

## Case Studies and Cost Benefit Analysis

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## Table of Contents

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1	Document Goal .....	4
2	Benefits Analysis .....	5
2.1	Decision making help for Operations/ Procurement Managers:.....	5
2.2	A new approach to workforce accommodation .....	6
2.3	BASECAMP3 Cost Overview .....	7
2.4	BASECAMP3 Cost Comparison Overview.....	7
3	Camp Value Comparisons .....	8
3.1	Camp Deployment: System of Work Comparison .....	8
3.2	Initial Camp Setup Comparison.....	9
3.3	Camp Relocation Comparison.....	10
3.4	Materials/Energy Use Comparison .....	11
3.5	Environmental Value Highlights.....	12
3.6	End of Lifecycle Options.....	13
3.7	The “Happiness Factor” .....	14
3.8	SafetyView – Mini Broadcasting Solution .....	14
4	SUPPORTING DOCUMENTS.....	<b>Error! Bookmark not defined.</b>

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## 1 Document Goal

The BASECAMP<sup>3</sup> design philosophy represents a significant breakaway from traditional camp construction and operation. So much so that companies can have difficulty comparing our system to others available in the region, which in turn makes it difficult to evaluate the comparative cost versus value over the lifespan of the operation.

This document will focus on the specific differences between designs and use case studies with real-world scenarios to highlight the main differences between our BASECAMP<sup>3</sup> system and traditional modular build construction, enabling purchase management teams and managers to better evaluate the overall costs of the project.

The main difference as you will see is; whereas most modular/camp providers have designed for delivery, we have designed for every aspect of ownership from the concept design through to end of life of the product including construction, mobilization, operation, demobilization, storage, and finally refurbishment, repurposing, resale or recycling of the modules.

Our goal is to work with companies that want a long term, cost effective, sustainable camp strategy and partnership that goes beyond just delivering portable cabins in the desert.

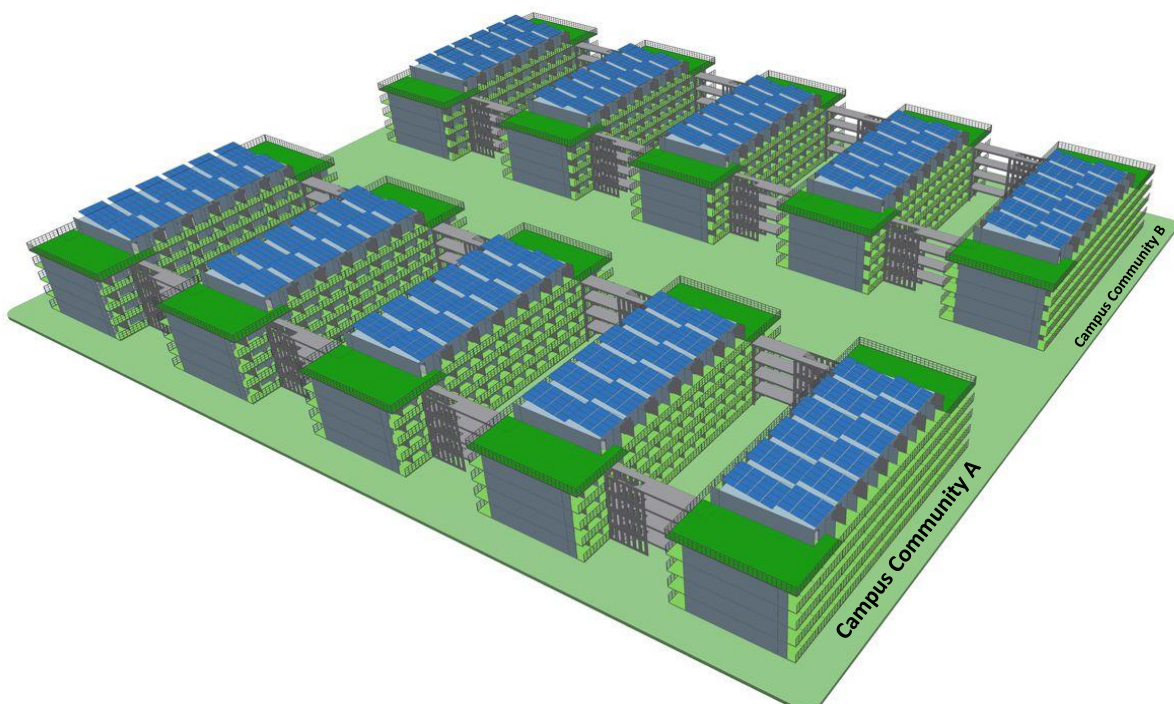
**BASECAMP<sup>3</sup>**  
Modular | Transportable | Sustainable

For Bokhowa Group

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*“Thoughtfulness in design creates a lifespan of good service, fiscal savings, lower risk and an overall better experience for the guests.” – Richard Scott-Smith*

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## 2 Benefits Analysis

### 2.1 Decision making help for Operations/ Procurement Managers:

Whilst BASECAMP<sup>3</sup> does have a significantly lower whole life cycle cost, we do recognize that it has a higher initial capital investment than many other solutions. We do not want to waste your time so we have created a list of questions that will assist you in identifying if BASECAMP<sup>3</sup> can indeed be a cost-effective benefit to your operation. If you can answer yes to any one of these questions, we feel that BASECAMP<sup>3</sup> is the best solution available to you in the market today.

Do you have limited space or has your organization adopted a policy of efficient use of space?	Our stackable modules use considerably less space than single story solutions and offers efficiency of construction, mobilization and storage. (See Basecamp Profile section 2.2 and 3.3)
Do you require a truly mobile camp that offers flexibility in its configuration?	Deployment, and any subsequent redeployment of a BASECAMP <sup>3</sup> campus is orders of magnitude lower in cost, time and risk than other solutions. (See Basecamp Profile section 3.4 and 3.5)
Does your organization value the health and safety of its employees?	BASECAMP <sup>3</sup> is designed and manufactured with the safety of the public (during transport), construction manpower and residents in mind. Every system of works, procedure and maintenance operation has been engineered to mitigate risk. Eg. All steel construction and use of fire retardant interior materials lowers risk of fire (the most common cause of injury and interruption to business continuity for camp operators). (See Basecamp Profile section 3.9)
Is your company dedicated to environmental preservation and has a strong sustainability / environmental policy in place?	We consider the environmental impact of the entire project from the drawing board to the end of its lifecycle and beyond. Using industry best practice, technology and ingenuity to lower the project's carbon footprint and increase energy efficiency wherever possible. (Our solution <u>BEGINS</u> with the upcycling of 4 tons of useable steel destined for the landfill or inefficient recycling into steel ingots)

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*When compared to typical woodframe construction BASECAMP Reduces plastic and wood landfill waste by 44,500kg with every deployment by eliminating bracing and packaging.*

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## 2.2 A new approach to workforce accommodation

BASECAMP<sup>3</sup> is a modern “labour campus” solution. Because it is designed for longevity, mobility and efficiency, it has a higher price of entry but a considerably lower cost of ownership when compared to traditional portable cabins.

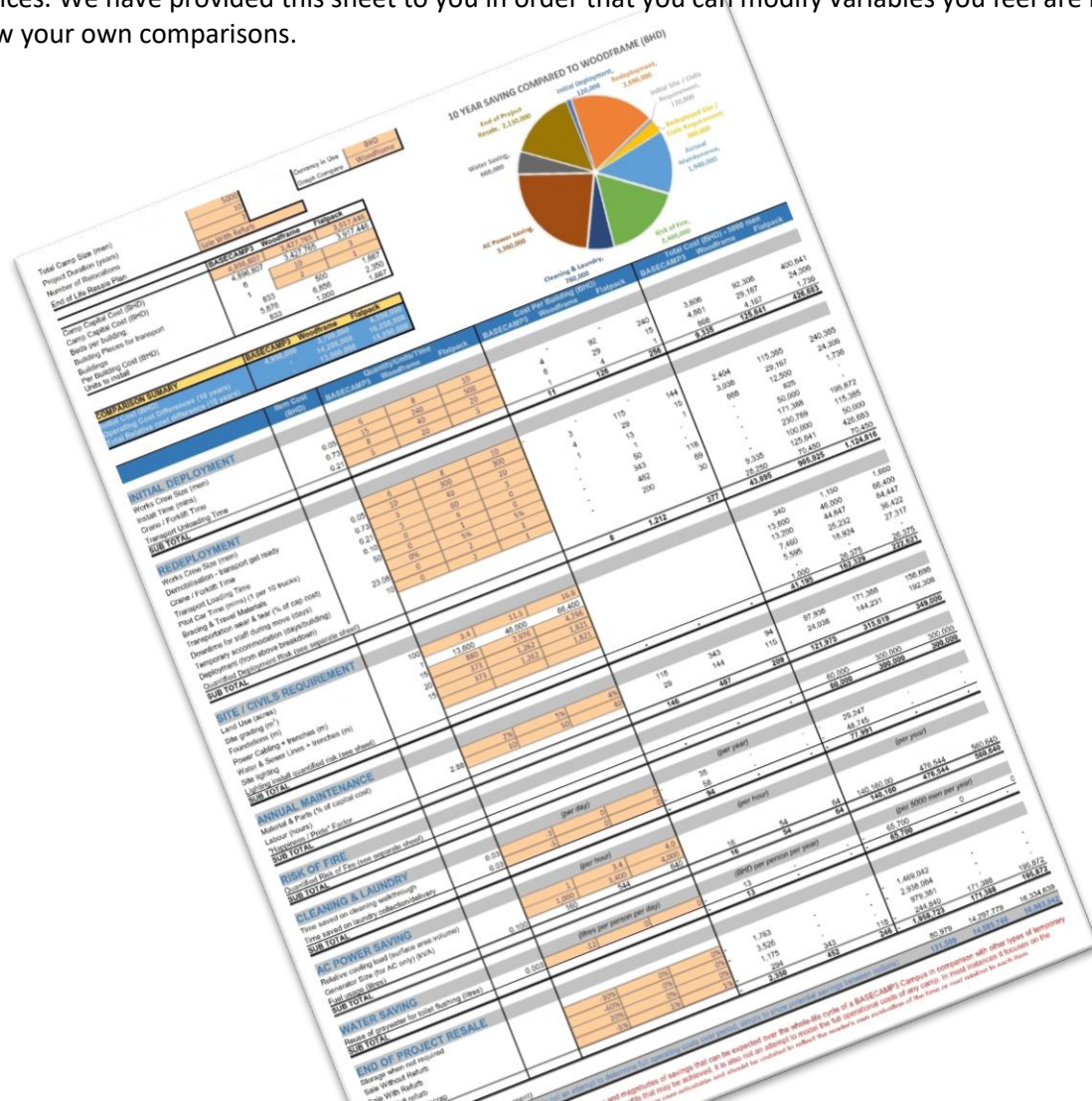
**BASECAMP<sup>3</sup>**  
Modular | Transportable | Sustainable

The main advantages and cost efficiencies related to the entire lifespan and operation of a BASECAMP<sup>3</sup> facility when compared to standard wood frame or flat pack solutions are:

1. All steel construction can be moved dozens of times over their lifespan without degradation
2. Mobilization and Remobilization operations are significantly quicker and safer
3. More compact masterplan reduces land use and civils costs
4. More energy efficient than flatpack or wood frame buildings
5. Reduced maintenance requirements saves manpower and costs
6. Increased quality of life means a more motivated, better rested and more effective workforce
7. High residual end-of-service resale/reuse value.

To assist you in the process of drawing a fair comparison between the whole-life costs of ownership of the BASECAMP<sup>3</sup> solution and other camps available to you, we have produced a high-level costing spreadsheet to provide analysis based upon Monitac’s experience in the industry and various quotations and estimates from several suppliers across the region. The remainder of this document draws information from this sheet using the values provided.

This sheet does not attempt to model the full operational costs, rather to compare the relative costs between options. It is possible that it is incomplete and that some estimates/values used may differ from your own experiences. We have provided this sheet to you in order that you can modify variables you feel are inaccurate and draw your own comparisons.



## 2.3 BASECAMP3 Cost Overview

Our assessment of costs is based upon our current understanding of the project. The goal of this document is to open a dialog with Bokhowa Group on creating a solution that fits your exact needs and dial in a cost that fits your budget.

**BASECAMP3 - Per Unit Cost (example only, based on mixed configuration and site specifics):**

BHD 5,879 each 6 Man BASECAMP unit (BHD 18.37/sqft, BHD 980/man, ~BHD4.9m / 5000 men)

**Note:**

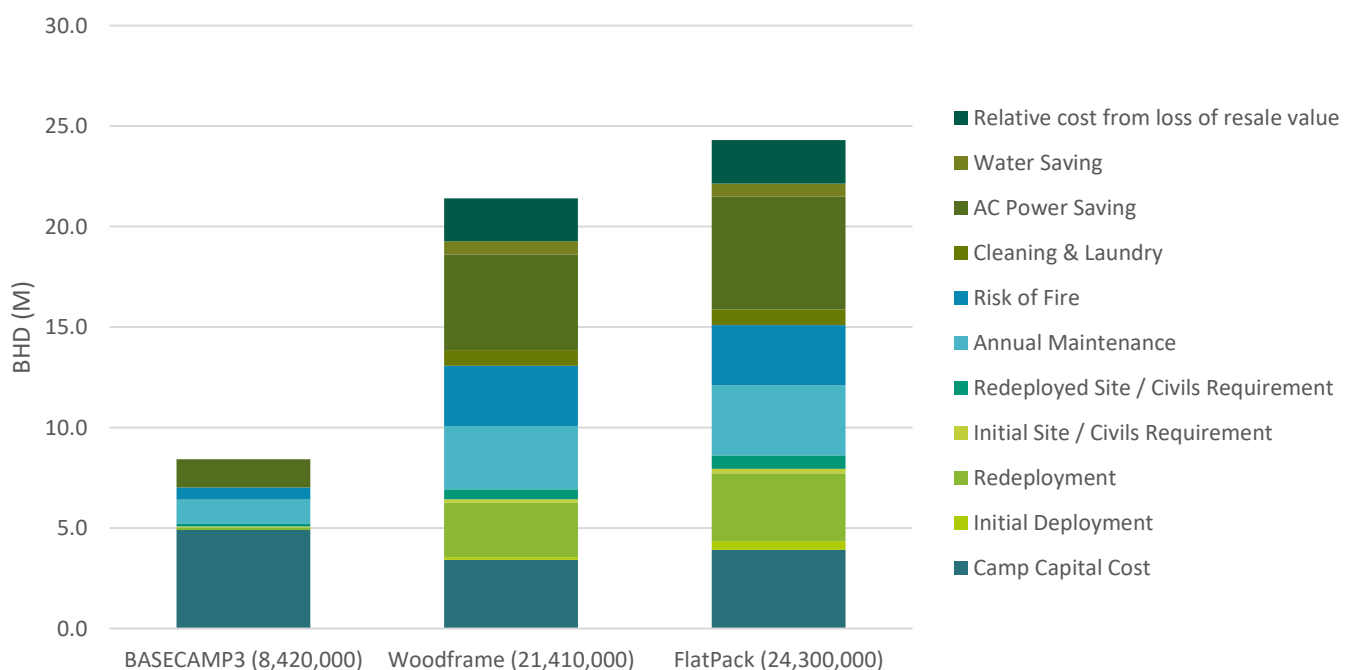
- All exclusions listed in Camp Proposal section 5.7

## 2.4 BASECAMP3 Cost Comparison Overview

Using the information in the sheet, assuming a 10 year lifespan with 3 relocations within this timeframe, and resale of the (refurbished) units at the end of the period, the BASECAMP3 solution could reduce overall project costs by as much as BHD 16m.

COMPARISON SUMMARY	BASECAMP <sup>3</sup>	Woodframe	Flatpack
Initial Cost inc. civils (BHD)	4,950,000	3,700,000	4,550,000
Operating Cost Differences (10 years)	0	14,200,000	16,250,000
Total Relative cost difference (10 years)	0	13,000,000	15,850,000

Whole Lifecycle Cost (10 Years, 3 Moves, Sale With Refurb)





## 3 Camp Value Comparisons

### 3.1 Camp Deployment: System of Work Comparison

In this example, we highlight the difference between the systems of work and procedures required for the deployment of both BASECAMP<sup>3</sup> and typical modular buildings:

<p><b>BASECAMP3 (Multi Floor)</b></p> <p>Modules are locked in place with 4 manual twist locks with no tools required for disconnection. Modules require no disassembly or teardown, no additional bracing, packaging or protective materials to be added. Modules are moved with a specialized forklift and transported safely on standard transport trailers.</p>	<p><b>Wood Frame Comparison (Single Floor):</b></p> <p>Traditional portable cabins require being broken down into halves for transport, bracing and protective materials to be installed. Each cabin requires a crew to conduct the breakdown, add bracing and protective materials. Crane operations are required for moving onto truck trailers.</p>
<p><b>BASECAMP3 Requirements:</b></p> <p><b>Equipment:</b> Container Handling Forklift Man lift (on standby)</p> <p><b>Manpower:</b> 1 Works Supervisor 1 Forklift Operator 1 Electrician 1 Safety Officer (Suggested) 2 General Labour (trained)</p> <p><b>Transport:</b> Standard truck/trailer</p> <p><b>Procedure:</b></p> <ol style="list-style-type: none"> <li>1. General Labour unlocks 4 corner locks on trailer (no straps required)</li> <li>2. Forklift connects to module (auto locks) and transports into position</li> <li>3. Electrician connects quick plug to DB</li> <li>4. Walkways deployed and handrails locked into place</li> </ol> <p><b>Time Required:</b></p> <p>A well trained and efficient crew with working equipment can disconnect and move a single BASECAMP3 module into place in less than 10 minutes. (Much like in a shipping container port).</p>	<p><b>Wood Frame Requirements:</b></p> <p><b>Equipment:</b> Crane with Rigging Man lift (some designs)</p> <p><b>Manpower:</b> Several works crews capable of teardown and rigging of cabins for transport.</p> <p><b>Transport:</b> Standard truck/trailer. However, cabins must be strapped into place. Pilot cars may be required if oversize load.</p> <p><b>Procedure:</b></p> <ol style="list-style-type: none"> <li>1. Cabin is de-constructed (if required)</li> <li>2. Installation of bracing</li> <li>3. Add protective materials</li> <li>4. Crane part 1 onto truck 1</li> <li>5. Crane part 2 onto truck 2</li> <li>6. Secure cabin parts to trailer</li> <li>7. Truck transport cabin to new location</li> <li>8. Installation is the reverse of demobilization</li> </ol> <p><b>Time Required:</b></p> <p>Several man-days are required to demobilize each cabin. If cabin size requires de-construction into halves, the time required for demobilization increases significantly. Crane and rigging operations, bracing, slower transport times, and laydown all add to the manpower and time required.</p>

## 3.2 Initial Camp Setup Comparison

**Activity:** Initial set-up of the (10) BASECAMP<sup>3</sup> Blocks (504 beds per block 5,040 Beds in total)

This scenario will walk through the time and costs associated with setting up the camp from civils to mobilization through to commissioning. BASECAMP<sup>3</sup> blocks use less space, and therefore less groundworks, cabling, pipework and foundations. Deployment uses the same stacking and connecting procedures as a container shipping port which is highly efficient, safe and does not require the manpower associated with wood frame and flatpack solutions. By utilizing a container handling forklift, this efficient stacking method greatly lowers the time, costs and reduces overall risk to personnel and business continuity.



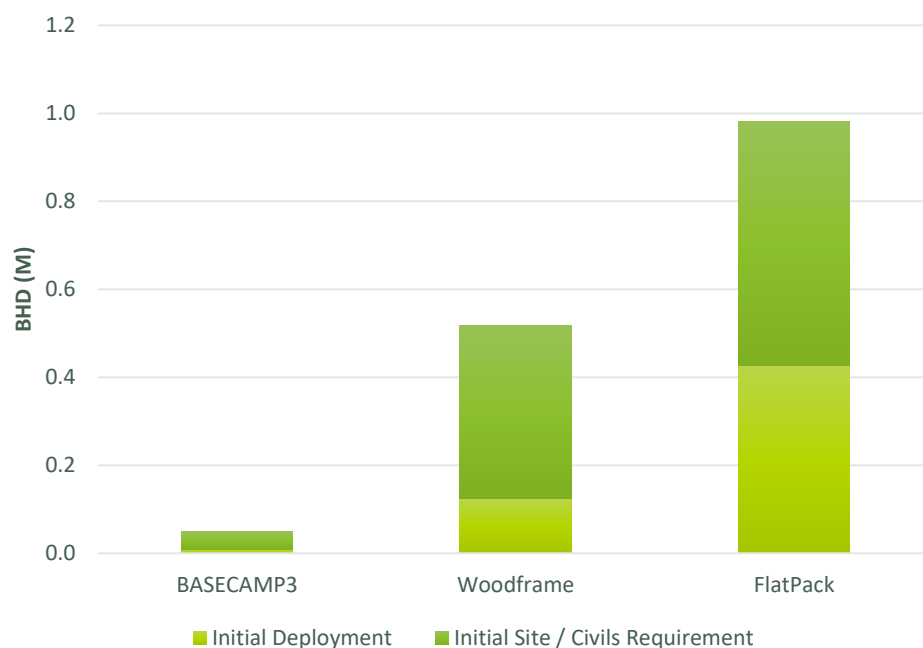
### INITIAL CAMP DEPLOYMENT AND CIVILS COST COMPARISONS:

**BASECAMP<sup>3</sup>:** Deployment 9,335 + Civils 41,195 = BHD 50,530

**Wood Frame:** Deployment 125,641 + Civils 392,329 = BHD 517,970

**Flat Pack:** Deployment 426,683 + Civils 554,621 = BHD 981,304

### Cost of Camp Deployment



## 3.3 Camp Relocation Comparison

**Activity:** The entire camp is moved from its original position to another area. As BASECAMP<sup>3</sup> is a highly portable solution significant value is gained from:

- 1) The camp can be moved block by block, ensuring that there is no downtime of bedspaces.
- 2) The camp can be moved with significantly less manpower and much quicker than competing systems.

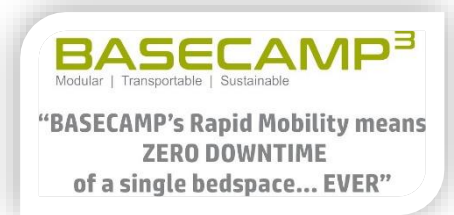
In this scenario, we will look at the costs of moving the camps 3 times over a period of 10 years. As was indicated by the system of works, BASECAMP<sup>3</sup> is mobilized within minutes rather than the hours/days associated with woodframe or flat pack solutions. With BASECAMP<sup>3</sup>, absolutely no teardown, deconstruction, bracing, or protective covering works need to be completed.

### CAMP MOVE AND CIVILS COSTS (3 Moves over 10 years):

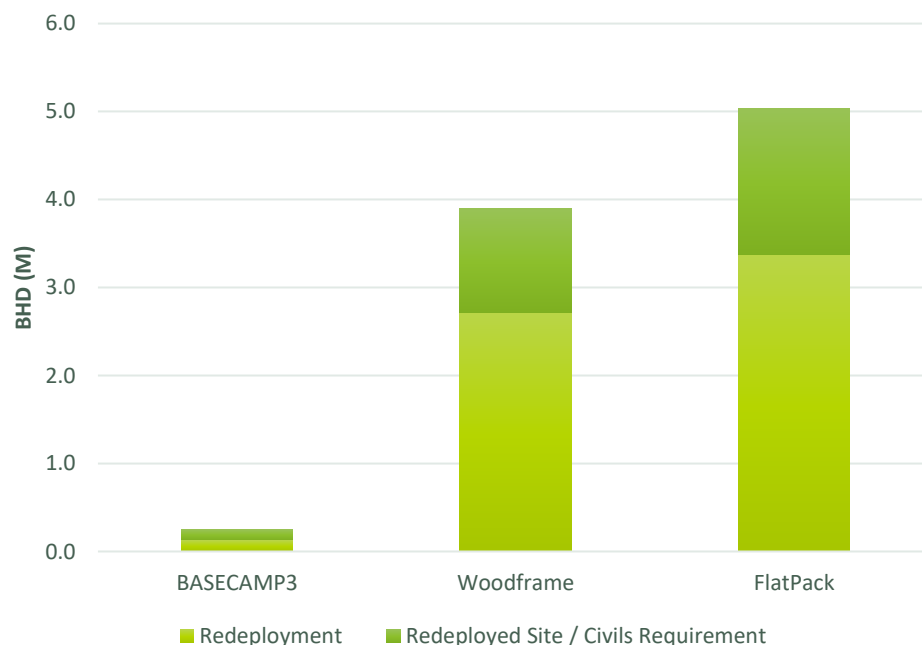
**BASECAMP<sup>3</sup>:** Demob/Remob 131,685 + Civils 123,585 = BHD 225,270

**Wood Frame:** Demob/Remob 2,717,774 + Civils 1,176,986 = BHD 3,894,760

**Flat Pack:** Demob/Remob 3,374,448 + Civils 1,663,864 = BHD 5,038,311



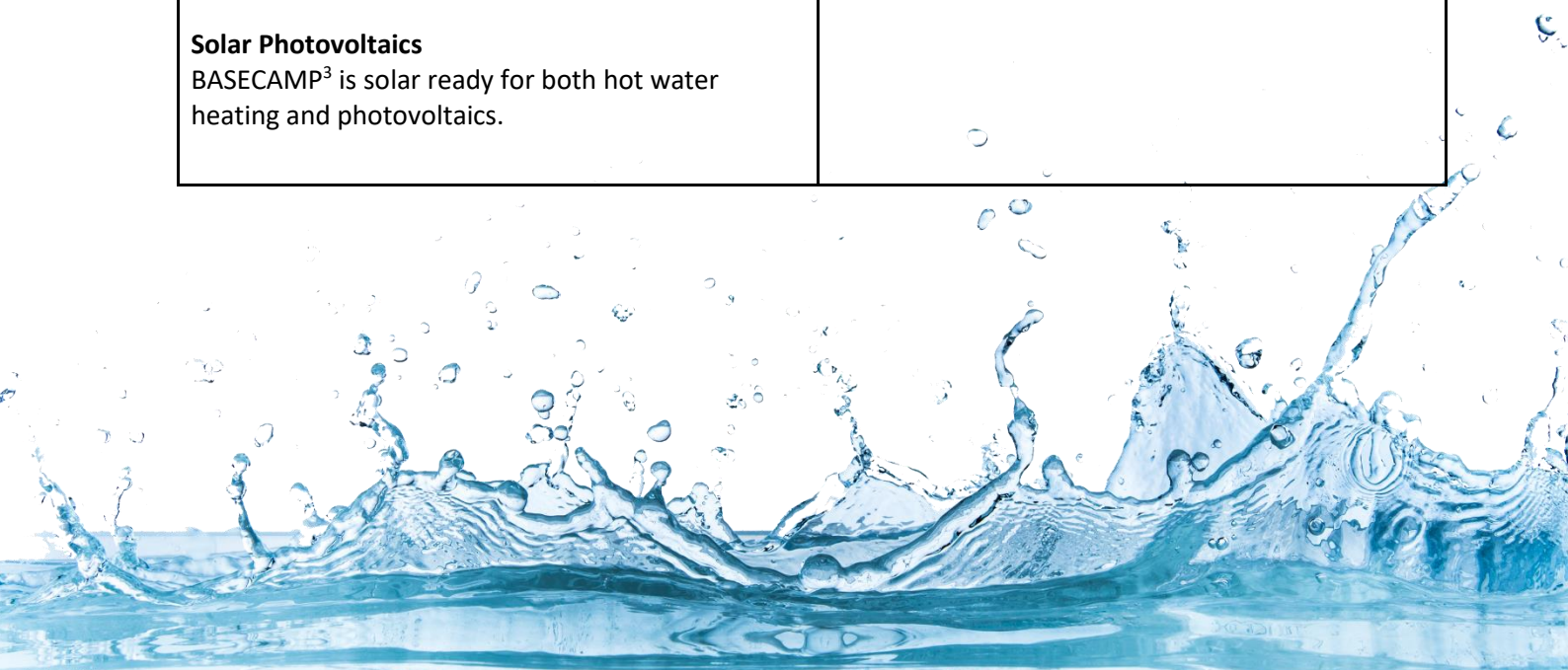
### Cost of Camp Relocation (3 Moves)



## 3.4 Materials/Energy Use Comparison

This table illustrates some of the environmental and energy use differences between BASECAMP<sup>3</sup> and traditional wood frame construction.

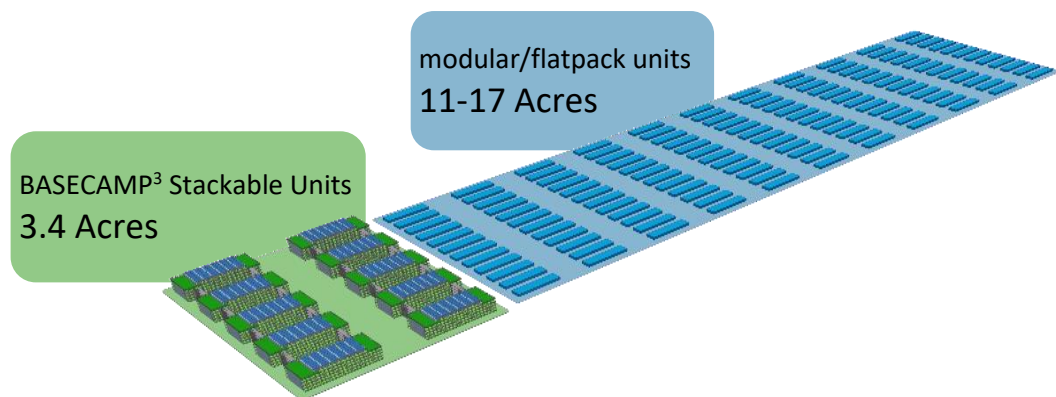
<p><b>BASECAMP<sup>3</sup> calculation:</b></p> <p><b>Transportation:</b> Each Module requires a single truck / trailer combination and is ready for transport. No additional wood or plastics are used.</p> <p><b>Main Structure Materials</b> The main structure is manufactured from upcycled, steel shipping containers and can be refurbished or recycled after lifecycle is complete.</p> <p><b>Interior Materials</b> Where possible both geographically and economically, we use recycled, upcycled, sustainable, fair trade or easily recyclable materials.</p> <p><b>Energy Saving Technology</b> In addition to using only energy efficient fixtures such as AC units and lighting, with our wireless “Modutech” remote management technology, operators can remotely monitor, measure and manage energy use.</p> <p><b>Greywater Recycling</b> For a 5000 man camp, greywater recycling could save an average of 22,000,000 liters of water per year. Rather than costly processing as sewage or trucking off-site, this resource could be reused to irrigate green spaces and flush toilets and urinals.</p> <p><b>Solar Photovoltaics</b> BASECAMP<sup>3</sup> is solar ready for both hot water heating and photovoltaics.</p>	<p><b>Wood Frame Construction:</b></p> <p><b>Transportation:</b> Structural bracing must be installed (using wood) and/or protective wrap using plastics (25kg per unit @ 500 units = 12,500kg of plastic) and/or 32,000Kg of wood bracing.</p> <p><b>Main Structure Materials</b> Constructed of wood and new materials that will have little or no value after lifecycle and usually ends up in a landfill. (768kg of timber X 500 units = 384,000kg of timber)</p> <p><b>Interior Materials</b> Unknown</p> <p><b>Energy Saving Technology</b> Although some manufacturers now use high efficiency LED lighting and AC systems, without being able to measure or control the use, the efficiencies built into the hardware can be lost due to controls being set incorrectly by residents.</p>
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## 3.5 Environmental Value Highlights

We encourage operators to look at the full lifecycle environmental impact of their camp solution. We are dedicated to protecting and preserving the environment all while lowering our overall carbon footprint both internally in our own operations and of the solutions that we provide.

- 1) Occupation Density** - Stacking allows for a higher density occupation (3.4 Acres for 5000 beds VS 11-17 Acres required for non-stacked units - See Basecamp Profile section 2.2 for illustration) and more efficient use of space which can have an overall lower impact on the environment.



- 2) Solar exposure impacting the cost/energy to control internal temperature of modules** – The BASECAMP<sup>3</sup> block (stacked) design reduces outer wall exposure, significantly reducing the amount of energy required to cool the interior spaces. Relative solar exposure is 1.0 VS 3.4 for temporary wood frame construction or 4.0 for modular flatpacks.

	Stacked Basecamp Units	Single Shipping Container	Temporary Buildings	Modular Flatpack
<b>Acres for 5000 Beds</b>	3.4	18.7	11.5	16.6
<b>Relative Site Area</b>	1.0	5.5	3.4	4.9
<b>Relative Solar Exposure</b>	1.0	5.6	3.4	4.0

- 3) Seals and Leaks** - Tolerances that stay consistent over time. All steel construction ensures that seals remain tight and that doors, windows and vents function as they should for the lifespan of the module, keeping conditioned air in and the elements out.
- 4) Solar Energy Options** - Each block can be supplied a significant amount of energy from roof mounted solar panels. This system can reduce the overall load on generators, especially during the peak summer months, allowing for a smaller generator or less grid power to be consumed.



## 3.6 End of Lifecycle Options

BASECAMP<sup>3</sup> modules are built with a continuation of useable lifecycle in mind. We design and manufacture a solution that holds value and has use far beyond its primary lifecycle. We have identified the following potential 'second life' uses:

**Sale (as is)** - BASECAMP<sup>3</sup> modules are robust and with minimal maintenance can maintain usability and value. Estimated resale value without significant refurbishment: BHD 1,469,042 (30% of original value)

**Recycling / re-configuration** - BASECAMP<sup>3</sup> is easily refurbished and reconfigured into single room, family or bunk housing units. With a constant need for affordable, emergency, student or refugee housing, there is no shortage of places around the globe that could utilize your excess or out of service modules.

**Recycling of metal** - Cor-Ten Steel is 100% recyclable and can be sold at market rates

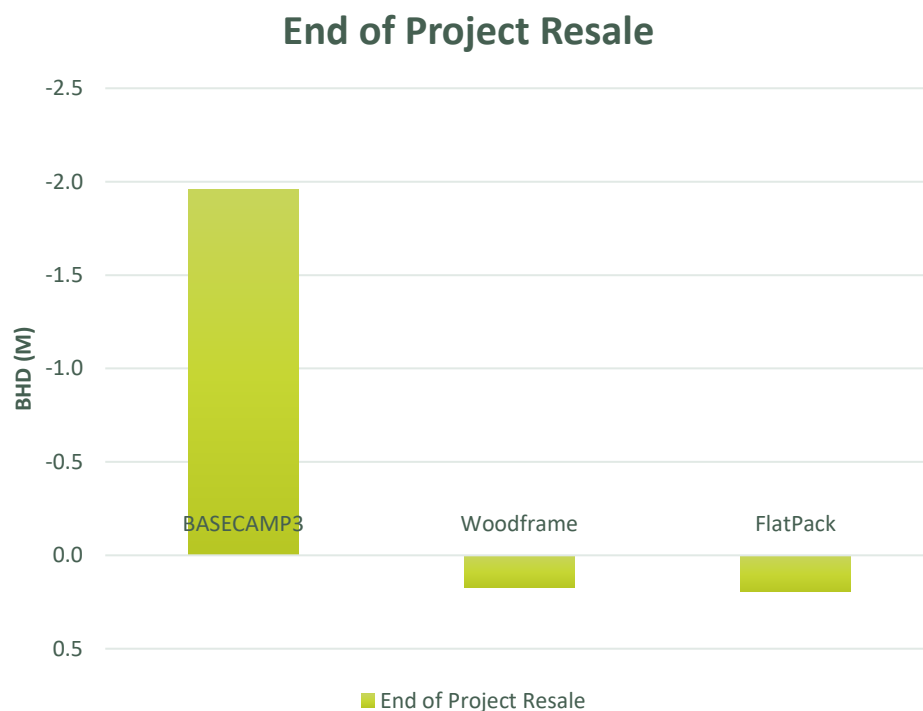
**Refurbishment / Sale** - Unlike their wooden or flatpack counterparts, BASECAMP<sup>3</sup>'s support structure does not degrade with time and holds both its structural integrity and its value. For roughly 20% of the initial investment, units can be entirely refurbished and brought up to like new condition.

Estimated cost of refurbishment after 10 years of service: BHD 1m

Estimated resale value after refurbishment: BHD 3m



2015 – Berlin repurposes shipping containers into refugee accommodation



NOTE: costs / values have not been adjusted for inflation

## 3.7 The “Happiness Factor”

Our core philosophies:

**“Workers should be provided a home away from home that offers safety, security and peace of mind”**

**“Campuses should be well designed, comfortable, functional and environmentally sound”**

**“Residents should feel a sense of pride in their community”**

Why we do it:

- A happier, more comfortable, workforce translates to better, higher quality production with less workplace illness.
- Pride in one’s space and community results in less vandalism, theft and damage.
- A well designed, safe, secure bedspace means employees get better rest, contributing to better general health, better concentration at work, fewer workplace injuries and lower staff turnover.

By factoring our core philosophies into the design of BASECAMP<sup>3</sup>, we end up with well-engineered environments for working communities that contribute to the health, safety and security and ultimately the happiness of your personnel. This holistic approach to design and inclusion of a “happiness” factor is what sets us apart from the competition. We work with our clients to create spaces that instill a sense of pride and community, giving workers a true home away from home that pays back dividends on its investment.

## 3.8 SafetyView – Mini Broadcasting Solution

We have the ability to cost effectively integrate our “SafetyView” corporate information system. This easy to update, cloud based system enables camp operators to push real time information, text, pictures and video in several languages out to any TV screen in the community including bunkhouses, common areas and around the workplace. This system is widely used for daily local updates for employees, announcements, and safety information.