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Wheeled Stretcher Production Drawings



transaid
transport for life




the **vital link** across the
developing world


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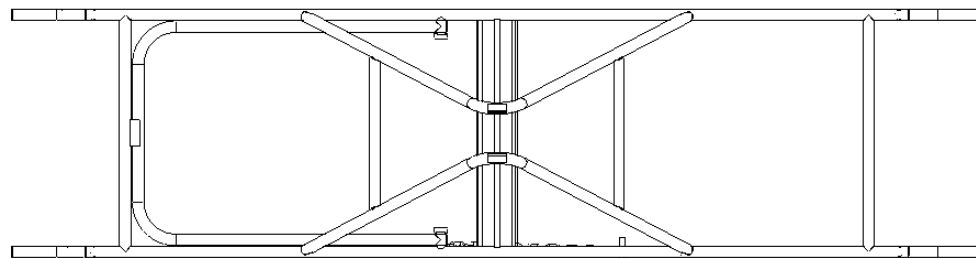
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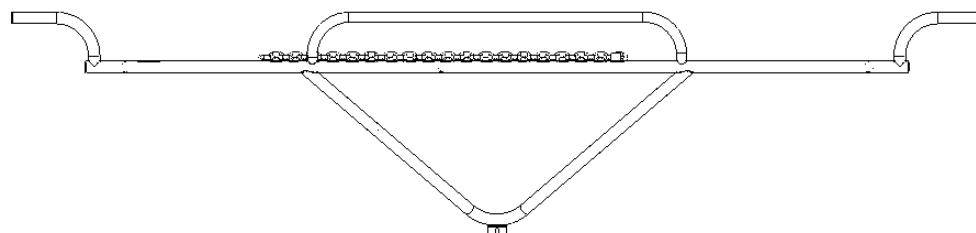
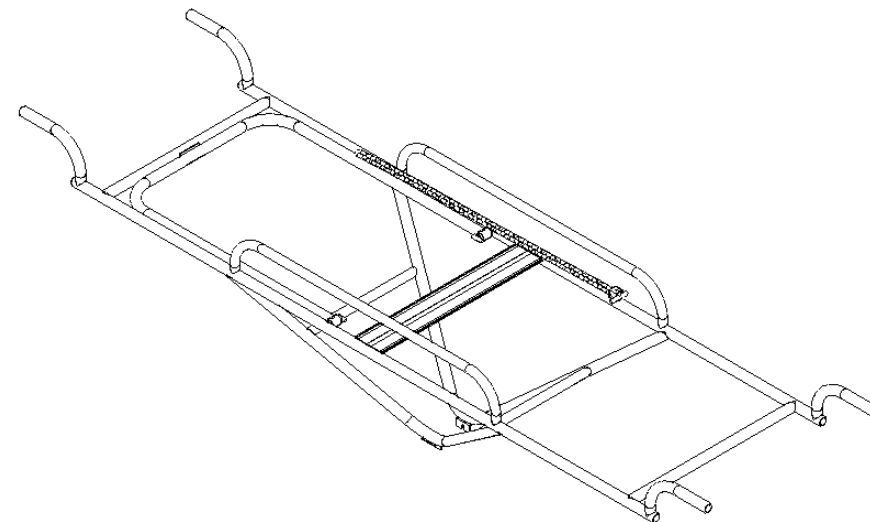
	1	2	3	4	5	6
A	<p>Summary</p> <p>The wheel stretcher was originally developed in Madagascar for rural emergency transport. It is intended for use in all types of terrain from hills to muddy and flooded roads. It should always be operable and have no need for breaks if four individuals are operating it with one driver at the front and one person at each side and the rear.</p> <p>Quality of bicycle wheels</p> <p>The quality of available bicycle tires can vary greatly in developing countries with some brands being of an unacceptably low quality. The manufacturer of the bicycle ambulance should be consulted to choose the best brands of tires, inner-tubes, rims, and hubs to use on the wheeled stretcher. Bicycle wheel components should be available locally to the communities and organizations receiving the wheeled stretcher so that they can replace the parts when needed.</p> <p>Stretcher Tarpaulin Backing</p> <p>The stretcher tarpaulin should be made from a strong, UV-stable material and be washable. A truck tarps should be sufficiently strong. Grommets should be put into the tarp so that a rope can be threaded through them and should have an equal number on each side. Strong tarpaulin and grommets need to be locally available within a reasonable distance from the communities and organizations receiving the wheeled stretcher so that they can make a replacement. If the old tarpaulin backing is brought to a tailor or seamstress as an example they should be able to reproduce it. Though not used by the authors of this document, the Bicycle Empowerment Network-Namibia bicycle ambulance’s tarpaulin backing used a 4mm rod sown into the seams instead of a grommet. Please contact michael@bennamibia.org for more information on this.</p> <p>Use of fixture</p> <p>It is recommended that the wheeled stretcher is built with the welding fixture included in this document since it is easier to align pieces and the fixture serves as a quality assurance method.</p> <p>Tube bender</p> <p>The design in this document was originally built and designed at a workshop with a Hossfeld tube bender. If the manufacturer producing the wheeled stretcher does not have an easy and reproducible way to bend tubes then it is highly recommended that they should acquire a tube bender or redesign the wheel stretcher to not need a tube bender. All bends in the drawings are done with a 10 cm radius tube bender.</p> <p>Additional Information</p> <p>For additional information please visit transaid.org/home/knowledge-centre/ or email bike.ambulance@gmail.com.</p> <p>Acknowledgements</p> <p>The design and development of the wheeled stretcher in Madagascar was made possible by the funding and support of Transaid</p> <p>The design and development of the wheeled stretcher and its manufacturing process in Madagascar involved the collaboration of the following people:</p> <p>Kurt Kornbluth, Jessica Vechakul, Andrianjaka Njaka, Michal Usowicz, and Ana Luisa Silva</p>					A
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TITLE:		Wheeled Stretcher Various Views		
DRAWN BY:		Wajahat Ali		
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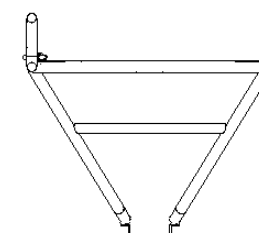
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Bottom View



Side View



Front View

TITLE:

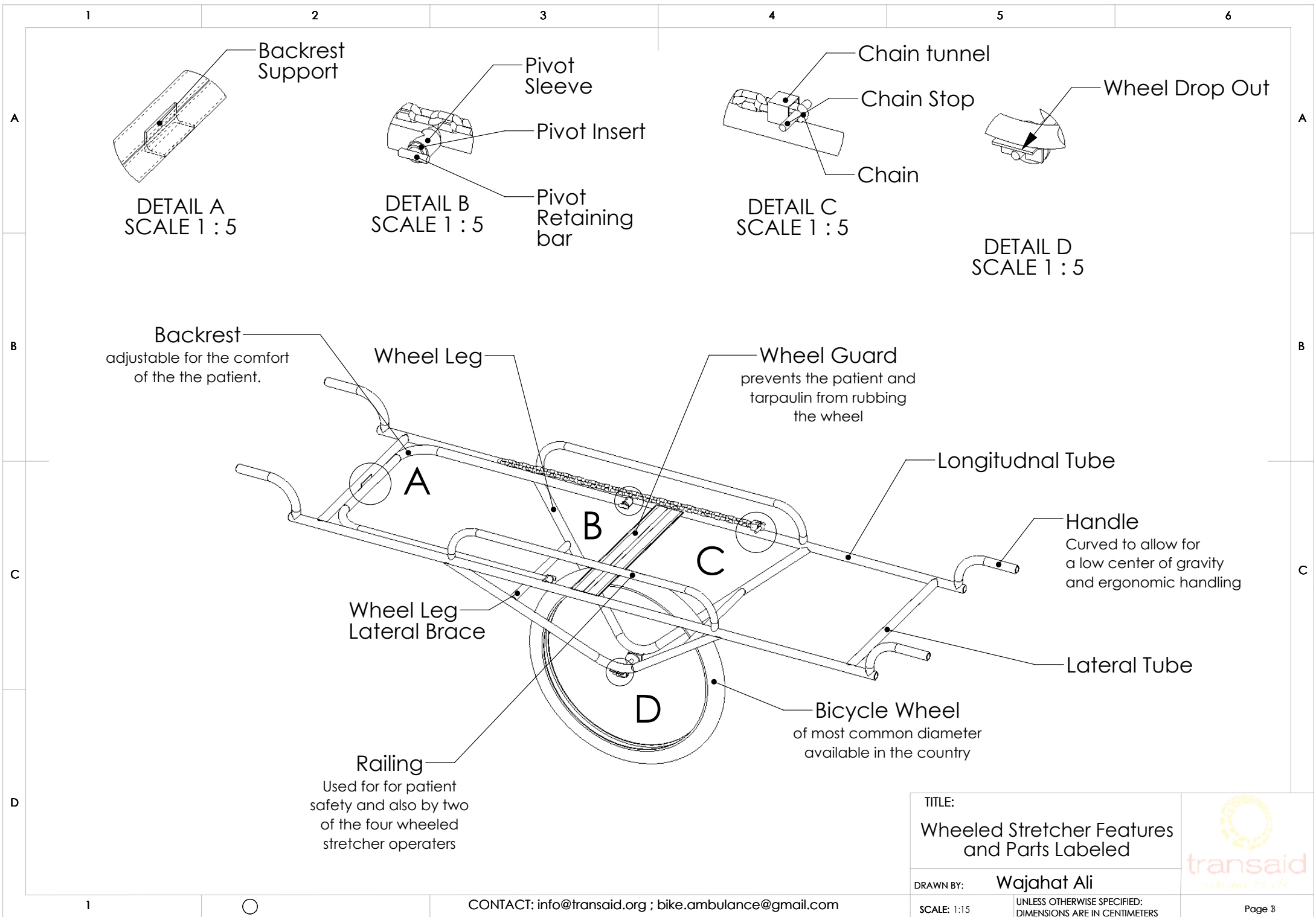
Wheeled Stretcher
Various Views

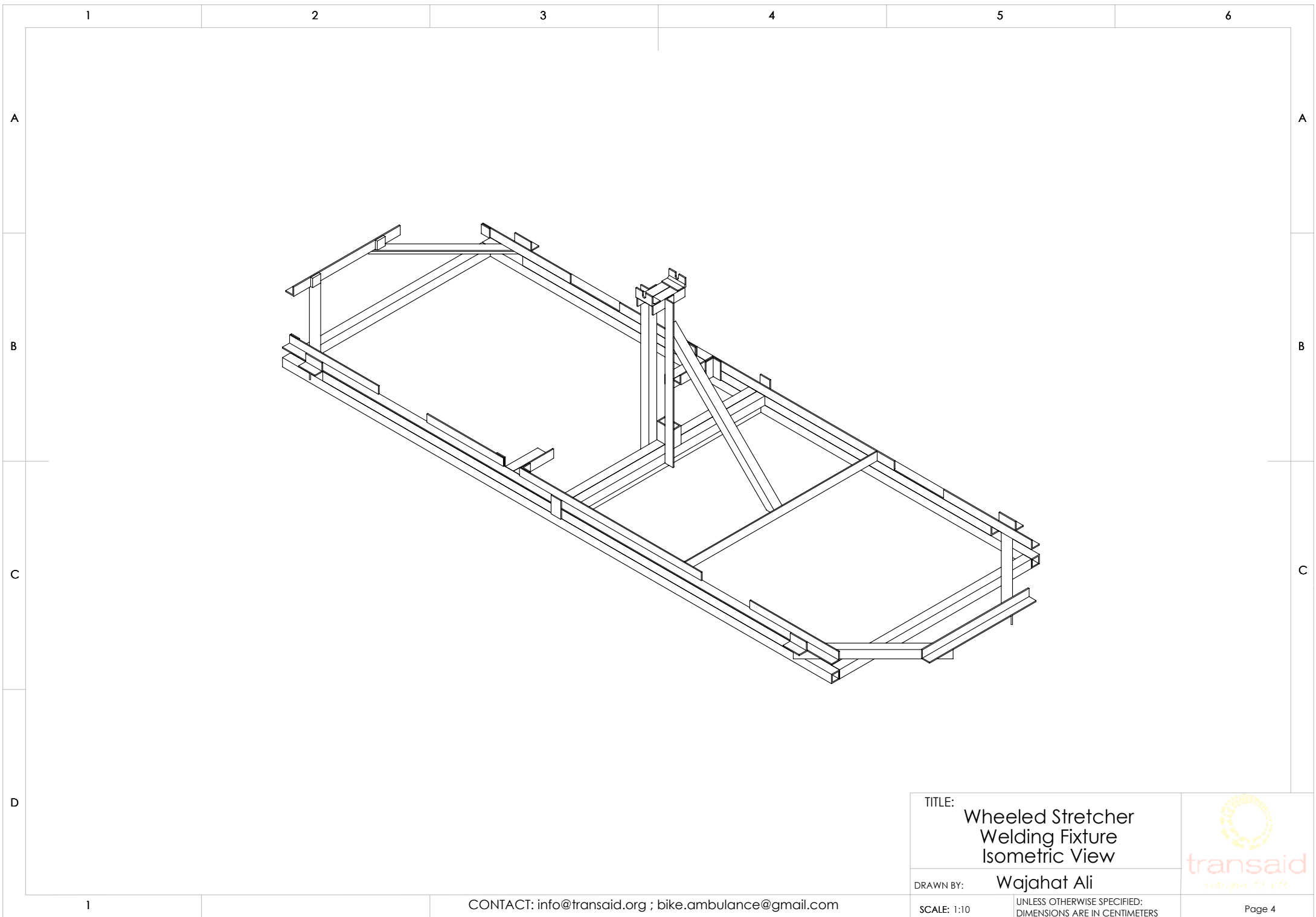
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Wajahat Ali

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TITLE: Wheeled Stretcher
Welding Fixture
Isometric View

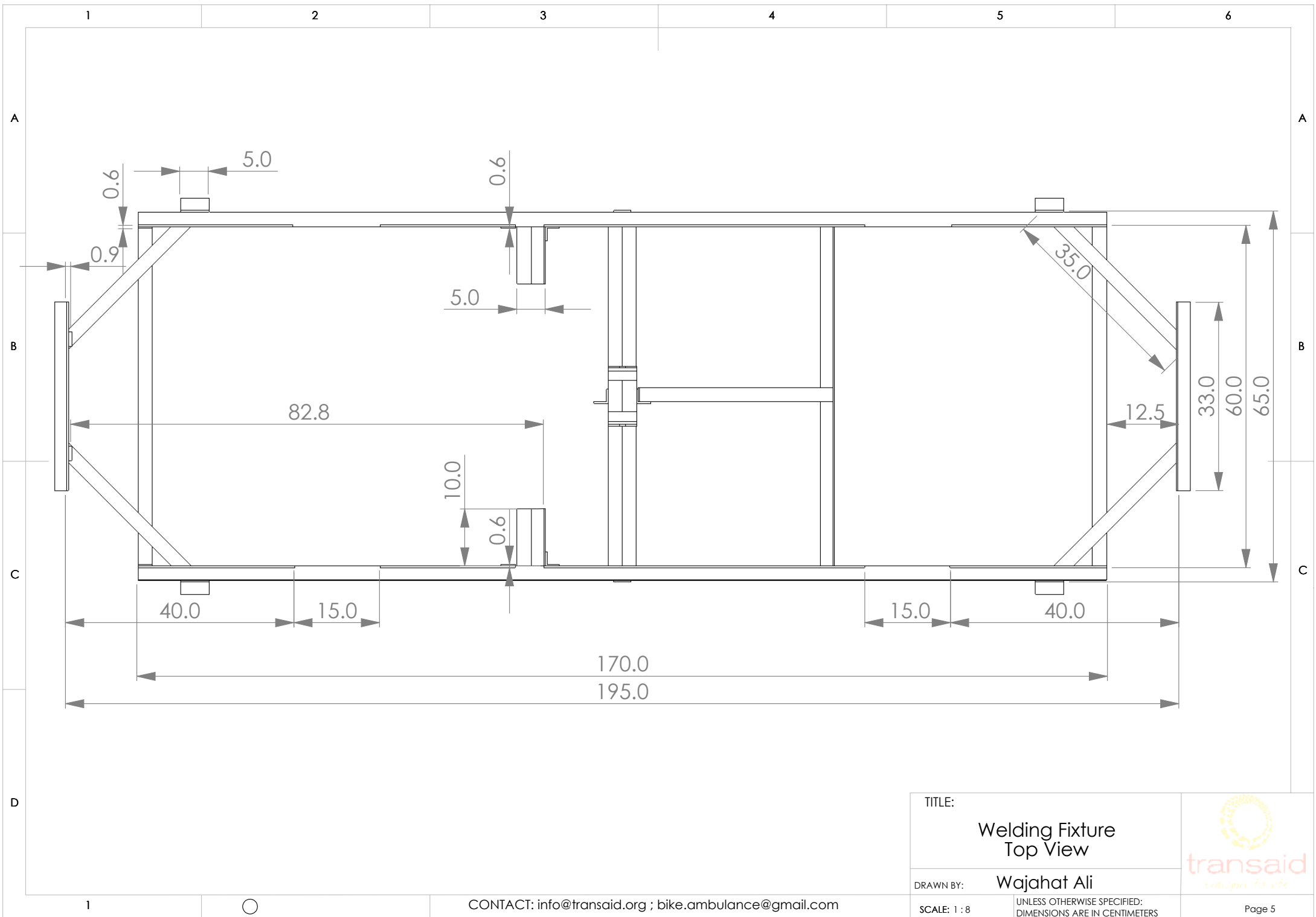
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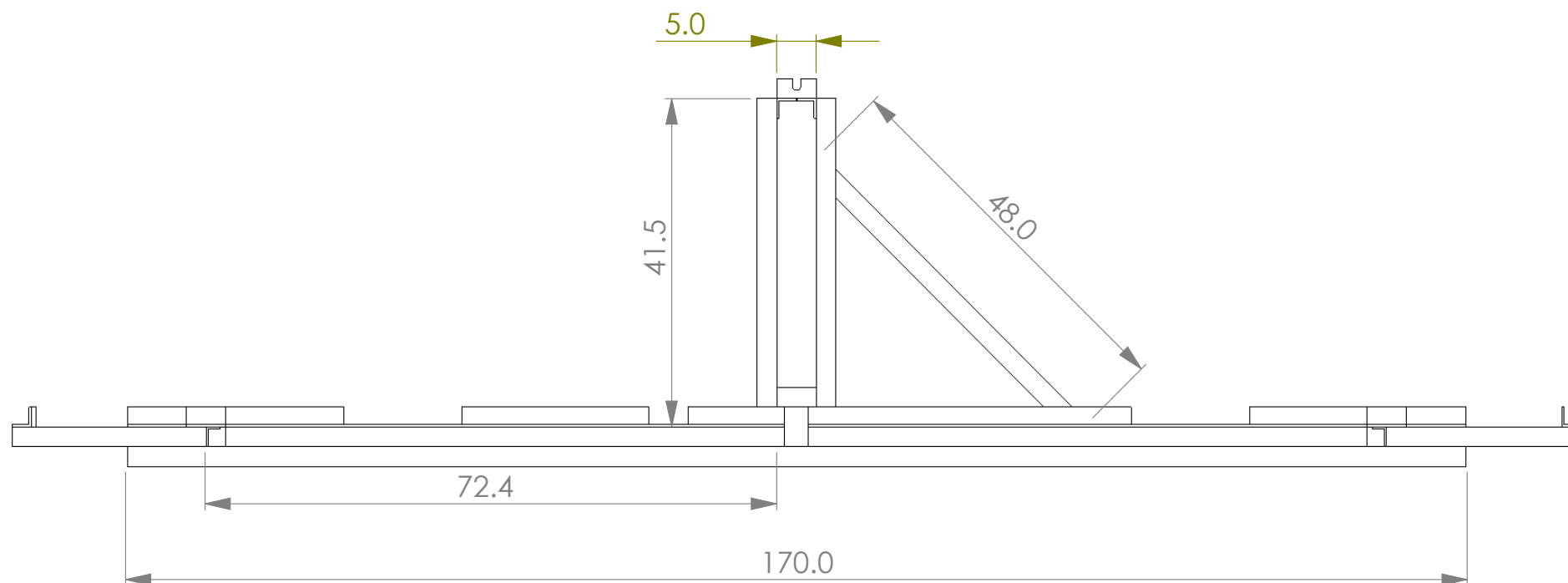
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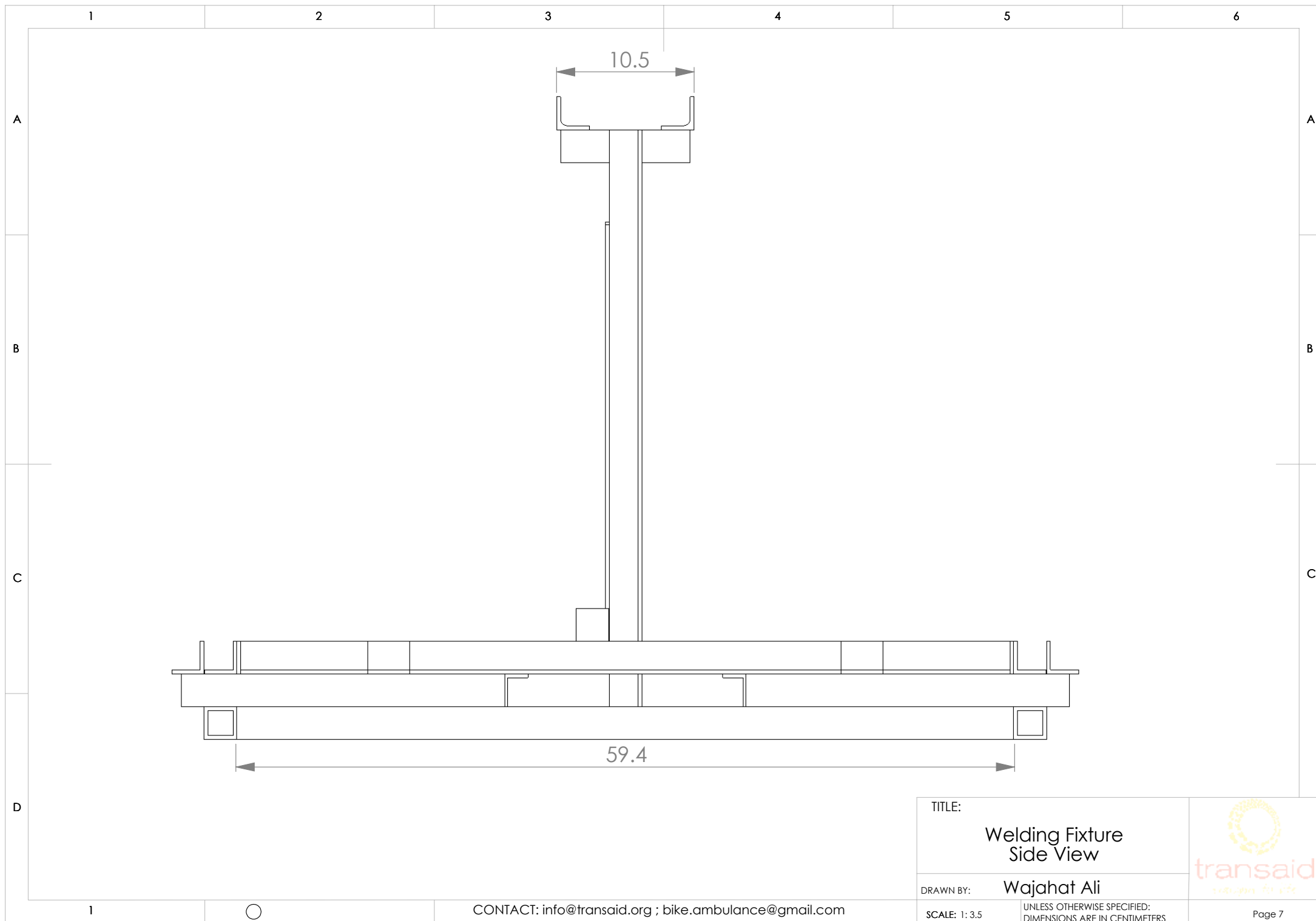
This welding fixture is used to align parts for welding and for quality assurance. It is not recommended that this wheeled stretcher is built without a fixture. When constructing the welding fixture only factory cut edges and sides of the metal should be clamped together and welded for any surface that will have a wheeled stretcher piece fixed to it when the fixture is in use. This practice will ensure that the fixture is plumb and square.




Note: The distance of the fixture at the wheel dropout is 0.5 cm larger than the length of a bicycle wheel hub. The weld tends to pull the dropouts several millimeters closer together after the piece is removed from the welding fixture. The wheel dropouts do not need to be the exact length of a bicycle wheel hub since they can flex several millimeters when a bicycle wheel is put into them. **This dimension may need to change based on the dimensions of locally available bicycle hubs.**

Materials

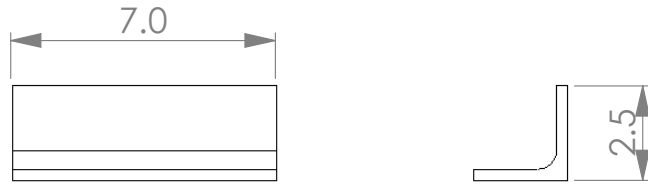
25x25x3 mm angle iron
25 mm square tube
3 mm flat bar

TITLE: Wheeled Stretcher Front View		
DRAWN BY: Wajahat Ali		
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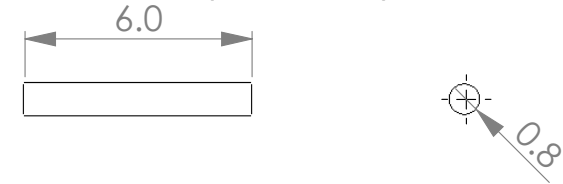


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A	<table border="1"> <thead> <tr> <th>PART NAME</th><th>MATERIAL</th><th>QTY.</th><th>CUT LENGTH</th><th>NOTES</th></tr> </thead> <tbody> <tr> <td>Backrest</td><td>25x1.6 mm round tube</td><td>1</td><td>210 cm*</td><td>Miter for 25mm round tube</td></tr> <tr> <td>Backrest Support</td><td>25x25x3mm angle iron</td><td>1</td><td>7.0 cm</td><td>File edges</td></tr> <tr> <td>Pivot Insert</td><td>21x1.6 mm round tube</td><td>2</td><td>4.5 cm</td><td>Miter for 25 mm round tube</td></tr> <tr> <td>Pivot Sleeve</td><td>25x1.6 mm round tube</td><td>2</td><td>3.0 cm</td><td>File inner and outer edges</td></tr> <tr> <td>Pivot Retaining Bar</td><td>8mm round bar</td><td>2</td><td>3.5 cm</td><td></td></tr> <tr> <td>Chain</td><td>5mm gage steel chain</td><td>1</td><td>95 cm</td><td></td></tr> <tr> <td>Chain Stop</td><td>8mm rod</td><td>1</td><td>6.0 cm</td><td></td></tr> <tr> <td>Chain Tunnel</td><td>25x1.2mm square tube</td><td>1</td><td>2.5 cm</td><td>File inner and outer edges</td></tr> <tr> <td>Longitudinal Stretcher Tube</td><td>25x1.6 mm round tube</td><td>2</td><td>218.0 cm</td><td>Cap ends with scrap sheet metal</td></tr> <tr> <td>Lateral Stretcher Tube</td><td>25x1.6 mm round tube</td><td>2</td><td>62.5 cm</td><td>Miter for 25 mm round tube</td></tr> <tr> <td>Wheel Leg</td><td>25x1.6 mm round tube</td><td>2</td><td>144 cm*</td><td>Miter for 25 mm round tube, angle at 90 degrees</td></tr> <tr> <td>Wheel Legs' Lateral Brace</td><td>21x1.6mm round tube</td><td>2</td><td>40.2 cm</td><td>Cut ends to fit between wheel legs</td></tr> <tr> <td>Wheel Dropout</td><td>25x25x3mm angle iron</td><td>2</td><td>5.0 cm</td><td>Perform quality control check with bicycle wheel hub after completion</td></tr> <tr> <td>Handle</td><td>25x1.6 mm round tube</td><td>4</td><td>32 cm*</td><td>Miter for 25 mm round tube, File all exposed edges at end of pipe</td></tr> <tr> <td>Railing</td><td>21x1.6 mm round tube</td><td>2</td><td>128 cm*</td><td>Miter for 25 mm round tube</td></tr> <tr> <td>Wheel Guard Sheet Metal</td><td>0.8 mm sheet metal</td><td>1</td><td>12 cm x 60.4 cm</td><td></td></tr> <tr> <td>Wheel Guard Tube</td><td>16x__mm square tube</td><td>1</td><td>60.4 cm</td><td></td></tr> </tbody> </table>	PART NAME	MATERIAL	QTY.	CUT LENGTH	NOTES	Backrest	25x1.6 mm round tube	1	210 cm*	Miter for 25mm round tube	Backrest Support	25x25x3mm angle iron	1	7.0 cm	File edges	Pivot Insert	21x1.6 mm round tube	2	4.5 cm	Miter for 25 mm round tube	Pivot Sleeve	25x1.6 mm round tube	2	3.0 cm	File inner and outer edges	Pivot Retaining Bar	8mm round bar	2	3.5 cm		Chain	5mm gage steel chain	1	95 cm		Chain Stop	8mm rod	1	6.0 cm		Chain Tunnel	25x1.2mm square tube	1	2.5 cm	File inner and outer edges	Longitudinal Stretcher Tube	25x1.6 mm round tube	2	218.0 cm	Cap ends with scrap sheet metal	Lateral Stretcher Tube	25x1.6 mm round tube	2	62.5 cm	Miter for 25 mm round tube	Wheel Leg	25x1.6 mm round tube	2	144 cm*	Miter for 25 mm round tube, angle at 90 degrees	Wheel Legs' Lateral Brace	21x1.6mm round tube	2	40.2 cm	Cut ends to fit between wheel legs	Wheel Dropout	25x25x3mm angle iron	2	5.0 cm	Perform quality control check with bicycle wheel hub after completion	Handle	25x1.6 mm round tube	4	32 cm*	Miter for 25 mm round tube, File all exposed edges at end of pipe	Railing	21x1.6 mm round tube	2	128 cm*	Miter for 25 mm round tube	Wheel Guard Sheet Metal	0.8 mm sheet metal	1	12 cm x 60.4 cm		Wheel Guard Tube	16x__mm square tube	1	60.4 cm		A
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D	<p>*Cut to dimensions on shop drawings after bending</p>	D																																																																																										
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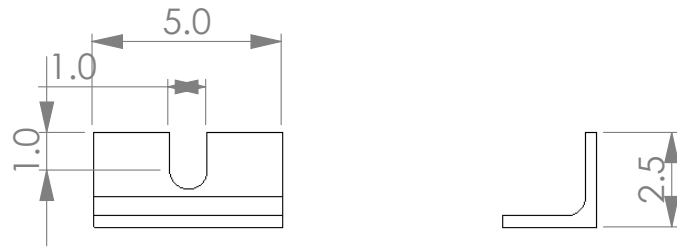
Backrest Support (25 x 25 x 3 angle iron) x 1



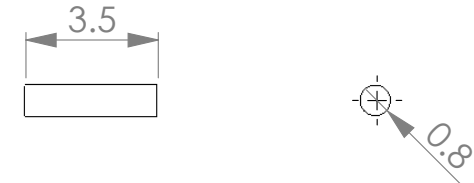
Chain Stop (8 mm rod) x 1



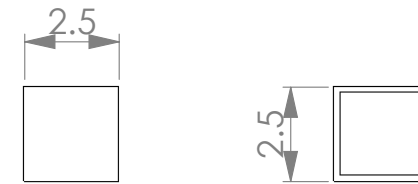
Wheel Dropout (25 x 25 x 3 angle iron) x 2



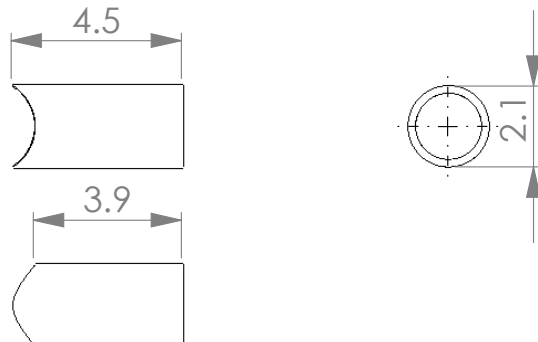
Pivot Retaining Bar (8 mm rod) x 2



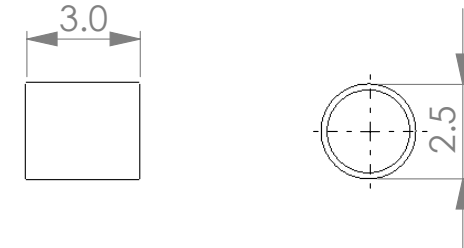
Chain Tunnel (25 x 1.6mm square tube) x 1



Pivot Insert (21x round tube)
(Miter for 25 mm tube)



Pivot Sleeve (25 x 1.6 mm round tube) x 2



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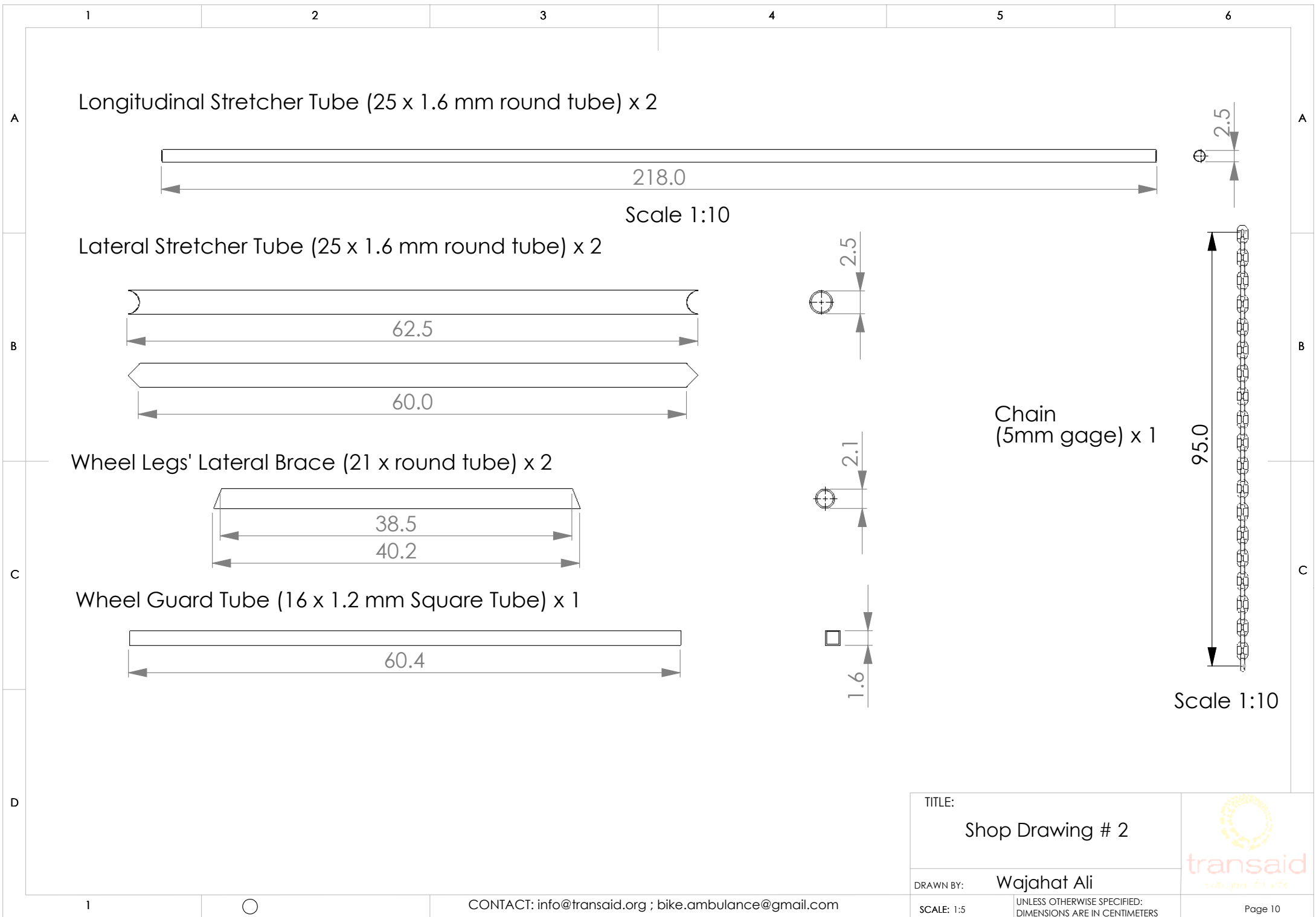
Shop Drawing #1


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Wajahat Ali

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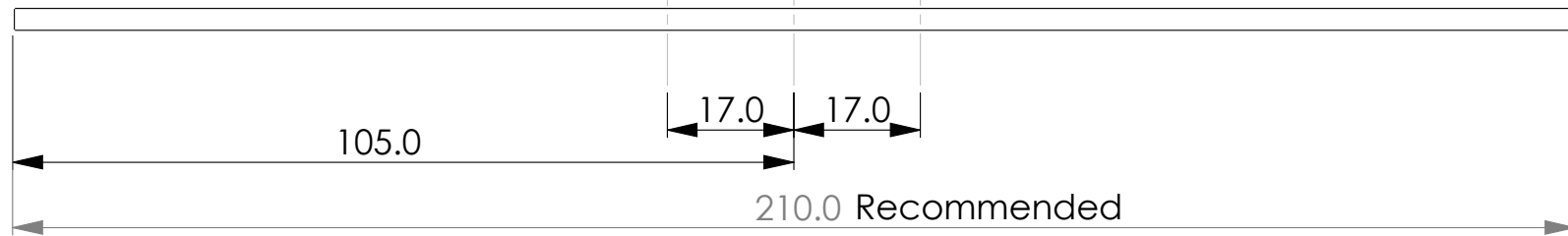
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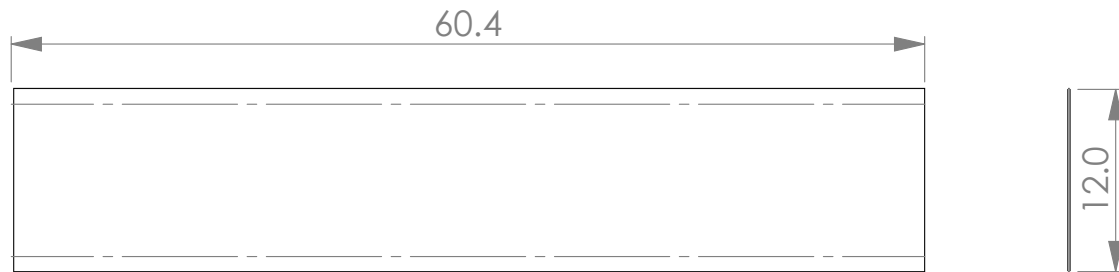
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A	<p>Directions for tube bending</p> <p>Cut stock tubes to the recommended cut length.</p> <p>Mark the bend line(s) on the tubes and the center line if bending the backrest.</p> <p>Align the bend line tube with the beginning of the tube bender, orient manufacturers welding seam on top or bottom, and bend the tube. If bending the backrest, bend from the center outward.</p> <p>Check that piece is planar with 90 degree corners.</p> <p>If bending backrest, check half of overall width from center line.</p> <ul style="list-style-type: none"> • If width is smaller by x, move the 2nd bend line away from the center line by x. • If width is larger by x, move the 2nd bend line closer to the center line by x. <p>Cut the piece to correct dimensions.</p>					A
B						B
C						C
D						D
	1	○	CONTACT: info@transaid.org ; bike.ambulance@gmail.com		<div> <div>TITLE:</div> <div>Tube Bending Directions</div> </div> <div> <div>DRAWN BY:</div> <div>Wajahat Ali</div> </div> <div> <div>SCALE:</div> <div>UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN CENTIMETERS</div> </div>	<div>  <div>transaid</div> <div>ambulance for life</div> </div> <div>Page 11</div>

Unbent tube for Backrest (25 x 1.6 mm round tube) x 1

BL CL BL

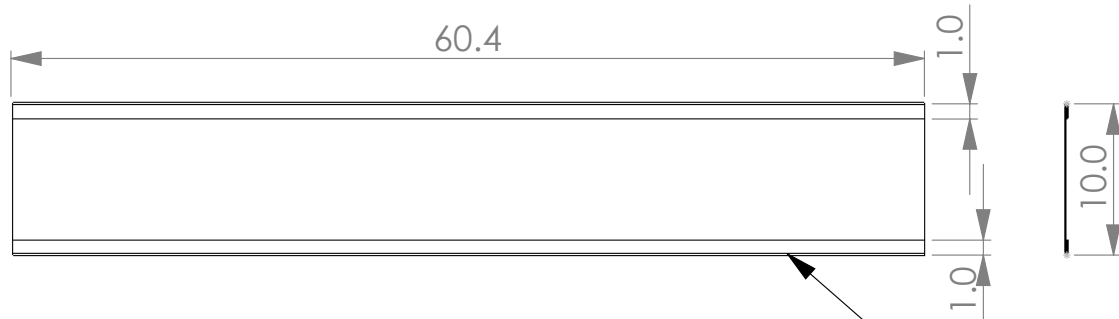


Wheel Guard Sheet Metal before folding (0.8 mm thick Sheet) x 1



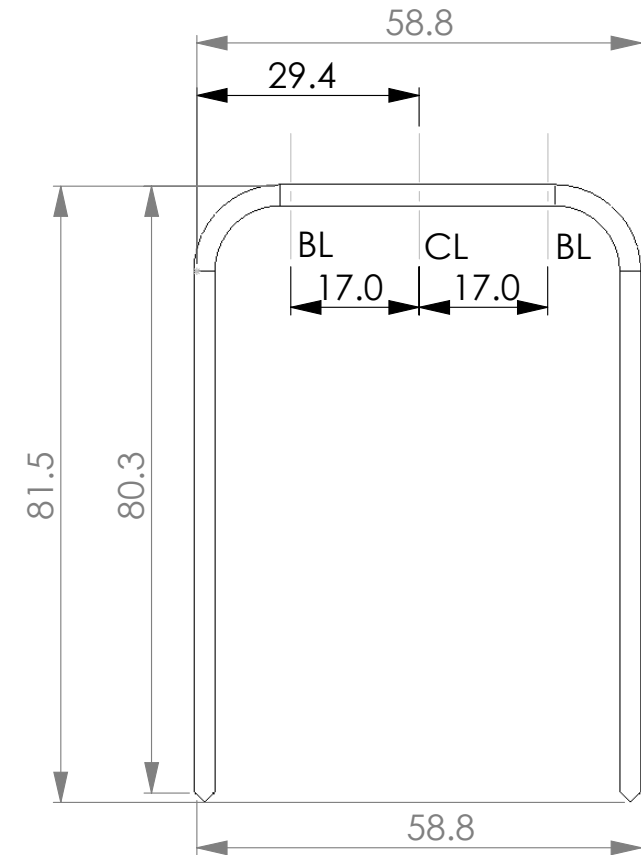
Scale 1: 5

Wheel Guard Sheet Metal After Folding



Scale 1: 5

Folded edges
of wheel guard
sheet metal



TITLE:

Shop Drawing # 3

DRAWN BY:

Wajahat Ali

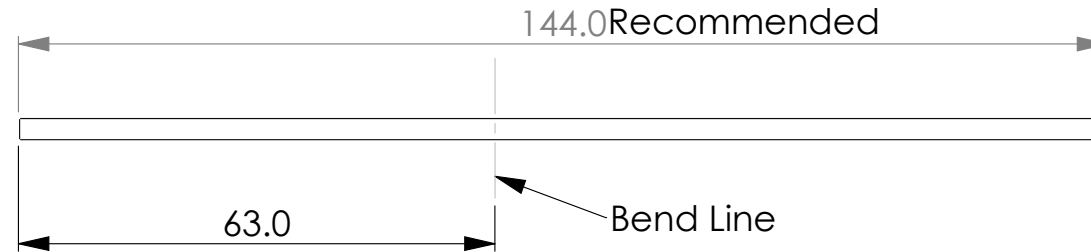
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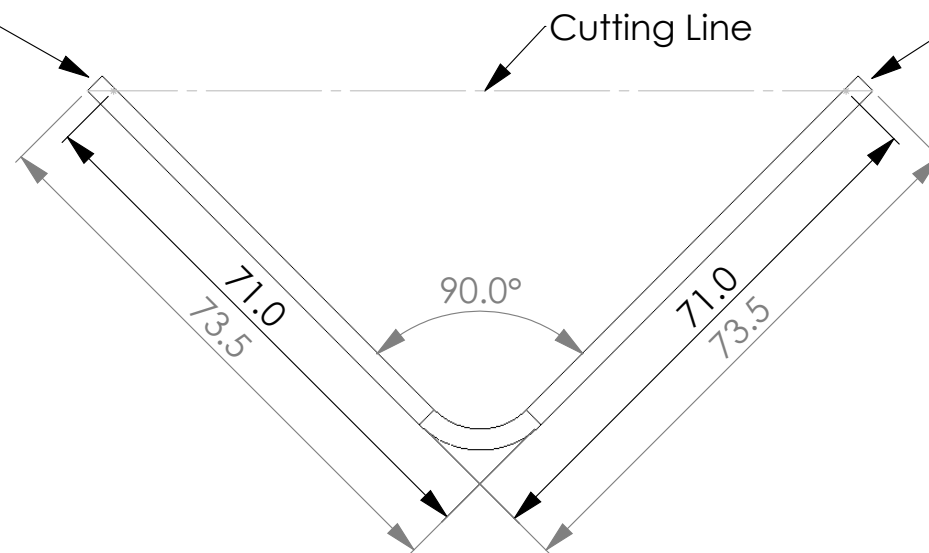


Unbend Tube for Wheel Leg

Wheel Legs (25 x 1.6mm round tube) x 2



Miter Tube End
for 25 mm tube
after cutting



Miter Tube End
for 25 mm tube
after cutting

After bending, cut the tube so that the length of both legs is 73.5 cm. Then use a straight edge to mark a line between the outer ends of the tube along the "cutting line" shown above and then cut it. Miter the tube by iteratively cutting and checking it while assembling the wheel legs in the welding fixture.

TITLE:

Shop Drawing # 4

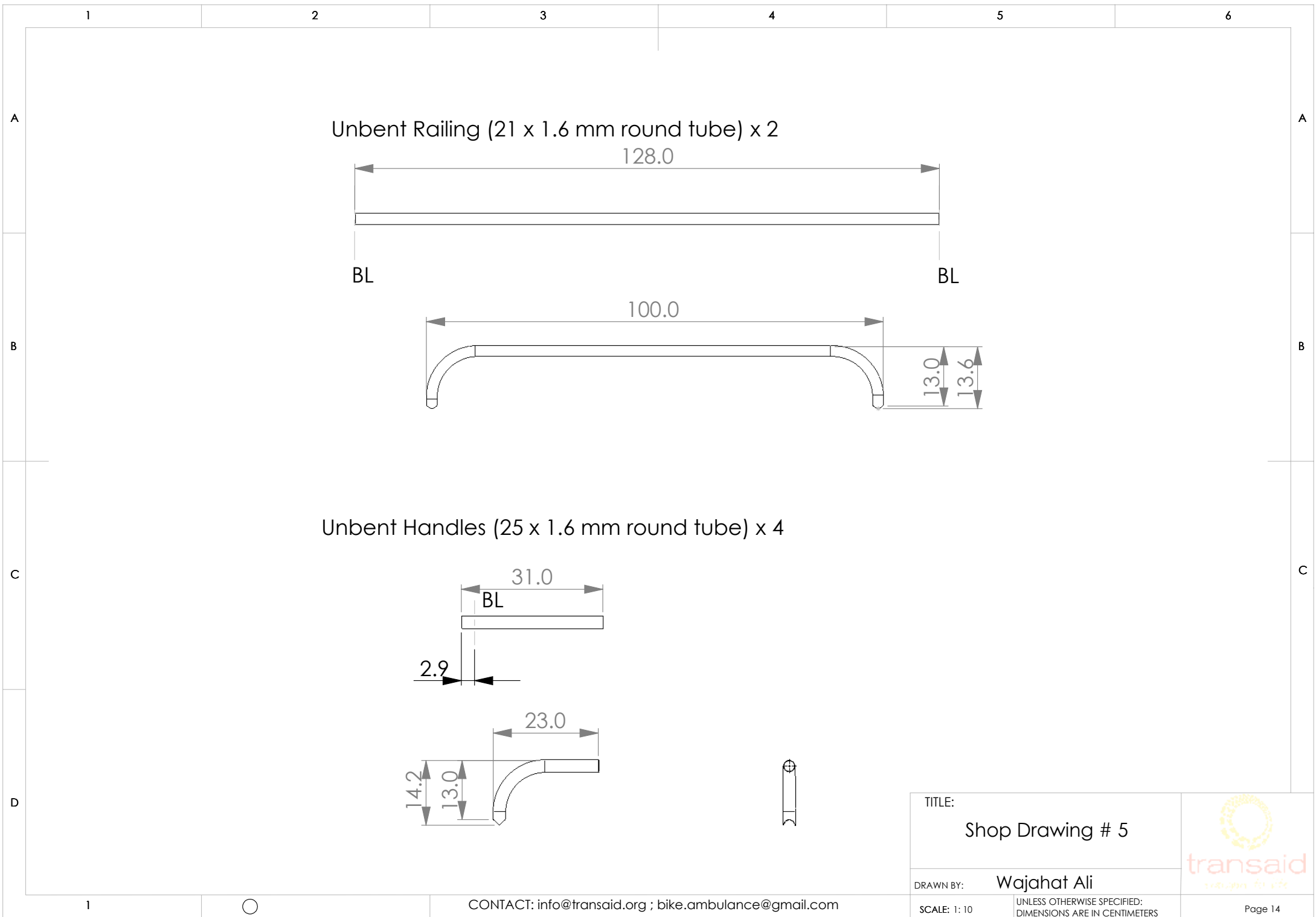
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Wajahat Ali

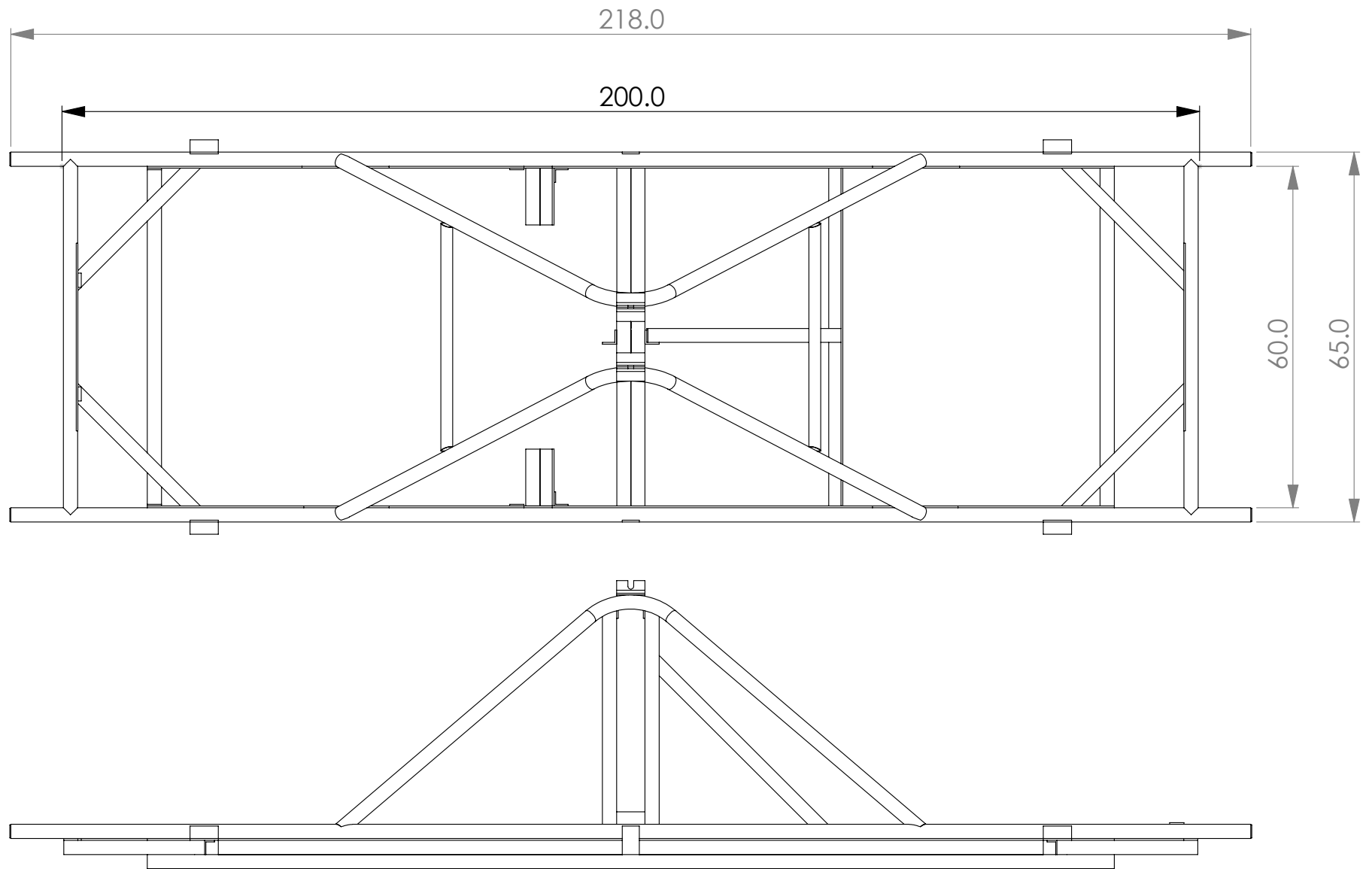
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Page 13



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TITLE:

Welding Leg Assembly

DRAWN BY:

Wajahat Ali

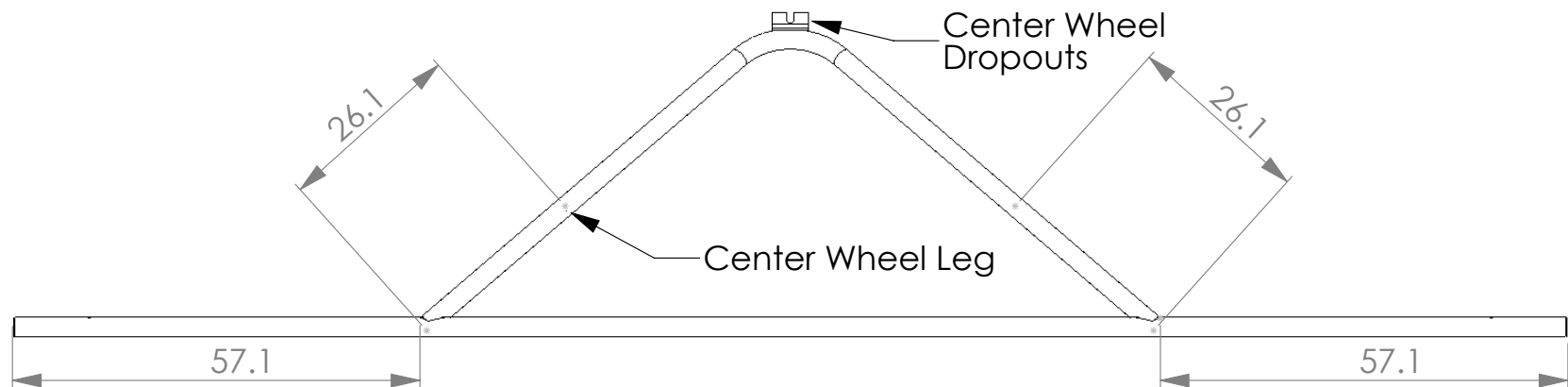
SCALE: 1:10

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN CENTIMETERS



Page 16

CONTACT: info@transaid.org ; bike.ambulance@gmail.com



TITLE:

Wheeled Stretcher
Various Views

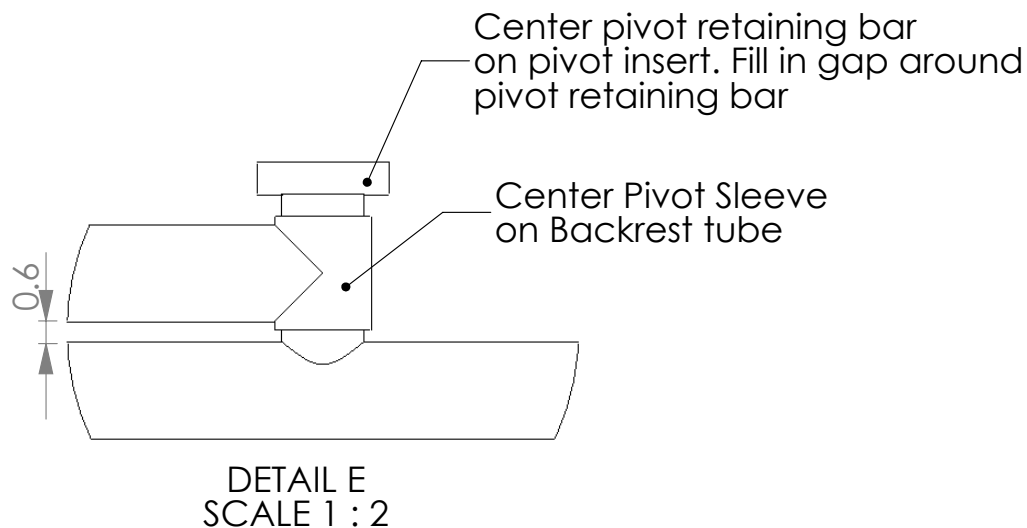
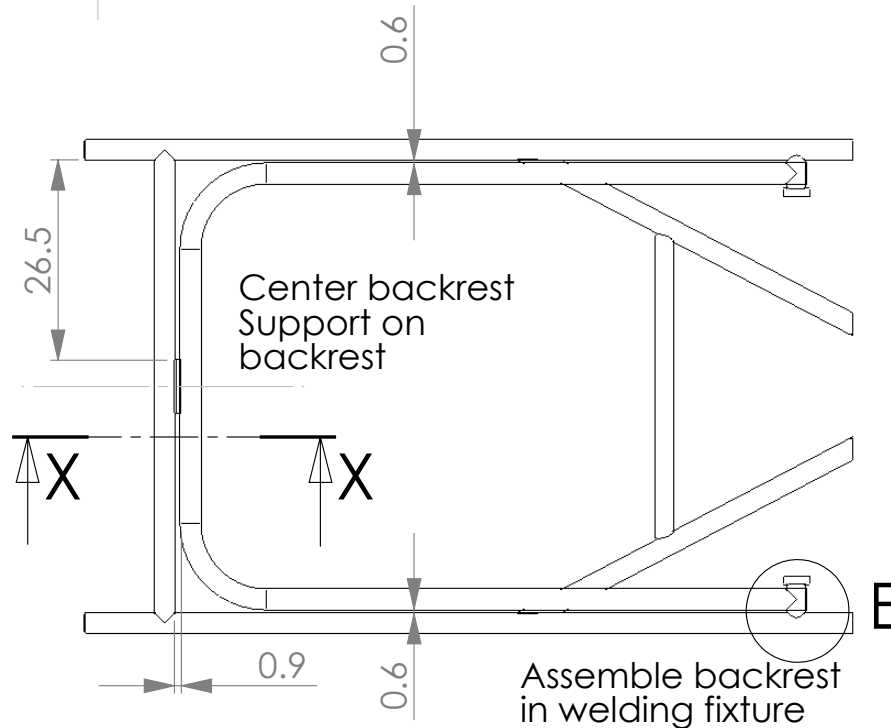
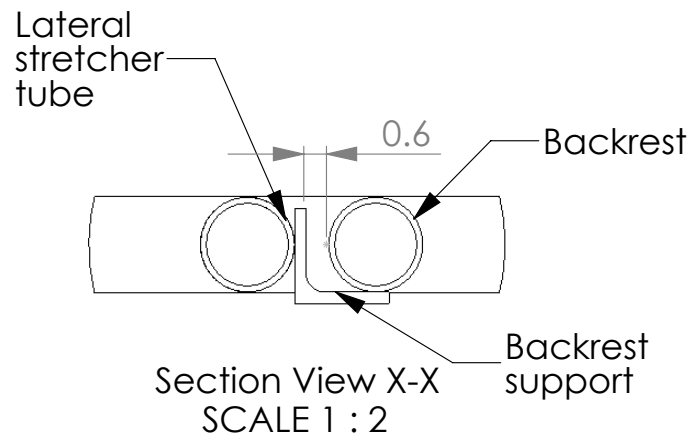
DRAWN BY:

Wajahat Ali

SCALE: 1:10

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN CENTIMETERS





Parts:

- Backrest x1
- Pivot Insert x2
- Pivot Sleeve x2
- Pivot Retaining Bar x2
- Backrest Support x1

TITLE:	
Backrest Assembly	
DRAWN BY:	Wajahat Ali
SCALE: 1 : 10	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN CENTIMETERS

