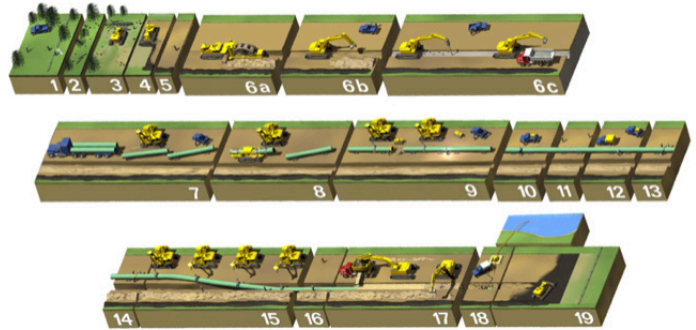


## THE PIPELINE CONSTRUCTION PROCESS

Planning for a pipeline projects begins months and sometimes years before the actual construction process begins. Initial steps include determining demand, exploring every possible pipeline route, extensive environmental assessments on selected route, public and landowner consultation, and government permitting. Once all of these steps are complete, the construction activities can begin. Below you will find a detailed overview of the multi-phased pipeline construction process.



Pipeline Route Fig. 1

## STEPS FOR CONSTRUCTION

### 1. Surveying and staking

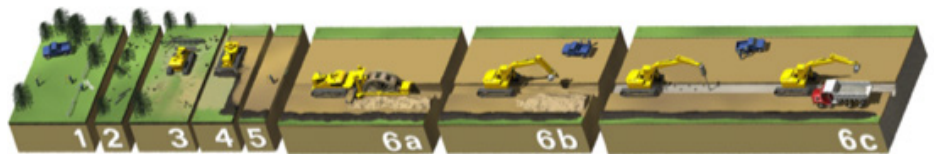
The survey crew carefully surveys the land and stakes the right-of-way (ROW) and all approved project work space and access roads to ensure that only the pre-approved construction workspace is cleared.

### 2. Clearing

The clearing crew is responsible for removing trees and debris from the construction ROW.

### 3. Front-end grading

The grading crew prepares a level and safe working surface for the heavy construction equipment that follows. This crew also installs silt fences along edges of streams and wetlands to prevent erosion of disturbed soil.



Pipeline Route Fig. 1.1

### 4. ROW topsoil stripping

If necessary, especially in agricultural areas, topsoil is separated from subsoil and stockpiled along the sides of the ROW.

### 5. Restaking trench centerline

The survey crew stakes the center line of the trench.

### 6a-c. Trenching

The trenching crew uses a wheel trencher, backhoe or rock trencher to dig the pipe trench. The U.S. Department of Transportation requires the top of the pipe to be buried a minimum of 30 inches below the ground surface in rural areas. The pipe is buried deeper in agricultural areas and at stream and road crossings.

## STEPS FOR CONSTRUCTION, *CONT.*



*Pipeline Route Fig. 1.2*

### 7. Stringing pipe

At steel rolling mills, where the pipe is fabricated, pipeline representatives carefully inspect new pipe to make sure it meets industry and government safety standards. The pipe is transported to a pipe storage yard near the project location. A stringing crew using specialized trailers moves the pipe to the ROW.

### 8. Field bending of pipe

A bending machine uses a series of clamps and hydraulic pressure to make very smooth, controlled bends in the pipe. Pipes are bent to account for changes in the route and to conform to the topography. All bending is performed

in accordance with federally prescribed standards to ensure integrity of the bend.

### 9. Line-up, initial weld

The pipe crew and welding crew weld the various sections of pipe together into one continuous length. The pipe crew uses special pipeline equipment to pick up each joint of pipe, align it with the previous joint, and make the first pass of the weld.

### 10. Fill and cap, final weld

The welding crew follows the pipe crew, completing each weld. This process follows all government welding regulations.

### 11. As-built footage

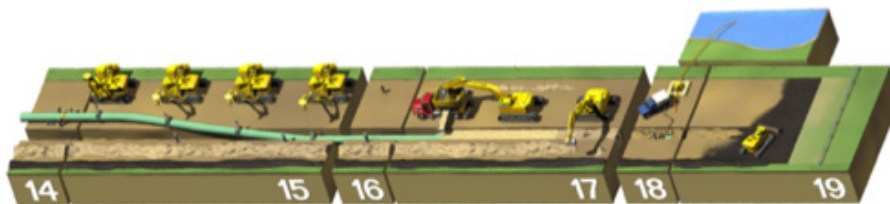
The survey crew records data regarding the length of the assembled pipeline.

### 12. X-ray inspection, weld repair

For quality assurance, technicians inspect all welds using X-ray technology to verify weld integrity.

### 13. Coating field welds

At the manufacturing mill, the majority of the pipe is coated to protect the pipeline from potential external damage. A small section of each pipe end is left uncoated to help with the welding process. The coating is applied to these areas once the welding is complete and X-ray inspection is verified.



*Pipeline Route Fig. 1.3*

### 14. Inspection & repair of coating

The pipe coating and welds are inspected one final time before being lowered into the trench.

### 15. Lowering pipe into trench

Operators lift the pipe and lower the welded sections into the trench.

### 16. As-built survey

The survey crew records the location and depth of cover of the pipeline after it is placed in the trench.

### 17. Pad, backfill, rough grade

Soil is returned to the trench in reverse order and the ROW is graded with the subsoil replaced first, followed by the topsoil.

### 18. Hydrostatic testing, final tie-in

Before the pipeline is put into service, the entire length is pressure tested using water. Each section is filled with water and pressured well beyond the maximum operating pressure, to ensure no leaks are present and that the pipeline meets all strength requirements.

### 19. Replace topsoil, cleanup, restore

The final step in the process is restoring the land as closely as possible to its original condition and all signage is installed.