

CITY OF BILLINGS DECK SUBMITTAL WORKBOOK



The City of Billings Deck submittal workbook is intended to be used for single-level, attached or detached, square or rectangle shaped decks.

- Decks that are not square or rectangle in shape may require a design professional to draw the plans.
- Multi-level decks, depending on complexity, may require a design by a structural engineer. Multi-level deck plans, at minimum, are to be drawn by a design professional.

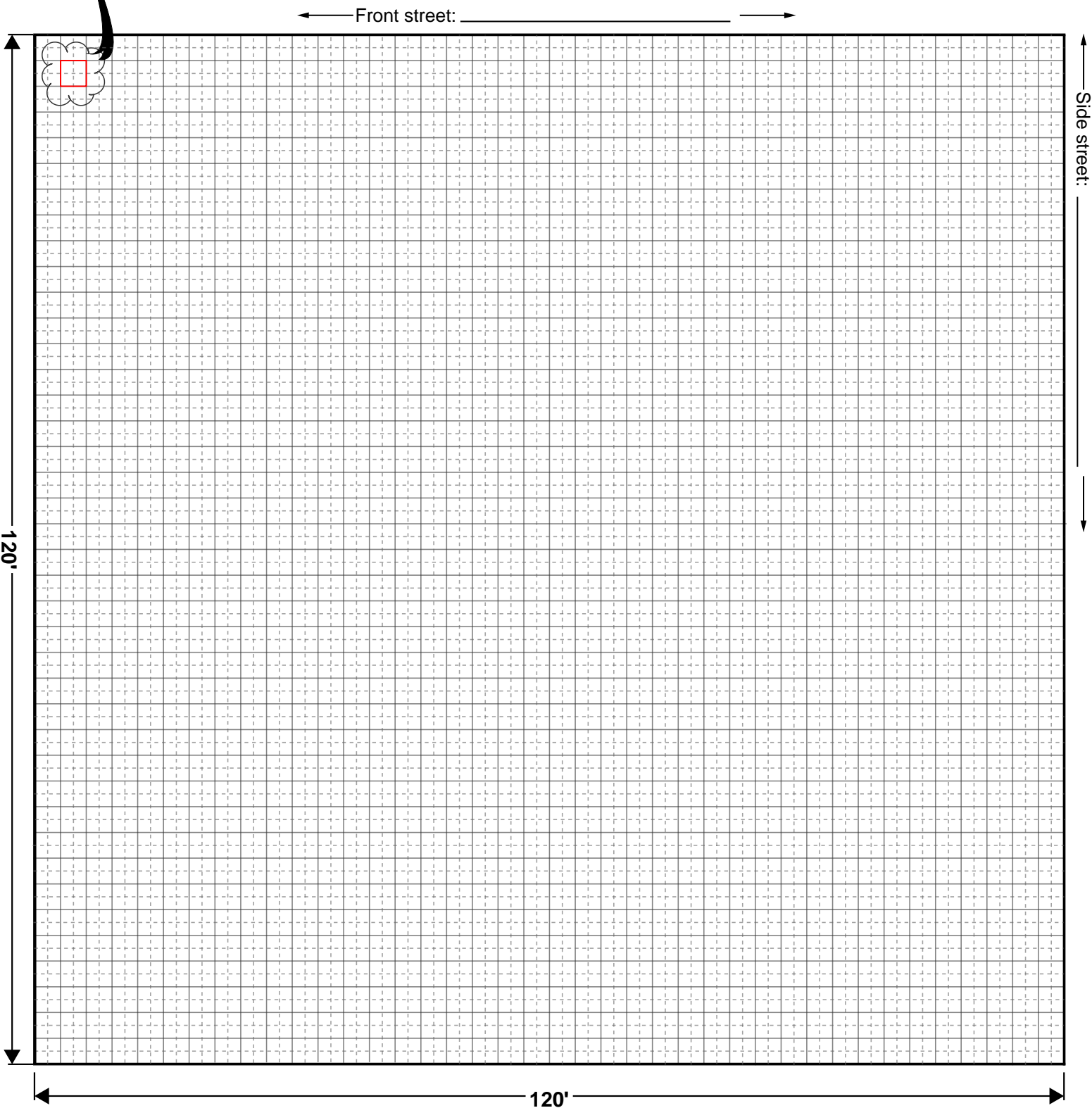
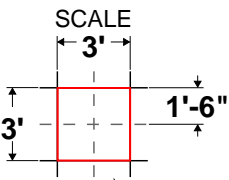
The City of Billings Deck Submittal Workbook is not suitable for:

Decks with hot tubs or decks with enclosed structures on a portion of the deck.
These decks are required to be designed by a structural engineer and SE stamped plans must be submitted for review in accordance with R301.1.3.

SITE PLAN

1. Show lot lines.
2. Show setbacks from all property lines (5' is typical; check with Planning for information on setbacks).
3. Show all structures - existing and proposed.
4. Show width and length of all structures; existing house and proposed deck.

This will be a very broad view of the lot, house, and deck. Use the page 3 to draw a detailed plan view of the deck. See example on page 8.



PLAN VIEW

Use the grid below to provide a plan view of the deck and wall of the house the deck is connected to.

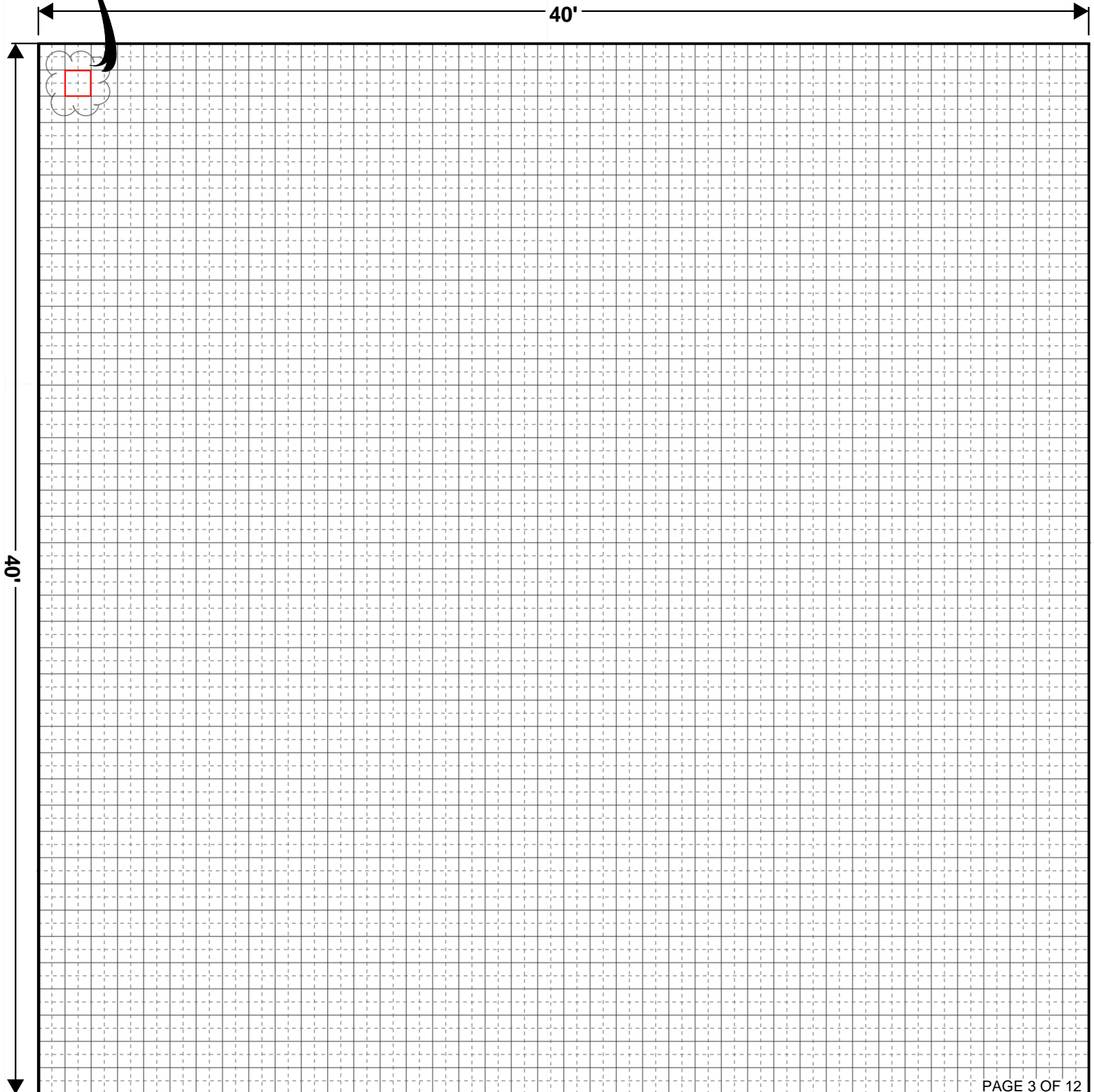
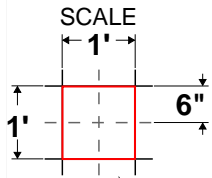
Show the location of stair(s). If there are stairs, show the landing(s).

Stairs require a concrete landing as wide as the stairs and 36" in the direction of travel.

Stairs with 4 or more risers require a handrail. Show the handrail.

Decks 30" or more above grade need guarding. Show the guards.

See example Plan View on page 9.



FLUSH BEAM DECK WORKSHEET FILL OUT COMPLETELY

Check mark deck type

Flush beam deck ☐

Flush beam deck
with mid-joist
span beam ☐

Deck height
above grade: _____
decks over 30" above
grade requires guards

Stairs

Yes ☐

No ☐

Stair
width: _____
36" minimum.

Number
of risers: _____
4 or more risers
require a handrail

Guards

Yes ☐

No ☐

Pre-made
guard Brand: _____
manufacturer of
the guards

Site made.
guard material: _____
material the guards
will be constructed from

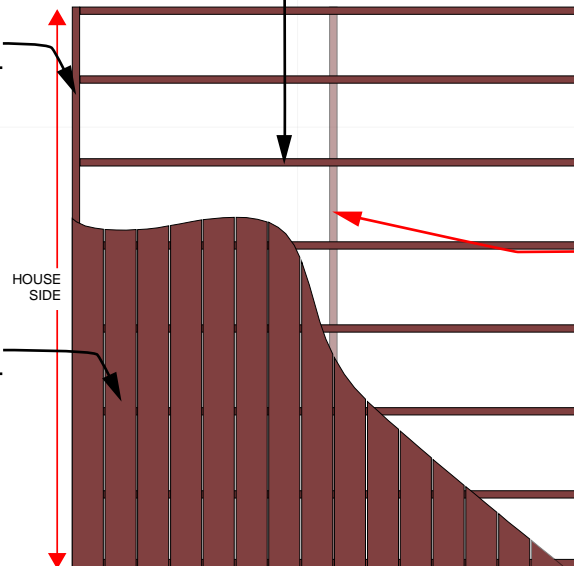
Joist
size: **2** x _____ ft; o.c spacing

Species
of wood: _____

Ledger
size: **2** x _____ ft
joist spacing for engineered decking products
according to manufacturers specifications

Decking
size: _____ x _____
joist spacing for engineered decking products
according to manufacturers specifications

Post
size: _____ x _____



Beam
size: _____ x _____ ft

Species
of wood: _____

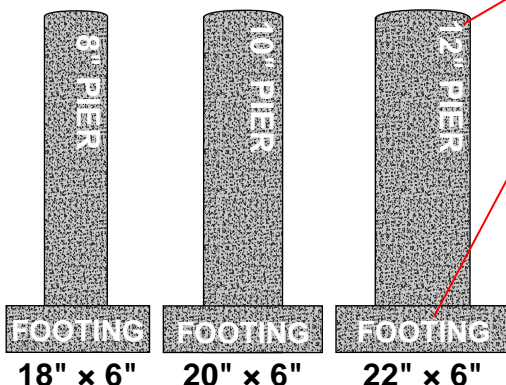
Glulam ☐ LVL ☐

Beam
size: _____ x _____ ft
only fill in IF there is a mid-joist span beam deck

Species
of wood: _____

Glulam ☐ LVL ☐

Example of pier sizes



Example of footing sizes

Pier (A) size: _____

Footing (A) size: _____ x _____

bottom of pier or footing at 42" below grade

Pier (B) size: _____

Footing (B) size: _____ x _____

bottom of pier or footing at 42" below grade

Pier (C) size: _____

Footing (C) size: _____ x _____

bottom of pier or footing at 42" below grade

Pier (D) size: _____

Footing (D) size: _____ x _____

bottom of pier or footing at 42" below grade

Pier (E) size: _____

Footing (E) size: _____ x _____

bottom of pier or footing at 42" below grade

Pier (F) size: _____

Footing (F) size: _____ x _____

bottom of pier or footing at 42" below grade

Pier (G) size: _____

Footing (G) size: _____ x _____

bottom of pier or footing at 42" below grade

Pier (H) size: _____

Footing (H) size: _____ x _____

bottom of pier or footing at 42" below grade

CANTILEVER DROPPED BEAM DECK WORKSHEET

FILL OUT COMPLETELY

Check mark deck type

Cantilever dropped
beam deck ☐

Cantilever dropped
beam deck with
mid-joist span beam ☐

Deck height
above grade: _____
decks over 30" above
grade requires guards

Stairs

Yes ☐

No ☐

Stair
width: _____
36" minimum.

Number
of risers: _____
4 or more risers
require a handrail

Guards

Yes ☐

No ☐

Pre-made
guard Brand: _____
manufacturer of
the guards

Site made.
guard material: _____
material the guards
will be constructed from

Joist
size: **2** x _____ ft; o.c spacing

Species
of wood: _____

Ledger
size: **2** x _____ ft
joist spacing for engineered decking products
according to manufacturers specifications

Decking
size: _____ x _____
joist spacing for engineered decking products
according to manufacturers specifications

Post
size: _____ x _____

Cantilever in
feet & inches: _____

Beam
size: _____ x _____ ft

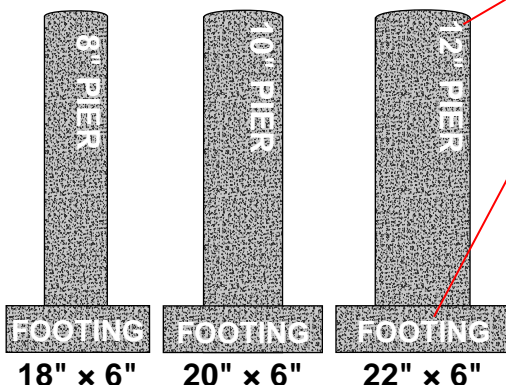
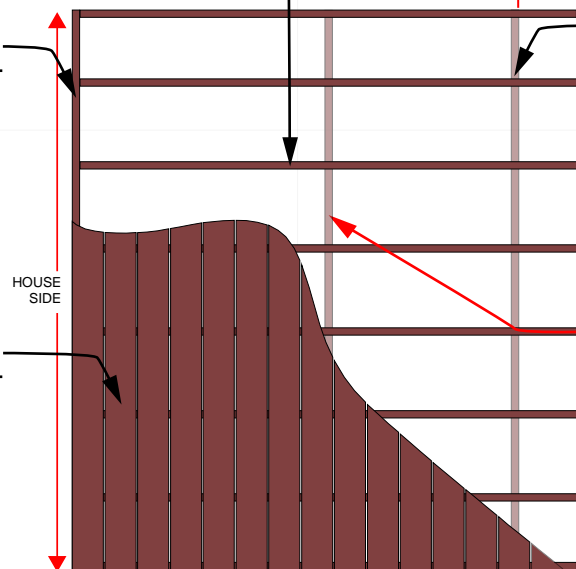
Species
of wood: _____

Glulam ☐ LVL ☐

Beam
size: _____ x _____ ft
only fill in IF there is a mid-joist span beam

Species
of wood: _____

Glulam ☐ LVL ☐



Example of pier sizes

Example of footing sizes

Pier (A) size: _____

Footing (A) size: _____ x _____
bottom of pier or footing at 42" below grade

Pier (B) size: _____

Footing (B) size: _____ x _____
bottom of pier or footing at 42" below grade

Pier (C) size: _____

Footing (C) size: _____ x _____
bottom of pier or footing at 42" below grade

Pier (D) size: _____

Footing (D) size: _____ x _____
bottom of pier or footing at 42" below grade

Pier (E) size: _____

Footing (E) size: _____ x _____
bottom of pier or footing at 42" below grade

Pier (F) size: _____

Footing (F) size: _____ x _____
bottom of pier or footing at 42" below grade

Pier (G) size: _____

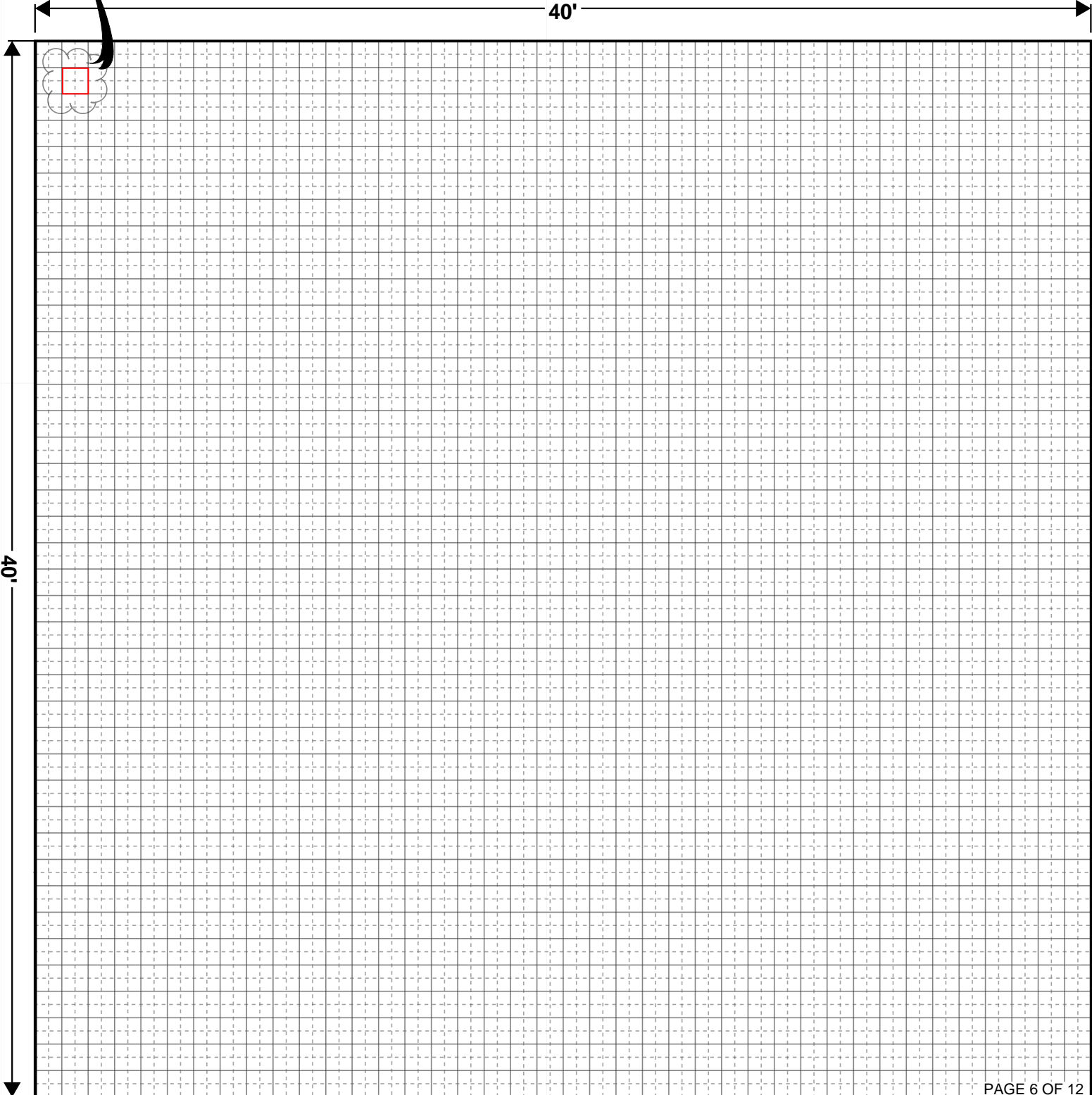
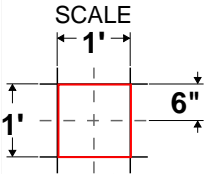
Footing (G) size: _____ x _____
bottom of pier or footing at 42" below grade

Pier (H) size: _____

Footing (H) size: _____ x _____
bottom of pier or footing at 42" below grade

TRIBUTARY AREA WORKSHEET

Use the grid below to draw a plan view of the outline of your deck. Draw in all posts.
Find the middle point from the face of the ledger to the posts (see examples on page 5, 12, 18, & 25 of the City of Billings Deck Construction Guide).
Find the middle point from the center of each post to the center of the next closest post (see examples on page 7, 14, 19, & 26 of the City of Billings Deck Construction Guide).
Outline the tributary areas. Calculate the square footage of each tributary area. Using page 30 of the City of Billings Deck Construction Guide, find the footing size for each tributary area. Note the footing size on page 4. If more than one footing size is needed, label each post with the footing size it needs or put a letter next to the post corresponding to the footing size on page 4 (example, Footing size (A), Footing size (B), etc). Multiple posts with the same footing size can have the same footing label. See example on page 11.



DECK FOOTING SIZE

TABLE R507.3.1 MINIMUM FOOTING SIZE FOR DECKS

NO SOILS REPORT

LIVE OR GROUND SNOW LOAD (psf)	TRIBUTARY AREA (ft²)	LOAD-BEARING VALUE OF SOILS (psf)		
		1,500		
		SIDE OF A SQUARE FOOTING (inches)	DIAMETER OF A ROUND FOOTING (inches)	THICKNESS (inches)
50	5	7	8	6
	20	11	13	6
	40	15	17	6
	60	19	21	6
	80	21	24	8
	100	24	27	9
	120	26	30	10
	140	28	32	11
	160	30	34	12

Interpolated Table R507.3.1 to
common round concrete form size

TRIBUTARY AREA (square feet)	DIAMETER OF ROUND FOOTING (inches)	THICKNESS (inches)
5	8	6
11	10	6
17	12	6
25	14	6
35	16	6
45	18	6
55	20	6
67	22	6
80	24	8
93	26	9
106	28	10

NEED SOILS REPORT

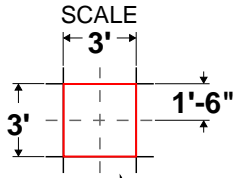
NEED SOILS REPORT

LIVE OR GROUND SNOW LOAD (psf)	TRIBUTARY AREA (ft²)	LOAD-BEARING VALUE OF SOILS (psf)			LOAD-BEARING VALUE OF SOILS (psf)		
		2,000			≥ 3,000		
		SIDE OF A SQUARE FOOTING (inches)	DIAMETER OF A ROUND FOOTING (inches)	THICKNESS (inches)	SIDE OF A SQUARE FOOTING (inches)	DIAMETER OF A ROUND FOOTING (inches)	THICKNESS (inches)
50	5	7	8	6	7	8	6
	20	10	11	6	8	9	6
	40	13	15	6	11	13	6
	60	16	18	6	13	15	6
	80	19	21	6	15	17	6
	100	21	23	7	17	19	6
	120	23	26	8	19	21	6
	140	25	28	9	20	23	7
	160	26	30	10	21	24	8

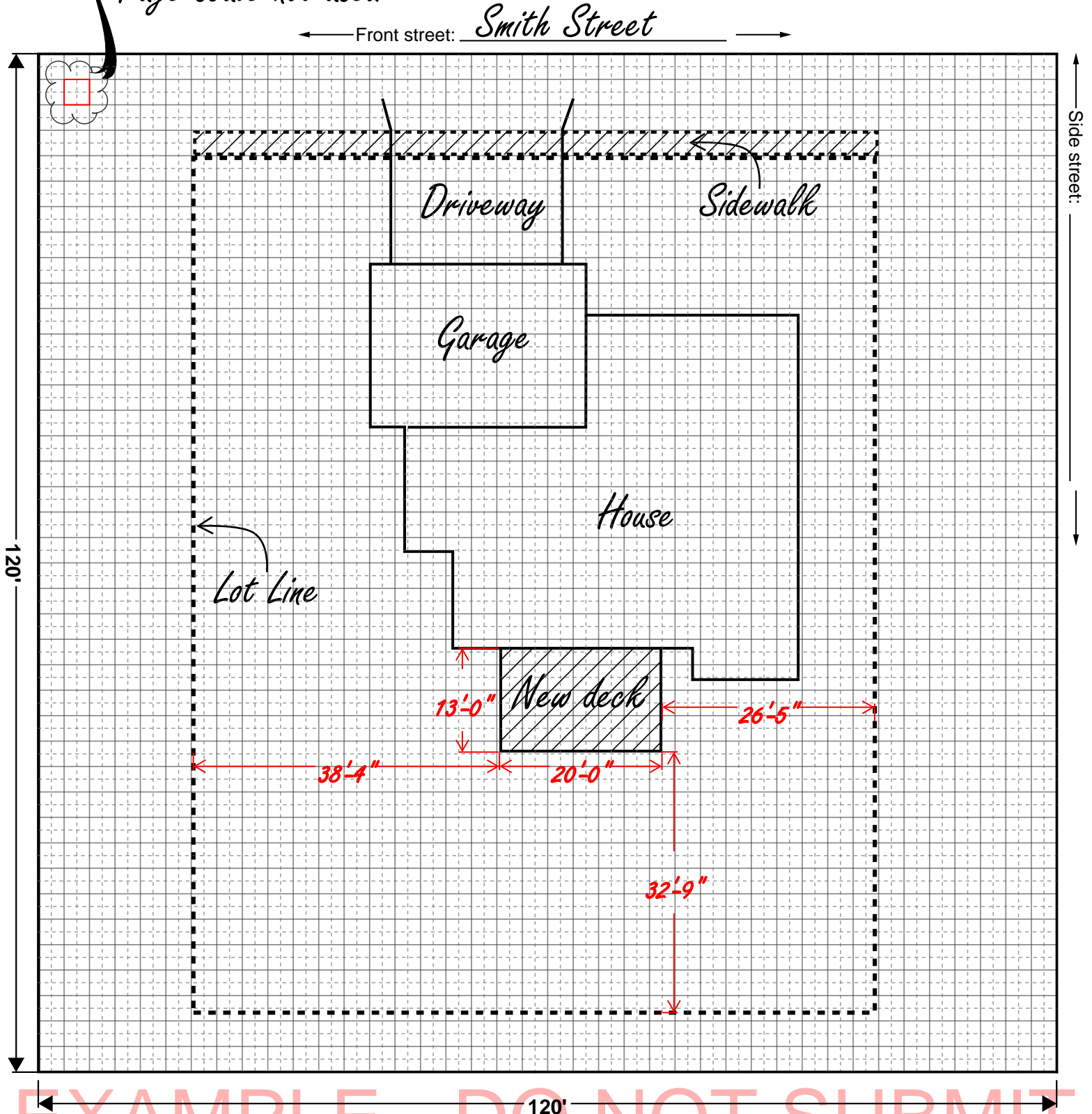
SITE PLAN

1. Show lot lines.
2. Show setbacks from all property lines (5' is typical; check with Planning for information on setbacks).
3. Show all structures - existing and proposed.
4. Show width and length of all structures; existing house and proposed deck.

This will be a very broad view of the lot, house, and deck. Use the page 3 to draw a detailed plan view of the deck.



Page scale not used



PLAN VIEW

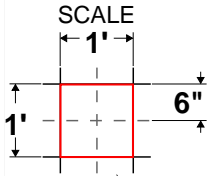
Use the grid below to provide a plan view of the deck and wall of the house the deck is connected to.

Show the location of stair(s). If there are stairs, show the landing(s).

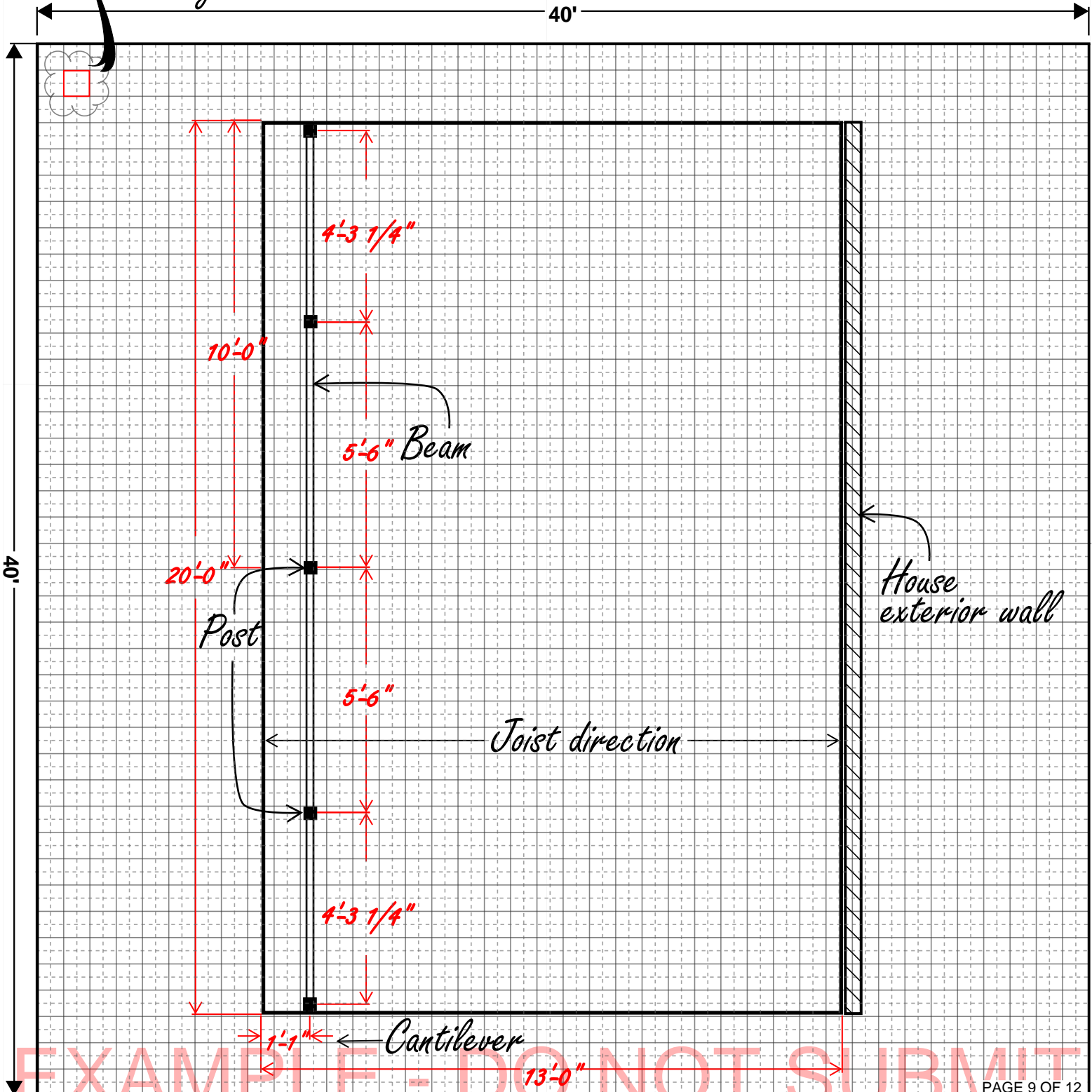
Stairs require a concrete landing as wide as the stairs and 36" in the direction of travel.

Stairs with 4 or more risers require a handrail. Show the handrail.

Decks 30" or more above grade need guarding. Show the guards.



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CANTILEVER DROPPED BEAM DECK WORKSHEET FILL OUT COMPLETELY

Check mark deck type

Cantilever dropped beam deck ☒

Cantilever dropped beam deck with mid-joist span beam ☐

Deck height above grade: **48**
decks over 30" above grade requires guards

Stairs

Yes ☒

No ☐

Stair width: **36**
36" minimum.

Number of risers: **4**
4 or more risers require a handrail

Guards

Yes ☒

No ☐

Pre-made guard Brand: **Fortress Railing**
manufacturer of the guards

Site made guard material:
material the guards will be constructed from

Joist size: **2 x 10 x 13** ft; **12** o.c spacing

Species of wood: **Red pine**

Ledger size: **2 x 10 x 20** ft
joist spacing for engineered decking products according to manufacturers specifications

Decking size: **1.5 x 6**
joist spacing for engineered decking products according to manufacturers specifications

Post size: **4 x 4**

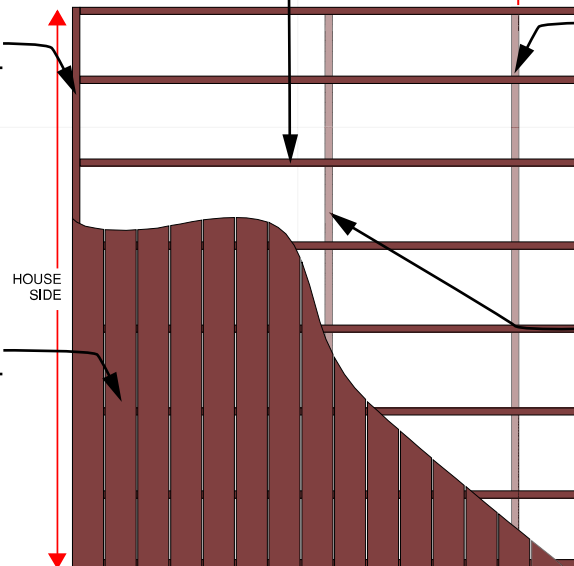
Cantilever in feet & inches: **1'-1"**

Beam size: **2-2 x 10 x 20** ft

Species of wood: **Red pine**
Glulam ☐ LVL ☐

Beam size:
x x ft
only fill in IF there is a mid-joist span beam

Species of wood:
Glulam ☐ LVL ☐



Pier (A) size: **10"**

Footing (A) size: **12" dia. x 6" thick**
bottom of pier or footing at 42" below grade

Pier (B) size: **10"**

Footing (B) size: **16" dia. x 6" thick**
bottom of pier or footing at 42" below grade

Pier (C) size: **10"**

Footing (C) size: **18" dia. x 6" thick**
bottom of pier or footing at 42" below grade

Pier (D) size:
x

Footing (D) size:
x
bottom of pier or footing at 42" below grade

Pier (E) size:
x

Footing (E) size:
x
bottom of pier or footing at 42" below grade

Pier (F) size:
x

Footing (F) size:
x
bottom of pier or footing at 42" below grade

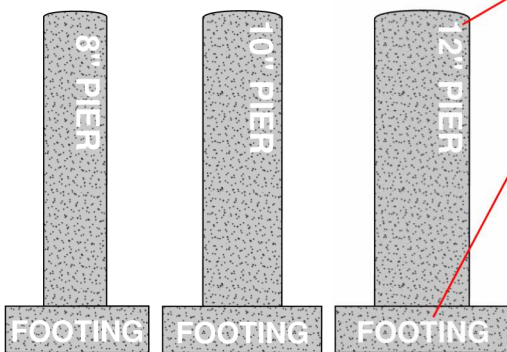
Pier (G) size:
x

Footing (G) size:
x
bottom of pier or footing at 42" below grade

Pier (H) size:
x

Footing (H) size:
x
bottom of pier or footing at 42" below grade

Example of pier sizes

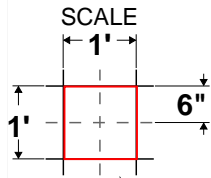


Example of footing sizes

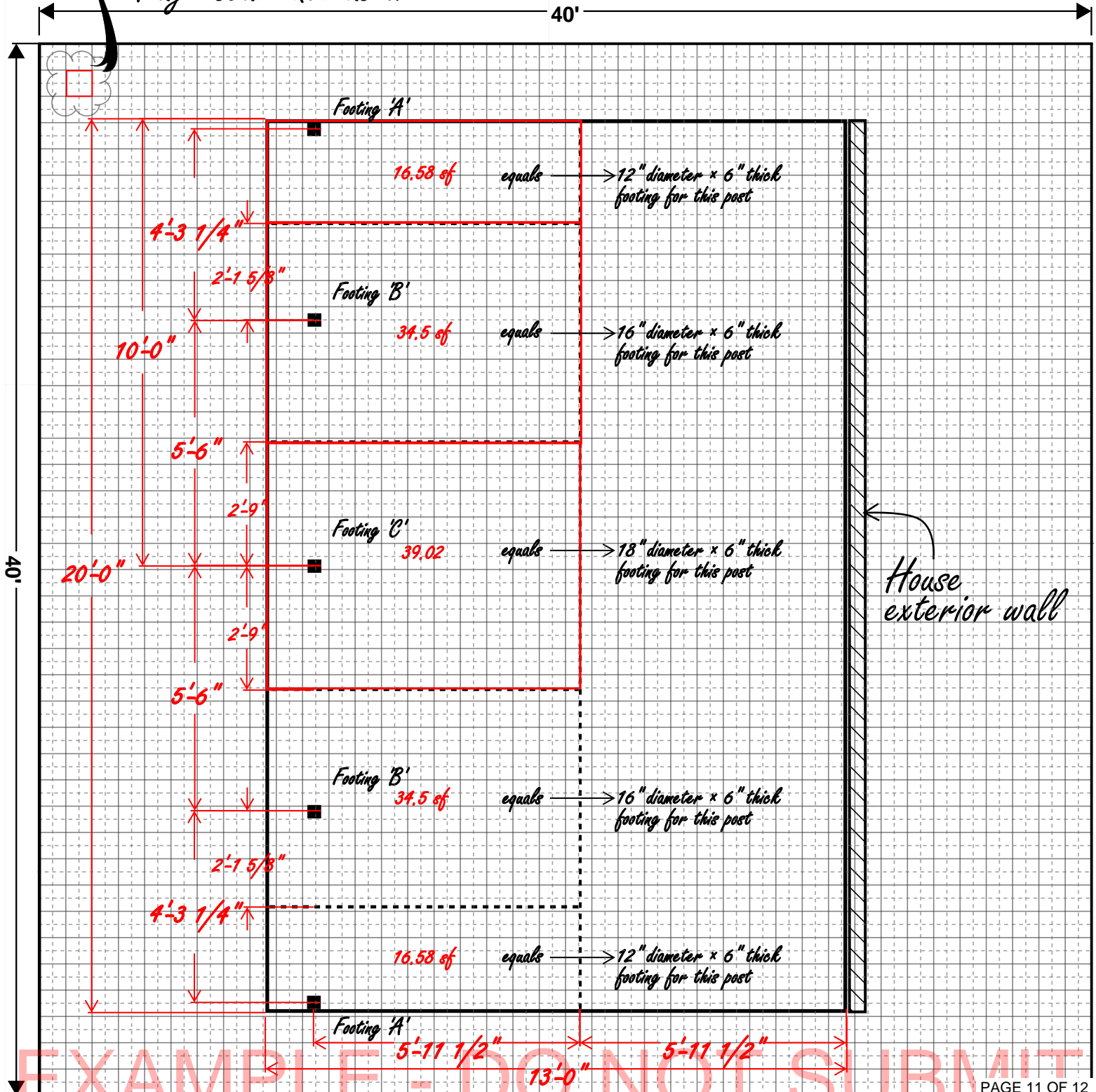
EXAMPLE - DO NOT SUBMIT

TRIBUTARY AREA WORKSHEET

Use the grid below to draw a plan view of the outline of your deck. Draw in all posts.
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Multiple posts with the same footing size can have the same footing label.



Page scale not used



DECK FOOTING SIZE

TABLE R507.3.1 MINIMUM FOOTING SIZE FOR DECKS

NO SOILS REPORT

LIVE OR GROUND SNOW LOAD (psf)	TRIBUTARY AREA (ft²)	LOAD-BEARING VALUE OF SOILS (psf)		
		1,500		
		SIDE OF A SQUARE FOOTING (inches)	DIAMETER OF A ROUND FOOTING (inches)	THICKNESS (inches)
50	5	7	8	6
	20	11	13	6
	40	15	17	6
	60	19	21	6
	80	21	24	8
	100	24	27	9
	120	26	30	10
	140	28	32	11
	160	30	34	12

Interpolated Table R507.3.1 to common round concrete form size

TRIBUTARY AREA (square feet)	DIAMETER OF ROUND FOOTING (inches)	THICKNESS (inches)
5	8	6
11	10	6
17	12	6
25	14	6
35	16	6
45	18	6
55	20	6
67	22	6
80	24	8
93	26	9
106	28	10

Round footing size up to next tributary area size.

Footing 'A' = 16.58 sq ft. Round to 17 sq ft. Footing size = 12" diameter x 6" thick

Footing 'B' = 34.5 sq ft. Round up to 35 sq ft. Footing size = 16" diameter x 6" thick.

Footing 'C' = 39.02 sq ft. Round up to 45 sq ft. Footing size = 18" diameter x 6" thick.