

GRAIN BELT EXPRESS

CLEAN LINE

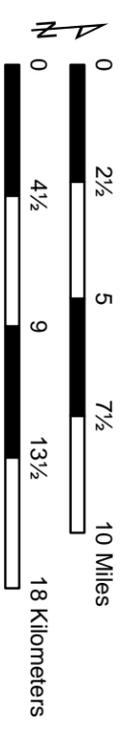
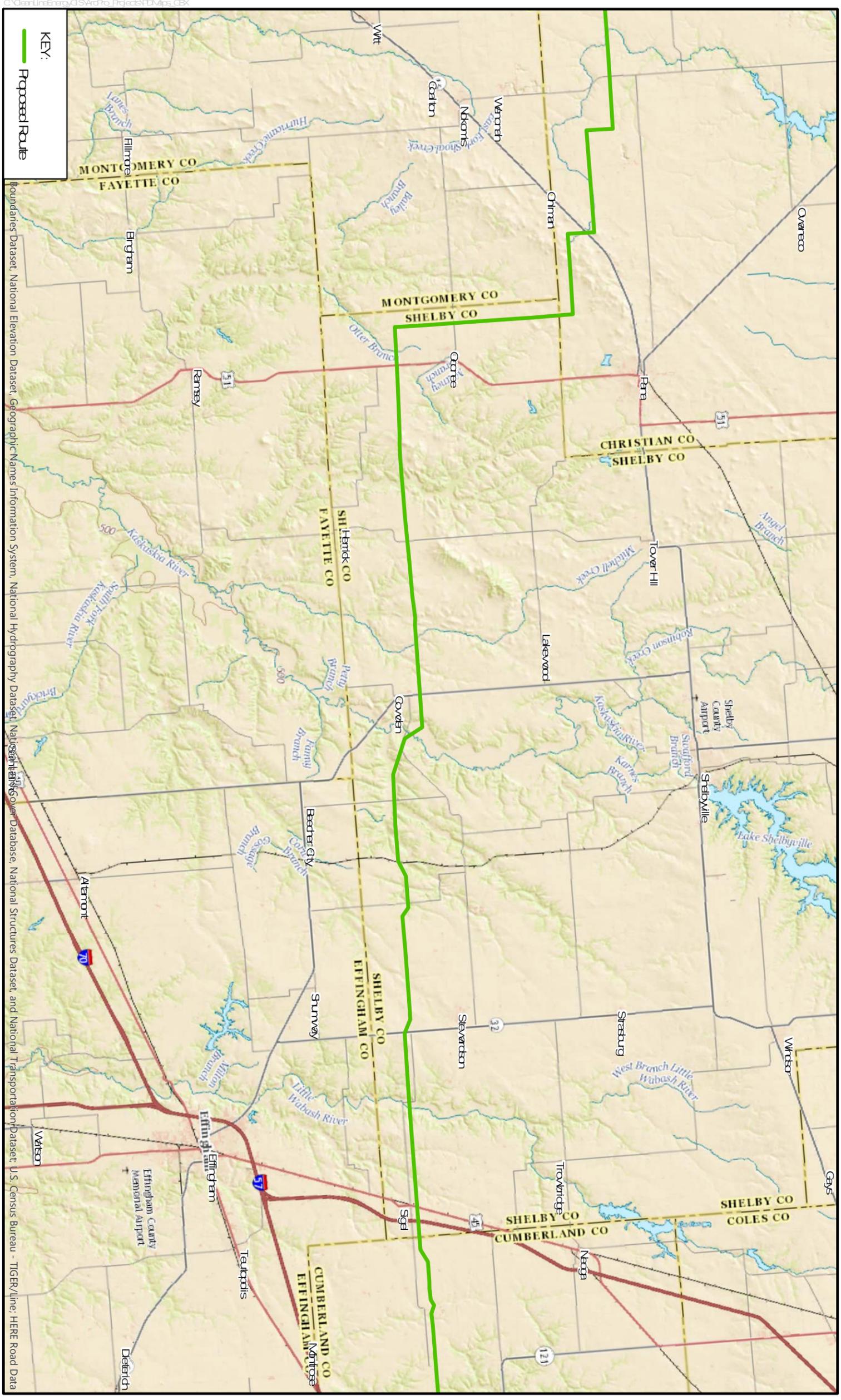


Figure 2-5
 Project Overview Map Book
 Grain Belt Express Clean Line
 Kansas, Missouri, Illinois and Indiana

GRAIN BELT EXPRESS CLEAN LINE

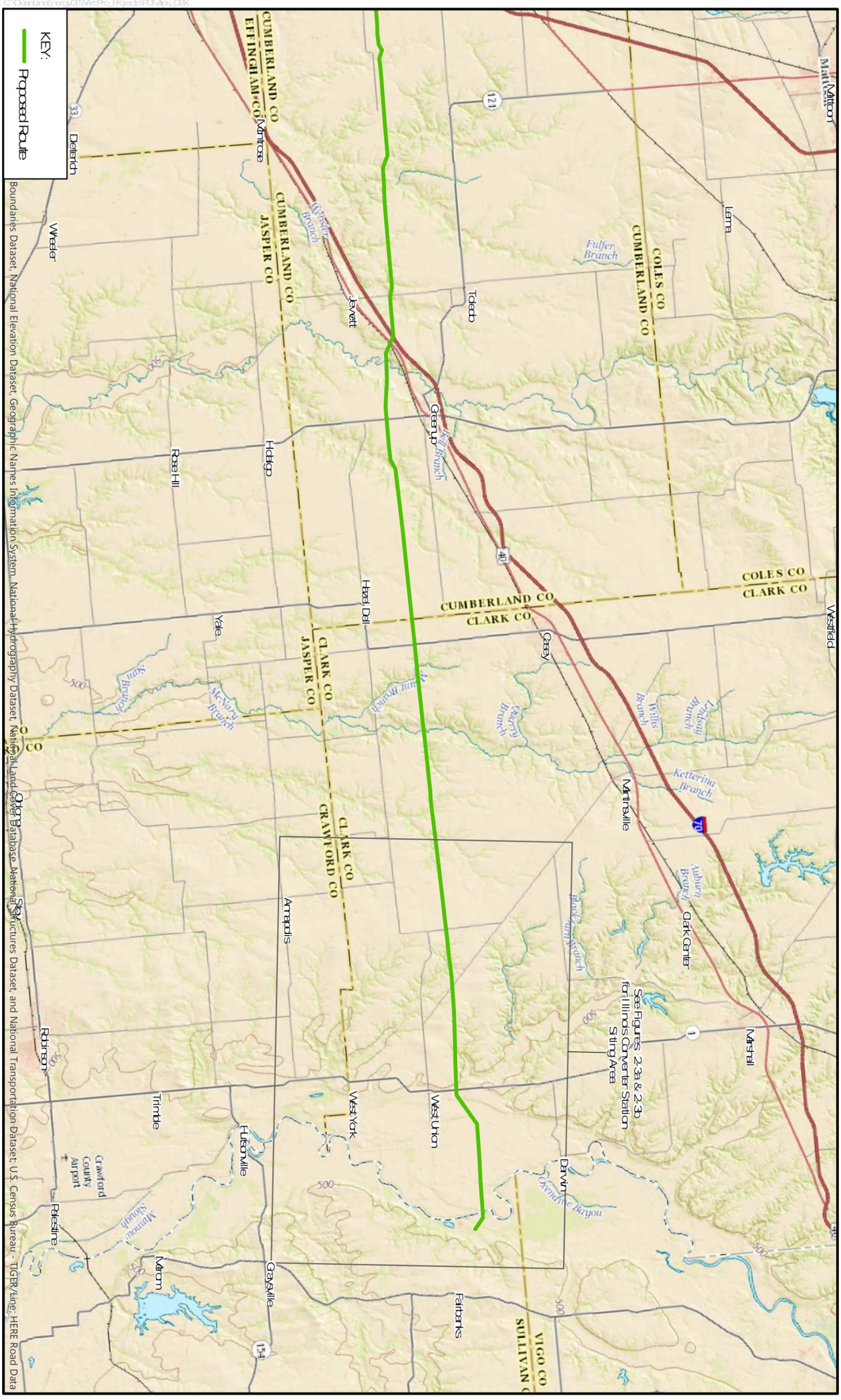


Figure 2-5
Project Overview Map Book
Grain Belt Express Clean Line
Kansas, Missouri, Illinois and Indiana

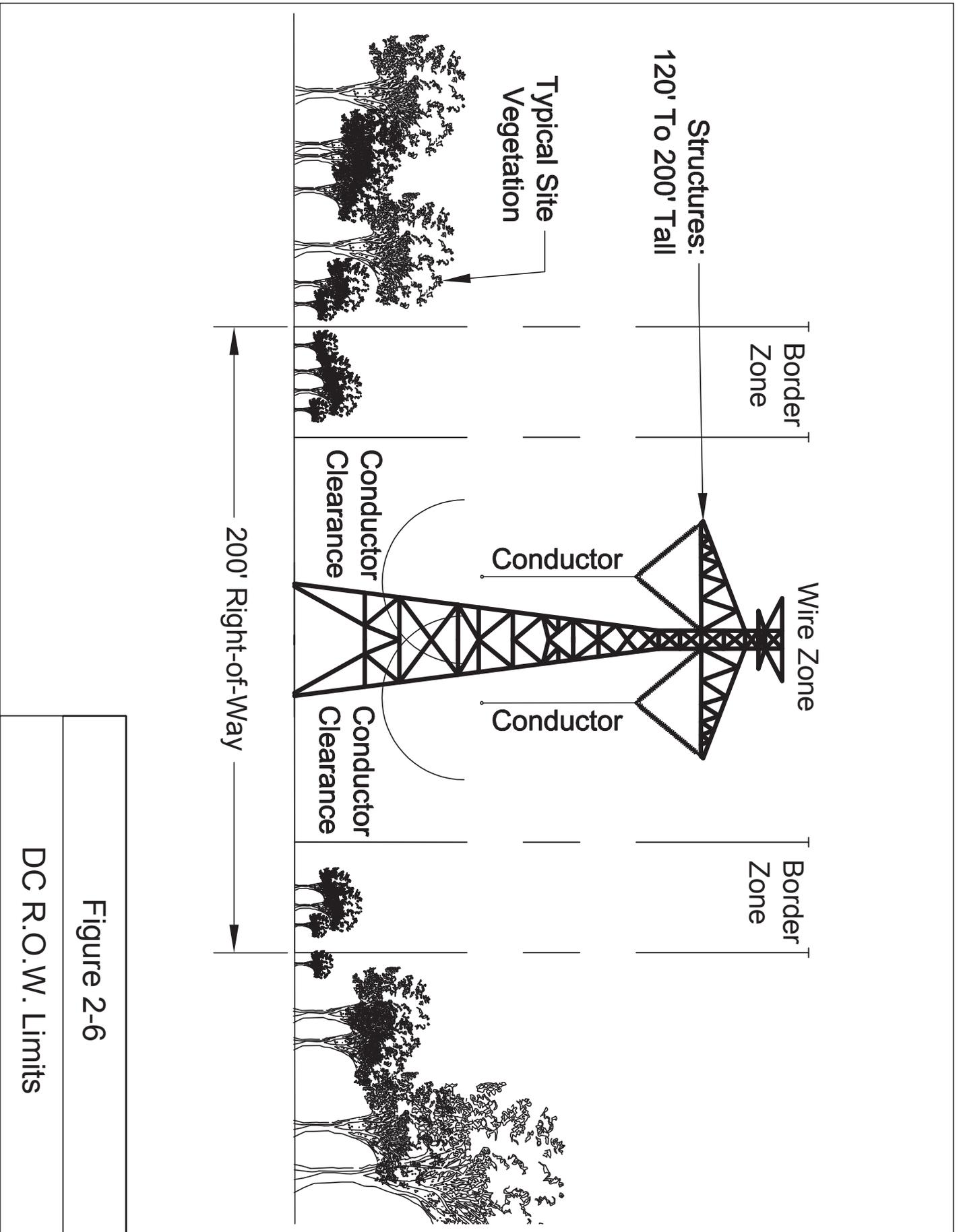


Figure 2-6

DC R.O.W. Limits

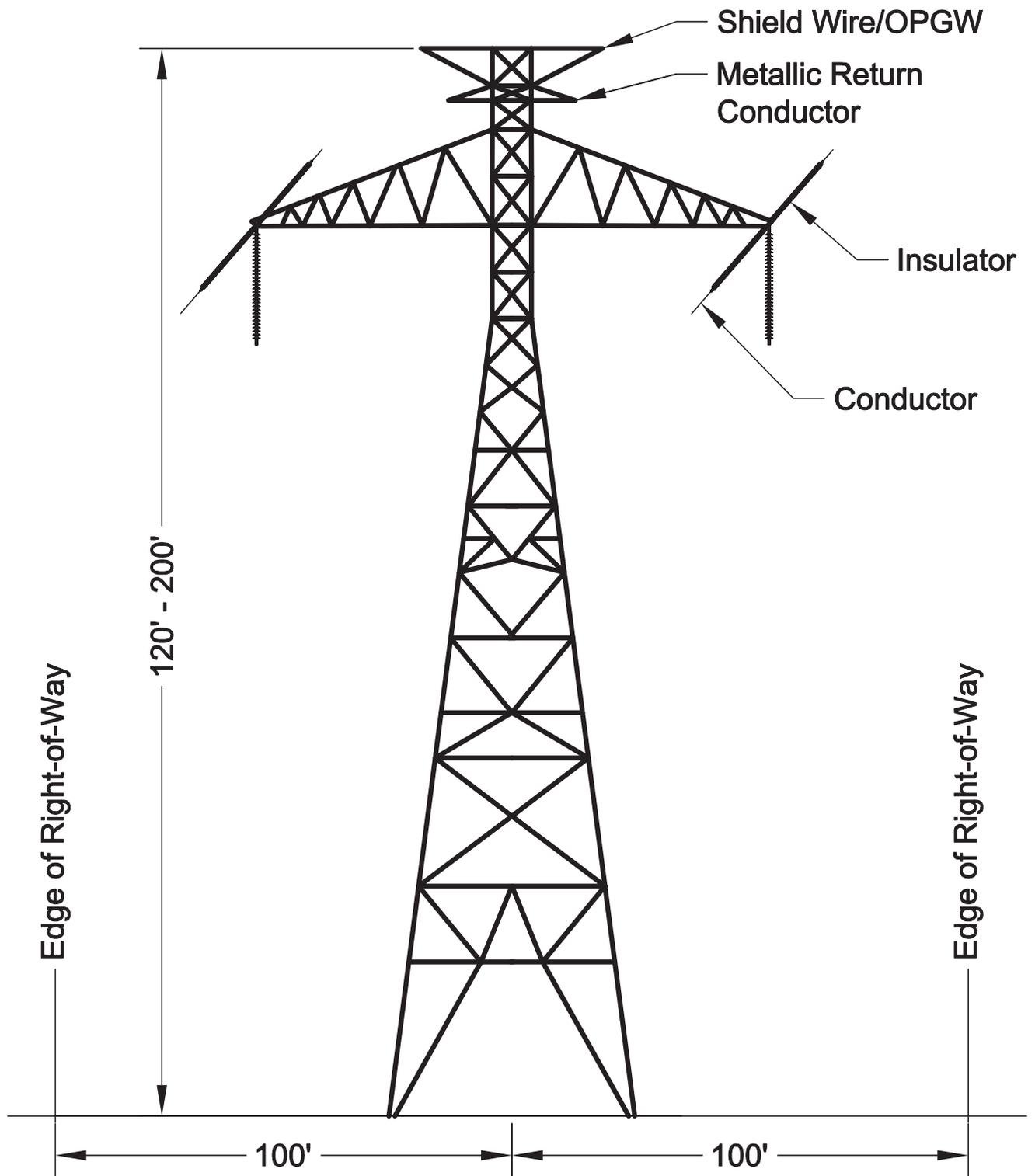


Figure 2-7a

600kV Lattice Deadend

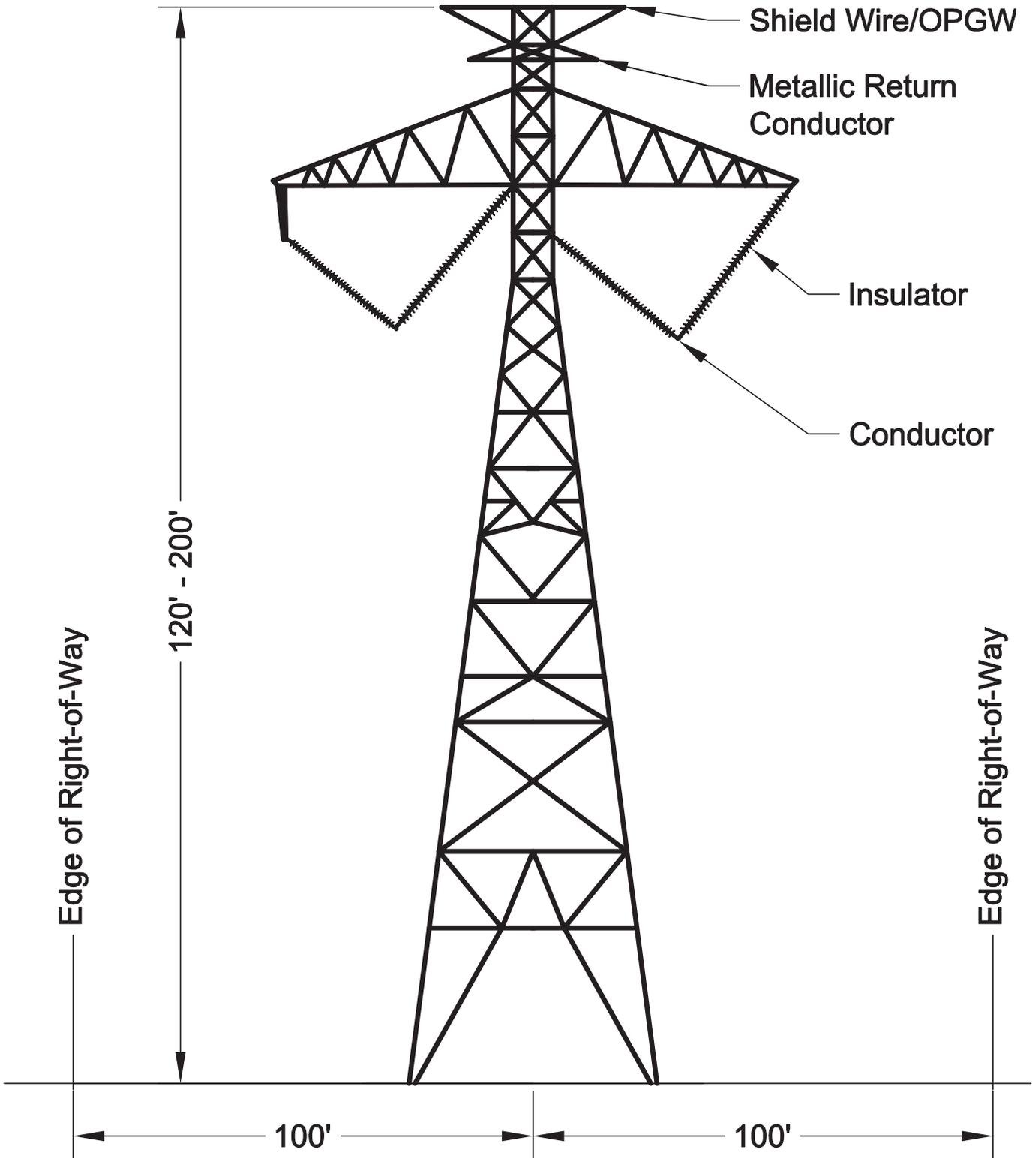


Figure 2-7b

600kV Lattice Running Angle

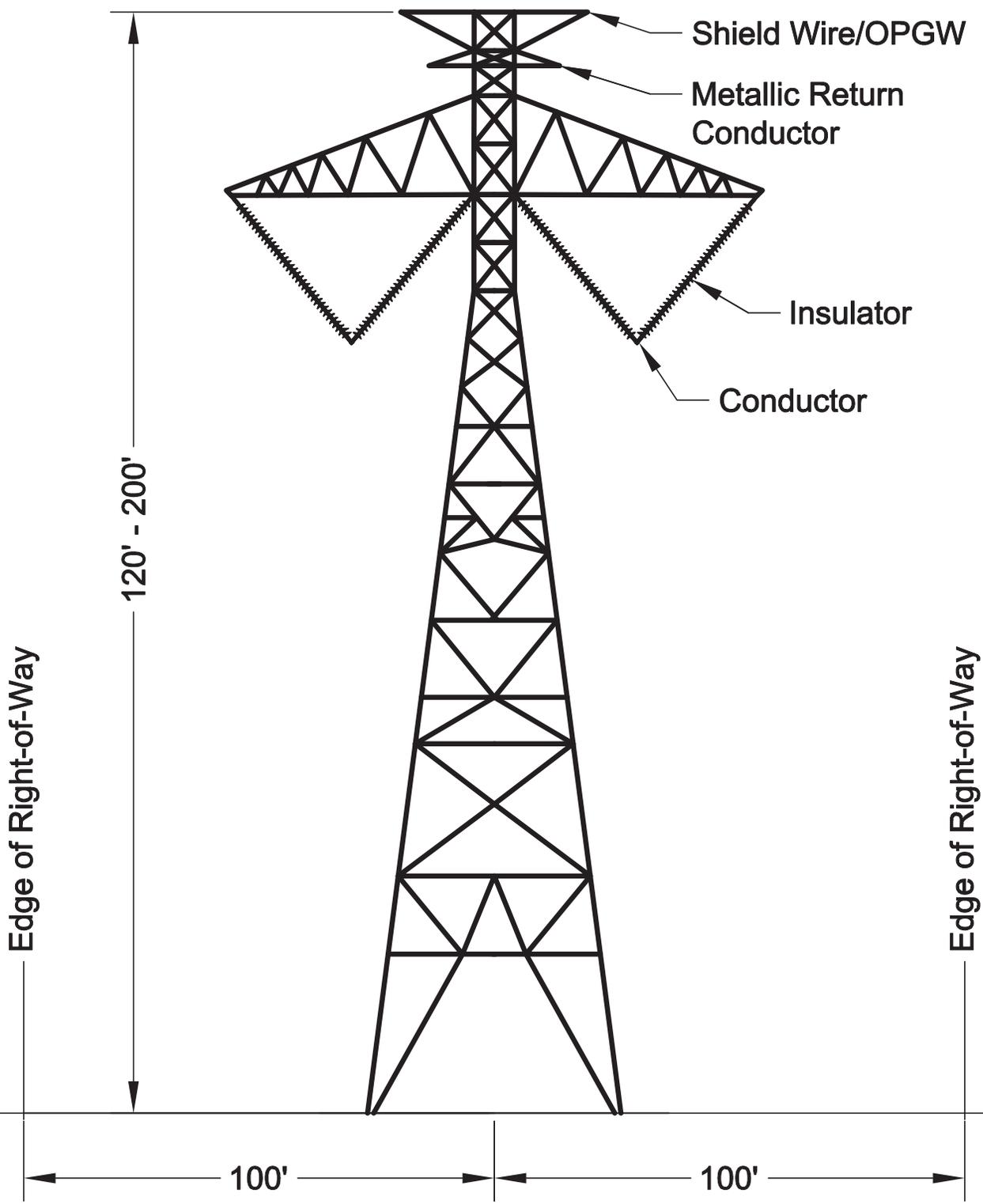
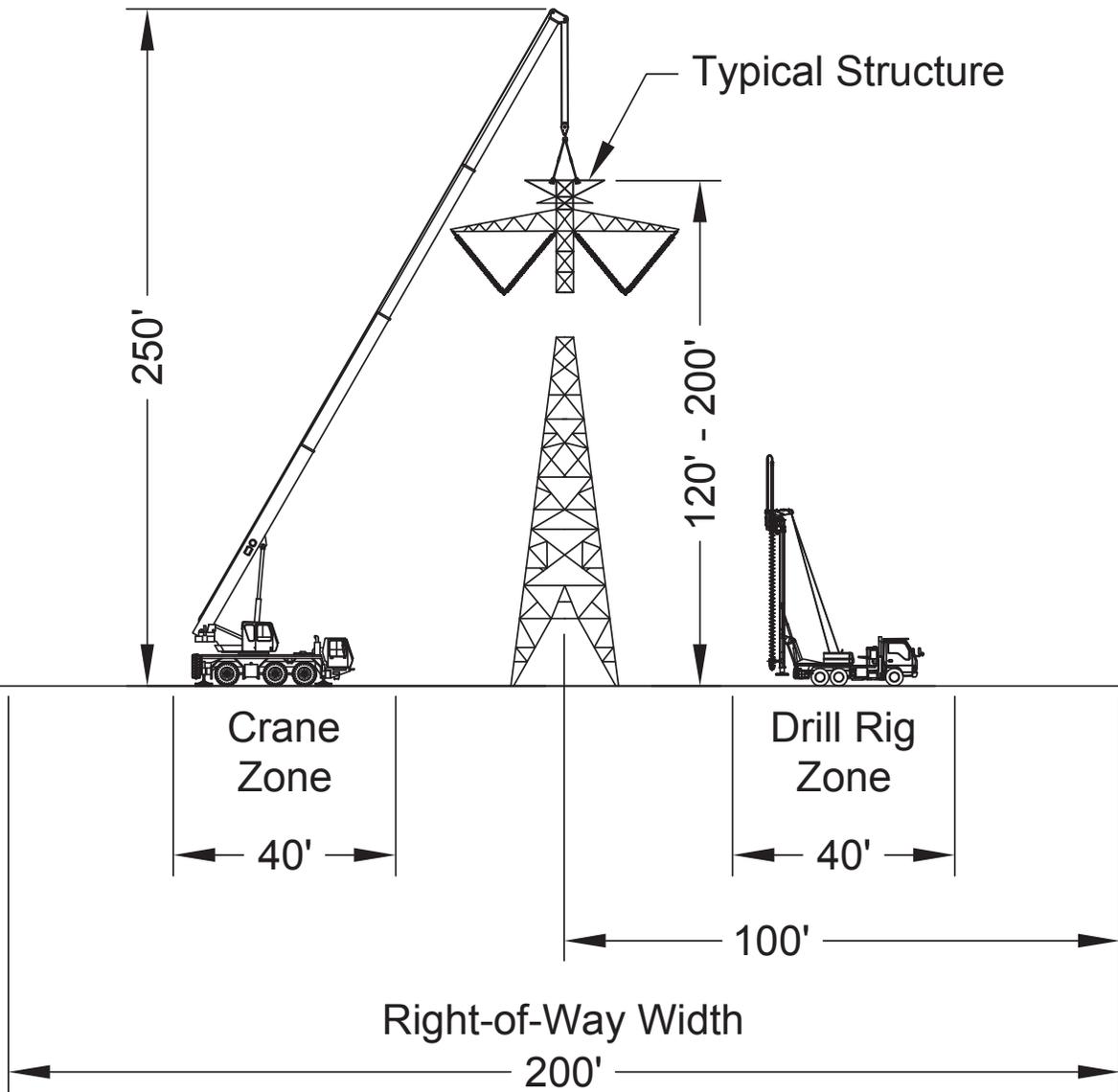


Figure 2-7c

600kV Lattice Tangent



Note: All Dimension Are
Typical

Figure 2-8

600kV DC Lattice Work Area

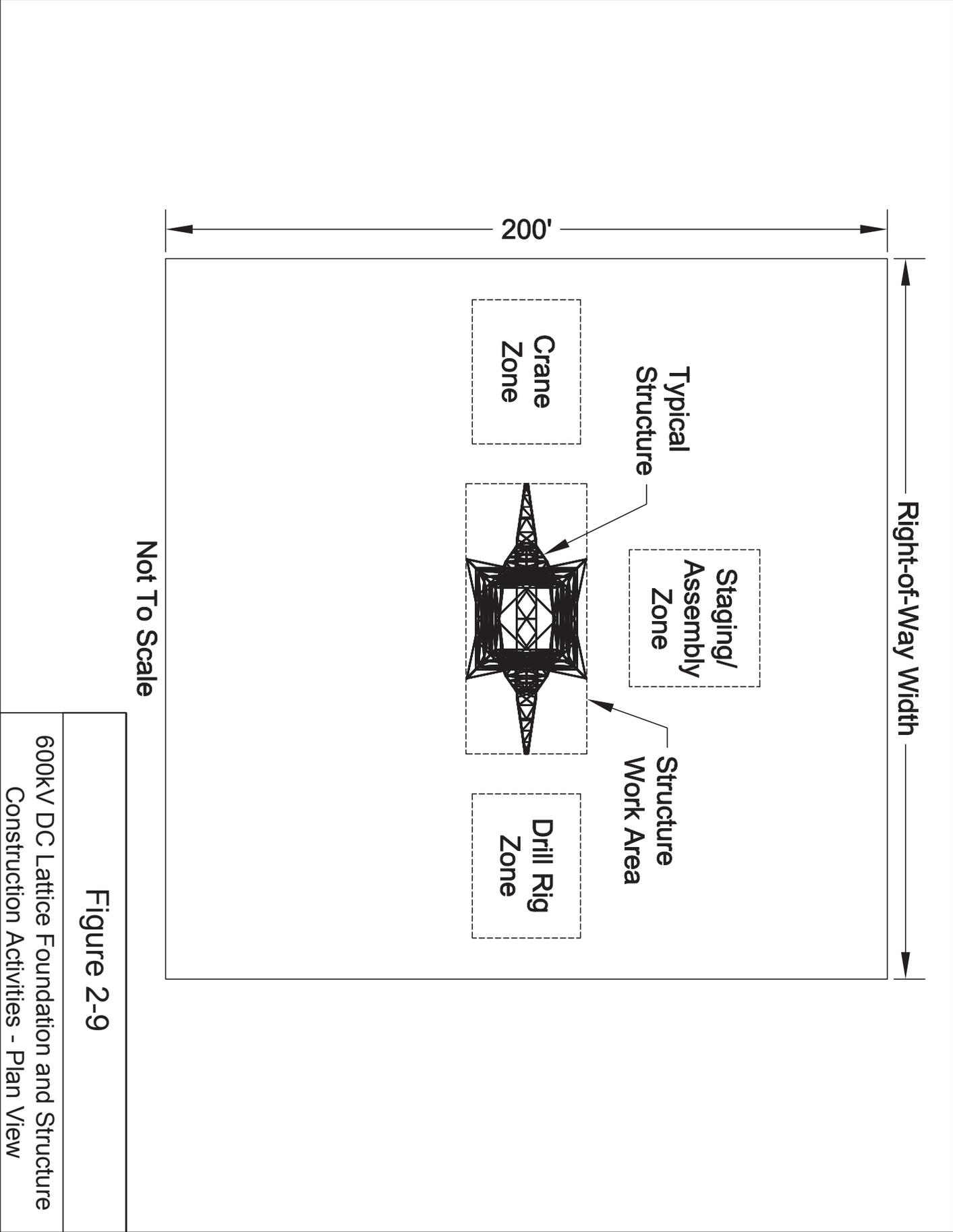


Figure 2-9

600kV DC Lattice Foundation and Structure
 Construction Activities - Plan View

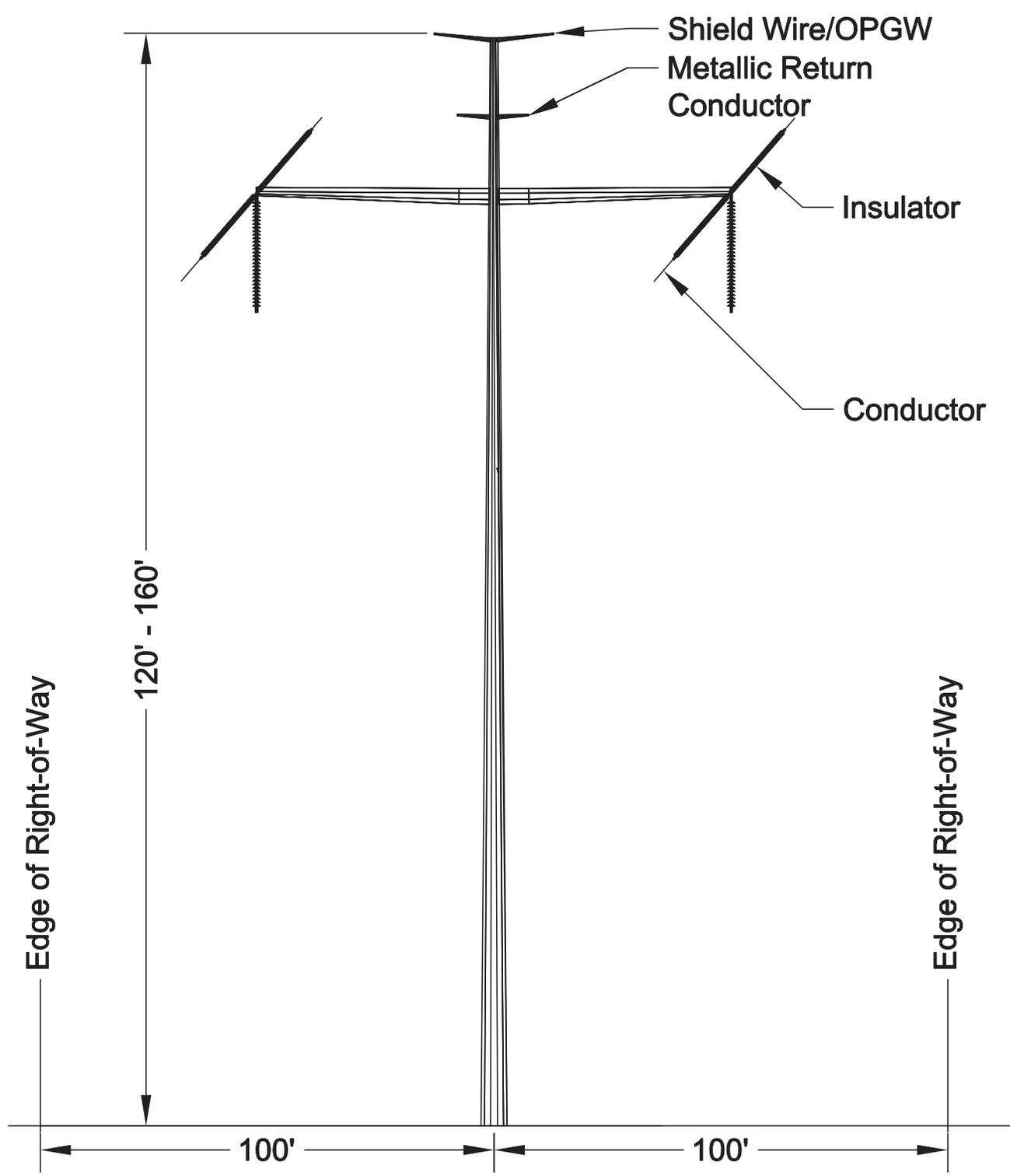


Figure 2-10a

600kV Monopole Deadend

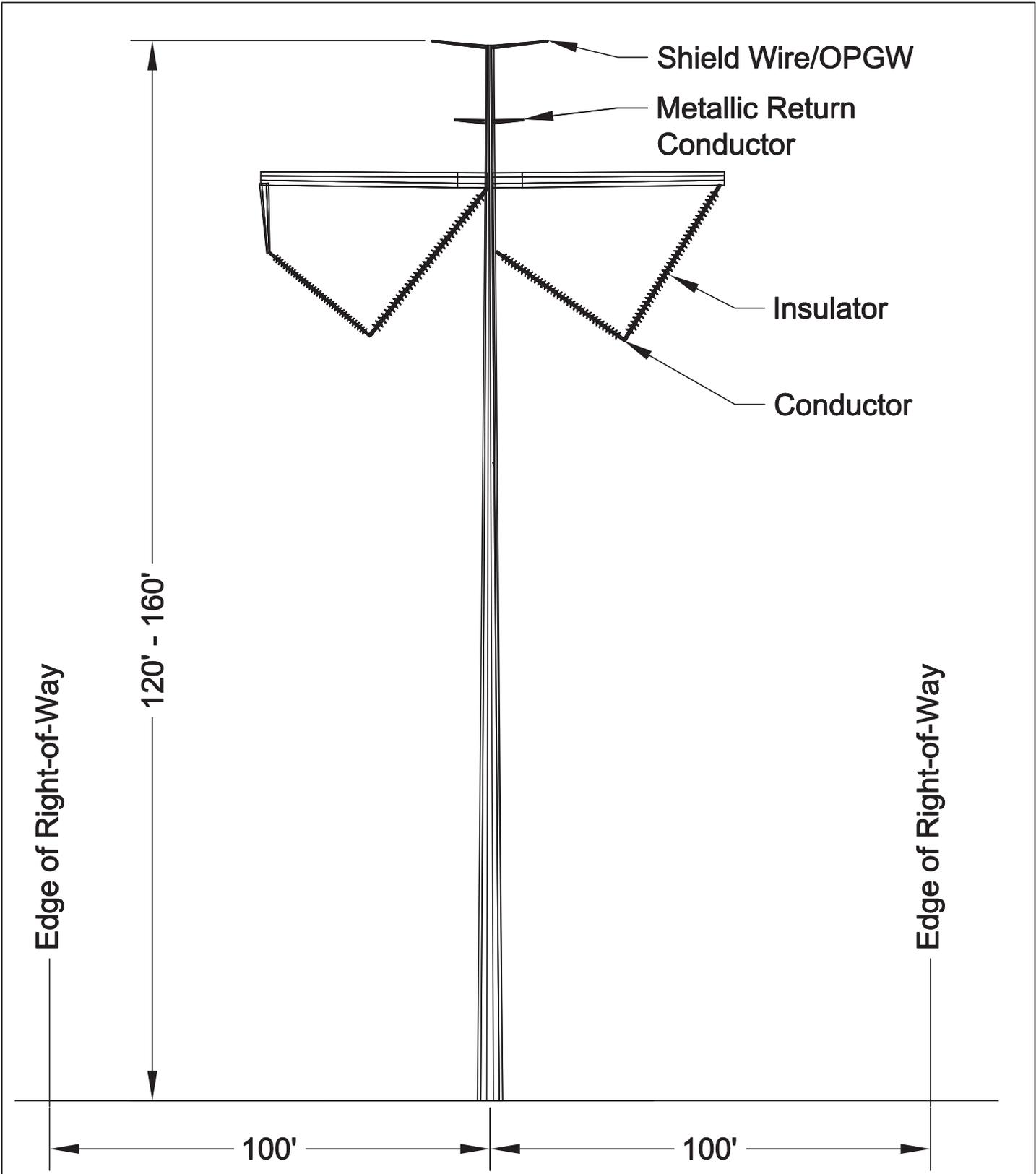


Figure 2-10b
 600kV Monopole Running Angle

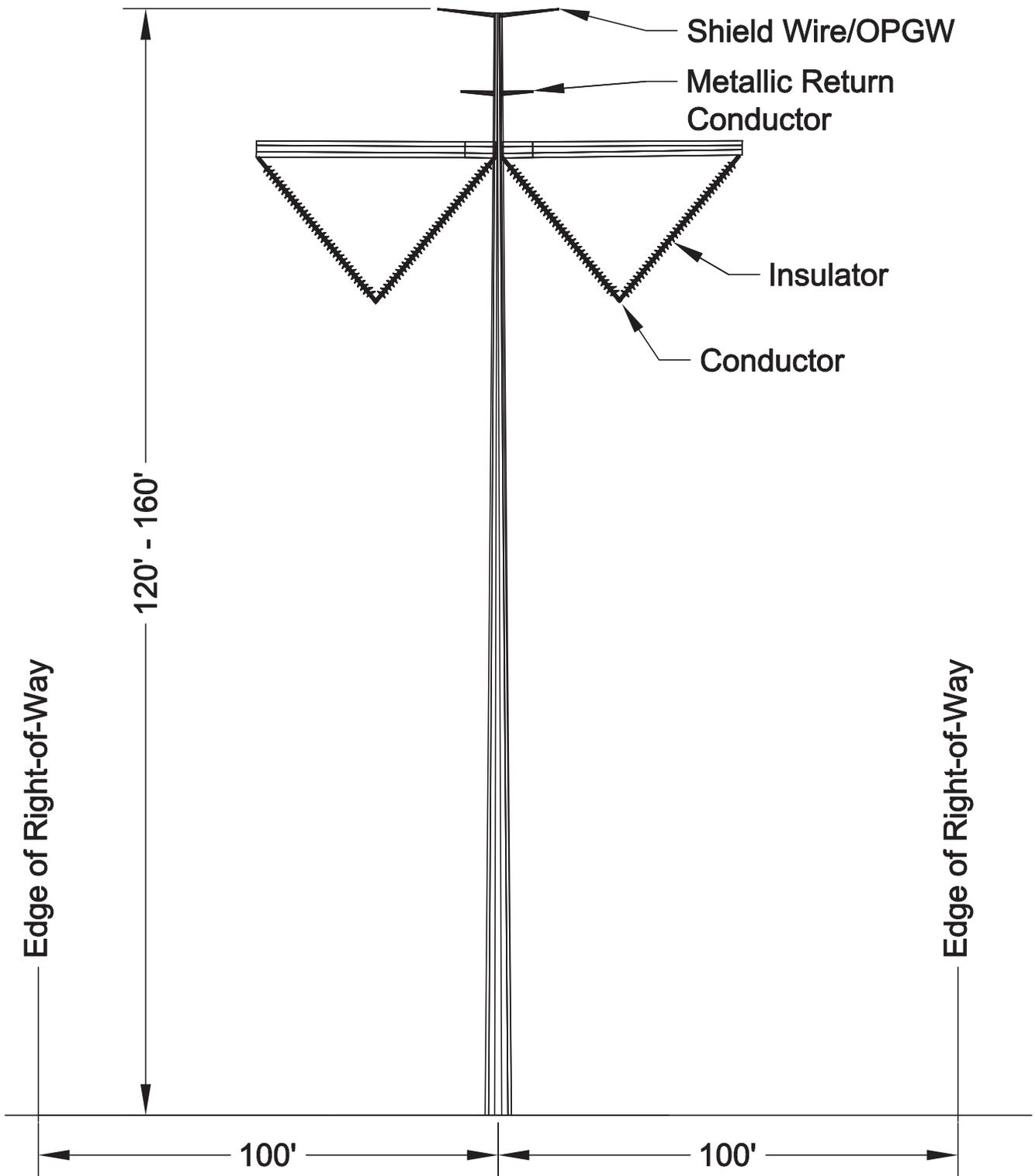


Figure 2-10c

600kV Monopole Tangent

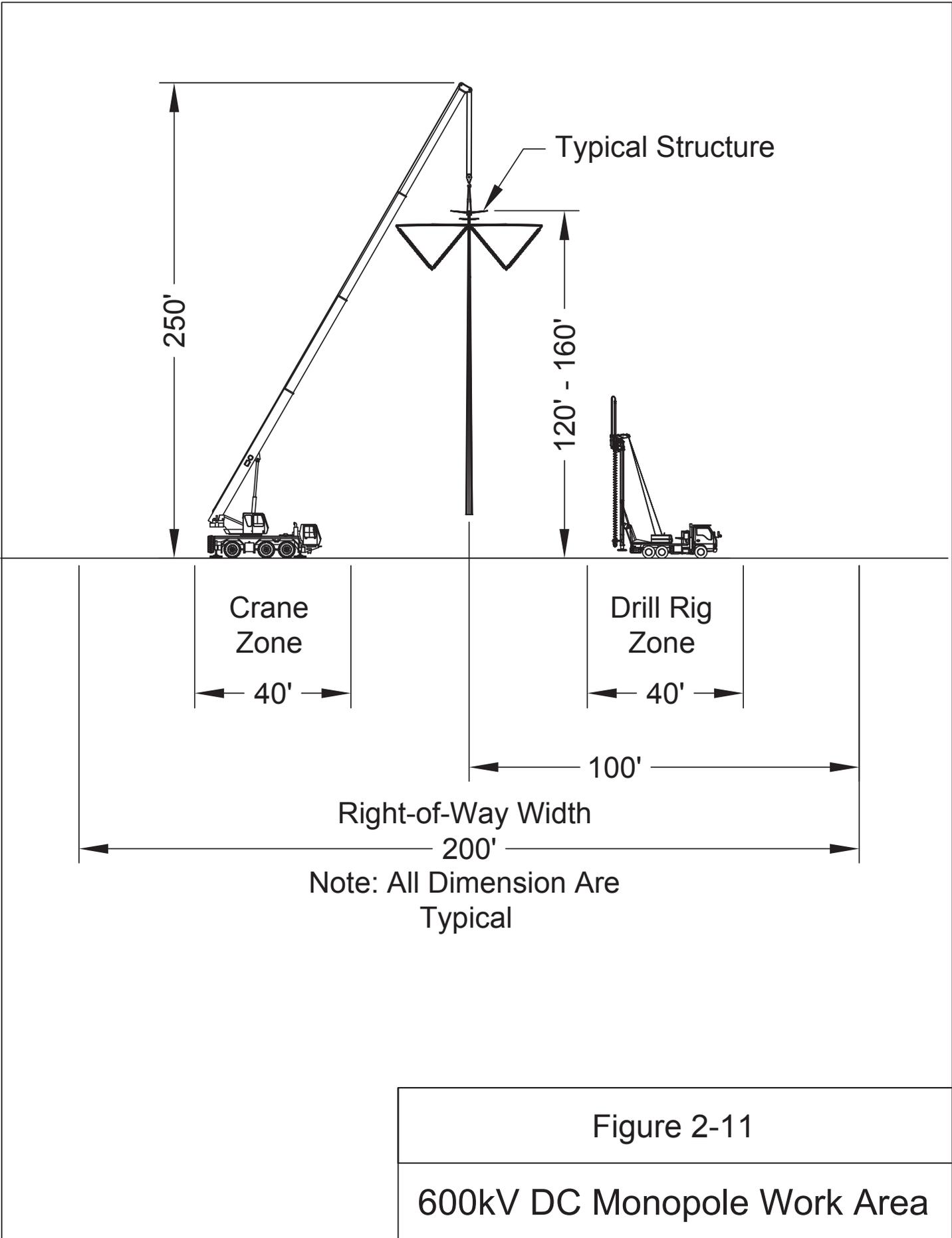


Figure 2-11

600kV DC Monopole Work Area

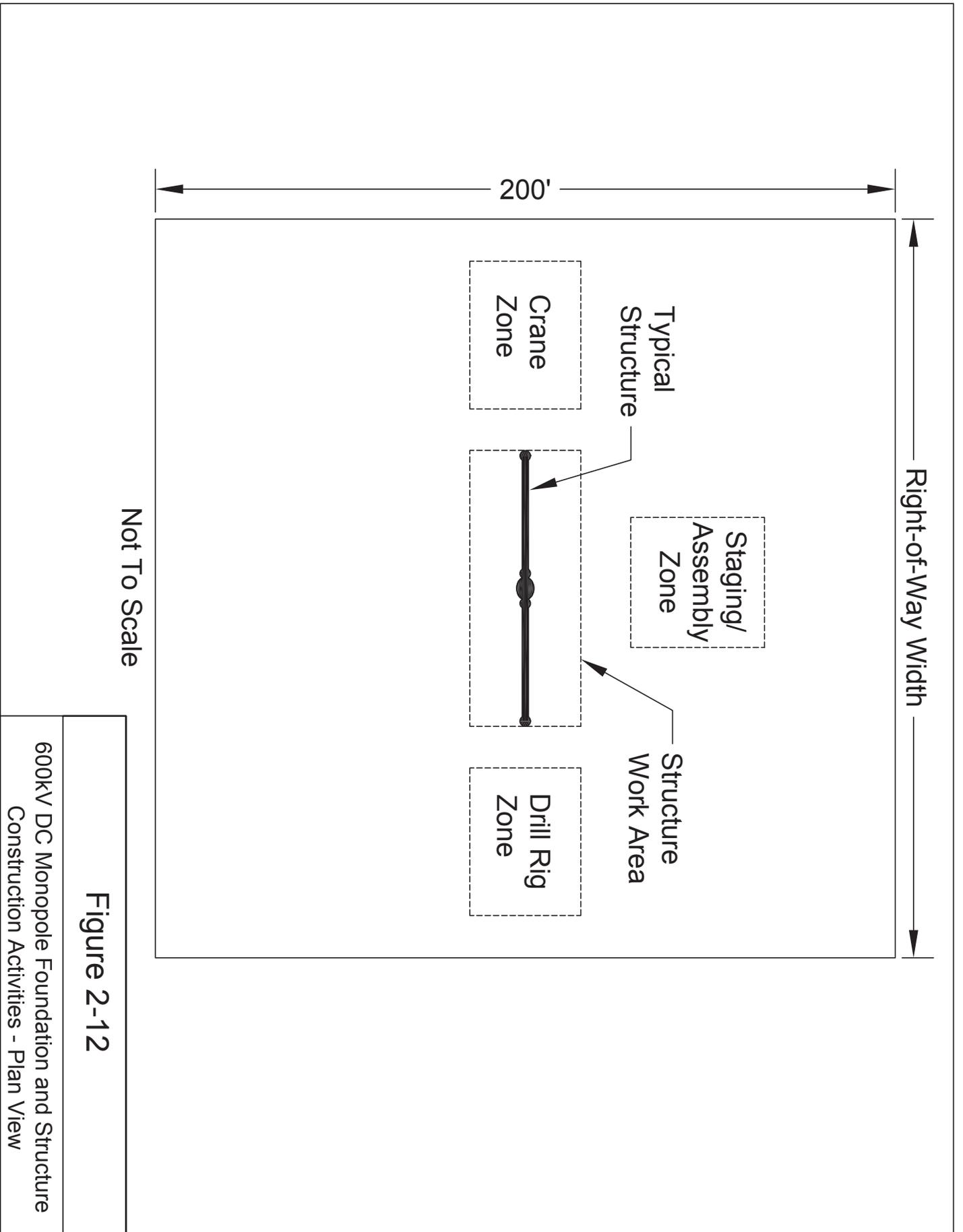
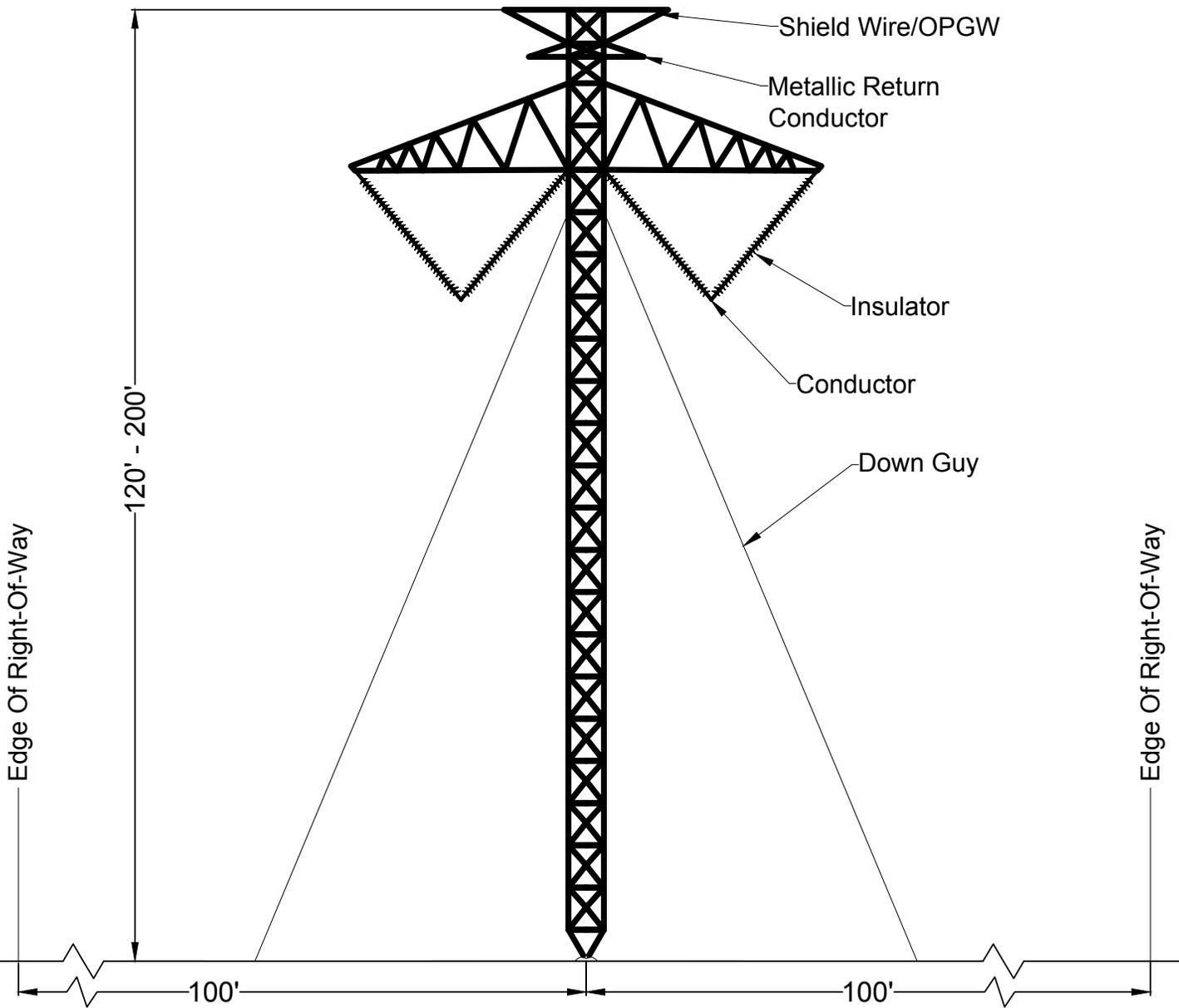
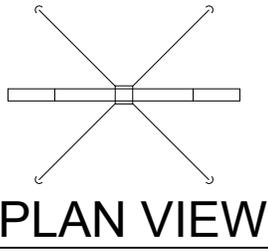


Figure 2-12

600kV DC Monopole Foundation and Structure
 Construction Activities - Plan View



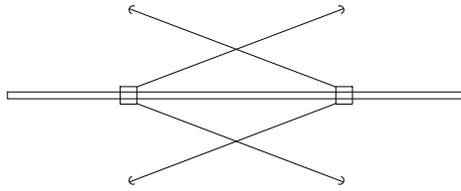
ELEVATION VIEW

NOT TO SCALE

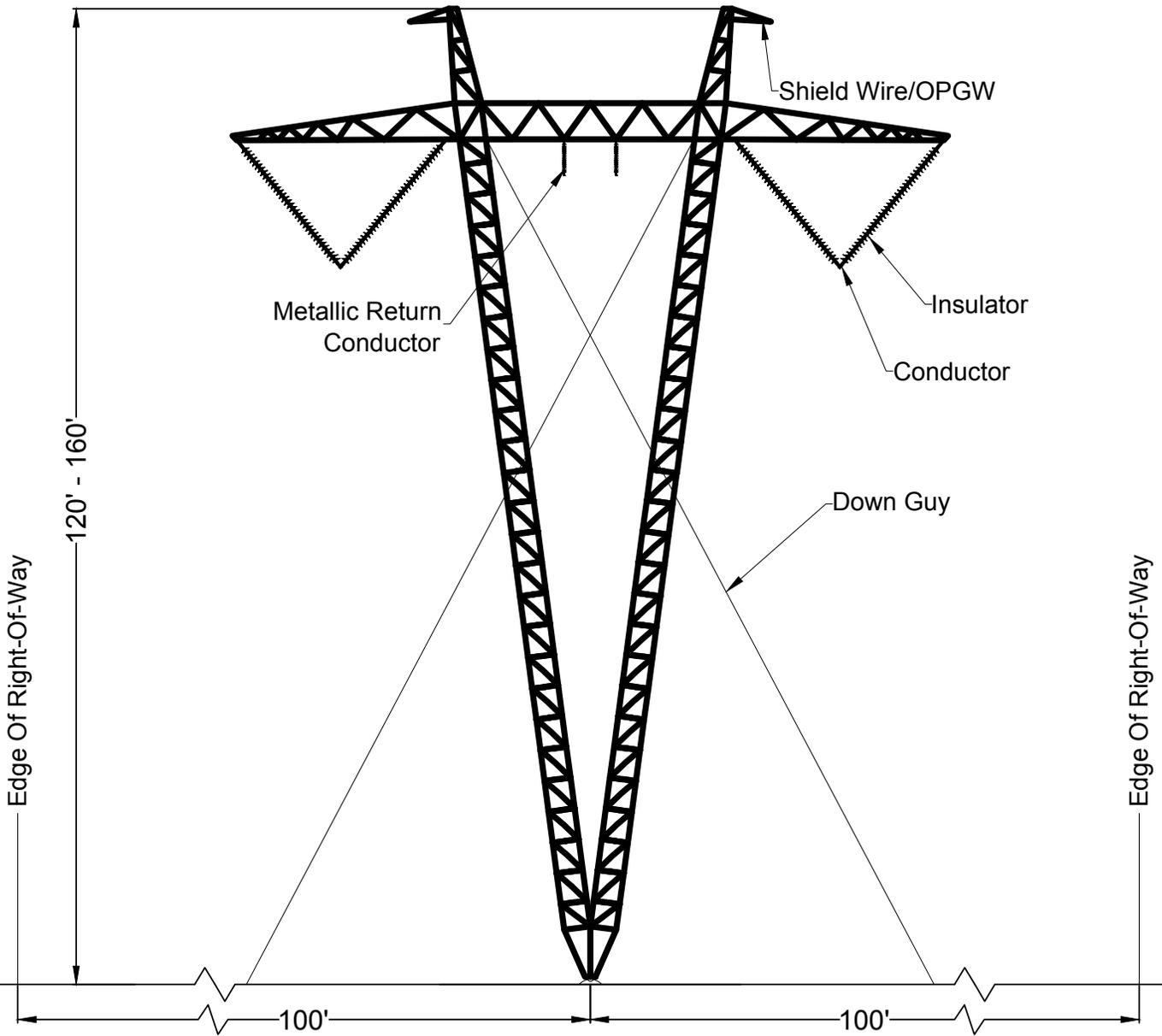
NOTE:
DEPENDING ON STRUCTURE HEIGHT AND LINE ANGLE, GUY
EASEMENTS MAY BE REQUIRED BEYOND THE PROJECT 200
FOOT RIGHT-OF-WAY.

Figure 2-13

600kV Guyed Mast Lattice Tangent



PLAN VIEW



ELEVATION VIEW

NOT TO SCALE

NOTE:
 DEPENDING ON STRUCTURE HEIGHT AND LINE ANGLE, GUY
 EASEMENTS MAY BE REQUIRED BEYOND THE PROJECT 200
 FOOT RIGHT-OF-WAY.

Figure 2-14

600kV Guyed V-Lattice Tangent

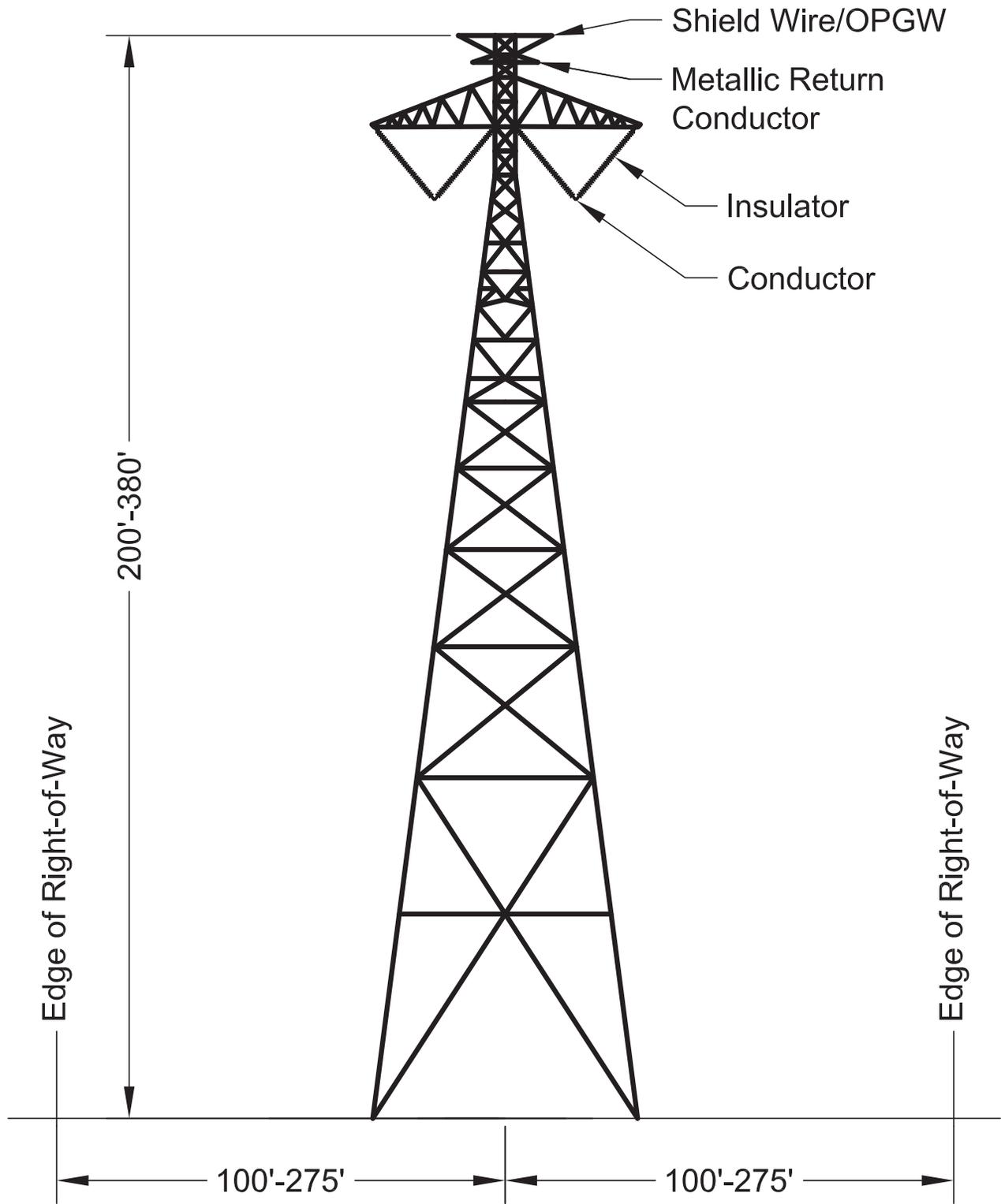
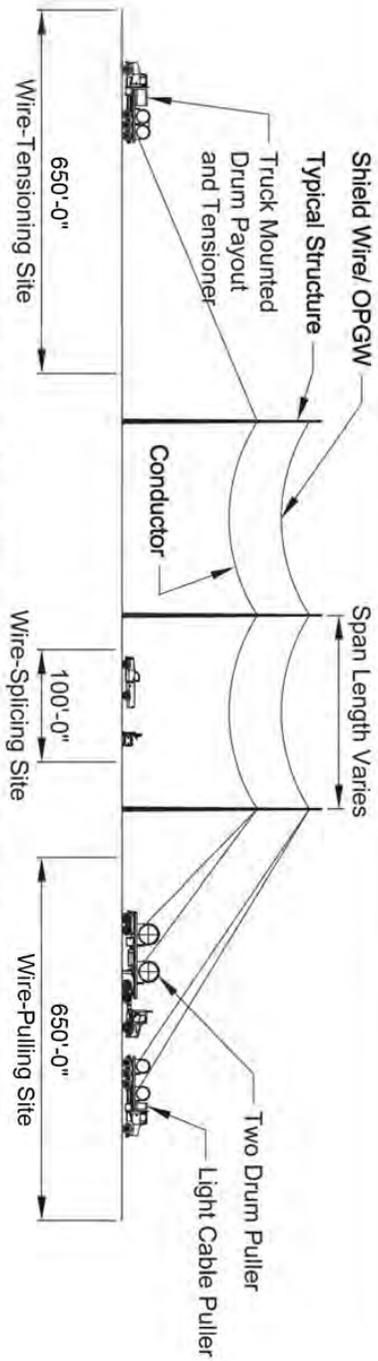
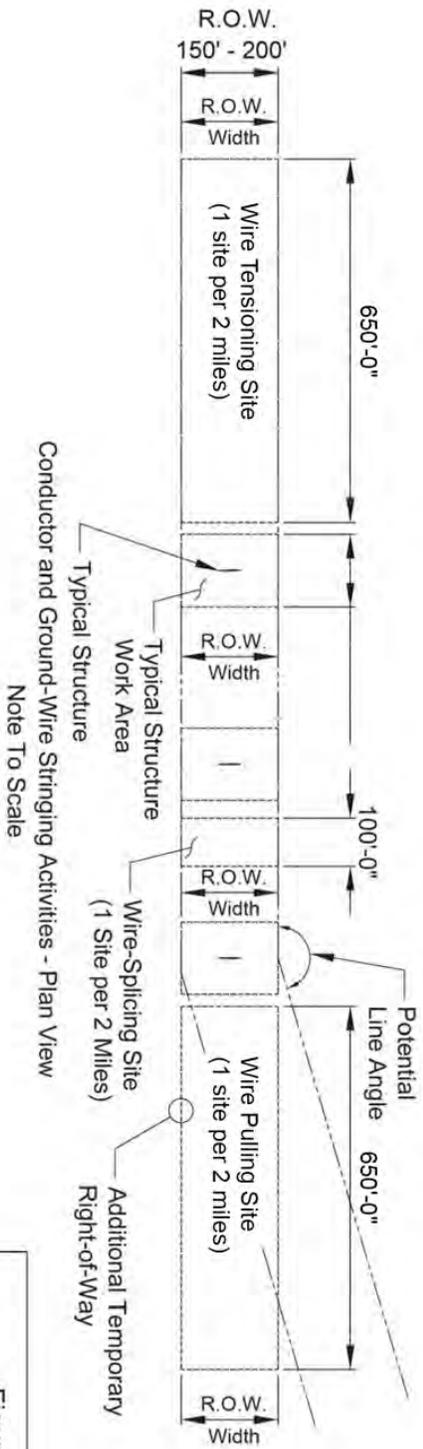


Figure 2-15

600kV Lattice Crossing Structure



Conductor and Ground-Wire Stringing Activities - Profile View
Not To Scale



Conductor and Ground-Wire Stringing Activities - Plan View
Note To Scale

Figure 2-16
Conductor and Ground-Wire Stringing Activities

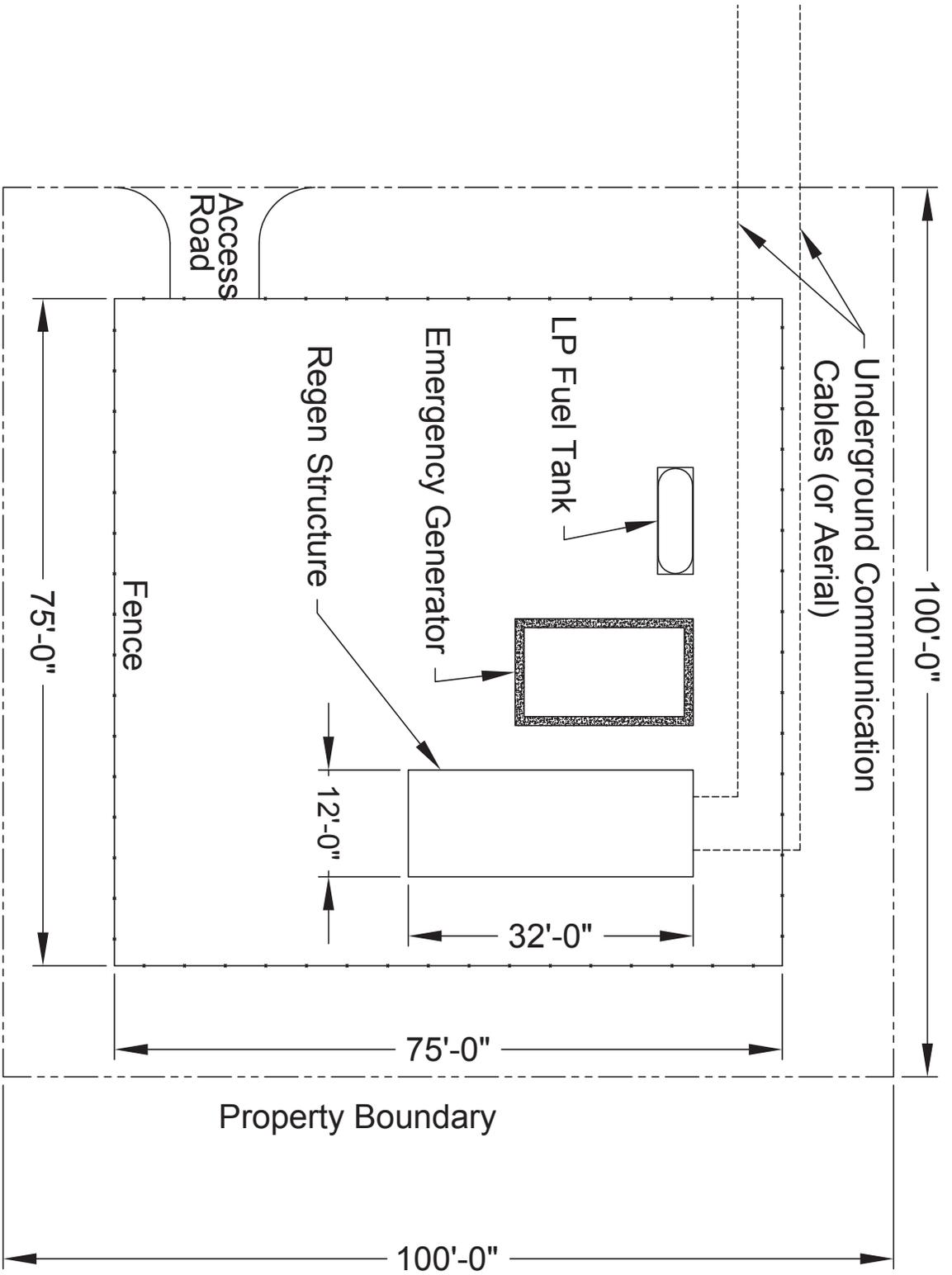
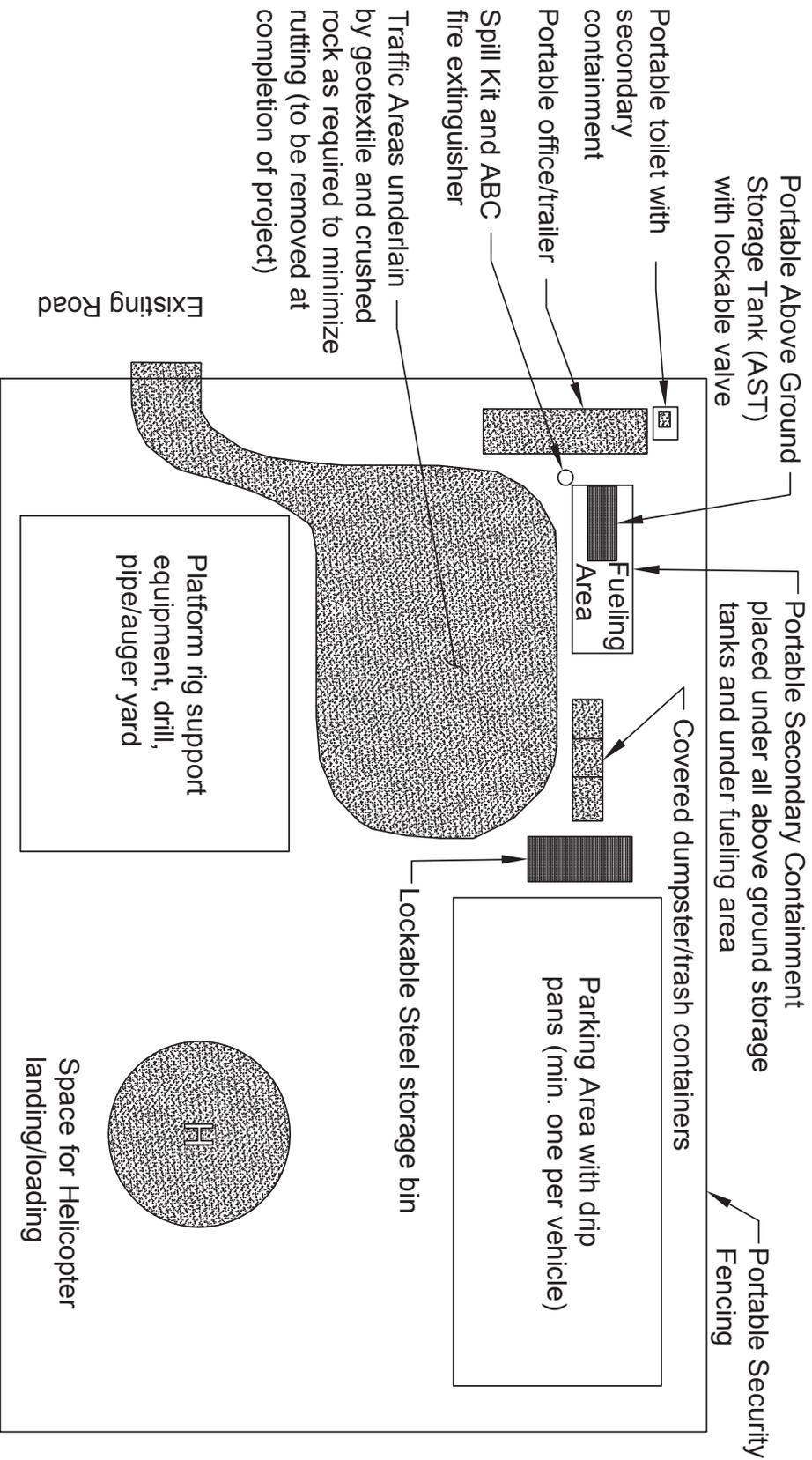


Figure 2-17

Regeneration Station Plan

Typical Multi-Use Construction Yard Schematic Plan (Not To Scale)



Notes:

- Individual, Multi-Use Areas may be arranged differently but all sites will typically include areas designated for field office, crew parking and sanitation, waste management, fueling area, material storage, and equipment storage.
- Fuel trucks, maintenance trucks and construction crews will be based in Multi-Use Areas.
- Vehicle wash stations may be located at multi use yards.
- Multi-Use Areas can also be used as fly yards (landing areas for helicopters) when needed for assembly and erection of tower sections prior to transport to final structure location.
- Staging areas will be reclaimed unless otherwise directed by landowner by removing all element from the site, raking, repairing ruts and seeding disturbed areas.

Figure 2-18

Multi-Use Construction Yard

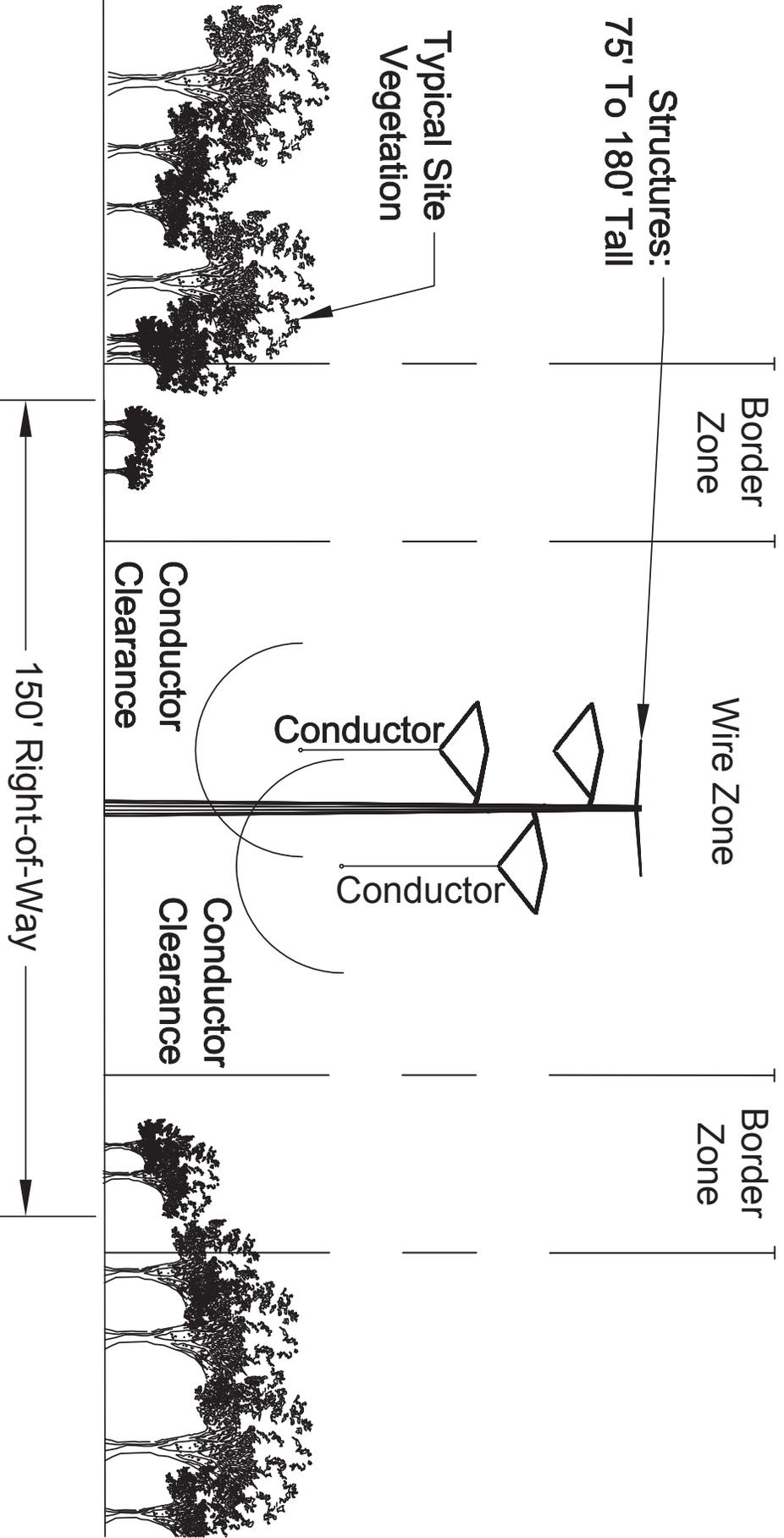


Figure 2-19

AC R.O.W. Limits

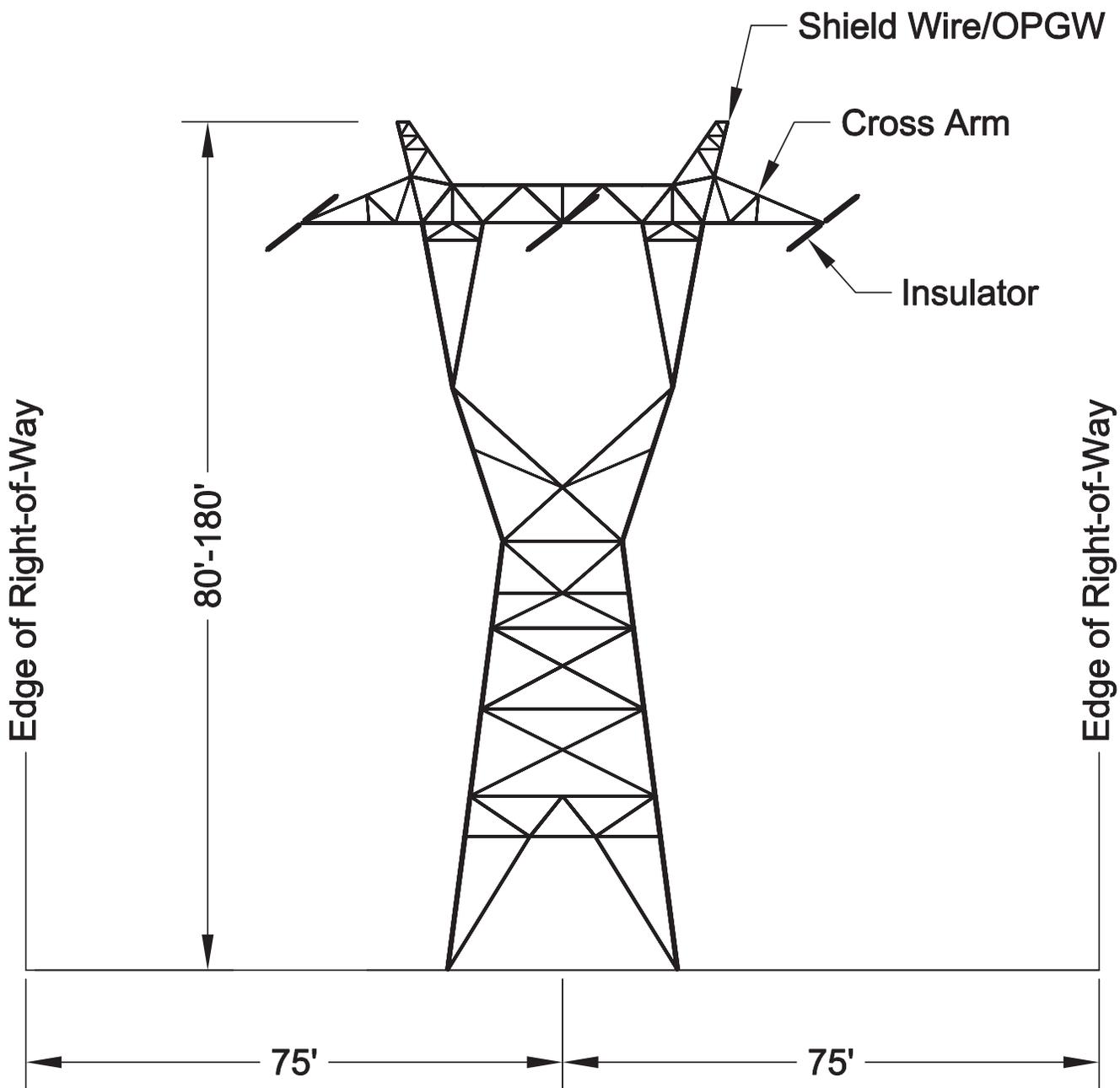


Figure 2-20a

345kV Lattice Deadend

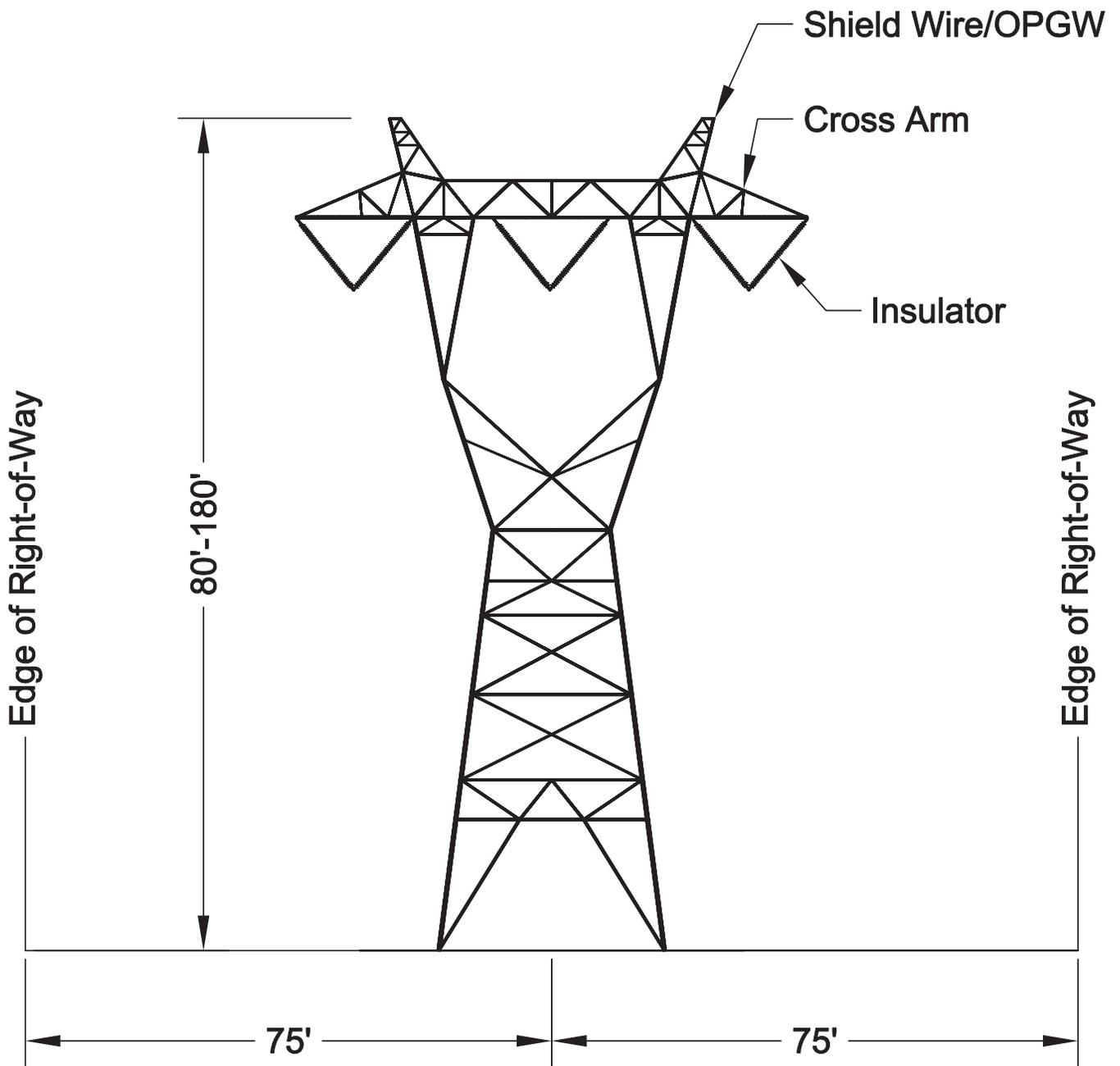


Figure 2-20b

345kV Lattice V-String

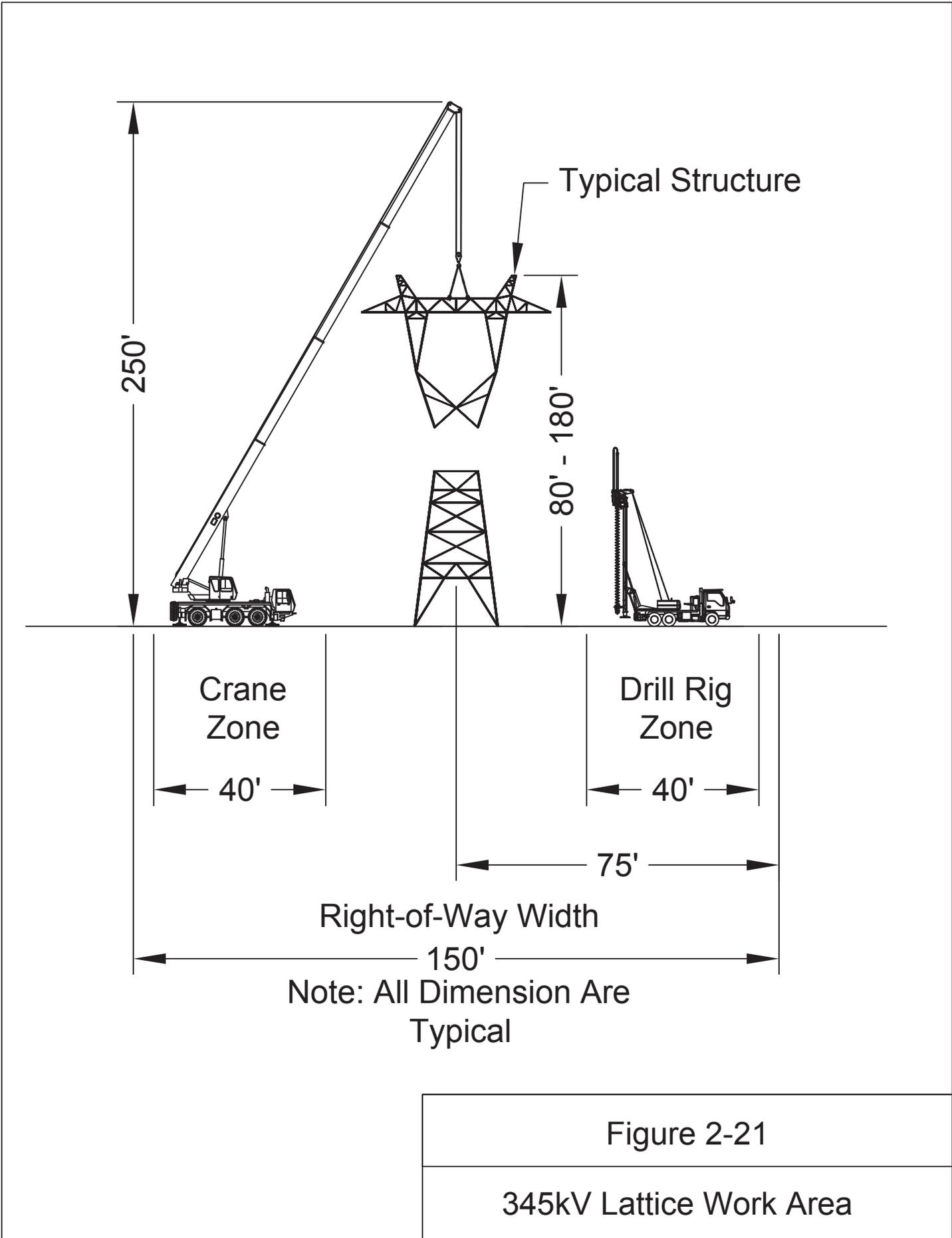
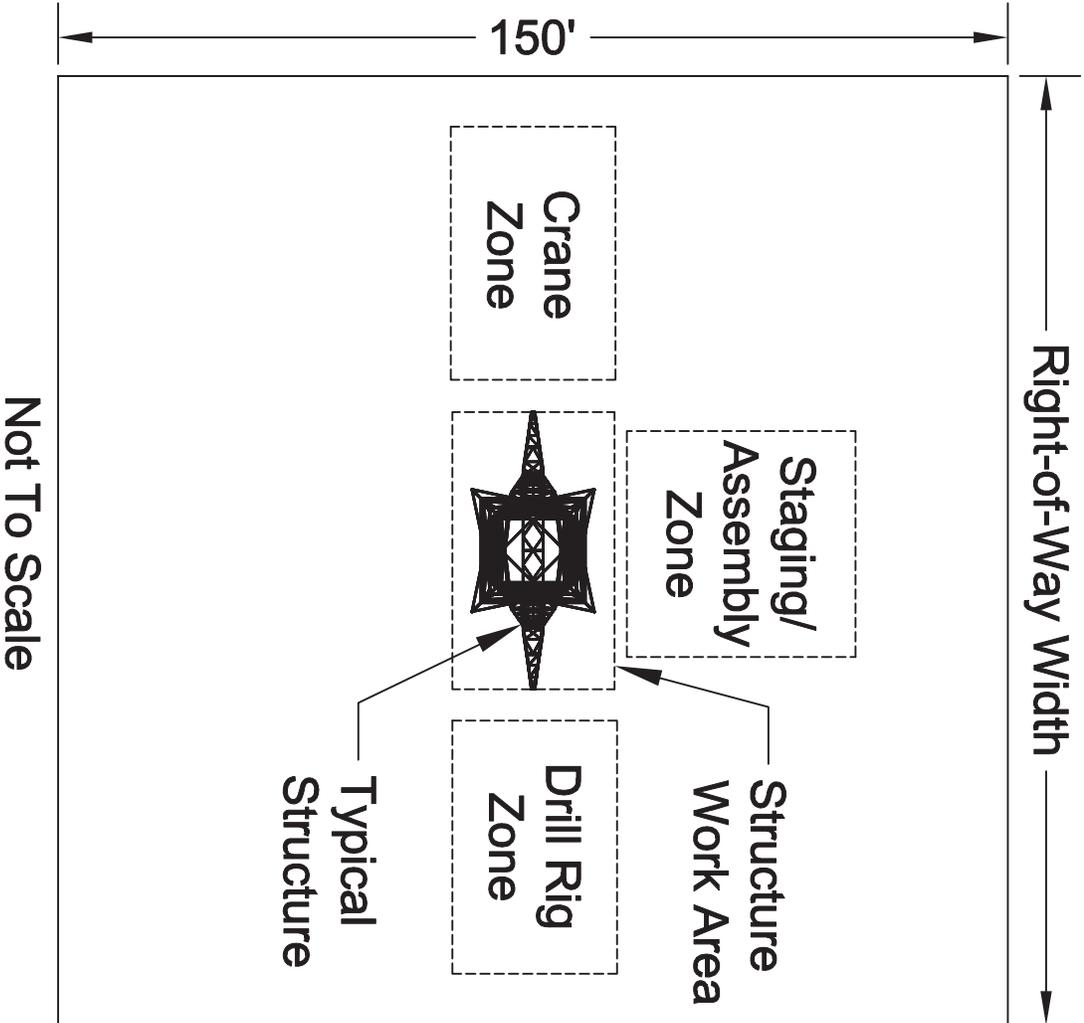


Figure 2-21

345kV Lattice Work Area



Not To Scale

Figure 2-22

345kV Lattice Foundation and Structure
 Construction Activities - Plan View

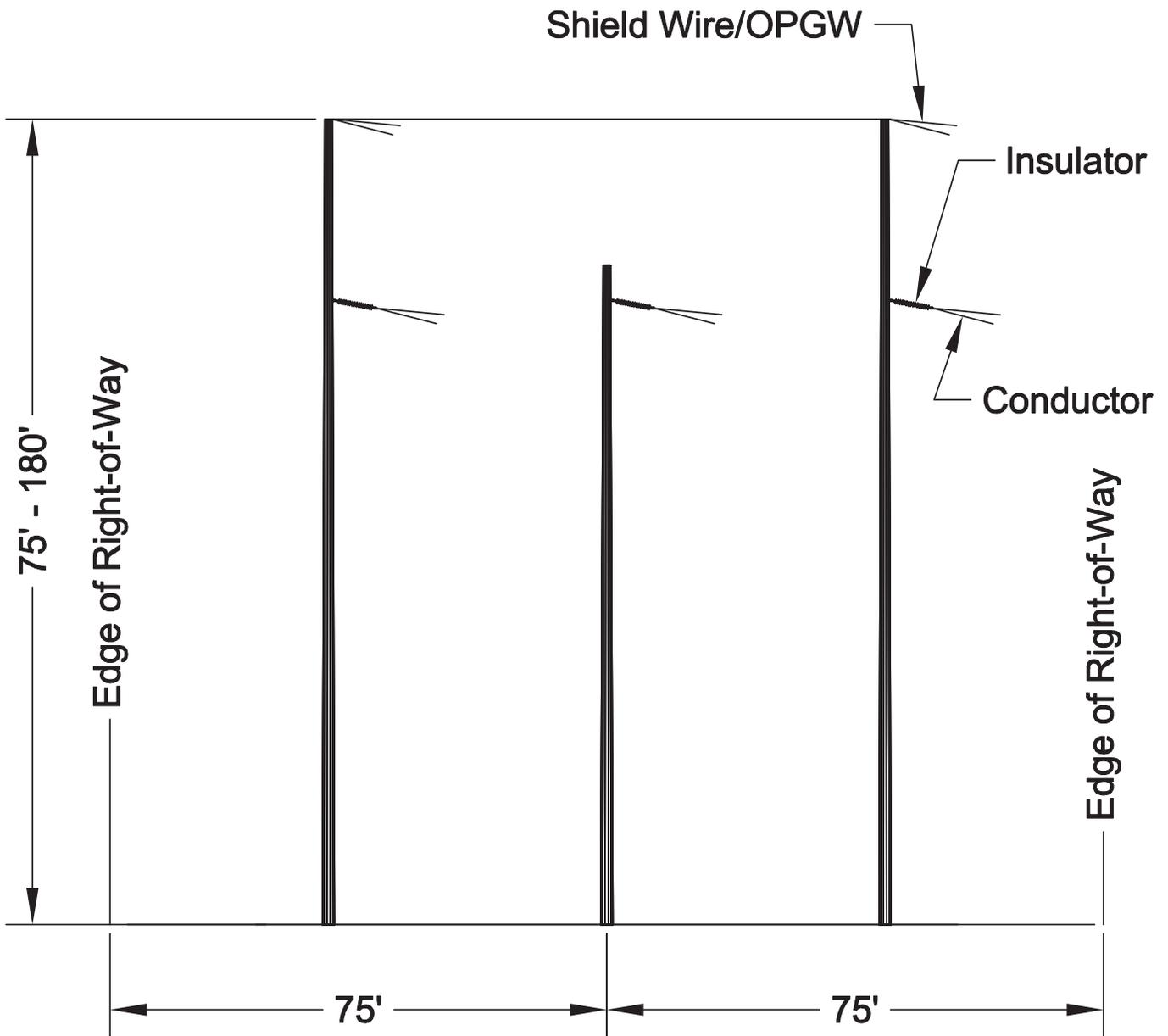


Figure 2-23a

345kV 3-Pole Running Angle

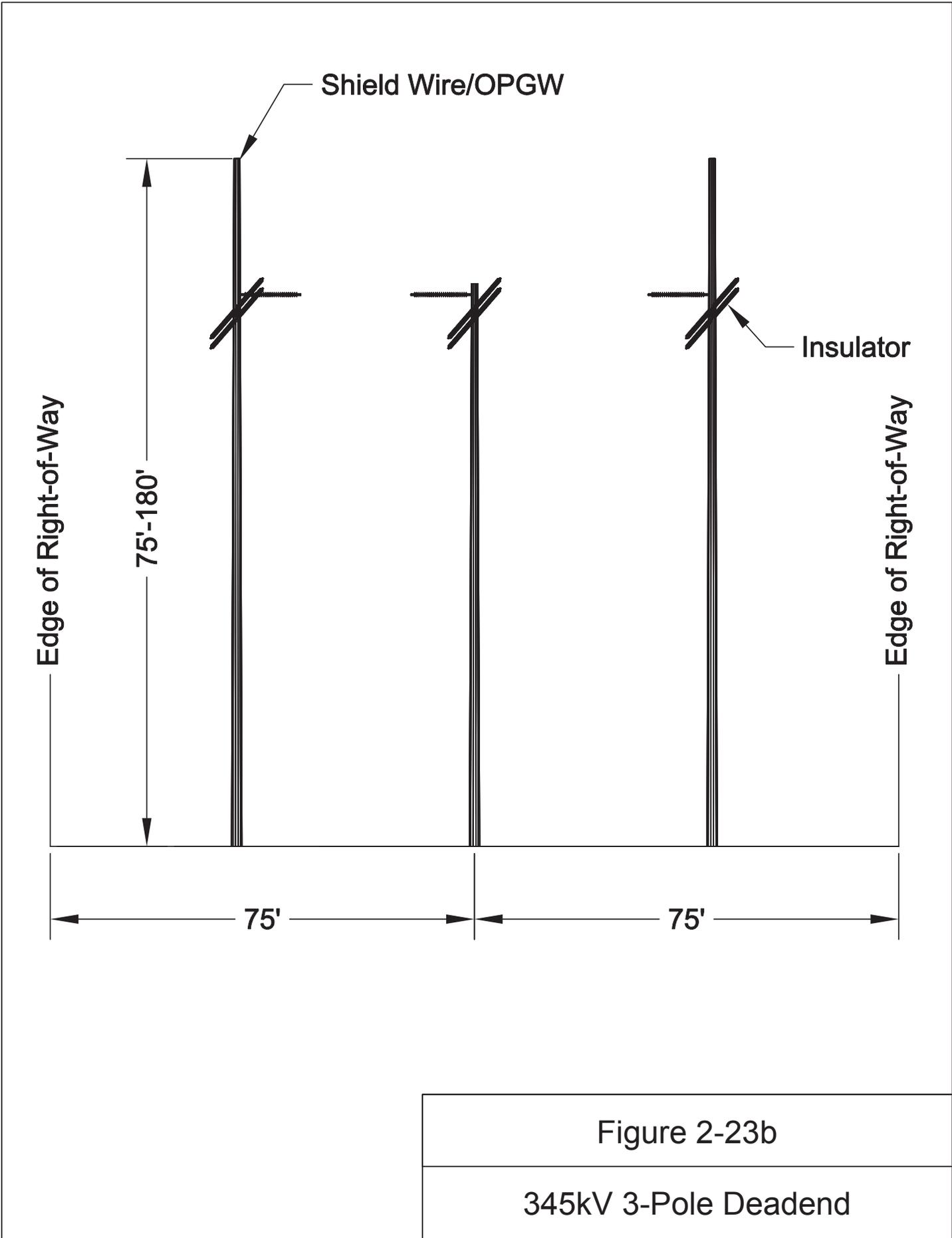
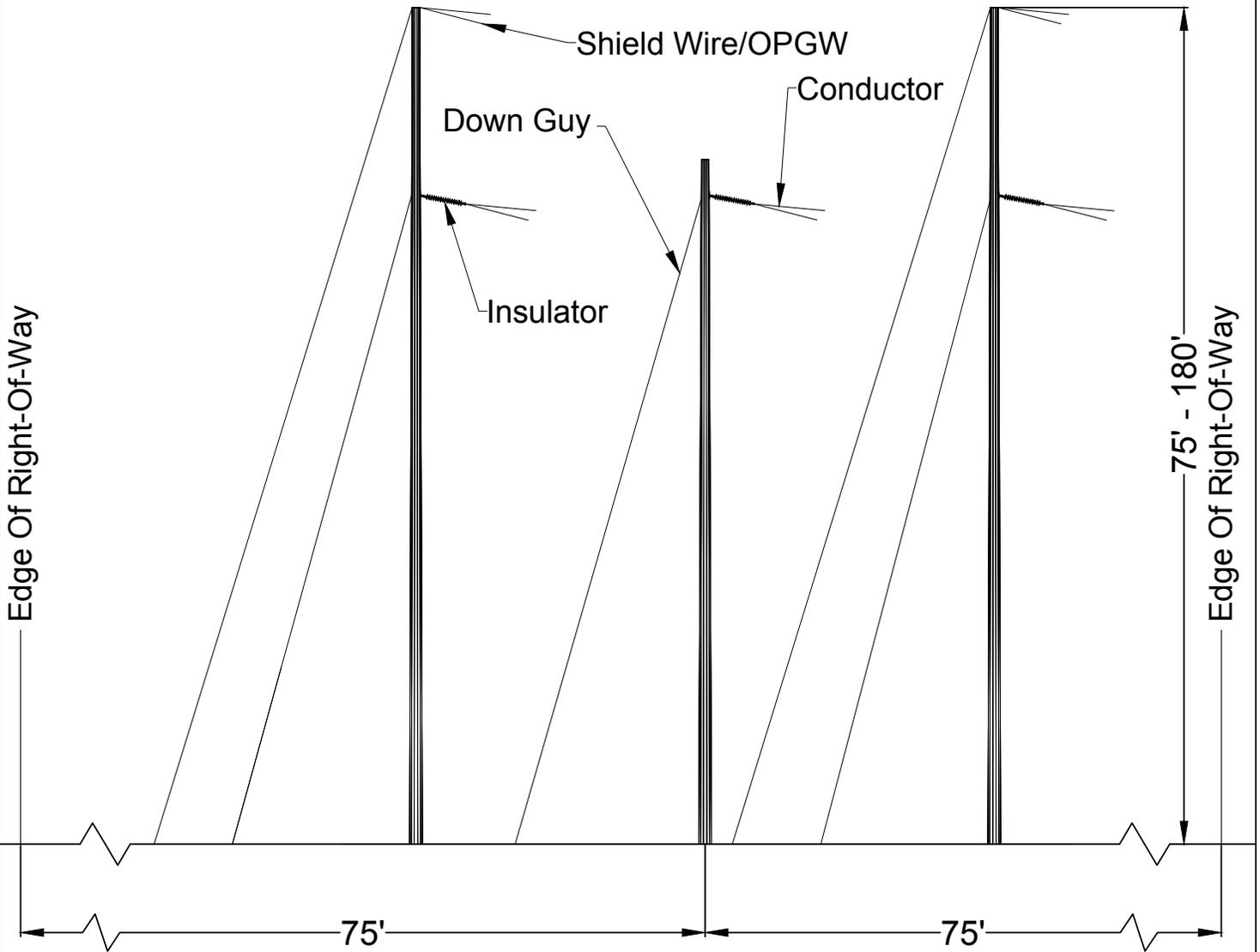


Figure 2-23b

345kV 3-Pole Deadend



PLAN VIEW



ELEVATION VIEW

NOT TO SCALE

NOTE:
DEPENDENT ON STRUCTURE
HEIGHT AND LINE ANGLE, GUY EASEMENTS MAY BE
REQUIRED BEYOND THE PROJECT 150 FOOT RIGHT-OF-WAY.

Figure 2-24a

345kV 3-Pole Guyed Running Angle

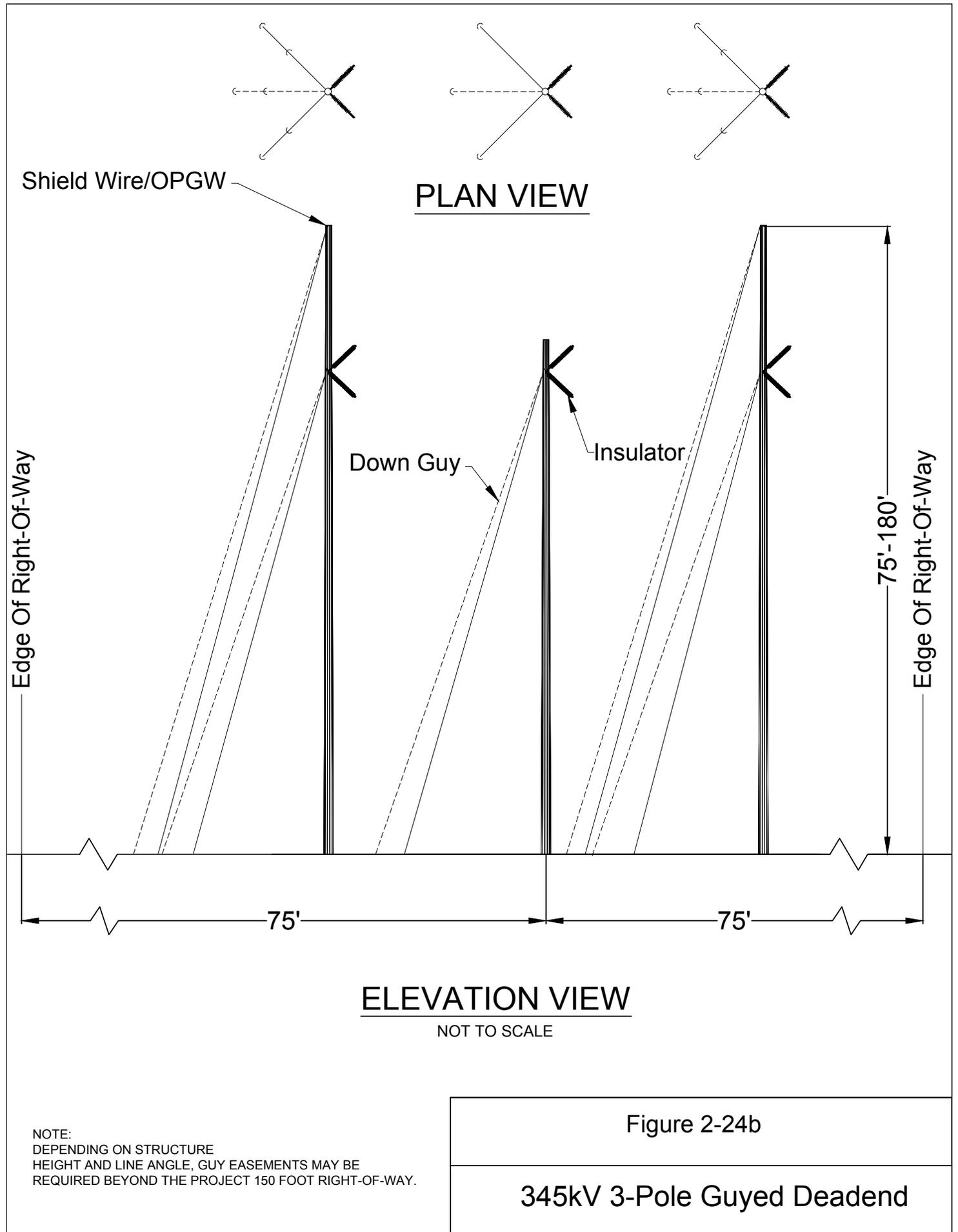


Figure 2-24b

345kV 3-Pole Guyed Deadend

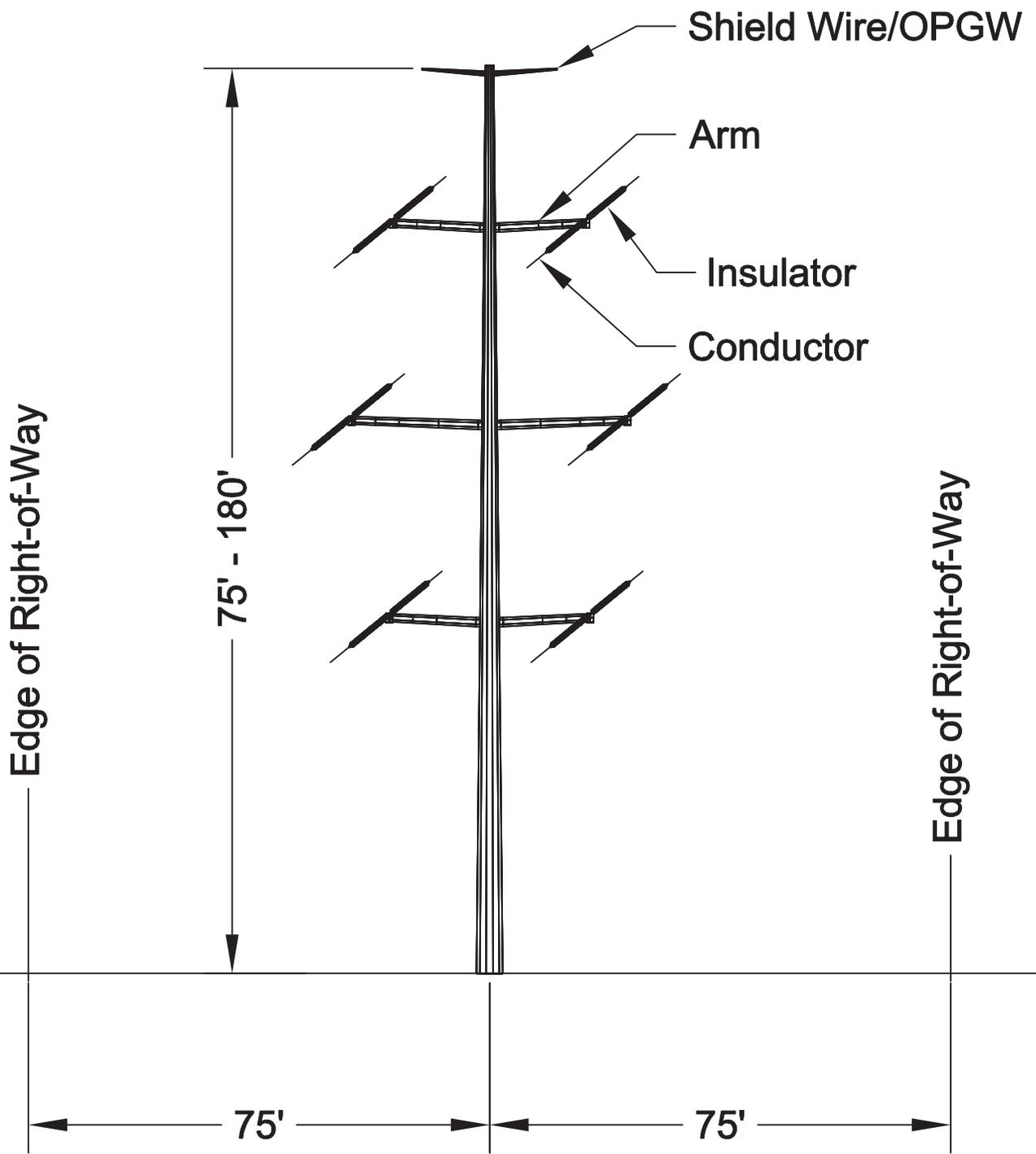


Figure 2-25a

345kV Double Circuit Pole Deadend

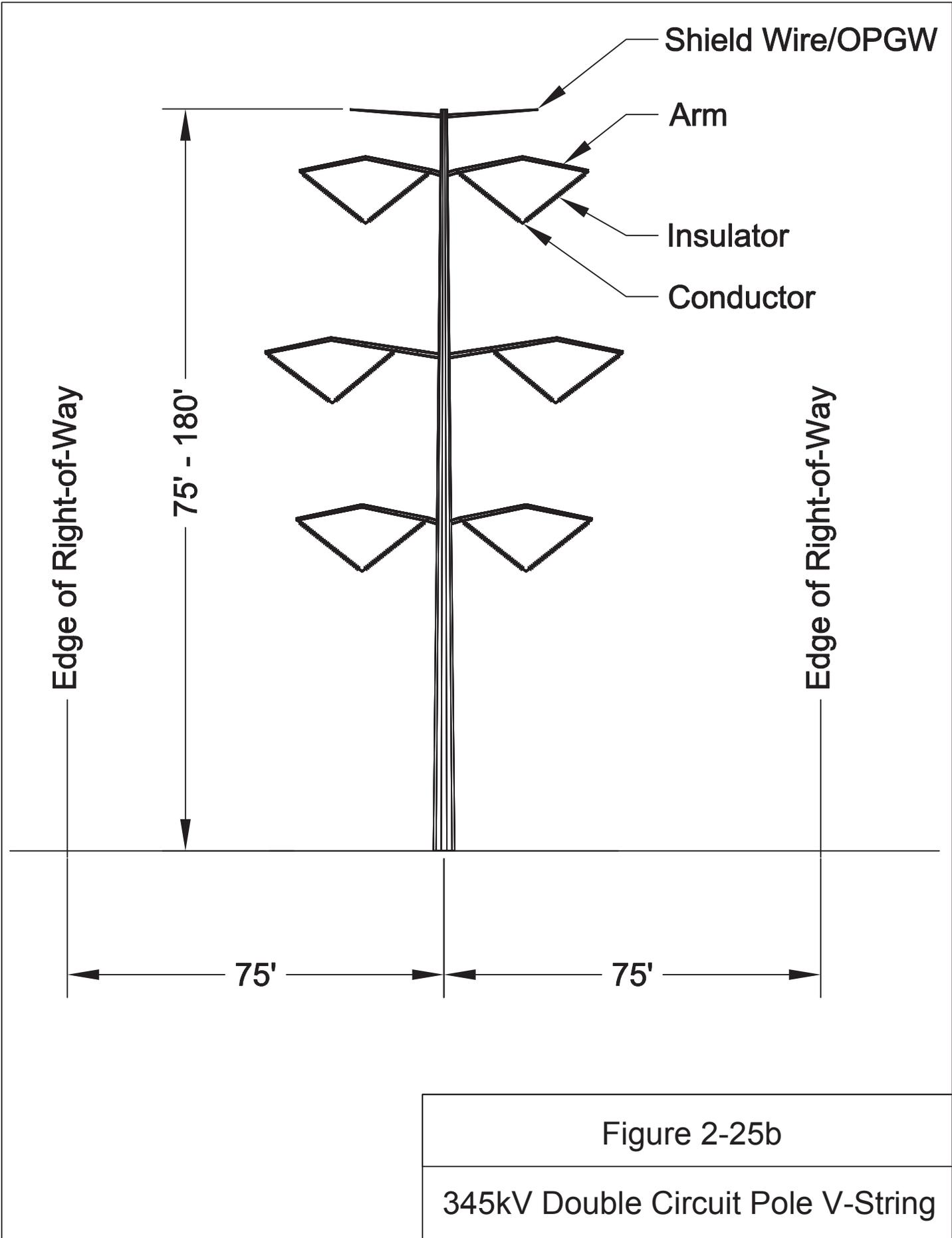


Figure 2-25b

345kV Double Circuit Pole V-String

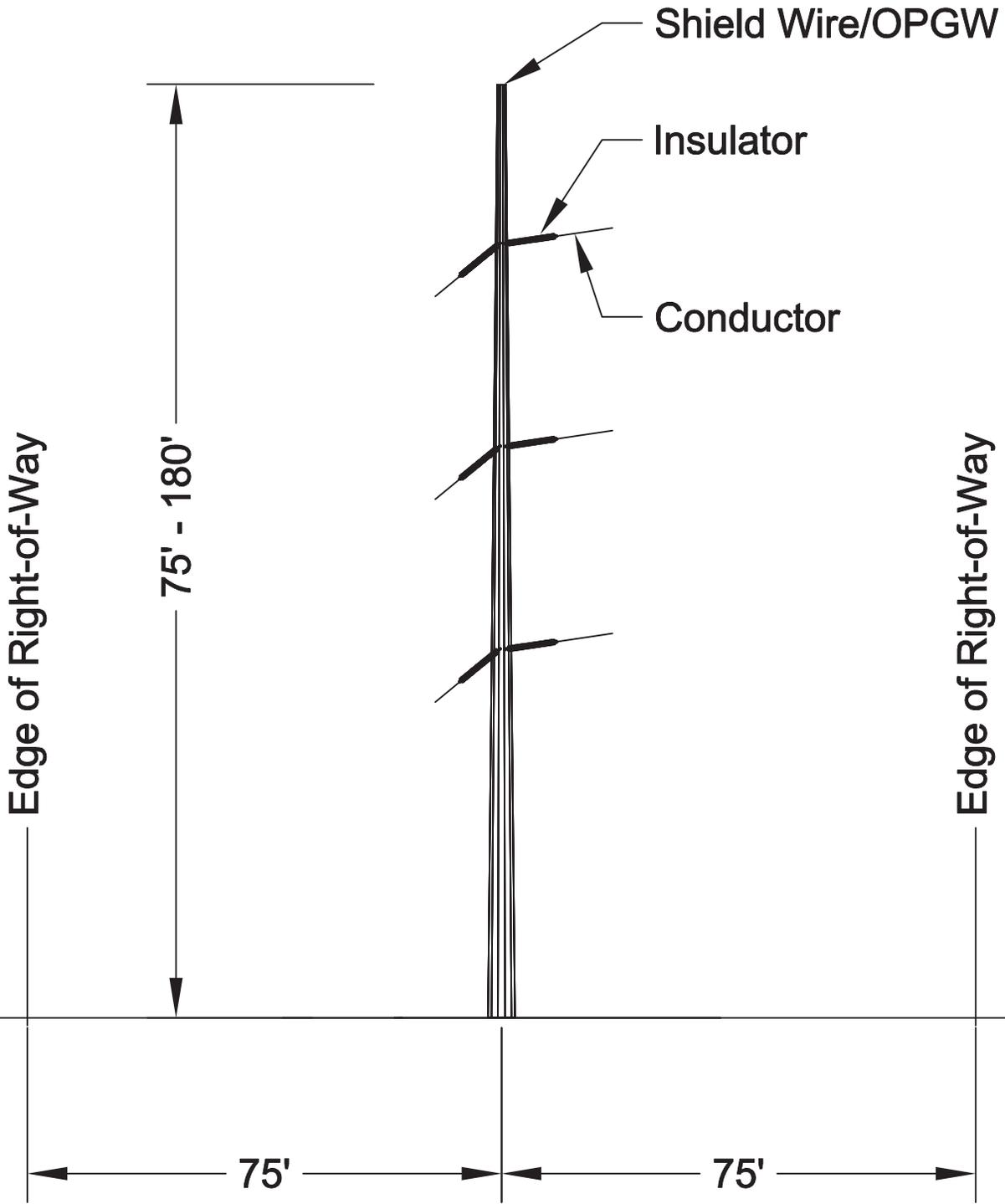
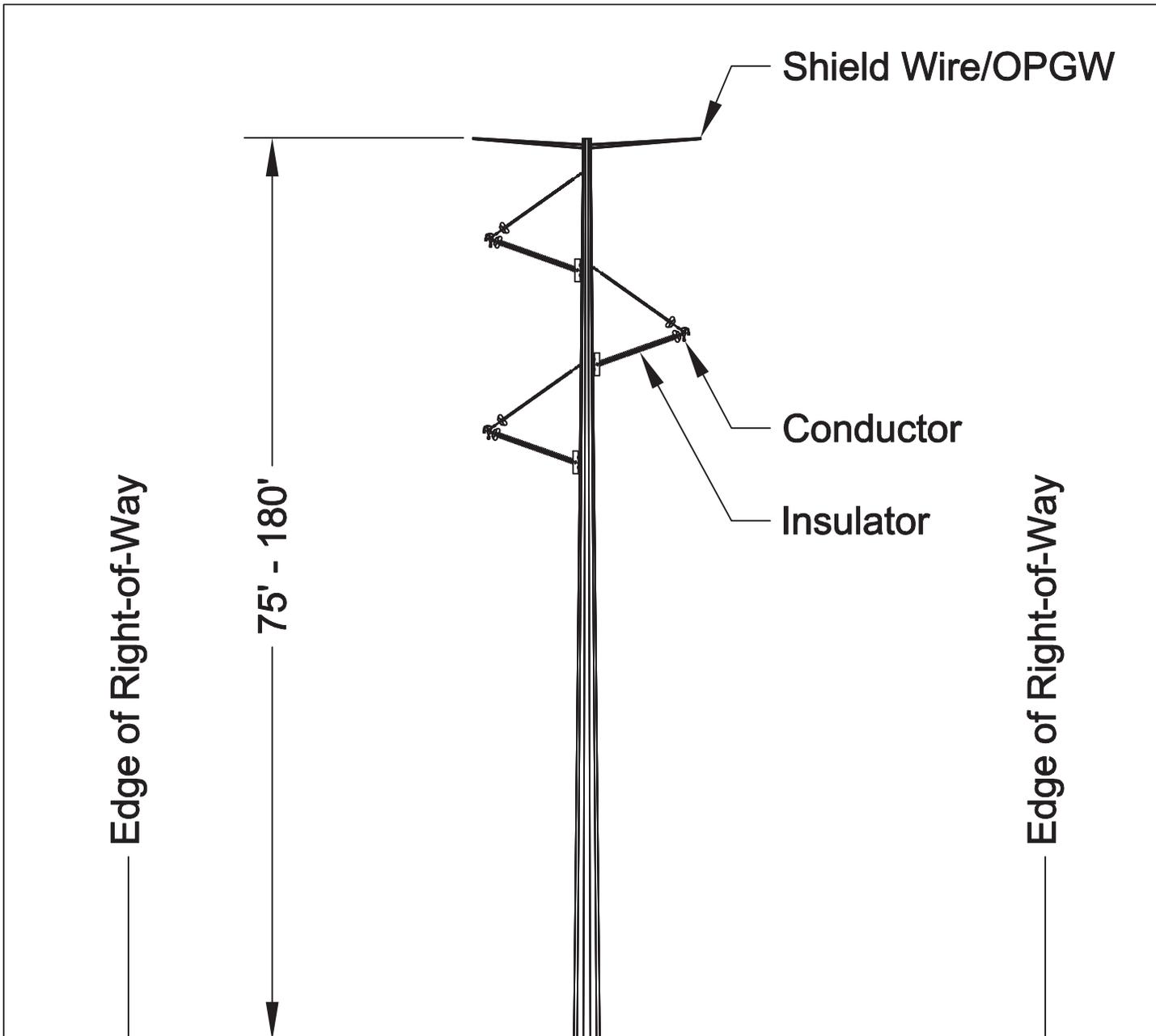


Figure 2-26a
 345kV Single Circuit Pole Deadend



Shield Wire/OPGW

Conductor

Insulator

Edge of Right-of-Way

Edge of Right-of-Way

75' - 180''

75'

75'

Figure 2-26b

345kV Pole Braced Post

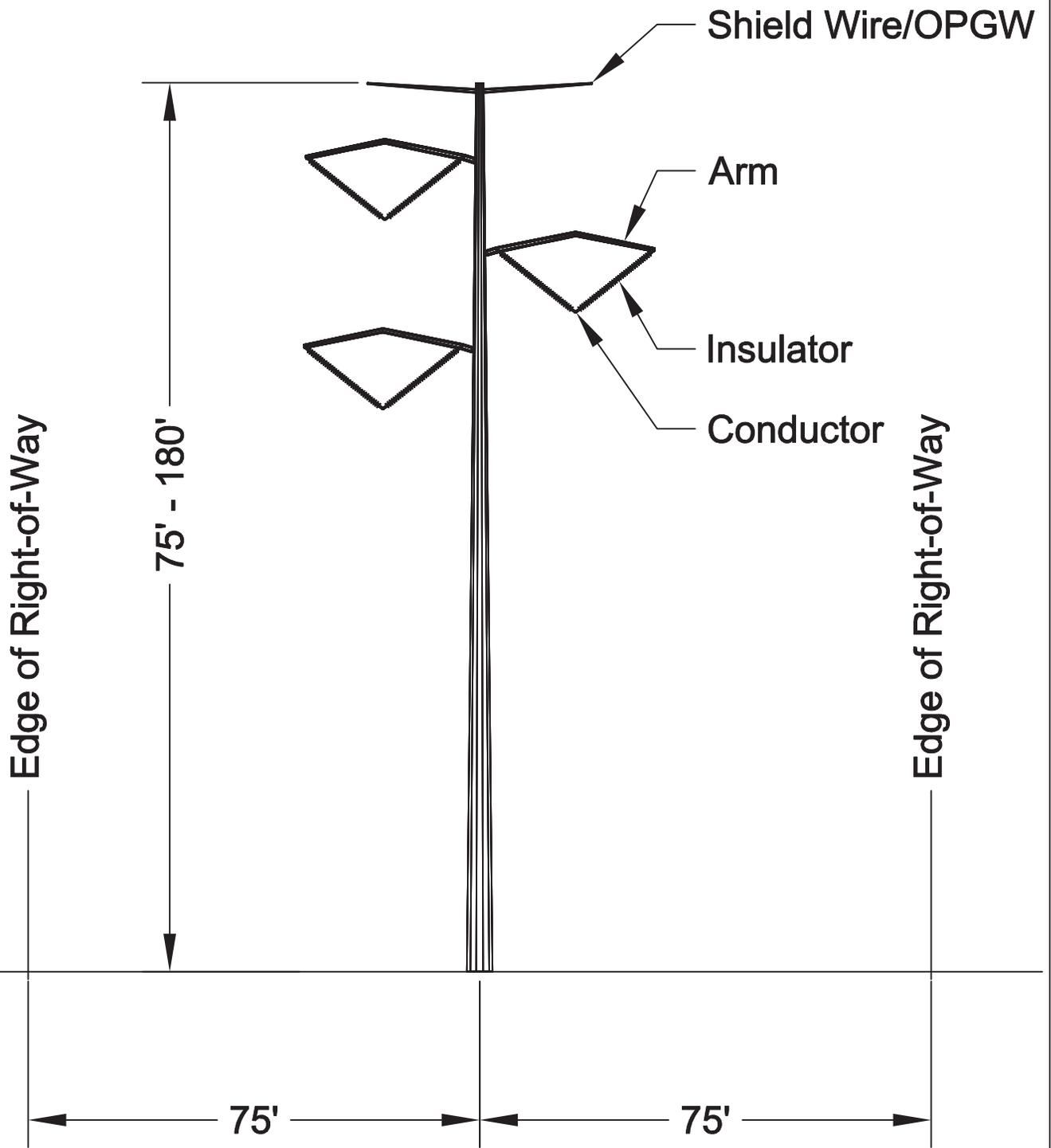
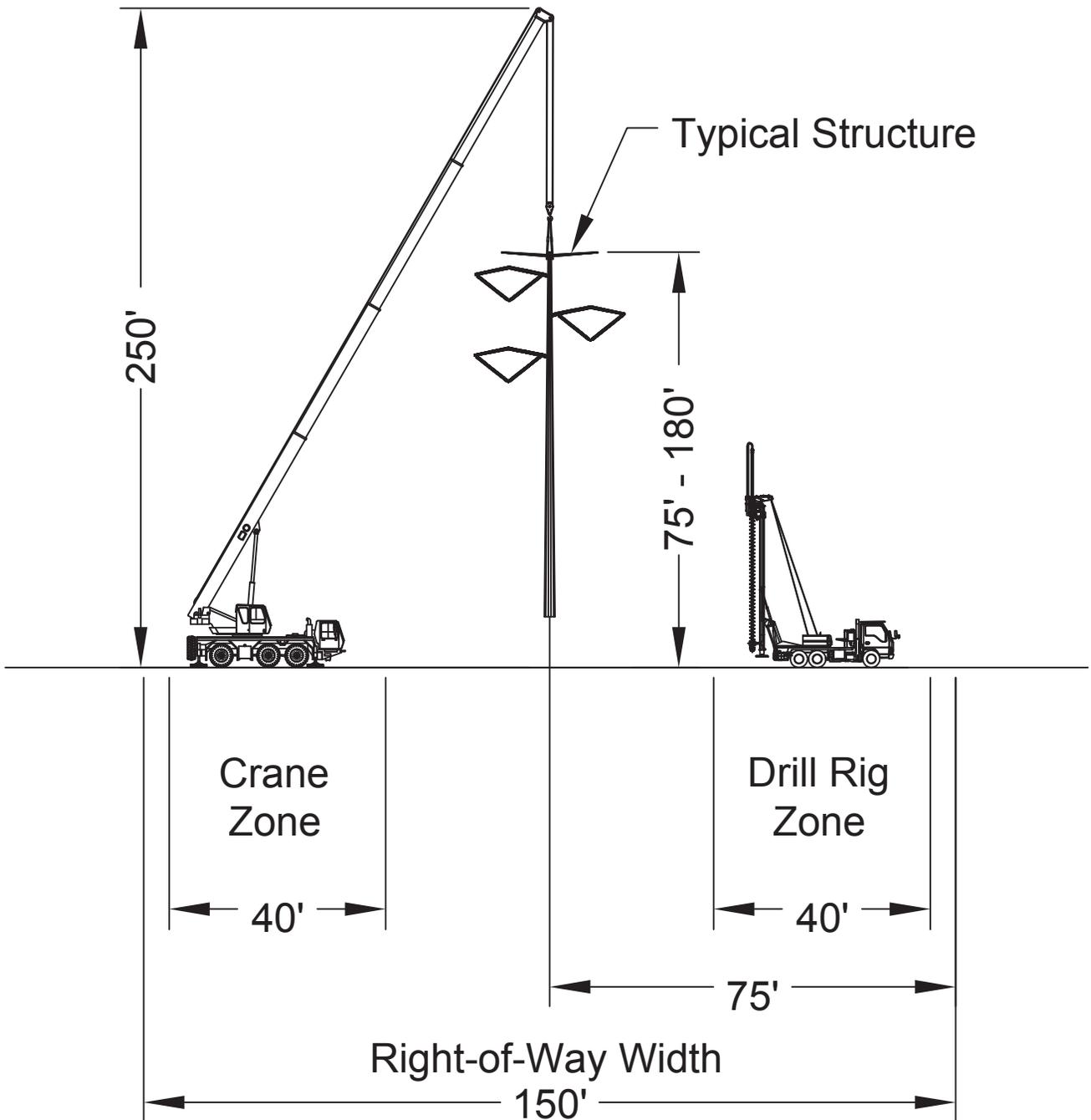


Figure 2-26c

345kV Single Circuit Pole V-String



Note: All Dimension Are Typical

Figure 2-27

345kV Monopole Work Area

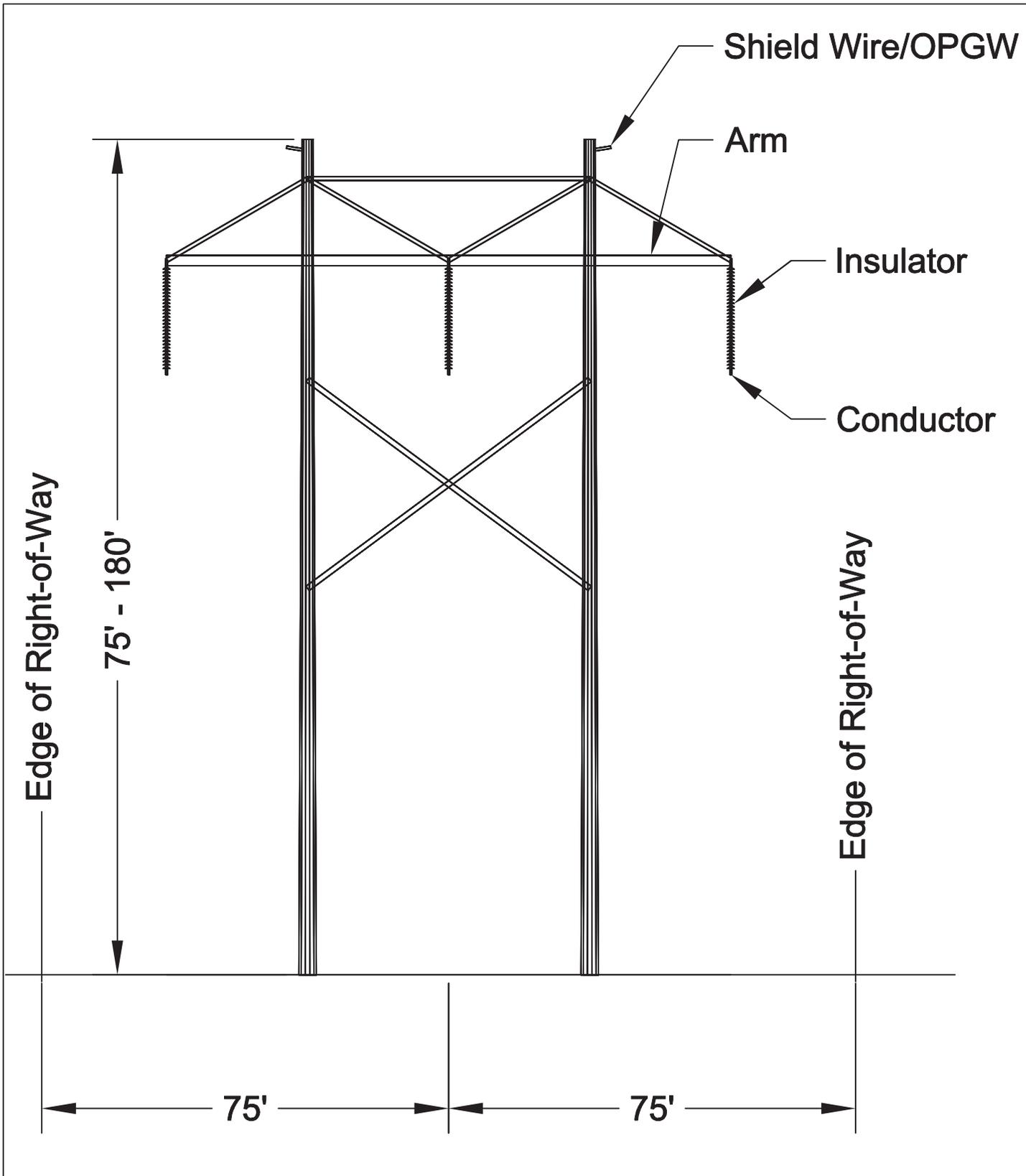


Figure 2-28a
 345kV Braced H-Frame

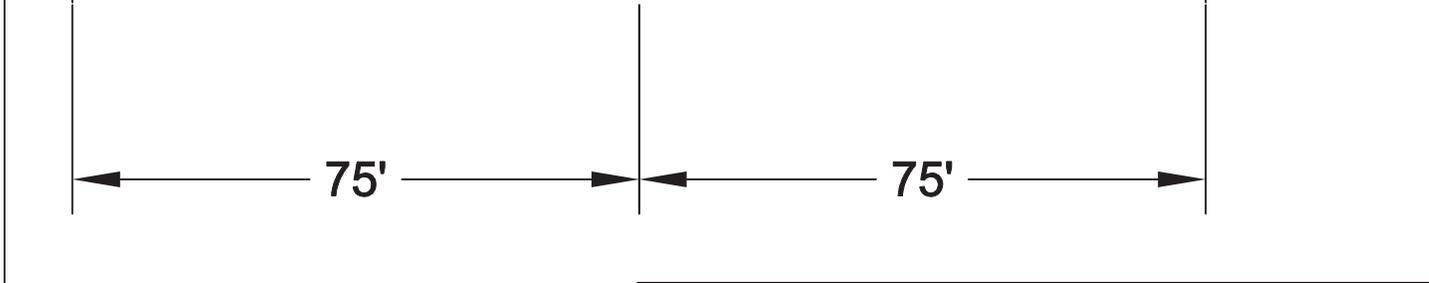
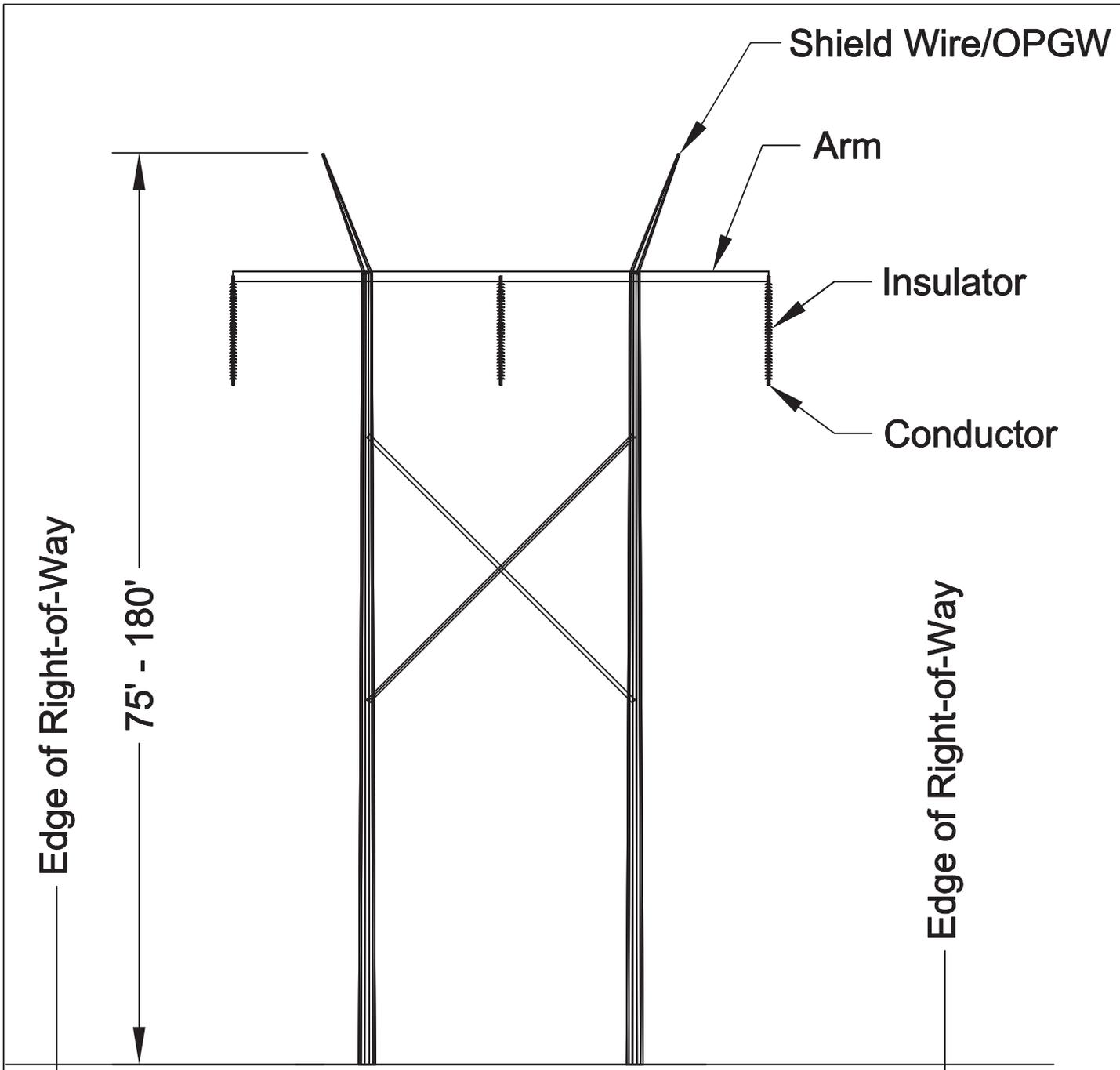


Figure 2-28b
 345kV H-Frame Tangent

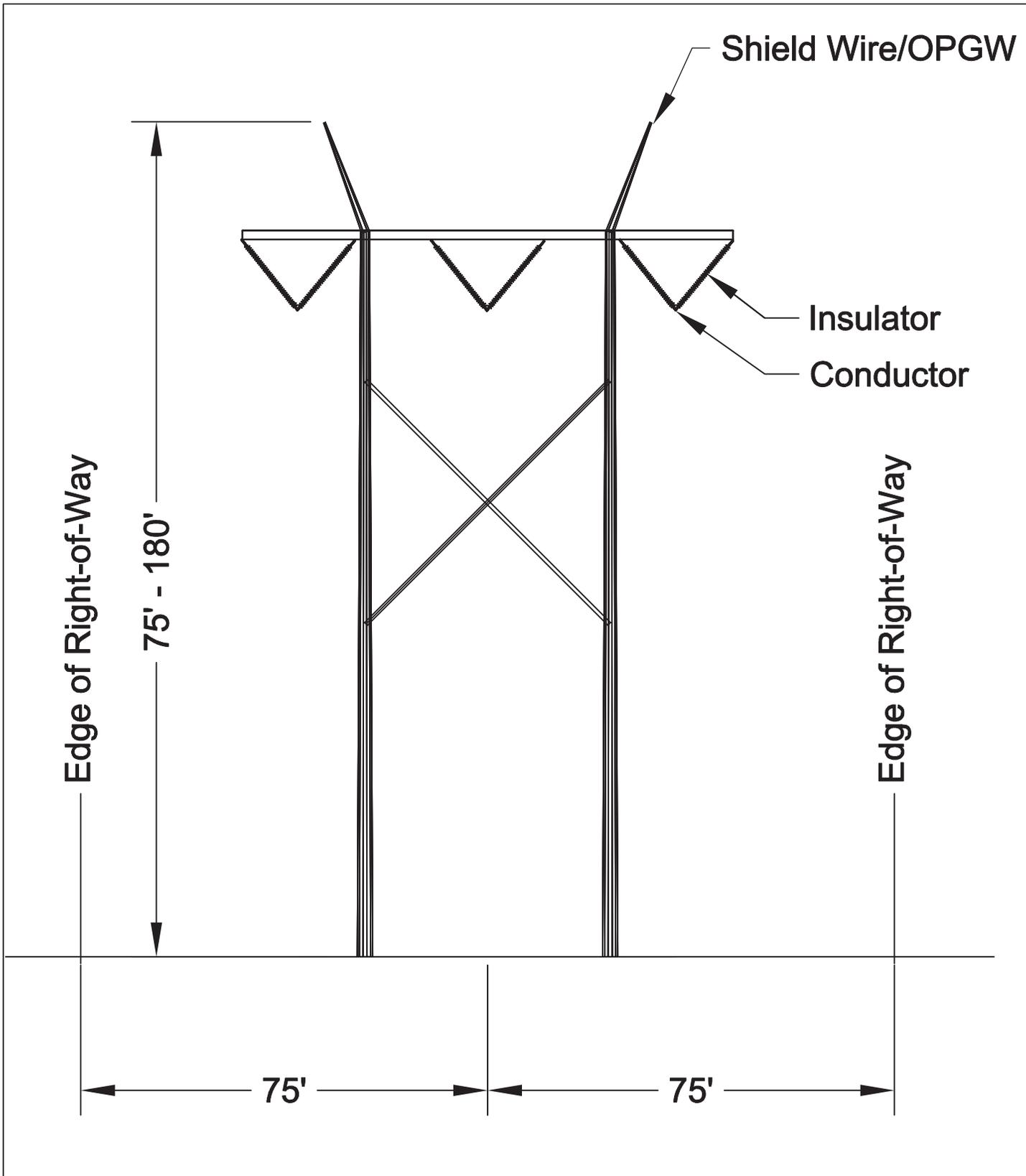
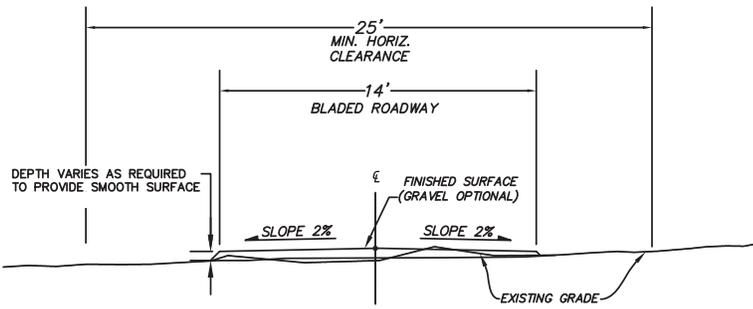
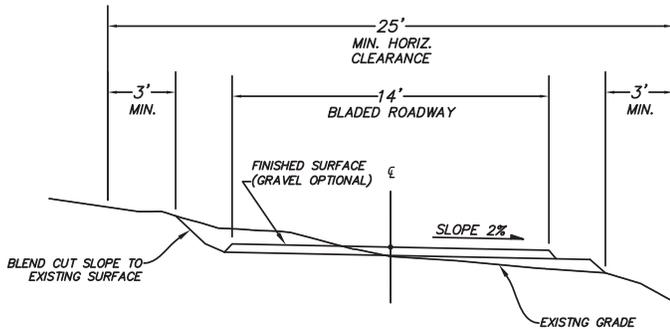


Figure 2-28c

345kV H-Frame V-String



TYPICAL SECTION ON FLAT GROUND

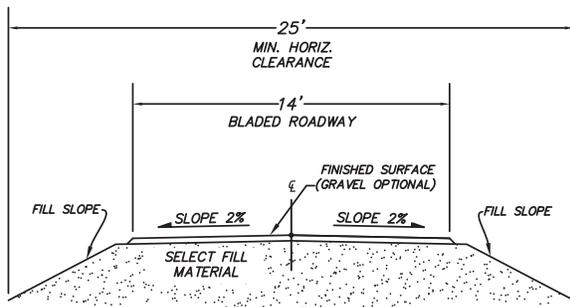


TYPICAL 'OUTSLOPE' SECTION

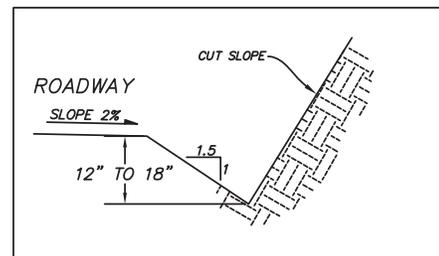
NOTE:
 PROVIDE OUTSLOPE ON ROADS WITH GRADES AS STEEP AS 20% IN THE SAME DIRECTION AS THE SURROUNDING TOPOGRAPHY SO THAT THE UPHILL EDGE OF THE ROAD IS HIGHER THAN THE DOWNHILL EDGE.

AVOID OUTSLOPED ROADS WHERE THEY WOULD DIRECT RUNOFF ONTO ERODIBLE FILL, EMBANKMENTS, OR WHERE THEY COULD CAUSE OFF-CAMBER CURVES.

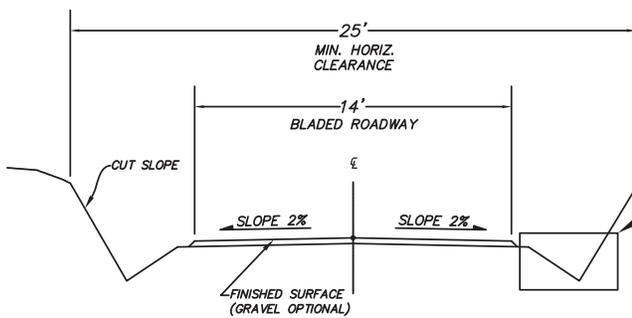
PROVIDE "INSLOPED" ROAD SECTION WITH ROADSIDE DITCH ON GRADES STEEPER THAN 20%.



TYPICAL FILL SECTION



TYPICAL DITCH SECTION



TYPICAL THROUGH-CUT SECTION

Figure 2-29

TYPICAL ACCESS ROADS

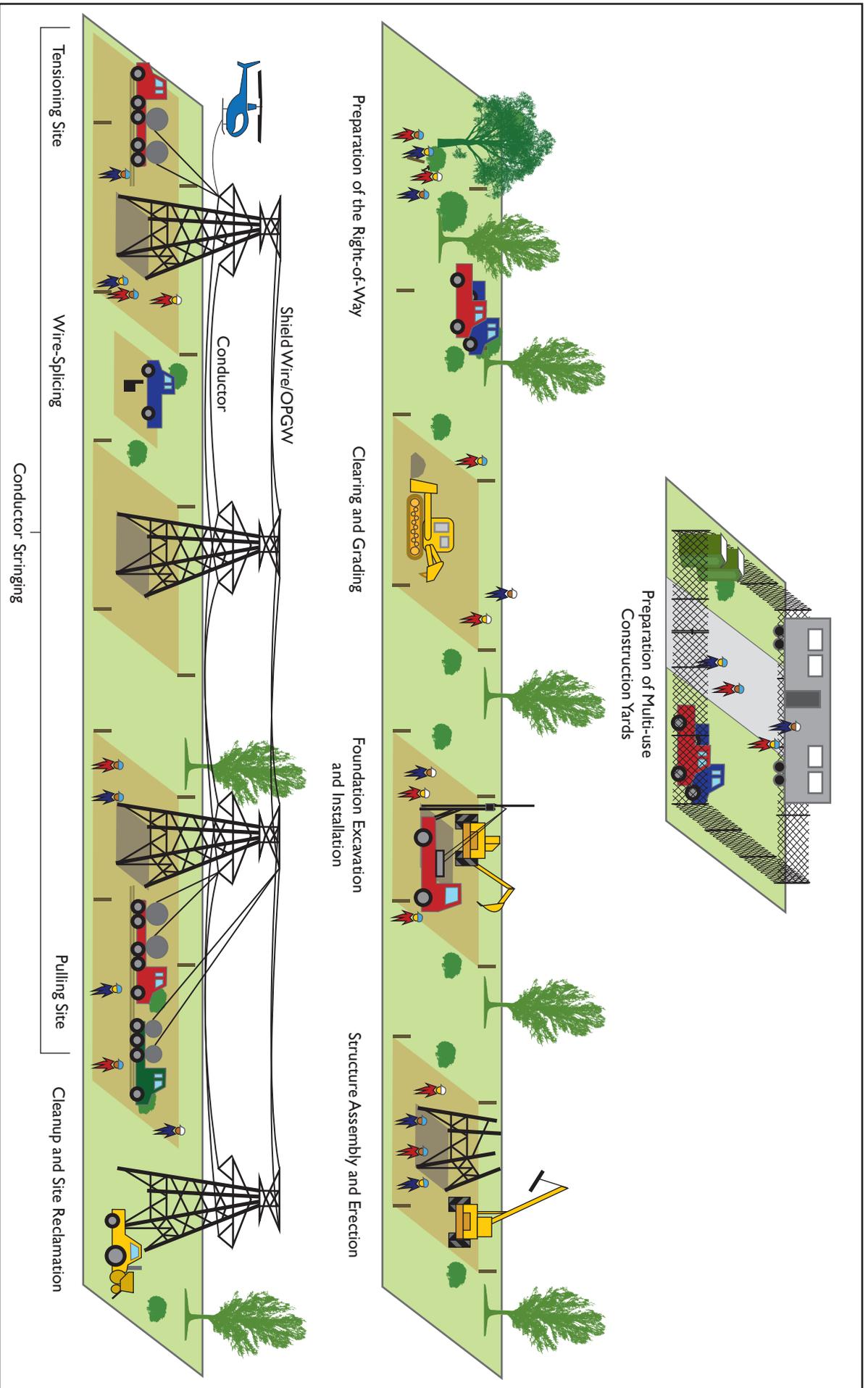


Figure 2-30
HVDC Transmission Line Construction Sequence
Plains & Eastern Clean Line
Oklahoma, Arkansas, and Tennessee

Appendix B
Workforce and Crews

Example of Typical Construction Activities and Durations on Agricultural Property

The following example timeline describes a typical construction sequence that could occur on a single parcel currently in agricultural use (with row crop or hay / grass pasture). This hypothetical situation assumes the following: 0.5 miles of HVDC right-of-way (ROW) on the parcel; two tangent lattice structures are planned within the parcel; no grading is needed; and access is obtained by driving only within the ROW from adjoining parcels through existing gates. The following timeline also assumes that the ROW has been surveyed and the clearing boundaries have been staked. The timeline describes the major planned activities associated with construction. During the construction period, other activities, usually smaller in scale (such as inspections or monitoring) may require intermittent access to and presence in the ROW between the activities listed below. Note that there will be breaks in the construction process. The duration of these breaks may vary from the periods identified below.

Typical Construction Activities on Agricultural Property			
Activity	Access typically restricted?	Day	Description
ROW mowing and/or clearing	Yes	1 to 2	Mowing equipment enters from adjoining parcel and mows portions of the ROW. The area mowed would include an access path down the ROW (approximately 16 to 35 feet wide) and two areas (each 100 x 100 ft) for future structure construction pads. Access to the construction area is restricted during mowing operations for safety.
None	No	3 to 14	There is a period of inactivity between mowing and/or clearing (above) and the beginning of surveying and staking (below). This period may be shorter or longer depending on construction schedule.
Survey and staking	No	15	A survey crew stakes each structure location with wooden lath.
Install storm water protection measures	No	16	According to state requirements, any storm water protection measures (e.g., silt fences) are installed. Silt fences would be discontinuous, and would not limit livestock movement. This typically requires one or two pickup trucks with trailers, possibly a small excavator, and a small crew of workers.
Drill and pour foundations	Partially	17 to 19	Auger equipment drills holes for footings, rebar cages are set, concrete trucks delivery concrete to the pad, stub angles are set, and concrete is poured into holes and mold surrounding stub angles. Access is prohibited in a small area within a protective fence around foundation sites, and periodically restricted around the construction area for safety due to the movement of trucks and other equipment.
None (Concrete curing)	Partially	20 to 22	Access to ROW is not restricted, except for a small area within a protective fence around foundation sites.

Typical Construction Activities on Agricultural Property			
Activity	Access typically restricted?	Day	Description
Remove concrete forms	Partially	23	Access to ROW is not restricted, except for a small area within a protective fence around foundation sites.
None (Concrete curing)	Partially	24 to 33	Access to ROW is not restricted, except for a small area within a protective fence around foundation sites.
Equipment set up, assembly, and structure erection	Partially	34 to 41	Structure material delivered to each structure site with a heavy truck, structure sections are assembled, and sections are lifted by crane and set into place. Access to ROW may be periodically restricted around the construction area for safety due to the movement of trucks, cranes, and other equipment.
Insulator assemblies fixed to structure	Partially	42	Insulators and associated hardware are pre-assembled into strings, strings are then lifted by crane or lift truck and fixed to tower arms. Access to ROW is periodically restricted around the construction area for safety due to the movement of trucks, cranes, and other equipment.
None	Partially	42 to 86	There is a period of inactivity between the end of insulator installation (above) and the beginning of wire stringing (below). This period may be shorter or longer depending on location and site conditions. During this period, access to the ROW outside of the structure pads is unrestricted.
Sock and Pilot line threading	Yes	87	A helicopter lifts a light weight sock/pilot line, which is threaded through rollers attached to the insulators. During stringing operations, access to the ROW is restricted for safety.
Conductor pulling and tensioning	Yes	88 to 92	Conductor is attached to the end of the sock/pilot and pulled through. Pulling and tensioning equipment (located on other parcels in this example) ensure that the proper clearance and sag is achieved for each span of the conductor. During stringing operations, access to the ROW is restricted for safety.
Clipping in	Yes	93	Conductor is permanently attached ("clipped in") to hardware connection at the end of insulator strings using one to three bucket trucks. Access to ROW is periodically restricted around the construction area for safety due to the movement of trucks and other equipment.
None	No	94 to 122	There is a period of inactivity between the end of clipping in and the start of final restoration activities. This lag could be considerably shorter, depending on season and site conditions.

Typical Construction Activities on Agricultural Property			
Activity	Access typically restricted?	Day	Description
ROW restoration	Partially	123 to 130	Repair of construction damage occurs, which may include re-seeding, recontouring, and restoration of drainage patterns. In row crop areas, this may also include decompaction, ripping, and/or tilling to restore ROW. Access to ROW is periodically restricted around the construction area due to the movement of trucks and other equipment for safety.
Vegetation Re-establishment	No	131 –	Depending on site conditions, vegetation will be allowed to become reestablished. Depending on the season, for row crops areas, crops or cover crops could be planted or re-established following restoration. Any storm water protection measures are removed after the site meets or exceeds state reclamation thresholds.

Appendix B

Workforce and Crews

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