

The LCRA Electric Transmission Easement & Right-of-Way Use Guide



Effective Date: February 10, 2023

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USING ELECTRIC TRANSMISSION EASEMENTS

GENERAL

The Lower Colorado River Authority (LCRA) transferred its electric transmission lines, easements and other electric transmission assets to LCRA TSC in 2002. LCRA staff continues to operate, maintain, improve, upgrade and expand that system as a service to LCRA TSC.

LCRA and LCRA TSC are committed to the safety and reliability of this electric transmission system, which includes 69-, 138- and 345-kilovolt (kV) transmission lines. Due to these high voltages, anyone working on or near these lines and their easements should exercise extreme care.

This guide provides important information to property owners, developers, architects, engineers and others who are considering developing property within or directly adjacent to LCRA Transmission Services Corporation (LCRA TSC) electric transmission system easements (commonly known as rights of way).

This guide cautions landowners and others of the risks associated with any unauthorized use within transmission line easements. Such uses can obstruct or interfere with the use of the transmission line easement. Obstructions can, for example: 1) create safety hazards, 2) interfere with access, 3) interfere with structure locations or relocations or 4) impair or obstruct the ability to safely, reliably and efficiently operate and maintain electric lines.

To avoid conflicts and costly removal expenses, landowners and developers should not construct facilities that conflict with transmission line easements. Examples of obstructions include, but are not limited to, the following:

- Permanent structures.
- Combustible materials.
- Ponds, channels, septic systems.
- Spoils and storage of cut/fill materials.
- Certain grading, earth-retaining systems, excavations.
- Certain plantings.
- Flag Poles.
- Wind Mills.

These examples are discussed in more detail later in this document.

PURPOSE OF THIS GUIDE

This guide can help landowners and developers streamline the planning and review process to facilitate and expedite plans that involve LCRA TSC easements, while avoiding potential negative impact to transmission facilities and easements.

This guide provides information about appropriate and inappropriate uses of LCRA TSC's easements by landowners. However, it is not a complete directory of all requirements that may apply to specific properties. If you are considering developing a site or constructing within an LCRA TSC easement, please contact LCRA early in the development of your project and submit plans for review. LCRA typically requires four to six weeks of lead time to review plans. Written responses will be provided for each project.

Compliance with this guideline does not necessarily ensure automatic acceptance of a project.

Nothing in this guide is intended to amend or deprive LCRA or LCRA TSC of any rights granted by the terms of the written easements, nor is it intended to release landowners or developers from any liability due to negative effects upon LCRA's or LCRA TSC's facilities or easements.

For information or assistance, contact LCRA's Real Estate Services department at 800-776-5272, Ext. 4420, or 512-578-4420.

Mailings should be addressed to:

LCRA
Real Estate Services
Mailstop D140
P.O. Box 220
Austin, Texas 78767

Overnight shipment or hand delivery should be made to:

LCRA
Real Estate Services
3505 Montopolis Drive
Building A
Austin, Texas 78744

Your drawings should:

- Be signed and dated, and include grading and site development plans (including geotechnical reports if applicable) for our review.
- Be drawn to an appropriate engineering scale (ranging from 1 inch = 10 feet to 1 inch = 400 feet), and the survey datum must be specified.
- Reference horizontal and vertical distances to existing LCRA TSC structures, anchors and easement boundaries.
- Refer to existing and proposed access roads, as well as refer to deed and easement recording information.

The Appendix contains typical dimensions for maintenance pads and work zones for typical transmission facilities. These are intended to assist you in understanding the

types of uses for transmission line easements that utility crews require to safely work on the facilities.

Your project must comply with all applicable rules, regulations and orders of all jurisdictional authorities, including federal, state, county and local agencies. Applicable regulations include, but are not limited to, the Texas Health and Safety Code, the Texas Utility Code, National Electrical Safety Code (NESC), the Federal Clean Water Act and the Federal Migratory Bird Treaty Act.

ENFORCEMENT

If an installation in the easement adversely affects the safe, reliable and efficient operation of a transmission line(s) or impedes our access to our facilities or our movement up and down the easement, LCRA TSC may remove the obstruction at the expense of the owner or developer. Necessary restoration of the easement to its original condition would be at the owner's or developer's expense. In such cases, LCRA TSC would not be liable for any expenses or damages to the facility.

TEMPORARY CONSTRUCTION AND MAINTENANCE EASEMENTS

No projects shall be constructed by the landowner or developer in temporary construction and maintenance easements for the term of the easement. These temporary easements are typically used for construction and wire-pulling.

PERMANENT STRUCTURES

Permanent structures should not be constructed within LCRA TSC easements. This includes, but is not limited to, billboards, signs, light poles, flag poles, wind mills, habitable structures such as residential, commercial and industrial buildings, and recreational and playground equipment such as basketball goals, volleyball nets, above-ground and below-ground swimming pools, diving boards and decks. Permanent structures should not be installed because they can:

- Interfere with or obstruct our right of access to the structures and along the easement.
- Impair the efficiency of maintenance, overhaul, construction and reconstruction.
- Interfere with future structure locations or relocations.
- Result in unsafe electrical clearances, which could cause electrical arcing from the transmission line to the structure.

TEMPORARY STRUCTURES

Temporary structures may be erected within LCRA rights of way as long as they don't interfere with access to perform scheduled work, emergency repairs, and are not an electrical hazard. Please contact LCRA in advance of any such installations. LCRA may move the structure to eliminate an electrical hazard or to gain access down the ROW after making a reasonable effort to contact the landowner. Examples of temporary structures include deer stands, deer feeders and mobile storage units.

COMBUSTIBLE MATERIALS

Combustible materials (other than approved pipeline crossings) should not be stored on LCRA TSC easements. Combustible materials include, but are not limited to, wood, chemicals, petroleum products, vessels containing combustible materials and waste materials. Combustible materials can pose fire hazards that may damage or interfere with the safe and efficient operation of transmission lines.

PIPELINES

Water lines, gas lines and waste water lines are not to be installed within LCRA TSC rights of way without written approval. Proposal submittals must include the size of the pipe, the material of the pipe to be used, the depth the pipe will be buried, the exact location of the pipe within the easement and distance from each LCRA TSC structure.

PONDS, CHANNELS, SEPTIC

Drainage and irrigation systems, retention or detention ponds, septic tanks and drain fields should not be constructed within LCRA TSC easement because they can:

- Interfere with or obstruct access.
- Be damaged by cranes, bucket trucks and other heavy vehicles.
- Compromise the integrity of the transmission structure.

SPOILS AND STORAGE FOR CUT/FILL MATERIAL

Spoils and storage for cut/fill material should not be placed in the easements because they:

- May result in unsafe electrical safety clearances.
- Interfere with access to and along the easement.

GRADING, EARTH-RETAINING STRUCTURES, EXCAVATIONS, OTHER FACILITIES

Cross-Slope: Finish grades should not introduce slopes exceeding 5 degrees (approximately 12 horizontal to 1 vertical) measured across the easement. LCRA TSC's easements are used for access by cranes, bucket trucks and other vehicles, where grades exceeding 5 degrees could result in unsafe conditions for electric utility workers. The 5-degree slope requirement is based on ANSI A92.2 Vehicle-Mounted Elevating and Rotating Aerial Devices (Section 4.5.2 Stability on Slopes).

Longitudinal slope: Finish grades should not increase slope relative to existing grade measured along the easement.

Clearances: Finish grades and fill material must not adversely affect electrical clearances. Grades or fill materials resulting in unsafe electrical clearances should not be constructed. The easement should not be used for temporary storage of spoils. Minimum clearances as established by state law and the National Electrical Safety Code (NESC). State law requires a 22-foot minimum clearance from roads to high-voltage electric lines at their maximum design sag. The NESC requires other clearances that may be more restrictive, especially at higher voltages such as 345 kV. Caution! Maximum design sag usually far exceeds those found in the field due to weather conditions and transmission line loading. Please contact LCRA when planning to increase grades or add fill material within LCRA TSC easements.

Access: Finish grades and construction of any walls or other earth-retaining structures must not adversely affect access.

Structures: Finish grades must not contact or encapsulate LCRA TSC structures or create standing or running water, around or in contact with LCRA TSC structures. Fill around and in contact with structures is unsafe and may cause dangerous corrosion due to alternate wetting and drying of the soil or due to standing water.

Excavations, cuts and trenching: Grade cuts and trenching may not be constructed in close proximity to LCRA TSC's support structures, generally no closer than a horizontal distance equal to the sum of the support structure foundation depth and the excavation, cut or trench depth. In no event should any excavation, cut or trench be made closer than 30 feet to a support structure. This is only general guidance for you to consider, and you must contact LCRA if you plan to excavate, cut or trench within an easement.

Retaining systems and excavations: Retaining systems and other facilities should not be constructed unless they enhance (rather than detract from) access to the transmission line and protect the transmission line without adverse effects.

Fill Compaction: Any and all fill must be placed with a minimum compaction of 95% maximum dry density, as determined by American Society for Testing and Materials (ASTM) D1557. LCRA may require compaction tests at the owner's or developer's expense.

Environmental: The Texas Commission on Environmental Quality (TCEQ) requires storm water pollution-prevention plans on certain projects that disturb soil.

PLANTINGS

Crops and grasses are generally acceptable anywhere in the easement as long as they do not adversely affect access or support structure and foundation integrity and full mature height will not exceed 10 feet.

Plantings other than the aforementioned crops and grasses should meet the following requirements:

- **Location:** Plantings should be confined to the outer perimeter of the easement area, located outside the maintenance pads and work zones such as those described in the appendix.
- **Height:** Any species with a full mature height exceeding 10 feet should not be planted in the easement. Plantings whose full mature heights exceed 10 feet may pose hazards to the safe and reliable operation of transmission lines. Plantings that reach dangerously close to electric transmission lines may result in electricity arcing from the plantings and into the surrounding soil, potentially creating safety hazards such as fire or possible electrocution.
- **Access:** Plantings may not be placed in or interfere with LCRA TSC's existing access roads or work areas, such as maintenance pads and work zones, nor restrict LCRA TSC's access to any of its facilities.

- **Working Zone:** Please note that clear working zones are required around LCRA TSC's support structures. Plantings other than crops and grasses should be avoided in these areas.
- **Irrigation:** Irrigation systems should not be installed in easements and should not spray directly onto any electric facilities, access roads, maintenance pads or work zones. Irrigation systems may be damaged by large equipment accessing the line.

In general, only low-growing vegetation with a mature height of 10 feet or less should be planted in the outer edges of LCRA TSC's easements. Low-growing crops and grasses may be planted in LCRA TSC's easements. However, no vegetation should be located in such a way as to hinder access or adversely affect safety clearances. Landowners and developers are encouraged to use licensed landscape architects. Plantings other than crops and grasses should be avoided in working zones around support structures. Keep in mind that soil conditions and rainfall/watering rates can affect heights of plantings. The Appendix contains a list of tree species offered as examples of trees that may meet the above requirements.

ROADS AND DRAINAGE

LCRA TSC must maintain 24-hour access to its facilities, structures and anchors for patrol, maintenance and emergency vehicles. The following minimum guidelines for roads constructed within LCRA TSC easements help ensure adequate access at all times:

- Design
 - **Widths:** Minimum width on access roads should be 14 feet. Curves require additional road width (see below – Horizontal Curves).
 - **Wearing Surface:** Reviewed on a case-by-case basis.
 - **Grades:** Roads will be reviewed on a case-by-case basis.
 - **Cross Slopes:** The road should be sloped, using a minimum 2% typical cross slope, to prevent standing water or damage from undirected water flow. When the road is designed to slope away from the cut bank, the water should be allowed to drain as sheet flow onto the downhill slope unobstructed by drainage swales or berms. Any fill in the downhill slope must be compacted to avoid erosion. When the road is sloped toward the cut bank, a drainage swale should be constructed along the inside edge of the road. Water bars also are required across the road to direct water into the drainage swale.
 - **Horizontal Curves:** All road curves must have a minimum radius of 75 feet, measured from the centerline of the usable road surface. Road grades are measured from the inside edge of the curves, which shall be used as the control for establishing road grades.

Radius of Curvature	Additional Road Width
75 to 100 feet	6 feet
101 to 150 feet	5 feet
151 to 200 feet	4 feet
201 to 400 feet	3 feet
Over 400 feet	2 feet

- **Vertical Curves:** LCRA will review vertical curves to guard against high-centering and tail dragging when grade breaks exceed 6%.
- **Stopping Sight Distance:** Stopping sight distance, according to typical Texas Department of Transportation (TxDOT) standards, should be maintained at all intersections with other roadways, public or private.
- **Loading Requirements:** All private roadways within LCRA TSC easements, or roads used as access for LCRA TSC, should be sized to handle heavy construction vehicular traffic (passable with a 100-ton crane and H-20 loading as specified by the American Association of State Highway Transportation Officials (AASHTO)).
- **Driveway Entrances:** If commercial aprons are not installed, curbs must be designed for 100-ton crane and AASHTO H-20 loading and painted red.
- **Dead-Ends/Turnarounds:** All dead-end or stub roads longer than 345 feet shall include a Y-type, T-type or circular type turnaround.
- o Drainage
 - Reviewed on a case-by-case basis. Standing water should not be allowed. Where an access road meets a publicly maintained road, drainage must meet the minimum requirement of the municipality or agency with jurisdiction over the publicly maintained road (usually a 100-year storm).
 - **Dip Section:** Dip sections should be constructed at a natural grade to allow upstream runoff to cross the road.
 - **Swales:** Brow ditches, swales, etc. should be avoided except transverse to the easement. When allowed, they must provide access for heavy construction equipment. Drainage swales shall be emptied by means of a culvert to the down slope side of the road, which then empties onto an energy dissipater or into a natural drainage path.
 - **Culverts:** Corrugated Metal Pipes (CMP), with a minimum of two feet of cover, should be used for culverts. CMPs must have a specified service life of 25 years, based on soil characteristics. Coupling bands and cut-off walls are required. Damaged coating must be repaired according to manufacturers' recommendations. The size of the CMP culvert must meet the minimum requirement of the municipality or agency with jurisdiction or be 12 inches in diameter, whichever is greater.
- o Erosion Control: Erosion control, using best management practices (BMPs), is required on all roads and slopes during and after construction. Erosion control shall not block access roads at any time. The developer assumes responsibility for obtaining any and all storm water pollution prevention plan (SWPPP) permits and maintaining any and all required BMPs, inspections, repairs and logs as required by the permit and the permitting authority.
 - **Energy Dissipaters:** All energy dissipaters, standpipes, desiltation basins, etc., must remain outside LCRA TSC's easement.
 - **Flume/dip apron:** Where subject to erosion, galvanized steel intakes (dip aprons) and down slope drains (troughs) must be used to protect roadway banks and natural soil. Energy dissipaters are to be installed at drain outlets outside of the easement.
 - **Water Bars:** Water bars shall be open at the lower end to allow drainage and should be placed at an approximate angle of 30 to 45 degrees to the

transverse section of the road spaced as follows:

Average Road Grade	Maximum Spacing
0-5%	Not required
5%	125 feet
10%	80 feet
15%	60 feet
20%	50 feet

- Utility and Street Crossings: Design should minimize utility and street crossings. Crossings should be as close to 90 degrees as possible and located no closer than 30 feet from any transmission structure.
- Linear facilities running parallel to the transmission line such as streets, trenches, sewer, water, gas, culverts, drainage culverts, etc., should not be constructed within the easement.
- Blasting: Blasting is not permitted in the easements. Care should be taken to protect and prevent transmission line structures from being damaged by blasting on adjacent lands.

FENCES, WALLS, GATES, OTHER TEMPORARY FACILITIES

Temporary facilities, such as fences, walls and gates, must meet the electrical clearance requirements of the NESC.

Temporary facilities, such as fences, walls and gates near electric lines should be properly grounded to prevent exposure to induced voltages and currents, and in accordance with the National Electric Code and the National Electrical Safety Code.

Fences: Fences must not obstruct access to transmission structures or prevent movement up and down the easement. Fences must be properly grounded and gates must be provided to allow access to and up and down the easement. Gates should be at least 16 feet wide.

Walls: Walls, except those that enhance access and meet safety requirements, should not be constructed across LCRA TSC easements (refer to Appendix).

Gates: Gates will be required if an LCRA TSC access road is obstructed. Gates must meet the following criteria:

- All gate openings must be at least 16 feet wide.
- all gates must include either an LCRA TSC standard lock or an electric gate override key.
- LCRA will cut an LCRA lock into an access gate along LCRA TSC ROW as part of regular line patrols if the existing lock is damaged or missing.

High Pressure Valves: Fire hydrants, air release valves, backflow preventers, PIV's, or any other high pressure valves are not allowed within LCRA TSC easements.

Manholes: Below-ground manholes (sewer, water, CATV, etc.) are not allowed within LCRA TSC easements.

Trash Receptacles: Dumpsters or other large trash receptacles should not be placed within LCRA TSC easements.

TRASH

Refuse must not be disposed of on the ROW because this can cause a fire and access issue. This includes but is not limited to household trash, tires, mattresses, construction debris, junk cars and farm equipment.

RELOCATION OF TRANSMISSION FACILITIES

Relocation of transmission facilities can be complex and costly. All costs associated with requested relocations are borne by the applicant.

The time frame needed to accomplish relocation often exceeds 12 months. In many cases, early planning with LCRA can provide alternatives to relocation.

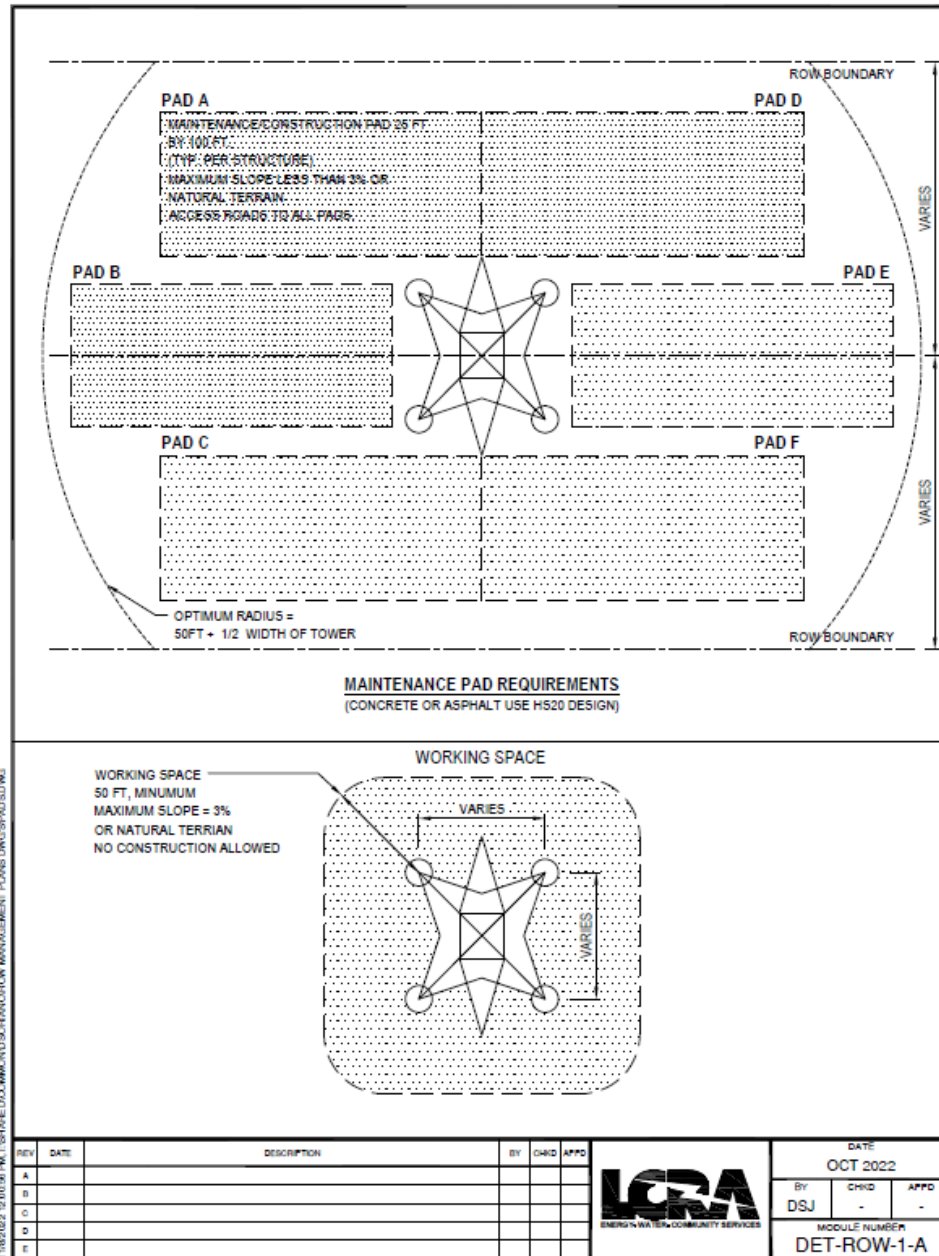
LCRA TSC will consider relocating transmission facilities when:

- The resulting alignment is acceptable to LCRA TSC.
- The relocated transmission line can be safely, reliably and efficiently operated and maintained.
- All landowners within 300 feet of the relocation have given written consent to the relocation.
- The proposed relocation provides access for maintaining and reconstructing, reconductoring, restringing or other activities granted in the easements.
- All relocation costs are paid by the landowner, including, but not limited to: engineering; surveying; environmental assessment; cost of relocating existing facilities, including all materials and construction; applicable differential cost of future construction; applicable additional life-cycle operating and maintenance cost; taxes; overheads; and interest during construction.
- Appropriate easements are provided to LCRA TSC at no cost and in a form acceptable to LCRA TSC.
- All regulatory requirements, if any, are met.

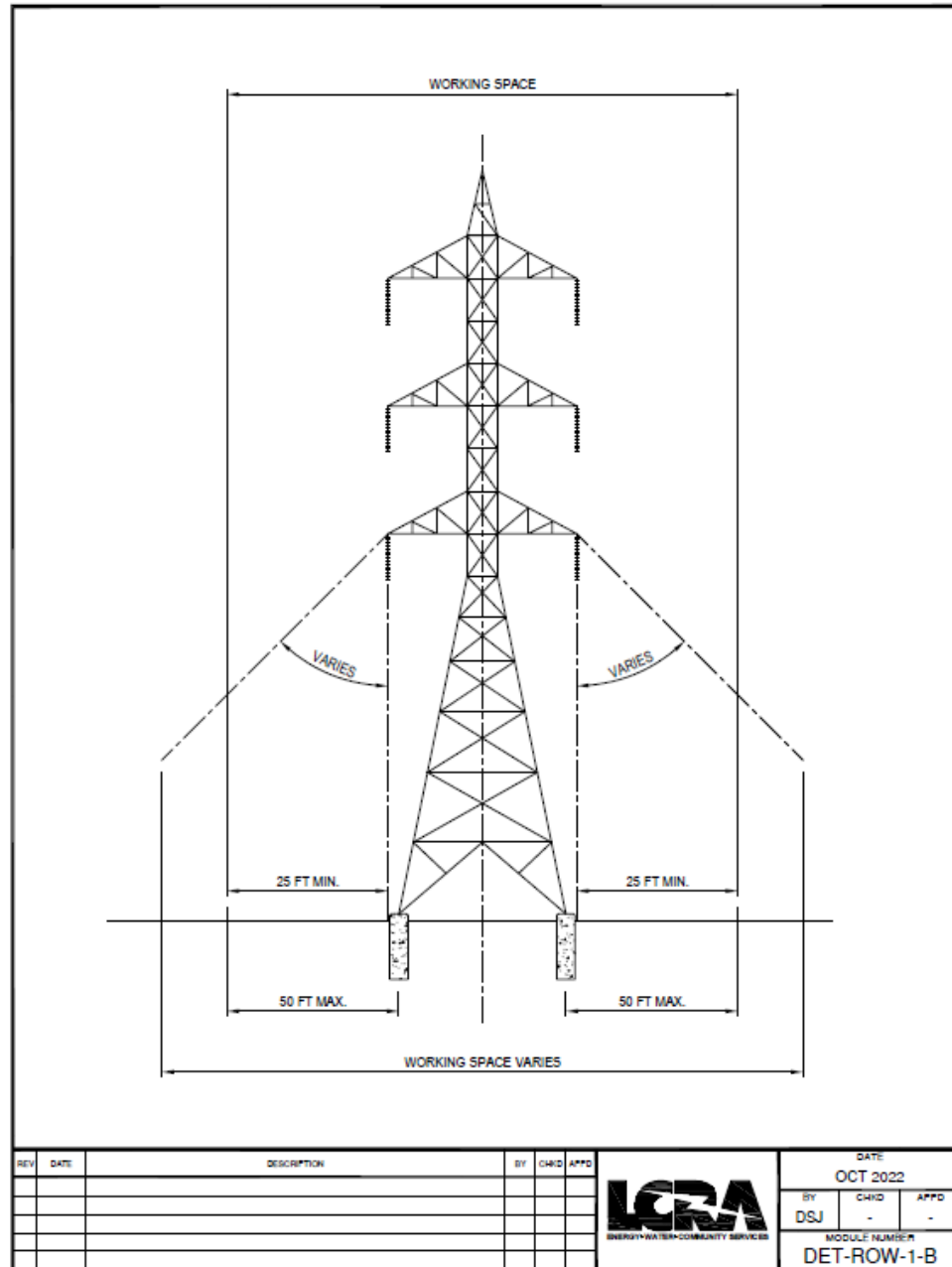
LINE PATROLS

LCRA generally patrols transmission lines annually on foot and/or by air. Aerial patrols can be conducted via helicopter, fixed wing or unmanned aerial systems (UAS). Ground patrols are normally completed by one or two individuals driving up and down the ROW on all-terrain vehicles. During patrols, photographic imagery and critical survey information will be collected. Patrols are used to check the condition of the ROW, identify any new activities within the ROW, and check the condition of the existing structures and lines to maintain system reliability and to ensure the safety of the public.

APPENDIX



MISC. DETAILS MAINTENANCE & WORKING PADS LATTICE TOWERS GUIDE FOR ENCROACHMENT



**MISC. DETAILS
MAINTENANCE & WORKING PADS
LATTICE TOWERS
GUIDE FOR ENCROACHMENT**

ROW BOUNDARY

PAD A

(MAINTENANCE/CONSTRUCTION PAD 35 FT BY 100 FT)

(TYP. PER STRUCTURE)

MAXIMUM SLOPE LESS THAN 3% OR NATURAL TERRAIN

ACCESS ROADS TO ALL PADS

PAD D

PAD B

PAD E

PAD C

PAD F

ROW BOUNDARY

VARIES

VARIES

MAINTENANCE PAD REQUIREMENTS

(CONCRETE OR ASPHALT USE H520 DESIGN)

WORKING SPACE

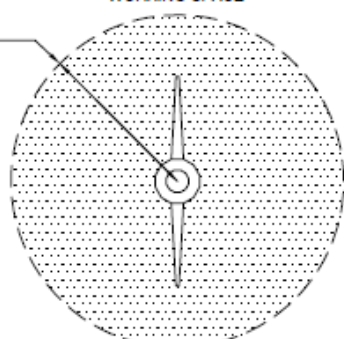
WORKING SPACE

50 FT, MINIMUM


MAXIMUM SLOPE = 3%

OR NATURAL TERRAIN

NO CONSTRUCTION ALLOWED



REV	DATE	DESCRIPTION	BY	CHKD	APPD



ENERGY • WATER • COMMUNITY SERVICES

DATE:

OCT 2022

BY	CHKD	APPD
DSJ	-	-

MODULE NUMBER

DET-ROW-2-A

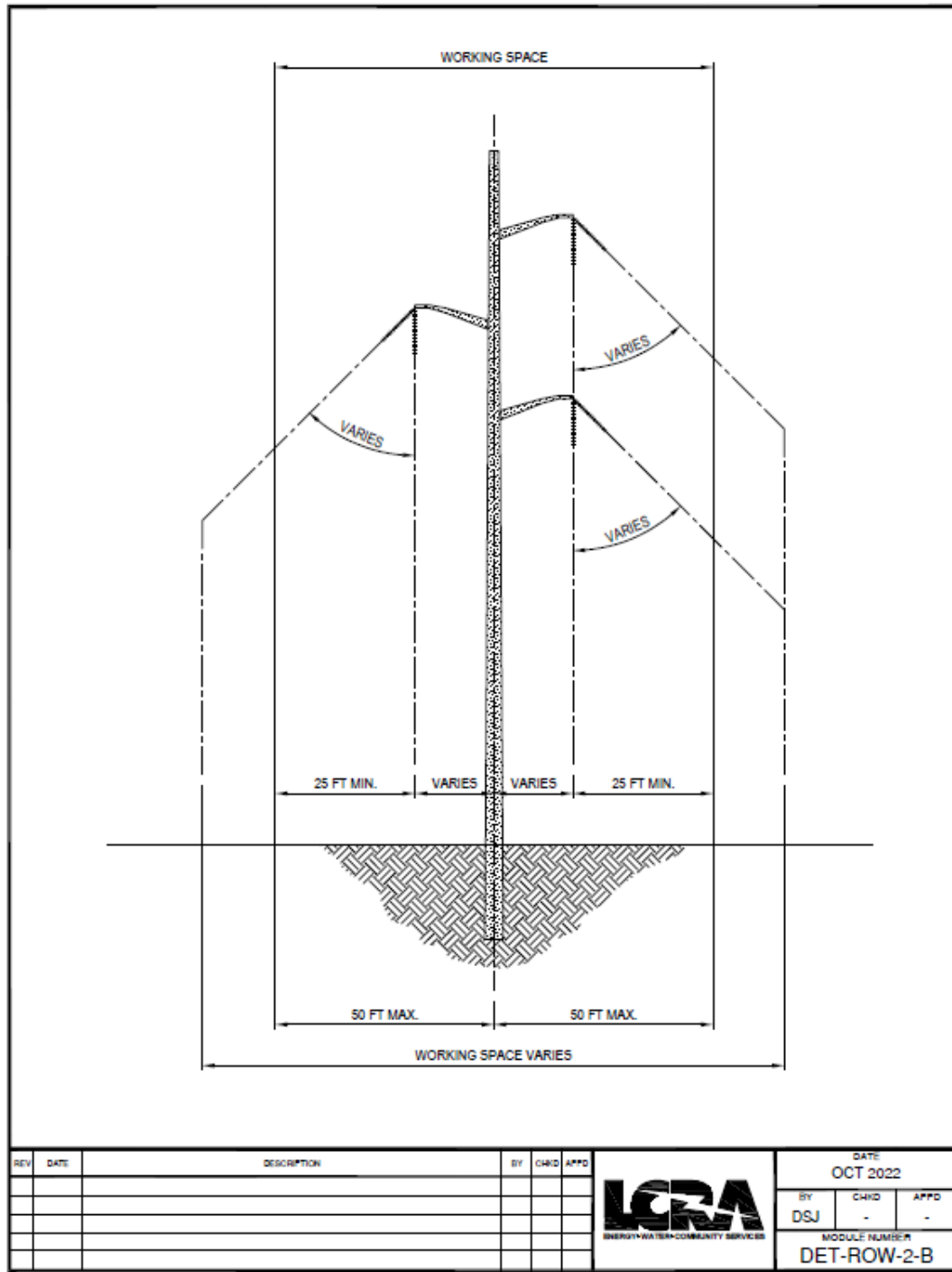
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MISC. DETAILS

MAINTENANCE & WORKING PADS

TUBULAR STEEL POLES

GUIDE FOR ENCROACHMENT



**MISC. DETAILS
MAINTENANCE & WORKING PADS
TUBULAR STEEL PADS
GUIDE FOR ENCROACHMENT**

<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>PAD A</p> <p>MAINTENANCE/CONSTRUCTION PAD 25 FT. BY 100 FT. (TYP. PER STRUCTURE) MAXIMUM SLOPE LESS THAN 3% OR NATURAL TERRAIN ACCESS ROADS TO ALL PADS.</p> </div> <div style="width: 45%;"> <p>PAD D</p> </div> </div>		ROW BOUNDARY VARIES VARIES ROW BOUNDARY
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>PAD B</p> </div> <div style="width: 45%;"> <p>PAD E</p> </div> </div>		
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>PAD C</p> </div> <div style="width: 45%;"> <p>PAD F</p> </div> </div>		
<p>MAINTENANCE PAD REQUIREMENTS (CONCRETE OR ASPHALT USE H520 DESIGN)</p>		

WORKING SPACE
50 FT. MINIMUM
MAXIMUM SLOPE = 3%
OR NATURAL TERRAIN
NO CONSTRUCTION ALLOWED

REV	DATE	DESCRIPTION	BY	CHKD	APPD

DATE
OCT 2022

BY DSJ	CHKD -	APPD -
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MODULE NUMBER
DET-ROW-3-A

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**MISC. DETAILS
MAINTENANCE & WORKING PADS
MULTIPLE WOOD POLE STRUCTURES
GUIDE FOR ENCROACHMENT**

Texas Native	Best Bet	Deer Resis. When Mature	Common Names	Botanical Name	Evergreen Or Deciduous	Attractive Bloom	Avg. Height	Avg. Width	Growth Rate	Light	Water Needs	Zone	Site Preference	Features and Landscape Values	Drawbacks or Possible Problems
★			Acacia, Huisache	<i>Acacia farnesiana</i>	E to SE	X	10'	6'	Fast	☼	L	8,9,10,11	<ul style="list-style-type: none"> Alkaline loam, clay, poor drainage okay Adaptable 	<ul style="list-style-type: none"> Drought and heat tolerant 	<ul style="list-style-type: none"> Somewhat short-lived Root rot and leaf spot from wet soils
★			Ash, Fragrant	<i>Fraxinus cuspidata</i>	D	X	10'-12'		Fast	☼	M	8	<ul style="list-style-type: none"> More suited to Trans-Pecos 	<ul style="list-style-type: none"> Spring blooms 	
★			Buckeye, Mexican	<i>Ungnadia speciosa</i>	D	X	10'-15'	10'	Mod-to-Fast	☼	L	8	<ul style="list-style-type: none"> Sandy, rocky hillsides and stream banks; Dry to more moist; Well-drained 	<ul style="list-style-type: none"> Showy spring flowers Drought tolerant Understory Pest and disease- 	
★	✓	Yes	Holly, Yaupon	<i>Ilex vomitoria</i>	E		10'-15'	10'	Medium	☼	L-M	7	<ul style="list-style-type: none"> Low, moist woods 	<ul style="list-style-type: none"> Salt tolerant Screening Wildlife food 	<ul style="list-style-type: none"> No insect, disease problems
★	✓	Yes	Mountain Laurel	<i>Sophora secundiflora</i>	E	X	15'		Slow	☼	L	8	<ul style="list-style-type: none"> Well-drained sand, loam, clay, caliche limestone soils Some salt okay 	<ul style="list-style-type: none"> Understory Fragrant flowers Drought & heat tolerant 	<ul style="list-style-type: none"> All parts poisonous to animals New growth attractive to Uresiphita reversalis worm Subject to damage in severe
★		Yes	Myrtle, Wax	<i>Myrica cerifera</i>	E		10'	8'	Fast	☼	M	7	<ul style="list-style-type: none"> Moist, fertile, acid soils; needs 25" of rain per year Thickets, woodlands, low places. 	<ul style="list-style-type: none"> Wildlife food Salt spray and wet soil tolerance Screening 	<ul style="list-style-type: none"> Brittle wood Not long-lived Large specimens may not transplant well Water suckers
★	✓	Yes	Persimmon, Texas (or Black)	<i>Diospyros texana</i>	SE		20' x 12'		Slow	☼	L	8	<ul style="list-style-type: none"> Dry, well-drained sites Loam, clay, caliche Adaptable 	<ul style="list-style-type: none"> Drought tolerant Wildlife food Very heat & drought tolerant 	
			Pine, Japanese Black	<i>Pinus thunbergiana</i>	E		10'-15'	8'	Slow	☼	L-M	7	<ul style="list-style-type: none"> Good drainage a must Doesn't like heavy soil 	<ul style="list-style-type: none"> Salt tolerant Picturesque form Drought tolerant Nice, dramatic form 	
★	✓		Redbud, Mexican	<i>Cercis canadensis var. mexicana</i>	D	X	10'	10'	Fast	☼	L	7	<ul style="list-style-type: none"> Hard limestone soils in West Texas Requires good drainage 	<ul style="list-style-type: none"> Spring color Autumn color 	<ul style="list-style-type: none"> Short-lived Leaf spot Stem canker Leaf borers
★	✓		Redbud, Texas	<i>Cercis canadensis var. 'Texensis'</i>	D	X	15'	15'	Fast	☼	L-M	6	<ul style="list-style-type: none"> Dry soils east of Eastern Redbud range 	<ul style="list-style-type: none"> Spring color Autumn color 	<ul style="list-style-type: none"> Short-lived Leaf spot Stem canker Leaf borers
★			Smoke Tree	<i>Cotinus Obovatus</i>	D	X	15'	15'	Med-Slow	☼	L-M	4,5,6,7,8,9	<ul style="list-style-type: none"> Well-drained sand, loam, clay, limestone, north or east-facing slope or protected in front of a Juniper 	<ul style="list-style-type: none"> Good spring show Deer resistant 	<ul style="list-style-type: none"> Weak wood Variable cold-tolerance Low tolerance of wet soils
★		Yes	Sumac Prairie Flameleaf Lanceleaf Sumac	<i>Rhus lanceolata</i>	D	X	15'	6'	Fast	☼	L	6	<ul style="list-style-type: none"> Limestone to neutral soils west of I-35 Sand, loam, caliche, limestone Well-drained 	<ul style="list-style-type: none"> Very high heat tolerance Wildlife food Fall color Western version of 	<ul style="list-style-type: none"> Suckers Self-seeding Colony-forming
★	✓	Yes	Willow, Desert	<i>Chilopsis linearis</i>	D	X	15'	15'	Fast	☼	L	8	<ul style="list-style-type: none"> Dry, gravelly, alkaline soils Good drainage 	<ul style="list-style-type: none"> Drought-tolerant Resistant to cotton root rot 	<ul style="list-style-type: none"> Requires pruning to keep from looking scraggly Not suitable for really harsh winter conditions
★		Yes	Yucca, Trecul	<i>Yucca treculeana</i>	E	X	10'-12'	4'	Medium	☼	L	8	<ul style="list-style-type: none"> Sandy loam, but adaptable as long as good drainage 	<ul style="list-style-type: none"> Heat and drought tolerant 	<ul style="list-style-type: none"> Sharp, stiff leaves May be subject to borers