BLE Bridge & Hub Planner

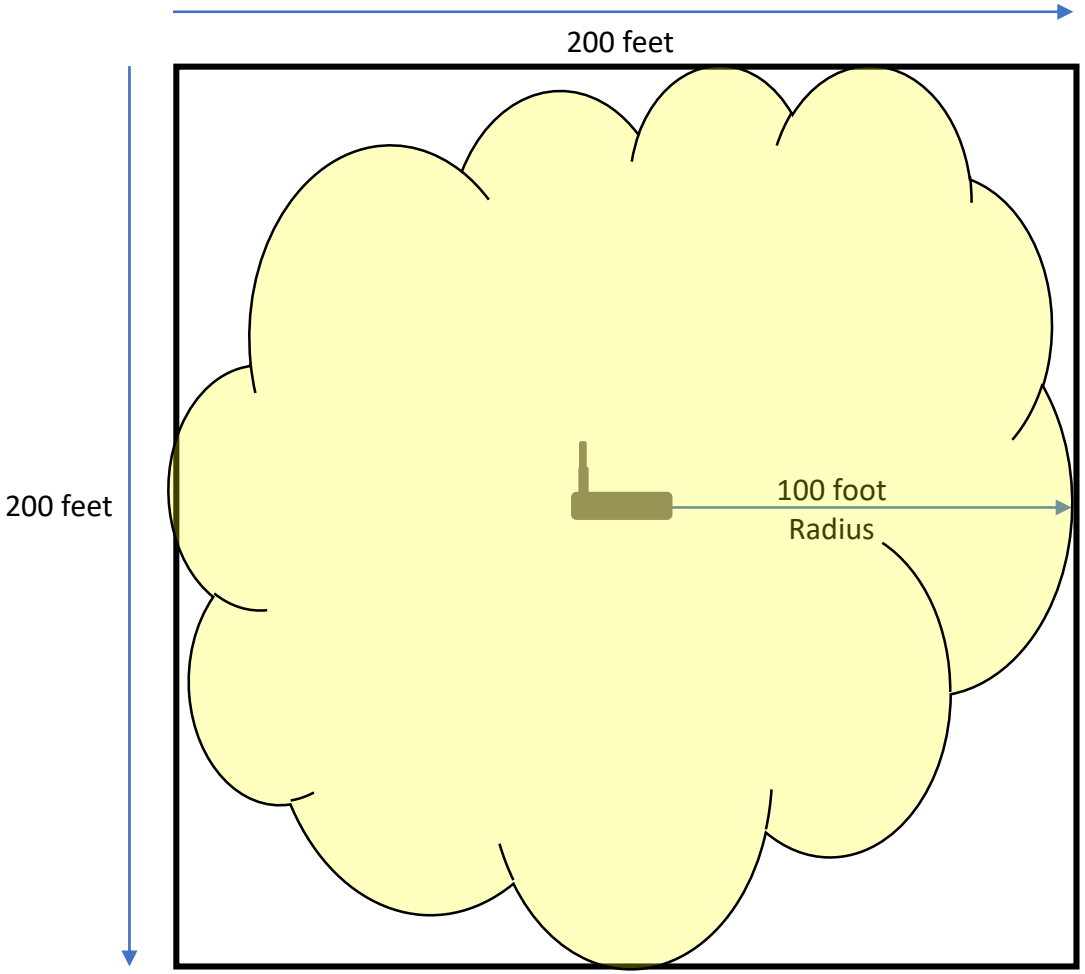
A Guide to Laying out Proxess BLE Bridges & Hubs,

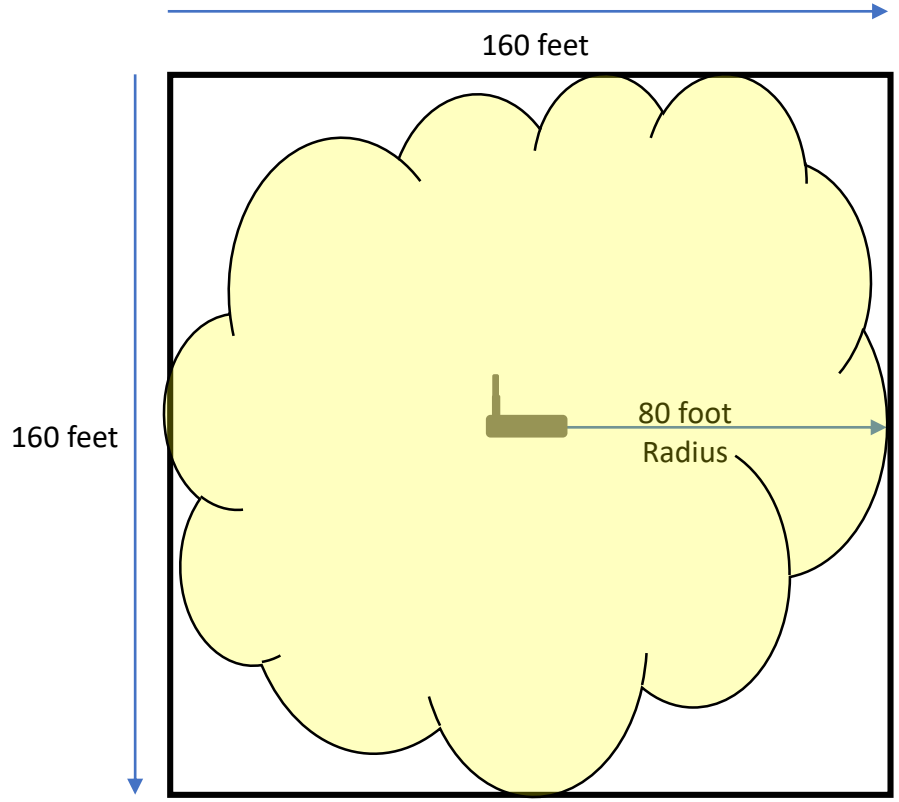
for Connection with Locksets and Mini-Controllers

06-22-19

General Bridge\Hub Coverage Area (a)

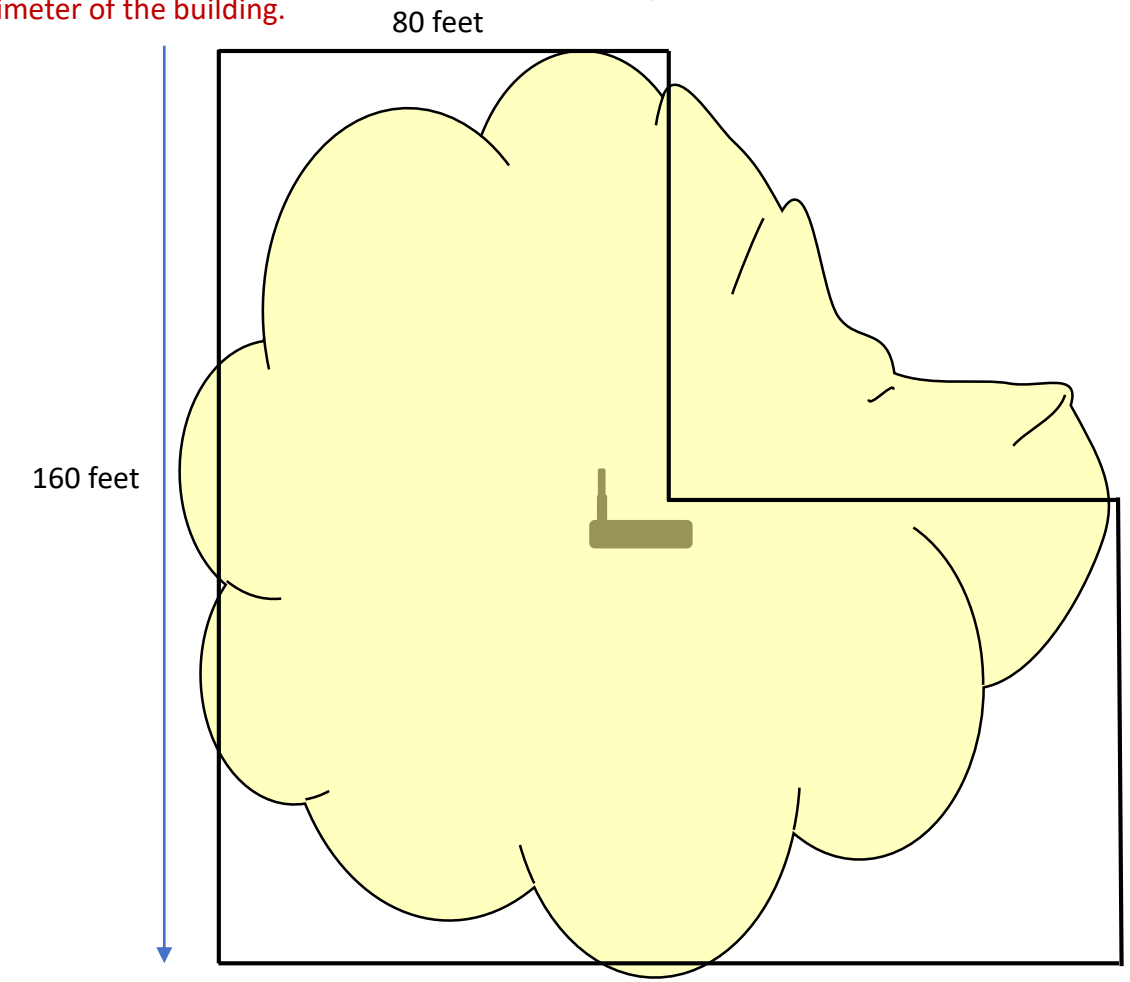
- A bridge can, by its specification, cover a maximum 100 foot radius\200 foot diameter area, which would mean that only one bridge is required to cover the below-left space.
- Throughout this guide we will instead use the more practical free-space coverage of an 80 foot radius160 foot diameter.
- However, even when they are properly placed in the public side of the ceiling tiles, the signal from *any* wireless bridge is not a perfect circle and can not be guaranteed to cover the full extent of the specified distance.





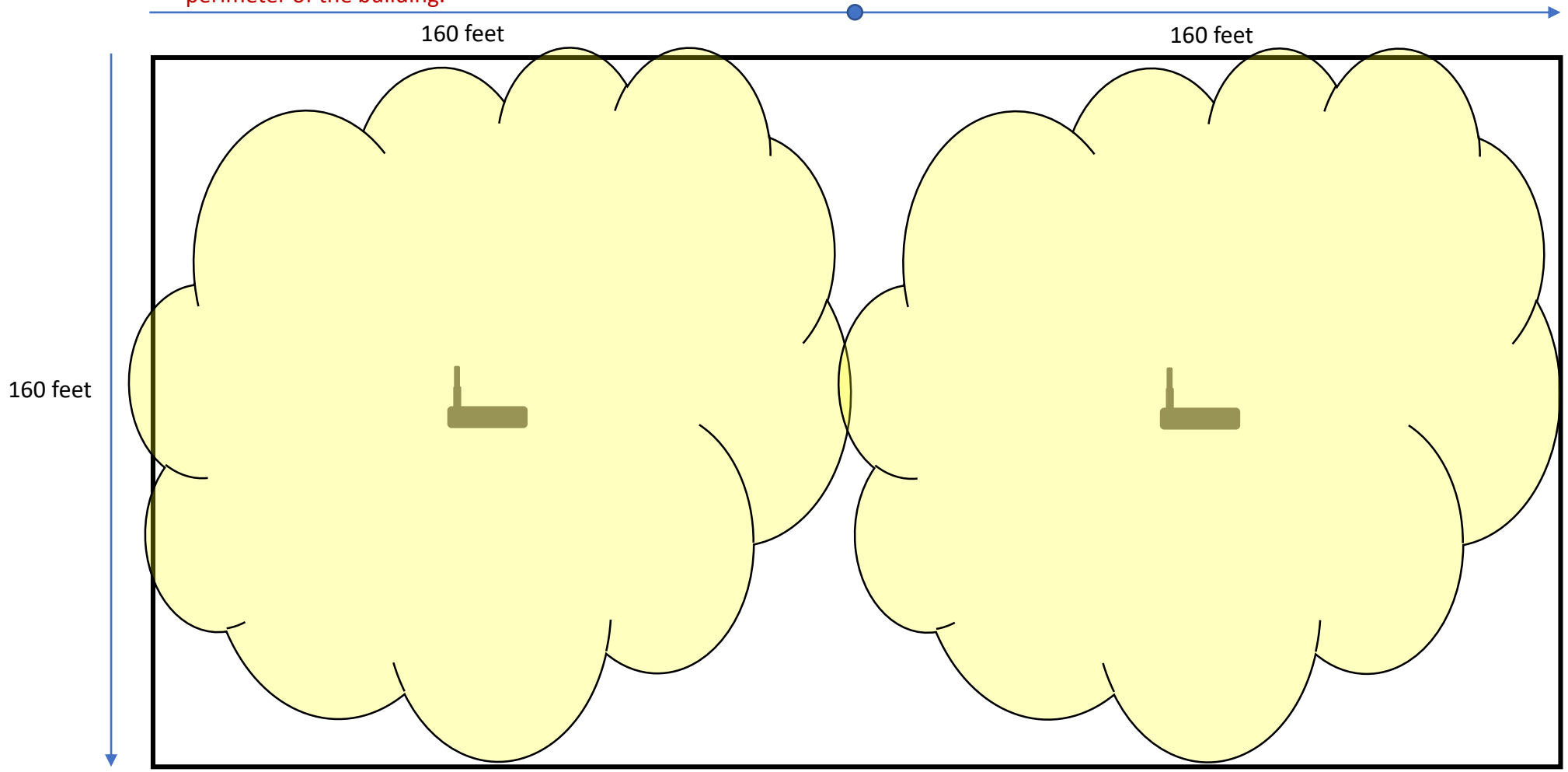
General Bridge\Hub Coverage Area (b)

- A bridge can, by its specification, cover a maximum 80 foot radius\distance, which would mean that only one bridge is required to cover this area.
- However, even when they are properly placed in the public side of the ceiling tiles, the signal from any wireless bridge is not a perfect circle and can not be guaranteed to cover the full extent of the specified distance. In addition, walls and other obstacles will reduce the communication distances.
- Therefore, the deployment shown below would not produce assured constant connectivity to locksets or mini-controllers on the perimeter of the building.



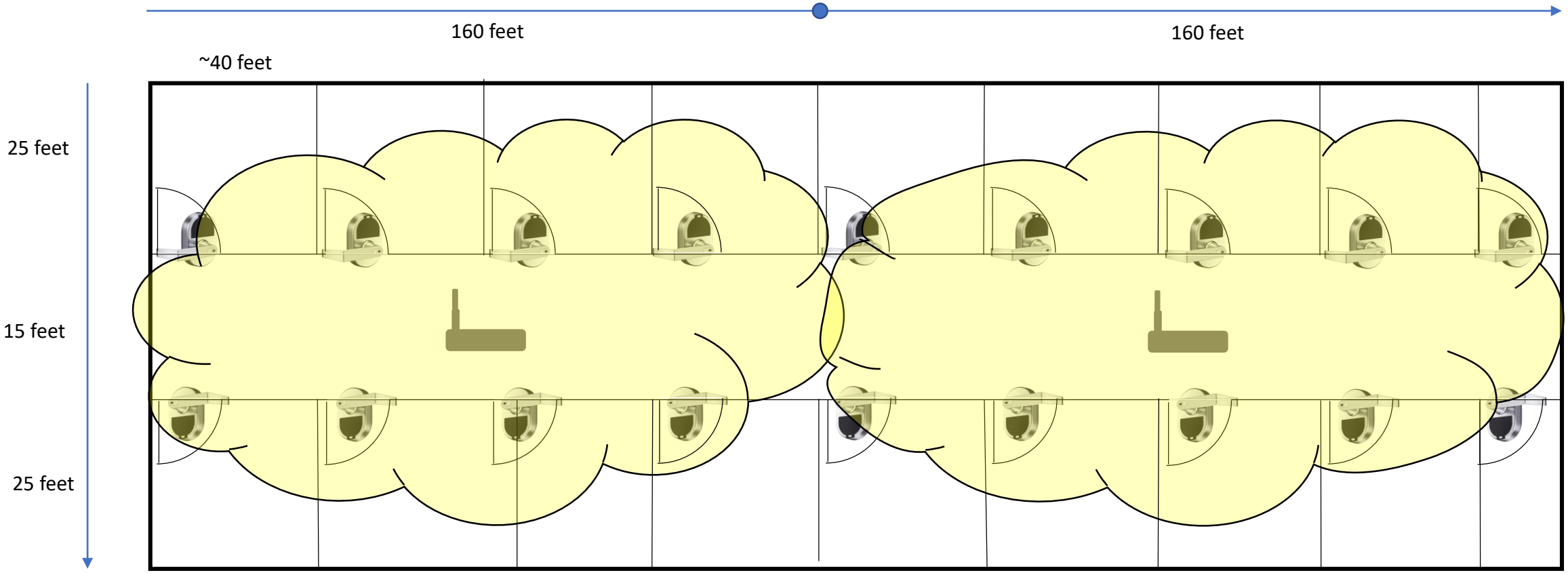
General Bridge\Hub Coverage Area (c)

- Two bridges can, by their specification, cover a maximum 160 foot diameter\distance each, which would mean that only two bridges are required to cover this 320 by 160 foot area.
- However, even when they are properly placed in the public side of the ceiling tiles, the signal from any wireless bridge is not a perfect circle and can not be guaranteed to cover the full extent of the specified distance.
- Therefore, the deployment shown below would not produce assured constant connectivity to locksets or mini-controllers on the perimeter of the building.



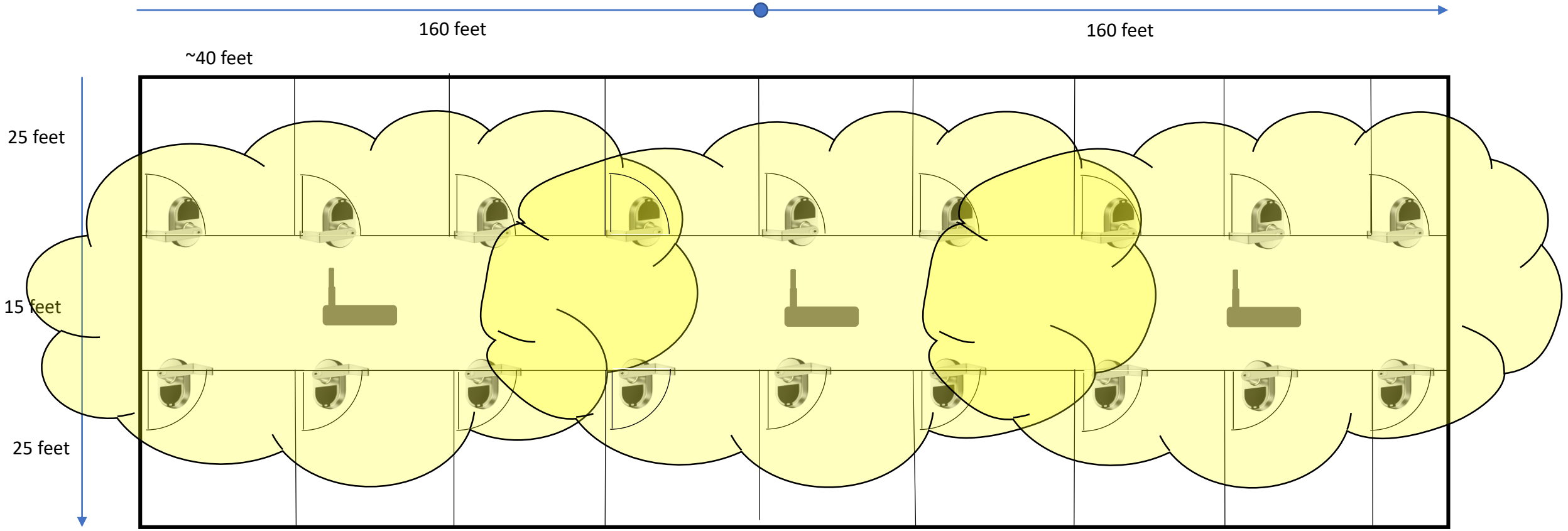
General Bridge\Hub Coverage Area (d)

- Two bridges can, by their specification, cover a maximum 160 foot diameter\distance each, which would mean that only two bridges are required to cover this 320 foot long hallway.
- However, even when they are properly placed in the public side of the ceiling tiles, the signal from any wireless bridge is not a perfect circle and can not be guaranteed to cover the full extent of the specified distance, especially when the normal obstructions and interference from building materials are taken into consideration.
- Therefore, the deployment shown below may not assure constant connectivity to the locksets in this hallway.

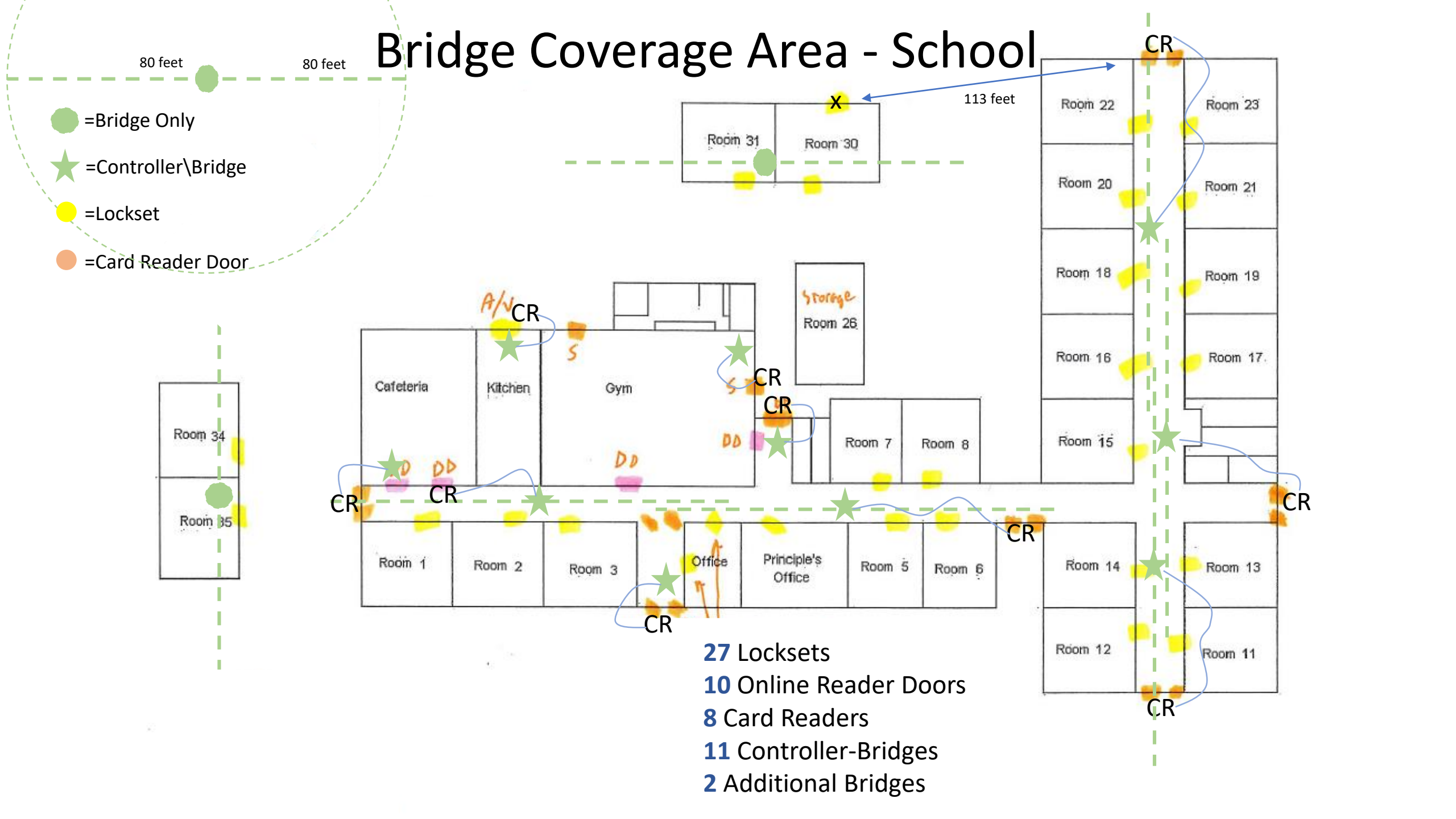


General Bridge\Hub Coverage Area (e)

- This building layout will produce reliable connectivity from the locksets to the bridges and therefore to the software.
- By adding an additional bridge, we have compensated for the imperfections of a wireless signal pattern and the normal obstructions and possible interference from building materials.



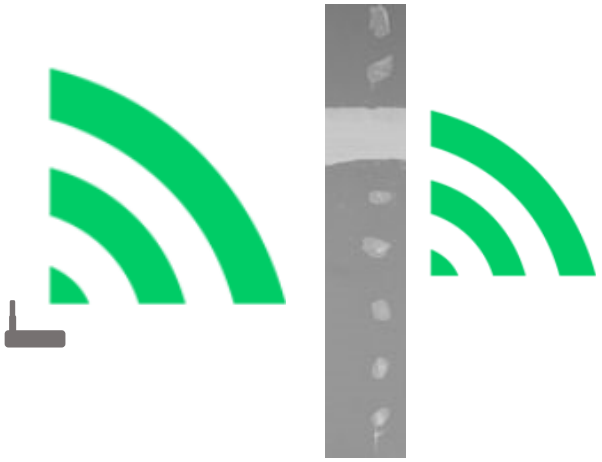
Bridge Coverage Area - School



27 Locksets
10 Online Reader Doors
8 Card Readers
11 Controller-Bridges
2 Additional Bridges

Building Materials

An even better estimate requires knowing the material type of each wall. If internal wall material is brick, cement, or cinderblock, the number of access points needed will increase.
The below diagrams depict the signal drop\loss when going through certain walls or barriers.
As your locksets approach the practical limit of the bridge’s reach, the biggest issue isn’t going to be the access point signal reaching locksets, but the lower power lockset signal getting back to the bridge. So, measuring distances in visible straight lines between bridges and locksets will yield the best chance of success and tests should be performed to assure your design will work.

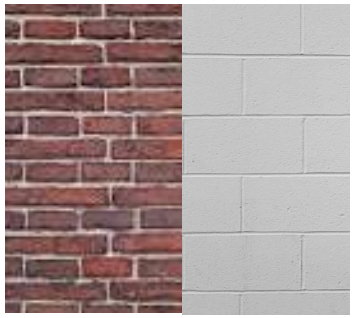


Drywall

Brick

Fixed Obstructions

Building materials, fixtures and fittings will have an effect on the signal strength. While the signal is capable of passing through certain objects, doing so will reduce the range which needs to be considered during the installation. Metallic objects will also cause the signal to reflect, which can cause a signal to fluctuate in strength. Also, an active building, with flowing water and electricity may also have an impact on performance, should designs or tests be performed prior to the building construction or turnover.



Brick & Cinder Block Walls

Plumbing Infrastructure

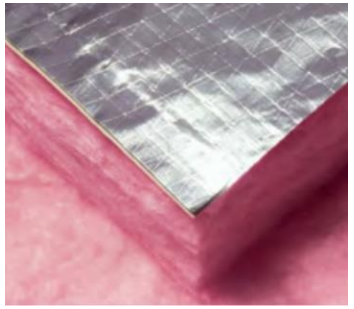
Metal Construction

Stairwells

Elevator & Equipment Rooms

Communications Raceways

Water & Sprinkler Infrastructure



Wall Insulation

Take the Building's Construction into Account

Compared to an office building, larger spaces, such as auditoriums or cafeterias are built differently and will likely require different bridge layouts. High ceilings and thicker wall material can necessitate other placement options. In these cases, it is possible that the use of directional antennas might be required due to the fact that most omni-directional antenna cells cannot cover enough vertical distance. It is important to understand that a bridge mounted to a high ceiling or flush to a wall, will not work the same as one mounted on a normal height ceiling.

2.4 GHz Signal Loss (dB) through various materials: Proxess Bridge Power Budget = 100 dB

- Air (30 feet = 60dB, 60 feet = 68dB, 100 feet = 90dB)
- Thin Window (2 dB)
- Plasterboard Wall (3 dB)
- Window Office (3 dB)
- Cinder Block Wall (4 dB)
- Dry Wall (4 dB)
- Light (Wood) Door (4 dB)
- Thick Window (4 dB)
- Glass Wall with Metal Frame (6 dB)
- Brick Wall (8 dB)
- Metal Door (11 dB)
- Concrete Wall (12 dB)
- Heavy Door (15 dB)
- Reinforced Concrete Floor (30 dB)

Overlapping: A Problem with our Competitors

When planning the bridge\gateways\access points layout for a network, it is important to bear in mind that the coverage cells of the bridges will most likely overlap with others. While there generally should be some overlap, how much will depend on the intended use of the network. Typically, roaming and location based services will require more overlap than networks that do not require these services. However, too much overlap can lead to increased interference, if the overlapping bridges are transmitting on the same channel as well as bumping\crowding out and orphaning nearby locksets. This problem is often exacerbated in multi-level buildings.

Proxess assigns locksets to bridges, locking them down and preventing wandering and orphaning.