

STRONGHOLD

INSULATED CONCRETE FORMS

BUILD TRUST

INSTALLATION

GUIDE

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STRONGHOLD INSTALLATION GUIDE

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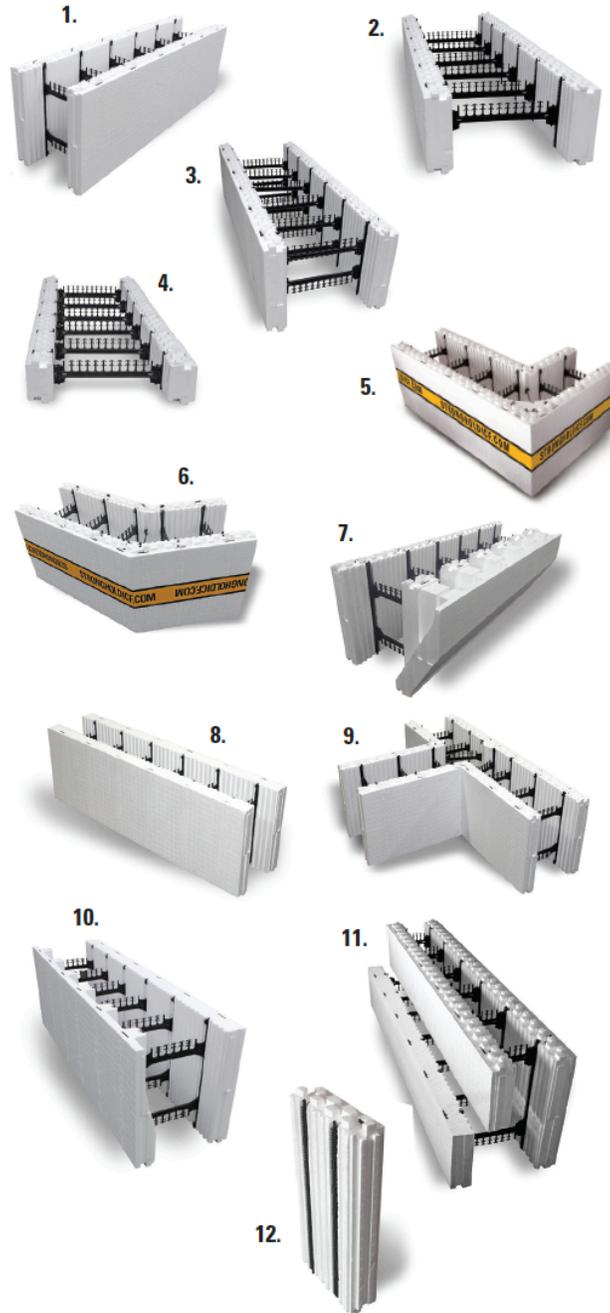
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STRONGHOLD INSULATION SYSTEMS

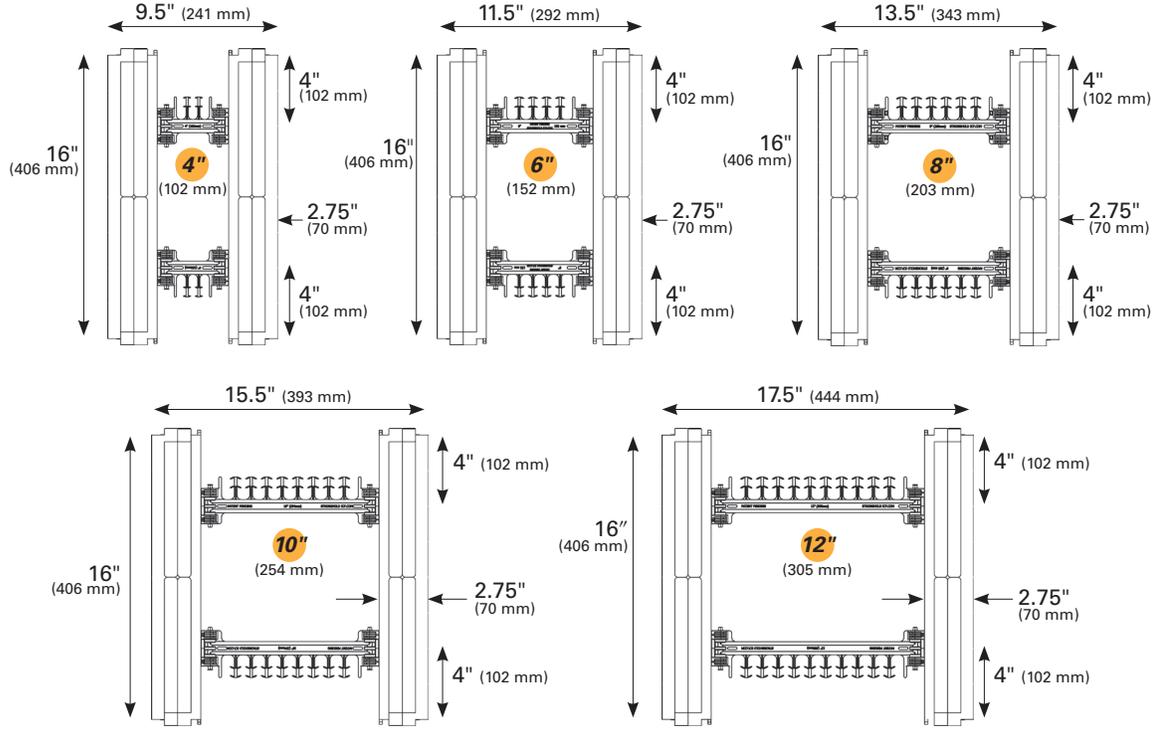
OVERVIEW OF STRONGHOLD BLOCKS

DESIGNED BY ARCHITECTS AND CONTRACTORS TO MEET YOUR NEEDS.

1. Straight Blocks (16" tall)
Fixed (FX) available in 6" and 8"
Folding (FD) available in 4"-12"
2. Straight ½ Height Blocks (8" tall)
Folding (FD) available in 4"-12"
3. Straight ¾ Height Blocks (12" tall)
Folding (FD) available in 4"-12"
4. 4" Height Adjuster Blocks (with or without center webs) 48" long
5. 90° Corner Blocks (16" tall)
Fixed (FX) available in 6" and 8"
Folding (FD) available in 4"-12"
6. 45° Corner Blocks (16" tall)
Fixed (FX) available in 6" and 8"
Folding (FD) available in 6", and 8"
7. Brickledge Blocks and Double Brickledge Blocks (16" tall)
Folding (FD) available in 4"-12"
8. Flat Top Blocks and Double Flat Top Blocks
Fixed (FX) available in 6" and 8"
Folding (FD) available in 4"-12"
9. T-Blocks (16" tall)
Available in 6" to 6" and 8" to 8"
10. Taper Top Blocks and Double Taper Top Blocks (16" tall)
Fixed (FX) available in 6" and 8"
Folding (FD) available in 4"-12"
11. Transition Blocks (16", 12", 8", and 4" tall)
Folding (FD) available in 4"-12"
12. End Caps (with webs)
Available in 6" and 8"



BLOCK SIZES AND DIMENSIONS



DIMENSIONS FOR CORNER BLOCK

	4" (102mm)	6" (152mm)	8" (203mm)	10" (254mm)	12" (305mm)
A	38" (965mm)	40" (1,016mm)	42" (1,067mm)	44" (1,118mm)	46" (1,168mm)
B	22" (559mm)	24" (609mm)	26" (660mm)	28" (711mm)	30" (762mm)
C	9.5" (241mm)	11.5" (292mm)	13.5" (343mm)	15.5" (393mm)	17.5" (444mm)
D	8" (203mm)	8" (203mm)	8" (203mm)	8" (203mm)	8" (203mm)

NOTES: FOR TYPICAL BLOCKS

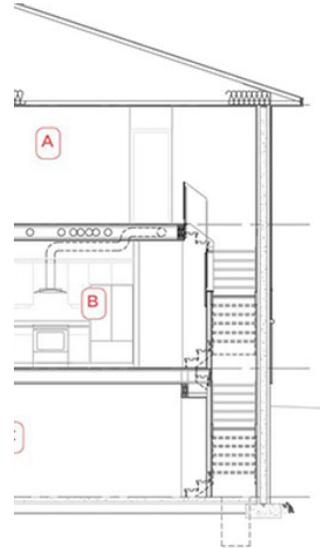
- Block Heights 16" (406 mm).
- Block Lengths 48" (1,219 mm).
- Block Panel Thickness 2.75" (70 mm).
- All blocks are reversible.
- Rebar holders accommodate stacked contact splicing.
- Rebar holders designed to hold horizontal bar up to .75" (20 mm) diameter.
- Furring strips 8" (203 mm) on center.

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SECTION 1: ESTIMATING & PROJECT SPECS

CHECKLIST:

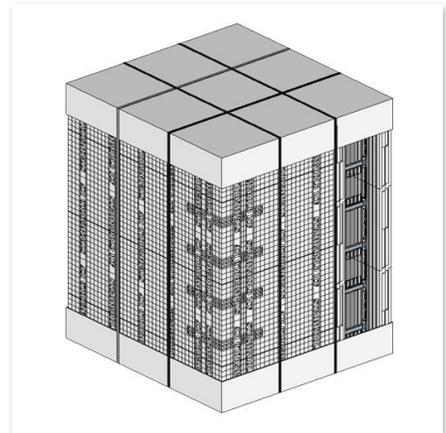
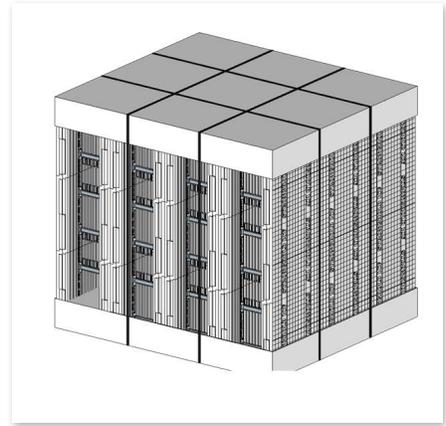
- Size/core of ICF block
- Heights of ICF walls
- Specialty blocks required, Brickledge, Taper Tops, etc.
- Vertical and horizontal rebar
- Lintel depth, bottom rebar and specs
- Window sill heights
- Backfill heights
- Waterproofing type and area
- Wall parging/stucco area
- Window buck type and specs
- Exterior siding details
- Site requirements, access, water, electrical, etc.
- Job staging areas
- Embedment hardware details
- Floor type and connection details
- Sill plates specs and details
- Decide if the knobs will be cut off the bottom course blocks prior to stacking or Flat Top Straight blocks will be used



2	DESCRIPTION	VENDOR OR SUBCONTRACTOR	ESTIMATED COST		
			LABOR	MATERIALS	TOT
4	GENERAL REQUIREMENTS				\$
5	Plans and Specifications				\$
6	Plan Review				\$
7	Permits: Zoning, Building, Environmental, Other				\$
8	Survey				\$
9	Impact Fee				\$
10	Administrative Costs				\$
11	Financing Costs				\$
12	Legal Fees				\$
13	Engineering Fees				\$
14	Insurance				\$
15	Enter Additional Items				\$
16					\$
17					\$
18					\$
19					\$
20	Subtotal		\$	\$	\$
21	SITE PREP				\$
22	Demolition (Remodel)				\$
23	Jacking & Shoring (Remodel)				\$
24	Dust control, Surface Protection (Remodel)				\$
25	Job-Site Access				\$
26	Job-Site Security				\$
27	Dumpster & Removal				\$
28	Clear Lot				\$
29	Storage On Site				\$
30	Portable Toilet				\$
31	Temporary Power				\$
32	Temporary Heat				\$
33	Scaffolding Rental				\$
34	Tool/Equipment Rental				\$
35	Enter Additional Items				\$

SECTION 2: MATERIAL DELIVERY & HANDLING

- Determine delivery access.
- Clear material staging areas.
- Wall layout on footings/slabs, squared and chalk lines snapped before materials.
- Chalk lines to exterior of building align with exterior face of block.
- Spray chalk lines with clear coat to rain proof.
- Cover stored block to protect.
- Place all materials/tools no closer than 6'(2m) to interior wall face for bracing space.
- Good site drainage to avoid flooding.
- Place corner block bundles near interior corners.
- Spread straight block bundles around interior of walls.
- Place rebar around interior of walls.
- Have plan to unload and move the bundles around site.
- Bundles can be moved around site by hand.
- Use skid steer with forks or a sturdy ramp to remove from trailer.
- Footing dowels spacing to local code typically 24" to 48" oc.
- The height of the dowels should be minimum 40d / 40 x bar diameter.
- Blocks are shipped locked together. To separate blocks, hold the lower block with a foot or a hand at one end of the blocks and with the other hand sharply pull up with a jerk to "tear" apart.



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SECTION 3: CRITICAL DETAILS, TOOLS & SUPPLIES

- Place tools to inside of foundation area.
- Step ladders/extension ladders into foundation area.
- Place additional form support strapping and screws inside foundation area.
- Canned foam and gun to inside of foundation area.
- Zip ties and wire hooks to inside of foundation area to join bottom and top courses end to end.
- Floor and roof anchoring hardware into foundation area.



SECTION 4: FOOTING/PREP & SETTING BLOCK

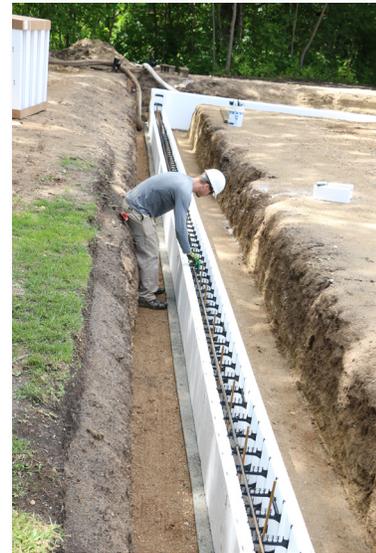
- Confirm footings/slab is free of all dirt and debris.
- Snap wall layout chalk lines and coat to rain proof.
- Layout window and door locations on footing or slab.
- Pre-build door/window buck frames, squared and braced.
- Check footing for level, with laser, should be plus or minus 1/4" (6.5mm) to level or decide to either raise blocks with foam shims or cut blocks to level with pruning saw.
- Set first corner block, with outer face of foam flush to chalk line.
- Orient all corners in same direction.
- After the first row of blocks is set, horizontal rebar can be placed with a 30" (762mm) for #4 (10MM) Lap joints and for #5 (15mm) a 38" (965mm) Lap joint.
- If FlatTop straight blocks were not ordered, then cut the foam knobs off the bottom of the first course and corner blocks.
- After second course is set, level wall using foam shims or cutting bottoms of blocks.
- When knobs are left on the bottom of the bottom course of blocks, the wall will settle when poured.
- Stack additional courses same running bond pattern in first two courses.
- Pre-bent 90° corner rebar can speed up install with lap lengths, depending on bar diameter, 30" (762mm) or 38" (965mm).
- No cutting blocks over the wall cavity to keep all debris from falling into wall.



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SECTION 5: REINFORCEMENT

- The Engineering tables are based on the IRC (International Residential Code) for the US. Canadian tables are based on the NBC (National Building Code of Canada).
- The Stronghold engineering tables are for typical residential use only, up to 60ft long walls, commercial projects, tall walls, long walls or special situations require an engineer.
- Horizontal rebar recommended minimum every other course (32"/813mm) OC, unless otherwise stated in the tables.
- Horizontal rebar is placed in walls in a staggered pattern, from course to course, so the vertical bars can be locked between them.
- Below grade walls vertical rebar is typically placed on the tension side of the wall, away from load.
- Above grade walls vertical rebar is typically placed in center of the wall.
- Footing dowels should be spaced between 24"(610mm) and 48"(1220mm) O.C. or as per local code.
- Length of the dowels out of the footing is often 40d, confirm with local building code.
- Vertical rebar is installed after all the Stronghold blocks have been stacked placing the vertical bars, so they are locked into their proper positions by the horizontal bars.
- The minimum coverage of horizontal bar to the foam panels or window bucks is .75"(19mm) and 1.25"(32mm) for the vertical bar.
- The minimum coverage for Lintel bottom rebar is 1.5"-2.5"(38mm-64mm).
- Stirrups should be bent from #3(10mm) rebar, see tables for spacing.



SECTION 6: WINDOW & DOOR OPENINGS

- Using the notes previously written on the footing, slab or floor about the window locations, sill heights and widths, cut the sill to the proper height based on the type of window buck frame being used.
- The window sills can be open spaced treated 2x lumber or can be solid wood or foam buck with holes cut in for concrete pumping access.
- For inset windows, allow for space around the buck frame for attaching foam or trim materials next to the window frame.
- For doors mounted flush to the exterior of the wall face and swinging into the building, 2x lumber can be installed flat against the buck material to allow more room for door knob access
- Window and door buck frames have to be supported with shoring to keep the frame from bowing in from concrete pressures.
- Shoring should be between 16" (406mm) – 24" (610mm) depending on the strength of the buck material used, both horizontally and vertically. Deep lintels required additional shoring
- The buck frame can be any size can located virtually anywhere in the wall.



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SECTION 7: BRACING/SCAFFOLDING SYSTEM

- Bracing systems perform three functions: 1. Brace against windy conditions. 2. Aligning walls straight. 3. Providing safe working platform.
- Bracing is typically installed after third or fourth course, unless it is a high wind area.
- The most common ICF bracing consists of upright channels screwed into the block webs with one screw per course, a diagonal screw jack that attaches to the upright on wall and is securely staked to solid ground at the opposite end, scaffold brackets support planking, guard rails and toe boards where required.
- Spacing of bracing uprights can be installed between 4'(1220mm) to 6'(1829mm) apart, depending on type of planking used and their ratings.
- Closer upright spacing provides for straighter walls, and eliminates use of inwall wire alignment trusses.
- Position height of scaffold brackets at convenient working levels.
- Set height of scaffold brackets no closer than 32" to the top of wall.
- Follow bracing manufacturer specifications for use.
- Secure scaffold planking to eliminate movement or separation of the planks.
- Secure bracing diagonals to soil or slab, confirming attachment method is secure for wind and working loads.
- For sandy soils, 2x4 or 2x6 long stakes can be pounded into the soil flat side towards the wall for more holding power.



SECTION 8: TOP ROW OF WALL DETAILS

- Determine the type of block called out for use as the top course; Taper Top, Flat Top, Knob Top.
- Determine if the wood top plate will be inset into the top course within the wall cavity flush with the top of blocks.
- Determine the width of the top plate that will be installed and whether it will be exposed on one side of the blocks or sitting on top of concrete level with the tops of the blocks.
- Secure top course of wall end to end to keep wall dimensions from concrete pressure with wire hooks, in-line zip ties, wood straps, or foam adhesive.
- A top row of horizontal rebar is placed in the top course, with a minimum of 2" (51mm) concrete coverage required .
- Install beam pockets where specified, with the Stronghold End Caps often being used as the blockouts for the pockets.
- Install vertical rebar after the top course is installed and secured as per local code/ engineering.
- Install 1x4 or 3/4" (19mm) scraps of wood on each side of every corner block by screwing into the webs.
- Install a string line over the corner wood scraps around the entire exterior perimeter of the wall near the very top of the forms.
- A speed square or a similar scrap of wood as the string corner scraps can be used as a guide to assure the walls are perfectly aligned with the strings.
- Cover the foam interlocking knobs with wide tape when additional courses will be installed after the pour.



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SECTION 9: PRE-POUR CONCRETE CHECKLIST

- Vertical rebar installed
- Horizontal rebar installed
- Lintel reinforcing installed and stirrups spaced properly
- Brickledge stirrups installed
- Perimeter stringline installed
- Top course of blocks secured end to end
- Top course of blocks secured down
- Top course of foam interlock protected with tape
- Wall is aligned with string slightly leaning in, never out
- Buck anchoring installed
- Buck frames secured to wall forms
- Window and door buck properly braced and shored
- All utility wall penetration sleeved in place
- Beam pockets installed
- Floor framing brackets and hangers installed
- Internal vibrator on site and ready (3/4" (19mm) to 1" (25mm) head max.)
- Cut forms properly supported
- Large gaps in forms filled with canned foam
- Anchor bolt and hurricane brackets on site
- Proper mix of concrete ordered
- Pump truck equipped with reducer hose
- Clean cavity free from debris and snow or ice
- Strapping and screws and guns for potential blowout
- All bracing/alignment elements installed, one screw per course
- Scaffolding planking is installed securely
- Short offset corners properly braced
- Place all bracing screws to the top of slots in strongback in case of settling

SECTION 10: ORDERING CONCRETE

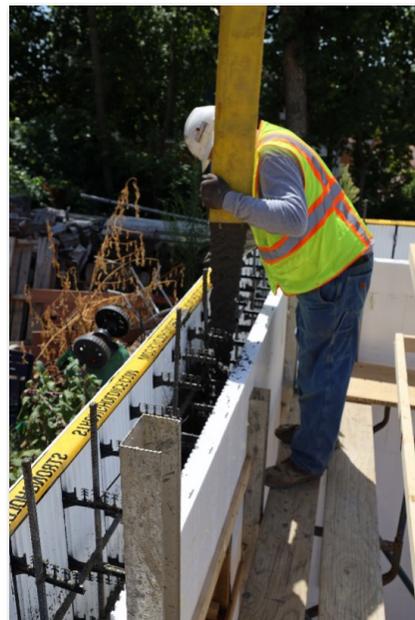
- Calculate the correct amount of concrete required.
- A 2% waste factor is often used for potential spills .
- A 1/2 CY/CM of extra concrete is required for the pump truck.
- Follow local code requirements or project engineer specifications for concrete mix.
- Concrete admixtures are not required but can be useful depending on the circumstance.
- Work closely with your ready-mix producer about wall mix designs.
- For 4" (102mm) and 6" (152mm) wall forms or heavily congested rebar configurations, specify smaller grade rock 3/8" (9.5mm max.) like pea rock or chips for less consolidation issues.
- For 8", 10" and 12" cavities 3/4" (19mm max.) aggregate is typically specified (ask local ready-mix producer).
- Cement powder content can be replaced with fly ash or similar materials as per working with the local ready-mix producer.
- The slump should be 5" (127mm) to 6" (152mm) for 4"-8" concrete wall thickness.
- The slump should be 4.5" (114mm) to 5.5" (140mm) for 10" & 12" concrete wall thickness.
- Exceeding the recommended slump can cause undue stress on the forms and potential bulging.
- A slump of less than recommended can cause consolidation and potential void issues.



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SECTION 11: PLACING CONCRETE

- Complete pre-placement checklist.
- Start placing concrete in the window cavities and consolidating as filled.
- Place concrete next to the corner forms, allowing the concrete to flow into the corner blocks.
- Continue placing concrete around entire perimeter of job, maximum of 48" (1200mm) lifts.
- Use internal vibrator with 3/4" (19mm) to 1" (25mm) max. dia.
- Internally vibrate concrete as it is placed using industry standard practice, insert fast and remove slowly but steadily.
- Subsequent lifts, start in same starting position of previous lift and follow same direction.
- ACI 318 specifies a maximum placement of 48" (1200mm) vertical feet per hour.
- While placing concrete adjust the wall straight to the stringline, while the concrete is still wet and moveable.



SECTION 12: POST CONCRETE PLACEMENT CHECKLIST

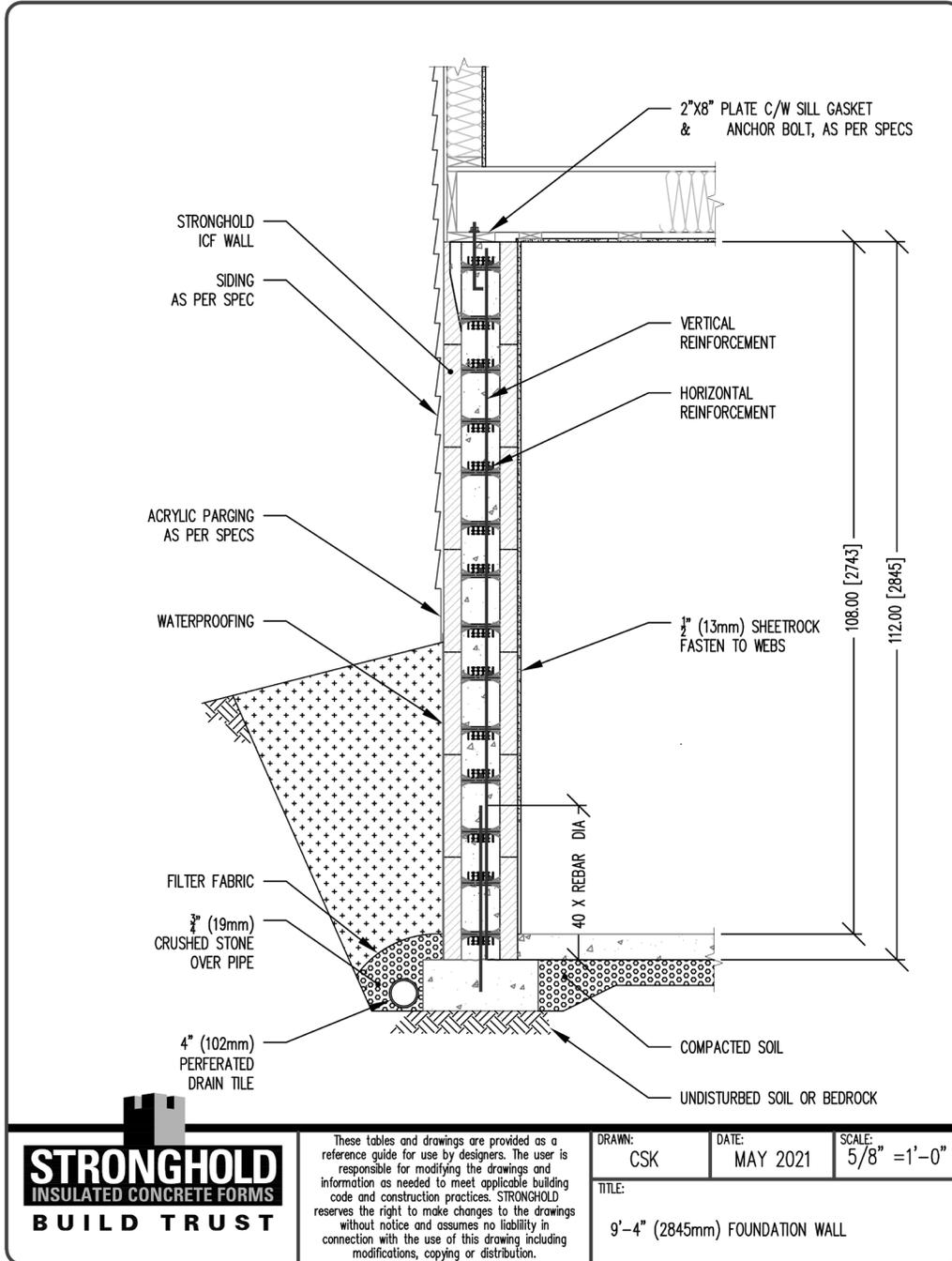
- Has all consolidation/vibration been completed?
- Are all walls straightened to the stringline?
- Has all window and door opening sills been leveled off and smoothed?
- Have all anchor bolts and hold-downs and brackets been installed and checked for level?
- Have thinner walled sleeves been checked for crushing?
- Has the top level of concrete been checked for perfectly level, and smoothed?
- Has the final check for square and plumb been done?
- Has all the spilled concrete been cleaned of the bracing, walls, footings, and tools?
- Has any spilled concrete been disposed of?

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SECTION 13: EXTREME WEATHER CONDITIONS

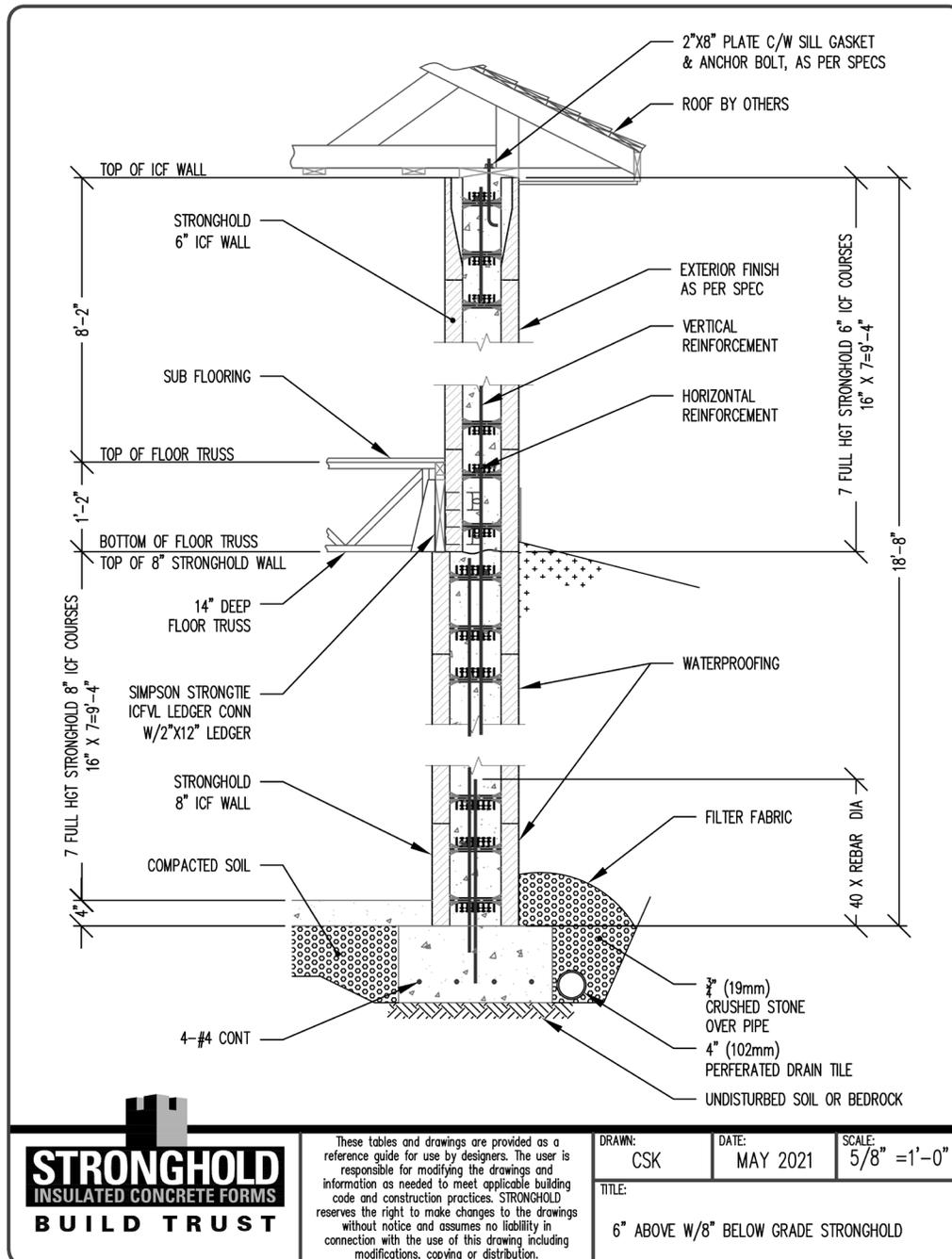
- Keep walls covered to keep snow and ice from accumulating in the cavity.
- All snow and ice must be removed from cavity prior to concrete placement.
- Insulate the top of walls in freezing weather with insulated tarps or cut rigid foam secured to the top of wall.
- Insulate the exposed window and door bucks in freezing temperatures, unless foam buck is used.
- In very cold temperatures down to 0°F (-20°C) cover the tops of the walls and only remove insulation where working specifically and replacing the insulation as you move forward.
- In very hot temperatures covering with a poly film can help stop evaporation and applying water can also help.

TYPICAL BASEMENT WITH FRAMED WALL SECTION



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TYPICAL BASEMENT WITH ABOVE GRADE WALL SECTION



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