

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK



CITY OF PORTLAND BUILDING PERMIT

This is to certify that HANLEY, ANTHONY J & ANTHONY J & HANLEY

Located At 17 HILLCREST

Job ID: 2011-06-1231-ALTR

CBL: 336 - - L - 031 - 001 - - - -

has permission to Build 18' x 16' deck on rear of bldng

provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statues of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of the buildings and structures, and of the application on file in the department.

Notification of inspection and written permission procured before this building or part thereof is lathed or otherwise closed-in. 48 HOUR NOTICE IS REQUIRED.

A final inspection must be completed by owner before this building or part thereof is occupied. If a certificate of occupancy is required, it must be

Fire Prevention Officer

Code Enforcement Officer / Plan Reviewer

THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY
PENALTY FOR REMOVING THIS CARD

OK to close out ESCO

WLD

BUILDING PERMIT INSPECTION PROCEDURES

Please call 874-8703 or 874-8693 (ONLY)

or email: buildinginspections@portlandmaine.gov

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the city of Portland Inspections Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
 - **Permits expire in 6 months. If the project is not started or ceases for 6 months.**
 - **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue.**
1. Setback and footing depth required prior to pouring concrete.
 2. Framing and final inspection required. These can be done at the same time if the framing is visible.

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OF CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.



PORTLAND MAINE

Strengthening a Remarkable City, Building a Community for Life • www.portlandmaine.gov

Director of Planning and Urban Development
Penny St. Louis

Job ID: 2011-06-1231-ALTR

Located At: 17 HILLCREST

CBL: 336 - - L - 031 - 001 - - - -

Conditions of Approval:

Zoning

1. This permit is being approved on the basis of revised plans submitted July 11, 2011. Any deviations shall require a separate approval before starting that work.
2. This property shall remain a single family dwelling. Any change of use shall require a separate permit application for review and approval.

Building

1. Application approval based upon information provided by applicant. Any deviation from approved plans requires separate review and approval prior to work.
2. The carrying beam must be a minimum of 2 - 2" x 10"-s.

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, FAX: (207) 8716

Job No: 2011-06-1231-ALTR	Date Applied: 5/31/2011	CBL: 336 - - L - 031 - 001 - - - - -	
Location of Construction: 17 HILLCREST CIRCLE	Owner Name: ANTHONY J HANLEY	Owner Address: 17 HILLCREST CIR PORTLAND, ME 04103	Phone: 207-272-3189
Business Name:	Contractor Name: OWNER	Contractor Address:	Phone:
Lessee/Buyer's Name:	Phone:	Permit Type: BUILDING	Zone: R-2
Past Use: Single Family	Proposed Use: Single Family – build a 18' x 16' deck off rear	Cost of Work: 2000.00	CEO District:
		Fire Dept: <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Denied <input checked="" type="checkbox"/> N/A	Inspection: Use Group: R-3 Type: SB Signature: <i>IRC 09</i>
Proposed Project Description: build a 18' x 16' deck		Pedestrian Activities District (P.A.D.)	

Permit Taken By:	Zoning Approval		
<p>1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.</p> <p>2. Building Permits do not include plumbing, septic or electrical work.</p> <p>3. Building permits are void if work is not started within six (6) months of the date of issuance. False informatin may invalidate a building permit and stop all work.</p>	Special Zone or Reviews <input type="checkbox"/> Shoreland <input type="checkbox"/> Wetlands <input type="checkbox"/> Flood Zone <input type="checkbox"/> Subdivision <input type="checkbox"/> Site Plan <input type="checkbox"/> Maj <input type="checkbox"/> Min <input type="checkbox"/> MM Date: <i>OK w/conditions</i> <i>7/11/11 ABN</i>	Zoning Appeal <input type="checkbox"/> Variance <input type="checkbox"/> Miscellaneous <input type="checkbox"/> Conditional Use <input type="checkbox"/> Interpretation <input type="checkbox"/> Approved <input type="checkbox"/> Denied Date:	Historic Preservation <input checked="" type="checkbox"/> Not in Dist or Landmark <input type="checkbox"/> Does not Require Review <input type="checkbox"/> Requires Review <input type="checkbox"/> Approved <input type="checkbox"/> Approved w/Conditions <input type="checkbox"/> Denied Date: <i>ABN</i>
	CERTIFICATION		

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the appication is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT	ADDRESS	DATE	PHONE
RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE		DATE	PHON



R-2 -

GO 5/31/11

2011-06-1231

If you or the property owner owes real estate or personal property taxes or user charges on any property within the City, payment arrangements must be made before permits of any kind are accepted.

Location/Address of Construction: 17 Hillcrest Circle, Portland, ME 04103		
Total Square Footage of Proposed Structure 192 sqft	Square Footage of Lot 10,884 sqft	
Tax Assessor's Chart, Block & Lot Chart# 336 Block# L031001 Lot#	Owner: Jennifer + Anthony Hanley	Telephone: 207-272-3189
Lessee/Buyer's Name (If Applicable) <i>over OK SF</i>	Applicant name, address & telephone: Anthony J Hanley 17 Hillcrest Circle Portland ME 04103 207-272-3189	Cost Of Work: \$ 1,800 Fee: \$ 40.00 C of O Fee: \$
Current Specific use: _____ If vacant, what was the previous use? _____ Proposed Specific use: <u>deck</u>		
Project description: Construction of a 192 sqft deck 18'x16' <i>See revised plans.</i>		
RECEIVED		
Contractor's name, address & telephone: Anthony Hanley		
MAY 31 2011		
Who should we contact when the permit is ready: <u>Anthony Hanley</u>		
Mailing address: 17 Hillcrest Cir Portland ME, 04103		Phone: <u>207-272-3189</u> Dept. of Building Inspections City of Portland Maine

Please submit all of the information outlined in the Commercial Application Checklist. Failure to do so will result in the automatic denial of your permit.

In order to be sure the City fully understands the full scope of the project, the Planning and Development Department may request additional information prior to the issuance of a permit. For further information visit us on-line at www.portlandmaine.gov, stop by the Building Inspections office, room 315 City Hall or call 874-8703.

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Signature of applicant:	Date: 5/25/2011
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This is not a permit; you may not commence ANY work until the permit is issued.

Revised Plat Plan: P-2 Zone

lot size - 19,884 sq ft

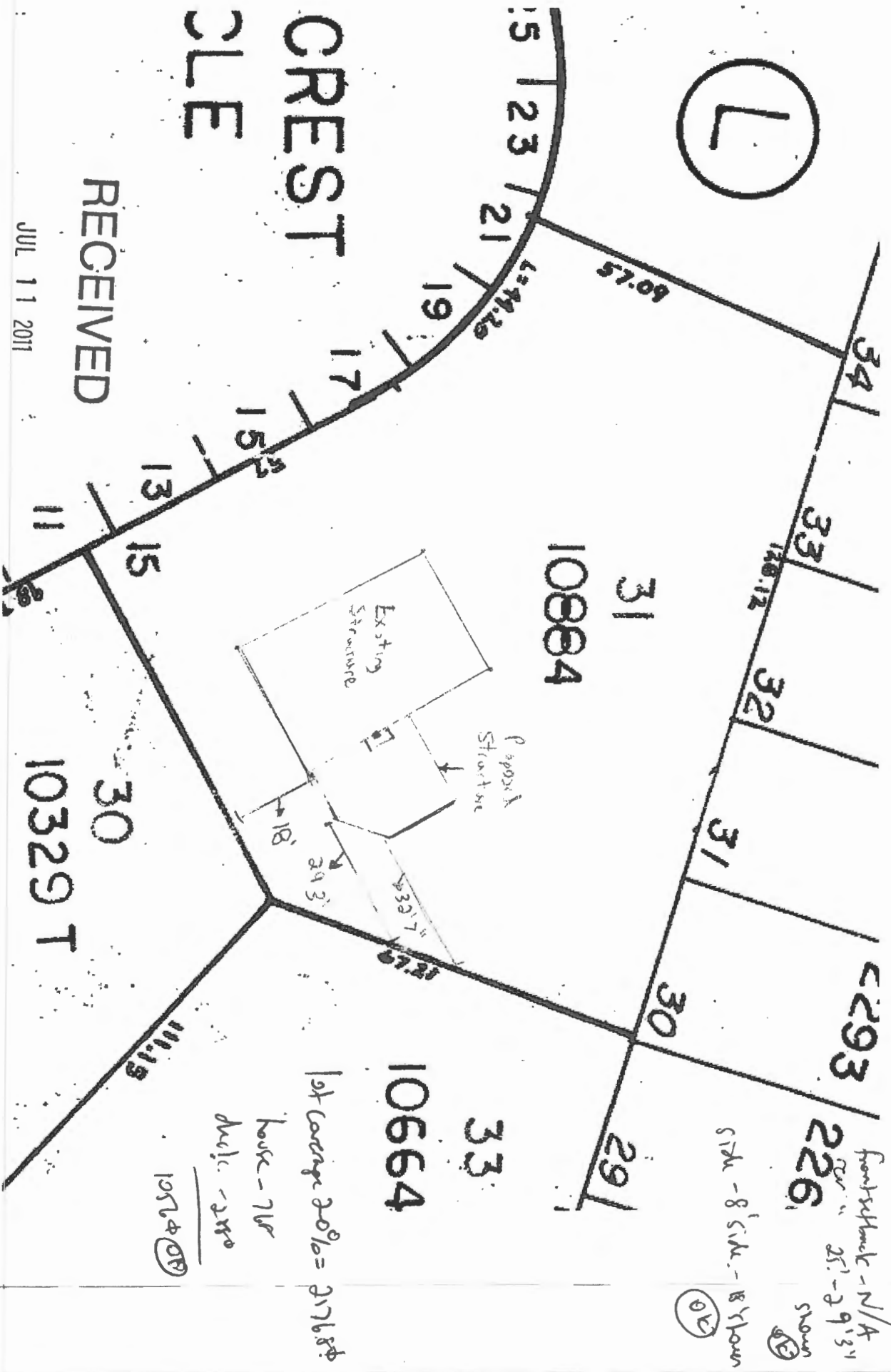
front setback - N/A
side " " 25' - 29' 3"

side - 8' side - 18' 1/2' down

(12)

(13)

(L)



lot coverage 20% = 2176 sq ft

house - 716 sq ft
driv. - 210 sq ft

(14)

RECEIVED

JUL 11 2011

Dept. of Building Inspections
City of Portland Maine

RECEIVED

JUL 11 2011

Dept. of Building Inspections
City of Portland Maine

Deck Information:

Foundation:

Pre cast concrete piers – 48" H, 9"x9" base to 6"x6" ✓

Below grade depth will be 48" ✓

4"x4" post anchors will anchor 4"x4" columns to piers ✓

Ledger:

2"x8" with back flashing and Z flashing ✓

3/8"x4" lag bolts, 16" OC (2) attached to existing house rim joist ✓

Framing:

Girders will be double 2"x8", attached to columns with post caps

Need - 2-2x10's

Decking size is 5/4"x6"

Railing:

Guardrail height will be 36" ✓

4"x4" posts will be notched and attached to rim joist

Balusters will be spaced no more than 3 3/4" ✓

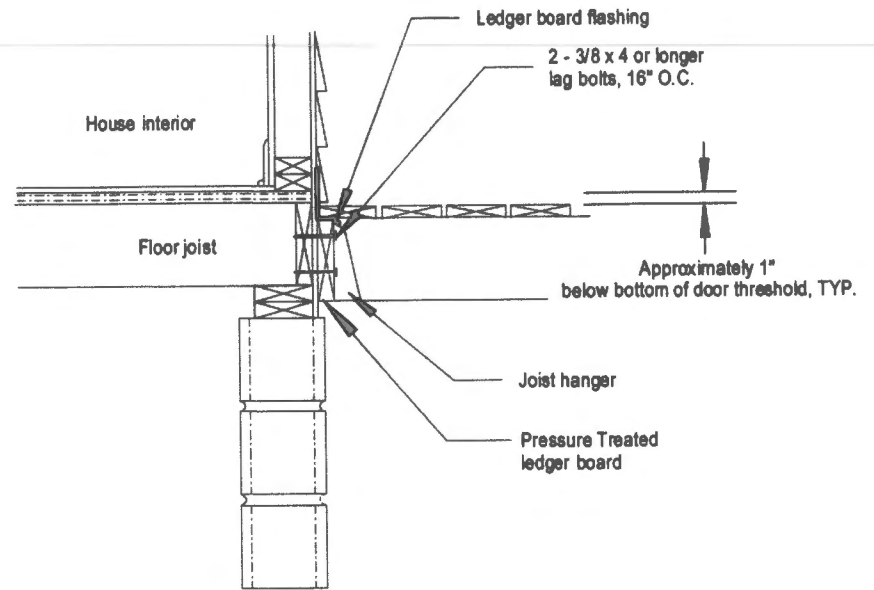
Stairs:

Tread Depth will be 10" -> each tread consists of (2) 5/4"x6" deck boards with 1/8" spacing and 1 1/8" radius nose ✓

Riser height is 6 3/4" ✓

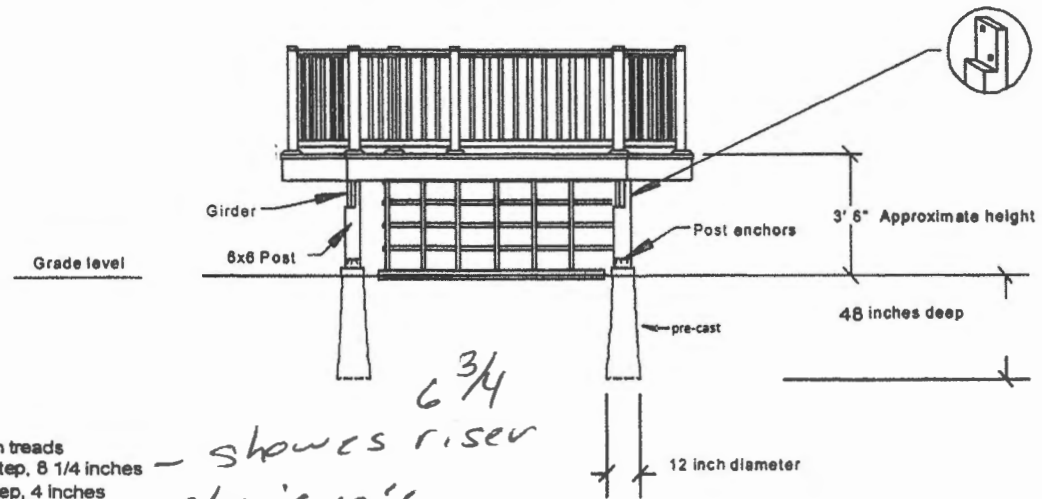
Stairs are 8'0" wide with handrail at each end

Ledger Board A



Deck Plan Framing View

4 inch maximum spindle spaces
36 inch railing height



Solid risers between treads
 Maximum rise per step, 8 1/4 inches - shows riser
 Minimum rise per step, 4 inches
 Minimum Tread depth, 9 inches - show's 10"
 All treads and risers to be uniform in depth and height
 Staircase railing height, 34-36 inches above tread bullnoses

17 - Hillcrest Cir Deck Plan

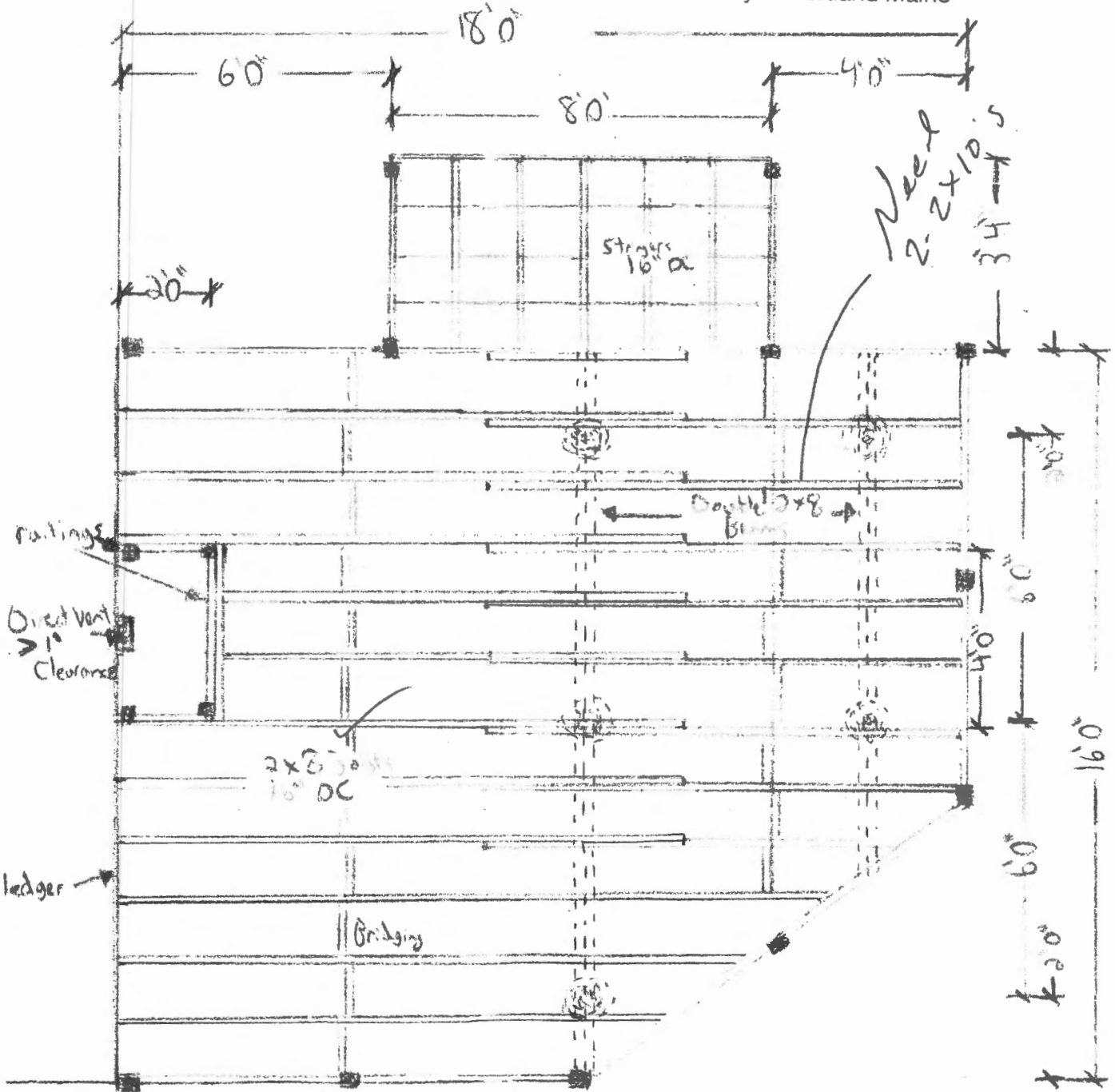
264 sqft pressure treated

1" = 3'

RECEIVED

JUL 11 2011

Dept. of Building Inspections
City of Portland Maine



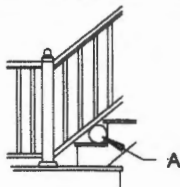
DECK INFORMATION REQUIRED WITH YOUR APPLICATION

The following is a guideline of information required for the review of a deck application. It is intended to help you supply proper and complete application packages. Please label all of the following items on your plans. Thank you!

1. **A complete plot plan showing all structures & proposed structures with distances to all property lines labeled.** See plot plan
2. **Type of foundation system**
 - a. Diameter of concrete filled tube 12"
 - b. depth below grade (minimum 4'-0" below grade)
 - c. anchorage of column to footing post anchors 4' 6"x6"
 - d. spacing of tubes See plan pg 2

Or

 - ~~e. pre cast concrete pier size~~
 - ~~f. depth below grade (minimum 4'-0")~~
 - ~~g. anchorage of column to footing~~
 - ~~h. spacing of tubes~~
3. **Columns (members supporting framing of floor system)**
 - a. wood size and type 6"x6" pressure treated, see plan pg 3; Southern pine
 - b. anchorage of column to footing post anchors 6"x6"
4. **Framing Members**
 - a. Ledger size attached to building 2x8
 - b. Lag Bolt size and spacing on ledger 3/8 x 4", 16" OC (2)
 - c. Location of all flashing top of all ledger, see plan pg 4
 - d. Girder Size and spans carrying floor system Double 2x10, see plan pg 2
 - e. Joist size, span, and spacing 2x8, 16" OC, see plan pg 2
 - f. Joist hangers or ledger yes joist hangers
 - g. Decking size 5/4 x 6
5. **Guardrails & Handrail Details**
 - a. Guardrail height 36", see plan pg 3
 - b. Baluster spacing no more than 3 3/4", see plan pg 5, step 151
 - c. Handrail height 36"
6. **Stair Details** See plan pg 3
 - a. Tread depth (measured nosing to nosing) see plan pg 3, min 9"
 - b. Riser height see plan pg 3, min 4", max 8 1/4"
 - c. Nosing on tread 1" with rounded edge
 - d. Width of stairs see plan pg 1, 3' 6"



Side view, staircase and sphere

A = Unable to pass a 6" diameter sphere through

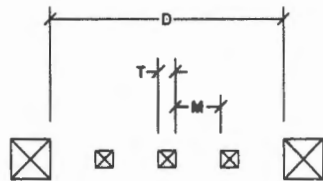
150. Spindle spacing

Railing balusters, often referred to as spindles, are the vertical members between the rails. The most common spindle spacing layout for railings has equal spaces between all the spindles including the space between the first and last spindle and post.

Important: The maximum spindle space for most building departments cannot exceed 4 inches. Some building departments may state this as 5 1/2 inches on-center assuming the use of 1 1/2 inch thick 2x2 spindles. Always check with the local building department first for the maximum spindle spacing for the particular type of deck project. Some towns require a different spacing or railing height than the ones stated and in the plans. In addition, different towns have different requirements depending on the type of deck. For example, some towns may require a railing height of 42 inches for pool decks where as others don't.

151. Achieving equal spacing

To achieve equal spaces between each spindle including the space between the first and last spindle and post, apply the following:



D = Distance between 2 posts
T = Thickness of a spindle
M = Maximum or desired space between 2 spindles

To space spindles evenly:

- $D \div T + (T \div M) = X$
- Round X up to full number = Y
- (Y less 1 equals the amount of spindles between posts)
- $[(D \div T) + Y] \cdot T =$ the space between each spindle and space between the and spindles and posts.

Example: The desired maximum spindle space is 3 3/4 inches and the measurement between 2 posts is 43 3/4 inches. If 2x2 spindles are being installed and they measure 1 3/8 inches thick, to achieve equal spacing of the spindles each space will need to be 3 5/8 inches.

- $43.75 \div 1.375 + (1.375 \div 3.75) = 8.005$
- 8.005 rounded up = 9
- $[(43.75 \div 1.375) + 9] \cdot 1.375 = 3.639$

Each space will be 3.639 inches

Additional notes: 3.639 = approximately 3 5/8 inches or 3.625

Additional notes: For best results when determining the spacing size, use a slightly smaller space size than the maximum space required by the building code.

Builder's Tip

To assemble the railing, cut a 2x4 spacer to properly space each spindle. A chop saw or miter saw works best for cutting a spacer square and to the exact measurement.

Important: A 1/8 inch off in size will, in turn, offset the 6th spindle installed by one full inch. Measure spacers and spindles within 1/16 of an inch tolerance for best results.

152. Spindle length for deck railings

Before assembling a railing section, the length of the spindles will need to be determined and cut to size. The design of the railing and height determines the size of the spindles. The length of the spindles used in the railing for the plan and included in the material list uses a spindle size of 29 1/4 inches.

The railing shown on the plans has a 1x3 trim board drilled and screwed to the top of the spindles. The top 2x4 cap is then placed on top of the trim board, which hides the screw heads. The bottom rail is then drilled and screwed to the bottom of the spindles. The space between the bottom rail and decking is usually 3 inches. The measurements given and the thickness of materials will determine the length of the spindles.

Example: If the top cap and bottom rail is a 2x4 on the flat and the trim board is a 1x3 on the flat, the length of each spindle (excluding the staircase spindles) for a 36 inch railing height will be 29 1/4 inches.

- 36 (railing height) $- 1.5$ (top cap) $- 0.75$ (trim board) $- 1.5$ (bottom rail) $= 30$ (bottom space)

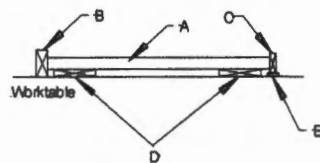
Additional notes: Check the size of spindles and the desired height of the railing before cutting the spindles. The length of some spindles may already come pre-cut.

Builder's Tip

To help avoid making errors, make a mock-up (full-size model of a small section) of the proposed railing to obtain and verify measurements.

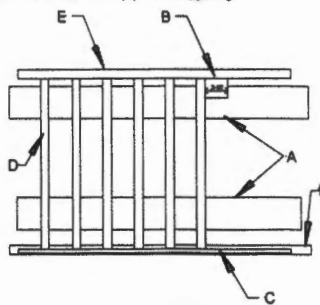
153. Lining up spindles and rails

After the rails and spindles are out to the correct lengths, each section of railing can then be assembled on a worktable. For ease of assembly, support the spindles level and center with the 2x4 bottom rail and 1x3 trim board. To do this use two 1 inch thick boards to rest the 2x2 spindles on and rip 1/2 inch thick piece on a table saw to rest the top trim board on.



Side view railing on worktable

A = 2x2 Spindle
B = 2x4 Bottom rail
C = 1x3 Trim board
D = 1 inch thick scrap pieces for spacing
E = 1/2 inch thick scrap pieces for spacing



Top view railing on worktable

A = 1 inch thick temporary support
B = Spindle spacer
C = 1x3 Trim
D = Spindle
E = Bottom rail
F = 1/2 inch thick temporary support

154. Assembling railing

Take one railing section at a time and arrange the top trim board, bottom rail and spindles on the worktable as noted above. Begin with the spacer and line it up with the end of

the bottom rail. Place the spindle in front of the spacer then drill and screw the bottom rail to the spindle using a 3 inch screw. Continue the same process for the entire length of the rail making sure the spacer and each spindle are tight with the previous spindle installed and square with the rail.

Builder's Tip

The spindle spaces may need minor adjustments when making up sections of railings. For best results, check the layout with the spindle and spacer first (dry run) prior to drilling and screwing together.

Once all the spindles are attached to the bottom rail, repeat the same process for installing the top trim board using 2 inch screws. After the trim board and the bottom rail are screwed to spindles, the top rail can then be attached by screwing up through the bottom of the trim board and into the top rail using 1 1/2 inch long screws, both sides every 12 to 16 inches apart.

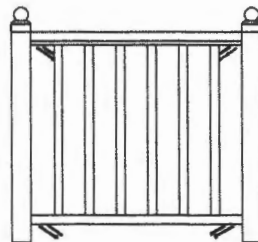
Builder's Tip

A small bead of construction adhesive can be applied down the center top of the 1x3 trim board prior to attaching the 2x4 top rail cap. The adhesive will help prevent the two from separating and fill any voids between the two surfaces.

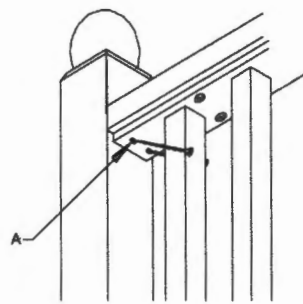
155. Installing the sections of railings

To install each assembled section of railing between posts, start by cutting 2 temporary support blocks out of a 2x4, both 3 inches long. The bottom of the railing section can then be placed on the blocks to properly space and support it off the deck. After the railing is screwed to the posts, the temporary support blocks can then be removed and used again.

To secure the railing to the post, drill both sides of the 1x3 trim board and 2x4 top rail cap. Drill up through bottom of the trim board on an angle towards the post (down with screws). Drilling through the bottom avoids the unsightliness of drill holes and screw heads showing. Secure the railing to the post with 3 1/2 inch screws. Then in the same manner, drill and screw the other end. The lower rail can then be drilled and screwed to the posts using the same method.

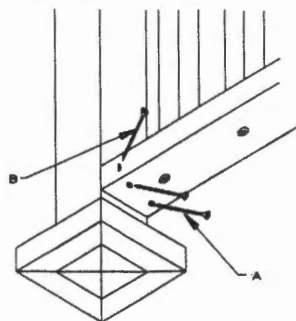


Drill and screw railing



Top rail and screws

A = Screw under rail and into post



Bottom rail and screws

A = Screw under rail and into post
B = Alternative method when necessary

Some drill and screw guns may require a flexible drive tip to get underneath the bottom rail.

Alternative method: Another method for securing the bottom rail to the post is to drill the side of the rail on an angle towards the post (down with screws) and install 3 1/2 inch screws. Unfortunately, using this method will not hide the screw heads and drill holes from view. For best results, install plugs after the screws are installed or use 3 1/2 inch trim head screws.

Important: When assembling railings, always drill and screw components together.

Builder's tip

For quick assembly of rails and spindles, use the pre-cut spacer and space and tack the spindles in position with a pneumatic finish nail gun. Once all the spindles are tacked and properly spaced, the rails can then be drilled and screwed to the spindles. Care should be taken not to break the drill bit by drilling on top of a finish nail, drill to the side of it.

A finish nail gun makes spindle spacing adjustments easier before screwing components together.

Finish nails can either be cut off and punched in below the surface with a nail set (punch) or pulled out when necessary.

156. Staircase railing, spindle length

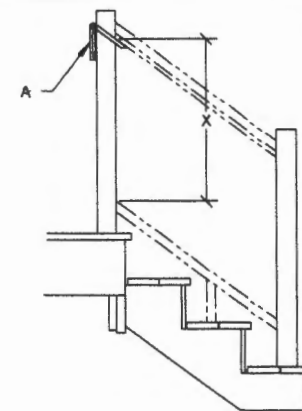
To determine the staircase spindle length and angle cut for the railing in the plan, mark the upper staircase post where the proposed railing will be attached. Start by marking the bottom of the 1x3 trim board and mark for the top of the 2x4 bottom rail. The measurement between the two marks is the size of the spindle from the short to the long of the angle (see diagram below).



Staircase spindle

A = Short of the angle
B = Long of the angle

An adjustable framing square can then be used to transfer the angle mark that's already been marked on the post (see staircases and posts) to the spindle.



Staircase rail angle

A = Adjustable framing angle
X = Spindle length, long to short of the angle

Important: Top and bottom rails that are not parallel to each other will have spindle lengths that vary. For ease of construction, check that the posts are plumb and then measure and cut the existing rails or cut new rails to the correct lengths.

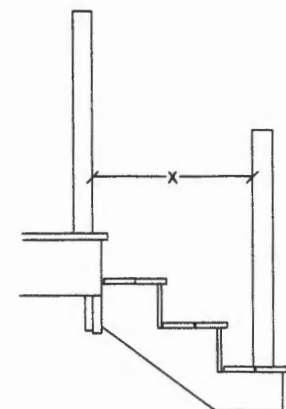
157. Cutting spindles

To cut the angle and length for the staircase spindles, use a chop saw or miter saw. After the first spindle is cut, check it with the marks on the top staircase post for correctness. If the length and angle are correct, use it as a template for the rest of the spindles in the section.

Additional notes: The spindle spacing, length and angle cut between both sides of the staircase may vary. For best results, check the spindle measurement and angle for each side and each section of the staircase.

158. Staircase spindle spacing

To achieve the same size space between each spindle, the horizontal distance between two posts will have to be measured. This measurement can then be applied to the same spindle spacing equation used previously for the deck railing (see - Achieving equal spacing).



Measurement to obtain spindle space

X = Horizontal measurement

159. Staircase railing assembly

After the spindle spacing has been determined and the spacer and spindles cut, the staircase railing can then be assembled. Build each section of railing on a worktable using the same basic building techniques as assembling the deck railing. For ease of screwing the staircase railing sections to the posts, install the 2x4 railing cap last.



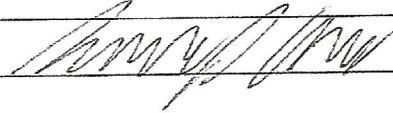
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Location/Address of Construction: <u>17 Hillcrest Circle, Portland, ME 04103</u>		
Total Square Footage of Proposed Structure <u>192 sqft</u>	Square Footage of Lot <u>10,884 sqft</u>	
Tax Assessor's Chart, Block & Lot Chart# <u>336</u> Block# <u>L031001</u> Lot#	Owner: <u>Jennifer + Anthony Hanley</u>	Telephone: <u>207-272-3189</u>
Lessee/Buyer's Name (If Applicable)	Applicant name, address & telephone: <u>Anthony J Hanley</u> <u>17 Hillcrest Circle</u> <u>Portland ME, 04103</u> <u>207-272-3189</u>	Cost Of Work: \$ <u>1,800</u> Fee: \$ <u>40.00</u> C of O Fee: \$ _____
Current Specific use: _____ If vacant, what was the previous use? _____ Proposed Specific use: <u>deck</u>		
Project description: <u>Construction of a 192 sqft deck</u>		
Contractor's name, address & telephone: <u>Anthony Hanley</u>		
Who should we contact when the permit is ready: <u>Anthony Hanley</u>		
Mailing address: _____ Phone: <u>207-272-3189</u>		
<u>17 Hillcrest Cir</u> <u>Portland ME, 04103</u>		

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Signature of applicant: 	Date: <u>5/25/2011</u>
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DECK INFORMATION REQUIRED WITH YOUR APPLICATION

The following is a guideline of information required for the review of a deck application. It is intended to help you supply proper and complete application packages. Please label all of the following items on your plans. Thank you!

1. A complete plot plan showing all structures & proposed structures with distances to all property lines labeled. *See plot plan*
2. Type of foundation system
 - a. Diameter of concrete filled tube *12"*
 - b. depth below grade (minimum 4'-0" below grade)
 - c. anchorage of column to footing *post anchors 4' 6"x6"*
 - d. spacing of tubes *See plan pg 2*

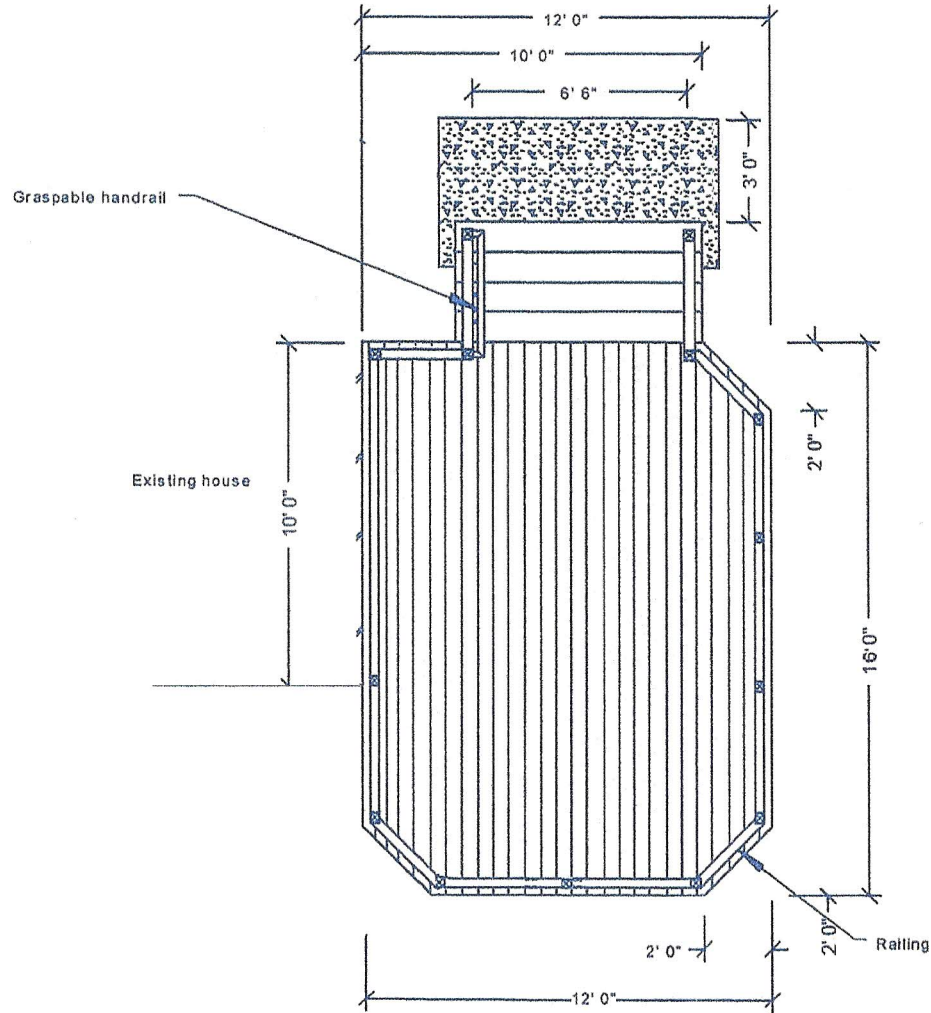
Or

 - ~~e. pre cast concrete pier size~~
 - ~~f. depth below grade (minimum 4'-0")~~
 - ~~g. anchorage of column to footing~~
 - ~~h. spacing of tubes~~
3. Columns (members supporting framing of floor system)
 - a. wood size and type *6" x 6" pressure treated, see plan pg 3, southern pine*
 - b. anchorage of column to footing *post anchors 6" x 6"*
4. Framing Members
 - a. Ledger size attached to building *2x8*
 - b. Lag Bolt size and spacing on ledger *3/8 x 4", 16" OC (2)*
 - c. Location of all flashing *top of all ledger, see plan pg 4*
 - d. Girder Size and spans carrying floor system *Double 2x10", see plan pg 2*
 - e. Joist size, span, and spacing *2x8, 16" OC, see plan pg 2*
 - f. Joist hangers or ledger *Yes joist hangers*
 - g. Decking size *5/4 x 6*
5. Guardrails & Handrail Details
 - a. Guardrail height *36", see plan pg 3*
 - b. Baluster spacing *no more than 3 3/4", see plan pg 5, step 151*
 - c. Handrail height *36"*
6. Stair Details *See plan pg 3*
 - a. Tread depth (measured nosing to nosing) *see plan pg 3, min 9"*
 - b. Riser height *See plan pg 3, min 4", max 8 1/4"*
 - c. Nosing on tread *1" with rounded edge*
 - d. Width of stairs *see plan pg 1, 3' 6"*

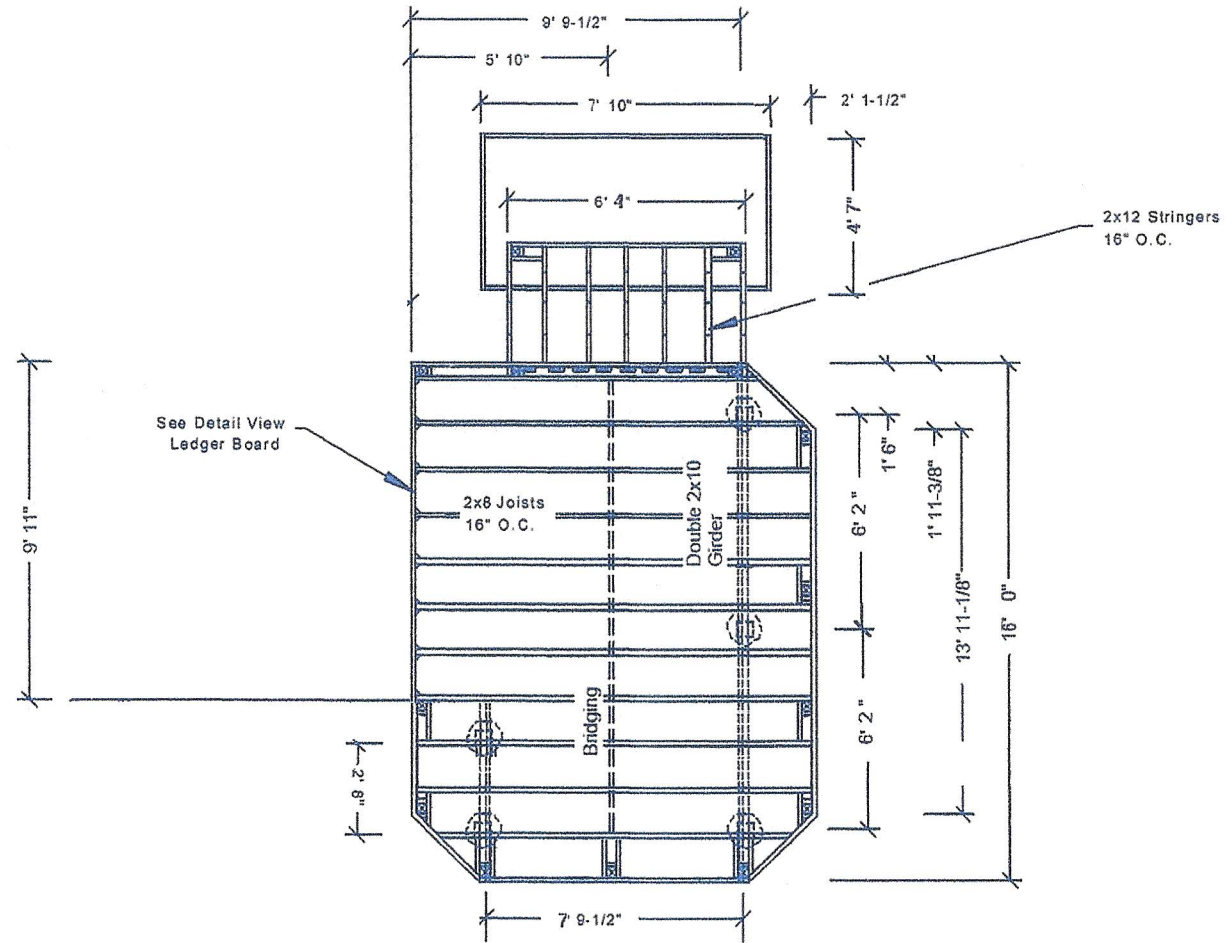
Deck Plan Top View

192 Square Feet
SCALE 3/16" = 1' - 0"

SUBMIT PLANS TO BUILDING DEPARTMENT
PRESSURE TREATED FRAMING # 2 GRADE OR BETTER
MINIMUM 2,500 PSI CONCRETE
FOOTINGS BASED ON ASSUMED SOIL BEARING CAPACITY OF 2000 PSF
STRUCTURAL DESIGN LOAD 60 PSF LIVE LOAD, 10 PSF DEAD LOAD SOUTHERN PINE #2 GRADE

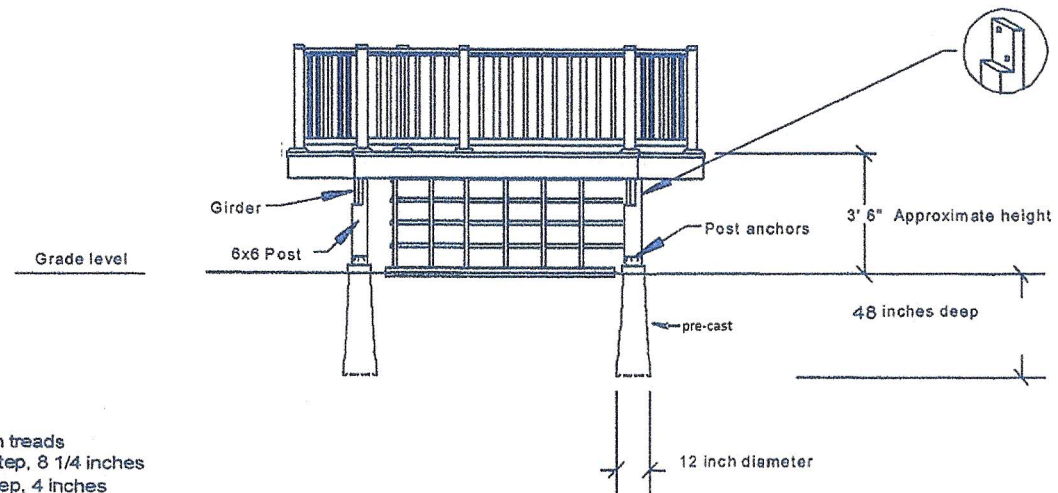


Deck Plan Framing View



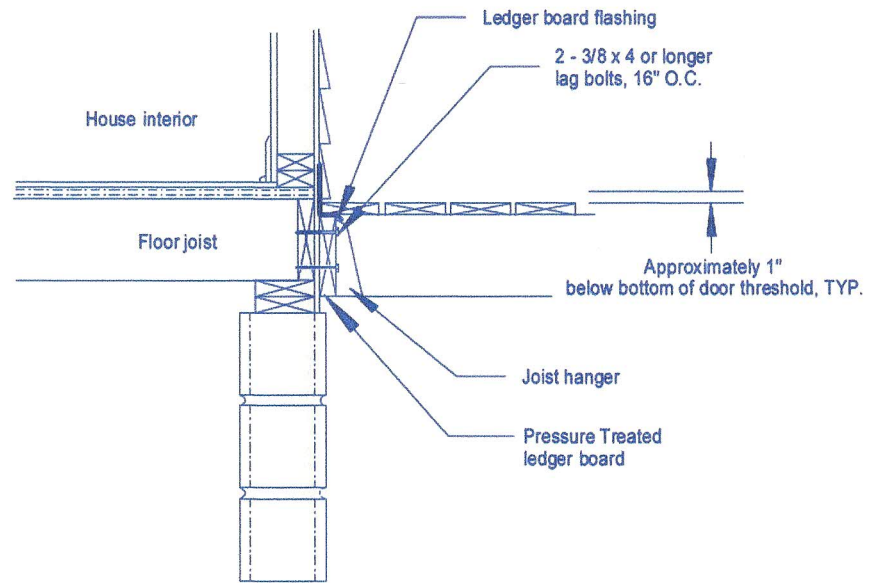
Deck Plan Framing View

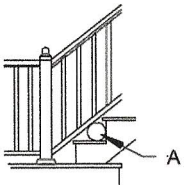
4 inch maximum spindle spaces
36 inch railing height



Solid risers between treads
Maximum rise per step, 8 1/4 inches
Minimum rise per step, 4 inches
Minimum Tread depth, 9 inches
All treads and risers to be uniform in depth and height
Staircase railing height, 34-38 inches above tread bullnoses

Ledger Board A





Side view, staircase and sphere

A = Unable to pass a 6" diameter sphere through

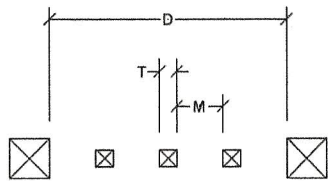
150. Spindle spacing

Railing balusters, often referred to as spindles, are the vertical members between the rails. The most common spindle spacing layout for railings has equal spaces between all the spindles including the space between the first and last spindle and post.

Important: The maximum spindle space for most building departments cannot exceed 4 inches. Some building departments may state this as 5 1/2 inches on-center assuming the use of 1 1/2 inch thick 2x2 spindles. Always check with the local building department first for the maximum spindle spacing for the particular type of deck project. Some towns require a different spacing or railing height than the ones stated and in the plans. In addition, different towns have different requirements depending on the type of deck. For example, some towns may require a railing height of 42 inches for pool decks where as others don't.

151. Achieving equal spacing

To achieve equal spaces between each spindle including the space between the first and last spindle and post, apply the following:



D = Distance between 2 posts

T = Thickness of a spindle

M = Maximum or desired space between 2 spindles

To space spindles evenly:

- $D + T + (T + M) = X$
- Round X up to full number = Y
- (Y less 1 equals the amount of spindles between posts)
- $[(D + T) + Y] - T =$ the space between each spindle and space between the end spindles and posts.

Example: The desired maximum spindle space is 3 3/4 inches and the measurement between 2 posts is 43 3/4 inches. If 2x2 spindles are being installed and they measure 1 3/8 inches thick, to achieve equal spacing of the spindles each space will need to be 3 5/8 inches.

- $43.75 + 1.375 + (1.375 + 3.75) = 8.805$
- 8.805 rounded up = 9
- $[(43.75 + 1.375) + 9] - 1.375 = 3.639$

Each space will be 3.639 inches

Additional notes: 3.639 = approximately 3 5/8 inches or 3.625

Additional notes: For best results when determining the spacing size, use a slightly smaller space size than the maximum space required by the building code.

Builders Tip

To assemble the railing, cut a 2x4 spacer to properly space each spindle. A chop saw or miter saw works best for cutting a spacer square and to the exact measurement.

Important: A 1/8 inch off in size will, in turn, offset the 8th spindle installed by one full inch. Measure spacers and spindles within 1/16 of an inch tolerance for best results.

152. Spindle length for deck railings

Before assembling a railing section, the length of the spindles will need to be determined and cut to size. The design of the railing and height determines the size of the spindles. The length of the spindles used in the railing for the plan and included in the material list uses a spindle size of 29 1/4 inches.

The railing shown on the plans has a 1x3 trim board drilled and screwed to the top of the spindles. The top 2x4 cap is then placed on top of the trim board, which hides the screw heads. The bottom rail is then drilled and screwed to the bottom of the spindles. The space between the bottom rail and decking is usually 3 inches. The measurements given and the thickness of materials will determine the length of the spindles.

Example: If the top cap and bottom rail is a 2x4 on the flat and the trim board is a 1x3 on the flat, the length of each spindle (excluding the staircase spindles) for a 36 inch railing height will be 29 1/4 inches.

- 36 (railing height) $- 1.5$ (top cap) $- 0.75$ (trim board) $- 1.5$ (bottom rail) $- 3$ (bottom space) $= 29.25$

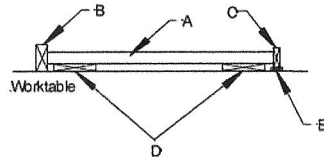
Additional notes: Check the size of spindles and the desired height of the railing before cutting the spindles. The length of some spindles may already come pre-cut.

Builders Tip

To help avoid making errors, make a mock-up (full-size model of a small section) of the proposed railing to obtain and verify measurements.

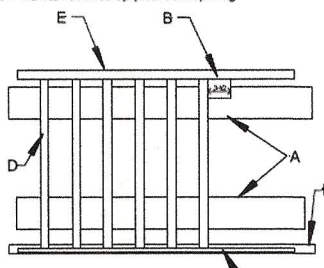
153. Lining up spindles and rails

After the rails and spindles are cut to the correct lengths, each section of railing can then be assembled on a worktable. For ease of assembly, support the spindles level and center with the 2x4 bottom rail and 1x3 trim board. To do this use two 1 inch thick boards to rest the 2x2 spindles on and rip 1/2 inch thick piece on a table saw to rest the top trim board on.



Side view railing on worktable

- A = 2x2 Spindle
- B = 2x4 Bottom rail
- C = 1x3 Trim board
- D = 1 inch thick scrap pieces for spacing
- E = 1/2 inch thick scrap pieces for spacing



Top view railing on worktable

- A = 1 inch thick temporary support
- B = Spindle spacer
- C = 1x3 Trim
- D = Spindle
- E = Bottom rail
- F = 1/2 inch thick temporary support

154. Assembling railing

Take one railing section at a time and arrange the top trim board, bottom rail and spindles on the worktable as noted above. Begin with the spacer and line it up with the end of

the bottom rail. Place the spindle in front of the spacer then drill and screw the bottom rail to the spindle using a 3 inch screw. Continue the same process for the entire length of the rail making sure the spacer and each spindle are tight with the previous spindle installed and square with the rail.

Builders Tip

The spindle spaces may need minor adjustments when making up sections of railings. For best results, check the layout with the spindle and spacer first (dry run) prior to drilling and screwing together.

Once all the spindles are attached to the bottom rail, repeat the same process for installing the top trim board using 2 inch screws. After the trim board and the bottom rail are screwed to spindles, the top rail can then be attached by screwing up through the bottom of the trim board and into the top rail using 1 1/2 inch long screws, both sides every 12 to 16 inches apart.

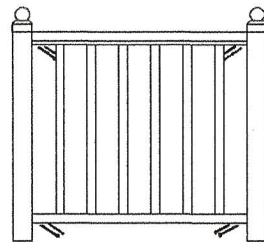
Builders Tip

A small bead of construction adhesive can be applied down the center top of the 1x3 trim board prior to attaching the 2x4 top rail cap. The adhesive will help prevent the two from separating and fill any voids between the two surfaces.

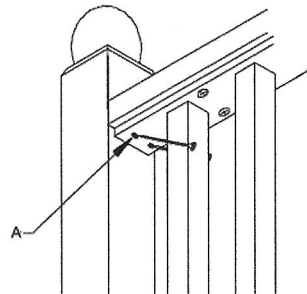
155. Installing the sections of railings

To install each assembled section of railing between posts, start by cutting 2 temporary support blocks out of a 2x4, both 3 inches long. The bottom of the railing section can then be placed on the blocks to properly space and support it off the deck. After the railing is screwed to the posts, the temporary support blocks can then be removed and used again.

To secure the railing to the post, drill both sides of the 1x3 trim board and 2x4 top rail cap. Drill up through bottom of the trim board on an angle towards the post (tenail with screws). Drilling through the bottom avoids the unsightliness of drill holes and screw heads showing. Secure the railing to the post with 3 1/2 inch screws. Then in the same manner, drill and screw the other end. The lower rail can then be drilled and screwed to the posts using the same method.

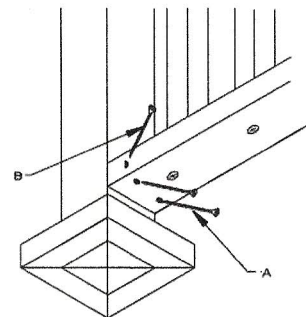


Drill and screw railing



Top rail and screws

A = Screw under rail and into post



Bottom rail and screws

A = Screw under rail and into post
B = Alternative method when necessary

Some drill and screw guns may require a flexible drive tip to get underneath the bottom rail.

Alternative method: Another method for securing the bottom rail to the post is to drill the sides of the rail on an angle towards the post (tenail with screws) and install 3 1/2 inch screws. Unfortunately, using this method will not hide the screw heads and drill holes from view. For best results, install plugs after the screws are installed or use 3 1/2 inch trim head screws.

Important: When assembling railings, always drill and screw components together.

Builders tip

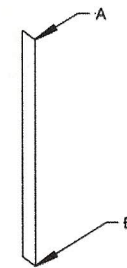
For quick assembly of rails and spindles, use the pre-cut spacer and space and tack the spindles in position with a pneumatic finish nail gun. Once all the spindles are tacked and properly spaced, the rails can then be drilled and screwed to the spindles. Care should be taken not to break the drill bit by drilling on top of a finish nail, drill to the side of it.

A finish nail gun makes spindle spacing adjustments easier before screwing components together.

Finish nails can either be cut off and punched in below the surface with a nail set (punch) or pulled out when necessary.

156. Staircase railing, spindle length

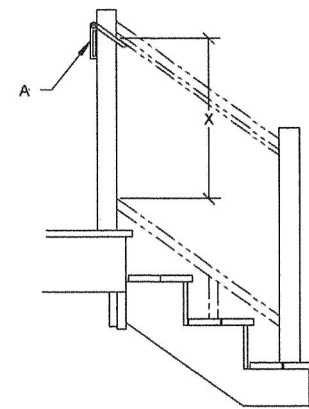
To determine the staircase spindle length and angle cut for the railing in the plan, mark the upper staircase post where the proposed railing will be attached. Start by marking the bottom of the 1x3 trim board and mark for the top of the 2x4 bottom rail. The measurement between the two marks is the size of the spindle from the short to the long of the angle (see diagram below).



Staircase spindle

A = Short of the angle
B = Long of the angle

An adjustable framing square can then be used to transfer the angle mark that's already been marked on the post (see staircases and posts) to the spindle.



Staircase rail angle

A = Adjustable framing angle
X = Spindle length, long to short of the angle

Important: Top and bottom rails that are not parallel to each other will have spindle lengths that vary. For ease of construction, check that the posts are plumb and then measure and cut the existing rails or cut new rails to the correct lengths.

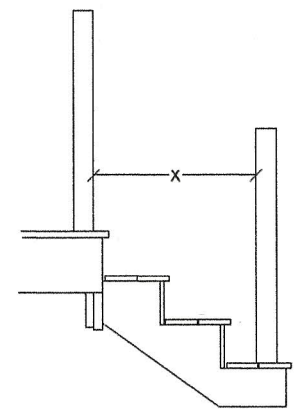
157. Cutting spindles

To cut the angle and length for the staircase spindles, use a chop saw or miter saw. After the first spindle is cut, check it with the marks on the top staircase post for correctness. If the length and angle are correct, use it as a template for the rest of the spindles in the section.

Additional notes: The spindle spacing, length and angle cut between both sides of the staircase may vary. For best results, check the spindle measurement and angle for each side and each section of the staircase.

158. Staircase spindle spacing

To achieve the same size space between each spindle, the horizontal distance between two posts will have to be measured. This measurement can then be applied to the same spindle spacing equation used previously for the deck railing (see - Achieving equal spacing).



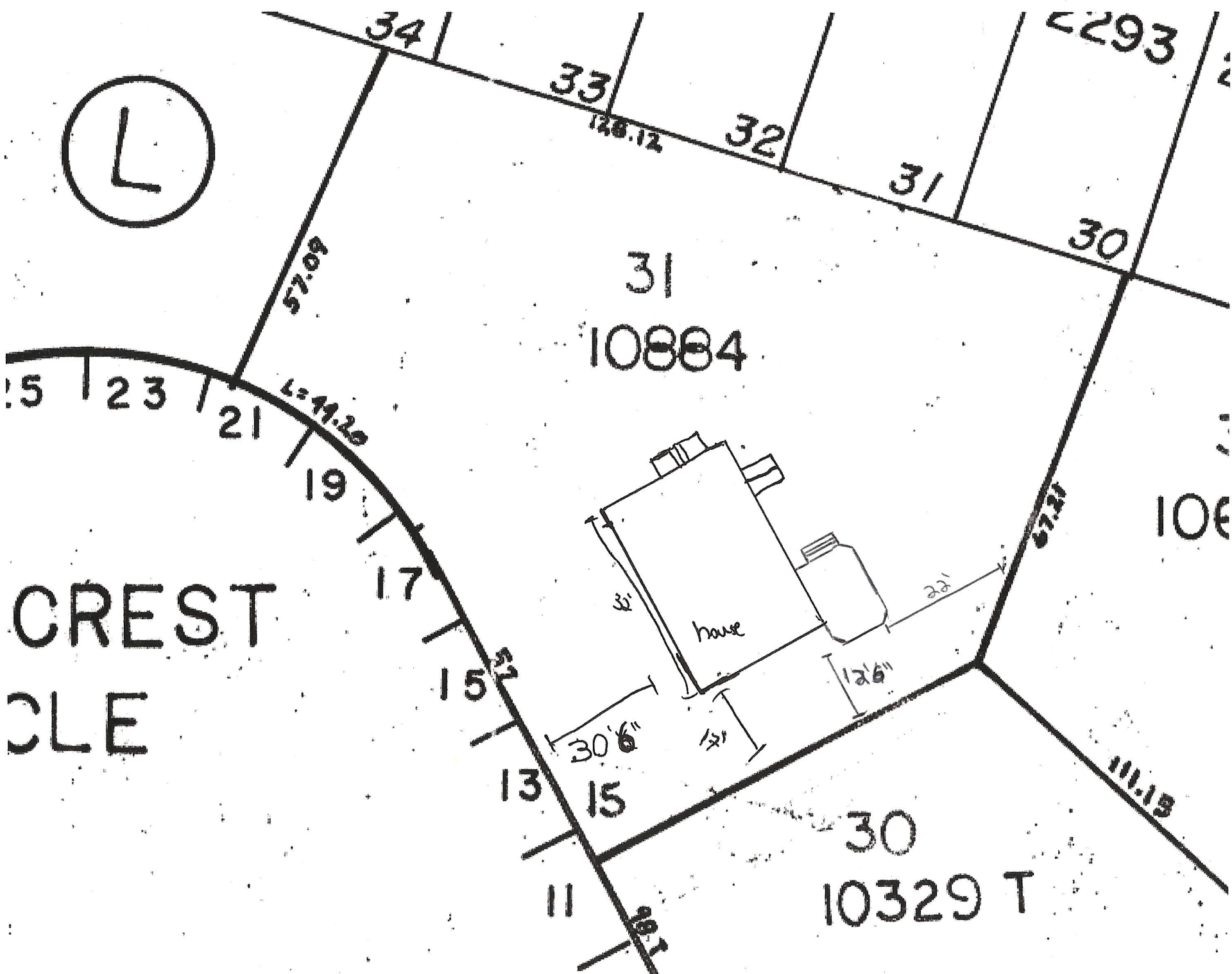
Measurement to obtain spindle space

X = Horizontal measurement

159. Staircase railing assembly

After the spindle spacing has been determined and the spacer and spindles cut, the staircase railing can then be assembled. Build each section of railing on a worktable using the same basic building techniques as assembling the deck railing. For ease of screwing the staircase railing sections to the posts, install the 2x4 railing cap last.

(L)



7-22-11

OK to pump MWB

9-12-11

OK to close out
MWB