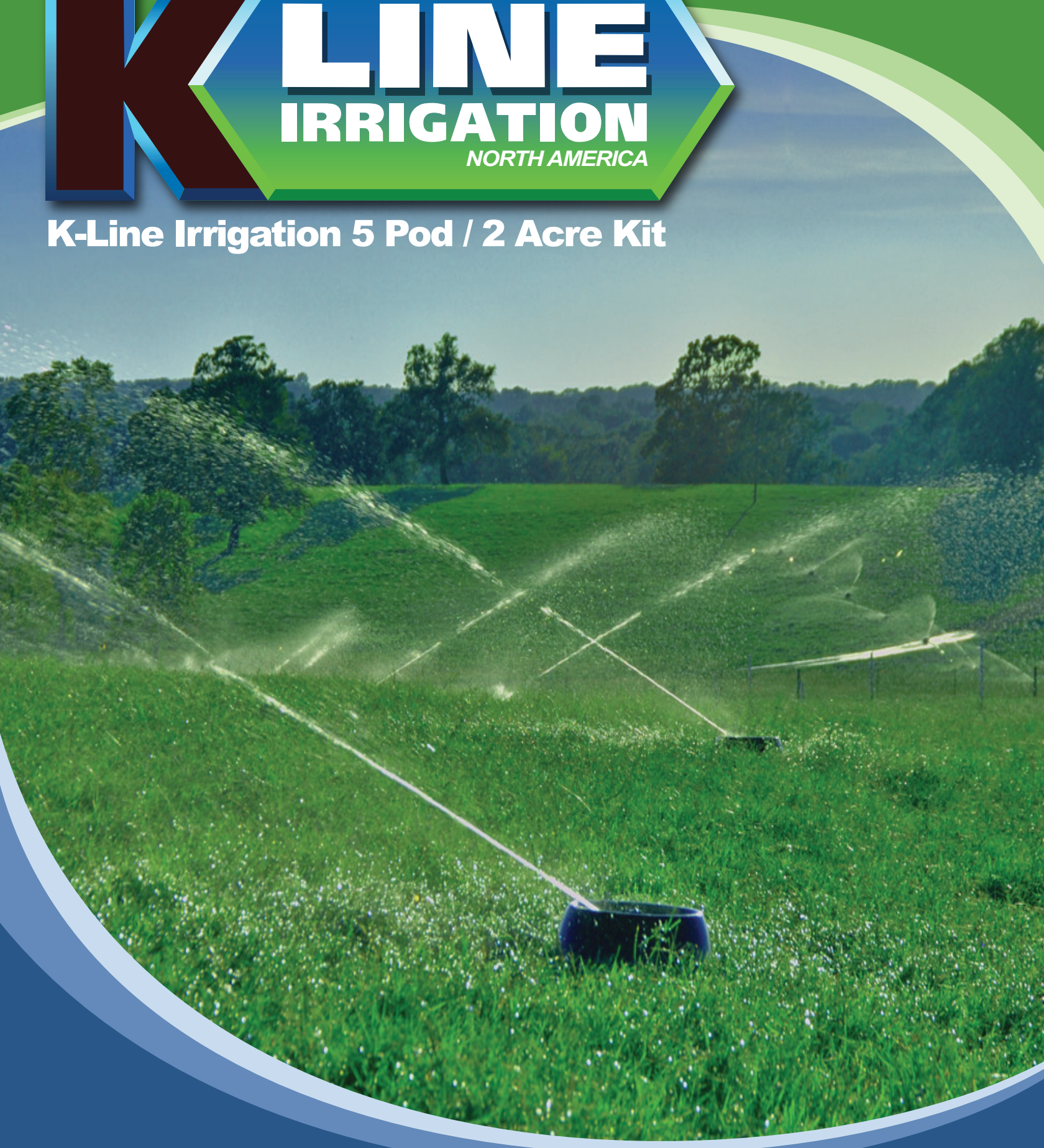
K-LINE IRRIGATION
NORTH AMERICA

K-Line Irrigation 5 Pod / 2 Acre Kit



Installation and User's Manual

STEP 1: View the K-Line Installation DVD

Please review the K-Line Installation DVD to become familiar with the K-Line System.

STEP 2: Identify System Components

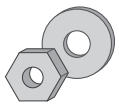
40mm Tapping Saddle (5)
KLTPS40

NAAN Adapter (5)
NAAN-ADAPT

Sprinkler w/Red Nozzle (5)
NAAN-5022-R

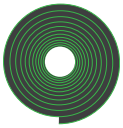
K-Line Pod (5)
KL-POD-1A

Hook Cap (1)
RXGHC40

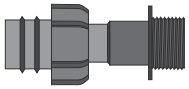


#8 Metric Nuts & Washers
(10)

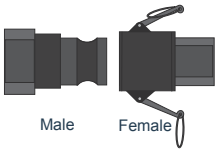
K-Line Installation DVD



40mm Tubing (300 ft.)
KL40LD-300



Male Adapter (4)
KLAMC40

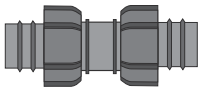


Camlocks (2 Sets)
FLO-P15A & FLO-P15D

Black & Orange Nozzles*
(5 each)
NAAN-NOZ-BK
NAAN-NOZ-O
*Alternative nozzles for sprinkler

Rope (7 ft.)
KL-ROPE

Hook (1)
KL-HOOK

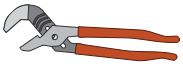


Straight Coupling (1)
KLASC40

9/16" Spade bit w/limiter
KL/BIT

STEP 3: Tools Required for Installation

Adjustable pipe wrench



Large channel lock pliers

Rubber mallet

Ratchet wrench

#13 metric deep socket

Socket extension(s)

Teflon tape

Cordless drill

1½" to 2" poly pipe cutters
(or hacksaw)

Water

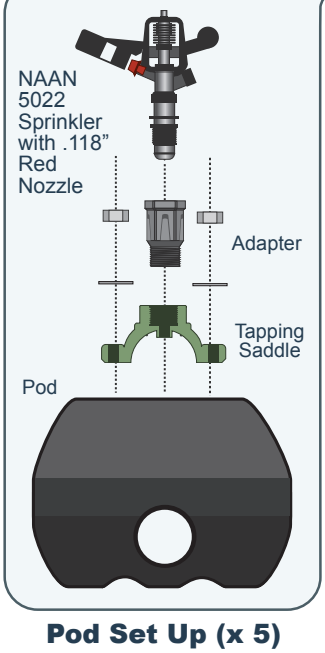
Measuring wheel
or 100' tape(s)

Marker flags

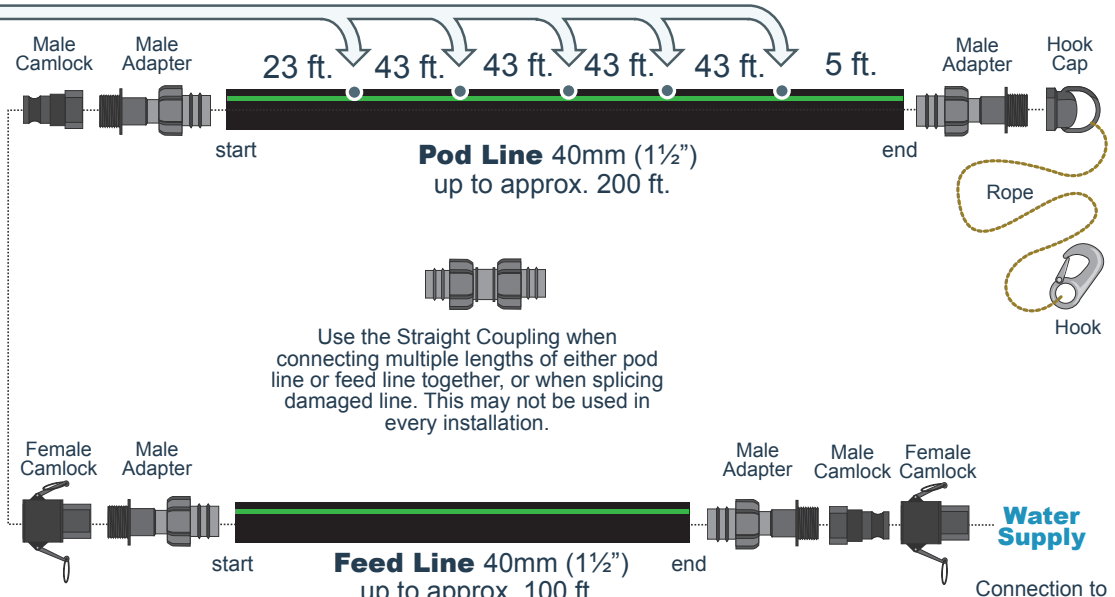
1 1/16" wrench
(optional)

1 1/8" wrench
(optional)

STEP 4: K-Line System Overview



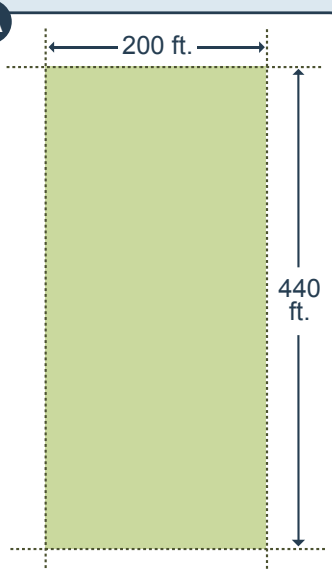
Pod Set Up (x 5)



STEP 5: Plan your 5 Pod / 2 Acre System Layout *

Field shapes and dimensions may not match this ideal layout. K-Line's signature flexibility allows for adaptation to other field dimensions. See the additional "Sample Designs" at the end of this manual. Also, see "K-Line Layout Design Process" on page 11 for ideas about customizing your design.

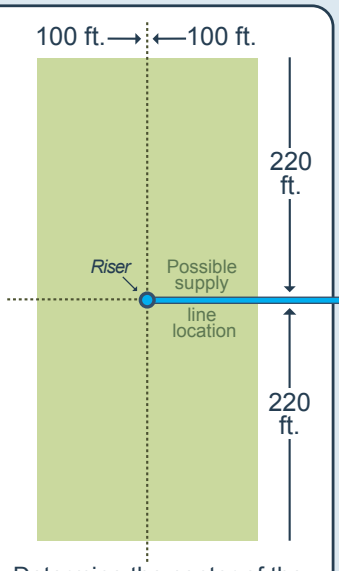
A



Determine the area of the field to be irrigated.

Up to approx. 2.0 acres.

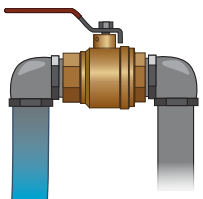
B



Determine the center of the field. This is the location of the riser.

C

Determine the supply line route from the water supply to the center of the field. The water supply line should be 1½" or larger from the water source, beginning at a point where sufficient gallons per minute and pressure are available.



Possible supply line location

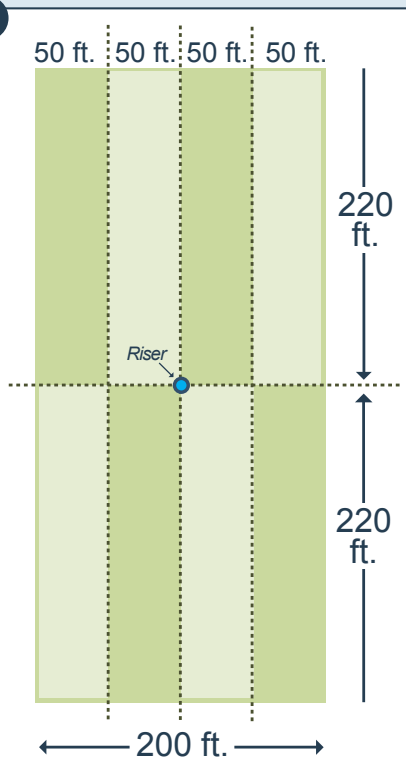
Water Supply
12-25 gallons per minute
@ 40 - 50 psi
Varies depending on nozzle size

D

Consider your supply line. Supply line options include:

1. Buried (underground) PVC or polyethylene plastic pipe.
2. Lay-flat tubing (above ground), similar to fire hose, available from your irrigation dealer.
3. K-Line Irrigation tubing (above ground). K-Line tubing is highly durable and specifically formulated to remain flexible, is freeze resistant, and has excellent UV resistance.

E



Determine Shift/Set Widths.
Shift/Set widths are recommended to be between 40 ft. and 50 ft.

The material included in this kit allows for a field length of up to 440 ft.

The field width should not exceed 200' for this 5 Pod/ 2 Acre K-Line Irrigation kit.

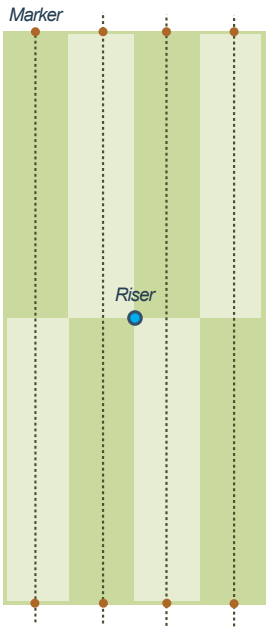
K-Line's great flexibility of design allows for numerous options in laying out a field. K-Line is adaptable in its ability to have more than one riser location. Sprinkler/pod lines can be curved to adjust to field shapes, obstacles, or terrain. Sprinkler nozzles are easily changed for adjusting application rates. Shifting more than once per day allows a larger area to be covered quickly. Extended irrigation sets can apply that long, slow rain that fills the soil profile and encourages a stronger, deeper and more efficient, and resilient, root system.

Rotational grazers have found an invaluable tool in K-Line Irrigation, especially in combination with the K-Line Portable Stock Tank, see the included **"K-Line and Rotational/Intensive Grazing"** brochure for more information.

The **"K-Line Layout Design Process"** included at the top of page 11 will help explain the general design process in designing a K-Line Layout. We have included many examples in our **"Sample Designs"** that are included in this kit to help identify irrigation opportunities for your situation. Call your K-Line dealer or K-Line Irrigation at **(866) 665-5463** with questions.

F

Once a field design has been decided and the riser location(s) have been located, another consideration is the placement of markers at the ends of the area to be irrigated to aid in shifting the K-Line.



Placement of markers at the end of the field (in the center of each Set width – see the Diagram to the right) gives the operator a target to aim for when shifting the K-Line (especially beneficial when becoming accustomed to shifting the K-Line or in irregularly shaped fields).

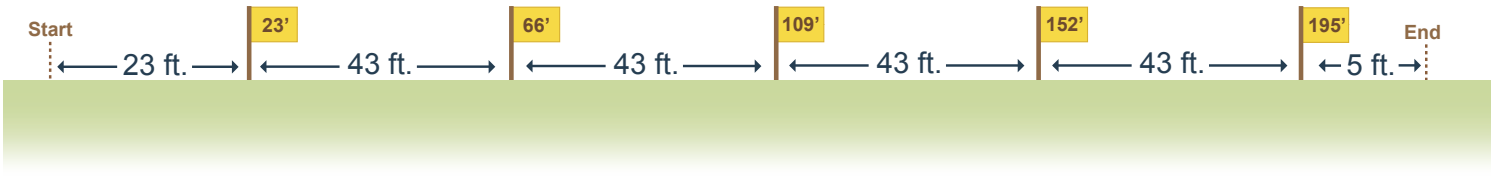
Markers are often brightly colored (fluorescent yellow, orange, or red) streamers that can be attached to a fence; or metal "T" posts driven into the ground, with a 1½" by 6' PVC sleeve slid over top that offers excellent visibility.

* If you are combining 2 kits, please follow steps 5 through 7 as outlined on pages 10 and 11.

STEP 6: 5 Pod / 2 Acre Layout of the Pod Line

A Measuring pod placement

Roll out a measuring tape and place 5 markers/flags, starting at 23 feet and then at 43 foot intervals.

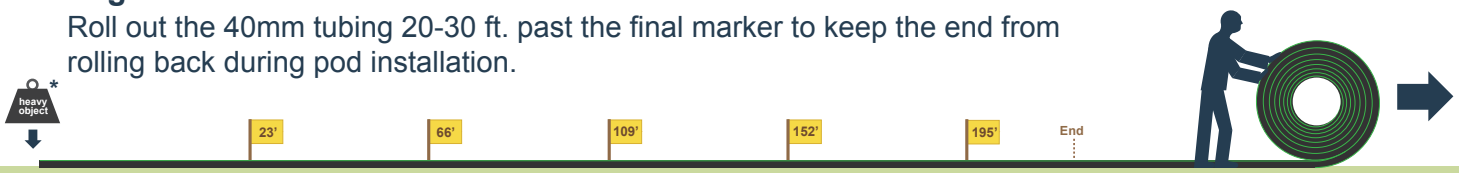


Note: Sprinkler/pod spacing is determined by field length and may differ if your area to be irrigated is less than 440'. For the K-Line 5 Pod/2 Acre Irrigation Kit, K-Line recommends spacing up to 43'. Dealer engineered K-Line layouts are usually between 40' and 50'.

If you need assistance, call your dealer or K-Line Irrigation at **(866) 665-5463**.

B Rolling out the Pod Line

Roll out the 40mm tubing 20-30 ft. past the final marker to keep the end from rolling back during pod installation.

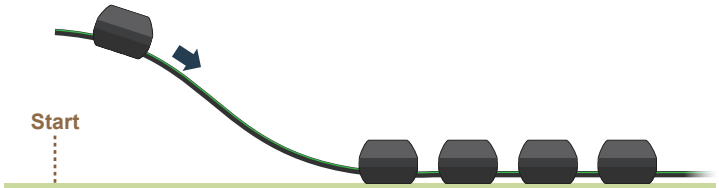


DO NOT ALLOW IT TO TWIST! The double green line should face up for the entire length of the tubing.
Do not make the end cut until the pods have all been installed.

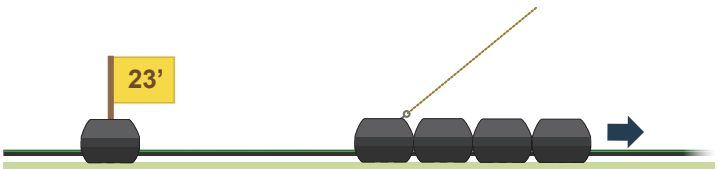
***Hint:** It helps to put a heavy object on the ends of the K-Line Tubing when rolling it out to keep the tubing in place and prevent it from rolling up behind you. The tubing will relax once rolled out and allowed to sit in the sun.

STEP 7: Placing the pods

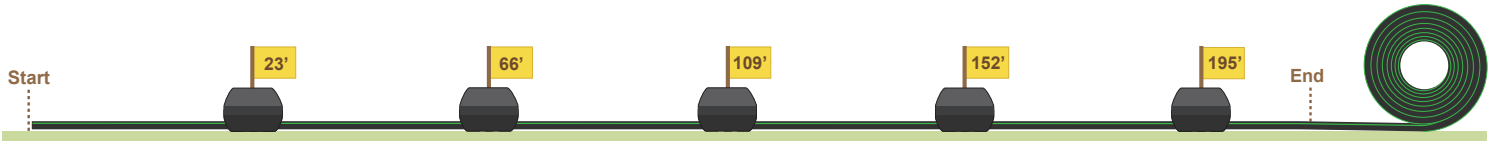
A Slide the 5 pods onto the K-Line tubing.



B Use the Tow Rope and Hook to pull all 5 pods to the first marker. Unhook a pod, leaving it at the marker.

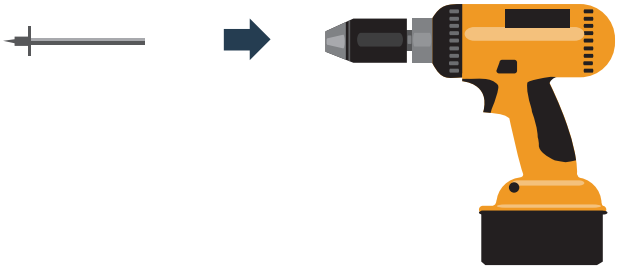


C Continue on to the remaining markers, leaving a pod at each.

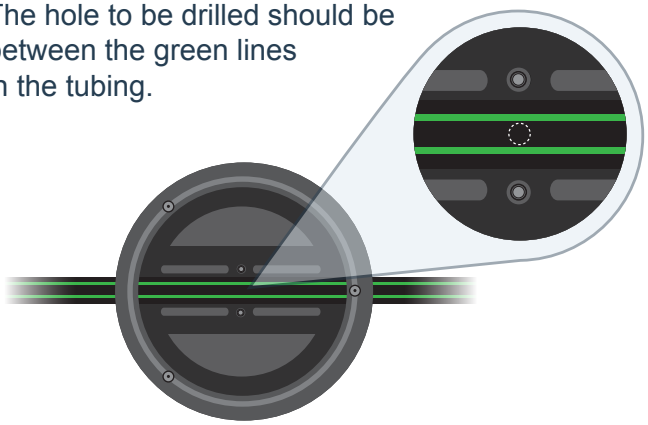


STEP 8: Tapping Saddle Installation

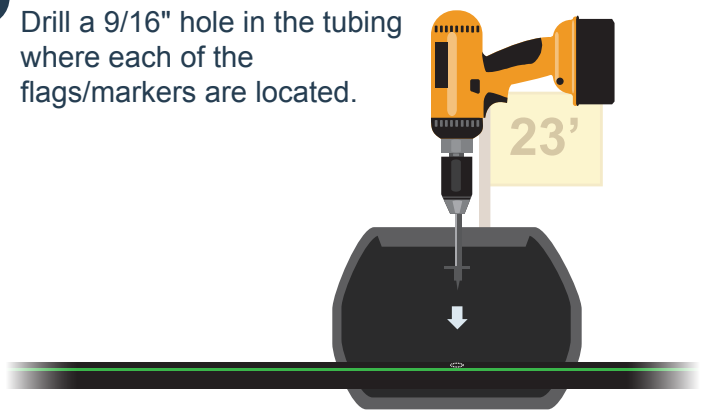
A Install the included K-Line spade drill bit w/limiter into a cordless drill.



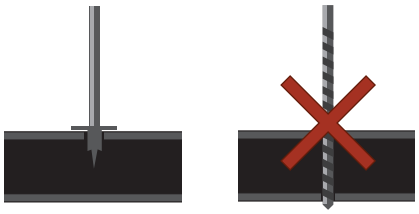
B The hole to be drilled should be between the green lines in the tubing.



C Drill a 9/16" hole in the tubing where each of the flags/markers are located.

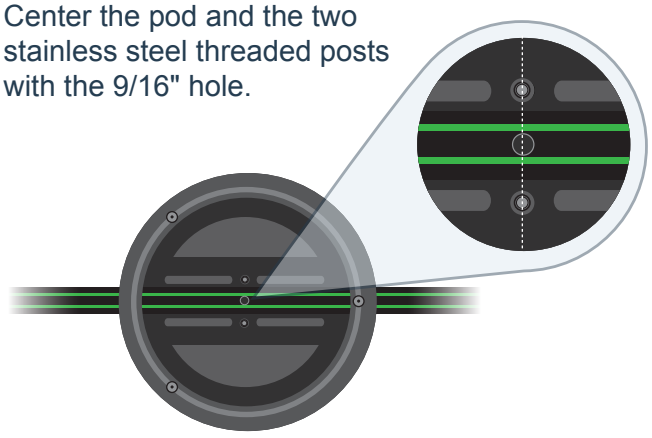


D **Caution: Do not use a 3rd party drill bit.** The K-Line Bit has a limiter welded onto it to prevent the bit from being inserted too deeply and puncturing the opposite tubing wall.

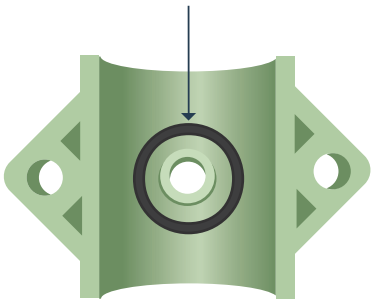


After drilling, remove the tubing chaff from each hole.

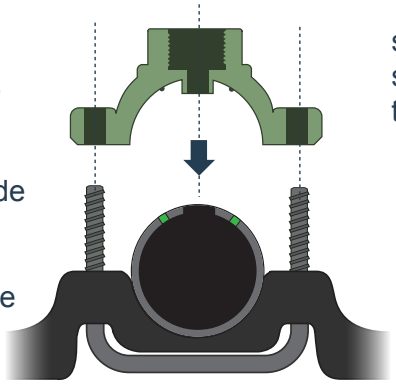
E Center the pod and the two stainless steel threaded posts with the 9/16" hole.



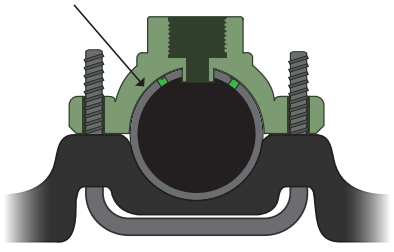
F Make sure that the rubber O-ring is in the groove on the underside of the K-Line Tapping Saddle.



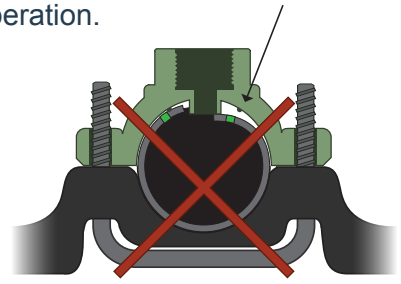
G Push the K-Line tapping saddle down over the threaded posts and be certain that the nipple on the underside of the tapping saddle is inserted into the 9/16" hole.



The K-Line tapping saddle should sit snugly over the tubing without a gap.



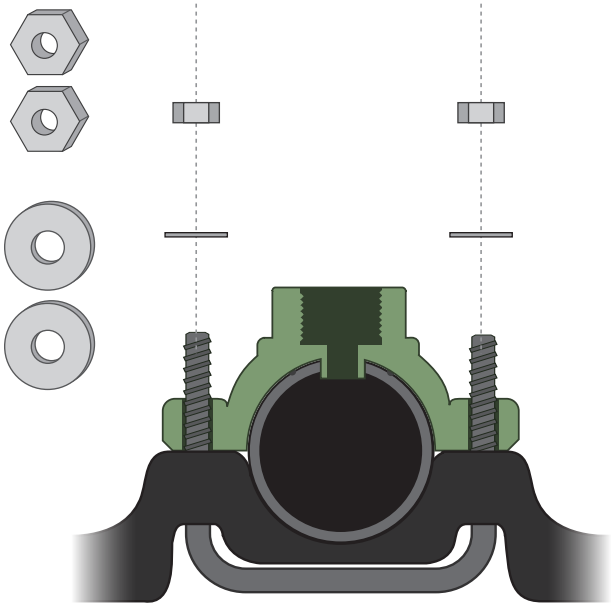
A gap might indicate that you are pinching the tubing on either side of the hole causing water to spray out into the pod during operation.



STEP 8: Tapping Saddle Installation (continued)

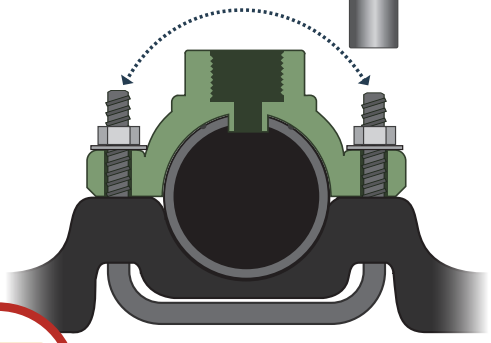
H

Put a stainless steel washer on each threaded post and then hand tighten a #8 metric stainless steel nut onto each post.



I

With a 13mm socket (with 8" or longer extension) and ratchet, alternate tightening the #8 metric nuts by switching back and forth several times to make sure that the Tapping Saddle is set level and square.

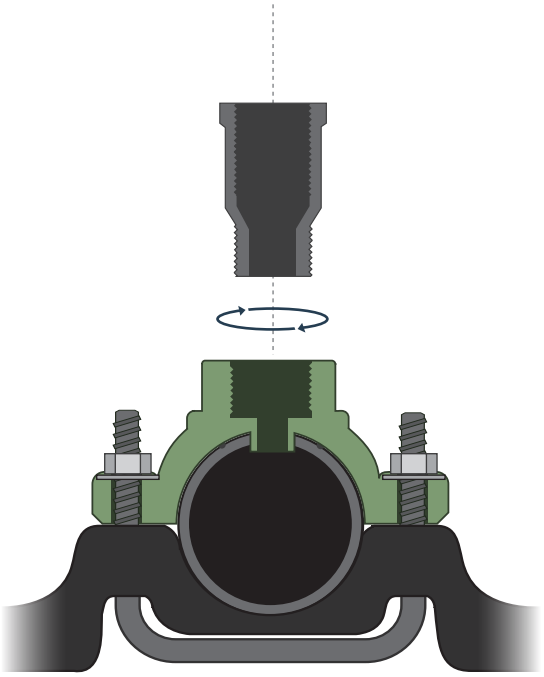


CAUTION: Using a drill to tighten stainless steel materials can cause the stainless steel to heat up and seize, resulting in broken threaded posts or failure to fully tighten the nuts onto the Tapping Saddle.

STEP 9: NAAN Sprinkler Installation

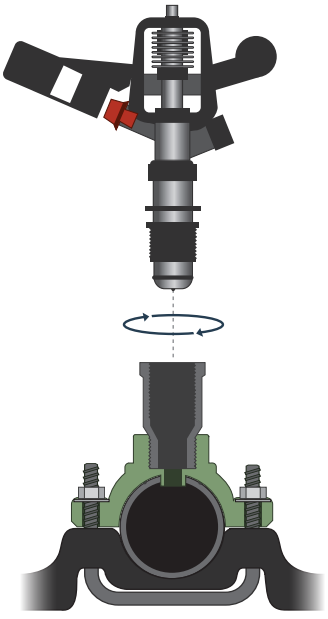
A

Hand start the NAAN adaptor into the K-Line tapping saddle (careful not to cross thread), then finish tightening with an adjustable wrench or channel lock pliers.



B

Hand start the NAAN 5022 sprinkler (careful not to cross thread), then finish tightening with a 13/16" open ended wrench or channel lock pliers.



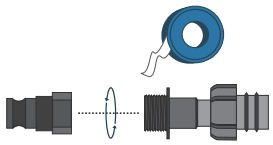
Repeat Steps 8 and 9 for each pod in the line.

STEP 10: K-Line Fittings Installation on the Lines

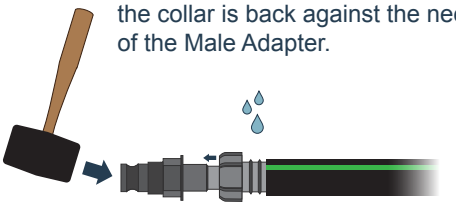
A

Attach the Male Adapter and Male Camlock to the Start of the Pod Line, as follows:

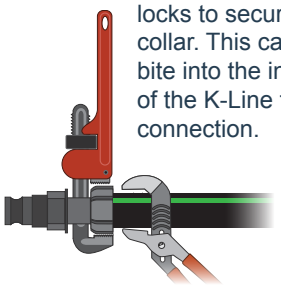
1. Assemble the Male Adapter and Male Camlock together, using Teflon tape on the threads to seal the connection, and tighten with a pipe wrench and channel locks.*



2. Moisten the barbed end of the Male Adapter with water. Drive the Male Adapter and Male Camlock into the K-Line Tubing with a rubber mallet ensuring that the collar is back against the neck of the Male Adapter.



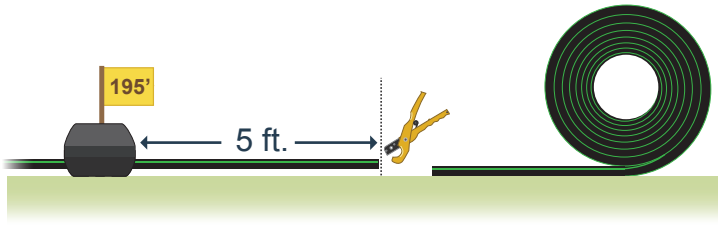
3. Hand tighten the collar of the Male Adapter onto the tubing, then finish by using a combination of pipe wrenches and channel locks to securely tighten the collar. This causes the barbs to bite into the interior and exterior of the K-Line tubing for a strong connection.



*Camlock and Male Adapter may be preassembled

B

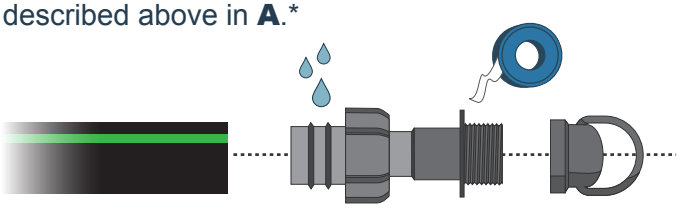
At the end of the **Pod Line** (5 ft. BEYOND THE LAST POD), use 1½" to 2" poly pipe cutters or a hack saw to cut the K-Line Tubing.



Make sure that the cut end is square and that any burrs are removed.

C

Attach the Hook Cap to the Male Adapter using Teflon tape on the threads, tighten securely, and connect to the **Pod Line** following the directions described above in **A**.*



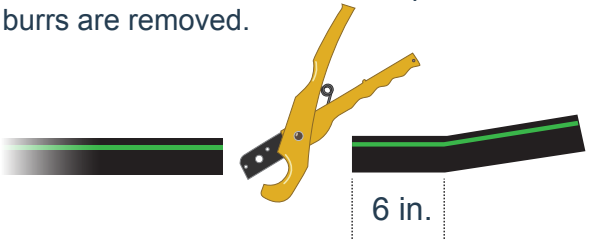
*Hook Cap and Male Adapter may be preassembled

D

Roll out the remainder of the 40mm tubing, this will be the **Feed Line**. It should be approximately 100' if your area to be irrigated is 200' wide. If your area to be irrigated is less than 200', then the **Feed Line** should be at least long enough to run from the riser in the center of the field to the edge of the field.

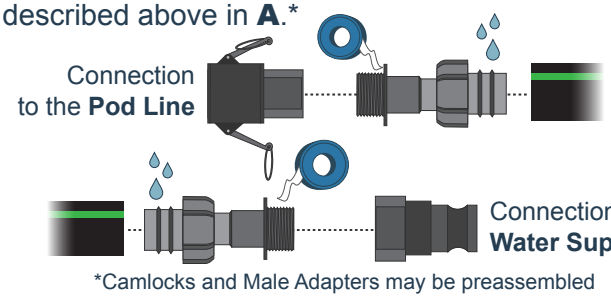
E

At the end of the desired length of Feed Line, cut the K-Line Tubing. There may be a kink in the 40mm tubing from when the tubing was wound for shipping, make a square cut 6" prior to the kink or make sure that the cut end is square and that any burrs are removed.



F

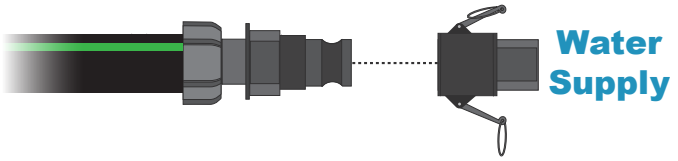
Attach one Female Camlock and one Male Camlock to two Male Adapters using Teflon tape on the threads, tighten securely. Connect one set to EACH END of the **Feed Line** following the directions described above in **A**.*



*Camlocks and Male Adapters may be preassembled

G

Attach the Male Camlock to the Water Supply Line using the supplied Female Camlock.



This completes the K-Line installation.

K-Line Shifting

Please also refer to the K-Line Installation DVD to learn how to shift the K-Line System.

Shifting from Set 1 to Set 2

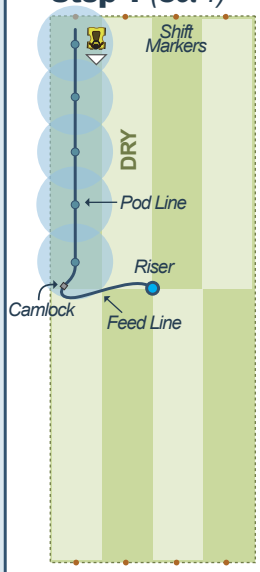
You can shift K-Line Irrigation with an ATV, heavy duty lawn tractor, golf cart, Gator, or similar tow vehicle. The preferred method of movement is while the sprinklers are in operation. This saves shifting time and the water pressure in the K-Line tubing helps prevent kinking.

The two most important practices to follow when shifting:

1. ALWAYS Shift on the "dry" side. Always begin the shifting procedure on the dry (unirrigated) side of the K-Line. The "dry" (unirrigated) side of a K-Line is the side next to the section(s) of the field that have not been irrigated. This is opposed to the "wet" (irrigated) sections or "Sets" which have been irrigated previously. This will prevent "double loops" in the Feed Line and reduce chances that the tubing will get kinked. Please refer to the illustrations below and note that the "wet" (irrigated) and "dry" (unirrigated) Sets have been labeled.

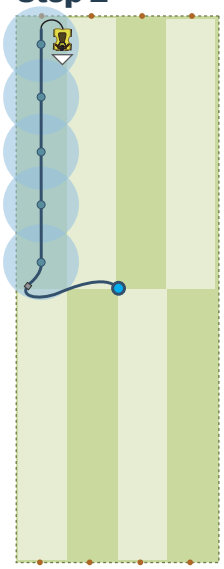
2. When connecting to the K-Line, always face towards mid-field and position the tow vehicle 6 - 8' from, and parallel to, the K-Line.

Step 1 *(Set 1)*



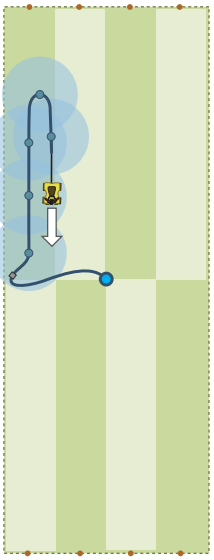
Facing the far end of the field, position your vehicle along side and 6 - 8' away from the sprinkler/pod line.

Step 2



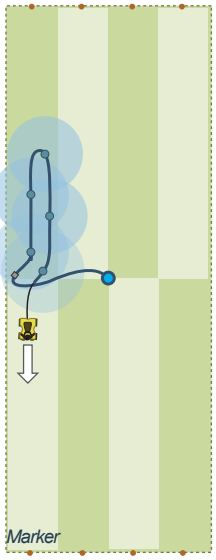
Attach the hook and rope at the end of the sprinkler/pod line to the tow vehicle.

Step 3



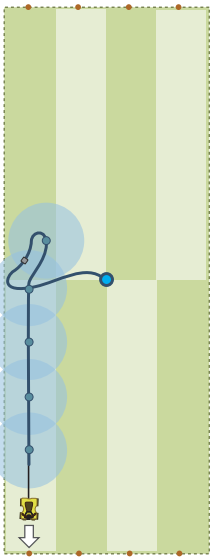
Drive along (parallel to) your sprinkler/pod line, staying within 6 - 8' of the line.

Step 4



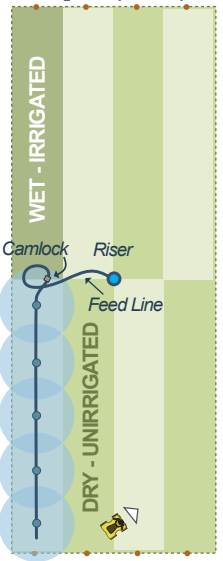
As you approach the midpoint of your field (running over the feed line), line up with your marker at the end of the field.

Step 5



Continue to the end of the field and stop when the first pod is approximately 30' from the end of the field.

Step 6 *(Set 2)*

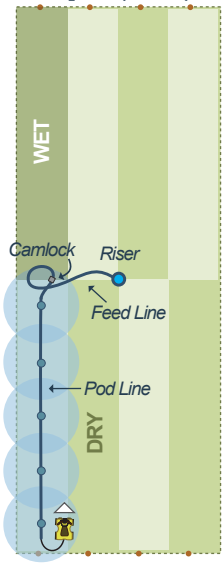


Unhook the sprinkler/pod line from your tow vehicle.

Shifting from Set 2 to Set 3

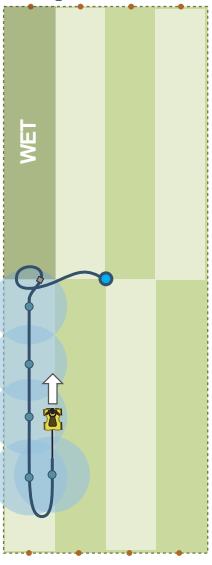
The following steps show how to move the K-Line 50' over to the right for the next set.

Step 1 *(Set 2)*



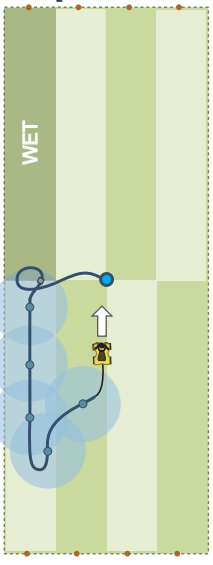
Position your vehicle as described above and hook the sprinkler/pod line to the tow vehicle.

Step 2



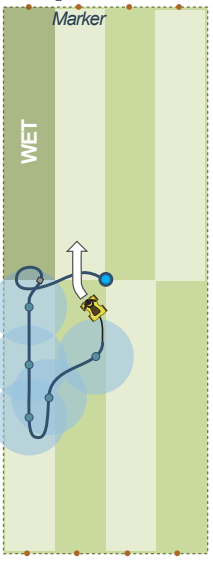
Pull straight forward until you reach the third pod.

Step 3



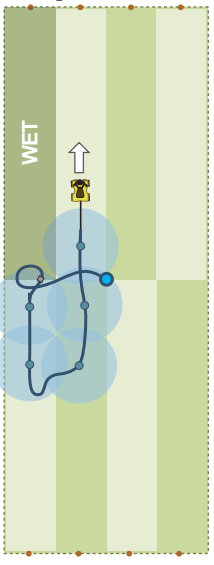
Veer right about 50' and straighten to align the vehicle with the end of the field.

Step 4



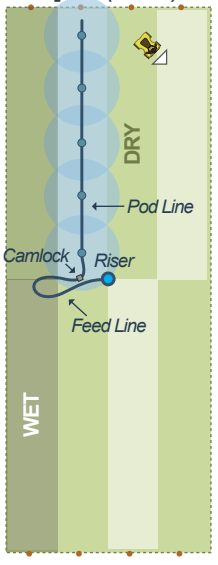
Before reaching the center line, veer back slightly to the left and line up with the marker at the end of the field .

Step 5



Pass over the feed line and continue to the end of the field.

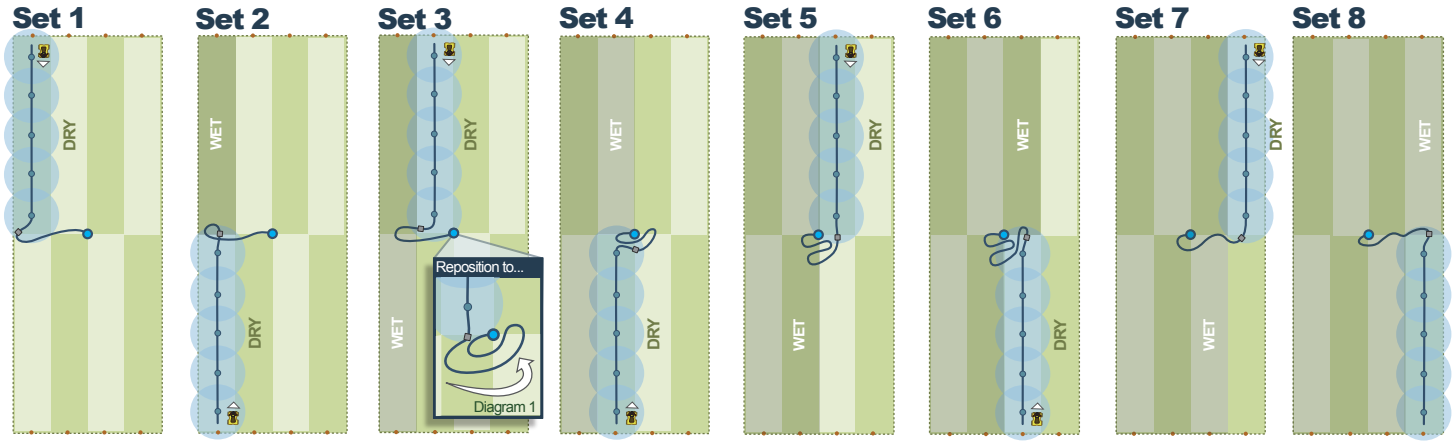
Step 6 *(Set 3)*



Unhook the vehicle from the sprinkler/pod line.

Follow the steps above to shift the line to irrigate all the sections of the field.

Example of a Complete Shifting Schedule



This is an example of the Sets and order of shifts to completely irrigate a field. For other field shapes and sizes please consult your K-Line dealer.

Repositioning the Feed Line

You will need to reposition the Feed Line at least once (sometimes more often) as you shift from Set to Set. In this Shifting Schedule, after the 2nd shift, where the K-Line is positioned to irrigate Set 3, the operator must manually take hold of the Feed Line at the point of the loop furthest from the riser. Then, as shown in **Diagram 1**, the operator must pull the Feed Line loop to a point about 15-20' to the right of the riser at mid-field.

The operator may also need to reposition the Feed Line if they see that the first sprinkler/pod (the sprinkler/pod closest to the riser or mid-field) is out of alignment with the other pods.

In this Shifting Schedule, this is most likely to occur after shifting the K-Line to the Set 7 position. In this situation, just pull the Feed Line (near the cam lock connection) to reposition the sprinkler/pod and Feed Line. Once the operator becomes familiar with the shifting procedure, the need to reposition (as in Set 7) will be less often.

K-Line Shifting Hints

To keep the final sprinkler (pod closest to the tow vehicle during shifting) from spraying the operator during shifting, use a clothes pin to prevent sprinkler movement, or a coffee can (or similar) over the sprinkler to redirect the spray. Remove after the K-Line has been shifted.

Always position the tow vehicle 6 - 8' from the K-Line to be shifted on the dry (unirrigated) side of the K-Line - SEE page **8-9**. This will prevent "double loops" in the Feed Line and reduce chances that the tubing will get kinked. Mark the ends of the field with large different colored markers or flags to help position your lines properly

The first sprinkler/pod may be out of line with the rest of the sprinklers/pods if you have not positioned the last pod (the sprinkler/pod furthest from mid-field) approximately 30' from the edge of the field; OR if the Feed Line needs to be repositioned (as after moving the K-Line to the Set 3 or Set 7 positions – see above, Repositioning the Feed Line, for more details).

Shifting K-Line in hot weather without water running through the tubing increases the chance of kinking. EITHER shift the line while irrigating, OR shift (without water running) in the early morning or early evening when the tubing is cool.

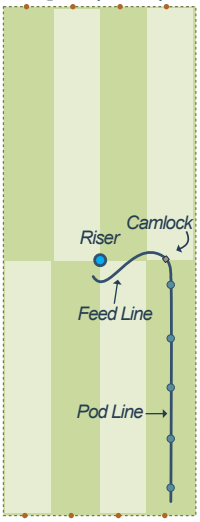
Winterization / Harvest

Unhook the Feed Line and K-Line from the riser and shift it to the side of the field for storage or during harvest. Setting the K-Line on an incline, and the action of shifting the K-Line itself, will remove most of the water from the K-Line. K-Line tubing will also stretch slightly to withstand some freezing. Open all riser and drain valves to drain the system and cover any open risers or tubing ends (cam dust caps and plugs are available) to prevent small animals from nesting inside.

If a significant amount of grass is allowed to grow up and entangle the K-Line (i.e., from fall through to late spring when you begin irrigating again) then be sure to manually loosen the pods from the grip of the forage before shifting the K-Line.

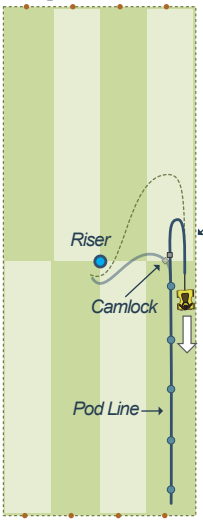
Resetting the System from Set 8 to Set 1

Step 1 *(Set 8)*



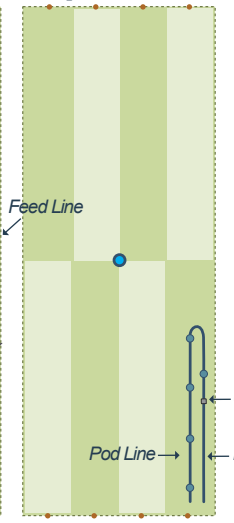
Turn off the water. Disconnect the Feed Line from the riser.

Step 2



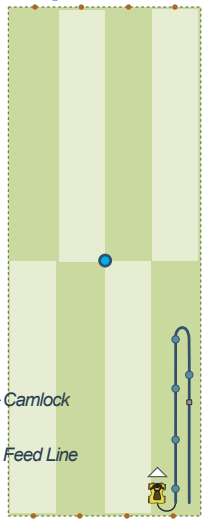
Begin to reposition the Feed Line by making a wide arc away from the pod line and moving to the far side, and 6-8' from the pod line.

Step 3



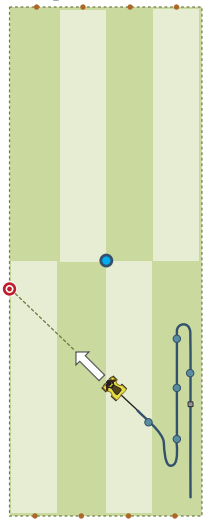
Reposition the Feed Line to run parallel to the pod line (on the far side of the field). The cam fitting that connects to the riser should be near the hook cap.

Step 4



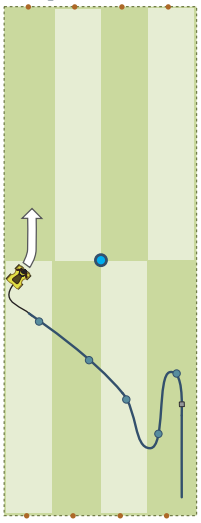
Position your vehicle along side and 6 - 8' from the sprinkler/pod line facing the far end of the field. Hook the sprinkler/pod line to the tow vehicle.

Step 5



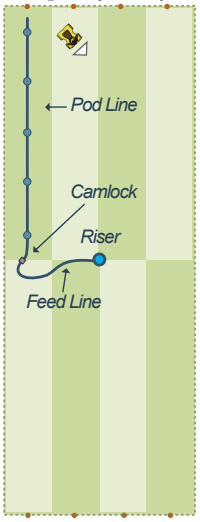
Pull forward to the second pod, then angle left aiming for a point short of the center of the far side of the field.

Step 6



Drive to the edge of the far side of the field. Before passing the center line, turn back and position yourself in the middle of Set 1.

Step 7 *(Set 1)*



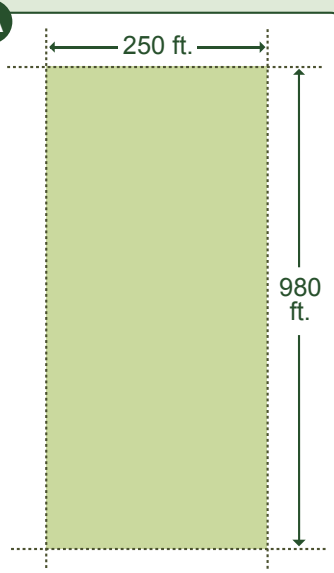
Continue to the end of the field. Unhook the sprinkler/pod line from the tow vehicle. Reposition the Feed Line and reconnect the Feed Line to the riser.

Combining 2 K-Line Kits: Steps 5 through 7

STEP 5: Plan your 10 Pod / 5.6 Acre System Layout

Field shapes and dimensions may not match this ideal layout. K-Line's signature flexibility allows for adaptation to other field dimensions. See the additional "Sample Designs" included at the end of this manual.

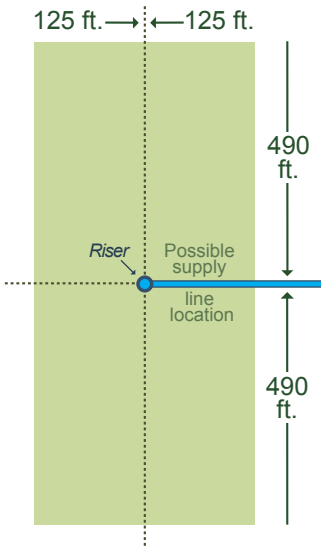
A



Determine the area of the field to be irrigated.

Up to approx. 5.6 acres.

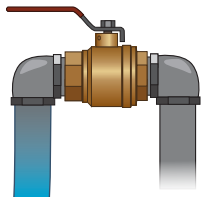
B



Determine the center of the field. This is the location of the riser.

C

Determine the supply line route from the water supply to the center of the field. The water supply line should be at least 2" or larger from the water source, beginning at a point where sufficient gallons per minute and pressure are available.



Possible supply line location

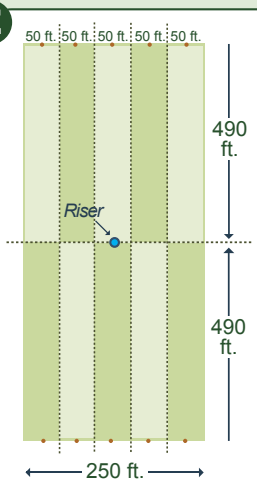
Water Supply
24-50 gallons per minute
@ 40 - 50 psi
Varies depending on nozzle size

D

Consider your supply line. Supply line options include:

1. Buried (underground) PVC or polyethylene plastic pipe.
2. Lay-flat tubing (above ground), similar to fire hose, available from your irrigation dealer.
3. K-Line Irrigation tubing (above ground). K-Line tubing is highly durable and specifically formulated to remain flexible, is freeze resistant, and has excellent UV resistance.

E



Determine Shift/Set Widths. Shift / Set widths are recommended to be between 40 ft. and 50 ft.

The material included in two kits allows for a field length of up to 980 ft.

The field width should not exceed 250' for this 10 Pod / 5.6 Acre K-Line Irrigation kit.

K-Line's adaptability is increased when 2 Kits are combined. The example layout in this Manual allows 2 Kits to be combined to irrigate a 5.6 acre area, but K-Line's almost limitless flexibility allows you an even greater range of options – from irrigating larger areas with a single 10 sprinkler/pod K-Line, to making two K-Lines of different lengths to irrigate several different sized areas.

The key to K-Line's success is the maneuverability of the sprinkler/pod line, allowing the K-Line to irrigate areas with trees, buildings, ponds, streams, and hilly or irregular shapes to become productive and profitable grasslands. Shifting markers (discussed further on Page **3,** Step **5F**) allow the operator to become accustomed to shifting and placement of the K-Line from Set to Set.

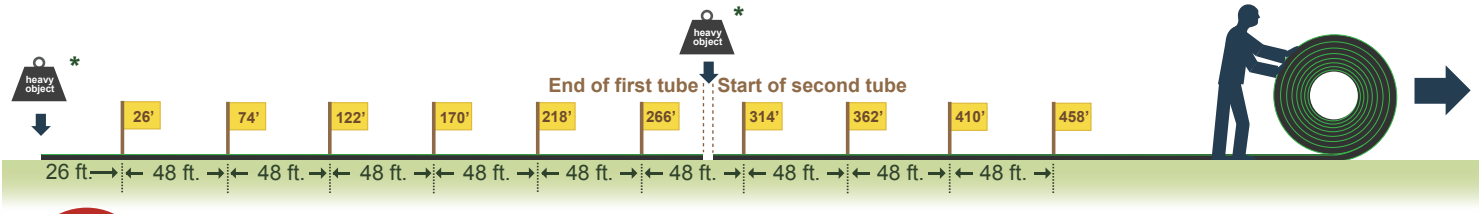
Follow the **"K-Line Layout Design Process"** on **page 11, Step 6B** to better understand how to develop K-Line layouts for your irrigation opportunities. Our **"Sample Designs"** literature gives many example layouts that may help you identify irrigation opportunities of your own. Call your dealer or K-Line Irrigation at **(866) 665-5463** with questions.

STEP 6: 10 Pod / 5.6 Acre Layout of the Pod Line

A

Measuring pod placement and rolling out the Pod Line

Roll out a measuring tape and place 10 markers/flags, starting at 26 feet then at 48 foot intervals.
Roll out 1 full 40mm roll of tubing for approximately 300 ft. (if the end is kinked, follow the instructions on page **7**, step **10E** to cut a square end).
Continue the line by rolling out the next roll of tubing 20-30 ft. past the final marker to keep the end from rolling back during pod installation.



DO NOT ALLOW IT TO TWIST! The double green line should face up for the entire length of the tubing.
Do not make the end cut until the pods have all been installed.

***Hint:** It helps to put a heavy object on the ends of the K-Line Tubing when rolling it out to keep the tubing in place and prevent it from rolling up behind you. The tubing will relax once rolled out and allowed to sit in the sun.

STEP 6: 10 Pod / 5.6 Acre Layout of the Pod Line (continued)

B

K-Line Layout Design Process

K-Line recognizes that most areas to be irrigated will differ from the 250' by 980' dimensions used in this Layout illustration. The process represented in this Installation Manual will guide you through your own application.

In general you will have 5' of tubing past the final pod, an even spacing between the pods in the line, and prior to the first pod, half or slightly more of the distance between pods.

Using our sample layout dimensions of 980' long by 250' wide, you will GENERALLY use these steps, when determining the distance between the pods:

1. Take the length of the field and divide by 2 (980'/2 = 490');
2. Subtract 10 – to account for overspray at the end of the line and to give room to maneuver the tow vehicle (490' - 10' = 480').
NOTE: Try to always leave about 30' between the final pod and the edge of the area to be irrigated.
3. Divide the remaining length by 50' (480'/50 = 9.6), always round up (9.6 → 10), this is the number of pods that you need to use in your K-Line (10 pods).
4. Take the remaining length found in step 2 (480') and divide by the number of pods that you calculated in step 3 (10 pods) to get the spacing between pods (480' / 10 pods = 48' between pods).
NOTE: Almost always round a decimal down (45.8' → 45') and do not exceed a 50' spacing between pods.
5. The length of tubing from the first pod of the Pod Line and the beginning of the K-Line tubing should be ½ of the distance between pods (48' x ½ = 24'), rounded up. In our 5.6 acre Layout we have 26' because we had extra tubing that could either be added to the Feed Line or the Pod Line and we choose to add it to the Pod Line. It is better to have more tubing than to not have enough tubing.

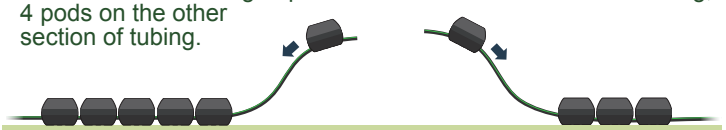
This is how we designed this 10 Pod / 5.6 Acre Layout and you can use this process to develop your own Layout.

NOTE: You will need a length of K-Line tubing for a Feed Line that is ½ (or more) the width (250') of the area to be irrigated (250' x ½ = 125' minimum).

STEP 7: Placing the pods

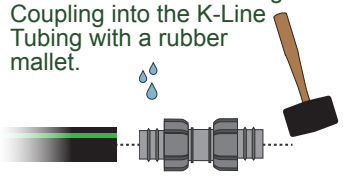
A

At the break between the two rolls of tubing, slide the 10 pods onto the K-Line tubing. 6 pods on the side with 300 feet of tubing, 4 pods on the other section of tubing.

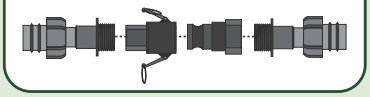


B

Be sure that the tubing ends are square. Moisten the end of the Straight Coupling with water and drive the Straight Coupling into the K-Line Tubing with a rubber mallet.

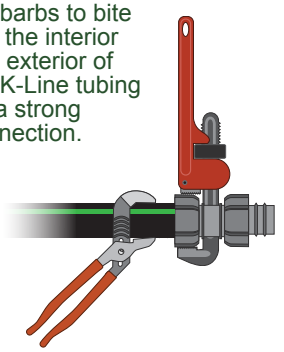


The "extra set" of Camlocks from combining 2 K-Line Kits can be used in place of a Straight Coupling. See step **10A** on page **7** for installation of both Camlocks.



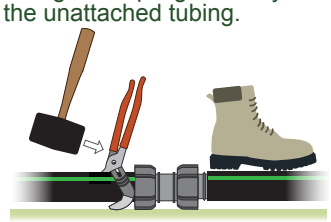
C

Hand tighten the collar of the Straight Coupling onto the tubing, then finish by using a combination of pipe wrenches and channel locks to securely tighten the collar. This causes the barbs to bite into the interior and exterior of the K-Line tubing for a strong connection.



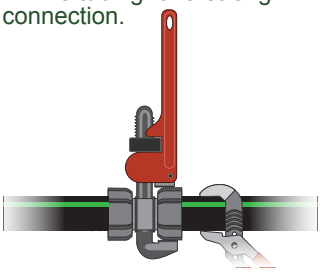
D

Wet and insert the unattached end of the Straight Coupling into the other section of tubing and place your foot (and weight) on the tubing to hold the tubing in place. On the already connected Straight Coupling/tubing side, place the channel locks directly behind the attached collar. Use a rubber mallet to strike the channel locks to drive the Straight Coupling securely into the unattached tubing.



E

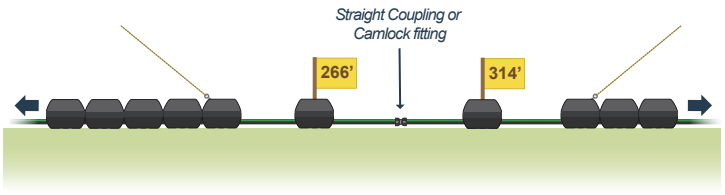
Hand tighten the collar of the Straight Coupling onto the tubing, then finish by using a combination of pipe wrenches and channel locks to securely tighten the collar. This causes the barbs to bite into the interior and exterior of the K-Line tubing for a strong connection.



When connecting 2 lengths of tubing, be sure to keep the green lines on the tubing facing up.

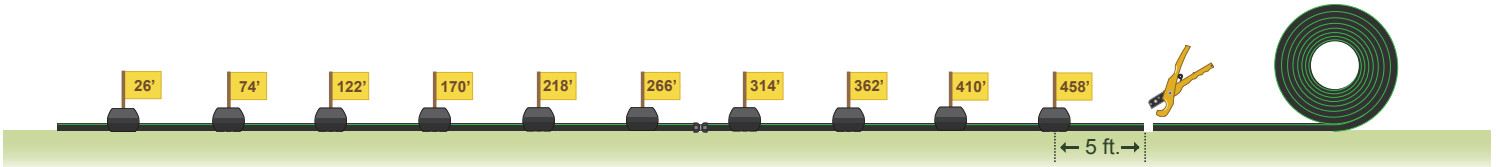
F

Use the Tow Rope and Hook to pull all pods to the first marker in both directions. Unhook a pod, leaving it at the marker.



G

Continue on to the remaining markers, leaving a pod at each.



Use 1½" or 2" Poly Pipe cutters or a Hacksaw to make a square cut at the end of the Pod Line 5' past the final marker. Make sure that the cut end is square and that any burrs are removed. **RESUME INSTRUCTIONS ON PAGE 5, STEP 8.**

K-Line Trouble Shooting Guide

Symptom	Possible Cause / Solution
Partial or poor distribution from sprinkler	▪ plugged nozzle - remove nozzle, check for obstruction. ▪ obstruction in tubing - remove hook cap and flush line ▪ improper pump pressure - check pump ▪ damaged tubing leaking water - make square cuts to remove the damage, install Straight Coupling as described on page **6**, **STEP 11C** ▪ saddle improperly mounted on tubing - remove and mount according to pages **4 and 5, STEP 8**
Pods rolling over during shifting	▪ towing vehicle is too far from K-Line - keep 6 - 8' from the pod line while shifting
Connectors coming loose	▪ improper tightening of the K-Line connectors - cut off and discard 3" of old scarred tubing when repairing (make sure that you have a square cut), then use pipe wrenches to more firmly tighten the connectors - see page **6, STEP 10A.** If this fails, replace fitting with new fitting with sharp edges.
Water Stream hits the inside of the pod	▪ tapping saddle is improperly tightened down - reposition tapping saddle and tighten down evenly, see pages **4 and 5, STEP 8**
Feed Line loop gets too tight	▪ Feed Line needs to be repositioned - see page **9, "Repositioning the Feed Line"** ▪ Feed Line is too short - add more tubing or narrow the width of the irrigated area
K-Line tubing gets kinked	▪ failure to reposition Feed Line – see page **9, "Repositioning the Feed Line"** - ▪ shifting the K-Line without water running when temperatures are hot - -straighten the kinked K-Line tubing and use a rubber mallet to lightly pound the tubing back into shape

K-Line Accessories

K-Line Stock Tank

K-Line's Portable Stock Tank can be pulled behind an ATV or small tow vehicle and is designed to be moved with the cattle as they move through the grazing rotation.

Benefits:

- Heavy duty stainless steel tank with rugged steel tubing framework for maximum durability and longevity.
- Low tank profile and center of gravity minimizes rubbing and potential of cattle tipping the tank.
- Minimal physical labor involved in moving the tank.
- Fields are more efficiently grazed when water is readily available.
- Minimal walking distances to water increases milk production and weight gain.
- A portable tank is rarely placed in the same location, minimizing mud holes.
- Compaction and pugging around the stock tank is minimal – when water is close, cows drink in ones and twos instead of as a mob that causes competition at the tank.
- Manure is more evenly distributed and not concentrated around a permanent tank.

K-Line Stock Guard

K-Line's Stock Guard is available to prevent animals from loosening or breaking the sprinklers. Most stocking situations do not require Stock Guards.

K-Line Kwik Shifter II

The Kwik Shifter II with adjustable hitch is pulled behind the tow vehicle and is designed to catch a heavy-duty, bright colored plastic ball that is attached to the end of the K-Lines. After catching the ball, the driver shifts the K-Line (at speeds up to 15mph) to the next set (area to be irrigated), pulls the trip rope which releases the ball, and then moves on to shift the next K-Line – all without stopping or dismounting. The time to shift multiple K-Lines can be easily cut in half and mounting/dismounting the tow vehicle is greatly reduced.

See the K-Line website, **www.k-linena.com**, for other K-Line accessories - pop-up sprinklers, Nelson Windfighter sprinklers, spool-out reels, fittings, regulators, couplings, and connectors.

Performance Chart

2 Acre K-Line Irrigation Kit

5022 NAAN impact sprinkler options with 43' between sprinklers and a 50' shift width

Nozzle Color & Size	Operating Pressure	Output per Sprinkler (gallons per minute)	Total Water Required for 5 Sprinklers	Water Application Rate/Hour	Total Applied Water in 24 hr. Set	Average Application Rate Per Week Based on 8 Shifts with Continuous Running
 Orange - 7/64"	40 psi.	2.3 gpm	11.5 gpm	.10 inches	2.4 inches	2.1 inches
	45 psi.	2.44 gpm	12.2 gpm	.11 inches	2.6 inches	2.2 inches
	50 psi.	2.57 gpm	12.9 gpm	.12 inches	2.7 inches	2.4 inches
 Red - .118"	40 psi.	2.64 gpm	13.2 gpm	.12 inches	2.8 inches	2.5 inches
	45 psi.	2.81 gpm	14.1 gpm	.13 inches	3.0 inches	2.6 inches
	50 psi.	2.96 gpm	14.8 gpm	.14 inches	3.1 inches	2.7 inches
 Black - 5/32"	40 psi.	4.4 gpm	22 gpm	.20 inches	4.7 inches	4.1 inches
	45 psi.	4.64 gpm	23.2 gpm	.21 inches	4.9 inches	4.3 inches
	50 psi.	4.86 gpm	24.3 gpm	.22 inches	5.2 inches	4.5 inches
The green and blue nozzles below are optional sprinkler nozzles available from your Dealer						
 Green - 1/8"	40 psi.	3.0 gpm	15 gpm	.13 inches	3.2 inches	2.8 inches
	45 psi.	3.17 gpm	15.9 gpm	.14 inches	3.4 inches	2.9 inches
	50 psi.	3.33 gpm	16.7 gpm	.15 inches	3.6 inches	3.1 inches
 Blue - 9/64"	40 psi.	3.44 gpm	17.2 gpm	.15 inches	3.7 inches	3.2 inches
	45 psi.	3.64 gpm	18.2 gpm	.16 inches	3.9 inches	3.4 inches
	50 psi.	3.82 gpm	19.1 gpm	.17 inches	4.1 inches	3.5 inches

5.6 Acre K-Line Irrigation Kit

5022 NAAN impact sprinkler options with 48' between sprinklers and a 50' shift width

Nozzle Color & Size	Operating Pressure	Output per Sprinkler (gallons per minute)	Total Water Required for 10 Sprinklers	Water Application Rate/Hour	Total Applied Water in 24 hr. Set	Average Application Rate Per Week Based on 8 Shifts with Continuous Running
 Orange - 7/64"	40 psi.	2.36 gpm	23.6 gpm	.09 inches	2.2 inches	1.5 inches
	45 psi.	2.49 gpm	24.9 gpm	.10 inches	2.4 inches	1.6 inches
	50 psi.	2.62 gpm	26.2 gpm	.11 inches	2.5 inches	1.7 inches
 Red - .118"	40 psi.	2.71 gpm	27.1 gpm	.11 inches	2.6 inches	1.8 inches
	45 psi.	2.88 gpm	28.8 gpm	.11 inches	2.7 inches	1.9 inches
	50 psi.	3.03 gpm	30.3 gpm	.12 inches	2.9 inches	2.0 inches
 Black - 5/32"	40 psi.	4.54 gpm	45.4 gpm	.18 inches	4.3 inches	3.0 inches
	45 psi.	4.78 gpm	47.8 gpm	.19 inches	4.6 inches	3.2 inches
	50 psi.	5.02 gpm	50.2 gpm	.20 inches	4.8 inches	3.3 inches
The green and blue nozzles below are optional sprinkler nozzles available from your Dealer						
 Green - 1/8"	40 psi.	3.0 gpm	30.1 gpm	.12 inches	2.9 inches	2.0 inches
	45 psi.	3.19 gpm	31.9 gpm	.13 inches	3.0 inches	2.1 inches
	50 psi.	3.35 gpm	33.5 gpm	.14 inches	3.2 inches	2.2 inches
 Blue - 9/64"	40 psi.	3.51 gpm	35.1 gpm	.14 inches	3.3 inches	2.3 inches
	45 psi.	3.71 gpm	37.1 gpm	.15 inches	3.5 inches	2.5 inches
	50 psi.	3.90 gpm	39.0 gpm	.16 inches	3.7 inches	2.6 inches

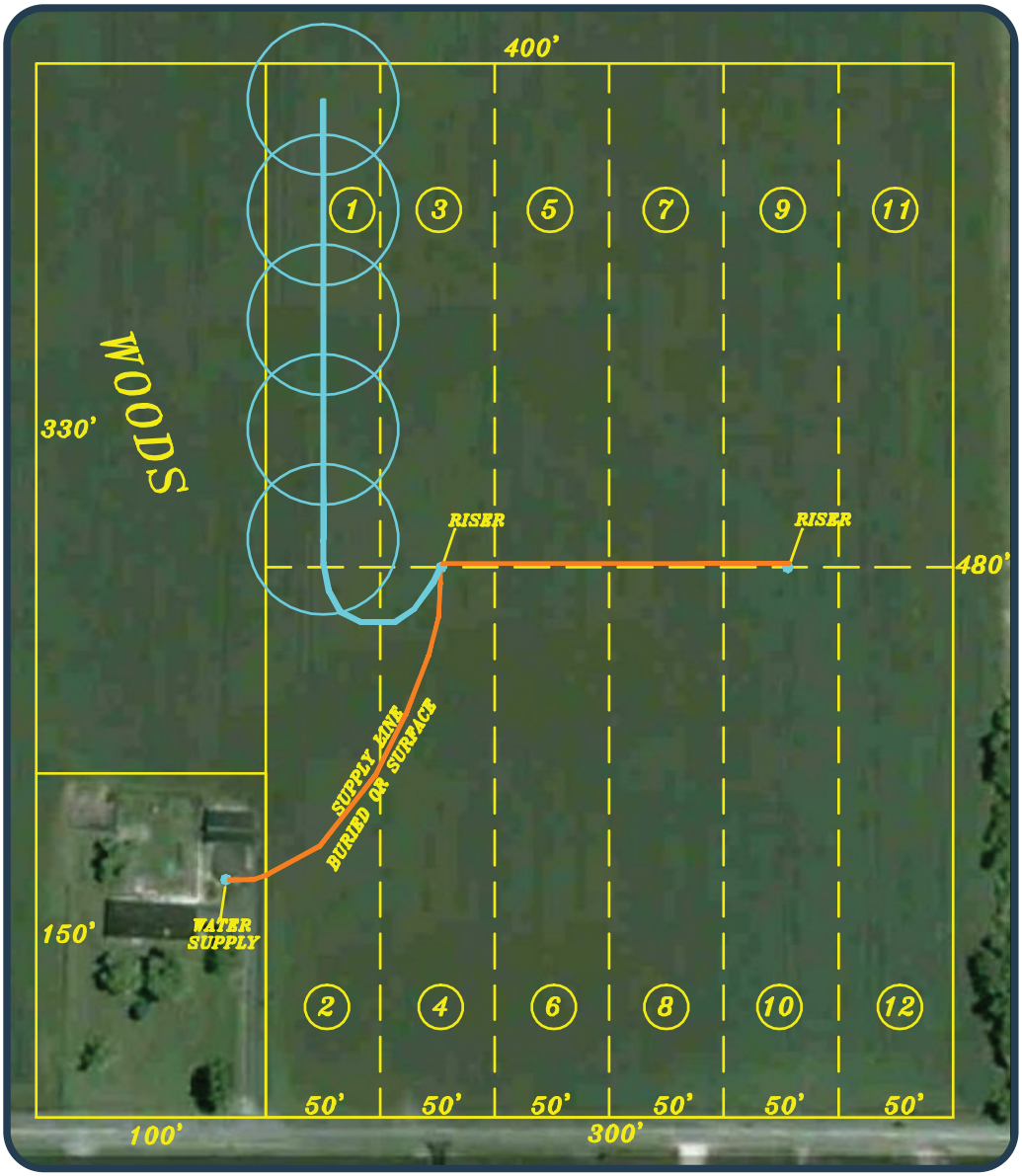
The amount of water needed for this K-Line sprinkler/pod kit varies by the nozzle used and the water pressure available. From the nozzles provided, choose the one that best fits your situation. The best operating pressure is between 40 and 50 psi.

Changing a Sprinkler Nozzle

To change a NAAN sprinkler nozzle, grip the nozzle already in the sprinkler between your thumb and forefinger, (or with a small pair of pliers), turn the nozzle counter clockwise for about 1/8 turn. Now the nozzle can be pulled straight out and the new nozzle inserted. Lock the new nozzle in place by turning it clockwise until it clicks (or the locking arms are horizontal). If unplugging a clogged nozzle, use the same procedure.

Sample Field Designs

Sample Design 1: One K-Line 2 Acre / 5 Pod Kit and Additional Tubing



Design Specifications

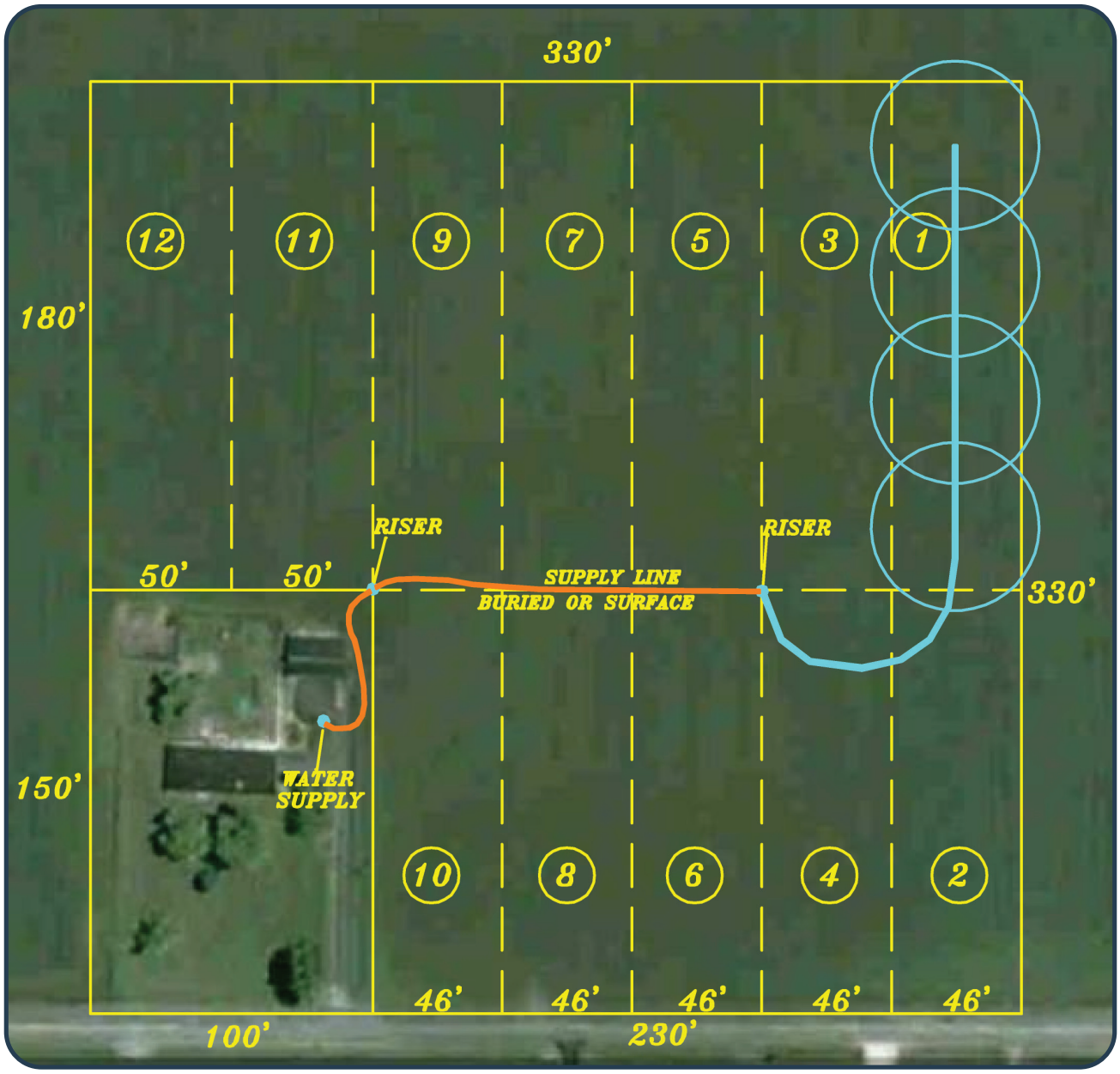
Size of total area to be irrigated	3.31 Acres
Number of sets or watering days required.	12 Sets
Distance between sprinkler pods	48 ft.
Set widths	50 ft.
Sprinkler nozzle color and size	Red .118"
Operating pressure available	50 psi
Sprinkler application rate in inches per hour	0.125 in/hr
Length of watering time per set	24 hours
Total amount of irrigation water applied during each set period	3.0 inches
System capability in inches per week applied	1.75
Number of sprinkler pods per K-Line	5
Output per sprinkler	2.96 gal/min
Total gallons per minute of water needed for this area	15 gpm

Notes

If the water holding capacity of the soil is good and small rainfall is usually available, then the number of sets can be increased as in the example. Additional K-Line tubing would be required but the acreage irrigated is large and economical.

Sample Design 2: One K-Line 5 Pod / 2 Acre Kit

2 Shifts a day, uses 4 sprinkler pods



Design Specifications

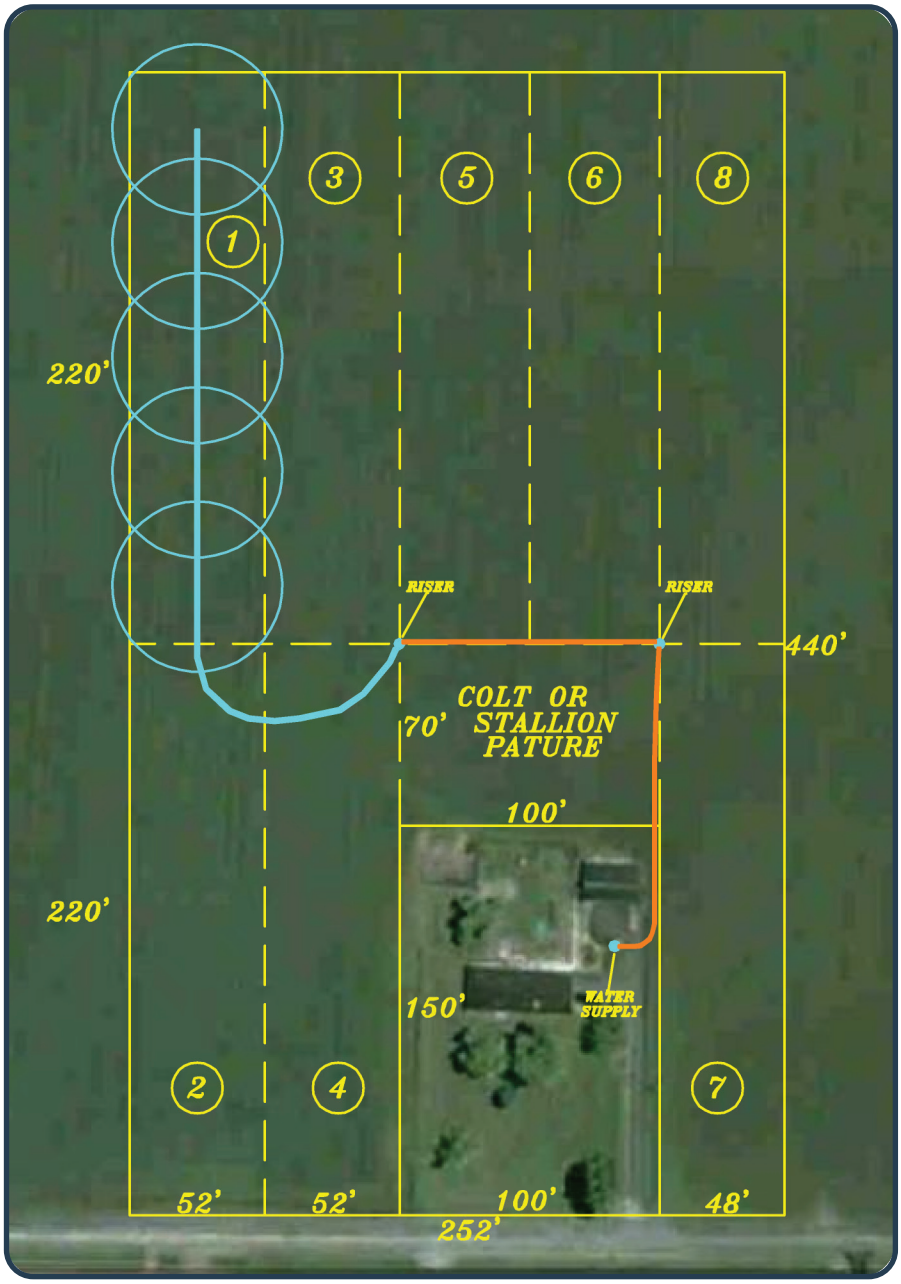
Size of total area to be irrigated	2.66 Acres
Number of sets or watering days required	12 Sets in 6 days
Distance between sprinkler pods	45 ft.
Set widths	46-50 ft.
Sprinkler nozzle color and size	Black 5/32"
Operating pressure available	50 psi
Sprinkler application rate in inches per hour	0.22 in/hr
Length of watering time per set	12 hours
Total amount of irrigation water applied during each set period	2.64 inches
System capability in inches per week applied	3.08
Number of sprinkler pods per K-Line	4
Output per sprinkler	4.86 gal/min
Total gallons per minute of water needed for this area	19.5 gpm

Notes

This layout uses only 4 pods of the kit, but there are two 12 hour shifts per day. By using the larger black 5/32" sprinkler nozzle, this entire area can be covered in 6 days and still apply over 2 ½" of water per set.

Sample Design 3: One K-Line 5 Pod / 2 Acre Kit

Shifting once per day



Design Specifications

Size of total area to be irrigated	2.56 Acres
Number of sets or watering days required	8 days
Distance between sprinkler pods	44 ft.
Set widths	48-52 ft.
Sprinkler nozzle color and size	Red .118"
Operating pressure available	50 psi
Sprinkler application rate in inches per hour	0.13 in/hr
Length of watering time per set	24 hours
Total amount of irrigation water applied during each set period	3.1 inches
System capability in inches per week applied	2.7
Number of sprinkler pods per K-Line	5
Output per sprinkler	2.96 gal/min
Total gallons per minute of water needed for this area	15 gpm

Notes

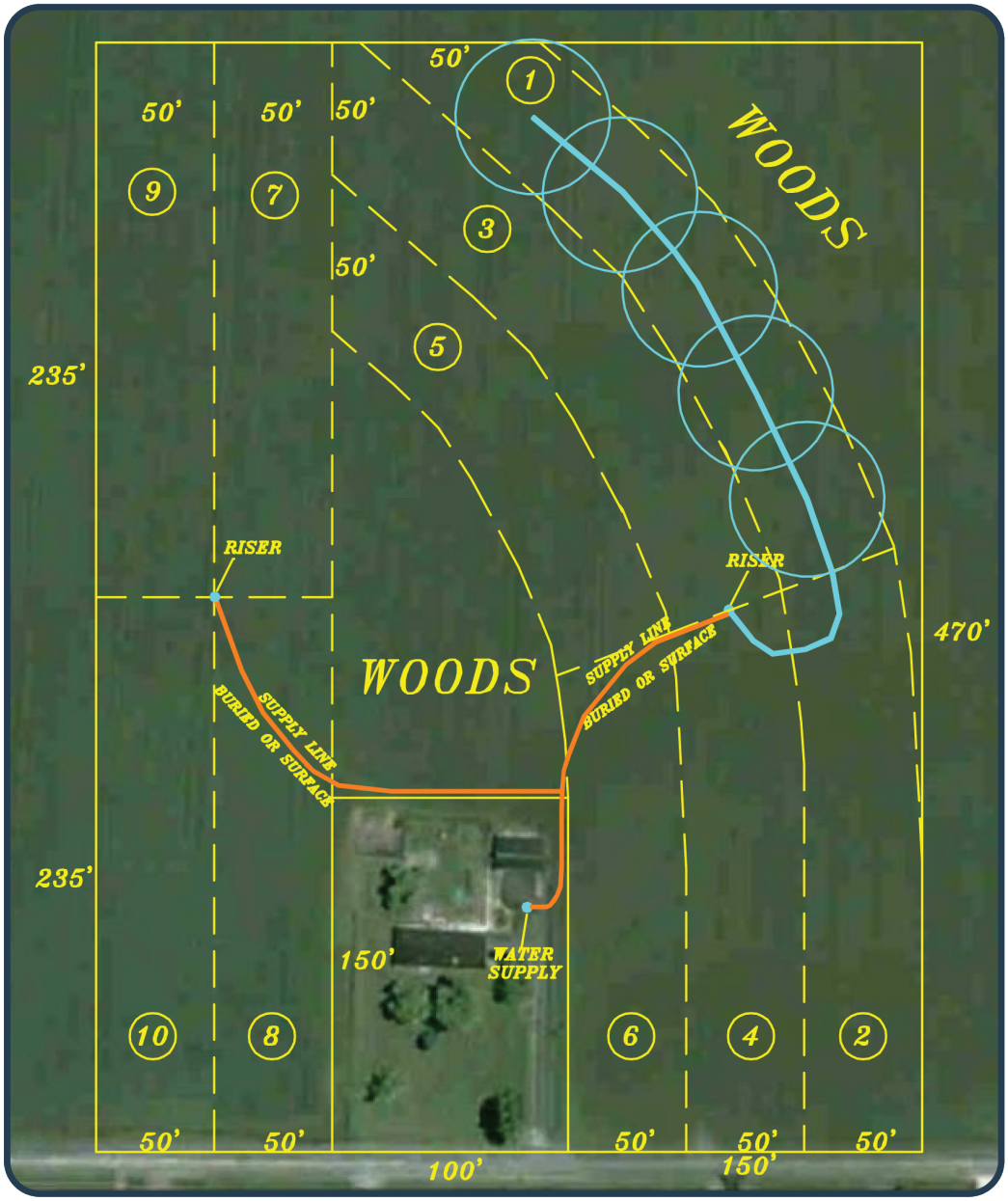
To move the K-Line from Set 5 to Set 6: Shut off the water, then disconnect the Feed Line from the Pod Line at the Cam Fitting. Next, shift the K-Line from Set 5 first into the Set 7 area and then immediately return to Set 6 with the Pod Line. Move the Feed Line to Riser 2. Reconnect to the Pod Line and restart the water.

To move the K-Line from Shift 1 to Shift 8: Use a similar procedure as described above by temporarily using the Set 2 area to line up the K-Line Pod Line.

In this layout, either the orange or red nozzle could be used to match the available water.

Sample Design 4: One K-Line 5 Pod / 2 Acre Kit

Shifting once per day



Design Specifications

Size of total area to be irrigated	2.7 Acres
Number of sets or watering days required	10 days
Distance between sprinkler pods	47 ft.
Set widths	50 ft.
Sprinkler nozzle color and size	Red .118"
Operating pressure available	50 psi
Sprinkler application rate in inches per hour	0.125 in/hr
Length of watering time per set	24 hours
Total amount of irrigation water applied during each set period	3.0 inches
System capability in inches per week applied	2.1
Number of sprinkler pods per K-Line	5
Output per sprinkler	2.96 gal/min
Total gallons per minute of water needed for this area	15 gpm

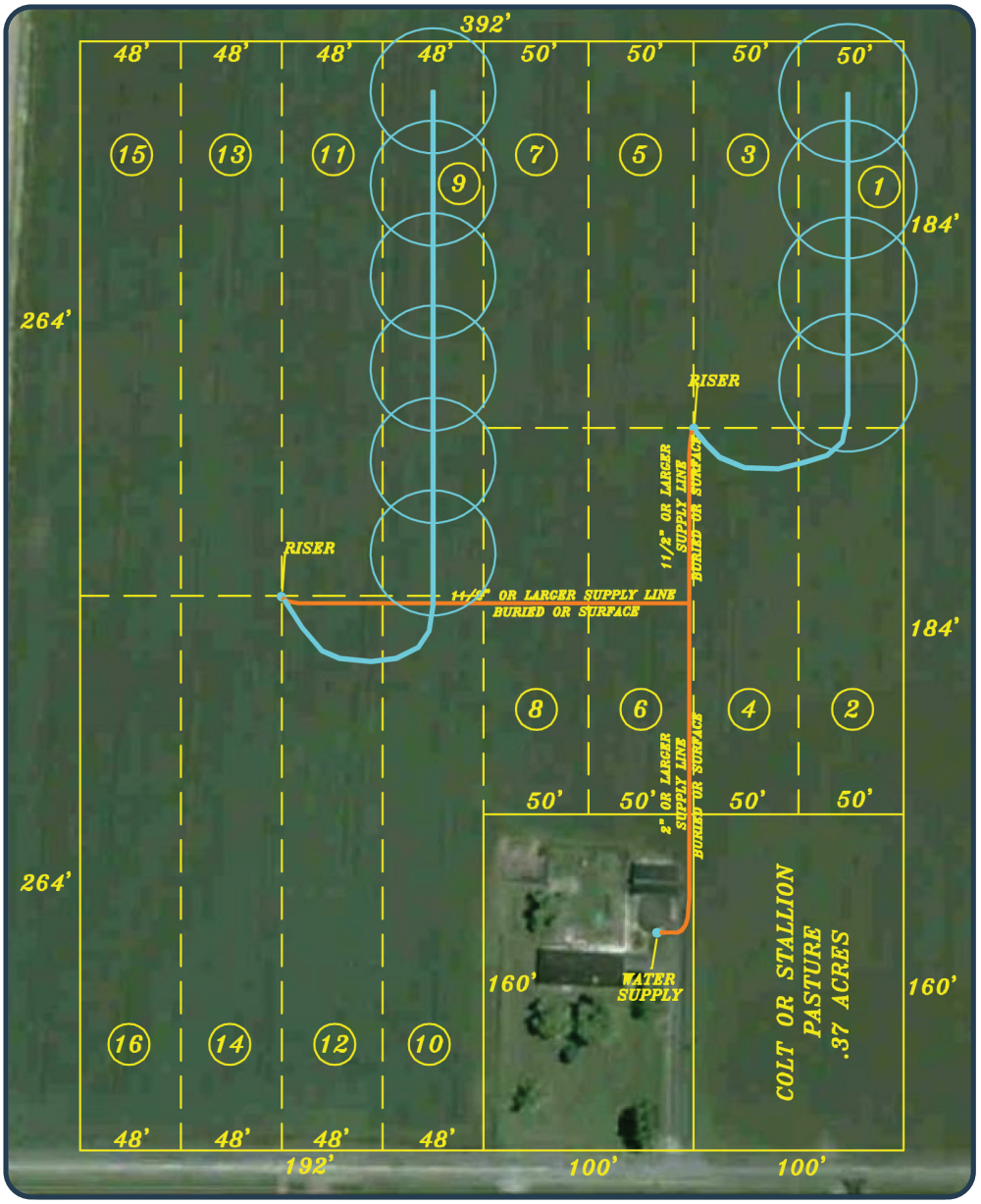
Notes

K-Line works easily around curves or other obstacles. On soil with good water holding capacity, the shift rotations can be increased by using additional riser locations. In the plan, the area irrigated would be completed in 10 day rotations.

This design covers 3.54 rotal acres, 2.7 acres being irrigated, it will requre extra K-Line tubing.

Sample Design 5: Two K-Line 5 Pod / 2 Acre Kits Combined

Shifting once per day



Design Specifications

	Sets 1-8	Sets 9-16	Totals
Size of total area to be irrigated	1.7 Acres	2.33 Acres	4.03 Acres
Number of sets or watering days required	8 days	8 days	8 days
Distance between sprinkler pods	46 ft.	44 ft.	
Set widths	50 ft.	48 ft.	
Sprinkler nozzle color and size	Red .118"	Red .118"	Red .118"
Operating pressure available	50 psi	50 psi	50 psi
Sprinkler application rate in inches per hour	0.125 in/hr	0.13 in/hr	0.125 in/hr
Length of watering time per set	24 hours	24 hours	24 hours
Total amount of irrigation water applied during each set period	3.0 inches	3.1 inches	3.0 inches
System capability in inches per week applied			2.63
Number of sprinkler pods per K-Line	4	6	10
Output per sprinkler	2.96 gal/min	2.96 gal/min	
Total gallons per minute of water needed for this area	12 gpm	18 gpm	30 gpm

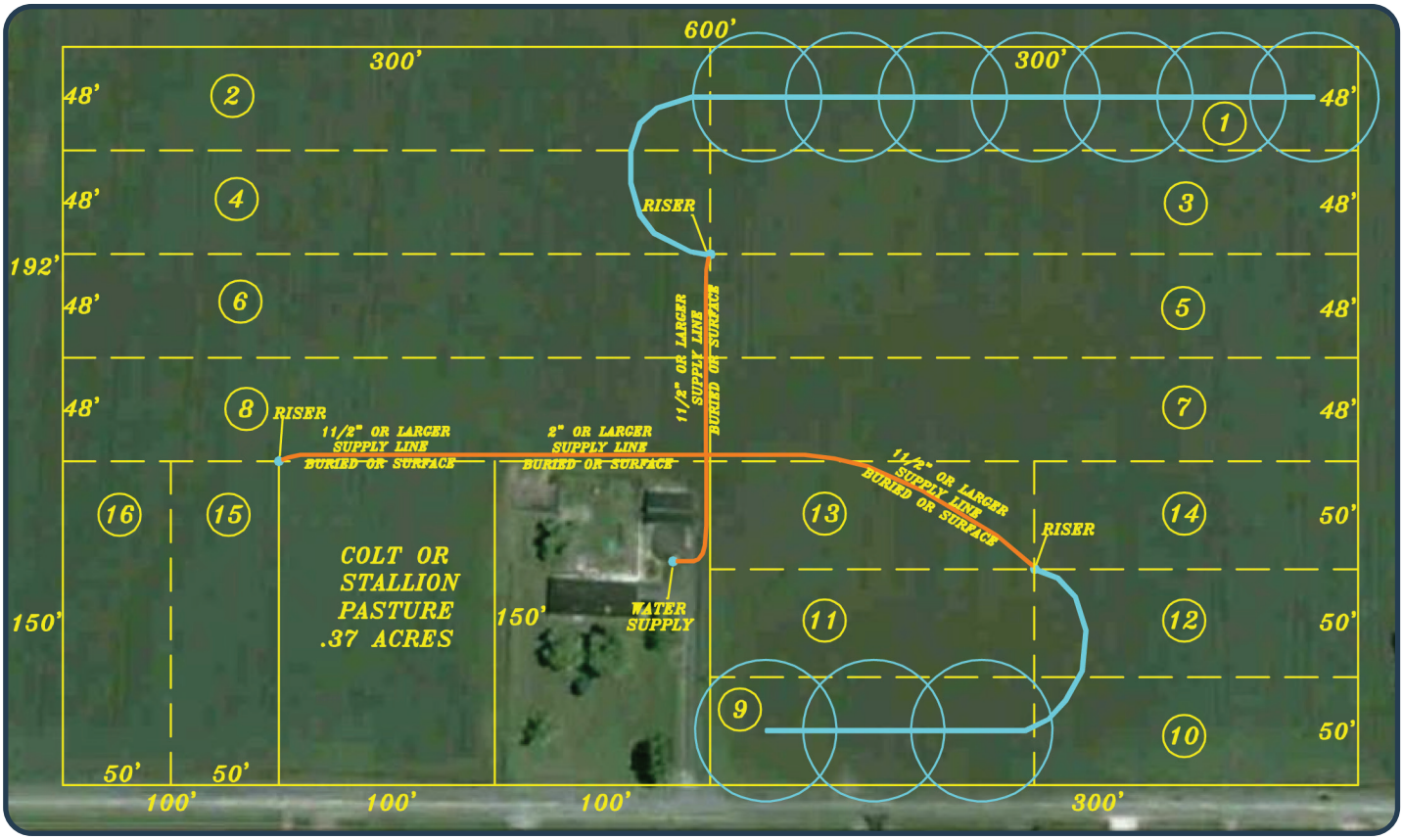
Notes

Both K-Line sprinkler pod lines are operating at the same time.

By dividing the total parts from 2 K-Line 5 Pod / 2 Acre Kits into a 6 sprinkler pod line and a 4 sprinkler pod line and then operating both K-Lines at the same time, a little over 4 acres can be irrigated, applying about 3 inches of water per set. This is designed for an 8 day rotation.

Sample Design 6: Two K-Line 5 Pod / 2 Acre Kits Combined

Shifting once per day



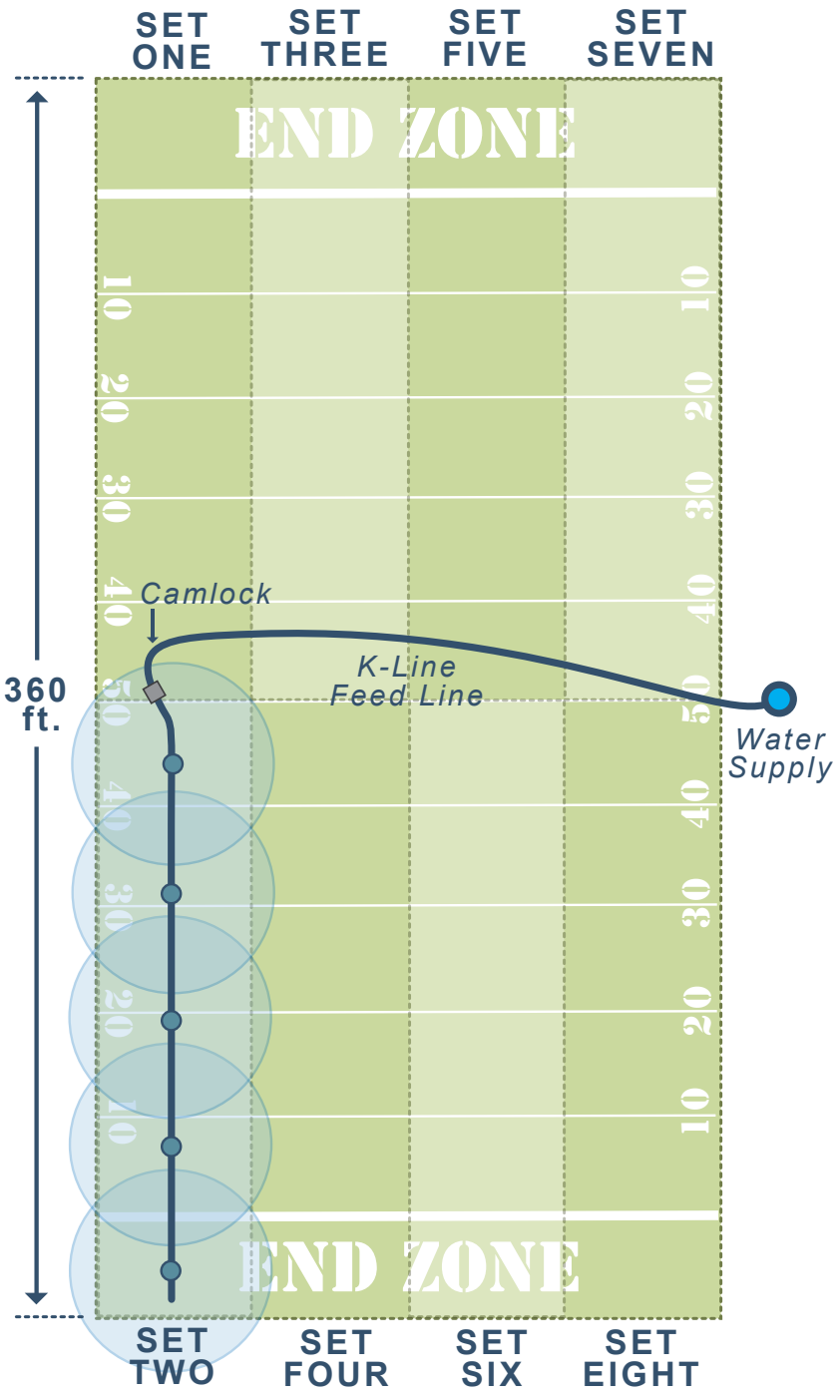
Design Specifications

	Sets 1-8	Sets 9-16	Totals
Size of total area to be irrigated	2.64 Acres	1.38 Acres	4.02 Acres
Number of sets or watering days required	8 days	8 days	8 days
Distance between sprinkler pods	43 ft.	50 ft.	
Set widths	48 ft.	50 ft.	
Sprinkler nozzle color and size	Orange 7/64"	Red .118"	Red/Orange
Operating pressure available	45 psi	45 psi	45 psi
Sprinkler application rate in inches per hour	0.114 in/hr	0.11 in/hr	0.11 in/hr
Length of watering time per set	24 hours	24 hours	24 hours
Total amount of irrigation water applied during each set period	2.72 inches	2.64 inches	2.7 inches
System capability in inches per week applied			2.38
Number of sprinkler pods per K-Line	7	3	10
Output per sprinkler	2.44 gal/min	2.81 gal/min	
Total gallons per minute of water needed for this area	17.1 gpm	8.5 gpm	27 gpm

Notes

This layout can be best irrigated with 2 separate K-Line sprinkler pod lines. One line has 7 pods and the other has 3 pods. Because the shift width and pod spacing is different for each K-Line, using a red nozzle in one and an orange nozzle in the other will equalize the water application rate.

Sample Design 7: K-Line Irrigation for your Athletic Field



This design can be used for football or soccer fields and consists of a 5 pod system with 8 sets or shifts.

The pods are spaced at 36' intervals, but spacing can be increased up to appproximately 50' to accommodate your field. The Set or Shift widths are 40' wide but can be increased to approximately 50' as required.

When water is applied at 45 psi with a NAAN 5022 sprinkler with a black 5/32" nozzle, the application rate is approximately 0.3" per hour. In this design, your total water requirement is 24 gallons per minute.

Another shifting alternative is that the operator can either move the line every hour through the course of an 8 hour day, or every 2 hours over the course of 2 days.

Application amounts can be altered using different nozzle sizes and/or by adjusting watering time.