

# Adaptive Re-Use of The American School Bus

Designing an Affordable Nomadic Environment Suitable for Live, Work and Play

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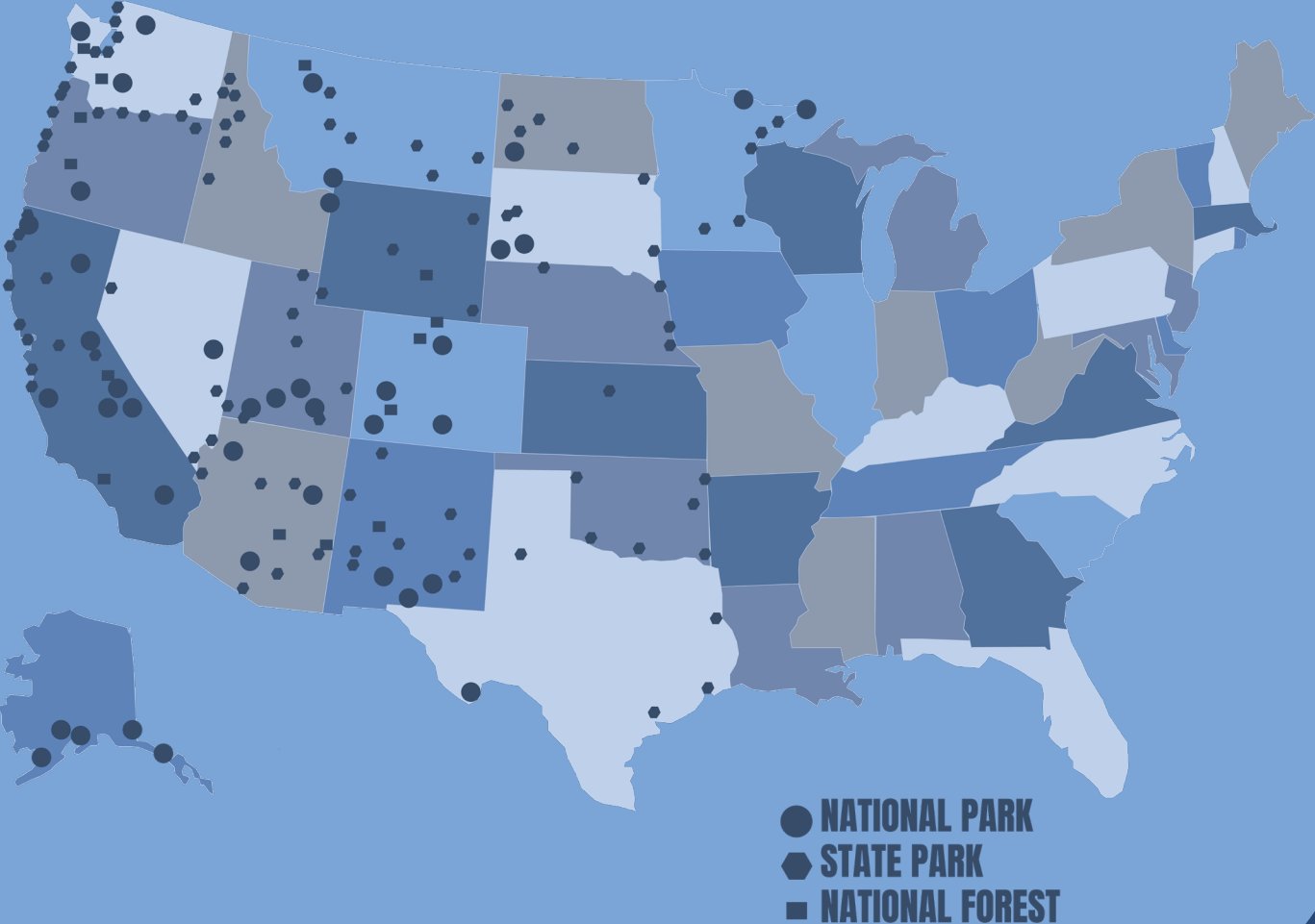


# Nomadism

HAVING NO PERMANENT ABODE, A WANDERER.

(John Krauer, How Chris McCandless Died, 2013 )

# Destinations



# Found out I wasn't entirely Alone...

- **“Nothing is art if it does not come from nature.” – Antoni Gaudi**
- **“Form must have a content, and that content must be linked with nature.” – Alvaro Alto**
- **“Study nature, love nature, stay close to nature. It will never fail you.” - Frank Lloyd Wright**

# The Irony

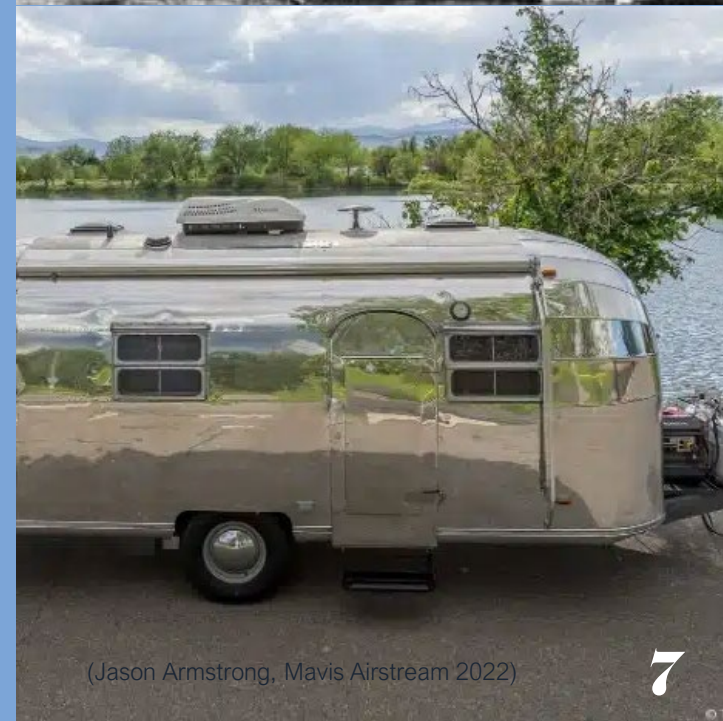
- **Adapting An American Object to avoid American Materialism**
- **Adapting a Vehicle into a Home, to avoid buying a Home**
- **An Architect who designs Houses, avoids living in one**
- **Pursuit of the Wild, just to bring civilization with**

# Is Nomadic Architecture, Architecture?

- **Architecture (n): the art or practice of designing and constructing buildings**
- **What is a building? Can it Not Have Wheels?**
- **Does a building have to be built on site?**
- **Is the redesign of Renaissance Hall Architecture?**

# Brief History of Nomadism

- **Defined by Method of Transportation**
  - **Animals, Engines, and now an internet connection**
- **Defined by the Environment**
  - **Needs over Wants**
  - **Available Materials**
  - **Adaptability**



# Why A School Bus?

- **Sustainable?**
- **Affordable**
- **Adaptable**
- **Cultural**

(Lenz L, A Brief History of  
the School Bus, 2022)



# Sustainable?

- Better to Re-use or Re-Build?
- MPG & Emissions Concerns
- Over 6 Tons of material otherwise left to waste
  - Other Buses Sold were Used for Storage by Farmers



# Affordable

- Safety Code for educational use leads to Buses being sold before they are past their “Prime”
- Purchased my School Bus for only \$2,250 from Breckenridge MN during a blind auction
- Average School Bus Found on Facebook Market Place is roughly \$4,500

# Adaptable

- Over-designed to ensure safety of original intended users
- Compartmentalization
  - Floor above crash zone
  - Hat-Channel Framing creates “Zones” in damage when it
  - 1/7<sup>th</sup> as deadly as a standard vehicle collision
- All of this helps with the ability to adapt the School Bus into a space that will better fit the needs of Nomadic Life Style



# Cultural



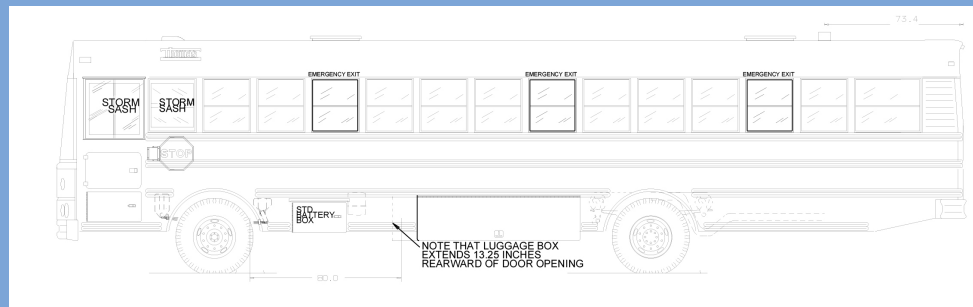
(Lenz L, A Brief History of the School Bus, 2022)

- **Uniquely American, specifically the Yellow Paint**
  - **School Buses trace their roots back to Puritan Colony's compulsory education**
- **In 1939, Frank Cyr, organized a conference on School Bus Safety Standards**
  - **Led to the choosing of "School Bus Chrome Yellow" for all school busses nationally**
  - **Other design choices such as all steel framing, compartmentalization, and other national requirements followed in years to come.**

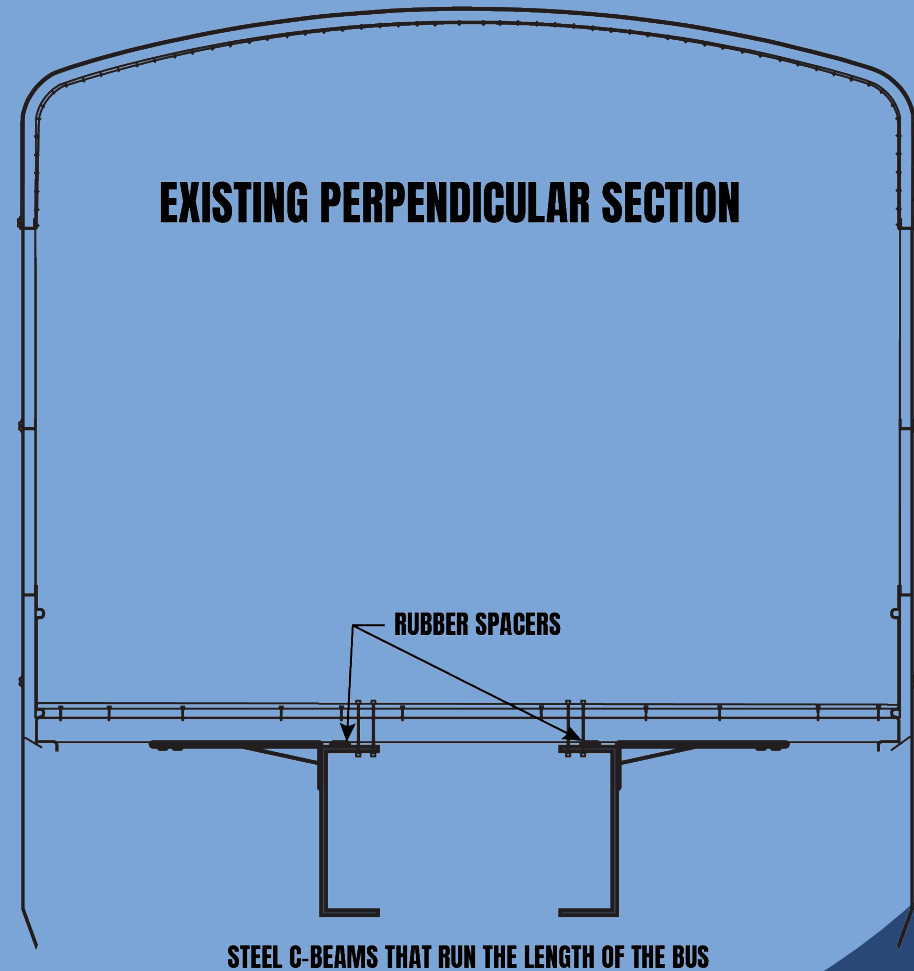
# How a School Bus is Built

## BODY TO FRAME ATTACHMENT DETAIL

- **2 Parts:**
  - **Frame:** Houses the mechanical portions of a vehicle including the cab
  - **Body:** Houses the passengers, main part that will be redesigned.



(Gattis J.L., Howard M., Large School Bus Design Vehicle Dimensions 1998)



**1. Sheet MTL.  
Bent into C-  
Channels &  
Welded Together**



## 2. Hat-Channels bent to create “void” of School Bus





**3. Connect  
Hat-Channels  
together and  
attach seat rail**

**4. Slide C-  
Channel Floors  
into Seat Rail**





# 5. Framing of Windows, Wheel Wells & Back Wall





## **6. Exterior Sheet Metal Attached & Ceiling fire escape framed**



## **7. Body Attached to Frame**

# Methodology

## 1. Affordability

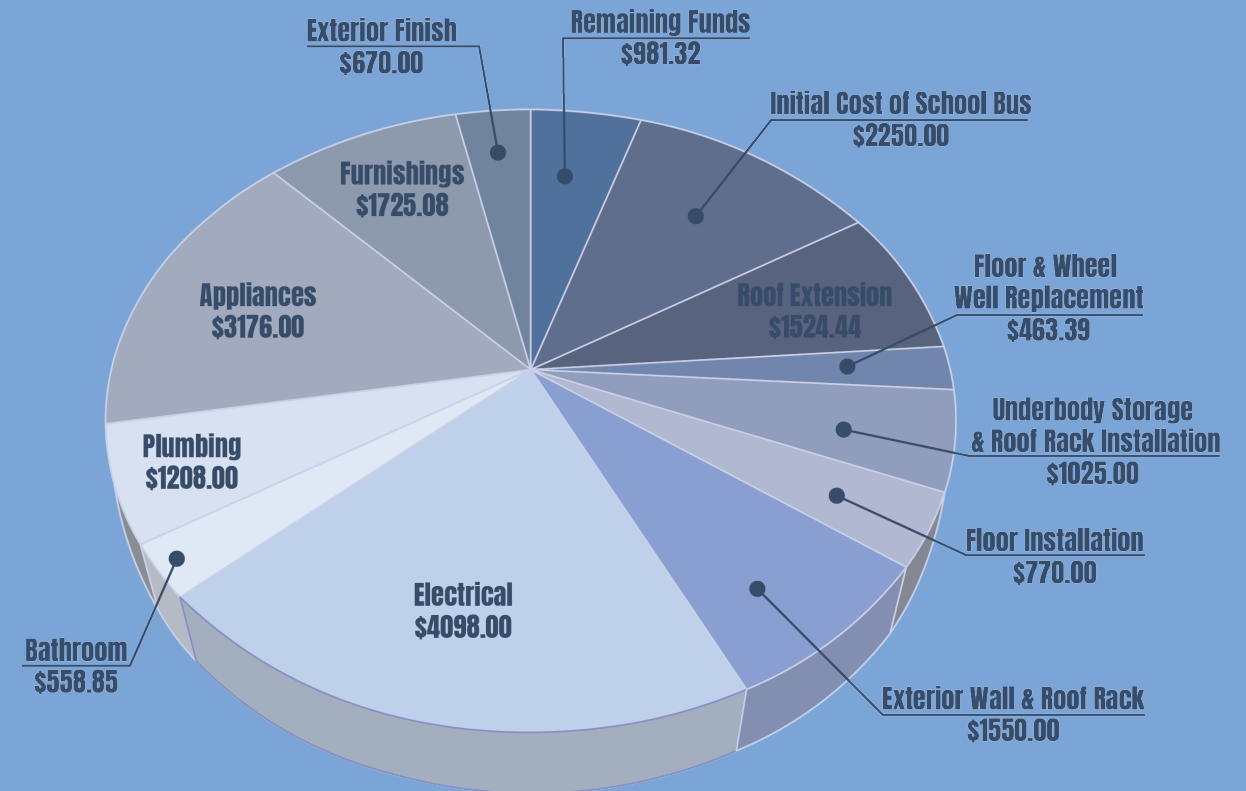
1. Staying to Budget
2. Needs over Wants
3. Buildable

## 2. Sustainability

- Recycling of Materials
- Purchasing Materials from Alternative Sources

## • 3. Flexibility

- Adaptable Design to Increase space Utilization
- Sqf to represent time spent  
Traveling, Boondocking, or Wet-Camping



# \$20,000 Budget



(Jason Armstrong, Mavis  
Airstream 2022)

# Inspiration



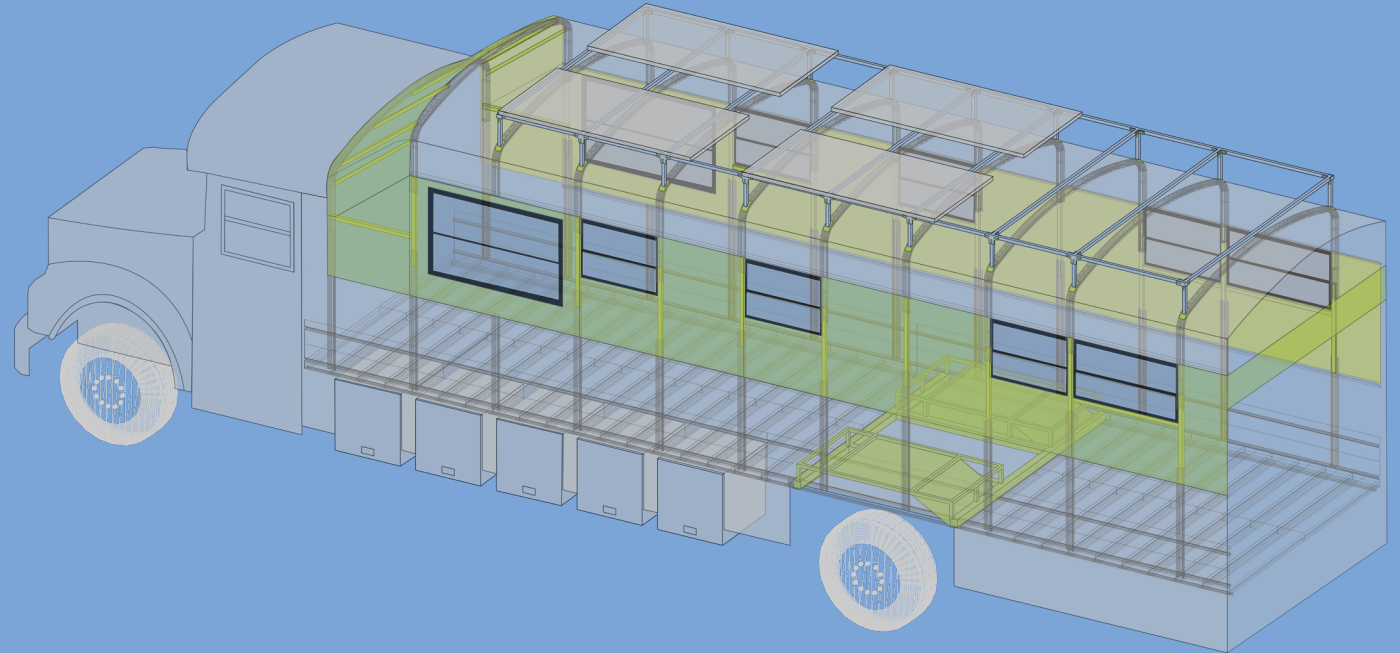
(Jeff Osborne, Some  
Drifters Studio, 2019)



(McGraw, 1973-1978  
GMC Motorhome 2016)

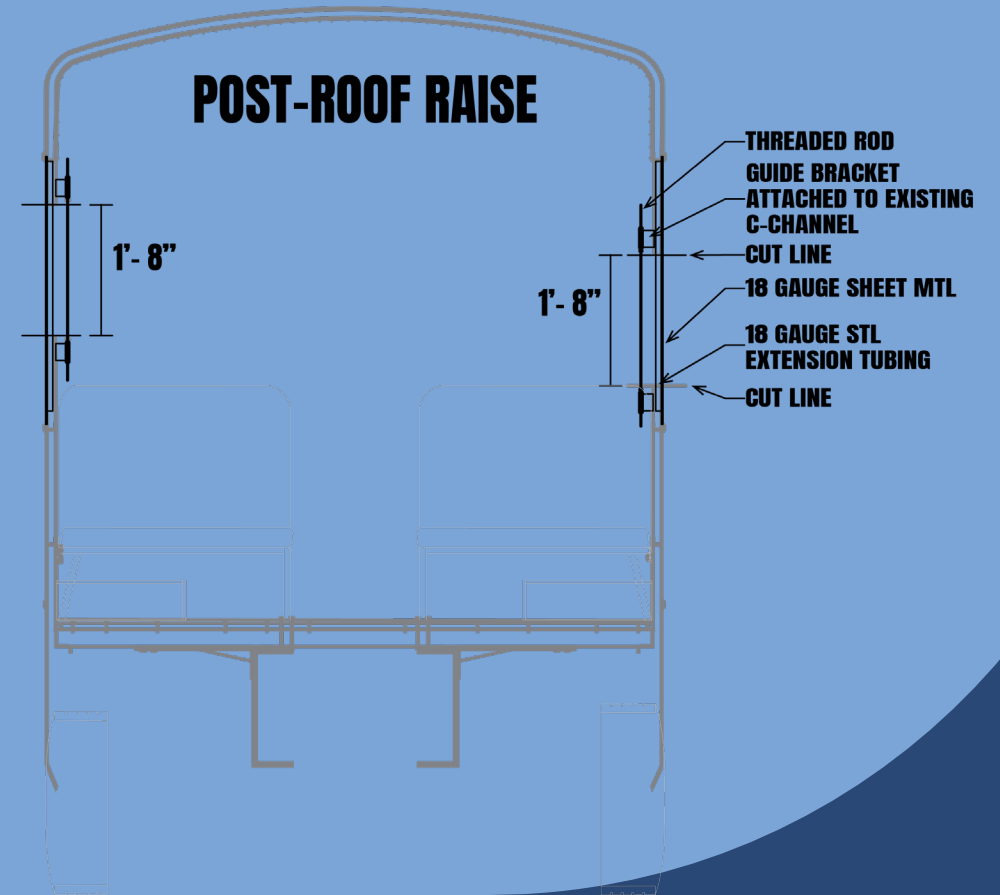
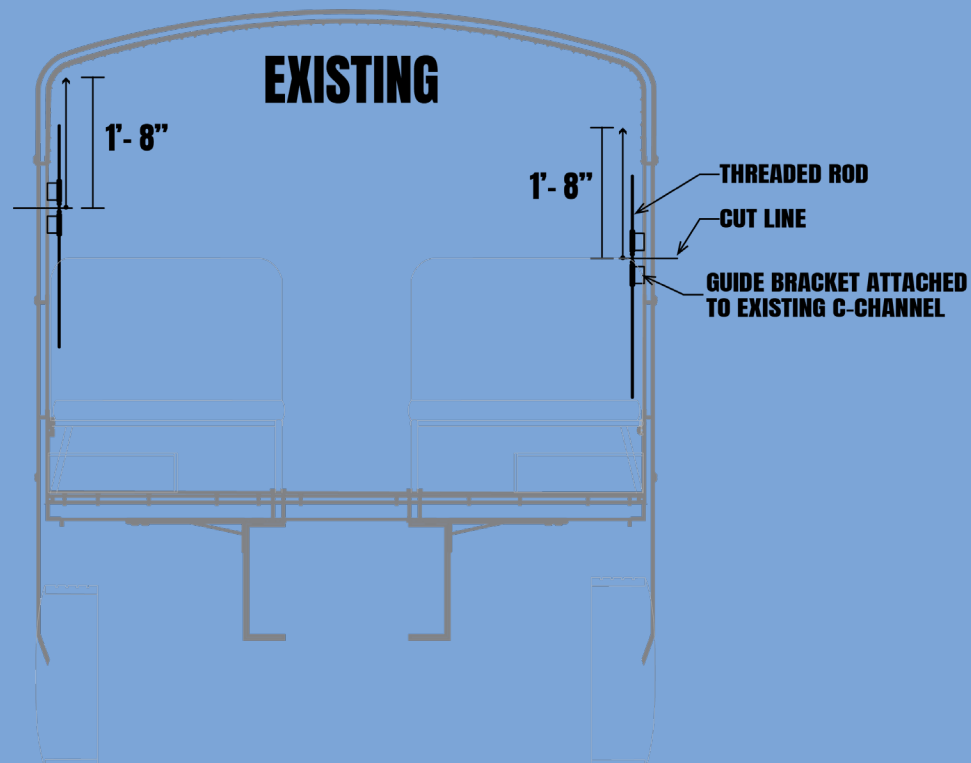
# Design Changes to School Bus Body Exterior

- Roof Extension
- Wheel Well Replacement
- Floor Treatment
- Window Replacement
- Roof Rack
- Underbody Storage

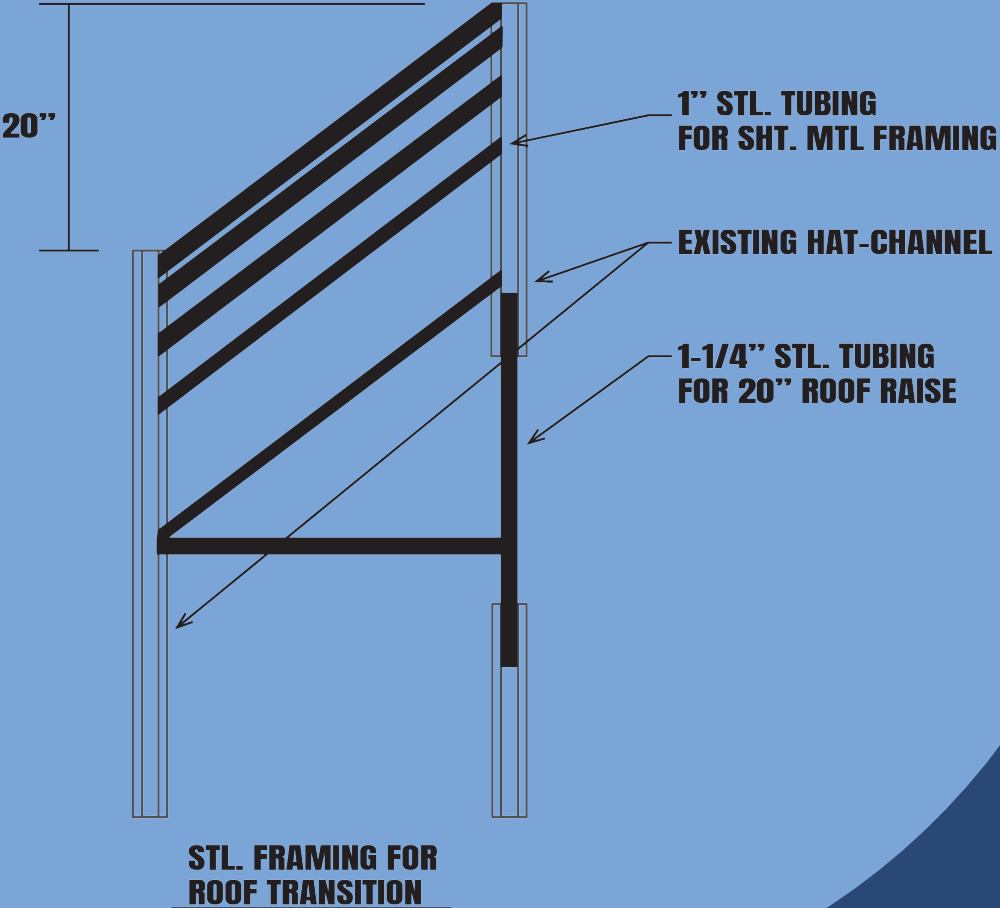
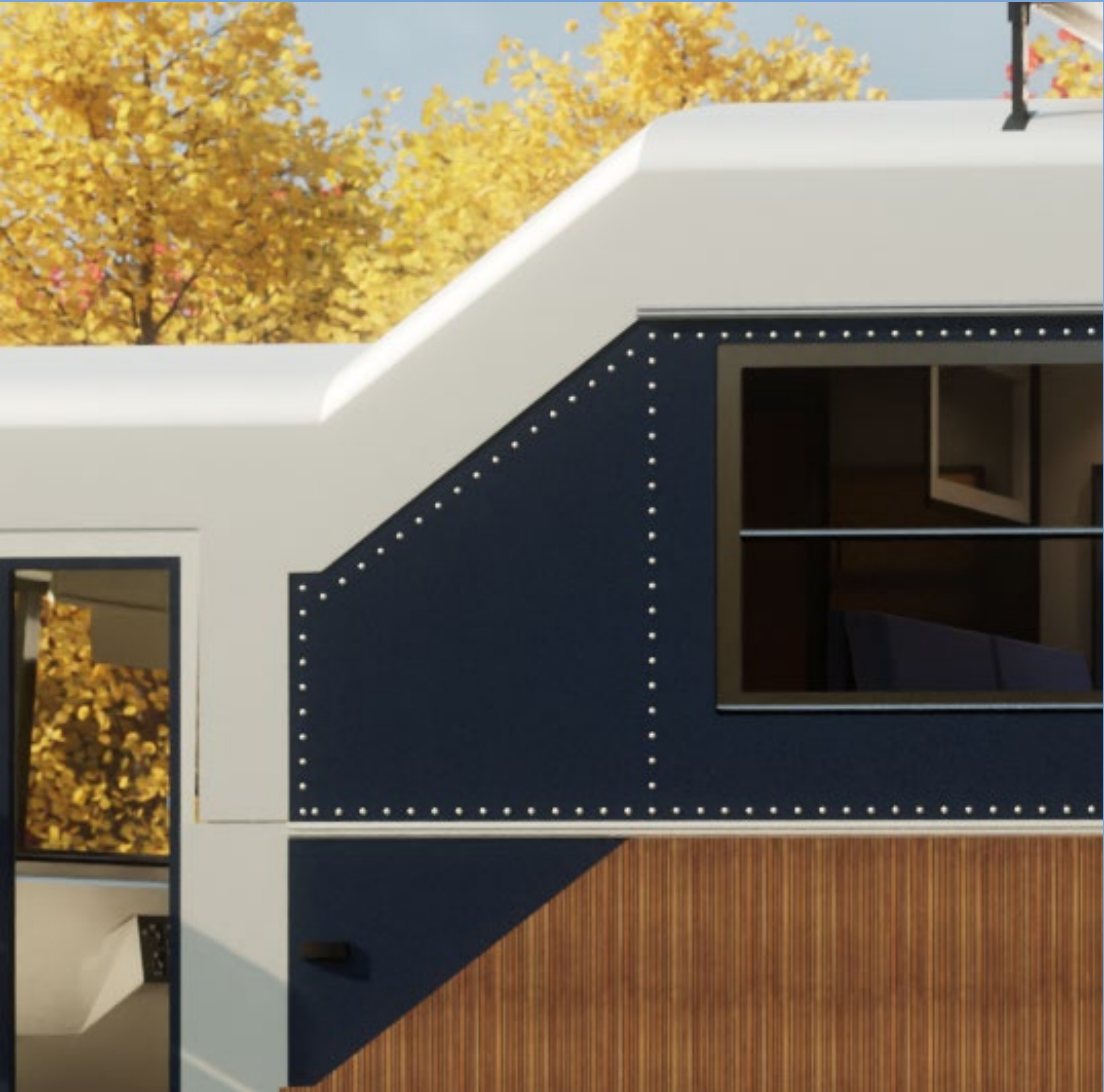


# 20" Roof Raise

- Existing Floor to Ceiling in Center: 6'-03"
- Insulation Concerns



# Transition







# Before/After



EMERGENCY EXIT

EMERGENCY EXIT

BRECKENRIDGE PUBLIC SCHOOL DIST 948

DIESEL ONLY 60 GAL

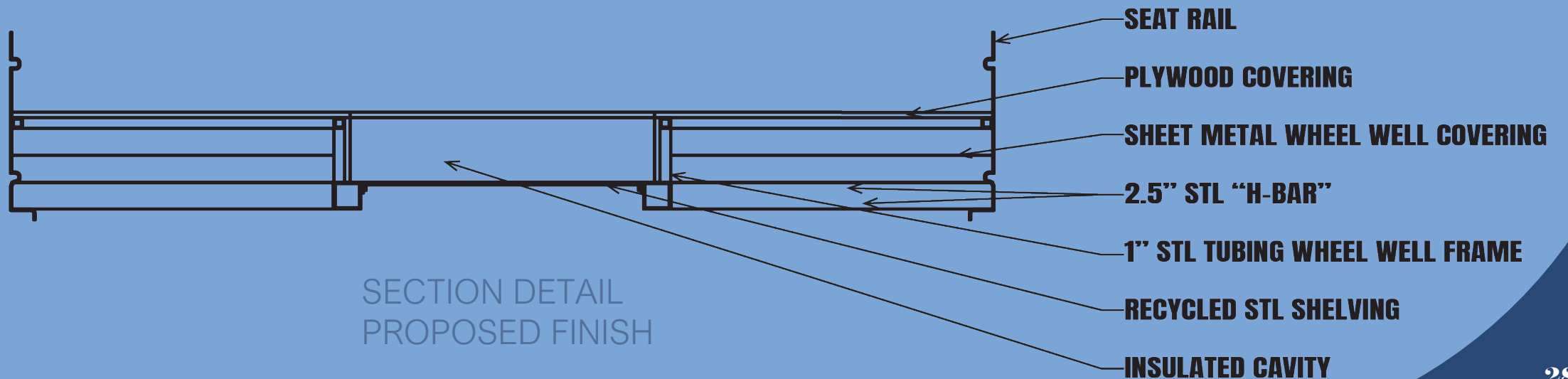
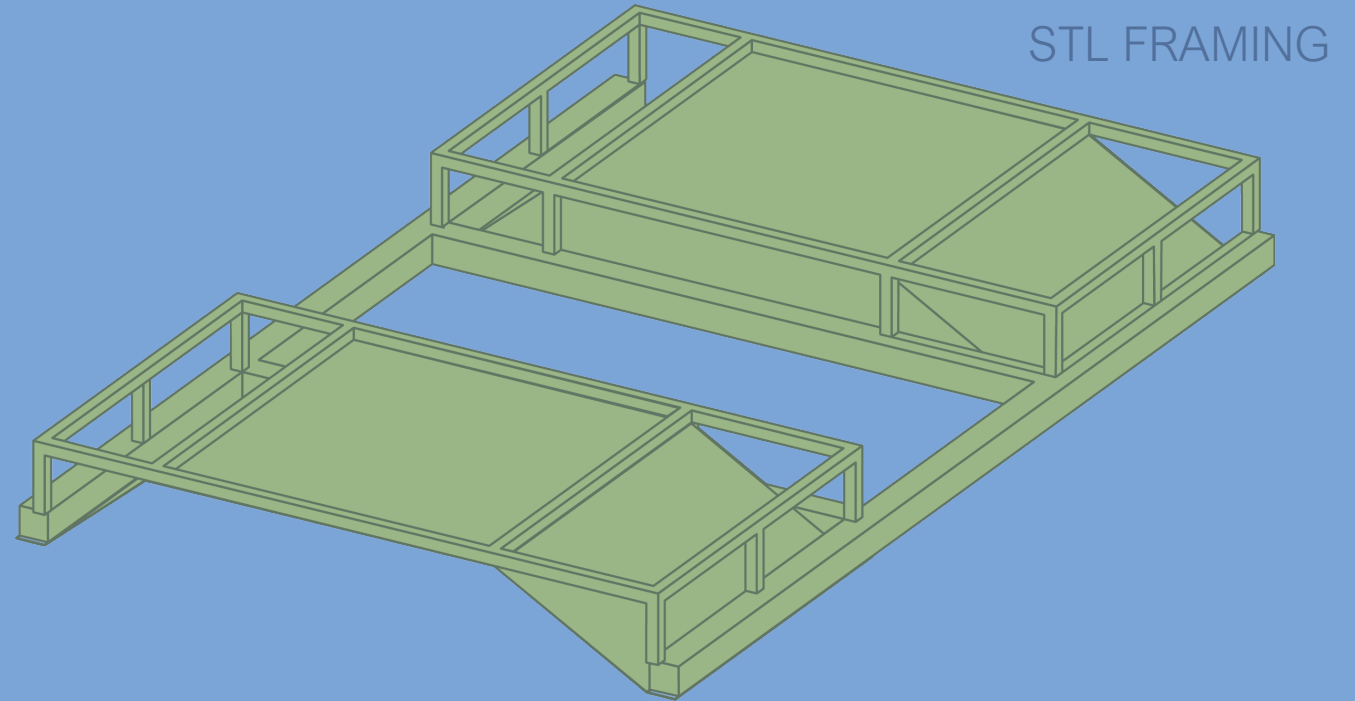
65 PASS

Thomas  
SCHOOL BUSES

# Wheel Well Replacement



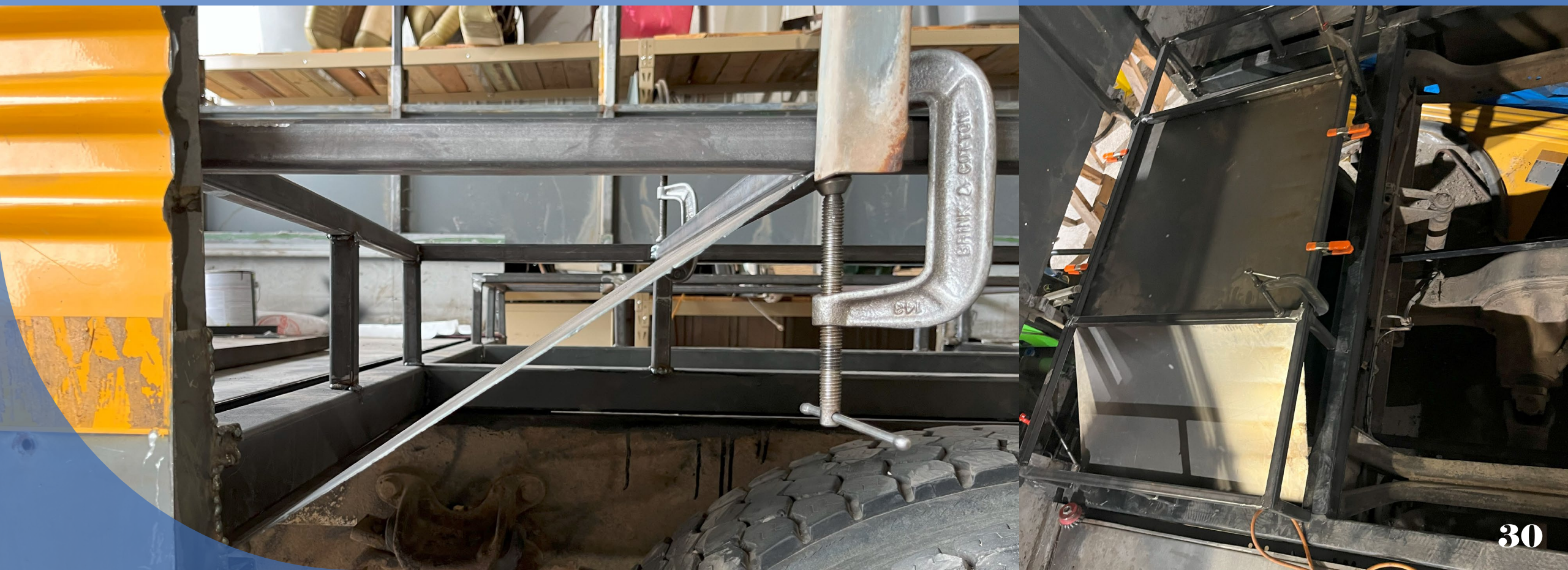
# Wheel Well Replacement Plan

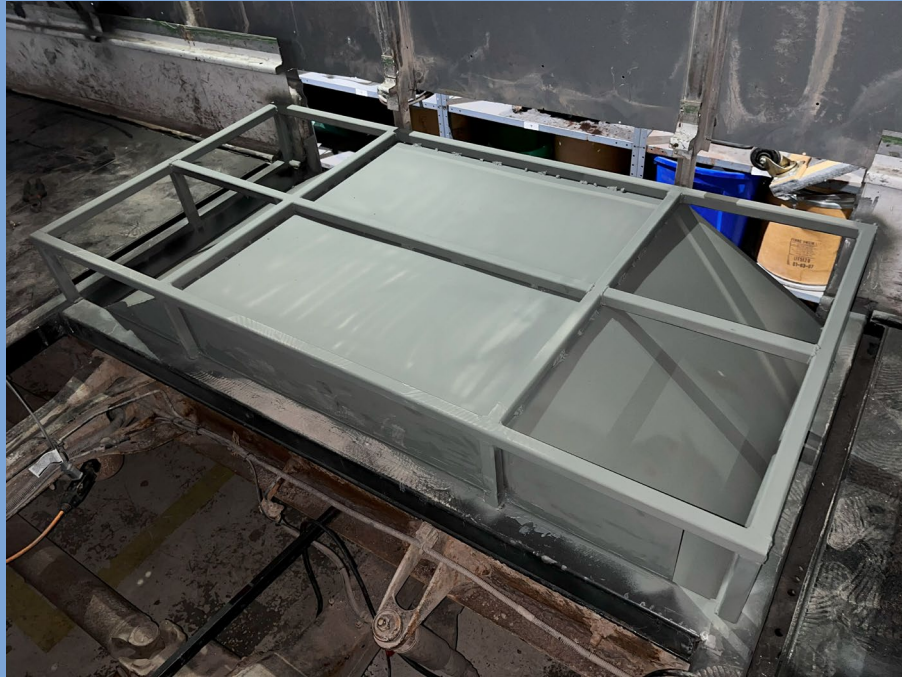




# New Wheel Framing

# New Wheel Framing





# Wheel Well Finish



# Floor Treatment

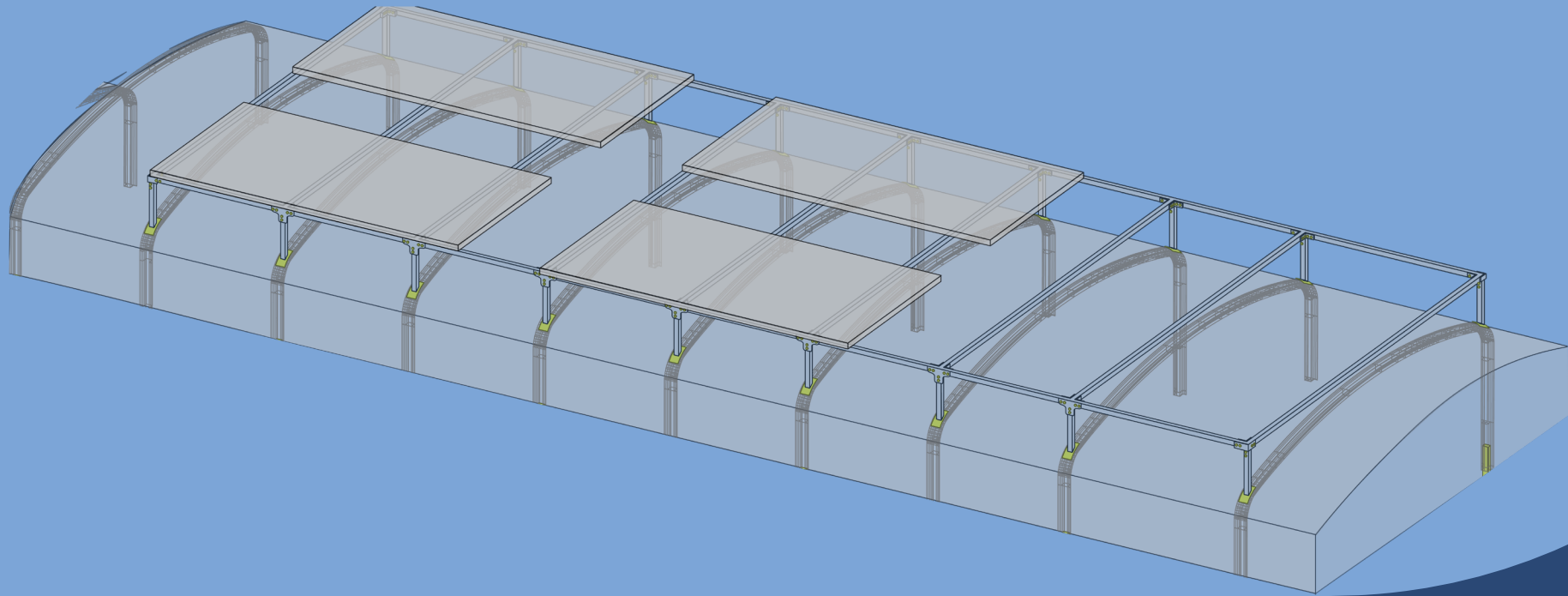


# Windows/Door

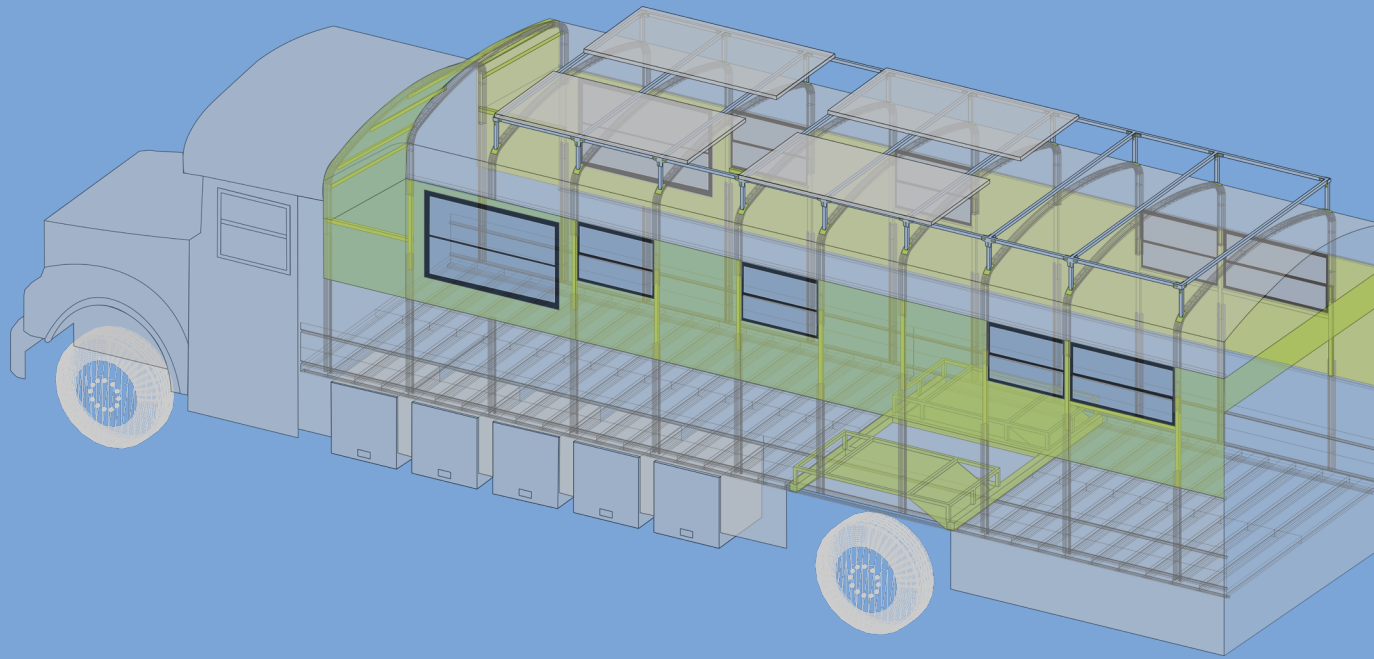
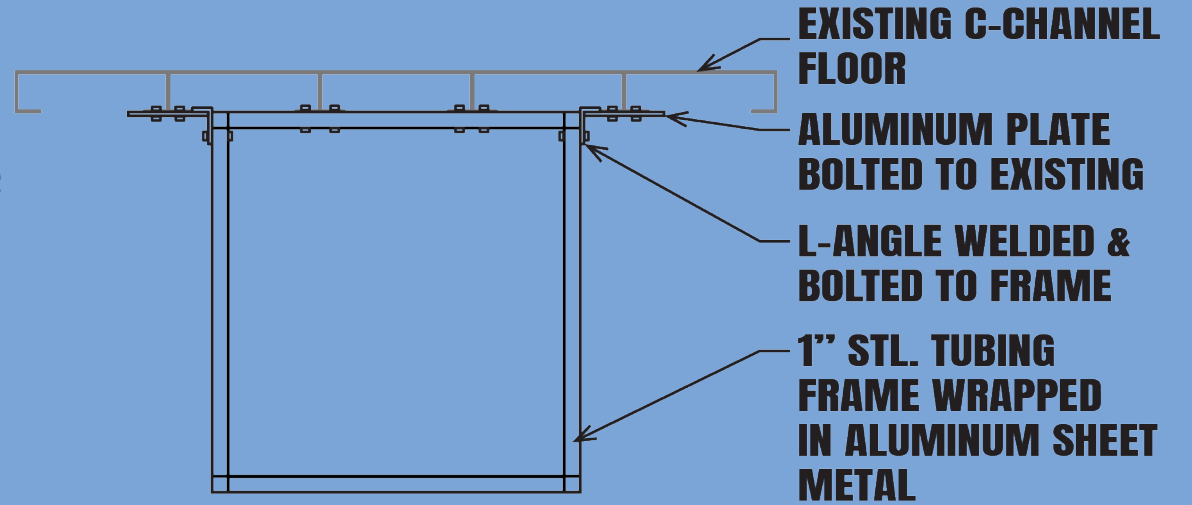
- **Recycle Existing Windows**
  - Cheapest and Most Sustainable
  - Poor Condition, Heat Sink and Limited Size
- **RV Windows**
  - Large Sizes, more Customization, reduced Framing and Increased Performance
  - Expensive and less sustainable

# Roof Rack

- Aluminum Framing
  - Solar Panels
  - Extra Storage Potential

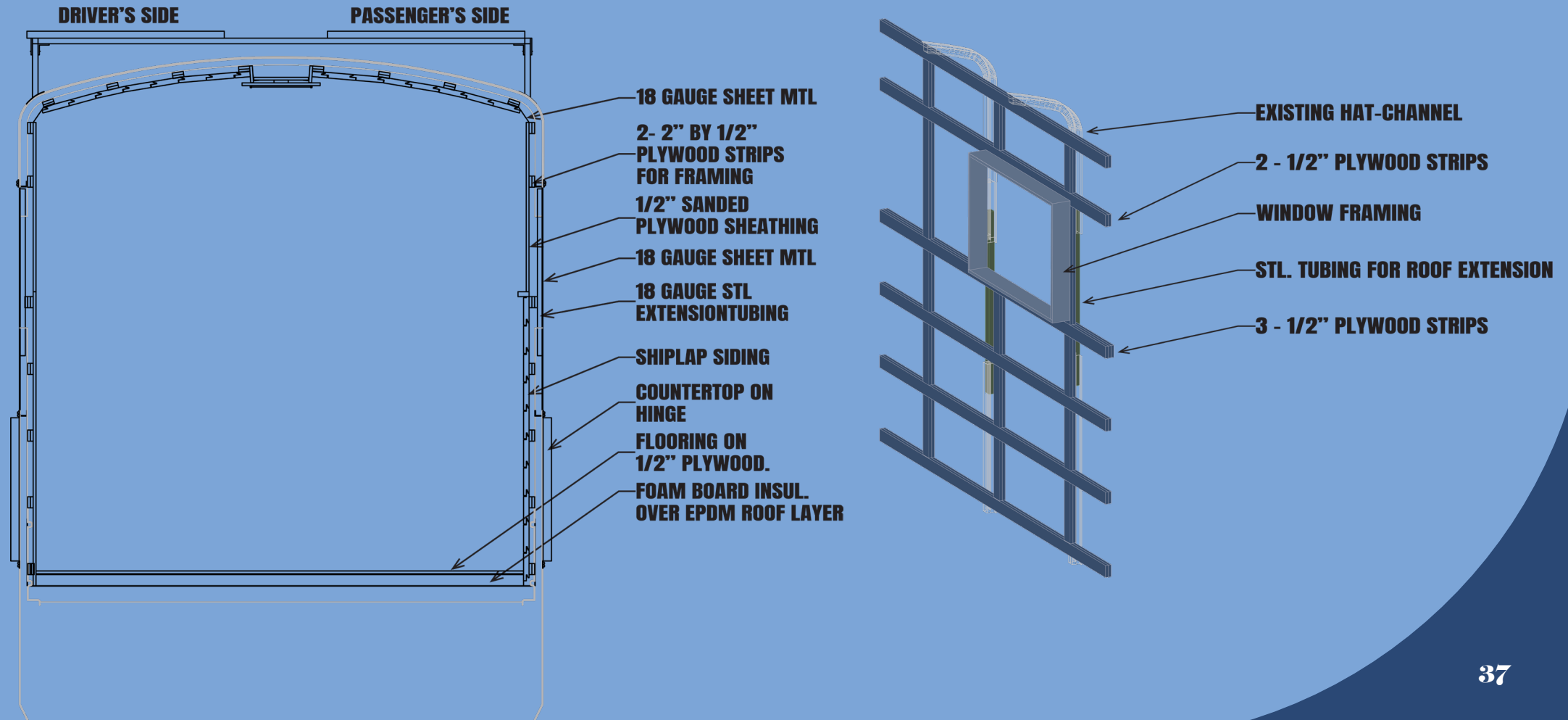


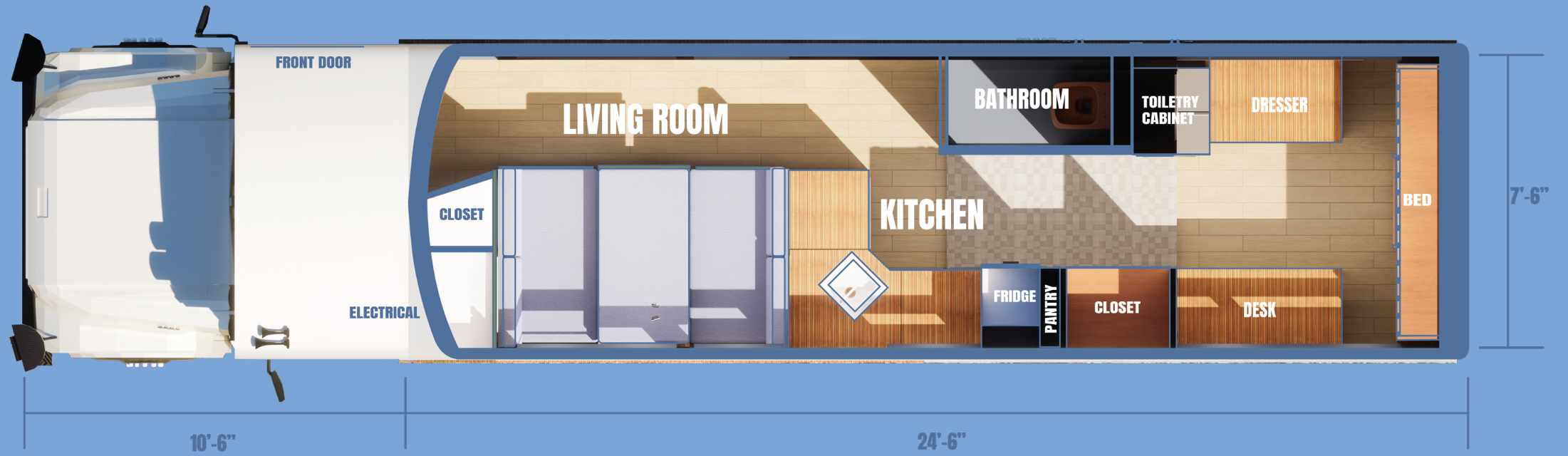
# Under Body Storage





# FRAMING PLAN





# FLOOR PLAN

# Driver's Side Section



# Passenger's Side Section







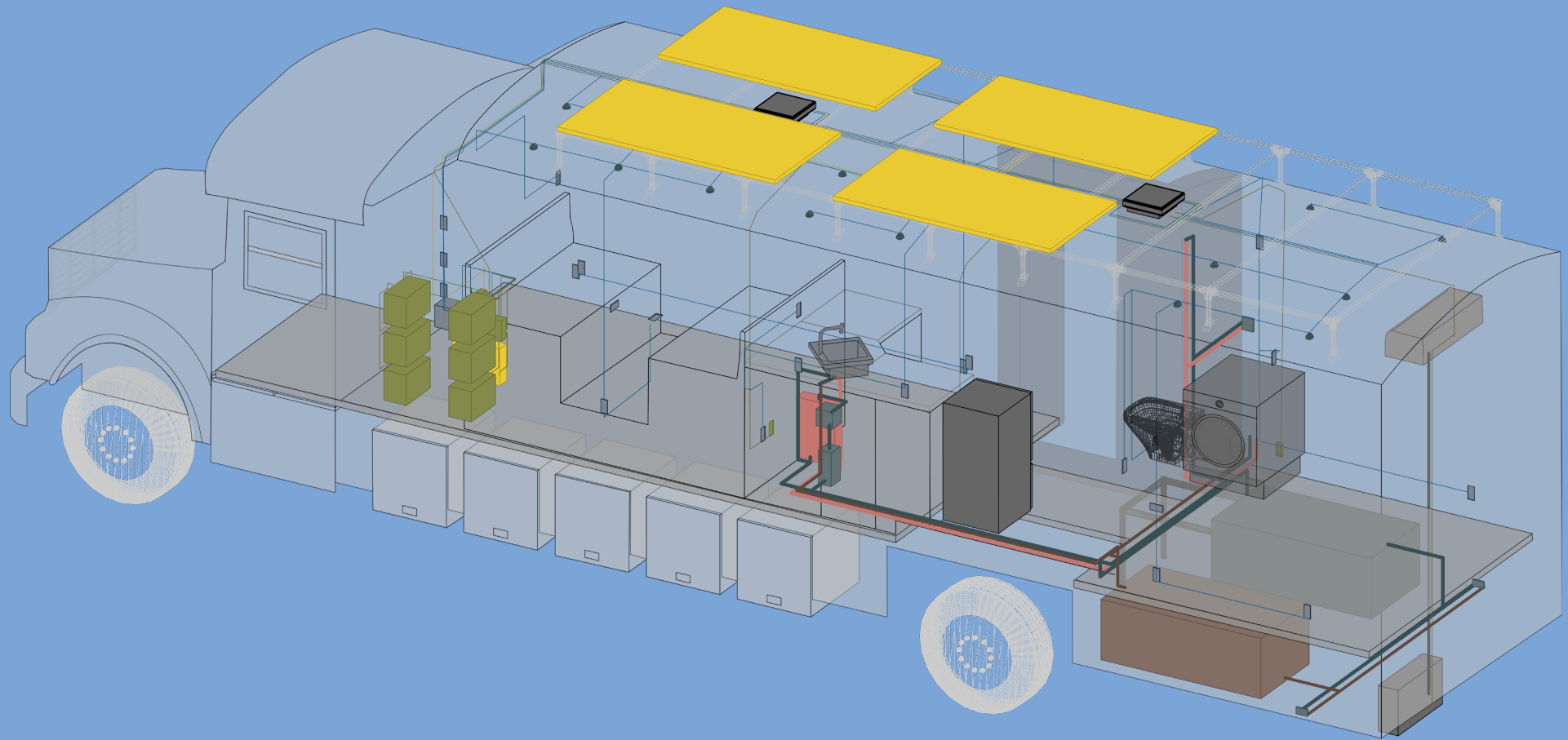


**Adaptable**



# Adaptable

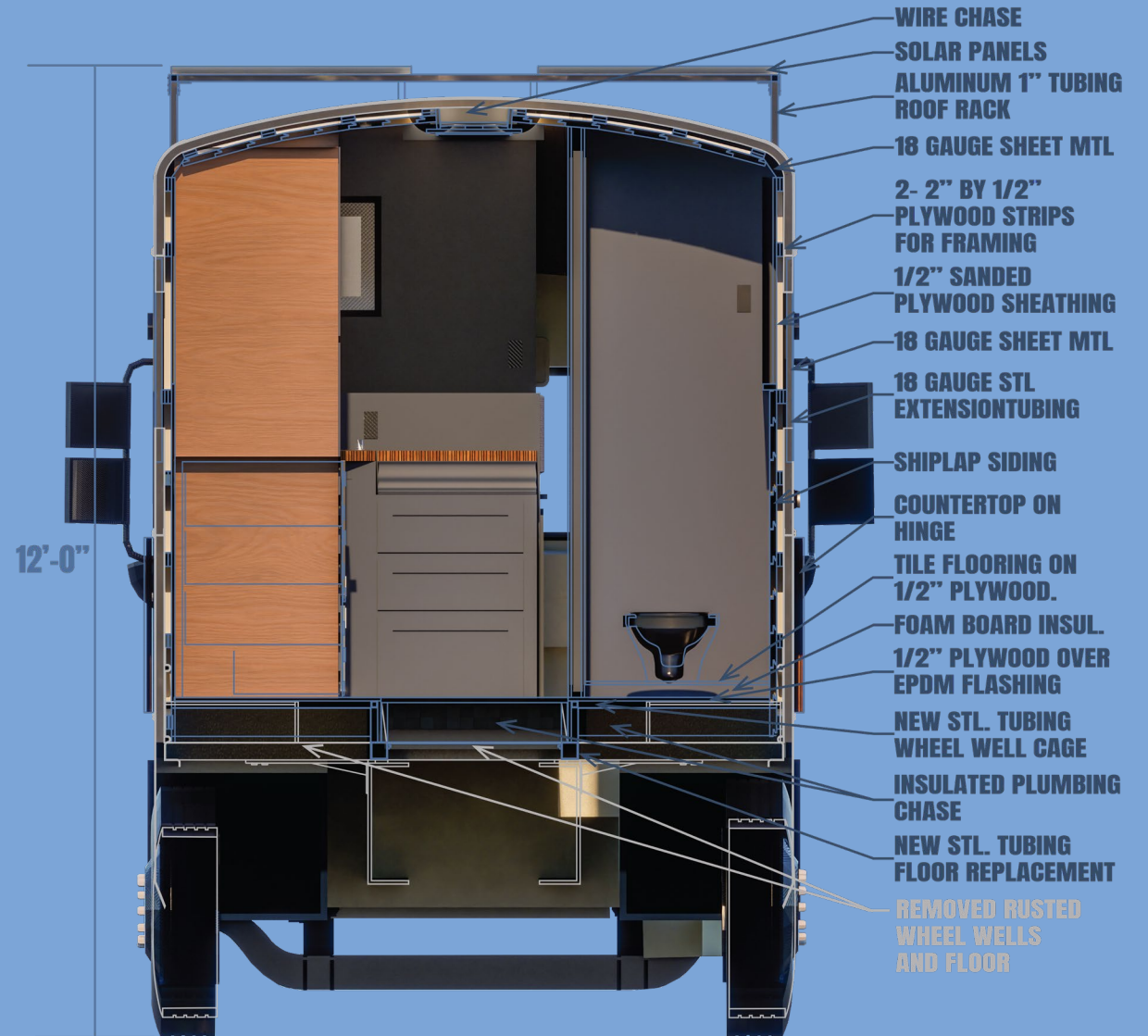




- SOLAR
- 12V ELECTRICAL
- 120V ELECTRICAL
- APPLIANCES
- HOT WATER
- COLD WATER
- GRAY WATER

# HVAC

# Final Interior





# Progress Pictures





# Progress Pictures



# Progress Pictures



# Progress Pictures



# Progress Pictures





**Thank You!**

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