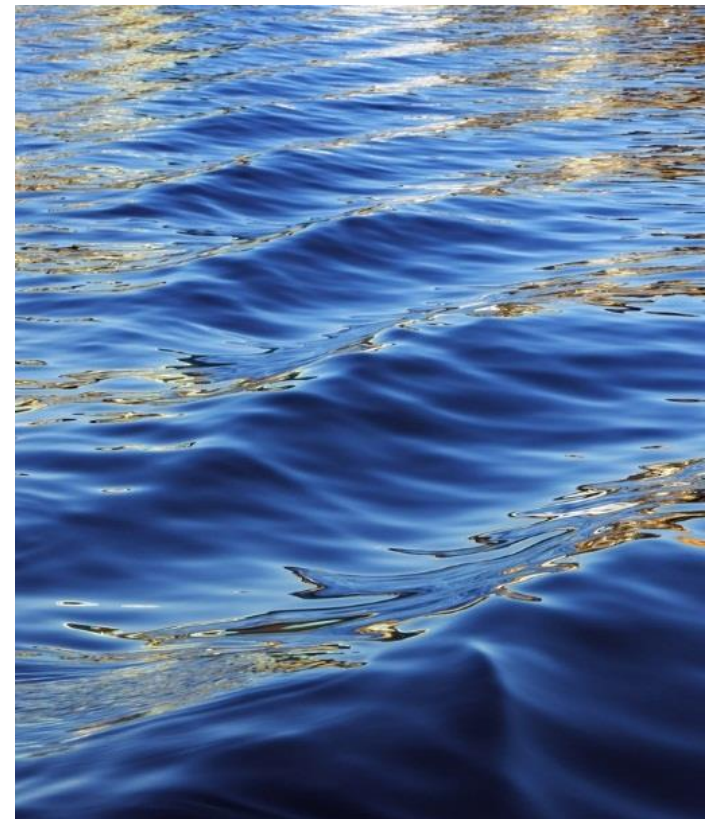




# Tiny Homes

December 14, 2017





# Overview of Tiny Homes

Definition: A Tiny Home on Wheels is a vehicular-type unit primarily designed for permanent residential dwelling that is:

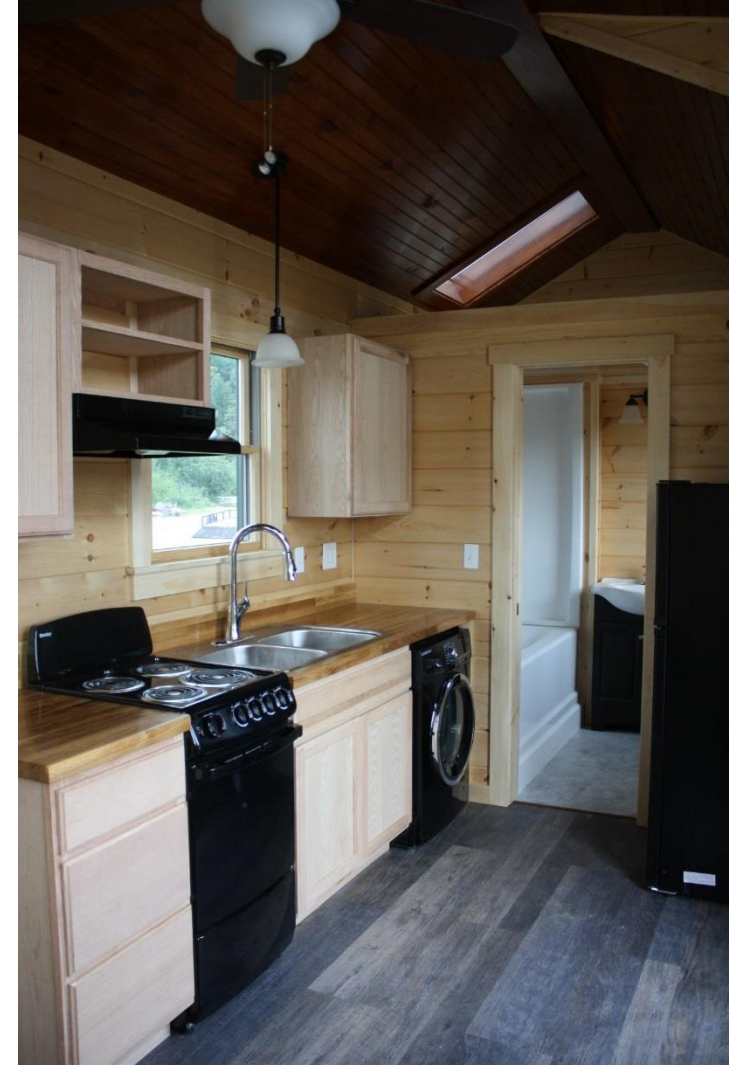
- Towed by another vehicle
- Currently Regulated by the United States Department of Transportations' National Highway Traffic
- Safety Administration (NHTSA) as a vehicle or vehicle equipment
- Does not require a special highway use permit for operation on the road
- Can be easily transported and set up by an individual

Primary Use: A Tiny Home on Wheels (THOW) is used as an accessory dwelling to an existing residence or it could be a used as a primary residence.



# Tiny Home Options

- Affordable primary residence
- Retirement (full or part-time living)
- Allow Flexibility (option to move if your situation changes)
- Keep aging parent(s) nearby (ADA compliant)
- Temporary housing in the event of a fire or becoming homeless
- Student housing
- Vacation home
- Rental income
- Business use (office, studio, food truck, retail shop)
- Keep adult children with disabilities nearby





# Why a Tiny Home?

- Create opportunity for a simpler lifestyle (downsize)
  - No junk or clutter, less to clean, less money spent on maintenance and upkeep
- Affordable housing solution – price range \$45,000 to \$75,000
  - Financing available with 10% down over 10 years, as little as \$362/month
- Considerably less impact on environment compared to traditional housing
  - A fraction of materials and waste when constructed
  - No need for installing septic system
  - Less water and energy used. Easy and low cost renewable energy opportunities.
  - Grey water reuse/irrigation applications
- Mobility
  - Great solution for those whose situation may change every year or 2
  - Avoid headache of buying and selling a home – take it with you!
  - Easy set up for instant or/and temporary use
- Ease of care
  - Majority of those seeking to live in tiny homes are wanting something they can manage themselves and not have to rely on someone else or having to pay a lot towards utility bills, repairs or home improvement projects



# Barriers to Tiny Home living

## 1. Finding a place to put it

- a) Park at a friend or family members home
- b) Purchase land and put in "hook ups"
- c) Would like to rent/lease space
- d) Be part of a tiny home community

## 2. Zoning/Code enforcement

- a) Town says not allowed
- b) Accessory Dwelling Unit rules applied, siting requirement for separate meter
- c) Regular home rules applied with road frontage and setback requirements
- d) Grey water vs. septic issues
- e) Various permitting requirements sited

## 3. Financing

- a) Initially no financing available, currently only 2 sources for tiny home financing
- b) Down payment requirements too burdensome for some people (10-20% down)



# Residents of the following locations have inquired about THOWs

---

Portland	South Portland
Peaks Island	Cape Elizabeth
Westbrook	North Yarmouth
Gorham	Bridgton
Scarborough	New Gloucester
Windham	Freeport
Raymond	Pownal
Casco	Standish
Sugarloaf /Sunday River Areas	Buxton
Litchfield	MDI
Mechanic Falls	Boothbay
Lisbon	Southport
Auburn	Bangor
Gardiner	Orono
Kennebunk	York
Old Orchard Beach	Cumberland
New England States	Canada

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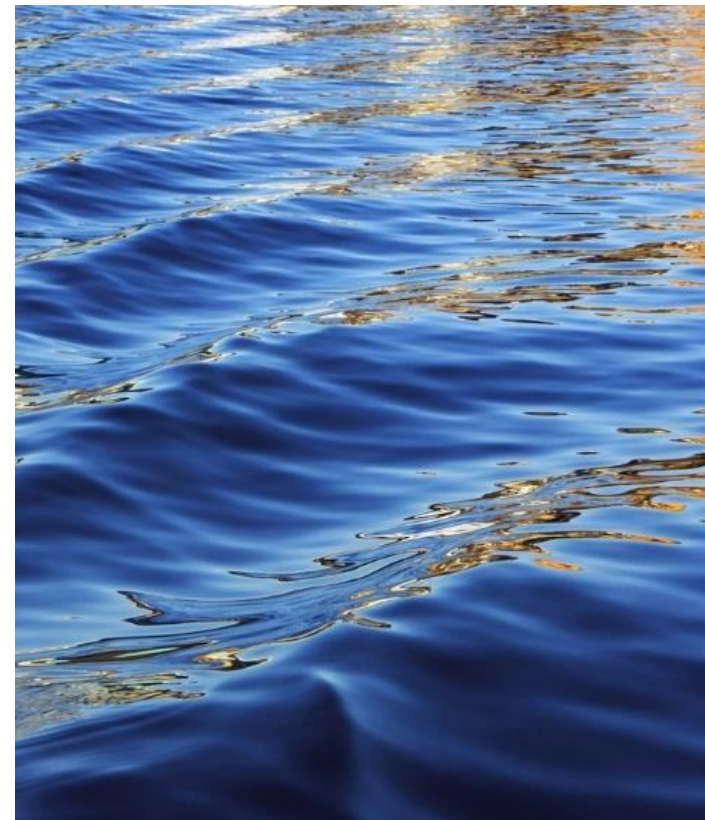






# Tiny Homes

Design, construction and use



# Tiny Home Foundation

Loading jack stabilizers in all four corners. These jacks are able to lift the weight while leveling your house and stabilizing it while parking it in place. These jacks work well on any kind of ground.

Standard with the square fenders for ease of framing and building.

Trailer subfloor framing is spaced at the standard 16" on-center and allows Advantech to be laid directly on top.

Comes standard with galvanized belly pan flashing. This provides a sturdy substrate and 6" of space for your floor insulation.



Tie down D-rings on all four corners.

An angle-iron sill plate is welded to the perimeter of the foundation, providing a structural anchoring point for the home's framing. A hole is drilled through the bottom wall plate and steel sill plate. Simpson Strong Ties HTT<sub>4</sub> or HTT<sub>5</sub> tension ties properly fasten the home to its foundation. This system is identical to that used in standard construction when securing a house to a concrete foundation. The structure is fully rated to withstand the hurricane force winds the house will experience while towing it down the road.

All foundations come with a completely sealed wiring harness with break-away braking system for the safety of everyone on the road.

Reflectors and lights meet DOT requirements, allowing your home to be towed safely and legally down the road.

2-5/16" tongue is standard on all foundations, providing a safe, secure connection to your tow vehicle while transporting your house down the road.

Resources: <http://www.trailermadetrailers.com/> <https://tinyfoundations.com/>

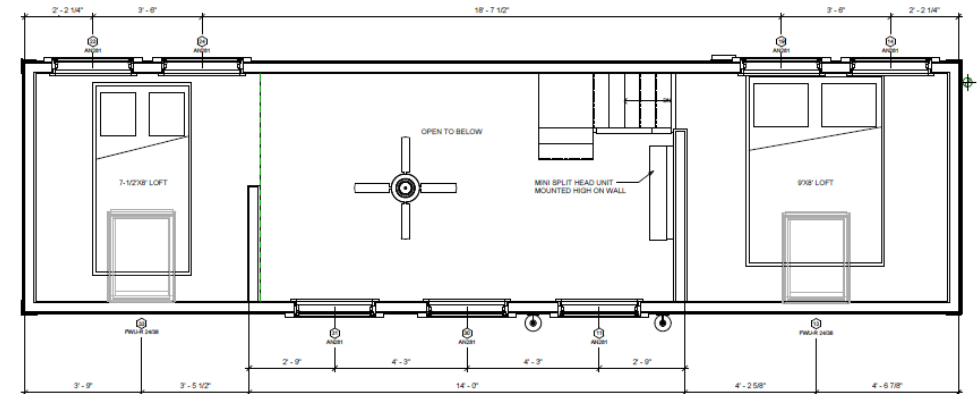
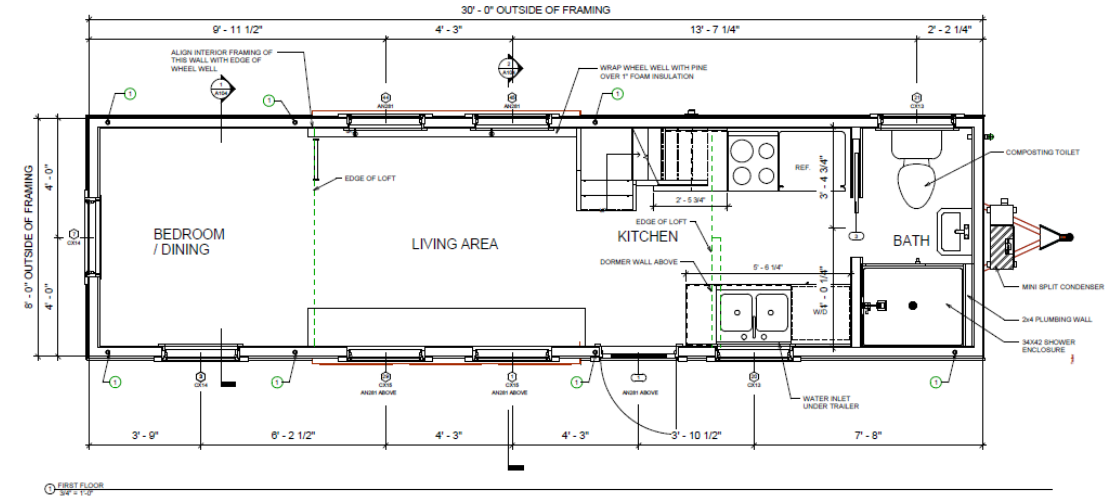


# Tiny Home Design

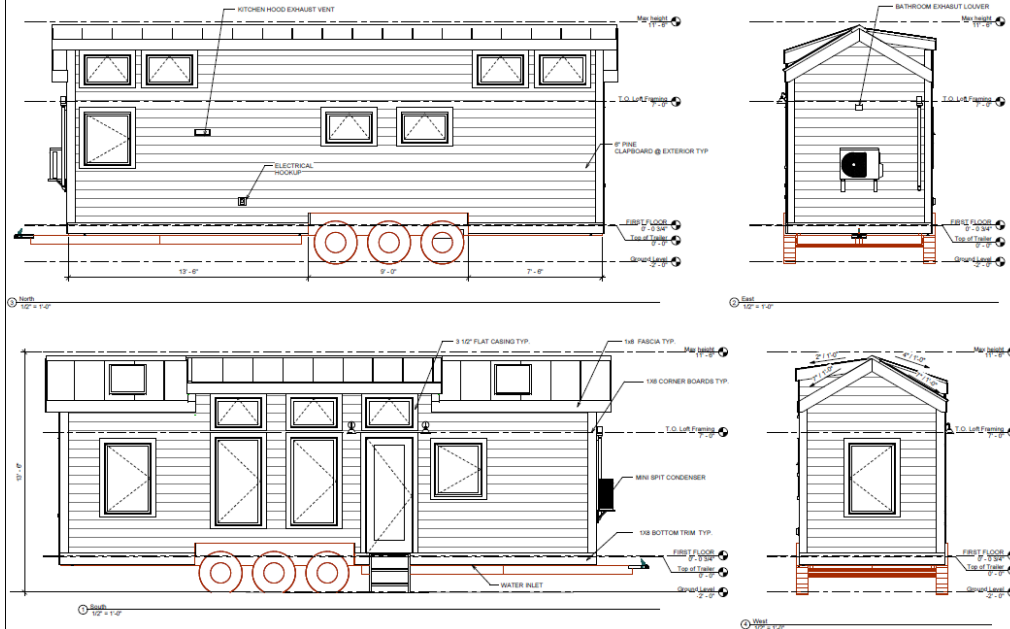
Tiny Homes of Maine works with the client on a conceptual 3D design



We create detailed architectural plans using Revit. Plans are reviewed with our carpenter, plumber and electrician for any modification before construction starts.



# Tiny Home Construction



- 2 layers of Roxul R15 or spray foam in subfloor
- All gaps and cracks filled with foam sealant
- Advantech subfloor, seams sealed with Zip tape
- Standard 2x4 wall construction with Roxul insulation
- 2x6 roof construction with closed cell spray foam
- ZIP System sheathing, all windows Zip taped
- All sheathing attached to framing with construction adhesive AND standard fasteners
- Anchor through base plate to trailer every 10 feet
- Ice and water shield on the entire roof
- 400 Series Andersen Windows
- Standing seam metal roof
- Fakro egress roof window in each sleeping loft
- 60-100 amp electric panel, standard wiring
- Standard plumbing with common grey water drain
- SunMar composting toilet
- Stained/painted pine or cedar clapboard siding
- 2 form forms of exhaust to address air quality and moisture



# Tiny Home Construction



- Option of electric, propane or solar
- Mini-split heat pump
- Combo washer/dyer
- Finished pine interior
- Choice of cabinets, flooring, lighting
- All one level or sleeping loft with ladder/stairs



# Tiny Home Tour

[Play Video](#)





# Our Tiny Homes are NOAH certified

The Nation Organization of Alternative Housing (NOAH) Standard incorporates nationally recognized standards for safety, energy efficiency and construction from multiple industries and associations.

- RIVA – Recreation Vehicle Industry Association
- IRC Appendix V – International Residential Code for Tiny Houses
- NFPA 1192 - National Fire Protection Association
- NFPA 70 (NEC) – National Electrical Code
- ATHA - American Tiny House Association Construction Guidelines (revised edition)



NOAH inspections are performed and/or reviewed by InterNACHI Certified Professional Inspectors: engineers, general contractors, electricians, plumbers and other professionals as needed.

**EACH** Tiny House is inspected at **FIVE** critical stages of construction for compliance to the NOAH Standard.

1. Foundation or Trailer
2. Attachment & Framing
3. All-Trades (Electrical, Plumbing & HVAC)
4. Insulation
5. Final



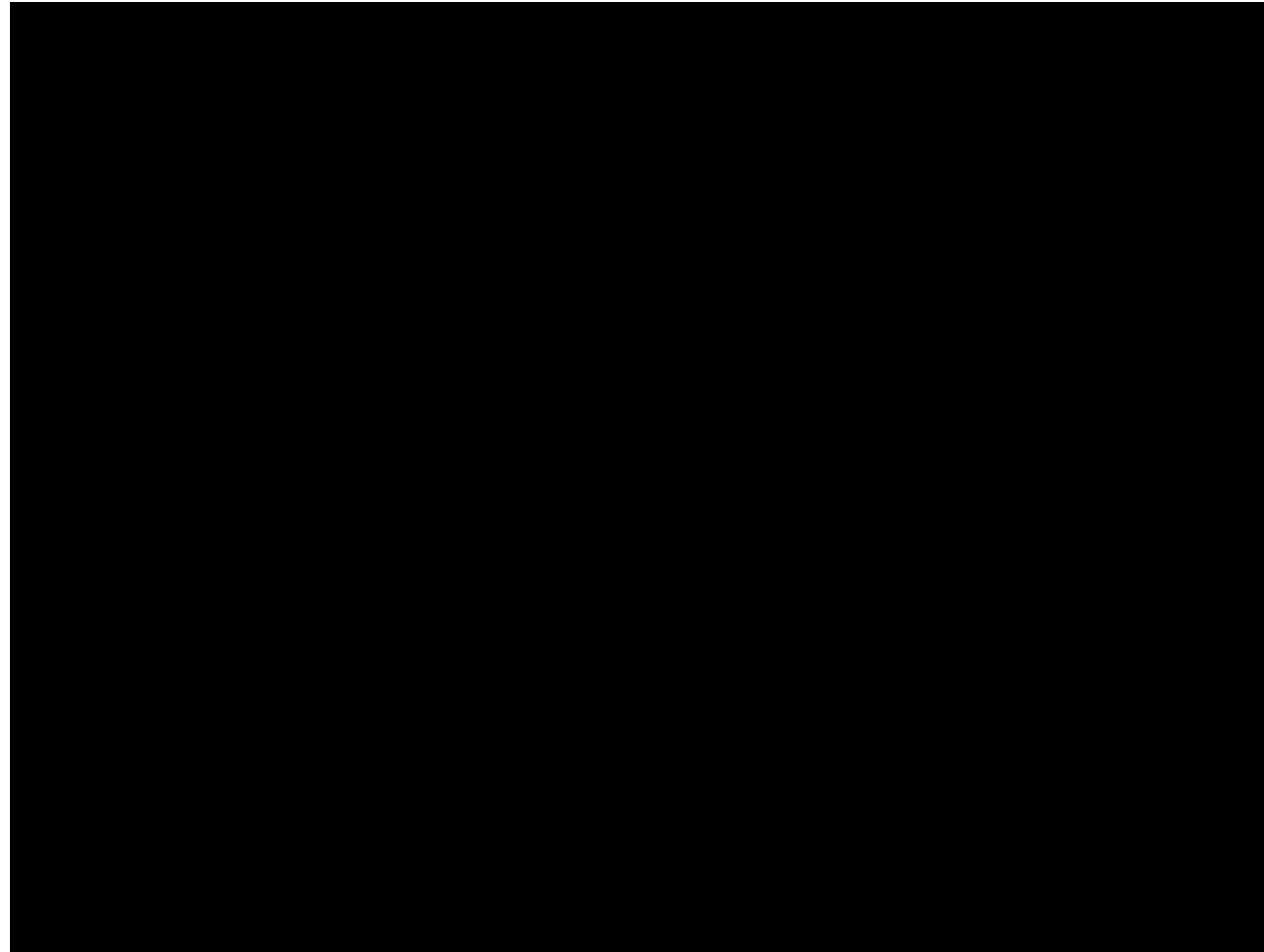
NOAH Demo Video: <https://www.youtube.com/watch?v=mXocpyL3TRQ&feature=youtu.be>



Certification Seal

# Our Tiny Homes are NOAH certified

NOAH is located in Apopka, FL and completes the inspection process via the live stream video application by GoToAssit called Seelt . Here is an example of our trailer inspection.



Play embedded  
video on this slide



# Construction progress





# Recommended configuration for plugging in to main home



Heated mat under  
Aqua2Use to keep above  
freezing  
~ \$130



50 Amp Twist Lock 50'  
extension cord ~\$250



No freeze drinking  
water 50'hose ~\$150



Aqua2use grey water  
filtration system  
~\$480 no pump  
~\$780 with pump

Total = \$1310

# Grey water filtration



- ❖ Easy to clean every 4-6 months
- ❖ Pump with float switch pumps water through 1.25' pipe sloped downward away from tiny home
- ❖ System can be installed above ground, half-submerged in ground, or underground
- ❖ See performance specs in links below

**Aqua2use GWDD Pump Specifications:**

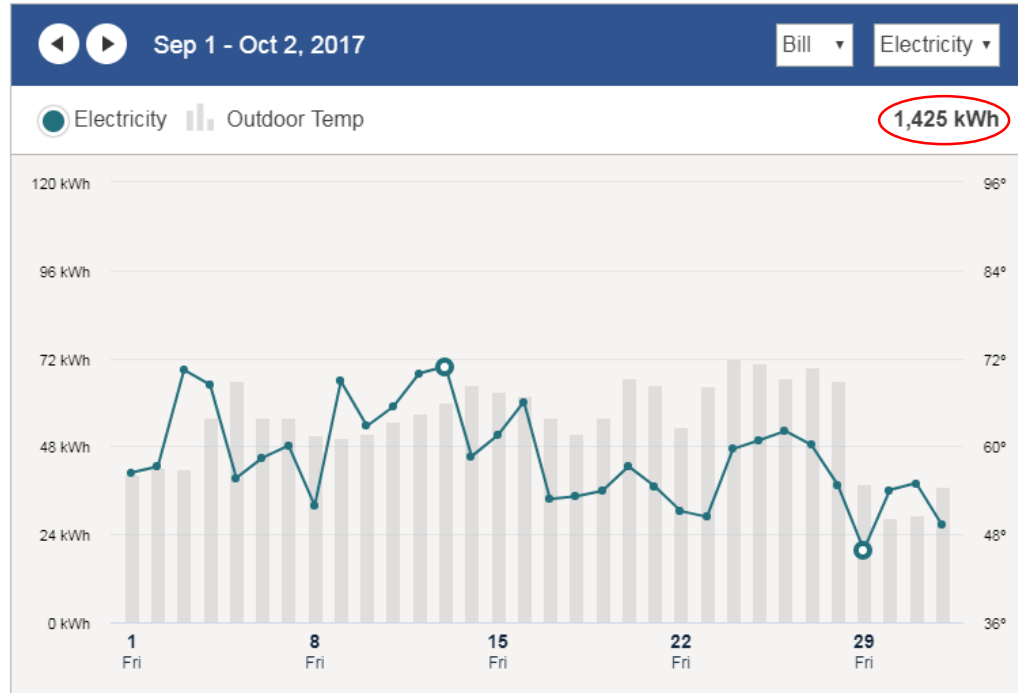
Output			Rated		Maximum		Dimension	Weight
HP	W	inch	Head (Ft)	Flow (GPM)	Head (Ft)	Flow (GPM)	L x W x H (in)	Pounds
1/4	200	1-1/4"	16	14	23	36	6.1 x 6.1 x 9.45	9.26

Resources: <http://www.aqua2use.com/products/gwdd.html>  
<https://waterwisegroup.com/wp-content/uploads/2016/08/aqua2use-gwdd-technical-brochure.pdf>



# Energy Usage

1900 sf home - \$214.03/month



## New charges

Electricity Delivery: Central Maine Power (see detail below)

\$111.55+

Electricity Supply: Electricity Maine LLC (see page 3)

\$102.48+

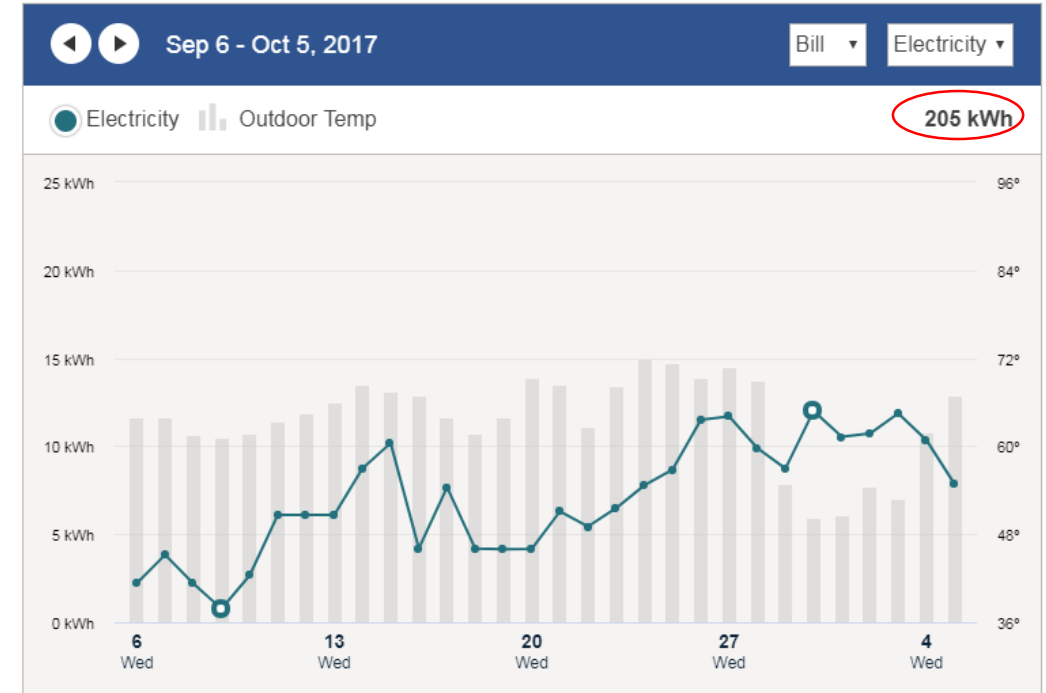
## Total new charges

\$214.03

3BR, 2BA Cape with 2 car garage: Standard appliances, oil heat, 2 AC window units

Resource: CMP energy use data

240 sf home - \$35.28/month



## New charges

Electricity Delivery: Central Maine Power (see detail below)

\$21.56+

Electricity Supply: Standard Offer Service

\$13.72+

## Total new charges

\$35.28

Tiny home energy load:

1. Heat pump (set on 70 degrees to heat or cool)
2. Microwave, coffee maker, mini fridge
3. Washer/dryer combo (not used often)
4. Composting toilet, on demand propane water heater
5. Lights (always on)

# 100% Renewable Energy



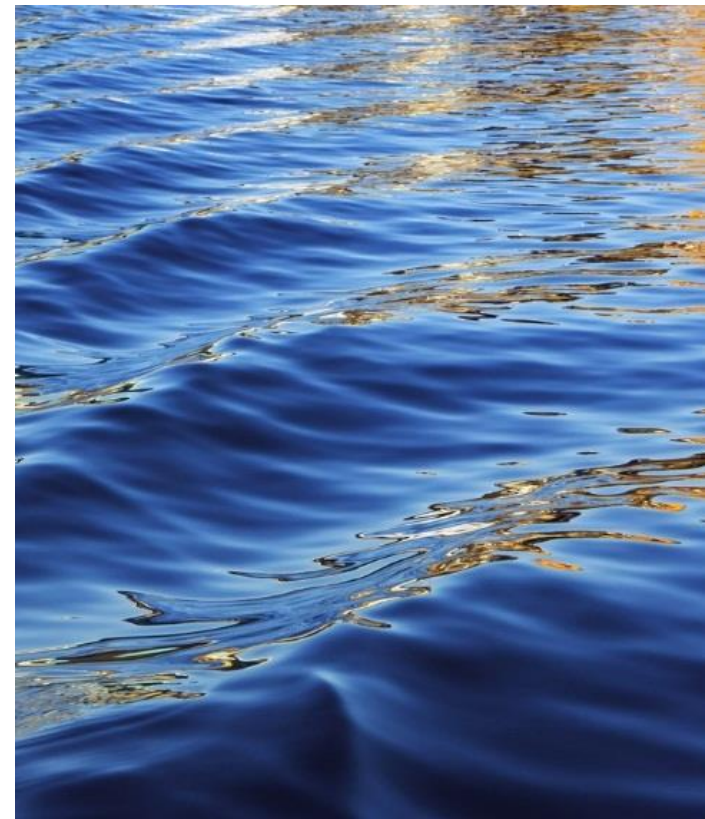
- ❖ Tiny Homes of Maine is working with ReVision Energy to design a self-sustaining solar powered tiny home
- ❖ Their goal is to have a solar tiny home to tour with in 2018 doing demonstrations
- ❖ Our goal is a design affordable homes for our clients





# Tiny Homes

Issues





# Code Enforcement Feedback

Several clients have gone to their respective towns asking about living in a tiny home and received different reactions. I called or emailed on their behalf to follow up or answer any questions. These were some of the statements made:

1. Bringing a prebuilt home on site only works if the manufacturer was certified to build such homes.
2. I will not allow your product in my Town unless I can verify that it is a Modular unit, or a Manufactured unit.
3. Tiny homes do not meet building codes.
4. Are you registered with the State Fire Marshall's Office?
5. That's technically an RV and we don't allow people to live in RVs in our town.
6. You are manufacturing houses and you need to be licensed with the state.
7. You can have a tiny home if its built on a foundation, on site, with a septic system.
8. Those do not meet the energy code.
9. Tiny homes on wheels need be on a slab for frost protection.
10. You can only have grey water drainage if your water is hand carried.
11. The tiny home needs a building permit and go through the inspection process.



# Client Feedback

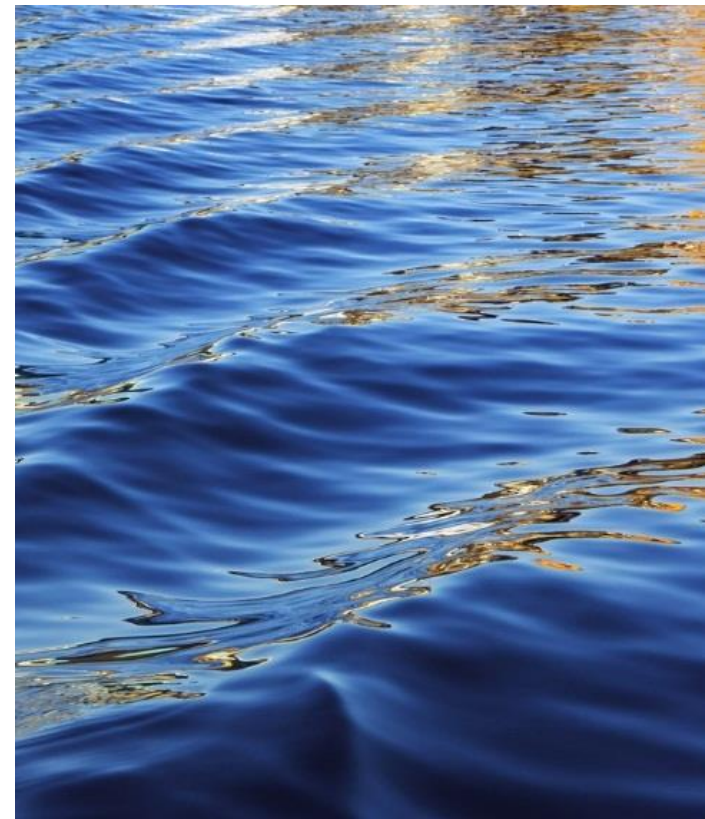
People that are trying to live in a tiny home and were approached by some type of town official said the following:

1. Town population 300 – parked a tiny home on their property for a family member to live in. Inspector required a separate utility pole. They hired an electrician to wire pole to tiny home. Needed to pay for a site/septic design even though had a composting toilet. Had to hire excavation contractor to install 10x10x4' deep grey water disposal field. Paid for a plumbing permit even though it was 'hand carry' system.
2. Asked to remove the tongue, wheels and axles to be considered "habitable"
3. Asked to move tiny home out of the town due to no septic system in place and not on a foundation
4. Asked to move tiny home or vacate or else the property owner would be fined
5. Land use ordinance specifies no mobile homes in that zone
6. No accessory dwelling units allowed or has to be attached to primary home
7. You can't stay in a tiny home for more than 120 days
8. Tiny home needs its own electric meter on it (i.e. can't plug into main home)



# Tiny Homes

Addressing Issues





# Addressing common CEO concerns

Need for building inspections – covered by NOAH certification process

Need for frost protection –not needed due to the Tiny Home being so small (under 400 square feet) and constructed to prevent bending and racking as they travel on the road. Typically foundations are put in place as a base to support bigger heavier structures and to prevent bending and decaying of the building. The Tiny Home's tubular steel chassis supported by a recommended blocking system is sufficient and earth auger anchors can be used for added security if desired by the homeowner. If the Tiny Home does become slightly out of level at any point, the homeowner can easily make a few minor adjustments via the leveling jacks to level it as needed.

Need for a septic systems – both composting toilets and grey water drainage, disposal, and drip irrigation is currently permitted under “The State of Maine Subsurface Wastewater Disposal Rules” so no septic system is needed. It is a easy, affordable and sustainable solution to use the Aqua2Use grey water filtration system in this application. This is a product that can be purchased and installed easily by the tiny home owner. Aqua2Use systems are currently being used in many applications in States needing to conserve and re-use water. The grey water regulations allow for “alternative materials and equipment” and can be approved by the LPI (Local Plumbing Inspector).

Does not meet energy codes – tiny homes will meet existing energy codes and this will be verified by the 3<sup>rd</sup> party inspector NOAH

# Addressing code concerns

## According to NFPA published white paper on *Applying Building Codes to Tiny Homes* – March 2017

- Tiny Homes that can be set on a permanent trailer chassis with wheels are often referred to as tiny homes on wheels (THOW). Remaining in a mobile-ready state, they do not fall within the scope of building codes.

## Do tiny homes meet energy code – yes.

Compliance with the 2009 IECC energy code can be demonstrated using the Total UA Alternative (Section 402.1.4), or the Performance Alternative (Section 405).

- Calculating U-Factor for total heat loss.

## Do tiny homes need to be on a foundation – no.

Compliance with 2009 IRC building code can be demonstrated using Section R403.1.2.1

- No frost protection needed for *accessory* structures under 600 square feet

## **MAINE UNIFORM BUILDING AND ENERGY CODE**

### **SECTION 16. EXPERIMENTAL BUILDINGS**

1. This Code shall not limit the use of non-traditional or experimental construction, including, but not limited to straw bale and earth berm construction. However, construction must adhere to the provisions of this Code.

# Suggested solutions

Based on:

1. Researching what other states and towns have done to make living tiny possible.
2. Consulting with several planning, building, plumbing and energy code professionals as well as local land use attorneys.

A person wanting to live in a Tiny Home in a larger Maine town (over 4000 people) is required to complete an application for a permit:

## Permitting Process:

1. The applicant will follow the permit checklist and submit an application
2. The application is reviewed
3. Permit issued by code enforcement





Permit App



## TOWN OF WINDHAM

Department of Code Enforcement  
8 School Road  
Windham, ME 04062

Voice (207)894-5960 Ext. 2  
Fax (207)892-1916

### TINY HOME ON WHEELS PERMIT APPLICATION

1. Please attach all required information detailed on the application check list.
2. If you have questions regarding the application please contact the Department of Code Enforcement.

Address:	
Tiny Home Owner's Name:	
Contact Info:	
Intended Use:	
Trailer Registration:	
Tiny Home Description:	

#### Property Owner Information

Property Owner Name:	
Parcel ID#:	
Phone Number:	
Mailing Address:	
Email Address:	

#### Builder Information

Individual/Business:	
Mailing Address:	
Phone Number:	
Email Address:	

*I hereby certify that I am the Owner of Record of the named property, or that the owner of record authorizes the proposed tiny home, and I have been authorized by the owner to make this application as his/ her authorized agent. I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for the tiny home described in this application is issued, I certify that the Code Official shall have the authority to enter all areas covered by this permit at any reasonable hour to enforce the provisions of the codes applicable to this permit.*

Applicant Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Please attach all information required on the permit checklist



Checklist

## TOWN OF WINDHAM CODE ENFORCEMENT CHECKLIST

### TINY HOME ON WHEELS PERMIT CHECKLIST: [What is required!](#)

- \_\_\_\_\_ permit application signed and dated by applicant (permit only required for primary residence living for more than 120 consecutive days) – fee of \$100
- \_\_\_\_\_ plot plan showing property dimensions and location of tiny home on wheels
- \_\_\_\_\_ driveway & street opening, permit if driveway is new and enters a town road or will be a town road. If new road or lot will need to work with assessing for address before getting any permits.
- \_\_\_\_\_ documentation of ownership (copy of current trailer registration)
- \_\_\_\_\_ 3<sup>rd</sup> party inspection certificate (tiny homes built prior to Jan 1, 2018 are exempt)
- \_\_\_\_\_ Alternative toilet fee - \$50 (non-flushing toilets)
- \_\_\_\_\_ "Other" components fee - \$30 (grey water system)
- \_\_\_\_\_ set-up instructions provided by the tiny home builder



Set up

## Tiny Home Set Up Instructions

**PERMIT:** Please note that permits are the responsibility of the tiny home owner. If your town's population is over 4000 people (reference Google for Census data) please check with your code enforcement department for permit requirements. Tiny Homes of Maine has experience working with code and planning departments in Maine. If you need assistance, please call us at 207-619-4108 and we'd be glad to help.

**DIY:** In most situations site preparation can easily be done by the tiny home owner. Either the site is nearly level or you can correct it by spreading a small amount of gravel. In situations where the grade is significantly out of level the you can address it yourself or contract out the work. If you are not comfortable setting up your tiny home, Tiny Homes of Maine can provide guidance or connect you with a setup service.

1. Select the EXACT location for your new tiny home prior to moving it there.
2. If the site location is unstable (loam or sand) you may want to add packed gravel to the site.
  - 2.1. The supports used shall support the load imposed by the chassis of the tiny home placed on them
  - 2.2. Leveling blocks, jack stands or cinder blocks are recommended for perimeter blocking support
3. Skirting, if used, shall be provided and installed by the home owner
4. Water Supply
  - 4.1. A potable water hose can be used for water supply from a main source to the tiny home (heated potable water hose in the winter)
  - 4.2. Protection against the water supply freezing is the responsibility of the tiny home owner
5. Grey Water Drainage
  - 5.1. Grey water (from sink and shower) is to be filtered
  - 5.2. Aqua2use (or any NSF certified product) grey water filtration system is recommended
  - 5.3. Tiny home owner shall use environmentally friendly products and pledge to not pour any harmful chemicals down any drains of the tiny home
6. Site Electricity
  - 6.1. Sites provided with an electrical service shall have all electrical equipment and installations designed, constructed and maintained in accordance with the applicable provisions of NFPA 70, National Electrical Code
  - 6.2. An adequate electric supply cord shall be use to connect the tiny home to the main electrical supply
7. Leveling Requirements
  - 7.1. After the home is set, the home shall be leveled so that all doors and windows operate as intended and plumbing and heat pump functions in a reliable manner
  - 7.2. The floor should be not more than 1" out of level along the width of the home

# Permit process continued



Permit

## TINY HOME ON WHEELS PERMIT

Town of Windham  
8 School Road - Windham, Maine 04062  
**Phone (207) 894-5960** Code Enforcement Ext 1  
Code Enforcement Officer - Chuck Daigle  
Code Enforcement Officer - Steve LeBrun

Permit Number #: \_\_\_\_\_

Permit Date: \_\_\_\_\_

Permit Fee: \_\_\_\_\_

MAP: \_\_\_\_\_ LOT: \_\_\_\_\_ Zone \_\_\_\_\_

Property address: \_\_\_\_\_

Property Owner: \_\_\_\_\_

Tiny Home Owner: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Use: \_\_\_\_\_

Contact Phone number(s) \_\_\_\_\_

Approved: \_\_\_\_\_ Denied: \_\_\_\_\_

Signature: \_\_\_\_\_ Title \_\_\_\_\_  
Town of Windham, Maine

Date: \_\_\_\_\_

State of Maine  
County SS: \_\_\_\_\_

On this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ personally appeared the above named \_\_\_\_\_ and acknowledged the foregoing instrument to be of his/her/their free act and deed.

Before me,

\_\_\_\_\_  
Notary Public / Attorney at Law

My Commission Expires: \_\_\_\_\_

# Tiny Home Considerations

1. Develop common area for tiny home parking
  - a. Tiny Home Eco Village
  - b. Low income housing
  - c. Temporary Housing
2. Each town to update ordinances to address tiny homes on wheels
3. Great use on “non-conforming” lots
4. Crowdfund or college groups to build tiny homes for homeless
5. VA loans for tiny homes
6. Tiny home rental program for homeless due to fire
7. Age friendly tiny homes to enable care of loved ones by keeping them close by

## Interesting links

Making tiny homes legal:

[https://www.youtube.com/playlist?list=PLlvBXhDyrgH3vVYhgUlqAuLQQ\\_rR8-Hph](https://www.youtube.com/playlist?list=PLlvBXhDyrgH3vVYhgUlqAuLQQ_rR8-Hph)

Tiny home ordinance:

<https://www.fresno.gov/darm/wp-content/uploads/sites/10/2016/11/UpdatetoExhibitDRevisionsNovember182015.pdf>

Urine diversion and fertilizer:

<http://richearthinstitute.org/>

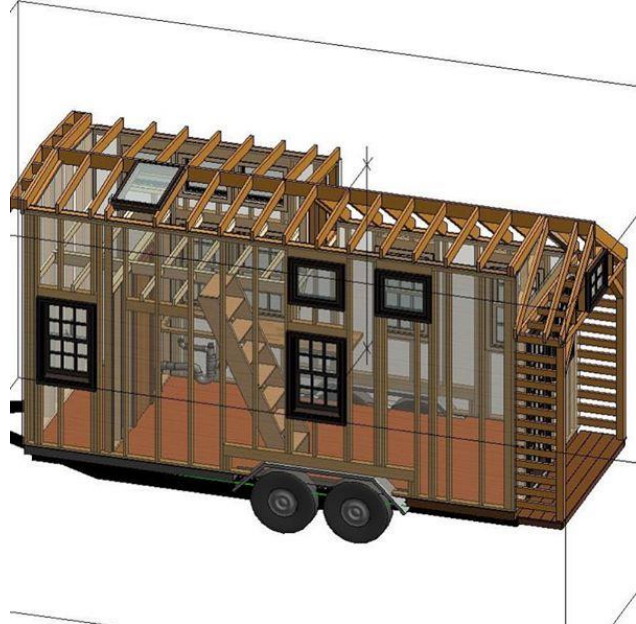
Model Zoning:

<http://americantinyhouseassociation.org/model-zoning/>



# Company Background

- 2014 - Started researching design, construction, trailers
- April 2015 - Purchased a car hauling trailer to start tiny home construction (1 year to complete)
- Multiple meetings with Windham planning and code officials and correspondence with state officials to discuss classification of Tiny Homes on Wheels
- Multiple meetings with local banks and credit unions to set up tiny home financing
- August 2016 – Official launch of Tiny Homes of Maine with open house event in Windham
- Continue periodic open house events and meet with clients weekly for private tours
- August 2017 – Sold first Tiny Home. Clients came to pick it up.
- November 2017 – 4 tiny homes sold and working on 2 more units.
- December 2017 – quoted and order for 40 units to start in the spring of 2018 for student housing
- Currently still looking for an affordable business location to meet with clients and build tiny homes in a facility.
- Working with land owners at 2 different locations to develop a tiny home eco village



Thank you!

Questions?