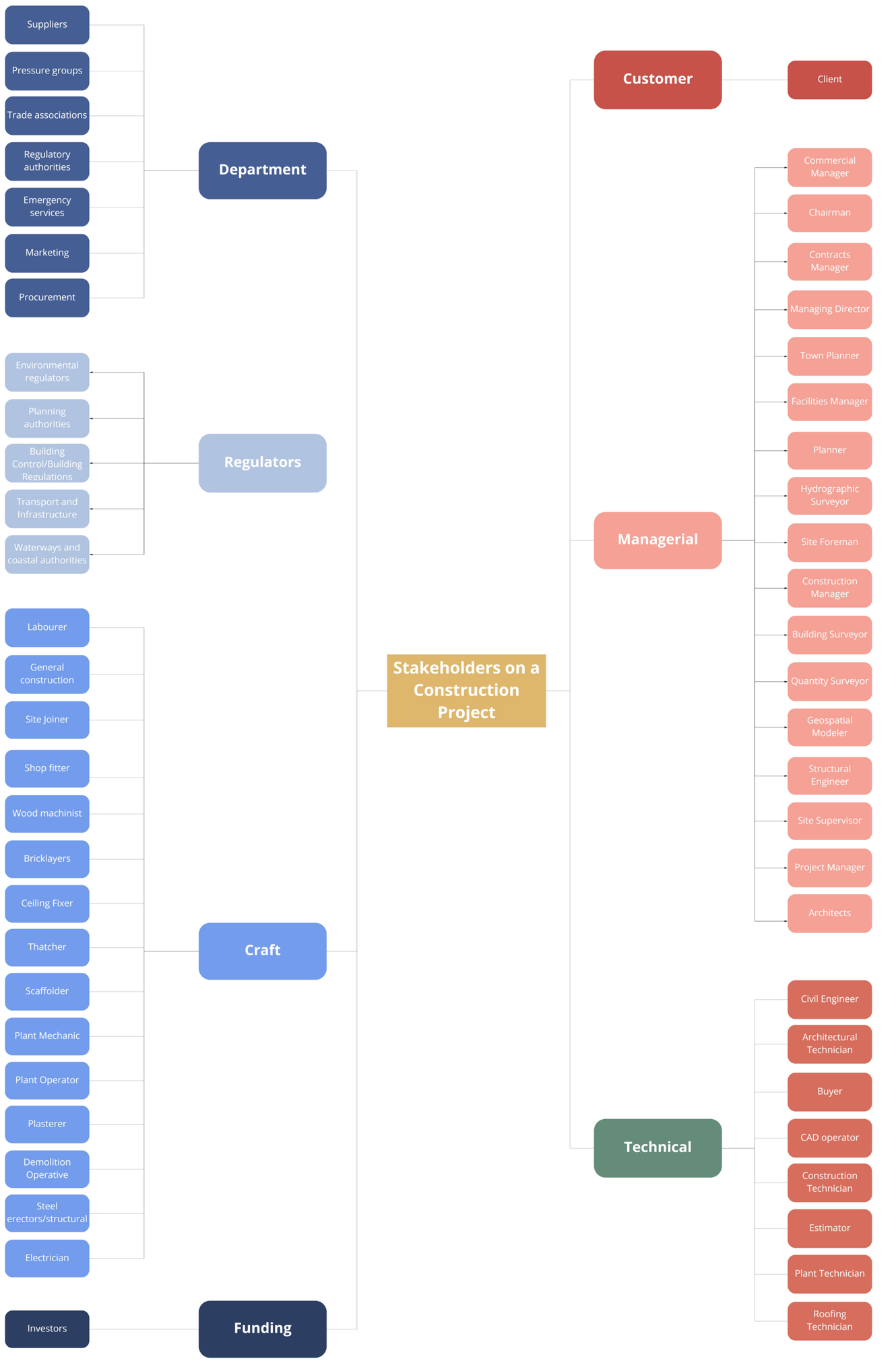
Empathize & Discover

Problem Statement

Construction waste is currently the **most prominent waste stream** globally at around **3 billion tonnes a year**. Additionally, with over 3 billion square yards of landfill with Construction and Demolition waste (CDW), this poses a significant threat to the environment. With increasing modernization and urbanization, we expect this problem only to grow. Thus, we need to **find efficient** and **creative ways** to deal with the Construction and Demolition waste.



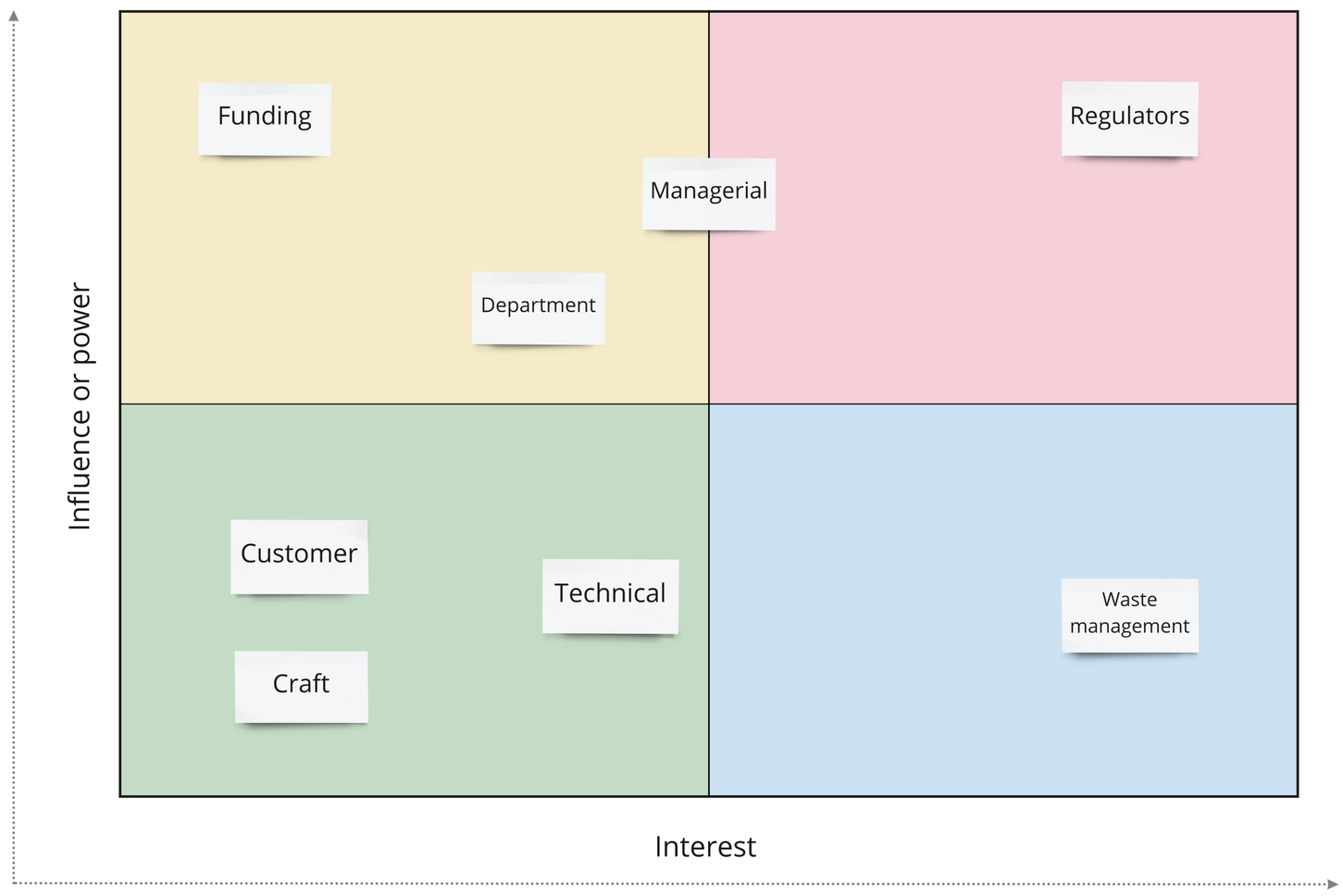
Stakeholders Mapping

Construction waste is generated from the **first** stage of **inception** to the final stage of completion. Based on this, the concept of **sustainability** must be involved in the construction industry early at the **design** stage

Thus, we looked in to all the stakeholder categories at both **internal** and **external** stakeholders within the system. This allowed us to see the **complexity** and the number of people that work together to **ensure** the **completion** of a stakeholder project.

Stakeholder Analysis

Depending on the type of construction project, the stakeholders vary, so if it's a **commercial**, **industrial**, or **residential** building or **engineering** projects like roads, bridges, and utility systems require different skills. We identified the key category of stakeholders and **evaluated** them on a **priority**/ **interest** matrix. By identifying the stakeholders with the highest **influence** and interest to change, we were able to tap into this target **audience** further in the interview process.



Interviewing Stakeholders

To understand what it is like to work on a construction project, how things work, procedures that need to be followed, etc. we spoke to stakeholders within the industry.

We conducted 8 expert interviews from 3 different countries on 3 continents. This allowed us to understand the differences in techniques, regulations, materials, procedures in all these regions and understand other sociocultural factors in play.

1. **Robbie Stewart**
   Choate Construction Company
   Savannah, GA
   Former Superintendent

2. **Kimberly Sannes**
   Public Solutions Group
   Minneapolis, MN
   Director of Operations

3. **PJ O'Brien**
   O'Brien Carpentry Inc
   Mahopac, NY
   Owner

4. **Patrick Moore**
   Rio Chante
   Monteverde, Costa Rica
   General Contractor

5. **Myles McGray**
   Activated Insights
   Chirripó, Costa Rica
   Program Manager

6. **Simon Pendel**
   Pendel Contracting
   Canaán de Rivas, Costa Rica
   Lead Contractor

7. **Sunil Nair**
   BK Gulf
   Dubai, UAE
   Operations Manager

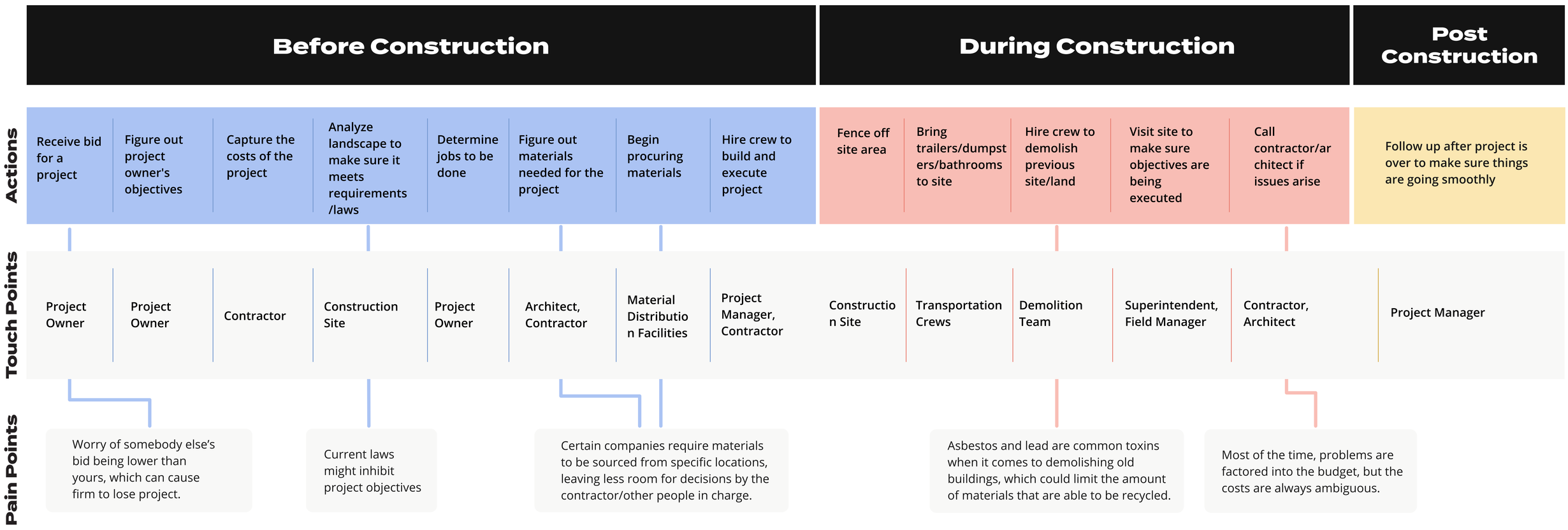
8. **Sungsoo Han**
   Consultant
   Panama city, Panama
   Architect

Journey Maps

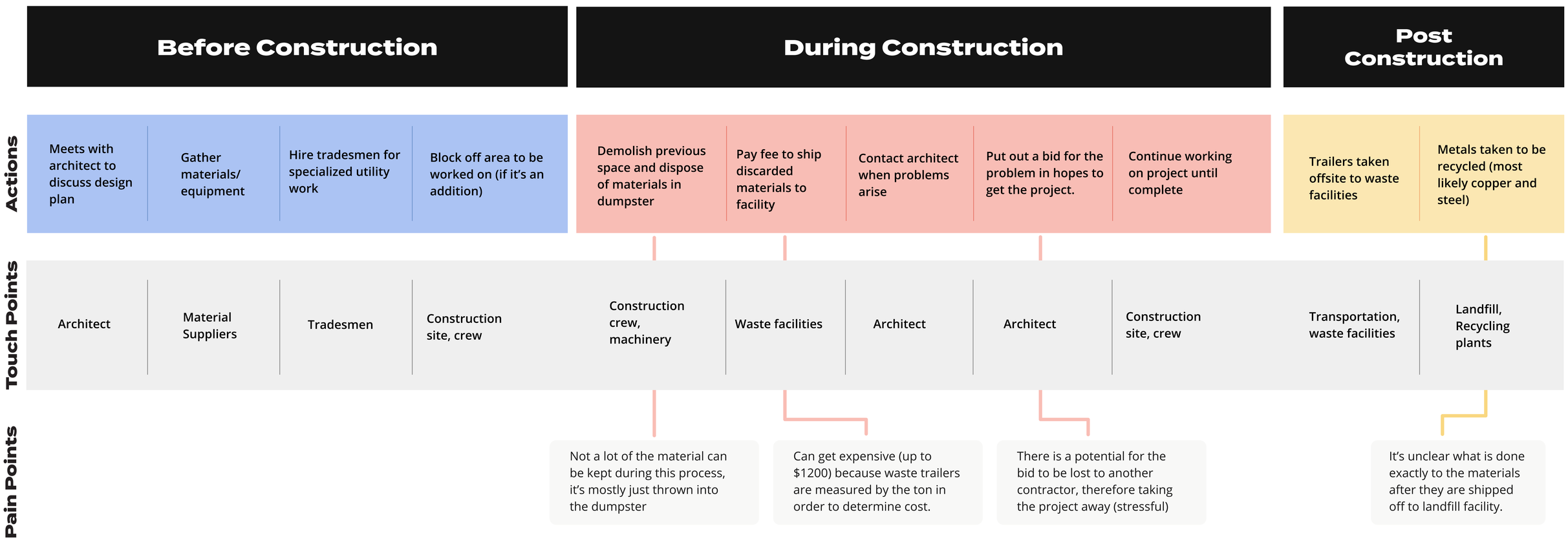
After our one-on-one interviews, we took detailed notes and organized them into a generalized journey of a construction project, start to finish. We've created them from the perspective of a Superintendent, a Contractor, and an Architect. You'll notice that time frames are not given, and that's because we found that projects are widely variable depending on the context of what's being built and how big/small the tasks are.

By identifying key touch points and pain points throughout each journey, we're able to get a better understanding of where gaps might be within the process. Along with this, we can recognize the repetition in what roles seem to be of most value when it comes to major decision-making.

Superintendent



Contractor



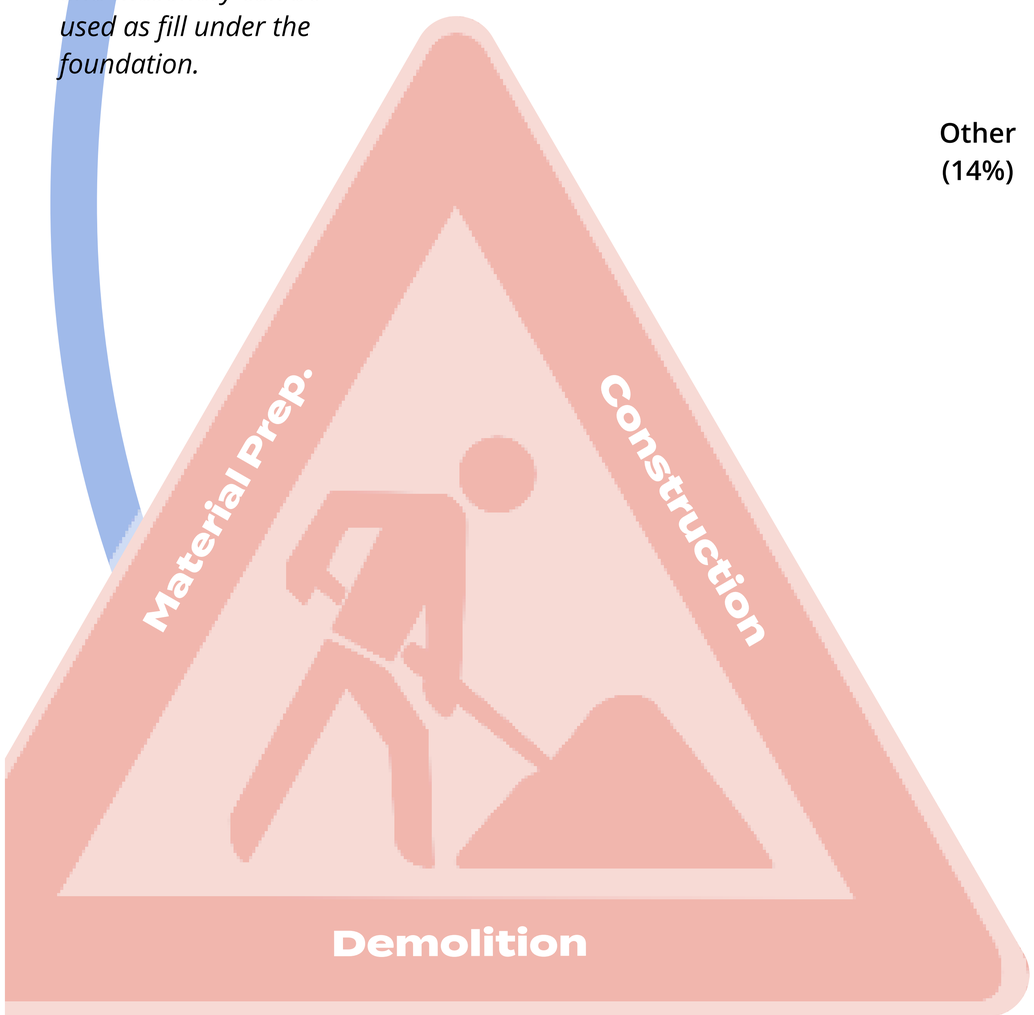
Architect

	Before Construction							During Construction		Post Construction
Actions	Get a Client and receive the project	Conduct a site survey	Create a schematic design	Schematic Design client presentation	Based on feedback, work on Design Development	Design Development client presentation	Work on Construction Document	Get blueprint for construction workers	Supervise the construction building process	Create an as-built drawing
Touch Points	Project client	Community	Technology resources Contractor Superintendent	The Client	Water engineer Electric engineer Plumbing engineer etc.	The Client	Technology resources Contractor Superintendent	Construction workers Field Manager	Construction workers Field Manager Contractor	The Client
Pain points	Trying to design with an intriguing 'concept' but need to still consider realistic boundaries when designing buildings.	If the owner and client's wants are well represented. Sometimes owner changes their mind.	Need to ask all the engineers if there will be any issues. Combine all their blueprints! Check for conflicts and fix everything.				How can we be more economic, save time in the construction phase?	"Construction workers always want to have it easy. They tend to simplify beautiful, complex designs done by architects."		If there are issues or fires in the building, to understand and fix, the as-built drawing is very important.

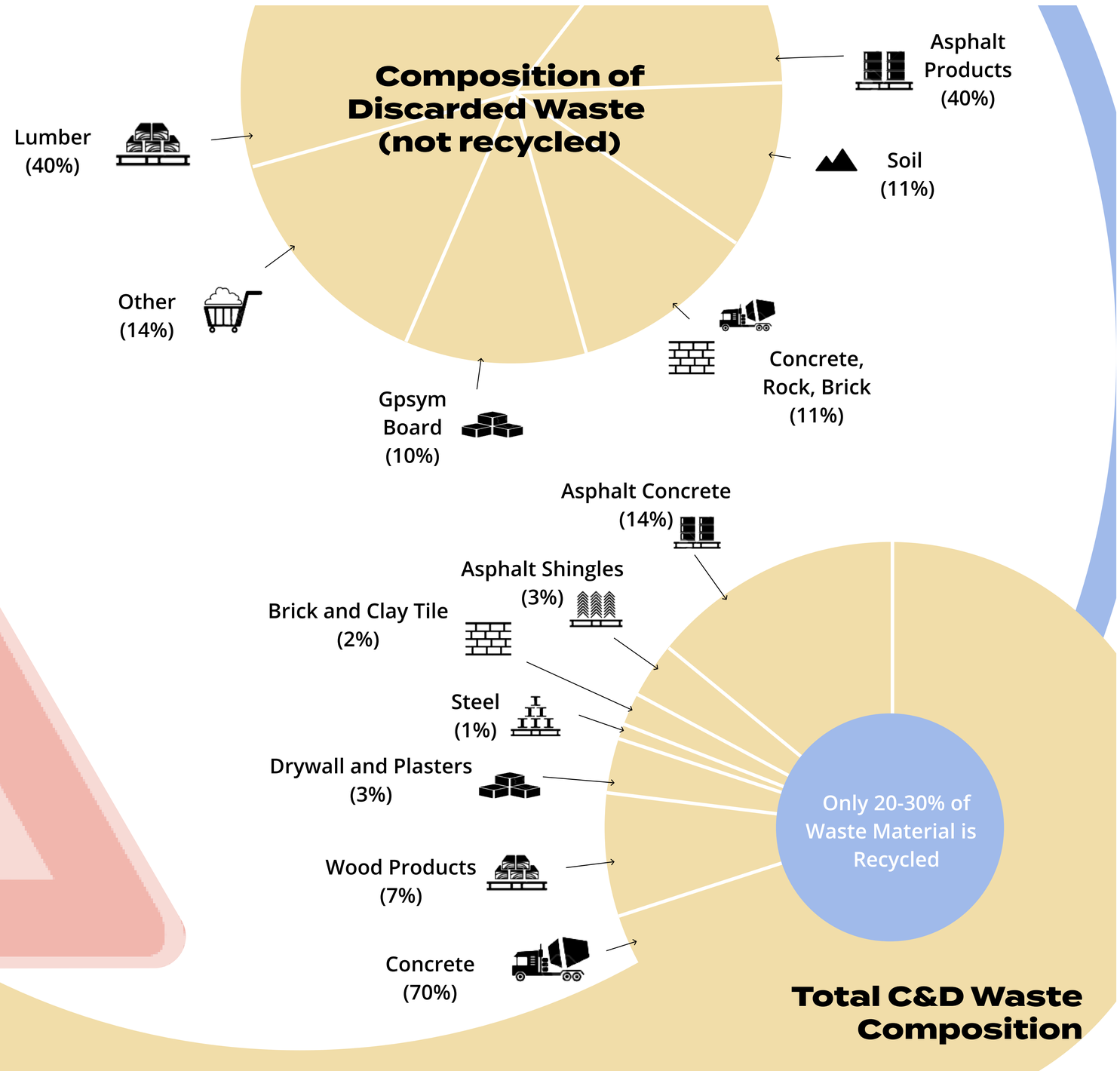
Construction Life Cycle

Small Amount of Recycled Materials Used

For example: old concrete and masonary can be used as fill under the foundation.

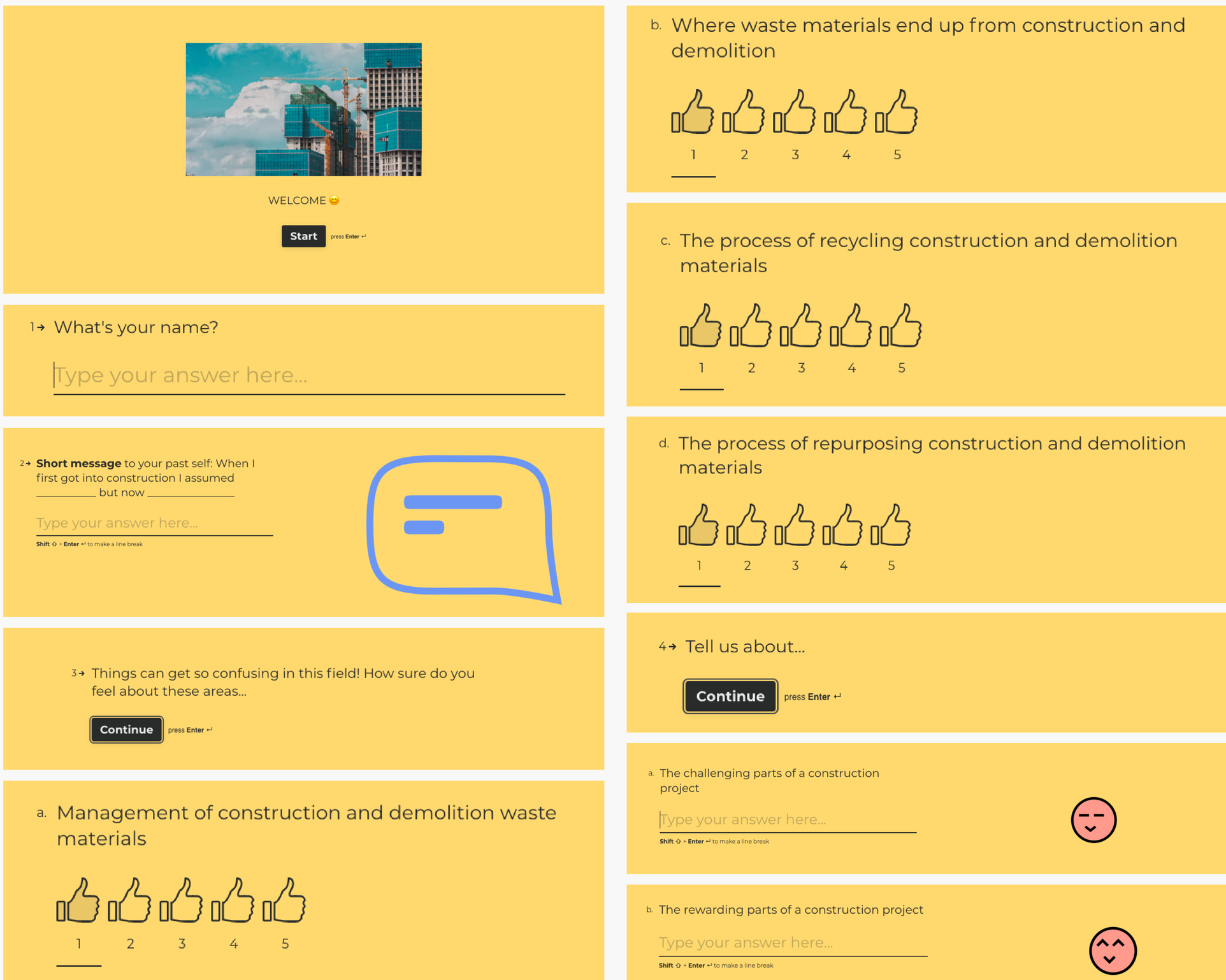


"Demolition is 90% of construction and demolition (C&D) waste in the US."



Cultural Probe Activities

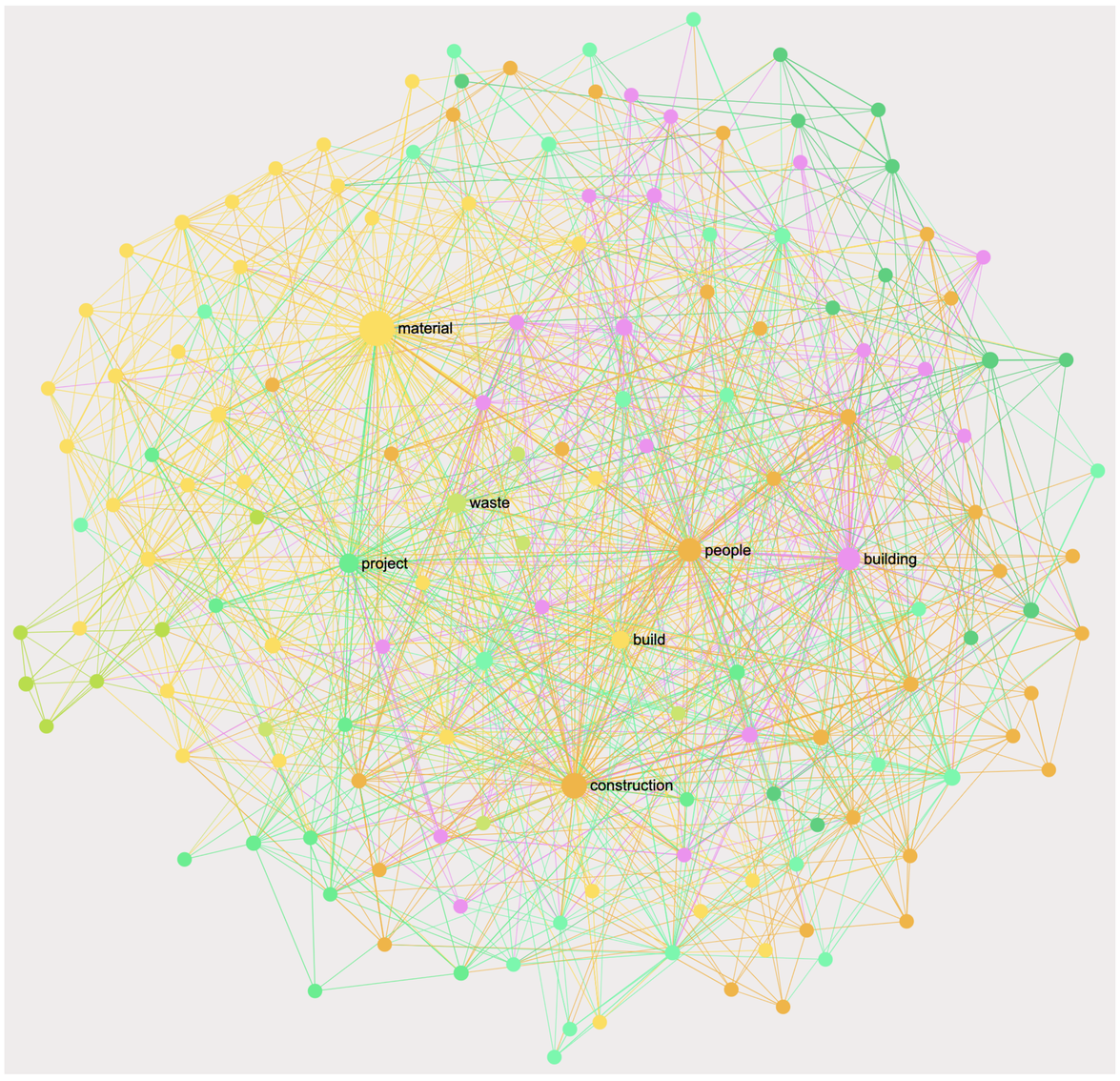
We wanted to capture our stakeholder's emotions and attitudes towards construction and waste within their industry. We used an online survey with strategically designed probes to reach our stakeholders scattered all around the world. We included reflective letter writing and questions that incited an emotional reaction from our stakeholders. Some questions were designed to investigate the extent of the knowledge gaps that seem to exist among professionals in the industry.



We are yet to receive all stakeholder responses so we will use the insights from these probes in the following round.

These probes will help center us towards our goal of creating a human-centered solution to managing construction materials.

Text Network Analysis



As a glimpse of major themes before we move into the frame and define stage, we ran our interview notes and transcripts through a text network analysis. This shows us the most important words and themes based on word frequency and their relation to other keywords.

This objective starting point will refine our intuition and perception going into the next phase as we analyze high-level patterns and find key opportunity areas to pursue.

Next steps

Some methods we will be using to analyze and synthesize our data:

- Affinitization
- POV statements
- Rainbow spreadsheet

We will use these methods to connect the dots between different data points, combining primary and secondary research. These will lead us to some key insights and patterns seen in the data. We will use these to further define our areas of opportunity and some How might we statements to guide ideation in Stage 4.