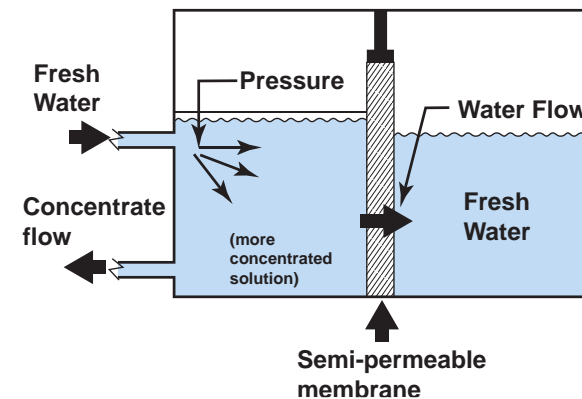


Diagram: Personal Reverse Osmosis Unit | cnwaterfilter



Cross-Section: Large Reverse Osmosis Unit | NDSU

## Sanitary Water Issues

An estimated 70-80% of domestic wastewater is discharged into the environment without treatment and the excessive use of fertilizer further pollutes ground water sources.

New, innovative, and alternative systems need to be implemented in order to reduce the dangerous contamination and nitrogen content. The treatment of wastewater is a vital aspect to solving the issue of contaminated water sources.

Some possibilities include: above-ground systems, recirculating sand filters, aerobic treatment units, humus/composting toilets, intermittent sand filters, bio-latrines, chemical toilets, dosing systems, evaporation-transpiration systems, gravelless systems, greywater systems, holding tank systems, incinerator toilets, lagoon systems, media filter systems, peat-filtered systems, pressure-dosed drainfield systems, steep slope systems, trenches, and wetland systems.

## Alternative Systems

### Above-Ground Septic System

Used to combat conditions of slow or fast permeable soils, shallow soil cover over creviced or porous bedrock, or a high water table. System consists of a septic tank or pretreatment unit, a dosing or pump chamber, and the elevated mound.

### Recirculating Sand Filters

A modified version of the old-fashioned, single-pass open sand filters. It was designed to alleviate odor problems associated with open sand filters. The noxious odors are eliminated through recirculation, which increases the oxygen content in the effluent that is distributed on the filter bed.

### Aerobic Treatment Units

Treats wastewater using natural processes that require oxygen. They use a mechanism to inject and circulate air inside the treatment tank, which requires electricity.

### Humus/Composting Toilets

Toilets which use little or no water and treat toilet waste on-site for reuse as valuable compost. They provide an enclosed environment for the natural process of aerobic decomposition.

### Intermittent Sand Filters

Consists of a 24" deep filter bed with either sand, atracite, mineral tailings, bottom ash, etc and serves as a 'first pass' of filtration before a more sophisticated filtration treatment or disposal. The surface of the bed is intermittently dosed with effluent that percolates in a single pass through the sand to the bottom of the filter.

### Bio-Latrine

Already introduced in some areas of Gaza, consists of a pit latrine, bio-digester, and expansion chambers. Pit latrine is dry with ventilation pipes to remove odors and trap flies. Bio-latrines are different from typical pit latrines because they are shallow and feed directly into the bio-digester, a large underground dome. Methane gas collects in the space and is led out through a plug, and can be used for heat for cooking, hot water heating, laundry irons, refrigerator power, and electricity through generators. It can also be burned to create light. We need this to cover all areas.

# Suggestions

## Septic Tank Systems

Replace cesspit with new septic system.

### Materials + Methods

Poured in place concrete construction, equipment, and accessory materials are readily available in Gaza.

### Cost

\$500 per 8 person household

## Humus/ Composting Toilets

**Appropriate for small single-family residences, compost toilets** reduce water costs, require no sewage connection/ maintenance, produce “humanure,” and do not pollute surrounding groundwater/ soil. **The compost generated could be traded/ sold to local farmers.**

### Materials + Methods

It is not known whether manufactured units are available. Households can build their own, however, user discipline is critical.

### Cost

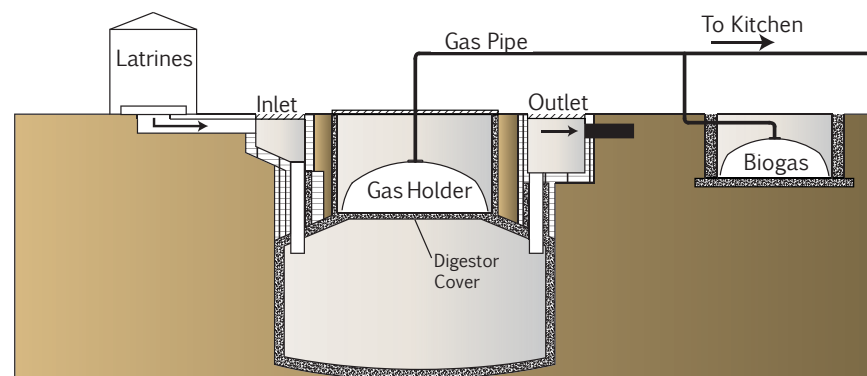
+\$1,000

## Bio-Latrine

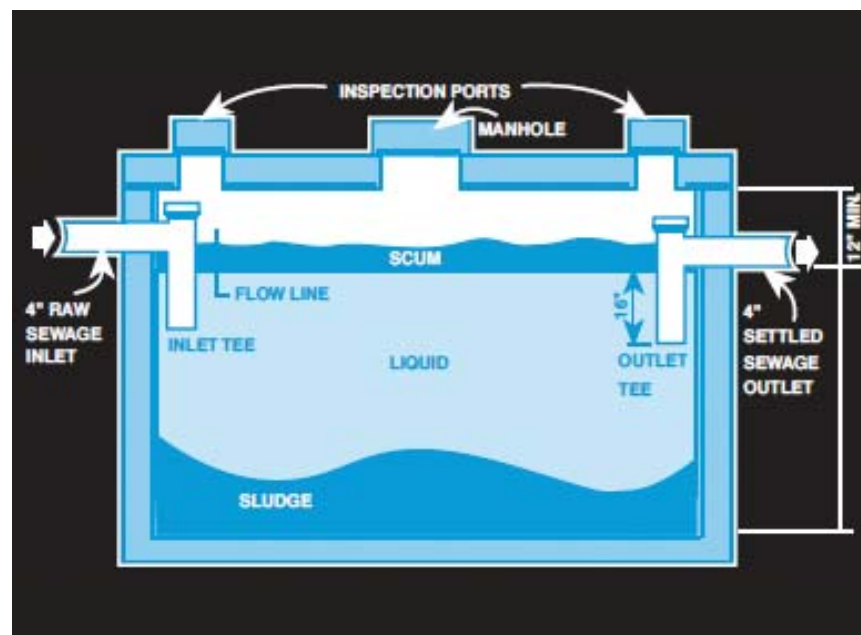
Bio-latrines are well-applied to higher-use areas, such as a multi-unit building or public facility. The methane produced is returned to the building as an energy source.

### Materials + Methods

- Poured in place concrete/ masonry units
- Various chambers for bio-digestion, expansion, and slurry retention
- To benefit from methane production, employ multi-house systems



Bio-Latrine PHOTO | SOURCE



Typical Septic System | NSFC



Self-Contained Composting Toilet | NSFC/BioLet U.S.A.



## Roof Replacement

The focus should be on replacing roofs on houses with either metal or asbestos roofs, as most concrete-roofed houses survived the war with minimal damage.

This represents approximately 10% of the houses surveyed in this study.

Verify structural integrity prior to any replacement.



Damaged Asbestos Roof in Gaza City | UUSC

## Alternative Systems

### Replace Asbestos Roofs

The most efficient means of repairing a damaged asbestos roof is to replace the entire roof with another material, either metal or concrete. Concrete is preferred as it is durable, provides an accessible roof surface, and is locally available material. Patching the roof is not ideal because supplies of the planks are diminishing and, more importantly, when an asbestos roof is damaged, it releases carcinogenic particles into the air.

### Rainwater Collection

Plan for and provide space for rainwater collection, storage, and use. Include a rain water collection systems wherever possible.



Children in Room with No Roof | UUSC

# Suggestions

## Metal Roofs

### Materials + Methods

A good quality metal roof system should be used. This would include:

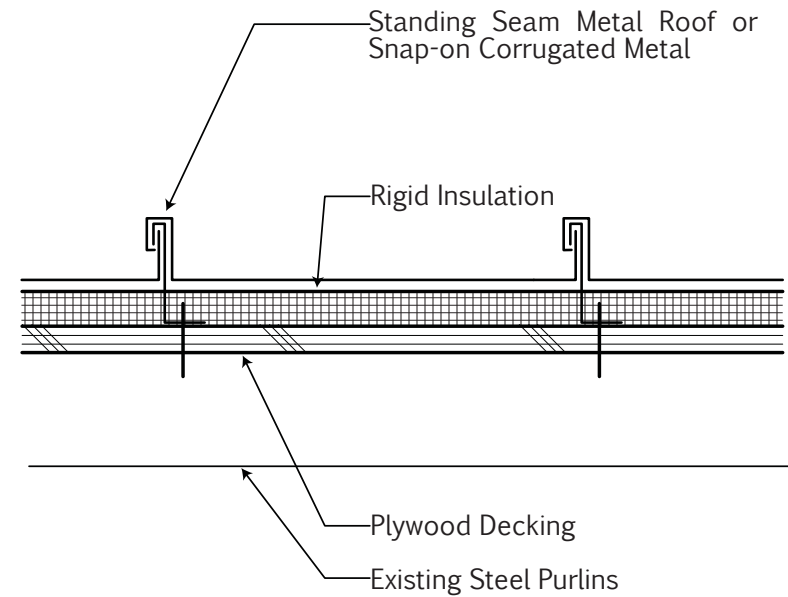
- Heavier gauge metal
- Integral fastening assembly
- Exterior grade paint or sealant applied to both faces
- Plywood substrate with waterproofing
- Rigid insulation over plywood decking

Metal is a good material for rain water collection.

- Metal roof material currently available in Gaza is not durable for long term
- Availability of high standard system is unpredictable, but preferred

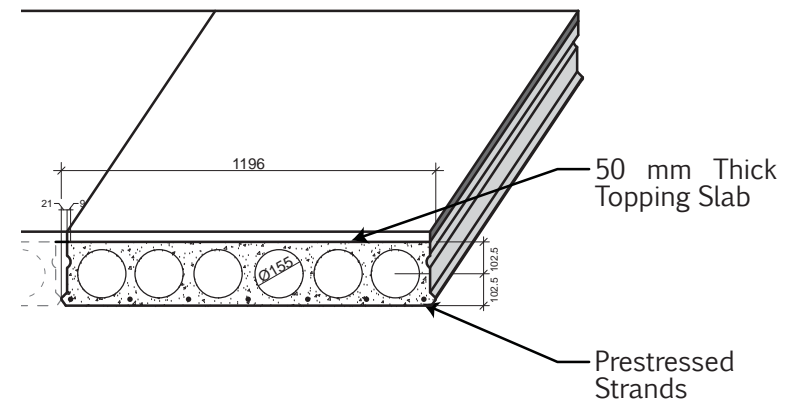
### Cost

- Cost for metal roofing material is low, and currently available in Gaza.
- High standard system is medium to high



### Section - Standing Seam Metal Roof

Not to Scale



### Section - Hollow Core Concrete Panels

Not to Scale



Hollow Core Concrete Plank Roof | Reward Walls

## Concrete Roofs

Concrete is the preferred material for replacement. It can support rain-water collection, water storage, and possible roof garden and/ or terrace space.

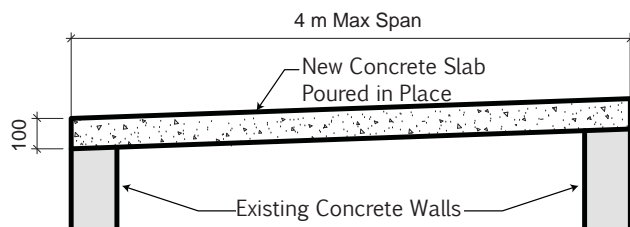
### Materials + Methods

The assembly can either be a 10cm poured in place slab or hollow concrete planks with a 5cm poured in place concrete topping. See diagrams.

- Materials are readily available in Gaza
- Aggregate can come from recycled rubble
- There is local familiarity with concrete construction
- Concrete has good thermal properties.
- Installation of hollow core concrete planks requires heavy machinery, which can be costly.
- If no factories are in the area, it is possible to set up casting beds on site for onsite production.

### Cost

- For poured in place concrete slab the cost is relatively low
- Cost for hollow core concrete planks is dependant on availability



### Section - Concrete Slab

Not to Scale

## Exterior Plaster

Large holes in the exterior walls present obvious security and weatherproofing issues. Walls with large holes should be patched and filled with new concrete block. The cells should be fully grouted with reinforcing bars to tie the new and existing blocks together. The finish plaster can then be added.

## Alternative Systems

### Lime Alternates - Kamkha

Kamkha is currently being used as a substitute for lime in the plastering process in Gaza. This is a recycled material that is a waste produce from tile manufacturing. In the past this material was dumped in open areas, causing environmental problems. This re-use of a manufacturing by-product is encouraging and a great example of how to solve the reconstruction problem with locally available



Damaged Exterior Wall in Beit Lahia | UUSC

## Suggestions

### Plaster

#### Materials + Methods

Water entering the exterior wall system can trap moisture and mold could develop. Continual exposure to mold can create lung problems and other severe allergic reactions. Before any plaster repair, ensure that all mold present, if any, is removed.

Typical Plaster Application:

- Layer 1: cement only
- Layer 2: cement and lime
- Layer 3: rendering, white cement with fine aggregate

Painting is usually not necessary if all three layers are applied. However, if a small area requires patching/ painting, such as a bullet hole, break all loose plaster in the area, clean the area and apply layers 1 and 2.

#### Cost

Access to high exterior walls, over 9meters high, requires scaffolding. It typically costs \$50 to rent scaffolding for a typical facade.



Damaged Exterior Wall in Gaza City | UUSC

# Handrails

The absence of handrails is categorized in this report under Life Safety issues because it presents hazardous conditions. This may not be considered direct damage from the war, but symptomatic of past cost-cutting approaches. Providing handrails in homes will provide safe conditions for children, those disabled (often as a result of the war), and elderly persons.

## Suggestions

### Parapet Wall

Build a solid guardrail with concrete block by either sitting on the existing treads (tie rebar to existing concrete stairs) or by building a concrete block wall in between the stair runs, that would span from ground floor to upper floor.

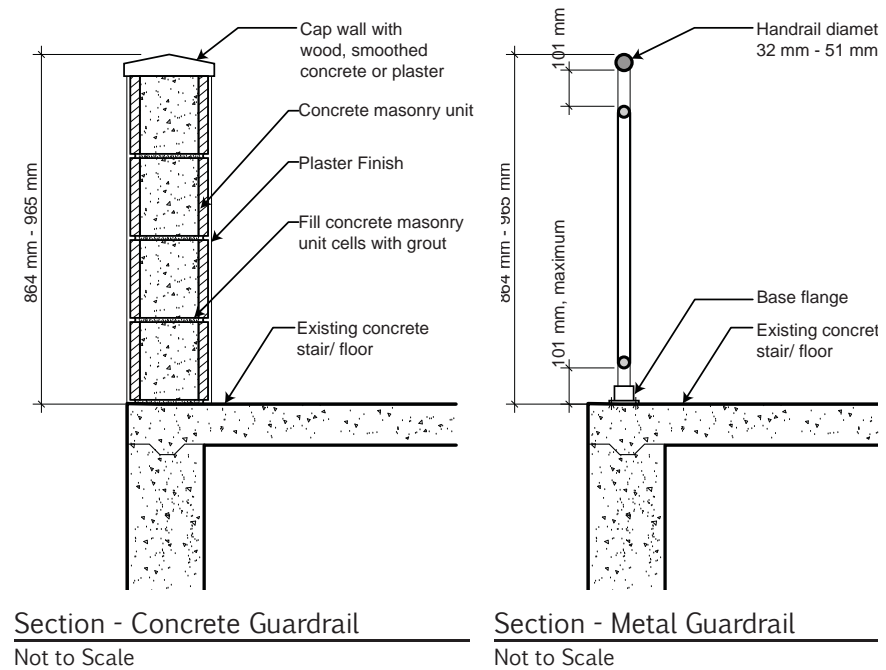
#### Materials + Methods

- Materials are readily available
- Concrete block can sit on treads and the other side of the staircase is supported on concrete columns
- There is local familiarity with concrete construction

### Metal Guardrail

#### Materials + Methods

- Currently raw materials are brought in through tunnels or from Israel. Local metal workers/ fabricators can make handrails and guardrails
- Bolt to existing stair



## Window Replacement

Many windows have been damaged or destroyed. Findings in this assessment include a large amount of broken/ destroyed glass, damaged frames (mostly aluminum). As a result, plastic is used as a temporary solution. Without any means for natural ventilation, indoor air quality, toxic mold growth, and comfort issues arise.

As the rainy season approaches, the repair/ replacement of broken windows becomes critical.

## Alternative Systems

### Louvers

In hot, arid climates, wood or metal louvers/ shutters can replace glass. They are operable and allow the user to adjust for privacy, shade, and ventilation. Overhangs can reduce water infiltration during storms, in particular wind-blown rain.

### Local Fabrication

Many businesses were destroyed during the war. To stimulate and support a local economy, glazing workshops/ factories should be established.



Window Repair in Beit Lahia | UUSC

## Suggestions

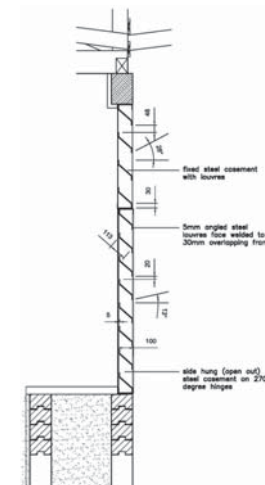
### Glass

#### Materials + Methods

- Single glazing 4mm thick is currently available in Gaza
- Glass is imported in large pieces and then cut to order in the workshops
- Aluminum is imported as sheet materials/fabricated in Palestine
- Steel bars can be used as a guardrail
- Small scale workshops are readily available

### Cost

- Double glazing is costly, not available and would require replacing the frames
- Israeli glass is inexpensive and available in Gaza



Louver | Darren Gill



Missing Window in Beit Lahia | UUSC

## Utilities

The high cost of importing natural gas means a disproportionate amount of the household income goes to purchasing this. All electrical components are manufacture in Israel, however, Palestinian trade contractors are commonly available for \$5.00/day.

The unpredictable electrical supply makes life very difficult and stressful. The residents of Gaza need to develop alternate sources of electricity in order to be self reliant. Alternative solutions are needed to meet basic energy needs forcooking, light, and communications.

## Alternative Systems

### Solar Energy

- photovoltaics
- solar hot water
- solar ovens

### Bio-gas

Methane gas generated from bio-latrines can be used to meet energy needs.

### Generators

These are expensive, loud, and depend on fuel. This is not a long-term recommendation but perhaps better suited as a back-up system - stored in a safe, protected location - for individual families or apartment building.

### High Efficacy Fixtures + Appliances

Compact fluorescent lamps and fixtures greatly reduce energy demands, and costs because of their efficiency and their long life spans.



Solar Panels | U.S. Navy

## Suggestions

### Photovoltaics + Solar Hot Water

The Gaza Strip is a great location to take advantage of the sun's abundant energy. Photovoltaics could be used to meet electrical demands, however expensive, and perhaps not available. Already in place, and perhaps more applicable, are solar hot water systems that heat domestic water in solar rooftop collectors. The hot water is recirculated and stored for domestic hot water.

### Solar Ovens

Solar ovens, also know as solar cookers, can be home-made and require no fuel. They can be used to meet cooking needs entirely or to pre-heat foods to save fuel.

They only work during daylight hours and require more time to cook foods than conventional ovens. However, the more gradual and consistent heat distribution reduces the risk of burning or uneven cooking.

### Bio-gas

Methane gas from bio-latrines can be used as a fuel source for many residential applications.

### High Efficacy Fixtures + Appliances

The Gaza Electrical Generating Plant operates at a limited capacity. Energy-saving fixtures and electrical devices should be installed and used. Electric power savers, electricity saving devices are available in local markets.



Solar Oven | Atlas de la Cuisine Solaire

## Tile

Tile is available locally. Spanish and Egyptian imports are also available.

Despite availability, tile installation practices are often inadequate. Floor tile is set on sand over concrete, rather than a setting medium such as mortar or grout. Also, many homes have no floor slab, and tile is thus laid directly on the sand/ dirt below. Ants, animals, and moisture can easily make their way in.



Damaged Bathroom in Gaza City | UUSC



Damaged and Missing Floor Tiles in Gaza City | UUSC

## Alternative Systems

### Kamkha

As a replacement for Lime, Kamkha is used for tiling and plastering works. Kamkha is mixed with cement and sand to be used for floor tiling and plastering purposes. It is a recycled material that is produced as a waste of tile manufacturing. In the past, this material was dumped in open areas and caused environmental problems to the soil. Currently, it is being used as an important construction material and sold by \$20 per cubic meter.

## Suggestions

### Walls - use tile with recycled content

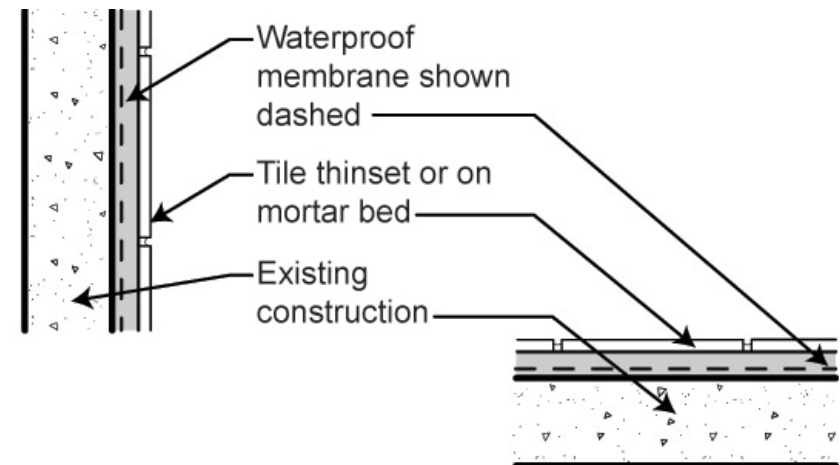
#### Materials + Methods

- Remove any mold, plaster, and concrete block
- Install a waterproof membrane (heavy plastic) on the room-side of the wall framing
- Raw materials are purchased from Israel. Recycled materials are available in Gaza

### Floors - use tile with recycled content

#### Materials + Methods

- Install a waterproof membrane (heavy plastic) over the subfloor, concrete, wood, or directly at-grade if there is no subfloor



Wall + Floor Tile Details | Architecture for Humanity

# Suggestions

## Interior Plaster

### Materials + Methods

A minimum of two coats should be applied. The first coat should be not be less than 6mm thick with a sand to Portland cement ratio of 1:2. The second coat should be 10mm thick with a sand to Portland cement to Kamkha ratio of 1:3:0.25. Kamkha is reused material from the tiles factory used instead of lime stone.



Interior Plaster Damage | UUSC

## Interior Paint

### Materials + Methods

After removing the old paint layer completely apply a minimum of two layers of putty. One layer of primer undercoat and two layers of oil paint are recommended.

### Cost

- Paint can be purchased locally
- \$30 to \$40 per 4m<sup>2</sup>



Interior Painting Damage | UUSC



## Community Engagement

Integrating the community in every step of the reconstruction process is crucial to success. It is important to focus on clarity, transparency, and organization in order to prevent conflicts with the community members before, during, and after the reconstruction effort.

The first step, which is often the most important step, is to find a reliable, competent, and knowledgeable building partner. The next step is to create an environment in which the community served can contribute and their help is noticeably and directly effecting the reconstruction process.

The benefit of properly engaging the community is that, with enough trained facilitators in affected communities, it will be easier to scale up reconstruction and give people certainty about how reconstruction will proceed and what their role in reconstruction will be.



Gaza Beach | Gus at nl.wikipedia

### Selecting a Building Partner

No single organization or category of organization can provide the institutional, human, technical, and financial resources needed to carry out a successful post-disaster reconstruction program. Collaboration among these organizations is key to successful post-disaster housing and community reconstruction. It is also important to create a clear set of ground rules that describe the roles and responsibilities of each partner in the effort. When dealing with partners, we must uphold the principles of equality, transparency, result-oriented approach, responsibility, and complementarity. The building partner(s) should be responsible for training the laborers. This means that the building partners will be held liable for laborers who are using inappropriate techniques or are inadequately trained for their work.

### Creating a Community-Friendly Environment

It may seem easier to separate the advice and suggestions of the community with the building effort, but it is far less effective. Without integrating the community's ideas into the building effort, both conceptually and physically, the community will not acquire the necessary feeling of ownership toward the new structures. It is important to establish that these repairs will not completely replace what they once had, but with the community's help, they can fulfill some of the basic human needs that have been lost due to the war.

Through multiple workshops, town hall meetings, private conversations, and public forums, the community should understand their role in the rebuilding efforts. By contributing ideas, skills, and manual labor, the community members will seamlessly gain a sense of ownership, pride, and understanding toward the new structures. This will ensure the sustainability of the project and the community members' positive views.



Child in His Home | UUSC

## Model 1

### Non-Governmental Organization (NGO) with Contractor

#### NGO's Role

- monitor construction process
- provide a 'go-to' person to respond to questions and concerns
- provide funds
- provide volunteers
- identify the beneficiaries

#### Contractor's Role

- train local labor
- use local labor
- source materials

#### NGO's and Contractor's Roles

- hold community meetings
- interface with governmental agencies



Repairing Water Pipe | Natan Flayer of wikipedia commons

## Model 2

### NGO with the Community only

#### NGO's Role

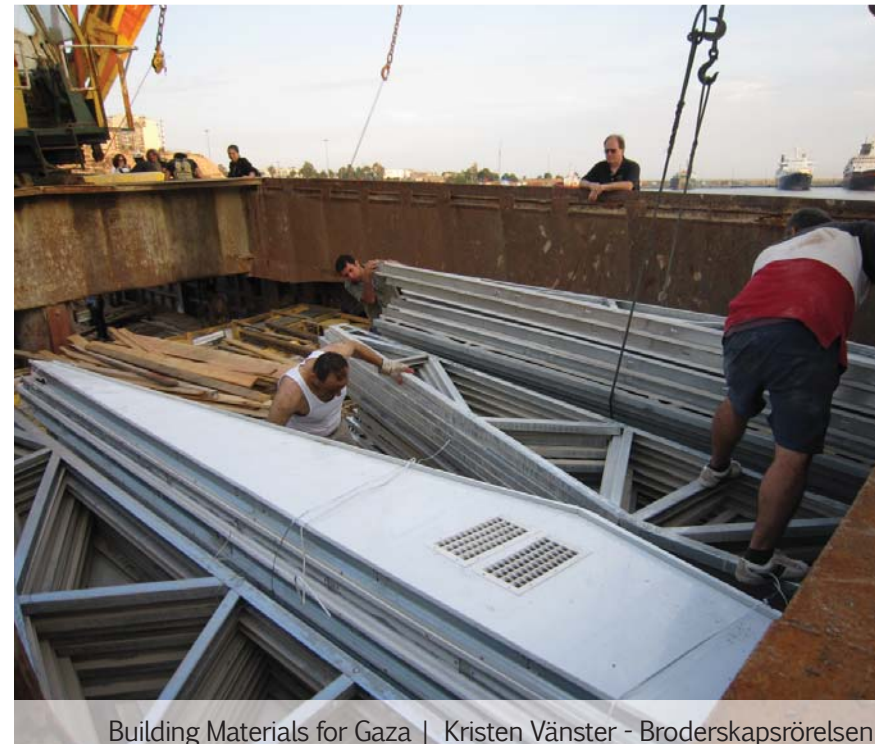
- bring their own engineers and construction managers
- hold community meetings
- identify beneficiaries
- provide volunteer labor
- provide training
- interface with governmental agencies
- monitor construction process
- provide a 'go-to' person to respond to questions and concerns

#### Community's Role

- provide majority of labor
- identify a community leader

#### Negotiable Roles

- establish a strategy for material sourcing



Building Materials for Gaza | Kristen Vänster - Broderskapsrörelsen

## Beneficiaries

The process of selecting beneficiaries should always be transparent, and follow clear, fair criteria that have been shared, and preferably developed together with, families and communities. A transparent process will help everyone involved understand the rationale for selection, and hopefully generate broad-based support among the community.

**Our priority-ranked database of homes** in six neighborhoods is the result of a thorough assessment and analysis of over 25 data categories. Organizations interested in selecting

### Beneficiaries from this database might consider:

- **Prioritizing homes from the top of the list**, which ranks homes from most to least in need of repairs from a perspective of damage that threatens safety and dignity.
- **Focusing on one kind of repair** and selecting from the database households in one or several neighborhoods that share the same repair need. For example, replacing windows in one neighborhoods, or repairing wells in the three Beit Lahia neighborhoods.
- **Prioritizing neighborhoods** that show a strong interest in learning construction skills and contributing in kind to the repair efforts.
- **Selecting households** according to a certain demographic, such as families with more than five children, or families with no income-earners.



Palestinian Women's Center in Rafah, Gaza | CODE PINK



UNRWA school in Rafah, Palestine | Rafahkid - Flickr

## Replicating our methods

Our assessment methodology and system for prioritizing beneficiaries from a humanitarian perspective can also serve as models for organizations interested in replicating them in other areas of Gaza.

## Coordination with the Shelter Sector

All repair and rebuilding efforts should be coordinated with the Gaza Shelter Sector, lead by the Norwegian Refugee Council (NRC). This group of organizations has created and uses a single Unified Shelter Sector Database, which centralizes all damage assessments and helps prevent overlap and duplication. More information is available at [www.sheltergaza.org](http://www.sheltergaza.org).

Data from this assessment, including identifying information, assistance received, and recorded damages, has been cross-checked with the Unified Shelter Sector Database.

Our complete database can be found at:  
[www.openarchitecturenetwork.org/projects/repair\\_gaza](http://www.openarchitecturenetwork.org/projects/repair_gaza)



**Organization Name**

American Friends Service Committee  
Architecture for Humanity

**Project Name**

Identifying Alternative Repair and Rebuild  
Strategies in Gaza following the 2008-9 War

**Report No.**

001 (Field Visit Report)

**Objectives**

- To conduct a preliminary visit to prepare for the starting of the project.
- To identify preliminary areas for assessment.
- To test the criteria for selection.
- To identify the key persons who could assist the team in the field assessment.
- To begin communication with the local communities.
- To begin searching for alternative solutions for rehabilitation

**Assessment Team**

Architect: Dr. Mohamed El Eila  
Engineer: Hatem Jaber  
Engineer: Ahmad Al-Zamly

**Survey**

The survey information was entered into a database in which a numerical ranking system was used to assess and prioritize repair need. The assessment focuses on a sample of homes within the surveyed neighborhoods, and does not include homes that were completely destroyed. The team interviewed families and inspected homes to gather information on housing conditions and damages as well as to document socioeconomic conditions. A questionnaire (Appendix 1) was developed and field tested for this purpose.

**Place of Visit**

**Gaza City: Al-Zayton** Neighborhood: Al-Samony area, Totah Area, east & west of cars market area.

**Beit Lahia City:** Al-Atatra & Al Seiafa, Al-Salaten & Al-Amody, Amer Project area.

**Jabalialia:** Ezbet Abed Rabo area.

**Goals of Visit**

1. To identify areas affected by the war of Gaza 2008-09.
2. Selection of areas that can be worked select for assessment.
3. To determine the mechanism that will be worked out during the assessment process for affected houses.
4. To identify the economic and social nature of the local community
5. To identify the nature of the damages to the residents homes to be taken into consideration within the Repair Project.

**Gaza City: Al-Zayton neighborhood****a. Al-Samony neighborhood**

The Al-Samony neighborhood is located in the far south of Al-Zaytoun, near the former settlement of Netzarim, most of the residents from the Al-Samony family. It has about 70 houses and about 400 inhabitants. The area is rural so most of the residents depend on agriculture as their main source of income. Many of the houses in this region were completely destroyed; those that sustained partial damage need urgent rapid intervention to be suitable for living. The approximate area is 1.7 Km<sup>2</sup>.

**b. Totah neighborhood**

Totah is located in the middle of the Al Zayton region, it has about 1600 inhabitants living in about 200 residences. Many homes have sustained direct damage from the war on Gaza. The homes have been identified as having sustained total damage, major damage, and minor damage. The area is suitable for work by a project mechanism, and their is a large proportion of the population that is low-income and unemployed. The approximate area is 1.2 Km<sup>2</sup>.

**c. East & West of Cars Market neighborhood**

The neighborhood is located between the Al-Samony area and Totah area. It has about 100 houses and about 700 inhabitants. The region has rural land and a low population density and contains some small scale factories. There is substantial damage to the agricultural land and many factories have been destroyed. Affected homes sustained minor damage. The approximate area is 1.8 Km<sup>2</sup>.

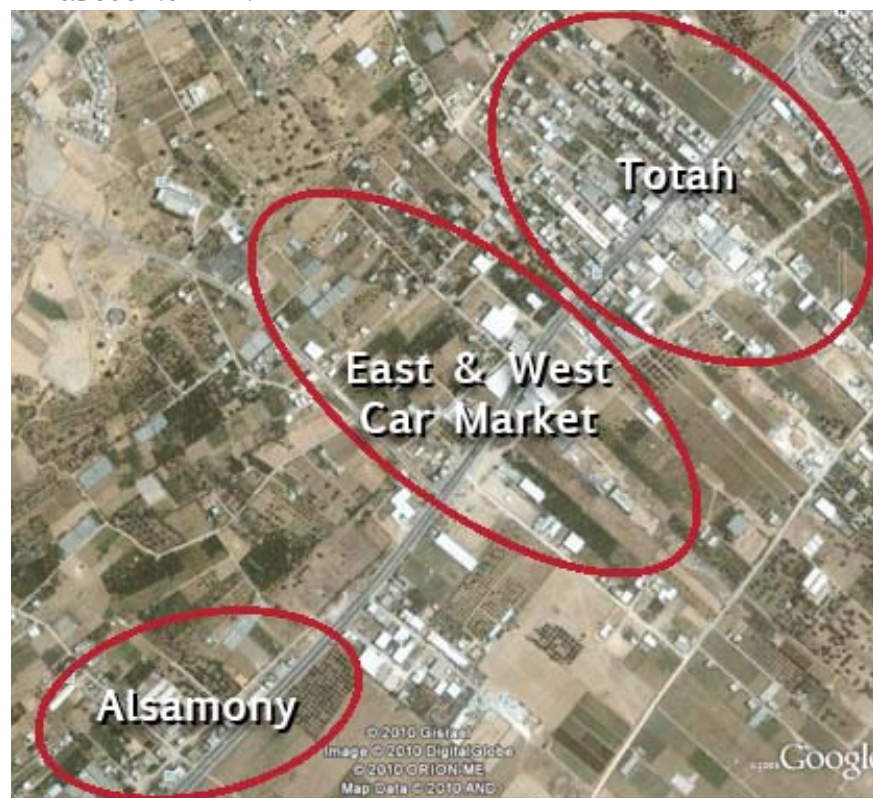
## North area: Beit Lahia City

### a. Al-Atatra & Al-Seiafa

This area is located in the northwest of Beit Lahia City, north of Gaza City. It has about 1800 inhabitants living in about 250 houses. The area is close to former settlements of Nissanit and Dugit and Eli Sinai that has led to frequent Israeli military invasions resulting in direct damages. Many of the houses of this region have sustained both total destruction and partial damage. The majority of the population is low-income and unemployed. The approximate area is 1.2 Km<sup>2</sup>.

### b. Al-Salaten

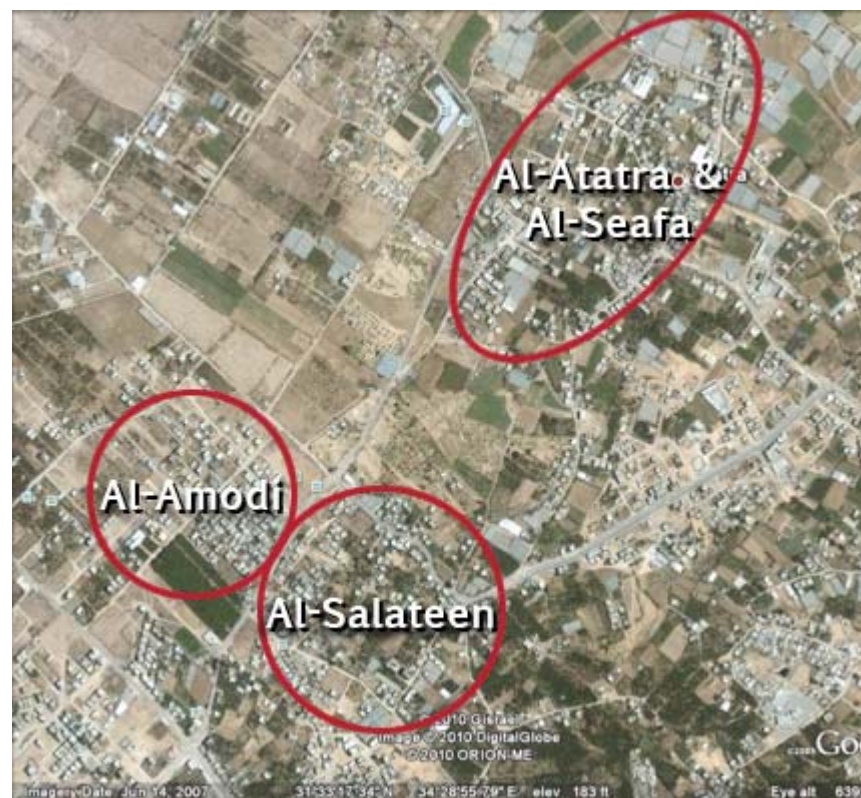
This area is located south-west of Beit Lahia city; it has about 200 houses and about 1500 inhabitants. Most of the population is low-income and unemployed. The houses in this region have sustained total destruction, or partial and minor damage. The area is suitable for work by a project mechanism. The total surface area of this community is about 1.0 Km<sup>2</sup>.



Satellite image of Al-Zayton neighborhood

### c. Al-Amody

This area is located south of Al-Salaten & Al-Atatra; it has about 180 houses and about 1300 inhabitants. Most of the population is low-income and unemployed. Many of the houses of this region have sustained total destruction or partial and minor damage. The area is suitable for work by a project mechanism, the approximate area is 0.8 Km<sup>2</sup>.



Satellite image for west Beit Lahia neighborhoods

## North area: Beit Lahia City cont.

### d. Amer neighborhood

This area is located at the far south of Beit Lahia city near the sea. Most of the houses in the villa system (high class) and most of the population is high-income earners and Mediterranean. Homes have sustained major damage which has been repaired by the owner themselves.

### Jabalia City: Ezbet Abed Rabo neighborhood

- a. Abed Rabo is located in the east of Jabalia city; it has about 230 houses and about 1600 inhabitants. Many of the houses in this area sustained total destruction or partial damage; the houses need urgent rapid intervention to be suitable for living. The approximate area equals 1.5 Km<sup>2</sup>



Satellite image for west Ezbet Abed Rabo neighborhood

## Results and Observations

### Observations and Assessment of the Field Visit:

During the Field visit, the team identified the nature of the local community and war-affected areas and created a mechanism and a plan of work according to the project standards that have been identified for the selection of the areas affected and the type of the houses damage.

### Results and Recommendations for the Field Visit:

This is a preliminary visit to prepare for starting the project. We have identified areas that will be approved with the criteria developed by project engineers as the following:

#### Gaza City, Al-Zayton Neighborhood:

Al-Samoony area, Totah area, East & West Cars Market area.

#### Beit Lahia City:

Al-Atatra & Al-Seiafa area, Al-Salaten & Al-Amody area and we have excluded Amer area from the list because of non-conformity with the terms of the project.

#### Jabalia City:

We select Ezbet Abed Rabo area because of conformity with the terms of the project.





**Organization Name:** American Friends Service Committee  
Architecture for Humanity

**Project Name:** Identifying Alternative Repair and Rebuild Strategies in Gaza following the 2008-9 War

**Introduction:**

In response to the current humanitarian crisis in Gaza the American Friends Services Committee (Quaker) is implementing a damage assessment in several areas of Gaza strip this assessment is funded by UUSC and implemented in the period of May – August 2010

**Questionnaire.**

**Part 1: Personal Information on the family head**

1_1 Questionnaire No.:	1_2 Date:
1_3 Name:	1_4 ID No.:
1_5 Sex	1_6 Age :
1_7 Refugee : Non Refugee :	
1_8 Area No.:	
1_9 Full Address:	
1_10 Telephone No.:	1_11 Mobile No.:

**Part 2: Socio-Economic Factors**

2\_1 Total family members including family head.....

2\_2 Family member aged less than 18 years old.....

2\_3 Family member older than 60 years.....

2\_4 Detail on the family members living in the house

	Name	Age	Sex	Relationship to the family head	Education level
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					

2\_5 Are there any family members who are currently injured or disabled or chronically ill.....

	Name	Case	Need
1			
2			
3			
4			
5			

2\_6 Are there family members who currently hold a job

	Name	Job	Place	Salary\$
1				
2				
3				
4				
5				

2\_7 Total monthly family income (Salary and assistants).....

**Part 3 Housing Unit Conditions**

3_1 House Area (m <sup>2</sup> ) .....	3_2 Land Area (m <sup>2</sup> ).....
<b>3_3 Ownership:</b> <input type="checkbox"/> 1- Owned <input type="checkbox"/> 2- Rented <input type="checkbox"/> 3- Other	
<b>3_4 Building Type:</b> <input type="checkbox"/> 1- Concrete building <input type="checkbox"/> 2- Asbestos Building <input type="checkbox"/> 3- Others	
<b>3_5 Type of residence:</b> <input type="checkbox"/> 1- Single family detached house <input type="checkbox"/> 2- Semi detached <input type="checkbox"/> 3- Multiple story apartment building <input type="checkbox"/> 4- Other Specify .....	
<b>3_6 Building Status:</b> <input type="checkbox"/> 1- New (<10years) <input type="checkbox"/> 2- Moderate between 10 & 30 years <input type="checkbox"/> 3- Old (>30years )	
3_7 Number of Rooms:.....	
3_8 Number of Rooms for Children:.....	
3_9 Number of Rooms for aged people :.....	
3_10 Drinking Water Source : <input type="checkbox"/> 1- Ground Water <input type="checkbox"/> 2- Municipality Water <input type="checkbox"/> 3- Other .....	
3_11 Has the main water source been damaged? <input type="checkbox"/> 1- Yes <input type="checkbox"/> 2- No	
3_12 Has the electricity network been damaged? <input type="checkbox"/> 1- Yes <input type="checkbox"/> 2- No	
3_13 Has the sanitary water network been damaged? <input type="checkbox"/> 1- Yes <input type="checkbox"/> 2- No	

**Site Drainage**  
 3\_14 Where does rainwater drain to?  
1- Inside the house   2- To the street   3- To the drainage system

3\_15 Does any flooding near house occur during rains? 1- Yes   2- No

3\_16 Type of cooking?  
1- Natural gas   2- wood burning   3- charcoal   4- electric

3\_17 Sketch or Drawing of the house and property :      3\_18 Photos

3\_19 Comments:

3\_20 Does the family own any other properties "land, house?   1- Yes   2- No

3\_21 If Yes, please specify .....

3\_22 Date of house hitting in the war.....

3\_23 Type of damage   1- Minor   2- Moderate   3- Major   4- Sever

3\_24 Has the family house been repaired by any of government, United Nations, UNDP, NGO's or by them self

	Organization	Type of work repairing done	Cost \$	Date
1				
2				
3				
4				
5				

**Part 4: Assessment of Elements Repairing Needed**

Element Description	Measurement Unit	Quantity	Unit cost in \$	Total repair cost in \$	Comment
<b>General Work</b>					
Block Works thick 20cm	m <sup>2</sup>				
Block Works thick 15cm	m <sup>2</sup>				
Block Works thick 10cm	m <sup>2</sup>				
Concrete Work	m <sup>3</sup>				
Window Marble Works	m <sup>2</sup>				
Terrazzo work	m <sup>2</sup>				
Internal Plastering Works	m <sup>2</sup>				
Internal Painting Works	m <sup>2</sup>				
Electrical Installation	m				
Switch	No				
Power Socket	No				
Lighting Unit	No				
Wooden Door Frame	No				
Wooden Doors 90 cm	No				
Wooden Doors 120 cm	No				
Wooden Doors 160 cm	No				
Wooden Doors maintenance	No				
Mul-T-lock door	No				
Windows Aluminum Glass	m <sup>2</sup>				
Windows Aluminum leaf	m <sup>2</sup>				
Windows Frame	m				
Windows louvers	m <sup>2</sup>				
Roof Asbestos Sheet	m <sup>2</sup>				
Roof Metal Sheet (Zinco)	m <sup>2</sup>				
Steel pipe 3 inch	m				
Other Elements					
<b>External Work</b>					
External Plastering Works	m <sup>2</sup>				
External Painting Works	m <sup>2</sup>				
Handrail	m				





### C.1. Construction Materials Manufactured in Gaza Factories

Most of the construction materials manufactured in Gaza are using raw materials from different sources such as from Israel or Egypt.

Construction material	Increase Price compared to its original price	Quality
Concrete block using recycled aggregate	50% increase	Fair
Floor tiling using Egyptian cement	10% increase	Fair
Painting materials using Egyptian raw materials	20% decrease	Fair
Electrical fittings using Egyptian raw materials	30% increase	Good
Plastic Pipes for water supply (different sizes) using Israeli raw materials	30% increase	Good
Pipes for sewer (different sizes) using Israeli raw materials	50% increase	Good
Solar panels for water heating using copper pipes for Egypt and glass from Israel.	20% increase	Good
Plastic water tanks (different sizes) using Israeli raw materials	10% increase	Good

### C.2. Construction Materials Purchased from Egypt and Smuggled via Tunnels

Palestinian traders are purchasing many construction materials from Egyptian traders and sending them to Gaza via tunnels. There is significant increase in prices of these materials compared to its prices in Egypt or Israel.

Construction material	Increase Price compared to its original price	Quality
Cement	50% increase	Good
Lime	10% increase	Fair
Steel reinforcement bar	20% decrease	Good
Wood	30% increase	Good
Aluminum	30% increase	Fair
Floor and wall tiles	30% increase	Fair
Painting materials	5% increase	Fair
Nails & screws	No changes	Fair
Toilets & sinks	No changes	Good
Shower trays	No changes	Good
Electrical fittings	No changes	Good
Tools, equipment and machinery	No changes	Good

### A.3. Construction Materials Purchased from Israel and Officially Entered Gaza

Palestinian traders are purchasing many construction materials from Egyptian traders and sending them to Gaza via tunnels. There is significant increase in prices of these materials compared to its prices in Egypt or Israel.

Construction material	Increase Price compared to its original price	Quality
Lime	10% increase	Good
Wood	10% increase	Good
Aluminum	10% increase	Good
Glass	10% increase	Good

## Progress Report Week 2 30 August - 3 June 2010

### D.1. Field Survey at Gaza City Areas

The field survey at four areas of Gaza City had been conducted. Around 134 housing units were investigated in the following areas.

Date	Area	Number of the visited houses
Sun. 23/05/2010	Samoni Area	21
Mon. 24/05/2010	Samoni Area	21
Tue. 25/05/2010	Car Market Area	11
Wed. 26/05/2010	Car Market Area	18
Thu. 27/05/2010	Office	-
Sun. 30/05/2010	Office	-
Mon. 31/05/2010	TOTAH	23
Tue. 01/06/2010	Office	-
Wed. 02/06/2010	TOTAH	26
Thu. 03/06/2010	TOTAH	14
	Total Number	134

### D.2. Refugee or Non Refugee

Most of the visited families are non refugees since the visited areas are at the periphery areas of Gaza City and resident by non refugees. The refugees who are more than 50% of the residents of Gaza Strip are living in the refugee camps, these areas are out of the scope of our assessment.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Non-Refugee	126	94.0	94.0	94.0
	Refugee	8	6.0	6.0	100.0
	Total	134	100.0	100.0	

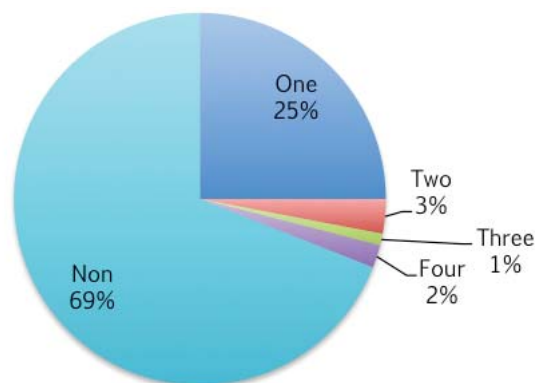
### D.3. Total family members including family head

Around 80% of the visited houses have a total of 12 family members or less including the head of the family. In general the average family size in Gaza is 7.0 persons/family.

	Frequency	Percent	Valid Percent	Cumulative Percent
2	3	2.2	2.2	2.2
3	7	5.2	5.2	7.5
4	8	6.0	6.0	13.4
5	3	2.2	2.2	15.7
6	14	10.4	10.4	26.1
7	14	10.4	10.4	36.6
8	19	14.2	14.2	50.7
9	11	8.2	8.2	59.0
10	9	6.7	6.7	65.7
11	11	8.2	8.2	73.9
12	8	6.0	6.0	79.9
13	6	4.5	4.5	84.3
14	5	3.7	3.7	88.1
15	4	3.0	3.0	91.0
16	2	1.5	1.5	92.5
17	1	.7	.7	93.3
19	3	2.2	2.2	95.5
20	2	1.5	1.5	97.0
21	1	.7	.7	97.8
23	1	.7	.7	98.5
27	1	.7	.7	99.3
37	1	.7	.7	100.0
Total	134	100.0	100.0	

#### D.4. Number of Working Family Members

Around 70% of these families have no one with a job at all. This means that 70% of these families are poor and could not afford to pay for the basic needs of their families. Around 75% of these families have less than \$300 as monthly income while the poverty threshold in Palestine is \$300 per month for a family of 6 including the parents.



#### D.5. No. of family members who are currently injured, disabled, or chronically ill.

Almost 55% of the families have at least one family member who is injured or has chronic disease.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	61	45.5	45.5	45.5
	1	38	28.4	28.4	73.9
	2	19	14.2	14.2	88.1
	3	11	8.2	8.2	96.3
	4	4	3.0	3.0	99.3
	5	1	.7	.7	100.0
	Total	134	100.0	100.0	

#### D.6. Date of house damage during the war

All households informed us that they had been damaged on the same day of 03 January 2010

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 03.01.2009	134	100.0	100.0	100.0

#### D.7. Type of Damage

93% of the visited houses are classified as sustaining minor damages (small hall at walls, glass windows, doors, water tanks, etc.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Minor	125	93.3	93.3	93.3
	Moderate	9	6.7	6.7	100.0
	Total	134	100.0	100.0	

#### D.8. Has the family gotten any primary assistance “cash” from the government?

- 41% received government agency emergency cash assistance ranging from \$100 - \$3,000
- 80% received additional emergency cash assistance ranging from \$100 - \$3,000 depending on the degree of damage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	79	59.0	59.0	59.0
	Yes	55	41.0	41.0	100.0
	Total	134	100.0	100.0	



### D.9. Has the family gotten any primary “cash” assistance from UNDP or UNRW?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	26	19.4	19.4	19.4
	Yes	108	80.6	80.6	100.0
	Total	134	100.0	100.0	

### D.10. Has the family house been repaired by themselves?

Only 37% of the families were able to make some repair of their houses.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	83	61.9	61.9	61.9
	Yes	50	37.3	37.3	99.3
	2	1	.7	.7	100.0
	Total	134	100.0	100.0	

### D.11. Has the family house been repaired by the government?

Only 7.5% got assistance from the government for repairs. Only 2% got assistance from international institutions such as Quakers and Rahmah for basic repairs.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	123	91.8	91.8	91.8
	Yes	10	7.5	7.5	99.3
	2	1	.7	.7	100.0
	Total	134	100.0	100.0	

### D.12. Has the family house been repaired by Mercy International organization?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	131	97.8	97.8	97.8
	Yes	2	1.5	1.5	99.3
	2	1	.7	.7	100.0
	Total	134	100.0	100.0	



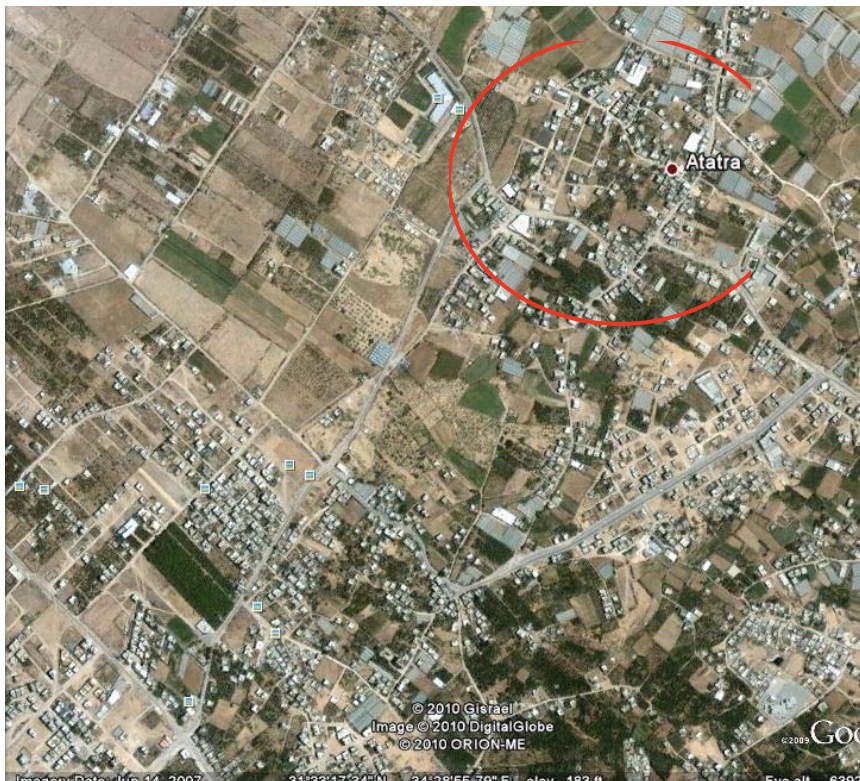
## Progress Report Week 3 6-10 June 2010

### Field Survey at North Gaza:

This week the field survey one area of North Gaza had been conducted. Around 55 housing units were investigated in the following areas:

#### E.1. Al-Atatra and Al-Seifa neighborhood North-West of Beit Lahia City at the northern part of Gaza Strip

Located in the northwest of Beit Lahia City north of Gaza City, it has about 250 houses and about 1800 inhabitants. It's closed to the Israeli border and has been the site of several incursions with direct damages. Many of the houses in this region have been sustained with total, major, or minor damage in this area. A large proportion of the population is low-income and unemployed. The approximate area of this neighborhood is equal to 1.2 Km<sup>2</sup>.



Date		Number of the visited houses
Sun 06/06/2010	Office work	-
Mon 07/06/2010	Atatra Area	16
Tue 08/06/2010	Office Work	0
Wed 09/06/2010	Atatra Area	21
Thu 10/06/2010	Atatra Area	18
<b>Total Number visited this week</b>		<b>55</b>
<b>Total Number visited since the beginning of the assessment</b>		<b>189</b>

### General socioeconomic factors of the residents of this area

#### E.2. Refugee or Non-Refugee

Most of the visited families (92% of this area) are registered as non-refugees since the visited areas are at the periphery of Beit Lahia City.

	Frequency	Percent	Valid Percent	Cumulative Percent
Non-Refugee	51	92.7	92.7	92.7
Refugee	4	7.3	7.3	100.0
Total	55	100.0	100.0	

### E.3. Total family members including family head

Around 60% of the visited houses have more than 7 family members including the head of the family.

	Frequency	Percent	Valid Percent	Cumulative Percent
2	1	1.8	1.8	1.8
3	3	5.5	5.5	7.3
4	1	1.8	1.8	9.1
5	6	10.9	10.9	20.0
6	6	10.9	10.9	30.9
7	5	9.1	9.1	40.0
8	6	10.9	10.9	50.9
9	5	9.1	9.1	60.0
10	7	12.7	12.7	72.7
11	5	9.1	9.1	81.8
12	1	1.8	1.8	83.6
13	2	3.6	3.6	87.3
14	1	1.8	1.8	89.1
15	1	1.8	1.8	90.9
17	1	1.8	1.8	92.7
18	2	3.6	3.6	96.4
20	1	1.8	1.8	98.2
21	1	1.8	1.8	100.0
Total	55	100.0	100.0	

### E.4. Family members under 18 years old

About 55% of the visited families have more than 4 children under 18 years old. 30% of these families have more than 6 children.

	Frequency	Percent	Valid Percent	Cumulative Percent
0	2	3.6	3.6	3.6
1	3	5.5	5.5	9.1
2	1	1.8	1.8	10.9
3	9	16.4	16.4	27.3
4	10	18.2	18.2	45.5
5	7	12.7	12.7	58.2
6	7	12.7	12.7	70.9
7	7	12.7	12.7	83.6
8	2	3.6	3.6	87.3
9	3	5.5	5.5	92.7
11	2	3.6	3.6	96.4
12	2	3.6	3.6	100.0
Total	55	100.0	100.0	

**E.5. Family members over 60 years old**

Only 7.3% of these families have 2 persons over 60 years old.

	Frequency	Percent	Valid Percent	Cumulative Percent
0	49	89.1	89.1	89.1
1	2	3.6	3.6	92.7
2	4	7.3	7.3	100.0
Total	55	100.	100.0	

**E.6. Number of Females in the house**

43.6% of these families have more than 4 females. About 12% of these families have 7-10 females.

	Frequency	Percent	Valid Percent	Cumulative Percent
1	4	7.3	7.3	7.3
2	3	5.5	5.5	12.7
3	16	29.1	29.1	41.8
4	8	14.5	14.5	56.4
5	6	10.9	10.9	67.3
6	6	10.9	10.9	78.2
7	6	10.9	10.9	89.1
8	4	7.3	7.3	96.4
9	1	1.8	1.8	98.2
10	1	1.8	1.8	100.0
Total	55	100.0	100.0	

**E.7. Number of family members who are currently injured, disabled or chronically ill**

Large numbers of these families (50%) had one or more person with injury or chronic diseases.

	Frequency	Percent	Valid Percent	Cumulative Percent
0	28	50.9	50.9	50.9
1	16	29.1	29.1	80.0
2	9	16.4	16.4	96.4
3	2	3.6	3.6	100.0
Total	55	100.0	100.0	

**E.8. Number of family members who are currently employed**

Around 87% of these families have no one with a job at all. This means that 87% of these families are poor and cannot afford to pay for the basic needs of their families.

	Frequency	Percent	Valid Percent	Cumulative Percent
0	48	0	87.3	87.3
1	6	1	10.9	98.2
2	1	2	1.8	100.0
Total	55	Total	100.0	

### E.9. Total monthly family income (Salary and assistance) (NIS)

Around 80% of these families earn less than 800NIS equivalent to \$200 as monthly income. The poverty threshold in Palestine is \$300 per month for a family of 6 including the parents. Only 7.2% of families are above the poverty threshold.

	Frequency	Percent	Valid Percent	Cumulative Percent
0	8	14.5	14.5	14.5
200	4	7.3	7.3	21.8
300	9	16.4	16.4	38.2
400	5	9.1	9.1	47.3
500	10	18.2	18.2	65.5
600	4	7.3	7.3	72.7
700	3	5.5	5.5	78.2
800	1	1.8	1.8	80.0
1000	4	7.3	7.3	87.3
1500	3	5.5	5.5	92.7
1600	1	1.8	1.8	94.5
2000	1	1.8	1.8	96.4
3000	2	3.6	3.6	100.0
Total	55	100.0	100.0	

### E.10. House Area (m<sup>2</sup>)

Most houses are less than 200 square meters. The largest houses are found in this neighborhood are about 300 square meters.

	Frequency	Percent	Valid Percent	Cumulative Percent
60	1	1.8	1.8	1.8
80	1	1.8	1.8	3.6
85	1	1.8	1.8	5.5
100	2	3.6	3.6	9.1
120	5	9.1	9.1	18.2
130	2	3.6	3.6	21.8
150	8	14.5	14.5	36.4
160	1	1.8	1.8	38.2
170	6	10.9	10.9	49.1
180	9	16.4	16.4	65.5
200	8	14.5	14.5	80.0
210	1	1.8	1.8	81.8
220	4	7.3	7.3	89.1
230	1	1.8	1.8	90.9
270	1	1.8	1.8	92.7
300	3	5.5	5.5	98.2
350	1	1.8	1.8	100.0
Total	55	100.0	100.0	

**E.11. Land Area (m<sup>2</sup>)**

92% of these families owned land for housing purposes of less than 500 square meters.

	Frequency	Percent	Valid Percent	Cumulative Percent
80	1	1.8	1.8	1.8
100	1	1.8	1.8	3.6
150	4	7.3	7.3	10.9
170	2	3.6	3.6	14.5
180	2	3.6	3.6	18.2
200	6	10.9	10.9	29.1
220	3	5.5	5.5	34.5
250	7	12.7	12.7	47.3
280	1	1.8	1.8	49.1
300	14	25.5	25.5	74.5
350	1	1.8	1.8	76.4
400	1	1.8	1.8	78.2
500	8	14.5	14.5	92.7
1000	3	5.5	5.5	98.2
2500	1	1.8	1.8	100.0
Total	55	100.0	100.0	
Total	132	100.0	100.0	

**E.12. Building Type**

Most of these families are living in a building with a concrete roof. Around 10% are living in a house with a roof made of asbestos or metal sheets.

	Frequency	Percent	Valid Percent	Cumulative Percent
Concrete building	49	89.1	89.1	89.1
Asbestos building	1	1.8	1.8	90.9
Zinco	5	9.1	9.1	100.0
Total	55	100.0	100.0	

**E.13. Building Status**

Most of these buildings were built after 1980 with acceptable structural conditions.

	Frequency	Percent	Valid Percent	Cumulative Percent
New (<10 yrs)	23	41.8	41.8	41.8
Moderate (between 10-30 yrs)	21	38.2	38.2	80.0
Old (>30 yrs)	11	20.0	20.0	100.0
Total	55	100.0	100.0	

**E.14. Drinking Water Source**

Since this is a rural area, about 52% of its residents are depending on the drilling of private water wells for drinking purposes. The rest of the families are depending on Municipal water wells with public water networks.

	Frequency	Percent	Valid Percent	Cumulative Percent
Private Water Well	29	52.7	52.7	52.7
Municipality Water Network	26	47.3	47.3	100.0
Total	55	100.0	100.0	

(All the visited houses had damages to their sanitary water networks.)

**E.15. Cooking Fuel**

All families in this area depend on natural gas for cooking purposes. Natural gas usually imported from Israel through Palestinian traders.

	Frequency	Percent	Valid Percent	Cumulative Percent
Natural Gas	55	100.0	100.0	100.0

## Damages

### E.16. Date of house damage during the war

All houses were damaged in the first week of January 2009

	Frequency	Percent	Valid Percent	Cumulative Percent
03.01.2009	55	100.0	100.0	100.0

### E.17. Type of Damage

94.5% of these houses had minor damages. Only 2% of the visited houses had major damage.

	Frequency	Percent	Valid Percent	Cumulative Percent
Minor	52	94.5	94.5	94.5
Moderate	2	3.8	3.8	98.2
Major	1	1.8	1.8	100.0
Total	55	100.0	100.0	

### E.18. Has the family received any primary “cash” assistance from the government?

Only 38.9% of these families received cash assistance from the Government.

	Frequency	Percent	Valid Percent	Cumulative Percent
No	33	60.0	61.1	61.1
Yes	21	38.2	38.9	100.0
Total	54	98.2	100.0	
Missing System	1	1.8		
Total	55	100.0		

### E.19. Has the family received any primary “cash” assistance from UNDP or UNRWA?

87% of the families living in this area received cash assistance from UNDP or from UNRWA.

	Frequency	Percent	Valid Percent	Cumulative Percent
No	7	12.7	13.0	13.0
Yes	47	85.5	87.0	100.0
Total	54	98.2	100.0	
Missing System	1	1.8		
Total	55	100.0		



**E.20. Payment Value**

72% of the families who sustained damages as a result of the war received less than \$5000.

	Frequency	Percent	Valid Percent	Cumulative Percent
0	6	10.9	11.1	11.1
250	2	3.6	3.7	14.8
700	4	7.3	7.4	22.2
900	1	1.8	1.9	24.1
1000	2	3.6	3.7	27.8
1200	2	3.6	3.7	31.5
1300	2	3.6	3.7	35.2
1500	1	1.8	1.9	37.0
1800	1	1.8	1.9	38.9
2000	2	3.6	3.7	42.6
2500	1	1.8	1.9	44.4
3000	6	10.9	11.1	55.6
3300	1	1.8	1.9	57.4
3500	1	1.8	1.9	59.3
4000	2	3.6	3.7	63.0
4500	3	5.5	5.6	68.5
4600	1	1.8	1.9	70.4
5000	1	1.8	1.9	72.2
5500	9	16.4	16.7	88.9
6500	1	1.8	1.9	90.7
7500	1	1.8	1.9	92.6
8000	2	3.6	3.7	96.3
13000	1	1.8	1.9	98.1
17500	1	1.8	1.9	100.0
Total	54	98.2	100.0	
Missing System	1	1.8		
Total	55	100.0		

**E.21. Has the family house been repaired by themselves?**

Most of the families (69.1%) had made preliminary repair to the damages of their houses by themselves.

	Frequency	Percent	Valid Percent	Cumulative Percent
No	17	30.9	30.9	30.9
Yes	38	69.1	69.1	100.0
Total	55	100.0	100.0	

**E.22. Has the family house been repaired by the government?**

The Ministry of Housing and Public Works has assisted only 10.9% of these families in repairing their homes. This assistance is only for urgent repair to the main structural elements of the house in order to avoid collapse of the building.

	Frequency	Percent	Valid Percent	Cumulative Percent
No	49	89.1	89.1	89.1
Yes	6	10.9	10.9	100.0
Total	55	100.0	100.0	

**E.23. Has the family house been repaired by Mercy International Organization?**

Only three houses in this area are being repaired by Mercy Organization (a local NGO in Gaza). This repair activity is still ongoing and limited to reconstruction of walls and floor tiles.

	Frequency	Percent	Valid Percent	Cumulative Percent
No	52	94.5	94.5	94.5
Yes	3	5.5	5.5	100.0
Total	55	100.0	100.0	



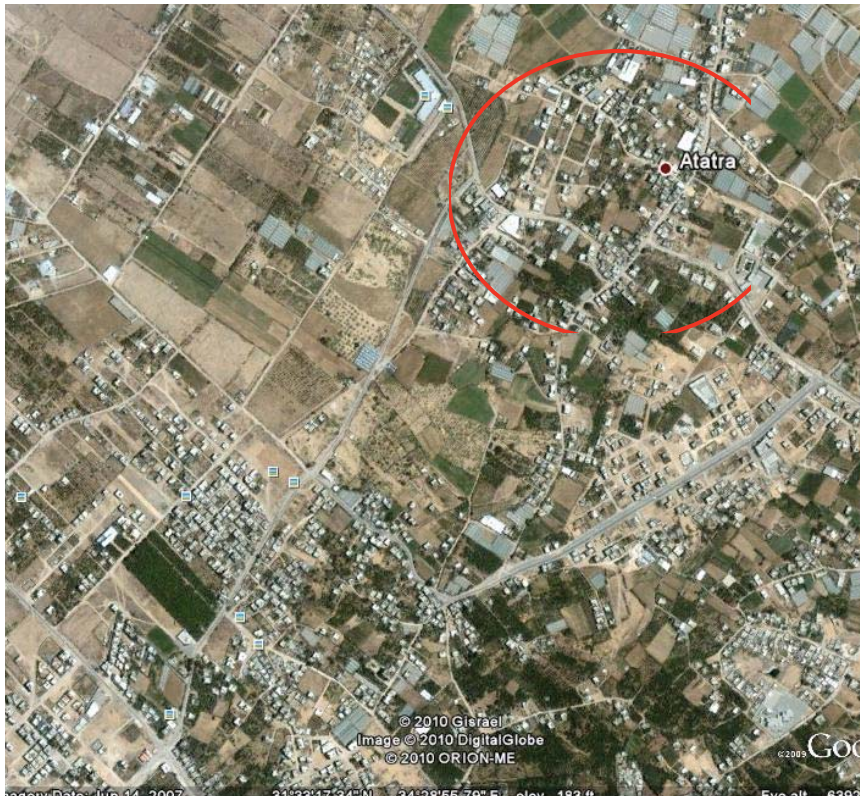
## Progress Report Week 4 13-17 June 2010

### Field Survey at North Gaza:

This week the field survey of one area of North Gaza had been conducted. Around 132 housing units were investigated in the following areas

#### F.1. Al-Atatra and Al-Seifa neighborhood northwest of Beit Lahia City at the northern part of Gaza Strip

Located in the Northwest of Beit Lahia City, north of Gaza City, it has about 250 houses and about 1800 inhabitants it's closed to Israeli border and been the site of several incursions with direct damages. Many of the houses in this region have sustained total, major, or minor damage. A large proportion of the population is low-income and unemployed. The approximate area of this neighborhood is equal to 1.2 km<sup>2</sup>



Date		Number of the visited houses
Sun 06/06/2010	Office work	-
Mon 07/06/2010	Atatra Area	16
Tue 08/06/2010	Office work	0
Wed 09/06/2010	Atatra Area	21
Thu 10/06/2010	Atatra Area	18
Sun 13/06/2010	Office work	0
Mon 14/06/2010	Seafa Area	19
Tue 15/06/2010	Seafa Area	23
Wed 16/06/2010	Seafa Area	18
Thu 17/06/2010	Office work	-
Sun 20/06/2010	Seafa Area	17
Total Number visited this week		132
Total Number visited since the beginning of the assessment		266

### General socioeconomic factors of the residents of this area

#### F.2. Refugee or Non-Refugee

Most of the visited families (94% of this area) are registered as non-refugees since the visited areas are at the periphery areas of Beit Lahia City.

	Frequency	Percent	Valid Percent	Cumulative Percent
Non-Refugee	124	93.9	93.9	93.9
Refugee	8	6.1	6.1	100
Total	132	100	100	

### F.3. Total family members including family head

About around 67% of the visited houses have more than 7 family members including the head of the family. Around 10% of these families have more than 17 family members. This mostly included extended family members.

	Frequency	Percent	Valid Percent	Cumulative Percent
2	2	1.5	1.5	1.5
3	6	4.5	4.5	6.1
4	3	2.3	2.3	8.3
5	12	9.1	9.1	17.4
6	11	8.3	8.3	25.8
7	9	6.8	6.8	32.6
8	12	9.1	9.1	41.7
9	15	11.4	11.4	53.0
10	16	12.1	12.1	65.2
11	10	7.6	7.6	72.7
12	7	5.3	5.3	78.0
13	7	5.3	5.3	83.3
14	1	.8	.8	84.1
15	2	1.5	1.5	85.6
16	2	1.5	1.5	87.1
17	5	3.8	3.8	90.9
18	3	2.3	2.3	93.2
20	1	.8	.8	93.9
21	2	1.5	1.5	95.5
22	1	.8	.8	96.2
23	1	.8	.8	97.0
24	1	.8	.8	97.7
25	1	.8	.8	98.5
27	1	.8	.8	99.2
39	1	.8	.8	100
Total	132	100.0	100.0	

### F.4. Family members under 18 years old

Around 51% of the visited families have more than 5 children under 18 years old. About 10% of these families have more than 10 children.

	Frequency	Percent	Valid Percent	Cumulative Percent
0	4	3.0	3.0	3.0
1	6	4.5	4.5	7.6
2	7	5.3	5.3	12.9
3	20	15.2	15.2	28.0
4	18	13.6	13.6	41.7
5	12	9.1	9.1	50.8
6	21	15.9	15.9	66.7
7	21	15.9	15.9	82.6
8	4	3.0	3.0	85.6
9	5	3.8	3.8	89.4
10	1	.8	.8	90.2
11	4	3.0	3.0	93.2
12	5	3.8	3.8	97.0
16	2	1.5	1.5	98.5
17	1	.8	.8	99.2
24	1	.8	.8	100.0
Total	132	100.0	100.0	

**F.5. Family member over 60 years old**

Less than 1% of families have 2 persons over 60 years old.

	Frequency	Percent	Valid Percent	Cumulative Percent
0	105	79.5	79.5	79.5
1	13	9.8	9.8	89.4
2	13	9.8	9.8	99.2
3	1	.8	.8	100.0
Total	132	100.0	100.0	

**F.6. Number of Females in the house**

49% of these families have more than 4 females. About 9% of these families have more than 8 females.

	Frequency	Percent	Valid Percent	Cumulative Percent
1	7	5.3	5.3	5.3
2	13	9.8	9.8	15.2
3	27	20.5	20.5	35.6
4	21	15.9	15.9	51.5
5	17	12.9	12.9	64.4
6	14	10.6	10.6	75.0
7	13	9.8	9.8	84.8
8	8	6.1	6.1	90.9
9	3	2.3	2.3	93.2
10	3	2.3	2.3	95.5
11	1	.8	.8	96.2
13	1	.8	.8	97.0
14	1	.8	.8	97.7
15	2	1.5	1.5	99.2
23	1	.8	.8	100.0
Total	132	100.0	100.0	

**F.7. Number of family members who are currently injured, disabled or chronically ill**

A large number of these families (58%) had one or more person with injury, disabled, or chronic disease.

	Frequency	Percent	Valid Percent	Cumulative Percent
0	56	42.4	42.4	42.4
1	45	34.1	34.1	76.5
2	22	16.7	16.7	93.2
3	9	6.8	6.8	100.0
Total	132	100.0	100.0	

**F.8. Number of family members currently employed**

Around 79.5% of these families have no one employed and cannot afford to pay for basic needs.

	Frequency	Percent	Valid Percent	Cumulative Percent
0	105	79.5	79.5	79.5
1	18	13.6	13.6	93.2
2	5	3.8	3.8	97.0
3	2	1.5	1.5	98.5
6	2	1.5	1.5	100.0
Total	132	100.0	100.0	

### F.9. Total monthly family income (Salary and assistance (NIS))

18% of these families have no income at all and depend on cash and food assistance from charities, the government, UNRWA, relatives and other sources.

Around 75% of these families earn less than 800NIS/month equivalent to \$200 as monthly income. The poverty threshold in Palestine is \$300 per month for a family of 6 including the parents. Only 7.2% of them are above the poverty threshold.

	Frequency	Percent	Valid Percent	Cumulative Percent
0	24	18.2	18.2	18.2
200	9	6.8	6.8	25.0
300	18	13.6	13.6	38.6
400	8	6.1	6.1	44.7
500	24	18.2	18.2	62.9
600	6	4.5	4.5	67.4
700	7	5.3	5.3	72.7
800	3	2.3	2.3	75.0
1000	12	9.1	9.1	84.1
1200	1	.8	.8	84.8
1500	4	3.0	3.0	87.9
1600	1	.8	.8	88.6
1800	2	1.5	1.5	90.2
2000	4	3.0	3.0	93.2
2600	1	.8	.8	93.9
2700	1	.8	.8	94.7
2800	1	.8	.8	95.5
3000	2	1.5	1.5	97.0
3100	1	.8	.8	97.7
4500	1	.8	.8	98.5
5000	1	.8	.8	99.2
6000	1	.8	.8	100.0
Total	132	100.0	100.0	

### F.10. Income per person in NIS

95% of family members earn less than \$2 per day/person. From this table we noticed that 95.5% of persons are getting less than 250 NIS (\$60) per month/person.

	Frequency	Percent	Valid Percent	Cumulative Percent
.00	24	18.2	18.2	18.2
11.76	1	.8	.8	18.9
16.67	1	.8	.8	19.7
22.22	1	.8	.8	20.5
23.08	2	1.5	1.5	22.0
25.00	2	1.5	1.5	23.5
27.27	2	1.5	1.5	25.0
27.78	2	1.5	1.5	26.5
28.57	2	1.5	1.5	28.0
30.00	4	3.0	3.0	31.1
33.33	3	2.3	2.3	33.3
36.36	1	.8	.8	34.1
37.50	1	.8	.8	34.8
38.46	3	2.3	2.3	37.1
40.00	3	2.3	2.3	39.4
42.86	1	.8	.8	40.2
43.48	1	.8	.8	40.9
43.75	1	.8	.8	41.7
44.44	1	.8	.8	42.4
45.45	4	3.0	3.0	45.5
50.00	9	6.8	6.8	52.3
55.56	2	1.5	1.5	53.8
60.00	1	.8	.8	54.5
62.50	1	.8	.8	55.3
63.64	1	.8	.8	56.1
66.67	3	2.3	2.3	58.3
70.00	1	.8	.8	59.1

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	Frequency	Percent	Valid Percent	Cumulative Percent
70.59	1	.8	.8	59.8
71.43	5	3.8	3.8	63.6
72.73	1	.8	.8	64.4
75.00	2	1.5	1.5	65.9
80.00	2	1.5	1.5	67.4
83.33	2	1.5	1.5	68.9
85.71	1	.8	.8	69.7
100.00	5	3.8	3.8	73.5
111.11	5	3.8	3.8	77.3
116.67	3	2.3	2.3	79.5
120.00	1	.8	.8	80.3
125.00	3	2.3	2.3	82.6
128.21	1	.8	.8	83.3
133.33	3	2.3	2.3	85.6
140.00	1	.8	.8	86.4
142.86	2	1.5	1.5	87.9
152.94	1	.8	.8	88.6
153.85	2	1.5	1.5	90.2
160.00	1	.8	.8	90.9
166.67	2	1.5	1.5	92.4
181.82	1	.8	.8	93.2
182.35	1	.8	.8	93.9
187.50	1	.8	.8	94.7
250.00	1	.8	.8	95.5
300.00	1	.8	.8	96.2
337.50	1	.8	.8	97.0
360.00	1	.8	.8	97.7
450.00	1	.8	.8	98.5
500.00	2	1.5	1.5	100.0
Total	132	100.0	100.0	

**F.11. House Area (m<sup>2</sup>)**

76% of the houses are less than 200 square meters. Only 7% of these families have a house over 300 square meters.

	Frequency	Percent	Valid Percent	Cumulative Percent
60	2	1.5	1.5	1.5
70	1	.8	.8	2.3
80	1	.8	.8	3.0
85	1	.8	.8	3.8
90	1	.8	.8	4.5
100	3	2.3	2.3	6.8
120	15	11.4	11.4	18.2
130	3	2.3	2.3	20.5
140	3	2.3	2.3	22.7
150	17	12.9	12.9	35.6
160	8	6.1	6.1	41.7
165	1	.8	.8	42.4
170	10	7.6	7.6	50.0
175	1	.8	.8	50.8
180	16	12.1	12.1	62.9
200	18	13.6	13.6	76.5
210	3	2.3	2.3	78.8
218	1	.8	.8	79.5
220	7	5.3	5.3	84.8
225	1	.8	.8	85.6
230	1	.8	.8	86.4
235	1	.8	.8	87.1
250	4	3.0	3.0	90.2
260	1	.8	.8	90.9
270	1	.8	.8	91.7
280	1	.8	.8	92.4
286	1	.8	.8	93.2
300	6	4.5	4.5	97.7
350	2	1.5	1.5	99.2
400	1	.8	.8	100.0
Total	132	100.0	100.0	

### F.12. Land Area (m<sup>2</sup>)

86% of these families own land for housing purposes of less than 500 square meters.

	Frequency	Percent	Valid Percent	Cumulative Percent
80	1	.8	.8	.8
100	1	.8	.8	1.5
120	5	3.8	3.8	5.3
130	1	.8	.8	6.1
150	12	9.1	9.1	15.2
170	4	3.0	3.0	18.2
180	2	1.5	1.5	19.7
200	19	14.4	14.4	34.1
220	4	3.0	3.0	37.1
235	1	.8	.8	37.9
240	1	.8	.8	38.6
250	14	10.6	10.6	49.2
260	1	.8	.8	50.0
270	1	.8	.8	50.8
280	4	3.0	3.0	53.8
300	22	16.7	16.7	70.5
350	2	1.5	1.5	72.0
360	1	.8	.8	72.7
400	3	2.3	2.3	75.0
450	1	.8	.8	75.8
460	1	.8	.8	76.5
500	13	9.8	9.8	86.4
600	1	.8	.8	87.1
750	2	1.5	1.5	88.6
1000	9	6.8	6.8	95.5
1200	1	.8	.8	96.2
1600	1	.8	.8	97.0
2500	1	.8	.8	97.7
3000	3	2.3	2.3	100.0
Total	132	100.0	100.0	

### F.13. Building Type

Most of these families are living in a building with a concrete roof. Around 7% are living in a house roof made of asbestos or metal sheets.

	Frequency	Percent	Valid Percent	Cumulative Percent
Concrete building	123	93.2	93.2	93.2
Asbestos building	2	1.5	1.5	94.7
Zinco	7	5.3	5.3	100.0
Total	132	100.0	100.0	

### F.14. Building Status

Most of these buildings were built after 1980 with acceptable structural conditions.

	Frequency	Percent	Valid Percent	Cumulative Percent
New (<10 yrs)	41	31.1	31.1	31.1
Moderate (between 10-30 yrs)	56	42.4	42.4	73.5
Old (>30 yrs)	35	26.5	26.5	100.0
Total	132	100.0	100.0	



### F.15. Drinking Water Source

Since this is a rural area, about 22% of residents are depending on the drilling of private water wells for drinking purposes. The rest of the families are depending on municipal water wells with public water networks.

	Frequency	Percent	Valid Percent	Cumulative Percent
Private Water Well	29	22.0	22.0	22.0
Municipality Water Network	103	78.0	78.0	100.0
Total	132	100.0	100.0	

(All the visited houses had damages to their sanitary water networks.)

### F.16. Cooking Fuel

All the families in this area depend on natural gas for cooking purposes. Natural gas is usually imported from Israel through Palestinian traders.

	Frequency	Percent	Valid Percent	Cumulative Percent
Natural Gas	132	100.0	100.0	100.0

## Damages

### F.16. Date of house damaged in the war

All of these houses were damaged on the first week of January 2009

	Frequency	Percent	Valid Percent	Cumulative Percent
03.01.2009	132	100.0	100.0	100.0

### F.17. Type of Damage

93.2% of these houses had minor damages. Only 0.8% of the visited houses had major damage.

	Frequency	Percent	Valid Percent	Cumulative Percent
Minor	123	93.2	93.2	93.2
Moderate	8	6.1	6.1	99.2
Major	1	.8	.8	100.0
Total	132	100.0	100.0	

### F.18. Has the family gotten any primary assistance "cash" from the government?

55.7% of these families did not get cash assistance from the government.

	Frequency	Percent	Valid Percent	Cumulative Percent
No	73	55.3	55.7	55.7
Yes	58	43.9	44.3	100.0
Total	131	99.2	100.0	
Missing System	1	.8		
Total	132	100.0		

### F.19. Has the family received any primary assistance "cash" from UNDP or UNRWA?

85% of the families living in this area received cash assistance from UNDP or UNRWA.

	Frequency	Percent	Valid Percent	Cumulative Percent
No	20	15.2	15.3	15.3
Yes	111	84.1	84.7	100.0
Total	131	99.2	100.0	
Missing System	1	.8		
Total	132	100.0		

**F.20. Payment Value**

72% if the families who had damages as a result of the war received less than \$5000.

	Frequency	Percent	Valid Percent	Cumulative Percent
0	14	10.6	10.7	10.7
250	2	1.5	1.5	12.2
600	1	.8	.8	13.0
700	6	4.5	4.6	17.6
900	1	.8	.8	18.3
1000	6	4.5	4.6	22.9
1100	1	.8	.8	23.7
1200	3	2.3	2.3	26.0
1300	4	3.0	3.1	29.0
1400	1	.8	.8	29.8
1500	3	2.3	2.3	32.1
1700	1	.8	.8	32.8
1800	2	1.5	1.5	34.4
2000	7	5.3	5.3	39.7
2200	1	.8	.8	40.5
2300	1	.8	.8	41.2
2500	7	5.3	5.3	46.6
2600	1	.8	.8	47.3
3000	11	8.3	8.4	55.7
3200	1	.8	.8	56.5
3300	1	.8	.8	57.3
3500	2	1.5	1.5	58.8
3600	1	.8	.5	59.5
3900	1	.8	.5	60.3
4000	5	3.8	3.8	64.1
4100	1	.8	.8	64.9
4300	2	1.5	1.5	66.4
4500	4	3.0	3.1	69.5
4600	1	.8	.8	70.2
5000	2	1.5	1.5	71.8
5500	23	17.4	17.6	89.3
5700	1	.8	.8	90.1
6000	1	.8	.8	90.8
6500	2	1.5	1.5	92.4
7500	3	2.3	2.3	94.7
8000	2	1.5	1.5	96.2
8500	1	.8	.8	96.9
10000	2	1.5	1.5	98.5
13000	1	.8	.8	99.2
17500	1	.8	.8	100.0
Total	131	99.2	100.0	
Missing System	1	.8		
Total	132	100.0		

**F.21. Has the family house been repaired by themselves?**

Most of the families (66.7%) had made preliminary repair to the damages of their houses themselves.

	Frequency	Percent	Valid Percent	Cumulative Percent
No	44	33.3	33.3	33.3
Yes	88	66.7	66.7	100.0
Total	132	100.0	100.0	

**F.22. Has the family house been repaired by the government?**

The Ministry of Housing and Public Works had helped only 5.3% of these families in repairing their homes. This assistance is only for urgent repair to the main structural elements of the house in order to avoid any collapse of the building.

	Frequency	Percent	Valid Percent	Cumulative Percent
No	125	94.7	94.7	94.7
Yes	7	5.3	5.3	100.0
Total	132	100.0	100.0	

**F.23. Has the family house been repaired by Mercy International Organization?**

Only three houses at this area are being repaired by Mercy Organization (a local NGO in Gaza). This repair activity is still ongoing and limited to reconstruction of walls and floor tiles.

	Frequency	Percent	Valid Percent	Cumulative Percent
No	129	97.7	97.7	97.7
Yes	3	2.3	2.3	100.0
Total	132	100.0	100.0	

### Home Damages

The following tables illustrate the home damages. Note: "missing system" represents the number of homes without damage to this specific item.

#### F.24. Block Works thick 20cm (in square meters)

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	5	3.8	38.5	38.5
3.0	1	.8	7.7	46.2
4.0	1	.8	7.7	53.8
6.0	1	.8	7.7	61.5
7.0	1	.8	7.7	69.2
8.0	1	.8	7.7	76.9
12.0	1	.8	7.7	84.6
20.0	2	1.5	15.4	100.0
Total	13	9.8	100.0	
Missing System	119	90.2		
Total	132	100.0		

#### F.25. Block Works thick 15cm (in square meters)

	Frequency	Percent	Valid Percent	Cumulative Percent
.5	1	.8	4.5	4.5
1.0	8	6.1	36.4	40.9
2.0	2	1.5	9.1	50.0
4.0	1	.8	4.5	54.5
6.0	3	2.3	13.6	68.2
8.0	1	.8	4.5	72.7
10.0	1	.8	4.5	77.3
12.0	1	.8	4.5	81.8
15.0	1	.8	4.5	86.4
20.0	2	1.5	9.1	95.5
50.0	1	.8	4.5	100.0
Total	22	16.7	100.0	
Missing System	110	83.3		
Total	132	100.0		

#### F.26. Block Works thick 10cm (in square meters)

	Frequency	Percent	Valid Percent	Cumulative Percent
2.0	2	1.5	66.7	66.7
30.0	1	.8	33.3	100.0
Total	3	2.3	100.0	
Missing System	129	97.7		
Total	132	100.0		

#### F.27. Concrete Work (in cubic meters)

	Frequency	Percent	Valid Percent	Cumulative Percent
.5	1	.8	50.0	50.0
1.0	1	.8	50.0	100.0
Total	2	1.5	100.0	
Missing System	130	98.5		
Total	132	100.0		

#### F.28. Windows Marble Works (in square meters)

	Frequency	Percent	Valid Percent	Cumulative Percent
1.5	1	.8	33.3	33.3
2.0	2	1.5	66.7	100.0
Total	3	2.3	100.0	
Missing System	129	97.7		
Total	132	100.0		

**F.29. Terrazzo Work (in square meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	2	1.5	12.5	12.5
2.0	2	1.5	12.5	25.0
4.0	1	.8	6.3	31.3
5.0	2	1.5	12.5	43.8
6.0	3	2.3	18.8	62.5
8.0	1	.8	6.3	68.8
10.0	1	.8	6.3	75.0
15.0	1	.8	6.3	81.3
20.0	2	1.5	12.5	93.8
30.0	1	.8	6.3	100.0
Total	16	12.1	100.0	
Missing System	116	87.9		
Total	132	100.0		

**F.30. Wall Cracks (in meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
3.0	2	1.5	3.4	3.4
4.0	1	.8	1.7	5.1
5.0	1	.8	1.7	6.8
7.0	1	.8	1.7	8.5
10.0	22	16.7	37.3	45.8
12.0	1	.8	1.7	47.5
13.0	1	.8	1.7	49.2
15.0	4	3.0	6.8	55.9
20.0	20	15.2	33.9	89.8
22.0	2	1.5	3.4	93.2
30.0	2	1.5	3.4	96.6
50.0	2	1.5	3.4	100.0
Total	59	44.7	100.0	
Missing System	73	55.3		
Total	132	100.0		

**F.31. Internal Plastering Works (in square meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
.5	3	2.3	4.2	4.2
1.0	10	7.6	13.9	18.1
2.0	10	7.6	13.9	31.9
3.0	3	2.3	4.2	36.1
4.0	9	6.8	12.5	48.6
5.0	2	1.5	2.8	51.4
6.0	4	3.0	5.6	56.9
7.0	1	.8	1.4	58.3
8.0	3	2.3	4.2	62.5
9.0	1	.8	1.4	63.9
10.0	11	8.3	15.3	79.2
12.0	1	.8	1.4	80.6
13.5	1	.8	1.4	81.9
15.0	1	.8	1.4	83.3
20.0	5	3.8	6.9	90.3
30.0	3	2.3	4.2	94.4
32.0	1	.8	1.4	95.8
50.0	3	2.3	4.2	100.0
Total	72	54.5	100.0	
Missing System	60	45.5		
Total	132	100.0		

## F.32. Interior Painting (in square meters)

	Frequency	Percent	Valid Percent	Cumulative Percent
.5	2	1.5	7.1	7.1
1.0	4	3.0	14.3	21.4
2.0	5	3.8	17.9	39.3
3.0	1	.8	3.6	42.9
5.0	4	3.0	14.3	57.1
6.0	1	.8	3.6	60.7
10.0	2	1.5	7.1	67.9
12.0	1	.8	3.6	71.4
20.0	3	2.3	10.7	82.1
50.0	3	2.3	10.7	92.9
100.0	1	.8	3.6	96.4
150.0	1	.8	3.6	100.0
Total	28	21.2	100.0	
Missing System	104	78.8		
Total	132	100.0		

## F.33. Electrical Installation

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	1	.8	25.0	25.0
30.0	1	.8	25.0	50.0
50.0	2	1.5	50.0	100.0
Total	4	3.0	100.0	
Missing System	128	97.0		
Total	132	100.0		

## F.34. Lighting Switch

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	1	.8	11.1	11.1
2.0	2	1.5	22.2	33.3
3.0	5	3.8	55.6	88.9
4.0	1	.8	11.1	100.0
Total	9	6.8	100.0	
Missing System	123	93.2		
Total	132	100.0		

## F.35. Power Socket

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	1	.8	7.7	7.7
3.0	8	6.1	61.5	69.2
5.0	4	3.0	30.8	100.0
Total	13	9.8	100.0	
Missing System	119	90.2		
Total	132	100.0		

## F.36. Lighting Unit

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	5	3.8	21.7	21.7
2.0	6	4.5	26.1	47.8
3.0	4	3.0	17.4	65.2
4.0	2	1.5	8.7	73.9
5.0	4	3.0	17.4	91.3
6.0	1	.8	4.3	95.7
10.0	1	.8	4.3	100.0
Total	23	17.4	100.0	
Missing System	109	82.6		
Total	132	100.0		

**F.37. Wooden Door Frame**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	12	9.1	60.0	60.0
2.0	7	5.3	35.0	95.0
5.0	1	.8	5.0	100.0
Total	20	15.2	100.0	
Missing System	112	84.8		
Total	132	100.0		

**F.38. Wooden Doors 90 cm**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	26	19.7	45.6	45.6
2.0	14	10.6	24.6	70.2
3.0	12	9.1	21.1	91.2
4.0	2	1.5	3.5	94.7
5.0	2	1.5	3.5	98.2
6.0	1	.8	1.8	100.0
Total	57	43.2	100.0	
Missing System	75	56.8		
Total	132	100.0		

**F.39. Wooden Doors 120 cm**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	3	2.3	75.0	75.0
2.0	1	.8	25.0	100.0
Total	4	3.0	100.0	
Missing System	128	97.0		
Total	132	100.0		

**F.40. Wooden Doors 160 cm**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	4	3.0	66.7	66.7
2.0	1	.8	16.7	83.3
3.0	1	.8	16.7	100.0
Total	6	4.5	100.0	
Missing System	126	95.5		
Total	132	100.0		

**F.41. Reinforced Glass for Door (in Square meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	1	.8	33.3	33.3
2.0	1	.8	33.3	66.7
10.0	1	.8	33.3	100.0
Total	3	2.3	100.0	
Missing System	129	97.7		
Total	132	100.0		

**F.42. Wooden Doors Maintenance**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	19	14.4	23.8	23.8
2.0	22	16.7	27.5	51.3
3.0	18	13.6	22.5	73.8
4.0	8	6.1	10.0	83.8
5.0	9	6.8	11.3	95.0
6.0	1	.8	1.3	96.3
9.0	1	.8	1.3	97.5
10.0	1	.8	1.3	98.8
12.0	1	.8	1.3	100.0
Total	80	60.6	100.0	
Missing System	52	39.4		
Total	132	100.0		

F.43. Windows Aluminum Glass (in Square meters)

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	3	2.3	3.0	3.0
2.0	8	6.1	8.0	11.0
3.0	6	4.5	6.0	17.0
4.0	14	10.6	14.0	31.0
5.0	9	6.8	9.0	40.0
5.5	1	.8	1.0	41.0
6.0	7	5.3	7.0	48.0
7.0	1	.8	1.0	49.0
8.0	12	9.1	12.0	61.0
9.0	1	.8	1.0	62.0
10.0	10	7.6	10.0	72.0
11.0	2	1.5	2.0	74.0
12.0	5	3.8	5.0	79.0
13.0	3	2.3	3.0	82.0
15.0	4	3.0	4.0	86.0
16.0	1	.8	1.0	87.0
17.0	1	.8	1.0	88.0
18.0	1	.8	1.0	89.0
20.0	5	3.8	5.0	94.0
22.0	1	.8	1.0	95.0
23.0	1	.8	1.0	96.0
25.0	1	.8	1.0	97.0
30.0	1	.8	1.0	98.0
35.0	1	.8	1.0	99.0
75.0	1	.8	1.0	100.0
Total	100	75.8	100.0	
Missing System	32	24.2		
Total	132	100.0		

F.44. Windows Aluminum Leaf (in Square meters)

	Frequency	Percent	Valid Percent	Cumulative Percent
.7	1	.8	1.8	1.8
1.0	3	2.3	5.3	7.0
2.0	12	9.1	21.1	28.1
3.0	6	4.5	10.5	38.6
4.0	10	7.6	17.5	56.1
5.0	3	2.3	5.3	61.4
6.0	9	6.8	15.8	77.2
8.0	1	.8	1.8	78.9
9.0	2	1.5	3.5	82.5
10.0	2	1.5	3.5	86.0
11.0	1	.8	1.8	87.7
12.0	2	1.5	3.5	91.2
16.0	2	1.5	3.5	94.7
19.0	1	.8	1.8	96.5
20.0	1	.8	1.8	98.2
23.0	1	.8	1.8	100.0
Total	57	43.2	100.0	
Missing System	75	56.8		
Total	132	100.0		

**F.45. Windows Aluminum Frame (in meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	1	.8	3.0	3.0
2.0	1	.8	3.0	6.1
4.0	5	3.8	15.2	21.2
6.0	6	4.5	18.2	39.4
7.0	1	.8	3.0	42.4
8.0	1	.8	3.0	45.5
10.0	1	.8	3.0	48.5
12.0	6	4.5	18.2	66.7
15.0	1	.8	3.0	69.7
18.0	8	6.1	24.2	93.9
30.0	2	1.5	6.1	100.0
Total	33	25.0	100.0	
Missing System	99	75.0		
Total	132	100.0		

**F.46. Aluminum Windows Maintenance**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	8	6.1	27.6	27.6
2.0	11	8.3	37.9	65.5
3.0	2	1.5	6.9	72.4
4.0	3	2.3	10.3	82.8
5.0	1	.8	3.4	86.2
6.0	2	1.5	6.9	93.1
8.0	1	.8	3.4	96.6
10.0	1	.8	3.4	100.0
Total	29	22.0	100.0	
Missing System	103	78.0		
Total	132	100.0		

**F.47. Windows Louvers (in Square meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
.5	2	1.5	2.4	2.4
.7	5	3.8	6.0	8.4
1.0	22	16.7	26.5	34.9
1.5	5	3.8	6.0	41.0
2.0	14	10.6	16.9	57.8
3.0	4	3.0	4.8	62.7
4.0	10	7.6	12.0	74.7
5.0	5	3.8	6.0	80.7
6.0	6	4.5	7.2	88.0
8.0	4	3.0	4.8	92.8
9.0	1	.8	1.2	94.0
10.0	2	1.5	2.4	96.4
18.0	1	.8	1.2	97.6
30.0	1	.8	1.2	98.8
47.0	1	.8	1.2	100.0
Total	83	62.9	100.0	
Missing System	49	37.1		
Total	132	100.0		



**F.48. Roof Asbestos Sheet (in square meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
6.0	1	.8	20.0	20.0
10.0	1	.8	20.0	40.0
12.0	2	1.5	40.0	80.0
20.0	1	.8	20.0	100.0
Total	5	3.8	100.0	
Missing System	127	96.2		
Total	132	100.0		

**F.49. Roof Metal Sheet (Zinco) (in square meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
6.0	2	1.5	6.7	6.7
10.0	1	.8	3.3	10.0
12.0	2	1.5	6.7	16.7
14.0	1	.8	3.3	20.0
15.0	4	3.0	13.3	33.3
16.0	2	1.5	6.7	40.0
18.0	3	2.3	10.0	50.0
20.0	11	8.3	36.7	86.7
25.0	1	.8	3.3	90.0
30.0	1	.8	3.3	93.3
50.0	2	1.5	6.7	100.0
Total	30	22.7	100.0	
Missing System	102	77.3		
Total	132	100.0		

**F.50. Steel Pipe 3 inch (in meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
6.0	1	.8	11.1	11.1
7.0	2	1.5	22.2	33.3
9.0	1	.8	11.1	44.4
10.0	3	2.3	33.3	77.8
12.0	1	.8	11.1	88.9
30.0	1	.8	11.1	100.0
Total	9	6.8	100.0	
Missing System	123	93.2		
Total	132	100.0		

**F.51. External Plastering Works (in square meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
2.0	2	1.5	15.4	15.4
4.0	2	1.5	15.4	30.8
5.0	2	1.5	15.4	46.2
6.0	2	1.5	15.4	61.5
10.0	2	1.5	15.4	76.9
20.0	2	1.5	15.4	92.3
50.0	1	.8	7.7	100.0
Total	13	9.8	100.0	
Missing System	119	90.2		
Total	132	100.0		

**F.51. Metal Doors (in square meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	2	1.5	18.2	18.2
2.0	2	1.5	18.2	36.4
2.5	1	.8	9.1	45.5
3.0	3	2.3	27.3	72.7
4.0	1	.8	9.1	81.8
6.0	1	.8	9.1	90.9
7.0	1	.8	9.1	100.0
Total	11	8.3	100.0	
Missing System	121	91.7		
Total	132	100.0		

**F.52. Metal Doors Maintenance**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	1	.8	4.3	4.3
2.0	7	5.3	30.4	34.8
2.5	1	.8	4.3	39.1
3.0	9	6.8	39.1	78.3
4.0	2	1.5	8.7	87.0
6.0	2	1.5	8.7	95.7
7.0	1	.8	4.3	100.0
Total	23	17.4	100.0	
Missing System	109	82.6		
Total	132	100.0		

**F.53. Aluminum Doors (in square meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	4	3.0	100.0	100.0
Missing System	128	97.0		
Total	132	100.0		

**F.54. Terrazzo Tiling Works (in square meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
2.0	1	.8	25.0	25.0
6.0	2	1.5	50.0	75.0
10.0	1	.8	25.0	100.0
Total	4	3.0	100.0	
Missing System	128	97.0		
Total	132	100.0		

**F.55. Ground Ceramic Tiling Works (in square meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	1	.8	33.3	33.3
8.0	1	.8	33.3	66.7
20.0	1	.8	33.3	100.0
Total	3	2.3	100.0	
Missing System	129	97.7		
Total	132	100.0		

**F.56. Aluminum Door Maintenance**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	1	.8	50.0	50.0
2.0	1	.8	50.0	100.0
Total	2	1.5	100.0	
Missing System	130	98.5		
Total	132	100.0		

**F.57. Ground Ceramic Tiling Works (in Square meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
2.0	1	.8	14.3	14.3
3.0	1	.8	14.3	28.6
4.0	3	2.3	42.9	71.4
10.0	2	1.5	28.6	100.0
Total	7	5.3	100.0	
Missing System	125	94.7		
Total	132	100.0		

**F.58. Wall Ceramic Tiling Works (in Square meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	3	2.3	15.0	15.0
2.0	4	3.0	20.0	35.0
4.0	2	1.5	10.0	45.0
5.0	3	2.3	15.0	60.0
8.0	1	.8	5.0	65.0
10.0	2	1.5	10.0	75.0
20.0	2	1.5	10.0	85.0
25.0	1	.8	5.0	90.0
30.0	2	1.5	10.0	100.0
Total	20	15.2	100.0	
Missing System	112	84.8		
Total	132	100.0		

**F.59. Water Basin**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	15	11.4	71.4	71.4
2.0	6	4.5	28.6	100.0
Total	21	15.9	100.0	
Missing System	111	84.1		
Total	132	100.0		

**F.60. Kitchen Marble Works (in meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	1	.8	14.3	14.3
2.0	1	.8	14.3	28.6
3.0	3	2.3	42.9	71.4
3.5	1	.8	14.3	85.7
4.0	1	.8	14.3	100.0
Total	7	5.3	100.0	
Missing System	125	94.7		
Total	132	100.0		

**F.61. Kitchen Marble Works Maintenance**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	2	1.5	33.3	33.3
2.0	1	.8	16.7	50.0
3.0	1	.8	16.7	66.7
4.0	2	1.5	33.3	100.0
Total	6	4.5	100.0	
Missing System	126	95.5		
Total	132	100.0		

**F.62. Faucets**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	5	3.8	55.6	55.6
2.0	3	2.3	33.3	88.9
3.0	1	.8	11.1	100.0
Total	9	6.8	100.0	
Missing System	123	93.2		
Total	132	100.0		

**F.63. Glass for Solar Unit (in Square meters)**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	3	2.3	4.1	4.1
2.0	6	4.5	8.1	12.2
3.0	6	4.5	8.1	20.3
4.0	39	29.5	52.7	73.0
5.0	3	2.3	4.1	77.0
6.0	14	10.6	18.9	95.9
8.0	1	.8	1.4	97.3
10.0	1	.8	1.4	98.6
12.0	1	.8	1.4	100.0
Total	74	56.1	100.0	
Missing System	58	43.9		
Total	132	100.0		

**F.64. Water Storage (1000 Lt)**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	45	34.1	83.3	83.3
2.0	9	6.8	16.7	100.0
Total	54	40.9	100.0	
Missing System	78	59.1		
Total	132	100.0		

**F.65. Toilet Cabinet**

	Frequency	Percent	Valid Percent	Cumulative Percent
1.0	4	3.0	100.0	100.0
Missing System	128	97.0		
Total	132	100.0		



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