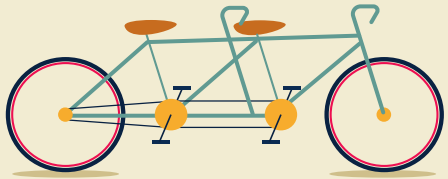
Inclusive Bike

Presented by **ELMECHIO**
Anastasia, Sean, Adriana and Sunwoo

Summary of Key Components from Deliverables



Client Statements & Needs

Customer Statements	Interpreted Needs	Priority
I want to have a fun experience	The bike gives excitement to users	3
I want to be comfortable	The user is not moving excessively in their seats, and experiences little vibration	4
Wheelchair is properly secured and safe	The connection from the bike to the wheelchair is strong	4
	There is adequate connection between the bike and wheelchair to ensure the safety and stability of the biker and wheelchair user	5
I want the inclusive bike to be fast	The inclusive bike enables fast biking speeds	3

Client Statements & Needs

I want to be at the front of the bike	Place the wheelchair in the front of the bike	4
I want to ride beside the river/bike path	Easy to attach/detach the devise	3
	Product will be able to withstand offtrack terrain such as: trails, biking paths, etc.	3
Not being used on sidewalks because they are bumpy	Product prevents “bumpy” feeling	4
Looks cool when I ride the bike and show it off to my friends	Product looks aesthetically pleasing	1
Van will be used to transport the bike/ will be stored in backyard shed	Product is portable, easy to store, and lightweight	2
Want to remain in their own wheelchair	The inclusive bike will not require the wheelchair user to leave their wheelchair	5
Use it to get place (as a mode of transportation)	Product will sustain long periods of usage and long distances	2
The biker should be at their leisure, do not want them doing additional work/intense exercise	Product enables leisurely experience for all participants	3
	Product eliminates difficulties of bike pushing an additional load (the wheelchair)	4
Some nervousness regarding speed, would like the ability to go fast but not always	Product can achieve variable speeds both fast and slow	2

Table 2 Client Needs Statements

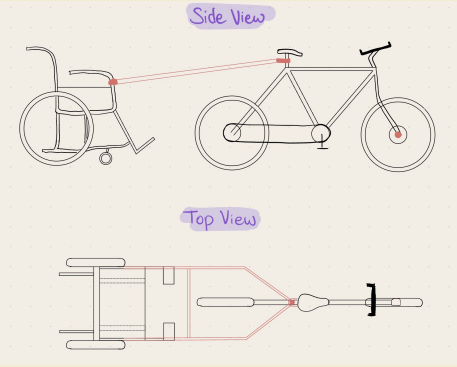
“We must design an attachment to secure a bike and wheelchair together, to allow the user of the wheelchair and biker to experience biking leisurely and safely”

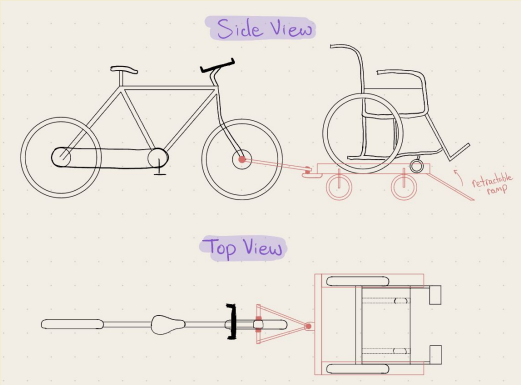
Benchmarks

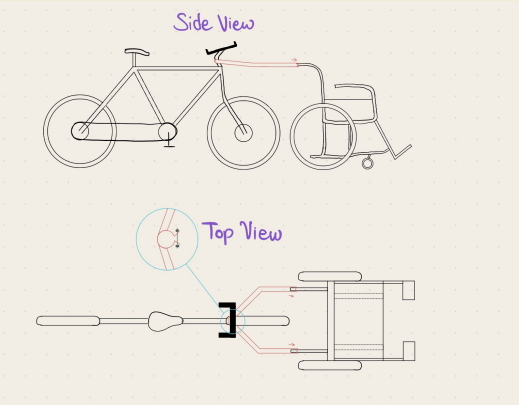
Target Specifications

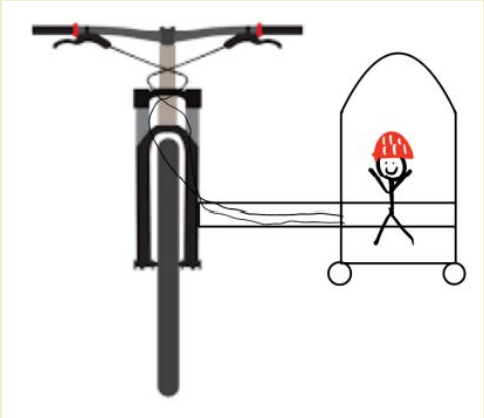
Metric	Marginal Value	Ideal Value	Unit
Size	100-110 X 55-65 X 85-95	105 X 60 X 90	cm
Cost	150-300	150	CAD
Weight	15-20	15	LBS
Lifespan	30+	30+	Years
Speed	0-30	0-20	Km/h
Material	Aluminum Frame, rubber tires	Aluminum frame/ acrylic frame, rubber tires	N/A
Maximum Force	1000-1300	1300	N

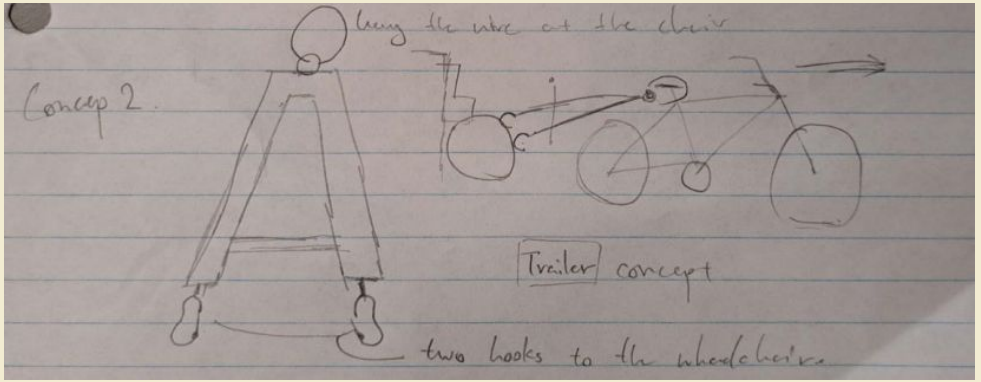
Concepts


Side View
Top View


Side View
retractable ramp
Top View


Side View
Top View

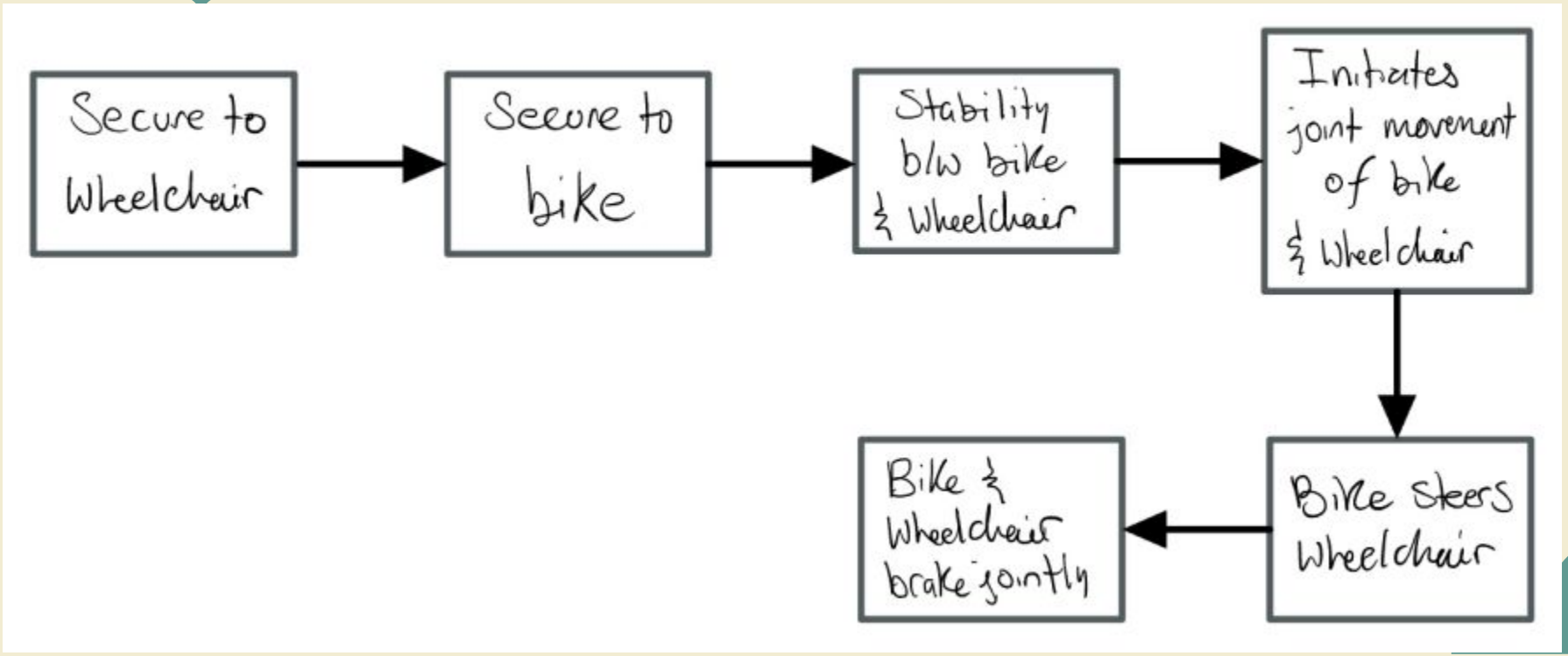



Concept 2.
Trailer concept
two hooks to the wheelchair

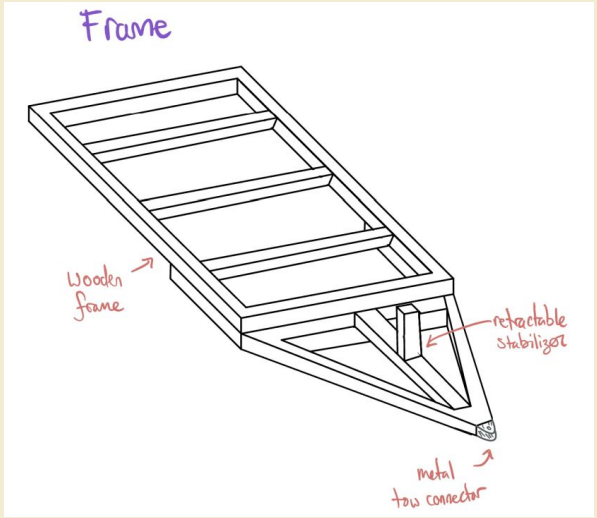
Decision Matrix

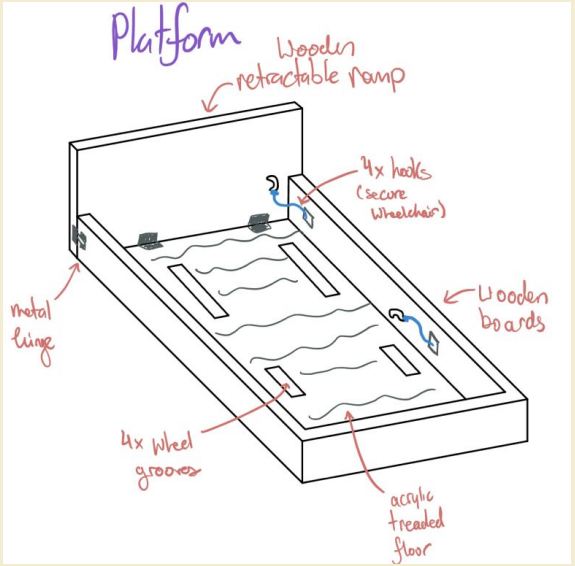
Person	Concept 1	Concept 2	Concept 3
Sean	• Power steering would not work connect into their preexisting wheelchair • Would be too difficult to take off the front tires • Braking issues due to the lack of front tire	• The levitating side piece would not distribute weight evenly	• Power steering would not work connect into their preexisting wheelchair • Would be too difficult to take off the front tires • Braking issues due to the lack of front tire
Anastasia	• The steering would not work but it works better than the other concept due to the struts • The connection going through the wheel helps with steering	• The axis of rotation would not transmit steering well • Cannot push a connection	• Steering may be heavy • May block off the view • Better steering
Adriana	• Most feasible idea in terms of steering and holding the passenger	N/A Subsystem assessed as part of concept A	N/A Subsystem assessed as part of concept A
	• Need to add hinges • Axis of rotation is off with one tire • Complex to create and expensive • Most intricately thought out • Breaking issues due to lack of front tire		
Sunwoo	• Very secure with the screws • Cost effective • Lightweight • Infront of the bike	• Easy to steer • Not where the client wants to be in terms of wheelchair placement	• Easy to design • Good view for client • Use of platform means there is less use of wheelchair tires

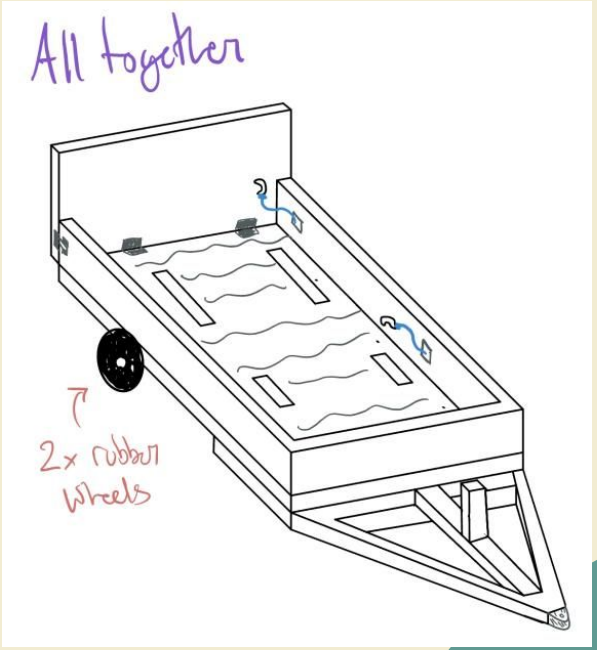
Functional Decomposition



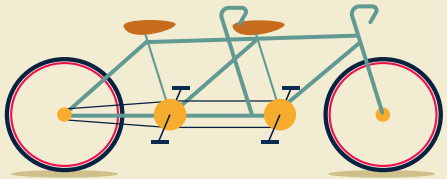
Finalized Detailed Design



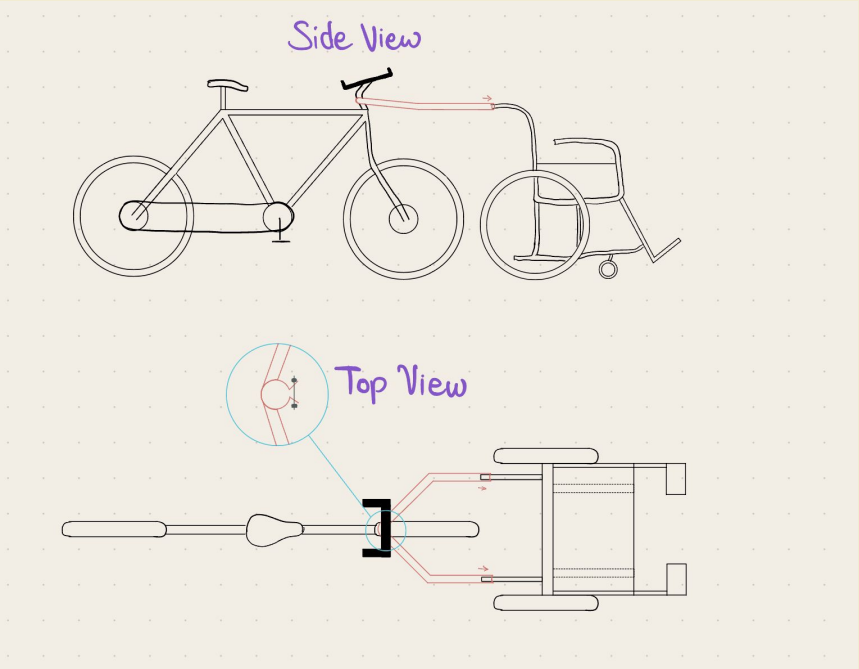


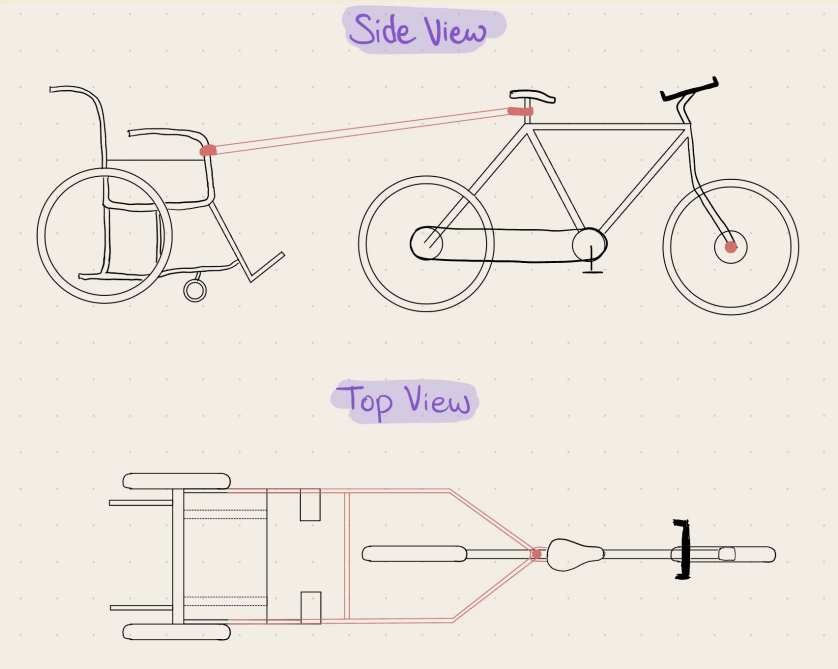


Initial Project Plan
&
Plan Tracking

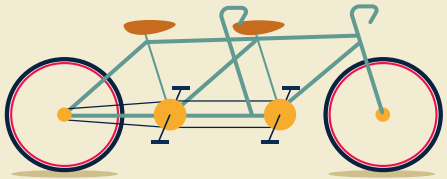


Initial Project Plan

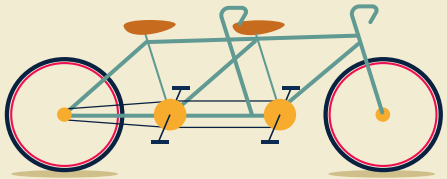




Developed Prototypes

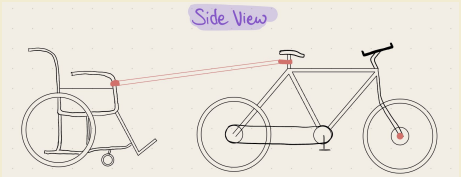


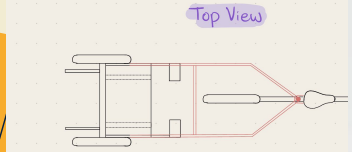
Client Feedback

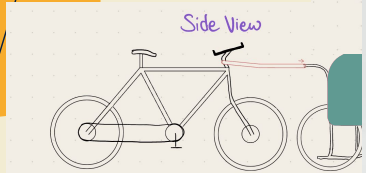


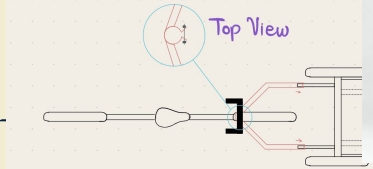
Client Meet 1 Feedback

- Not much experience with similar products
- Emphasized a need for comfort and safety
- They want a leisure experience for both bikers



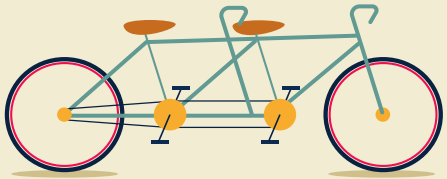






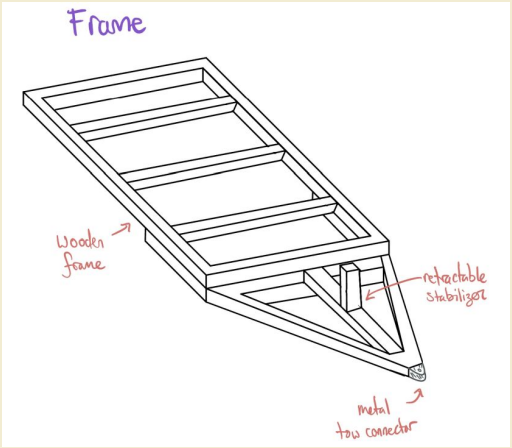
Client Meet 2 Feedback

Future Prototype Development Plans



Prototype A

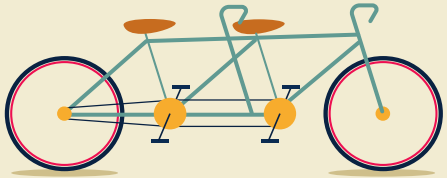
- **Function:** Connecting bike and platform.
- **Material:** Wood
- **Size:** 1:16 ratio
- **Test:** Stress and Loading test



Prototype B

- **Function:** Loading wheelchair and fix up on the platform.
- **Material:** Wood
- **Size:** Full scale
- **Test:** Weight distribution, steering test, securement points

Client 3
Meeting Plan



Client Meet 3 Feedback

- Additional safety features required?
- Anticipated challenges using the ramp
- Storage specifications
- Limitations of the product

Bibliography

Ki Mobility – FOCUSCR. (n.d.). Retrieved October 14, 2022, from https://www.kimobility.com/Product.action?productName=Focus%2BCR

Thank you for listening!

QUESTIONS?