Barn In-Plant Office — Design Options

Nov 23, 2026 · @Toby

My recommendation is a 19 × 13 ft DIY stick-built room filling the corner out to the steel column, with 2x6 walls and a 2x12 storage deck on top. That's 247 sf, and it costs about $10.5k–$15k in materials and equipment. Your measurements show the corner is bigger than I first estimated. The front wall stops about 22 in. short of the overhead door's track, so the big door stays completely clear. The deck top lands about 17 in. under the exhaust fan. A prefab steel-panel office would cost about the same for a much smaller box, and its roof won't carry storage unless you pay for an engineered deck. The same shell also works as a recording studio with a vocal booth (section 3B), or as a TV lounge with an office corner (section 3C).

1. The corner: photos and your measurements

The building is a pre-engineered steel barn. It has red-oxide rigid frames, steel girts and purlins, and a white vinyl-faced fiberglass blanket lining the walls and roof. The bottom ~4 ft of wall is wood wainscot. The floor is a slab with saw-cut joints on a 10 ft grid. Here's what matters for the office, combining your measurements with the photos:

- **Overhead door.** From the corner to the light switch is 14 ft. In your photo the switch looks about 10 in. short of the door's steel track, which puts the track roughly 14 ft 10 in. from the corner. The horizontal tracks run 15.5 ft back into the barn. The door width hasn't been measured yet; it looks like about 12 ft.
- **Exhaust fan.** The bottom of the fan box is 11 ft 6 in. up. It sits just inside the door track, so it ends up above the office's front corner at the door-wall end. The deck has to stay below it.
- **Sink wall.** It's 19 ft from the wood paneling in the corner to the inside edge of the steel column. The office's end wall will butt against that column.
- **Barn walls.** The blanket insulation is roughly R-10 and full of steel thermal bridges. The office should have its **own freestanding walls**, set 1–2 in. off the barn liner and not fastened through it.
- **Electrical panel.** It's at the diagonally opposite corner of the barn and has several open spaces. That makes a subpanel at the office the right approach (section 9).
- **Eave height.** Not measured yet; it looks like about 14–16 ft.

Measurements so far. Confirm the items marked "verify" before buying lumber.

#	Measurement	Value	Status
A	Corner → light switch on the door wall	14 ft	Measured
A+	Light switch → near edge of the door track	~10 in. (read from photo)	**Verify:** confirms the ~22 in. door clearance
B	Door opening width	~12 ft (estimate)	Verify; doesn't affect the office
C	Corner paneling → inside edge of steel column, sink wall	19 ft	Measured
D	Steel column positions	—	Verify none land inside the 19 × 13 outline
E	Door track depth into the barn	15.5 ft	Measured
F	Floor → bottom of the exhaust fan box	11 ft 6 in.	Measured
H	Floor → lowest steel beam	~14–16 ft (estimate)	Optional: limits storage stacking
J	Electrical panel	Opposite diagonal corner, several open spaces	Noted

2. Footprint: 19 × 13 ft (247 sf), corner to column

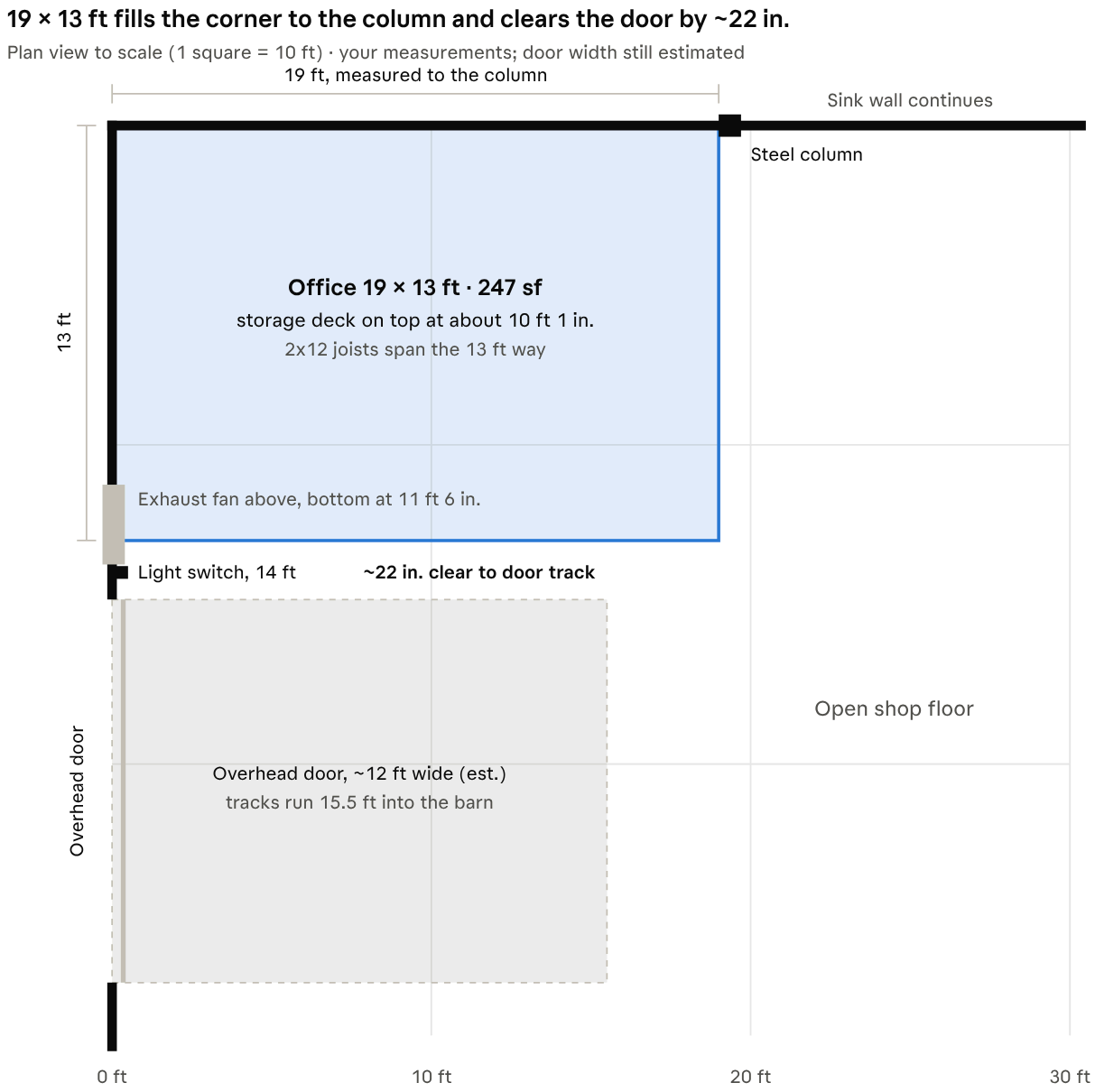
For your 250 sf target, the corner holds **19 ft along the sink wall × 13 ft out along the door wall**, or 247 sf. Along the sink wall it runs the full 19 ft to the steel column. Along the door wall it stops about 22 in. short of the overhead door's track, so the door, its chain and its 15.5 ft tracks all stay clear with room to spare. The joists span the shorter 13 ft direction. If you'd rather have exactly 250+, 18 × 14 ft gives 252 sf, but it leaves a 1 ft dead gap at the column and only about 10 in. at the door track.

Item	Dimension
Outside footprint	19 ft along the sink wall × 13 ft along the door wall

Item	Dimension
Floor area	247 sf outside, about 218 sf inside
End wall	Tight against the inside face of the steel column
Clearance to door track	About 22 in. (14 ft to the switch + ~10 in. to the track − 13 ft)
Deck top vs. fan bottom	About 10 ft 1 in. vs. 11 ft 6 in., so about 17 in. clear

At 13 ft deep, the office's front wall lands about a foot short of the light switch, so the switch can stay where it is. Frame the end wall about 1/2 in. off the column rather than touching it, and fill that gap with foam. That keeps the steel from conducting cold into the office and stops the column from buzzing when the band plays.

The plan below is drawn to scale on your 10 ft floor grid, using your measurements. The door width is still an estimate.



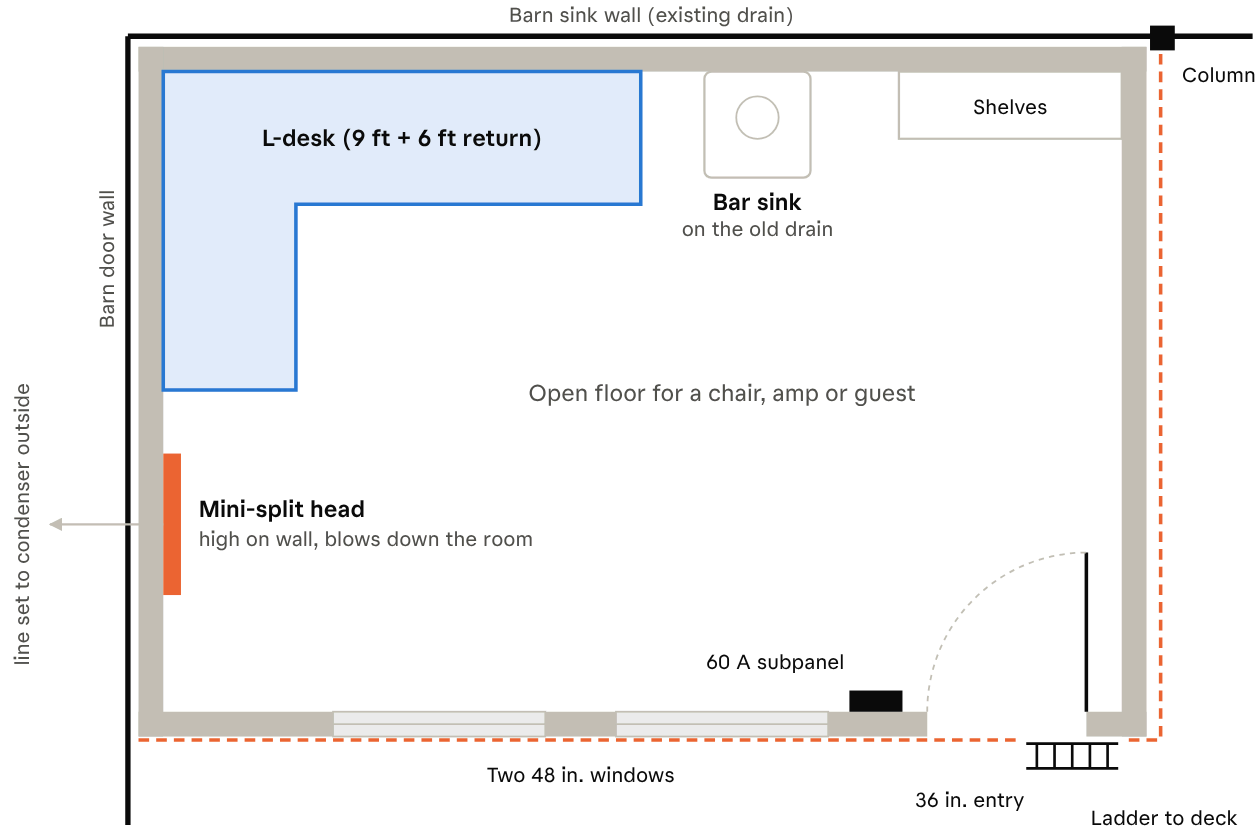
Corner plan · 19 × 13 ft office against the door, fan and column

3. Option A — DIY stick-built room with storage deck (recommended)

This is a freestanding 2x6 box, 19 × 13 ft outside, under a 2x12 deck rated for 50 psf of storage. Inside you get about 18 ft × 12 ft with an 8 ft 10 in. ceiling. The deck surface lands about 10 ft 1 in. up, roughly 17 in. under the exhaust fan. Everything is standard lumber-yard material, and every step is a DIY job: you and a helper can frame the shell and set the deck in two or three weekends.

Option A layout: desk on the barn walls, door and windows facing the shop

Plan to scale · 19 × 13 ft outside, 2x6 walls · storage deck above at about 10 ft 1 in.



Option A floor plan · 19 × 13 ft with storage deck above

Layout (drawn above):

- **Entry:** a 36 in. insulated steel prehung door in the shop-facing front wall, near the column end, swinging in. That keeps the door swing out of the overhead door's lane.
- **Windows:** two 48 × 36 in. double-pane sliders in the front wall, so you can see the shop floor and the big door. Use laminated glass if sound matters.
- **Desk:** an L-desk in the back corner, about 9 ft along the sink wall plus a 6 ft return along the door wall.
- **Coffee/sink station:** swap the big shop sink for a 15 in. bar sink in a 24 in. base cabinet on the existing drain.
- **Heat/AC:** a mini-split head high on the door-wall end, blowing down the 18 ft length. The line set goes straight out through the barn wall to a condenser on a pad.

- **Subpanel:** a 60 A subpanel inside the front wall next to the entry door, fed from the main panel across the barn (section 9).
- **Storage access:** a fixed ladder on the shop side of the front wall at the column end, or a rolling warehouse ladder. A 42 in. guardrail runs along the front and column-side edges of the deck.

Item	Spec
Outside size	19 ft × 13 ft (247 sf)
Wall height	9 ft 1 in. to top of plates (104-5/8 in. precut studs)
Deck surface height	About 10 ft 1 in. (plates + 11-1/4 in. joists + 3/4 in. deck); fan bottom is at 11 ft 6 in.
Interior clear	About 18 ft 1 in. × 12 ft 1 in. × 8 ft 10 in. after floor build-up
Studs	2x6 @ 16 in. o.c., kiln-dried SPF or SYP
Bottom plate	Pressure-treated 2x6 on foam sill gasket, 1/4 × 3-1/4 in. Tapcons 12 in. from ends and 32 in. o.c.
Top plate	Doubled 2x6, lapped at corners
Bearing walls	The two 19 ft walls (sink-wall side and front) carry the joists
Headers (front wall)	(2) 2x12 + 1/2 in. plywood spacer over the door and each window, double jack studs
Barn-side walls	Freestanding, 1–2 in. off the barn liner; end wall 1/2 in. off the column, gap foamed
Shop-side finish	1/2 in. plywood or T1-11 (takes hooks and shelves, matches the wainscot)
Interior finish	5/8 in. Type X drywall, walls and ceiling
Entry door	36 × 80 in. insulated steel exterior prehung, weatherstripped, threshold and sweep
Windows	(2) 48 × 36 in. vinyl sliders, double-pane low-E

Suggested build order:

1. Clear the corner and cap the sink.
2. Snap the outline on the slab.
3. Frame and stand the walls.
4. Set the joists, deck and guardrail.
5. Rough in the subpanel, wiring and mini-split line set.
6. Insulate.
7. Hang and finish the drywall.
8. Lay the floor.
9. Trim out, set the sink and mount the head unit.

The deck structure is detailed in section 6 and the insulation in section 7.

3B. Studio version — control room + vocal booth

This version uses the same 19 × 13 ft shell and storage deck. A 6 × 7.5 ft vocal booth sits in the back corner at the column end, built as a room within the room. It has its own walls, floor and ceiling, none of them touching the office structure. A double-pane window looks out at the control room desk. The control room keeps about 11 × 12 ft, which is enough for a desk, monitors, keys and a guitar or two. Expect about STC 55–60 between the booth and the control room. That's quiet enough to track vocals with the monitors at normal volume. A full band out in the barn will still come through faintly in the low end, so record vocals when the drums are quiet.

Layout:

- **Vocal booth:** about 6 ft wide × 7 ft 6 in. deep inside, in the back corner against the column-end wall and the sink wall.
- **Window:** about 36 × 24 in., centered in the booth wall that faces the control room, sill at about 40 in. so the singer and engineer can see each other.
- **Control room:** about 11 ft × 12 ft. The desk faces the booth window with the monitors on either side of it. The mini-split head goes on the door-wall end.
- **Entry:** the office door in the front wall at the column end opens into a small vestibule, about 3 ft 6 in. wide, in front of the booth. The booth door opens off that vestibule.
- **Shop windows:** use one 48 × 36 in. laminated window in the control room's front wall instead of two, to keep shop noise down.
- **Sink:** optional. Water and plumbing noise don't mix well with a studio, so cap the drain or keep the bar sink at the door-wall end, away from the booth.

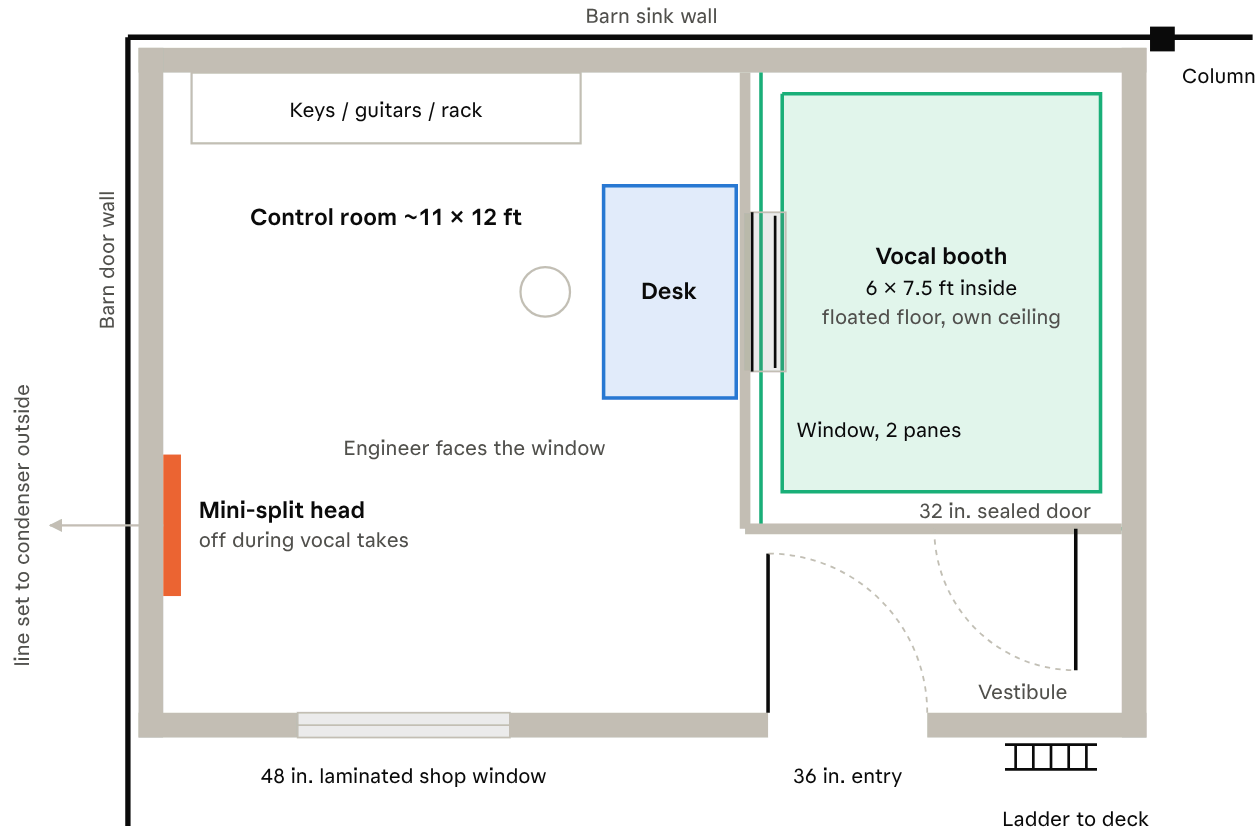
Booth element	DIY spec
Booth walls	Separate 2x4 @ 16 in. walls on their own plates, 1 in. air gap to every office wall. R-13 mineral wool. Two layers of 5/8 in. drywall with Green Glue between them on the booth side
Partition to control room	Double-stud: the control room's 2x4 wall + the booth's 2x4 wall, 1 in. apart, about 11 in. thick overall. Two layers of 5/8 in. drywall + Green Glue on each outer face
Booth floor	Floating floor: two layers of 3/4 in. plywood with Green Glue, on 1 in. rubber isolation pads or a 2x4 sleeper grid on neoprene pucks; raises the booth floor about 3 in.
Booth ceiling	Its own 2x6 joists @ 16 in. spanning the 6 ft width on the booth walls, R-19 mineral wool, two layers of 5/8 in. drywall + Green Glue, at least a 2 in. gap below the office ceiling. About 7 ft 9 in. clear inside
Window	Two separate panes, one in each stud wall: 1/4 in. laminated on the control room side, 3/8 in. laminated on the booth side. 4–5 in. air gap, one pane tilted about 5°, glass bedded in neoprene, cavity lined with fabric-covered mineral wool
Door	32 in. solid-core door with full perimeter seals and an automatic door bottom. A second door in the outer stud wall gives the best isolation
Ventilation	Two lined baffle boxes (supply and return) through the booth ceiling, with a quiet 4 in. inline fan at the far end. It pulls conditioned air from the control room without letting sound through
Cables	Wall-plate snake (XLR/TRS/headphone) through the partition, or a 2 in. sleeve packed with acoustic putty

Booth element	DIY spec
Acoustic treatment	Booth: 2 in. mineral wool panels on 40–60% of the walls, corner bass traps, ceiling cloud. Control room: panels at the side-wall first reflections, 4 in. corner bass traps, a cloud over the desk, a rug

Studio add-on cost (DIY, approximate): about $3,000–$6,000 on top of the Option A budget. That covers the extra framing, about 40 more sheets of 5/8 in. drywall and the Green Glue, the floating floor, the window glass, solid-core door and seals, ventilation boxes and fan, acoustic panels and the cable snake.

Studio version: 11 × 12 ft control room facing a 6 × 7.5 ft vocal booth

Plan to scale · same 19 × 13 ft shell · booth is a room within the room: own walls, floated floor, own ceiling



Grey: office walls and partition face · green: the booth's own inner walls, 1 in. apart

Studio floor plan · control room, vocal booth, window and vestibule

3C. Lounge + office version

This version uses the same 19 × 13 ft shell and storage deck, split into two zones with no interior wall. An office zone of about 8 × 12 ft sits at the door-wall end. A TV lounge of about 10 × 12 ft sits at the column end. The sofa's back faces the desk, so it works as a room divider. The TV goes on the column-end wall, where no window faces it or sits behind it, so the screen stays glare-free. A small kitchenette on the old sink drain serves both zones.

Layout:

- **Office zone:** an L-desk on the door-wall end (6 ft) returning along the sink wall (about 4.5 ft). The mini-split head is high on the same end wall, blowing down the room's length.
- **Lounge:** a 65 in. TV centered on the column-end wall over a low media console. A 3-seat sofa (about 84 in.) sits facing it at roughly 7.5 ft, the right viewing distance for a 65 in. 4K set. There's a coffee table and rug in between, and an accent chair in the back corner.
- **Kitchenette:** a 4 ft run on the sink wall between the zones: a bar sink on the existing drain, an under-counter mini fridge and one upper cabinet.
- **Entry:** a 36 in. insulated steel door with a half-lite glass panel in the front wall, between the sofa and the TV end.
- **Windows (redesigned):** a 48 × 36 in. slider in the office zone's front wall for daylight at the desk. A smaller 36 × 36 in. slider in the lounge sits beside the sofa, side-on to the TV rather than facing it. Both get cellular shades so the lounge can go dark for movies. There's no window on the TV wall or opposite it.
- **Storage access:** the same ladder and guardrail as Option A, at the column end of the front wall.

Lounge element	DIY spec
TV wall	Two rows of 2x6 flat blocking between studs at 40 and 60 in. on the column-end wall, for a full-motion or tilt mount
TV wiring	Recessed media box behind the TV with an outlet and a 2 in. conduit down to the console. Cat6 and HDMI pulled through the conduit, so cables never show

Lounge element	DIY spec
Sound	Speaker wire for a 5.1 or 3.1 setup run inside the walls before drywall: front left/right on the TV wall, surrounds on the side walls behind the sofa. Or just a soundbar on the console
Lighting	Two switched zones of dimmable 6 in. wafer lights (office / lounge), plus an LED strip behind the TV for bias lighting
Kitchenette	48 in. base cabinet with 15 in. bar sink and faucet, 20 in. under-counter fridge space with its own 20 A outlet, 30 in. upper cabinet
Floor	Same poly + XPS + plywood build-up as Option A, LVP throughout, an 8 × 10 ft rug in the lounge
Windows	48 × 36 in. and 36 × 36 in. vinyl sliders, double-pane low-E, cellular (blackout) shades

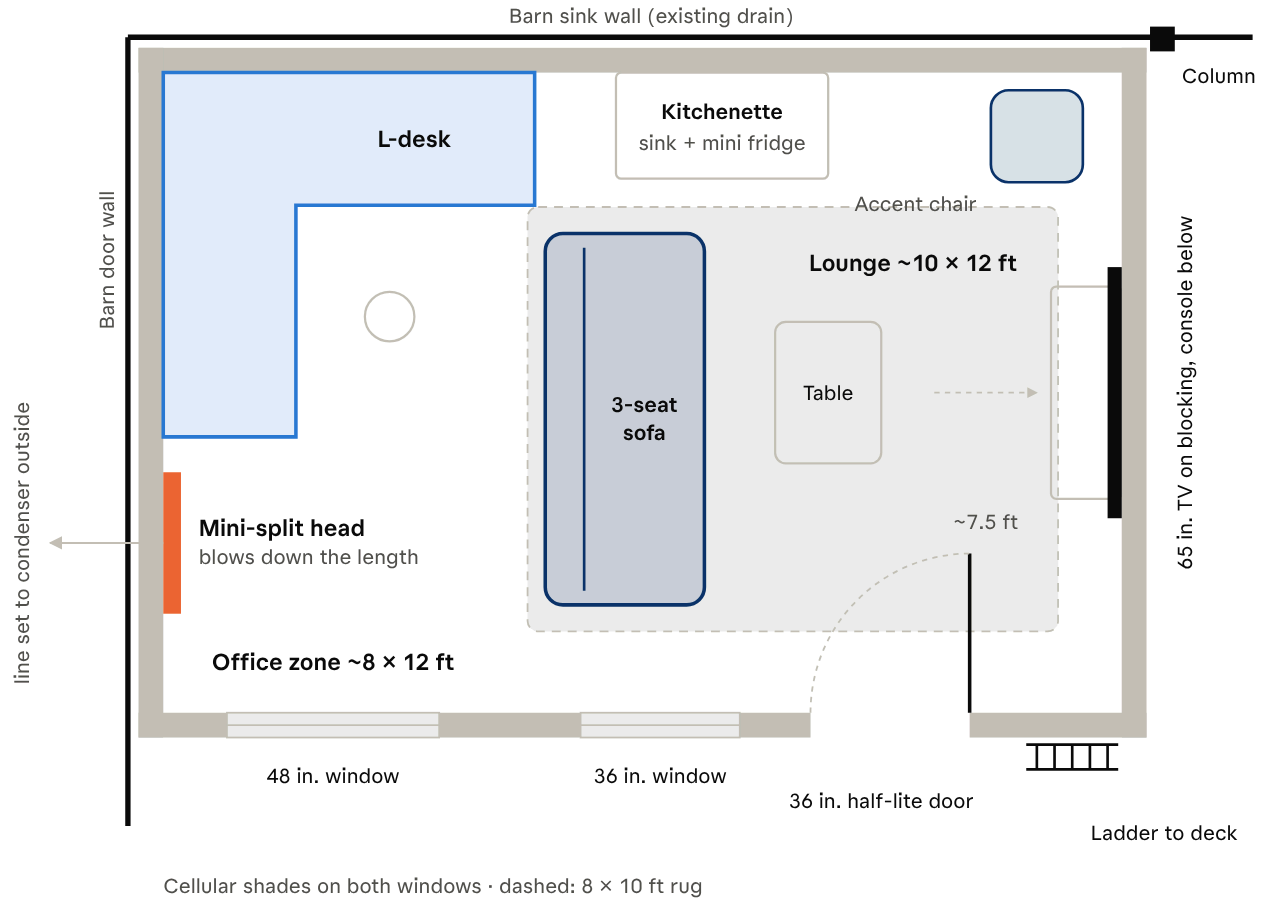
Dark finish scheme: the lounge is designed as a dark, low-lit den.

- **Walls and ceiling:** charcoal walls (about #2B2D31, a flat or matte paint) and a matte black ceiling. These make the room feel enclosed and help the TV image.
- **Walnut slat wall:** an acoustic panel behind the TV, with black felt behind the slats. It also soaks up sound.
- **Floor:** smoked-oak LVP.
- **Rug:** charcoal, with a bronze border.
- **Furniture:** a cognac leather sofa and a deep-green velvet accent chair.
- **Kitchenette:** matte black cabinets, a dark stone top and brass hardware.
- **Lighting:**
  - Dimmable 2700 K downlights.
  - Warm LED strips under the bookshelf, under the upper cabinet and beneath the floating TV console.
  - A bias strip behind the TV.
  - A brass floor lamp and a picture light.

Lounge add-on cost (DIY, approximate): about $300–$600 on top of the Option A budget. That covers the TV blocking, media box and conduit, speaker wire, the second lighting zone and the upper cabinet. The window change roughly cancels out against Option A's two 48 in. windows. The TV, sofa, mini fridge and other furniture aren't included.

Lounge + office: TV lounge at the column end, desk at the door end

Plan to scale · same 19 × 13 ft shell and storage deck · windows side-on to the TV, never facing it



Cellular shades on both windows · dashed: 8 × 10 ft rug

Lounge + office floor plan · 19 × 13 ft

3D inside view: open the interactive 3D model of the lounge + office. It opens seated at the desk, facing the whole room.

- **Looking around:** drag to look; scroll or pinch zooms the lens. Inside views turn in place, so you can't zoom out through the walls.
- **Moving:** walk with W A S D or the arrow keys, or tap the minimap to jump.
- **Views:** at the desk, from the door, on the sofa, the TV corner, and a ceiling-off dollhouse.
- **Lighting:** Evening, Movie and Work lights modes.



Stills from the 3D model, dark scheme. Top row: seated at the desk looking across the room in evening lighting, and from the door. Bottom row: from the sofa in movie mode, and the ceiling-off dollhouse.

4. Option B — prefab modular in-plant office

A catalog in-plant office costs roughly $9.5k–$16k for 12 × 12 ft before freight, HVAC and flooring. Its standard roof is a dust cover, not a storage floor. To get your storage deck you need a custom-quoted load-bearing roof, which makes these the priciest way to get what you described. Their real advantages are speed, since the panels bolt together and there's no drywall mud, and that you can unbolt and move the room later. A handy owner can assemble one in a day or two.

Unit	Size	Price	Notes
Porta-King 2-wall, vinyl, Class C	12 × 12 ft	$6,299	Uses the barn's walls for two sides, so they would still need insulating
Porta-King 4-wall, white vinyl, Class A, STC 31	12 × 12 ft	$9,499	8 ft high, 3 in. panels, steel door with vision lite

Unit	Size	Price	Notes
Global Industrial 4-wall, Class A	12 × 12 ft	$10,449	2 windows
PortaFab GS1212 4-wall, steel	12.4 × 12.4 ft	$16,131	R-11 panels, 3 lights, 4 outlets

What the panels give you: PortaFab lists its thermal panel at R-13 / STC-24 and its fire-and-sound panel at R-11 / STC-31, with a 2 × 4 ft drop ceiling and R-19 batts. That's comparable to 2x4 walls, but below the R-23 mineral-wool walls in Option A.

Storage roof: Panel Built's standard roof is a 22-gauge steel deck rated for only 5 psf. Walkable roofs are 30 psf, and true storage roofs are 125 psf, with 40, 50 and 100 psf engineered on request. InPlant Offices and Allied Modular sell load-bearing roofs too. All of these are quote-only.

Other catches:

- Freight is extra. Zoro adds a $550 special-delivery surcharge on one 12 × 12 unit.
- HVAC isn't included, so add the same mini-split as Option A.
- The floor is your bare slab.
- Custom sizes run 4–6 weeks after drawing approval. Panel Built's own guide puts typical projects at $65–$150 per sq ft, which is $16k–$37k for a custom 247 sf room.
- Standard walls are 8 ft. With load-bearing roof beams on top, keep the total under your 11 ft 6 in. fan line.

5. Option C — insulated panels (SIPs or used walk-in cooler panels)

SIP walls go up fast, are airtight, and insulate better per inch than studs. But they cost more than Option A and block sound worse, which matters with a jam space next door. SIPs run about $7–$12 per sq ft of panel (about $9.70 on average). The ~576 sf of wall in a 19 × 13 × 9 ft room comes to about $4,000–$6,900 for panels alone. That's roughly 2–3 times the cost of 2x6 studs plus mineral wool.

- **SIP spec:** 6-1/2 in. EPS-core panels with OSB skins (about R-23), on a PT 2x6 sill plate. Spline joints are foamed and screwed. Plan the electrical chases with the supplier before they cut the panels.
- **Deck:** use the same 2x12 joist deck as Option A on a doubled top plate. SIP roof panels can carry storage too, but the supplier has to engineer them for 50 psf.

- **Sound:** foam cores are lightweight and pass more sound than mineral wool. Add a second layer of drywall inside if quiet matters.
- **Used walk-in cooler/freezer panels:** these are a budget wildcard. They're about 4 in. of urethane foam with steel skins and cam-lock joints, and they turn up on Marketplace when restaurants close. Very high R-value and fast to assemble, but sizes are whatever you find, and their ceiling panels are not built for storage. You would frame the deck on its own posts.

Go with Option C if you want the fastest airtight shell and don't mind paying more. For your 247 sf storage-deck room, Option A wins on cost, sound and simplicity.

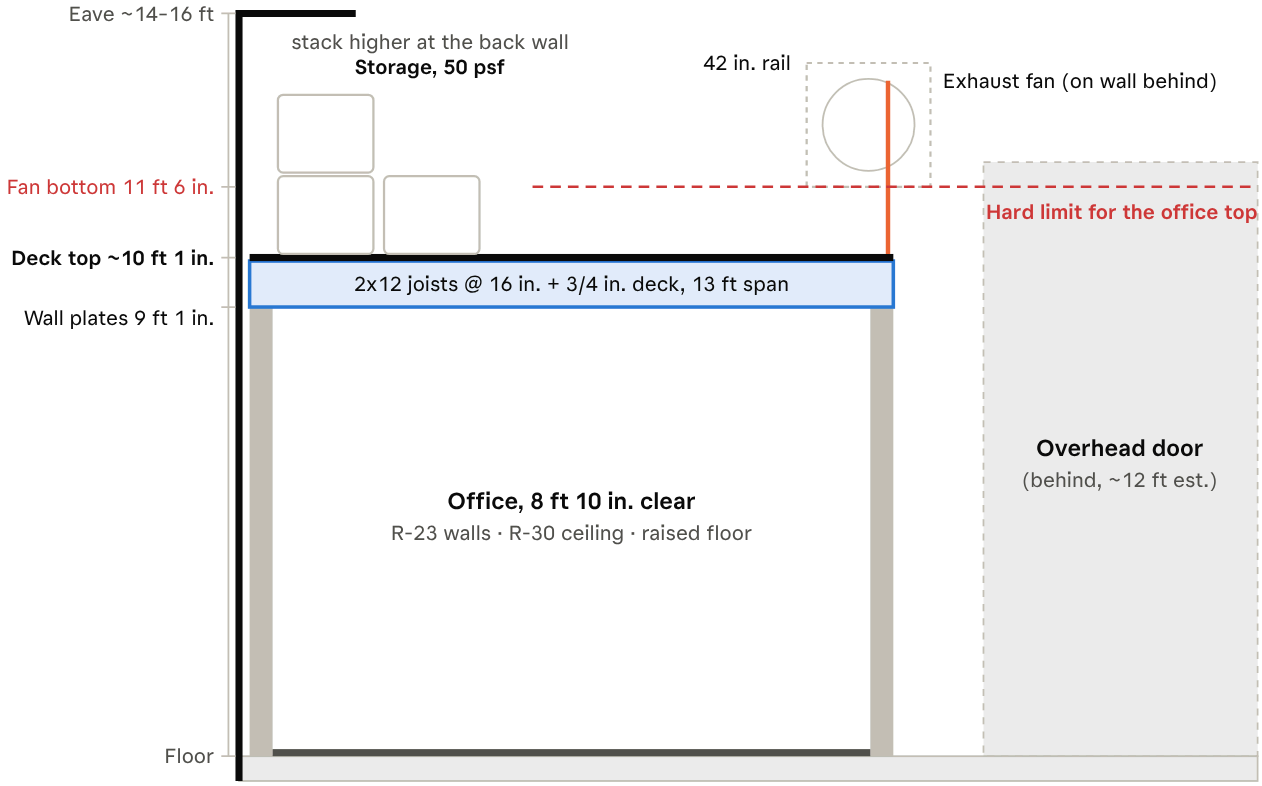
6. Storage deck structure

Design the deck for **50 psf of storage plus 10 psf dead load**, the same as a light-storage floor. Over the 13 ft span, 2x12 #2 Southern Yellow Pine at 16 in. on center carries that with margin. My check puts bending at about 74% of allowable, with live-load deflection around L/900 against an L/360 limit. Spacing them at 12 in. drops bending to about 56% and gives a stiffer deck for heavy bins. These are hand calcs using standard NDS values for SYP #2. Have the lumber yard's span tables or an engineer confirm them, especially for dense storage.

Part	Spec
Joists	2x12 SYP #2 @ 16 in. o.c., 14 ft stock cut to 13 ft, spanning sink wall to front wall (16 joists over 19 ft); @ 12 in. = 20 joists
Alternative	11-7/8 in. I-joists @ 16 in. o.c., sized from the maker's table for 50 psf
Bearing	Doubled 2x6 top plates of the two 19 ft walls, full 1-1/2 in. minimum bearing
Rim and blocking	2x12 rim board; solid blocking at both bearings and one row at mid-span
Ties	Simpson H2.5A (or equal) at each joist end
Decking	3/4 in. T&G plywood or AdvanTech, glued and screwed
Capacity	About 12,350 lb total over 247 sf, evenly spread

The deck tops out about 17 in. under the exhaust fan

Section through the 13 ft depth, barn sink wall at left · 1 ft = 28 px · fan height measured, eave estimated



Wall section · heights of deck and fan

Using it safely:

- **Post a sign:** "Storage 50 psf max." That's about 1,600 lb on any 4 × 8 ft area. Keep the heaviest bins over the walls and spread the rest around.
- **Guardrail:** 42 in. high along the front (19 ft) and column-side (13 ft) edges, with a mid-rail and a 4 in. toe board so bins can't slide off. Leave a gap at the ladder. The barn-side edges can stay open as long as the gap to the barn wall is under 4 in.
- **Access:** a fixed ladder with grab-bar extensions 42 in. above the deck, at the column end of the front wall. Make sure it doesn't stick out into the overhead door's lane. An alternating-tread stair is safer if you'll carry bins up often.
- **Clearances:** keep 2–3 ft clear in front of the exhaust fan, which sits above the deck's front corner at the door-wall end.

7. Insulation, sound, vapor and floor

Use mineral wool, not fiberglass. It costs a little more, but it blocks sound better, which matters next to the jam space and the shop tools. It also doesn't sag and is non-combustible next to a shop with a laser. Coastal Virginia is humid, so **don't put a poly vapor barrier in the walls.** Seal the air leaks instead, and let the mini-split handle the dehumidifying.

Element	Spec	Approx. R / STC
Walls	Rockwool Comfortbatt R-23 (5-1/2 in.) in 2x6 cavities; 5/8 in. Type X drywall inside; 1/2 in. plywood or T1-11 shop side	R-23 cavity; about STC 45–50
Ceiling / deck	Rockwool Comfortbatt R-30 (7-1/4 in.) between the 2x12 joists; 5/8 in. Type X drywall below	R-30
Air sealing	Foam sill gasket under plates; acoustic caulk at drywall edges and top plates; gasketed or putty-padded electrical boxes; foam around the door and window	—
Floor	6-mil poly on the slab (taped seams), 1 in. XPS foam (R-5), 3/4 in. T&G plywood floated and screwed through at the edges, LVP or carpet tile on top. Or use DRIcore-type panels as one layer.	about R-5 to R-6
Door	Insulated steel slab, full weatherstrip, adjustable threshold, door sweep	about R-5
Window	Double-pane low-E vinyl; laminated glass if you want it quieter	—

Sound upgrades, if you'll record or want real quiet from the shop:

- **Staggered studs.** Put 2x4s on a 2x6 plate so the two wall faces don't share studs. That's about STC 55.
- **Second drywall layer** with damping compound (Green Glue) between the layers.
- **Solid-core door** with a full perimeter seal.

The floor build-up raises the inside floor about 1-3/4 in. Use a beveled threshold at the door. If you'd rather keep it flush with the shop, skip the foam and just put rubber or carpet tile on the slab, accepting a colder floor in January.

8. Heating and cooling

A well-insulated 247 sf room needs very little heat. I estimate about 3,800 Btu/h on a 22 °F night, conservatively treating the barn air as being as cold as outside. Cooling peaks around 5,000–5,500 Btu/h on a summer afternoon, assuming the air up near the barn roof is at 100+ °F, one person, a computer, monitors and some audio gear. **A 9,000–12,000 Btu ductless mini-split heat pump** covers both with room to spare. It also dehumidifies, which is what protects the instruments and electronics in summer.

Unit	Install	Price seen
MRCOOL DIY Select 12k, 115V	DIY, pre-charged quick-connect line set	$1,399
MRCOOL Easy Pro 12k	DIY, no special tools	$1,599.99
MRCOOL DIY 5th Gen 12k, 115V, 23.5 SEER2	DIY, WiFi, 25 ft line set	$1,859 (list $2,359)
MRCOOL Advantage 12k, 115V	Conventional: needs a tech to vacuum and charge it	$939.99 + install

- **Pick:** a 115V DIY 12k unit, which runs on a single 20 A, 120 V circuit. A 9k model also works and cycles less in mild weather, if you can find one cheaper.
- **Placement:** put the indoor head high on the door-wall end so it blows down the room's length. Run the line set straight out through the barn wall in a sealed sleeve, with the condenser outside on a pad or wall bracket. Don't put the condenser inside the barn: in summer it would dump heat into the barn, and in winter it would chill it.
- **No-AC fallback:** a 1,500 W heater makes about 5,100 Btu/h, which covers most of the heating load on its own. A 240V wall heater such as a Cadet is the cheap winter-only route, but you lose the summer cooling and dehumidifying.
- **Laser engraver:** keep it outside the office, or vent it outdoors if it moves in. Its fumes don't belong in a sealed room.

9. Electrical, sink and lighting

The main panel is in the diagonally opposite corner, about 70–90 ft of wire away. At that distance, separate 20 A circuits would lose too much voltage on 12 AWG wire. Run **one 60 A feeder to a small subpanel at the office** instead, and wire everything from there on short runs. That uses 2 of your open breaker spaces. If you do the wiring yourself, check with Virginia Beach permits about a homeowner electrical permit, and get it inspected; insurance cares about that in an outbuilding. Do a quick load calculation too, to confirm the main service can carry the added 60 A.

Circuit	Breaker / wire	Serves
Feeder	60 A 2-pole in the main panel; 6 AWG copper × 3 + 10 AWG ground, in EMT or PVC conduit along the girts	60 A main-lug subpanel (12+ spaces) inside the office front wall. Neutral and ground on separate bars; bond only at the main panel
Desk receptacles	20 A, 12 AWG	Desk wall: 3–4 duplexes plus a USB-C combo; computer and audio gear
Room receptacles	20 A, 12 AWG	Remaining walls about every 6 ft, one outside on the deck
Lighting	15 A, 14 AWG	6 thin LED wafer lights (6 in., 4000 K) on a dimmer; one LED shop light above the deck, switched at the ladder
Mini-split	20 A, 12 AWG, dedicated	115V unit, with a disconnect at the condenser
Spares	Open spaces	Laser, studio gear, booth ventilation fan or a backup heater
Data	Cat6	Run to the house router, or a mesh WiFi node on the desk wall

- **Wiring method:** NM cable inside the new stud walls; conduit wherever wire runs across open barn wall.
- **Light switch at 14 ft:** it stays put. The office's front wall lands about a foot short of it.
- **Sink:** pull the big shop sink, cap the supply lines, and reuse the drain for a 15 in. bar sink in a 24 in. base cabinet inside the office.

- **Bench, shelving and laser:** move them out before framing. The bin rack can go up on the deck, and the L-bench can be rebuilt along the shop side of the office.

10. Cost comparison and next steps

Built fully DIY, Option A gets you 247 sf with a 50 psf storage deck for about $10.5k–$14.7k in materials. The studio version adds $3k–$6k, and the lounge version about $300–$600 before the TV and furniture. A prefab gets you 144 sf without storage for $12k–$19k. The mini-split and prefab prices come from the listings linked above. The lumber and finish figures are my approximate yard prices, so get a takeoff quote to firm them up.

	A: Stick-built office	A + studio booth	B: Prefab 12×12	C: SIP
Size	19 × 13 ft, 247 sf	19 × 13 ft: ~135 sf control room + 45 sf booth	12 × 12 ft, 144 sf	19 × 13 ft, 247 sf
Approx. DIY cost	$10.5k–$14.7k	$13.5k–$20.5k	$12k–$19k (unit, freight, mini-split, floor)	$12.5k–$19.5k
Storage deck	50 psf, included	50 psf, included	Quote-only load-bearing roof	50 psf joist deck, included
Wall insulation	R-23 mineral wool	R-23 + booth walls	R-11 to R-13	About R-23 foam
Sound	STC 45–50 to the shop	Booth about STC 55–60 to the control room	STC 24–31	Below A without extra drywall
Build time	2–3 weekends for the shell + finishing	Add 2–3 weekends for the booth	4–6 week lead time, 1–2 day assembly	Fast shell, same finishing time
Movable later	No	No	Yes	Partly

Option A budget, line by line (approximate):

Item	Low	High
Framing: studs, PT plates, headers, 2x12 joists, 3/4 in. T&G deck, ties	$2,200	$2,900
Mineral wool: R-23 walls, R-30 ceiling	$1,150	$1,450
5/8 in. Type X drywall, shop-side plywood, mud, paint	$1,500	$2,000
Entry door, two windows, hardware	$900	$1,350
Floor: poly, 1 in. XPS, plywood, LVP	$1,350	$1,850
Mini-split, 12k DIY	$1,400	$1,900
Electrical: 60 A subpanel, feeder, conduit, circuits, lights	$1,000	$1,600
Bar sink, base cabinet, faucet	$300	$500
Ladder and guardrail	$350	$700
Fasteners, sealants, gaskets	$350	$450
Total, Option A	**$10,500**	**$14,700**
Studio booth add-on (section 3B)	$3,000	$6,000

Lounge + office version (section 3C): add about $300–$600 to the Option A total for TV blocking, the media box and conduit, speaker wire, a second lighting zone and an upper cabinet. The TV, sofa, mini fridge and other furniture are extra.

Tools for a DIY build: circular saw and miter saw, a hammer drill for the Tapcons, and a framing nailer with compressor (buy or rent). Rent a drywall lift for the ceiling and use a laser level for layout. A second person is essential for standing walls and setting 13 ft joists.

Next steps:

- [ ] Measure from the light switch to the near edge of the door track, to confirm the ~22 in. clearance
- [ ] Check that no steel columns land inside the 19 × 13 outline
- [ ] Decide: office only, office + vocal booth, or lounge + office
- [ ] Check with Virginia Beach permits about building and homeowner electrical permits

- [ ] Confirm two open breaker spaces and enough service capacity for a 60 A subpanel
- [ ] Clear the corner: move the laser, bin rack and L-bench; cap the sink
- [ ] Snap the 19 × 13 outline on the slab with chalk
- [ ] Get a lumber and insulation takeoff quote; order the mini-split
- [ ] Build: walls → deck and guardrail → subpanel and rough wiring → line set → insulation → booth (if building it) → drywall → floor → trim, sink, head unit