

# Alternative Housing: The Shipping Container Home

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**AUTHOR:**

**MARY MARTINEZ-GARCIA, MANAGER,  
LIBRARY COLLECTION DEVELOPMENT,  
INFORMATION CENTRAL, NAR**

## **AUDIENCE**

- **REALTORS®** who list shipping container homes.
- **CLIENTS of REALTORS®** who are interested in shipping container homes and potential development opportunities.
- **GREEN Designees** who would like to know more about the technology and opportunities presented in shipping container homes.

## **ABSTRACT**

The purpose of this paper is to educate REALTORS® and their customers on the features of shipping container homes. This paper highlights the pros and cons of shipping container homes. There are an abundance of containers that can be reused for this purpose which supply a sturdy and lasting structure.

## **SHIPPING CONTAINER AS HOME**

Shipping container homes range in size from as little as the standard 20 by 8 foot container, yielding 160 square feet, for a single residence to as much as the wallet, land, and imagination can handle. Arranged in multiples with some architectural flair, the shipping container – or *intermodal steel building unit* (ISBU) – can be as lavish and spacious as any traditionally built home. Arranged in multiples, in a temporary compound for instance, the ISBU serves as housing for victims of natural disasters. Stacked on top of each other like building blocks, the ISBU becomes affordable housing, student housing, or even a mixed-used development of retail, office, and residential units. No longer just the pet-project of trendy architects, container housing is gaining traction. As the need for affordable housing, infill housing, and temporary housing options grows, so too does interest in these simple and low-cost building blocks among city planners, nonprofit organizations, real estate brokers and developers, architects, and communities alike.

Interest in the shipping container for housing has grown for several reasons. The country's trade deficit (the U.S. imports more goods than it exports) has led to a proliferation of retired shipping containers (Small House Bliss, 2013). Other factors include the need for more sustainable building materials and the low cost of the ISBU as a building block – containers can run as little as \$2,000 (Laris, 2014). In addition, shipping containers are sturdy: the ISBU is water, wind, rust, mold, fire, and pest resistant (Weber, 2014). Common examples of container housing include *sustainable homes* for the environmentally conscientious dweller, *well-*

appointed high-end container homes for the more affluent, and multi-unit and special use applications that meet specific needs such as housing for students and low-income residents.

## THE ENVIRONMENTALLY FRIENDLY CONTAINER HOME

The environmentally friendly container home can pack as many green features as – if not more than – the traditionally built home by virtue of its compact size and construction. For instance, a San Antonio container guest house<sup>1</sup> designed by architect Jim Poteet features a rooftop garden,

bamboo plywood flooring and walls, a composting toilet, and a gray water tank for garden watering, among other features – all in an 8 by 40 foot footprint (Chang 2012). Another example can be found in Nederland, Colorado. The award-winning two-container<sup>2</sup> design by Herr Architects (formerly Studio H:T) makes use of photovoltaics, solar orientation, passive cooling, pellet stove heating, and green roof technologies, all intended to keep the house “off the grid” (Katz, 2013). In another example of the environmentally friendly container home, architect Adam Kalkin’s Quik House<sup>3</sup> is said to be constructed of about 75% recycled materials



Figure 1: CCSGen1 project home - Orchard Avenue, Cleveland, Ohio - Cleveland Container Structures [www.clevelandcontainersstructures.com](http://www.clevelandcontainersstructures.com) - See Floor Plan and Site Plan in Addendum

<sup>1</sup> [www.remodelista.com/posts/the-architect-is-in-container-as-guest-house-by-poteet-architects](http://www.remodelista.com/posts/the-architect-is-in-container-as-guest-house-by-poteet-architects)

<sup>2</sup> [www.christopherherr.com/work/live/shipping-container-house/](http://www.christopherherr.com/work/live/shipping-container-house/)

<sup>3</sup> [www.quik-build.com/](http://www.quik-build.com/)

by weight (Howard, 2013). NAR had an opportunity to check in with REALTOR® Michael J. Rastatter Jr., of [Cleveland Container Structures](#)<sup>4</sup>, on a container home project being offered in the Cleveland area (See Figure 1). Located in a walkable artisan neighborhood on an urban infill lot accessible near public transportation, Rastatter’s container home offers sustainable features such as a high efficiency heating and cooling system, Energy Star rated appliances and lighting, water-conserving features, recycled (and formaldehyde-free) building materials, and low/no VOC paints, primers, adhesives and sealants. According to Rastatter, the “CCSGen1 container home will have a HERS Energy Star rating of 47, compared to a traditionally built home of equal size which rates an average of 100. Existing older homes generally rate 100-150. Homes rated zero are considered off the grid, or *net zero*.” Estimated energy costs and savings for CCSGen1 can be found on the project’s MLS [listing](#)<sup>5</sup> details.

## THE HIGH-END DESIGNER CONTAINER HOME

Examples of *luxury* container homes exist throughout the world. In the United States, an example includes designer Peter De Maria’s [eight-container](#)<sup>6</sup> Redondo Beach, Calif., home, constructed with both prefab assembly and conventional construction for a clean-lined modern exterior and interior (De Maria Design Associates Inc., 2011). Across the country on the east coast, designer Julio Garcia’s [two-container](#)<sup>7</sup>

one bedroom home/studio contrasts a refined contemporary interior with the original rough container exterior – complete with fully intact loading doors (Small House Bliss, 2013). In the Midwest, [Stone’s Throw Builders](#)<sup>8</sup> of Union Pier, Michigan (See Figure 2), sees container homes as the next frontier. Stone’s Throw Builders’ Wendy Ruttenberg shared with NAR a little bit about the container home movement. “An estimated 300 million freight containers sit empty at sea ports all over the world at any given time. Recycling shipping containers for home construction is an innovative method to improve sustainability across the board.” Ruttenberg continued, “Environmentally conscious building practices are more than a trend, they are a viable new direction for home construction and Stone’s Throw Builders is on the forefront of the movement in the Midwest. The basic structure already exists with the use of containers, unlike typical stick-built frame construction. Containers can be combined in a number of ways to create a unique and completely custom luxury retreat.”

What seems to make these projects work is compatibility with the surroundings. De Maria’s beach home, Garcia’s studio home, and the projects of Stone’s Throw Builders in Harbor Country all make sense in their specific locales. Similarly, Rastatter’s CCSGen1 project in Cleveland *works* with its location. “The juxtaposition of the industrial ascetic, structural integrity and earthy interior finish pallet are what attract people to this home as well as its low energy/operating/maintenance costs,” Rastatter

<sup>4</sup> [www.clevelandcontainerstructures.com/](http://www.clevelandcontainerstructures.com/)

<sup>5</sup> [www.howardhanna.com/property/property.asp?PRM\\_MLSNumber=3468232&PRM\\_MlsName=NorthernOH](http://www.howardhanna.com/property/property.asp?PRM_MLSNumber=3468232&PRM_MlsName=NorthernOH)

<sup>6</sup> [demariadesign.com/2/index.php?option=com\\_content&view=article&id=53&Itemid=29](http://demariadesign.com/2/index.php?option=com_content&view=article&id=53&Itemid=29)

<sup>7</sup> [smallhousebliss.com/2013/08/01/savannah-project-a-container-house-by-julio-garcia/](http://smallhousebliss.com/2013/08/01/savannah-project-a-container-house-by-julio-garcia/)

<sup>8</sup> [stonestrowbuilders.com/](http://stonestrowbuilders.com/)



Figure 2: Union Pier, MI home built by Stone's Throw Builders.

explained. “Very few cities rivaled Cleveland's prowess during the industrial revolution and even fewer possess the level of assets, innovation and creative capacity being utilized/developed across the region, especially in and around the sustainability industry. Cleveland is on the international rise, again. The adaptive reuse of containers (Inter-modal Steel Building Units - ISBUs) is being embraced by CCS, who is putting its unique stamp on the trend, making it a product of its time, right here in Cleveland.”

## THE SPECIAL USE CONTAINER HOME

Besides being used for the environmentally friendly home and luxury homes, the ISBU has more recently been used in *multi-unit* and *special use* applications to meet the housing needs of students and low-income residents. Examples include a Habitat for Humanity project in Kentucky, a low-income housing development in Vancouver, and a unique student housing development constructed with shipping containers and grain silos in Johannesburg. *USA Today* recently reported on what is considered to be Kentucky's first shipping container home. The three-room home<sup>9</sup> will be provided to a low-income resident at a cost of \$25,000, payable at an estimated \$140 per month for a 20-year no-

<sup>9</sup> [www.usatoday.com/story/news/nation/2014/07/03/shipping-containers-home/12198057/](http://www.usatoday.com/story/news/nation/2014/07/03/shipping-containers-home/12198057/)

interest loan (Downs, 2014). In 2013, Vancouver saw its first container housing development open to low-income residents. Atira Women’s Resource Society’s [12-unit building](#)<sup>10</sup> offers below-market studio apartments to women over the age of 50 (Walsh, 2013). Perhaps one of the most unusual examples of container housing, however, can be found in South Africa. At [Mill Junction](#)<sup>11</sup> in Johannesburg (See Figure 3), shipping containers have been stacked atop and alongside former grain silos to create a 400-student dorm/apartment complex, complete with libraries, study rooms, shared kitchens, computer rooms and gym. Using hot water heat, light-sensing technologies, double-paned windows, and insulation, Mill Junction is reportedly using half the energy of a conventional property (Citiq, 2014). Mill Junction serves as a bright and colorful testament to what container housing can be – in this case, infill housing for a student population.

## EMERGING TRENDS

Several conditions in the real estate market make container housing worthy of serious consideration. Increased demand for affordable housing and rental housing due to the recent recession coupled with ongoing demand for infill development near public transportation and jobs (Broberg, 2014), pose opportunities for container housing. ISBUs can be quickly and economically assembled into multi-unit complexes. Given the compact size of the shipping container, it can easily be accommodated on small land parcels for infill development. Other conditions that lend themselves to container housing include the



Figure 3: Mill Junction, Johannesburg, South Africa - Citiq, Property Investment & Management Company

<sup>10</sup> [www.atira.bc.ca/imouto-container](http://www.atira.bc.ca/imouto-container)

<sup>11</sup> <https://www.facebook.com/MillJunction>



Figure 4: Brookland Development, Washington, DC - Travis Price, Architect - See Site Plan in Addendum

need to reduce homelessness, create emergency housing after natural and man-made disasters, and provide workforce housing in areas where there are shortages due to job market shifts.

## HOUSING FOR THE HOMELESS

An example of ISBU housing for the homeless comes from the Brighton Housing Trust (UK), which developed a portable [36-unit community](#)<sup>12</sup> on what was once a scrap metal yard. The community will eventually be moved to another site when the 5-year land-use agreement ends (BBC News, 2014). Across the pond, container housing architect Travis Price is currently working on an [18-container student housing project](#)<sup>13</sup> in DC's Brookland neighborhood (See Figure 4).

According to a recent *Washington Post* article, Price is also contemplating floating container apartments and a homeless village on the river to serve Georgetown (Laris, 2014). Price shared his vision for these projects. "Besides a larger on-land village of containers in the city, we would like to float the same 200 units on elegant barges and create mixed-use containers on the river fronts. The best part is that it would create what most Washingtonians would love most; urban life on the water. This is the future of cities...the US has an abundance of natural rivers and parks." Price added, "Cities really don't need to keep their river fronts completely pristine. Bruges in Belgium, Florence and Venice, Italy are all echoes of a richer history of life on the water in a dense

environment. This is not only lovable but also more valuable. Think of the vast amount of money spent each year to visit such places as well as the huge investment in metal and glass condominiums and you suddenly realize the containers are simply an evolution of using less materials and human technical genius to provide more with less. The river ecology is far better preserved with responsible living than open parks that are costly and hard to maintain. Good ecology comes when a person has to eat and sleep where they live!"

## INTERIM HOUSING

Container housing also fills a need for emergency and interim housing. Shipping containers have been used as offices, barracks, and medical buildings (Weber, 2014) by the military, and more recently as emergency housing by governments. In 2008 the Office of Emergency Management of the City of New York (See Figure 5) held a competition for innovative [post-disaster housing](#)<sup>14</sup> designs. The winning prototype – an "interim housing prototype based on a shipping container-style modular system" (The City of New York, 2014) – opened for viewing in August 2014. In addition to housing for the homeless and emergency housing, container homes provide quick solutions for rapidly shifting workforces. At the 2013 South Texas Oil and Gas Expo, Infrastructure Developments Corp. introduced the 880-square-foot shipping container [WingHouse](#)<sup>15</sup> – a fold-out, ready-to-use living

<sup>12</sup> [www.bbc.com/news/uk-england-sussex-28035388](http://www.bbc.com/news/uk-england-sussex-28035388)

<sup>13</sup> [www.washingtonpost.com/local/trafficandcommuting/shipping-container-apartment-being-erected-in-washington-this-week/2014/07/20/50aabd04-0e01-11e4-b8e5-d0de80767fc2\\_story.html](http://www.washingtonpost.com/local/trafficandcommuting/shipping-container-apartment-being-erected-in-washington-this-week/2014/07/20/50aabd04-0e01-11e4-b8e5-d0de80767fc2_story.html)

<sup>14</sup> [www.nyc.gov/html/whatifnyc/html/purpose/rfp.shtml](http://www.nyc.gov/html/whatifnyc/html/purpose/rfp.shtml)

<sup>15</sup> [www.winghouses.com/spec.html](http://www.winghouses.com/spec.html)



Figure 5: NYC Emergency Management - <http://nyc.gov/whatifnyc>

space, complete with “baths, water, AC, lighting, cable, network and electrical fittings” (Professional Services Close-Up, 2013). NAR reached out to WingHouse representative, Peter Prescott, who elaborated on the use of this product (See Figure 6). “We currently market the units predominately throughout Asia and the Middle East. The most common use in these areas is for remote housing for mining and oil exploration accommodations. Due to their ability to ‘close up’ and move easily (as a 40ft containers) they become very versatile in many other areas as well. This can be as wide as a mobile medical facility in Africa or beachfront vacation units in Vietnam. We are currently

seeking a partner to begin marketing the units here in the USA. The potential we see here is varied but initially we have had good feedback from the Oil & Gas industry and I also see a good use of the units for FEMA as emergency shelters.” And the WingHouse isn’t alone in this space. More recently, Falcon Containers displayed its one bed/one bath 160 square foot [workforce housing unit](#)<sup>16</sup> – constructed from an 8 foot by 20 foot Conex box – at the South Texas Oilfield Expo in July (Falcon Containers, 2014). The Falcon Living Box can be used for crew living quarters, work camps, offshore living quarters, military housing, and disaster relief housing (Falcon Containers, 2014). Standard

<sup>16</sup> [www.falconcontainers.com/portable-living-container/](http://www.falconcontainers.com/portable-living-container/)



Figure 6: WingHouse units and renderings. - [winghouses.com](http://winghouses.com)

features include plumbing for shower, sink and toilet, air conditioning and heating, electrical system and lighting, wiring for telephone and Internet connections, and insulated walls and ceiling (Falcon Containers, 2014).

## THE NEXT-GEN CONTAINER HOME: MOBILITY AND MECHANIZATION

first-gen shipping containers are transported to permanent or temporary locations to serve as permanent or interim housing, the next-gen container home moves *with* its owners. LOT-EK's Mobile Dwelling Unit (MDU) (See Figure 7) was developed according to LOT-EK representative Ada Tolla, as a “concept for a transportable house – aimed at a more dynamic and globalized work environment.” Tolla



Figure 7: Mobile Dwelling Unit (MDU) by LOT-EK - [lot-ek.com](http://lot-ek.com)

While the first generation of container housing seems largely focused on environmental sustainability and adaptability, the next generation of container housing brings to the table features such as flexibility between temporary and permanent use, super-transportability, and mechanization. Whereas

explained to NAR, “The intention is for the house to be shipped to different destinations – through the standard shipping container networks – and installed for a stretch of time. We had in mind business people, tech inventor, professors, etc. In this sense, the client is a type more than an actual client. The appeal is the

transportability, the modern and self-contained design, and the efficiency of space.” The MDU created for the University Art Museum (at the University of California - Santa Barbara) was designed to “travel with its dweller to the next long-term destination, fitted with all live/work equipment and filled with the dweller’s belongings” (LOT-EK, 2014). The MDU can easily be configured for permanent residency. Another example of the next gen container is Industrial Zombie’s fully mechanized container units. From its [Push Button House](#)<sup>17</sup>, featuring pop-up/drop-down living, sleeping, and bathroom quarters, complete with ambient lighting, to its [GOPRO](#)<sup>18</sup> multi-story structure of four full-sized containers – each on-end and conjoined – Industrial Zombie’s container buildings truly demonstrate how quickly and easily a container house or compound can be mobilized and quickly functioning through mechanization.

## IMPACT ON REAL ESTATE INDUSTRY

Given the nearly one way flow of goods coming to the United States and excess supply of ISBUs, the growing green movement, and the cost and time savings associated with shipping container homes, the container-housing trend will likely continue to gain momentum. How much momentum is hard to say; after all, there are some downsides to container homes. Despite the fact that container giants like Hapag-Lloyd and OOCL are using

environmentally sensitive products such as water soluble varnishes (Hapag-Lloyd, 2014), tin-free paints and bamboo flooring (OOCL, 2014), some ISBUs have been treated with pesticides and chemicals (Glink, 2014) to protect shipped contents. Then, there are zoning issues and local regulations to consider. And, unless the homeowner has a decent budget, the container home will remain looking like just that...a container.

## NIMBY

Not unlike mobile homes and the cookie cutter homes of the 1950s, container homes have their share of critics – one of them being Gary Imhoff of *DC Watch*, a neighborhood watchdog organization. In response to the container apartment building planned for DC’s Brookland neighborhood, Imhoff is reported as saying, “Prefab shipping container houses can be made to look nice in architect’s plans. So can trailer parks. But I suspect that a few decades of wear will quickly turn them into slums” (Neibauer, 2014). Another critic’s [arguments](#)<sup>19</sup> are understandably fueled by images of an infamous building constructed in Mankato, Minn., in the early 1970s (Hood, 2012). In 1972, [Valley View Apartments](#)<sup>20</sup> were constructed using 20 mobile homes, stacked four stories high, on a concrete frame (Adkins, 2013). The property, referred to by journalists as one of the nation’s ugliest buildings, later fell into disrepair and was ultimately purchased and demolished by the city (Adkins, 2013).

<sup>17</sup> [www.inzombie.com/!push-button-house/c20ct](http://www.inzombie.com/!push-button-house/c20ct)

<sup>18</sup> [www.inzombie.com/!gopro/co9y](http://www.inzombie.com/!gopro/co9y)

<sup>19</sup> [www.startribune.com/local/yourvoices/181679951.html](http://www.startribune.com/local/yourvoices/181679951.html)

<sup>20</sup> [mobilehomeliving.org/stacked-mobile-homes-highrises-of-the-past-present-and-future/](http://mobilehomeliving.org/stacked-mobile-homes-highrises-of-the-past-present-and-future/)



Figure 8: Sarah House, Salt Lake City, UT

## THE PROS WEIGH IN ON CONTAINER HOMES

### AFFORDABILITY, SUSTAINABILITY

REALTOR® Jeff White of Makris-White Real Estate in Bountiful, Utah, knows quite a bit about container homes and has demonstrated how the shipping container can be used as an affordable, environmentally friendly housing option. White has been the driving force behind the [Sarah House](#)<sup>21</sup> container home (See Figure 8) project in Salt Lake City, which recently sold and closed. White shared his opinions on why there is a growing fascination

with the container home. “Everyone first relates to the cost of retired containers and people will read how containers will wash ashore after weeks at sea with ten thousand pair of dry Nikes inside and think how to convert one for themselves. I have been an active real estate broker since the early ‘80s and involved with a small local non-profit. Because of my business relationship with my local container purveyor, I will stack numerous containers in various configurations even on end to see how the designs work. This will be the third home constructed and the largest to date at 672 square feet, which strikes a chord with so many people.” Size and price are not

<sup>21</sup> <https://www.facebook.com/pages/Sarah-House-Utah/72517442758?sk=info>

the only attractor-factors of container homes. Like other container home designer-builders, White has incorporated environmentally friendly features into the Sarah House container home, such as bamboo flooring, radiant heat, insulating paint, a tankless water heater, strategically placed windows to maximize daylight, a high-efficiency

Accessory Dwelling Unit — on to the site. It would give increase the affordability of the home if the resident was able to rent out the accessory dwelling to help with payment, or to start a new home business, or to help with a child returning home due to a martial or job change or high student loan debt. Another rationale could be to provide for a senior



Figure 9: Lava Runner Series - Affordable Portable Housing, Hawai'i - See Floor Plan in Addendum

Mitsubishi heating and cooling system, and insulation made from recycled clothing and rolled corn. NAR asked White what features he would like to incorporate into future projects. “Solar would be something to incorporate. Also, not particularly green, I would like to incorporate an ADU —

parent in a multi-generational situation.”

### **TRANSPORTABILITY**

Environmental features, cost, speed of construction, and flexibility of use make container homes a housing option that holds limitless possibilities. Jeff White is already

working on plans for a development of “affordable, architecturally attractive individual homes of less than 600 square feet” which will include “...a couple of container-based designs along with some very stylish but smaller homes.” When asked what he sees for the future of container homes, White responded, “Container housing is a great solution for another form of housing methodology, and I believe we will start

Figure 9), builds both container and modular homes. As indicated by the name, his company’s aim is affordable and *portable*. While Rogers works with either type of home, he recommends going with “traditional materials because 12' wide is so much more livable than 8' wide.” Rogers explained, “Steel transmits thermally and acoustically, which means a steel home is noisier, and in need of heat reflective coatings outside to



Figure 10: Sol 480 - MEKA INC. - [mekaworld.com](http://mekaworld.com) - See Floor Plan in Addendum

seeing a crosslink between container based engineering designs and the modular housing industry.” White’s predictions are very much in line with those of other professionals involved in this niche. John Rogers, of Affordable Portable Housing in Hawai’i (See

make the home livable. Also, code requirements in most places for wall insulation means more cost due to having to furr out the interior walls, insulate and install Drywall.” Rogers’ Lava Runner series is 12' wide which allows the home to be transported

without taking two lanes of traffic on a road. Rogers explained that while escorts are still required for the move of a 12' wide home, going any wider than that makes moving very difficult and expensive. Transportability is also at the center of Meka Modular Buildings Worldwide products. Meka housing products are designed “to be the size of ISO shipping containers (US and foreign pat Pending) and thus can be transported anywhere there is road,” according to Michael De Jong of Meka. The Residential Sol 480 modular home (*See Figure 10*), for instance, is a 480-square-foot one-bedroom/one-bath home which can be installed and move-in ready in about a week’s time. Described by De Jong as “where Ikea meets Lego” Meka buildings are built to meet specific local requirements and can be safely transported on the roads, overseas, and by train, making this product a “global housing solution.”

## WHAT THE FUTURE HOLDS

NAR asked real estate professionals Jeff White and Michael Rastatter, as well as architects and designers Ada Tolla, Michael De Jong and Travis Price, what the future holds for these housing options. White foresees more synergy between container-based engineering design and modular housing. Rastatter’s vision of the future echoes those of Jeff White. “I think container housing will continue to grow as a green building trend and establish a strong presence in the smart-home/modular/prefab industry,” said Rastatter. “The hope is that consumers become better educated and realize that this type of building technology works to mitigate long-term cost increases and environmental issues while stabilizing its surroundings in the community.”

Tolla envisions the emergence of specialized factories that “transform containers executing sophisticated design – smart in their efficiency, energetically savvy, tight in their carbon footprint and yet beautiful architecture.” De Jong “foresees that in the near future we will deliver cost savings due to engineering solutions (installation, energy consumption efficiencies) combined with purchase financing to offer a global housing solution which will change the traditional method of building construction.” De Jong adds, “Our method will be seen more as a product rather than a commodity where pricing and quality are uniform and transparent.” As architect Price sees it, “Pre fabrication and mass customization are continuing by necessity and more importantly, they have become the romantic vision of the 21st century. Much like the smart phone appendage we all enjoy, these innovations will become the expected and enjoyed norm. The tipping point is here. It is not a technical revolution as most of the components are not new. It’s a cultural evolution!”

Opinions of city planners and consumers remain mixed about container homes. Local zoning in most instances does not address container housing. Modifications such as a permanent foundation and pitched roof (Downs, 2014) may be required to adhere to local building code if permitted at all. As Jeff White experienced with Sarah House, intangible resources such as time, persistence, and an abundance of patience need to be factored into container house projects. On the other hand, a container housing project could result in tax abatement. Rastatter explained, “We followed Enterprise's Green Communities guidelines in the design/build process, therefore the project is eligible for

the city's tax abatement. Energy modeling confirmed that the home will perform quite well using only half the energy of an equal size home built by traditional construction means and methodologies.”

Zoning aside, new generations of home buyers and renters have fresh ideas and perspectives on what constitutes a home. Some people note that tiny homes<sup>22</sup> and micro-unit apartments, for instance, have become price-efficient options for “price-conscious Millennials” who – thanks to digital

media – do not require or want extra space for personal belongings like book and music collections (Sexton, 2013). As H Inc. developer Harry Hepler explained in a recent article on his micro-unit project in Lansing, Michigan, Gen Y has witnessed its older generations toiling just to pay the mortgage – only to lose their homes during bad economic times (Caswell, 2014). Millennials are opting for *quality over quantity*, and container home experts are providing unique housing options to meet that demand.

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<sup>22</sup> [www.realtor.org/field-guides/field-guide-to-the-small-house-movement](http://www.realtor.org/field-guides/field-guide-to-the-small-house-movement)

## BIBLIOGRAPHY

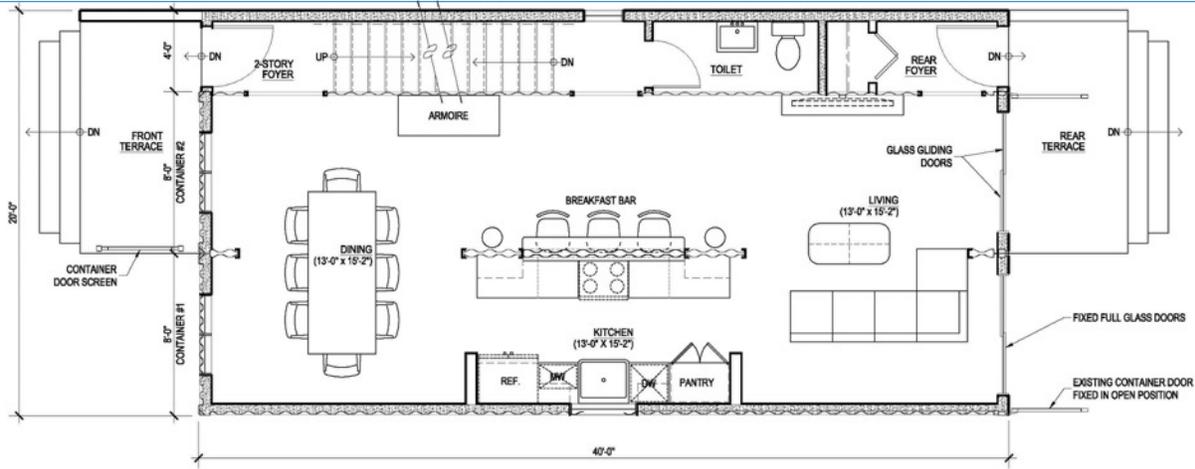
- BBC News, 2014. Brighton shipping container homes an overwhelming success. BBC News.
- Adkins, C., 2013. Unique mobile homes – highrises of the past, present and future. Mobile and Manufactured Home Living.
- Bribery, B., 2013. The Home building revival. On Common Ground.
- Caswell, E., 2014. H Inc. announces plans for new residential development. Greater Lansing Business Monthly, vol. 27, no. 2, pp. 12.
- Chang Hanway, C., 2012. The Architect is in: Container as guest house by Poteet Architects. Remodelista.
- Citiq, 2014. Citiq's Newtown silos open for business in Johannesburg South Africa. Image Communications. [www.imagecom.co.za](http://www.imagecom.co.za)
- City of New York, 2014. About the post-disaster housing prototype program. What If New York City. <http://www.nyc.gov/html/whatifync/html/home/home.shtml>
- De Maria Design Associates Inc., 2011. Redondo Beach House. [www.Demariadesign.com](http://www.Demariadesign.com)
- Downs, J., 2014. Shipping containers: A new Kentucky home? USA Today.
- Falcon Containers, 2014. Falcon Containers proves portability with model workforce housing unit at oil & gas events. <http://www.falconcontainers.com/>
- Glink, I., 2014. 7 homes built with shipping containers. CBS News.
- Hapag-Lloyd, 2014. Our containers: Less wood and up to 100% recyclable. Container. <https://www.hapag-lloyd.com/en/home.html>
- Hood, N., 2012. Shipping container housing is a terrible idea. Star Tribune – Minneapolis, MN.
- Howard, B. C., 2013. Shipping container homes. Popular Mechanics.
- Hu, W., 2012. City will test a disaster housing prototype both innovative and inside the box. The New York Times.
- Katz, M., 2013. 12 homes made from shipping containers. Design Milk.
- Laris, M., 2014. Shipping container apartment being erected in Washington this week. TheWashington Post.
- LOT-EK, 2014. MDU (Mobile Dwelling Unit). <http://www.lot-ek.com/>
- Neibauer, M., 2014. D.C.'s first shipping container apartments coming to Brookland. Washington Business Journal.
- OOCL, 2013. Sustainability Report. <http://www.oocl.com/usa/eng/Pages/default.aspx>
- Professional Services Close – Up, 2013. IDVC to introduce WingHouse mobile shelter to the US market at South Texas Oil and Gas Expo. Professional Services Close - Up.
- Sexton, C. J., 2013. Micros for Millennials. On Common Ground.
- Small House Bliss, 2013. Savannah Project, a container house by Julio Garcia. Small House Bliss.

Walsh, C., 2013. Canada's first container housing development built in Vancouver.  
JetsonGreen.com.

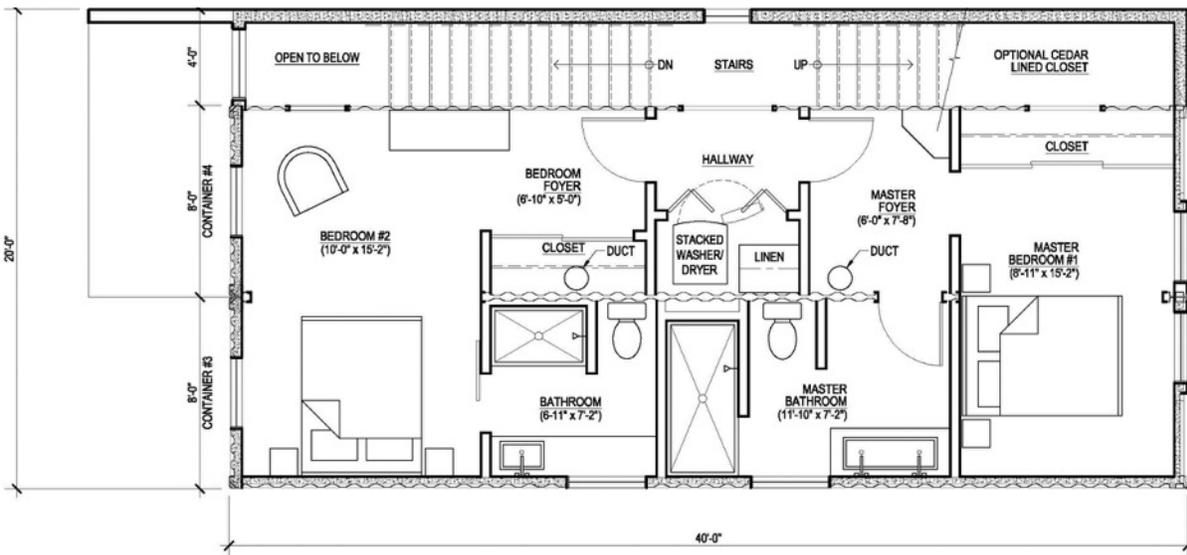
Weber, M., 2014. You can have an affordable, creative, eco-friendly house made from shipping containers. Realty Times.

**ADDENDUM**  
**FLOOR PLANS/SITE PLANS**

**CCSGen1 Floor Plans - p. 2-3 - Cleveland Container Structures**



**OVERALL FIRST FLOOR PLAN**  
SCALE: 1/4" = 1'-0"  
0 2' 4'

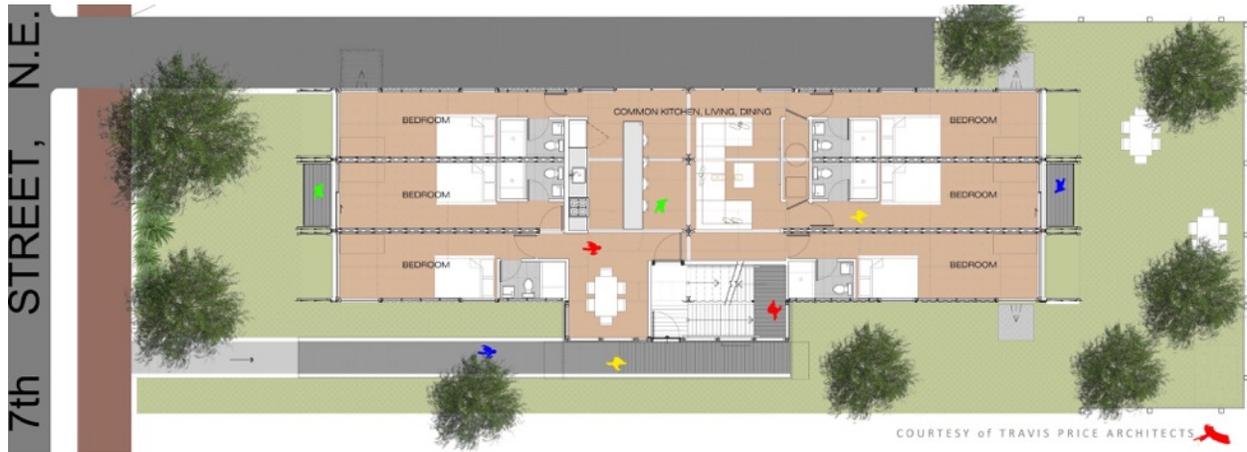


**OVERALL SECOND FLOOR PLAN**  
SCALE: 1/4" = 1'-0"  
0 2' 4'

**CCSGen1 Site Plan - p. 2-3 - Cleveland Container Structures (Cont.)**

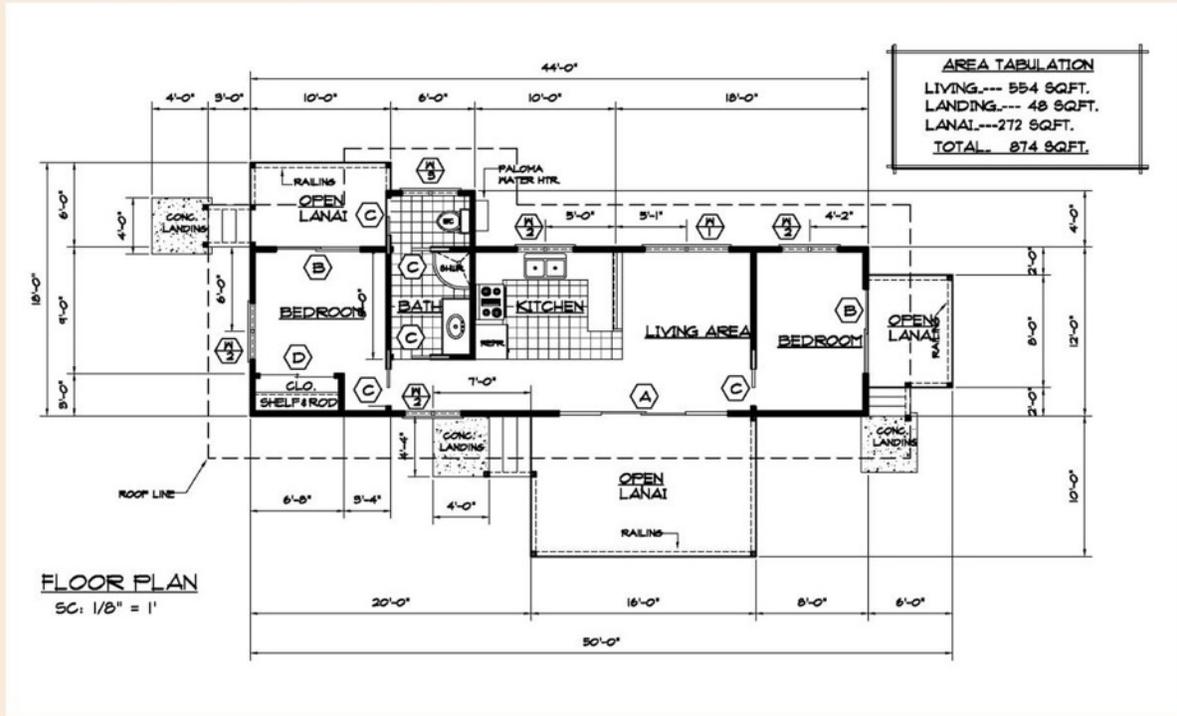


**Brookland Unit Site Plan - p.6-7 - Travis Price, Architect**



Lava Runner Unit Floor Plan - p.13-15 - Affordable Portable Housing

Portable Homes - Lava Runner series – wood or steel frame



Sol 480 Unit Floor Plan - p.14-15 - MEKA INC.

