Date: July 29th, 2021
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Report ID: 07292021 -02
Prepared for: Edgardo San Miguel
Case: 02179516 & 02179517
Project: Recording Studio, 12th Floor OAT 1.0

Introduction:

Armstrong Techline is not an acoustical engineering firm nor was this report prepared by an acoustician. We are happy to provide these reports to support the appropriate use of our products.
Our Reverberation Time (RT) Reports are the result of simple Reverberation Time (RT) Calculations based on the Sabin Equation and Our Speech Privacy Class (SPC) Reports are calculations based on laboratory performance data applied to ASTM E2638 calculations method.
In all cases good design practices must be used prevent or account for special conditions. This report should not be misunderstood as professional acoustical advice. A professional Acoustical Consultant can be found at the National Council for Acoustical Consultants web page (http://www.ncac.com/)

Request:

The request was to evaluate the treatment options for a photo/video studio and enclosed office/conference rooms.

Target:

In Room Sound Quality

For the video studio I am suggesting a maximum target not to exceed RT 0.8 seconds however a preferred target may be closer to RT 0.4 seconds

Room-to room Sound isolation

Enclosed rooms have an expectation of "confidential" speech privacy meaning that, speech from an adjacent room may be heard but not understood. The metric for speech privacy between enclosed rooms is Speech Privacy Class (SPC) in accordance with ASTM E2638. "Minimal Confidential speech privacy is accepted as SPC 60. A preferred target may be closer to SPC 65 but for a recording studio the highest SPC posable is recommended.

Report Index:

Treatment Options:

I have calculated the RT with the following treatment options:

- **Calla**
- **Calla High CAC**
- **Calla PrivAssure-45**
- **Calla PrivAssure-50**
- **SoundSoak-60 (wall treatment)**

Speech Privacy Fundamentals

Speech Privacy is fundamentally a signal to noise ratio. The architecture isolates and reduces speech from the source room and the background sound "masks" the intruding voice in the receiving room. Better architecture (wall STC & ceiling CAC) will allow lower background/masking sound levels. Inversely, less robust architecture will require higher background/masking sound levels. Most efficient design will "match" the wall STC and the ceiling CAC. Background sound is best control with a Sound Masking system such as **LogiSon**

Reverberation Time Fundamentals

Reverberation time is one of the key elements related to the acoustic comfort within a room. Reverberation Time (RT) is the decay rate of sound within a space. When sound strikes a hard surface such as concrete, nearly all the energy is reflected back into the space thus the room will have a longer RT.
Inversely, when sound strikes a soft surface such as an acoustical ceiling, only a portion of sound is reflected back into the space, thus a lower RT will result. When a material minimizes the reflection, this is known as sound absorption. Sound Absorption can be a surface treatment such as ceilings and wall materials or space absorbers such as canopies, clouds, baffles and blades.
The appropriate RT target will depend on the usage and expectation of the space. An office or classroom will require a low RT to meet the intended function and comfort. A festive pub or lobby may require a higher RT to create the appropriate atmosphere.

Executive Summary

Based on the results of this study we can make some suggestions for you to consider related to your treatment option.

In Room Sound (RT). Part I (page 3 of this study)
Just looking at the in-room sound within the studio, the removal of the current ceiling will increase volume and reduce sound absorption. New treatment will need to be sufficient to overcome both these negative effects. The InvisAcoustics alone can meet the upper target range but will require more material than area available to meet the lower target range. This coupled with good acoustical design practices of adding a treatment to both walls, and ceilings results in my suggesting adding SoundSoak 60 as wall treatment. The SoundSoak 60 (mineral fiber SoundSoak) will also increase the sound isolation performance of the walls as discussed in the sound isolation part of this report.
By treating ½ the walls with SoundSoak 60 you will only need 14% coverage of InvisAcoustics to meet the upper target but still need 93% coverage to meet the preferred target for a studio.

Sound Isolation: Part II (page 4) Part III (page 5) and Part IV (page 6)
Room-to-room sound isolation will be improved with any of the ceiling options; however, the Calla is a modest improvement and will require a minimum background sound/ sound masking level of 37dB to achieve the minimal "confidential" speech privacy expected. Calla High CAC will allow for a quieter 35dB background / masking sound, the Calla PrivAssure-45 will require only 33dB, and the Calla PrivAssure-50 will only need 32dB of background/masking sound.

Room-to-studio sound isolation is more challenging for two reasons. First a studio will need a quieter background sound, therefor better sound isolation is required. Second, higher sound isolation is more difficult because in accordance with your design, there will only be a ceiling on the room side. As a result, the new walls must be built to structure.
Part III of this report shows that with walls terminating at the ceiling and a ceiling only on the room side, will not meet the required performance with any of the ceiling options.
Part IV of this report shows that when the walls with SoundSoak 60 treatment (STC 52) built to the structure, will meet the minimum requirements with all the ceiling options.

I suggest that your best design may be to include the SoundSoak 60 wall treatment with InvisAcoustics in the studio space with the walls extending to structure, and the Calla High CAC in the enclosed rooms. I also highly recommend a sound masking system in the enclosed rooms.

Part I: Reverberation Time – Photo/video studio

Conditions:

Room: Estimated Area of 1800 SF Average Ceiling Height of 11’ (8’ for the “current condition” with base grade ACT ceiling)

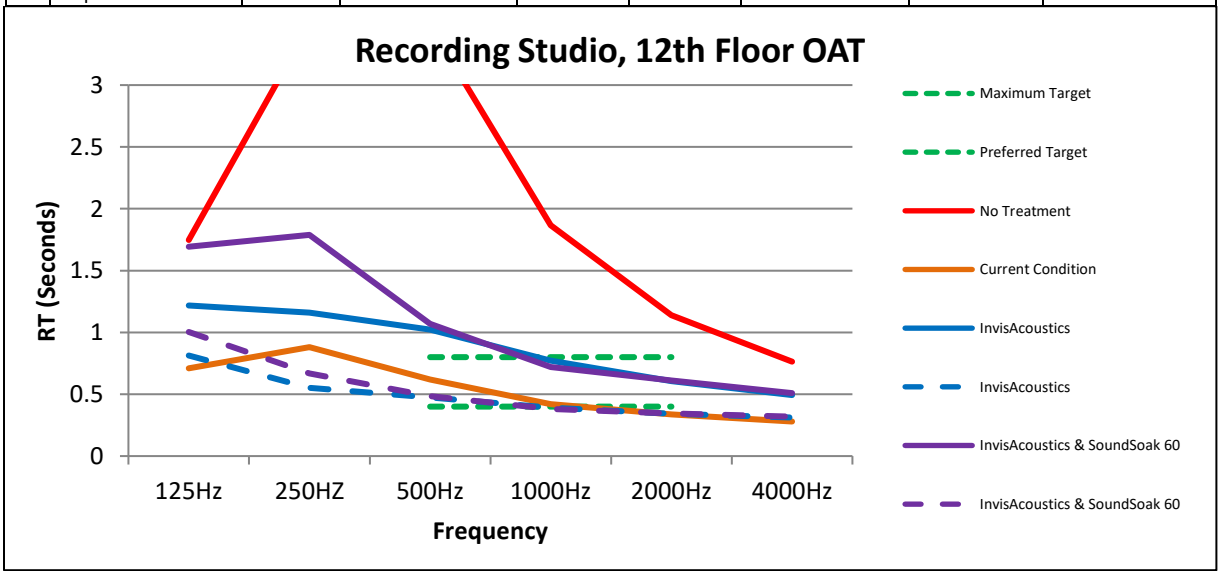
Surface finishes:

- Floor: Carpet
- Walls: Drywall & Glass
- Ceiling Current: Base grade ACT
- Ceiling New: Exposed Structure

Commentary:

1. I have calculated the RT for the space with an exposed structure and no treatment as a baseline.
2. I then calculated with wall-to-wall base grade ACT ceiling for your current condition.
3. Next, I calculated the amount of InvisAcoustics needed to meet the maximum target.
4. I then calculated the amount of InvisAcoustics needed to meet the preferred target.
5. Next, I added SoundSoak 60 to 50% of the walls and InvisAcoustics needed to meet the maximum target.
6. Last, I added SoundSoak 60 to 50% of the walls and InvisAcoustics needed to meet the preferred target.

	Base Ceiling	Ceiling Height	Ceiling Treatment	Amount (SF)	Amount (%)	Wall Treatment	Amount (SF)	Reverberation Time (RT)
1	Exposed Structure	11’	No Treatment	NA	NA	No Treatment	NA	2.16 seconds
2	Base Grade ACT	8’	No Treatment	NA	NA	No Treatment	NA	0.46 seconds
3	Exposed Structure	11’	InvisAcoustics	870 SF	48%	No Treatment	NA	0.80 seconds
4	Exposed Structure	11’	InvisAcoustics	2300 SF	128%	No Treatment	NA	0.40 seconds
5	Exposed Structure	11’	InvisAcoustics	250 SF	14%	SoundSoak 60	700 SF	0.80 seconds
6	Exposed Structure	11’	InvisAcoustics	1670 SF	93%	SoundSoak 60	700 SF	0.40 seconds



Part II: Speech Privacy – Between enclosed rooms

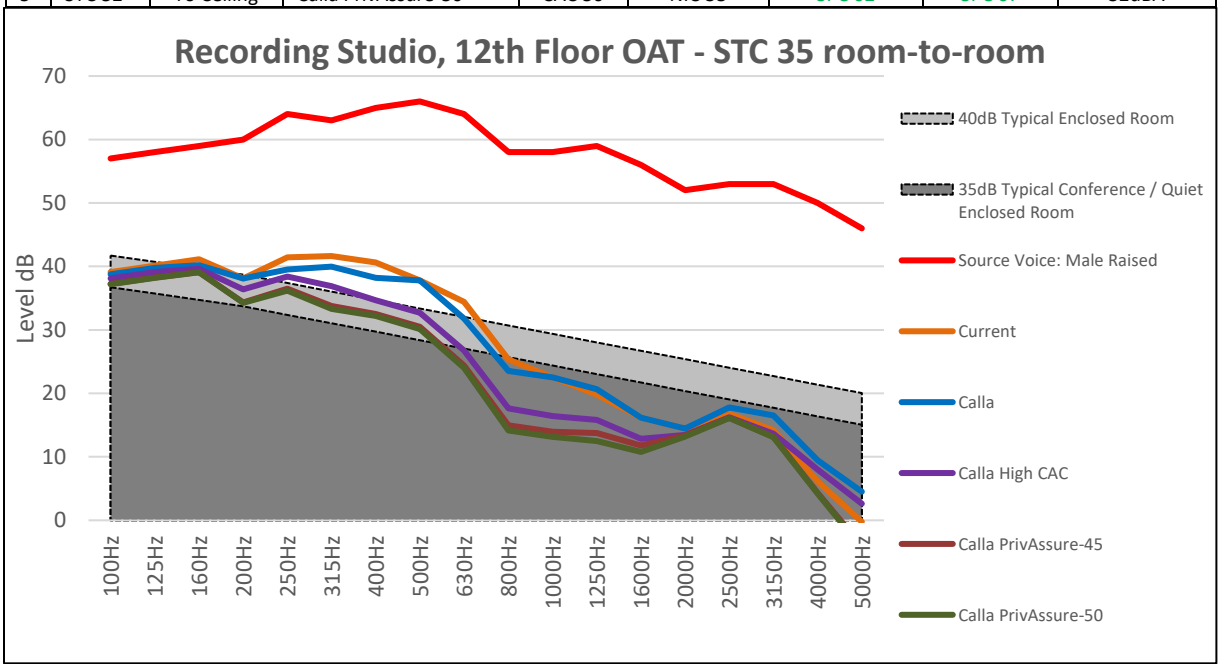
Conditions:

For the current condition I am assuming a typical, basic wall without infill (STC 38) terminating at the ceiling and a base grade mineral fiber ACT ceiling (CAC 33).

Commentary:

- I have calculated the room-to room sound isolation with the STC 38 wall terminating just above the ceiling, along with the CAC 33 base grade ceiling as your current condition.
- I then calculated with each of the ceiling options listed in both rooms.
- Last, I calculated the Speech Privacy Class (SPC) with the background sound at 35dBA (for quiet offices and conference rooms) and 40dBA (for typical offices)

	Wall STC	Wall Height	Ceiling	Ceiling CAC	NIC	SPC @ 35dBA (conference / quiet office)	SPC @ 40dBA (typical office)	Background Sound Level required for Confidential
1	STC 38	To Ceiling	Base Grade	CAC 33	NIC 32	SPC 57	SPC 62	37dBA
2	STC 52	To Ceiling	Calla	CAC 35	NIC 33	SPC 57	SPC 62	37dBA
3	STC 52	To Ceiling	Calla High CAC	CAC 40	NIC 36	SPC 60	SPC 65	35dBA
4	STC 52	To Ceiling	Calla PrivAssure-45	CAC 45	NIC 37	SPC 62	SPC 67	33dBA
5	STC 52	To Ceiling	Calla PrivAssure-50	CAC 50	NIC 38	SPC 62	SPC 67	32dBA



Part III: Speech Privacy – Between enclosed rooms and Photo/video studio (walls to ceiling)

Conditions:

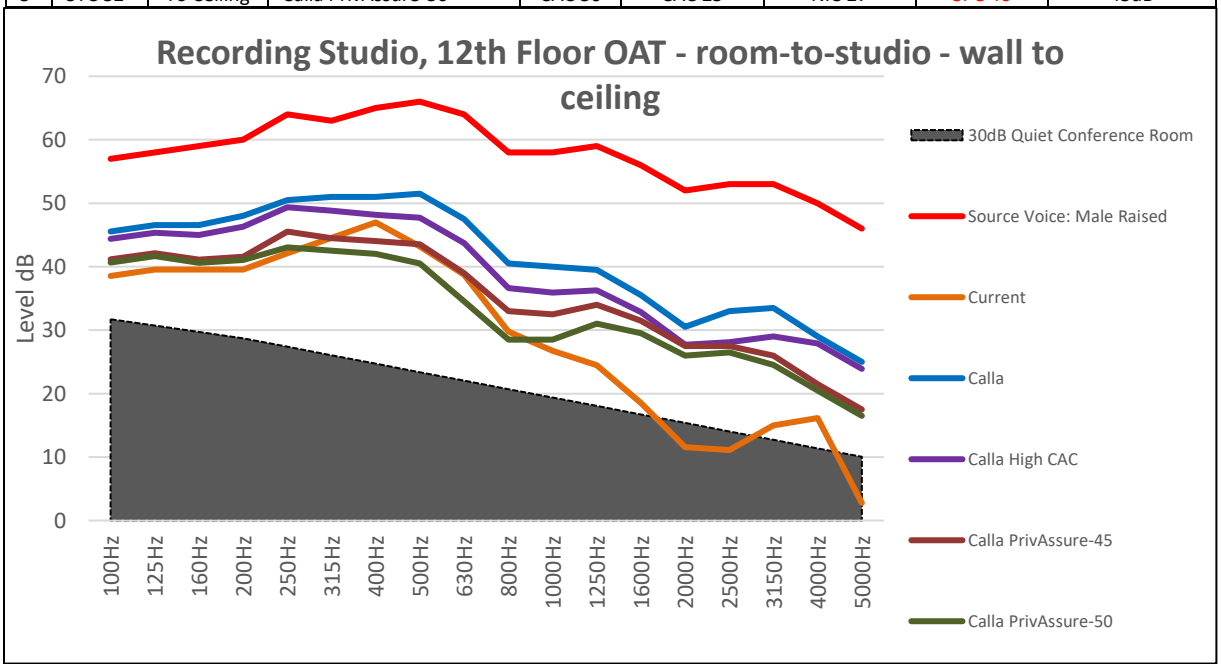
Based on the photo's provided I used glass walls (STC 28) terminating at the ceiling along with a base grade mineral fiber ACT ceiling in both rooms.

The upgraded condition I used a typical basic wall with R11 infill and SoundSoak 60 on one side for an STC 52 terminating at the ceiling.

Commentary:

- I have calculated the room-to room sound isolation with the STC 28 wall terminating just above the ceiling, along with the CAC 33 base grade ceiling as your current condition.
- I then calculated with the new wall terminating at the ceiling and each of the ceiling options listed in one room only.
- Last, I calculated the Speech Privacy Class (SPC) with the background sound at 30dBA (maximum for a recording studio)

	Wall STC	Wall Height	Ceiling One room only	Ceiling CAC	Average CAC	NIC	SPC @ 30dBA (studio)	Background Sound Level required for Confidential
1	STC 28	To Ceiling	Base Grade (both rooms)	CAC 33	CAC 33	NIC 27	SPC 50	40dB
2	STC 52	To Ceiling	Calla	CAC 35	CAC 17	NIC 18	SPC 38	52dB
3	STC 52	To Ceiling	Calla High CAC	CAC 40	CAC 20	NIC 21	SPC 40	49dB
4	STC 52	To Ceiling	Calla PrivAssure-45	CAC 45	CAC 22	NIC 24	SPC 44	45dB
5	STC 52	To Ceiling	Calla PrivAssure-50	CAC 50	CAC 25	NIC 27	SPC 46	43dB



Part IV: Speech Privacy – Between enclosed rooms and Photo/video studio (walls to structure)

Conditions:

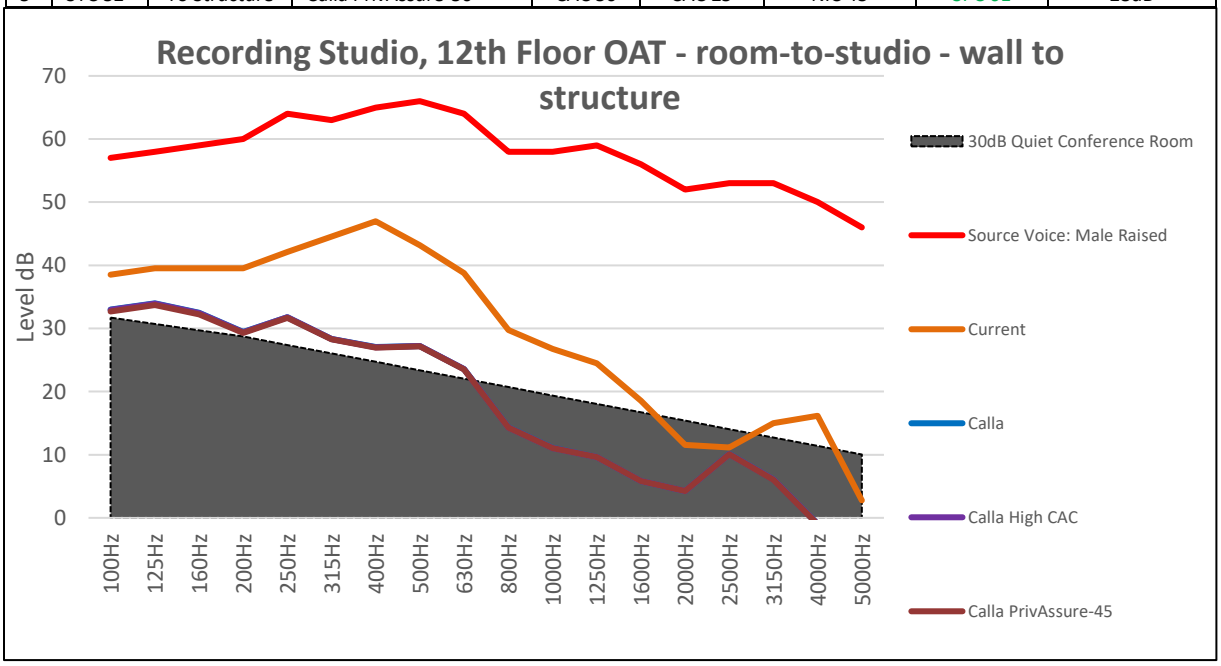
Again, I used glass walls (STC 28) terminating at the ceiling along with a base grade mineral fiber ACT ceiling in both rooms as the "current" condition.

For upgraded condition I used a typical basic wall with R11 infill and SoundSoak 60 on one side for an STC 52 terminating at the structure.

Commentary:

- I have calculated the room-to room sound isolation with the STC 28 wall terminating just above the ceiling, along with the CAC 33 base grade ceiling as your current condition.
- I then calculated with the new wall terminating at the structure and each of the ceiling options listed in one room only.
- Last, I calculated the Speech Privacy Class (SPC) with the background sound at 30dBA (maximum for a recording studio)

	Wall STC	Wall Height	Ceiling One room only	Ceiling CAC	Average CAC	NIC	SPC @ 30dBA (studio)	Background Sound Level required for Confidential
1	STC 28	To Ceiling	Base Grade (both rooms)	CAC 33	CAC 33	NIC 27	SPC 50	40dB
2	STC 52	To Structure	Calla	CAC 35	CAC 17	NIC 42	SPC 61	28dB
3	STC 52	To Structure	Calla High CAC	CAC 40	CAC 20	NIC 42	SPC 61	28dB
4	STC 52	To Structure	Calla PrivAssure-45	CAC 45	CAC 22	NIC 43	SPC 61	28dB
5	STC 52	To Structure	Calla PrivAssure-50	CAC 50	CAC 25	NIC 43	SPC 61	28dB



Regards

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