NATURAL RESOURCES CONSERVATION SERVICE CONSERVATION
PRACTICE SPECIFICATION & IMPLEMENTATION REQUIREMENTS

382A – FENCE – BARBED, SMOOTH, OR WOVEN WIRE

Client Name:		**Planner Name:**	
Contract No:		**Phone:**	
CINs		**Planned Feet:**	

Livestock Type:	☐ Cattle ☐ Horses ☐ Sheep	☐ Goats ☐ Pigs	**Purpose:**	☐ Containment (Exclusion or Perimeter fence) ☐ Deterrent (cross fence)	
Describe Planned Fence:		☐ Barbed, double strand ☐ Smooth, double strand		Number of Wires:	
Overall height:		☐ Woven	Top Wire:	☐ 1 wire ☐ 2 wire	☐ Barbed ☐ Smooth
			Bottom Wire:	☐ 1 wire ☐ none	☐ Barbed

Plans and Specifications

Plans and specifications that describe the requirements for installing this practice in accordance with the practice standard are described in this document.

Included are:

- Plan map showing planned layout of fence and location of gates. (see attached)
- Material requirements and details for fence installation.

This specification is **not** a how-to guide for building a fence. Novices to fence design and construction should refer to appropriate publications or industry experts for assistance in designing, constructing and maintaining a fence system.

All fences must be planned, designed, and constructed in compliance with all Federal, State, and local regulations. The landowner must obtain all necessary permissions from regulatory agencies or document that no permits are required. The landowner and/or contractor is responsible for locating all buried utilities in the project area, including drainage tile and other structural measures.

It is the client's responsibility to ensure they understand the practice requirements. Contact your planner if you have ANY questions PRIOR to construction or purchasing materials.

Fence construction requiring the removal of existing fencing materials shall provide for proper disposal to prevent harm to animals, people and equipment.

Fence construction methods should consider fire risk, safety and health risks, vegetative disturbance, durability and ease of construction and repair.

1 SCOPE & GENERAL USE

The work shall consist of furnishing materials and installing either barbed, smooth, or woven wire or a combination thereof, and must be constructed to equal or exceed, in strength and durability in accordance with the specifications in this document. The specifications provide for a fence with an intended lifespan of 20 years under normal conditions. *Note: This intended lifespan may not be realized in locations where the fence might be subject to salt spray, vog, lava, fire, extreme livestock or wildlife pressure or other environmental factors that encourage accelerated corrosion or other damage to fencing materials.*

Locate fences to help facilitate management of livestock or different land uses and special management areas such as ponds or wetlands, riparian areas, critical eroding areas, pasture types, etc.

For domestic livestock, install fences in areas that will address resource concerns, improve livestock distribution, and improve livestock handling, feeding, watering and movement of the type of livestock managed. For horses, consider avoiding the use of barbed wire and steel T-Posts when possible, to minimize potential injury, especially when areas of confinement are small.

When installing fences in areas with the presence of the Hawaiian Hoary Bat, consideration should be given to fence and wire types. Electric fences, woven wire fences and/or barbed wire fences where the top two strands (above 36”) are smooth are less hazardous to the bat than fences with barbed wire above 36”.

2 FENCE TYPE AND DESIGN

There are several types of fences used in the Pacific Islands Area. The overall effectiveness of each type of fence and the costs for installation and maintenance, depends on the type of animal controlled, the number and size of wires used, and post type, and spacing. Specifications for containment fences should be used for livestock exclusion, and livestock containment and isolation areas (bull/stud/ram/buck pastures, weaning pastures, lanes, livestock quarantine pastures/lots). “Containment” fences are NOT recommended as perimeter fences. Specifications for deterrent fences should be adequate for most internal cross fences to facilitate grazing management.

TABLE 1. FENCE TYPES PER LIVESTOCK TYPE AND SUGGESTED WIRE SPACING

Fence Type	Livestock Type	Purpose	Min. Number of Wires	Min. Height of Top Wire	Suggested Wire Spacing (from ground up)**
Barbed/Smooth	Cattle/Horses	Containment	5	~52”	12”, 10”, 10”, 10”, 10”
Barbed/Smooth	Cattle/Horses	Deterrent	4	~48”	12”, 12”, 12”, 12”
Woven Wire	Cattle	Containment/ Deterrent	47” woven + 1*	~51”	2” (woven), 2”
	Sheep/Goats	Containment	47” woven + 1*	~48”	0” (woven), 1”
		Deterrent	39” woven + 2*	~48”	0-2” (woven), 4”, 4”
	Horses	Containment/ Deterrent	39” woven + 2*	~48”	4” (woven) 5”
	Pigs	Containment/ Deterrent	36” woven + 2*	~41”	1”(barbed), 1”(woven), 3”

*top wires may be barbed (where appropriate), smooth or electrified-smooth off-set. See Electric Fence spec for information on electrified top-wire.
** See examples below.

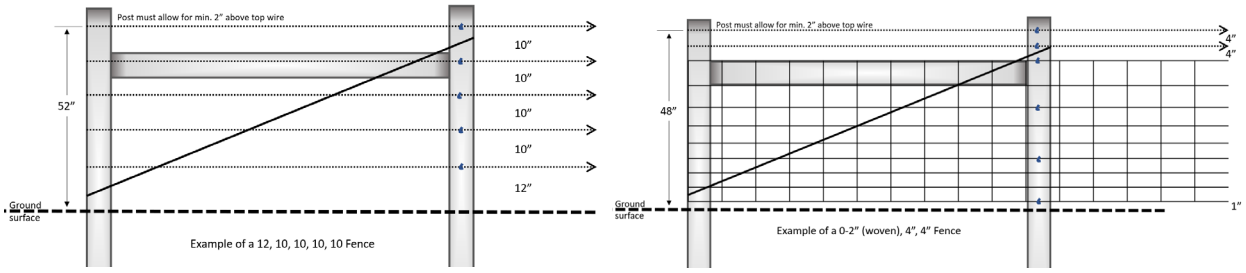


FIGURE 1 EXAMPLES OF FENCE WIRE SPACINGS

3 MATERIALS AND INSTALLATION SPECIFICATIONS

3.1 WIRE MATERIALS

All wire will be of new galvanized material and in accordance with criteria outlined in **Table 2**.

Galvanization is critical to rust protection of wire and different classes of galvanization provide different levels of protection. Wire with Class III or Zinc Aluminum (Zn-5AL-MM: Zinc-5% Aluminum mischmetal) galvanization meets the minimum level of treatment required. Wires designated as regular, commercial and utility grade does not offer the level of treatment to prevent rust. Most wire manufacturers include wire specifications on fence tags.

3.1.1 Table 2. WIRE TYPE SPECIFICATIONS

WIRE TYPE	MINIMUM WIRE SIZE	MINIMUM PROTECTIVE COATING AND BREAKING STRENGTH
Standard Double Strand Barbed or Smooth Wire	12.5-gauge (0.099"/2.5 mm diam.) If barbed: with 14-gauge or heavier two-point barbs spaced not more than 5 inches apart.	Conform to ASTM-121, Class III galvanized, 950 lb.
High-Tensile Double Strand Barbed or Smooth Wire	15.5-gauge (0.067"/1.7 mm diam.) If barbed: four-point barbed	Conform to ASTM-A854, Class III galvanized or Zn-5AL-MM, 1400 lb.
Woven Wire	Top and bottom wires, 11-gauge (0.12"/3 mm diam.), intermediate and stay wires 14.5-gauge (0.076"/1.9 mm diam.)	Conform to ASTM A-116, Class III galvanized, 950 lb.
High-Tensile Woven Wire	Top and bottom wires 12.5-gauge (0.099"/2.5 mm diam.), intermediate and stay wires 14.5 gauge (0.076"/1.9 mm diam.)	Conform to ASTM-A121, Class III galvanized or Zn-5AL-MM, 1400 lb.
Fence Panels	50" x 16' combination panels 4-gauge, 13 or 15 strand	Hot dipped, Class III galvanized Conform ASTM A116-87
Tension Wires for Braces	9 gauge (0.148"/3.7 mm) single-strand smooth malleable wire OR 12.5-gauge double-strand smooth malleable wire	Class III galvanized, 58,000 lb. tensile strength
Zn-5AL-MM = Zinc-5% Aluminum mischmetal aka "Bezinal"; All Class III galvanization shall conform to ASTM A 641		

3.2 WIRE INSTALLATION

Fence wire will be stretched to sufficient tension per manufacturer's specifications prior to being fastened to posts. Posts will be installed as necessary to ensure the fence follows the terrain. Woven wire will not be allowed to "belly".

Wire will be attached to fence post on side receiving most pressure except along curved sections where wire will be placed on the outside along the curve.

3.2.1 Wire Attachments

3.2.1.1 Attaching to Anchor/Pull Posts

- Wires will be attached to anchor (pull) posts by at least one complete wrap around post, stapled (wood posts) or wired (steel posts) and ends tightly twisted around stretched wire at least six times.
- Most manufacturers of high-tensile wire recommend attaching using an end-knot (Figure 2).
- For woven or mesh wire, determine amount of wire needed to fully wrap around post then remove enough vertical stays to provide the length needed. The wire ends are then attached as described above.



FIGURE 2: END KNOT IN HIGH TENSILE WIRE

3.2.1.2 Attaching to Brace and Line posts

- Every strand of barbed wire and at least every third strand including top and bottom wires of woven wire will be fastened to <u>all</u> posts.

3.2.1.3 Wire clips

Wire clips will be 12 – 12 ½ gauge Class III galvanized or Zn-5AL-MM.

3.2.1.4 Staples

- 9-gauge galvanized steel staples with a minimum length of 1½ inches for soft woods (pine) and 1 inch for hardwoods (kiawe, Ohi'a, eucalyptus).
- Drive staples diagonally to the wood grain at a slight downward angle (upward if pull is up) to avoid splitting the post.
- Space will be left between post and staple to allow free movement of wire and to avoid damage to galvanized coating.

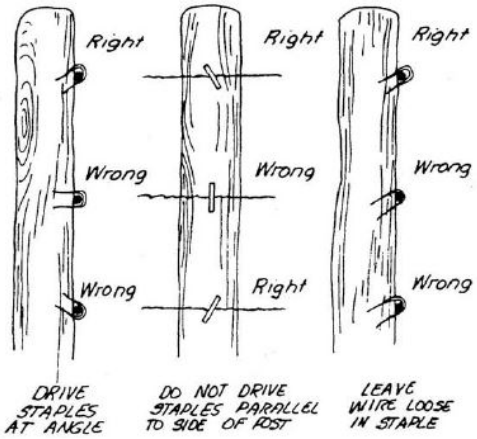


FIGURE 3: FENCE STAPLING (TECHNICAL NOTES, 1990)

3.2.2 Wire Splices

3.2.2.1 Standard Wire

- Western Union splices, as shown in Figure 4, shall have a minimum of 8 wraps on each side of center, tightly wound and closely spaced.
- "Loop" Splices where the wire has a minimum of 8 wraps on each side.

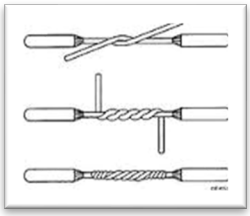


FIGURE 4: WESTERN UNION SPLICE

3.2.2.2 High Tensile Wire

- Splicing of high tensile wire will be accomplished by properly installed crimping sleeves, "figure eight knots", or "square knots" or “Western union splice” or compression fittings.

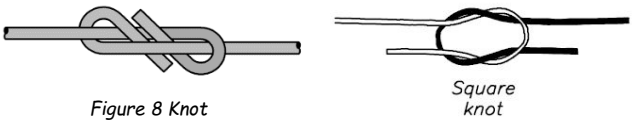


FIGURE 5: EXAMPLES OF HIGH TENSILE WIRE SPLICES (ALSO FIGURE 4 ABOVE)

3.2.2.3 Compression Fittings or Splice Sleeves

- Can be used on either standard wire or high tensile.
- Will have a tensile strength not less than 80% of the wire. Ends of wire will be overlapped at least 2 inches with sleeves crimped and installed according to manufactures specifications. Two 3/8 in. long sleeves or one 3/4 in. long sleeve will be installed at each splice.

3.3 POST MATERIALS

Type, height, size, and spacing of posts will be used that best provides the needs for the types of fences required and is best suited for the topography of the landscape.

3.3.1 Wood Post

- Wood posts do not need to be new materials (Power Poles are allowed); however, all posts shall meet the minimum criteria for durability and protective coating.
- Wood posts need to be sound and free from decay, with all limbs trimmed substantially flush with the body. All limbs shall be substantially straight throughout their full length.
- Kiawe posts are approved for use.
- ‘Ohi’a[1] and/or eucalyptus posts may be used, if the following conditions are met:
    - Cut surfaces must be hand-painted with wood preservative (such as copper naphthenate) to prevent rot.
    - All bark must be removed from posts.
    - At least half the diameter shall be heartwood.
    - Posts shall be free of ring shake, season cracks more than 0.25” wide, splits in the end and unsound knots.
    - *Caution: life-span of ‘ohi’a posts may be shorter in wet areas.
- The use of landscaping timbers in any part of the fence is prohibited.
- Tying or affixing any part of a fence to a living or dead tree is prohibited.
- Commercially-produced wooden fence posts must be pressure treated with pentachlorophenol, creosote, or chromated copper arsenate (CCA).
- Wooden Line posts must have a minimum diameter of 4 inches. Length must be sufficient to allow for 24 inches buried depth plus 2 inches of post above top wire.
- Wooden anchor/pull, brace, and gate posts must have a minimum diameter of 5-6 inches. Length must be sufficient to allow for 36 inches buried depth plus 2 inches of post above top wire.
- Compression members for H-braces shall be straight and have a minimum diameter of 4 inches. Length should be two times the height of the fence --OR-- at least 7 feet for fences 5 ft and under.

[1] Due to Rapid ‘Ohi’a Death, ‘Ohi’a posts may only be used in the areas they are gathered in. NRCS strongly recommends producers who plan to use ‘Ohi’a learn about ROD.

Buckling problems may develop if extremely long compression members are used. The maximum recommended length is 10 ft.

- Minimum wooden angle brace post diameter is 4 inches; length shall be eight (8) feet for fence heights up to 48 inches or nine (9) feet for fence heights of 49-54 inches. Angle brace shall be straight.

3.3.2 Steel pipe posts

- Conform to ASTM A 53 or ASTM F1083.
- Must be of good quality and free of excessive rust, pitting, or other damage.
- Must be galvanized or painted to provide protection from rust.
- Tops must be permanently capped or filled to prevent rainfall from entering the post.
- Steel pipe line posts, anchor/pull, brace, and gate posts must have a minimum inside diameter of 2 inches (2 3/8 OD).
- Horizontal compression members must have a minimum inside diameter of 1.5 inches or larger.
- Must be at least schedule 40, 3.12 lb./ ft. for 2-inch pipe (2 3/8 OD).
- Compression member length should be two times the height of the fence –OR—at least 7 feet for fences 5 ft and under. Buckling problems may develop if extremely long compression members are used. The maximum recommended length is 10 ft.
- Minimum steel pipe angle brace post length shall be eight (8) feet for fence heights up to 48 inches or nine (9) feet for fence heights of 49-54 inches.
- Must be of sufficient length to allow for the required buried depth of:
    - 36 inches plus at least 2 inches of post above the top wire for anchor/pull, brace and corner posts.
    - 24 inches plus at least 2 inches of post above the top wire for line posts.

3.3.3 Steel "T" posts

- Conform to ASTM A 702
- Must be like new or unused.
- Must be galvanized, enameled and baked, or painted with weather resistant steel paint and components will be repainted if rusting occurs.
- Must be made from high carbon steel weighing at least 1.33 lbs. per foot.
- Must be of sufficient length to allow for the required buried depth of 18 inches plus at least 2 inches of post above the top wire.
- Must have an anchor plate and be studded, embossed, or punched for wire attachment.

3.3.4 Steel Anchors

- Conform to ASTM A 702
- Must be like new or unused, galvanized, enameled and baked, or painted with weather resistant steel paint.
- 24-inch length with anchor plate.
- ¼" hole 6 inches from the top.

3.3.5 Concrete Posts

- Concrete posts may only be used as line posts. Concrete posts can only be used as brace or anchor posts with an engineer approved design.

- Concrete must conform to NRCS-PI Specification 103 – Concrete.
- Concrete strength must be at least 3,000 PSI at 28 days.
- Acceptable minimum dimensions include:
    - 6 inches round.
    - 5 inches x 5 inches square.
    - 6 inches x 4 inches rectangle.
- Must be of sufficient length to allow for the required buried depth of 24 inches plus at least 2 inches of post above the top wire.
- Reinforcing steel:
    - Shall be at least grade 40 deformed #4 rebar, centered in the middle of the post.
    - Must be covered by at least 3 inches of concrete on both ends of the post.
- Wire fastener appurtenances may be incorporated into the post (i.e. indentations, grooves, etc.) or nail holes may be drilled into the post while concrete is “green.”

3.3.6 Stays

- Fence stays will be constructed of materials designed specifically for this purpose.
- All stays must be the height of the fence plus 2 inches.
- All stays will be installed so that they swing free of the ground and allow the fence to move when touched by an animal.
- Metal stays must be a minimum Class 3 galvanization.

TABLE 3. SUMMARY OF FENCE POST REQUIREMENTS

POST MATERIAL	POST TYPE	MIN. DIAMETER	MIN. BURIED DEPTHS	MIN. LENGTHS*	PROTECTIVE COATING
Wood	Line	4 in.	24 in.	6.5 ft.	Kiawe, no treatment needed. See notes in 3.3.1.
	Brace/Anchor	5-6 in.	36 in.	8 ft.	
	Compression	4 in.	n/a	7 ft.	
	Angle brace	4 in.	n/a	8 – 9 ft	
Standard "T" post studded, embossed, or punched for wire with anchor plate attachment	Line	1.33 lbs. /ft of length, exclusive of anchor plates	18" – Bury the spade + 1 knob	6 ft.	Hot-dip galvanized, or one or more coats of high-grade, weather-resistant steel paint, or enamel-applied and baked.
Steel, round	Line	2 in (2-3/8 in. OD), 3.12 lb./ft.	24 in.	6.5 ft.	Schedule 40 pipe. Wrap wire or place a metal stay on wires next to post to prevent vertical wire movement.
	Brace /Anchor		36 in.	7.5 ft.	
	Angle brace		n/a	8 – 9 ft	
	Compression	1.5 in (1.9 in OD), 3.12 lb/ft	n/a	7 ft.	
Concrete	Line	6 "round OR 5" x 5" OR 5" x 4"	24 in.	6.5 ft.	Conform to NRCS-PI Specification 103 – Concrete. 3,000 psi @ 28 days Steel reinforced
Steel Anchors	Anchor pins	1.33 lbs. /ft of length	18" – Bury the spade	2 ft	Hot-dip galvanized
*Lengths listed are based on a 48-inch top wire height					

3.4 POST INSTALLATION

3.4.1 Line Post

- To maintain the strength and life of the practice, line posts (wood or steel) should be placed at intervals suitable for the site conditions and expected pressure on the fence.
    - On flat ground with little stress on the wires, line posts can be placed after every 10 t-posts.
    - Where topography is sloped, and the fence is following the slope, OR where fence is expected to experience increased livestock pressure, line posts should be placed more frequently approximately every 5 t-posts.
- Placed at bends in the fence less than 20 degrees and at every low point on undulating topography, with an earth-anchor or set in concrete for added strength if necessary.
- Alternatively, in low spots, the fence may be wired down to a t-post angled and buried ¾ length or more.
- Installation of line posts shall ensure adequate fence height is maintained based on its purpose.

- Line posts will be set in as straight a line as possible between corners and turns.

3.4.2 T-Posts

- For woven wire fence, maximum post spacing is 15 feet.
- For barbed wire fence, t-posts may be placed at 15 – 30-foot intervals, depending on topography and site conditions.
  - If they are spaced 15’ or less, a stay is not required.
  - If they are spaced 15’ - 20’ apart, one stay is required evenly spaced.
  - If they are spaced 20’ - 30’ apart, two stays are required evenly spaced.
- T-posts shall be driven perpendicular to the slope of the terrain so that the height of the fence is not compromised over steep terrain sections.

3.4.3 Setting Posts

- T-posts will be driven. Pilot holes may be drilled when pounding into rock and anchor plates may be removed.
- Post holes for wood or steel line posts will be a minimum of 24 inches deep.
- When backfilled with dirt, posts will be centered in a hole that is at least 6-inches larger in diameter than the post and tamped in 4-6 inch lifts up to ground level.
- When backfilled with concrete, posts will be centered in a minimum 12-inch diameter hole. The hole will be completely filled and should be crowned/mounded at post base to prevent water ponding around post at ground level.
- Posts may also be driven into the ground to appropriate depths.
- All posts will be vertically level.

4 BRACE ASSEMBLIES

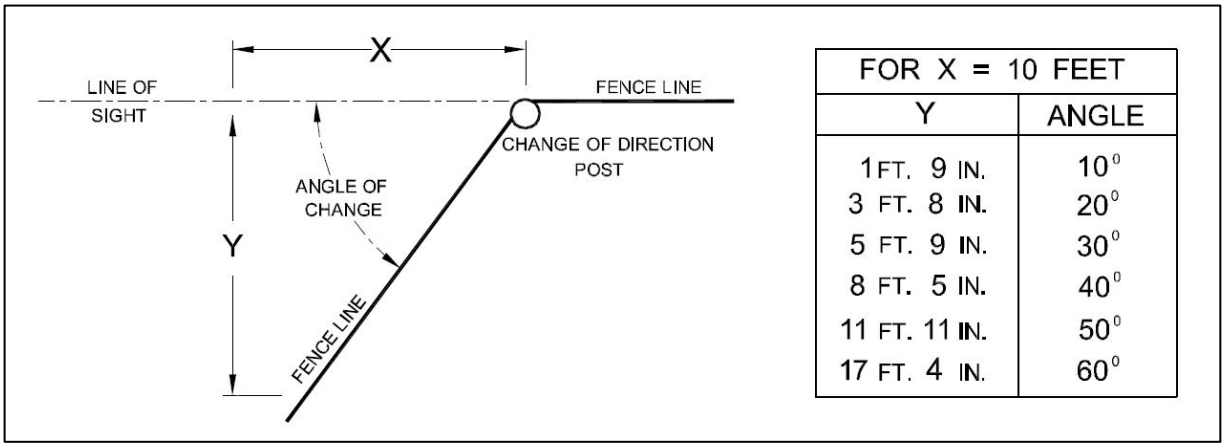
Brace assemblies are the foundation of a fence and determine the structural soundness and longevity of any fence line. Fence braces fail because of structural failure, soil movement, or corner or end post pullout. Structural failure of an end brace is usually due to improper depth placement, poorly selected materials, or improper design. By carefully designing fence braces and properly proportioning and sizing the members, structural failures can be avoided. Fence braces also fail when the soil is too weak to support the load, which allows the fence brace to move through the soil. Soil failures can usually be eliminated by using larger posts and proper placement. Corner post pullouts, when braces lift out of the ground, can be eliminated by using longer fence braces and proper installation.

4.1.1 Corner/End Braces

Bracing is required at:

- Terminal points (end of fence) and gates
- All anchor (tie-off) posts must be braced.
- At corners or changes in fence alignment (greater than 20 degrees) to prevent pullouts and fence failure. See Figure 5 for estimating angle of change
- Fence bends or turns between 20 and 60 degrees must be supported at a minimum by:
  - A single H-brace or single angle brace, set to the interior of the fence to bisect the interior angle or

  - A corner brace assembly (double H brace or double angle brace) set to either side of the anchor/pull post that follows the alignment of the fence.
- Fence bends or turns greater than 60 degrees must be supported by:
  - A corner brace assembly (double H brace or double angle brace) set to either side of the anchor/pull post that follows the alignment of the fence.
- At all corners, wires should be cut and tied off on the anchor post to prevent jacking.
- Allow newly-installed braces and assemblies to settle and/or pack dirt sufficiently around all posts; do not over-tighten wires.



FOR X = 10 FEET	
Y	ANGLE
1 FT. 9 IN.	10°
3 FT. 8 IN.	20°
5 FT. 9 IN.	30°
8 FT. 5 IN.	40°
11 FT. 11 IN.	50°
17 FT. 4 IN.	60°

FIGURE 5: ESTIMATING FENCE LINE ANGLE OF CHANGE (FENCING FACTSHEET, 1996)

4.1.2 In-line Braces

In-Line Brace assemblies are located in straight sections at lengths not greater than 1,320 feet (barbed or smooth wire) or 660 feet (woven wire) or where there are sudden changes in elevation, such as the bottom and top of steep slopes. **Wires must be tied off to the anchor post at these braces**. Any of these brace types can be used:

- Double H-brace
- Double Diagonal Brace (see drawings in following section)

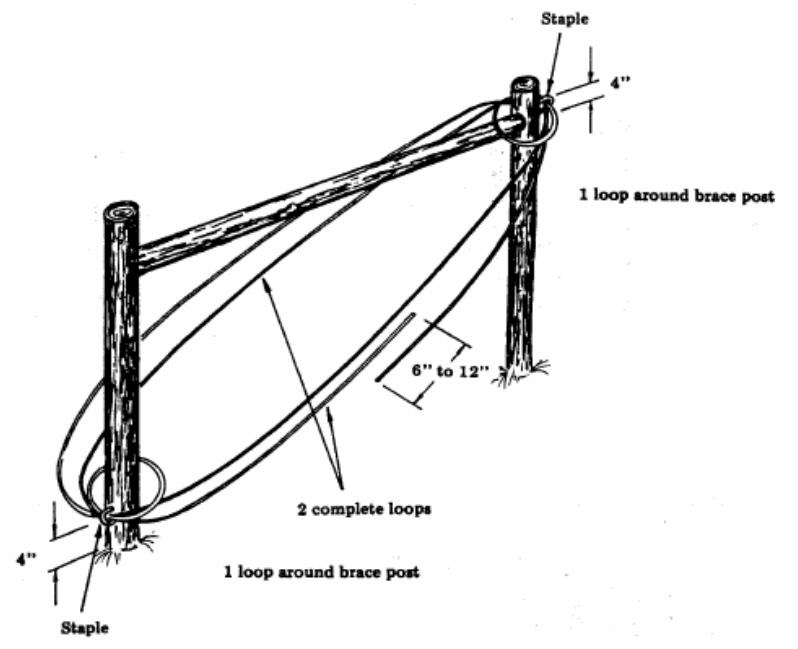
4.2 Brace Installation

4.2.1 H-braces

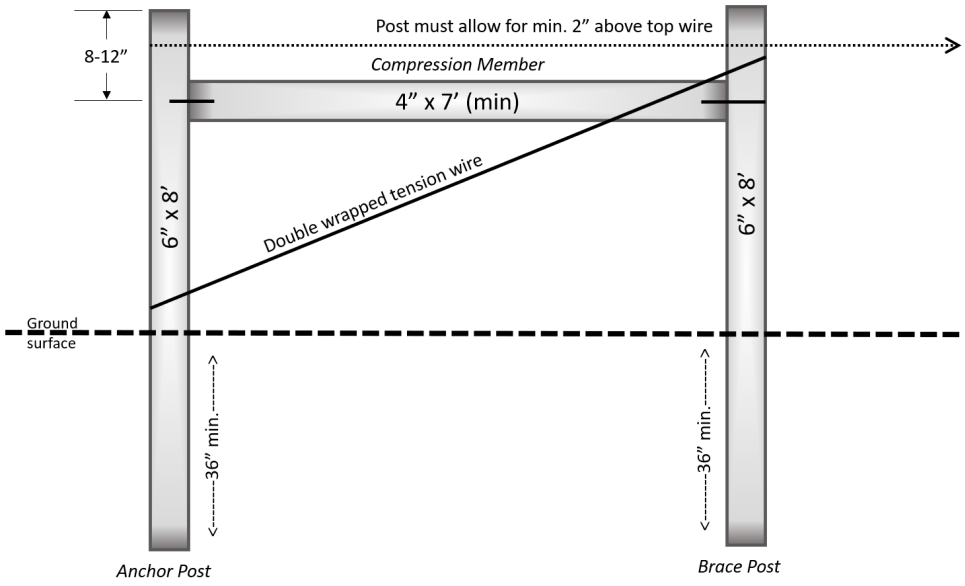
- Install vertical posts a minimum of 3 feet in the ground, vertically level.
- Compression member will be installed inside and between the vertical posts 8-12 inches from the top of vertical posts.
- Wooden compression members and angle brace posts will be attached using:
  - At least a 3/8-inch steel pin, drilled 2 inches into each post and 2 inches into the compression member, OR
  - At least a 3/8-inch steel pin, drilled 2 inches into the anchor post and 2 inches into the compression member and at least a 3/8-inch steel pin or lag screw, drilled through the brace post and at least 2 inches into the compression member, OR
  - Vertical post notched, notched area treated and compression member set and nailed.
- Steel compression members will be secured to vertical posts by welding OR heavy-duty fittings intended for use in livestock fence braces installed according to manufacturer specifications.

- Proper tension wire installation is crucial to an effective H-brace and are required for all H braces. All tension wires (single or double strand) will be:
    - Double wrapped and secured to brace post at a height 4-6 inches above compression member and anchor (pull) post at a point about 4 inches above the ground level.
    - Wire will be twisted and secured (knotted or twist stick in place) or strained with a strainer (high tensile) to provide necessary rigidity to ensure brace assembly integrity.
    - Gripple Speed Brace Cable system assemblies installed to manufacturer specifications are also acceptable.

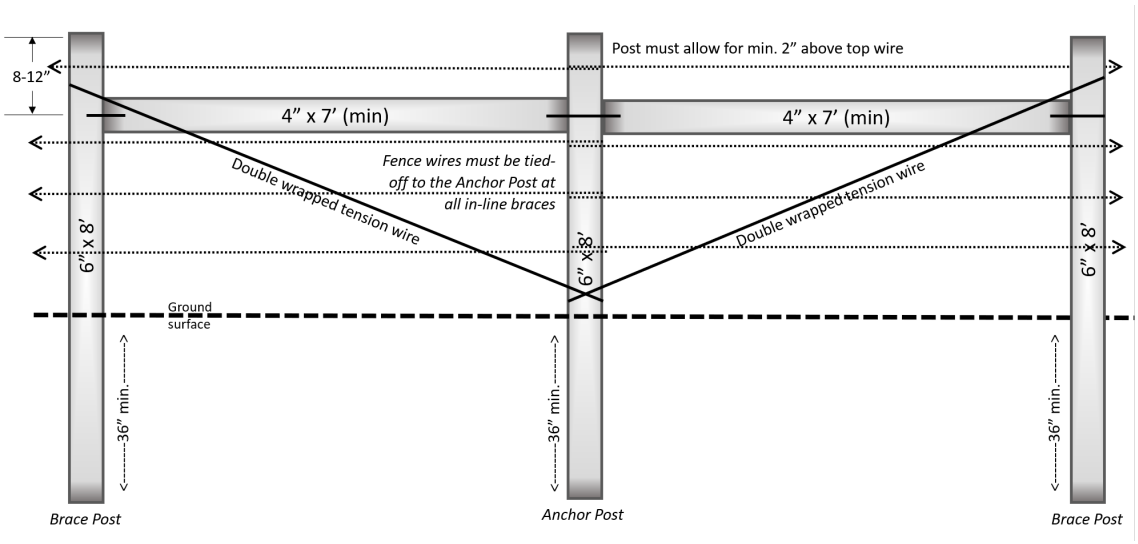
4.2.1.1 Brace Wire detail for H-brace



4.2.1.2 Typical Wooden H-brace



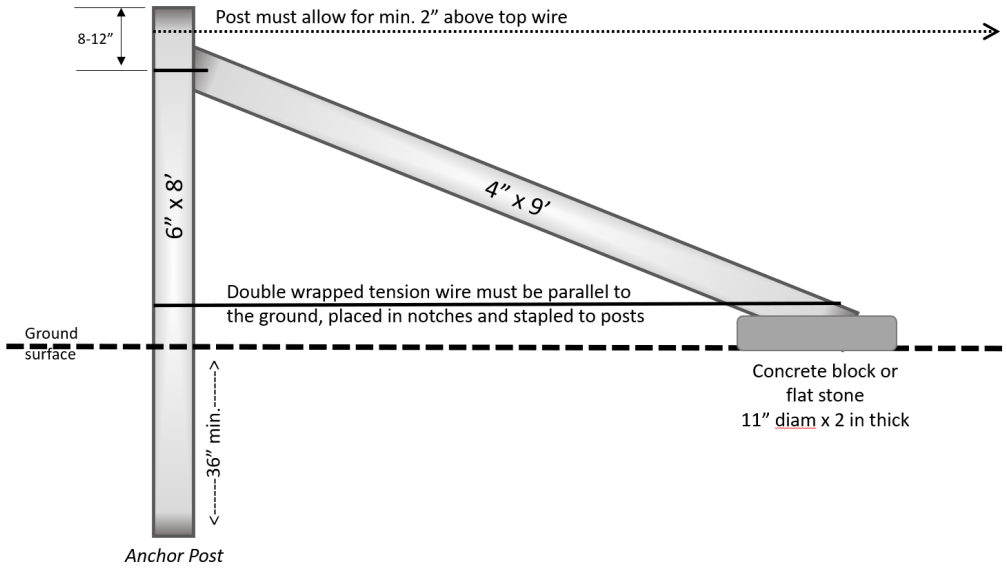
4.2.1.3 Double H-brace in-line brace assembly



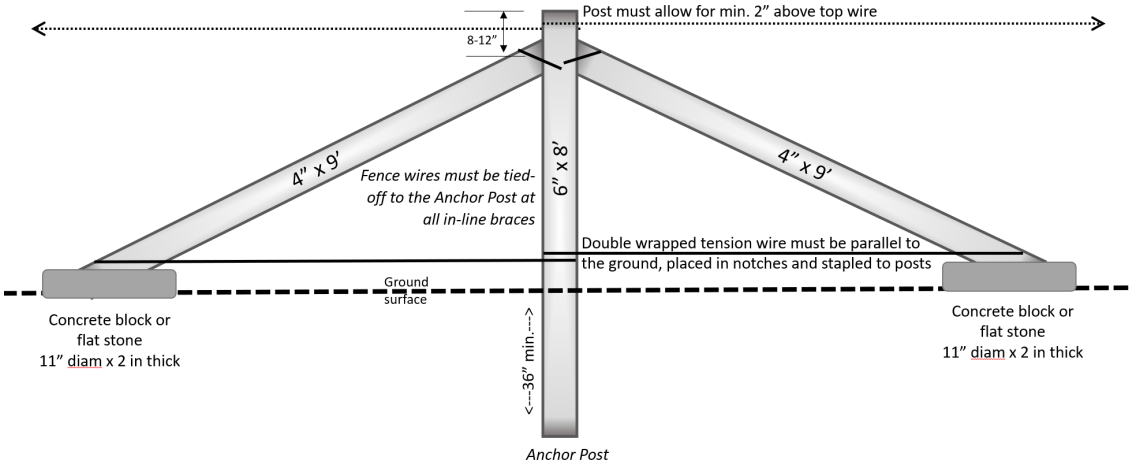
4.2.2 Angle Braces

- Angle brace assemblies shall not be used for fences exceeding 54 inches in height.
- Install vertical posts a minimum of 3 feet in the ground, vertically level.
- The bottom of the angle brace must be placed on a flat stone or steel reinforced concrete block with a minimum surface area of 96" (ex: 8" x 12" or 11 in diameter) and a minimum 2 inches thick.
- The ends of the angle brace post will be cut at angles to meet the anchor post and flat stone/block.
- The top of the angle brace will meet the anchor post 8-10 inches from the top of the anchor post.
- Wooden angle brace posts will be attached using:
    - At least a 3/8-inch steel dowel pin or lag screw, drilled through the brace post and at least 2 inches into the compression member OR
    - Nailed through brace post and into anchor post 2 inches without splitting the post.
- Steel angle braces will be secured to vertical posts by welding OR heavy-duty fittings intended for use in livestock fence braces installed according to manufacturer specifications.
- Angle brace post will be wired to the anchor post by two complete loops of brace wire, 4-6 inches above ground level, placed in a notch in each post and wire stapled or otherwise attached to post.

4.2.2.1 Typical Wooden Angle Brace



4.2.2.2 Typical Wooden Double-Angle Brace



5 GATES

5.1.1 Gates constructed of wood, panels, aluminum or steel

- Panel gates shall be of appropriate type, size, and quality to meet the purpose of the fence and shall include the necessary fittings required for installation.
- Gates shall be of rigid construction free from sag or twist.
- The fittings shall consist of not less than two hinges and one latch or galvanized chain for fastening.
- All fittings shall not be of lesser quality than the gate manufacturer's standard.

5.1.2 Wire gates

- Shall be made of the same materials of the same kind, grade and size specified for the fence and stays will not exceed a 4-foot spacing.

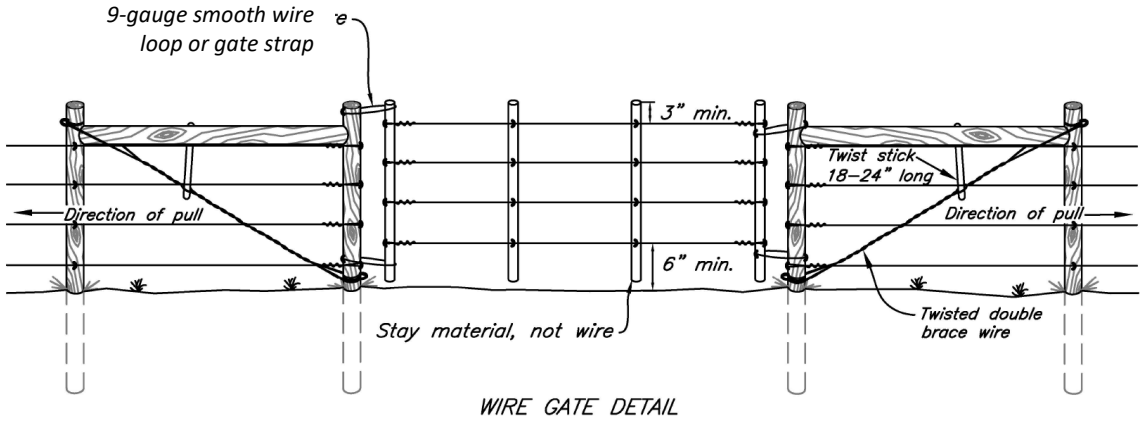


FIGURE 6: EXAMPLE OF A WIRE GATE

6 CLEARING THE FENCE LINE

- Establish fence boundaries on a map or aerial photograph prior to clearing the fence line.
- Locate underground utilities or any other sensitive areas prior to clearing the fence line.
- Once the utilities have been located, remove brush, loose rocks, trees, and tall grass from the fence line.
- Fence construction time is considerably reduced when the fence line is well cleared ahead of time.
- Cleared areas must be stabilized to ensure no erosion hazard is created upon completion of the fence.

7 SPECIAL CONSIDERATIONS

7.1 CROSSING STREAMS OR DRAWS

When the fence crosses landscape depressions, draws, or swales, and the bottom wire is more than 20 inches above the ground at the low spot, the use of an earth-anchor may be necessary to maintain fence height. When crossing the streams or very deep draws, the fence may be dead-ended on each side of the crossing by use of braces. The section across the stream may be removable, a breakaway type, or swinging picket-type fence.

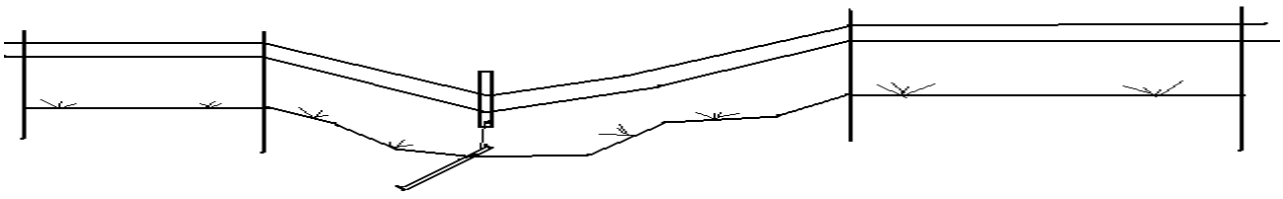


FIGURE 7: EXAMPLE OF AN EARTH-ANCHOR IN A DRAW.

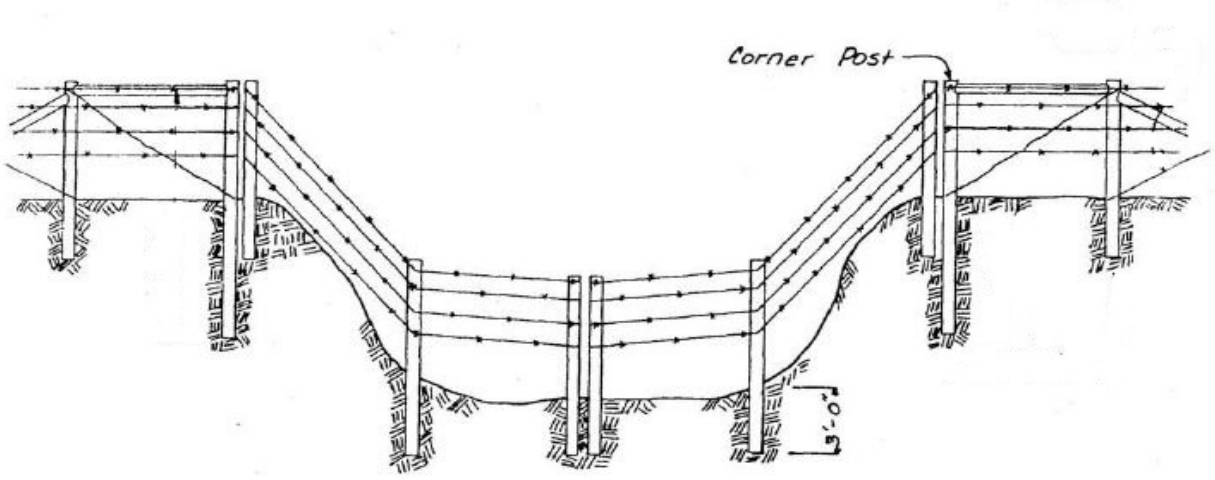


FIGURE 8: EXAMPLE OF A "BREAKAWAY FENCE" THAT CAN BE USED IN FLASHY CHANNELS OR WATERWAYS (TECHNICAL NOTES, 1990)

7.2 Odd Areas & Small Exclusion Fences

The use of hog-panels for fencing small enclosures (e.g. around small water tanks) or for short sections in odd areas in a fence line (between a gate on a road and tying in to an existing fence for example) is acceptable. The panels must be Class III Galvanized. The panels must be attached at least four times to a wooden or steel line post at the ends and at least one t-post midway in the panel. The panel must follow the terrain of the ground and be of sufficient height as the rest of the planned fence.

8 Basis of Acceptance

The installation of the fence shall conform to the figures and drawings provided by NRCS. All posts shall be placed to the required depth and shall be firmly embedded so that there is less than 1 inch of horizontal movement at the top of post when a horizontal force of 80 lbs. is applied.

Provide material tags and/or invoices to verify fence materials meet the minimum specifications.

The completed job shall be workmanlike and present a good appearance. The installer and other persons will conduct all work in accordance with proper safety procedures. Old fence material has been properly disposed of and any cleared areas have been stabilized to ensure no erosion hazard will be created.

9 Maintenance

A properly maintained fence is an asset to your property. This practice will require you to perform periodic maintenance. Some items to be observed and corrected are:

- Repair or replacement of loose or broken material, gates and other damage to the fence.
- Removal of trees/limbs.
- Tension of wire, broken wires, broken or bent stays
- Post alignment, post stability.
- Replacement of water gap, repair of eroded areas as necessary.

10 ADDITIONAL SITE-SPECIFIC REQUIREMENTS

☐ Endangered Hawaiian Hoary Bats are known to occur in the area. When clearing fence line, no woody plants over 15 ft. (4.6 m) tall will be removed, cut, or trimmed during the sensitive bat pup birthing and rearing season: June 1 to September 15. If a bat is present at the project site, the area will be avoided. If a bat arrives in the construction area after work begins, work will cease until the animal leaves on its own accord.

☐ Electrified off-set wire: An electrified top-wire will be installed on this fence. The Electric Fence specification is attached and electric fence components must meet that specification.

11 JOB CLASS

Controlling Factor	Units	Job Class				
		I	II	III	IV	V
Fence Types (Conventional or Electrified), % Slope and Special Landscape/Soil Conditions Sandy/Gravelly/Low-Strength Soils, Restrictive Layers, Wetlands, Riparian Areas, Multi-species Livestock, Wildlife Considerations	Fence Type , % Slope, and Number of Special Landscape/Soil/ Wildlife Conditions	Conventional Fence Types, <15% Slopes, No Special Landscape/ Soil/Wildlife Conditions	Conventional or Electrified Fence Types, < 15% Slopes, <=1 Special Landscape/Soil/ Wildlife Conditions	All Fence Types, < 30% Slopes, <=2 Special Landscape/ Soil/Wildlife Conditions	All Fence Types, < 45% Slopes, <=3 Special Landscape/ Soil/Wildlife Conditions	All Fence Types, All Slopes, All Special Conditions
This job is classified as Job Class		☐	☐	☐	☐	☐

By signing below, I certify that the site-specific requirements for the installation, and maintenance of the practice on the client's land unit have been identified and reviewed with the client and that this fence has been planned and designed or reviewed by a person with appropriate Job Approval Authority.

Planner Signature: _____ JAA: _____ Date: _____

Reviewer Signature (if applicable): **_____ JAA: _____ Date: _____**

12 CLIENT ACKNOWLEDGEMENT

The site-specific specifications for this practice have been reviewed with me and I understand the requirements of this practice. It is my responsibility to ensure the fences installed meet this specification and I understand that fences installed may be deemed ineligible for payment if the installation is not in accordance with this specification. NRCS has my permission to discuss the technical details of my fences with my contractor (if a contractor is used).

Client Signature: _____ Date: _____

13 PRACTICE INSTALLATION CERTIFICATION

Date of Inspection:		Inspection completed by:	
Applied Amount:		Measurement Method:	☐ GPS ☐ Wheel ☐ Other
CIN(s)		☐ Photos attached:	

Type of fence installed:			
Overall fence height:		Wire spacing:	
Materials used:			
Brace type and materials:			
Line post materials and dimensions and spacing:	Line post		
	T-post		
Bracing dimension and installation as required by the specification:		☐ Yes or ☐ No	
Post dimension and installation as required by the specification:		☐ Yes or ☐ No	
Wire size, type and installation as required by the specification:		☐ Yes or ☐ No	
Gate type and installation as required by the specification:		☐ Yes or ☐ No	
Special Considerations addressed?		☐ Yes or ☐ No or ☐ N/A	

Other notes or Corrective Actions Needed:

I certify that the installation of this practice meets NRCS materials and installation standards and specifications. As-built map, notes and photos are attached to this copy of the certification.

Planner Signature: _____ JAA: _____ Date: _____