SOAH DOCKET NO. 473-16-4342
PUC DOCKET NO. 45866

APPLICATION OF LCRA TRANSMISSION SERVICES CORPORATION TO AMEND ITS CERTIFICATE OF CONVENIENCE AND NECESSITY FOR THE PROPOSED LEANDER TO ROUND ROCK 138-KV TRANSMISSION LINE IN WILLIAMSON COUNTY, TEXAS	§ § § § § § § §	**BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS**

DIRECT TESTIMONY AND EXHIBITS

OF

JESSICA R. MELENDEZ, P.E. #104702

ON BEHALF OF

APPLICANT
LCRA TRANSMISSION SERVICES CORPORATION

JULY 15, 2016

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I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Jessica R. Melendez. My business address is: Lower Colorado River Authority (LCRA), 3505 Montopolis Drive, Bldg D, Austin, Texas 78744.

Q. WHAT IS YOUR CURRENT OCCUPATION?

A. I am a Senior Engineer employed by the LCRA in the Line and Structural Engineering Department.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A. I earned a Bachelor of Science Degree in Architectural Engineering from the University of Texas at Austin in 2003 and a Master of Science Degree in Engineering Management from the University of Texas at Austin in 2008. I am a licensed professional engineer in the State of Texas (License No. 104702) and have worked for professional engineers or as a professional engineer since 2003. I have worked in the Line and Structural Engineering Department at LCRA since May 2005.

Q. PLEASE STATE YOUR CURRENT JOB RESPONSIBILITIES.

A. I provide professional services related to the engineering design of electric transmission lines. I am responsible for organizing, executing, and managing various types of transmission line projects and ensuring that the designs address the provisions and requirements of applicable engineering regulations, guidelines, and standards. I prepare cost estimates, perform engineering calculations, procure consulting services, structures, and other materials, prepare construction documents (drawings, specifications, and cost estimates), provide construction support and oversight, and provide engineering support to LCRA TSC's transmission maintenance and operations functions.

Q. HAVE YOU TESTIFIED PREVIOUSLY BEFORE THE PUBLIC UTILITY COMMISSION OF TEXAS (PUC OR COMMISSION)?

A. Yes, I testified in PUC Docket No. 39479 and PUC Docket No. 43599.

II. SCOPE AND PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to describe the engineering, design, and cost aspects of the proposed Leander to Round Rock 138-kilovolt (kV) Transmission Line Project (Project), including:

(1) the design of the proposed transmission line facilities;

(2) how the proposed structures and right-of-way (ROW) widths were selected;

(3) engineering considerations and permits for the proposed transmission line facilities; and

(4) estimated costs for the proposed transmission line facilities.

Q. WHAT PORTIONS OF LCRA TSC'S APPLICATION TO AMEND ITS CERTIFICATE OF CONVENIENCE AND NECESSITY (CCN) FOR THE PROJECT (APPLICATION) DO YOU SPONSOR?

A. I sponsor the responses to Question 5 in the Application. I also co-sponsor the response to Question 13 with Mr. Sergio Garza, the responses to Questions 6, 20, and 23 with Ms. Lisa Meaux, and the response to Question 4 with Mr. Garza and Mr. Christian Powell. I co-sponsor Section 1 of the *Leander to Round Rock 138-kV Transmission Line Project Environmental Assessment and Alternative Route Analysis Williamson County, Texas* (EA) prepared by POWER Engineers, Inc. (POWER) that is included with the Application as Attachment 1 with Mr. Garza. I also co-sponsor Attachment 4 to the Application with Mr. Garza as amended by the errata filed in this proceeding on June 1, 2016. Please refer to Exhibit CTP-1 in Mr. Powell's direct testimony for an overview of LCRA TSC sponsorship of the Application in this case.

Q. WERE YOUR TESTIMONY AND THE PORTIONS OF THE APPLICATION YOU SPONSOR PREPARED BY YOU OR BY KNOWLEDGEABLE PERSONS UPON WHOSE EXPERTISE, JUDGMENT, AND OPINIONS YOU RELY IN PERFORMING YOUR DUTIES?

A. Yes, they were.

Q. IS THE INFORMATION CONTAINED IN YOUR TESTIMONY AND THE PORTIONS OF THE APPLICATION YOU SPONSOR TRUE AND CORRECT TO THE BEST OF YOUR KNOWLEDGE AND BELIEF?

A. Yes, it is.

III. <u>DESCRIPTION OF THE PROJECT</u>

Q. PLEASE DESCRIBE THE PROJECT.

A. LCRA TSC proposes to construct, own, and operate a new 138-kV electric transmission line in Williamson County. The Project will connect the existing Pedernales Electric Cooperative, Inc. (PEC) Leander Substation, two proposed new substations, and the existing Oncor Electric Delivery Company LLC (Oncor) Round Rock Substation. The entire project will be approximately 11 to 22 miles in length, depending on the routeapproved by the Commission.

LCRA TSC will initially install one 138-kV circuit on the new structures with the provision for a second circuit to be installed in the future. The initial 138-kV circuit will consist of two 795 kcmil 26/7 ACSR "Drake" conductors per phase and one fiber optic ground wire (OPGW).

IV. <u>STRUCTURE TYPE AND ROW WIDTH</u>

Q. WHAT TYPICAL STRUCTURE TYPE DOES LCRA TSC PROPOSE TO USE FOR THIS PROJECT?

A. LCRA TSC proposes to construct the Project primarily with 138-kV double-circuit capable braced post or v-string steel poles due to the generally densely developed project study area. Pole type structures have a smaller foot print than H-frames and lattice towers, and steel poles can be delivered in sections to be assembled during construction, as opposed to concrete poles, which can typically only be delivered and installed in one piece. In addition, the braced post or v-string insulator assemblies aid in limiting wire movement/blow-out, which reduces the ROW width required for electrical clearances and vegetation management.

Some route segments, including Segments I3, G3, E3, C3, X2, and a portion of A1, utilize an existing LCRA TSC electric transmission line corridor (LCRA TSC T378 Round Rock to Chief Brady and T355 Chief Brady to Georgetown, depending upon the specific route segment). Along these segments, LCRA TSC proposes to remove the existing single-circuit structures and wires and construct triple-circuit capable H-frame structures that will support the existing circuit and the two new circuits proposed for this Project.

In some areas, such as transmission line crossings and highway crossings, shorter than typical, taller than typical, or alternative structure types may be utilized.

Q. WHAT TYPICAL NEW ROW WIDTH DOES LCRA TSC USE FOR NEW 138-KV TRANSMISSION LINE PROJECTS?

A. LCRA TSC's typical minimum ROW width for a new 138-kV transmission line is 80-feet. LCRA TSC uses this ROW for safe access to the transmission line structures and to provide the necessary clearances between the conductor and structures and vegetation outside of the controlled ROW.

Q. WHAT ROW WIDTH DOES LCRA TSC PROPOSE TO USE FOR THIS PROJECT?

A. The new double-circuit capable 138-kV transmission facilities will typically be constructed on new ROW within 80 foot easements and using spans that range from approximately 600 to 1,000 feet. However, due to the densely populated nature of the Project study area, in order to identify a reasonable number of geographically diverse route alternatives, LCRA TSC evaluated areas where segments could be located using a narrower than typical ROW width. Specifically, all or some portions of Segments A4, B2, E4, H3, J3, L4, M1, N1, N3, O3, T2, X5, and Y2 are estimated using a 60-foot ROW. This narrower ROW width results in shorter spans (approximately 500-600 feet versus 600-1,000 feet typical), which will require the use of more poles.

In other areas where 60 feet of private ROW space was not available but adjacent road ROW could be used, LCRA TSC proposes to utilize the road ROW for some portion of the necessary clearances. For example, 40 feet of ROW on private property plus 20 feet of clearance in the road ROW equals 60 feet of total clearance for the transmission line. Specifically, all or some portions of Segments A4, B2, D1, E, F5, H3, J3, L, M1, N3, O, O3, and Y2 are estimated to utilize a portion of road ROW for clearance purposes.

Finally, LCRA TSC also proposes to construct some of the transmission line structures within road ROW in order to identify route segments where sufficient ROW (approximately 35 feet) on private property was unavailable for a route segment in that area. Specifically, all or some portions of Segments A4, B2, D1, E4, H4, I4, L5, M1, N3, and O3 are estimated to be constructed with structures located within road ROW.

Thus, because 80 foot ROW was not available throughout the study area, LCRA TSC's use of narrower than typical ROW allowed it to identify a robust set of geographically diverse route alternatives within this highly constrained area and to maximize the distance of the transmission line from habitable structures in some areas.

Actual easement widths will be determined during the detailed design phase of the Project. Access easements and/or temporary construction easements may be needed in some areas as well.

Q. DOES LCRA TSC OWN ANY EXISTING EASEMENTS OR PROPERTY ALONG ANY OF THE PROPOSED ROUTE SEGMENTS?

A. Yes. As described above, some route segments, including Segments I3, G3, E3, C3, X2, and a portion of A1, utilize an existing LCRA TSC electric transmission line corridor. Along these segments, LCRA TSC owns easements within which LCRA TSC could operate and maintain the existing circuit and the two new circuits proposed for this Project. LCRA TSC does not anticipate the need to acquire any additional easement width along the existing corridor. The easements associated with these segments and the associated transmission line were originally acquired and constructed, respectively, in the late 1940s. Thus, all of the habitable structures currently located adjacent to the existing transmission line corridor were constructed after the transmission line.

Q. HOW WOULD THE PROPOSED TRANSMISSION LINE STRUCTURES DIFFER FROM THE FACILITIES THAT ARE CURRENTLY LOCATED WITHIN THE EXISTING TRANSMISSION LINE CORRIDOR?

A. The facilities in the existing corridor consist of primarily single-circuit steel H-frame tangents and small angles and lattice tower large angles and dead-ends. The structures proposed for this Project are triple-circuit capable H-frames and small angles and steel 3-pole large angles and dead-ends.

The new triple-circuit capable H-frames are estimated to have a slightly larger footprint than the existing H-frames (with the pole spacing increased by approximately 4 feet total, 2 feet either side of the structure centerline) and to be taller (by approximately 25-30 feet or more). This structure height increase is intended to at least maintain the existing minimum ground clearance (i.e., the wires will not be closer to the ground than they are today). LCRA TSC intends to place the new structures in the vicinity of the existing structures (within 5-10 feet of the existing structure location).

The precise footprint, height, and location of each new structure will be determined following the issuance of a final order in this docket and during the detailed design phase when light detection and ranging (LIDAR) survey data and supplemental ground survey data are available in order to fully evaluate all constraints.

Q. DOES LCRA TSC PLAN TO OVERBUILD EXISTING DISTRIBUTION LINES?

A. Yes, in some areas. LCRA TSC's typical practice is to construct transmission lines on their own structures in their own easements adjacent to existing distribution lines. However, due to the generally densely populated nature of the Project area and existing constraints, portions of some route segments, including Segments B2, D1, E4, F5, N3, and Y2, are generally located along existing distribution alignments and may require coordination with the distribution circuit owner for co-locating or "overbuilding" the existing distribution circuits with the new transmission line. The precise locations of overbuild will be determined during the detailed design phase of the Project after approval by the Commission.

Overbuilding means that, where required, existing distribution poles will be replaced with new, taller and wider poles that can support both the transmission line and the distribution line wires, hardware, appurtenances, etc. as well as other utilites (e.g., telephone) currently attached to the distribution poles.

Please see exhibit JRM-1 for correspondence from Oncor regarding overbuilding of their distribution facilities in the study area.

V. ENGINEERING CONSIDERATIONS

Q. WHAT ENGINEERING CONSIDERATIONS WILL BE USED IN THE DESIGN OF THE PROJECT?

A. LCRA TSC will design the Project to meet or exceed industry-accepted standards and specifications for operating the transmission facilities in a safe and reliable manner, including the National Electrical Safety Code (NESC). The Project will be constructed in a manner that complies with all state and federal statutes and regulations applicable to transmission line construction and operation as well as LCRA TSC's Transmission Line Engineering Standards and the Rural Utilities Service (RUS) "Design Manual for High Voltage Transmission Lines."

Q. HOW WILL LCRA TSC DETERMINE THE FINAL ALIGNMENT OF THE ROUTE APPROVED BY THE COMMISSION?

A. Upon Commission approval, engineers for LCRA TSC will begin detailed design of the Project and develop an alignment based on the approved route. This will involve gathering detailed survey information, including locations of above-ground, at-grade, and sub-surface constraints and precise property line locations, as well as any locations of environmental and cultural resources.

Q. WILL LCRA TSC WORK WITH LANDOWNERS TO MAKE MINOR ROUTE ADJUSTMENTS FOLLOWING THE COMMISSION'S APPROVAL OF A ROUTE?

A. Yes. In accordance with direction set forth in the Commission's order, LCRA TSC will work with landowners on minor routing modifications during the design phase of the Project.

Q. PLEASE DESCRIBE THE TYPICAL CONSTRUCTION, OPERATION, AND MAINTENANCE PROCESS FOR A TRANSMISSION LINE OF THE TYPE PROPOSED FOR THE PROJECT.

A. During construction, projects of this type require surveying, ROW clearing, foundation installation, structure assembly and erection, conductor and shield wire installation, and cleanup. Following construction, periodic inspection of the ROW, structures, and wires will be performed. These activities are described further in Sections 1.5 and 1.6 of the EA.

Q. DOES LCRA TSC MITIGATE THE POTENTIAL IMPACTS OF THE CONSTRUCTION, OPERATION, AND MAINTENANCE OF TRANSMISSION LINES ON THE PUBLIC?

A. Yes. LCRA TSC utilizes a number of standard practices to mitigate vegetation removal, construction, and maintenance impacts. These practices are discussed in detail in Sections 1.3, 1.5, and 1.6 of the EA.

Q. CAN LCRA TSC SAFELY AND RELIABLY CONSTRUCT, OPERATE, AND MAINTAIN A TRANSMISSION LINE THAT CROSSES A FLOODPLAIN?

A. Yes. LCRA TSC has constructed, operates, and maintains transmission lines within the 100-year floodplain in numerous locations throughout its system. The presence of a 100-year floodplain along the path of a transmission line is taken into account during design of the facilities and does not prevent the safe and reliable construction, operation, and maintenance of a properly designed and constructed transmission line.

Q. WILL ANY ADDITIONAL PERMITS OR APPROVALS BE REQUIRED FOR THE PROJECT AND, IF SO, WHEN WILL THEY BE OBTAINED?

A. Yes. Following Commission approval of the Project, permits or other agency actions will be required and will be obtained prior to construction during the design phase of the Project, when specific structure locations and heights have been determined. Permits or regulatory approval may be required from the following agencies:

- TxDOT
- Texas Commission on Environmental Quality
- United States Army Corps of Engineers

- United States Fish & Wildlife Service (USFWS)
- Texas Historical Commission (THC)

The potential permits or regulatory approvals are described in more detail in Section 1.3 of the EA.

Q. HAVE YOU PERFORMED ANY CALCULATIONS RELATED TO THE PROJECT'S ELECTRIC AND MAGNETIC FIELDS (EMF)?

A. Yes. I calculated EMF for four line configurations based on expected Electric Reliability Council of Texas transmission line load flows. The line configurations included:

- A vertical configuration double-circuit pole with a 28 foot minimum ground clearance (only one circuit installed).
- A vertical configuration double-circuit pole with a 28 foot minimum ground clearance (two circuits installed).
- A triple-circuit capable H-frame with a 28 foot minimum ground clearance (two circuits installed).
- A triple-circuit capable H-frame with a 28 foot minimum ground clearance (three circuits installed).

I calculated magnetic fields in milliGauss (mG) and electric fields in kV per meter (kV/m). The results, at various distances from the centerline, are presented in Exhibit JRM-2.

Q. WHAT ARE THE UNDERLYING ASSUMPTIONS FOR THESE EMF CALCULATIONS?

A. The EMF calculations presented in Exhibit JRM-2 assume peak loading. The calculation results are taken at a mid-span cross-section where the conductors are at their maximum sag, which results in calculating the highest potential EMF for the span. At most times and in most places, the EMF will be less than those presented in the exhibit.

Q. WHAT CONCLUSIONS DID YOU REACH BASED ON THE EMF CALCULATIONS YOU PERFORMED?

A. The calculated EMF levels are comparable to other transmission lines of this type.

VI. COST ESTIMATES FOR THE TRANSMISSION LINE PORTION OF THE PROJECT

Q. WHAT ARE LCRA TSC'S ESTIMATED TRANSMISSION LINE COSTS FOR THE PROJECT?

A. LCRA TSC's estimated costs for the transmission line portion of the Project range from approximately $50 million to $84 million, with route lengths ranging from approximately 12 to 22 miles. The estimated costs are presented in Attachment 4 to the Application. Mr. Garza addresses estimated substation costs for the Project in his direct testimony. The combination of estimated transmission line costs that I prepared and substation costs that Mr. Garza prepared provides the total estimated cost for each route of the Project.

Q. WHAT INFORMATION DID YOU USE AS A BASIS FOR GENERATING THE TRANSMISSION LINE COST ESTIMATES?

A. I used information from a variety of sources, including segment data from the EA and geographic information system (GIS) analysis, preliminary designs and costs from LCRA TSC vendors and contractors based on long-term contract pricing models, and construction cost estimates based on a review of the Project area. Estimates are based on current pricing.

Q. WHAT METHOD DID YOU USE FOR GENERATING THE REAL ESTATE COST ESTIMATES FOR THE TRANSMISSION LINE PORTION OF THE PROJECT?

A. The real estate cost estimates for the Project (with the exception of Segments A3a, B1, B4a, D3a, F4a, J5, M5, N5, U1a, V1a, V2, and W2a) were developed using the following steps:

- Identify the parcels crossed by the estimated transmission line easement for each segment, and determine the estimated easement acreage on each parcel.
- Obtain the county tax appraisal market value for each parcel. Use the tax appraisal data to determine the cost per acre for each parcel.
- Calculate the estimated easement cost on each parcel by multiplying the estimated easement acreage on the parcel by the tax appraisal market value per acre.
- For each segment, sum the estimated easement cost per parcel to obtain the total estimated easement cost for the segment.

- Multiply the estimated easement cost by a factor of 2.5. The multiplier factor accounts for additional costs associated with items not specifically included in the estimated cost of the easement on a per parcel basis. These items include, but are not limited to, temporary construction easements, damages to the remainder, construction damages, temporary or permanent off ROW access easements, changes in land use and/or land value during the period of time between the preparation of the estimate and acquisition, and additional compensation required as an outcome of litigation.

This method will be referred to as the "traditional real estate cost estimating method."With the exception of the segments discussed below, this method was used to develop the cost estimates for the majority of the route segments.

Q. WHAT METHOD WAS USED FOR GENERATING THE REAL ESTATE COST ESTIMATES FOR THE "OFFSET" TRANSMISSION LINE SEGMENTS (SEGMENTS A3a, B4a, D3a, F4a, U1a, V1a)?

A. As described in Section 4.5.1 of the EA, Segments A3a, B4a, D3a, F4a, U1a, and V1a were included in the Application to increase the distance of the transmission line to over 300 feet from habitable structures. These "offset" segments generally parallel a corresponding segment that is located immediately adjacent to an existing property line (e.g., Segment A3a generally parallels Segment A3; Segment B4a generally parallels Segment B4, etc.). By offsetting the segments away from habitable structures, the distance of the alignment of the offset segment from the property boundary was increased, essentially leaving a strip of property between the property boundary and the new transmission line easement boundary. Please see Exhibit JRM-3 for a map depicting the estimated transmission line easement and strips of property between the property boundary and easement areas for each offset segment.

The real estate cost estimates for the offset segments were developed using the steps described in my previous answer for the transmission line easement plus the following steps to account for the estimated increased cost of the strip of property between the property boundary and the easement:

- Identify the parcels crossed by the estimated transmission line easement for each segment, and determine the estimated acreage of property between the property boundary and the easement on each parcel.

- Obtain the county tax appraisal market value for each parcel. Use the tax appraisal value to determine the cost per acre for each parcel.
- Calculate the estimated cost of the property between the property boundary and the easement on each parcel by multiplying the estimated acreage for that property by the tax appraisal market value per acre.
- For each segment, sum the estimated cost per parcel to obtain the total estimated property between the property boundary and the easement area cost for the segment.

This method will be referred to as the "offset real estate cost estimating method."

Q. WHAT METHOD WAS USED FOR GENERATING THE REAL ESTATE COST ESTIMATES FOR TRANSMISSION LINE SEGMENTS CROSSING ACTIVE OR POTENTIALLY ACTIVE QUARRY AREA (SEGMENTS B1, J5, M5, N5, V2, AND W2a)?

A. All or portions of Segments A1, A3, A3a, B1, B3, C3, D3, D3a, E3, I5, J5, K5, M5, N5, O5, P5, R5, U2, U5, V2, W2, W2a, and X2 cross property owned by Texas Crushed Stone, an active quarry operation. All segments crossing Texas Crushed Stone property were separated into two categories for real estate cost estimating: (1) <u>does not</u> cross active or potentially active quarry area, or (2) <u>does</u> cross active or potentially active quarry area.

Segments A1, A3, A3a, B3, C3, D3, D3a, E3, I5, K5, O5, P5, R5, U2, U5, W2, and X2 were estimated as entirely not crossing active or potentially active quarry area because they were either located on non-active quarry property south of FM 1431 zoned as commercial use, along the existing LCRA TSC T378 and T355 transmission line corridors, or located within 100 feet of the property boundary. The real estate cost estimates for these segments were prepared following the "traditional real estate cost estimating method" described above.

The method used for generating the real estate cost estimates for segments or portions of segments crossing active or potentially active quarry was developed via consultation with and based on a recommendation from an independent appraiser in the Georgetown area with expertise estimating and appraising easements crossing quarry properties. The real estate cost estimates for the segments or portions of segments crossing active quarry or potentially active quarry were developed using the following steps:

- Determine the estimated easement acreage crossing active or potentially active quarry area.

- Calculate the estimated easement cost by multiplying the estimated easement acreage on the parcel by $3.50 per square foot or $152,460 per acre. ($3.50 per square foot is based on an approximate estimated 32,000 tons of rock per 10 feet of pit depth per acre x a 60 foot pit depth x $0.80 per ton rock royalty.)
- Multiply the estimated easement cost by 2.5.
- Determine the estimated easement "buffer" acreage. This "buffer" acreage is calculated based on an estimated width of 180 feet on both sides of the estimated easement area (60 foot pit depth x 3:1 operational slope).
- Calculate the estimated "buffer" cost by multiplying the estimated "buffer" acreage on the parcel by $3.50 per square foot and 0.50.

This method will be referred to as the "quarry real estate cost estimating method."

Segments B1, J5, M5, N5, V2, and W2a were estimated as entirely or partially crossing active or potentially active quarry area. The real estate cost estimates for these segments were generally developed using the "quarry real estate cost estimating method," but they are each unique and will be described individually in detail below.

<u>Segment B1</u>

A portion of Segment B1 is located within 100 feet of the Texas Crushed Stone property boundary and a portion of it is not. The portion of Segment B1 located within 100 feet of the property boundary was estimated using the "traditional real estate cost estimating method" and the portion of Segment B1 not located within 100 feet of the property boundary was estimated using the "quarry real estate cost estimating method."

<u>Segment J5</u>

Segment J5 was entirely estimated using the "quarry real estate cost estimating method."

<u>Segment M5</u>

A portion of Segment M5 crosses area that has already been excavated and a portion crosses active or potentially active quarry area. The portion of the segment that crosses area that has already been excavated was estimated using the "traditional real estate method of cost estimating" and the portion of the segment that crosses active or potentially active quarry was estimated using the "quarry real estate cost estimating method."

Segment N5

Segment N5 was entirely estimated using the "quarry real estate cost estimating method."

Segment V2

A portion of Segment V2 crosses area that is active or potentially active quarry area and a portion of V2 crosses area that was estimated as not active or potentially active quarry area because it has been developed as a treatment plant. The portion of the segment that crosses active or potentially active quarry was estimate using the "quarry real estate cost estimating method" and the portion of the segment crossing within 100 feet of the property boundary and the property that has been developed as a treatment plant was estimated using the "traditional real estate cost estimating method."

Segment W2a

For the 100 foot strip of land located along the quarry property's western property boundary and between the quarry property's western property boundary and Segment W2a the "offset real estate cost estimating method" was used. From the eastern edge of the 100 foot strip described above to the eastern edge of the estimated easement area of Segment W2a, the "quarry real estate cost estimating method" was used.

Q. DOES THE TRANSMISSION LINE REAL ESTATE ESTIMATED COST PER ACRE DETERMINE THE ROW AND LAND ACQUISITION COST FOR A PARCEL THAT LCRA TSC WILL ACTUALLY PAY A LANDOWNER?

A. No. Upon selection of a final route by the Commission, LCRA TSC will determine the precise placement of the alignment on each parcel and use property values based on an independent appraisal to develop actual easement acquisition costs for each parcel. The ROW costs presented in the Application that are used for Project cost estimating purposes should not be viewed or considered as appraised, calculated costs to obtain individual parcels. The data I used to estimate ROW costs for the Project were based on generally publicly available, reproducible, and verifiable information. Basing the estimates on mostly public data ensured that LCRA TSC applied a consistent method for the purpose of comparing relative overall cost estimates among all the proposed alternative routes.

Q. DO THE TRANSMISSION LINE COST ESTIMATES INCLUDE COSTS ASSOCIATED WITH POTENTIAL ENDANGERED SPECIES MITIGATION?

A. Yes. The potential construction-related effects to the federally listed (endangered) golden-cheeked warbler and the two federally listed cave invertebrate species, the Bone Cave harvestman and Coffin Cave mold beetle, can be authorized and mitigated through participation in the Williamson County Regional Habitat Conservation Plan (RHCP). Estimated mitigation costs for these species incorporate conditions of the Williamson County RHCP, including methods/measurements for calculating potential direct and indirect effects, applicable mitigation ratios (i.e., 1:1, 0.5:1), and participation fees (per acre). The cost estimates included in the Application include mitigation costs associated with these species where applicable.

Estimated mitigation costs for the federally listed Jollyville Plateau salamander are based on actual costs incurred for take avoidance and minimization measures on a recently completed LCRA TSC project in Travis County that crossed Balcones Canyonlands Preserve (BCP) land and federally designated Critical Habitat for the Jollyville Plateau salamander. The cost estimates included in the Application include mitigation costs associated with the Jollyville Plateau salamander where applicable.

Q. PLEASE DESCRIBE IN DETAIL HOW THE ENVIRONMENTAL COST ESTIMATES WERE PREPARED.

A. To estimate the golden-cheeked warbler mitigation acreages, three habitat models were evaluated (Model C, Model L, and Model IRNR). Both direct habitat effects resulting from clearing the ROW and indirect effects to contiguous habitat within 250 feet of the edge of the ROW that results from clearing the ROW (fragmentation) were estimated. Per the Williamson County RHCP, for the direct effects a mitigation ratio of 1:1 was used (meaning the cost of one mitigation acre was estimated for every one acre of habitat effected) and for indirect effects a mitigation ratio of 0.5:1 was used (meaning the cost of 0.5 mitigation acres was estimated for every one acre of habitat effected). The estimated acreages were then multiplied by the Williamson County RHCP mitigation cost per acre to determine the total estimated mitigation cost for golden-cheeked warbler for each segment.

For the Bone Cave harvestman and Coffin Cave mold beetle, the USFWS's karst zone mapping (GIS layer) for Travis and Williamson Counties was used. Acreage effects related to ground disturbance in ROW within Karst Zones 1 and 2 were then multiplied by the Williamson County RHCP mitigation cost per acre to determine the total estimated mitigation cost for the karst species.

For the Jollyville Plateau salamander, LCRA TSC consulted with an environmental expert to identify locations with the potential to impact the species. Mitigation costs were included in the cost estimate for all routes containing a segment or segments identified as having the potential to impact the Jollyville Plateau salamander.

Q. DO YOU FIND THE TRANSMISSION LINE COST ESTIMATES TO BE REASONABLE?

A. Yes, I do. The estimates were prepared using input from LCRA TSC staff and outside experts with expertise in different disciplines, including real estate, environmental, and construction. I reviewed the components of the transmission line cost estimates and found the cost estimates for the various routes to be reasonable and consistent with engineering practices and market conditions in effect on the filing date.

Q. ARE THERE FACTORS THAT COULD AFFECT THE ESTIMATED TRANSMISSION LINE COSTS PRESENTED IN THE APPLICATION?

A. Yes. Changes in market conditions, including construction labor and/or the cost of metals or other natural resources, as well as changes in land use, could increase or decrease costs above or below the estimates contained in the Application. Over time, these and other factors could change, resulting in increased or decreased actual costs.

VII. SUMMARY AND CONCLUSION

Q. PLEASE SUMMARIZE YOUR CONCLUSIONS.

A. LCRA TSC proposes to construct, own, and operate a new 138-kV electric transmission line in Williamson County. The Project will connect the existing PEC Leander Substation, two proposed new substations, and the existing Oncor Round Rock Substation. The entire project will be approximately 11 to 22 miles in length, depending on the final route approved.

LCRA TSC will initially install one 138-kV circuit on the new transmission line with the provision for a second circuit to be installed in the future. The initial 138-kV circuit will consist of two 795 kcmil 26/7 ACSR "Drake" conductors per phase and one OPGW.

Steel poles on 60- to 80-foot wide easements are generally proposed. Along the existing transmission line corridor, triple-circuit capable H-frames on existing LCRA TSC easements are proposed. In some areas, depending on terrain and other engineering constraints, easement widths may be more or less than typical. Actual widths will be determined during the detailed design phase of the Project.

The Project cost estimates are reasonable and consistent with engineering practices and market conditions in effect on the filing date.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.