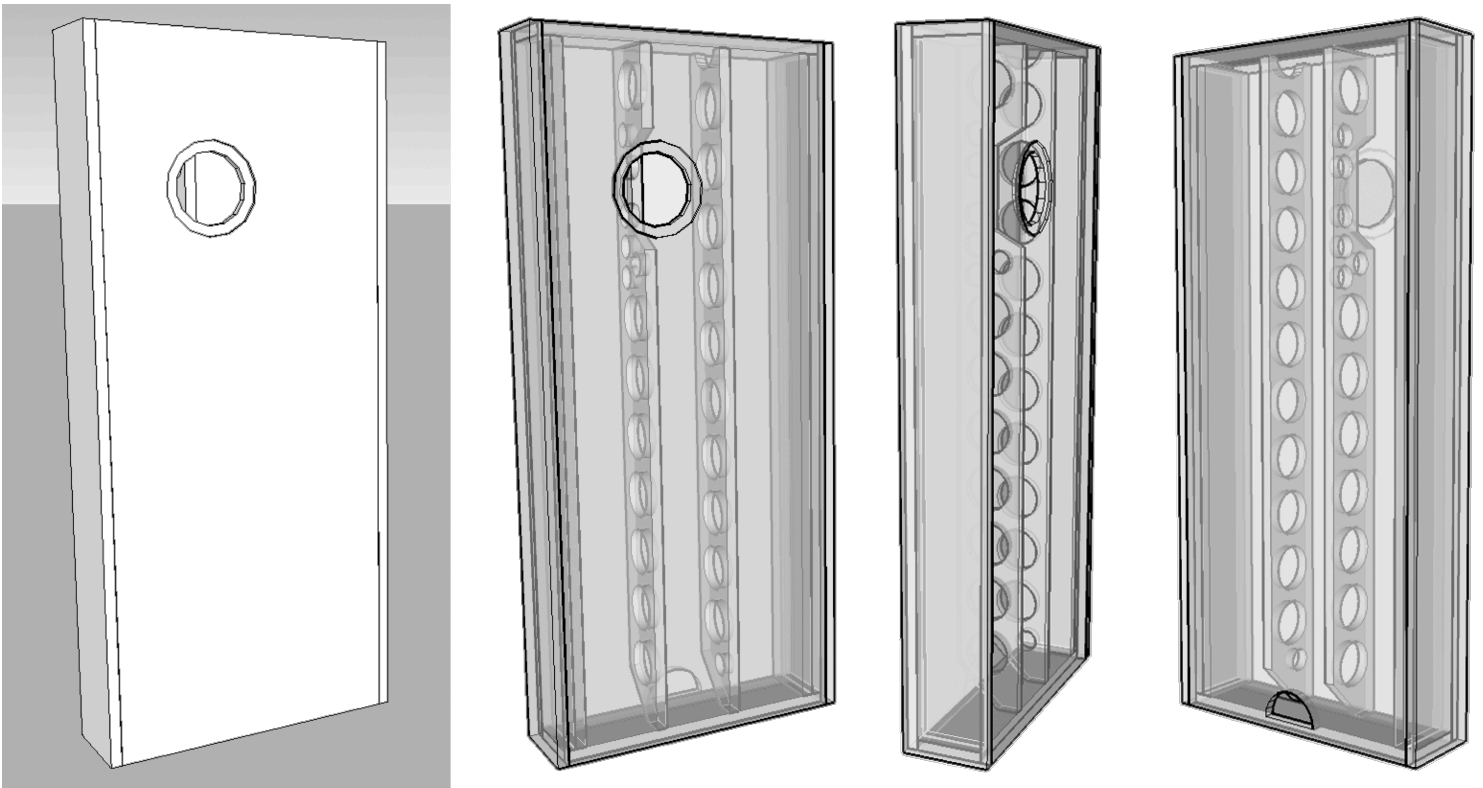




# Hawking Memorial Obelisk

## Mass-Loaded Transmission Line

for Jordan Eikona | 09-april-2018



This loudspeaker design was developed as a tribute to the late Professor Stephen Hawking CH CBE FRS FRSA. One of the leading theoretical physicists and cosmologists of the 20th and 21st Centuries despite suffering for most of his life with motor neurone disease, Professor Hawking revolutionised the understanding of black holes and was the first person to set out a theory of cosmology based on a unification of general relativity and quantum mechanics. Widely regarded as a genius of equal standing to Newton and Einstein, he was also a gifted author and populariser of science, his dry humour and willingness to engage with the public doing much to increase interest in science, astronomy and physics. His most famous work 'A Brief History of Time' remains one of the best-selling works of popular science.

The Hawking loudspeaker was inspired by Professor Hawking's devotion to science, but also his fondness for creativity -traits he shared with the great cosmologist and astrobiologist Carl Sagan, and science-fiction author Arthur C. Clarke, with whom he recorded the remarkable documentary God, the Universe and Everything Else. As a design it is a mass-loaded quarter-wave loudspeaker; a type that has an elegant simplicity in terms of both construction and operating physics. The proportions follow the 1:4:9 ratio of The Monolith from Clarke's 2001: A Space Odyssey and were carefully refined to allow easy positioning in-room and balance baffle losses against boundary gain.

Design by Scott Lindgren

09-april-2018 | drawn by dld

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## Notes

09-april-2018

### Notes:

0/ Use 18mm quality plywood

1/ Make mirror imaged pairs. Driver is offset horizontally by the golden ratio

2/ 2 possible driver positions. Top position is more suitable for seated ear level, lower position potentially useful if box is wall-mounted

3/ If floor standing, a minimal stabilizing base made up of 2 narrow pieces orthoganol to the width of the box is suggested

4/ Make sure that the back of the driver cutout is relieved, preferably a 45° angle – one can leave the area under the screws unrelieved.

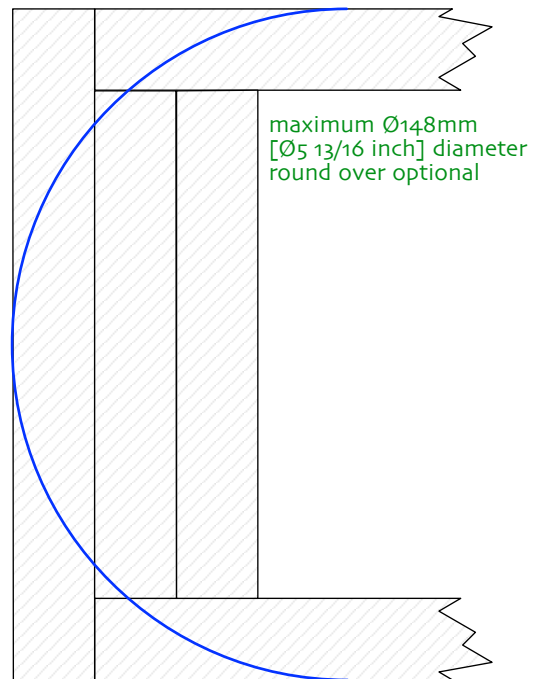
5 / Wide baffle with near wall placement obviates any baffle step

6/ Vent is shown as a semi-circle and placed on the back. Optional round & rectangular vents indicated on the drawing. Vent can be moved to the front – mandatory if mounted on the wall

7/ If vent moved to the front, the angles on the bottom of the holey braces will need to be moved to the front from the back as well

8/ Suggested damping indicated in drawing notes. Fill can be adjusted for more (less damping) or less (more damping) bass as room, room placement, and taste dictate. We suggest removable bottom to aid in changing damping. Poly-fluff needs to be very well teased, do not try to hurry this process.

9/ with the large sides (54mm) one could put significant round overs on the sides to minimize edge diffraction down to a significant frequency. It would no longer be the 2001 obelisk



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## Pictures

05-april-2018

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BUILD IN PROGRESS

This depth dimension is best determined with a test fit.

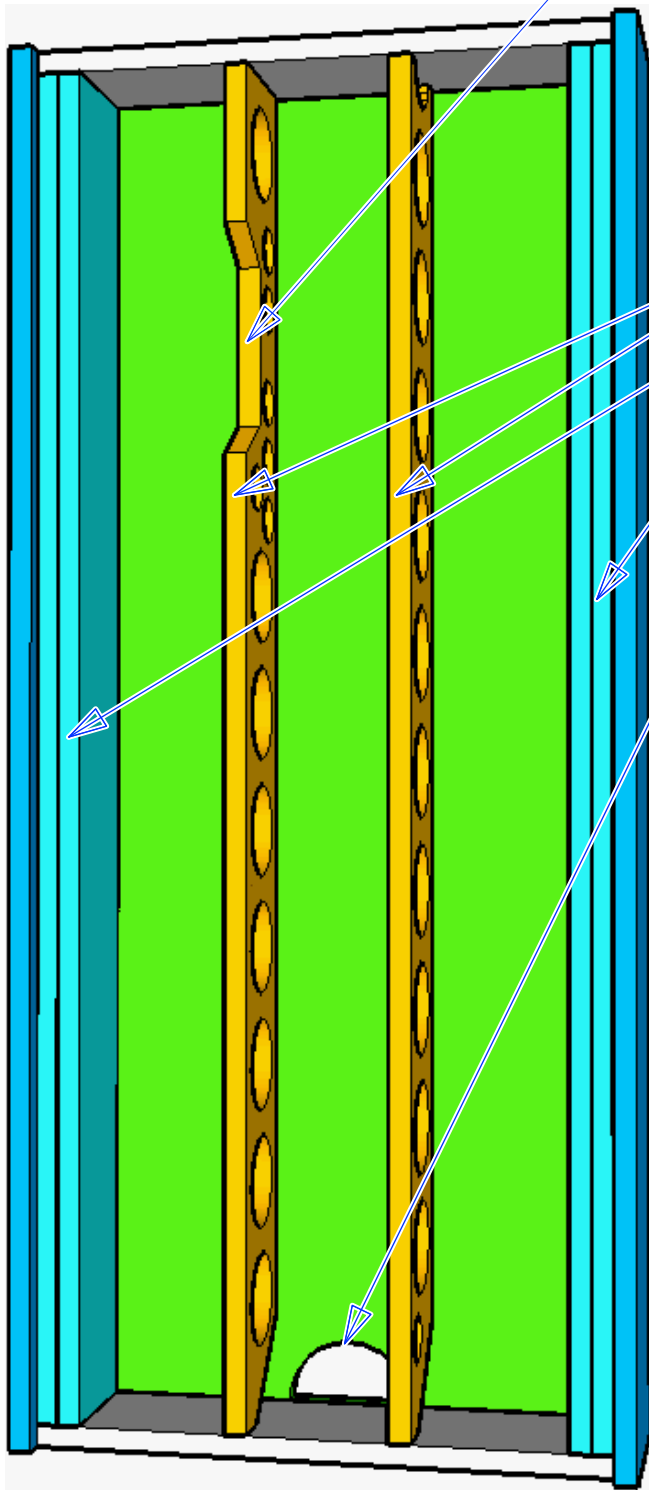
You want the driver magnet to be firmly braced against the Holey brace. Tight but not so tight as to stress the driver basket. If needed shim with something stiff (ie shim, veneer piece).

Driver reative energy is dissipated across 4 panels greatly decreasing energy loaded into them and reducing the likelihood of exciting any resonance.

Horizontal driver position based on golden ratio, make mirror imaged pairs.



Hawking Memorial Obelisk  
Jordan Eikona | 08-april-2018  
Sheet dv – detail visualization  
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Holey braces (orange) brace the baffle – the weakest panel in the box – to the back (and top/bottom) creating an i-Beam to greatly stiffen the construction.

Holey braces are intentionally unevenly spaced.

Triple thick sides required to come close to 2001 obelisk proportions. Also allow for optional addition of significant round-overs

Restricted terminus forms the mass-loading vent.

Vent can also exit out the front (required for wall-mounting)

As well as semi-circular vent, alternative circular or rectangular vents can be used

## internal layout

A shallow box with twin multi-purpose braces creates a stiff enclosure.

An optional base is recommended to stabilize the thin box from tipping over. Minimalist twin=spar suggested to maintain the obelisk appearance.

If wall mounted, some resilient damping layer suggested between back & wall.





# Hawking Memorial Obelisk ML-TL ov81

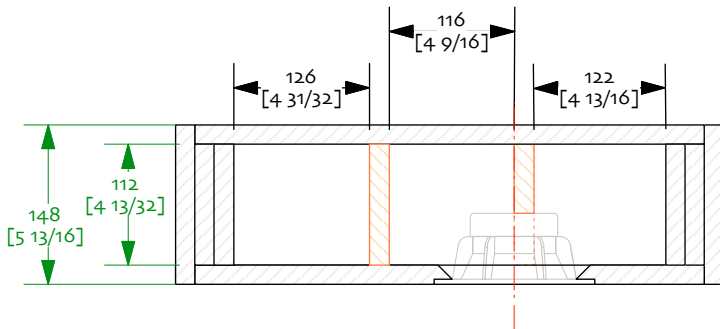
Jordan Eikona

Sheet 1- plan | 06-april-2018

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## Notes:

0/ All panels are 18mm, high quality multi-ply recommended

1/ Brace shape is only suggestive -- prime purpose is to brace driver, it needs to be about 35-40% offset holes

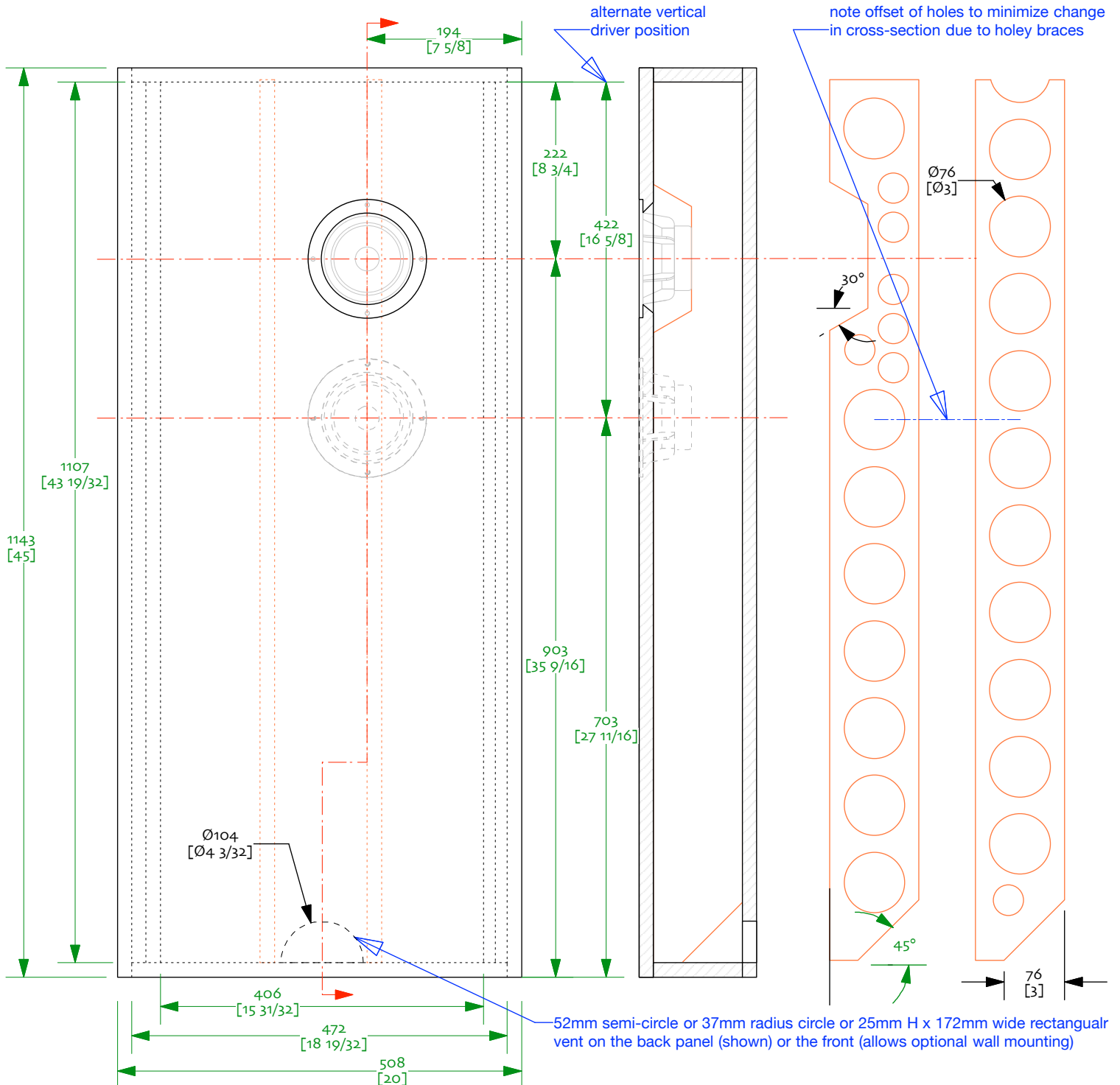
2/ Don't forget to angle cut the back of the driver cut-out to give it breathing room

3/ Enclosure stuffed 0.65lbs ft<sup>3</sup> uniform density (170z = 485g - reduce a bit around the driver) with 1in acoustic fiberglass, ultratouch or SAE-F10 - SAE F-13 rated felt on rear panel behind driver.

4/ Shape is ~9:4:1 ratio, as per the 2001 Space Odyssey Obelisk (actual 9:4:1.17)

5/ Minimal stabilizing struts on the bottom suggested

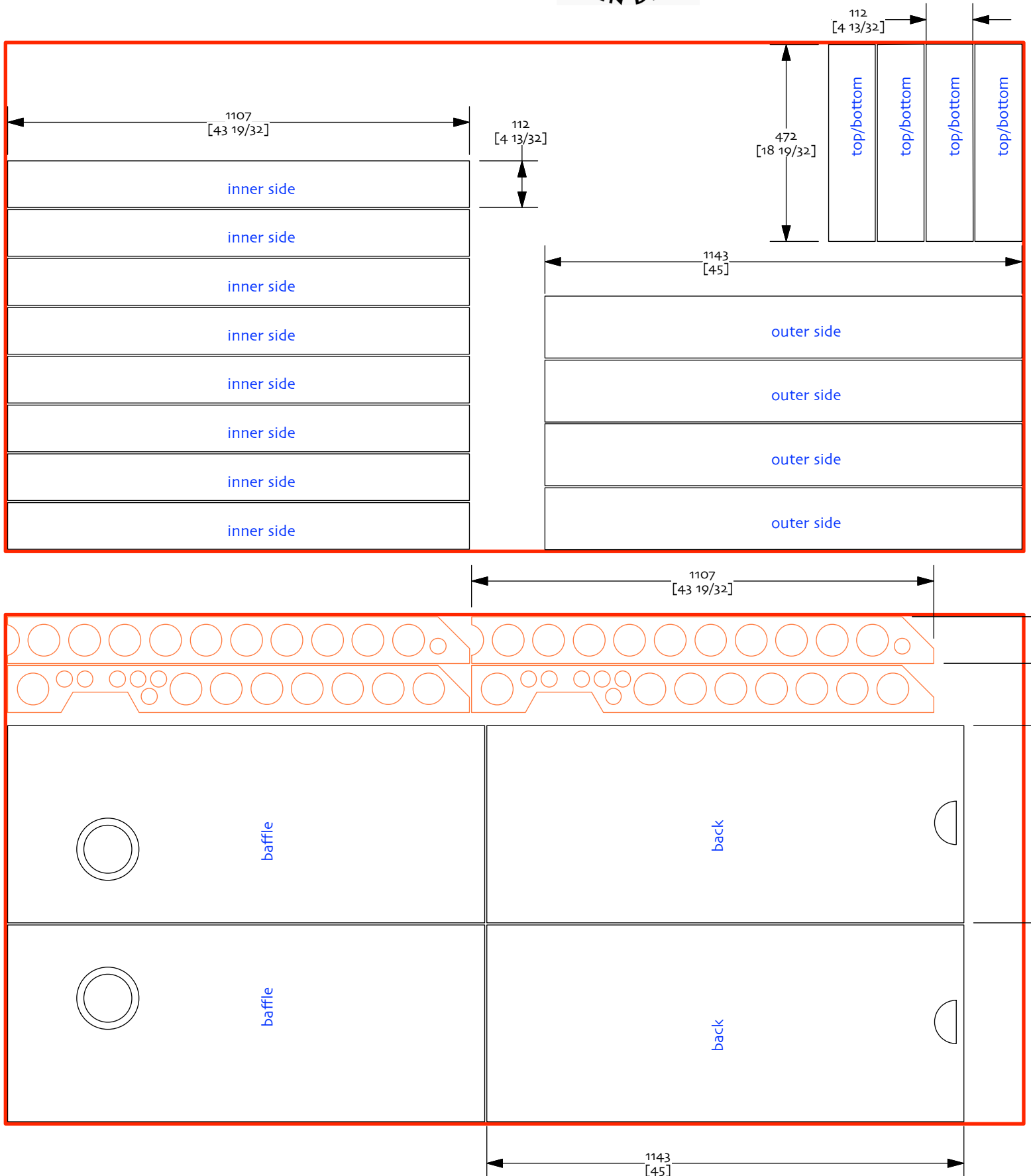
6/ Make mirror-imaged pairs



Notes:  
 0/ 18mm high quality plywood  
 1/ 5mm kerf & trim  
 2/ does not include any stabilizing base  
 3/ this layout considers the usual grain direction which is important if you are planing on finishin gthe natural plywood.



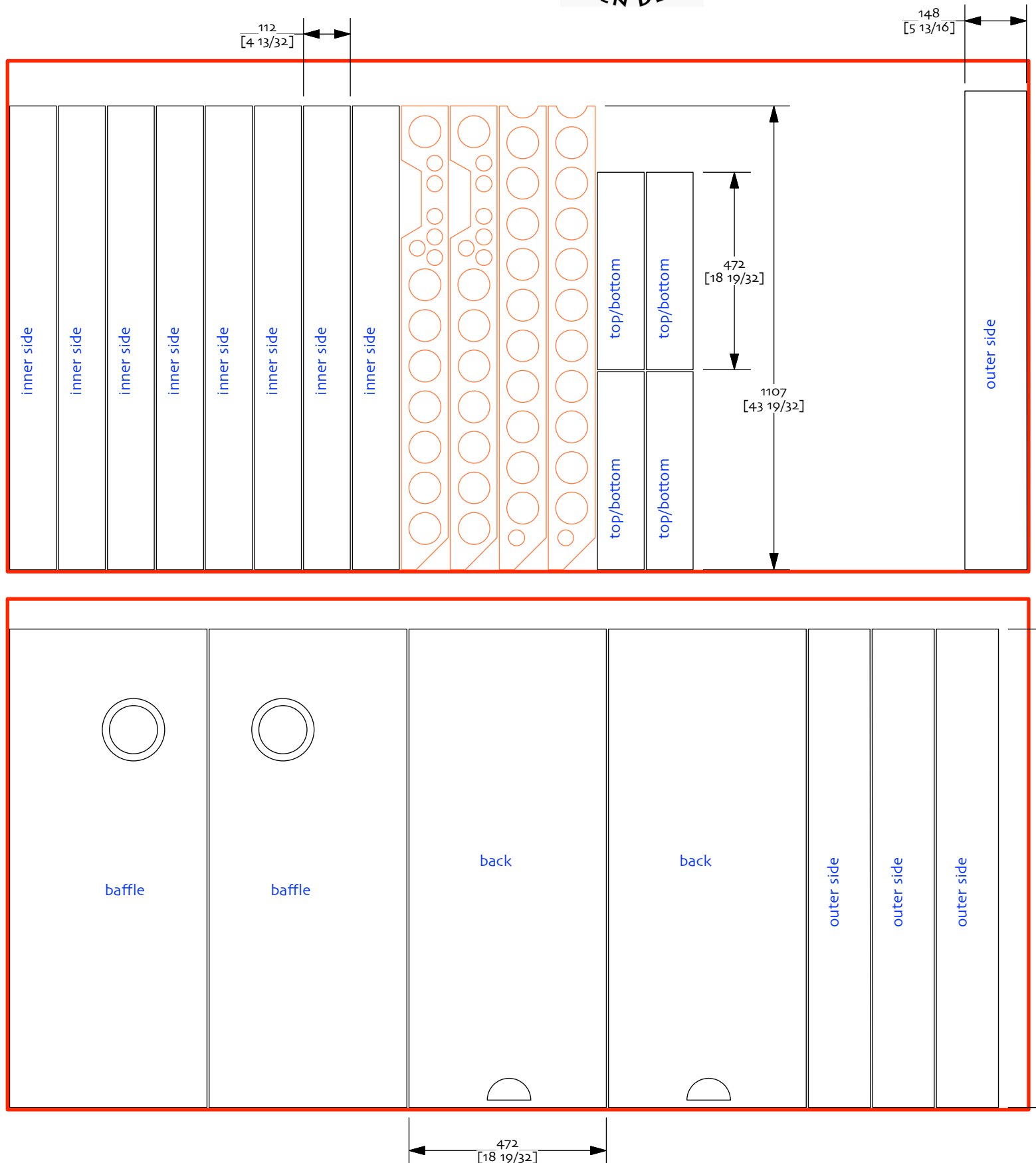
Hawking Memorial Obelisk ov81  
 Jordan Eikona  
 Sheet x – 1220 x 2440 cut suggestion 1  
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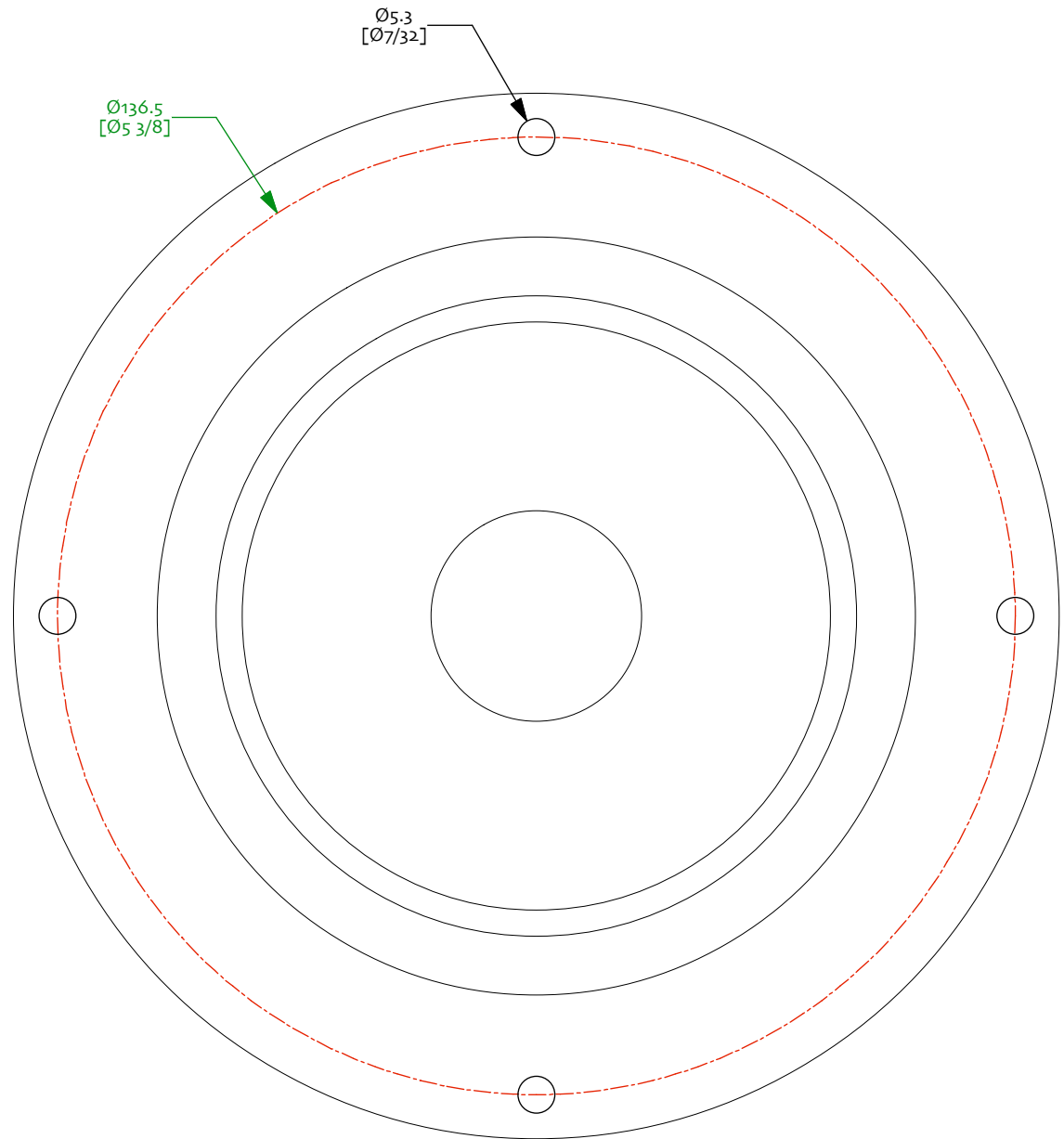
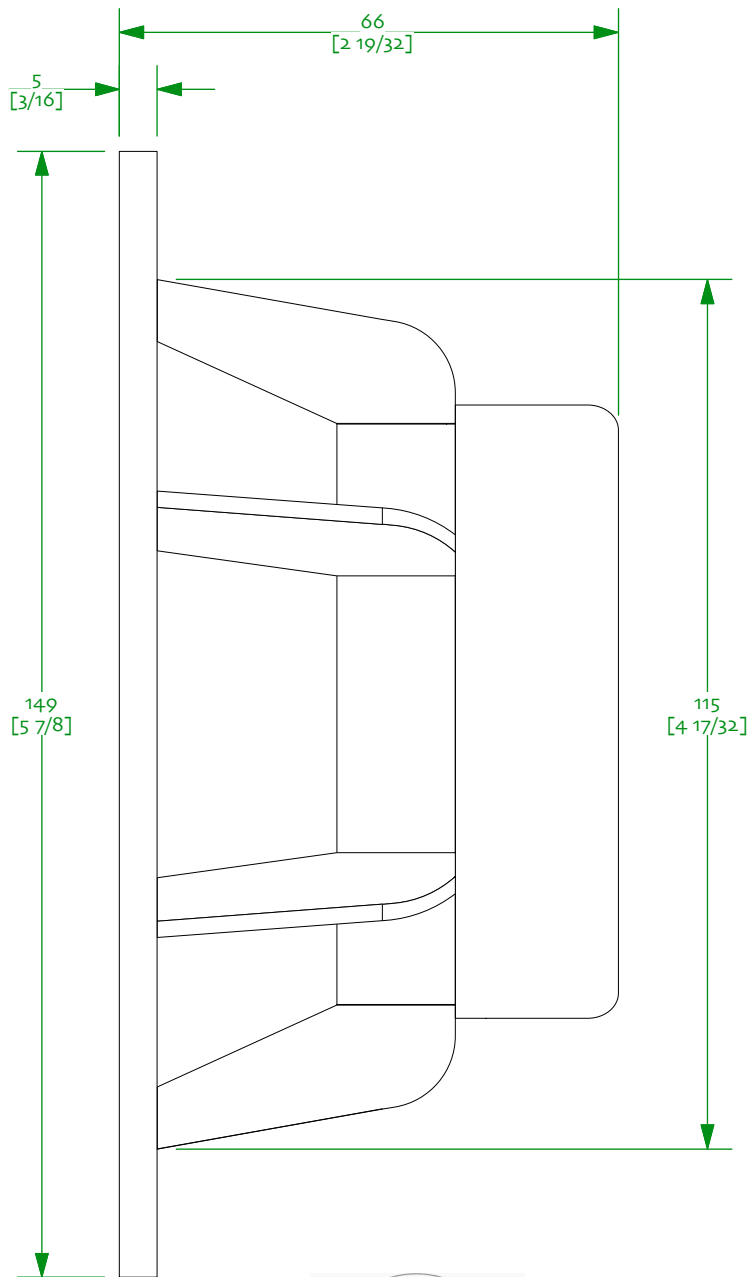


Notes:  
 0/ 18mm high quality plywood  
 1/ 5mm kerf & trim  
 2/ does not include any stabilizing base  
 3/ this layout is intended on maximizing the size of the leftover pieces



Hawking Memorial Obelisk ov81  
 Jordan Eikona  
 Sheet x – 1220 x 2440 cut suggestion 2  
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Jordan Eikona  
 dimensions | 05-april-2018  
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This is not a drawing of the Eikona, it is only a representation of critical dimensions. It will be updated when drivers are in-hand