

WESTWOOD HILLS HOME OWNER'S ASSOCIATION SIDEWALK FEASIBILITY STUDY

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Table of Contents

Introduction 2
Tract "D&A" 3
Tract "A" 7
Tract "B" 10
Summary 13

List of Appendices

- Appendix A – Conceptual Plan and Profile Drawings
- Appendix B – Construction Cost Estimates
- Appendix C – Westwood Hills Final Plat
- Appendix D – Westwood Hills 3rd Plat

Submitted By:



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Introduction

- a. **Project Location:** The project is located in the Westwood Hills Subdivision north and east of the Wakarusa Drive and Queens Road in Lawrence, KS.
- b. **Purpose of Study:** The goal of the study is to gain an understanding of the feasibility and cost associated with constructing and maintaining 5-foot sidewalks in the common areas of the subdivision as identified in the figure below.

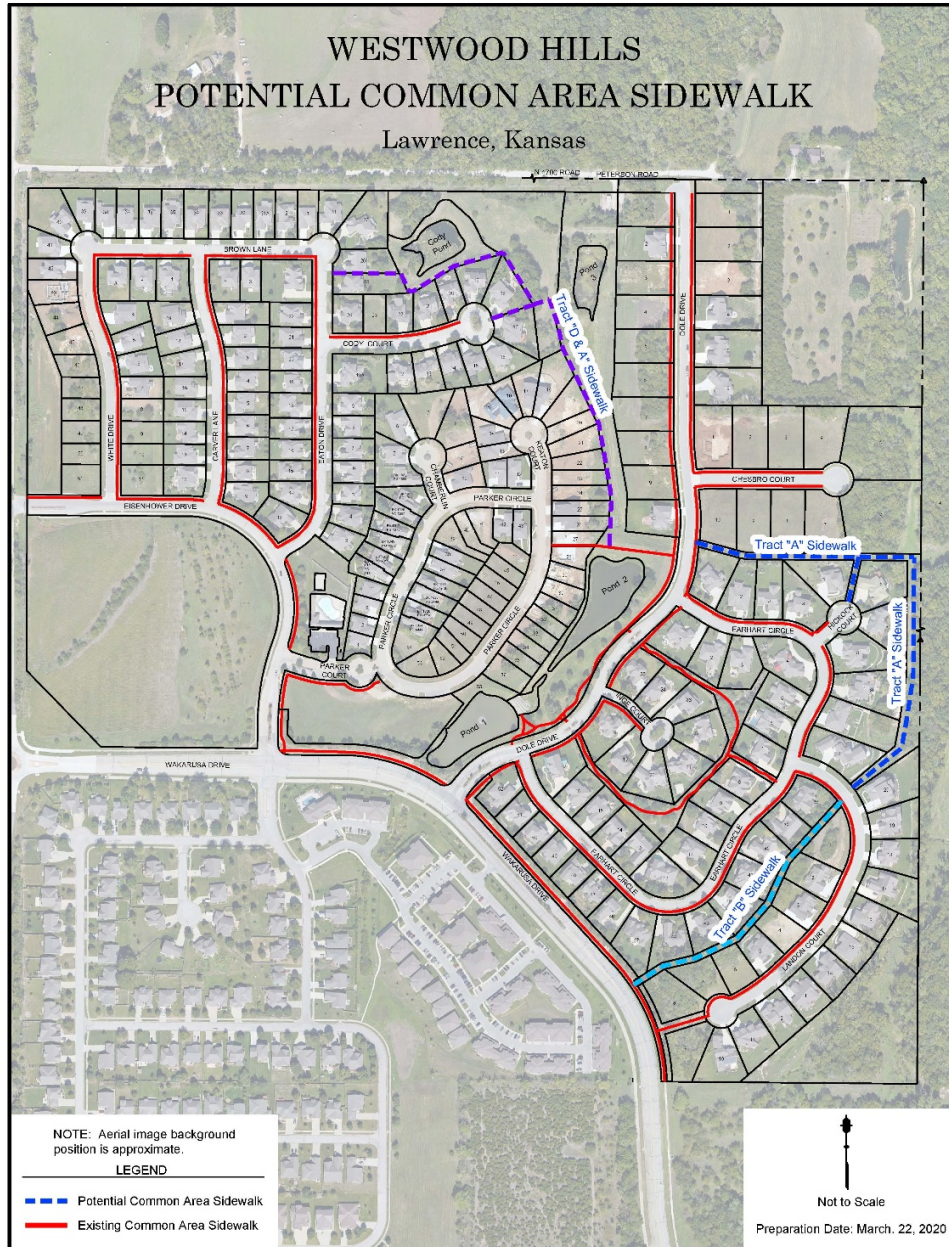


Figure 1 - Location Map

c. Study Scope:

The following were considered in the development of this feasibility study:

- General construction /access within the existing common area tracts.
- Anticipated service life of the pedestrian facilities and future replacement cost.
- Consideration of possible alternate pavement materials to concrete.
- ADA concerns related to slope and terrain.
- Identification of storm drainage improvements required to facilitate construction.
- Identification of retaining walls to accommodate construction.
- Recommended pavement typical section for sidewalk improvements.

Tract "D&A"

The Tract "D&A" segment extends from Eaton Drive to an existing sidewalk on a pond embankment west of Dole Drive. There is also a planned connection to the sidewalk at the end of the Cody Court cul-de-sac.

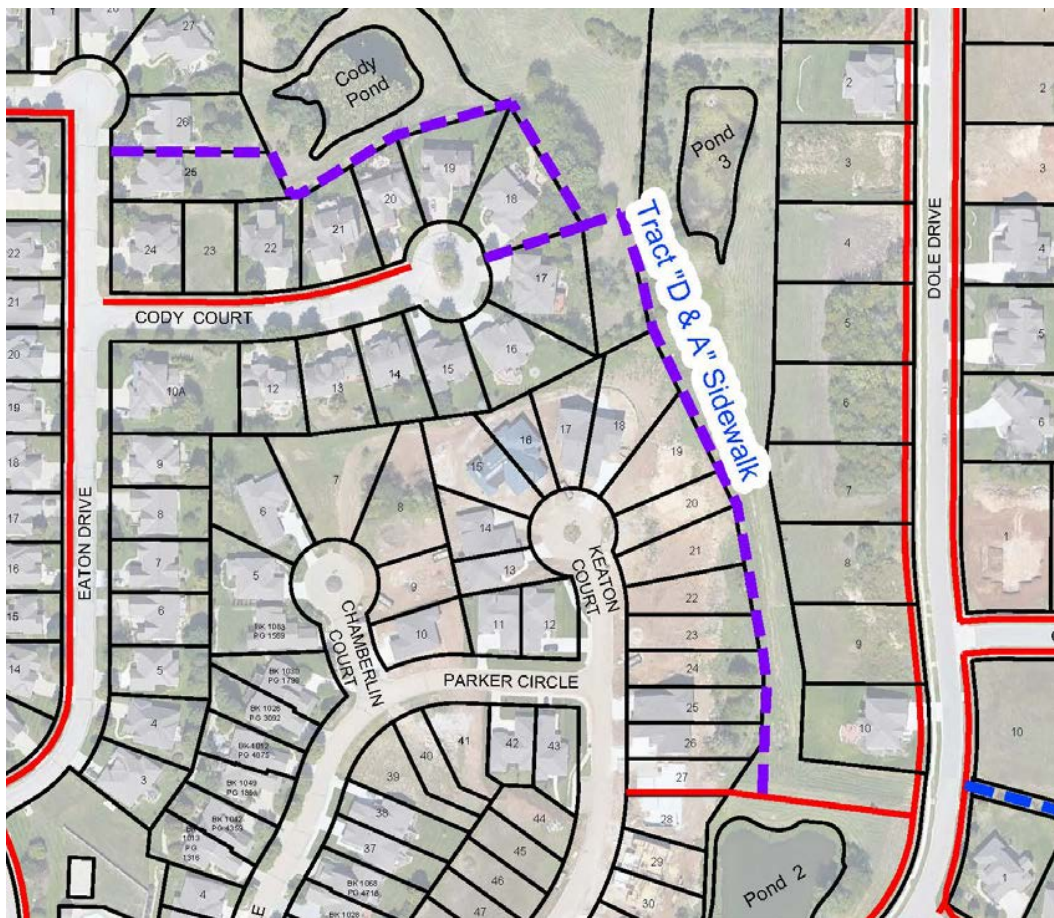


Figure 2 - Tract "D&A"

The Tract “D&A” segment is generally a feasible sidewalk to construct although there are significant portions of the segment that would not be ADA compliant. Conceptual plan and profile drawings are included in the appendix which shows conceptual slopes of the planned sidewalks. In order to meeting ADA criteria, sidewalk longitudinal slopes cannot exceed 5% nor 2% cross slope. Slopes between 5% and 8.3% are considered ramps and must have handrails on both sides except when ramps are intersecting streets. Using this criteria, approximately the first 300 feet east of Eaton Drive (STA 1+00 to STA 4+00) would require handrails on both sides to meet ADA accessibility requirements. Modifications to the existing grade would also be required to meet ADA requirements.



Figure 3 - 10' Ped. Esmt. between Lots 25 & 26

A 10' Pedestrian Easement exists between Lots 25 and 26 of Westwood Hills 3rd Plat (See Figure 3). However, the distance between the existing homes, the existing landscaping, and the confined space between the homes do not make this an ideal location for a 5' sidewalk. It is recommended that a 15' pedestrian easement be acquired over the existing 15' utility easement that exists between lot 25 and lots 22-24 to accommodate a 5' sidewalk. (See Figure 4) The conceptual sidewalk alignment shown in the appendix to this study places the sidewalk in this 15' utility easement.



Figure 4 - 15' Utility. Esmt. between Lot 25 & Lots 22-24

The next segment of Tract “D&A” from STA 4+00 to STA 11+25 is relatively simple to construct and does not present significant design challenges. This segment is located in the Tract “A” Drainage Easement and the longitudinal grades can be designed to meet ADA criteria. South of STA 11+25, the conceptual sidewalk alignment begins to merge with a drainage channel north of the existing retention pond west of Dole Drive. As the sidewalk alignment merges with the drainage channel, a combined sidewalk/retaining wall will need to be designed to ensure the sidewalk cross-slope meets ADA criteria. The length of the combined sidewalk/retaining wall is approximately 450-feet through the drainage channel. At STA 16+00, the sidewalk begins to climb the embankment for the retention pond and therefore exceeds the ADA maximum slope for both sidewalk and sidewalk ramp. Sidewalk ‘switchbacks’ may need to be designed to meet ADA slope criteria on the north side of the retention pond embankment.



Figure 5 - Typical Topography of Tract "D&A"



Figure 6 - View from the retention pond embankment looking north along drainage channel

There is a planned sidewalk connection from Cody Court to Tract "D&A" in a 20' Pedestrian Easement between Lots 17 and 18 in Block One. Although a wider pedestrian easement exists here, this connection is not practical due to the dense vegetation and steep slopes which exceed 20% on Lots 17 and 18. The existing 5-foot sidewalk on the north side of Cody Ct. can be used as an alternate connection to the Tract "D&A" sidewalk for the residents along Cody Ct., with the simple connection of the "D&A" sidewalk to the existing sidewalk along the west frontage of Lot 24.



Figure 7 - Dense vegetation at Cody Ct. sidewalk connection

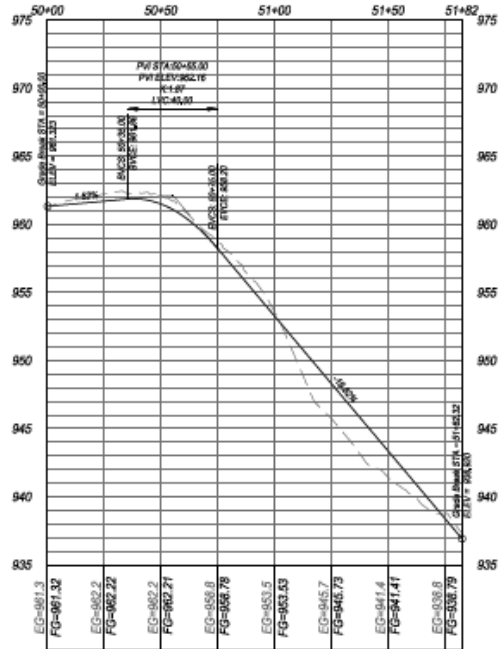
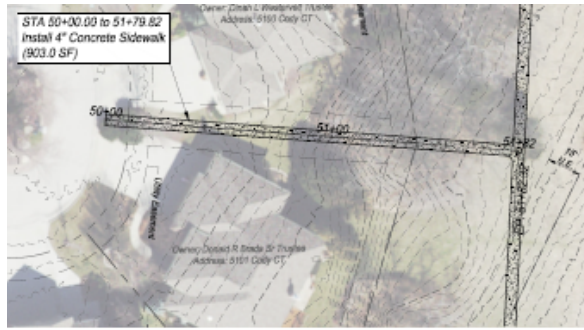


Figure 8 - Plan and profile at Cody Ct. connection

A detailed construction cost estimate for Tract D&A is provided in the appendix. The cost estimate assumes 4" concrete sidewalk construction and includes a 20% contingency. The construction cost estimate for Tract "D&A" is \$269,159 and the construction cost estimate for the Tract "D&A" connection at Cody Ct. is \$74,954. The construction cost estimate does not include the construction of steps, stairs, or handrails if needed.

Tract "A"

The Tract "A" Sidewalk extends from the east side of Dole Drive north of Earhart Circle to the north side of Landon Court on the east side of Earhart Circle. There is also a planned sidewalk connection at the Hickock Court cul-de-sac.

Tract "A" is proposed in a 20-foot wide Access Easement of Block One of the Westwood Hills Subdivision as shown on the Final Plat.

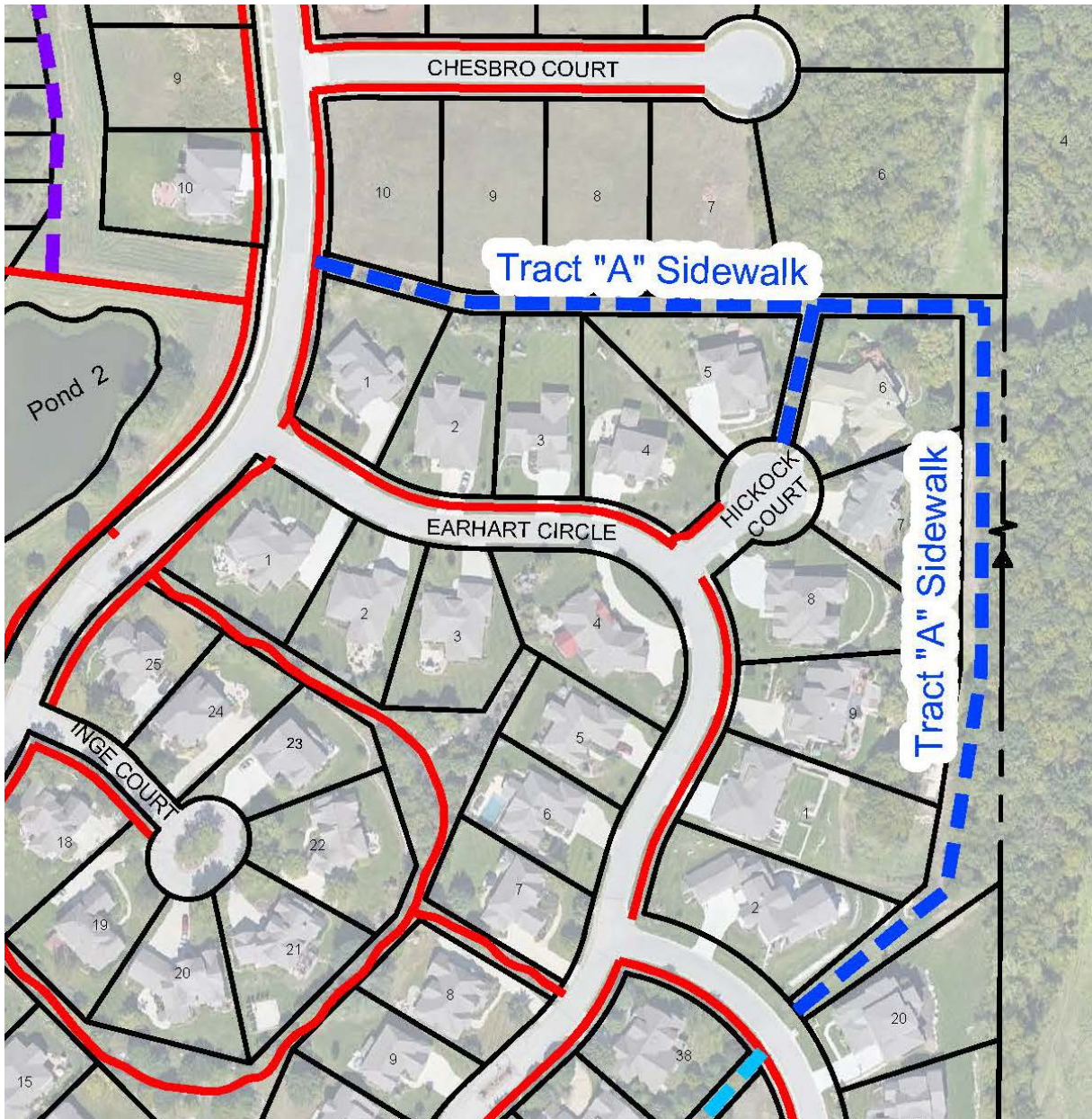


Figure 9 - Tract "A"

Tract "A" is generally feasible to construct, however, the 200-foot segment from STA 14+50 to 16+50 on the north side of Lot 6 has very steep grades in excess of 25% and will not meet ADA grade requirements. Stairs, or a series of stairs, may need to be designed and constructed to facilitate a trail connection along the slope.

The other area of the trail segment that is problematic is the south end of the trail portion where Tract "A" connects with Landon Court. The anticipated grade of the 150-feet of this sidewalk segment is approaching 20% and stairs will also likely be required here.



Figure 10 - 25% grade in pedestrian easement on North side of Lot 6 along Tract "A"



Figure 11 - 18% grade at Tract "A" connection to Landon Court.

Tract "A" has a proposed sidewalk connection at the Hickok Court cul-de-sac in a 20-foot wide pedestrian easement. While the grades along this potential connection are conducive for a sidewalk, there are substantial landscaping improvements and a number of cedar trees in the easement that may require removal or relocation. It is also not clear without being verified by a boundary survey if the landscaping improvements are within the pedestrian easement or if a sidewalk connection can be made inside the pedestrian easement east of the existing retaining wall. Survey work is required to determine the location of the stone retaining wall relative to the pedestrian easement and if the sidewalk connection can be made without acquiring additional pedestrian easement between the stone retaining wall and the home on Lot 6.



Figure 10 - Landscaping challenges at Tract "A" Hickok Ct. connection

The construction cost estimate for Tract "A" is \$158,322. The construction cost estimate for the Hickok Court sidewalk connection is \$16,670, not including the cost of landscape relocation or acquiring additional pedestrian easement, if necessary. The construction cost estimate does not include the construction of steps, stairs, or handrails if needed.

Tract "B"

The Tract "B" Sidewalk extends from the south side of Landon Court to the existing sidewalk on the north side of Wakarusa Drive. There is an existing 20' pedestrian access easement that is identified at Tract "B" on the Final Plat of Westwood Hills that the 5-foot sidewalk will be located in.

Unlike Tracts "D&A" and Tract "A", the alignment and property lines for the properties adjacent to Tract "B" are not as apparent as the other two segments of sidewalk. There are also more trees, vegetation, and rocks that will require more removal, not only for construction, but for topographic survey as well. Tract "B" will require substantially more survey and design effort to establish the pedestrian easements and topographic survey through the dense vegetation and trees along the segment.

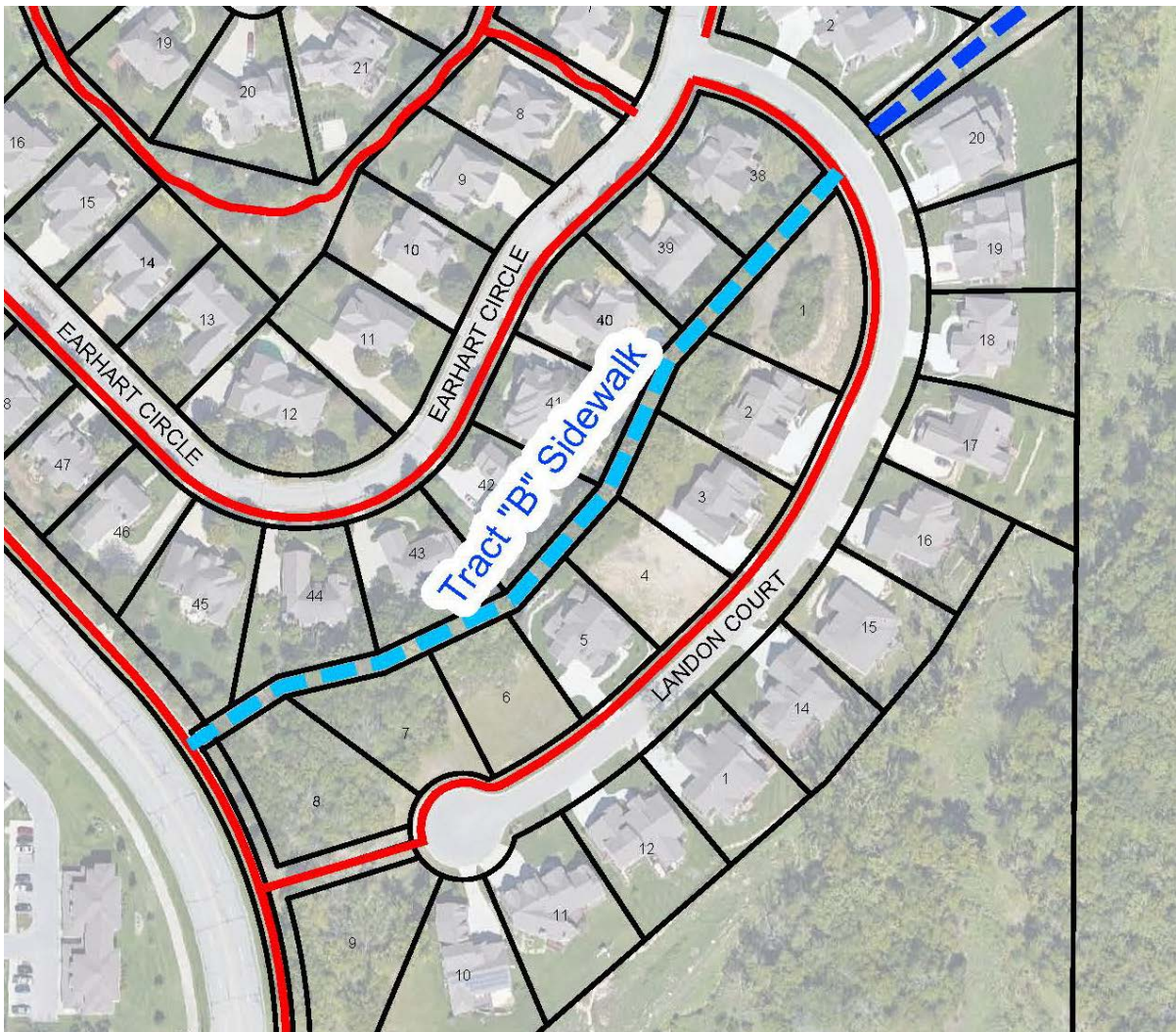


Figure 11 - Tract "B"

Similar to Tracts “D&A” and Tract “A”, Tract “B” also has topography that will make constructing a sidewalk to ADA standards a challenge. The first 250-feet south of Landon Court has existing grades between 8% and 10% which exceed ADA criteria for sidewalk ramps. However, since the grades are close to 8%, there may be an opportunity to meander or design switchbacks to meet ADA sidewalk ramp requirements if handrails are installed with the sidewalk improvements.



Figure 13 - Topographic challenges at Tract "B" connection at Landon Court



Figure 12 - Tract "B" Pedestrian Access Easement area



Figure 15 - Tract "B" Pedestrian Access Easement area north of sidewalk connection to Wakarusa Drive

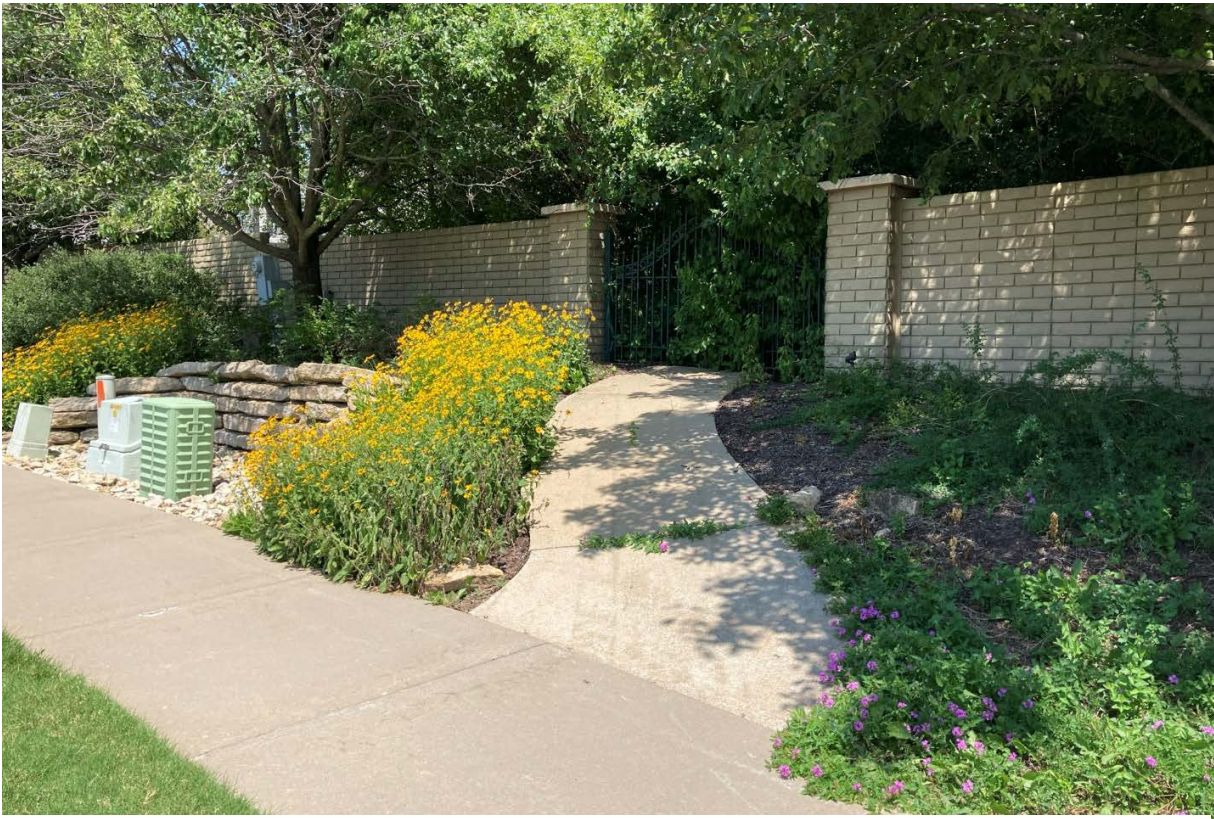


Figure 14 - Tract "B" Pedestrian Access Easement area north of sidewalk connection to Wakarusa Drive

The construction cost estimate for Tract “B” is \$158,852. The construction cost estimate does not include the construction of steps, stairs, or handrails if needed.

Summary

A majority of the proposed project consisting of constructing 4” concrete sidewalk along Tracts “D&A”, “A”, and “B” is feasible, however, there are a number of locations where the sidewalk slopes will not be within ADA requirements. In other locations, the proposed sidewalk can be made compliant by adding handrails to both sides of the walk, but these handrails have not been included in the construction cost estimates and will add significant cost to the project. However, in the case of these proposed sidewalk connections, there are already existing sidewalks built in the public Right-of-Way and common areas of the subdivision that provide an alternate ADA route. An option may exist to sign the proposed sidewalk connections as non-accessible routes and direct handicap users to the existing alternate routes along the streets. It is recommended that the Westwood Hills Board consult an attorney specializing in ADA compliance before deciding how to proceed with the project.

The construction cost estimates provided in this study are based on a 4” thick, 5-foot wide concrete sidewalk on compacted subgrade in accordance with the City of Lawrence Standard Technical Specifications. This material and typical section is recommended because it is the most durable material that will provide the longest design life (in excess of 30 years) with the least amount of recurring maintenance. Concrete is also a non-erodible material that will reduce maintenance on the steep slopes that exist on all three of the planned construction tracts.

Asphaltic pavement is another viable construction material that can be used on the project. Asphaltic pavement may reduce the construction cost estimate by 50%. If asphalt is used, it is recommended that a 2” asphalt surface be placed on 4” of compacted aggregate base (AB-3) to a width of 6-feet. The disadvantage of asphalt is that it is a flexible material that users tend to expect to behave as a rigid material. Asphalt will tend to ‘ravel’ at the edges as a result of freeze/thaw deterioration and will also heave and shove with changes in moisture, freezing, and roots/vegetation. It is expected that an asphalt surface would need to be milled or partially milled and overlaid approximately every 10 years.

Natural materials are another option for constructing a trail but may present maintenance challenges on the steep longitudinal and cross-slopes. Natural materials such as a chat or limestone screening surface are used on many rail-trails across the country and is also an option for Westwood Hills. The disadvantage is that this material is easily erodible and will not hold up well on the steep longitudinal slopes. Another natural material that can be used is a wood mulch. In addition to being easily erodible, mulch deteriorates quickly and will likely need to be reapplied on an annual basis. Another option for a trail is simply to use the natural turf or dirt surface. The maintenance required will depend on the usage of the trail. If the usage is high

enough so that a turf surface does not remain, then erosion of the soil along the trail will likely result. The boundary or property lines of the pedestrian access easement may also need to be better defined if a natural trail material is chosen.

Cost Estimate Summary

The following cost estimates are based on 4” thick, 5-foot wide concrete sidewalk construction. The construction cost estimates include a 20% contingency but do not include additional improvements such as concrete steps or handrails. Inspection estimates are based on full-time inspection and are estimated at 10% of construction costs. These cost may vary depending on the amount of inspection services requested during construction.

	<u>Construction Cost</u>	<u>Design</u>	<u>Inspection</u>	<u>Total</u>
Tract “D&A”	\$269,159	\$20,000	\$26,916	\$316,075
“D&A” Cody Ct. Connection*	\$74,954	\$6,000	\$7,500	\$88,454
Tract “A”	\$158,322	\$20,000	\$15,900	\$194,222
“A” Hickok Ct. Connection	\$16,670	\$2,000	\$2,000	\$20,670
<u>Tract “B”</u>	<u>\$158,852</u>	<u>\$30,000</u>	<u>\$26,916</u>	<u>\$215,768</u>
Total	\$519,635	\$78,000	\$79,232	\$835,189

*The “D&A” Cody Court cul-de-sac sidewalk connection is not recommended due to grade constraints and the availability of alternate routes in close proximity.