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Leo: a carrier to help increase disaster evacuation compliance among cat owners

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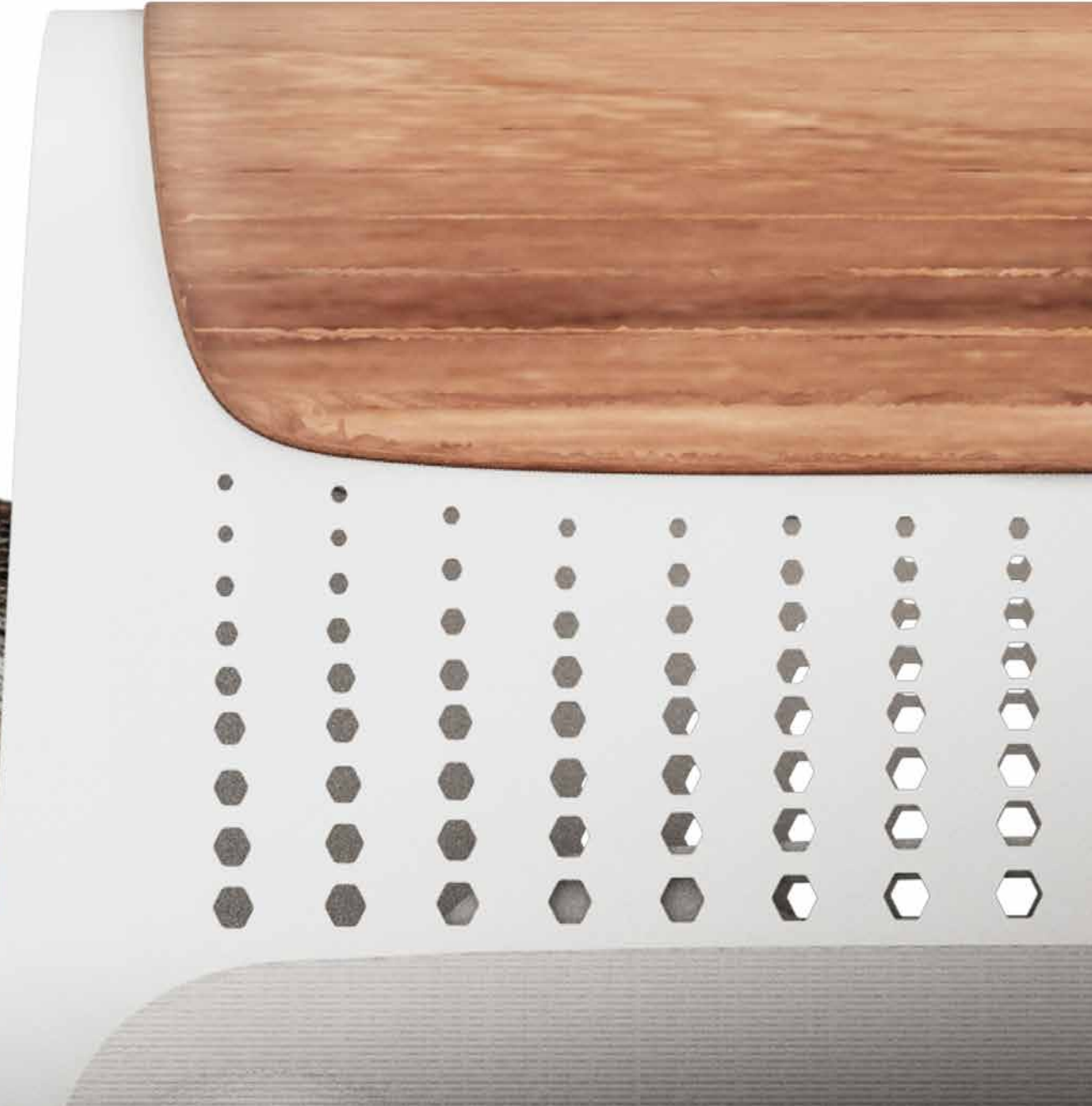
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leo

anna lorino

senior thesis | 2024



When a natural disaster occurs,
despite evacuation warnings,

20-30%

of **all failed evacuations**
happen because owners **chose**
not to leave their pets behind



People Refuse To Leave And Stay Behind To Save Stranded Cats From Flood In Houston



Leaving a pet behind **increases the risk of post-disaster PTSD** in owners...



...but staying behind with a pet **puts owners' and rescuers' lives in danger** and uses **costly rescue resources**.

83% of pet owners live in areas
impact by natural disasters, yet

less than half

of **pet owners** have a
disaster plan in place.



Cats present a unique challenge when trying to evacuate...

- Cats are more sensitive to stress
- They can sense changes barometric pressure
- Some can't tolerate wearing a collar or harness



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Major risk factors for evacuation failure with cats include...

- Not having a carrier
- Inability to catch and transport cats



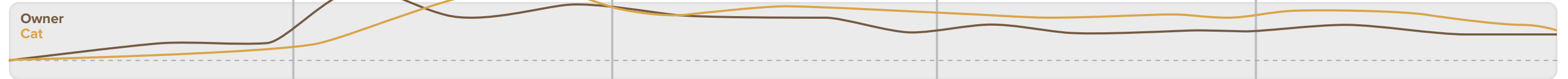
Current Evacuation Procedure

Based on best practice recommendations from ASPCA, FEMA and The Humane Society



Stress Levels

Owner
Cat



Plan Ahead

- Have a kit ready to go
- Know places to go to or where to contact

Find and Secure

- Find your cat
- Get your cat into the carrier

Evacuate

- Transport you and your cat to safety
- Minimize the stress of travel

Shelter

- Go somewhere until it's safe
- Minimize the stress of unfamiliar places and disaster effects

Return

- Repeat find and secure
- Minimize stress of change post-disaster

Pain Points

- Some cats require specific needs
- There isn't much variability in kits
- Certain items will expire

- Cat will hide if they are scared
- Cat is unwilling to get into the carrier
- Multiple cats makes it harder to crate

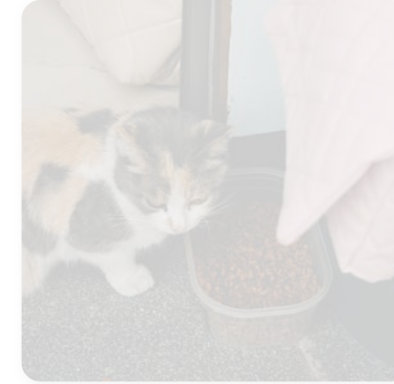
- Cats get nervous and stressed
- Cat may get destructive and/or escape
- Owner may not know where to go

- Cat may get distressed (PTSD risk)
- May not leave the carrier out of fear
- Re-crate cat to return home

- Re-secure in an unfamiliar place
- Home may not be the same
- Adjust to a new normal potentially

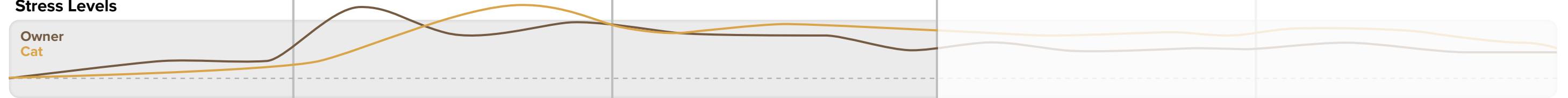
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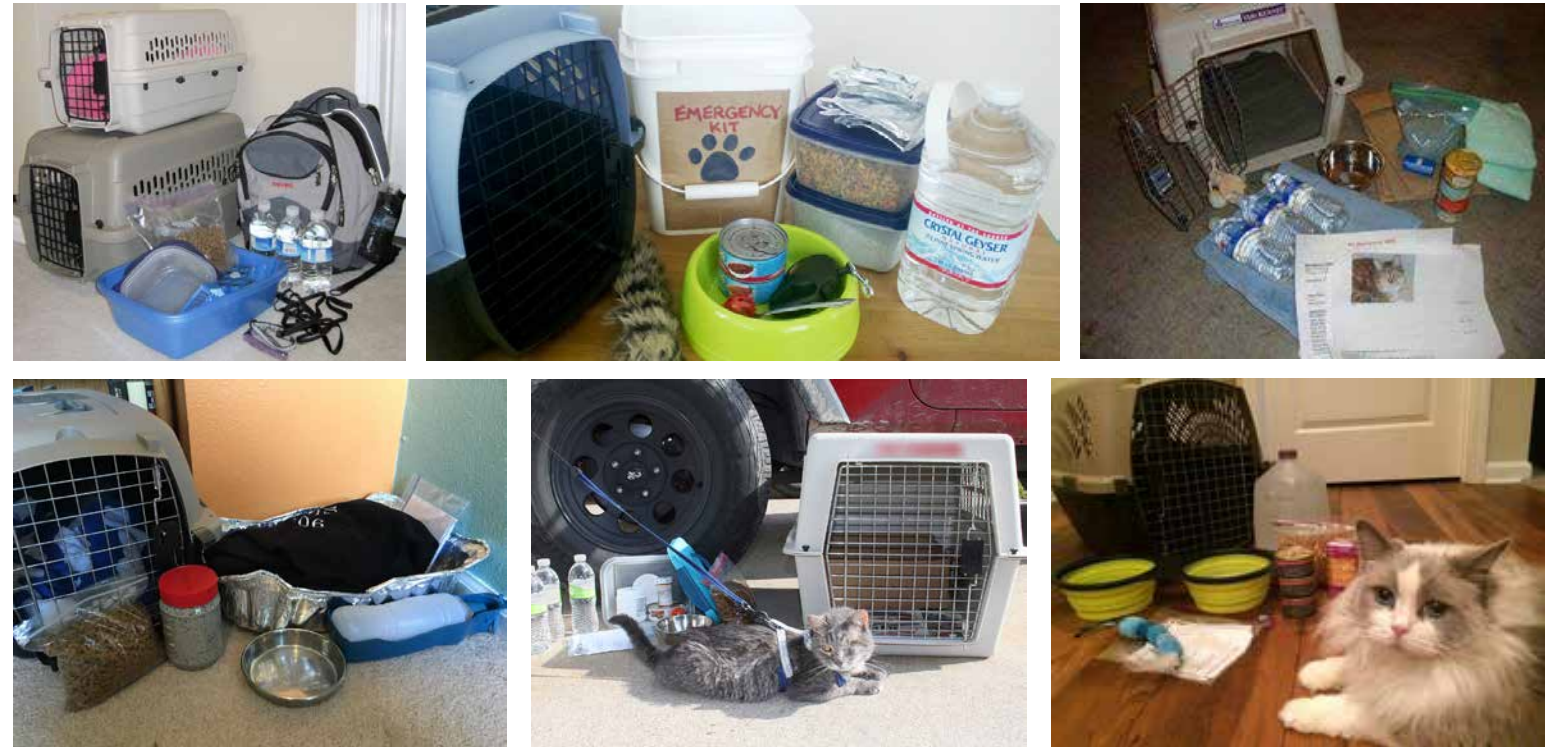
Evacuation Kits

Whether bought or made are important to have; it's hard to gather everything you need for you and your cat if you're not ready.



Ready-Made Evacuation Kits

- Compact design for evacuations or casual travel
- Made for a single pet
- Isn't meant for special food or medications
- Still need to add medical records and ID



DIY Evacuation Kits

- Made with things around the house (litter tubs, baking pans, tupperware, etc.)
- Can build one kit for multiple cats
- Mismatched containers may be harder to transport and store neatly
- Watch out for expiration on medications and non-vacuum sealed food items

Getting Cats into Carriers

Lowering stress during this process can help reduce compounded stress and help prevent post-disaster distress.



Pillowcase Stuffer

ASPCA recommended; effective in an emergency, but could easily get injured.



Towel Burrito

Easy to contain the cat but they might start thrashing when grabbed.



Old Fashioned

Usually difficult; high chance of getting scratched or bit and traumatizing the cat.



Split the Crate

Not many people do this, it could be easier for the cat to escape.



Air Drop

Game over if you're cat figures out there's a crate under them.

These methods can be tricky to do as one person and they often stress out the cat.

How to Train Your Cat

Common ways to train (accidentally or purposefully) a cat to come to someone.

Positive Reinforcement



Use consistent audio or visual cues repetitively and reward correct behaviors that you want (i.e. come when called).

It's important that you don't punish undesired behaviors, cats don't understand and this will confuse them.

Owner Intervention



Rewarding Habits



Cats will sprint to an automatic feeder when they hear it go off, even if they were in a deep sleep.

It's been recommended for people to form a daily habit to feed your cat at that time because they will punctually seek you out.

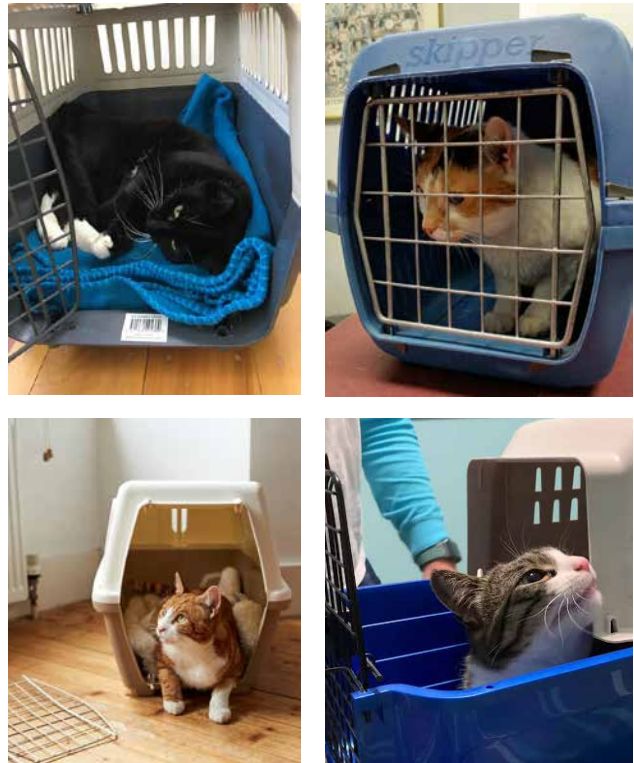
Owner Intervention



These methods can help find cats easier or coax them out from their hiding spots.

Transporting Cats

There are various styles of products to transport cats, these are three common products.



Hard Shell

- Door, top and bottom come apart
- Sturdy construction
- Pinch points around the door
- Bulky to store away



Soft Shell

- Modular, some are expandable
- Easier to carry and store away
- Zippers and velcro can be pushed open
- Cats claws get stuck in the mesh

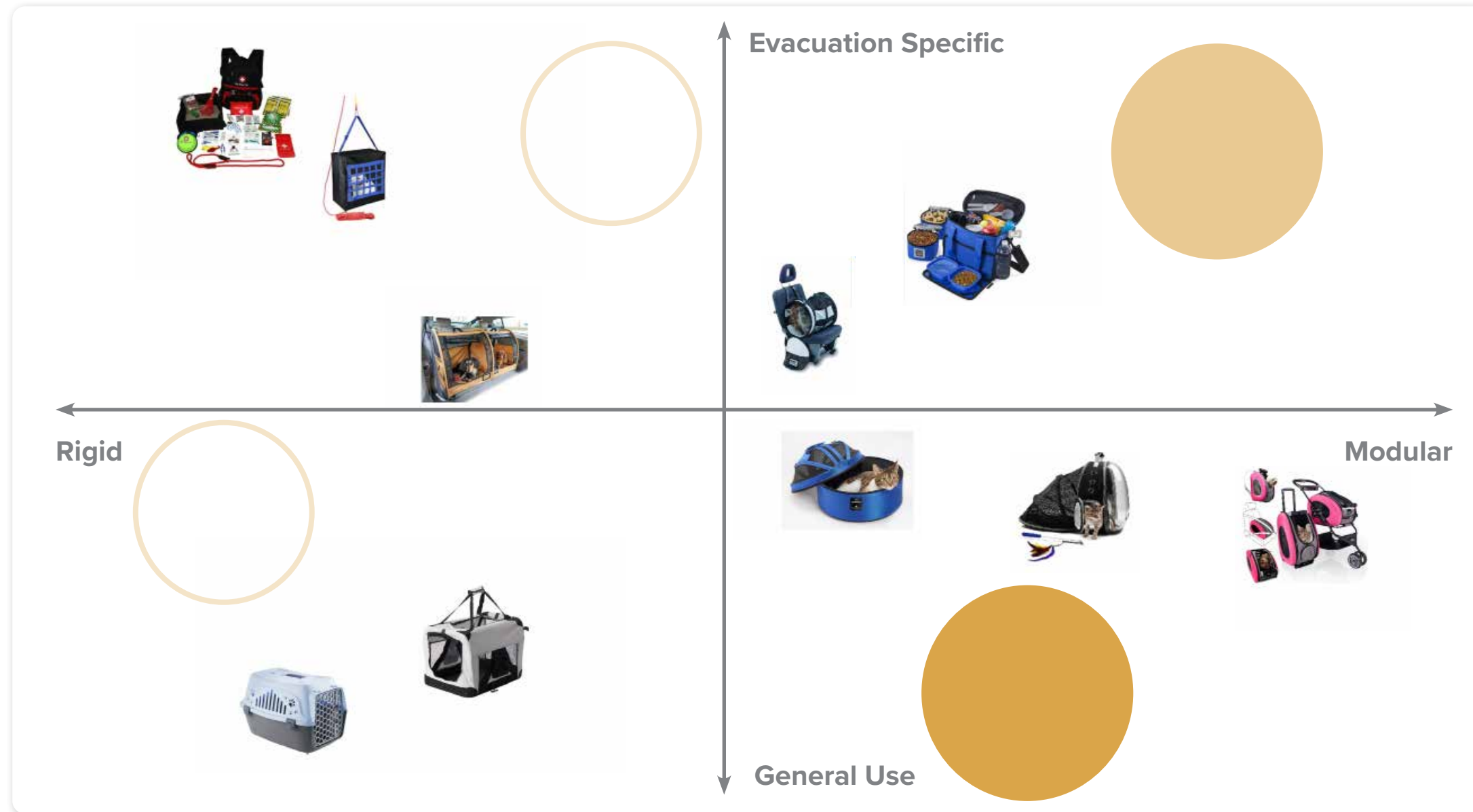


Backpack

- More compact for travel
- Some are expandable
- Easy to carry on the back or by handle
- May be difficult to put the cat into it

What's Out There?

Products on the market are focused on the carrier and general transportation or evacuation supplies.



There lacks an integrated transport solution that incorporates the needs of an evacuation.

Key Insights

- The hardest part is to “Find and Secure”
- Prepared evacuation kits are important
- Stress levels impact success with a cat

How Might We...

Ensure preparedness and help catch cats for their owners in order to increase natural disaster evacuation compliance.



Design Principles



Quick Transport

Provide safe and efficient transport for evacuating cats

User Needs

- Quickly find the cat
- Safely get the cat into a carrier
- Safely transport the cat

Inspiration



Comfort in Chaos

Encourage comfort and security for cats to find and secure them

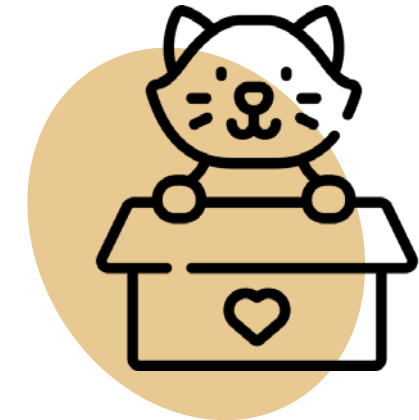
- Minimize fighting with the cat
- Encourage the cat to feel safe
- Entice the cat to cooperate



Ready to Go

Be prepared with supplies and be informed on what to do

- Have an evacuation kit available
- Be informed of places to go
- Care for the cat while traveling

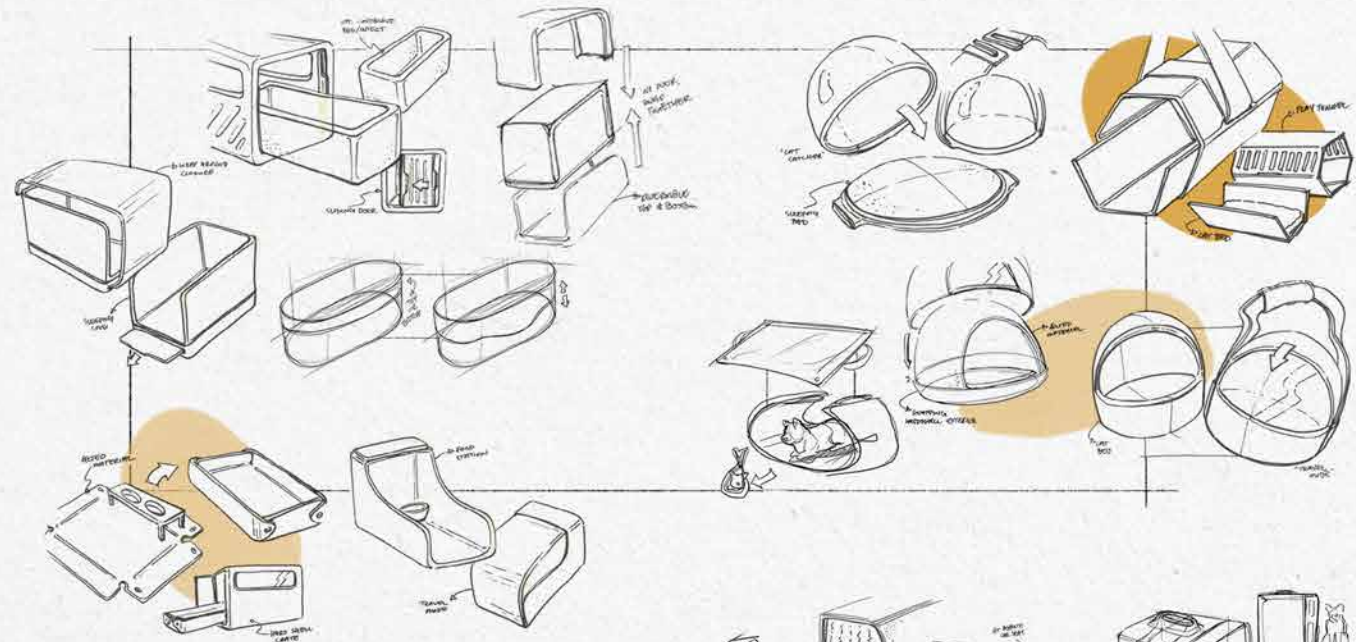


Stress Less

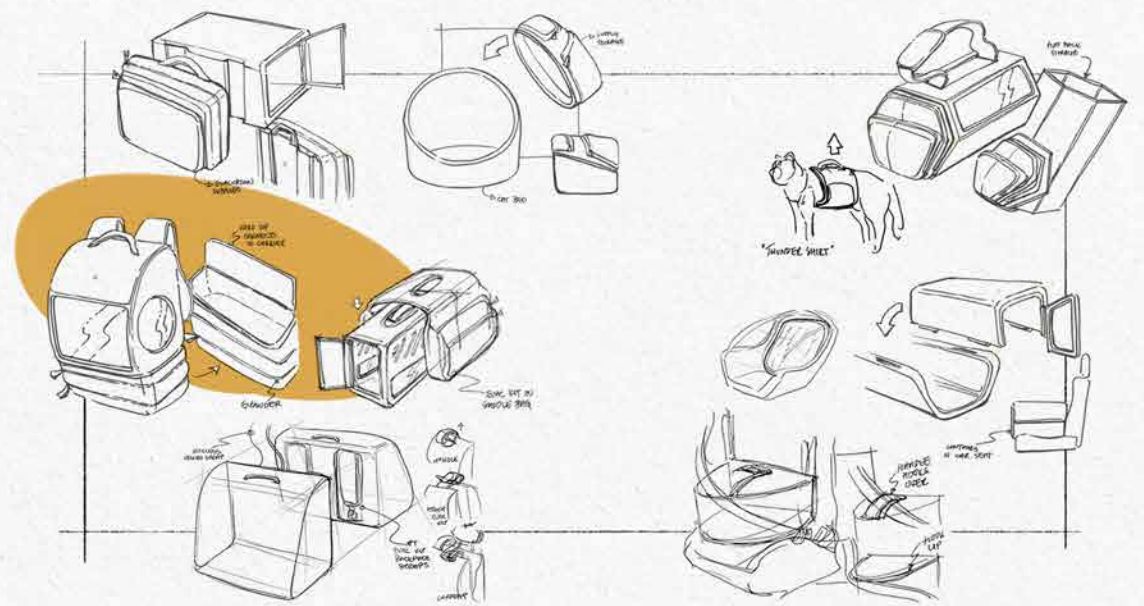
Minimize stress to help prevent post-disaster distress

- Prevent distress in the cat
- Minimize stress of traveling and staying in an unfamiliar place

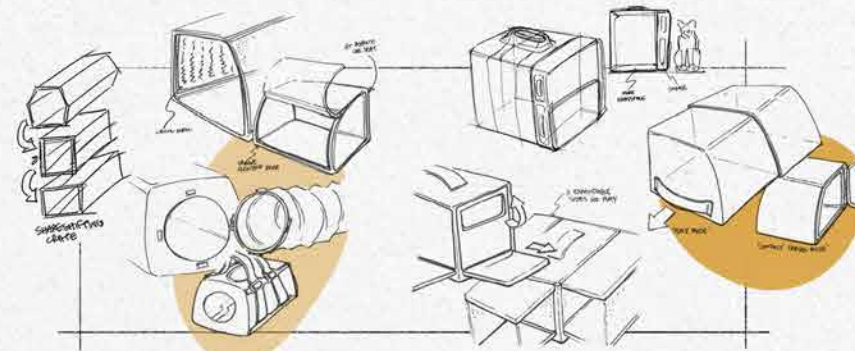




Home Integration

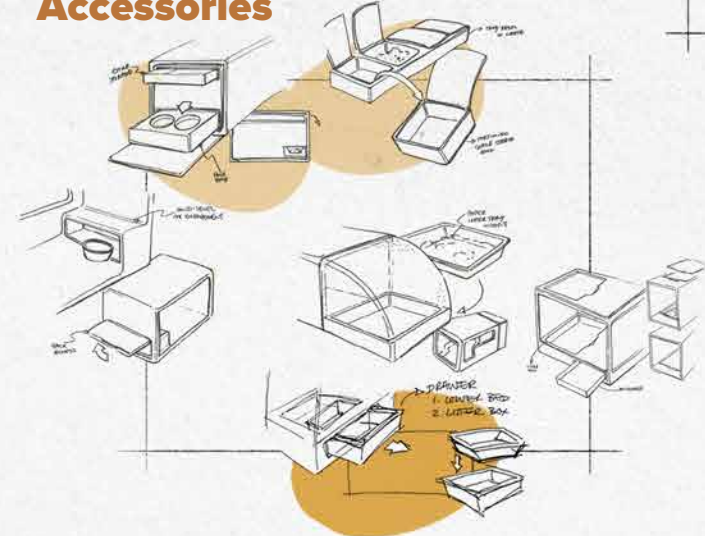


Evacuation Ready

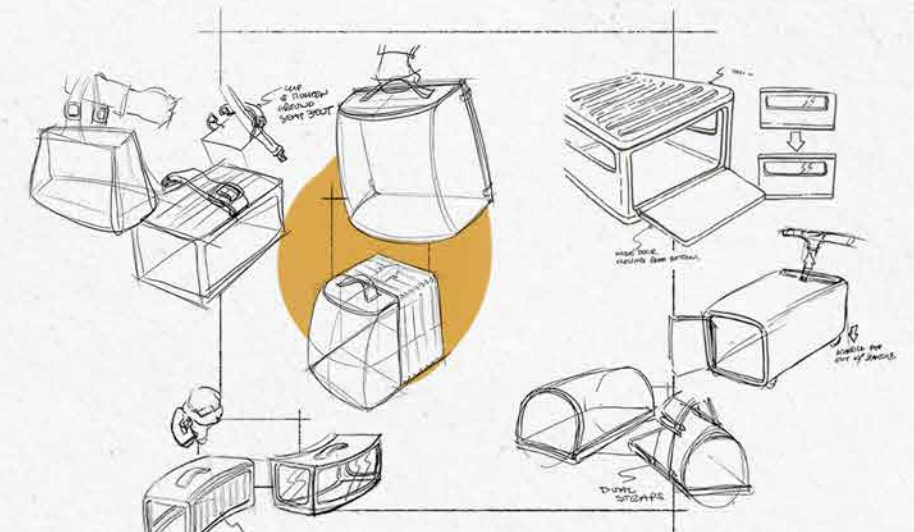
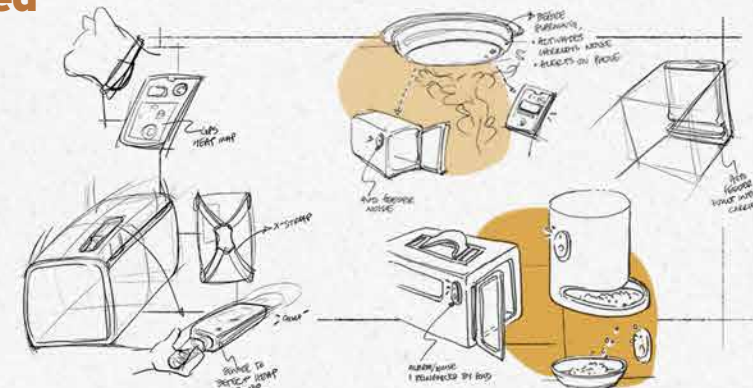


Play Focused

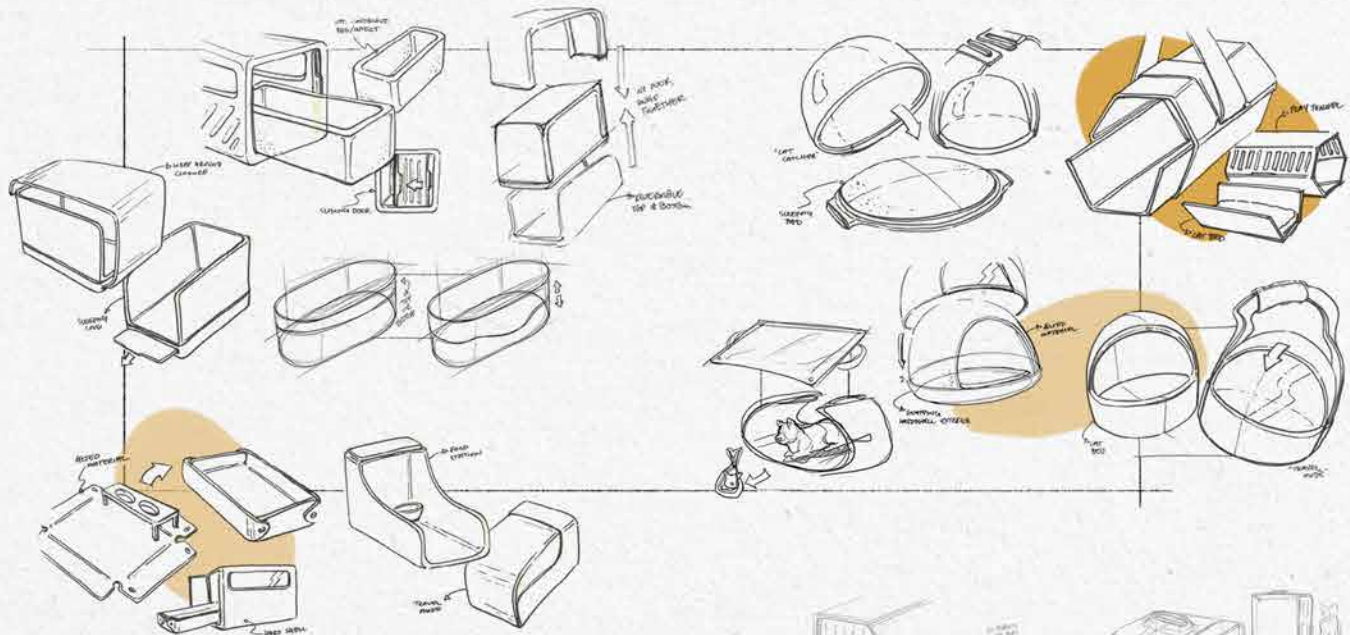
Accessories



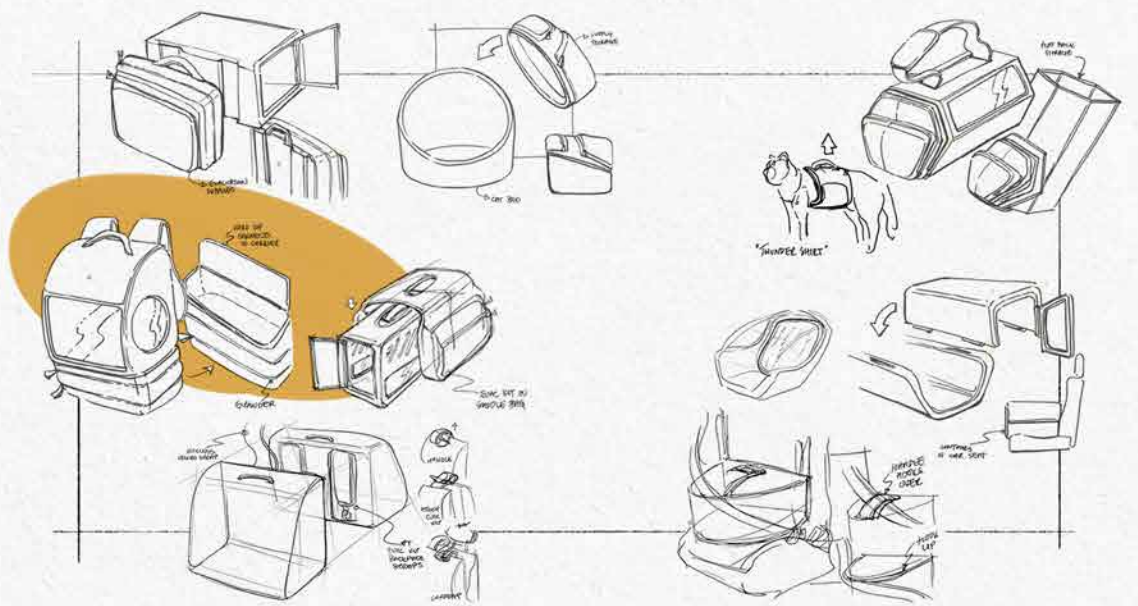
Find to Secure



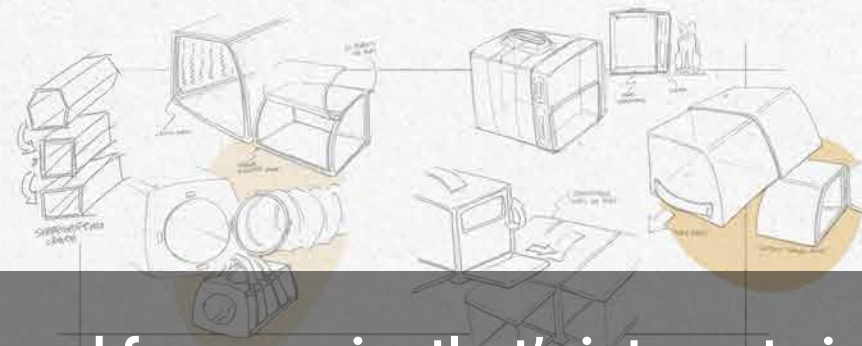
Easy Transport



Home Integration



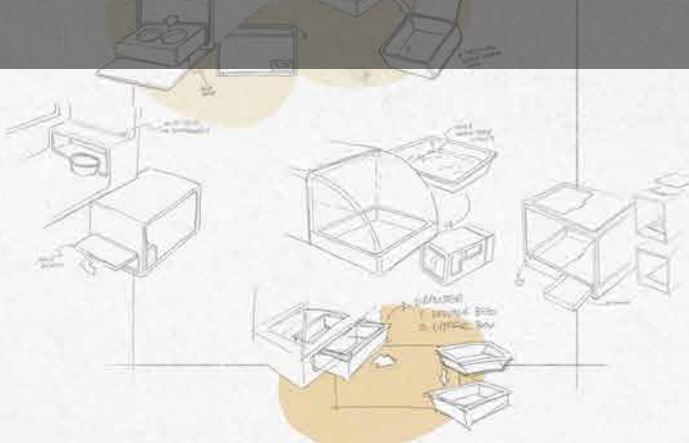
Evacuation Ready



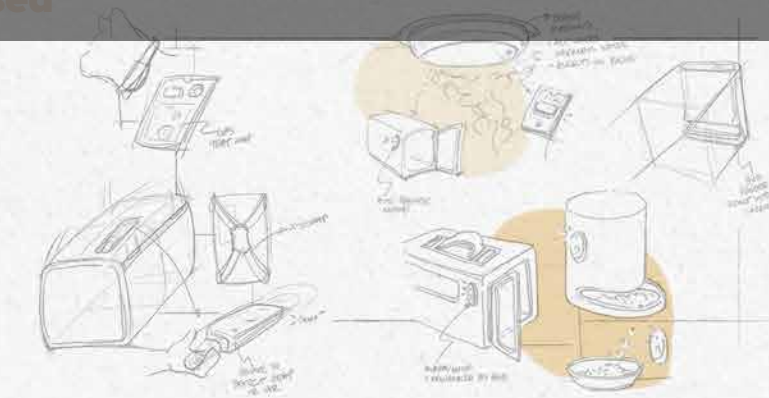
Play Focused

Accessories

Insights determined a need for a carrier that's integrate into the home while having necessities at hand.



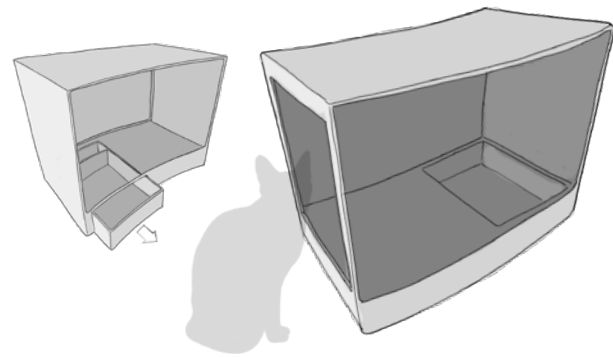
Find to Secure



Easy Transport

Blending Integration and Preparedness

Four concepts were developed to learn how to integrate an evacuation focused carrier into the home.



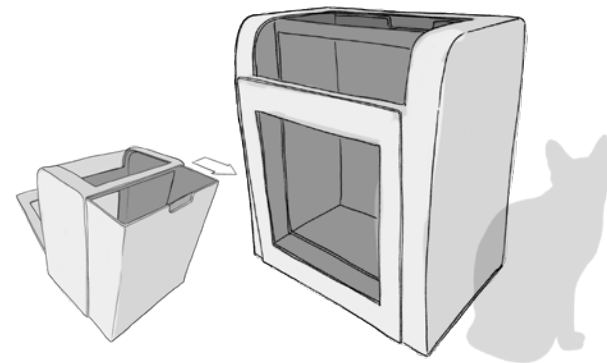
Grab n' Go

- Dedicated to evacuations
- Transport comfort for all users
- Focus on care while sheltering

Architecture

Evacuation Focus

Multi-Purpose



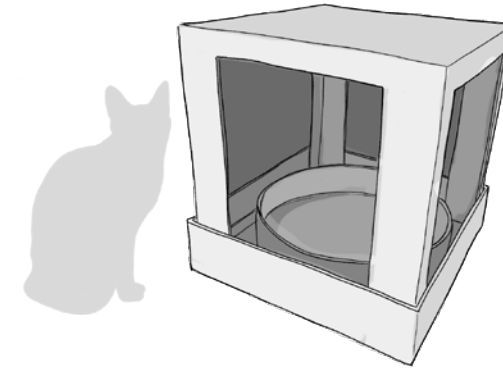
Backpacking

- Multiple carrying styles
- Compact with expansion
- More technology integration

Architecture

Evacuation Focus

Multi-Purpose



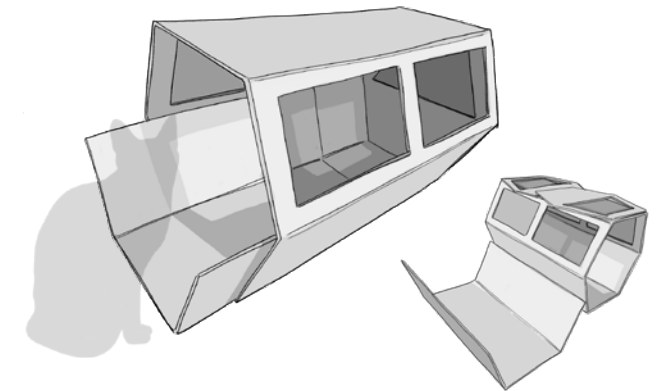
Home Base

- Integrated into the home
- Flexible carrying style
- Food reinforcement

Architecture

Evacuation Focus

Multi-Purpose



Mobile Home

- Integrated into the home
- Focus on transport and care
- Carrier is multi-purpose

Architecture

Evacuation Focus

Multi-Purpose



Concept Testing

Determining ease of use and maneuverability with owners and willingness to interact and fit in the carrier with a cat.



Concept Evaluation

Synthesizing user insights and observations to determine the concept to develop further.



Grab n' Go

- Curve makes it easier to carry
- Angled strap fit well
- Too big, cat tips crate
- Needs wheels



Backpacking

- Compact, easier to carry
- Can carry 2 cats more easily
- Would store away
- Need smaller access inside



Home Base

- Easier to crate a cat
- Put multiple bases in the home
- Not sure how to hold it
- Box-shape is awkward to move



Mobile Home

- Bed insert is nice, use at vet too
- Double doors is inviting for cats
- Pointy sides hurt to carry
- Needs smaller access inside

Mobile Home had the best blend of home integration with the ability to modify to better prepare for an evacuation.

Meeting Emotional Needs

Cats should feel **comforted and safe** in a familiar space.

Owners should feel **prepared and capable** to care for their cat.

First Read



Layered Forms

Gentle Curves

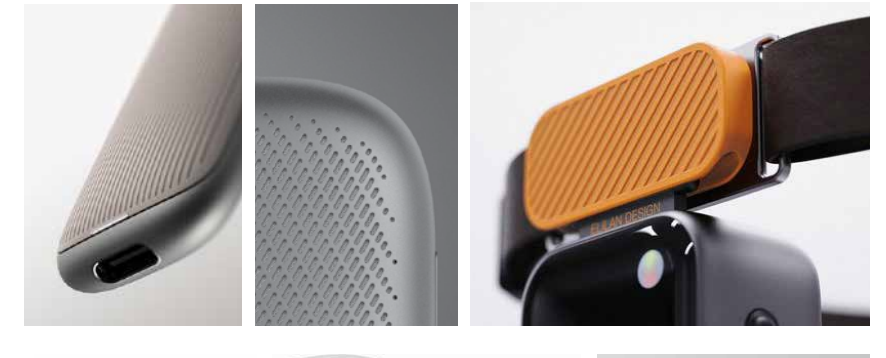
Second Read



Clean Chamfers

Soft Touchpoints

Third Read

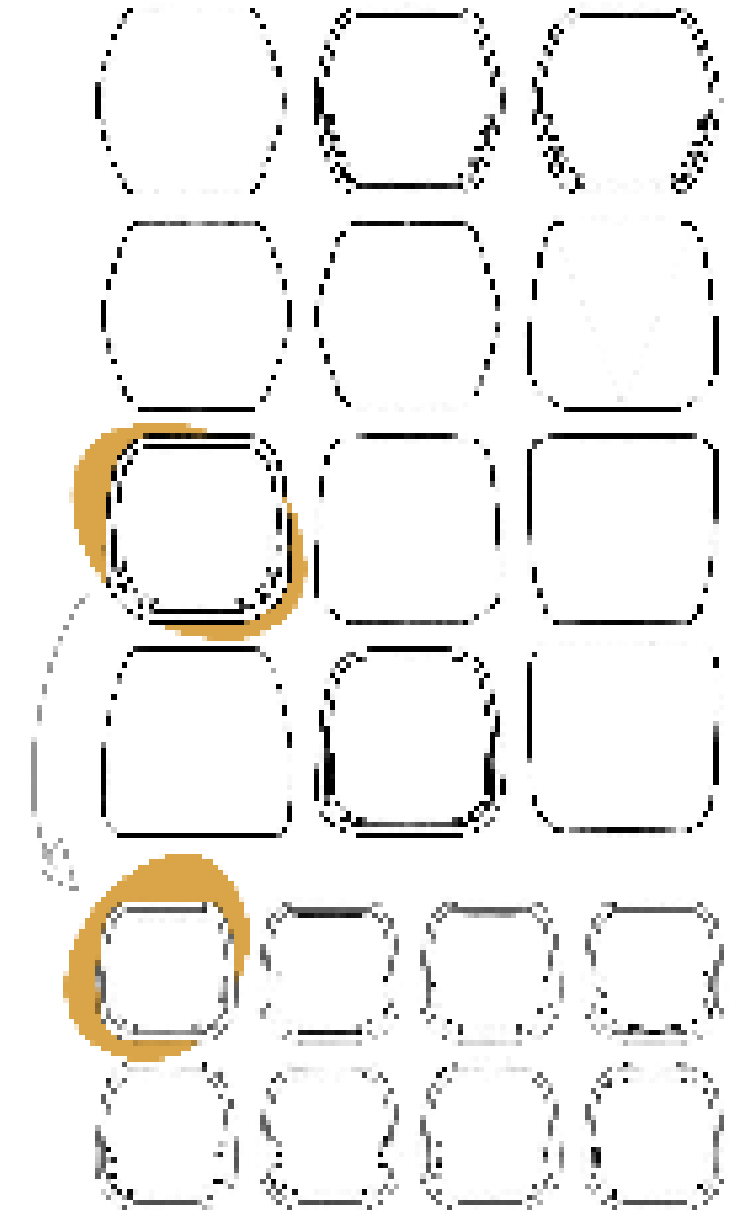
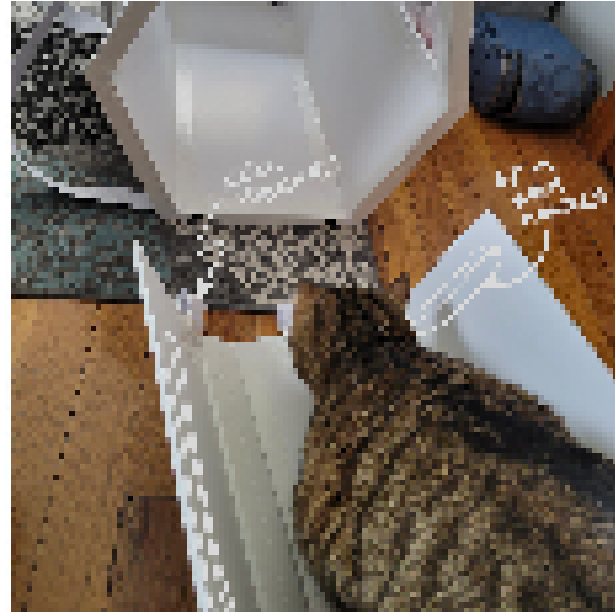


Precise Textures

Integrated Features

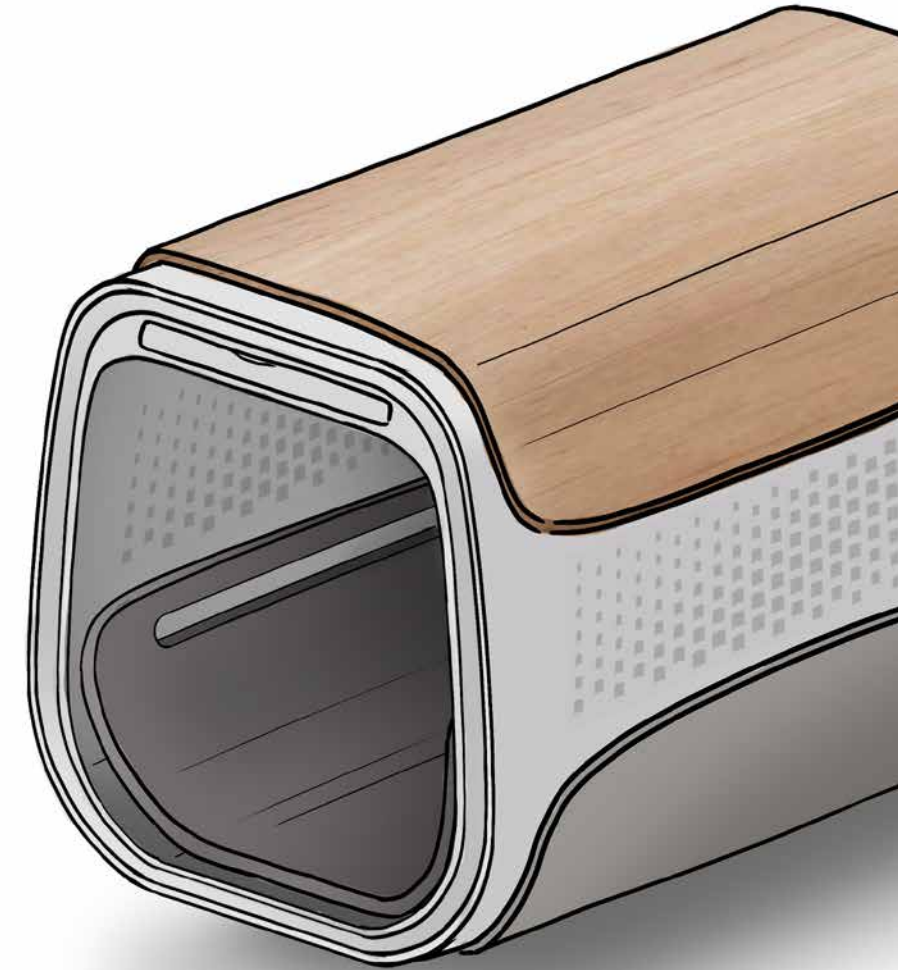
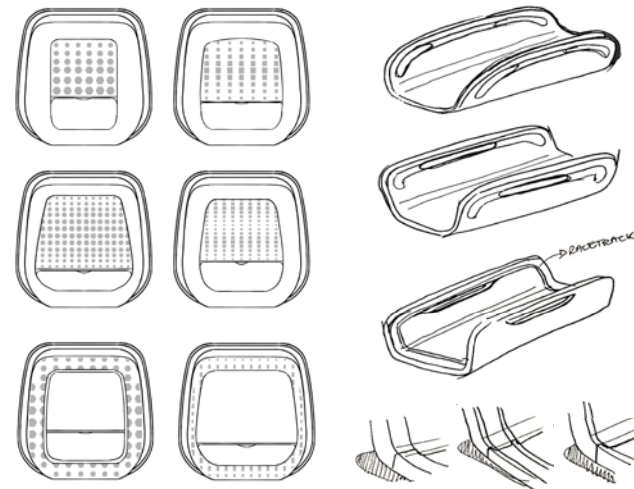
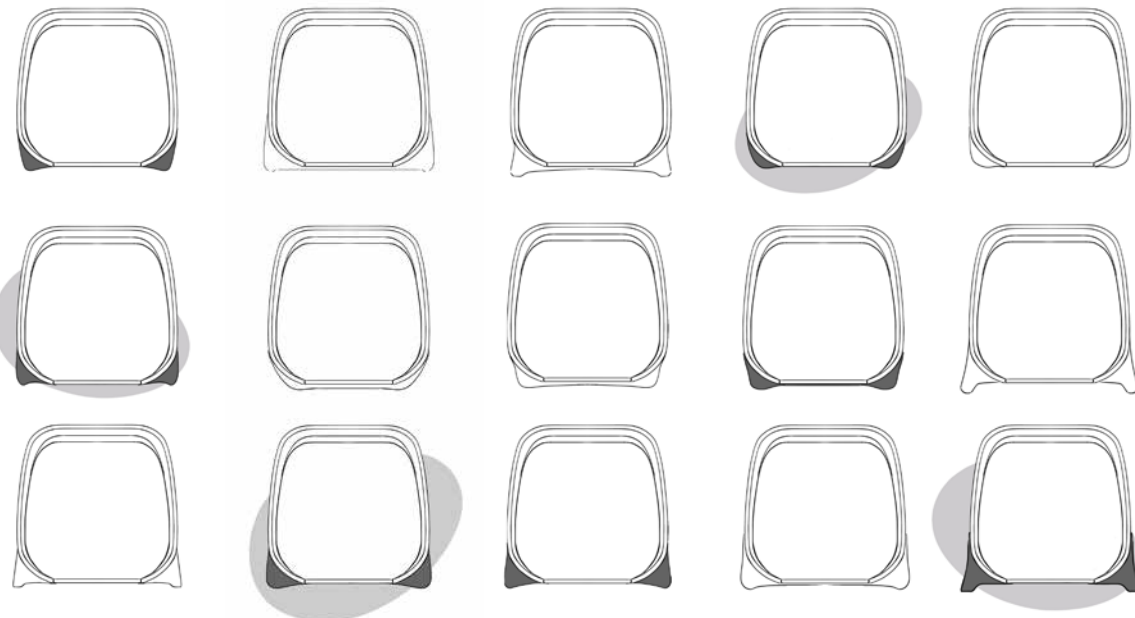
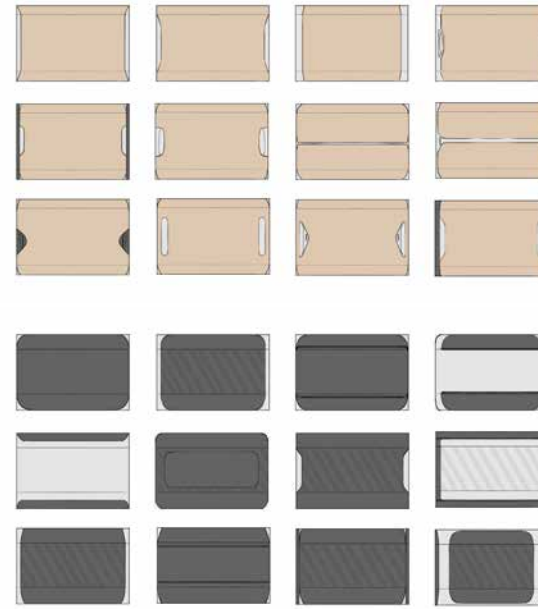
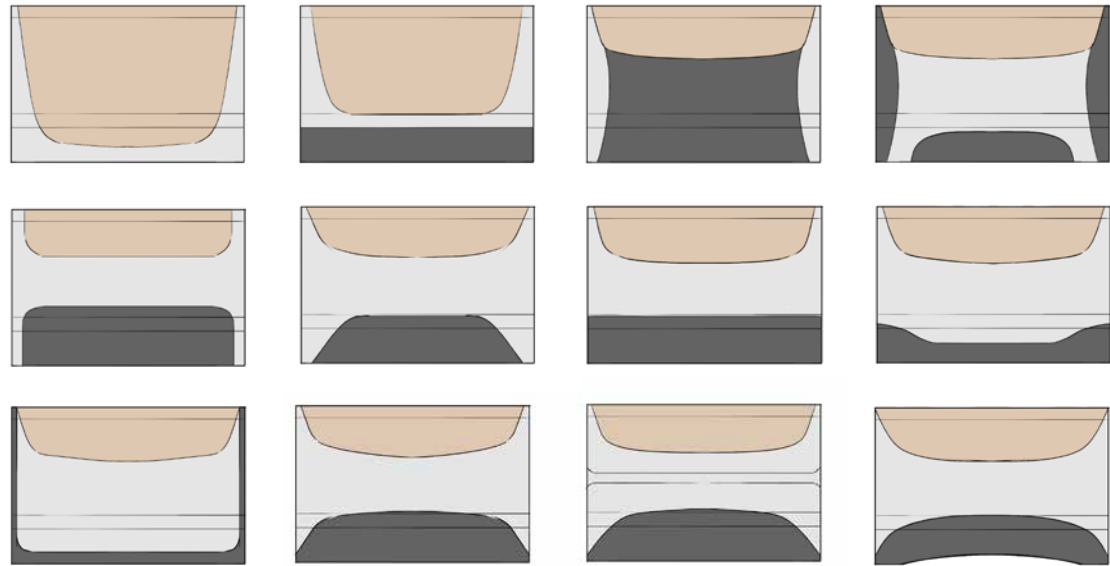
Translating Insights and Aesthetics

Refining the architecture based on mood boards and user feedback.



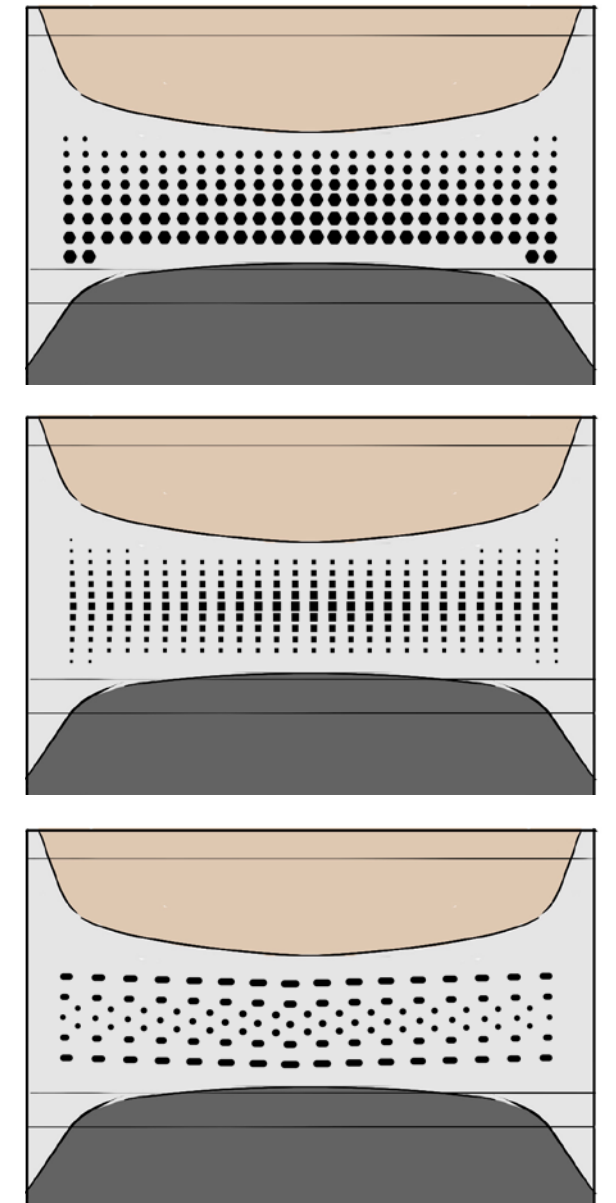
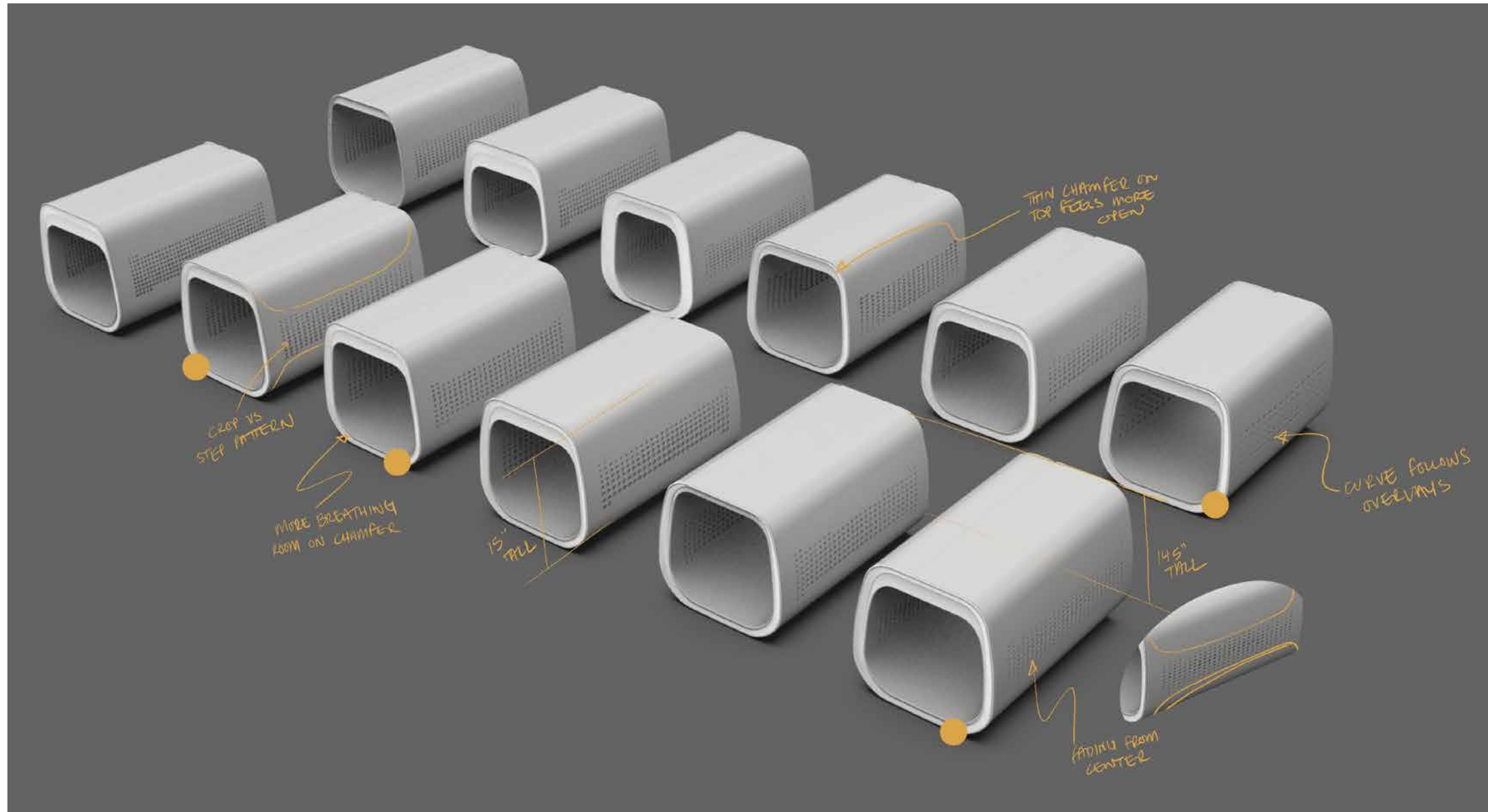
Designing the Details

Developing color breaks, part lines, clip placement, and usability of the bed insert.



Door Frames and Venting Patterns

Ideating on additional second and third read details.





meet

leo



meet

leo

bringing home
in an evacuation

Fitting into the Home

Inspired by different colorations of cats, these neutral palette options blend into a variety of homes.



Comfort and Convenience

The removeable cat bed expands the carrier's familiarity and comfort into the home.



The carrier is a multi-functional piece of furniture in the home.



Provide the comfort and convenience of home for your cats during an evacuation.



Public Safety Alert

City of San Diego: Advising of expected flooding
February 1, 2024

Evacuation Warning in effect. Be prepared to
evacuate if advised by public safety officials.
See more information at [Sandiego.gov/storm](https://sandiego.gov/storm)

Next time an evacuation warning or order is issued...

- 1 Prepare the Carrier
- 2 Find and Secure Cats
- 3 Pack and Check List
- 4 Load and Go

Prepare the Carrier

Doors fold and store underneath the carrier and are magnetically secured. Unfold them before getting your cat.



1
2
3
4

Find and Secure Cat

There are multiple different ways to find and secure your cat in the carrier. Combining these methods with training will increase success rate.

1
2
3
4



Transfer

Use the bed to transfer your cat into the carrier

Owner Intervention

Passive Intensive



Entice

Utilize treats or toys to entice your cat through the double doors

Owner Intervention

Passive Intensive



Train

Feed your cat in the carrier to teach them that it's a safe space

Owner Intervention

Passive Intensive



Pack Extra Items and Check List

The top lifts off to reveal a small storage area for important evacuation items or short trips where the carrier is needed including:

- Collar(s) and leash(es)
- Rabies tags
- Vet Records
- Pet Identification
- Food and water bowls
- Treats
- GPS tracker

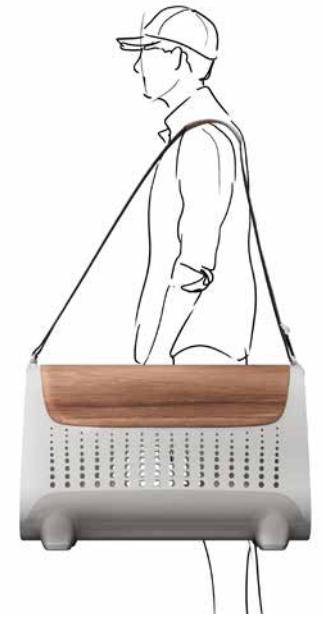
An evacuation checklist is also provided in a protective sleeve on the bottom of the lid.



Load and Go

Clip the strap into the slots on the carrier, adjust the strap length and you're ready to go.

1
2
3
4



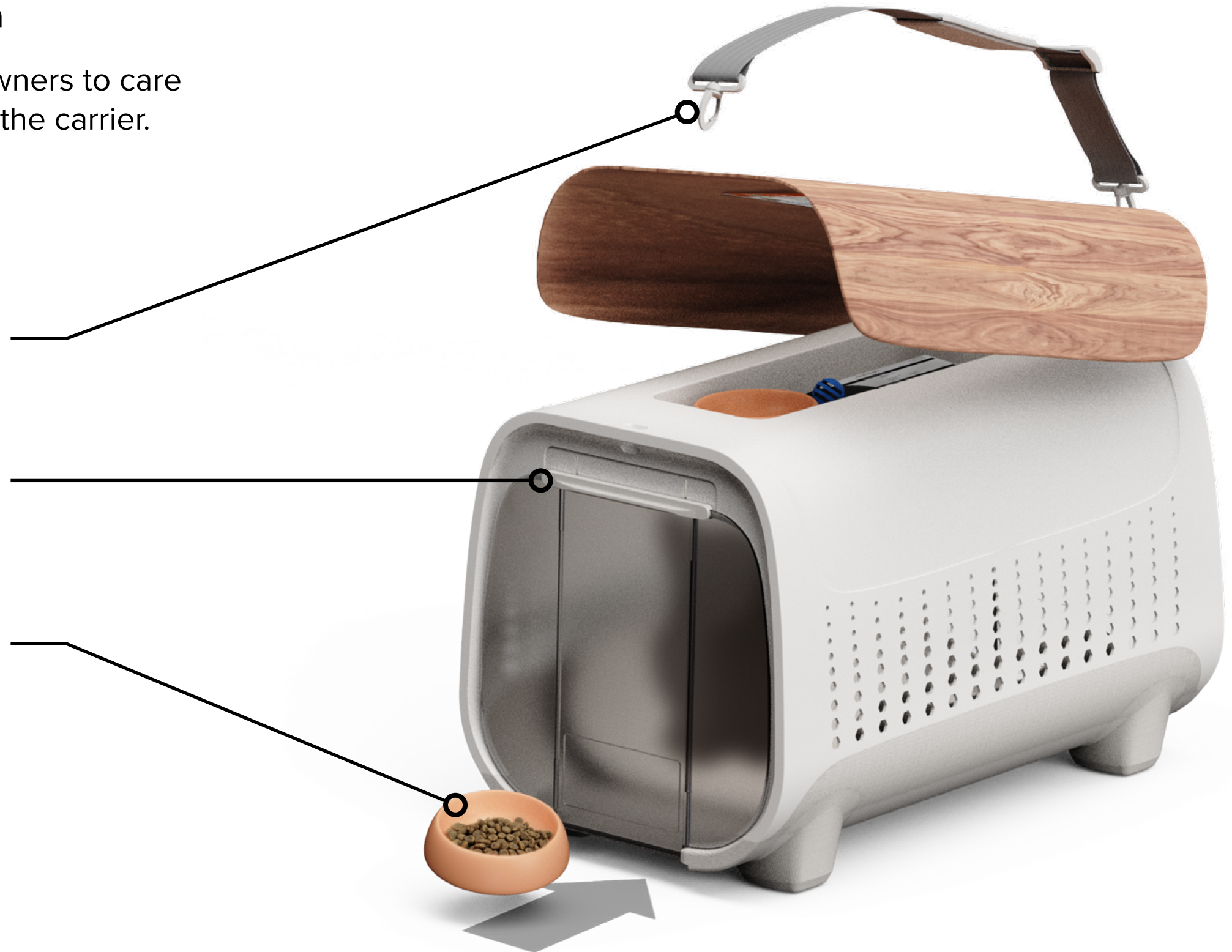
Ready for an Evacuation

Additional features allow for owners to care for their cat while contained in the carrier.

Secure the carrier in the car with the strap

Lock the doors with the push down lock

Access door for food, water, toys, treats, etc.



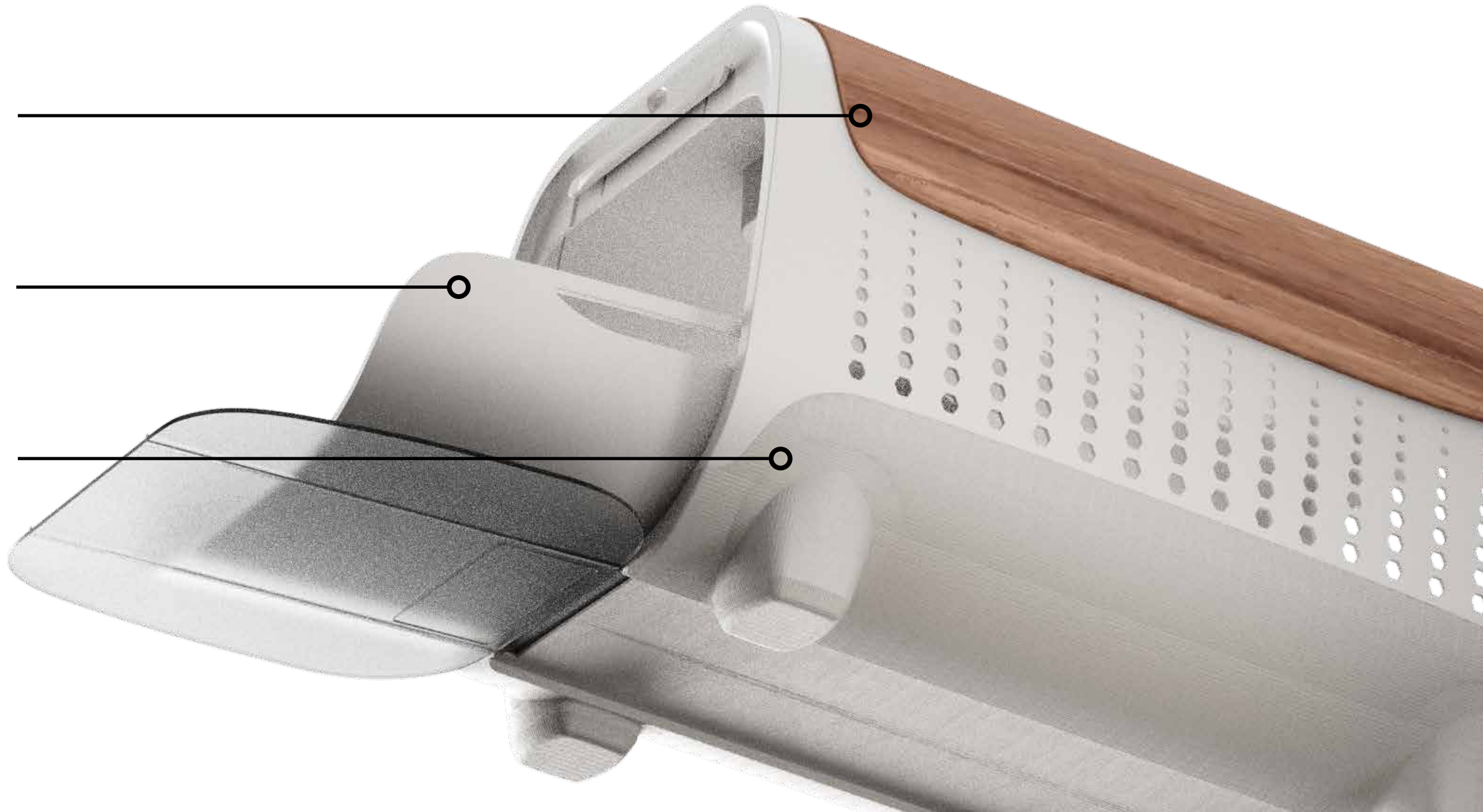
Materials Meant to Last

This hardshell carrier is built to handle rough travel and destructive cats.

**Hydrodipped
plastic lid**

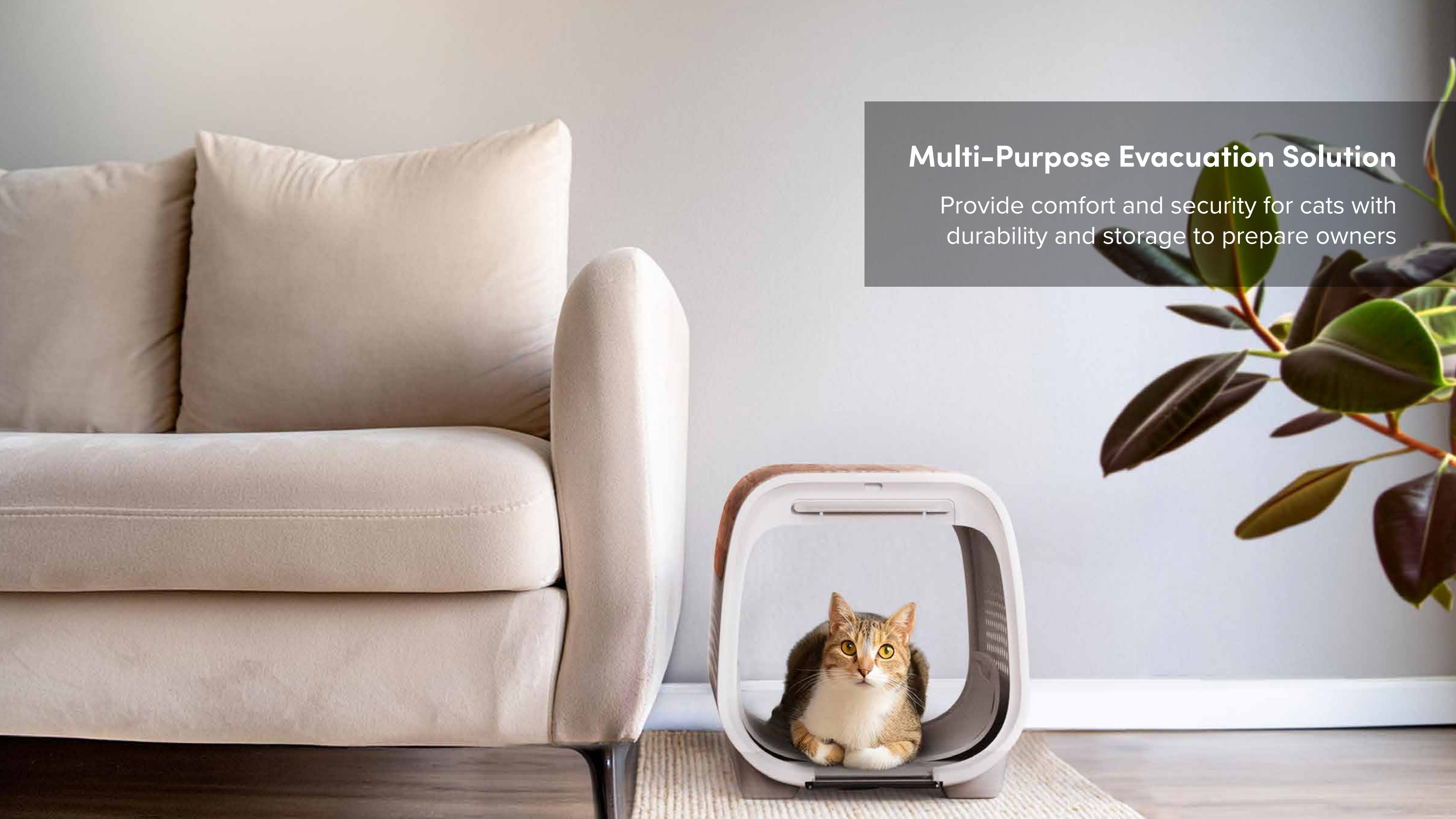
**Easy to clean
plastic bed**

**Durable
rubber base**



Multi-Purpose Evacuation Solution

Provide comfort and security for cats with durability and storage to prepare owners



thank you

Display at the 2024
RIDI Talent Celebration

