

Finding it hard to:

Make accurate drawing of your design?

Getting a diagram big enough for your team to discuss and play with the positions of parts?

Ensure the driver fits the vehicle?

Getting the design proportions right?

This is an approach that will overcome these issues and creates a 'life size' plan

You could make a scale drawing from this or trace it onto large sheets of paper and make parts from the drawing.

The same technique can be used to design a "Custom Cart"

Driveway Design

... A quick way of customizing a design to fit your rider/driver.



E.g. Customising a Bike

Over 20kph vehicles need good aerodynamics.

It is then important to get a bike rider into a low profile position.

This bike from Mahurangi College is a good example.



Designing around the Driver

- Imagine taking the rider off this bike and having them lie on their side on the driveway / asphalt in the same position.
- Do this for your largest rider.
- Chalk around the driver to leave their 'shadow' on the asphalt.



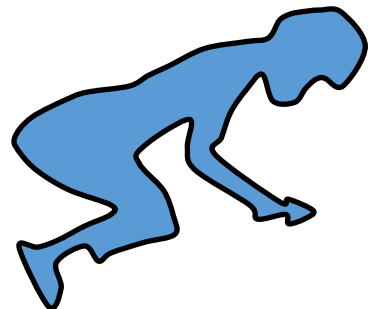
Vision of design



Rider position required for design



'Shadow' of desired rider position



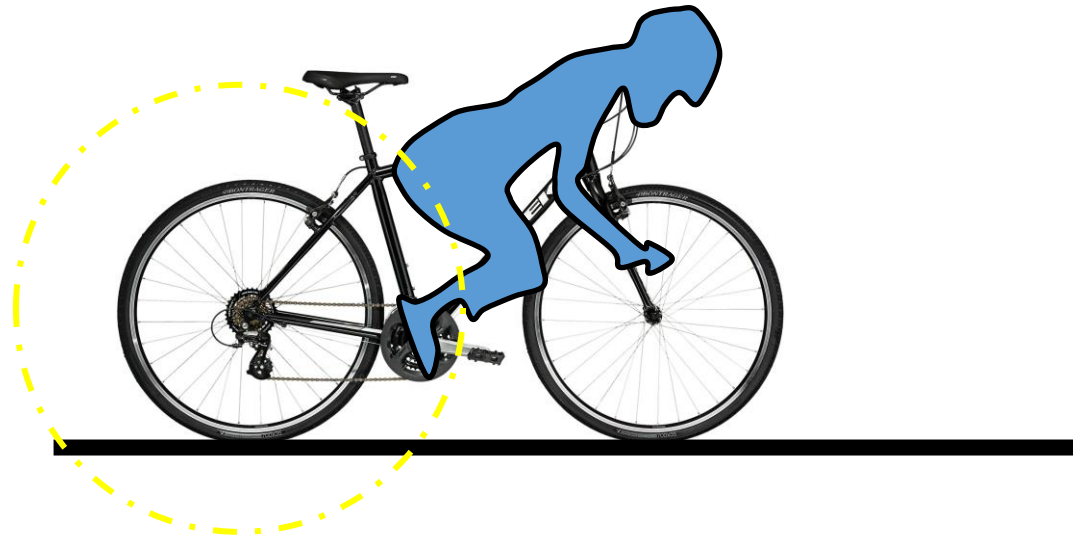
Positioning the Rider

Draw in the asphalt road at an appropriate distance below the driver to create a low riding position.

Care should be taken to allow sufficient road clearance so the driver can lean over going around corners.



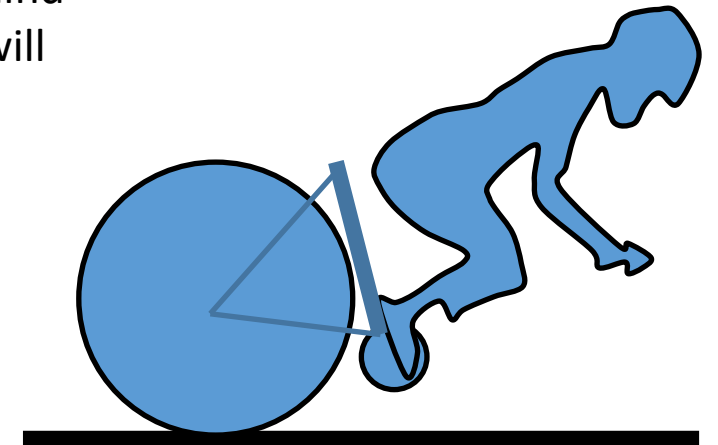
- Take your donor bike and lay the back wheel in position behind the driver.



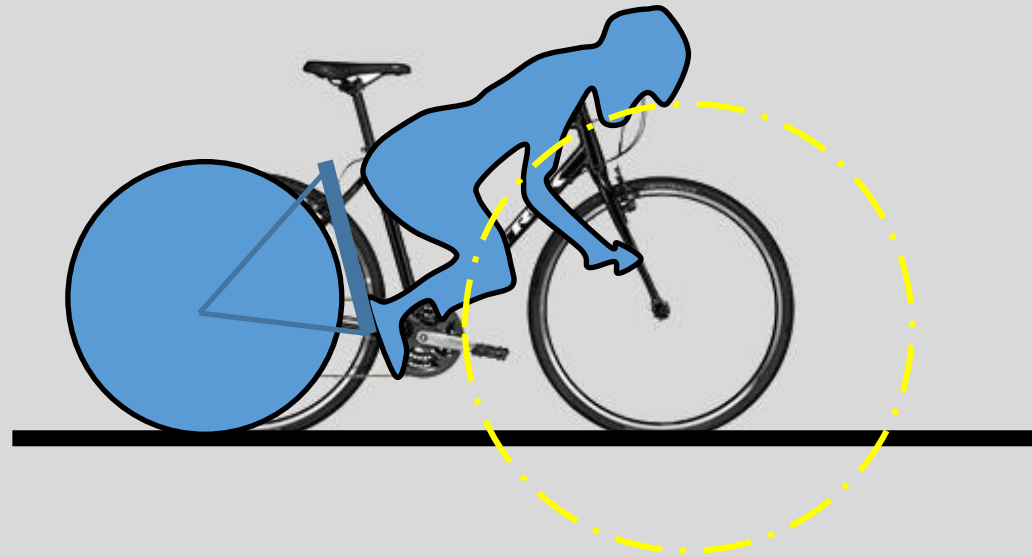
Adding bike parts

.... Back wheel

- Draw around the wheel and frame behind the rider including all gearing as they will be useful select the right drive ratios.

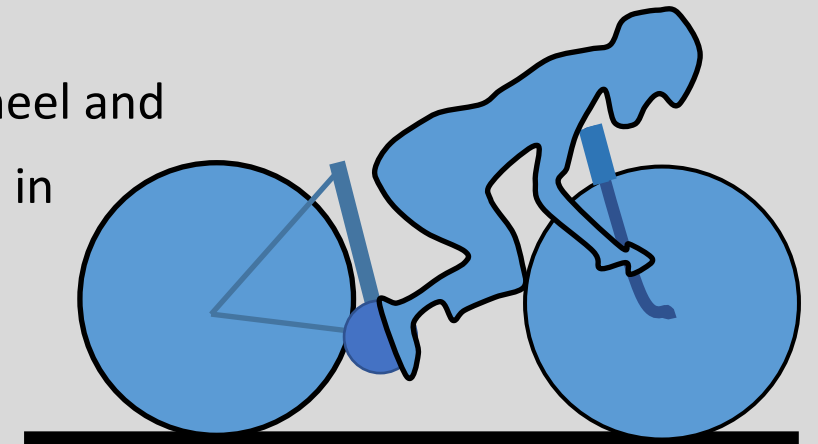


- Now let's move to position the front wheel to best suit the rider.



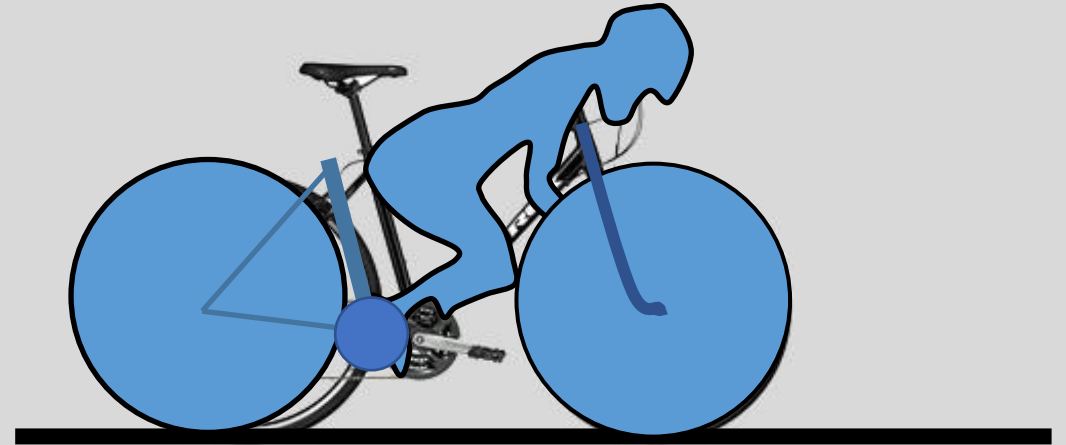
- The bike is now slightly longer than it was but the rider is better positioned to cut through the air efficiently.

- Now chalk around the front wheel and forks to establish their position in this design.

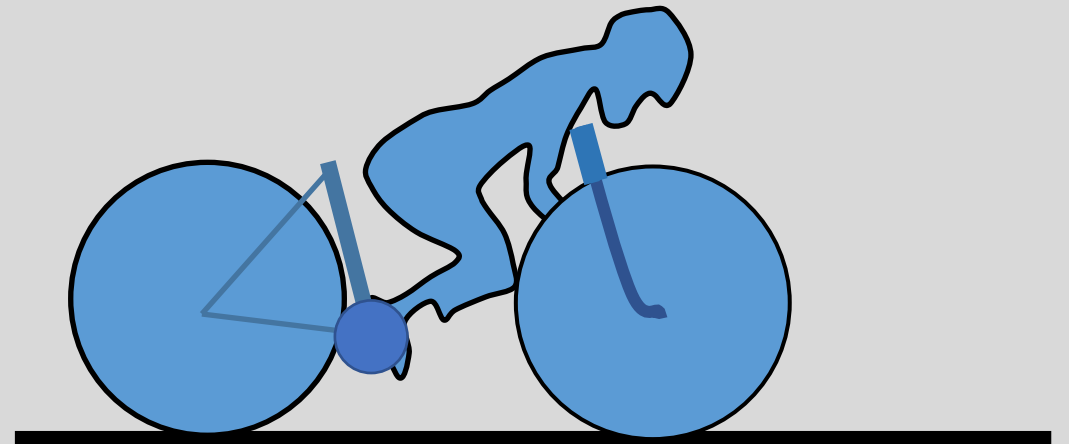


Front Wheel position

- This should be what you now have.

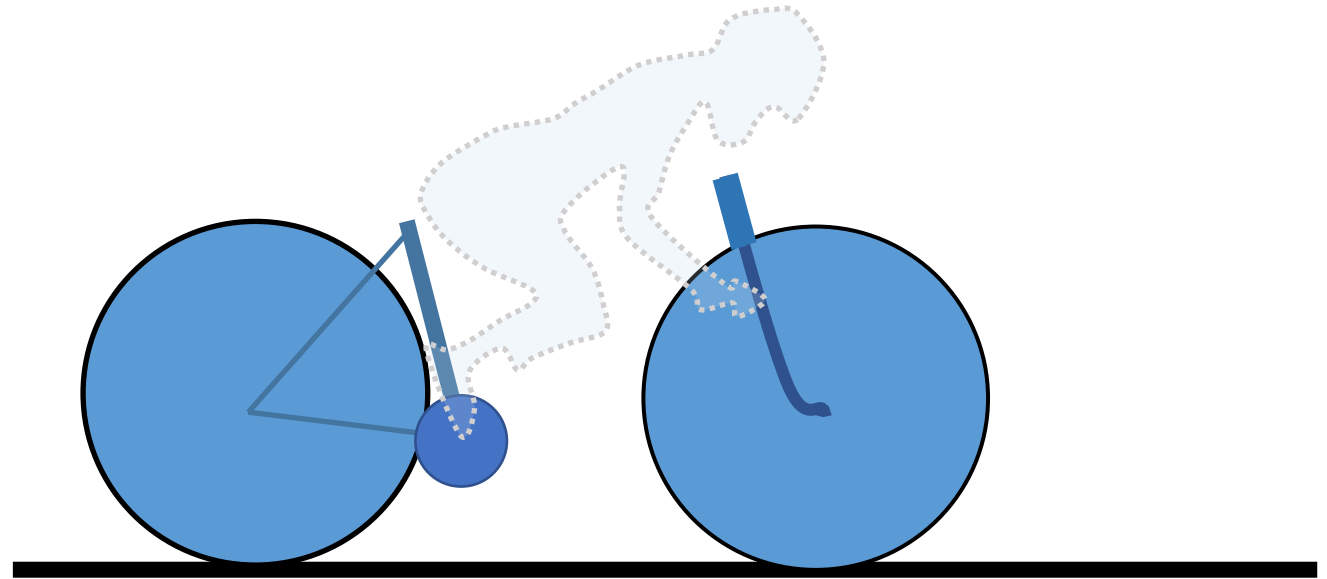


- And if we take the bike away it should look like this



Starting to see
the bike
design

- With the driver in the background we can draw in the frame pieces to connect the back wheel frame with the front forks.

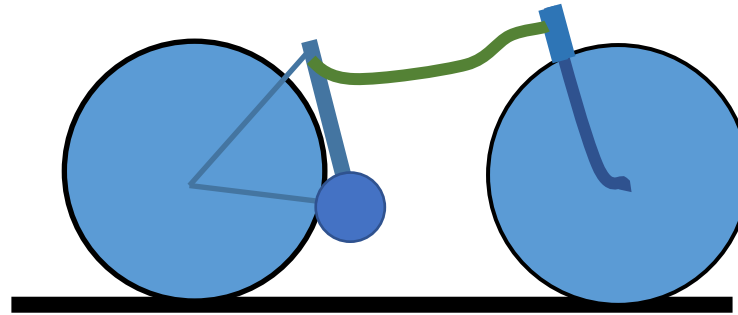


Questions:

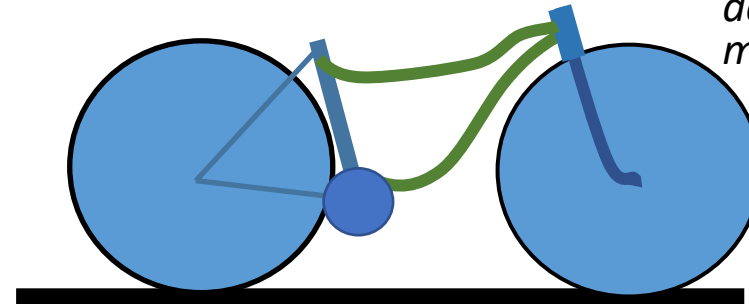
1. Where are the best positions for the batteries and controller?
2. If we keep the bike gears;
Where will we mount the motor?
What will the motor drive onto?

Completing our Frame

- With the driver in the background we can draw in the frame pieces to connect the back wheel frame with the front forks.

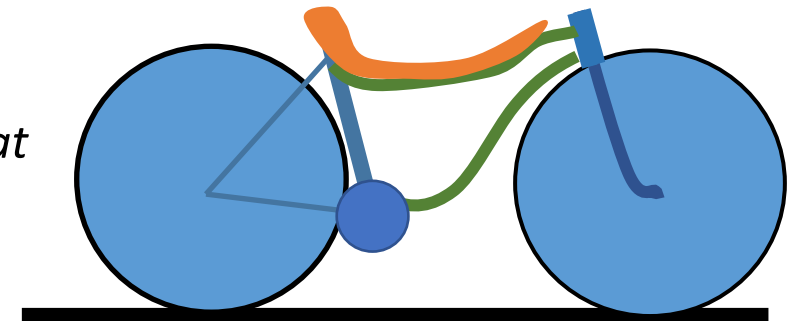


- Draw in a top bar to connect the front forks and back frame



- Draw in a bottom bar bent accommodate batteries, motor and controller etc.

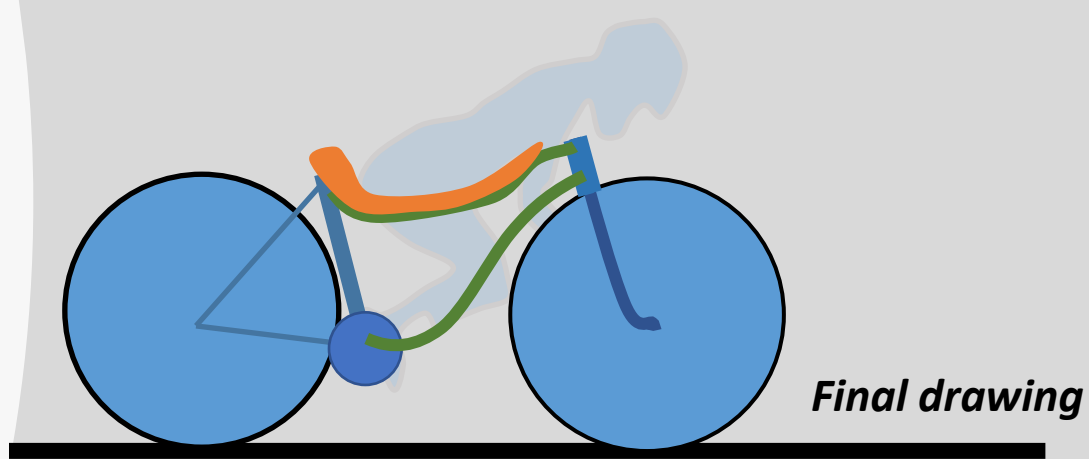
- Sketch in a suitable comfy seat



You now have a bike frame designed to fit your rider!

Completing the Frame

How do we complete our real bike?



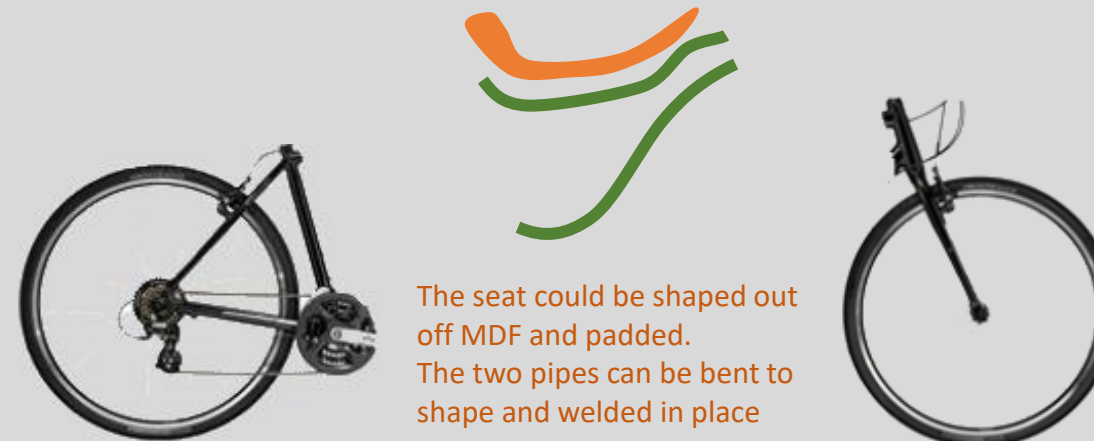
Cut the donor bike appropriately to fit this design.



Only three parts have to be made to complete the frame.

The 3 parts can be shaped & measured off the drawing.

You will need to add foot pegs & handle bars (with brake handles) and throttle.



The seat could be shaped out off MDF and padded.
The two pipes can be bent to shape and welded in place

The frame of our Evo-Bike is designed and ready for;

- The motor to be mounted
- The drive system created,
- The handle bars, brakes and throttle set up
- The battery frames mounted etc

Our Evo-Bike



Any body work you add will further reduce drag and make it look like it will go 20kph faster!