



# Mass Earthwork & Subgrade Preparation: Sector S5

Tennessee TDOT Project — Geometric Quantity  
Take-off (QTO) & Risk Diagnostic Model

# The Digital Blueprint & Diagnostic Dashboard

## Included: Earthwork to Subgrade

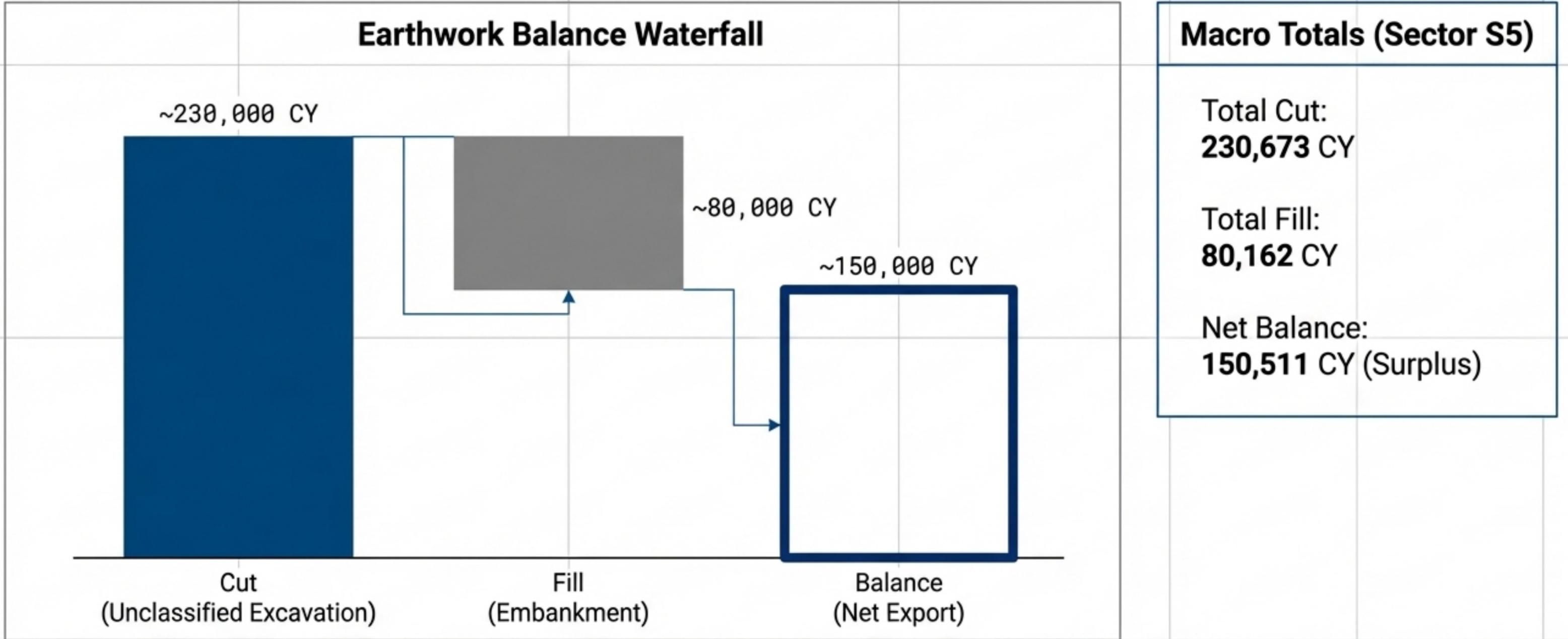
- Unclassified Excavation (Road & Drainage, Rock)
- Embankment & Borrow Operations
- Topsoil Stripping & Placement
- Subgrade Construction & Preparation

## Excluded: Pavement & Structural

- Base & Sub-base Aggregates
- Asphalt / Concrete Paving
- Geotechnical Soil Treatments

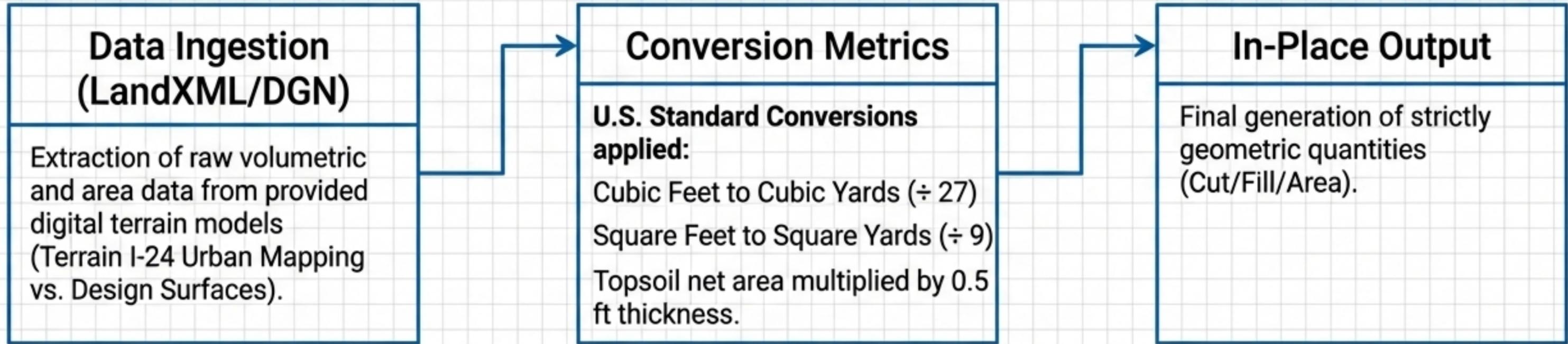
**Objective: Deliver a 'Black and White' summary of geometric quantities based strictly on provided terrain models for Sector S5, Tennessee, USA.**

# EARTHWORK BALANCE WATERFALL (SECTOR S5)



NOTE: In-place Yardage strictly used. Volumes represent purely geometric surface-to-surface variance.

# The Digital Blueprint & Diagnostic Dashboard

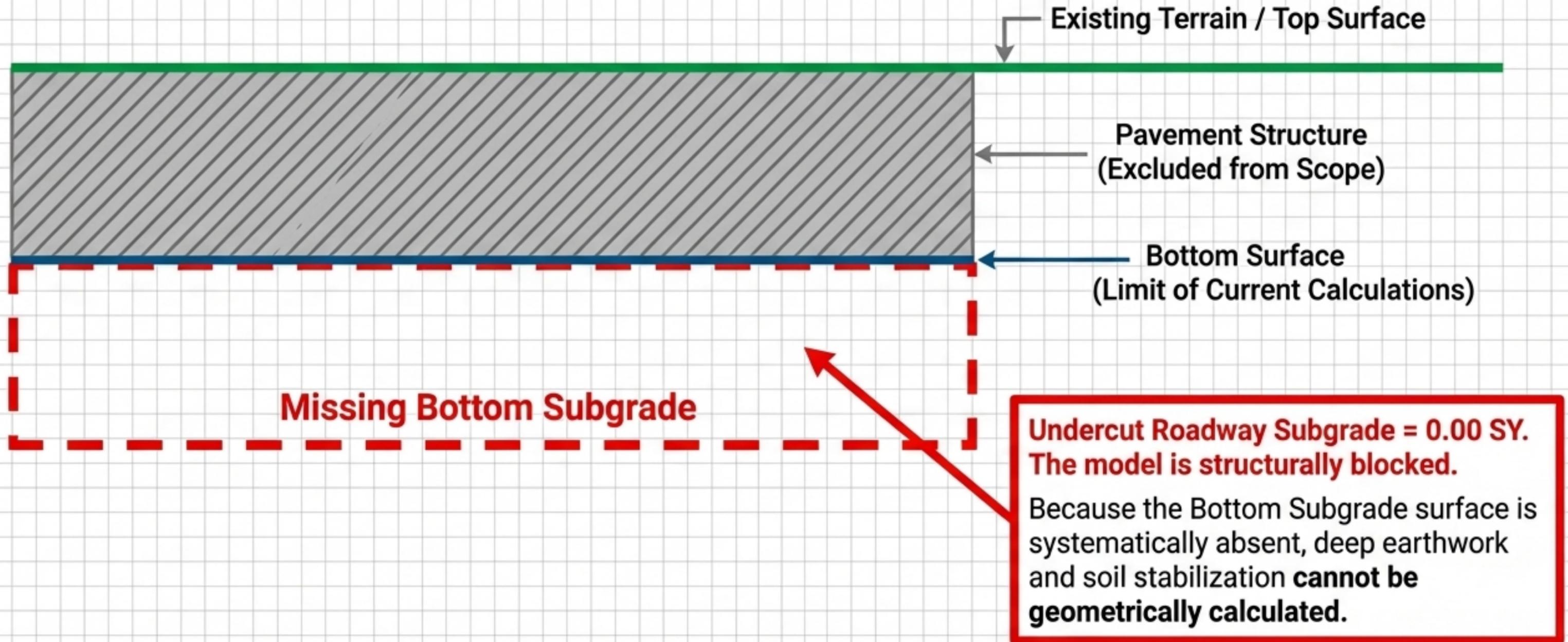


## **Zero-Factor**

Zero Shrinkage/Swell Applied.

Due to the absence of targeted geotechnical data, factors of compaction (Shrinkage) or expansion (Swell) are strictly **prohibited** in this model.

# The Stratigraphy Gap



# Sector S5: Structural Layer Diagnostic Matrix

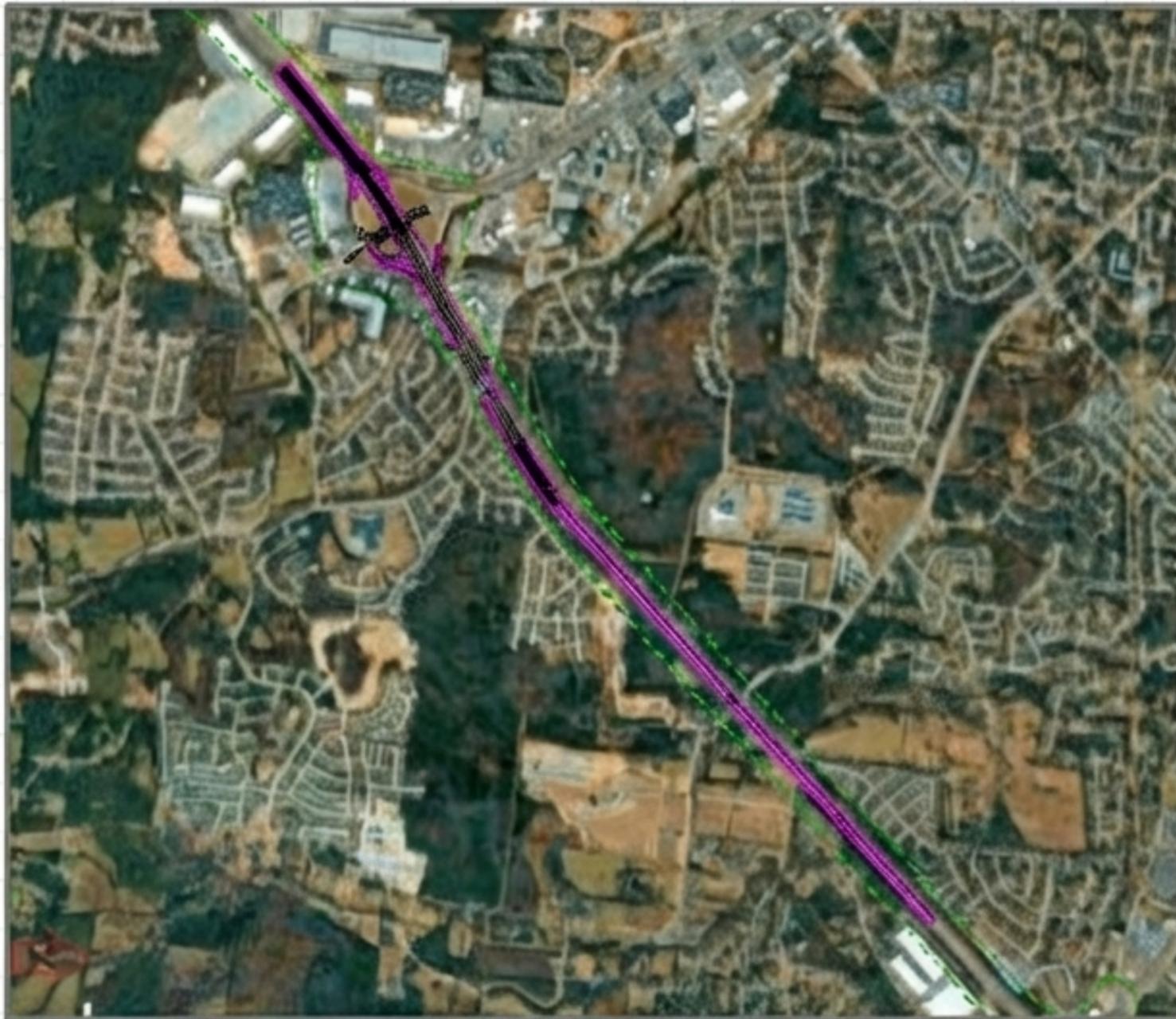
Element	Top Surface	Bottom Surface	Bottom Subgrade
I-24 (EB, WB, Median Ramps)	[EXISTING]	[EXISTING]	[MISSING]
Ramps L1, L3, L5_1, L5_2, L7, L9	[EXISTING]	[EXISTING]	[MISSING]
Ramps L2, L4, L6, L8	[Included in Median Ramps]	[Included in Median Ramps]	[MISSING]
Local & Cross Roads (Sam Ridley)	[EXISTING]	[EXISTING]	[MISSING]
Rocky Fork Road	[MISSING]	[MISSING]	[MISSING]



## Key Insight Panel

**100% Failure Rate in Subgrade Column.** Every element in Sector S5 lacks the deepest design layer, limiting all subsequent QTO tables to upper-level earthwork only.

# Itemized QTO: I-24 Mainline & Corridors



Item	Quantity
Road & Drainage Excavation	221,705.99 CY
Embankment & Borrow	73,958.07 CY
Rock Excavation	17,601.39 CY
Topsoil Placement	40,495.21 CY
Subgrade Construction & Prep	464,173.23 SY
<b>Undercut Roadway Subgrade</b>	<b>0.00 SY</b>

Surfaces processed: I-24\_Bottom1 vs I-24 Urban Mapping Terrain.

# Itemized QTO: Sam Ridley & Interchanges



## Sam Ridley NB1

Cut: 2,059.98 CY | Fill: 66.23 CY | Rock: 52.43 CY  
Topsoil: 174.38 CY | Subgrade Prep: 4,957.38 SY

## Sam Ridley SB2

Cut: 952.54 CY | Fill: 206.68 CY | Rock: 0.00 CY  
Topsoil: 214.80 CY | Subgrade Prep: 3,183.76 SY

## Sam Ridley N

Cut: 618.07 CY | Fill: 1,843.76 CY | Rock: 0.00 CY  
Topsoil: 363.60 CY | Subgrade Prep: 6,104.42 SY

Undercut Roadway Subgrade registers as 0.00 SY across all Sam Ridley surfaces.

# Itemized QTO: Ramps (L5 & L9)

## Matrix - Ramp L9

Cut:	4,608.58	CY
Fill:	3,685.12	CY
Rock:	47.90	CY
Topsoil:	994.59	CY
Subgrade Prep:	8,702.24	SY

## Matrix - Ramp L5

Cut:	727.37	CY
Fill:	402.24	CY
Rock:	0.00	CY
Topsoil:	240.69	CY
Subgrade Prep:	2,298.34	SY



### Diagnostic Callout Box

**Ramp L5 Anomaly:** In addition to the missing Bottom Subgrade, Ramp L5 is missing the 'Top' surface file. This prevents closing the mass balance of the pavement structure for this specific element.

# Technical Risk Statement & Professional Disclaimer

Risk Warning: High Risk of Cost Underestimation. The systematic absence of the Bottom Subgrade surface limits this model strictly to upper pavement structures. Any unmapped deep earthwork or subgrade soil treatment requirements could potentially double the excavation volumes anticipated in current bidding documents.

**QUANTITIES ARE BASED ON PROVIDED DIGITAL MODELS. FINAL FIELD VERIFICATION AND ANY RISKS ARISING FROM UNIDENTIFIED UNDERCUT REQUIREMENTS ARE THE RESPONSIBILITY OF THE CLIENT.**