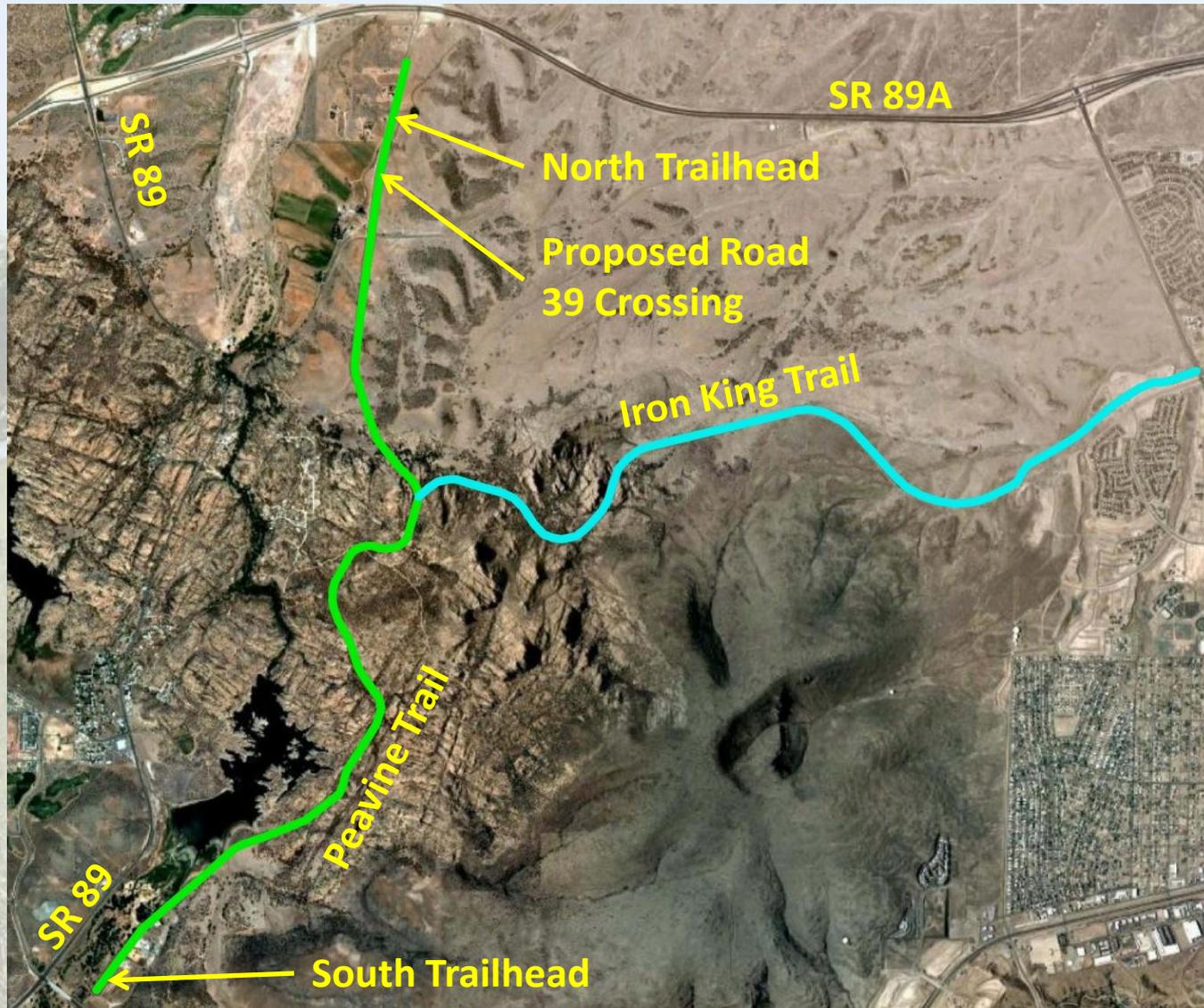


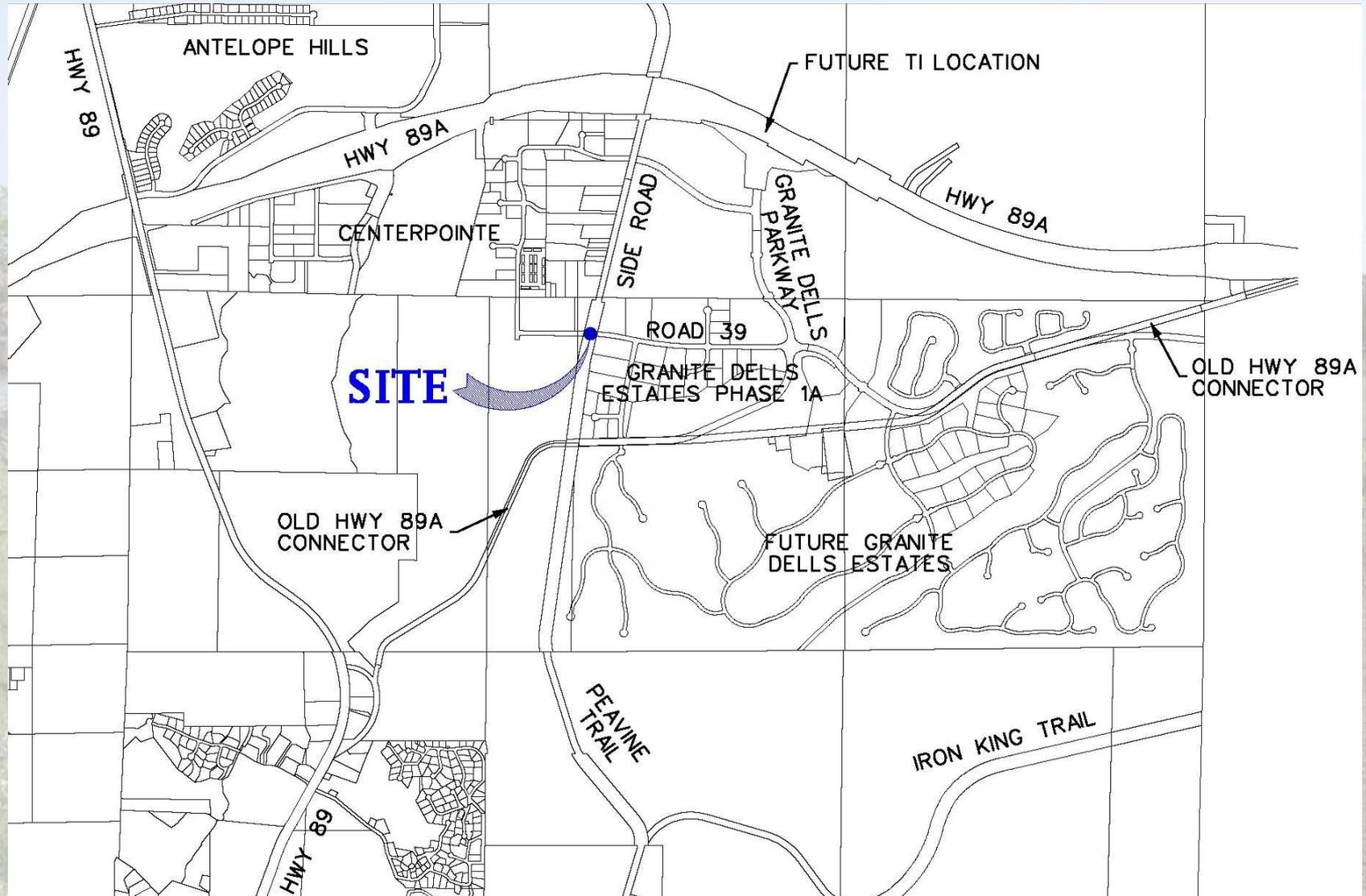
# **Peavine Trail Crossing Design Alternative Analysis For Granite Dells Estates Proposed Road 39**

**Prepared for the City of Prescott by  
Lyon Engineering and Development  
September 24, 2009**

# Project Overview



# Location Map



# Existing Conditions

- Longitudinal Slope – 0% - 3%
- Cross Slope – 0% - 1.5%
- Clear Width – 6' – 12'
- Minimum Existing Vertical Clearance – 12' (89A box culvert)

# Existing Conditions

- Trail Embankment – 1.5:1 (H:V)
- Surface Type – Hard packed rock/cinders
- User Type – Pedestrian, Equestrian, Bicycle
- Number of Users – 77 to 158 users/day

# Design Criteria

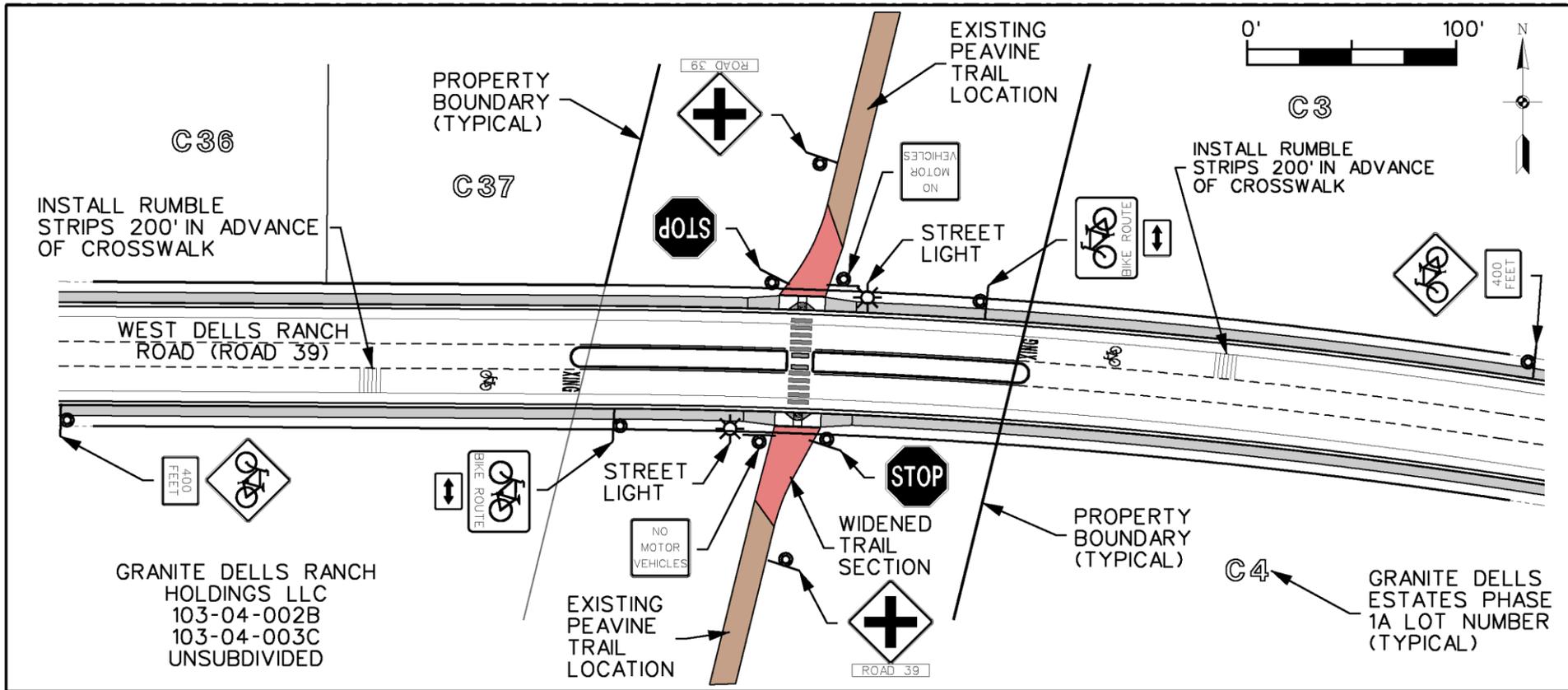
- Longitudinal Slope – 5% without landings per ADA
- Cross Slope – 2% max per ADA
- Clear Width – 3' minimum per ADA
- Vertical Clearance Overpass – 17' AASHTO recommended
- Vertical Clearance Underpass – 12' SR 89A Crossing

# Design Criteria

- Horizontal Clearance (Span) – 100' dictated by site
- Allowable trail rise/fall at bridge or underpass transition- .25" maximum per ADA
- Handrail – 36" high per ADA
- Design Speed – 35 mph posted speed limit on Road 39
- Traffic Volume – 2,300 vpd per GDE traffic report

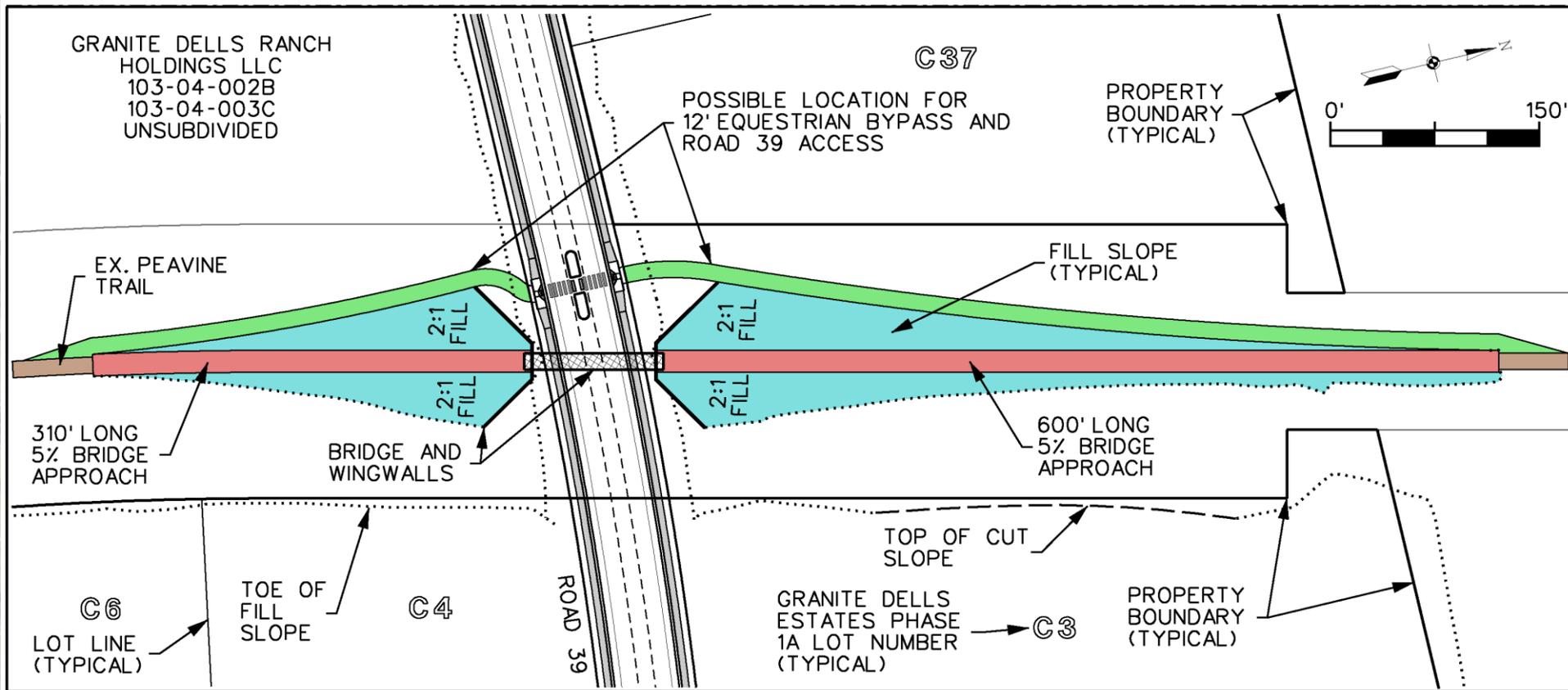
# Option 1

## At-Grade Crossing



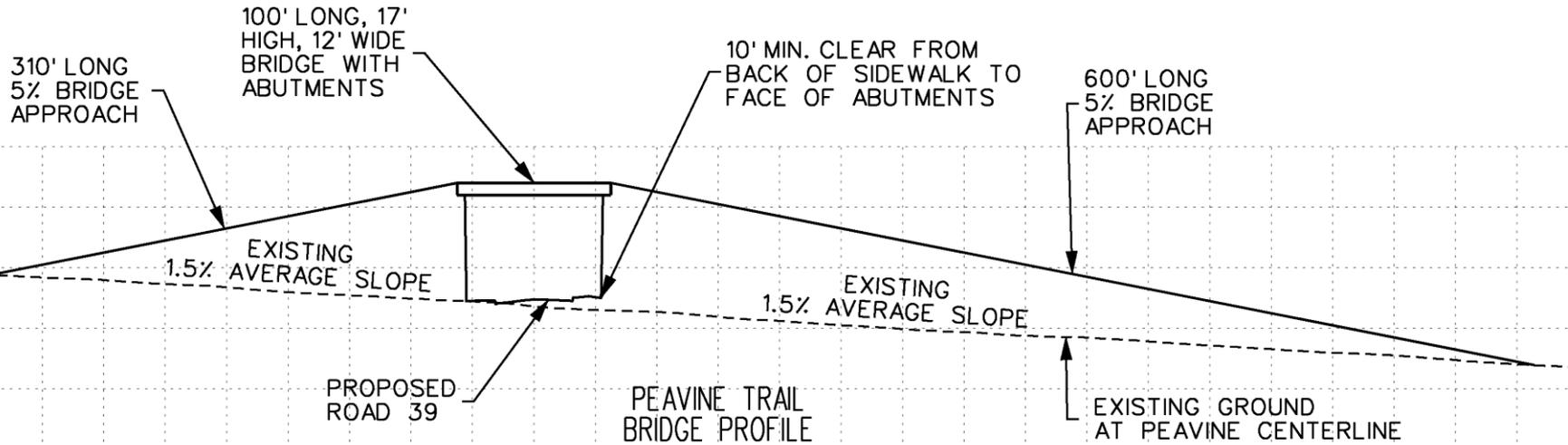
# Option 2 - Plan View

## Grade Separated Peavine Overpass



# Option 2 - Profile View

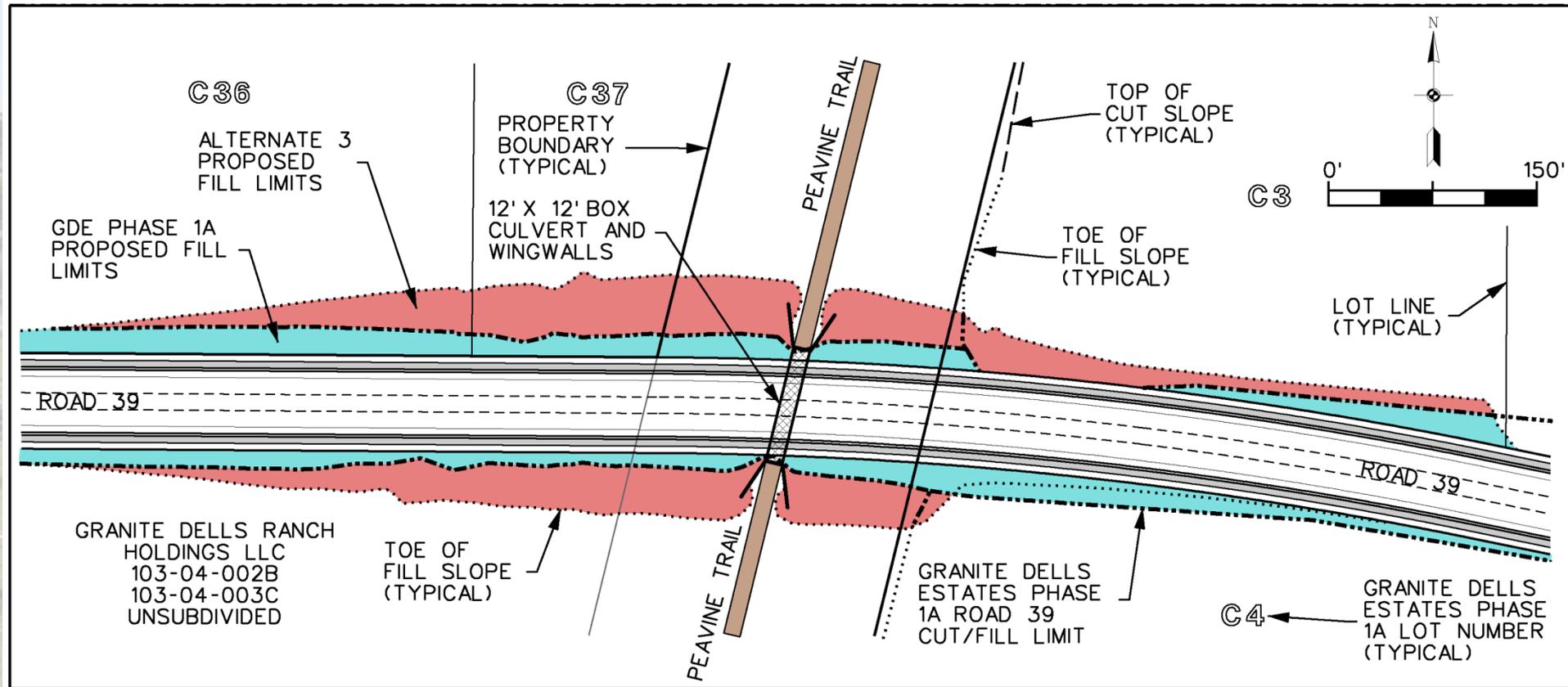
## Grade Separated Peavine Overpass



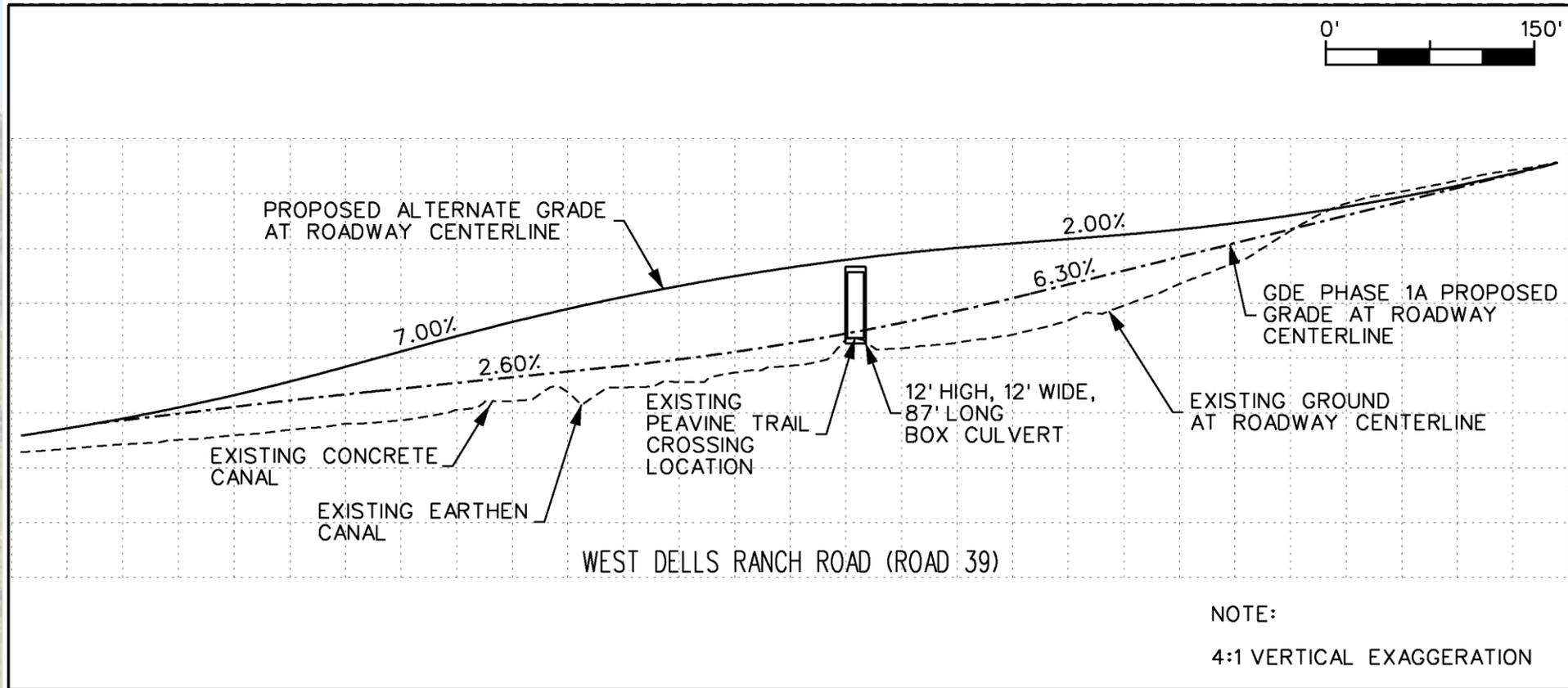
NOTE:  
4:1 VERTICAL EXAGGERATION

# Option 3 – Plan View

## Grade Separated Peavine Underpass (Road 39 at an Elevated Grade)

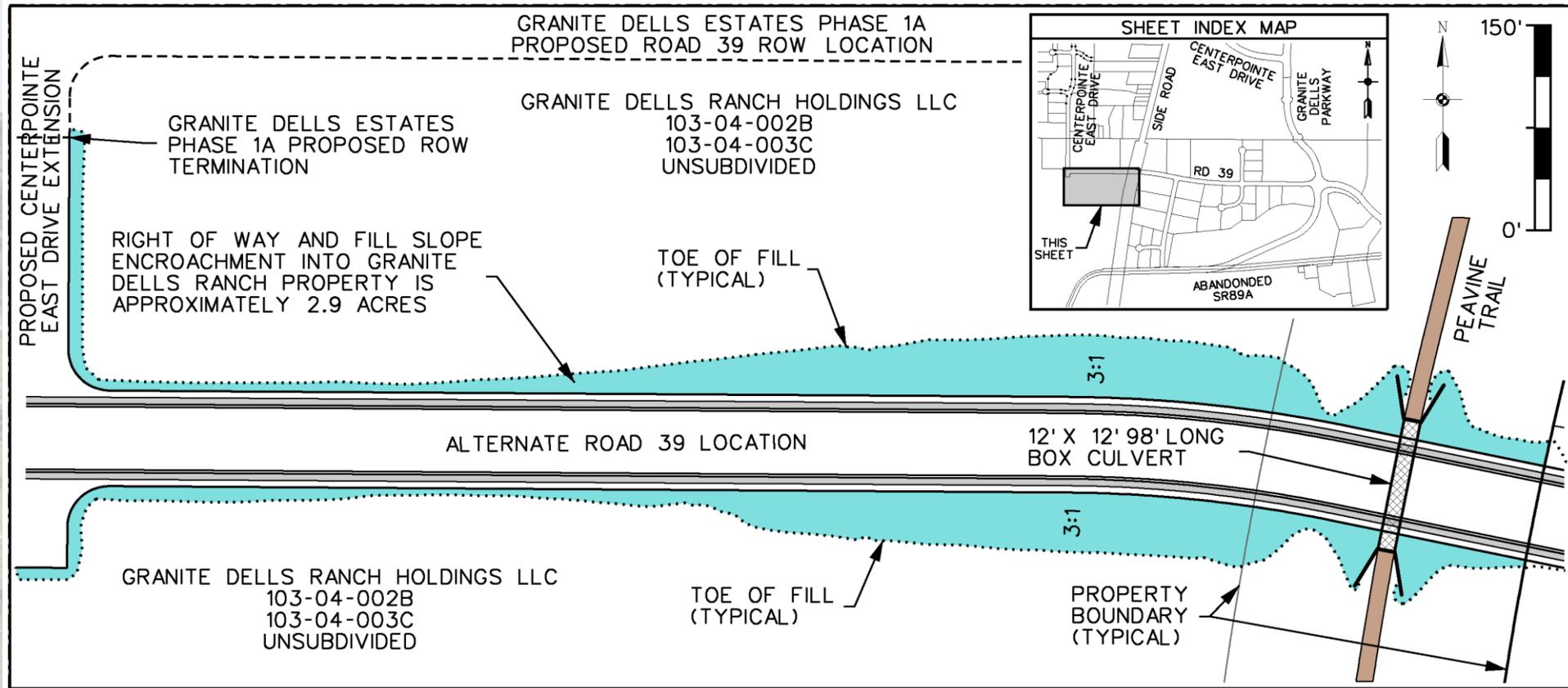


# Option 3 – Profile View Grade Separated Peavine Underpass (Road 39 at an Elevated Grade)



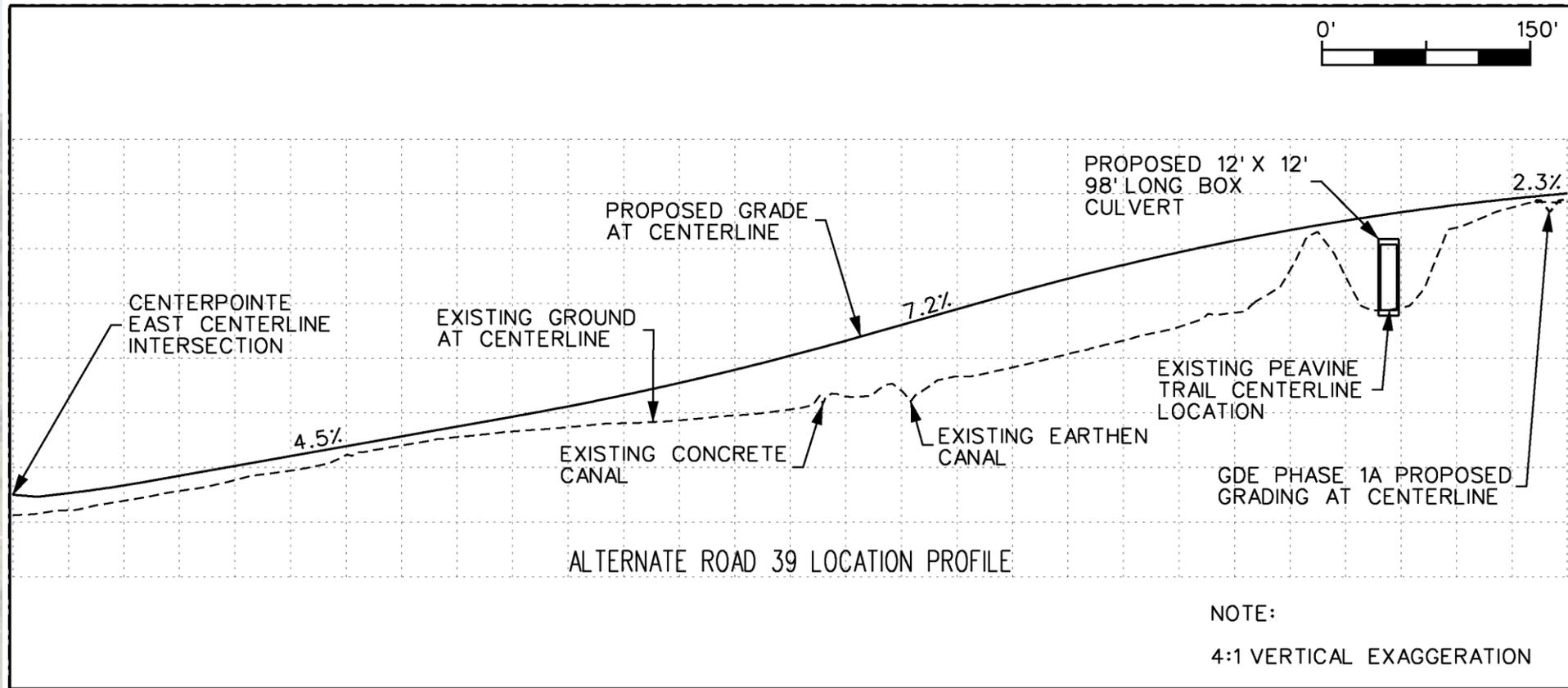
# Option 4 – Plan View

## Grade Separated Road 39 Alternate Location



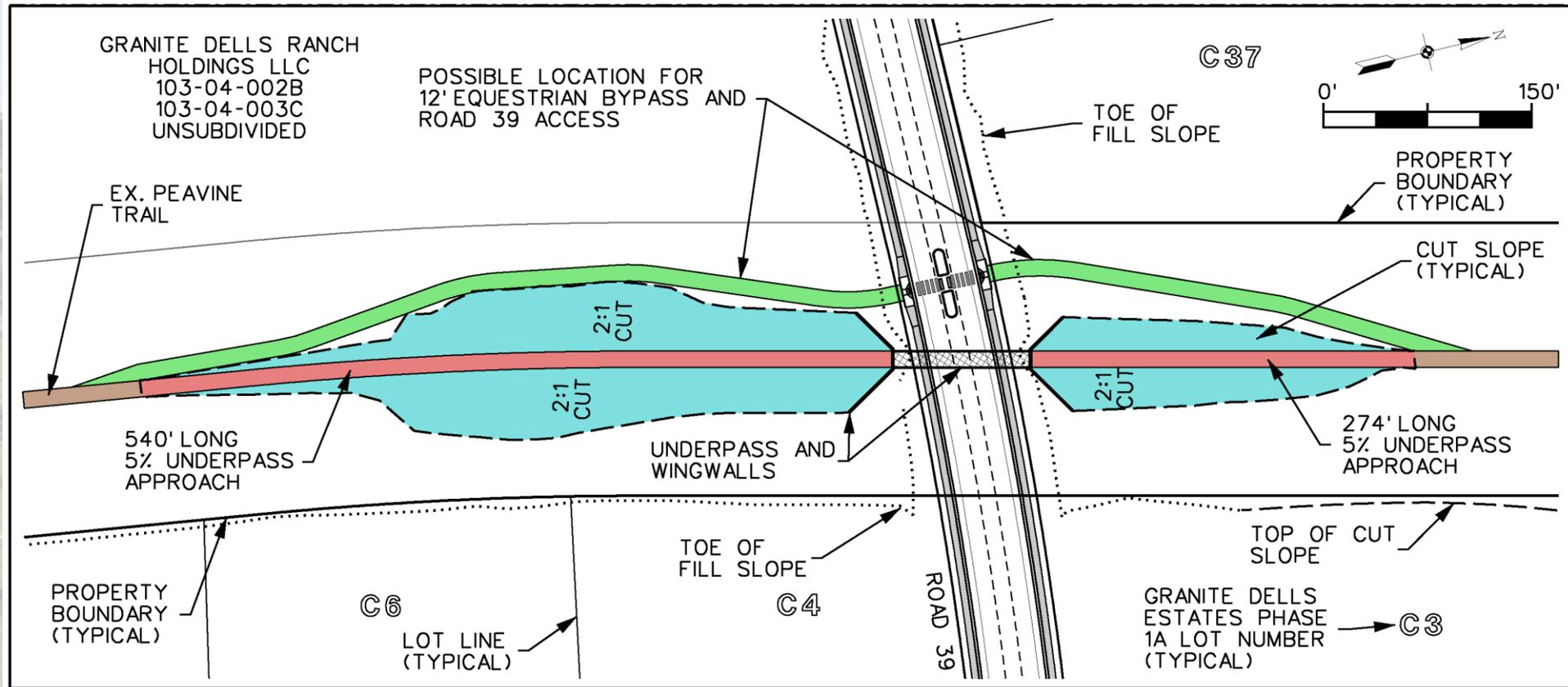
# Option 4 – Profile View

## Grade Separated Road 39 Alternate Location

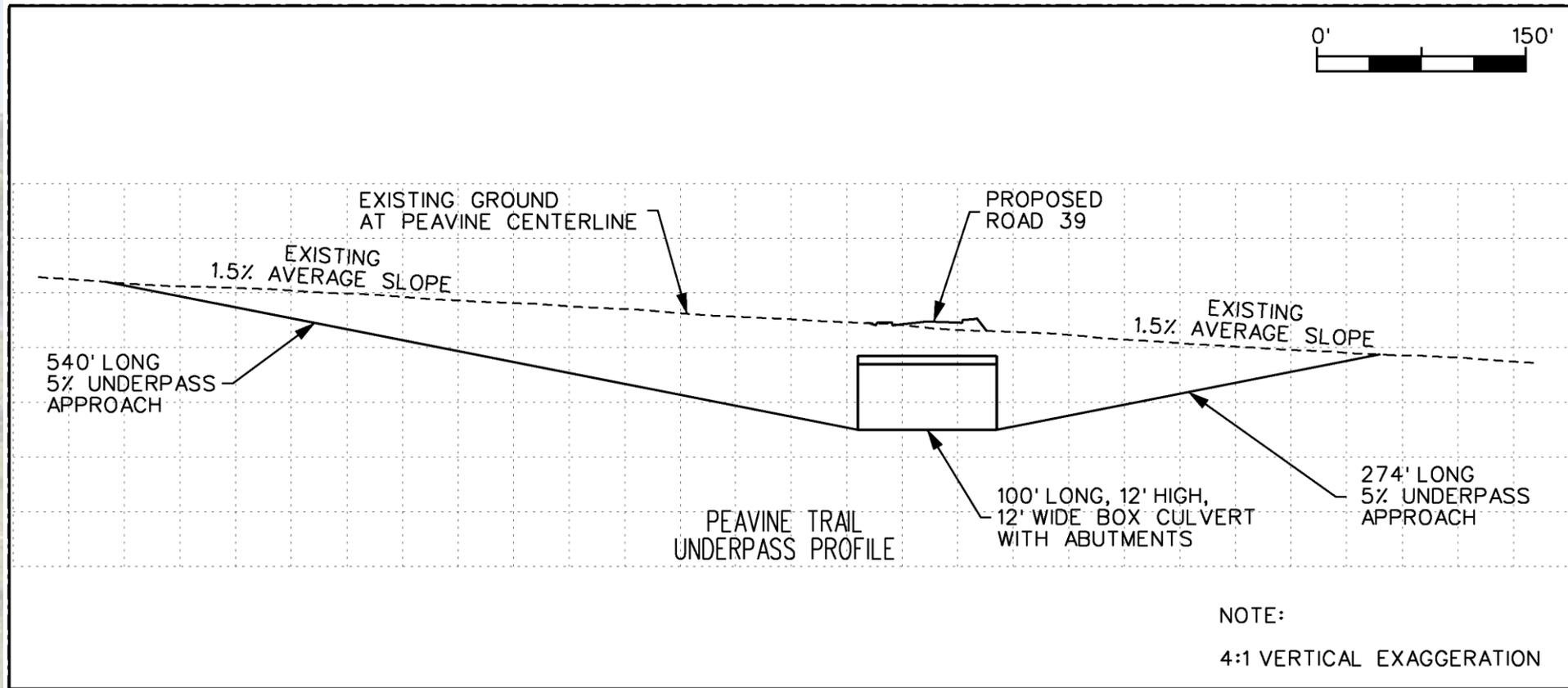


# Option 5 – Plan View

## Grade Separated Peavine Underpass Road 39 at Design Grade



# Option 5 – Profile View Grade Separated Peavine Underpass Road 39 at Design Grade



# At-Grade vs. Grade Separated Warrants

- The Highway Capacity Manual (HCM 2000) states that a proposed at-grade crossing will result in the likelihood of '*Low to Moderate*' risk taking behavior for trail users based on a Level of Service B and the 2030 projected traffic volumes
- USDOT FHWA recommends an at-grade '*Marked Crosswalk*' at this location based on traffic volumes and design speed

# Option Cost Estimate Summary

<u>Option Number - Description</u>	<u>Cost</u>
<b>1 – At-Grade Crossing – Road 39 Grade and Location Unchanged</b>	<b>\$46,225</b>
<b>2 – Peavine Overpass – Road 39 Grade and Location Unchanged</b>	<b>\$353,215</b>
<b>3 – Peavine Underpass – Road 39 Elevated at Same Location</b>	<b>\$383,906</b>
<b>4 – Peavine Underpass – Road 39 Alternate Location</b>	<b>\$422,477</b>
<b>5 – Peavine Underpass – Road 39 Grade and Location Unchanged</b>	<b>\$597,811</b>

# Peavine Trail-Road 39 Alternate Crossing Decision Matrix

	Category Total Weight	Item Weight	At-Grade		Overpass		Underpass At-Grade		Alternate Location Underpass		Underpass-Below Grade		Score Range
			Option 1		Option 2		Option 3		Option 4		Option 5		
			Score <sup>1</sup> (1-10)	Adjusted Weight <sup>2</sup>									
<b>Safety</b>	30												1=Least Safe 10=Most Safe
Trail Users-Peavine		30	8	24	9	27	9	27	9	27	4	12	
<b>Aesthetics</b>	5												1=Least Aesthetic 10=Most Aesthetic
Visual Impact		5	8	4	5	2.5	5	2.5	5	2.5	7	3.5	
<b>Usability and Convenience</b>	30												1=Less Usable 10=Most Usable (Current Condition)
Pedestrian		10	7	7	8	8	9	9	9	9	2 *	2	
Equestrian		7	7	4.9	8	5.6	5	3.5	5	3.5	4 *	2.8	
Bicycle		10	8	8	5	5	9	9	9	9	2 *	2	
Maintenance Vehicle		3	10	3	8	2.4	8	2.4	8	2.4	2 *	0.6	
<b>Cost</b>	25												1=High Cost 10=Low Cost
Structure/Foundation		7	10	7	2	1.4	2	1.4	2	1.4	2	1.4	
Earthwork		4	10	4	3	1.2	2	0.8	3	1.2	4	1.6	
Maintenance		4	10	4	8	3.2	6	2.4	6	2.4	1	0.4	
Energy Usage		2	9	1.8	9	1.8	7	1.4	7	1.4	4	0.8	
ROW Impact		8	10	8	10	8	2	1.6	1	0.8	10	8	
<b>Adjacent Property Owner Impact</b>	10												1=High Impact 10=Low Impact
Encroachment onto Property		5	10	5	10	5	3	1.5	1	0.5	10	5	
Usability/Access to Land		5	10	5	10	5	4	2	1	0.5	10	5	
<b>Total</b>	<b>100</b>		<b>85.7</b>		<b>76.1</b>		<b>64.5</b>		<b>61.6</b>		<b>45.1</b>		

(1) - Option's "score" is based on a 1-10 range  
 (2) - Option's "adjusted weight" is calculated by multiplying the "item weight" by the "score" divided by 10  
 (\* ) - Option 5 scores in this area are lower than Option 3 and 4 due to the possibility of standing water and muddy conditions following a rain or snow event

# Peavine Trail-Road 39 Alternate Crossing Decision Matrix Scores

