

Proposal:

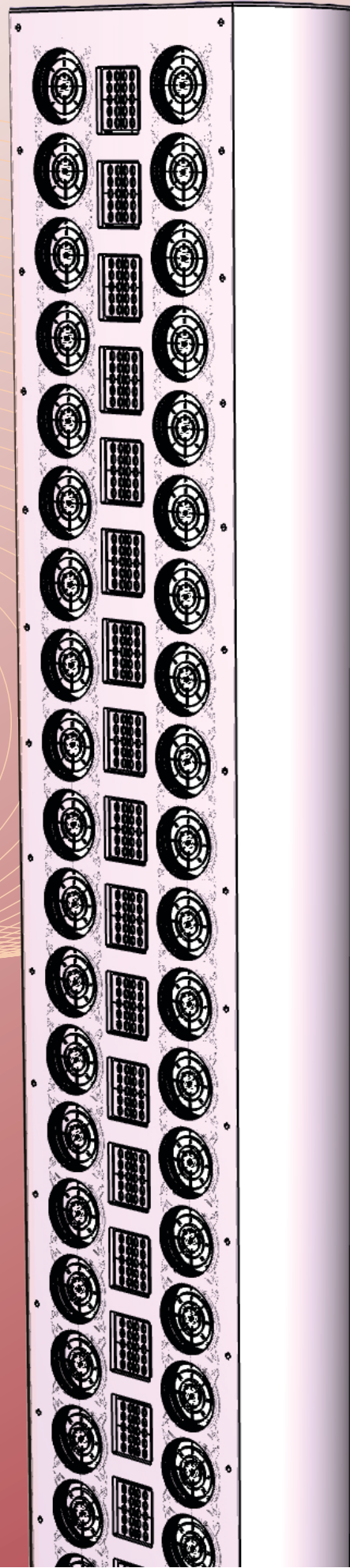
Outdoor CBT Array

Date

May 7th, 2020

Prepared for

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DESIGN CONCEPTS

We are proposing a unique and radical concept to high-end audio reproduction.

A design that, while adhering to function before form, breaks away from the concept that a loudspeaker needs to look like a loudspeaker. We believe that loudspeakers can present themselves as more than just a fancy box, and when integrating multiple functional elements in a visually aesthetic manner, can do more than just another speaker.

Our initial thought was to create an unobtrusive design. One that wouldn't obstruct the view and scenery, and would allow for optimal placement to maintain the feng shui of the area for purposes of a gathering, as well as casual listening and entertaining.

A tall and thin column seemed to best fit the agenda. From that starting point, we worked further with the concept of speakers as a discreet component of sculpture. Given the availability of propane gas in the area of the speakers optimal placement, adding gas fire effects to the project can be optionally included along with lighting, creating objects that have multiple functions in an aesthetic package.



pictured: patio site

DESIGN DETAILS ACOUSTIC + ELECTRIC

In order to meet the minimum width and SPL design considerations, a **line array** has been selected for the mains speakers. Using small and closely placed transducers, we have been able to design a loudspeaker with a minimum horizontal dimension of just over 9 1/2 inches wide, and about 5.5 feet tall. This system will allow for 132dB peak output in the low frequencies, allowing comfortable use in the 90-98dB slow SPL range without unduly stressing the system in any way.

The loudspeakers will be comprised of a vertical line of 18 Bohlender Graebener Neo3 planar drivers for the high frequencies, and 40 Faital Loudspeakers 3FE25 3" low frequency drivers in an **MTM** (midwoofer-tweeter-midwoofer) configuration. The drivers are all mounted on an aluminum baffle plate, with a matching face-plate that will sandwich the drivers in place. Between the two aluminum plates will be a layer of viscoelastic material which creates a vibration suppression system called **constrained layer damping**, in which any vibration applied to either of the plates is trapped and dissipated in the middle layer. This system holds all the drivers in position while keeping spacing between the drivers to the absolute minimum physically possible and preventing resonances from emitting from the baffle.

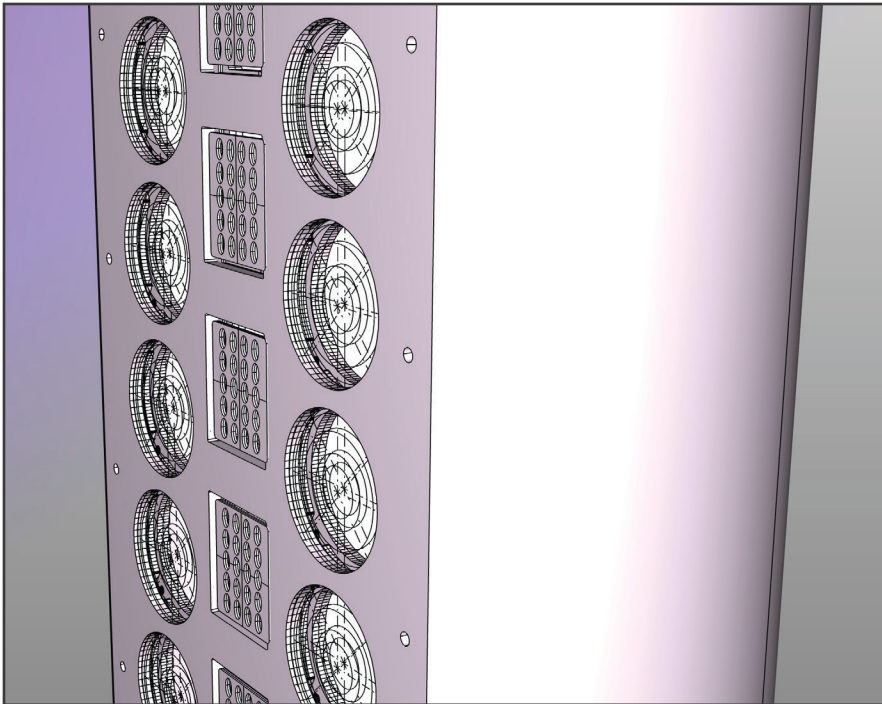
The system would be weatherized using the following mechanisms:

- Drivers as spec-ed are considered water-resistant.
- The enclosure would be made of fiberglass, and would come with gasketed covers that would be installed during the winter months.

- The drivers would be protected by a multilayered cutaway grill, with mesh stainless steel and acoustically transparent water-repellent cloth layers covering and protecting the drivers.

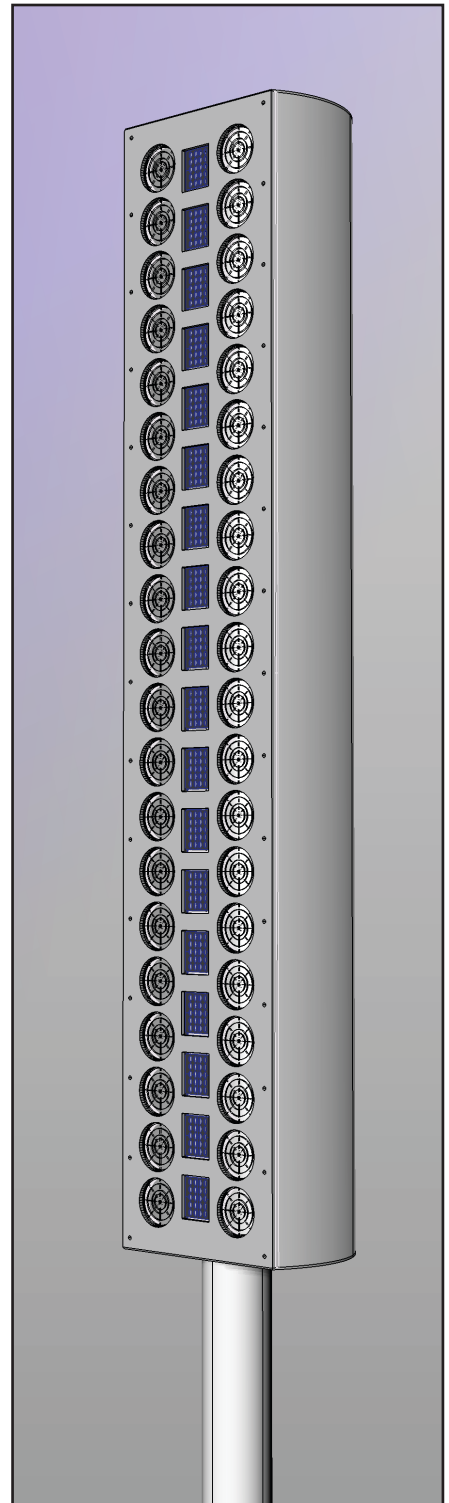
The optimum known configuration of a line source is **Don Keele's Constant Beamwidth Transducer**, and the optimum source for high frequencies in a line source are planar diaphragms, which output the correct wavefront shape and also minimize phase distortion. In order to design a speaker that correctly takes advantage of the CBT design while still maintaining the requirement for a physically straight array for aesthetic reasons, we have settled on using a straight array with delay curving and amplitude shading for the mid-range and high frequencies, creating a coherent and constant beam-width coverage pattern. The mid drivers will also feature aperiodic venting on the rear of the enclosure, which both acts as an acoustic 'brake' on the drivers. This absorbs pressure inside the enclosure to improve the transient response of the otherwise sealed cabinet. It also arrives out of polarity with sound wrapping around the outside of the cabinet to cancel low frequency sound behind the speaker, creating a cardioid pattern in the lower frequencies.

DESIGN DETAILS ACOUSTIC + ELECTRIC



Pictured above: detail of speaker

Pictured right: entire speaker (without final enclosure)



DESIGN DETAILS ENCLOSURE, SUPPORT, ORNAMENTATION

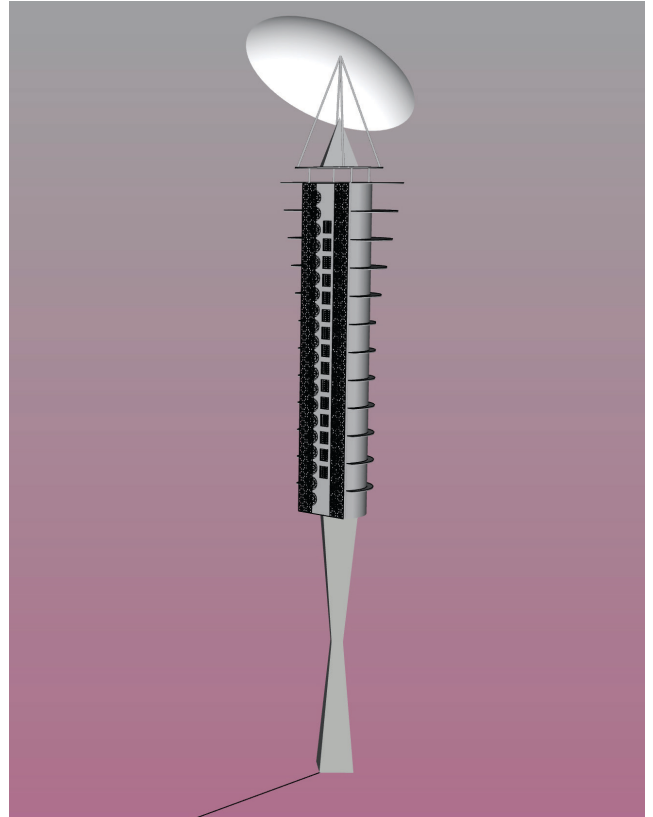
Over the last nine months of discussion and planning, we have explored numerous rabbit holes in pursuit of the form of this project.

At this point, we're both feeling that input from you is the next step in order to define restriction and increase focus. We've thus provided some thematic directions we have interested in for you to consider, and we invite you to join us in a participatory process in order to define this piece, choosing and prioritizing elements based on budget restrictions.

Here are links to Pinterest boards with some of the various themes that we're interested in. Neo-Art Deco and Geometric are both of interest. There's also a board called Natural Forms, inspired by Haeckel and microscopic photographs, but we expect that something with that amount of detail and manufacturing complexity will be out of budget given discussion to date.

[Art Deco](#) [Geometric](#) [Natural Forms](#)

These are some sample renderings of one the the many directions that we discussed. It's one look among a variety of artistic directions we're interested in taking. The first image includes an inverted flame bowl that could be used for an Incendia-type flame effect. The second image shows the flame bowl invisible, with the idea that a mirror finish could reflect the environment around it, both via effect lighting, and during daylight.





BUDGET

Base sound system cost is \$40K total including installation and commissioning.

This does not include a permanent support structure or aesthetic treatment.

Sound options:

- High end D/A convertor for DJ input - \$2500 Burl B2 Bomber. This could be a future upgrade.
- Hot tub system is TBD but would involve using small/inexpensive off-the shelf weatherized speakers with stands/cowls that compliment the main systems look. This can be quoted once the main system design is complete.
- Subwoofers are TBD and can be quoted based on future location visit and sound testing results.

Structure price is flexible and defined budget would guide the design process.

PROCESS + TIMELINE

Build and Installation Timeline

On project commencement:

- Driver/baffle assembly would be manufactured and prototype enclosure built.
- Amplifier/DSP/Rack assembly would commence.

On finalizing the enclosure shape:

- The final speaker enclosures will be modeled and cast.
- Speakers will be assembled for final testing and auditioning.
- Speakers and amps will be temporarily installed for use while the permanent structure is completed.

On completion of the design process:

- Manufacture of the structure and fitment will commence.
- Sound system would be taken down, permanent structure installed, and sound system reinstalled.
- Lighting and gas will be installed and commissioned.