



4601 Commercial Avenue Marion, IA 52302 319.373.1425

## Proposal

Mark Doubet, president and owner of DB Acoustics visited Good Shepherd on 8-September and made spatial and acoustic measurements of the sanctuary with the intent of providing us a proposal for an audio and video system that would be designed for the spoken word, and enable us to broadcast high quality audio and video across radio and YouTube channels. Our sanctuary is an extremely live space that is great for music, but hinders the ability to hear the spoken word because of reverberation. This proposal that will enhance the spoken word without hindering music, came to fruition on 3-November and was received by Pastor Amy, Brooke Joyce and members of the Facilities and Grounds Committee.

This document is an effort to summarize the issues we have with the current system and give the Congregation working knowledge of this proposal. The Facilities and Grounds Committee, Brooke Joyce and Pastor Amy are unanimous in supporting adoption of this proposal and feel it is a good fit for the size of our Congregation. Of the three companies that were invited to provide proposals, DB Acoustics was the only company that followed through.

Should the Congregation approve this project within the next 26 days, the estimated installation would happen as soon as the components become available. Given the current issues with supply chain logistics, installation could be as late as March 2022.

Why is it so difficult to hear the spoken word in our sanctuary? There are two problems:

As in real estate, location, location, location is important. Specifically, speaker location. Our worship presentation happens from the front of the sanctuary, but the amplified audio comes from the rear and off to the sides. This causes unnatural sound.

Secondly, the loudspeakers do not emit bass very well and disperse their energy in a very limited vertical pattern with an extremely wide horizontal pattern. The speakers are mounted high and next to the ceiling, in the rear and off to the sides. A significant amount of sound energy emitted by these speakers hits the ceiling, reflects off in multiple directions, thus adding to the reverberation or echo of the room. With the vertical dispersion being so narrow, the sound that doesn't hit the ceiling sails over our heads, hits the walls and windows, and then reflects back to where the congregation is seated. All of these sources of sound arrive at your ears at different times causing a muddled sound because of delay and echo. If one uses a visual analogy, it is like looking at an image that is out of focus and not clearly seeing the region of interest. The problem is compounded by having four speakers mounted in the rear and off to the sides, further causing an unfocused sound to arrive at your ears.

Additional problems are specific to the aged electronics, cabling and inadequate microphone pickup patterns.

The proposal from DB Acoustics will fix these problems with guaranteed results, at a cost that is reasonable.

Budget as proposed: \$22,650

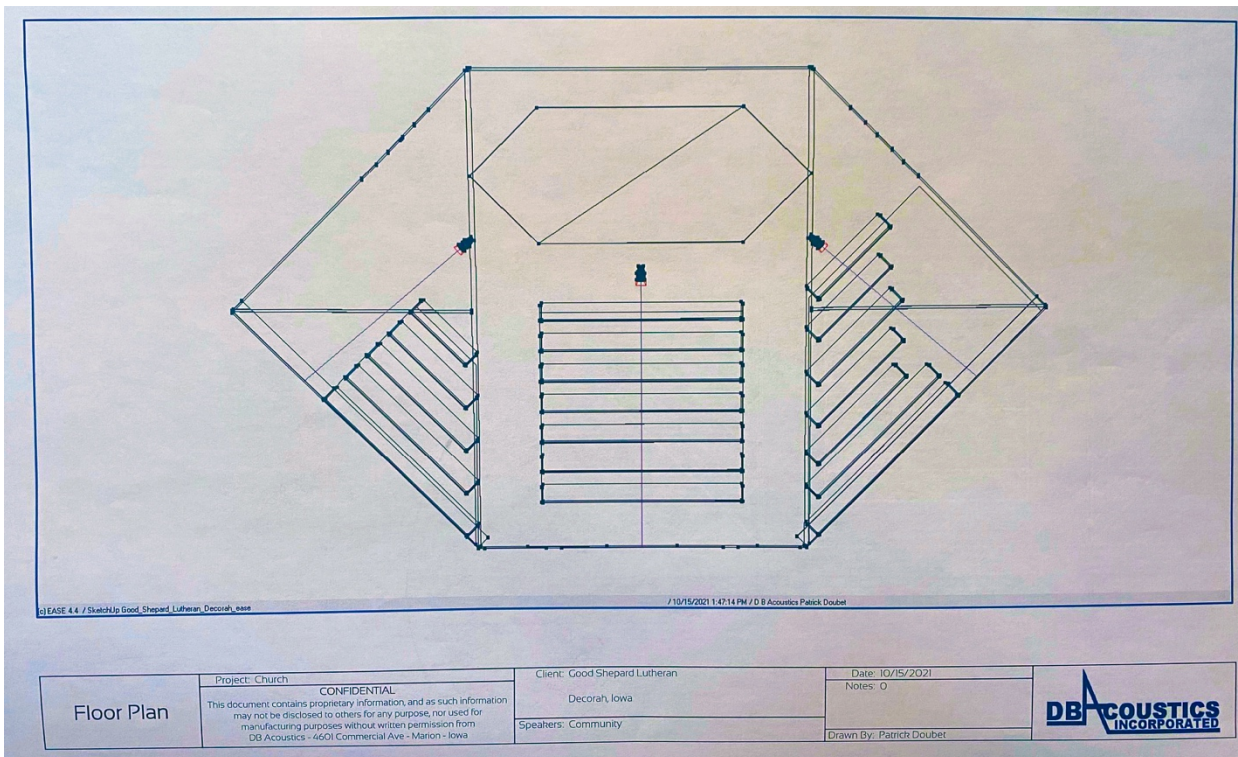
10% contingency: \$2,265 to cover unexpected costs

Total budget of audio/video: \$24,915

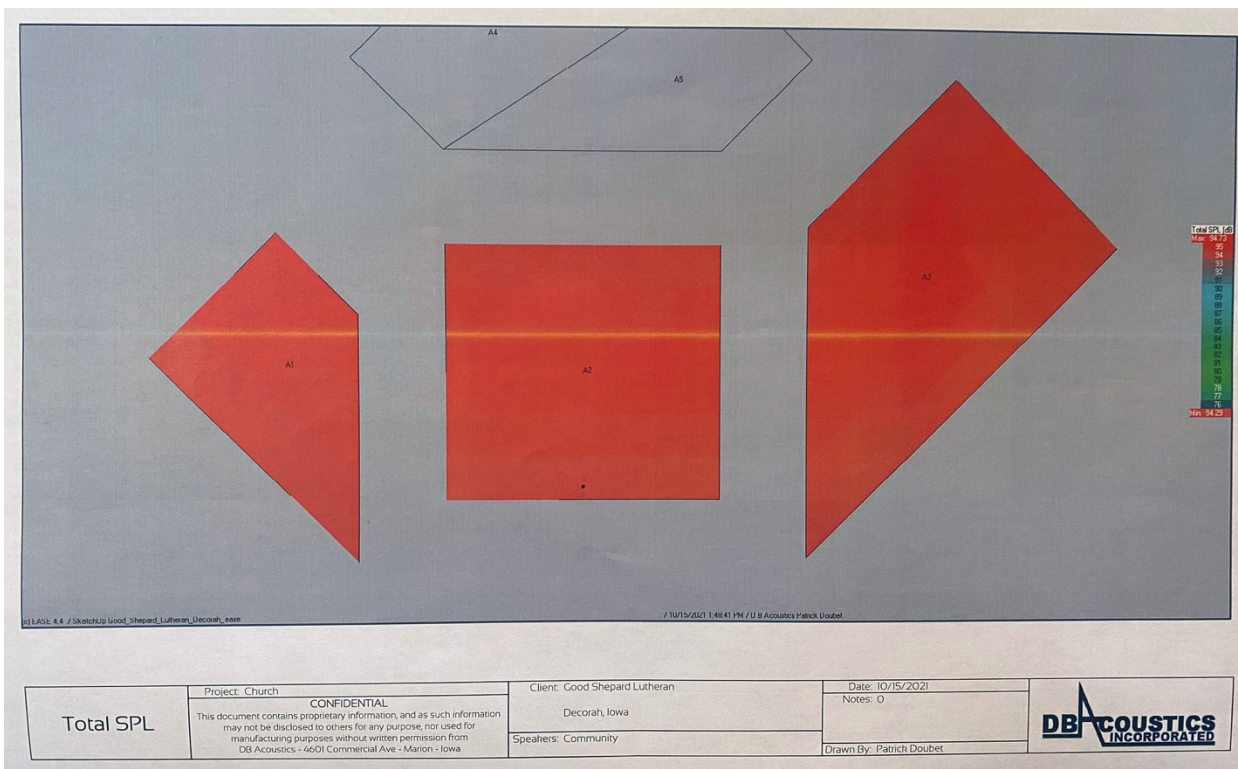
### **Summary of the proposal:**

#### **Audio portion:**

Spatial measurements, reverberation analysis, and replacement speaker dispersion data was entered into computer modeling software that provided acoustic maps of how the proposed system will perform. The proposed floor plan calls for three ceiling mounted speakers in the indicated locations:

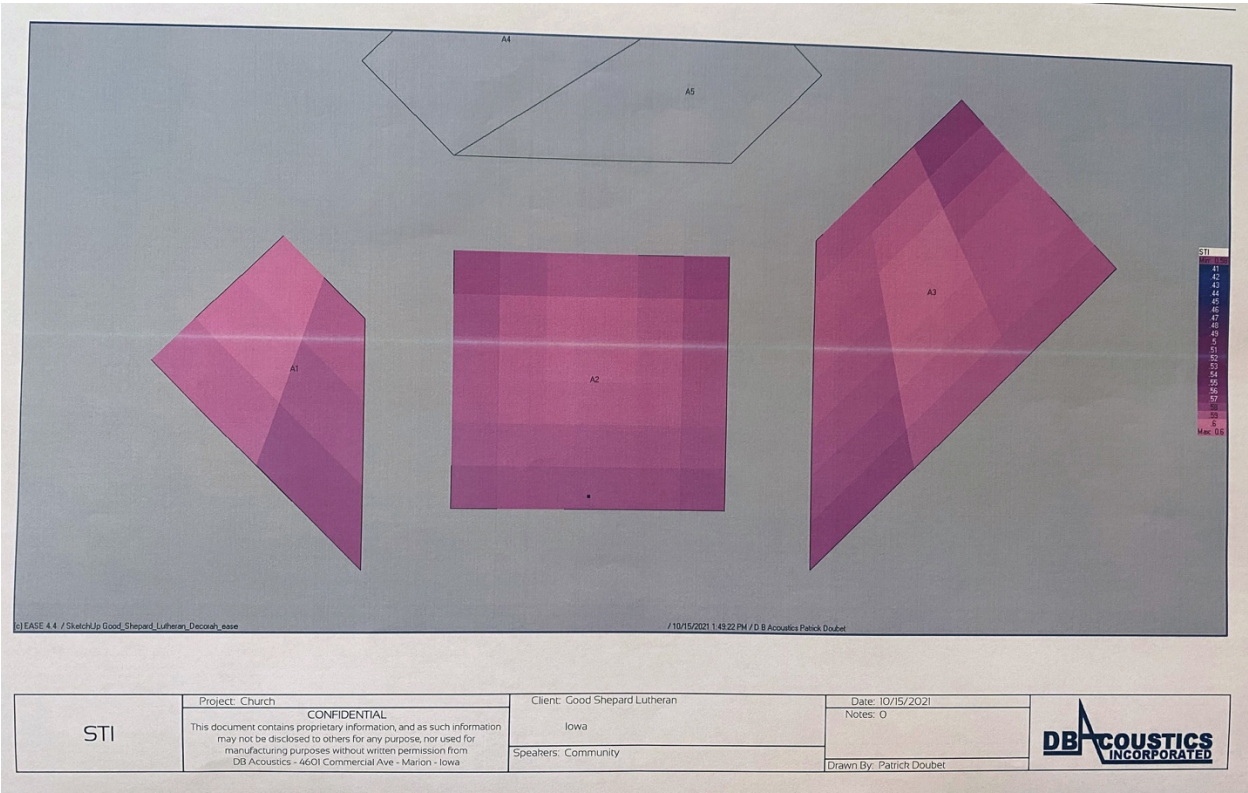


The Sound Pressure Level modeling (SPL) or how loud something is measured in decibels, appears below. Most humans can barely detect a 3 dB change. With the altar at the top of the map, the three main seating areas have very even SPL distribution (less than 3 dB) so sitting at the front versus the rear, one could expect to have the same experience as to how loud the spoken word is. If this was not the case, one would observe a gradation from the front to the rear in the model.





Speech Transmission Indices (STI) were mapped according to the sanctuary seating areas. A speech index of 1.0 is considered excellent where a value of 0.5 is considered desirable for most applications. DB Acoustics modeling predicted values of .58 to .60 with a fairly even distribution across the seating areas. Given this map, one could expect to hear speech equally well in all areas of seating.



Components:

The system will consist of a digital signal processor (the brain) to provide multiple controls over all inputs and outputs, a professional power amplifier, three two-way full range loudspeakers, new cabling, all controlled by a wall mounted secure touch screen, located adjacent to the northeast sanctuary entrance (look for the 3 gang blank metal switch plate). All visible components (speakers) can either be painted or ordered in white or black to blend in with the background.

A new wireless headset microphone will be installed for portable use. A new miniature gooseneck microphone will be mounted on the pulpit that includes a shock mount and LED switch. A microphone and stand will be provided for the cantor position and can be used for other locations if needed. The contingency line in the budget will provide financial ability to add microphones if needed.

The Narthex will have two of the existing sanctuary loudspeakers installed adjacent to the wall mounted TV with a local volume.

The Library and Nursery will have new ceiling mounted loudspeakers with local volume control that receives sanctuary audio.

Fellowship Hall will have the other two existing sanctuary speakers installed at the north end and wired to a new mixer amplifier located in the kitchen area. A new handheld wireless microphone for this room will allow flexibility for multiple users.

## Video

The audio/visual department at Good Shepherd managed to produce good-quality video and audio during the period of the pandemic when we were not worshipping in person. These pre-recorded, edited services created a sense of community and allowed many to participate in worship, even from a distance.

As we moved back to in-person worship, we have continued to have an online presence, only now, our videos are recorded “live,” without editing, and are uploaded immediately following Sunday morning worship. We are not currently streaming our services due to concerns about our intermittent internet issues (which we are working to resolve). Here are the challenges we face with our current equipment and setup:

- Our camcorder is manual—if you want to move the camera or zoom in or out, it must be done by an operator, who awkwardly needs to stand on a pew in the rear of the church.

- Without introducing a lot of noise into the audio, it is not possible to connect our current microphones to the camera. That is why you see an extra microphone by the pulpit, and why that microphone gets moved to the altar during communion. This is also why, if you are listening to the service online, you probably don’t hear much of the children’s sermon, or the assisting minister saying “Go in peace, serve the Lord.”

- Our camcorder has limitations such that when we record a service, the camera actually creates 3 separate video files, which we then have to stitch together before we upload to YouTube. That step adds another 10-15 minutes.

- Because of the way we need to collect the sound of the sanctuary and feed it to the camera, we are never quite sure if the volume level is set correctly...and because we are rushing to get the service online, we don’t have time to make corrections or improvements.

In short, the current system has real limitations that can’t be overcome without fancier equipment.

In the sanctuary a Marshall Pro AV camera with 1080P resolution will be installed on the rear wall. The camera will connect to a digital recorder that receives audio from various microphone inputs including an overhead microphone that will blend congregational singing and call and response audio. A live web streaming device will complement the recorder, camera and multiple microphone inputs to post live video and audio to the Good Shepherd YouTube channel. The camera can be set up with many presents for easy operation and is controlled by an infrared remote control and/or wall mounted touch screen or portable tablet (option). As the camera scans from one preset location to the next (pulpit to baptismal font), the image is frozen during the scan so as not to impart motion as the new target location is blended into the video feed. This will give the illusion of a multicamera system.

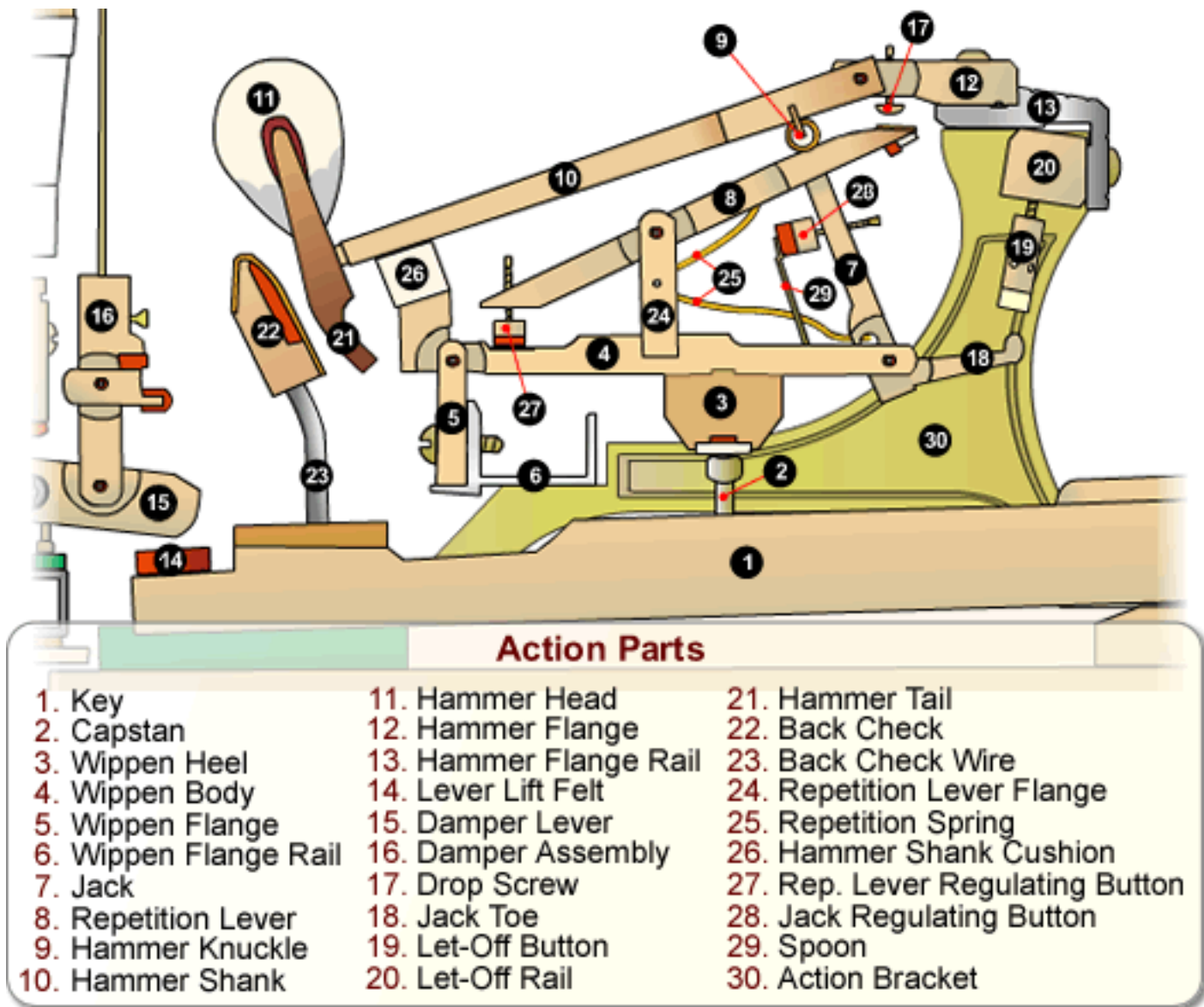
For all video and audio systems, Installation includes all calibrations and software specific to our applications, followed by training personnel in all aspects of the audio and video portions of the system. Installation is expected to begin on a Monday and end the following Friday so as not to disrupt worship.

## Piano

Though the piano repair has already been funded (\$5,000), we wanted to give the congregation some information on the work that needs to be done.

Our Estey grand piano is approximately 100 years old. It is, all things considered, in fine shape. It has a relatively new set of strings, the sound board is in good shape, and the keys have been recovered (the white keys are plastic, not the original ivory or bone). The case shows its age, but the “bones” of the instrument are solid. A similarly sized used piano would be difficult to find, and would cost 10-15k. A new piano would be much more expensive.

However, the piano is very inconsistent in terms of its response. It is very difficult to play softly in certain registers of the piano, which is a necessity for a lot of musical situations. Playing the same note in quick succession often doesn’t work. And, as many have noticed, the damper pedal slips, requiring a makeshift repair involving a clothespin shoved into the pedal mechanism!



Brian Knox, piano technician for the music department at Luther College, will perform the repairs. These all involve the “innards” of the piano, collectively called the “action.” He will:

- Replace the hammers and felts with new ones made by the German company Abel;
- Replace the shanks, flanges, and wippens (see the accompanying picture)
- Install new back checks from the company Tokiwa as the existing leather is worn

Once he has replaced these parts, he will regulate, voice and tune the piano, so that a musician should be able to sit and play any part of the instrument and expect it to respond in a consistent manner.