Interim Report

US-23 to I-71 Connector Joint Plan – Interim Report – HB 96

EXECUTIVE SUMMARY

Quick Takeaway

This planning study finds that a US-23 to I-71 connector along or near the Delaware/Marion/Morrow County line would offer the greatest benefit, while reducing the potential impacts and cost. It is recommended that the second phase of the study focuses preliminary engineering and public engagement within this area.

Overview

Over the past few decades, Central Ohio has emerged as one of the state's strongest engines of population and economic expansion. Franklin County and Delaware County are at the center of this growth. This growth has also expanded the commercial and recreational ties linking Columbus with the Toledo and Sandusky regions, including increased freight traffic to and from the Lake Erie region (including Ontario) and boosted tourism travel to the lakefront. Together, these forces are generating sustained growth in commuter, freight, and discretionary trips that depend on the limited existing set of north–south highways connecting Central Ohio with Northwest and Northeast Ohio. US-23 sits at the heart of this evolving travel pattern, traversing through Delaware County as the primary gateway between Columbus and points to the north.

ODOT's 23 Connect initiative, and the subsequent capital program have and will continue to deliver dozens of needed intersection, signal, and interchange upgrades that will relieve existing and future congestion, reliability, and safety challenges on US-23. Completely converting the thirty-mile Delaware County segment of US-23 to a limited-access highway would require extensive right-of-way acquisition, costly business and residential relocations, and complex construction staging. Recognizing that incremental upgrades alone cannot guarantee long-term corridor mobility and enable the transportation system to continue to support Ohio's economic expansion, the Ohio General Assembly directed the Ohio Department of Transportation (ODOT) and the Ohio Turnpike & Infrastructure Commission (OTIC) to jointly "create a plan regarding the feasibility of connecting U.S. Route 23 to Interstate Route 71" through a range of options that include widening an existing state route, building a new freeway, or creating a tolled facility.

Section 755.60 of House Bill 54 (further amended by HB 96), Ohio's FY 2026-2027 transportation-budget act, provides specific direction to ODOT and OTIC by defining the study area and classes of potential corridors, and sets two fixed milestones: an interim report by **October 1, 2025,** and a final joint plan by **October 1, 2026**. This report fulfils the first milestone and positions ODOT and OTIC with critical information that will inform the focused development of the joint plan to connect US-23 to I-71 in Delaware, Marion, and/or Morrow counties.

Definitions and Key Findings

Study Area

The legislation limits the connector evaluation to northern Delaware County and adjoining portions of Marion and Morrow counties. For analytical clarity, ODOT has delineated a study boundary framed by US-23 on the west, I-71 on the east, US-36 on the south, and SR-95 on the north. The area lies entirely inside ODOT District 6 and spans the planning jurisdictions of the Mid-Ohio Regional Planning Commission (MORPC) and the Central Ohio Rural Planning Organization (CORPO). It contains the City of Delaware and the villages of Sunbury, Waldo, Marion, Ashley, Cardington, Fulton, Edison, and Mount Gilead. The study area touches one US House District (District 4), four Ohio House Districts (Districts 60, 61, 86, and 87), and two Ohio Senate Districts (Districts 19 and 26).

A scan of study area demographics, development, and transportation trends uncovered three fundamental findings:

1. **Growth pressure is shifting north and east.** The south subarea east of Delaware City and along US-36 is seeing the most rapid residential and commercial expansion. Some of this growth is moving northward west of I-71 and adjacent to the SR-61 interchange south of Marengo.
2. **US-23 is under pressure.** Despite programmed improvements, current mixed access control and an expanding driveway network along US-23 continue to impact reliability for both commuters and freight.
3. **Environmental and recreational assets are extensive.** Multiple reservoirs, state parks, and stream corridors constrain route-selection options and elevate permitting complexity.

Corridor Definitions

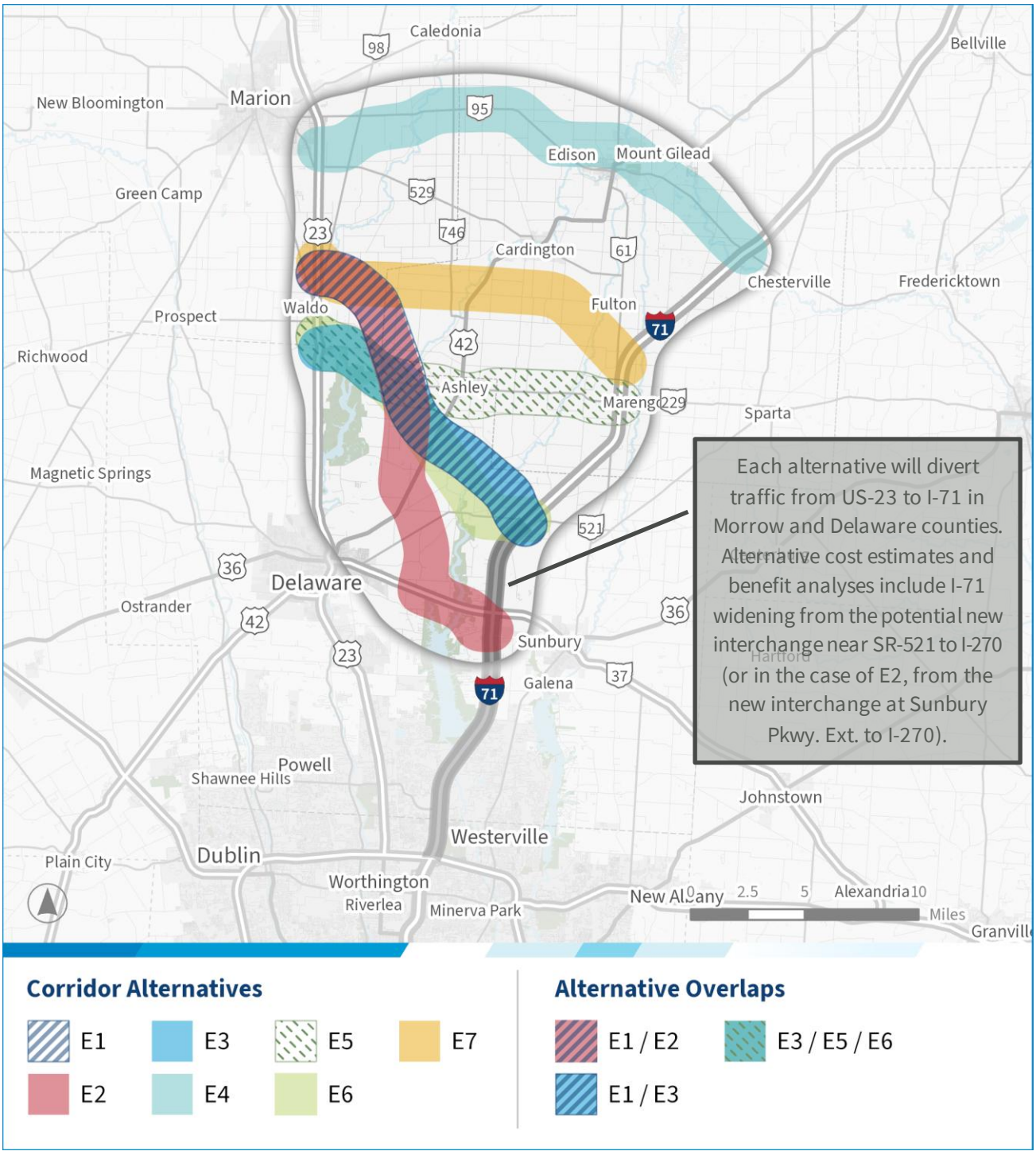
Seven conceptual corridors, designated **E1 through E7** (also see **Figure 1**), were identified for preliminary evaluation as conceptual connections between US-23 and I-71. Together, they translate the five connections set out in HB 96 into location-specific concepts. These concepts include upgrades of existing state routes to freeways and entirely new freeway corridors, including options that could be tolled. All were assessed for benefits, costs, and environmental risks.

The seven conceptual corridors are derived from recent and ongoing planning activities. Although conceived in different forums, each concept reflects a good faith attempt to satisfy the Legislature's directive:

- E1, E2, and E3 were originally defined and assessed in the 23 Connect Preliminary Feasibility Study (2022) when they first emerged as long-range eastern bypass concepts north of Delaware City.
- E4 and E5 were developed as part of the 2025 Strategic Transportation & Development Analysis – Alternatives Analysis to address gaps, particularly in the Mount Gilead corridor (SR-95) and along SR-229.
- E6 and E7 were developed at the outset of this HB 96 study to capture opportunities not yet examined: a hybrid state route upgrade/new-build link that ties SR-229 and SR-521 to I-71 (E6) and a direct Waldo-to-Marengo greenfield corridor following the Waldo–Fulton Road axis (E7).

For screening purposes, each corridor is represented by a two-mile-wide swath centered on a preliminary "best-fit" conceptual centerline.

FIGURE 1. STUDY AREA AND CONCEPTUAL CORRIDORS



Source: ODOT

Each concept will divert a share of through-traffic from US-23 to I-71 in Morrow and Delaware counties. These traffic diversions, in addition to traffic accessing I-71 from new interchanges under development at Sunbury Parkway and Big Walnut Road, and the impact of continued development in Delaware County, will increase daily volumes on I-71. To preserve the travel-time savings delivered by each corridor under those higher volumes, the analysis pairs every corridor concept with a companion widening of I-71 from approximately the concept interchange with I-71 to I-270 (as FHWA will require improvements to I-71 so that operations are not degraded). The added mainline capacity is folded into both benefit calculations and cost estimates so that each alternative is evaluated as a self-contained, long-term solution. (Note that the cost of a companion widening of I-71 was not included in the tolling feasibility analysis.)

Evaluation Methodology

The objective of this evaluation is to move from the broad study area to the definition of a sub-area that contains only the most promising connection options. Every concept was tested under the same three-part analytical framework (Benefits, Costs, and Impacts) with common data sources, time horizons, and economic assumptions. The comparative analysis was performed under the assumption that each concept would be free (non-tolled). Assessing every concept on the same footing enables comparison of trade-offs and to pinpoint which corridors, and therefore which portions of the overall study area, merit refinement in the next phase of engineering and environmental review.

- **Benefits** – Benefits were compiled and monetized for each concept over a 20-year analysis period (2036-2055) for travel time savings, crash savings, fuel savings, and vehicle operating costs through use of the Ohio Statewide Model (OSWM) and current practice as recommended by USDOT for discretionary grant benefit/cost analysis.
- **Costs** – Construction, right-of-way, and operations and maintenance costs (for the same 20-year period) were compiled consistent with current ODOT practice and the scope of each concept (consistent with the planning-level scale of detail available for each concept).
- **Impacts** – A preliminary environmental screening for each concept was supplemented with a qualitative evaluation of corridor concept risk and complexity. The screening results summarize the highest-risk resources identified within 300-ft and 1-mile evaluation bands. This screening draws solely on desktop information; no field verification, agency consultation, or formal determinations under the National Environmental Policy Act (NEPA) or related statutes occurred. The issues uncovered through this screening analysis may require further action, documentation, mitigation, or avoidance during future activities associated with project development and delivery.

Comparative Evaluation Results

Figure 2 provides a comparison of each conceptual corridor as a free (non-tolled) facility and an overall assessment. The comparison scales for benefit criteria and cost criteria are based directly on ranking by corridor concept, consistent with results presented in the noted tables and figures. The comparison scale for environmental impacts is based on a compiled average ranking of the quantitative and comparison scale results from the comparison matrix presented in the *Preliminary Environmental Screening Technical Memo*.

FIGURE 2. CORRIDOR ALTERNATIVES COMPARATIVE EVALUATION SUMMARY

	Criteria	E1	E2	E3	E4	E5	E6	E7
Benefits	Reduced Travel Time	3	3	1	7	5	2	6
	Expected Utilization	1	2	3	6	5	4	7
	Travel Time Savings	2	1	3	7	6	4	5
	Other Monetized Benefits	3	1	2	7	5	4	6
Costs	Construction Costs	2	6	3	7	5	4	1
	ROW Costs	2	7	3	6	5	4	1
	O&M Costs	5	6	1	7	3	2	4
Impacts	Ecological and Natural Resources	2	6	4	7	3	5	1
	Community Resources	1	6	4	7	6	3	2
	Cultural Resources	2	3	5	1	7	4	6
	Dams and Reservoirs	2	4	6	3	5	7	1
	Regulated Materials	1	6	2	7	4	3	4
	Development Density	2	5	1	7	6	4	2

Best (#1) — Worst (#7)

The comparative evaluation of benefits, costs, and environmental impacts across the seven concepts highlights three fundamental outcomes that inform decisions on advancing certain corridors for further study.

1. Four of the seven concepts (**E1, E2, E3, and E6**) show a potential for sustained mobility and safety benefits to the study area and the 20-county area considered in the benefits analysis. This includes travel time savings (20 minutes or more in the presumed 2035 opening year compared to the 2035 no-build scenario under congested conditions) for vehicle trips between Toledo and Columbus.
2. Construction and right-of-way costs are high and uncertain given the potential extent of environmental and community impacts. Across at least three concepts (**E1, E2, and E3**), benefit cost ratio outcomes indicate a very strong return compared to the estimated capital investment (benefits exceed costs by 3x or more).
3. Environmental impacts are variable across the corridors, and any concept that advances will face three recurring factors: Reservoirs and State Parks are the dominant risk drivers; stream density and flood-plain breadth vary sharply by alignment; and existing development and planned growth present risks. Corridor concepts **E1 and E7** show the greatest inherent capacity to avoid or minimize environmental impacts. Both conceptual alignments avoid reservoirs, state-park lands, and broad flood-hazard zones for much of their length, keeping permitting, right-of-way, and schedule risks low.

Tolling Feasibility

House Bill 96 requires that the Interim Report include *"a preliminary assessment of toll feasibility, including whether the Commission's statutory authority is sufficient to make the project a turnpike project."* This mandate is fulfilled through integrating three parallel aspects of work:

1. **Traffic & Revenue Sketch-Modeling** – Order-of-magnitude utilization, gross revenue, and net operating margin for each build corridor concept (E1-E7), drawn from the *Utilization & Benefits Technical Memo* and the stand-alone *Tolling Financial Feasibility Assessment Technical Memo*.
2. **Capital & O&M Outlay** – Planning-level cost ranges from the *Cost Estimate Technical Memo* and incremental toll costs from the *Tolling Financial Feasibility Assessment Technical Memo*.
3. **Statutory Authority Review** – A legal scan contained in the *Tolling Statutory Authority Technical Memo* that tests whether existing Ohio law allows OTIC to bond and toll the candidate facilities.

These inputs provide an initial, high-level *go/no-go* tolling assessment for the corridors. This go / no-go tolling assessment relies on the understanding that a corridor must, at a minimum, pay its operating bills and support a credible debt tranche to remain a toll-delivery candidate.

The existing toll rates on the Ohio Turnpike reflect a conservative approach, based on the ongoing maintenance needs of a facility originally constructed in 1955 and spanning 241 miles. These rates are designed to support the upkeep of aging infrastructure. If a new facility were to be built today, toll rates would instead be determined by projected traffic volumes and the cost of new construction, rather than just applying the legacy rates currently in use on the Ohio Turnpike.

Based on the analysis and review, concepts **E1, E2, E3, and E6** are the only concepts that, when tolled at the current Ohio Turnpike per-mile, generate a sustained net operating surplus. Yet even the strongest of the three, E1, could bond no more than about 4 percent of its total capital need under conservative finance assumptions. In other words, tolling at the current Ohio Turnpike rates solves the long-term O&M problem but contributes very little toward construction.

Recognizing that this type of proposed corridor, one that will serve as the primary gateway between Columbus and points to the north, represents a very different user base and purpose than the I-76/I-80/I-90 Ohio Turnpike, toll rates of "comparable" connector routes in other states were evaluated in an exploratory toll rate sensitivity analysis. This subsequent toll rate sensitivity analysis proceeded by testing an array of different toll rates for the alternatives from the initial assessment that yielded the most promising results: E1, E2, E3, and E6. Tested toll rates ranged from $0.10 to $0.60 per mile for autos and 2.5 times that amount for trucks.

Results of this analysis suggest that higher rates than the current Turnpike toll rates can provide a significant increase in operating revenues while minimizing the diversion of traffic using the Connector. The higher operating revenues make more revenue available to apply toward bonding capital costs, resulting in a much greater bonding capacity than the initial assessment. Note that the traffic and toll revenue analysis is meant to be illustrative in nature and is intended to provide a scale of possible outcomes rather than a precise estimate. The assessment is not adequate to support the financing of a project, and more detailed analyses, in form of a Level 2 Tolling Analysis, are required to support decision making on whether to move forward as a toll candidate. The *Tolling Financial Feasibility Assessment Technical Memo*

provides a comprehensive discussion of the preliminary traffic and revenue analysis and methods performed to complete this interim report.

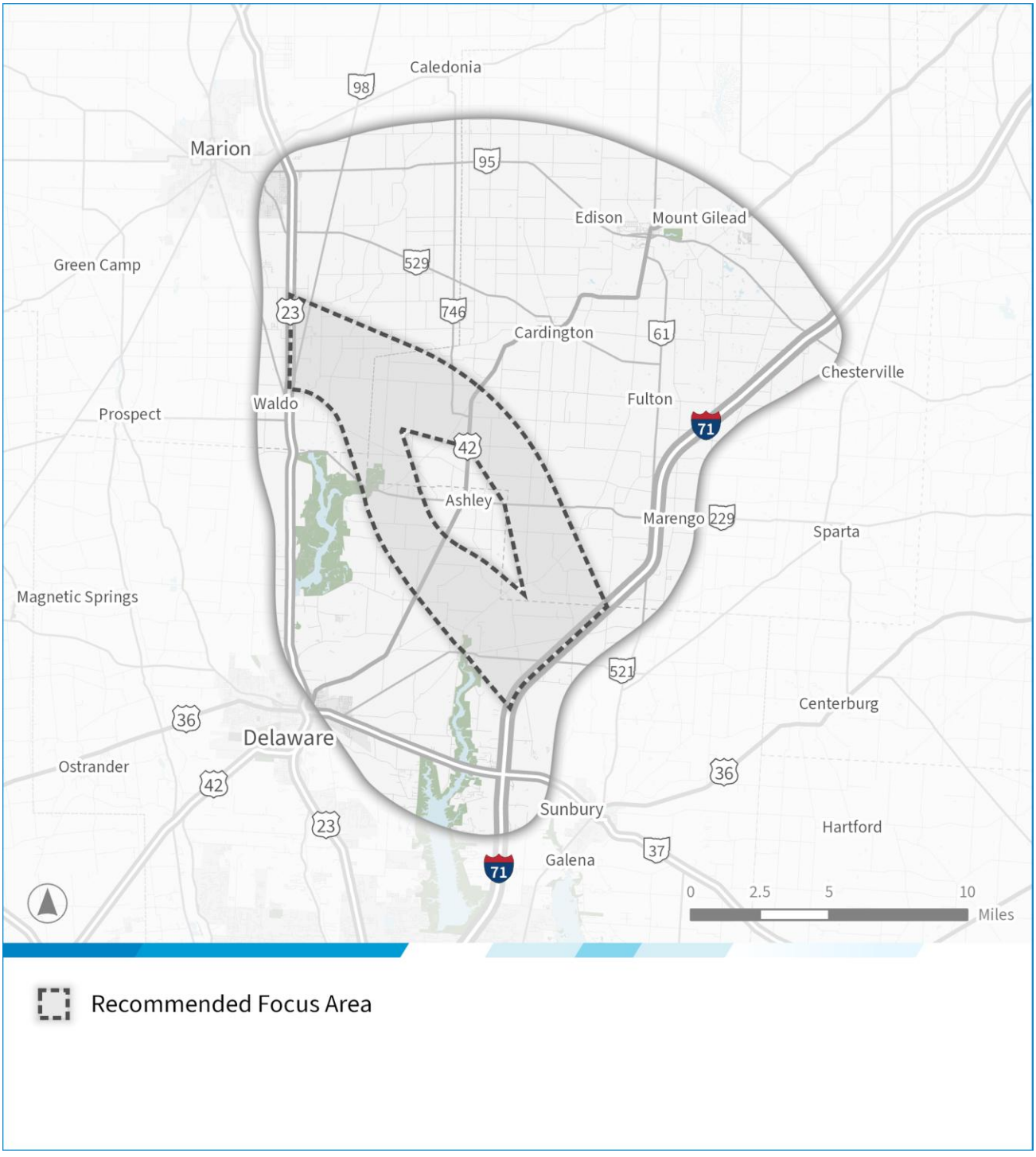
Should the State opt to pursue a tolled delivery, OTIC possesses full statutory authority under Revised Code § 5537 to designate, finance, and operate the facility. Exercising that authority will require completion of an investment-grade traffic-and-revenue study, refinement of interchange spacing, and preparation of a preliminary finance plan. The legal scan also acknowledges barriers to ODOT's ability to deliver this as a toll project.

Recommendation and Next Steps

Findings point to a central, south-leaning alignment within the study area (common to E1, E2, E3, and E6) as the most promising foundation for continued study. By directing forthcoming alignment identification and refinement, necessary field investigations, and early agency- and public engagement within the recommended focus area (**Figure 3**), ODOT and OTIC can concentrate their efforts where they yield the greatest benefit. This targeted strategy will position the agencies to advance and document a single, fully vetted, NEPA-ready preferred alternative by October 1, 2026, meeting the schedule established in House Bill 96. The recommended focus area includes three distinct zones:

- **Western gateway (US-23 north of Waldo):** Use the area surrounding the E1/E2 entry, avoiding the Delaware Reservoir and the congested SR-229/US-23 node.
- **Central reach (SR-98 to Alum Creek):** Follows the common green-field band of E1/E3/E6, providing room to refine the river crossing and interchange spacing around Ashley. Additionally includes the reach north of Ashely to provide alignment flexibility.
- **Eastern gateway (I-71 North/South of SR-521):** Follows the E1/E3/E6 corridors to I-71, preserving flexibility to define the exact tie-in termini as geotechnical and community data mature.

FIGURE 3. RECOMMENDED FOCUS AREA



Source: ODOT

1. INTRODUCTION

Regional Growth Trends and Emerging Travel Demand

Over the past few decades, Central Ohio has emerged as one of the state's strongest engines of population and economic expansion. Franklin County, home to Columbus and surrounding suburbs, recorded an increase of 26,000 residents between 2017 and 2022, while adding 67,000 new jobs and more than nine billion dollars in real gross domestic product – the largest gains of any Ohio county. Delaware County, immediately north of Franklin County, followed closely with about 24,000 new residents and statewide top five growth in jobs and economic output. This economic growth was powered by the transition to a knowledge-based economy fueled by research, advanced logistics, semiconductor manufacturing, and other high-technology investments and associated development that are radiating outward from the Columbus metropolitan core.

State and regional forecasts prepared for the MORPC's 2024-2050 Metropolitan Transportation Plan indicate that development pressure will continue pushing north, northwest, and northeast into areas that are still largely exurban or rural today. At the same time, commercial and recreational ties linking Columbus with the Toledo and Sandusky regions are expected to intensify, including increasing freight traffic to and from the Lake Erie region (including Ontario) and boosting tourism travel to the lakefront. Together, these forces are generating sustained growth in commuter, freight, and discretionary trips that depend on the limited set of north–south highways connecting Central Ohio with Northwest and Northeast Ohio.

US-23 sits at the heart of this evolving travel pattern, traversing through Delaware County as the primary gateway between Columbus and points to the north. Along with I-71 (twelve miles to the east) and US-33 (about twenty-five miles to the west), the corridor carries nearly all north–south personal and commercial traffic north of I-270 within the Central Ohio region. This demand conflicts with an inconsistent corridor design that changes (south to north) from signal-controlled suburban arterial, to access-controlled freeway, back to signal-controlled suburban arterial, and then eventually to a high-speed divided arterial highway. These abrupt changes in roadway character translate into recurring congestion, unreliable travel times, and a concentration of crash locations – all problems that intensify during peak commutes and summer tourism weekends. Meanwhile, daily traffic volumes and heavy-truck percentages keep climbing alongside growth in Franklin and Delaware counties, and the proliferation of driveways, cross-streets, and traffic signals continues to erode corridor reliability.

ODOT's 23 Connect initiative, and the subsequent capital program have and will continue to deliver dozens of needed intersection, signal, and interchange upgrades that will relieve many of these existing and future challenges. However, completely converting the thirty-mile Delaware County segment of US-23 to a limited-access highway would require extensive right-of-way acquisition, costly business and residential relocations, and complex construction staging.

Legislative Mandate: House Bill 54, Section 755.60 (as amended in HB 96)

Recognizing that incremental upgrades alone cannot guarantee long-term corridor mobility, the Ohio General Assembly directed the Ohio Department of Transportation (ODOT) and the Ohio Turnpike & Infrastructure Commission (OTIC) to jointly "create a plan regarding the feasibility of connecting U.S. Route 23 to Interstate Route 71" through a range of options that include widening an existing state route, building a new freeway, or creating a tolled facility (six specific options are listed in Section 755.60(A)). The statute sets two deliverable milestones:

1. **Interim Report – due October 1, 2025**
    - Identify and evaluate conceptual corridor alternatives for each legislative option.
    - Provide a preliminary assessment of toll feasibility and OTIC authority.
2. **Final Joint Plan – due October 1, 2026**
    - Recommend a preferred route and develop preliminary engineering, cost, right-of-way, and environmental documentation sufficient for National Environmental Protection Act (NEPA).
    - Advise whether ODOT or OTIC is best positioned to deliver the project and, if OTIC, confirm statutory authority to advance it as a turnpike project.

Purpose of This Interim Report

This document fulfils the first of those milestones. The objectives of this Interim Report are to:

1. **Define the Study Framework** – Establish the broad "study area" that captures all reasonable north–south connection points from US-23 to I-71 within Delaware, Marion, and Morrow counties.
2. **Identify and Evaluate Conceptual Corridors** – Build upon the 23Connect and subsequent Alternatives Analyses as part of the Strategic Transportation and Development Analysis to test previously studied concepts (E1-E5) and two new corridors specifically crafted to close gaps in the HB 96 option set.
3. **Screen Tolling Feasibility** – Apply OTIC's turnpike criteria to each conceptual corridor, flagging revenue, legal, and operational considerations to be explored in the next phase.
4. **Narrow the Focus Area** – Recommend a "small study sub-area" where more detailed preliminary engineering, environmental screening, and public engagement can be concentrated between fall 2025 and October 2026.
5. **Set the Stage for Preliminary Engineering** – Lay out the additional technical work, schedule, and steps needed to progress from potential connection to a federally compliant preferred route.

How the Interim Report Is Organized

- **Chapter 2 – Legislative & Planning Context:** Summarizes HB 96 language, related statewide plans, and the regional growth outlook.
- **Chapter 3 – Study-Area Overview:** Describes existing transportation networks, land use patterns, environmental constraints, and demographic trends.

- **Chapter 4 – Corridor Identification & Screening:** Details the list of conceptual corridors, the performance measures applied, and comparative results.
- **Chapter 5 – Preliminary Tolling Assessment:** Presents order-of-magnitude traffic and revenue indicators, statutory review, and next-step considerations.
- **Chapter 6 – Recommendation and Next Steps:** Identifies the area most capable of meeting HB 96 objectives and outlines the scope for the 2025-2026 advanced study.
- **Appendix** – Seven technical memoranda provide additional details on the assumptions, methodology, data, and analysis outcomes supporting the findings highlighted in this Interim Report.
    - Study Area Profile Technical Memorandum
    - Corridor Concepts Technical Memorandum
    - Cost Estimate Technical Memorandum
    - Utilization & Benefits Technical Memorandum
    - Preliminary Environmental Screening Technical Memorandum
    - Tolling Financial Feasibility Assessment Technical Memorandum
    - Tolling Statutory Authority Technical Memorandum

2. LEGISLATIVE AND PLANNING CONTEXT

Statutory Direction

Section 755.60 of House Bill 54 (further amended by HB 96), Ohio's FY 2026-2027 transportation-budget act, directs ODOT and OTIC to develop, jointly, a plan for a free-flow connection between U.S. Route 23 (US-23) and Interstate 71 (I-71) in northern Delaware, Marion, or Morrow counties. The statute defines the study area, lists six corridor options, and sets two fixed milestones: an interim report by **October 1, 2025,** and a final joint plan by **October 1, 2026**. Because the legislation governs both scope and schedule, the full text is reproduced below.

Section 755.60, House Bill 54 (further amended by HB 96)

(A) *The Department of Transportation and the Ohio Turnpike and Infrastructure Commission shall work together to create a joint plan regarding the feasibility of connecting U.S. Route 23 to Interstate Route 71 through one of the following options:*

1. *Expanding State Route 229 in northern Delaware County;*
2. *Expanding another similar state route or other highway in northern Delaware County;*
3. *Creating a new freeway between U.S. Route 23 and Interstate Route 71 in northern Delaware County;*
4. *Creating a toll road between U.S. Route 23 and Interstate Route 71 in northern Delaware County;*
5. *Creating a new freeway, which may be a toll road, in the region between State Route 529 and Waldo, Ohio, heading eastward toward Interstate Route 71 north of Marengo, Ohio, in Marion County and Morrow County;*
6. *Any other alignment considered appropriate by the Department and the Commission.*

(B) *Not later than October 1 2025, the Department and Commission shall submit an interim report that includes both of the following:*

1. *An identification and evaluation of conceptual corridor alternatives related to the options and alignments specified in division (A) of this section;*
2. *A preliminary assessment of toll feasibility, including whether the Commission's statutory authority is sufficient to make the project a turnpike project.*

(C) *Not later than October 1 2026, the Department and Commission shall submit a final joint plan that includes all of the following:*

1. *Identification of a preferred route connecting U.S. Route 23 to Interstate Route 71;*
2. *Completion of preliminary engineering assessments, including preliminary design, construction cost estimates, and right-of-way and environmental impacts;*
3. *A recommendation regarding whether implementation would be best conducted by the Department or the Commission. If implementation is best conducted by the Commission, the plan also shall include an evaluation of whether the Commission's statutory authority is sufficient to make the project a turnpike project.*

(D) *The Department and Commission shall submit both the interim report and the final joint plan specified under divisions (B) and (C) of this section to the President of the Senate, the Speaker of the House of Representatives, the Minority Leaders of both the Senate and the House of Representatives, and the chairpersons of the respective committees of the House of Representatives and Senate responsible for transportation-related matters.*

Planning Context

House Bill 96 builds on a sequence of recent ODOT efforts that have examined conditions and needs along the US-23 corridor north of Columbus:

- **Route 23 Connect Preliminary Feasibility Study (2022).** Conducted under ODOT PID 112768, this study evaluated a range of alternative bypasses and upgrades but preceded major announcements, most notably Intel's semiconductor investment, which have since altered regional land-use and traffic forecasts.
- **Route 23 Connect Update and U.S. 23 Corridor Action Plan (2025).** ODOT refreshed its earlier analysis, released new technical findings, and catalogued targeted spot and interchange projects between I-270 and Waldo. The January 2025 Action Plan determined that, while individual improvements address specific bottlenecks, continuous access control on US-23 through Delaware County would remain cost-prohibitive.
- **HB 23 - Strategic Transportation & Development Analysis (2025).** This earlier act directed ODOT to complete a "Strategic Transportation & Development Analysis". Completed in 2025, that analysis included focus-corridor needs assessments for the Toledo–Columbus and Sandusky–Columbus travel markets (both reliant on US-23) and identified the signalized arterial segment through Delaware County as a principal constraint on long-term inter-regional (or market-to-market) mobility.

These prior efforts provide a substantial technical foundation for the present study, which must now compare upgrade and new-build options, evaluate toll feasibility, and identify a preferred route consistent with HB 96.

3. STUDY AREA OVERVIEW

This chapter defines the study area and provides an overview of study area development and land use, demographics and economy, and transportation network characteristics. More details on each of these topics is available in the *Study Area Profile Technical Memo*.

Study Area Definition

House Bill 96 limits the connector evaluation to northern Delaware County and adjoining portions of Marion and Morrow counties. For analytical clarity, ODOT has delineated a study boundary framed by US-23 on the west, I-71 on the east, US-36 on the south, and SR-95 on the north (**Figure 4**). The area lies entirely inside ODOT District 6 and spans the planning jurisdictions of the Mid-Ohio Regional Planning Commission (MORPC) and the Central Ohio Rural Planning Organization (CORPO). It contains the City of Delaware and the villages of Sunbury, Waldo, Marion, Ashley, Cardington, Fulton, Edison, and Mount Gilead, and touches one US House District (District 4), four Ohio House Districts (Districts 60, 61, 86, and 87) and two Ohio Senate Districts (Districts 19 and 26).

The study area sits in an important environmental context upstream of the Delaware, Alum Creek, and Hoover reservoirs. It is crossed by the Olentangy River, Whetstone Creek, Alum Creek, Walnut Creek, and the Kokosing River - along with a network of smaller streams and wetlands. Two state parks (Delaware and Alum Creek) and Mount Gilead State Park protect large blocks of natural land.

Development & Land Use

To reflect distinct existing development and growth patterns, the study area is discussed in **northern, middle,** and **southern** subareas. Moving from north to south, the development pattern of the study area transitions from primarily rural, including widespread agriculture, to suburban residential and commercial in Delaware County (Figure 5). There are pockets of residential and commercial development within this area, primarily within Marion and Morrow counties in Mount Gilead, Edison, Cardington, Fulton, Waldo, Ashley, and Marengo, and on the east side of Marion along US-23. South of SR-229, agricultural land uses are mixed with natural areas at Delaware Lake and Alum Creek state parks and pockets of residential and commercial development east of Delaware City along the US-36 and SR-521 corridors. Development continues to intensify and expand adjacent to I-71 interchanges at SR-61 and US-36.

Northern subarea. The northern subarea covers the area between and including SR-95 and SR-529 corridors, connecting Marion to Edison, Mount Gilead, Cardington, Fulton, and Chesterville through southeastern Marion County and southwestern Morrow County. SR-95 and SR-529 provide east-west connections while SR-746, US-42, and SR-61 provide north-south connections. Parallel to US-42 runs a CSX Railroad corridor connecting south to Columbus and north to Cleveland. The subarea is generally rural, featuring a majority of agricultural uses, with natural areas along the Olentangy River, Alum Creek, Big Walnut Creek, and Mount Gilead State Park. Suburban commercial and residential growth is occurring around the US-23/SR-95 interchange in Marion, with established development clustered at traditional crossroads, including some minor residential growth occurring in small-town neighborhoods in Cardington, Edison, and Mount Gilead.

Middle subarea. The middle subarea covers the area between and including the SR-529 and SR-229 corridors, connecting Waldo to Ashley to Marengo through southernmost areas of Marion and Morrow Counties and the northernmost areas of Delaware County. SR-529 and SR-229 provide east-west connections while SR-746, US-42, and

SR-61 provides north-south connections. The subarea is generally rural, featuring a majority of agricultural uses, with natural areas along the Olentangy River, Alum Creek, Whetstone Creek, and Delaware Lake State Park. Suburban commercial and residential growth is occurring along US-23 north of Waldo and adjacent to the SR-61 / I-75 interchange south of Marengo, which also includes recent and ongoing distribution center development (Marengo has annexed land along I-71 to accommodate this growth). Ashley features traditional development clustered around the US-42 / SR-229 crossroads with some recent minor residential growth.

Southern subarea. The south subarea covers the area between and including the SR-229 and US-36 corridors connecting northern Delaware County and Delaware City towards Sunbury. While still predominantly rural with primarily agricultural uses, it contains the fastest-growing residential pockets in the county, especially east of Delaware along US-36, around Alum Creek Lake, and near the I-71/US-36 interchanges. Delaware Lake and State Park create a natural barrier that limits cross-corridor growth south of SR-229 and east of US-23. Land between US-42 and I-71 is more interconnected, supporting ongoing suburban and exurban residential growth. Significant commercial nodes include Glenwood Commons in Delaware, and Tanger Outlets and associated services at I-71/US-36.

The I-71/US-36/SR-37 Interchange and Sunbury Pkwy project (PID 90200) will reduce congestion and improve the safety and operation of US-36/SR-37 through the I-71 interchange. The project will support existing and future planned residential and commercial growth and improve east-west connectivity in Delaware County and is divided into seven phases, with the first (Phase A) expected to begin construction in 2025.

Demographics & Economy

U.S. Census Bureau data (analyzed at the block level) show the study-area population rising from about 33,000 in 2000 to nearly 44,000 in 2023 (a 33 percent gain) while households increased from 12,500 to more than 17,000. Growth accelerated after 2020, with the addition of almost 2,500 residents and 1,000 households in just three years.

Employment climbed from 7,700 jobs in 2002 to nearly 12,000 in 2022. Retail trade (25 percent), accommodation and food services (13 percent), and health care and social assistance (11 percent) dominate the local economy, though advanced manufacturing is significant near Cardington and Rome Township. Major employers include Kroger's grocery and distribution complex and OhioHealth in Delaware, Whirlpool and affiliated suppliers in Marion, and, most recently, Ohashi Technica's $11-million expansion in Sunbury.

Transportation Network

The study area is anchored by three north–south highways (**Figure 6**). I-71 provides full access control and the highest volumes; US-23 is mostly a four-lane divided highway with partial access control north of Delaware City and north of Waldo; US-42 is a two-lane rural arterial with no access control. Key east–west routes (SR-521, SR-229, SR-529, SR-95, and US-36) are primarily two-lane rural collectors that feed local traffic to US-23 and I-71. US-36 carries the highest east–west volumes and is the only major crossing of Alum Creek Lake. Traffic data for 2023 indicates:

- **Average annual daily traffic (AADT).** I-71 carries the heaviest daily traffic volumes, followed by US-23 and US-36. Daily traffic volumes on I-71 steadily increase from north to south, with 61,000 vehicles per day just south of SR-95 to over 88,000 vehicles per day south of US-36. US-23 follows a similar trend, with nearly 25,000 vehicles per day at SR-95 in Marion to nearly 40,000 vehicles per day south of US-36 in Delaware City. Most

other routes register fewer than 5,000 vehicles per day, except for the Mount Gilead to I-71 corridor along SR-61 (vehicles per day range from around 6,000 just south of Mt. Gilead to 13,000 at the I-71 interchange.

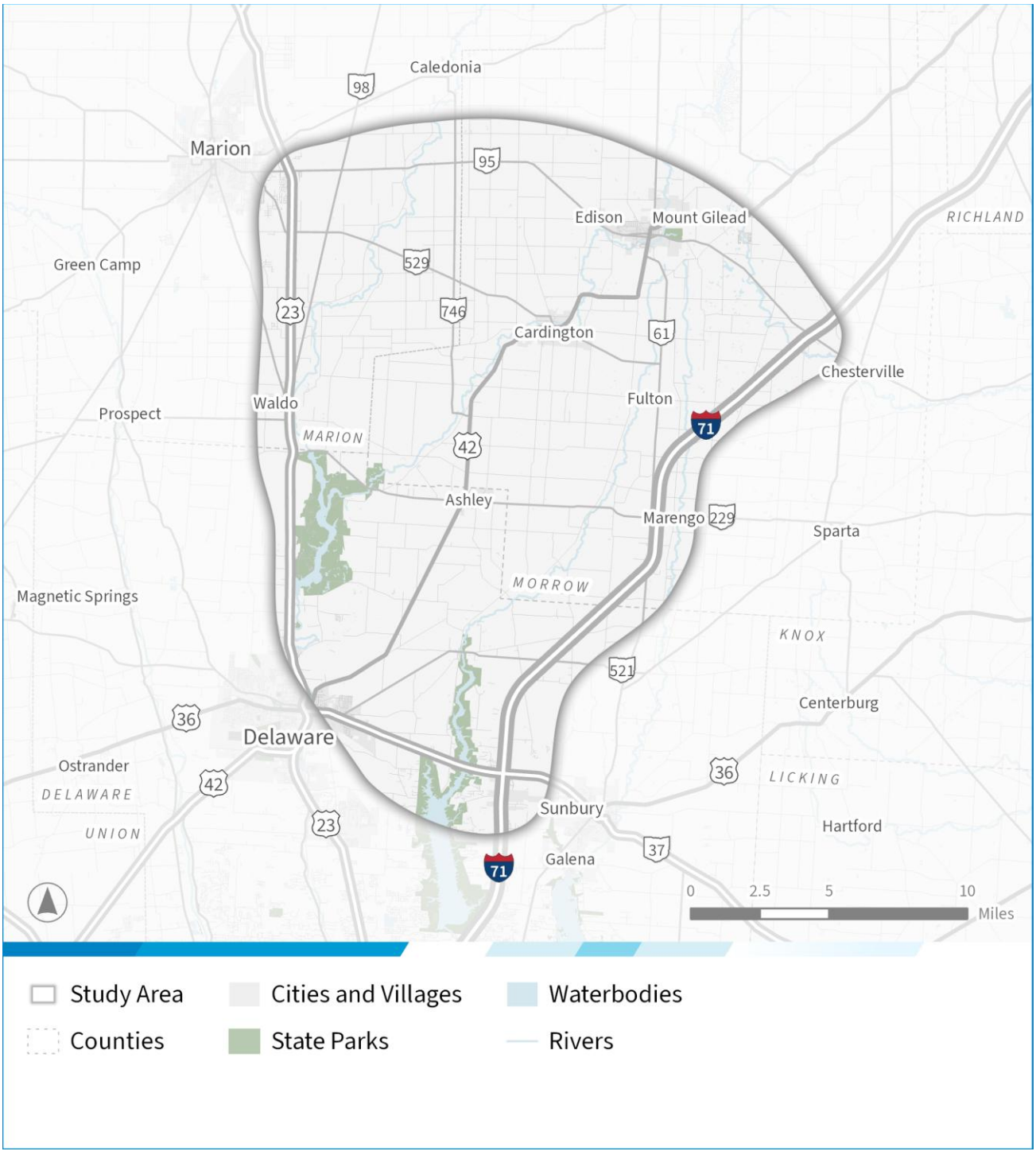
- **Truck percentages.** Heavy trucks concentrate on I-71 and US-23, with I-71 truck percentages approaching 25 percent and US-23 approaching 15 percent. Trucks account for 15–30 percent of daily volume along the SR-229 corridor between Ashley and SR-61, reflecting agricultural and distribution activity.

Two freight rail lines traverse the study area. Norfolk Southern parallels US-23 from Delaware through Waldo to Marion with grade-separated highway crossings, while a CSX line follows US-42 through Ashley and Cardington with mostly at-grade crossings. Both lines connect south to Columbus and north to broader national networks.

Key Findings

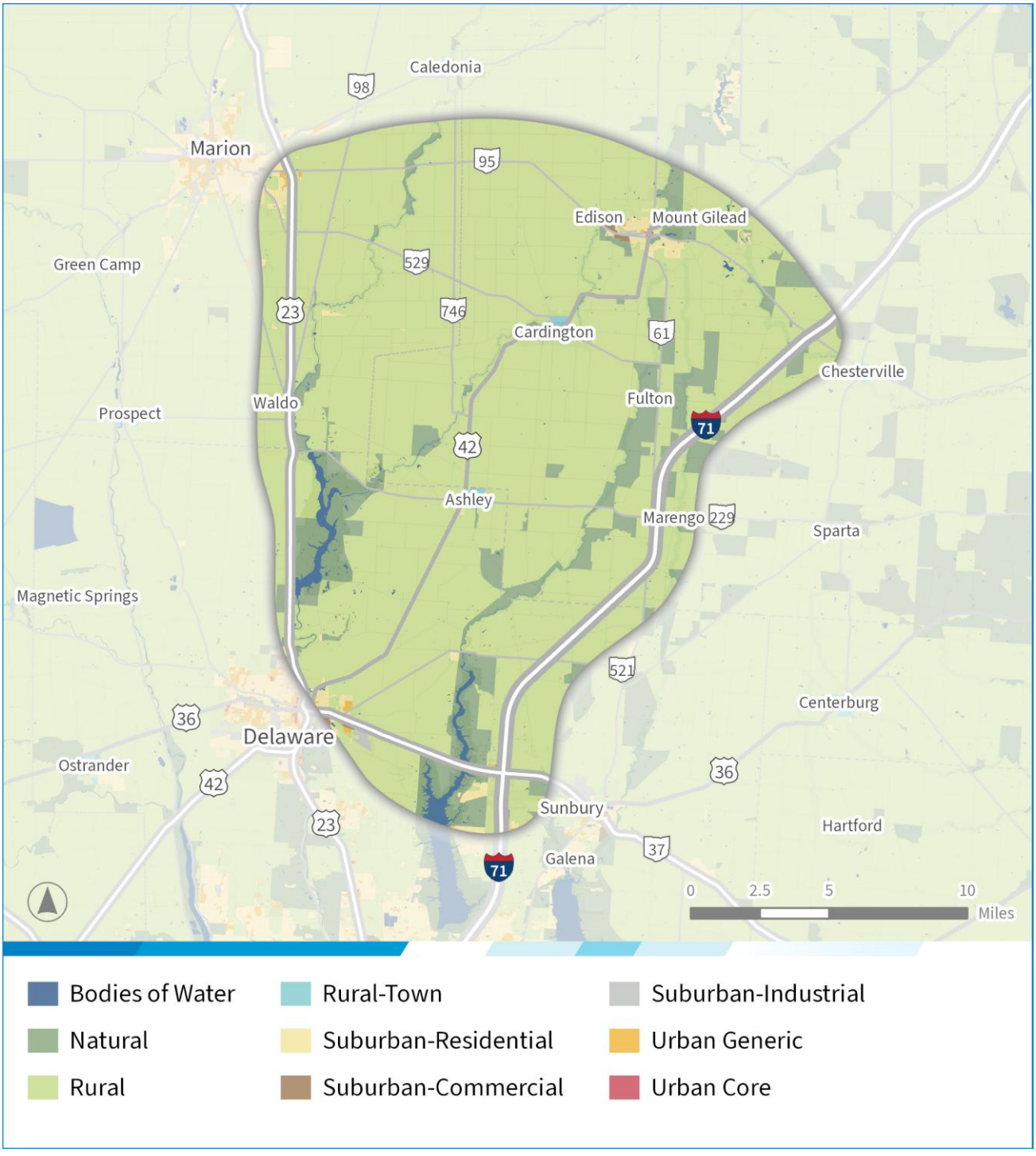
1. **Growth pressure is shifting north and east.** The south subarea east of Delaware City and along US-36 is seeing the most rapid residential and commercial expansion. Some of this growth is moving northward west of I-71 and adjacent to the SR-61 interchange south of Marengo.
2. **US-23 is under pressure.** Despite programmed spot improvements, the current mixed access control and expanding driveway network along US-23 continues to impact reliability for both commuters and freight.
3. **Environmental and recreational assets are extensive.** Multiple reservoirs, state parks, and stream corridors constrain route-selection options and elevate permitting complexity.

FIGURE 4. HB 96 STUDY AREA



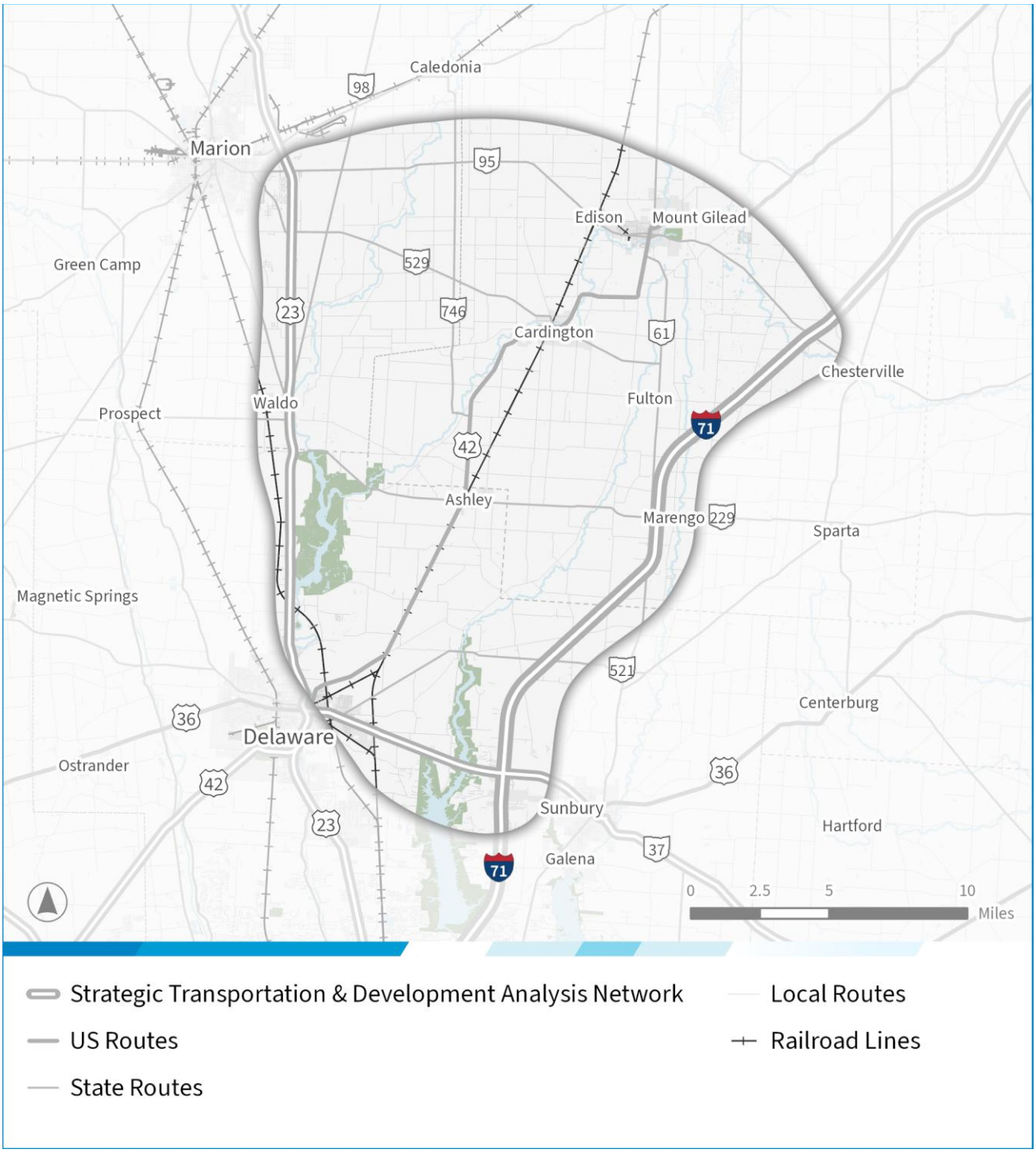
Source: ODOT

FIGURE 5. STUDY AREA DEVELOPMENT CONTEXT



Source: ODOT

FIGURE 6. STUDY AREA TRANSPORTATION NETWORK



Source: ODOT

4. CORRIDOR IDENTIFICATION AND EVALUATION

The study area overview and context described in **Chapter 3** shapes the conceptual corridors. This chapter defines and evaluates the conceptual corridors without tolling, while **Chapter 5** presents the screening of tolling feasibility, and **Chapter 6** provides a recommended focus area for detailed engineering and environmental study.

Corridor Identification

House Bill 96 directs ODOT and OTIC to evaluate the feasibility of a free-flow connection between US-23 and I-71 in northern Delaware County and adjoining portions of Marion and Morrow counties. Building on earlier work completed under the 23 Connect program and the 2025 Strategic Transportation & Development Analysis - Alternatives Analysis, seven location-specific concepts (labeled **E1 through E7)** were defined for conceptual review.

- **E1, E2, and E3** were originally defined and assessed in the 23 Connect Preliminary Feasibility Study (2022) when they first emerged as long-range eastern bypass concepts north of Delaware City.
- **E4 and E5** were developed as part of the 2025 Strategic Transportation & Development Analysis – Alternatives Analysis to address gaps and stakeholder feedback that the earlier study had not fully resolved, particularly in the Mount Gilead corridor (SR-95) and along SR-229.
- **E6 and E7** were developed at the outset of this HB 96 study to capture opportunities not yet examined: a hybrid state route upgrade/new-build link that ties SR-229 and SR-521 to I-71 (E6) and a direct Waldo-to-Marengo greenfield corridor following the Waldo–Fulton Road axis (E7).

For screening purposes, each corridor is represented by a two-mile-wide swath centered on a preliminary "best-fit" conceptual centerline. The extra width preserves engineering flexibility in later design phases while ensuring that all data assembled for this interim study (traffic assignments, environmental constraints, parcel mapping, and cost estimates) would be applicable as the alignment shifts within that swath.

Table 1 summarizes key descriptive elements (length, type of work, county coverage, and conceptual interchange assumptions) for all seven corridors. Each concept is described in more detail, including its geographic context, key features, and rationale for inclusion within the *Corridor Concepts Technical Memo*.

TABLE 1. CORRIDOR ALTERNATIVE CONCEPT DESCRIPTIONS

Corridor ID	Description and General Concept
E1	Swath located in Marion, Morrow, and Delaware counties, including 15 miles of new freeway on new alignment between US23 (north of Waldo) and I-71 (south of Marengo).
E2	Swath located in Delaware County, including 16 miles of new freeway on new alignment and a 3-mile freeway upgrade of US-36/SR-37, connecting to I-71 via the Sunbury Parkway interchange.
E3	Swath located in Delaware County, including a 5-mile freeway upgrade of SR-229 between US23 and Ashley and 12 miles of new freeway on new alignment (including a bypass of Ashley) connecting to I-71 south of Marengo.
E4	Swath located in Marion and Morrow counties, including 11 miles of new freeway on new alignment with a bypass of Mt. Gilead and an 11-mile freeway upgrade of SR-95.
E5	Swath located in Delaware County, including an 11-mile freeway upgrade of SR-229 and a 3-mile new freeway on new alignment bypass of Ashley.
E6	Swath located in Delaware County, including a 4-mile freeway upgrade of SR-229, 7 miles of new freeway on new alignment from SR-229 to SR-521 near Kilbourne, and a 3-mile freeway upgrade of SR-521 connecting to I-71.
E7	Swath located in Marion, Delaware, and Morrow counties, including 14 miles of new freeway on new alignment from the SR-529/Waldo area to I-71 north of Marengo (generally following the Waldo-Fulton Road corridor).

Definitions:

Freeway upgrade: Existing roadway corridor is expanded to meet freeway facility design and operational standards.

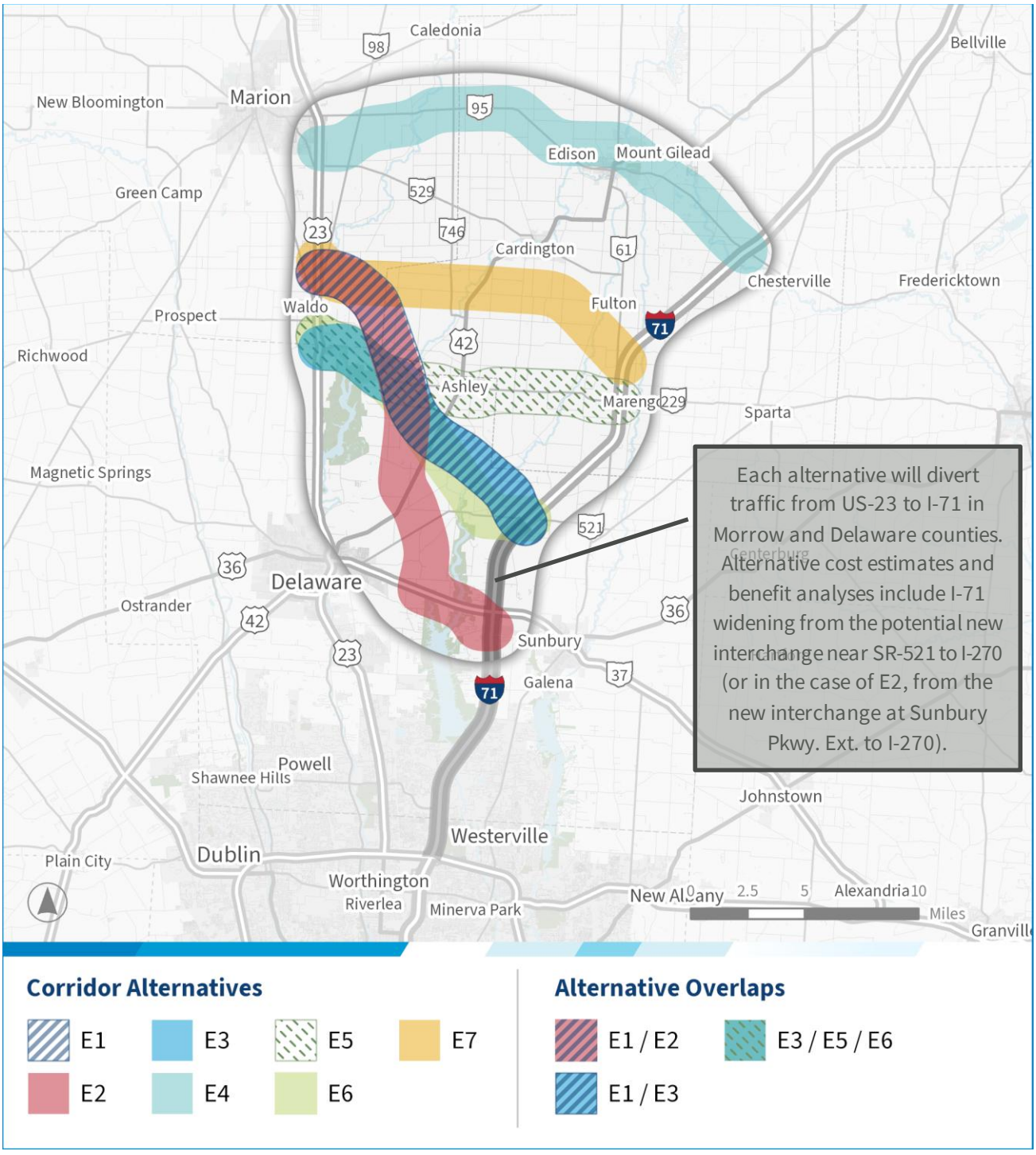
New freeway on new alignment: New freeway corridor is primarily located within new greenfield right-of-way (and in some cases may repurpose and expand existing roadway corridors).

Interaction with I-71

Each concept will divert a share of through-traffic from US-23 to I-71 in Morrow and Delaware counties. These traffic diversions, in addition to traffic accessing I-71 from new interchanges under development at Sunbury Parkway and Big Walnut Road, and the impact of continued development in Delaware County, will increase daily volumes on I-71. To preserve the travel-time savings delivered by each corridor under those higher volumes, the analysis pairs every corridor concept with a companion widening of I-71 from approximately the concept interchange with I-71 to I-270 (as FHWA will require improvements to I-71 so that operations are not degraded). The added I-71 mainline capacity is folded into both benefit calculations and cost estimates so that each alternative is evaluated as a self-contained, long-term solution.

Figure 7 presents the two-mile-wide swath for each conceptual corridor, noting areas of overlap, and the definition and limits of the associated I-71 widening for each corridor.

FIGURE 7. CORRIDOR ALTERNATIVE CONCEPTS



Source: ODOT

Evaluation Methodology

The objective of this evaluation is to move from the broad study area to the definition of a sub-area that contains only the most promising connection options. Every concept was tested under the same analytical framework (see **Figure 8**) – Benefits, Costs, and Impacts – with common data sources, time horizons, and economic assumptions. The comparative evaluation was performed under the assumption that each concept would be free (non-tolled). Assessing every concept on the same footing enables comparison of trade-offs and to pinpoint which corridors, and therefore which portions of the overall study area, merit refinement in the next phase of engineering and environmental review. Results of the separate tolling analysis can be found in Chapter 5 of this report.

FIGURE 8. EVALUATION FRAMEWORK

Benefits

The Ohio Statewide Model (OSWM) was the primary travel demand analysis tool supporting the monetization of benefits as part of the comparative analysis detailed later in this chapter and in the *Utilization and Benefits Technical Memo*. Use of the OSWM and data assumptions were customized to meet the analysis needs and context. Data generated by the OSWM is input into a multicriteria benefit analysis presented in **Table 2**. The benefit analysis methodology is consistent with best practices as specified through Federal guidance for discretionary grant programs while leveraging current ODOT tools and datasets. Key assumptions to estimate benefits include:

- **Benefits analysis area** – Covers 20 counties to capture all counties, cities, towns, and villages between Toledo and Columbus along the corridor, as well as counties between Columbus and Sandusky.
- **Horizon years** – Forecasts in 2035 (opening year) and 2055 (design year) to estimate total benefits for the 20-year period 2036 to 2055.
- **Free and tolled corridors** – The comparative evaluation in this chapter assumes a free, non-tolled corridor. **Chapter 5** includes an assessment of various tolling rates to assess tolling financial feasibility.
- **Population and employment forecasts** – Incorporate the baseline population growth forecast by county developed by the Ohio Department of Development (ODOD) in 2023, the latest regional employment forecasts based on the 2020 Census, and Intel development forecasts for the MORPC region.

- **Updated MORPC Transportation Improvement Program and Metropolitan Transportation Plan** – Updates the no-build highway network in 2035 and 2055 to reflect implementation of projects identified in the current MORPC Transportation Improvement Program (TIP) and MORPC 2024-2050 MTP projects anticipated to be open to traffic by 2035.
- **Updated freight flows** – Uses the Freight Analysis Framework (FAF), the Federal Highway Administration's (FHWA) national dataset, updated to FAF5, which forecasts substantial growth in freight truck traffic through 2055 across the national system compared to FAF4 (used in the 2022 analysis).

TABLE 2. UTILIZATION AND BENEFITS METRICS

Analysis Outputs	Description	Methodology
Reduced travel time (annual hours or minutes per trip)	Analysis area travel time savings for the concept compared to the no-build	Hybrid Ohio Statewide Model (OSWM) with forecasts for 2035 and 2055, which captured differences in total vehicle hours traveled between the concept and no-build.
Expected utilization	Indicative demand on the new facility	Corridor-level volumes extracted from the same model runs, reported for opening (2035) and design (2055) years.
Monetized travel-time savings	Current dollar value of passenger and truck travel time reductions	Value of time applied to vehicle hours traveled savings to estimate current benefits based on a 3.1% real discount rate applied to a 20-year benefits stream (2036-2055).
Other monetized benefits	Crash cost reduction, fuel & vehicle-operating cost savings	Leverages ODOT crash modification factors and FHWA crash costs to monetize crash savings and changes in speed and vehicle miles traveled to estimate vehicle operating costs.

Costs

Cost estimates rely on planning-level cost assumptions consistent with current ODOT practice. Costs are developed for each concept and the associated widening of I-71 and are broken down into construction, right-of-way (ROW), and operations and maintenance (O&M) costs (see **Table 3**). Details on the costing assumptions and data are summarized in and presented in the *Cost Estimate Technical Memo*.

TABLE 3. COSTING METRICS

Analysis Outputs	Description	Methodology
Construction cost (low / high range)	Capital outlay for roadway, interchanges, structures	Relies on ODOT quantities for a four-lane divided freeway with 2024 - 2025 unit prices plus a 30% contingency. The high range adds 20% to prices and 10% to quantities for alignment uncertainty.
Right-of-way cost	Land acquisition inclusive of admin and relocation costs	Parcel overlay inside two-mile swath with land-use-specific market values applied, plus a $10,000 per parcel administrative allowance.
Operations & maintenance cost	Upkeep of pavement and bridges, plus winter operations	14-year mill-and-overlay cycle utilizing the posted ODOT inflation factor plus annual winter operation costs using ODOT lane-mile factors over a 20-year horizon.

Impacts (Community and Environmental Screening)

To assess corridor impacts, a preliminary environmental screening was conducted along each corridor. The screening assembled data and other information within the study area and then identified potential issues along each of the seven corridor concepts (see **Table 4**). This screening draws solely on desktop information. To date, no field verification, agency consultation, or formal determinations under the National Environmental Policy Act (NEPA) or related statutes have occurred. The issues uncovered through this screening analysis may require further action, documentation, mitigation, or avoidance during future activities associated with project development and delivery.

This screening supplements the benefits analysis with a level of detail consistent with the expected depth of understanding of community and environmental issues typically found at this stage of project development. Categories of community resources reviewed include public buildings, cemeteries, parks and recreation areas, agricultural land and districts, dams and reservoirs, drinking water protection areas, and percentage of developed areas. Categories of environmental impacts reviewed include streams, wetlands, wooded habitat, endangered species, floodplains, landfills, and other regulated materials sites, and historical and archaeological resources. Total acres, linear feet, or count of resources within each category are tallied within 1 mile and 300 feet of the conceptual corridor centerline. Details on the screening data and methodology are presented in the *Preliminary Environmental Screening Technical Memo*.

TABLE 4. COMMUNITY AND ENVIRONMENTAL SCREENING METRICS

Analysis Outputs	Description	Methodology
Ecological & natural-resource intersections	Acres/linear feet of wetlands, streams, mussel habitat, floodplains, and wooded habitat	One-mile core bands intersected with various Federal and State geolocated data layers.
Community resource displacements, schools, churches, and agricultural land impacts	Public buildings, cemeteries, state and local parks, agricultural lands/districts, and drinking water protection areas affected	One-mile core bands intersected with various Federal, State, and local geolocated data layers, including Homeland Infrastructure Foundation-Level Data (HIFLD).
Cultural resources	Historic/archaeological sites affected	State Historic Preservation Office points and National Historic Register locations.
Dams, reservoirs / high-hazard impoundments	Locations with high-hazard impoundments	Ohio Department of Natural Resources dam-safety inventory data.
Regulated materials sites	Landfills and leaking underground storage tanks	EPA RCRA & CERCLIS points within each corridor swath.
Development density	Building count and Building floor-area/acre	FEMA/USA Structures building-footprint floor area per acre used as a proxy for construction complexity.

Comparative Evaluation Overview

The following pages consolidate each corridor's performance (as a free, non-tolled facility) across the three evaluation lenses (benefits, costs, and impacts) and present key takeaways, evaluation summaries, and color-band figures that illustrate the relative ranking of the seven concepts. All headline results draw from the detailed work documented in the companion technical memoranda in the appendix. Readers needing source data, methods, or calculation details should consult:

- *Utilization & Benefits Technical Memo* (Benefits)
- *Cost Estimate Technical Memo* (Costs)
- *Preliminary Environmental Screening Technical Memo* (Impacts)

Benefits

Key Takeaway

A clear pattern emerges from the benefit modeling. Corridors that tie into I-71 near the Delaware/Marion/Morrow county border (E1, E2, E3, and E6) capture more demand and, therefore, greater user benefits. Each is forecast to carry 21,000–25,000 Average Annual Daily Traffic (AADT) at opening in 2035. The three northern concepts (E4, E5, and E7) top out near 7,000 AADT, with E7 falling below 5,000 AADT. Because traffic volumes drive the monetized benefits, the southern set delivers the largest travel-time savings and the highest benefits, while the northern set lags well behind.

Evaluation Summary

Benefits of each concept are cumulative over a 20-year analysis period (2036 to 2055). Benefits include travel time savings, crash savings, fuel savings, and vehicle operating costs, and are compiled across the 20-county analysis area and then monetized into current dollars.

One key aspect of travel time savings is the impact on trips between Toledo and Columbus. The travel time savings from Toledo (specifically the I-75/I-475 interchange in Perrysburg) to Columbus (specifically the I-71/I-270 interchange) for each concept, compared to the no-build, are presented in

Table 5 for the morning peak travel period (based on OSWM data). The results of this analysis include:

- The no-build free flow travel time is estimated at 1hr 53min, and the estimated congested travel time is estimated at 2hr 8min in 2035 and 2hr 25min in 2055.
- Among the concepts, E3 shows the highest total travel time savings, with 8 minutes saved in free flow conditions, and 22 minutes (2035) and 38 minutes (2055) saved in congested conditions. E1, E2, and E6 show slightly lower travel time savings (from 19 minutes in 2035 to 35 minutes in 2055).
- All concepts reduce travel time from Toledo to Columbus, except E4, which adds overall distance and travel time to the trip given the path along SR-95 and I-71 in Marion and Morrow counties.

TABLE 5. REDUCED TRAVEL TIME (FROM I-475 TO I-270)

Corridor ID	No Build – Build Concept (Free Flow)	Congested (AM Peak Period)	
		No Build – Build Concept (2035)	No Build – Build Concept (2055)
E1	4 min	18 min	34 min
E2	4 min	18 min	34 min
E3	8 min	22 min	38 min
E4	-15 min	-1 min	15 min
E5	0 min	14 min	30 min
E6	4 min	19 min	35 min
E7	-3 min	11 min	28 min

Note: Travel time savings are based on data from the OSWM for each trip path. The no-build trip path is from the I-75/I-475 interchange along I-75, US-68/SR-15, US-23, and I-270 to the I-71/I-270 interchange. The concept trip path is the identical path until reaching the concept interchange with US-23 in Marion or Delaware counties, then following the concept alignment to I-71 to the I-71/I-270 interchange.

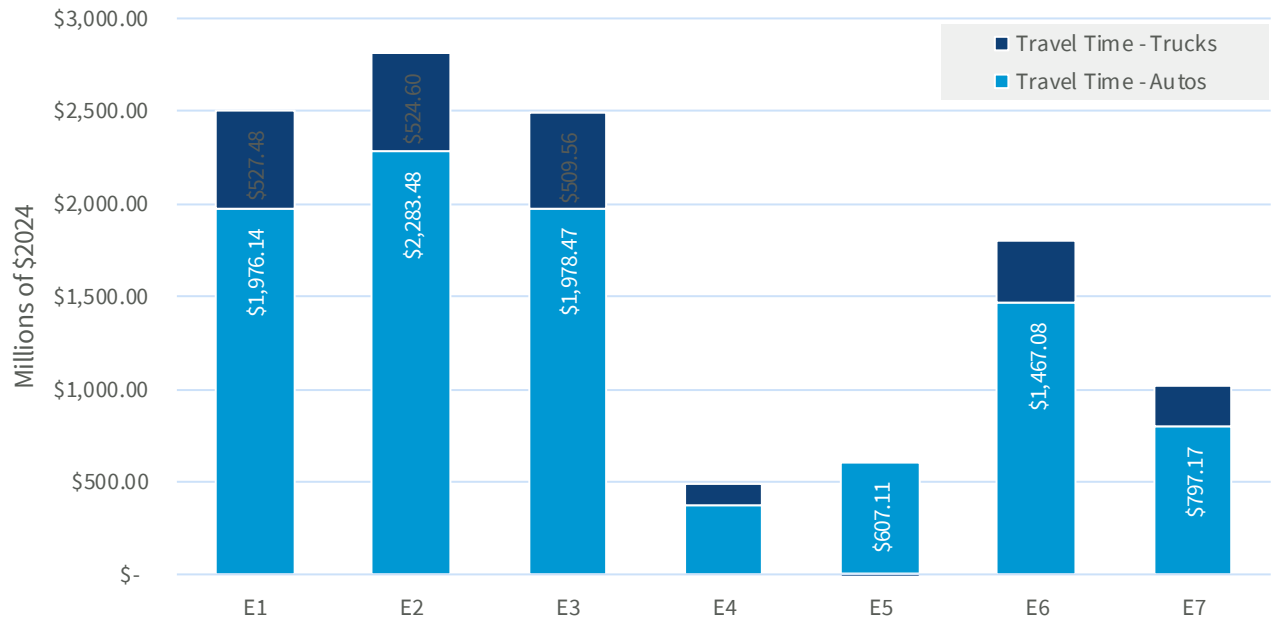
Travel time savings are a primary factor shaping diversions from existing routes (such as US-23), which lead to estimates of corridor utilization for each concept. **Table 6** presents average daily traffic along each conceptual corridor in the presumed opening year (2035). Concepts E1, E2, and E3 divert similar volumes of total daily traffic. Concept E6 diverts around 4,000 fewer vehicles daily than E1, E2, and E3. Due to a combination of lower travel time savings, initial interchange locations, and longer route distances, concepts E4, E5, and E7 all divert only approximately 20 to 25% of the total volumes diverted by concepts E1, E2, and E3.

TABLE 6. UTILIZATION – AVERAGE DAILY TRAFFIC (2035) BY CORRIDOR CONCEPT

Corridor ID	Average Annual Daily Traffic
E1	24,600
E2	25,000
E3	24,000
E4	5,900
E5	7,000
E6	20,800
E7	4,800

Travel time savings within the study area average 47% of total benefits (including crash reduction, fuel savings, and vehicle operating costs). Travel time savings are compiled individually for autos and trucks based on different values of time. On average, 82% of travel time savings across the concepts are from autos. Total travel time savings by concept, segmented by autos and trucks, are presented in **Figure 9**. E1, E2, and E3 each show total travel time savings approaching or above $2.5 billion for the 20-year period. E6 is the next highest, totaling around $1.8 billion. E4, E5, and E7 travel time savings are each $1 billion or less.

FIGURE 9. TRAVEL TIME SAVINGS BY CONCEPT



Adding the other benefits (crash savings, fuel savings, and vehicle operating costs) results in the same general pattern when looking across the concepts. Total other benefits range from a high of nearly $3.0 billion for E2 to a low of $563 million for E4. The total benefits are presented in **Figure 10**. E1, E2, and E3 each show total benefits above $4.5 billion, with E2 estimated to be the highest, approaching $5.7 billion. E6 total benefits are just below $4.0 billion, with E4, E5, and E7 all below $1.5 billion.

FIGURE 10. TOTAL BENEFITS BY CONCEPT

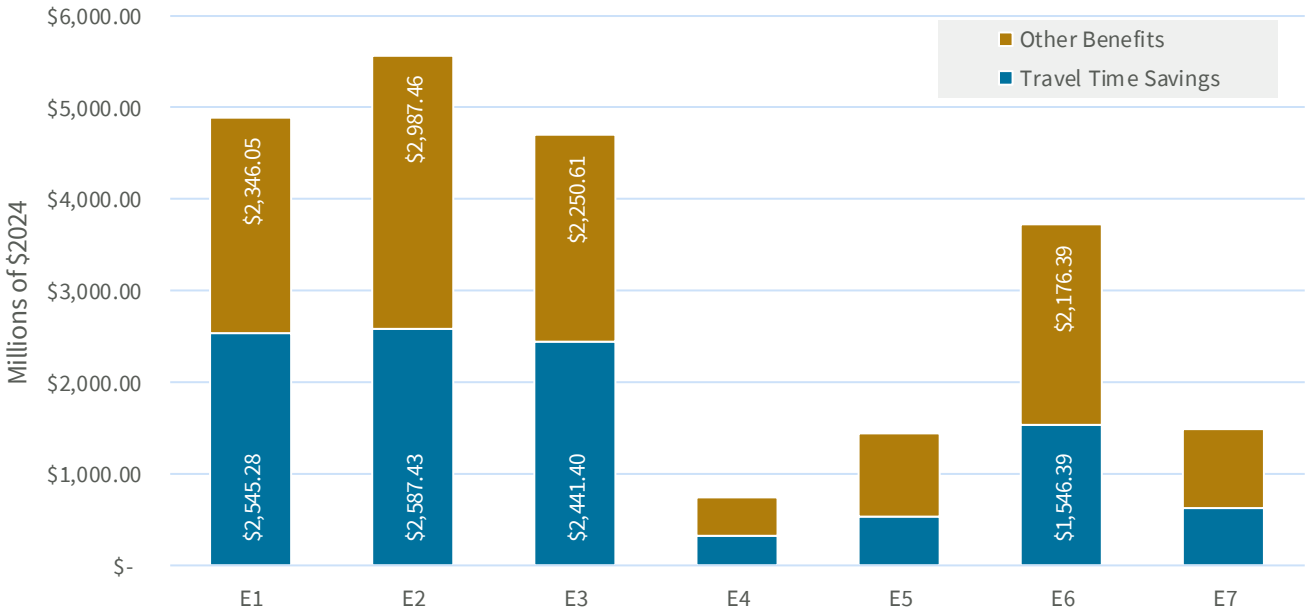


Figure 11 summarizes results across the four benefit criteria (reduced travel time, utilization, travel time savings, and other benefits), through a relative ranking (dark blue the highest benefits, dark red the lowest benefits). Concepts E1, E2, E3, and E6 clearly distinguish themselves in terms of benefits (both from a comparative ranking and magnitude) while E4, E5, and E7 are substantively less beneficial to mobility and safety in the study area.

FIGURE 11. BENEFITS – EVALUATION SUMMARY

	Criteria	E1	E2	E3	E4	E5	E6	E7
Benefits	Reduced Travel Time	3	3	1	7	5	2	6
	Expected Utilization	1	2	3	6	5	4	7
	Travel Time Savings	2	1	3	7	6	4	5
	Other Monetized Benefits	3	1	2	7	5	4	6

Comparison scale: Best (#1) … Worst (#7)

Costs

Key Takeaway

Planning-level estimates show total "all-in" capital needs (including the companion I-71 widening) ranging from about $0.8 – 1.0 billion for E7 to $1.2 – 1.6 billion for E4. The lower estimates (E7, E1, E3) reflect shorter and predominantly greenfield conceptual corridor footprints and modest right-of-way acquisition. The highest totals (E2, E4, E5) stem from converting long stretches of built-up state routes to freeway standards, acquiring more urban land, and constructing additional structures at reservoir or park crossings (factors that compound construction quantities, utility relocations, and contingencies).

Evaluation Summary

Construction, ROW, and O&M costs for each concept were developed as high and low ranges to account for cost uncertainty (see *Cost Estimate Technical Memo*). A summary of these costs is presented in **Table 7**. The cost categories in blue (construction, ROW, and O&M) are specific to each conceptual corridor. The cost category in grey references the widening of I-71 from approximately the concept interchange at I-71 to the I-71/I-270 interchange and includes the additional O&M costs in that corridor due to the widening.

TABLE 7. CONCEPT COST ESTIMATES (MILLIONS OF $2024)

Corridor ID	Cost Range	Construction	Right-of-way	Operations & Maintenance	Concept Total	I-71	All-in Total
E1	Low	$462.83	$19.85	$9.19	$491.87	$366.29	$858.16
	High	$595.51	$33.09	$11.03	$639.63	$476.17	$1,115.80
E2	Low	$784.21	$60.08	$12.16	$856.45	$306.74	$1,163.19
	High	$997.97	$100.13	$14.59	$1,112.69	$398.77	$1,511.46
E3	Low	$583.08	$29.07	$7.62	$619.77	$366.29	$986.06
	High	$738.89	$48.46	$9.14	$796.49	$476.17	$1,272.66
E4	Low	$822.35	$53.68	$13.00	$889.03	$319.90	$1,208.93
	High	$1,058.38	$89.47	$15.60	$1,163.45	$415.87	$1,579.32
E5	Low	$778.76	$51.17	$8.65	$838.58	$319.90	$1,158.48
	High	$987.56	$85.29	$10.38	$1,083.23	$415.87	$1,499.10
E6	Low	$652.35	$31.11	$8.04	$691.50	$368.69	$1,060.19
	High	$826.46	$51.85	$9.65	$887.96	$479.30	$1,367.26
E7	Low	$459.97	$17.55	$9.13	$486.65	$319.90	$806.55
	High	$593.00	$29.24	$10.96	$633.20	$415.87	$1,049.07

Across each cost component, **Figure 12** summarizes results through a relative ranking (dark blue is the lowest cost, dark red is the highest cost). Concepts E7, E1, and E3 total costs are noticeably lower, all below $1.3 billion, with E6 slightly higher at $1.37 billion. Concepts E5, E2, and E4 are all at $1.5 billion or more in total cost.

FIGURE 12. COSTS – EVALUATION SUMMARY

	Criteria	E1	E2	E3	E4	E5	E6	E7
Costs	**Construction Costs** (based on high costs)	2	6	3	7	5	4	1
	ROW Costs (based on high costs)	2	7	3	6	5	4	1
	O&M Costs (based on high costs)	5	6	1	7	3	2	4

Comparison scale Best (#1) … Worst (#7)

Impacts

Key Takeaway

The preliminary environmental screening highlights three consistent risk drivers across the study area. First, reservoir and state-park crossings present the most substantial challenge and risk: corridors that span Delaware, Alum Creek, or Mt. Gilead reservoirs would trigger Section 408 dam-safety permissions and Section 4(f)/6(f) land conversions, adding time and uncertainty to project delivery. Second, stream density and flood-plain breadth vary sharply by concept; E1 and E7 thread the narrowest flood-plain zones, while E2 and E4 intersect the longest stream mileage, which would increase hydraulic design and mitigation requirements. Third, existing development along several corridors (including in Mt. Gilead along E4) or planned development (particularly along US-36 east of Delaware City along E2) present substantial challenges. Taken together, E1 and E7 offer the clearest path to impact avoidance as a whole, whereas reservoir-heavy or development-intensive alternatives would face progressively higher permitting and mitigation risks for some of their extents.

Evaluation Summary

The quantitative analysis results of the preliminary environmental screening were synthesized into a comparative assessment across six topics: ecological and natural resources, community resources, cultural resources, dams and reservoirs, regulated materials, and development density. Detailed information on each corridor concept's direct and secondary impacts for these topics within 300-ft and 1-mile evaluation bands is presented in the *Preliminary Environmental Screening Technical Memo*. The compilation of these impact results is summarized in

Figure 13 through a relative ranking (with dark blue representing the greatest potential for avoidance and minimization of impacts, and dark red representing the lowest potential for avoidance and minimization of impact). The relative ranking compares corridor swathes against each other in terms of quantity, length, or area of a resource within the corridor and does not consider the severity of the impact (for example, all corridor concepts impact ecological and natural resources such as all streams, mussel streams, floodplains, wetlands, and wooded habitats, however, concept E7 and E1 impact the fewest in terms of length or area).

This analysis is based upon a review of secondary source environmental data only. As part of NEPA, the implementing agency is required to assess the alternatives' ability to meet the project's purpose and need. At this early planning stage, the purpose and need is not fully defined. Therefore, the comparison within this section is based solely upon environmental issues and must be considered along with the benefits analysis and cost estimates when making determinations of corridors to advance for further study.

FIGURE 13. IMPACTS – EVALUATION SUMMARY

	Criteria	E1	E2	E3	E4	E5	E6	E7
Impacts	Ecological and Natural Resources	2	6	4	7	3	5	1
	Community Resources	1	6	4	7	6	3	2
	Cultural Resources	2	3	5	1	7	4	6
	Dams and Reservoirs	2	4	6	3	5	7	1
	Regulated Materials	1	6	2	7	4	3	4
	Development Density	2	5	1	7	6	4	2

Comparison scale: Best (#1) … Worst (#7)

Comparative Evaluation by Concept

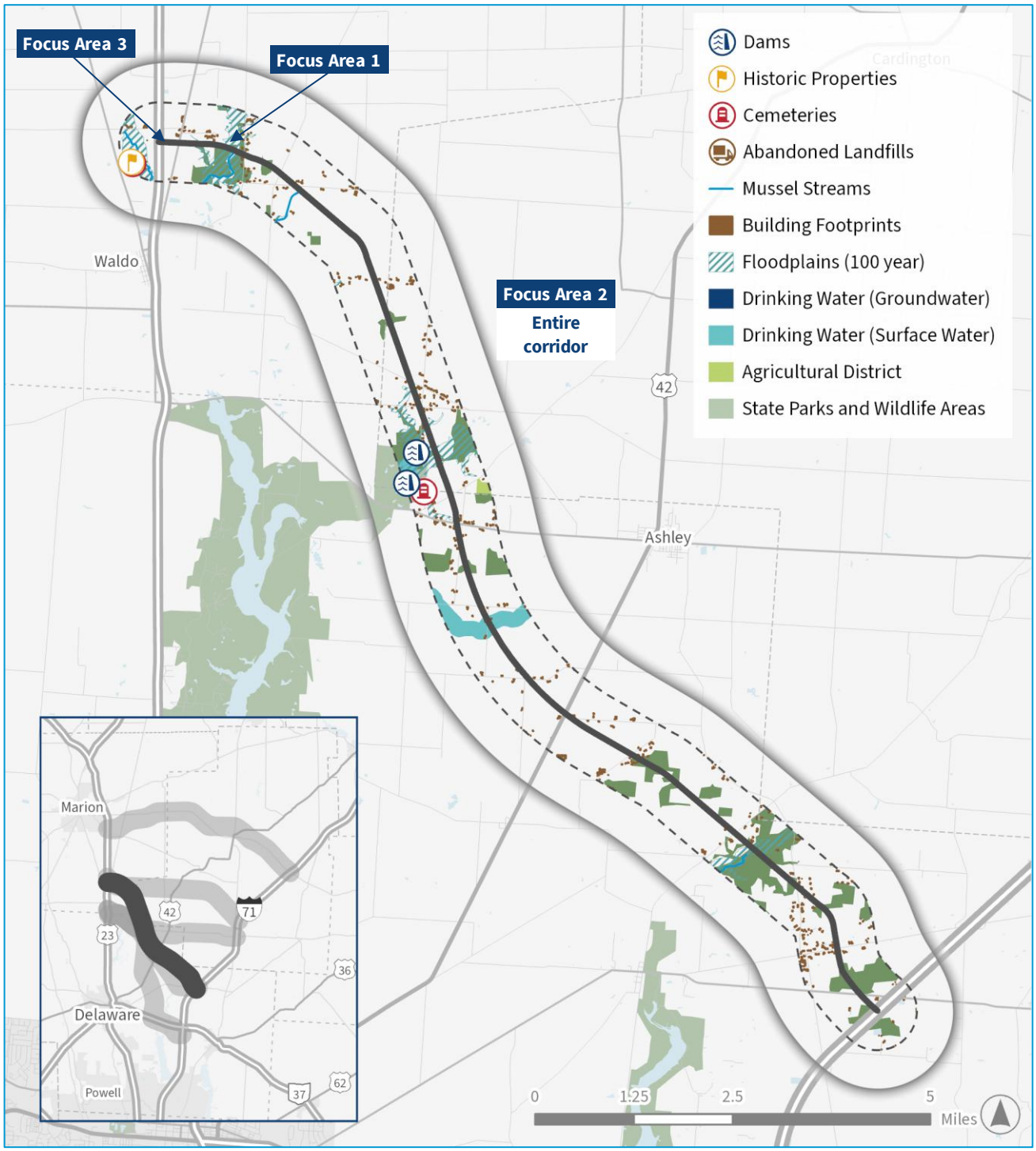
Summaries of findings for each concept are presented individually to enable an understanding of the benefits, costs, environmental impacts, and feasibility. Each concept summary provides an overview of results for benefits, costs, and impacts and a map of the impacted environmental and community resources.

Concept E1

15-mile new freeway on new alignment between US-23 north of Waldo to I-71 (south of Marengo)

Evaluation	Key Takeaways
Benefits	**Total benefits equal $4,399 million (the third highest of all concepts).** At the assumed opening in 2035, average daily traffic is 24,600 vehicles per day. In 2035, this concept contributes to a 4-minute reduction in travel time from I-475 (Toledo) to I-270 (Columbus) under free-flow conditions and an 18-minute reduction in travel time under congested conditions. Total travel time savings, over the 20-year performance period, surpass $2,504 million (2nd highest). Other benefits (crash savings, fuel savings, vehicle operating costs) total $1,895 million.
Costs	**Total costs range from $858 million to $1,116 million (the second lowest total cost concept).** Total concept costs (US-23 to I-71) range from $492 million to $640 million. The associated I-71 widening costs range from $366 million to $476 million.
Impacts	**E1 is ranked as the best concept based on its potential for avoidance and minimization of impacts to the human and natural environment.** **Advantages:** Likely no impacts to federal or state dams and reservoirs, and landfills; lower impacts to streams, drinking water protection areas, floodplains, wooded habitats, public buildings, cemeteries, and parks. Lower building count. Moderate overall area of agricultural land and agricultural districts. **Risks:** One known historic site within a 1-mile corridor. Much of the area not previously surveyed for cultural resources. Need to investigate avoidance of historic resources if identified. Need to verify avoidance of cemeteries. **Focus Areas:** (see **Figure 14**) 1. The northern section (identical with E2 and overlaps with E7) includes the Olentangy River (Group 2 mussel stream), and a tributary to the river. There is suitable wooded habitat along the riparian corridor. Wetlands are indicated along the river, and there are likely additional unmapped wetlands present in wooded areas. 2. Agricultural district parcels span the entire corridor. Research on farm operations and coordination with NRCS may help identify if adjacent parcels have common farm operators. Alignments can evaluate how to minimize splitting of farms and disruption to operations. 3. A residential cluster is present along St. James Road. If not acquiring these properties and relocating residents, it would be desirable to attempt to maintain a 500-ft+ distance (measured from the edge of travel lanes, not edge of right-of-way) to minimize the potential for noise impacts.

FIGURE 14. CONCEPT E1 – ENVIRONMENTAL AND COMMUNITY RESOURCES



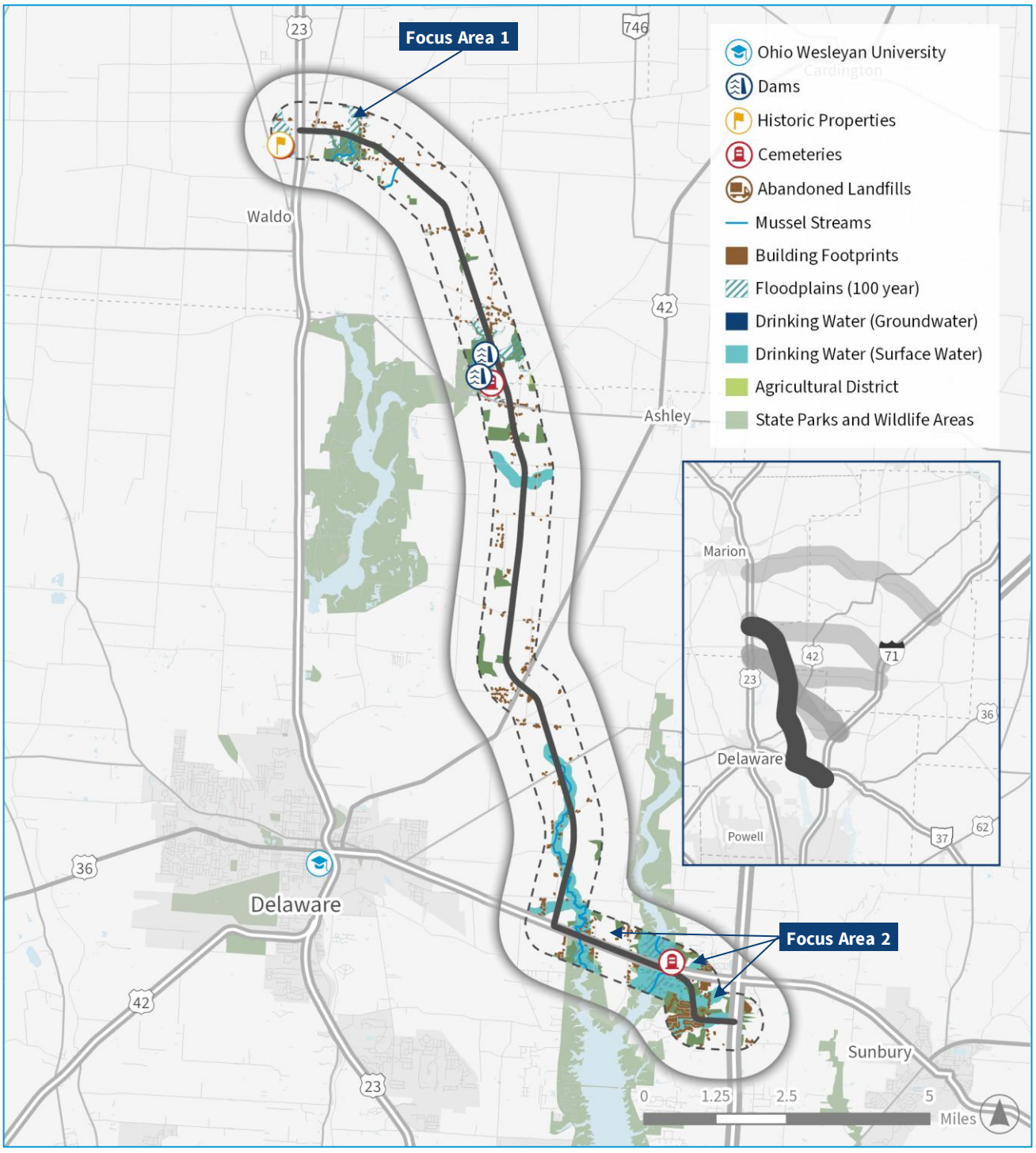
Source: ODOT

Concept E2

16-mile new freeway on new alignment from US23 to US-36/SR-37 east of Delaware and a 3-mile freeway upgrade of US-36/SR-37

Evaluation	Key Takeaways
Benefits	**Total benefits are $5,675 million (the highest of all concepts).** At the assumed opening in 2035, average daily traffic is 25,000 vehicles per day (the highest utilization of all concepts). In 2035, this concept contributes to a 4-minute reduction in travel time from I-475 (Toledo) to I-270 (Columbus) under free-flow conditions and an 18-minute reduction in travel time under congested conditions. Total travel time savings, over the 20-year performance period, are $2,808 million (the highest among all concepts). Other benefits (crash savings, fuel savings, vehicle operating costs) total $2,867 million.
Costs	**Total costs range from $1,163 million to $1,511 million (the second highest total cost concept).** Total concept costs (US-23 to I-71) range from $856 million to $1,113 million. The associated I-71 widening costs range from $307 million to $399 million.
Impacts	**E2 is ranked as the fifth best concept based on its potential for avoidance and minimization of impacts to the human and natural environment.** **Advantages:** No impact on public buildings and landfills. Smaller impacts to reservoirs, drinking water protection areas, and wooded areas. Moderate impacts to Group 2 streams, floodplains, and parks. Lower building count. **Risks:** Greater potential impact on agricultural lands. Possibly higher impacts to designated agricultural districts subject to NRCS coordination. Highest potential impacts to streams overall and for Group 1 streams. Impacts to Delaware State Park and Alum Creek State Park are subject to Section 4(f) requirements. Both may be subject to Section 6(f) requirements. Two known historic sites within 1-mile corridor. Locally sponsored business park on US-36/SR-37. Conflicts with existing project construction at the US-36/SR-37 I-71 node. **Focus areas:** (see **Figure 15**) 1. The northern section east of Waldo (identical with E1 and overlaps with E7) 2. Only the existing US-36/37 bridge and right-of-way span the reservoir. Converting the under-construction, 50-mph Sunbury Parkway interchange to freeway geometry would widen the footprint, force additional relocations, trigger a new Section 4(f) review, reopen NEPA (EA/EIS) for added impacts, violate the 0.75-mi AASHTO spacing, and undermine Berlin Township's 1,800-acre Business Park/TIF that depends on multiple signalized accesses.

FIGURE 15. CONCEPT E2 – ENVIRONMENTAL AND COMMUNITY RESOURCES



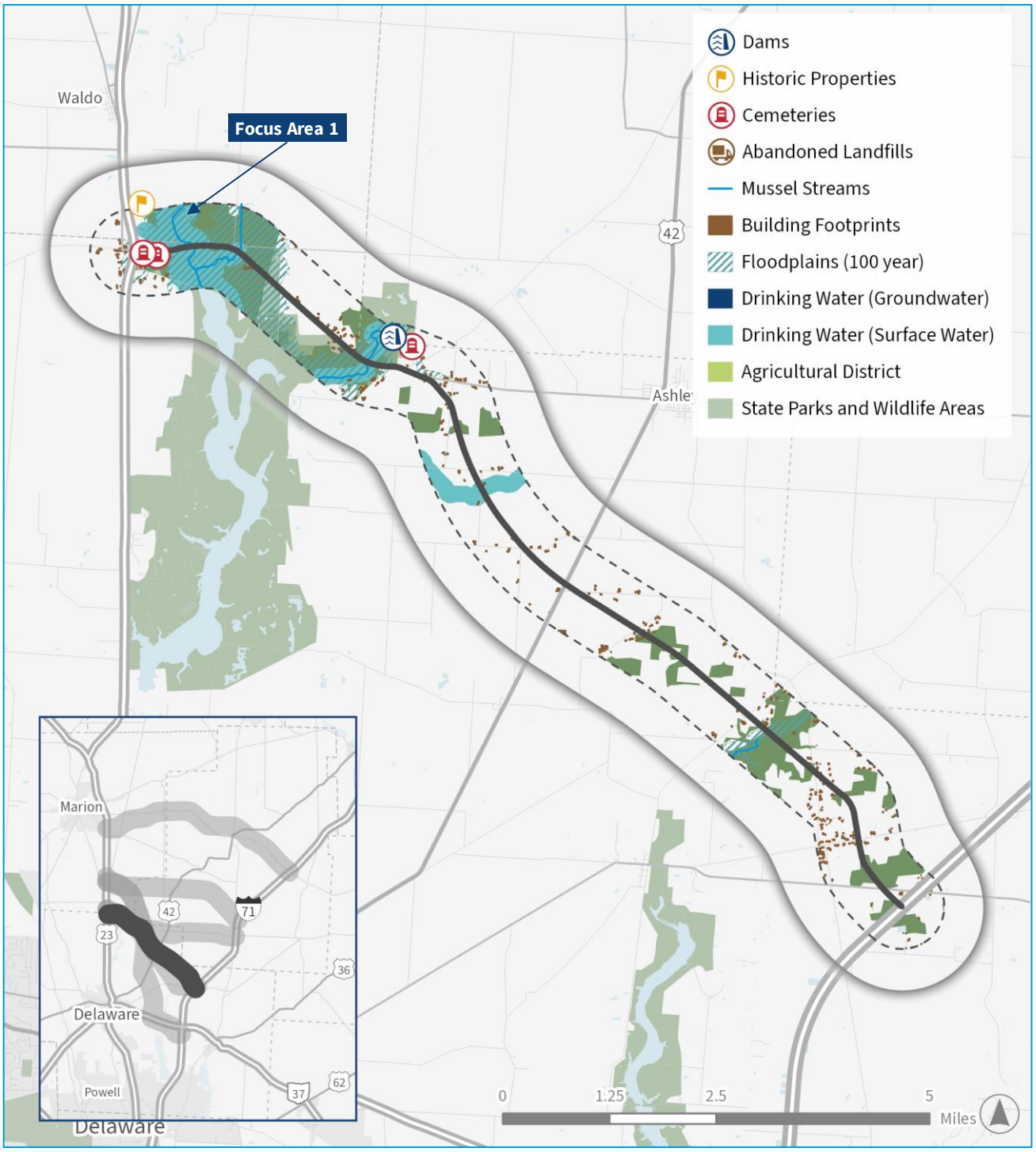
Source: ODOT

Concept E3

5-mile freeway upgrade of SR-229 between US23 and Ashley and 12-mile new freeway on new alignment (including a bypass of Ashley)

Evaluation	Key Takeaways
Benefits	**Total benefits are $4,457 million (the second highest of all concepts).** At the assumed opening in 2035, average daily traffic 24,000 vehicles per day (the third highest utilization of all concepts). In 2035, this concept contributes to an 8-minute reduction in travel time from I-475 (Toledo) to I-270 (Columbus) under free-flow conditions and a 22-minute reduction in travel time under congested conditions. Total travel time savings, over the 20-year performance period, are $2,488 million (the third highest concept). Other benefits (crash savings, fuel savings, vehicle operating costs) total $1,969 million.
Costs	**Total concept costs range from $986 million to $1,273 million (the third lowest total cost).** Total concept costs (US-23 to I-71) range from $620 million to $796 million. The associated I-71 widening costs range from $366 million to $476 million.
Impacts	**E3 is ranked as the third best concept based on its potential for avoidance and minimization of impacts to the human and natural environment.** **Advantages:** Lower overall impacts to streams, agricultural lands, and agricultural districts. Low building count. **Risks:** Higher impacts to floodplains, wooded habitat, and state parks. Impacts on Delaware Reservoir, which is subject to Section 408. Mayfield Cemetery and Norton Cemetery are centrally located in the corridor. Potential impacts to Delaware State Park and Alum Creek State Park. Each of them may be subject to Section 6(f) requirements. One historic site and one archaeological site are within the 1-mile band. **Focus area:** (see **Figure 16**) 1. The area at US-23 and SR-229 is challenging, with many resources close together, making avoidance difficult, including: Delaware Reservoir, Delaware State Park/Wildlife Area and shooting range, Norton Cemetery, Olentangy River (Group 2 stream), and an NRHP-listed archaeological site between US-23 and the river. Note, E3's tie-ins at US-23 and SR-229 overlap ongoing ODOT project development activity (US-23/SR-229 Intersection Improvements, PID 119804), creating potential schedule conflicts and design re-work.

FIGURE 16. CONCEPT E3 – ENVIRONMENTAL AND COMMUNITY RESOURCES



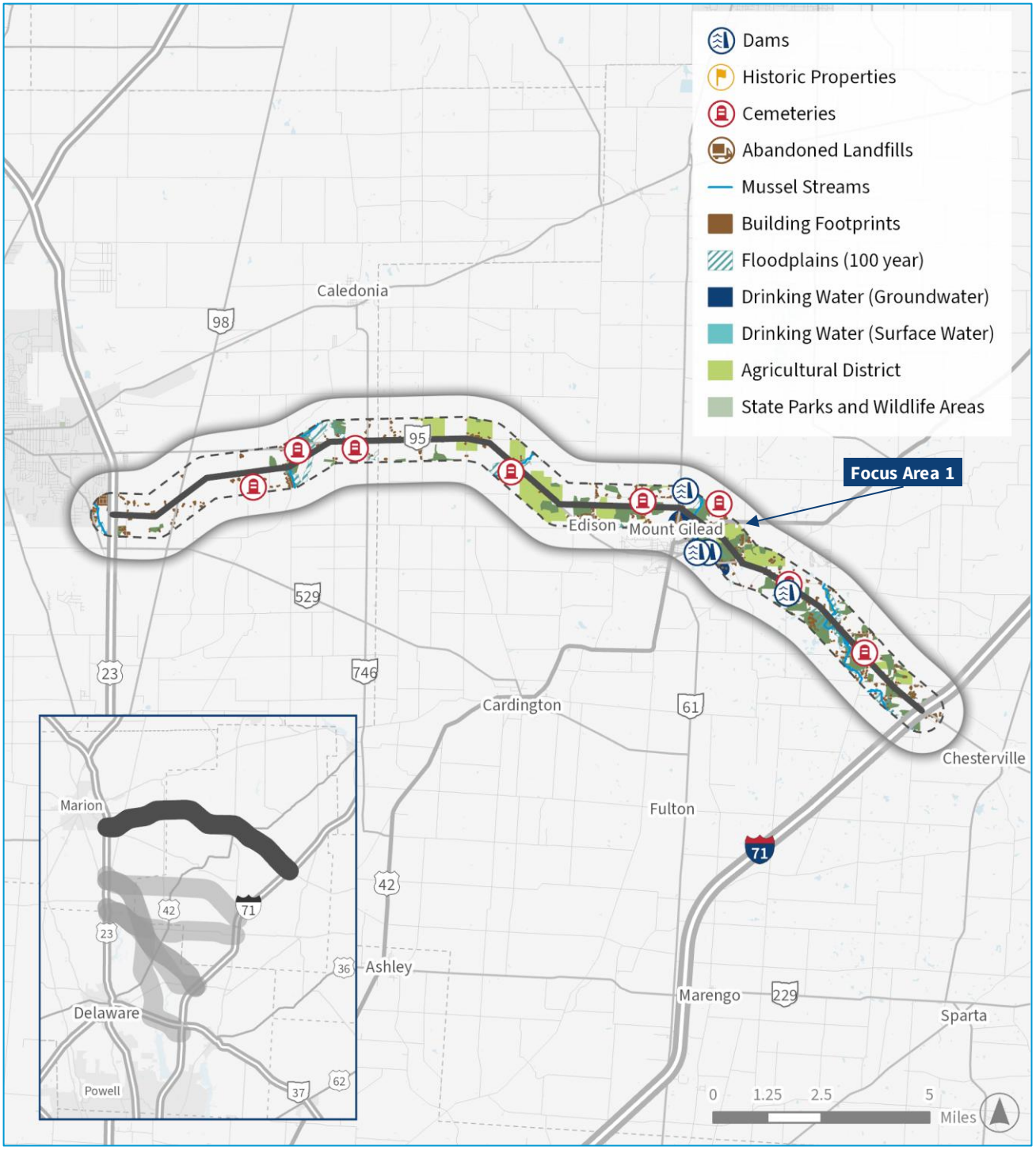
Source: ODOT

Concept E4

11-mile new freeway on new alignment (including a bypass of Mt. Gilead) and an 11-mile freeway upgrade of SR-95

Evaluation	Key Takeaways
Benefits	**Total benefits are $1,050 million (the lowest of all concepts).** At the assumed opening in 2035, average daily traffic is 7,000 vehicles per day (the third lowest utilization of all concepts). In 2035, this concept would increase travel time from I-475 (Toledo) to I-270 (Columbus) by 15 minutes under free-flow conditions and increase travel time by 1 minute under congested conditions. Total travel time savings, over the 20-year performance period, are below $500 million (the lowest of all concepts). Other benefits (crash savings, fuel savings, vehicle operating costs) total $563 million.
Costs	**Total costs range from $1,208 million to $1,579 million (the highest cost concept).** Total concept costs (US-23 to I-71) range from $889 million to $1,163 million. The associated I-71 widening costs range from $320 million to $416 million.
Impacts	**E4 is ranked as the worst concept based on its potential for avoidance and minimization of impacts to the human and natural environment.** **Advantages:** No impact to federal dams and reservoirs as impacts to Mt. Gilead State Park may be avoidable. Lower impacts to floodplains. Low impact to drinking water source protection areas. **Risks:** Greater overall impact to streams, Group 2 streams, public buildings, wooded habitat, agricultural lands, and agricultural districts. Possible impacts to the local park would be subject to Section 4(f) requirements, as well as the school athletic fields if they are open for public use. Possible highest impact to buildings. **Focus area:** (see **Figure 17**) 1. The area from SR-95 to SR-61 is dense with resources, including agricultural districts, wooded areas (likely wet), Mt. Gilead Lake and campground, Sams Creek, Whetstone Creek, and the Mt. Gilead soccer fields. This collection of closely spaced resources will make avoidance difficult.

FIGURE 17. CONCEPT E4 – ENVIRONMENTAL AND COMMUNITY RESOURCES



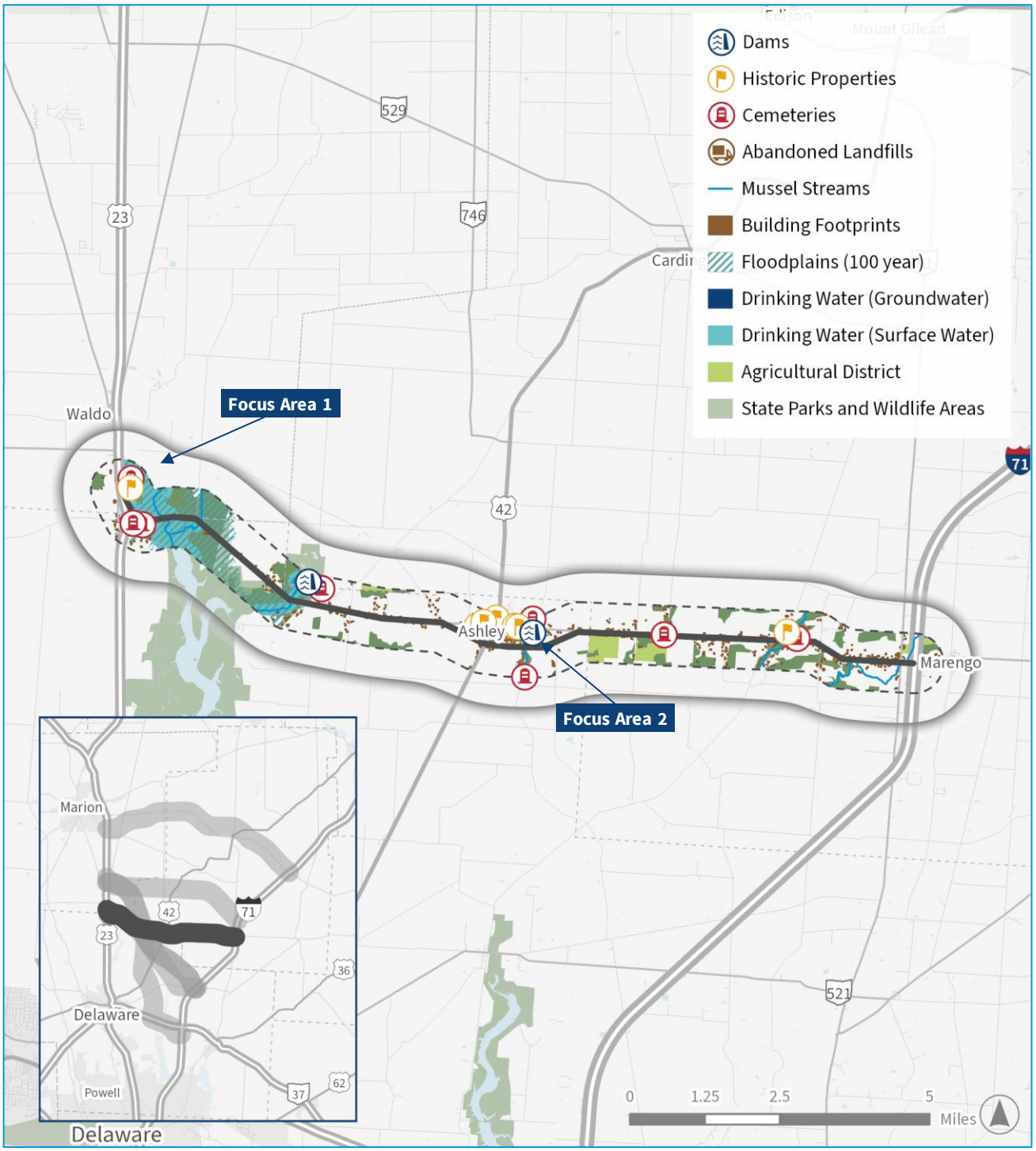
Source: ODOT

Concept E5

11-mile freeway upgrade of SR-229 and a new 3-mile freeway on new alignment bypass of Ashley

Evaluation	Key Takeaways
Benefits	**Total benefits are $1,584 million (the second lowest of all concepts).** At the assumed opening in 2035, average daily traffic is 5,900 vehicles per day (the second lowest utilization of all concepts). In 2035, this concept contributes to no change in travel time from I-475 (Toledo) to I-270 (Columbus) under free-flow conditions and a 14-minute reduction in travel time under congested conditions. Total travel time savings, over the 20-year performance period, are below $600 million (the second lowest of all concepts). Other benefits (crash savings, fuel savings, vehicle operating costs) total $1,049 million.
Costs	**Total costs range from $1,158 million to $1,499 million (the third-highest cost concept).** Total concept costs (US-23 to I-71) range from $839 million to $1,038 million. The associated I-71 widening costs range from $320 million to $416 million.
Impacts	**E5 is ranked as the second worst concept based on its potential for avoidance and minimization of impacts to the human and natural environment.** **Advantages:** Lower overall stream impacts, Group 2 streams, wooded habitat, agricultural lands, and districts. **Risks:** Greater impacts to Delaware Reservoir (subject to Section 408), floodplains, and Delaware State Park. Alum Creek Cemetery, Morehouse Cemetery, and Norton Cemetery are centrally located in the corridor. Larger number of buildings. Impacts to public buildings and Village of Ashley Park. Seven historic sites are within the 1-mile band, including NRHP-listed archaeological site. **Focus areas:** (see **Figure 18**) 1. Corridor E5 contains the same concerns near US-23 and SR-229 as discussed in E3. 2. In addition, corridor E5 crosses Alum Creek using an existing structure on SR-229. Widening the existing crossing could cut off access to the residential areas on both sides. Creating a new crossing of Alum Creek may be challenging due to the length of the stream that is parallel to SR-229. Lateral encroachments may dramatically increase the stream impacts compared to what is currently estimated.

FIGURE 18. CONCEPT E5 – ENVIRONMENTAL AND COMMUNITY RESOURCES



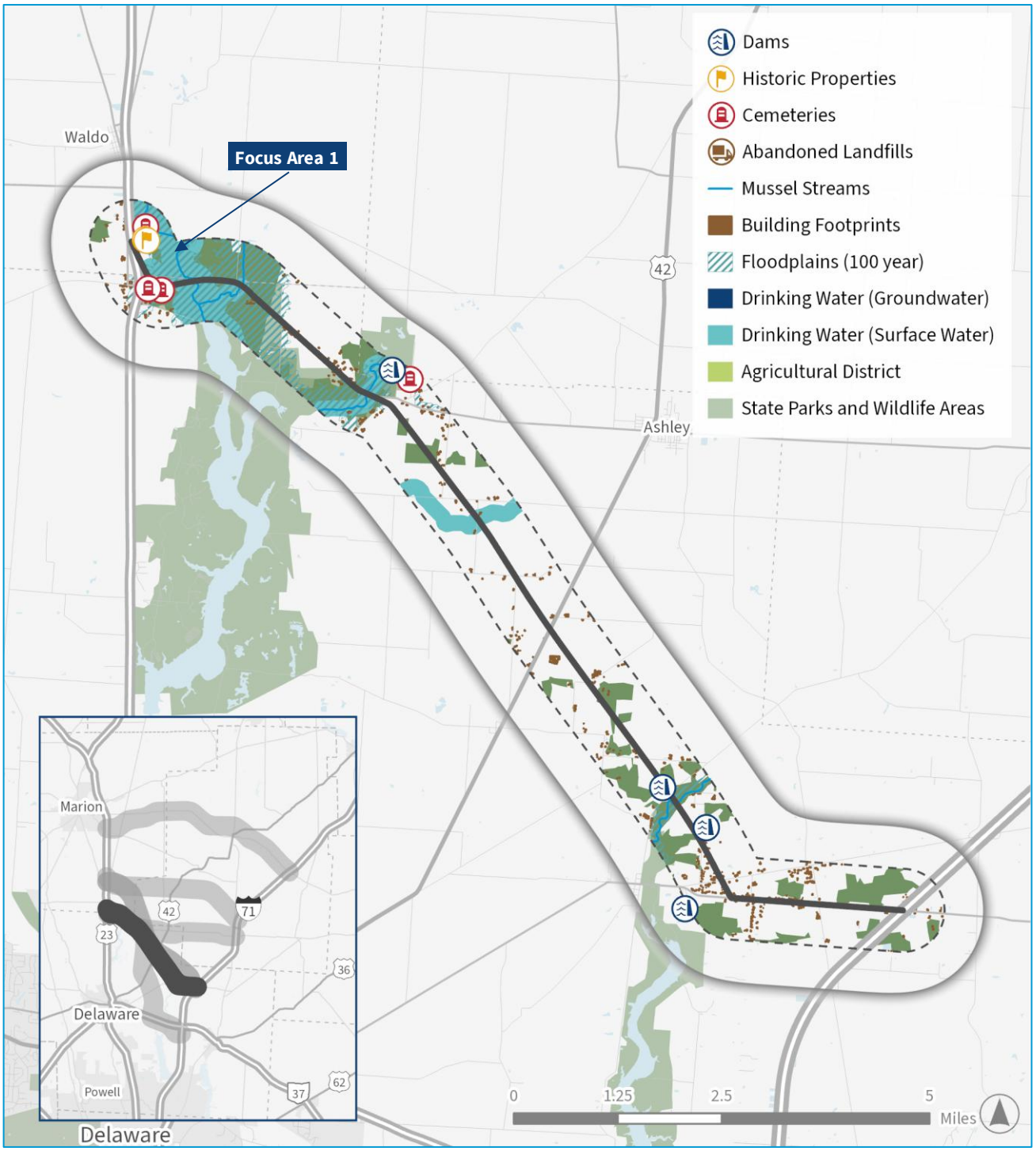
Source: ODOT

Concept E6

4-mile freeway upgrade of SR-229, 7-mile new freeway on new alignment from SR-229 to SR-521 near Kilbourne, and a 3-mile freeway upgrade of SR-521 connecting to I-71

Evaluation	Key Takeaways
Benefits	**Total benefits are $3,912 million (the fourth highest of all concepts).** At the assumed opening in 2035, average daily traffic totals 20,800 vehicles per day. In 2035, this concept contributes to a 4-minute reduction in travel time from I-475 (Toledo) to I-270 (Columbus) under free-flow conditions and a 19-minute reduction in travel time under congested conditions. Total travel time savings, over the 20-year performance period, are $1,802 million. Other benefits (crash savings, fuel savings, vehicle operating costs) total $2,110 million.
Costs	**Total costs range from $1,060 million to $1,367 million (the fourth highest cost concept).** Total concept costs (US-23 to I-71) range from $692 million to $888 million. The associated I-71 widening costs range from $369 million to $479 million.
Impacts	**E6 is ranked as the fourth best concept based on its potential for avoidance and minimization of impacts to the human and natural environment.** **Advantages:** Lower impacts to public buildings, agricultural lands, and districts. Moderate buildings count. **Risks:** Greater potential impacts to Group 2 streams, floodplains, wooded habitat, and state parks. Larger area of drinking water source protection within corridor. Impacts to Delaware Reservoir and Alum Creek Reservoir (both subject to Section 408). Mayfield Cemetery is centrally located in the corridor. One NRHP-listed archaeological site is within the 1-mile band. **Focus area:** (see **Figure 19**Figure 19) 1. In addition to the dispersed impacts that may be hard to minimize (Delaware Reservoir, Alum Creek Reservoir), Corridor E6 contains the areas of concern at US-23/SR-229 that overlaps E3 and E5.

FIGURE 19. CONCEPT E6 – ENVIRONMENTAL AND COMMUNITY RESOURCES



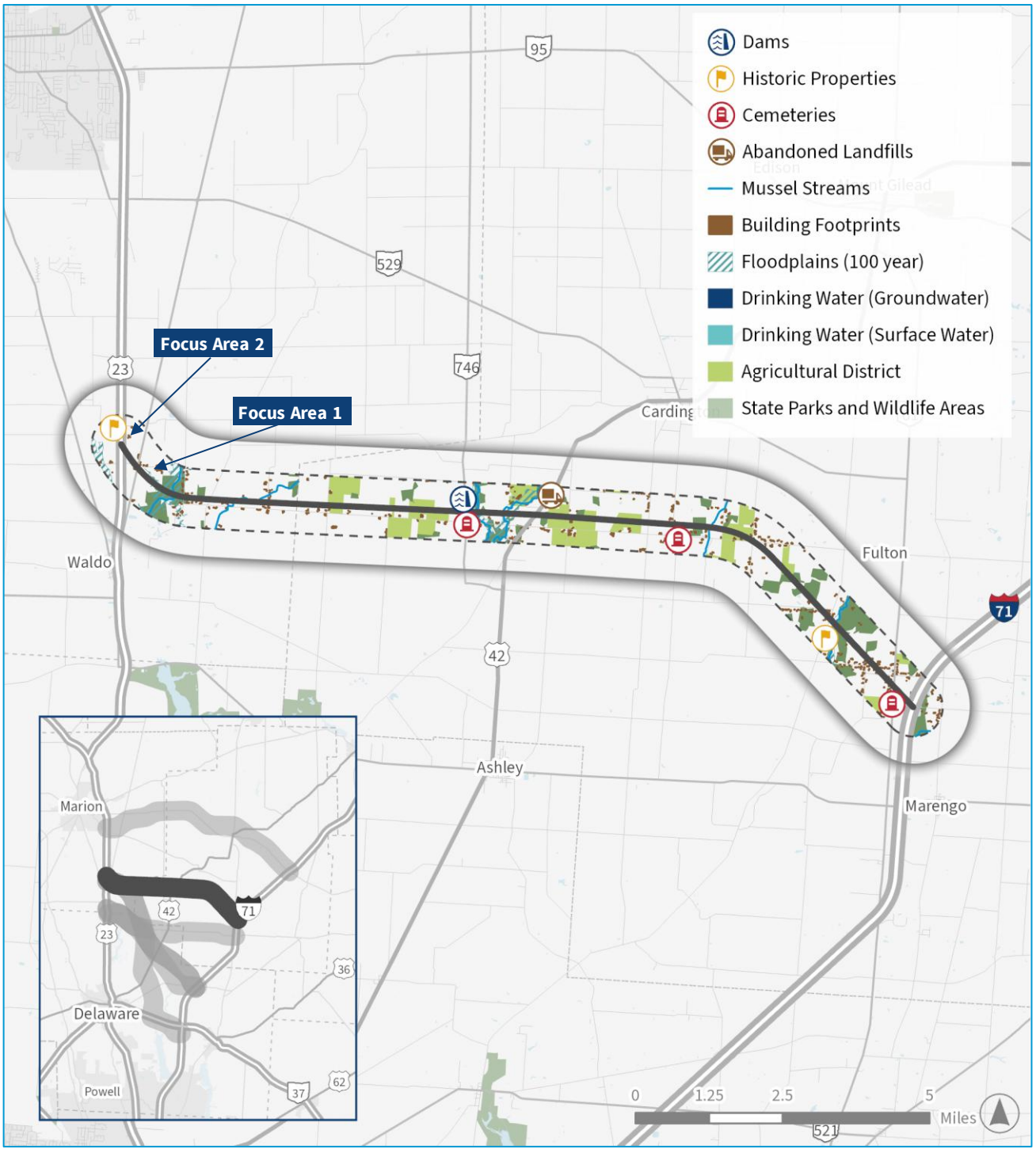
Source: ODOT

Concept E7

14-mile new freeway on new alignment from the SR-529/Waldo area to I-71 north of Marengo

Evaluation	Key Takeaways
Benefits	**Total benefits are $2,004 million (the third lowest of all concepts).** At the assumed opening in 2035, average daily traffic totals 4,800. In 2035, this concept increases travel time by 3 minutes from I-475 (Toledo) to I-270 (Columbus) under free-flow conditions and contributes to an 11-minute reduction in travel time under congested conditions. Total travel time savings, over the 20-year performance period, for E7 are $1,015 million. Other benefits (crash savings, fuel savings, vehicle operating costs) are $989 million.
Costs	**Total costs range from $807 million to $1,049 million (the lowest cost concept).** Total concept costs (US-23 to I-71) range from $487 million to $633 million. The associated I-71 widening costs range from $320 million to $416 million.
Impacts	**E7 is ranked as the second-best concept based on its potential for avoidance and minimization of impacts to the human and natural environment.** **Advantages:** No impacts to federal or state dams, reservoirs, and drinking water protection areas; lower impacts to streams, Group 2 mussel streams, floodplains, wooded habitats, public buildings, cemeteries, and parks. Lower building count. Moderate overall area of agricultural land. **Risks:** Highest impacts to known agricultural districts. Three known historic sites within 1-mile band, including 1 NRHP-listed site centrally located in corridor. Abandoned landfill in corridor. Greatest percentage of overall stream impacts predicted to be mussel streams (46% of total). **Focus Areas:** (see **Figure 20**Figure 20) 1. The northern section (overlaps E1 and E2) includes the Olentangy River (Group 2 mussel stream) and a tributary to the river. There is suitable wooded habitat along the riparian corridor. Wetlands are indicated along the river, and there are likely additional unmapped wetlands present in wooded areas. 2. A residential cluster is present along St. James Road. If not acquiring these properties and relocating residents, it would be desirable to attempt to maintain a 500-ft+ distance (measured from the edge of travel lanes, not edge of right-of-way) to minimize the potential for noise impacts.

FIGURE 20. CONCEPT E7 – ENVIRONMENTAL AND COMMUNITY RESOURCES



Source: ODOT

Comparative Evaluation Findings

Figure 21 Figure 21 provides a summary comparison of each conceptual corridor through the overall assessment of benefits, costs, and impacts. A relative ranking for each concept is provided with #1 being the best in the respective category/row and #7 being the worst.

FIGURE 21. CORRIDOR ALTERNATIVES COMPARATIVE EVALUATION SUMMARY

	Criteria	E1	E2	E3	E4	E5	E6	E7
Benefits	Reduced Travel Time	3	3	1	7	5	2	6
	Expected Utilization	1	2	3	6	5	4	7
	Travel Time Savings	2	1	3	7	6	4	5
	Other Monetized Benefits	3	1	2	7	5	4	6
Costs	Construction Costs	2	6	3	7	5	4	1
	ROW Costs	2	7	3	6	5	4	1
	O&M Costs	5	6	1	7	3	2	4
Impacts	Ecological and Natural Resources	2	6	4	7	3	5	1
	Community Resources	1	6	4	7	6	3	2
	Cultural Resources	2	3	5	1	7	4	6
	Dams and Reservoirs	2	4	6	3	5	7	1
	Regulated Materials	1	6	2	7	4	3	4
	Development Density	2	5	1	7	6	4	2

Comparison scale: Best (#1) … Worst (#7)

Figure 22 below provides an overall ranking of each concept within the three evaluation categories and overall:

FIGURE 22 8. CORRIDOR RANKINGS BY EVALUATION CATEGORY

Criteria	E1	E2	E3	E4	E5	E6	E7
Benefits	2	1	2	7	5	4	6
Costs	3	6	2	7	5	4	1
Impacts	1	5	3	7	6	4	2
Overall	1	5	2	7	6	4	3

Major Findings

The comparative evaluation across the seven concepts highlights three fundamental findings that inform decisions on potentially advancing certain corridors for further study.

1. Southern concepts (E1, E2, E3, E6) show potential for meaningful and sustained mobility and safety benefits, while northern concepts underperform (E4, E5, E7).

    - Because the study area is so large, modeling the geographically diverse set of corridors revealed how well each potential US 23 to I-71 connection would serve both interregional and local travelers. Opening-year forecasts (2035) illustrate the gap: the four concepts that tie into I-71 south of the county border (E1, E2, E3, E6) attract 20,800–25,000 Average Annual Daily Traffic (AADT) while the northern trio (E4, E5, and E7) tops out at just 7,000 AADT, with E7 only reaching 4,800 AADT. This low utilization stems from the added mileage and increased traffic times imposed by a longer corridor path to I-71 through Morrow County. The inefficiency shows up in run-time tests: E4, for example, adds fifteen minutes to the Toledo-to-Columbus free-flow trip and still loses a minute in the 2035 a.m. peak, whereas E1–E3, and E6 cut 18–22 minutes in congested conditions.
    - Expected traffic is modest for the northern concepts; as such, the monetized benefits are much lower. Over the 20-year analysis window, E1–E3 each generate more than $2.5 billion in travel-time benefits; E6 follows at about $1.8 billion. By contrast, E4, E5, and E7 all remain at or below $1 billion. When the full benefit package is monetized, the southern concepts clear $4.5–5.7 billion, while the northern set never reaches $1.5 billion.
    - Consequently, alignments that swing north to meet I-71 in Morrow County lengthen the regional trip, divert little traffic from the existing US-23/I-71 spine, and yield only minimal economic return (outcomes unlikely to satisfy the connector's purpose and need). Conversely, a connection in the southern half of the study area (at or below the county line) captures the highest demand and delivers the greatest monetized benefits.

2. Construction and right-of-way costs are high and uncertain given the potential extent of environmental and community impacts.

    - Concepts E1 and E7 are the lowest-cost corridors, particularly due to anticipated lower right-of-way costs for the conceptual alignments and a lower count of stream and wetland crossings. Concepts E2, E4, and E5 are the highest-cost corridors due in part to the conversion of existing roadways to freeways (US-36, SR-95, SR-229) and extensive right-of-way acquisition needs (including impacts to developed properties).
    - Future O&M costs are highest on the longest corridors, including E4 and E5.
    - The cost of the I-71 widening (high-cost estimate) varies from a low of $399 million (E2) to a high of $479 million (E6). The differences in costs are tied to the assumed terminus of each widening (Sunbury Parkway interchange for E2 compared to the SR-521 area in other concepts).
    - Travel time savings exceed total costs (both high and low estimates) for E1, E2, E3, and E6 (see Figure 23Figure 23.).
      E6 and E7 total benefits also exceed total costs. E4 and E5 total benefits fall short of total costs.
    - Benefit-cost ratios for travel time savings and all benefits compared to costs are presented in **Figure 24**Figure . For E1, E2, and E3, monetized travel time savings are 1.9 times to 2.9 times total costs and total benefits are

3.5 times to 5.1 times total costs. These are strong benefit/cost ratios developed consistently with federal discretionary grant practice.

FIGURE 23. TOTAL BENEFITS COMPARED TO TOTAL COSTS

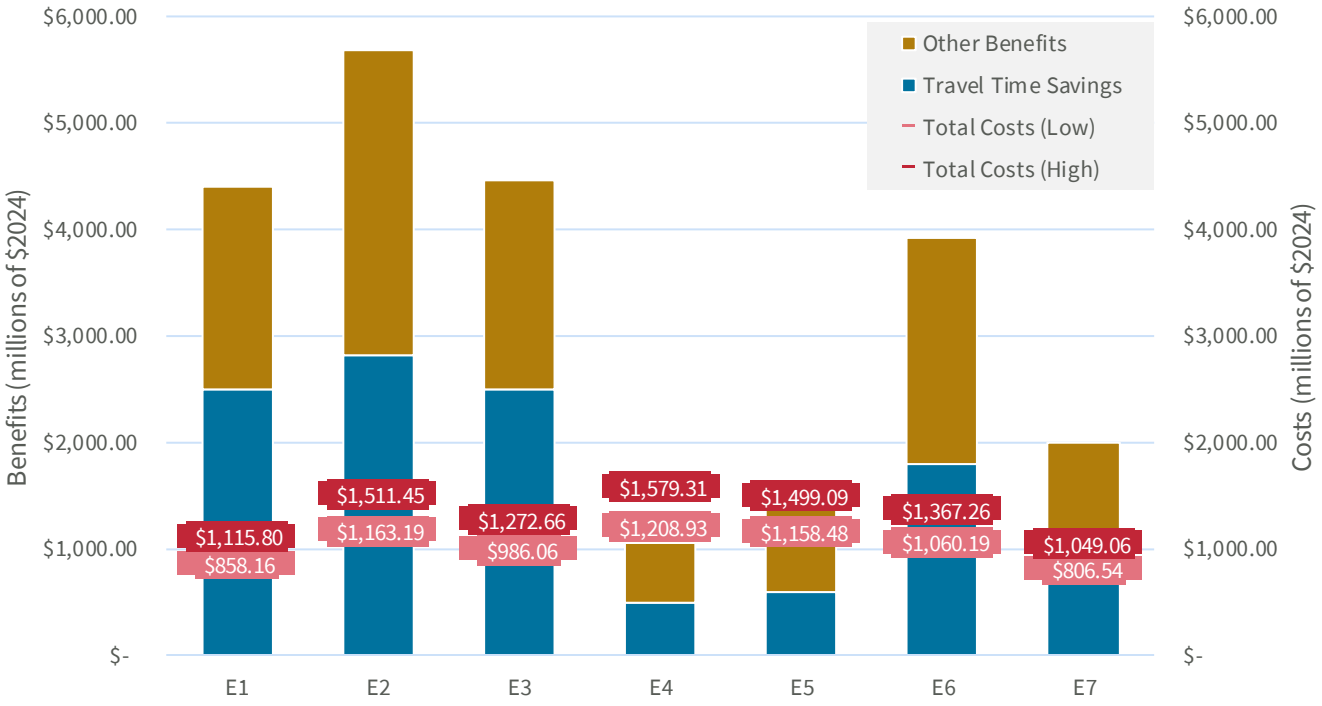


FIGURE 24. BENEFIT COST ANALYSIS

3. Environmental and community impacts are variable across the corridors, and any concept that advances will face three recurring factors:

   Factor 1: Reservoirs and State Parks are the dominant risk drivers.

   - Delaware and Alum Creek Reservoirs are federally owned flood-control dams; any bridge, embankment, or causeway modification invokes a USACE §408 permission in addition to standard Section 404/401 permits.
   - Delaware, Alum Creek, and Mt. Gilead State Parks present unavoidable Section 4(f) issues. Substantial property impacts will require a "no prudent and feasible alternative" finding. Delaware and Alum Creek State Parks are also subject to Section 6(f), which involves protracted agency coordination and in-kind land replacement for conversion of even small acreages.
   - High impacts to Delaware, Alum Creek, and Mt. Gilead State Parks forested and ecological areas (E2, E3, E4, E5, and E6) present unavoidable complexity, high studies and coordination effort, extreme mitigation requirements, and schedule uncertainty.
   - Corridors that avoid both a reservoir and state-park acreage (E1, E7) eliminate two of the most time-consuming federal actions, giving these corridors a clear delivery advantage.

   Factor 2: Stream density and flood-plain breadth vary sharply by alignment.

   - Each corridor alternative in this study area intersects the Olentangy and Alum Creek stream networks as well as large FEMA floodplains.
   - E1 and E7 thread the narrowest flood-plain zones (≈30–34 acres in the 300-ft evaluation band) and cross the fewest linear feet of streams, reducing mitigation acreage and the likelihood of complex hydraulic design.
   - E2, E4, and E6 capture the highest stream mileage (>2.5 mi in the 300-ft evaluation band for E2 and E4) and >80 acres of floodplain, driving up aquatic mitigation cost and exposing the project to potential FEMA map revisions.

   Factor 3: Existing development and planned growth present risks.

   - Relocation density ranges within an order of magnitude (from ~55 structures in E3 to ~243 in E4), directly affecting communities, ROW cost, schedule, and potential relocation complexity.
   - Active or pending local projects (e.g., the Sunbury Parkway interchange in E2 and ongoing project development at US-23 and SR-229 (E3, E5, and E6) create compounded risk, including redesign costs, sunk-fund exposure, and potential development opposition.
   - Large contiguous Agricultural Districts fall mainly under E7 and portions of E6/E4, requiring coordination with the Ohio Department of Agriculture and possible Farmland Conversion Impact Ratings under NRCS rules, and have the highest impacts on active farms in the region.

5. PRELIMINARY TOLLING ASSESSMENT

Purpose

House Bill 96 requires that the Interim Report include *"a preliminary assessment of toll feasibility, including whether the Commission's statutory authority is sufficient to make the project a turnpike project."* This chapter fulfils that mandate. It pulls together three parallels of work:

1. **Traffic & Revenue Sketch-Modeling** – Order-of-magnitude utilization, gross revenue, and net operating margin for each build corridor concept (E1-E7), drawn from the *Utilization & Benefits Technical Memo* and the stand-alone *Tolling Financial Feasibility Assessment Technical Memo*.
2. **Capital & O&M Outlay** – Planning-level cost ranges from the *Cost Estimate Technical Memo* (the same figures used in **Chapter 4**) and incremental toll costs from the *Tolling Financial Feasibility Assessment Technical Memo*
3. **Statutory Authority Review** – A legal scan contained in the *Tolling Statutory Authority Technical Memo* that tests whether existing Ohio law allows OTIC to bond and toll the candidate facilities.

These inputs provide an initial, high-level *go/no-go* tolling assessment for the corridors. This *go/no-go* tolling assessment relies on the understanding that a corridor must, at a minimum, pay its operating bills and support a credible debt tranche to remain a toll-delivery candidate.

Methods and Key Assumptions

Table 8 highlights the primary methods and assumptions used for this preliminary tolling assessment.

TABLE 9. TOLLING ASSESSMENT METHODOLOGY

Element	Description	Principal Sources / Parameters
Traffic projection	2035 opening-year and 2055 design-year runs of the 20-county hybrid OSWM with each concept (with I-71 widening) compared to the no-build.	*Utilization & Benefits Technical Memo*
Revenue Calculations	North Carolina DOT *Financial Feasibility Screening Tool* (FFST), which translates projected corridor traffic to gross revenue.	• Base ETC rate (2010$): $0.0563/mi autos, $0.1503/mi trucks; sensitivity test rates • 60/80/95% 3-yr revenue ramp-up • 6 % leakage; 2 % annual indexation
Cost side	Corridor-specific roadway + toll-system capital and 40-yr O&M from cost memo.	*Cost Estimate Technical Memo* (2031 construction midpoint; 30% contingency)
Finance screen	BBB credit target, 4.5% tax-exempt coupon, 2.0× net-revenue-to-debt-service coverage; corridor *passes* if O&M is paid and ≥1% of capital can be bonded	
Limitations	Assumes no induced-demand elasticity, dynamic price tests, or TIFIA/INFRA credit assistance.	

Tolling Effects on Utilization

The OSWM was run twice for each corridor – once with the concept assumed free and once with the same facility assumed tolled (at the current rates). **Table 10** summarizes the 2035 opening-year average annual daily traffic (AADT) for each, along with the expected diversion.

TABLE 10. 2035 OPENING YEAR TRAFFIC COMPARISON

Corridor ID	Free AADT	Toll AADT	Change	% AADT Decrease When Tolled
E1	24,600	20,900	-3,700	–15 %
E2	25,000	19,500	-5,500	–22 %
E3	24,000	20,700	-3,300	–14 %
E6	20,800	18,000	-2,800	–13 %
E4	5,900	4,500	-1,400	–24 %
E5	7,000	5,100	-1,900	–27 %
E7	4,800	2,000	-2,800	–58 %

Interpretation:

- **Reasonable elasticity on high-demand corridor concepts** – Corridors that intercept the Delaware to Columbus commuter and truck trip market (E1–E3, E6) retain 78% to 87% of free corridor demand when tolled, yielding 18,000 to 21,000 vehicles per day.
- **Local-trip corridors collapse** – E4, E5, and especially E7 depend heavily on shorter local trips or recreational trips that divert to parallel free routes once a toll is introduced (with volume reductions ranging from 24% to as high as 58%).

Traffic & Revenue Indicators

Table 11 folds tolled AADT into the Financial Feasibility Screening Tool (FFST) to produce 40-year gross revenue, O&M, and bonding capacity results. The bonding capacity results are only indicative of the extent to which tolling revenue supports capital costs associated with each US-23 to I-71 connector concept, not the capital costs of the connector and the I-71 improvements.

TABLE 11. SKETCH FINANCIAL SCREEN (CURRENT OTIC TOLL RATES)

Corridor	2035 Tolled AADT	40-yr Gross Revenue (M $)	40-yr Net Operating Revenue (M $)*	O&M Coverage? **	Capital Supported w/ Bonds***
E1	20,900	$1,685	$311	✓	4.7 %
E2	19,500	$2,133	$206	✓	<1 %
E3	20,700	$1,402	$236	✓	2.5 %
E6	18,000	$1,183	$76	✓	<1 %
E4	4,500	$345	–$880	✕	—
E5	5,100	$477	–$426	✕	—
E7	2,000	$305	–$562	✕	—

* Calculated based on traffic volume and toll rates, incorporating inflation for each year in the operating schedule.

** After paying 40 years of O&M and major maintenance (sketch FFST results).

*** Bonding capacity expressed as a share of total capital cost of the corridor concept. Does not include the cost of the I-71 improvements.
Source: Toll Analysis FFST output.

Interpretation:

- **Operating self-sufficiency** – Only E1, E2, and E3 (and marginally E6) generate enough revenue to meet long-run O&M costs plus major-maintenance obligations.
- **Limited debt support** – The best performer (E1) bonds 4% of its $634.4 million capital program. As a result, state or federal grants, an OTIC system cross-pledge, or conventional ODOT funding would be required for the capital balance.

Toll Rate Exploratory Analysis

As a supplement to the initial tolling feasibility assessment, an exploratory sensitivity analysis was conducted to evaluate the impact of varying toll rates, particularly considering the limited bonding capacity associated with the current Ohio Turnpike toll structure. This analysis focused on the most promising alternatives identified in the initial assessment (E1, E2, E3, and E6) testing a range of toll rates from $0.10 to $0.60 per mile for automobiles, with truck rates set at 2.5 times those amounts.

The results showed (**Table 11**) that toll revenue initially increases with higher rates, reaches a peak, and then begins to decline as vehicle diversion reduces overall revenue. This behavior is governed by demand elasticity, which measures how sensitive travelers are to toll changes by comparing traffic diversion to revenue generation.

The analysis identified "optimal" toll rates that strike a balance between economic feasibility for users and financial feasibility for the project. These rates occur at lower levels than those that simply maximize revenue. Findings suggest

that toll rates higher than those currently in place on the Ohio Turnpike could significantly boost operating revenues while minimizing traffic diversion on the connector. Increased operating revenue, in turn, enhances the available funds for bonding capital costs, resulting in a substantially greater bonding capacity than initially estimated.

TABLE 12. SKETCH FINANCIAL SCREEN (WITH OPTIMIZED TOLL RATES)

Corridor	Optimized Toll Rates (Auto/Truck)*	2035 Tolled AADT	40-yr Gross Revenue (M $)**	40-yr Net Operating Revenue (M $)***	Capital Supported w/ Bonds****
E1	$0.20/$0.50	18,300	$4,883	$3,553	82 %
E3	$0.25/$0.63	17,900	$5,150	$3,990	73 %
E2	$0.15/$0.38	17,400	$4,728	$2,880	36 %
E6	$0.25/$0.63	15,700	$4,556	$3,453	56 %

* Optimized toll rates based on the balance of diversion and revenue (refer to Figures 1-4 in *Tolling Financial Feasibility Assessment Technical Memo*).

** Calculated based on traffic volume and toll rates, incorporating inflation for each year in the operating schedule.

*** After paying 40 years of O&M and major maintenance (sketch FFST results).

**** Bonding capacity expressed as a share of total capital cost. Does not include the cost of the I-71 improvements.
Source: Toll Analysis FFST output.

Interpretation:

- **Optimized toll rates are higher** – Toll rates for autos are 3x to 4x higher and toll rates for trucks are 2x to 4x higher than the existing Turnpike rates.
- **Decline in traffic with optimized rates** – Optimized rates result in an 11% to 13% decrease in AADT in 2035 compared to expected AADT at current OTIC rates.
- **Significant debt support** – Where the best performer (E1) bonds 4% of its $700 million capital program with the existing toll rates, optimized toll rates could potentially increase the capital supported by bonds.

Statutory Authority Findings

The legal scan confirms that **OTIC already possesses full statutory authority** under O.*R.C. § 5537* to:

- designate a new-build connector as part of the turnpike system;
- acquire right-of-way, issue revenue bonds, and establish toll rates; and,
- operate upgraded state-route lanes if rebuilt to turnpike standards.

No state-level legislation is required. Federal conditions, including NEPA clearance and, if federal-aid dollars are used, a Section 129 tolling agreement, are routine and can be satisfied within the existing OTIC process framework.

The legal scan also acknowledges **potential barriers to ODOT's ability to deliver the connector as a toll project:**

- Under current Ohio law, there is a general prohibition against ODOT putting tolls on existing non-toll roads. ORC §5531.12(C)(1)
- ODOT can institute tolling on new highways and new lanes added to existing non-toll highways if they do not reduce the number of non-toll lanes. ORC §5531.12(C)(2)
- If ODOT imposes tolls as part of the project, it would not have the ability to utilize "quick take" which is an accelerated eminent domain process used to acquire the property necessary for road projects. Section 19, Article I, Ohio Constitution and ORC §163.06(B) limit the use of quick take to roads that are open to the public without charge. Without this authority, any land acquisition will be slowed and delay construction.

Findings & Conclusion

Operational Feasibility

Concepts E1, E2, and E3 are the only concepts that, when tolled conservatively at current Ohio Turnpike rates, generate a sustained net operating surplus. Yet even the strongest of the three, E1, could bond no more than about 4 percent of its total capital need under conservative finance assumptions. In other words, tolling solves the long-term O&M problem but contributes very little toward construction. The toll rate sensitivity analysis indicates additional bonding capacities are plausible with higher yet palatable toll rates. The toll rates for a new facility should be established based on a comprehensive financial model that aligns with the specific cost structure and funding strategy of the project. A refined Level 2 Tolling Analysis would need to be performed to validate traffic models and toll rates.

Marginal and Infeasible Candidates

Concept E6 meets the O&M test but supports less than one percent of its capital in bonding capacity; it should therefore be advanced only under a conventional funding premise, with tolling retained as a possible, but not primary, revenue stream. Corridors E4, E5, and E7 do not pay their operating expenses and, under current assumptions, are not credible toll candidates. They should only be revisited as non-tolled improvements if warranted by other evaluation factors.

Institutional Pathway

Should the state opt to pursue a tolled delivery, OTIC possesses full statutory authority under Revised Code § 5537 to designate, finance, and operate the facility. Exercising that authority will require completion of an investment-grade traffic-and-revenue study, refinement of interchange spacing, and preparation of a preliminary finance plan. ODOT also possesses statutory authority, however, this authority is limited by requirements for maintaining non-tolled capacity and a constraint on the ability for "quick take" as part of right-of-way acquisition for a tolled facility.

Conclusion

This sketch toll analysis indicates that a facility south of the Delaware/Marion/Morrow County border could, at a minimum, cover its life-cycle O&M and potentially support a portion of construction costs, particularly if optimized toll rates are applied. Should the state choose to retain tolling as a funding option to support a connection within this area, it would likely be viable to do so.

6. RECOMMENDATION & NEXT STEPS

From Concept Testing to Study-Area Refinement

The comparative evaluation and preliminary tolling assessment demonstrate that no single concept is challenge-free, yet the work conducted through this planning study yields a clear set of findings that should guide future concept identification conducted between the fall of 2025 and October 2026 (in alignment with HB 96 requirements):

- **Demand is concentrated south of the Marion/Morrow/Delaware county line:** Corridors that intercept trips in this subarea (E1, E2, E3, E6) attract the greatest potential demand, generate the largest time-savings, and post the strongest benefit-cost ratios (within the comparative evaluation as a free, non-tolled concept).
- **Reservoir and state-park crossings are the dominant schedule and cost risk:** Alignments that avoid both Delaware and Alum Creek reservoirs will avoid Section 408 dam-safety permissions and major Section 4(f)/6(f) conversions, sharply reducing permitting complexity and associated costs.
- **Long state-route upgrades add cost with limited benefit.** Conversions along US-36/SR-37 or SR-95 drive right-of-way, utility, and relocation costs into the highest cost tiers, yet return only modest additional user benefit.

Together, these findings point to a central, south-leaning alignment (common to E1, E2, E3, and E6) as the most promising foundation for continued study. This path would deliver the strongest mobility benefits, avoid the reservoirs/park complexes, thread between the densest residential clusters, and show greater potential for tolling feasibility.

Recommended Focus Area

The recommended focus area (described in **Table 13** and mapped in **Figure 22** through **Figure 24**Figure 23) is not a single corridor concept; it is a hybrid envelope that keeps the best-performing elements of E1 and selected portions of E2, E3, and E6 while trimming sections proven to be prohibitive. This envelope deliberately excludes two high-risk zones: the SR-229/US-23 node west of Delaware Reservoir and the US-36/Sunbury-Parkway interchange area, where overlapping constraints and active projects present substantial delivery risk. This area also includes the area north of the City of Ashley. It is anticipated that a connection through this area would provide the same benefits as the highest performing concepts even though it was not fully considered through this initial planning study.

TABLE 13. RECOMMENDED FOCUS AREA

Corridor segment	Rationale
Western gateway (**US-23 north of Waldo**)	Use the area surrounding the E1/E2 entry, avoiding the Delaware Reservoir and the congested SR-229/US-23 node.
Central reach (**SR-98 to Alum Creek**)	Follows the common green-field band of E1/E3/E6, providing room to refine the river crossing and interchange spacing around Ashley. Additionally includes the reach north of Ashely to provide alignment flexibility.
Eastern gateway (**I-71 North/South of SR-521**)	Follows the E1/E3/E6 corridors to I-71, preserving flexibility to define the exact tie-in termini as geotechnical and community data mature.

Expected Performance, Benefits, and Cost

- **Utilization and travel time savings (for free, non-tolled corridor):** Alignments developed within the envelope are expected to carry 21,000–25,000 AADT in the opening year (2035) and deliver 18 to 22-minute reductions in travel times between Toledo and Columbus during congested periods and 4 to 8-minute reductions in uncongested periods.
- **Cost estimate (for free, non-tolled corridor):** Preliminary cost ranges, inclusive of the companion I-71 widening, are expected to remain within $0.9–1.3 billion (2024 $) (associated with the lower-higher ranges recorded for E1 and E3) owing to predominantly green-field construction and moderated right-of-way exposure.

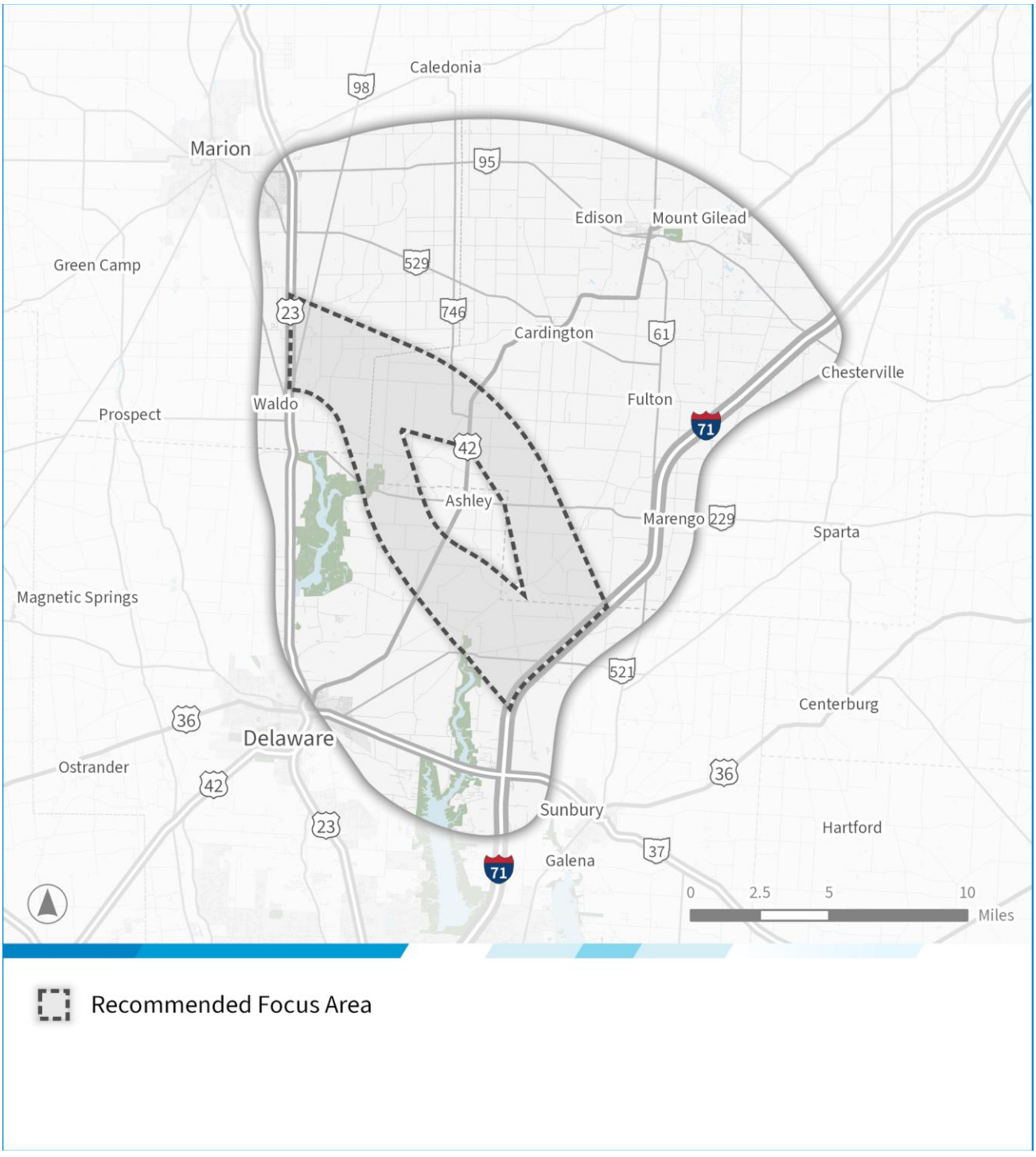
Tolling Financial Feasibility Assessment

- **Tolling potential:** Sketch toll tests indicate that a facility in this envelope could, at a minimum, cover its life-cycle O&M and potentially support a modest to substantial portion of construction costs (based on potential optimal tolling rates), allowing the State to keep tolling as a viable option for defraying associated costs if desired.

Next Steps

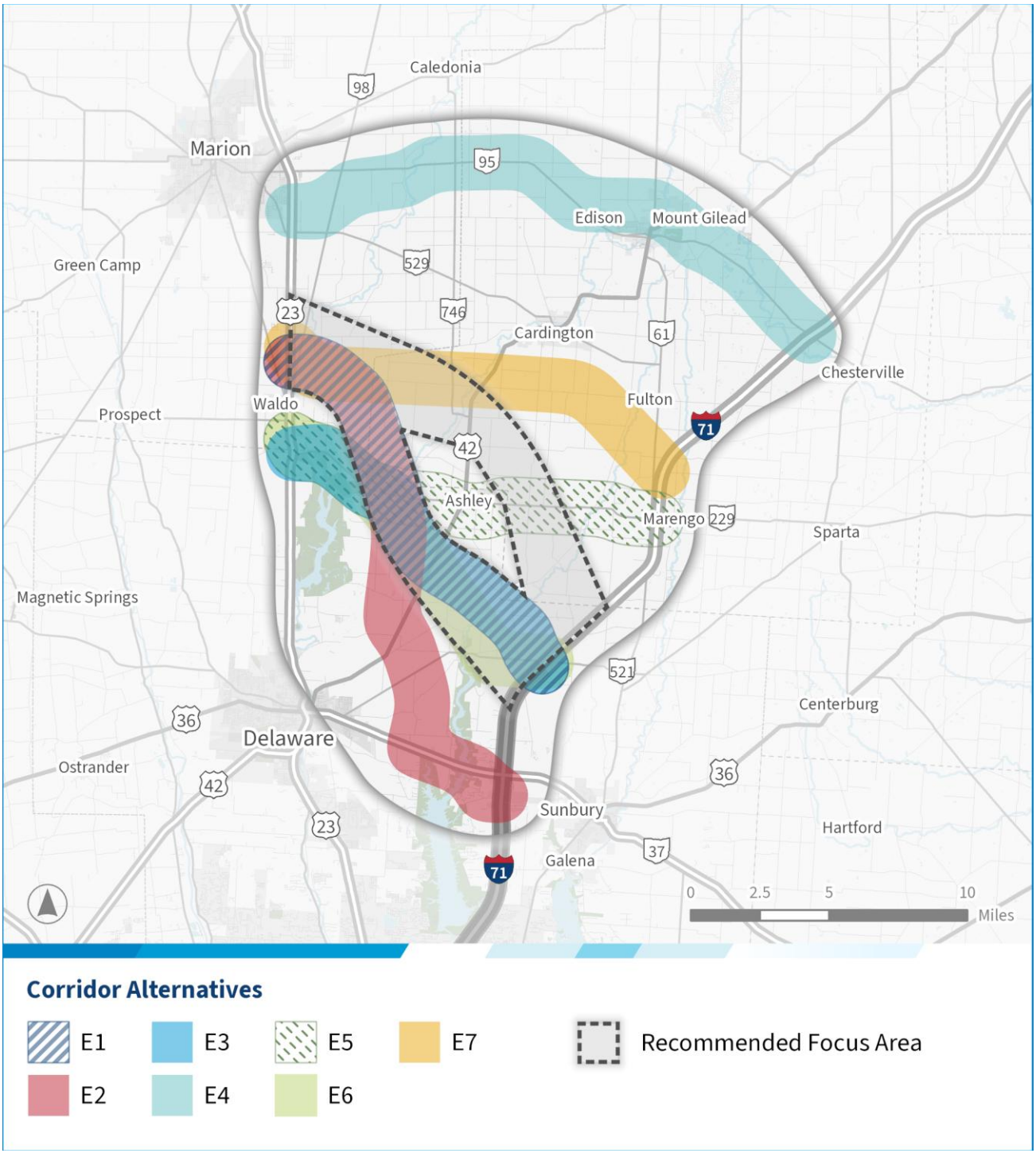
By directing forthcoming alignment identification and refinement, needed field investigations, and early agency and public engagement to this focus area, ODOT and OTIC can concentrate effort where it yields the greatest benefit. This targeted strategy will position the agencies to advance and document a single, fully vetted, NEPA-ready preferred alternative by October 1, 2026, meeting the schedule established in HB 96.

FIGURE 22. RECOMMENDED FOCUS AREA



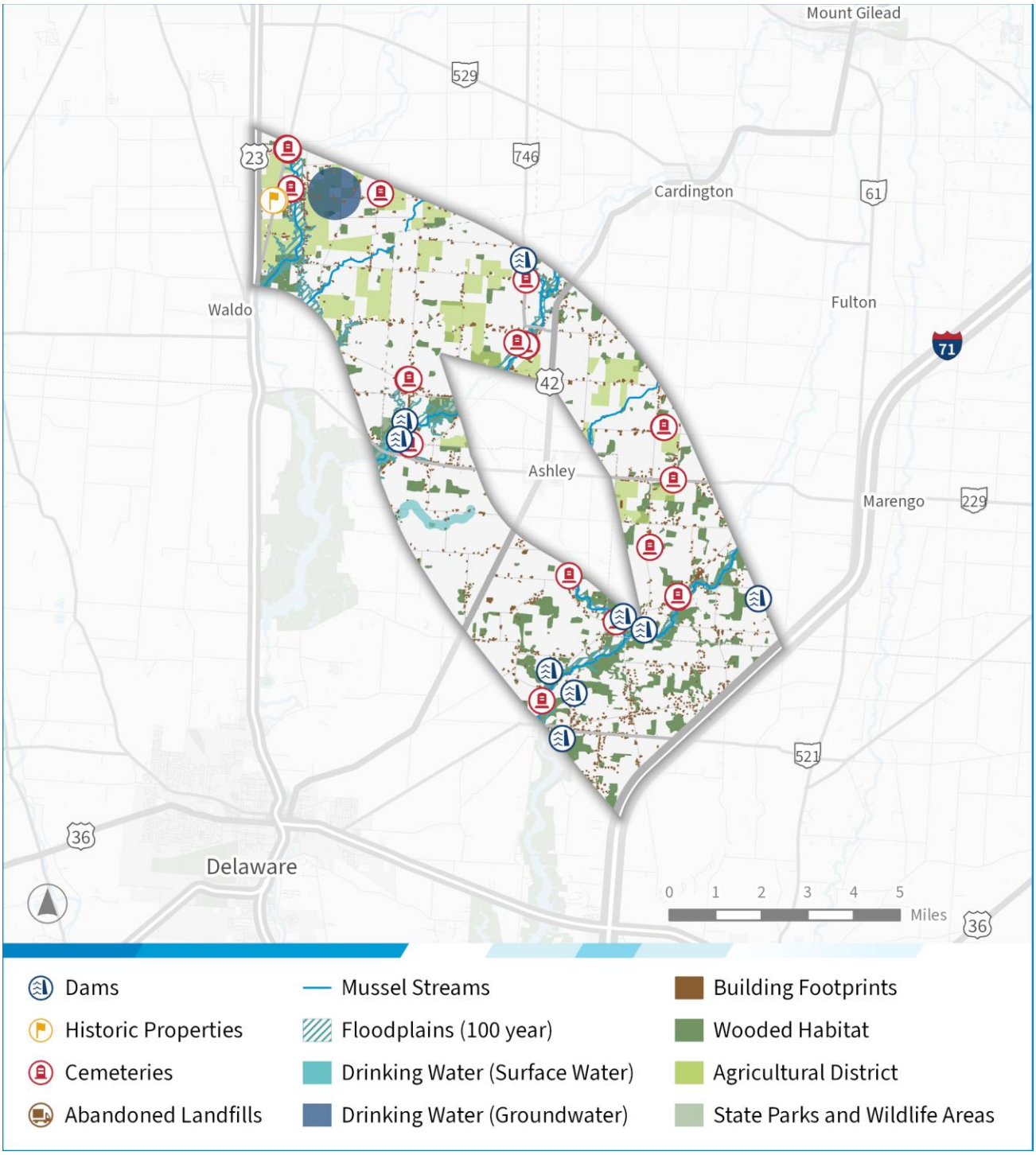
Source: ODOT

FIGURE 23. CONCEPT DEFINITIONS WITHIN THE FOCUS AREA



Source: ODOT

FIGURE 24. ENVIRONMENTAL AND COMMUNITY RESOURCES WITHIN THE FOCUS AREA



Source: ODOT

APPENDIX

The appendix includes seven technical memoranda:

- Study Area Profile Technical Memorandum
- Corridor Concepts Technical Memorandum
- Cost Estimate Technical Memorandum
- Utilization & Benefits Technical Memorandum
- Preliminary Environmental Screening Technical Memorandum
- Tolling Financial Feasibility Assessment Technical Memorandum
- Tolling Statutory Authority Technical Memorandum

Study Area Profile Technical Memo

US-23 to I-71 Connector Joint Plan – Interim Report – HB 96

INTRODUCTION

This memorandum provides a summary of the study area considered for the US-23 to I-71 Connector Joint Plan, a planning effort led by the Ohio Department of Transportation (ODOT) and the Ohio Turnpike and Infrastructure Commission (OTIC) in response to House Bill 54, Section 755.60 (further amended by HB 96). The legislation directs the agencies to jointly evaluate the feasibility of a new connection between U.S. Route 23 (US-23) and Interstate 71 (I-71) in northern Delaware, Marion, or Morrow counties through a range of options, including upgrades to existing highways or construction of new freeways and toll roads.

STUDY AREA DEFINITION

The study area boundary was developed in response to the five connection types outlined in House Bill 54, Section 755.60(A). Consistent with this direction, ODOT identified a study area as presented in **Figure 1**. The study area is bounded by US-23 on the west, SR-95 on the north, I-71 on the east, and US-36 on the south. The area includes northern Delaware County, southern Marion County, and southern Morrow County. The study area is entirely within ODOT District 6 jurisdiction and the planning areas of the Mid-Ohio Regional Planning Commission (MORPC) and Central Ohio Rural Planning Organization (CORPO). Cities and villages within the vicinity include Delaware, Sunbury, Waldo, Marion, Ashley, Cardington, Fulton, Edison, and Mount Gilead. The study area impacts one US House District (District 4), four Ohio House Districts (Districts 60, 61, 86, and 87) and two Ohio Senate Districts (Districts 19 and 26).

The area is up-river from three reservoirs north of Columbus, including Delaware Lake, Alum Creek Lake, and the Hoover Reservoir. Significant creeks and rivers within the study area include the Olentangy River, Whetstone Creek, Alum Creek, Walnut Creek, Shaw Creek and the Kokosing River. Other minor creeks and wetlands are present throughout the study area. Two of the reservoirs (Delaware and Alum Creek lakes) are within state parklands and another state park is present in Mount Gilead.

As shown in **Figure 2**, in addition to US-23, US-36, and I-71, which create the west, south, and east limits of the study area, US-42 bisects the study area from the southwest to northeast along a line from Delaware to Ashley to Cardington to Mount Gilead. SR-521, SR-229, SR-529, and SR-98 are located east to west within the study area. SR-61 runs from Sunbury north to its interchange with I-71 and Mount Gilead, and SR-98 branches off US-23 in Waldo, heading north to Bucyrus. Other major transportation assets within the study area include a CSX rail line that mirrors US-42's alignment and a Norfolk Southern Railway that runs west of US-23, from Delaware through Waldo to Marion and points north.

FIGURE 1. HB54 STUDY AREA

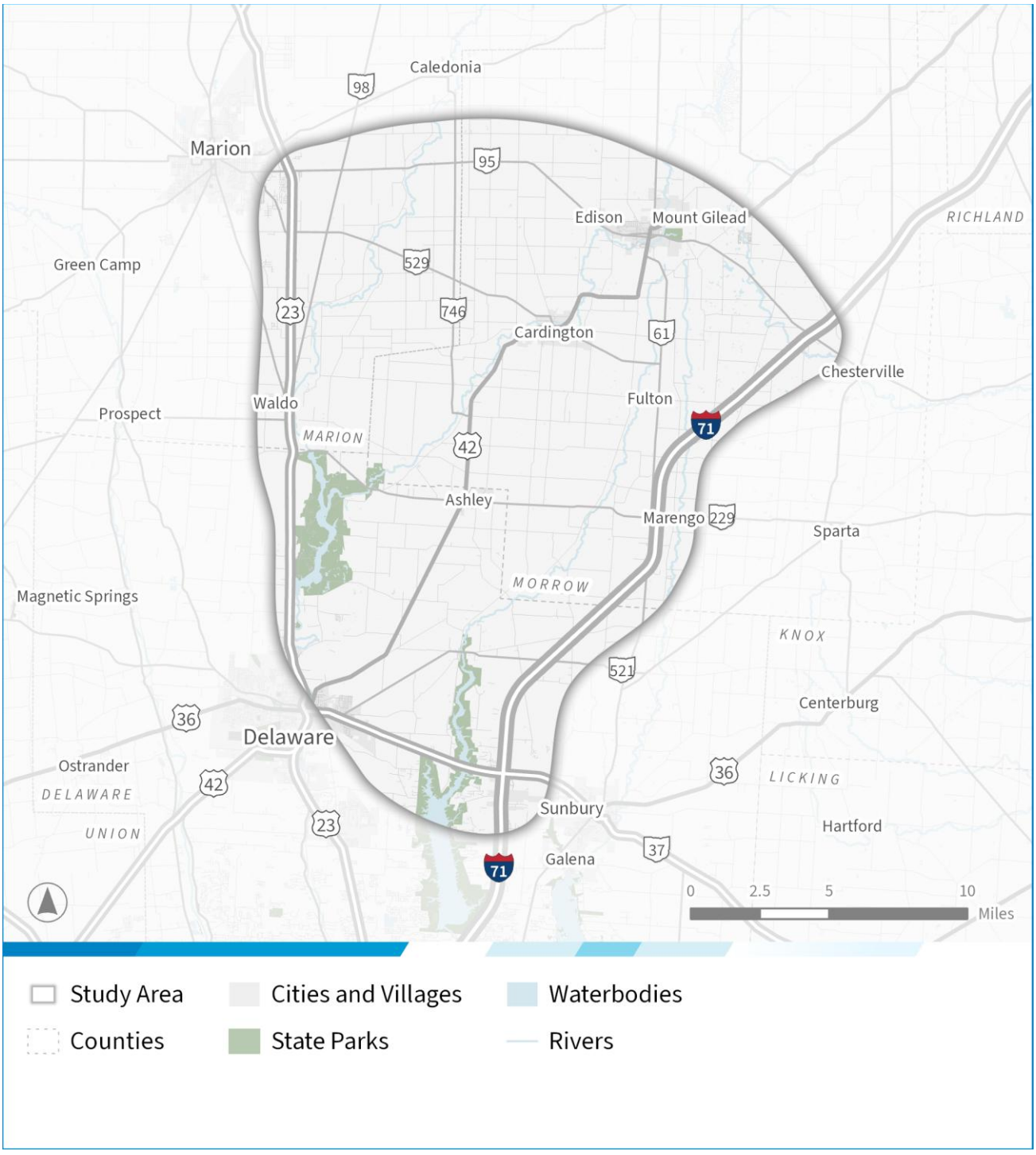
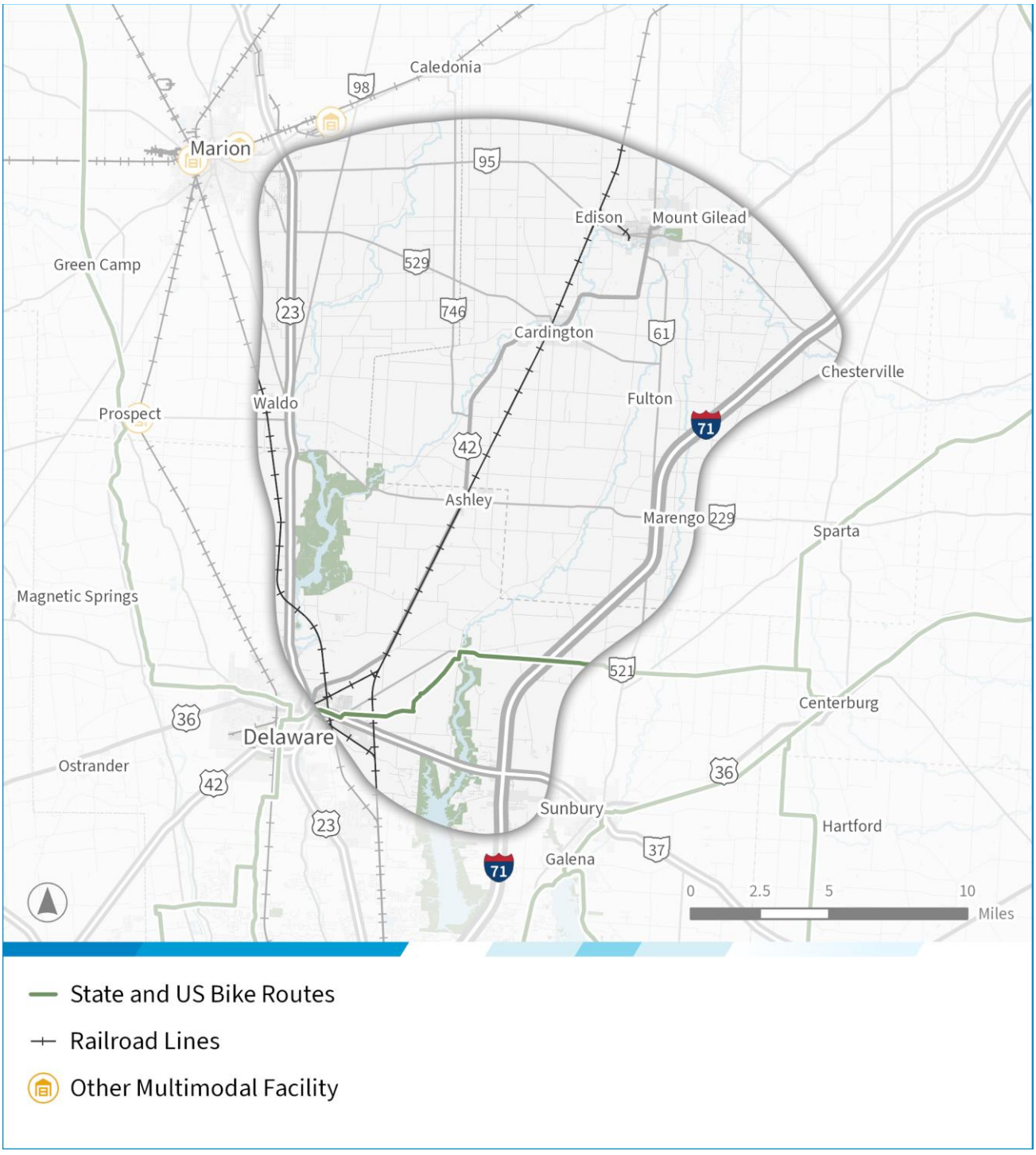


FIGURE 2. HB54 STUDY AREA TRANSPORTATION SYSTEM



Source: ODOT TIMS, ODOT Transport Ohio

STUDY AREA PROFILE

The study area profile focuses on existing conditions and observed trends across three topic areas: development and land use, demographics and economy, and the transportation network.

Development and Land Use

Moving from north to south, the development pattern of the study area transitions from primarily rural, including widespread agriculture, to suburban residential and commercial in Delaware County. There are pockets of residential and commercial development within this area primarily within Marion and Morrow counties in Mount Gilead, Edison, Cardington, Fulton, Waldo, Ashley, and Marengo and on the east side of Marion along US-23. South of SR-229 agricultural land uses are mixed with natural areas at Delaware Lake and Alum Creek state parks and pockets of residential and commercial development east of Delaware City along the US-36 and SR-521 corridors. Development continues to intensify and expand adjacent to I-71 interchanges at SR-61 and US-36. The study area is divided into three subareas with distinct existing development and growth patterns: north, middle, and south. **Figure 3** through **Figure 9** illustrate land use, development and development change, environmental resources, and community assets, all of which are important considerations within the definition and analysis of the alternatives.

Northern Subarea

The northern subarea covers the area between and including SR-95 and SR-529 corridors, roughly connecting Marion to Edison, Mount Gilead, Cardington, Fulton, and Chesterville through southeastern Marion County and southwestern Morrow County. SR-95 and SR-529 provide east-west connections while SR-746, US-42, and SR-61 provide north-south connections. Parallel to US-42 runs a CSX Railroad corridor connecting south to Columbus and north to Cleveland. The subarea is generally rural, featuring a majority of agricultural uses, with natural areas along the Olentangy River, Alum Creek, Big Walnut Creek, and Mount Gilead State Park. Suburban commercial and residential growth is occurring around the US-23/SR-95 interchange in Marion, with established development clustered at traditional crossroads including some minor residential growth occurring in small-town neighborhoods in Cardington, Edison, and Mount Gilead.

- **Marion:** The second most populous city in this profile, a portion of the city's eastern side is located within the study area. New single-family residential development is anchored around a suburban commercial district between the study area boundary and the US-23 and SR-95 interchange. This area also includes the Ohio State University at Marion campus. This residential development extends south to Marion-Cardington Road. Similar commercial and residential development has spread east of the interchange. Further east on SR-95 and SR-98 are two local schools that serve the area (**Figure 9**).
- **Edison:** The Village of Edison is home to a couple of small neighborhoods, some retail, and other businesses along SR-95, and a train depot on the CSX Railroad.
- **Mount Gilead:** US-42 serves as Mount Gilead's Main Street, with traditional rural downtown development on both sides of the roadway. West of US-42 are most of the village's neighborhoods, schools, commercial areas, the Morrow County Hospital, and the Morrow County Fairgrounds. East of US-42 is the River Cliff Union

Cemetery, the Morrow County Auto Title Department, the Morrow County Board of Developmental Disabilities, and the Mount Gilead Public Library. Mount Gilead State Park is adjacent to the eastern side of the Village.

- **Cardington:** Typically made up of traditional rural single-family housing, Cardington is bisected by US-42 and Whetstone Creek from west to east. It is home to a commercial core and multiple schools. Industry includes Yutaka Technologies, an automotive parts manufacturer, and Adalet, a stainless steel electrical enclosure manufacturer.
- **Fulton**: At the intersection of SR-61 and Waldo-Fulton-Chesterville Rd, most of Fulton's development is found along Main Street. It is primarily residential with a few businesses, including the Mae Fence Company. Lincoln Center Manufacturing, which provides custom metal manufacturing solutions, is located immediately to the south of the Village Border on SR-61. Fulton Cemetery is located just outside of the Village's southwest border.
- **Chesterville:** This small village is located on the eastern edge of the study area. It radiates around the intersection of S Portland Street and SR-95. The Selover Public Library, the Morrow Manor Nursing Center, and the Big Walnut Joint Fire District Station 2 are located within its boundaries.

Middle Subarea

The middle subarea covers the area between and including the SR-529 and SR-229 corridors, roughly connecting Waldo to Ashley to Marengo through southernmost areas of Marion and Morrow Counties and the northernmost areas of Delaware County. SR-529 and SR-229 provide east-west connections while SR-746, US-42, and SR-61 provide north-south connections. The subarea is generally rural, featuring a majority of agricultural uses, with natural areas along the Olentangy River, Alum Creek, Whetstone Creek, and Delaware Lake State Park. Suburban commercial and residential growth is occurring along US-23 north of Waldo and adjacent the SR-61 / I-75 interchange south of Marengo, which also includes recent and ongoing distribution center development (Marengo has annexed land along I-71 to accommodate this growth). Ashley features traditional development clustered around the US-42 / SR-229 crossroads with some recent minor residential growth.

- **Waldo:** A small village with a commercial strip and a couple of single-family neighborhoods, most of the develop is southeast of the US-23/SR-98 interchange. It is less than a mile from a railroad-accessible grain distribution facility at Main Street and Elevator Street.
- **Ashley:** Ashley is bisected by both US-42 and the CSX Railroad, which run adjacent to each other, north to south through the village. Its commercial core, most of the village's housing, and Buckeye Valley East Elementary School are located along West High Street (SR-229).
- **Marengo:** Marengo is a small village with a central commercial strip east of I-71 and connected west to SR-61 and Ashley via SR-229.

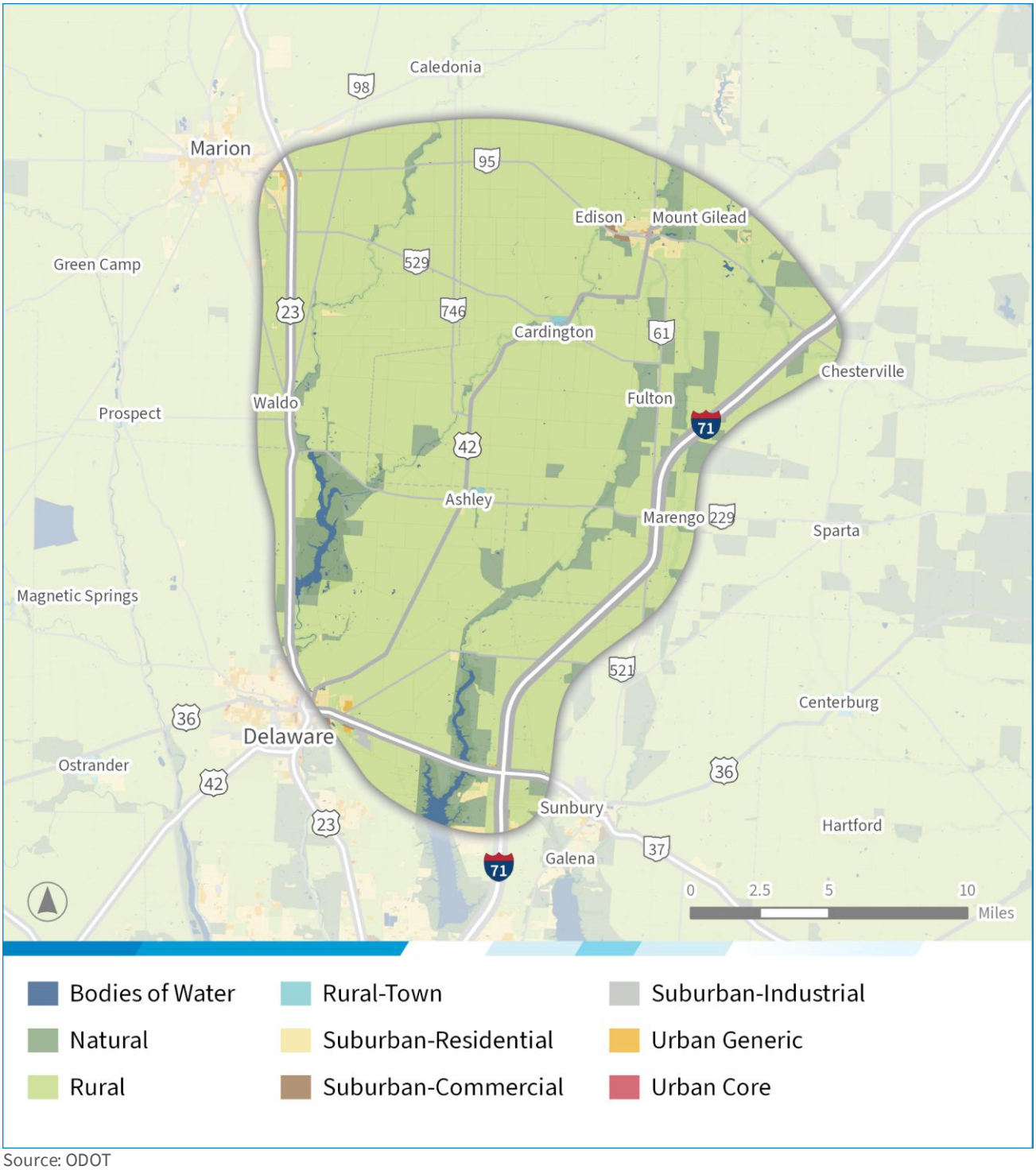
South Subarea

The south subarea covers the area between and including the SR-229 and US-36 corridors connecting northern Delaware County and Delaware City towards Sunbury. While still predominantly rural with primarily agricultural uses, it contains the fastest-growing residential pockets in the county, especially east of Delaware along US-36, around Alum Creek Lake, and near the I-71/US-36 interchanges. Delaware Lake and State Park create a natural barrier that limits

cross-corridor growth south of SR-229 and east of US-23. Land between US-42 and I-71 is more interconnected, supporting ongoing suburban and exurban residential growth. Significant commercial nodes include Glenwood Commons in Delaware, and Tanger Outlets and associated services at I-71/US-36. Sunbury has annexed land along I-71 to accommodate additional growth.

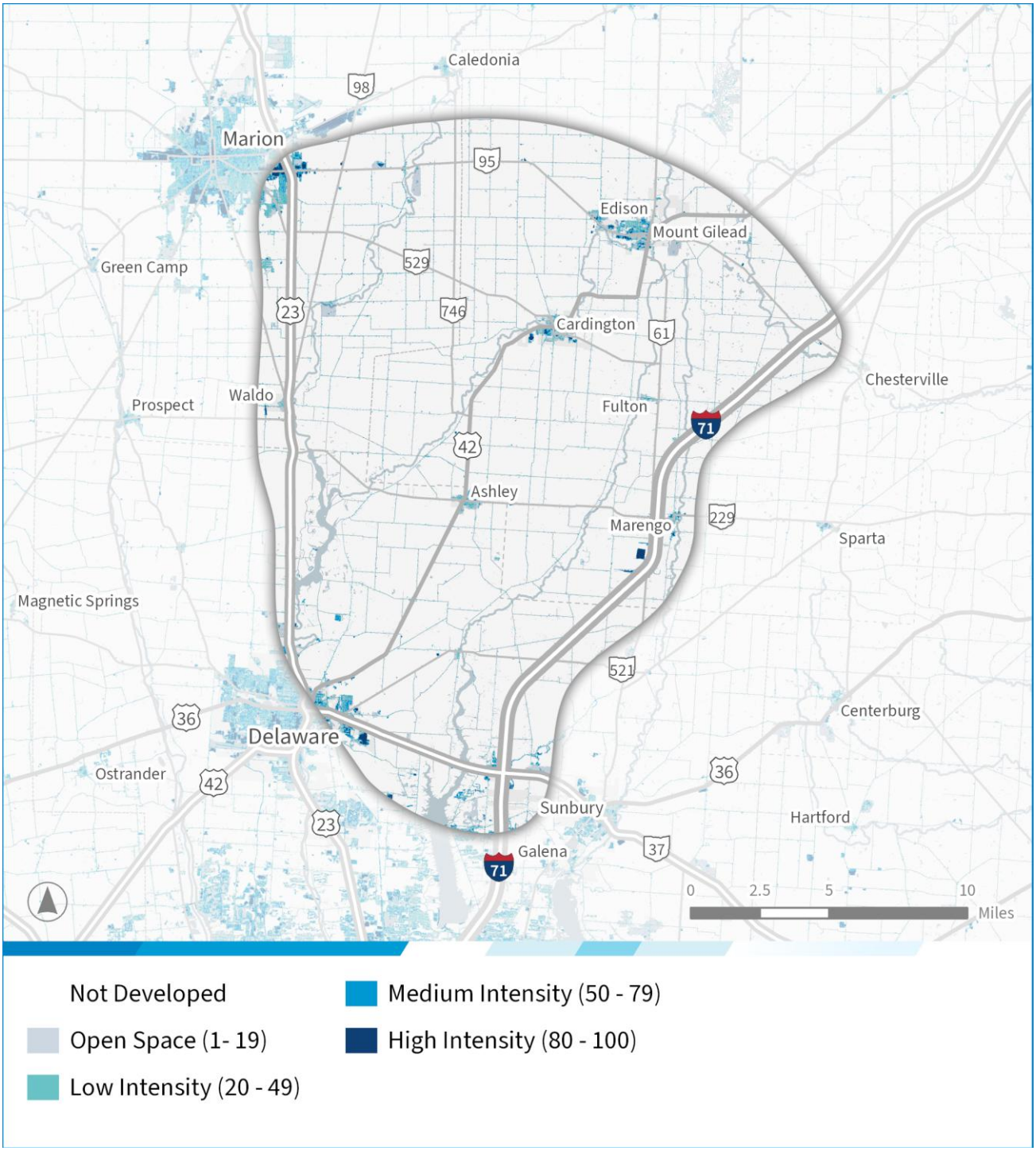
- **Delaware:** The seat of Delaware County, this is the most populous city featured in this profile. Most of the city is located to the west of US-23 and outside the study area. Within the study area, US-36 runs through downtown Delaware and crosses east over the Olentangy River, where it intersects at grade with US-42. This includes a small piece of downtown Delaware and a significant amount of agricultural land north of Mingo Park. Some traditional grid-based residential development is located between the Olentangy River and the Norfolk Southern Railway. East of US-42, a new single-family tract development has been constructed off US-36, anchored around the Glenwood Commons commercial development. There is also a Kroger distribution center further east on US-36.
- **Alum Creek and Western Sunbury (US36 and I-71):** New suburban residential neighborhoods have been constructed northwest of commercial developments on US-36, including apartments, townhomes, and single-family homes. East of the interchange is the Tanger Outlets commercial development and truck stop. To the northeast, new single-family residential developments have been built along Wilson Road. Sunbury has annexed land on both sides of I-71 south of US-36, with the intent to capture future development along the interstate.

FIGURE 3. DEVELOPMENT CONTEXT



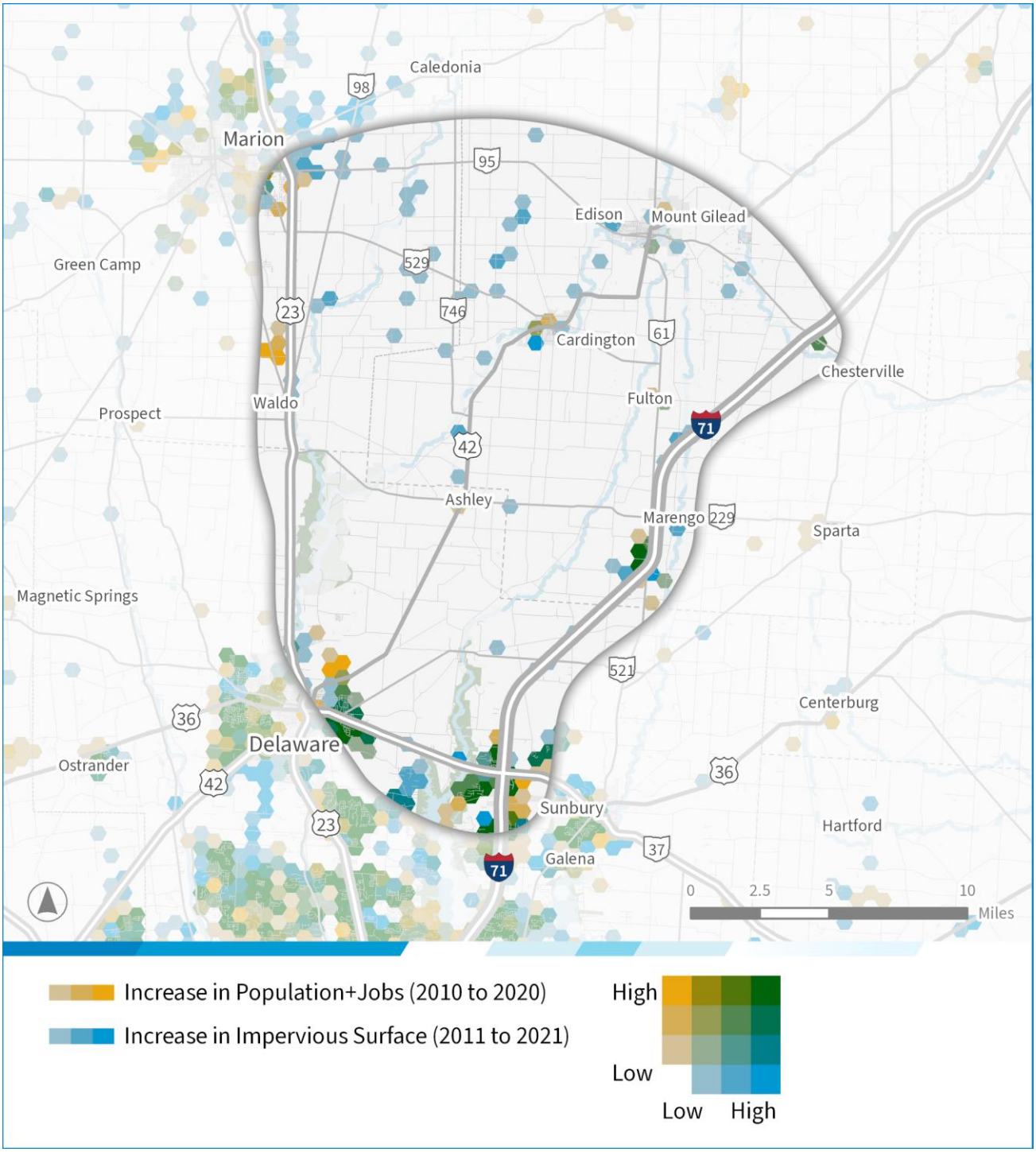
Source: ODOT

FIGURE 4. IMPERVIOUS SURFACE



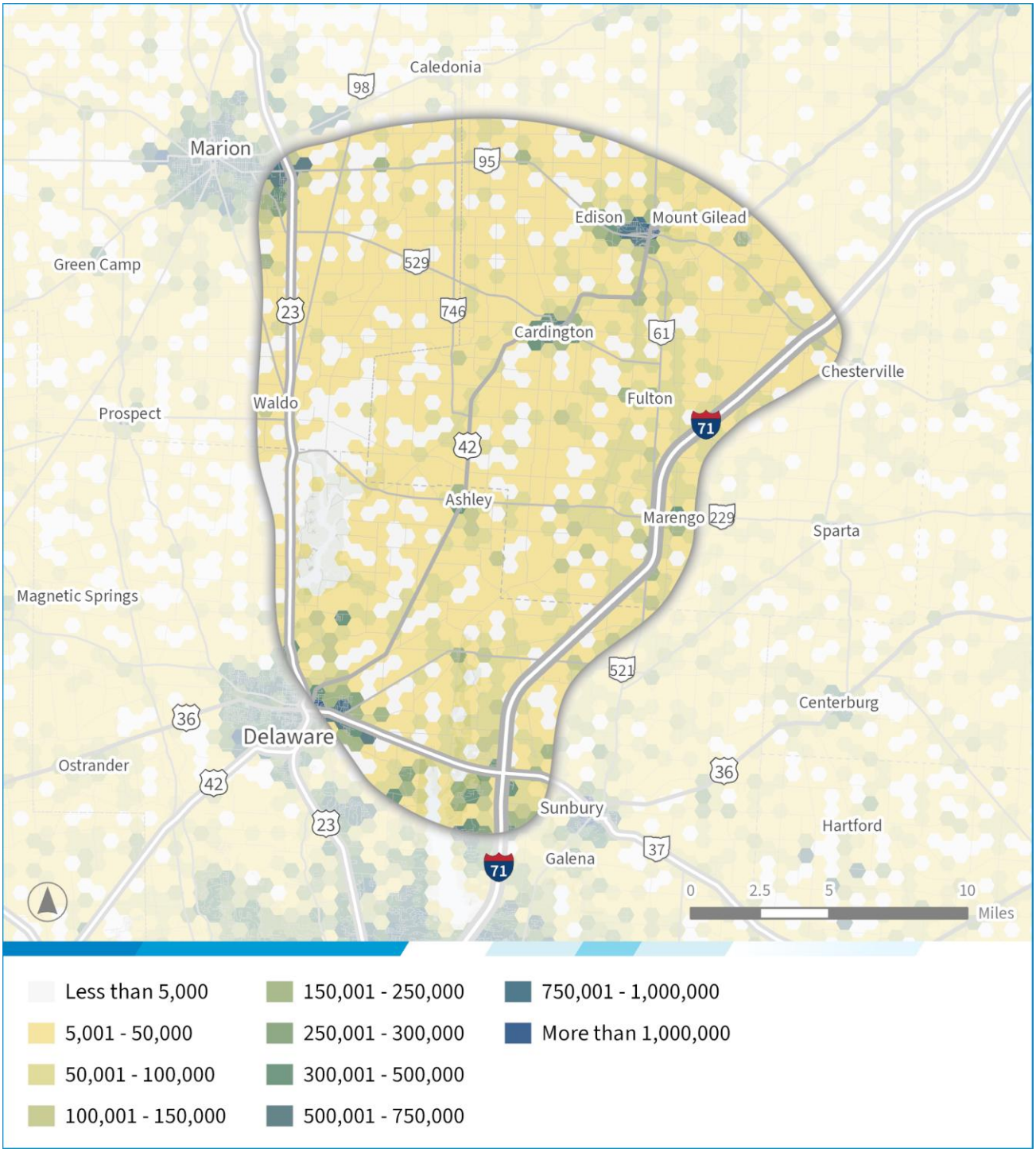
Source: National Land Cover Database (NLCD), Multi-Resolution Land Characteristics Consortium (MRLC): https://www.mrlc.gov

FIGURE 5. INCREASE IN POPULATION+JOBS AND IMPERVIOUS SURFACE



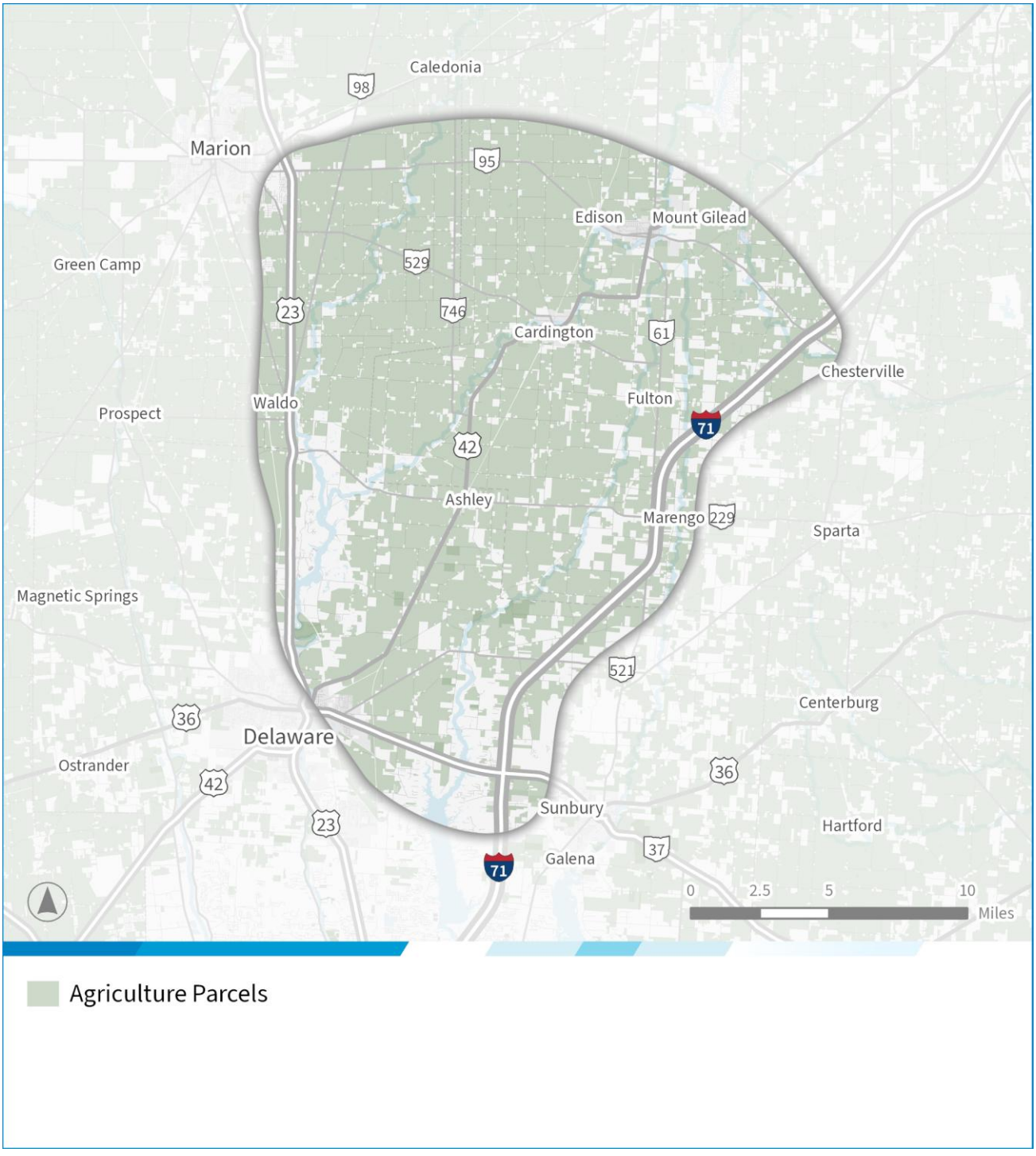
Source: National Land Cover Database, US Census Bureau, Longitudinal Employer-Household Dynamics (LEHD) OnTheMap https://onthemap.ces.census.gov/

FIGURE 6. BUILDING FOOTPRINT DENSITY (TOTAL SQUARE FEET)



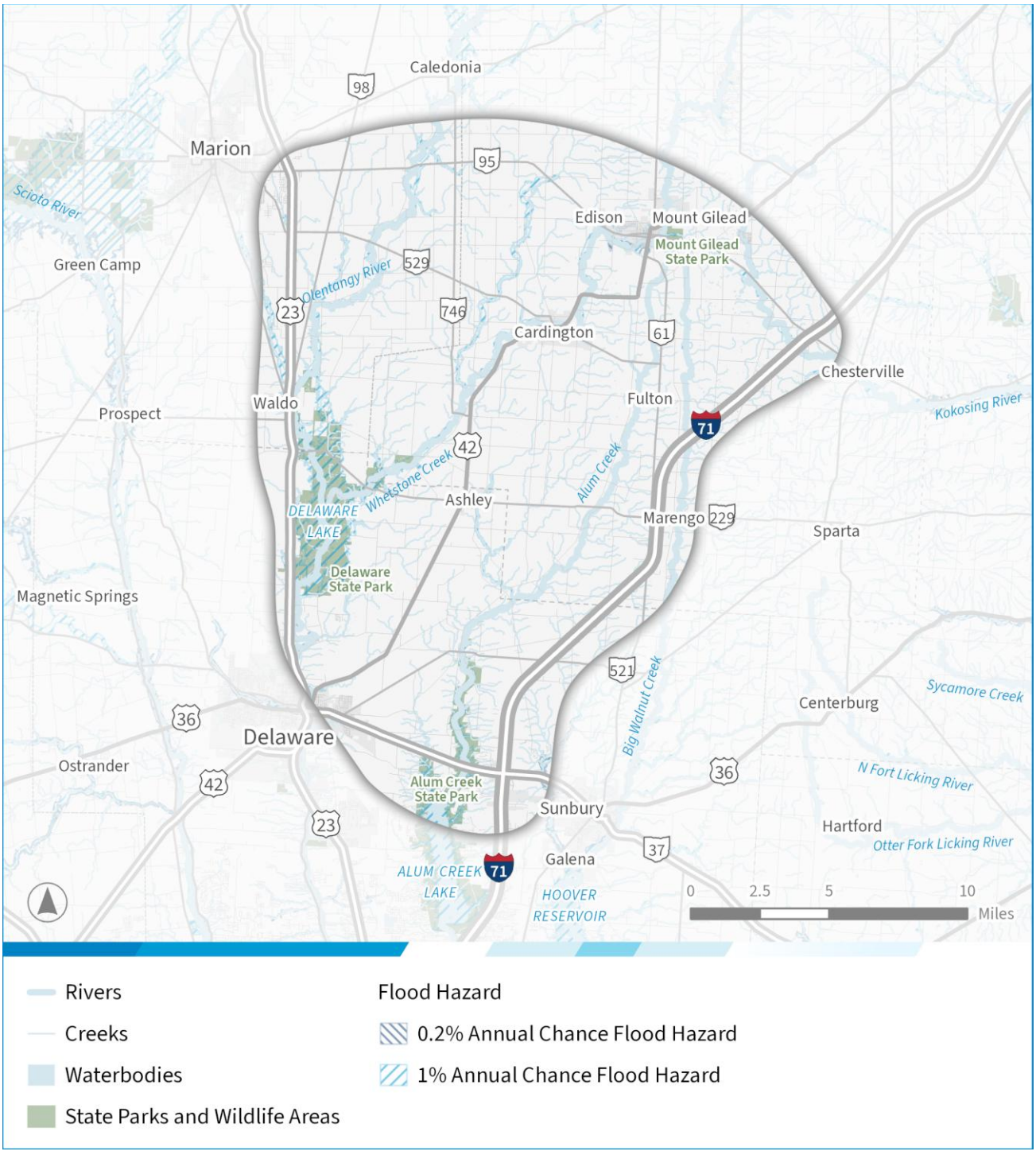
Source: ESRI Living Atlas, Federal Emergency Management Agency (FEMA) USA Structures

FIGURE 7. AGRICULTURE PARCELS



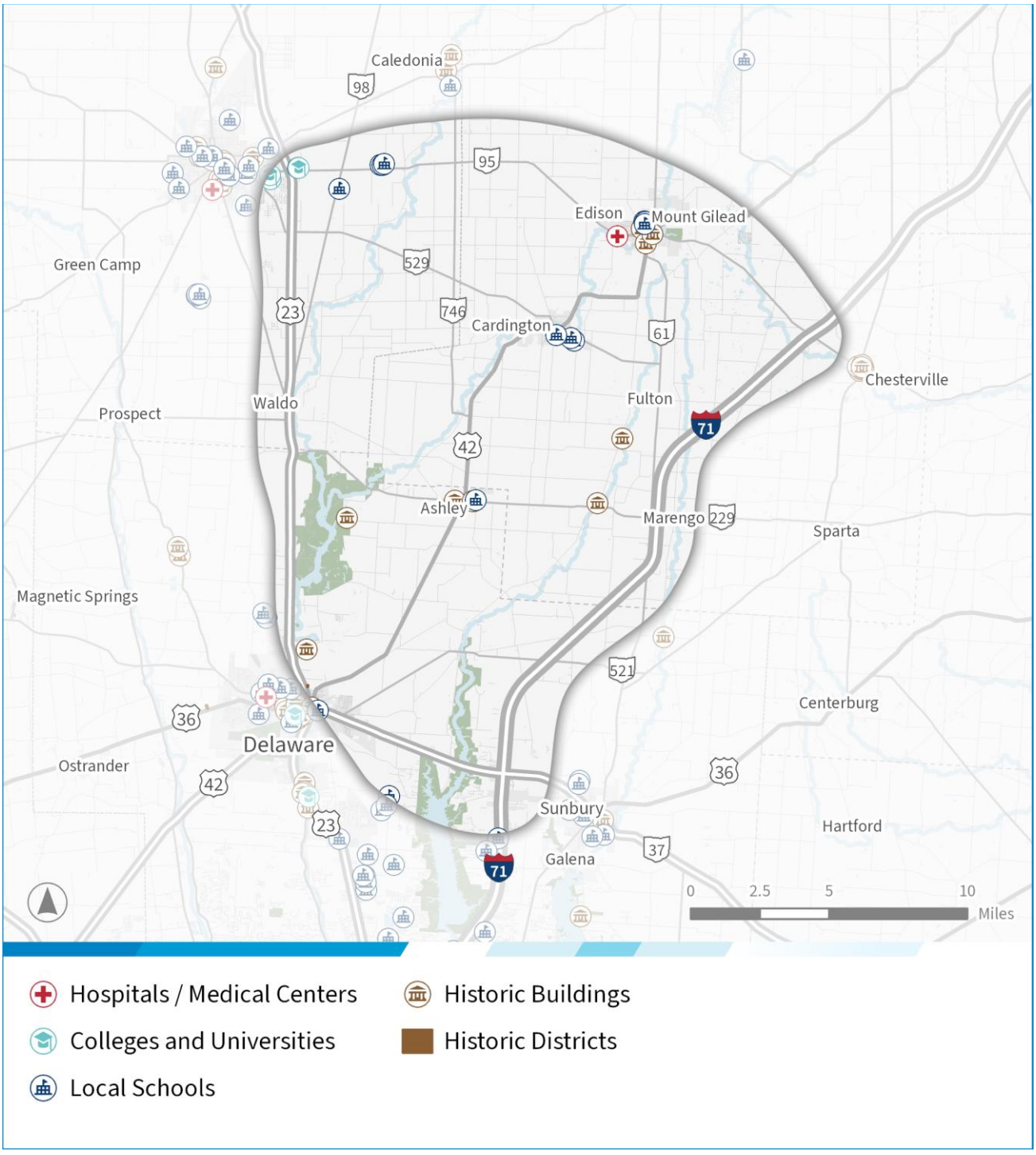
Source: Ohio Geographically Reference Information Program (OGRIP), Ohio Parcels

FIGURE 8. ENVIRONMENTAL AND NATURAL RESOURCES



Source: U.S. Geological Survey National Hydrography Dataset, Ohio Department of Natural Resources (ODNR), FEMA Flood Hazard Areas

FIGURE 9. COMMUNITY ASSETS



Source: Homeland Infrastructure Foundation-Level Data (HIFLD), National Register of Historic Places (National Parks Service)

Demographics and Economy

Population (**Figure 10**), households (**Figure 11**), and employment (**Figure 12**) are most dense in the study area to the west of Sunbury, east of Delaware, and southeast of Marion. The villages of Mount Gilead, Edison, and Cardington have the next highest clusters of jobs and households, followed by Marengo, Ashley, and Fulton. Data from Census Blocks within the study area (**Table 1**) shows the population grew by over a quarter, from 33,089 in 2000 to 41,544 in 2020, and housing quadrupled from 12,521 to 16,191 over the same period. Population growth from 2020 to 2023 approached 6% (an additional nearly 2,500 residents), which almost outpaced the 6.5% increase from 2010 to 2020. That growth in residents since 2020 includes an additional 1,023 households in the study area.

TABLE 1. POPULATION AND HOUSEHOLDS, 2000 TO 2020

	2000	2010	2020	2023
Population	33,089	38,987	41,544	43,998
Households	12,521	14,894	16,191	17,223

Source: US Census Bureau, 2000, 2010, and 2020 Census. American Community Survey 2019-2023 5-year estimates

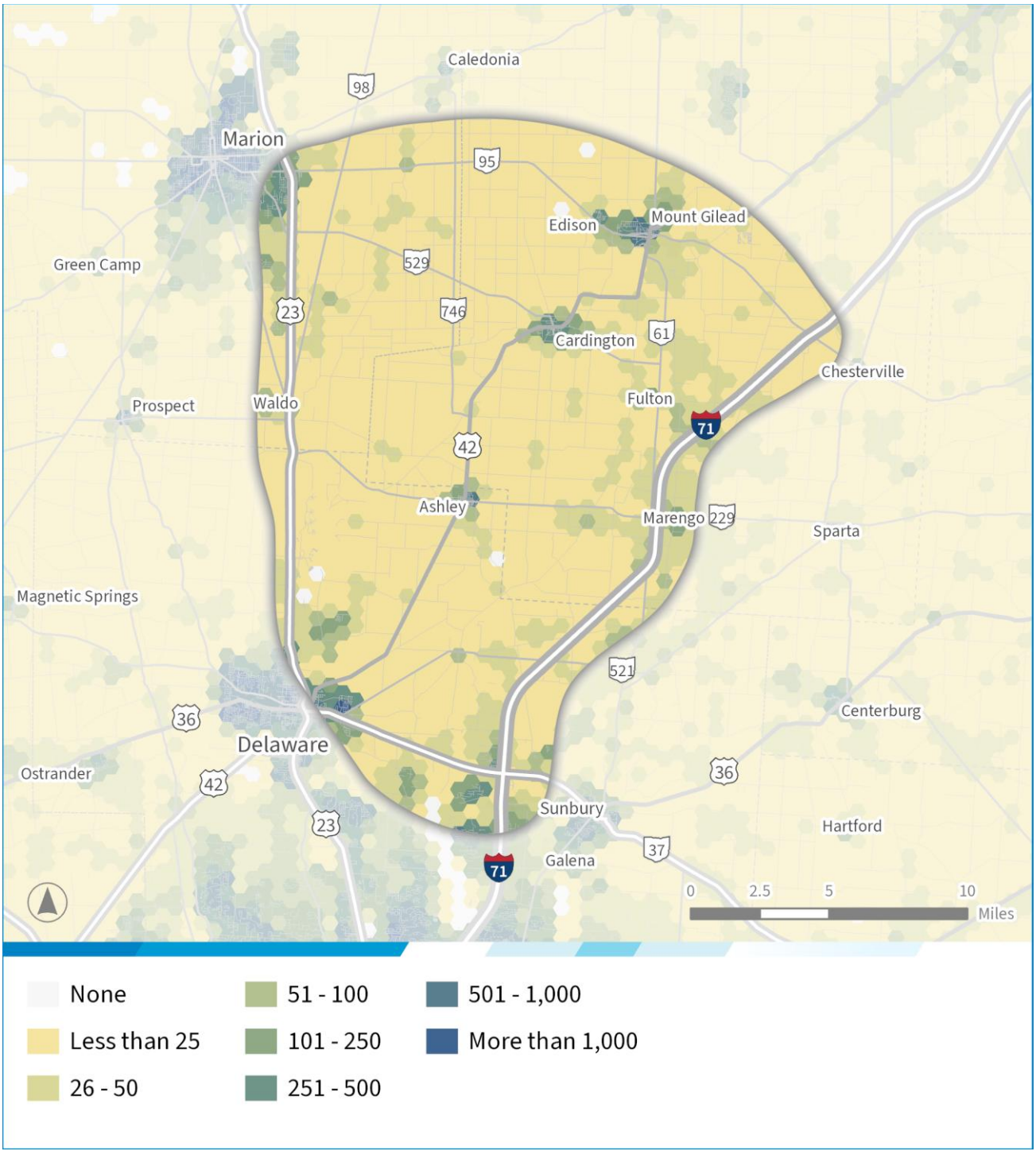
While job growth was relatively flat with an increase of 3 percent, between 2002 and 2010, the total number of jobs increased by 15 percent from 2010 to 2020 (see **Table 2**). In 2022, the study area contained 11,921 jobs, including automotive and advanced manufacturing jobs south of Cardington and near Rome. The industries with the greatest share of employment within the study area include Retail Trade (25%), Accommodation and Food Services (13%), and Health Care and Social Assistance (11%). The largest employers are in Delaware, on the southwest border of the study area. According to the City of Delaware, its largest employers include Kroger Company Grocery and Distribution, Ohio Wesleyan University, Delaware County Government, and OhioHealth Health Care. To the northwest of the study area, Marion's economy is fueled by the manufacturing industry. Marion's largest employer is Whirlpool Corporation, and the city is also home to five industrial parks. To the Southeast of the study area, Sunbury's economy is driven by Finance and Insurance, Health Care and Social Assistance, and Retail Trade. In May 2025, Ohashi Technica U.S.A. Manufacturing, a supplier of precision automotive components, announced an investment of over $11 million to expand and renovate its existing facility in Sunbury (Columbus Region, May 2025).

TABLE 2. JOBS IN THE STUDY AREA

	2002	2010	2020	2022
All Jobs	7,703	7,954	11,185	11,921

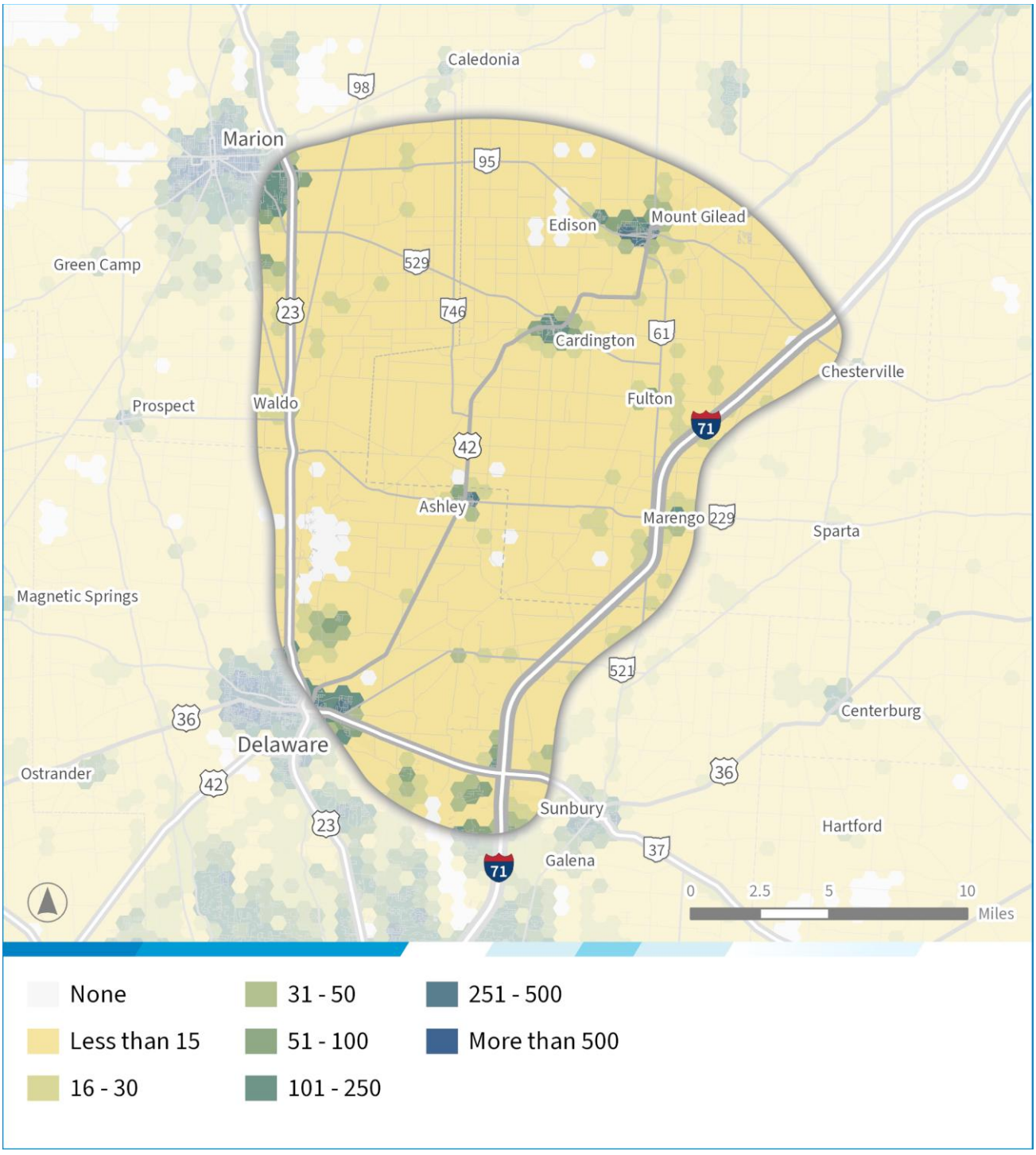
Source: US Census Bureau, OnTheMap

FIGURE 10. TOTAL POPULATION



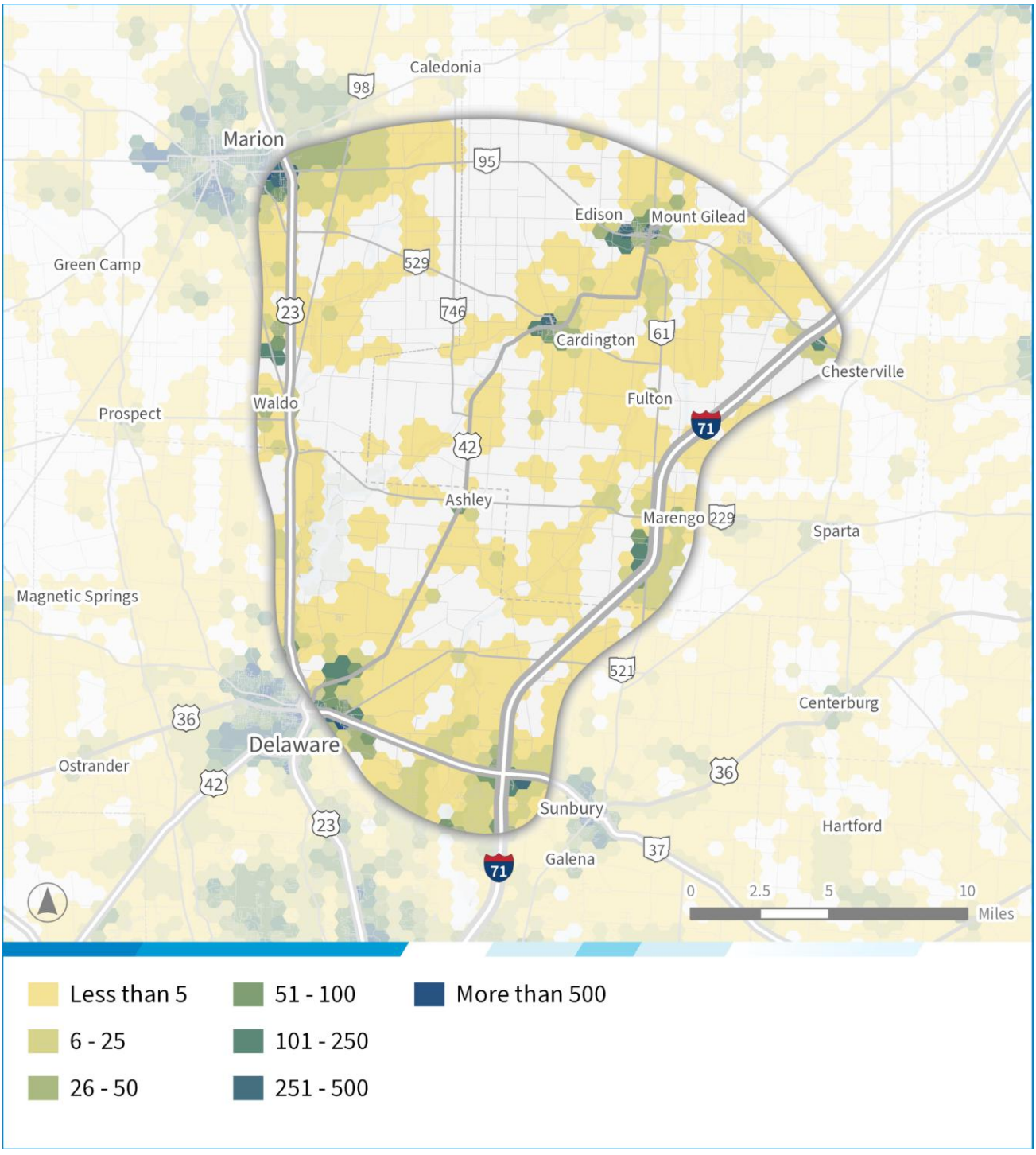
Source: IPUMS NHGIS, University of Minnesota, www.nhgis.org. U.S. Decennial Census, 2020

FIGURE 11. TOTAL HOUSEHOLDS



Source: IPUMS NHGIS, University of Minnesota, www.nhgis.org. U.S. Decennial Census, 2020

FIGURE 12. TOTAL JOBS BY WORK LOCATION, 2021



Source: US Census Bureau, Longitudinal Employer-Household Dynamics (LEHD) OnTheMap https://onthemap.ces.census.gov/

Transportation Network

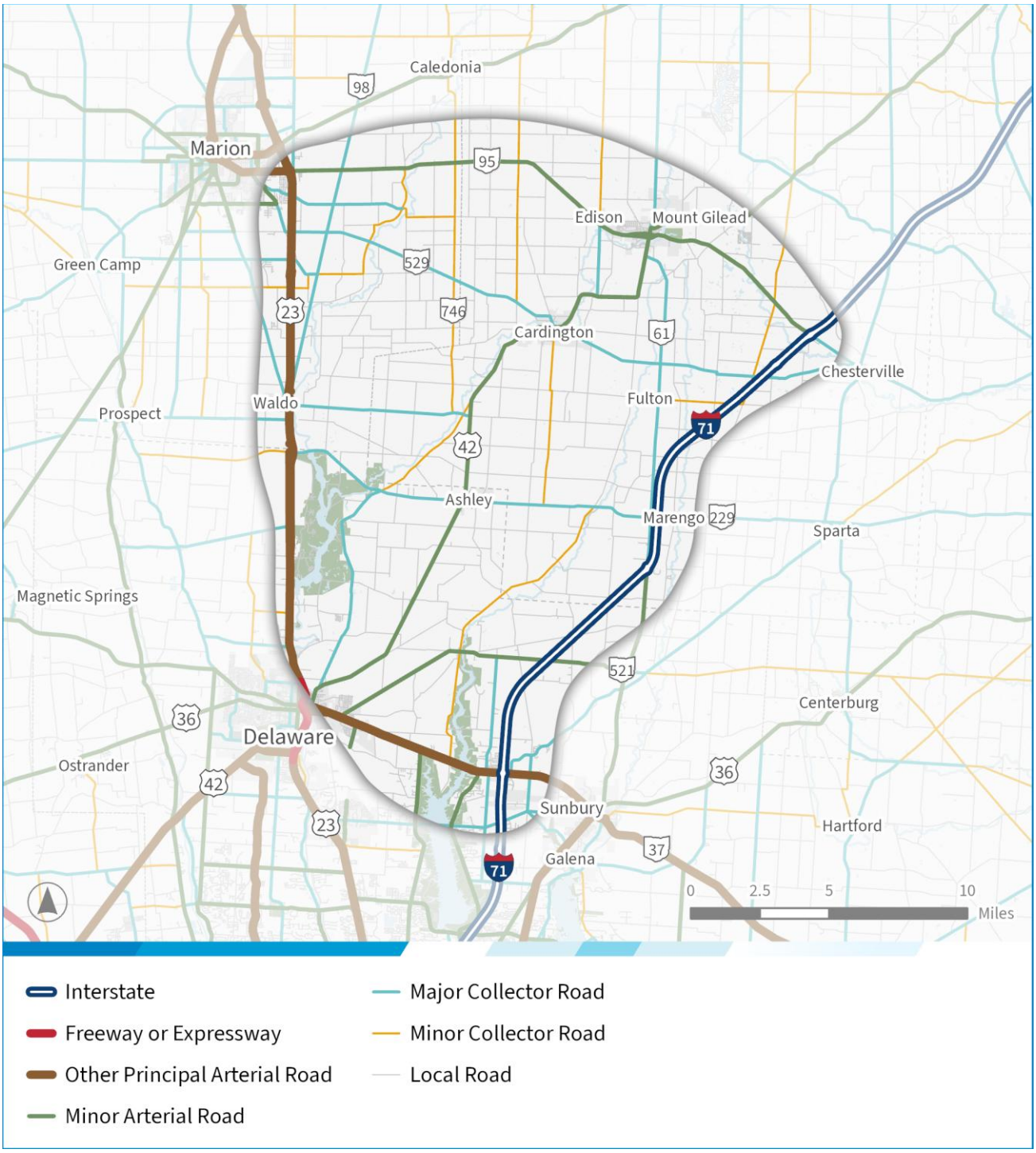
The study area is served by I-71, US-42, and US-23, all of which facilitate major interregional connections between Central Ohio, Cleveland, Toledo, Sandusky, and beyond. **Figure 13** presents the functional classification for the roadway network within the study area. US-42, SR-95, and SR-521 are the only roads within the study areas classified as minor arterial or above. All other roads, including SR-229 and SR-529, are classified as major collectors, minor collectors, or local roads.

Figure 14 and **Figure 15** present number of lanes and current access control for study area roads. I-71 has full access control as does most of US-23. Some segments of US-23 north of Delaware and north of Waldo only have partial access control. US-42 is a significantly lower-capacity facility compared to the other two corridors. It is a two-lane rural corridor with no access control and at-grade intersections. East-west routes are rural two-lane roads with no access control and include SR-521, SR-229, SR-529, and SR-95. These routes provide access for the villages in the study area to reach higher-speed corridors providing access to Columbus such as US-23 and I-71. US-36 has higher capacity and partial access control and is also the only major thoroughfare that crosses Alum Creek Lake.

Figure 16 and **Figure 17** present 2023 average annual daily traffic (AADT) and truck percentages on study area roadways. I-71 has the highest AADT of all facilities within the study area, followed by US-23 and US-36, respectively. US-42 and other state routes between I-71 and US-23 have low traffic volumes, with most routes seeing less than 5,000 AADT. The one exception is the Edison–Mount Gilead to I-71 corridor via US-42 and SR-61, which also connects to the villages of Fulton and Marengo. Most truck traffic also utilizes US-23 and I-71, with few trucks contributing to average daily traffic on the US and state routes between the two. This is apart from SR-229 east of Ashley to SR-61 where 15% to 30% of this segment's average daily traffic is comprised of trucks.

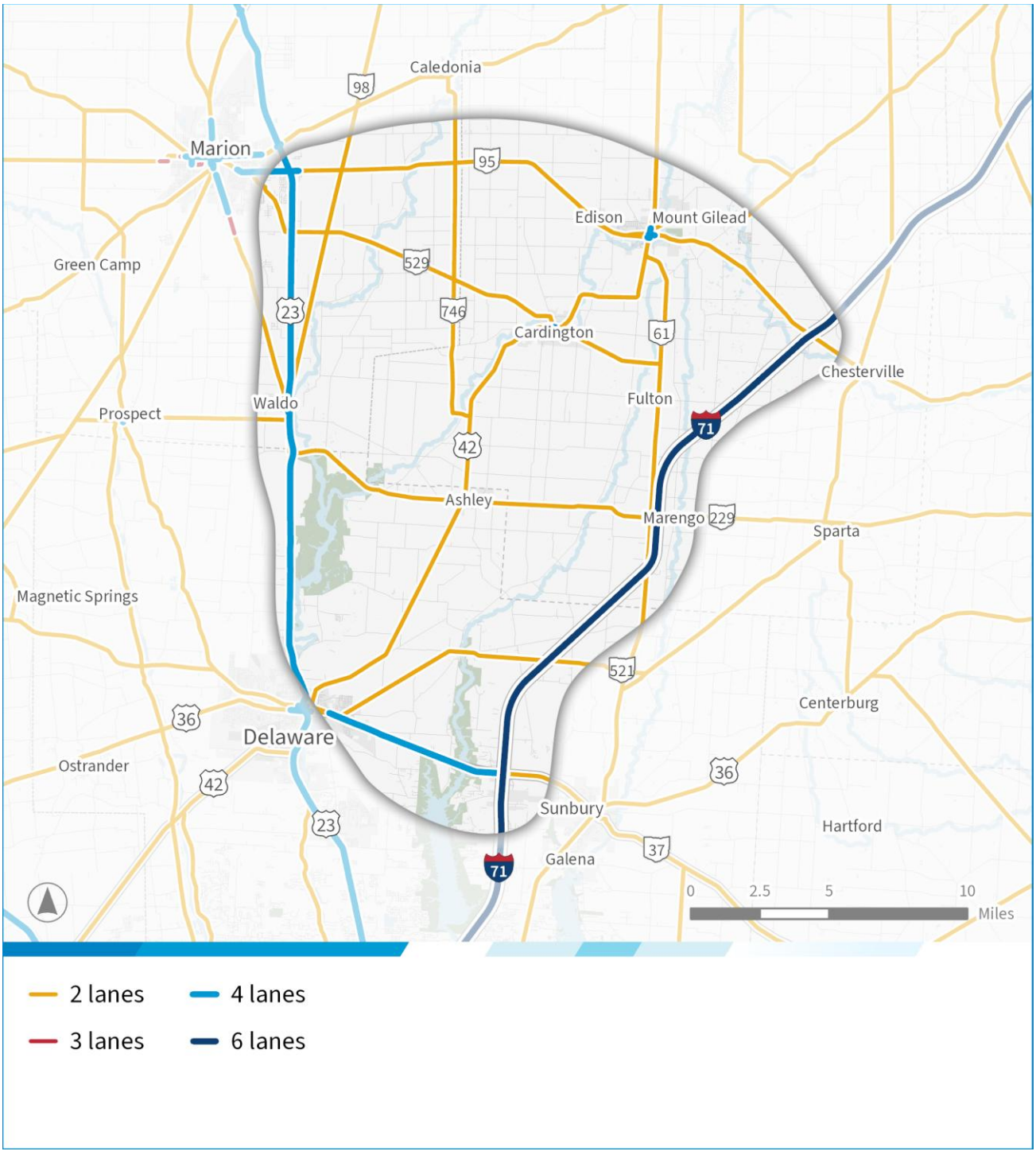
In addition to the roadway network within the study area, two railroad lines traverse the study area. Both are linked south to Columbus, but split east of Delaware. Norfolk Southern owns the line that travels northwest through Waldo to Marion and further northwest. CSX owns the line that travels northeast through the villages of Ashley and Cardington to the northeast. The Norfolk Southern line has grade-separated crossings with US-23, US-42, and US-36, but the CSX line crosses most of its intersecting thoroughfares at-grade. The CSX line runs parallel with US-42 from the intersection with Cackler Road to Ashley before splitting and continuing to cross, at-grade, through Cardington and Edison.

FIGURE 13. FUNCTIONAL CLASSIFICATION



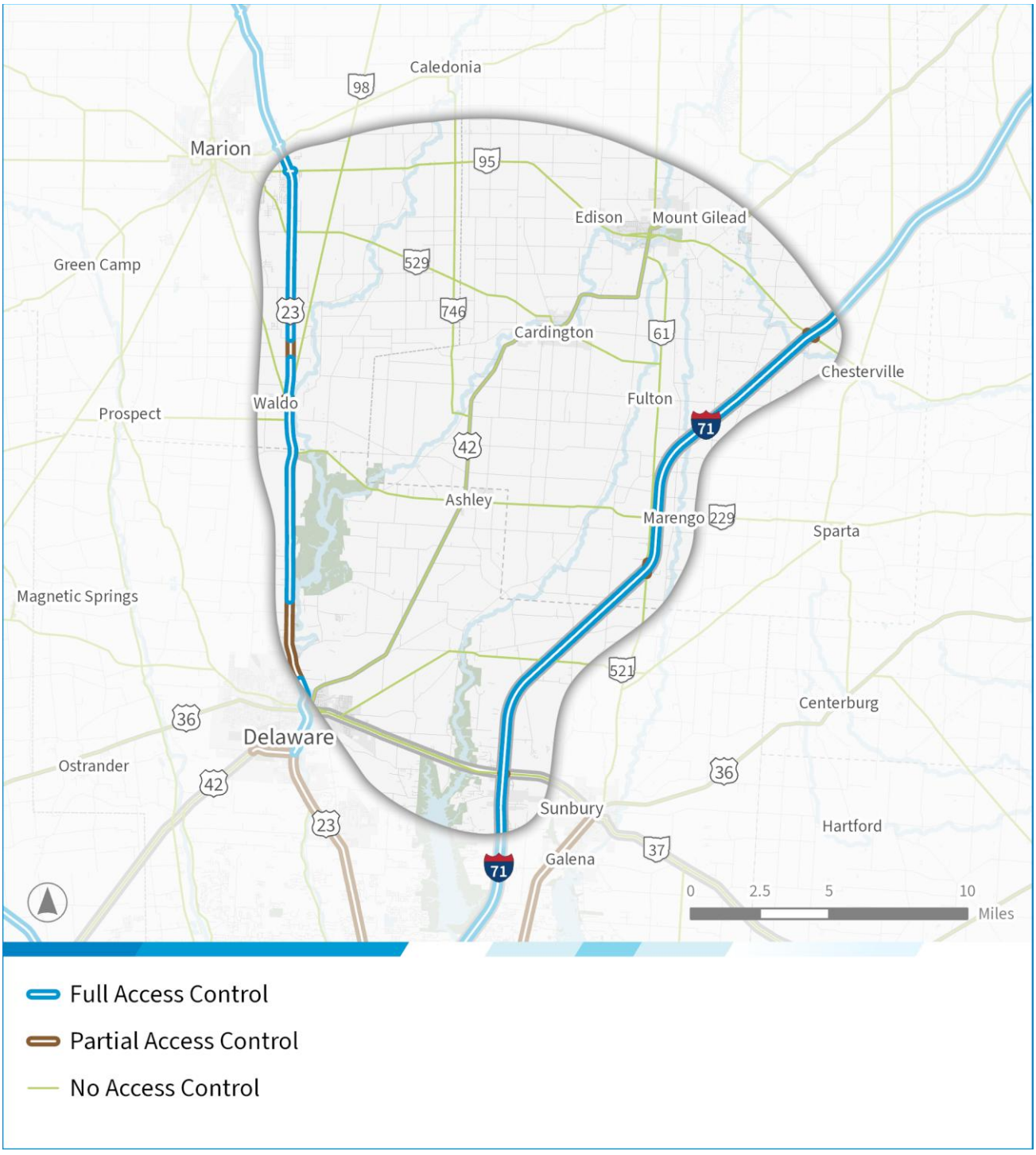
Source: ODOT

FIGURE 14. NUMBER OF LANES



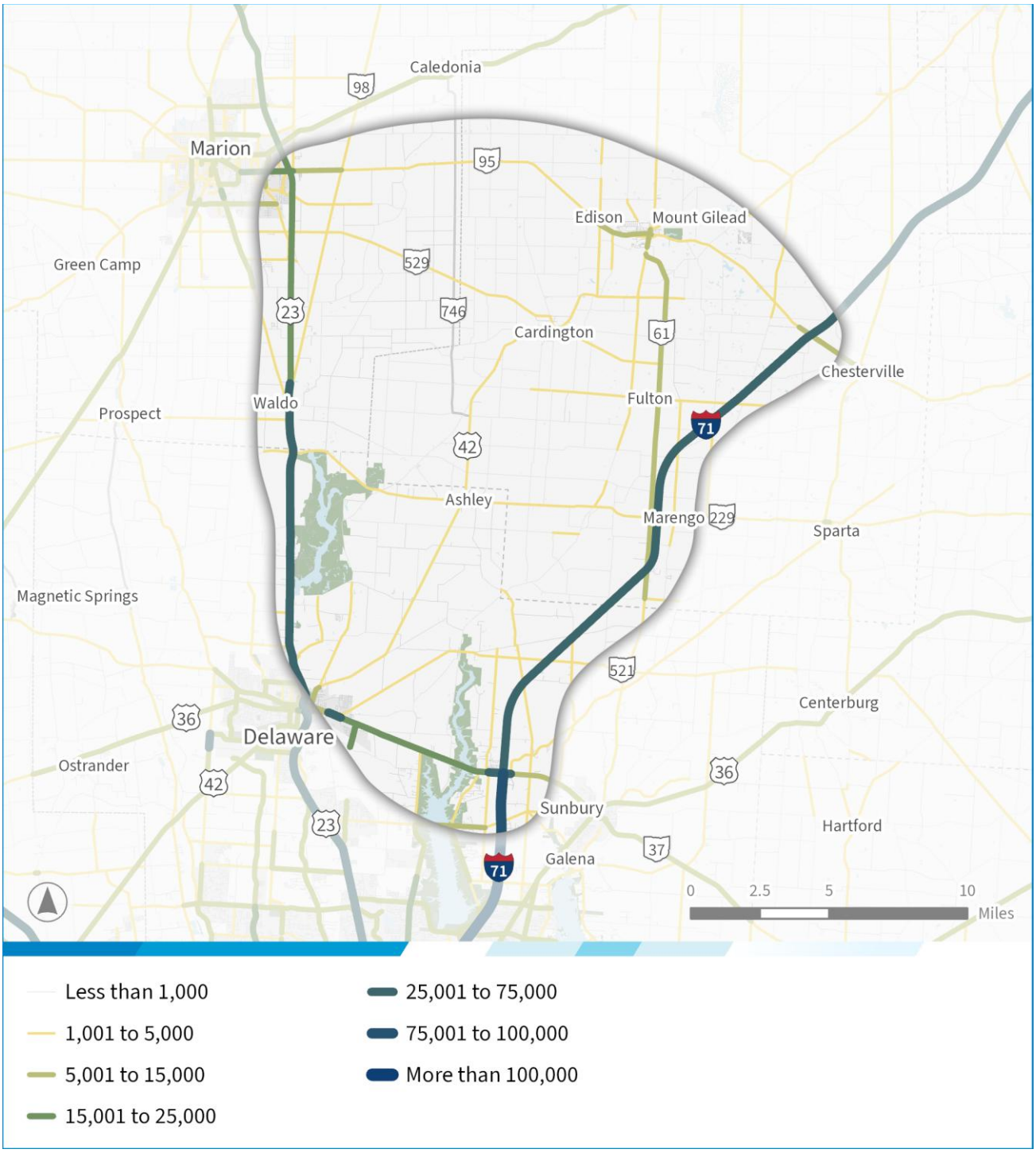
Source: ODOT TIMS

FIGURE 15. ACCESS CONTROL



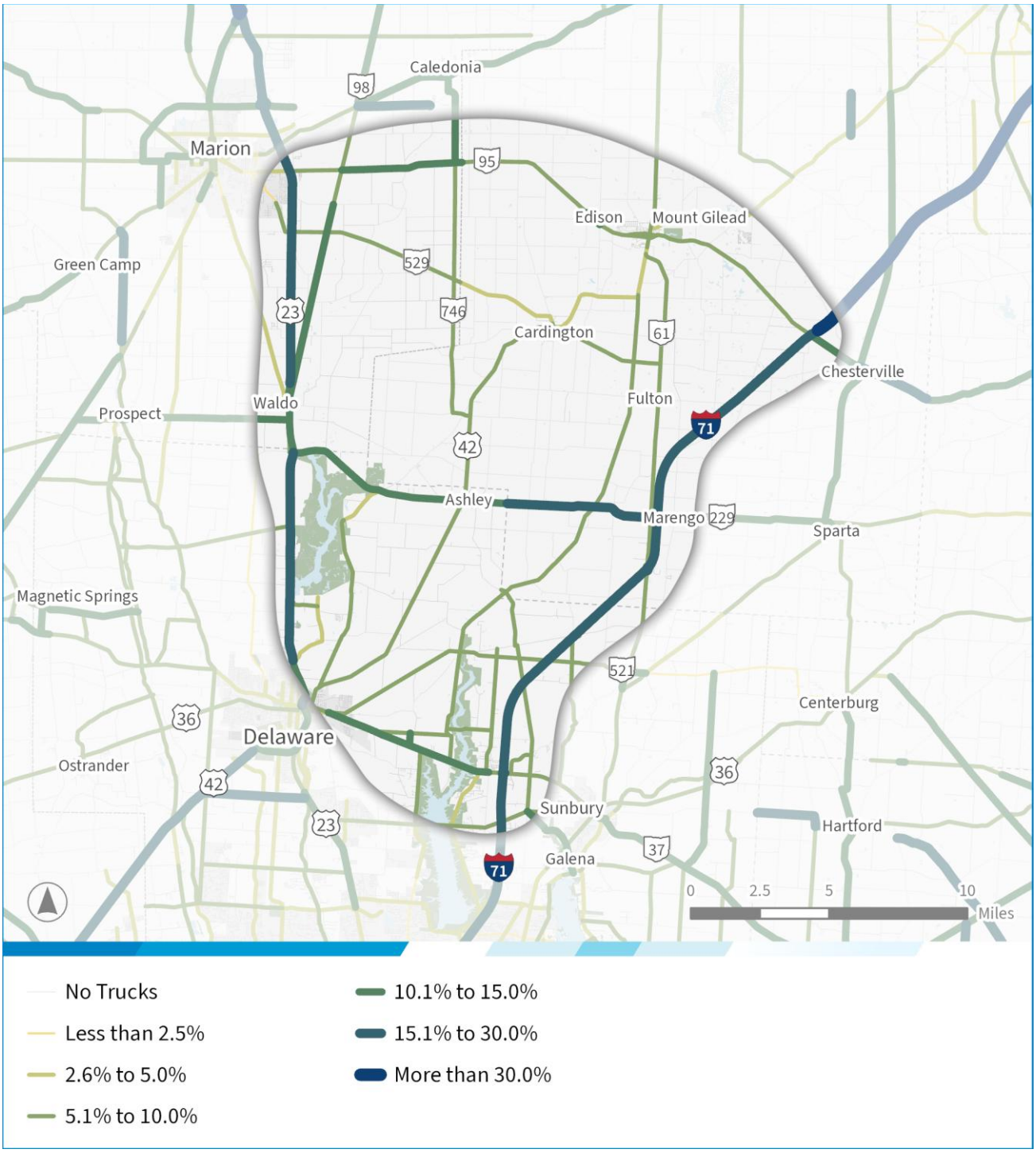
Source: ODOT TIMS and Study Team

FIGURE 16. AVERAGE ANNUAL DAILY TRAFFIC (2023)



Source: ODOT, TIMS

FIGURE 17. TRUCK PERCENT, AVERAGE ANNUAL DAILY TRAFFIC



Source: ODOT, TIMS

Corridor Concepts Technical Memo

US-23 to I-71 Connector Joint Plan – Interim Report – HB 96

INTRODUCTION

This memorandum provides a technical summary of the corridor alternatives currently under evaluation as part of the US-23 to I-71 Connector Joint Plan, a planning effort led by the Ohio Department of Transportation (ODOT) and the Ohio Turnpike and Infrastructure Commission (OTIC) in response to House Bill 54, Section 755.60 (further amended by HB 96). The legislation directs the agencies to jointly evaluate the feasibility of a new connection between U.S. Route 23 (US-23) and Interstate 71 (I-71) in northern Delaware, Marion, or Morrow counties through a range of options, including upgrades to existing highways or construction of new freeways and toll roads.

The purpose of this memo is to establish a shared understanding for ODOT and OTIC of the seven corridor concepts (labeled E1 through E7) that are advancing to screening. Each corridor is represented as a two-mile-wide swath centered on a conceptual alignment (for analysis purposes only). These swaths serve as the basis for planning-level environmental, engineering, and cost evaluations, allowing for flexibility in later refinement of exact alignment during project development.

The memo includes:

- Detailed narrative descriptions of each corridor alternative;
- Conceptual alignment intent and general routing;
- Alternatives mapping displaying high-level geographic and functional characteristics; and
- References to the specific requirements in HB54 that each corridor addresses (fully or partially).

CORRIDOR CONCEPTS OVERVIEW

The corridor concepts were developed in response to the five connection types outlined in House Bill 54, Section 755.60(A). These alternatives range from upgrades to existing state routes to entirely new freeway corridors, including options that could be implemented as toll facilities.

Each alternative is defined initially for planning purposes as a two-mile-wide swath centered on a conceptual alignment. These swaths are not intended to represent final or engineered alignments. Rather, they define a study band within which environmental constraints, travel performance, right-of-way needs, and constructability factors will be assessed.

An overview of each corridor alternative is presented in **Table 1** with generalized corridor swaths presented in **Figure 1**. Note, **Figure 1** also depicts the various overlaps among the seven corridor swaths. These overlaps occur in the southeast corner of Marion County and northern Delaware County.

Each alternative is described in detail in the next section, including its geographic context, key features, and rationale for inclusion in the study.

TABLE 1—CORRIDOR CONCEPT DESCRIPTIONS

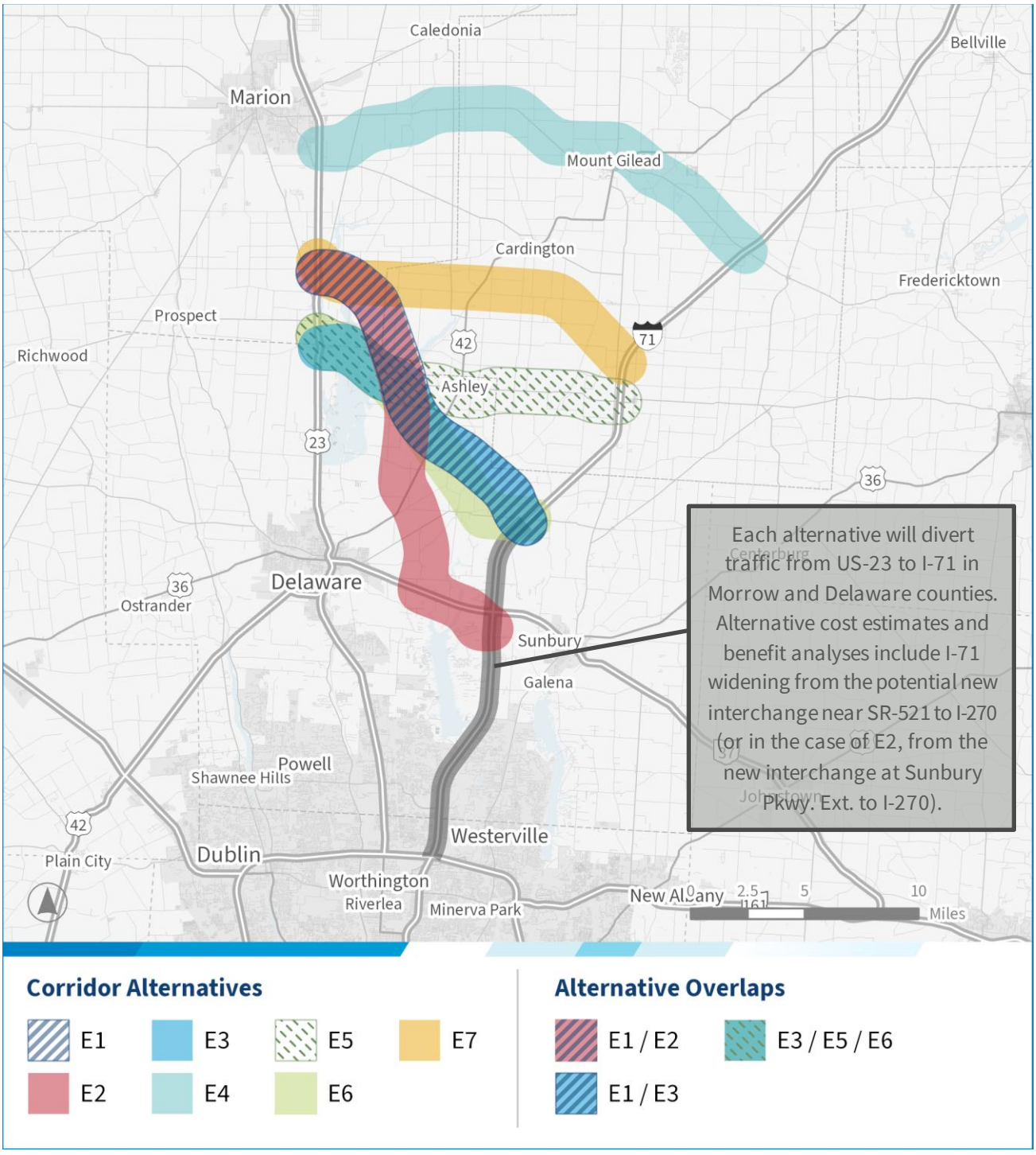
Corridor ID	Description and General Concept	HB54 Requirement Alignment
E1	Swath located in Marion, Morrow, and Delaware counties including 15 miles of new freeway on new alignment between US-23 (north of Waldo) and I-71 (south of Marengo).	**A3** **A4**
E2	Swath located in Delaware County including 16 miles of new freeway on new alignment and a 3-mile freeway upgrade of US-36/SR-37, connecting to I-71 via the Sunbury Parkway interchange.	**A2** **A3** **A4**
E3	Swath located in Delaware County including a 5-mile freeway upgrade of SR-229 between US-23 and Ashley and 12 miles of new freeway on new alignment (including a bypass of Ashley) connecting to I-71 south of Marengo.	**A1** **A3** **A4**
E4	Swath located in Marion and Morrow counties including 11 miles of new freeway on new alignment with a bypass of Mt. Gilead and an 11-mile freeway upgrade of SR-95.	**None**
E5	Swath located in Delaware County including an 11-mile freeway upgrade of SR-229 and a 3-mile new freeway on new alignment bypass of Ashley.	**A1** **A3** **A4**
E6	Swath located in Delaware County including a 4-mile freeway upgrade of SR-229, 7 miles of new freeway on new alignment from SR-229 to SR-521 near Kilbourne, and a 3-mile freeway upgrade of SR-521 connecting to I-71.	**A2** **A3** **A4**
E7	Swath located in Marion, Delaware, and Morrow counties including 14 miles of new freeway on new alignment from the SR-529/Waldo area to I-71 north of Marengo (generally following the Waldo-Fulton Road corridor).	**A3** **A4** **A5**

Definitions:

Freeway upgrade: Existing roadway corridor is expanded to meet freeway facility design and operational standards.

New freeway on new alignment: New freeway corridor is primarily located within new greenfield right-of-way (and in some cases may repurpose and expand existing roadway corridors).

FIGURE 1. CORRIDOR ALTERNATIVE CONCEPTS



Source: ODOT

CORRIDOR CONCEPTS DESCRIPTIONS

This section provides a detailed narrative for each of the seven corridor alternatives (E1 –E7) under consideration. Each alternative is represented as a two-mile-wide swath centered on a conceptual alignment, intended for planning-level analysis. These swaths define the general path of each corridor and serve as the basis for evaluating potential environmental constraints, engineering feasibility, and HB 54 compliance. The descriptions highlight the key geographic features, connections, and rationale for including each alternative in the study.

I-71 Improvements

Each alternative will divert significant traffic from US-23 to I-71 in Morrow and Delaware counties. These diversions in addition to traffic accessing I-71 from new interchanges under development at Sunbury Parkway and Big Walnut Road, and the impact of continued development in Delaware County will likely increase daily volumes on I-71.

A description of assumptions on the widening of I-71 is provided within each alternative summary on the following pages. This widening is included in the analysis to assess the potential to manage increasing travel demand and congestion on I-71 to preserve travel time benefits created by the seven alignments. It is expected that travel time benefits compared to the no build for each alternative would be substantively lower without these additional I-71 improvements. As a result, the benefit analysis and cost estimates for alternatives E1 through E7 include savings resulting from this new capacity and the additional costs.

Corridor Concept E1

Corridor Description

Corridor E1 is defined as a two-mile-wide swath centered on a conceptual freeway alignment from US-23 to I-71 extending from southeast Marion County through southwest Morrow County and across northern Delaware County. It represents a new, limited-access freeway corridor that provides a direct connection between US-23 and I-71, bypassing north and east of the City of Delaware. Corridor E1 includes:

- 15 miles of a new 4-lane divided freeway on a new alignment connecting US-23 and I-71 with interchanges located at US-23, US-42 (south of the Village of Ashley), and I-71.
- This freeway would pass southwest of the Village of Ashley and crosses over the Olentangy River while remaining outside the boundaries of Delaware State Park and Alum Creek State Park.

Key Corridor Attributes Table

Attribute	Detail
Corridor ID	E1
General Location	North of Waldo to I-71 passing south of Ashley and east of Kilbourne
Length (approx.)	15 miles
New Alignment (mi)	15 miles
Existing Upgrade (mi)	0 miles
I-71 Connection	New interchange between US-36/SR-37 and SR-61
I-71 Improvements	Widen from new connection to Polaris Parkway (3 to 4+ lanes) and Polaris Parkway to I-270 (4+ to 6+ lanes)
Counties Crossed	Southeast Marion, Southwest Morrow, Northern Delaware
US-23 Connection Point	North of SR-229
HB54 Requirements	A3, A4

FIGURE 2. CONCEPT E1 – CORRIDOR

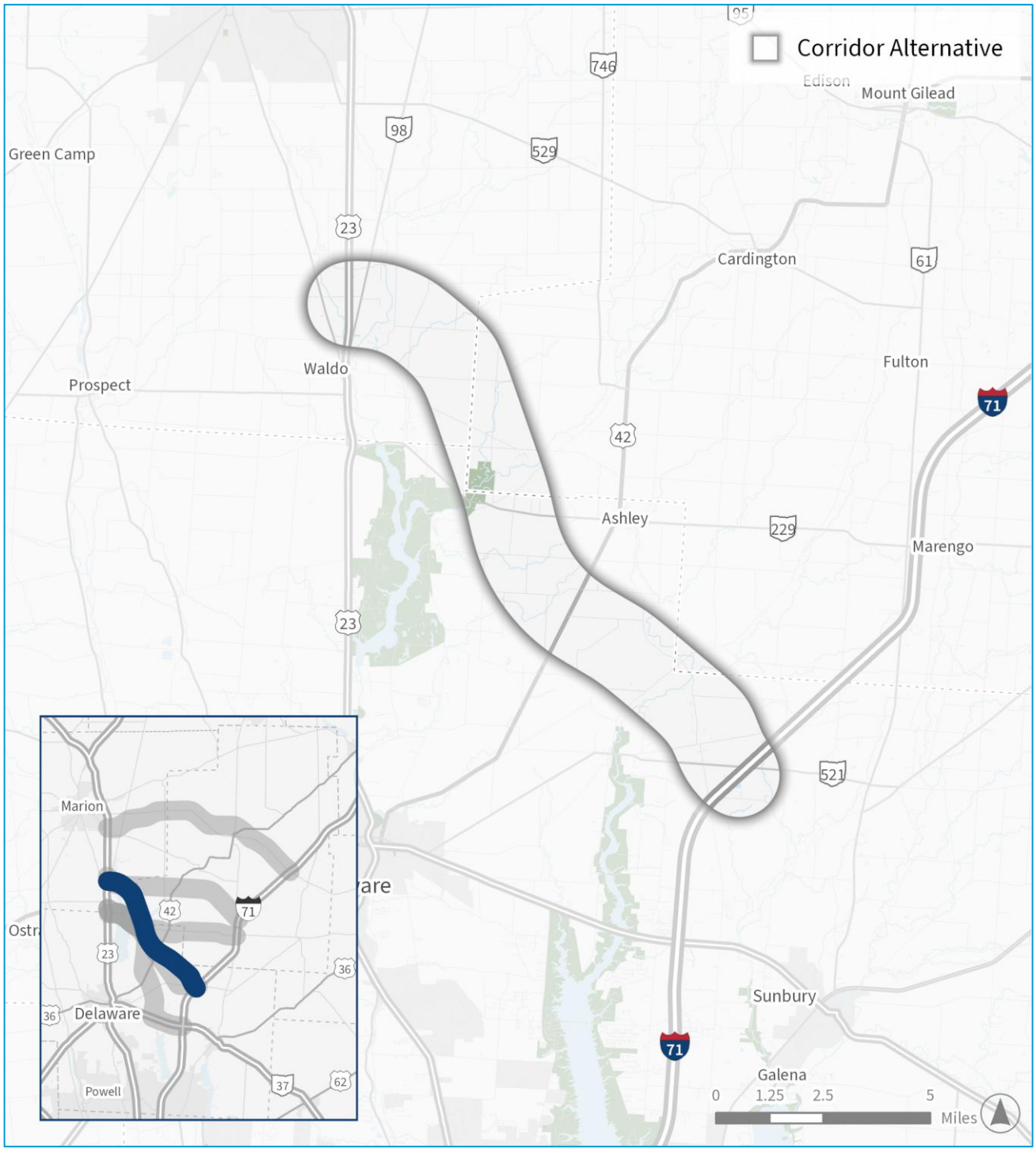
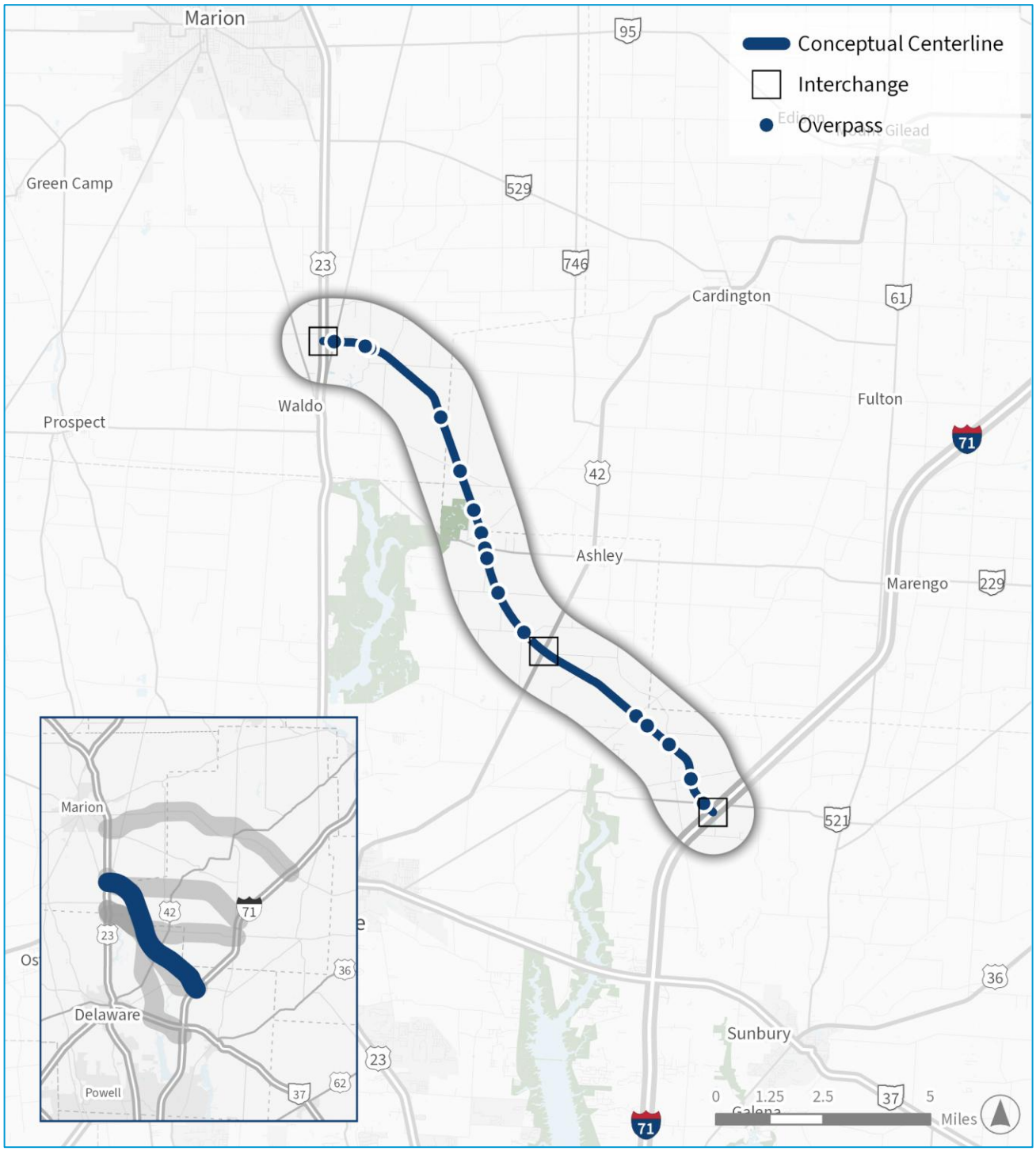


FIGURE 3. CONCEPT E1 – CONCEPTUAL CENTERLINE, INTERCHANGES, OVERPASSES



Corridor Concept E2

Corridor Description

Corridor E2 is defined as a two-mile-wide swath centered on a conceptual freeway alignment from US-23 to I-71 extending from southeast Marion County through southwest Morrow County and across northern and central Delaware County. It represents a new, limited-access freeway corridor bypassing north and east of the City of Delaware, connecting into US-36/SR-37 west of Alum Creek Lake. Corridor E2 includes:

- 16 miles of a new 4-lane divided freeway on a new alignment connecting US-23 to US-36/SR-37 east of the City of Delaware with interchanges located at US-23, US-42 (south of the Village of Ashley), and US-36/SR-37 (west of Alum Creek Lake). This freeway would pass southwest of the Village of Ashley and west of the Village of Kilbourne.
- A 3-mile segment of US-36/SR-37 would be upgraded to a limited access freeway between the new freeway interchange (west of Alum Creek Lake) and the proposed Sunbury Parkway extension and new I-71 interchange (PID 106960, 106961) including interchanges at North Old State Road and the new Sunbury Parkway Extension interchange at US-36/SR-37.

Key Corridor Attributes Table

Attribute	Detail
Corridor ID	E2
General Location	North of Waldo to I-71 near US-36/SR-37 interchange
Length (approx.)	19 miles
New Alignment (mi)	16 miles
Existing Upgrade (mi)	3 miles (US-36/SR-37/Sunbury Parkway)
I-71 Connection	Sunbury Parkway interchange (proposed)
I-71 Improvements	Widen from Sunbury Parkway interchange to Polaris Parkway (3 to 4+ lanes) and Polaris Parkway to I-270 (4+ to 6+ lanes)
Counties Crossed	Southeast Marion, Southwest Morrow, Northern Delaware
US-23 Connection Point	North of SR-229
HB54 Requirements	A2, A3, A4

FIGURE 4. CONCEPT E2 – CORRIDOR

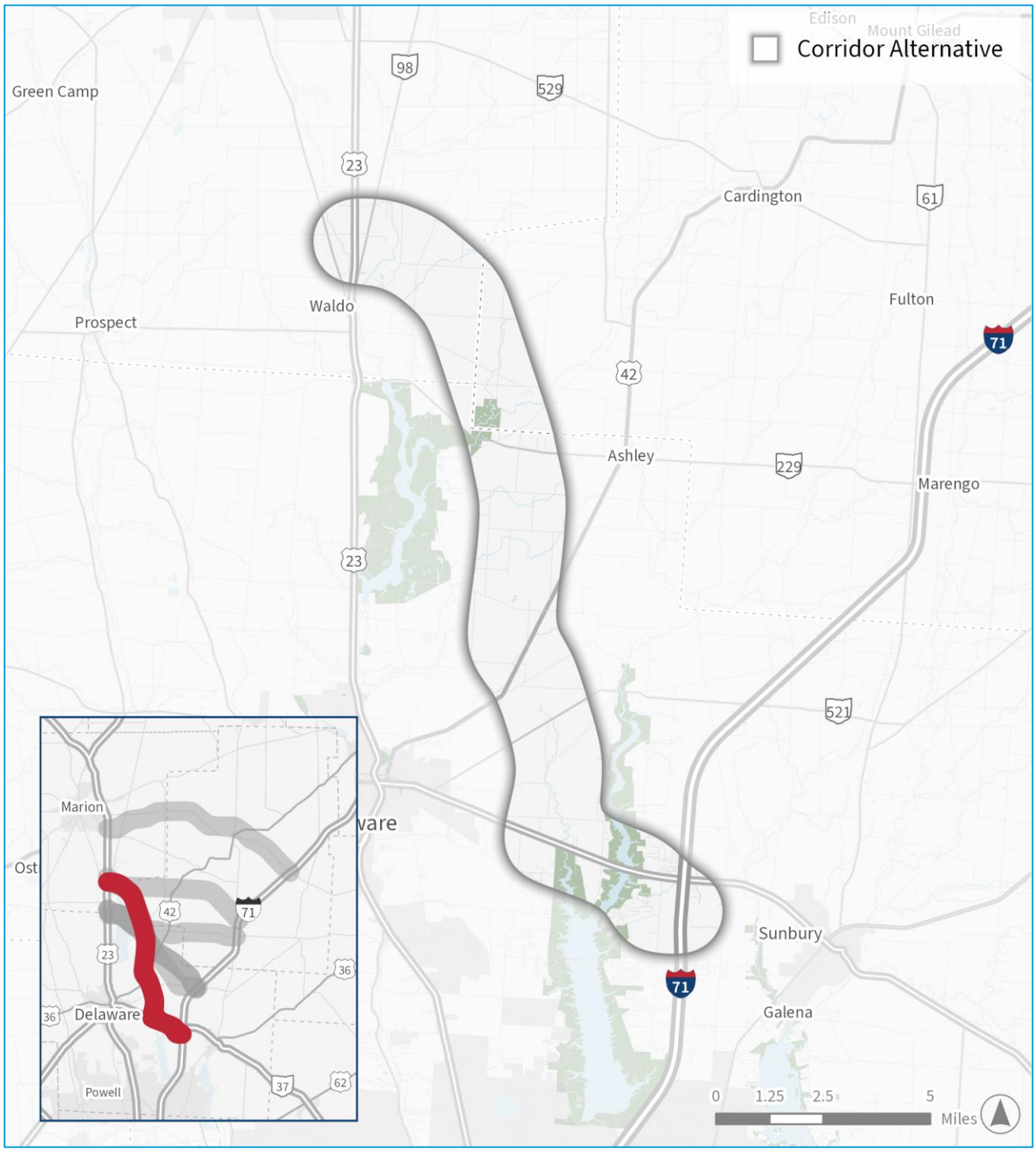
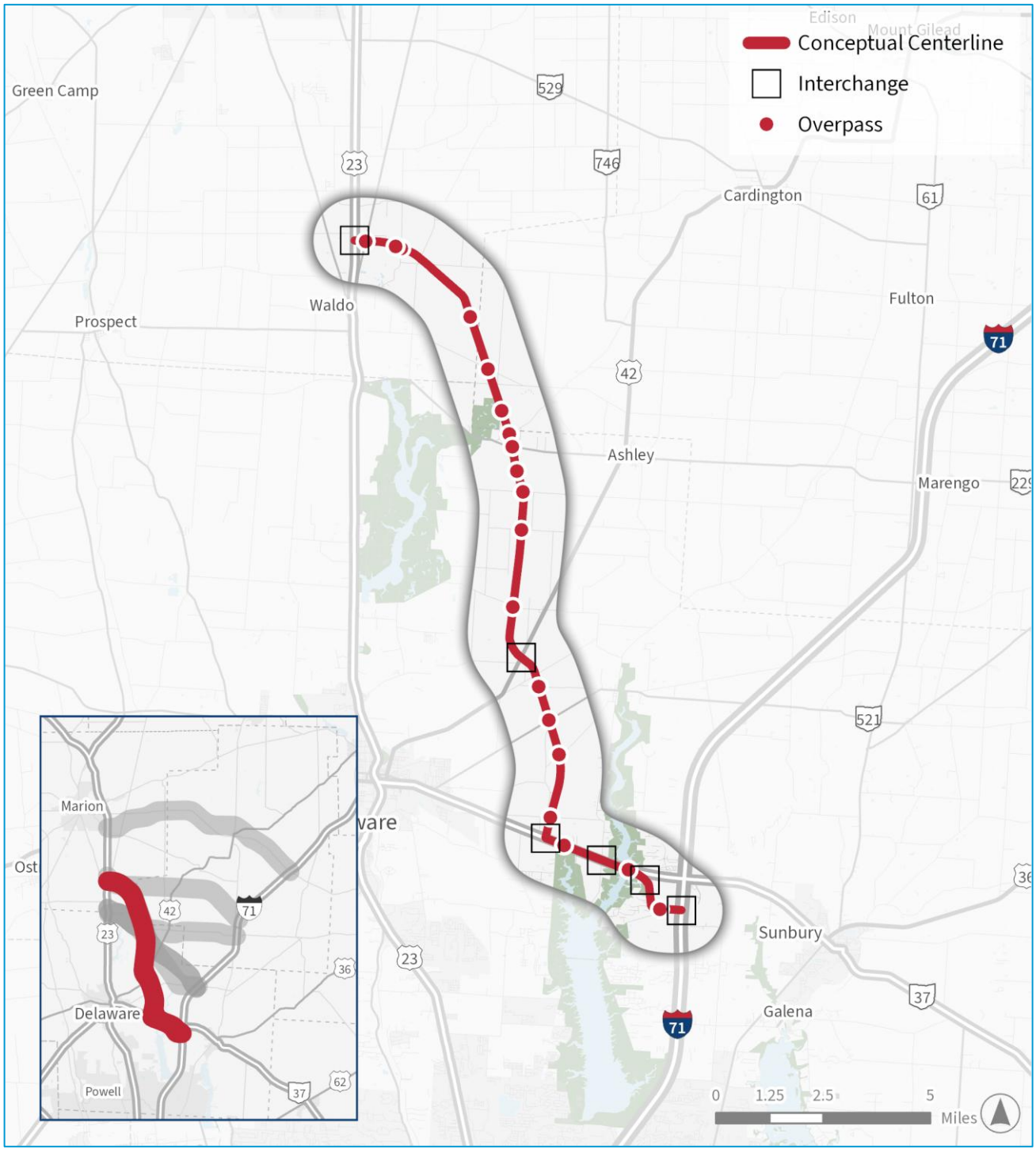


FIGURE 5. CONCEPT E2 – CONCEPTUAL CENTERLINE, INTERCHANGES, OVERPASSES



Corridor Concept E3

Corridor Description

Corridor E3 is defined as a two-mile-wide swath centered on a conceptual freeway alignment from US-23, along SR-229 and a new alignment to I-71 across northern Delaware County. It represents a new, limited-access freeway corridor that provides a direct connection between US-23, SR-229 and I-71, bypassing north and east of the City of Delaware. Corridor E3 includes:

- 12 miles of a new 4-lane divided freeway on a new alignment connecting SR-229 west of the Village of Ashley to I-71 with interchanges located at US-23, Peters Road (in Windsor Corners), SR-229, US-42 (south of Ashley), and I-71. The new alignment would pass southwest of Ashley and east of the Village of Kilbourne.
- A 5-mile existing section of SR-229 from US-23 to west of Ashley would be upgraded to a freeway and cross over the Olentangy River outside the boundaries of Alum Creek State Park.

Key Corridor Attributes Table

Attribute	Detail
Corridor ID	E3
General Location	US-23 and SR-229 to I-71 passing south of Ashley and east of Kilbourne
Length (approx.)	17 miles
New Alignment (mi)	12 miles
Existing Upgrade (mi)	5 miles (SR-229)
I-71 Connection	New interchange between US-36/SR-37 and SR-61
I-71 Improvements	Widen from new connection to Polaris Parkway (3 to 4+ lanes) and Polaris Parkway to I-270 (4+ to 6+ lanes)
Counties Crossed	Northern Delaware
US-23 Connection Point	SR-229
HB54 Requirements	A1, A3, A4

FIGURE 6. CONCEPT E3 – CORRIDOR

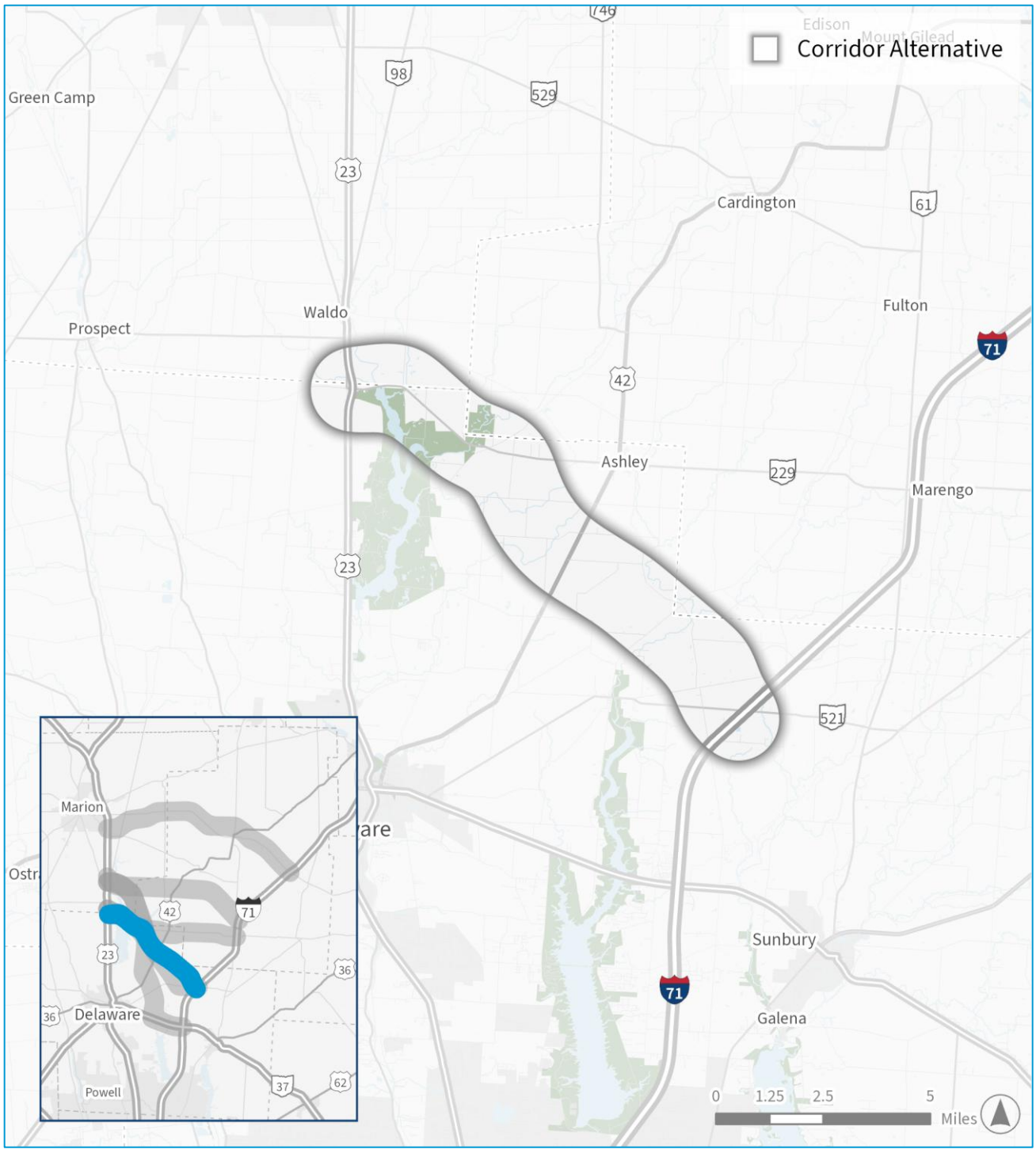
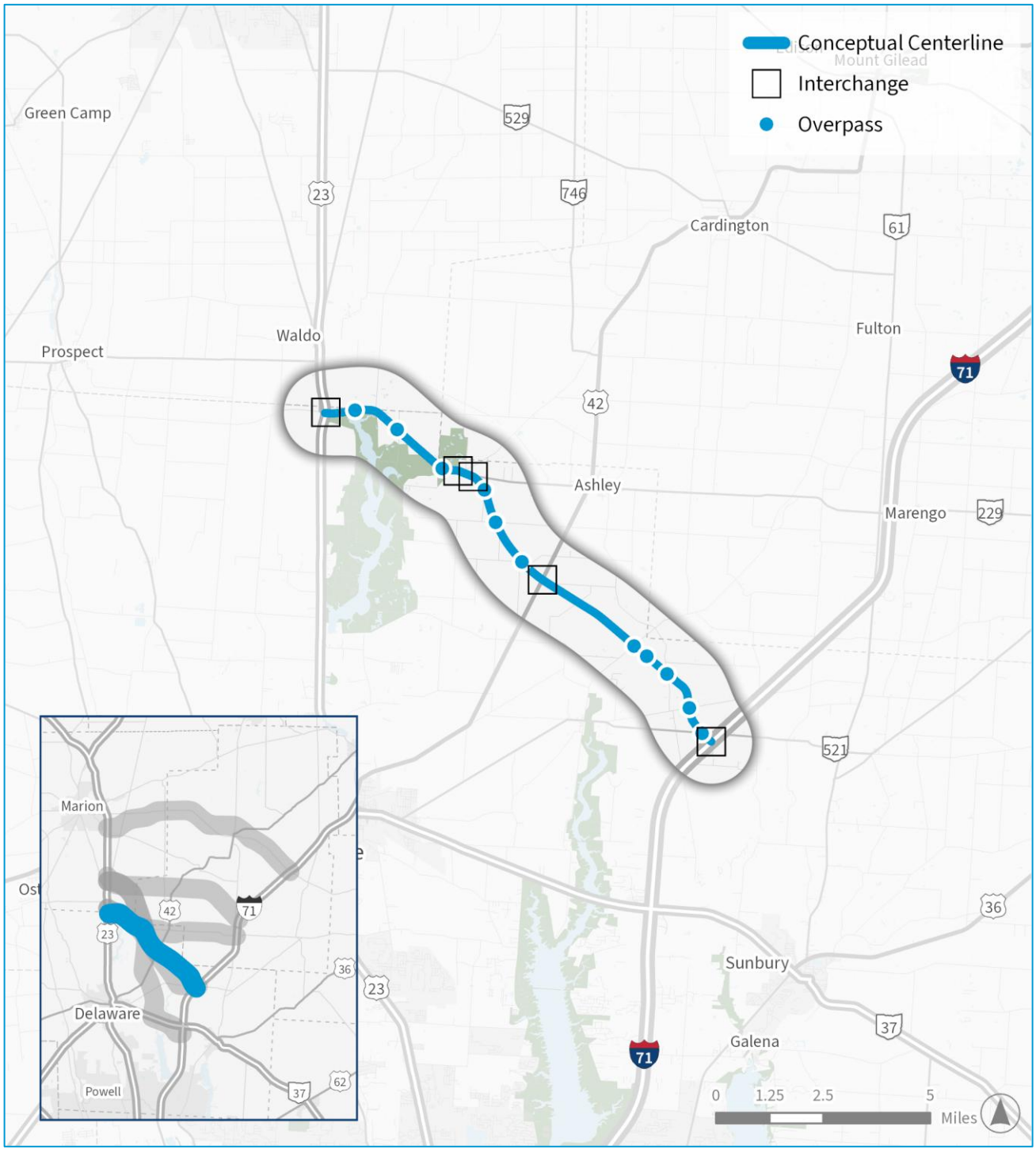


FIGURE 7. CONCEPT E3 – CONCEPTUAL CENTERLINE, INTERCHANGES, OVERPASSES



Corridor Concept E4

Corridor Description

Corridor E4 is defined as a two-mile-wide swath centered on a conceptual freeway alignment along or near the existing SR-95 corridor from US-23 to I-71 extending from Marion County through Morrow County. Corridor E4 includes:

- 11 miles of a new 4-lane divided freeway on a new alignment in two segments: (1) from US-23 south of the City of Marion to an interchange with SR-95 near the Morrow County line and (2) a bypass north or south of the Village of Mt. Gilead.
- 11 miles of SR-95 would be upgraded to a limited-access freeway facility with frontage roads to maintain access to existing properties.
- Interchanges located along this corridor include US-23, SR-98, Whetstone River Road (in Claridon), SR-746, SR-95 west of Mt. Gilead, SR-61, Williamsport-Bloomingrove Road east of Mt. Gilead, and I-71.

Key Corridor Attributes Table

Attribute	Detail
Corridor ID	E4
General Location	Marion to I-71 along the existing SR-95 corridor
Length (approx.)	22 miles
New Alignment (mi)	11 miles
Existing Upgrade (mi)	11 miles (SR-95)
I-71 Connection	Existing SR-95/I-71 interchange
I-71 Improvements	Widen from US-36/SR-37 to Polaris Parkway (3 to 4+ lanes) and Polaris Parkway to I-270 (4+ to 6+ lanes)
Counties Crossed	Southeast Marion, Southern Morrow
US-23 Connection Point	North of SR-529 near Marion
HB54 Requirements	None

FIGURE 8. CONCEPT E4 – CORRIDOR

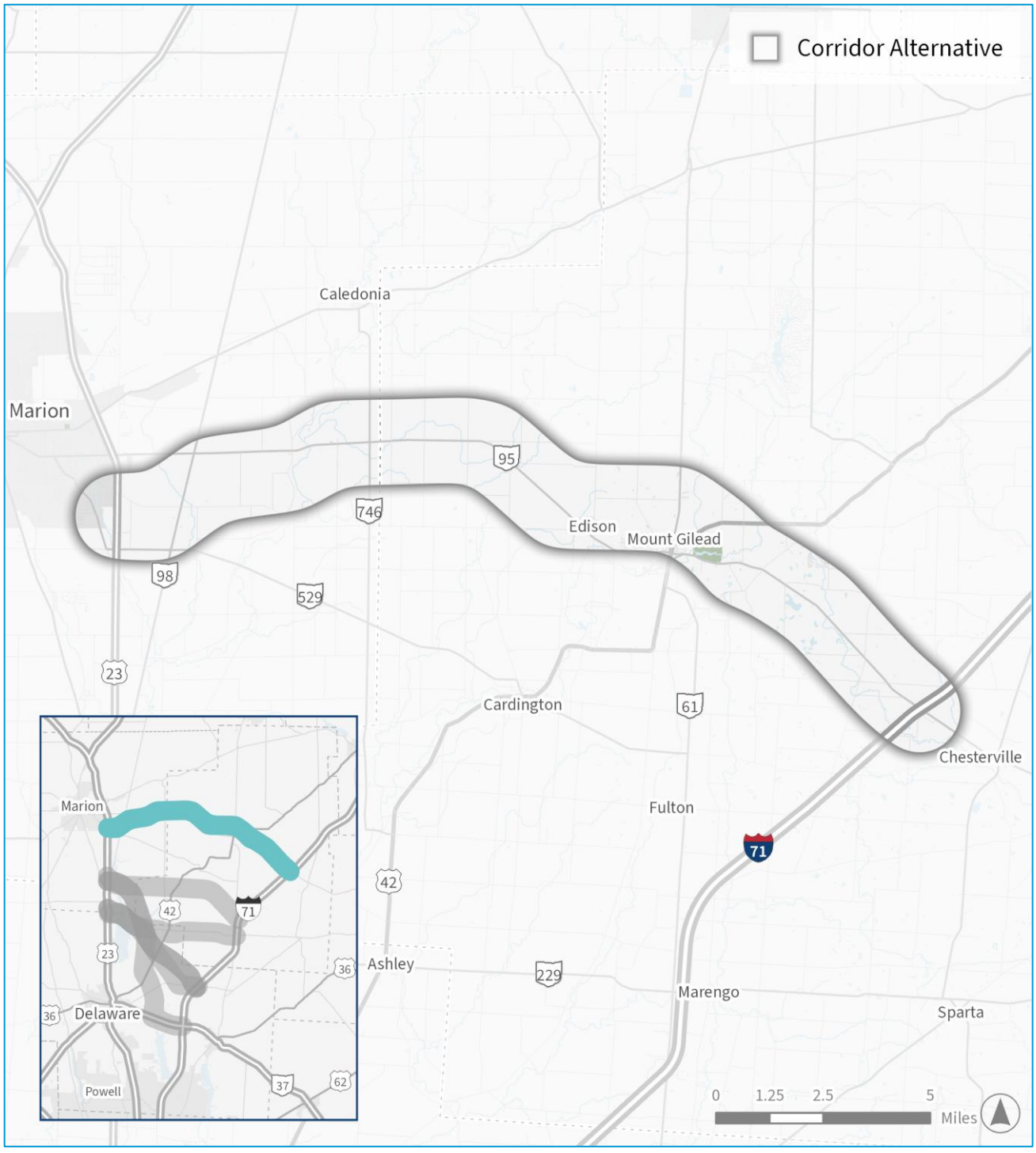
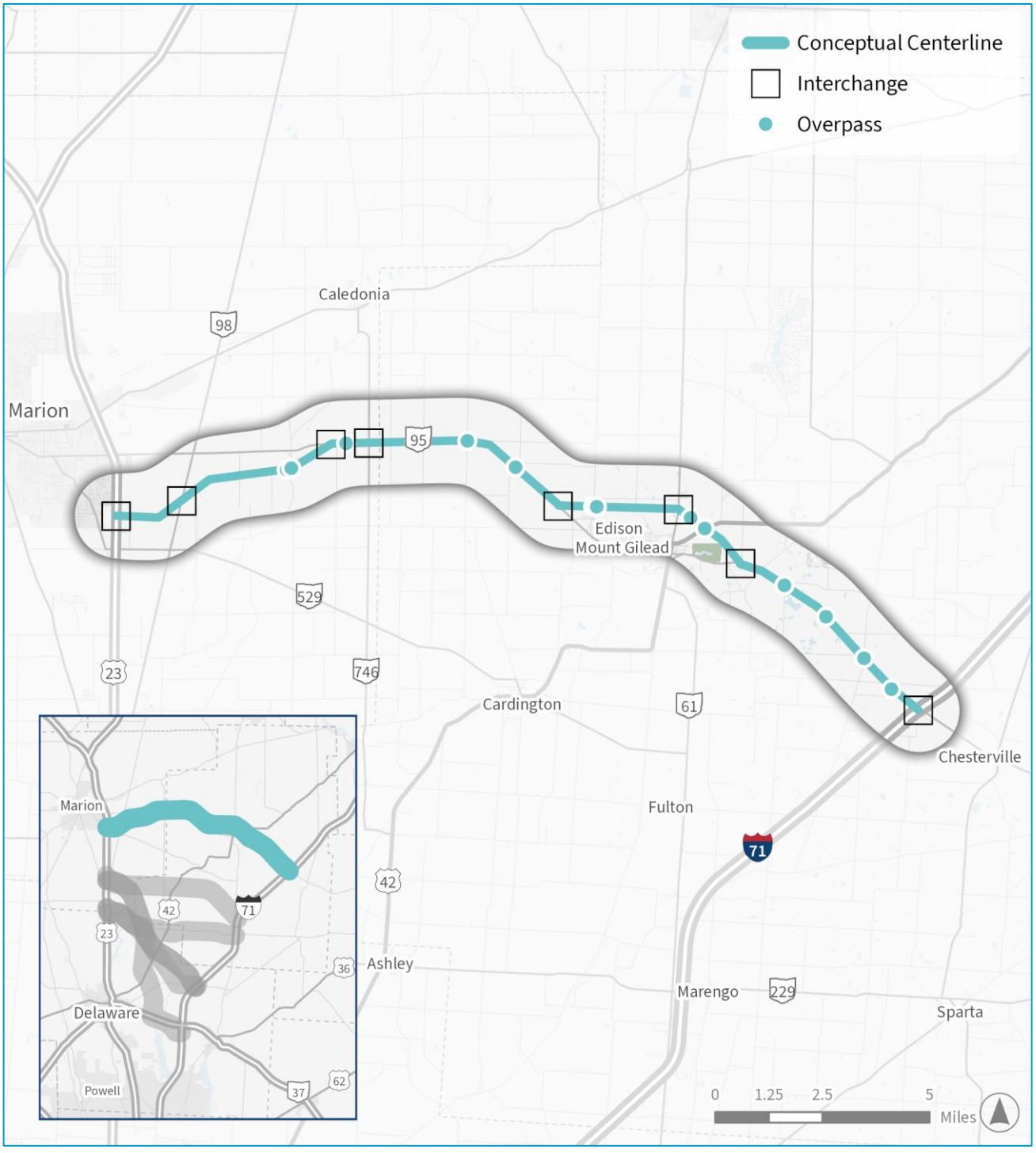


FIGURE 9. CONCEPT E4 – CONCEPTUAL CENTERLINE, INTERCHANGES, OVERPASSES



Corridor Concept E5

Corridor Description

Corridor E5 is defined as a two-mile-wide swath centered on a conceptual freeway alignment along or near the existing SR-229 corridor from US-23 to I-71 extending from Delaware County through Morrow County. Corridor E5 includes:

- 3 miles of a new 4-lane divided freeway on a new alignment to bypass the Village of Ashley.
- 11 miles of SR-229 would be upgraded to a limited-access freeway facility with frontage roads to maintain access to existing properties.
- Interchanges located along this corridor include US-23, Peters Road (in Windsor Corners), SR-229 west of Ashley, US-42, SR-229 east of Ashley, Worthington-New Haven Road, and I-71.

Key Corridor Attributes Table

Attribute	Detail
Corridor ID	E5
General Location	US-23 to I-71 along the existing SR-229 corridor
Length (approx.)	14 miles
New Alignment (mi)	3 miles (Village of Ashley bypass)
Existing Upgrade (mi)	11 miles (SR-229)
I-71 Connection	New interchange at SR-229/I-71
I-71 Improvements	Widen from US-36/SR-37 to Polaris Parkway (3 to 4+ lanes) and Polaris Parkway to I-270 (4+ to 6+ lanes)
Counties Crossed	Northern Delaware, Southern Morrow
US-23 Connection Point	SR-229
HB54 Requirements	A1, A3, A4

FIGURE 10. CONCEPT E5 – CORRIDOR

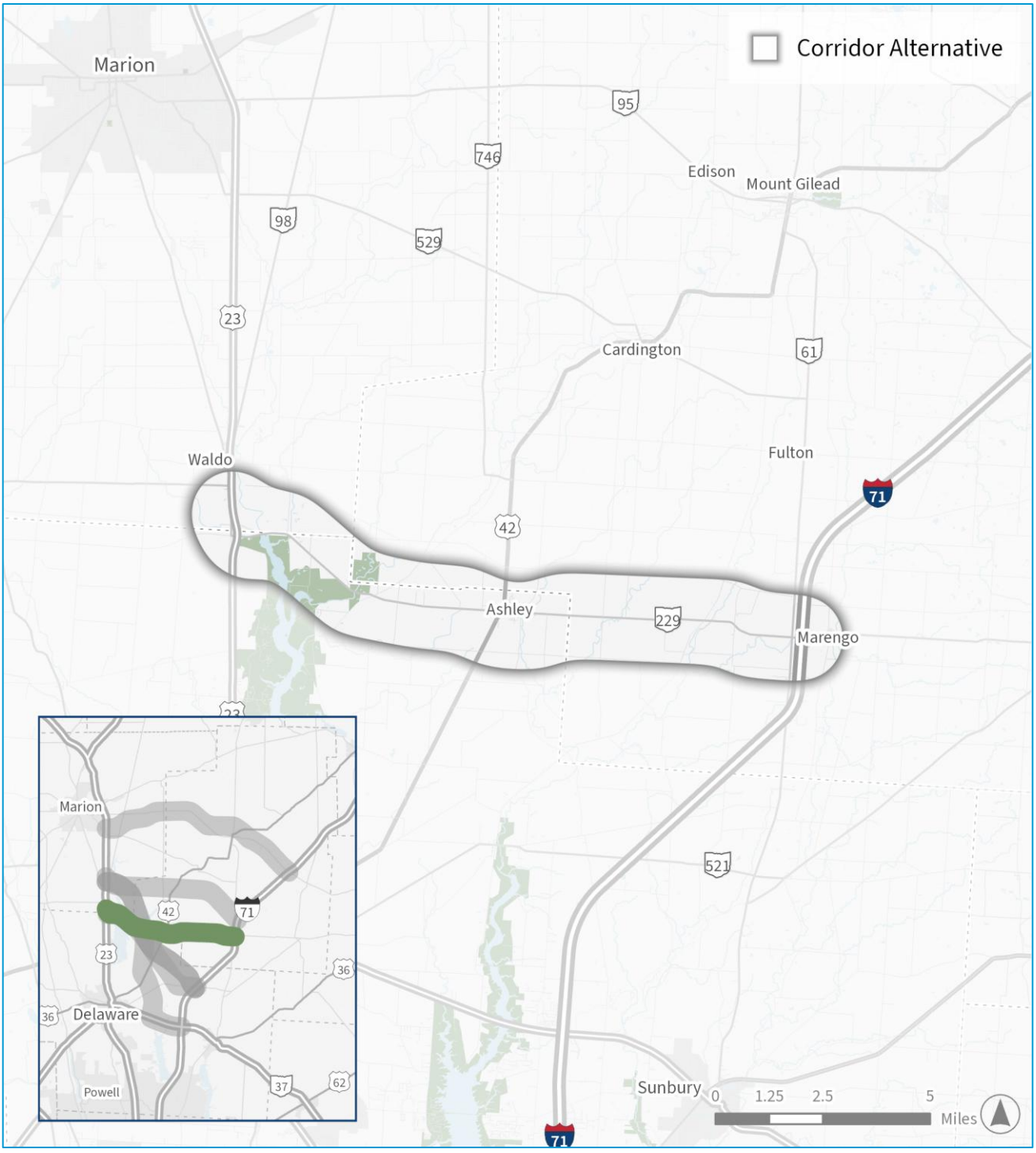
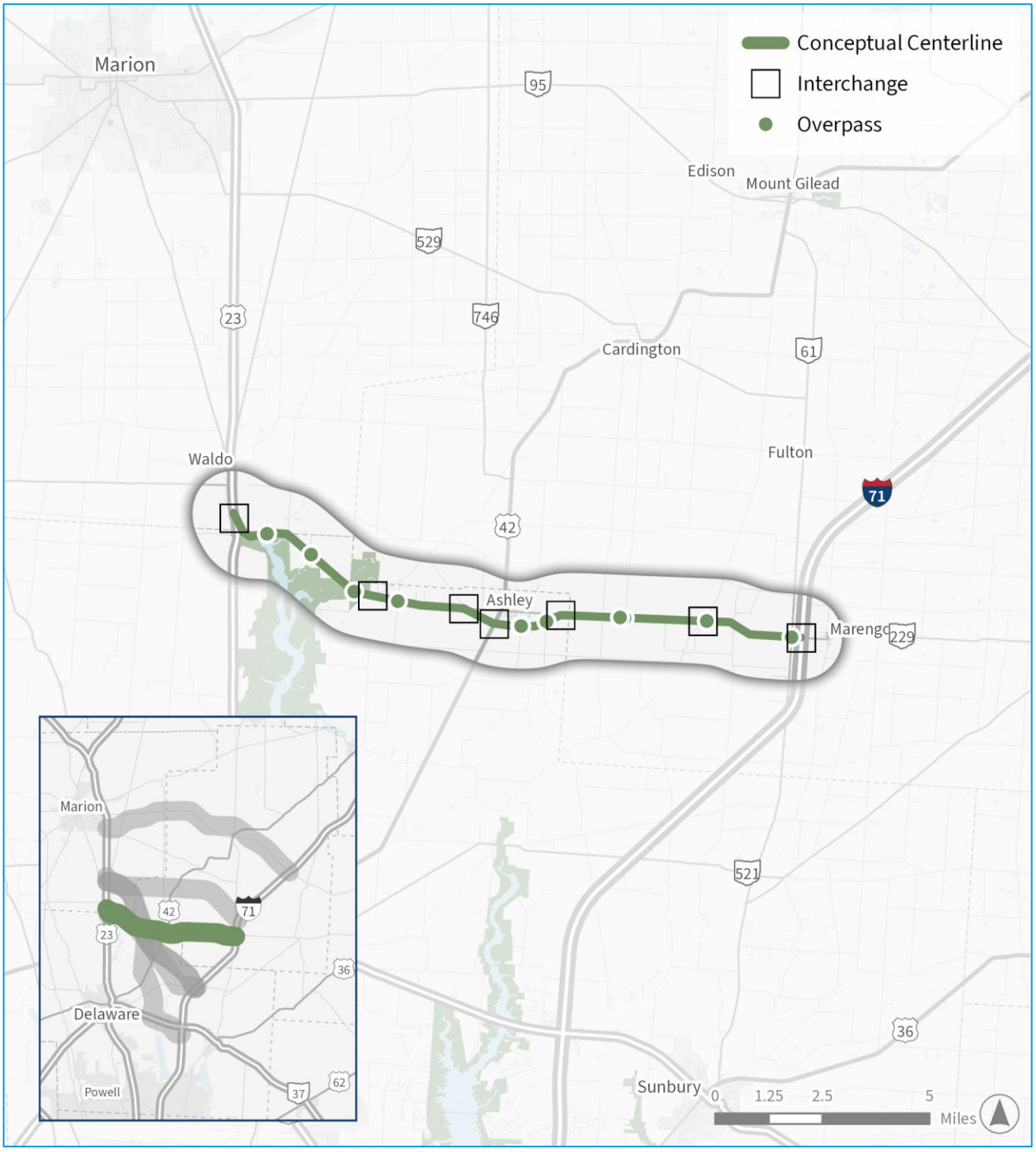


FIGURE 11. CONCEPT E5 – CONCEPTUAL CENTERLINE, INTERCHANGES, OVERPASSES



Corridor Concept E6

Corridor Description

Corridor E6 is defined as a two-mile-wide swath centered on a conceptual freeway alignment from US-23 to I-71 in northern Delaware County along SR-229, on new alignment from west of the Village of Ashley to east of the Village of Kilbourne, and along SR-521 to I-71. Corridor E6 includes:

- 7 miles of a new 4-lane divided freeway on a new alignment connecting SR-229 from west of Ashley to SR-521 east of Kilbourne.
- Nearly 4 miles of SR-229 and 3 miles of SR-521 would be upgraded to a limited-access freeway facility with frontage roads to maintain access to existing properties.
- Interchanges would be located at US-23, SR-229 (west of Ashley), US-42 (south of Ashley), SR-521 (east of Kilbourne), and I-71.

Key Corridor Attributes Table

Attribute	Detail
Corridor ID	E6
General Location	Northern Delaware County connecting SR-229 and SR-521 to I-71
Length (approx.)	14 miles
New Alignment (mi)	7 miles
Existing Upgrade (mi)	7 miles (SR-229 and SR-521)
I-71 Connection	New interchange at SR-521/I-71
I-71 Improvements	Widen from new connection to Polaris Parkway (3 to 4+ lanes) and Polaris Parkway to I-270 (4+ to 6+ lanes)
Counties Crossed	Northern Delaware County
US-23 Connection Point	SR-229
HB54 Requirements	A2, A3, A4

FIGURE 12. CONCEPT E6 – CORRIDOR

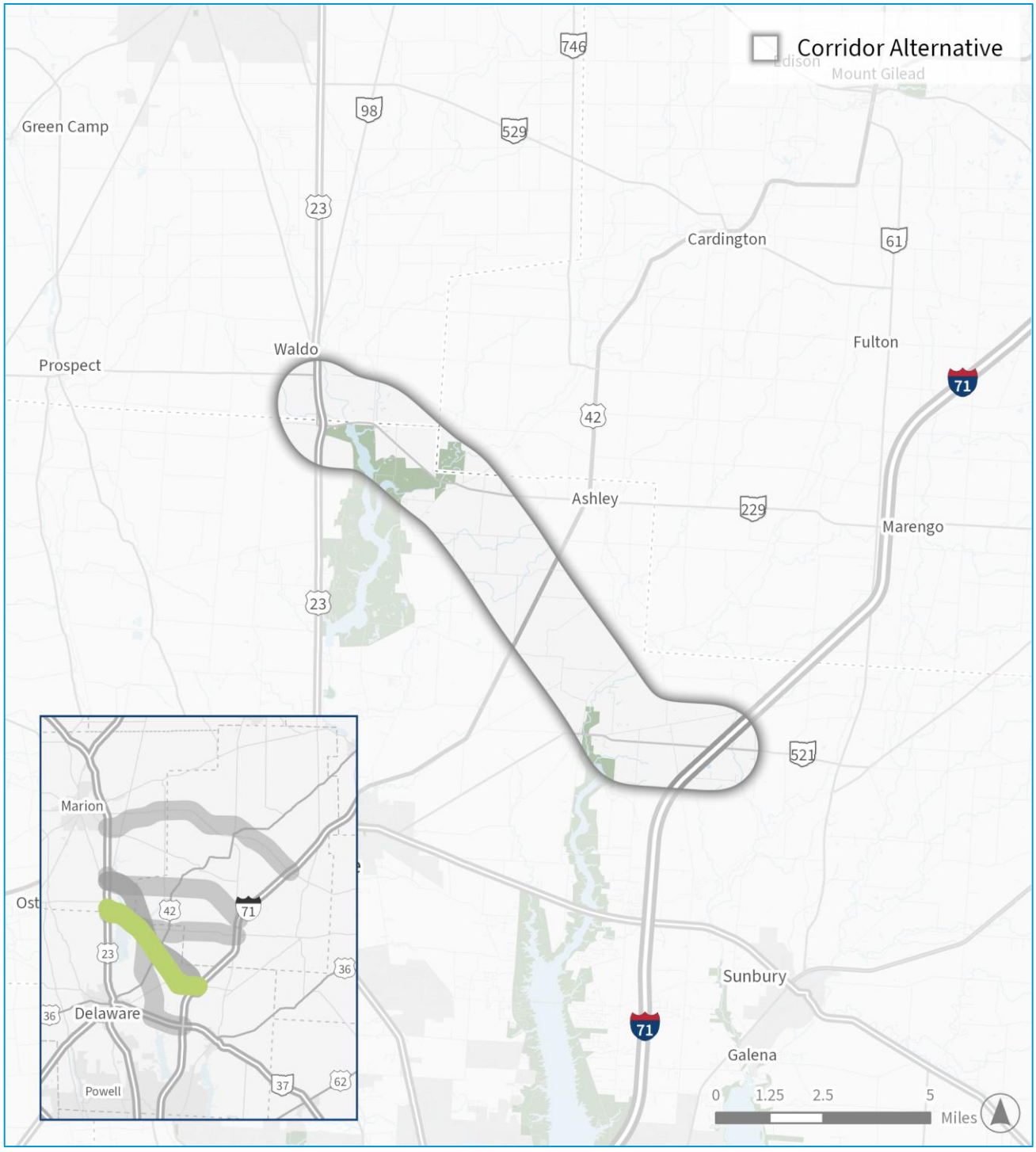
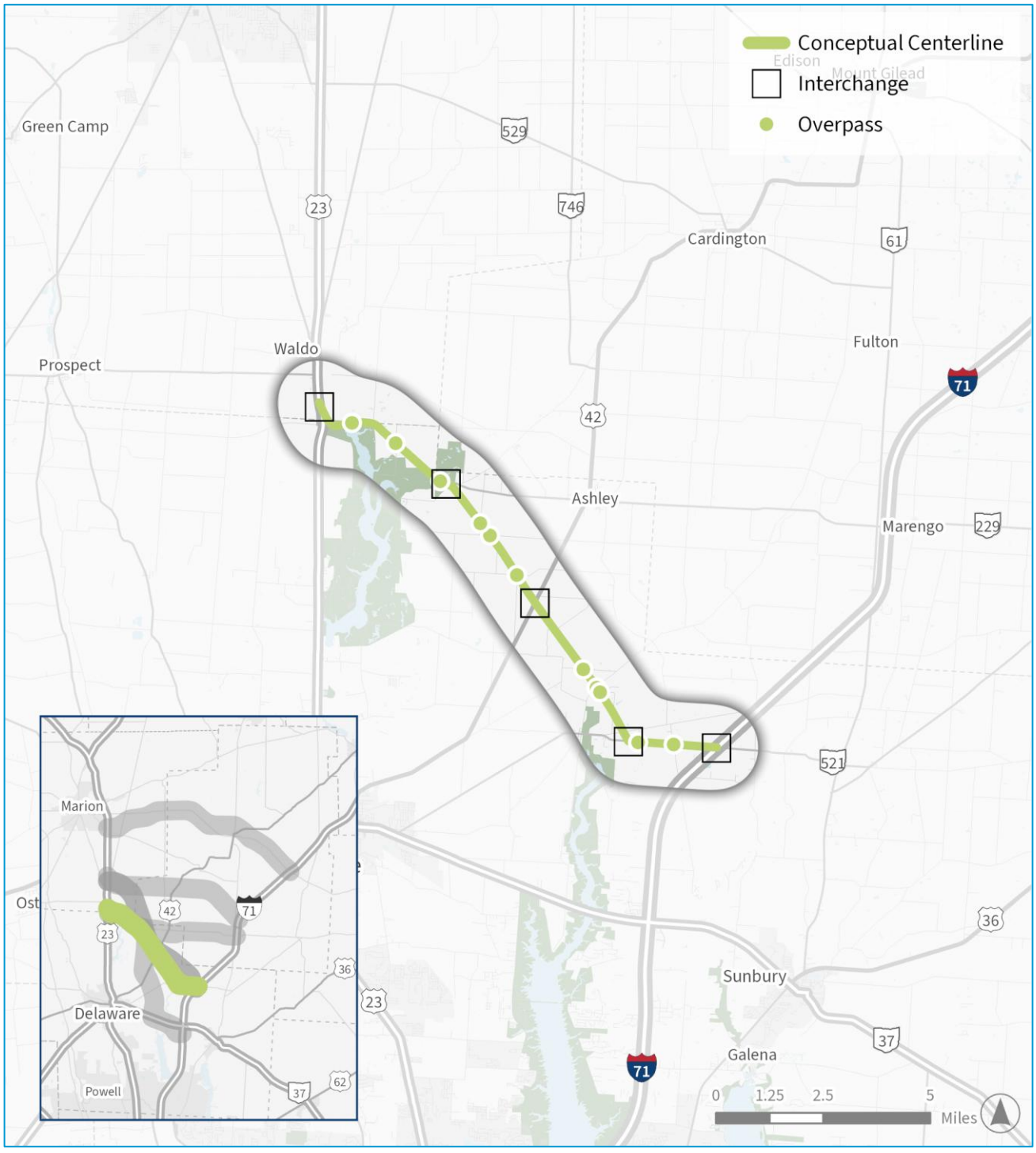


FIGURE 13. CONCEPT E6 – CONCEPTUAL CENTERLINE, INTERCHANGES, OVERPASSES



Corridor Concept E7

Corridor Description

Corridor E7 is defined as a two-mile-wide swath centered on a conceptual freeway alignment from US-23 to I-71 extending from southeast Marion County through southern Morrow County. It represents a new, limited-access freeway corridor that provides a direct connection between US-23 and I-71 on a swath north of the Village of Ashley and south of the Village of Cardington. Corridor E7 includes:

- 15 miles of a new 4-lane divided freeway on a new alignment connecting US-23 and I-71 with interchanges located at US-23, US-42 (south of the Village of Ashley), and I-71. Generally, the alignment is expected to follow/run parallel to the existing Waldo-Fulton Road corridor from US-23 to east of US-42, where it would then turn southeast toward SR-61 and I-71 north of the Village of Marengo.
- Interchanges would be located at US-23 (north of Waldo), US-42 (southwest of Cardington), and I-71 (north of the Marengo).

Key Corridor Attributes Table

Attribute	Detail
Corridor ID	E7
General Location	North of Waldo to I-71 passing south of Ashley and east of Kilbourne
Length (approx.)	15 miles
New Alignment (mi)	15 miles
Existing Upgrade (mi)	0 miles
I-71 Connection	New interchange north of Marengo
I-71 Improvements	Widen from US-36/SR-37 to Polaris Parkway (3 to 4+ lanes) and Polaris Parkway to I-270 (4+ to 6+ lanes)
Counties Crossed	Southeast Marion, Southwest Morrow
US-23 Connection Point	North of Waldo
HB54 Requirements	A3, A4, A5

FIGURE 14. CONCEPT E7 – CORRIDOR

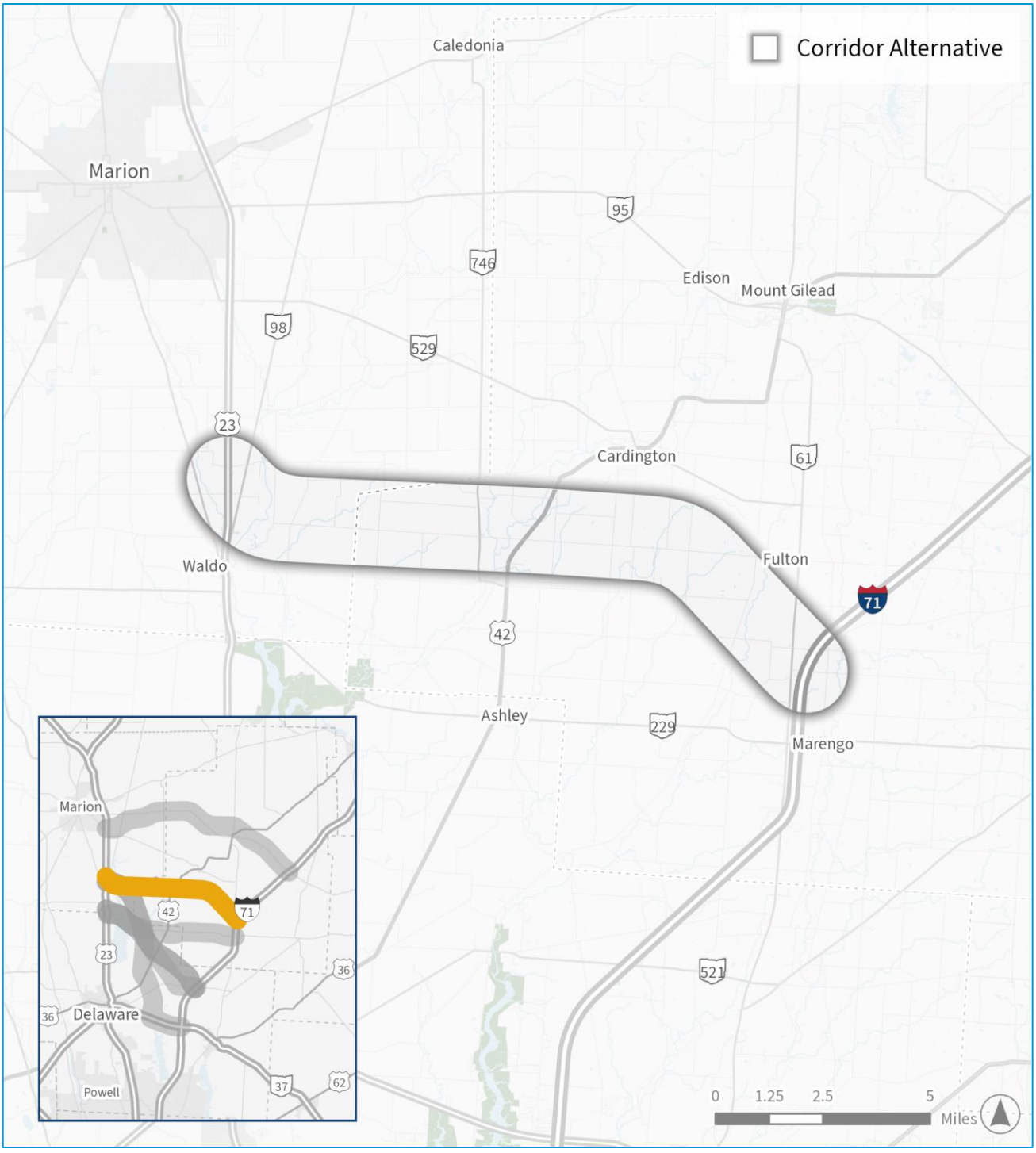
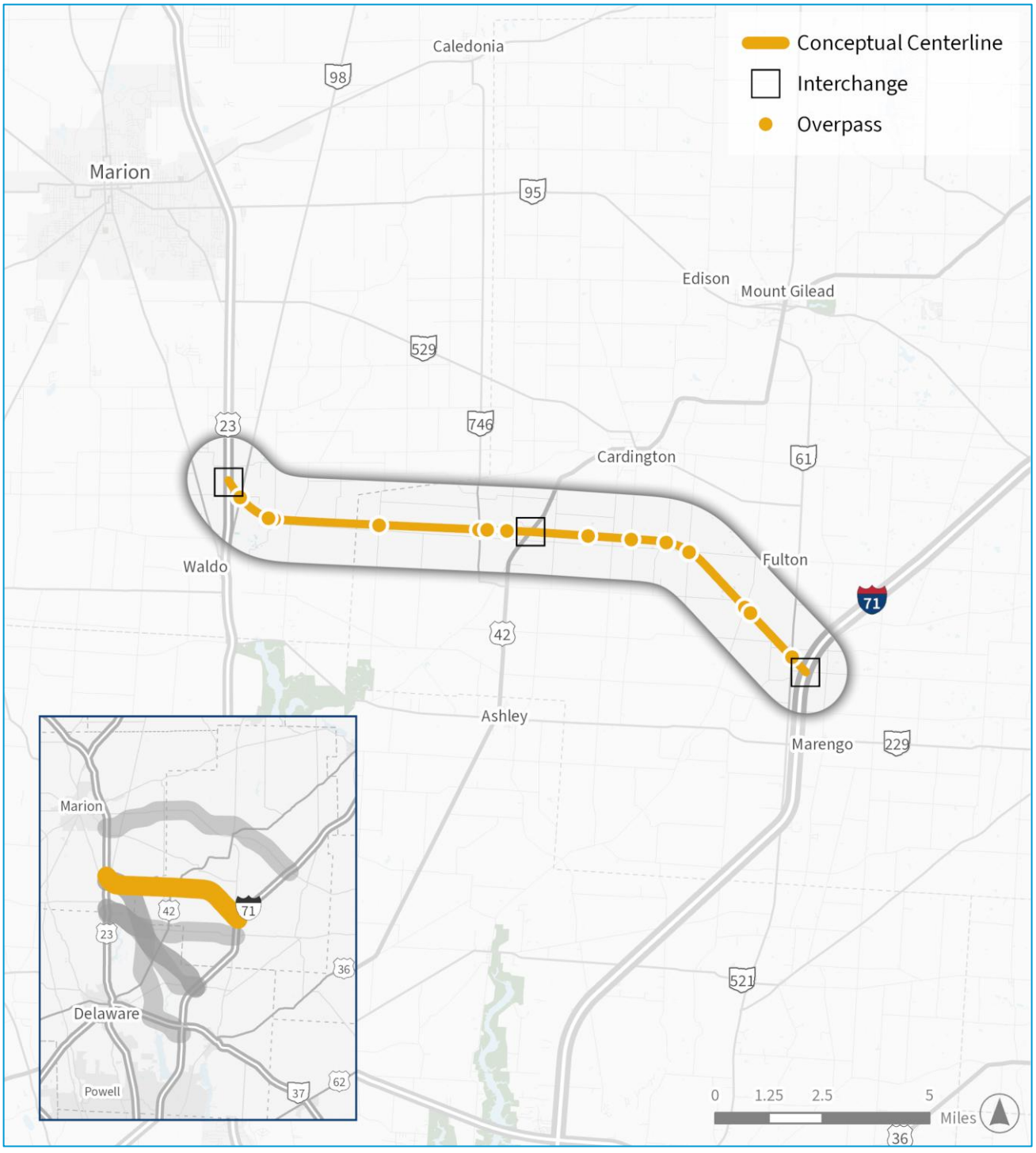


FIGURE 15. CONCEPT E7 – CONCEPTUAL CENTERLINE, INTERCHANGE, OVERPASSES



Cost Estimate Technical Memo

US-23 to I-71 Connector Joint Plan – Interim Report – HB 96

INTRODUCTION

This memorandum provides a technical summary of the cost estimating for the corridor alternatives under evaluation as part of the US-23 to I-71 Connector Joint Plan, a planning effort led by the Ohio Department of Transportation (ODOT) and the Ohio Turnpike and Infrastructure Commission (OTIC) in response to House Bill 54, Section 755.60 (further amended by HB 96).

The purpose of this memo is to document the costing approach and assumptions for the seven corridor alternatives (labeled E1 through E7). The memo includes:

- Construction cost estimation
- Right-of- Way cost estimation
- Operations and Maintenance cost estimation

SUMMARY OVERVIEW

An overview of the cost estimate for each US-23 to I-71 corridor alternative is presented in **Table 1** with generalized corridor swaths presented in **Figure 1**. Note, **Figure 1** also depicts the various overlaps among the seven corridor swaths.

The cost estimates were developed within three categories: construction, right-of-way, and operations and maintenance. Within **Table 1**, cost estimate ranges have been provided to align with the concept level of detail currently completed for the seven corridor alignments. The detailed assumptions of what informed the cost ranges are provided within this memorandum.

Furthermore, as referenced in **Figure 1**, a widening of I-71 was included as a part of this evaluation. The interstate widening extends from I-270 generally to the potential new interchange of the US-23 to I-71 Connector, or in the case of E4, E5 or E7, the widening extends to the US-36/SR-37 interchange. The costs associated with the I-71 widening have been summarized in **Table 2**. Total project costs have been summarized in **Table 3**. It should be noted that for this evaluation, the widening of I-71 was assumed to be completed within the existing right-of-way. Further analysis would need to be completed to fully verify this assumption.

FIGURE 1. CORRIDOR ALTERNATIVE CONCEPTS

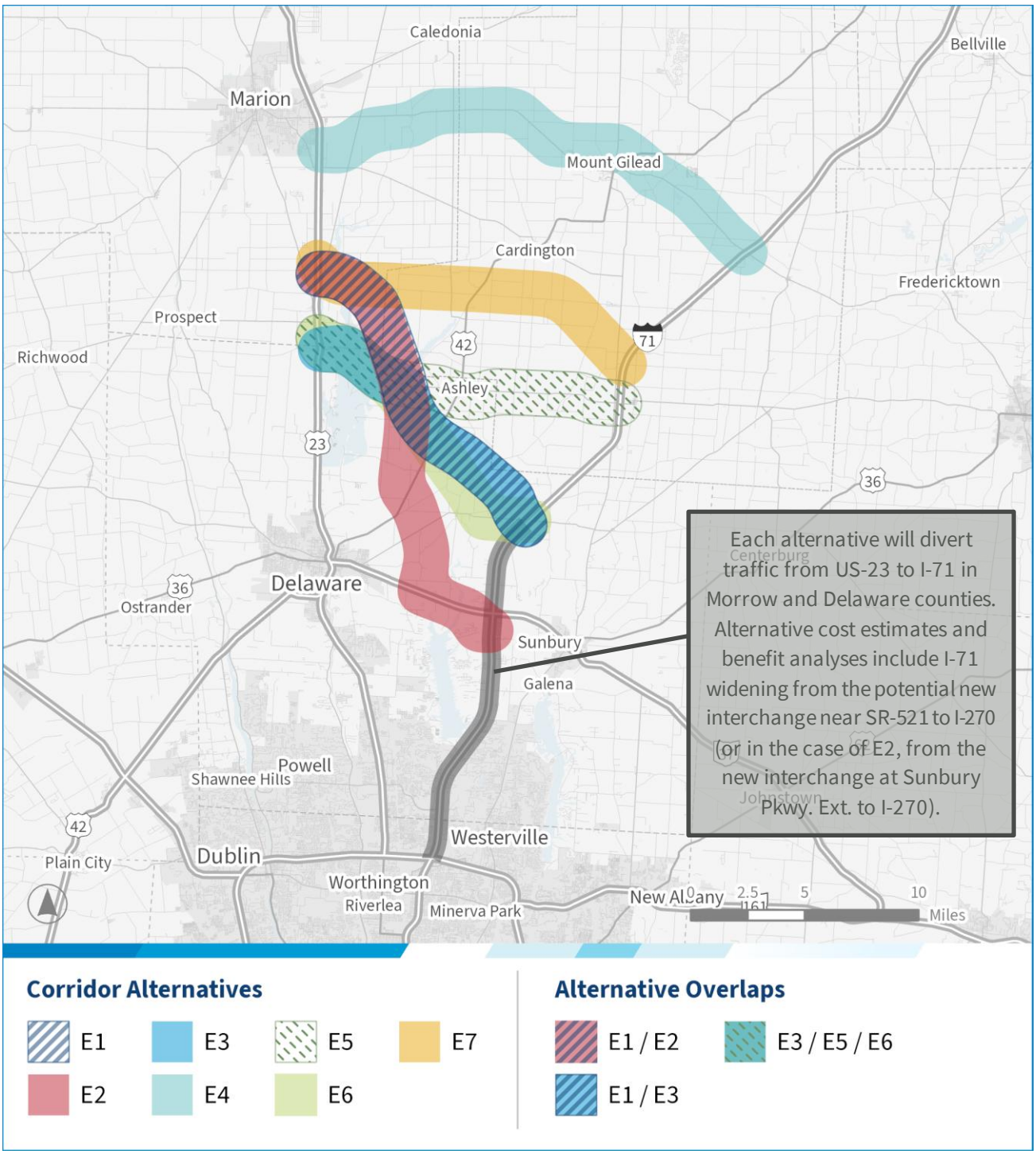


TABLE 1. US-23 TO I-71 COSTING SUMMARY TABLE (IN MILLIONS)

Corridor ID	Cost Range Scenario	Construction Cost	Right of Way Cost	O+M Cost	Total Cost
E1	Low	$463	$19.9	$9.2	**$492**
	High	$596	$33.1	$11.0	**$640**
E2	Low	$784	$60.1	$12.2	**$856**
	High	$998	$100.1	$14.6	**$1,113**
E3	Low	$583	$29.1	$7.6	**$620**
	High	$739	$48.5	$9.1	**$796**
E4	Low	$822	$53.7	$13.0	**$889**
	High	$1,058	$89.5	$15.6	**$1,163**
E5	Low	$779	$85.3	$8.6	**$839**
	High	$988	$85.3	$10.4	**$1,083**
E6	Low	$652	$31.1	$8.0	**$692**
	High	$826	$51.8	$9.7	**$888**
E7	Low	$460	$17.5	$9.1	**$487**
	High	$593	$29.2	$11.0	**$633**

TABLE 2. I-71 WIDENING COSTING SUMMARY TABLE (IN MILLIONS)

Corridor ID	Cost Range Scenario	Construction Cost	Right of Way Cost	O+M Cost	Total Cost
E1	Low	$361	$0.0	$5.0	**$366**
	High	$470	$0.0	$6.5	**$476**
E2	Low	$303	$0.0	$3.5	**$307**
	High	$394	$0.0	$4.5	**$399**
E3	Low	$361	$0.0	$5.0	**$366**
	High	$470	$0.0	$6.5	**$476**
E4	Low	$316	$0.0	$3.7	**$320**
	High	$411	$0.0	$4.8	**$416**
E5	Low	$316	$0.0	$3.7	**$320**
	High	$411	$0.0	$4.8	**$416**
E6	Low	$364	$0.0	$5.1	**$369**
	High	$473	$0.0	$6.6	**$479**
E7	Low	$316	$0.0	$3.7	**$320**
	High	$411	$0.0	$4.8	**$416**

TABLE 3. TOTAL PROJECT COST SUMMARY TABLE (IN MILLIONS)

Corridor ID	Cost Range Scenario	Construction Cost	Right of Way Cost	O+M Cost	Total Cost
E1	Low	$824	$19.9	$14.2	**$858**
	High	$1,065	$33.1	$17.5	**$1,116**
E2	Low	$1,087	$60.1	$15.6	**$1,163**
	High	$1,392	$100.1	$19.1	**$1,511**
E3	Low	$944	$29.1	$12.6	**$986**
	High	$1,209	$48.5	$15.6	**$1,273**
E4	Low	$1,139	$53.7	$16.7	**$1,209**
	High	$1,469	$89.5	$20.4	**$1,579**
E5	Low	$1,095	$51.2	$12.3	**$1,158**
	High	$1,399	$85.3	$15.1	**$1,499**
E6	Low	$1,016	$31.1	$13.1	**$1,060**
	High	$1,299	$51.8	$16.3	**$1,367**
E7	Low	$776	$17.5	$12.8	**$807**
	High	$1,004	$29.2	$15.7	**$1,049**

CONSTRUCTION COST ESTIMATION

A planning level cost estimate was developed based on a combination of quantity estimates and engineering judgement. The goal was to provide a cost estimate commensurate with the level of design effort completed at this stage of the analysis. Construction costs were categorized into several key areas: new freeway costs, arterial improvement costs where the freeway shares alignment with an existing state route, interchange costs, and the widening of I-71 costs. This section outlines the methodologies and assumptions that underpin the construction cost estimates with further details provided in **Appendix I**.

Methodology

The construction cost development began with creating a planning level roadway layout along the defined roadway centerlines. This layout is intended for planning purposes only and does not constitute an exact, planned roadway alignment. It consists of creating a four-lane divided freeway with two lanes in each direction. This proposed roadway cross-section was entered into Concept Station to develop a preliminary alignment. The goal of this preliminary alignment was to develop quantities for roadway and bridge calculations as well as determine right- of- way impacts, which are discussed later in this memorandum.

Interchange locations were determined based upon the judgement of various access needs presented by each centerline as it relates to land use. The number and locations of interchanges may be further refined should a corridor be selected for further analysis. Furthermore, the detailed cost build-up outlines interchange costs to understand the

cost impact of each interchange within the proposed concepts. The locations of the proposed interchanges are shown in **Table 4** .

The layout also assumed the creation of frontage roads where the defined roadway centerline followed an existing state route to maintain local access as well as a nominal amount of frontage roads for local access along greenfield centerline alignments. These arterial improvements are assumed to be a two-lane road with one lane in each direction.

TABLE 4. PROPOSED INTERCHANGE SUMMARY

Corridor ID	Interchange Locations	Total Number of Interchanges
E1	US-23; US-42 (south of Ashley); I-71	**3**
E2	US-23; US-42 (south of Ashley); US-36/SR-37 (west of Alum Creek Lake); North Old State Road; US-36/SR-37 (at Sunbury Parkway Extension); I-71	**6**
E3	US-23; Peters Road; SR-229 (west of Ashley); US-42 (south of Ashley); I-71	**5**
E4	US-23; SR-98; Whetstone River Road (in Claridon); SR-746; SR-95 (west of Mt. Gilead); SR-61; Williamsport-Bloomingrove Road (east of Mt. Gilead); I-71	**8**
E5	US-23; Peters Road (west of Ashley); SR-229 (west of Ashley); US-42; SR-229 (east of Ashley); Worthington-New Haven Road; I-71	**7**
E6	US-23; SR-229 (west of Ashley); US-42 (south of Ashley); SR-521 (east of Kilbourne); I-71	**5**
E7	US-23; US-42 (north of Ashley); I-71	**3**

The interchange costs were developed based on the classification of the interchange type. Service interchanges were assigned a line-item cost, either being considered a basic or complex service interchange. System interchanges were also classified as either basic or complex and were assigned a higher line-item cost due to the additional size and complexity.

To ensure consistency when comparing the corridors, a methodology was created to determine the needed overpasses along the centerline. An overpass was included within the alignment if one of the following criteria were met: the roadway functional classification was higher than a local road, the roadway was part of the travel demand modeling efforts, or the roadway connection was needed to provide crossing access within a minimum of every three miles. This methodology does not make a definitive statement on the amount of local access, as further refined alignments and local engagement may change the number of overpasses provided.

For the needed bridges across waterways, a desktop level review was completed to determine the proposed needs. If the existing waterway crossing was handled with a bridge, it was assumed a bridge would be needed for the proposed alignments as well. If the existing waterway crossing was handled with a culvert, it was assumed a culvert structure would be needed for the proposed alignment. The locations of the proposed waterway bridges are shown in **Table 5**.

TABLE 5. PROPOSED WATERWAY CROSSING SUMMARY

Corridor ID	Waterway Bridge Crossings	Total Number of Waterway Bridges
E1	Olentangy River; Whetstone Creek; Alum Creek	3
E2	Olentangy River; Whetstone Creek; Big Run; Alum Creek	4
E3	Olentangy River; Whetstone Creek; Alum Creek	3
E4	Olentangy River; Otter Creek; Shaw Creek; Whetstone Creek; Kokosing River; Batchlor Run	6
E5	Olentangy River; Whetstone Creek; West Branch Alum Creek; Turkey Run; Alum Creek	5
E6	Olentangy River; Whetstone Creek; Alum Creek	3
E7	Olentangy River; Shaw Creek; Whetstone Creek; Alum Creek	4

The costs for widening I-71 were developed by considering several key items. For bridges within the I-71 corridor, costs were included to account for any freeway bridges that need to be widened. Any existing overpass bridges were assumed to be replaced. For the pavement, costs were included for both new pavement needed for the new lanes and an assumed pavement overlay of the existing I-71 lanes to be completed in conjunction with the widening. Furthermore, a line-item cost was developed for noise walls within the more urbanized areas of I-71. Retaining wall costs were assumed for a portion of the interstate to support the assumption that no right-of-way costs are included in the I-71 widening estimate.

The unit cost development was derived using ODOT's bid data tools where applicable, utilizing only 2024 and 2025 award data. Summary costs for items such as interchanges were based upon similar type projects as outlined, instead of unit price buildups. The detailed unit cost and interchange cost development is further outlined in **Appendix I**.

Key Assumptions

Both a low and high estimate were developed for this memorandum. The low estimate came directly from the quantity build-up and resultant unit costs as outlined in this memorandum. The high estimate was developed in a two-fold manner. First, the assumed costs were increased by 20%. Secondly, to account for the generalized alignment within each concept, an additional 10% increase in quantity was applied to the costs associated with the new connection between US-23 and I-71. This acknowledges that the alignments have been developed at a concept level, not a design level.

For the new connection costs, several assumptions were made to account for the various cost items not explicitly discussed above. These costs categories include maintenance of traffic, incidentals, erosion control, traffic control, and drainage. The percent of these total costs were derived by aggregating the percentage of total costs from recent ODOT projects of similar construction types. Furthermore, a 30% contingency was added to align with the concept level design.

From a project level view, engineering costs and construction administration costs were applied to the total developed construction cost estimate. For the purposes of this study, 15% was used to account for engineering costs, while 8% was used to account for construction administration costs.

Results

The construction cost estimates are shown in **Table 6** for both the low and high estimates. All construction cost estimates are reported in 2025 dollars. Costs in **Table 6** have a 30% contingency already applied.

TABLE 6. US-23 TO I-71 COSTING DETAIL SUMMARY TABLE (IN MILLIONS)

Corridor ID	Cost Range Scenario	New Freeway Cost	Interchange Cost	Arterial Cost	Engineering and CA Cost
E1	Low	$230.3	$143	$2.9	$86.5
	High	$307.9	$171.6	$4.6	$111.4
E2	Low	$245.4	$325	$67.2	$146.6
	High	$337.4	$390	$83.9	$186.6
E3	Low	$159.5	$260	$54.6	$109
	High	$217.8	$312	$70.9	$138.2
E4	Low	$205.3	$396.5	$66.8	$153.8
	High	$292.3	$475.8	$92.4	$197.9
E5	Low	$166.6	$396.5	$70.1	$145.6
	High	$230.8	$475.8	$96.3	$184.7
E6	Low	$151.2	$325	$54.1	$122
	High	$209.4	$390	$72.5	$154.5
E7	Low	$182.4	$188.5	$3	$86
	High	$251.2	$226.2	$4.7	$110.9

RIGHT OF WAY COST ESTIMATION

Each concept has right-of-way impacts associated with both the new freeway alignments, whether a new terrain facility, an expansion of existing state route, or some combination of both. The right-of-way costing methodology was developed to provide a consistent approach to allow for objective comparisons of the seven corridors. It is anticipated that further refinement of the corridors and alignment will have the potential to modify the summarized cost values. This section will outline the methodologies and assumptions that support the current right-of-way cost estimation.

Methodology

Estimated right-of-way impacts for the corridors were developed based on conceptual models of the defined centerline alignments. These models assumed a 300'-wide typical section for right-of-way acquisition, with larger footprints as needed to accommodate interchanges and grade separation of existing roads. The larger footprints have been developed planning level, and do not constitute an exact, planned roadway alignment. Right-of-way acquisition limits were overlaid onto current geospatial parcel data acquired from the Delaware, Marion, Morrow, and County Auditors to quantify impacts on individual parcels.

The right-of-way cost for each impacted parcel was based upon the current assessed parcel value as of May 2025. These values were collected from the county auditor's office for Delaware, Marion, and Morrow counties. The impacted parcels were then analyzed through various assumptions related to the amount of parcel impacted and parcel land use classification, as further discussed in the key assumptions below. This analysis resulted in a right-of-way cost per parcel calculation that was then totaled to summarize the right-of-way cost for each corridor.

It should also be noted that while individual parcel data was utilized to develop a right-of-way cost estimate, this analysis makes no definitive statements to the resultant impact of any unique parcel should a concept be moved forward.

Key Assumptions

For the displacement cost determination, thresholds were established for each land use classification to estimate whether impacts would result in a partial acquisition or a full acquisition (i.e., displacement). For residential and agricultural parcels, acreage impacts exceeding 50% of the total parcel acreage were assumed to result in displacements. For commercial and industrial parcels, the displacement threshold was set at 10%. Impacts that did not exceed these thresholds were assumed to result in partial acquisitions.

Furthermore, this is a planning level analysis based solely on the percent impacted. It does not consider the actual location of infrastructure on parcels relative to the assumed right-of-way impacts when determining full vs. partial takes. It is anticipated that any further refined alternative alignments would look to refine the right-of-way impacts for each individual parcel.

It should also be noted that this analysis assumed that the detailed design of the selected corridor would be refined to avoid substantial impacts on tax-exempt parcels such as publicly owned land, schools, and places of worship. As such, these parcels were not included in summarizing the right- of- way cost estimate.

A 15-foot buffer was extended around any widened interchange layouts to account for any unforeseen obstacles that may arise during a more refined geometric design at these locations.

When estimating right-of-way acquisition costs, current parcel values were adjusted based on land use classification for partial acquisition. Parcel values were increased to 130% of current value for residential parcels and to 150% for agricultural, commercial, and industrial parcels. For impacts resulting in displacements, parcel values were increased to 300% of the current parcel value to reflect the added costs associated with relocations. These value adjustments are reflective of potential additional costs associated with negotiations, appraisals, and relocations. The administrative cost to support right-of-way negotiations was estimated at $10,000 per parcel. The detail of the calculations are further defined within **Appendix II.**

Results

The process outlined above produced a total estimated right-of-way acquisition cost for each concept. To reflect the conceptual nature of this analysis, right-of-way costs in **Table 7.1** thru **Table 7.7** are presented as a range from low (75% of estimate) to high (125% of estimate).

TABLE 7.1. RIGHT OF WAY COST SUMMARY: E1 ALTERNATIVE

County	Acres Impacted	Low Cost Estimate	High Cost Estimate
Delaware	432	$14,060,000	$23,433,000
Marion	154	$1,712,000	$2,854,000
Morrow	89	$4,080,000	$6,801,000
Total	**676**	**$19,852,000**	**$33,087,000**

TABLE 7.2. RIGHT OF WAY COST SUMMARY: E2 ALTERNATIVE

County	Acres Impacted	Low Cost Estimate	High Cost Estimate
Delaware	774	$55,094,000	$91,824,000
Marion	166	$1,473,000	$2,455,000
Morrow	86	$3,512,000	$5,854,000
Total	**1,026**	**$60,080,000**	**$100,133,000**

TABLE 7.3. RIGHT OF WAY COST SUMMARY: E3 ALTERNATIVE

County	Acres Impacted	Low Cost Estimate	High Cost Estimate
Delaware	681	$28,886,000	$48,144,000
Marion	20	$187,000	$312,000
Morrow	-	-	-
Total	**701**	**$29,074,000**	**$48,456,000**

TABLE 7.4. RIGHT OF WAY COST SUMMARY: E4 ALTERNATIVE

County	Acres Impacted	Low Cost Estimate	High Cost Estimate
Delaware	-	-	-
Marion	300	$9,298,000	$15,497,000
Morrow	685	$44,381,000	$73,969,000
Total	**985**	**$53,680,000**	**$89,466,000**

TABLE 7.5. RIGHT OF WAY COST SUMMARY: E5 ALTERNATIVE

County	Acres Impacted	Low Cost Estimate	High Cost Estimate
Delaware	556	$26,975,000	$44,958,000
Marion	18	$169,000	$282,000
Morrow	299	$24,030,000	$40,050,000
Total	**873**	**$51,174,000**	**$85,290,000**

TABLE 7.6. RIGHT OF WAY COST SUMMARY: E6 ALTERNATIVE

County	Acres Impacted	Low Cost Estimate	High Cost Estimate
Delaware	695	$30,940,000	$51,567,000
Marion	19	$169,000	$282,000
Morrow	-	-	-
Total	**714**	**$31,109,000**	**$51,849,000**

TABLE 7.7. RIGHT OF WAY COST SUMMARY: E7 ALTERNATIVE

County	Acres Impacted	Low Cost Estimate	High Cost Estimate
Delaware	-	-	-
Marion	126	$2,163,000	$3,605,000
Morrow	614	$15,382,000	$25,637,000
Total	**740**	**$17,545,000**	**$29,242,000**

OPERATIONS AND MAINTENANCE COST ESTIMATION

To account for lifecycle infrastructure costs, an estimate of operations and maintenance costs for each concept was developed for a twenty-year horizon. This section will outline the methodologies and assumptions that underpin the construction cost estimates.

Methodology

The lifecycle costing was developed with two key inputs, pavement rehabilitation and annual winter operations. Other lifecycle costs, such as those associated with structures, lighting, and signage, were not included at this stage of analysis because they are associated with point locations, not based primarily upon lane miles.

Key Assumptions

The pavement rehabilitation costs over the twenty-year horizon were based on the ODOT Life-cycle Cost Analysis process as outlined in ODOT's *Pavement Design Manual*. Section 703.2.1 calls for a 1.5" pavement milling and overlay for just the driving lanes at year 14. It was assumed that the new freeway lanes would receive this treatment. The cost was derived from the current ODOT bid database and inflated by 51% which aligns with the current construction forecasting documentation within ODOT's Inflation Calculator.

The winter operation costs were assumed based upon the lane miles treated and costs posted by ODOT on the Winter Operations and Best Practices webpage (https://www.transportation.ohio.gov/traveling/snow-ice/operations). Given the planning level nature of these efforts, this detail was deemed adequate. ODOT treats 43,000 lanes miles of highway and spends approximately $50 million annually on labor, equipment, and materials. A per lane mile cost was developed from this data and added over a 20-year horizon to determine the winter operations costs.

Note that for the purposes of this concept effort the pavement was assumed to be flexible. Ultimately, because these concepts would be more than four lane-miles of mainline driving lanes, ODOT's Office of Pavement Engineering would be responsible for the pavement design. This design effort will include the pavement type selection as well as the completion of a full life-cycle cost analysis (LCCA analysis). A sketch level costing exercise was completed to understand the potential maintenance impacts of flexible compared to rigid pavement. The detail of that exercise is included within **Appendix III**.

Results

Table 8 reflects the operations and maintenance cost estimates for both the US-23 to I-71 Connector and the additional costs for the widening along I-71.

TABLE 8. US-23 TO I-71 O+M DETAIL SUMMARY TABLE (IN MILLIONS)

Corridor ID	Cost Range Scenario	Winter Operation Cost	Pavement Lifecycle Cost	Total O+M Cost	Winter Operation Cost	Pavement Lifecycle Cost	Total O+M Cost
		US-23 to I-71			I-71 Widening		
E1	Low	$1.4	$7.8	**$9.2**	$0.8	$4.2	**$5.0**
	High	$1.7	$9.3	**$11.0**	$0.9	$5.1	**$6.5**
E2	Low	$1.9	$10.3	**$12.2**	$0.5	$2.9	**$3.5**
	High	$2.2	$12.3	**$14.6**	$0.6	$3.5	**$4.5**
E3	Low	$1.2	$6.4	**$7.6**	$0.8	$4.2	**$5.0**
	High	$1.4	$7.7	**$9.1**	$0.9	$5.1	**$6.5**
E4	Low	$2.0	$11.0	**$13**	$0.6	$3.1	**$3.7**
	High	$2.4	$13.2	**$15.6**	$0.7	$3.7	**$4.8**
E5	Low	$1.3	$7.3	**$8.6**	$0.6	$3.1	**$3.7**
	High	$1.6	$8.8	**$10.4**	$0.7	$3.7	**$4.8**
E6	Low	$1.2	$6.8	**$8.0**	$0.8	$4.3	**$5.1**
	High	$1.5	$8.2	**$9.7**	$0.9	$5.2	**$6.6**
E7	Low	$1.4	$7.7	**$9.1**	$0.6	$3.1	**$3.7**
	High	$1.7	$9.3	**$11**	$0.7	$3.7	**$4.8**

APPENDIX I: CONSTRUCTION COSTING DETAILED METHODOLOGY

Table of Contents

SUMMARY

The objective of this document is to further define cost assumptions and methodologies to develop construction costs for the evaluation. It also supports the excel calculation sheets that have been developed, with summary tables attached at the end of this document.

Construction Total

The construction subtotal is the sum of the four cost categories for each concept. The four categories in this cost estimate include freeways on new routes, new/modified interchanges, upgrades of existing arterials, and freeway widening. The details for each of these categories can be found on the tabs of the spreadsheet as well as other sections of this methodology. The construction total was calculated after applying the contingency to the construction subtotal. Contingency was assumed to be 30%.

Project Construction Cost

Total construction cost is represented in current year dollars because cost assumptions were pulled from recent projects. Engineering costs were assumed to be 15% and construction admin costs were assumed to be 8%.

LANE SUMMARY

New Terrain Freeway

The total centerline miles for each concept was calculated using in ConceptStation according to layouts described in Corridor Alternatives Summary Section 755.60 (HB54) – US-23 to I-71 and coordination with ODOT and District 6. The total lane miles represent the total miles of additional lanes added (i.e. four additional lanes across 15.2 miles would be the equivalent of 60.8 lane miles).

I-71 Added Lanes

An additional two lanes in each direction were assumed between I-270 and Polaris Parkway to align with completed traffic modelling to date. Just one additional lane in each direction was then assumed between Polaris Parkway to the connection point of each concept. The stretch of I-71 between I-270 and Polaris Parkway was found to be 1.3 miles via aerial imaging. The stretch between Polaris Parkway and the connection point was found via aerial imaging according to the tie-in point at I-71 (or US-36/SR-37 for certain alignments). The total lane miles represent the total miles of additional lanes added. This was found via the same process as **New Terrain Freeway**.

NEW TERRAIN FREEWAY – LOW

New Terrain Freeway Notes

The entire length of the proposed alignment for each concept was assumed to receive New Terrain Freeway. This includes sections of the alignment that follow existing alignment (i.e. US-36/SR-37, SR-95, and SR-229). The New Terrain Freeway consists of two lanes in each direction with a grass median.

Costing Notes

The base subtotal is broken into four different cost categories: new terrain freeway miles, pavement costs, earthwork costs, and larger earthwork surcharge.

NEW TERRAIN FREEWAY MILES

The new freeway miles on new alignment were pulled from **New Freeway** in the **Lane Summary**.

PAVEMENT COSTS

The pavement costs were calculated using the pavement cost per mile.

Strategy: Utilize ODOT's Item Price Search Tool to identify the weighted average and median prices for the subcomponents of the pavement structure cross section. Use ConceptStation to pull roadway area and multiply by depth to find volume in cubic yards of an assumed cross-section. The final outcome is the cost of the pavement structure per mile of roadway. A contingency amount will be included, as well as carrying a percentage cost for other project components such as drainage, erosion control, incidentals, maintenance of traffic, and traffic control.

Methods: Pavement cross section data was extracted from **Project 119141 (Ath-33-18.78)**.

Project Description (119141): Construction of the 4.48-mile conversion from super two-lane highway to a four-lane freeway, add new structures with grade separated interchanges and ramps at Pleasant Hill and Pleasanton Road, resurfacing the existing westbound lanes, the project will include drainage system adjustments, new traffic control, and partial interchange lighting along the corridor.

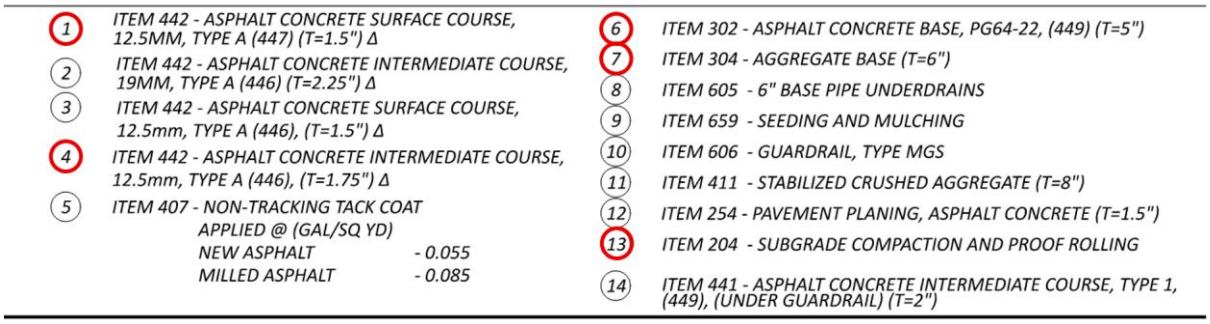
Typical Section Source: Information was obtained from page 9 of the 907-page plan set titled PlanSet_AsAdvertised. Relevant legend items include 1, 4, 6, 7, and 13. These were slightly modified to a thicker typical section for this analysis to account for the unknown geotechnical information at the planning level.

Pay Items and Cost Data: Cost data for the identified pay items is based on letting dates in 2024 and 2025.

TABLE I.1. PAVEMENT TYPICAL SECTION PAY ITEMS AND COST DATA

Pay Item Description	Depth T [in] – Using PID 119141	Weighted Average Item Price [per CY]	Median of Item Price	Data Points
442E10300 – Asphalt Concrete Surface Course 12.5 MM, Type A (447)	T= 1.5”	$234.68	$240	25
442E10080 – Asphalt Concrete Intermediate Course, 12.5 MM, Type A (446)	T=1.75”	$207.63	$213	32
301E56000– Asphalt Concrete Base, PG64-22, (449)	T=5”	$191.74	$275.50	336
304E20000 – Aggregate Base	T=6”	$74.46	$95.00	447
Total	**14.25”**	**$708.51**	**$823.5**	**-**
204E10000 – Subgrade Compaction and Proof Rolling (SY)	-	$2.10	$3.00	377

FIGURE 1: CROSS SECTION DATA EXTRACTED FROM PROJECT 119141



Note: Items of interest are highlighted in Red

The following assumptions were made to calculate the pavement cost per mile:

- Surface course: 1.5” thick at a cost of $240/CY
- Intermediate course: 2” thick at a cost of $210/CY
- Base Course: 6” thick at a cost of $195/CY
- Aggregate Base: 6” thick at a cost of $95/CY
- Compaction: $3/SY
- Cross Section Width: 76’ (bidirectional)
    - Inner Shoulder: 4’
    - Lane: 12’ (2 each direction)
    - Outer Shoulder: 10’

EARTHWORK COSTS

Earthwork quantities were pulled from ConceptStation. The quantities pulled were excavation (CY), fill (CY), and start and end station. Excavation per mile and embankment per mile were derived from these outputs. An assumed value of $9/CY for excavation and $4/CY for embankment were used per ODOT bid tabs. The excavation and embankment costs were totaled to determine an earthwork cost per mile for each concept. The costs were then averaged for each concept to develop an average earthwork cost per mile. This average cost was applied across each corridor.

LARGER EARTHWORK SURCHARGE

For large earthwork costs, a surcharge was applied. Any earthwork near/over Delaware Lake was assumed twice the cost per mile as all other corridors. Looking at the park limits, 2 miles of larger earthwork was assumed to be required for Concepts E3, E5 and E6.

Calculation Notes

Table I.2 shows the average percentage (of total project cost) for Maintenance of Traffic, Incidentals, Erosion Control, Traffic Control, and Drainage for 22 projects classified as Major widening and Major Reconstruction.

TABLE I.2. PERCENTAGE OF TOTAL PROJECT COST BREAKDOWN BY MOT, INCIDENTALS, EROSION CONTROL AND DRAINAGE

Project Type	PIDs	Data Points	Maintenance of Traffic	Incidentals	Erosion Control	Drainage	Traffic Control
Major Widening	119143, 119144, 119141, 119142	4	3%	8%	6%	7%	1%
Major Reconstruction	77372, 109270, 117367, 108240, 113835, 109278, 107408, 107714, 116949, 108665, 95459, 111404, 98232, 113013, 76779, 111381, 117525, 96680	18	6%	9%	2%	10%	2%

Based upon the above numbers and an engineering review of the alignments, the following assumptions were made to estimate drainage, erosion control, MOT, traffic control, and incidentals:

- Drainage: 10%
- Incidentals: 9%
- Erosion Control: 10%
- MOT – High: 8%
- MOT – Low: 4%
- Traffic Control: 2%

The increase in the erosion control percent is to acknowledge the construction through new right of way compared to the analyzed bid data. The higher values between the project categories were assumed for this analysis. Furthermore, note that the maintenance of traffic pricing was split into a 'High' and 'Low' category. This was assumed due the acknowledgement that alignments along existing state routes would carry a higher cost compared to those which are predominantly constructed along new alignments.

Bridges

To estimate high-level bridge costs, HNTB utilized bid history for ODOT bridges constructed within the past 10 years. HNTB initially filtered all ODOT-owned bridges (approximately 10,000 bridges) based on several characteristics including: superstructure type, span configuration, span lengths, total bridge length, and number of lanes carried. Each project was then inflated to current year dollars using ODOT's CCIs (Construction Cost Indices). Having established a set of representative bridges, HNTB then collected the winning bidder's structure construction cost for each bridge utilizing ODOT bid tabs. This total cost per structure was then divided by the bridge deck area from ODOT TIMS data to determine a cost-per-square-foot. The proposed bridges were assigned parameters (e.g. superstructure type, overpass or mainline, etc.) and per-square-foot costs based on the costs for similar bridges calculated previously. The bridge deck areas for each proposed bridge were determined by ConceptStation. Unit cost per square foot of bridge can be found in **Table I.3**. Unit costs for mainline, overpass, and ramp bridges came out to the same unit cost depending on the bridge type.

TABLE I.3. COST-PER-SQUARE-FOOT BASED ON BRIDGE TYPE

Bridge Type	
Routine multi-beam overpass or mainline bridge with up to four spans	$268/SF
Multi-beam mainline or flyover bridge with five or more spans	$219/SF
Reinforced concrete slab bridge	$227/SF

NEW TERRAIN FREEWAY – HIGH

Quantity Notes

A quantity factor of 1.25 was applied to create the high estimate of New Terrain Freeways. This was applied to select quantities to account for the conceptual nature of the current alignments. This includes new freeway miles on new alignments, excavation (CY), and fill (CY). It does not include changing the geometry of the cross section (depth and width of the new freeway).

Costing Notes

A cost factor of 1.2 was applied to all unit costs. This includes all cost per cubic yard of pavement quantities, cost for excavation/CY, cost for embankment/CY, and bridge costs.

INTERCHANGES - LOW

Interchange Notes

Interchanges are broken down into four conceptual types. There is a basic and complex interchange price for both system interchanges and service interchanges. This is to account for the various levels of complexity that each interchange presents.

- 'System-Basic' is for a new system-level (freeway-to-freeway) interchange.
- 'System-Complex' is for a new system-level interchange that is co-located with an existing state route. It is assumed that these locations will provide both access to the freeways as well as maintain local access to the existing state route.
- 'Service-Basic' is for a new service interchange where the proposed freeway intersects with an existing roadway.
- 'Service-Complex' is for a new service interchange where the proposed freeway aligns with or diverges from an existing state route. It is assumed that these locations will result in a more complex roadway geometry because access is being provided to the existing state route, the proposed freeway, and the proposed frontage roads.

Interchange locations and types for each concept are listed in the detailed breakdown to allow for comparisons across the concepts.

Costing Notes

Table I.4 displays the costs for 11 interchanges with Letting Year = (2024, 2025). These projects were reviewed to determine which ones were most applicable to the proposed interchanges to determine the cost estimate.

TABLE I.4. INTERCHANGES COST

PID	Project Description	Awarded Amount	Project Link
102375	Reconstruct the interchange of I-75 at CR-99 from an existing diamond interchange to a diverging diamond interchange. Project includes the reconstruction and widening of the existing ramps and widening of CR-99 from technology drive to main street including storm sewer upgrades from main street to the outfall at Howard run. Proposed work includes, sidewalk and shared use path, pavement widening and full depth replacement of asphalt and concrete pavement, new bridge construction, existing bridge widening, drainage, erosion control, traffic signals, traffic control, and lighting.	$ 30,815,752	Link
112280	This project involves 0.17 miles of improvements along us 68 including reconfiguring the intersection of US-68 and the SR-15 ramps to provide a single lane roundabout. A portion of the existing SR-15 southbound off ramp will be removed and relocated to tie into the reconfigured intersection while 0.38 miles of the existing southbound off ramp will be converted to a two-lane township road as part of this project. Work will also include installing roundabout lighting, drainage and permanent traffic control.	$ 2,558,252	Link
106239	This project widens and replaces the superstructure of the Wallings Road bridge over I-77, and provides full depth pavement replacement and additional turning lanes at the ramp intersections. Improvements on Wallings Road from east of skyline drive to mill road include widening, asphalt overlay, curb and gutter, closed drainage system, and new traffic signals.	$ 8,035,650	Link
113156	Preventative maintenance resurfacing of Mainline I-271 from Fairmount to Mayfeild Heights Corp. Limit in Pepper Pike, Lyndhurst, and Mayfield Heights in Cuyahoga County.	$ 15,863,126	Link
105889	Reconstruction and reconfiguration of the SR-51 interchange over US-23 in the city of Sylvania, Lucas County. Necessary work includes bridge replacements, ramp reconstruction, secondary street upgrades and resurfacing.	$ 31,735,107	Link
117712	Replacing at-grade intersection on US-24 at CR-17d in Henry County with a new diamond interchange, including a new bridge over US-24.	$ 12,310,624	Link
115840	Construct a new 2-lane overpass at the US-24/CR-185 at-grade intersection & remove current intersection. The project consists of raising CR-185 over US-24 on the existing alignment, constructing a new 2-span bridge & removing intersection pavement on US-24 & restoring US-24 to a 4-lane divided facility.	$ 5,336,583	Link
105435	This project will improve capacity and rehabilitate facilities in need of repair or replacement in the I-270 and I-71 interchange on the north side of Columbus. There will be the addition of capacity to the I-270 eastbound to I-71 northbound movement. Two ramp bridges will be replaced, one bridge will have the superstructure and abutments replaced, and one bridge will be restriped.	$ 41,431,734	Link

PID	Project Description	Awarded Amount	Project Link
77555	Replace the existing intersection of US-33 and Pickerington Road with an interchange and remove the Allen Road intersections. The project will eliminate four at grade railroad crossings.	$ 51,269,955	Link
106959	Construct a new partial diamond interchange on I-71 at Sunbury Parkway. This will include an entrance ramp from Sunbury Parkway to I -71 SB and an exit ramp from I-71 NB to Sunbury Parkway. Build a I-71 NB cd road between Sunbury Parkway and SR-36/37 combining the exiting traffic to Sunbury with the exiting traffic to SR-36/37. Connect Sunbury Parkway to Wilson Rd. The project will also include the Sunbury Parkway two span bridge over I-71, the reconstruction of storm sewers and culverts, and the relocation of signage and lighting. The full parclo interchange and the extension of Sunbury Parkway will be built in future phases.	$ 32,271,186	Link
120547	The Ohio Department of Transportation (ODOT) is developing plans for an interchange improvement project at the I-70/State Route 149 interchange. Construction is anticipated to commence in 2026 and last at least two years. It will involve widening State Route 149 and replacing the existing bridges on I-70.	$ 27,231,121	Link

- $45,000,000 used for system-basic interchanges. Based on construction costs PID 105435 which effectively rebuilt three legs of the I-71 and I-270 system interchange.
- $80,000,000 used for system-complex interchanges. Based on combining the assumptions of a basic system interchange and a complex service interchange. (Pricing was unable to be found for a complex interchange of the assumed magnitudes over the last two years).
- $20,000,000 used for constructing a new service-basic interchange along the proposed route. Based on construction costs from PID 117712, a relatively straightforward interchange design.
- $35,000,000 used for constructing a new service-complex interchange along the proposed route. Based on construction costs from recent new service interchanges PID 105435 and PID 106959. These were service interchanges that had a higher level of complexity within their design.

Calculation Notes

Each alternative that contained the specified intersection listed received a “1”.

INTERCHANGES - HIGH

Interchange Notes

Interchange quantities did not change when comparing low to high scenarios.

Costing Notes

A 20% cost increase was applied to the high scenario for the same baseline costs underpinning the low scenario.

ARTERIAL IMPROVEMENTS – LOW

Arterial Improvement Notes

This tab used the same methodology as **New Terrain Freeway – Low**. This was broken into a different tab to capture the cost of any improvements to local roads that may be needed for each concept. For any section of the proposed corridor that follows the existing alignment of a roadway, frontage roads will be required to maintain access. For concepts that do not follow an existing alignment, 1 mile of arterial improvements was added as contingency as local connectors are likely to be constructed at places for local connectivity. All miles of arterial improvements were measured using aerial imaging.

Costing Notes

All unit costing assumptions remain the same as **New Terrain Freeway – Low**. Total bridge costs for underpasses or mainline were cut in half because all arterial improvement roadways will be 2 lanes instead of the 4 lanes for the proposed freeway.

All pavement unit costing assumptions and roadway typical section remains the same as **New Terrain Freeway – Low**. The arterial cross section assumed is defined as follows:

Cross Section Width: 32’ (bidirectional)

- Inner Shoulder: 0’
- Lane: 12’ (1 each direction)
- Outer Shoulder: 4’

ARTERIAL IMPROVEMENTS – HIGH

Quantity Notes

A quantity factor of 1.25 was applied to create the high estimate of Arterial Improvements. This was applied to select quantities to account for the conceptual nature of the current alignments. This includes new arterial improvement miles on new alignments, excavation (CY), and fill (CY). It does not include changing the geometry of the cross section (depth and width of the new arterial improvements).

Costing Notes

A cost factor of 1.2 was applied to all unit costs. This includes all cost per cubic yard of pavement quantities, cost for excavation/CY, cost for embankment/CY, and bridge costs.

I-71 – LOW

I-71 Notes

The tab details the estimated construction costs to add additional lanes to I-71 north of I-270. Based on current traffic modelling, one or two additional lanes will be needed to adequately serve the additional traffic volume.

Costing Notes

The following assumptions were made to estimate drainage, erosion control, MOT, traffic control, and incidentals (See **Calculation Notes** in **New Freeway – Low** for details):

- Drainage: 7%
- Incidentals: 20%
- Erosion Control: 6%
- MOT – High: 10%
- Traffic Control: 2% (Review of bid tabs)

Note the maintenance of traffic cost was increased due to working along the interstate but the erosion control and drainage costs were reduced slightly to acknowledge the existing infrastructure within the corridor.

SEGMENT LENGTH

The length of the upgrades on I-71 were pulled from **I-71 Added Lanes** in the **Lane Summary**. This was broken down into two segments based on two additional lanes needed between I-270 and Polaris Parkway and one additional lane needed between Polaris Parkway to either connection point of the alternative concept or US-36/SR-37.

PAVEMENT COSTS

All pavement unit costing assumptions remain the same as **New Terrain Freeway – Low**.

Cross Section Width for each direction was assumed as follows:

- Inner Shoulder: 0’
- Lane: 12’ (1 or 2 lanes in each direction, pending location)
- Outer Shoulder: 12’

EARTHWORK COSTS

Earthwork cost per mile remains the same as **New Freeway – Low** for the segment between I-71 and Polaris Parkway. This was assumed because both scenarios are ultimately adding 4 total lanes, 2 in each direction. Cost per mile north of Polaris Parkway in the one lane added in each direction assumes 67% of earthwork costs since the cross width of new pavement is 2/3 slimmer.

OVERLAY COSTS

The planing costs were calculated using the planing (mill-and-fill) cost per mile.

Strategy: Utilize ODOT's Item Price Search Tool to identify the weighted average and median item price for pavement planing.

Item of interest: 254E01000 – Pavement Planing, Asphalt Concrete; 254E01010 Pavement Planing, Portland Cement Concrete.

Pay Items and Cost Data: Cost data for the identified pay items is based on letting dates in 2024 and 2025.

TABLE I.5. PAVEMENT PLANING (MILL-AND-FILL COSTS)

Pay Item Description	Average Depth	Weighted Average Item Price	Median of Item Price	Data Points
254E01000 – Pavement Planing, Asphalt Concrete	T= 1.5"	$2.04	$4.00	526
442E10300 – Asphalt Concrete Surface Course 12.5 MM, Type A (447)	T= 1.5"	$234.68	$240	25

Total overlay miles is a calculation of lane miles between each segment of I-71. From I-270 to Polaris Parkway, 13 lanes are assumed (five existing lanes plus 12' shoulder in each direction with a bonus lane). From Polaris Parkway to the concept connection point, 8 lanes are assumed (three existing lanes plus 12' shoulder in each direction).

The following assumptions were made to calculate the mill-and-fill cost per mile::

- Planing: $2.10/SY
- Surface course: 1.5" thick at a cost of $240/CY

BRIDGE COSTS

The following assumptions were made for estimating freeway overhead replacement and mainline bridge widenings:

- 9,000 SF for an average 2-lane overpass bridge (from US-23 Corridor Study, PID 112768)
- $300/SF (10% premium for freeway work included)
- 18,000 SF for a 4-lane freeway bridge widening (approximate measurement taken from aerial imaging)
- 4,000 SF for a 2-lane freeway bridge that is approximately 150' long

WALLS

The noise wall costs were calculated using the cost per square foot.

Strategy: Utilize ODOT's Item Price Search Tool to identify the average height and cost of a noise wall.

Methods: Data was extracted from 16 data points to confirm a noise wall unit costs. A detailed review of a subset of these projects determine the average noise wall height.

Average Wall Height: The noise barrier height is approximately 15 feet, based on profile views found on the plan sets.

Item of interest: 606E10920 (Noise Barrier)

Pay Items and Cost Data: Cost data for the identified pay items is based on letting dates in 2024 and 2025.

TABLE I.6. NOISE WALL COSTS

Pay Item Description	Average Height	Weighted Average Item Price	Median of Item Price	Data Points
606E10920 – Special – Noise Barrier	~15ft	$29.18	$38.25	16

Noise walls are assumed to be installed from I-270 to Polaris Parkway and Gemini Place to Jaycox Road. In many locations this is a replacement of existing noise walls but also acknowledges the development pressures along this corridor. Therefore, the assumption was made that any noise wall gaps within the corridor would be filled in with any widenings. Length of the noise walls was measured using aerial imaging and an assumed noise wall height of 15' was used (30' was carried in the spreadsheet to account for walls on both sides of the freeway). The cost of new noise walls is $30/SF.

Retaining walls currently exist in most places between I-270 and Polaris. It was assumed that retaining walls would be needed along this section for freeway in lieu of obtaining right of way. Length of the retaining walls was measured using aerial imaging and an assumed retaining wall height of 9' was used (18' was carried in the spreadsheet to account for walls on both sides of the freeway). The cost of new retaining walls is $150/SF per engineering judgement.

I-71 – HIGH

I-71 Notes

I-71 quantities did not change when comparing low to high scenarios.

Costing Notes

A 30% cost increase was applied for the high scenario to the total costs in the low scenario. The more aggressive cost spread compared to the other costing areas was to acknowledge the challenge of working within one of the heavier corridors within the state.

Note:

The following pages contain the construction costing spreadsheets for the corridors reflective of the methodology found in these sheets.

7/16/2025

PRELIMINARY COST ESTIMATE (Low-Range) - New Terrain Freeways

Construction costs only

Ancillary Cost Percent Assumptions

- *10% Drainage*
- *10% Erosion Control*
- *8% MOT - High*
- *4% MOT - Low*
- *2% Traffic Control*
- *9% Incidentals*

Summary

Concept E1	Concept E2	Concept E3	Concept E4	Concept E5	Concept E6	Concept E7
$ 177,191,249	$ 188,784,027	$ 122,687,479	$ 157,911,963	$ 128,145,883	$ 116,339,706	$ 140,331,044

Detailed Breakdown

	Concept E1	Concept E2	Concept E3	Concept E4	Concept E5	Concept E6	Concept E7
New Freeway Distance (approx. miles)	15.2	20.1	12.6	21.5	14.3	13.3	15.1
Pavement Costs	$ 49,473,365	$ 65,422,016	$ 41,010,816	$ 69,978,773	$ 46,544,021	$ 43,289,195	$ 49,147,883
Earthwork Costs	$ 4,626,071	$ 6,117,370	$ 3,834,769	$ 6,543,455	$ 4,352,159	$ 4,047,812	$ 4,595,636
Delware Lake Earthwork Cost Surcharge	$ -	$ -	$ 608,694	$ -	$ 608,694	$ 608,694	$ -
Base Pavement and Earthwork Subtotal	**$ 54,099,436**	**$ 71,539,386**	**$ 45,454,279**	**$ 76,522,229**	**$ 51,504,874**	**$ 47,945,700**	**$ 53,743,519**
Bridge Cost Estimate Subtotal	**$ 77,153,341**	**$ 64,276,461**	**$ 45,425,335**	**$ 37,083,500**	**$ 40,686,409**	**$ 38,231,860**	**$ 47,214,067**
Ancillary Costs							
Drainage Costs	$ 13,125,278	$ 13,581,585	$ 9,087,961	$ 11,360,573	$ 9,219,128	$ 8,617,756	$ 10,095,759
Erosion Costs	$ 13,125,278	$ 13,581,585	$ 9,087,961	$ 11,360,573	$ 9,219,128	$ 8,617,756	$ 10,095,759
MOT Class	Low	High	Low	High	High	Low	High
MOT Costs	$ 5,250,111	$ 10,865,268	$ 3,635,185	$ 9,088,458	$ 7,375,303	$ 3,447,102	$ 8,076,607
Traffic Control Costs	$ 2,625,056	$ 2,716,317	$ 1,817,592	$ 2,272,115	$ 1,843,826	$ 1,723,551	$ 2,019,152
Incidental Costs	$ 11,812,750	$ 12,223,426	$ 8,179,165	$ 10,224,516	$ 8,297,215	$ 7,755,980	$ 9,086,183
Ancillary Subtotal	**$ 45,938,472**	**$ 52,968,180**	**$ 31,807,865**	**$ 44,306,234**	**$ 35,954,600**	**$ 30,162,146**	**$ 39,373,458**

7/16/2025

PRELIMINARY COST ESTIMATE (High-Range) - New Terrain Freeways

Construction costs only

Ancillary Cost Percent Assumptions

- *10% Drainage*
- *10% Erosion Control*
- *8% MOT - High*
- *4% MOT - Low*
- *2% Traffic Control*
- *9% Incidentals*

High-Range Increase Assumptions

- *1.25 Quantity Increase Factor*
- *1.2 Cost Increase Factor*

Summary

Concept E1	Concept E2	Concept E3	Concept E4	Concept E5	Concept E6	Concept E7
$ 236,881,719	$ 259,561,436	$ 167,575,309	$ 224,814,901	$ 177,521,154	$ 161,074,861	$ 193,203,776

Detailed Breakdown

	Concept E1	Concept E2	Concept E3	Concept E4	Concept E5	Concept E6	Concept E7
New Freeway Distance (approx. miles)	19.0	25.1	15.8	26.9	17.9	16.6	18.9
Pavement Costs	$ 74,210,048	$ 98,133,024	$ 61,516,224	$ 104,968,160	$ 69,816,032	$ 64,933,792	$ 73,721,824
Earthwork Costs	$ 8,673,883	$ 11,470,069	$ 7,190,192	$ 12,268,979	$ 8,160,298	$ 7,589,647	$ 8,616,818
Delware Lake Earthwork Cost Surcharge	$ -	$ -	$ 913,040	$ -	$ 913,040	$ 913,040	$ -
Base Pavement and Earthwork Subtotal	**$ 82,883,931**	**$ 109,603,093**	**$ 69,619,457**	**$ 117,237,139**	**$ 78,889,370**	**$ 73,436,480**	**$ 82,338,642**
Bridge Cost Estimate Subtotal	**$ 92,584,009**	**$ 77,131,753**	**$ 54,510,402**	**$ 44,500,200**	**$ 48,823,691**	**$ 45,878,232**	**$ 56,656,880**
Ancillary Costs							
Drainage Costs	$ 17,546,794	$ 18,673,485	$ 12,412,986	$ 16,173,734	$ 12,771,306	$ 11,931,471	$ 13,899,552
Erosion Costs	$ 17,546,794	$ 18,673,485	$ 12,412,986	$ 16,173,734	$ 12,771,306	$ 11,931,471	$ 13,899,552
MOT Class	Low	High	Low	High	High	Low	High
MOT Costs	$ 7,018,718	$ 14,938,788	$ 4,965,194	$ 12,938,987	$ 10,217,045	$ 4,772,588	$ 11,119,642
Traffic Control Costs	$ 3,509,359	$ 3,734,697	$ 2,482,597	$ 3,234,747	$ 2,554,261	$ 2,386,294	$ 2,779,910
Incidental Costs	$ 15,792,115	$ 16,806,136	$ 11,171,687	$ 14,556,360	$ 11,494,175	$ 10,738,324	$ 12,509,597
Ancillary Subtotal	**$ 61,413,779**	**$ 72,826,590**	**$ 43,445,450**	**$ 63,077,562**	**$ 49,808,094**	**$ 41,760,149**	**$ 54,208,254**

7/16/2025

PRELIMINARY COST ESTIMATE (Low-Range) - Interchanges

Costing Notes

Low Cost Estimate	*Interchange Type*
$45,000,000	*System-Basic*
$80,000,000	*System-Complex*
$20,000,000	*Service-Basic*
$35,000,000	*Service-Complex*

Summary

Interchange Type	Concept E1	Concept E2	Concept E3	Concept E4	Concept E5	Concept E6	Concept E7
System-Basic	2	1	1	1	0	0	1
System-Complex	0	1	1	1	2	2	1
Service-Basic	1	1	2	2	2	1	1
Service-Complex	0	3	1	4	3	2	0
Total Interchanges	**3**	**6**	**5**	**8**	**7**	**5**	**3**
GRAND TOTAL - Interchanges	$110,000,000	$250,000,000	$200,000,000	$305,000,000	$305,000,000	$250,000,000	$145,000,000

Detailed Breakdown

Interchange Type	Interchange Location	Concept E1	Concept E2	Concept E3	Concept E4	Concept E5	Concept E6	Concept E7
System-Basic	US-23	1	1		1			1
System-Complex	US-23			1		1	1	
Service-Basic	Peters Rd			1		1		
Service-Complex	SR-229 (west of Ashley)			1		1	1	
Service-Basic	SR-98				1			
Service-Complex	Whetstone River Road				1			
Service-Complex	SR-746				1			
Service-Complex	SR-95 (west of Edison)				1			
Service-Basic	SR-61				1			
Service-Basic	US-42	1	1	1		1	1	1
Service-Complex	SR-95 (east of Mt. Gilead)				1			
Service-Complex	SR-229 (east of Ashley)					1		
Service-Complex	Worthington-New Haven Rd					1		
Service-Complex	SR-36/37 (west of Alum Creek Lake)		1					
Service-Complex	N. Old State Rd		1					
Service-Complex	US-36/SR-37 (At Sunbury Pkwy Ext.)		1					
Service-Complex	SR-521 (east of Kilbourne)						1	
System-Basic	I-71	1		1				
System-Complex	I-71		1		1	1	1	1

7/16/2025

PRELIMINARY COST ESTIMATE (High-Range) - Interchanges

Costing Notes

High Cost Estimate	*Interchange Type*
$54,000,000	*System-Basic*
$96,000,000	*System-Complex*
$24,000,000	*Service-Basic*
$42,000,000	*Service-Complex*

120%

**cost increase compared to low scenario*

Summary

Interchange Type	Concept E1	Concept E2	Concept E3	Concept E4	Concept E5	Concept E6	Concept E7
System-Basic	2	1	1	1	0	0	1
System-Complex	0	1	1	1	2	2	1
Service-Basic	1	1	2	2	2	1	1
Service-Complex	0	3	1	4	3	2	0
Total Interchanges	**3**	**6**	**5**	**8**	**7**	**5**	**3**
GRAND TOTAL - Interchanges	$132,000,000	$300,000,000	$240,000,000	$366,000,000	$366,000,000	$300,000,000	$174,000,000

Detailed Breakdown

Interchange Type	Interchange Location	Concept E1	Concept E2	Concept E3	Concept E4	Concept E5	Concept E6	Concept E7
System-Basic	US-23	1	1		1			1
System-Complex	US-23			1		1	1	
Service-Basic	Peters Rd			1		1		
Service-Complex	SR-229 (west of Ashley)			1		1	1	
Service-Basic	SR-98				1			
Service-Complex	Whetstone River Road				1			
Service-Complex	SR-746				1			
Service-Complex	SR-95 (west of Edison)				1			
Service-Basic	SR-61				1			
Service-Basic	US-42	1	1	1		1	1	1
Service-Complex	SR-95 (east of Mt. Gilead)				1			
Service-Complex	SR-229 (east of Ashley)					1		
Service-Complex	Worthington-New Haven Rd					1		
Service-Complex	SR-36/37 (west of Alum Creek Lake)		1					
Service-Complex	N. Old State Rd		1					
Service-Complex	US-36/SR-37 (At Sunbury Pkwy Ext.)		1					
Service-Complex	SR-521 (east of Kilbourne)						1	
System-Basic	I-71	1		1				
System-Complex	I-71		1		1	1	1	1

7/16/2025

PRELIMINARY COST ESTIMATE (Low-Range) - Arterial Improvements

Construction costs only

Ancillary Cost Percent Assumptions

- *10% Drainage*
- *10% Erosion Control*
- *8% MOT - High*
- *4% MOT - Low*
- *2% Traffic Control*
- *9% Incidentals*

Summary

Concept E1	Concept E2	Concept E3	Concept E4	Concept E5	Concept E6	Concept E7
$ 2,260,980	$ 51,656,057	$ 41,967,002	$ 51,380,726	$ 53,884,748	$ 41,633,366	$ 2,327,972

Detailed Breakdown

	Concept E1	Concept E2	Concept E3	Concept E4	Concept E5	Concept E6	Concept E7
New arterial improvement miles (approx.)	1.0	3.0	5.0	11.0	11.0	7.0	1.0
Pavement Costs	$ 1,370,453	$ 4,111,360	$ 6,852,267	$ 15,074,987	$ 15,074,987	$ 9,593,173	$ 1,370,453
Earthwork Costs	$ 304,347	$ 913,040	$ 1,521,734	$ 3,347,814	$ 3,347,814	$ 2,130,427	$ 304,347
Base Pavement and Earthwork Subtotal	**$ 1,674,800**	**$ 5,024,400**	**$ 8,374,000**	**$ 18,422,801**	**$ 18,422,801**	**$ 11,723,601**	**$ 1,674,800**
Bridge Cost Estimate Subtotal	**$ -**	**$ 32,138,231**	**$ 22,712,668**	**$ 18,541,750**	**$ 20,343,205**	**$ 19,115,930**	**$ -**
			Ancillary Costs				
Drainage	$ 167,480	$ 3,716,263	$ 3,108,667	$ 3,696,455	$ 3,876,601	$ 3,083,953	$ 167,480
Erosion Control	$ 167,480	$ 3,716,263	$ 3,108,667	$ 3,696,455	$ 3,876,601	$ 3,083,953	$ 167,480
MOT Class	Low	High	Low	High	High	Low	High
MOT	$ 66,992	$ 2,973,010	$ 1,243,467	$ 2,957,164	$ 3,101,280	$ 1,233,581	$ 133,984
Traffic Control	$ 33,496	$ 743,253	$ 621,733	$ 739,291	$ 775,320	$ 616,791	$ 33,496
Incidentals	$ 150,732	$ 3,344,637	$ 2,797,800	$ 3,326,810	$ 3,488,940	$ 2,775,558	$ 150,732
Ancillary Subtotal	**$ 586,180.03**	**$ 14,493,426.01**	**$ 10,880,333.79**	**$ 14,416,174.90**	**$ 15,118,742.16**	**$ 10,793,835.73**	**$ 653,172.04**

7/16/2025

PRELIMINARY COST ESTIMATE (High-Range) - Arterial Improvements

Construction costs only

Ancillary Cost Percent Assumptions

- *10% Drainage*
- *10% Erosion Control*
- *8% MOT - High*
- *4% MOT - Low*
- *2% Traffic Control*
- *9% Incidentals*

High-Range Increase Assumptions

- *1.25 Quantity Increase Factor*
- *1.2 Cost Increase Factor*

Summary

Concept E1	Concept E2	Concept E3	Concept E4	Concept E5	Concept E6	Concept E7
$ 3,545,546	$ 64,558,365	$ 54,522,250	$ 71,084,227	$ 74,089,054	$ 55,786,627	$ 3,650,599

Detailed Breakdown

	Concept E1	Concept E2	Concept E3	Concept E4	Concept E5	Concept E6	Concept E7
New arterial improvement miles (approx.)	1.3	3.8	6.3	13.8	13.8	8.8	1.3
Pavement Costs	$ 2,055,680	$ 6,167,040	$ 10,278,400	$ 22,612,480	$ 22,612,480	$ 14,389,760	$ 2,055,680
Earthwork Costs	$ 570,650	$ 1,711,951	$ 2,853,251	$ 6,277,152	$ 6,277,152	$ 3,994,551	$ 570,650
Base Pavement and Earthwork Subtotal	**$ 2,626,330**	**$ 7,878,991**	**$ 13,131,651**	**$ 28,889,632**	**$ 28,889,632**	**$ 18,384,311**	**$ 2,626,330**
Bridge Cost Estimate Subtotal	**$ -**	**$ 38,565,877**	**$ 27,255,201**	**$ 22,250,100**	**$ 24,411,845**	**$ 22,939,116**	**$ -**
			Ancillary Costs				
Drainage	$ 262,633	$ 4,644,487	$ 4,038,685	$ 5,113,973	$ 5,330,148	$ 4,132,343	$ 262,633
Erosion Control	$ 262,633	$ 4,644,487	$ 4,038,685	$ 5,113,973	$ 5,330,148	$ 4,132,343	$ 262,633
MOT Class	Low	High	Low	High	High	Low	High
MOT	$ 105,053	$ 3,715,589	$ 1,615,474	$ 4,091,179	$ 4,264,118	$ 1,652,937	$ 210,106
Traffic Control	$ 52,527	$ 928,897	$ 807,737	$ 1,022,795	$ 1,066,030	$ 826,469	$ 52,527
Incidentals	$ 236,370	$ 4,180,038	$ 3,634,817	$ 4,602,576	$ 4,797,133	$ 3,719,108	$ 236,370
Ancillary Subtotal	**$ 919,215.56**	**$ 18,113,498.18**	**$ 14,135,398.16**	**$ 19,944,495.46**	**$ 20,787,576.16**	**$ 14,463,199.53**	**$ 1,024,268.77**

7/16/2025

PRELIMINARY COST ESTIMATE (Low-Range) - I-71 Improvements

Construction costs only

Ancillary Cost Percent Assumptions

- *7% Drainage*
- *6% Erosion Control*
- *10% MOT*
- *2% Traffic Control*
- *20% Incidentals*

Summary

Concept E1	Concept E2	Concept E3	Concept E4	Concept E5	Concept E6	Concept E7
$ 225,952,473	$ 189,659,570	$ 225,952,473	$ 197,773,119	$ 197,773,119	$ 227,399,247	$ 197,773,119

Detailed Breakdown

	Concept E1	Concept E2	Concept E3	Concept E4	Concept E5	Concept E6	Concept E7
I-71 to Polaris Miles	1.3	1.3	1.3	1.3	1.3	1.3	1.3
New Pavement Costs	$ 4,923,776	$ 4,923,776	$ 4,923,776	$ 4,923,776	$ 4,923,776	$ 4,923,776	$ 4,923,776
Earthwork Costs	$ 395,651	$ 395,651	$ 395,651	$ 395,651	$ 395,651	$ 395,651	$ 395,651
Polaris to Connection	13.9	8.9	13.9	9.5	9.5	14.2	9.5
Pavement Costs	$ 33,923,413	$ 21,720,747	$ 33,923,413	$ 23,185,067	$ 23,185,067	$ 34,655,573	$ 23,185,067
Earthwork Costs	$ 2,834,381	$ 1,814,820	$ 2,834,381	$ 1,937,167	$ 1,937,167	$ 2,895,555	$ 1,937,167
I-71 to Polaris Overlay (Lane Miles)	16.9	16.9	16.9	16.9	16.9	16.9	16.9
Polaris to Connection (Lane Miles)	111.2	71.2	111.2	76	76	113.6	76
Total Lanes Miles Overlay	128.1	88.1	128.1	92.9	92.9	130.5	92.9
SY Overlay	901824	620224	901824	654016	654016	918720	654016
CY Overlay	37576	25843	37576	27251	27251	38280	27251
Overlay Pavement Cost	$ 9,018,240	$ 6,202,240	$ 9,018,240	$ 6,540,160	$ 6,540,160	$ 9,187,200	$ 6,540,160
Ovelay Planing Cost	$ 1,893,830	$ 1,302,470	$ 1,893,830	$ 1,373,434	$ 1,373,434	$ 1,929,312	$ 1,373,434
Base Pavement and Earthwork Subtotal	**$ 52,989,292**	**$ 36,359,704**	**$ 52,989,292**	**$ 38,355,254**	**$ 38,355,254**	**$ 53,987,067**	**$ 38,355,254**
I-71 to Polaris Bridges (2-lane equilvalent) overhead replacement	9	9	9	9	9	9	9
Mainline Bridge Widening	1	1	1	1	1	1	1
Bridge Cost	$ 29,700,000	$ 29,700,000	$ 29,700,000	$ 29,700,000	$ 29,700,000	$ 29,700,000	$ 29,700,000
Polaris to Connection (2-lane equivalent)	18	11	18	14	14	18	14
Mainline Bridge Widening	5	5	5	5	5	5	5
Bridge Cost	$ 27,600,000	$ 19,200,000	$ 27,600,000	$ 22,800,000	$ 22,800,000	$ 27,600,000	$ 22,800,000
Bridge Cost Estimate Subtotal	**$ 57,300,000**	**$ 48,900,000**	**$ 57,300,000**	**$ 52,500,000**	**$ 52,500,000**	**$ 57,300,000**	**$ 52,500,000**
Gemini to Jaycox distance	17000	17000	17000	17000	17000	17000	17000
Polaris to I270	8400	8400	8400	8400	8400	8400	8400
Sum Noise Walls Length	25400	25400	25400	25400	25400	25400	25400
Noise Wall Cost Subtotal	**$ 22,860,000**	**$ 22,860,000**	**$ 22,860,000**	**$ 22,860,000**	**$ 22,860,000**	**$ 22,860,000**	**$ 22,860,000**
Polaris to I-270	8400	8400	8400	8400	8400	8400	8400
SF Retaining Walls	151200	151200	151200	151200	151200	151200	151200
Retaining Wall Cost Subtotal	**$ 22,680,000**	**$ 22,680,000**	**$ 22,680,000**	**$ 22,680,000**	**$ 22,680,000**	**$ 22,680,000**	**$ 22,680,000**
Ancillary Costs							
Drainage	$ 10,908,050	$ 9,155,979	$ 10,908,050	$ 9,547,668	$ 9,547,668	$ 10,977,895	$ 9,547,668
Erosion Control	$ 9,349,758	$ 7,847,982	$ 9,349,758	$ 8,183,715	$ 8,183,715	$ 9,409,624	$ 8,183,715
MOT Class	High	High	Low	High	High	Low	High
MOT	$ 15,582,929	$ 13,079,970	$ 15,582,929	$ 13,639,525	$ 13,639,525	$ 15,682,707	$ 13,639,525
Traffic Control	$ 3,116,586	$ 2,615,994	$ 3,116,586	$ 2,727,905	$ 2,727,905	$ 3,136,541	$ 2,727,905
Incidentals	$ 31,165,858	$ 26,159,941	$ 31,165,858	$ 27,279,051	$ 27,279,051	$ 31,365,413	$ 27,279,051
Ancillary Subtotal	**$ 70,123,181.36**	**$ 58,859,866.62**	**$ 70,123,181.36**	**$ 61,377,864.39**	**$ 61,377,864.39**	**$ 70,572,180.24**	**$ 61,377,864.39**

7/16/2025

PRELIMINARY COST ESTIMATE (High-Range) - I-71 Improvements

Construction costs only

Ancillary Cost Percent Assumptions

- *7% Drainage*
- *6% Erosion Control*
- *10% MOT*
- *2% Traffic Control*
- *20% Incidentals*

High-Range Increase Assumptions

- *1.3 Cost Increase Factor*

Summary

Concept E1	Concept E2	Concept E3	Concept E4	Concept E5	Concept E6	Concept E7
$ 293,738,215	$ 246,557,441	$ 293,738,215	$ 257,105,054	$ 257,105,054	$ 295,619,022	$ 257,105,054

APPENDIX II: RIGHT OF WAY COSTING DETAILED METHODOLOGY

METHODOLOGY

1. Establish proposed ROW limits

Establish proposed ROW limits for alternatives E1-E7 based on ConceptStation models developed by Roadway team.

a. Create the centerline of the proposed alignment in ConceptStation (by the roadway team).
b. Import the CAD data into GIS.
c. Use the "Define Projection" tool to assign the correct coordinate system to the shapefiles, enabling editing.
d. Generate a 300-foot buffer around the mainline centerline using the "Buffer" tool to represent the proposed ROW swath.
e. Create a second buffer extending 15 feet beyond the proposed grading limits.
f. Merge the two buffer layers into one using the "Append" tool.
g. Edit the vertices of the merged polygons to form a closed polygon that accurately represents the proposed ROW limits.

2. Gather parcel data

Gather parcel data from the affected counties. Data includes parcel valuation as of the most recent county-wide reappraisal and land-use codes.

a. Delaware County - https://gisdatadelco.hub.arcgis.com/datasets/cd8f9ac644ec4dc1979b254193b895a2_0/explore?location=40.284660%2C-82.997732%2C11.69
b. Marion County – https://services.arcgis.com/T6eVl85nNm64wxjn/arcgis/rest/services/parcel_joined/FeatureServer/0
c. Morrow County – https://services9.arcgis.com/fb2xHTkLEUUJA1y5/arcgis/rest/services/parcel_joined/FeatureServer/0

3. Clean up GIS parcel data

Clean up GIS parcel data to remove duplicate values from the analysis.

a. Delaware County – data includes some duplicate parcels with identical (coincident) geometry, land use code, and valuation. Duplicate polygons were removed from the dataset to avoid double counting impacts.
b. Marion County – no adjustments needed.

c. Morrow County – some adjacent (non-coincident) parcels have identical parcel IDs and data, including land use code and valuation. These parcels are listed under a single entry on the auditor's website. Parcels were merged in GIS and analyzed as one shape.

4. Calculate the area of each individual parcel that intersects the proposed ROW

Using the ConceptStation ROW polygon developed in step 1, use the GIS "Summarize Within" tool to calculate the area of each individual parcel that intersects the proposed ROW.

a. Export the resulting data to Excel

5. Perform calculations for each affected parcel

Perform the following calculations for each affected parcel (Details in Calculations):

a. **Percent Take** – the intersecting area calculated in step 4 as a percentage of the total parcel area.
b. **Full Take** – if the Percent Take exceeds the threshold value set for the parcel land use code, then the parcel is assumed to be a full take. If the Percent Take is less than the threshold percentage, then the parcel is assumed to be a partial take. The following thresholds were used:
    i. Commercial, industrial land use – **10%**
    ii. Agricultural, residential land use – **50%**
    iii. Exempt, public land use – **N/A (see below)**
c. **Adjusted Parcel Valuation** – the base valuation for each impacted parcel was adjusted upwards based on the parcel land use code to represent the additional cost which may be incurred during ROW acquisition. The following values were used for partial takes:
    i. Commercial, agricultural, industrial land use – **150%** of base parcel valuation
    ii. Residential land use – **130%** of base parcel valuation
    iii. Exempt, public land use – Adjusted value **set at $0**.
        1. *The analysis assumes that the detailed design of each alternative will be refined to avoid significant ROW impacts to tax-exempt private-use land, and that public-use land will either be avoided or repurposed at minimal cost. Exempt or public-use parcels include, but not limited to: schools, churches, parks, cemeteries, existing transportation ROW.*
d. **Acreage Impact** – calculate the total acreage impact of ROW acquisition activities:
    i. For full takes, the acreage impact is taken to be the full parcel acreage.
    ii. For partial takes, the acreage impact is taken to be the full parcel acreage multiplied by the Percent Take.
e. **Take Value** – calculate the total dollar value of ROW acquisition activities:
    i. For full takes, the take value is equal to the Base Valuation.
    ii. For partial takes, the take value is equal to the Adjusted Parcel Valuation multiplied by the Percent Take.
f. **ROW Processing Fee** – a flat value of **$10,000** is assessed for each impacted parcel to represent the administrative costs of ROW acquisition activities. This step includes exempt and public-use parcels.

g. **Full Take Surcharge** – for full takes, an additional factor of **200%** is applied to the base valuation to represent additional costs associated with full takes, such as relocations. The total full take value is equal to the base valuation multiplied by 3.

Notes:

- This analysis does not consider existing ROW when developing acreage impacts and assessing Percent Take. Acreage impacts to parcels that extend into existing transportation ROW (e.g., to the centerline of a county road) are treated the same as parcels with no existing ROW use.
- This is a high level analysis based on Percent Take only. It does not consider the actual location of infrastructure on parcels relative to the assumed ROW impacts when determining full vs. partial takes.
- This analysis is limited to parcel valuations as determined by County Auditor data and does not consider any additional factors such as year built, square footage, historic or architectural value, etc.
- The thresholds and value adjustment factors in Step 5 follow the methodology of the Route 23 Connect Preliminary Feasibility Study.

CALCULATIONS

Right-of-Way (ROW) Impact Analysis (Automated Script-Based Version)

The ROW impact analysis was performed using a Python-based script "ROW_Cost_Analysis.py". The process is designed to ingest a structured Excel workbook (.xlsx) containing multiple sheets, each representing parcel-level impact data for a specific county. The script standardizes input, performs all computations, and outputs an Excel workbook summarizing ROW impact values by county.

1. Input Requirements

All sheets are read and standardized to the following columns:

- The input file must be an **Excel workbook (.xlsx)**.
- Each **sheet** represents a different **county-level dataset** and must follow one of two standardized formats depending on the county:

a. Delaware County Sheet Requirements

Column Name	Description
OBJECTID	Parcel identifier
CLASS	Land use classification code
ACRES	Parcel size in acres
MARKET_TOT	Base parcel valuation
sum_Area_SQUAREFEET	Intersecting area from ROW footprint
Shape_Area	Total parcel area in square feet

Note: For Delaware, the land use code is translated using the first digit of the CLASS field.

b. All Other County Sheet Requirements

Column Name	Description
OBJECTID	Parcel identifier
PPAcres	Parcel size in acres
PPClassCode	Pre-labeled land use code (A, R, C, etc.)
PPTotalValue	Base parcel valuation
sum_Area_SQUAREFEET	Intersecting area from ROW footprint
Shape_Area	Total parcel area in square feet

In both formats, the intersecting area represents the portion of the parcel affected by ROW acquisition.

2. Processing Steps (Automated in Script)

Once the workbook is provided, the script performs the following steps:

c. Standardization and Merging

All sheets are read and standardized to the following columns:

- OBJECTID
- Acres (from ACRES or PPAcres)
- TotalValue (from MARKET_TOT or PPTotalValue)
- Intersecting_Area_sqft (from sum_Area_SQUAREFEET)
- Parcel_Area_sqft (from Shape_Area)
- Land_Use_Type (mapped from CLASS or taken directly as PPClassCode)
- County (parsed from the sheet name)

d. Percent Take

Calculated as:

Percent_Take = (Intersecting_Area_sqft / Parcel_Area_sqft) * 100

e. Full Take Determination

Thresholds are applied based on Land_Use_Type:

Commercial (C), Industrial (I) → 10%

Agricultural (A), Residential (R) → 50%

Exempt/Public (E) → No threshold; treated separately

f. Adjusted Parcel Valuation

Adjusted to account for acquisition complexity:

- C, I, A → 150% of base value
- R → 130%

- E → $0

g. **Acreage Impact**
   - For **full takes**: uses total parcel area (Parcel_Area_sqft) converted to acres
   - For **partial takes and exempt parcels**: uses intersecting area (Intersecting_Area_sqft) converted to acres

h. **Take Value**
   - Full takes: equal to Adjusted Parcel Value
   - Partial takes: prorated by Percent_Take
   - Exempt: set to 0

i. **ROW Processing Fee**

A flat **$10,000** is added to all parcels, including exempt/public-use land.

j. **Full Take Surcharge**

Full takes receive a surcharge equal to **200%** of their base valuation (for relocation and additional ROW expenses).

k. **Total Full Take Value**

Calculated as:

Total_Full_Take_Value = Take_Value + $10k_ROW_fee + Full_Take_Surcharge

3. Output

- A new Excel workbook is generated in a /Results/ subdirectory.
- The output file is named:
- Affected_Parcels_<InputFileName>.xlsx
- Each sheet in the output represents a county and contains the fully calculated parcel-level data.

APPENDIX III: PAVEMENT TYPE COST COMPARISON

Rigid Pavement Capital Cost Development

To compare rigid to flexible pavement capital costs, all quantities and costs assumed as outlined in Appendix I: Construction Costing Detailed Methodology were held constant except for the pavement costs.

RIGID CONCRETE PAVEMENT CONSTRUCTION COSTS

The pavement costs were calculated using the pavement cost per mile.

Strategy: Utilize ODOT's Item Price Search Tool to identify the weighted average and median prices for the subcomponents of the pavement structure cross section. The outcome is the cost of the pavement structure per mile of roadway.

Methods: Aggregate base depth was assumed to remain the same as flexible pavement. Rigid concrete pavement assumed to be 10" non-reinforced. The depth was determined based upon engineering judgement and the non-reinforced concrete per ODOT preferences as outlined in *ODOT Pavement Design Manual*.

Pay Items and Cost Data: Cost data for the identified pay items is based on letting dates in 2024 and 2025.

TABLE III.1. RIGID CONCRETE PAVEMENT TYPICAL SECTION PAY ITEMS AND COST DATA

Pay Item Description	Depth T [in]	Weighted Average Item Price	Median of Item Price	Data Points
452E14020– Non-Reinforced Concrete Pavement, Class QC 1P With QC/QA (SY)	T= 10"	$118.2	$108	2
304E20000 – Aggregate Base (CY)	T=6"	$74.46	$95.00	447
204E10000 – Subgrade Compaction and Proof Rolling (SY)	-	$2.10	$3.00	377

The following assumptions were made to calculate the pavement cost per mile:

- Non-Reinforced Concrete Pavement: 10" thick at a cost of $110/SY
- Aggregate Base: 6" thick at a cost of $95/CY
- Compaction: $3/SY
- Cross Section Width: 76' (bidirectional)
    - Inner Shoulder: 4'
    - Lane: 12' (2 each direction)
    - Outer Shoulder: 10'

Capital Cost Comparison Results

The results of the sketch level analysis show that the construction costs of rigid pavement are approximately 43% greater on average than flexible pavement. (Note that just the low scenario results are reported for simplicity, not duplicated with the high scenario that increases quantities and costs as outlined in Appendix I.)

TABLE III.2. NEW TERRAIN FREEWAY PAVEMENT COST COMPARISON (LOW SCENARIO)

Corridor ID	Flexible Pavement Construction Costs	Rigid Pavement Construction Costs
E1	$49,473,000	$87,313,000
E2	$65,422,000	$115,459,000
E3	$41,011,000	$72,378,000
E4	$69,979,000	$123,501,000
E5	$46,544,000	$82,143,000
E6	$43,289,000	$76,399,000
E7	$49,148,000	$86,738,000

Maintenance Cost Overview

A sketch level cost analysis was completed comparing the maintenance costs between flexible and rigid pavement types. The guidelines from the *ODOT Pavement Design Manual* were utilized for this analysis. The guidelines prescribe what future rehabilitation is required to keep the pavement in serviceable condition for the next 35 years and those key rehabilitation steps are outlined below.

Flexible pavement rehabilitation steps:

a. Year 14: 1.5" overlay with planing (driving lanes only)
b. Year 24: 3.25" overlay with planing (driving lanes and shoulders) with 1% patching planed surface
c. Year 34: 1.5” overlay with planing (driving lanes only)

Rigid pavement rehabilitation steps:

a. Year 22: Diamond grinding (driving lanes plus one foot of each shoulder) and full depth rigid repairs of 4% of the driving lanes surface area
b. Year 32: 3.25" asphalt overlay and full depth rigid repair of 2% of the driving lanes surface area

Key Assumptions

The analysis was completed by analyzing the critical pay items associated with each pavement type. For flexible pavement, asphalt cost, planing costs, patching costs, and sawing costs were included. For rigid pavement, grinding costs, full depth replacement costs, asphalt costs, and sawing costs were included. The ratio of sawing quantities to patching quantities were determined based upon a review of the quantities included in PID 91774 and PID 116910. Unit

pricing was obtained from ODOT Bid Data for 2025 and 2024. The future year inflation values were obtained from the ODOT inflation calculator.

Maintenance Cost Comparison Results

The results of the sketch level analysis show that the maintenance costs of rigid pavement are approximately 21% less than flexible pavement. This is just outside the magnitude of the 20% low vs. high contingency factor included in the O+M costing analysis included in the primary O+M costing estimates.

TABLE III.3. MAINTENANCE COST COMPARISON (LOW SCENARIO)

Corridor ID	Flexible Pavement Maintenance Costs	Rigid Pavement Maintenance Costs
E1	$49,315,000	$40,614,000
E2	$65,212,000	$53,706,000
E3	$40,879,000	$33,666,000
E4	$69,755,000	$57,447,000
E5	$46,395,000	$38,209,000
E6	$43,150,000	$35,537,000
E7	$48,990,000	$40,346,000

Lifecycle Cost Overview

A sketch level lifecycle cost analysis (LCCA) was completed comparing the construction and maintenance costs between flexible and rigid pavement types.

Lifecycle Cost Comparison Results

The results below reflect the full lifecycle cost comparison of flexible to rigid pavement.

TABLE III.4. LIFECYCLE COST COMPARISON – (LOW SCENARIO)

Corridor ID	Flexible Pavement	Rigid Pavement	Difference (Rigid – Flexible)
E1	$98,788,000	$127,927,000	$29,139,000
E2	$130,634,000	$169,165,000	$38,531,000
E3	$81,890,000	$106,044,000	$24,154,000
E4	$139,734,000	$180,948,000	$41,214,000
E5	$92,939,000	$120,352,000	$27,413,000
E6	$86,439,000	$111,936,000	$25,497,000
E7	$98,138,000	$127,084,000	$28,946,000

Utilization & Benefits Technical Memo

US-23 to I-71 Connector Joint Plan – Interim Report – HB 96

INTRODUCTION

This memorandum provides a technical summary of the corridor and analysis study area utilization and estimated benefits for the corridor alternatives currently under evaluation as part of the US-23 to I-71 Connector Joint Plan, a planning effort led by the Ohio Department of Transportation (ODOT) and the Ohio Turnpike and Infrastructure Commission (OTIC) in response to House Bill 54, Section 755.60 (further amended by HB 96).

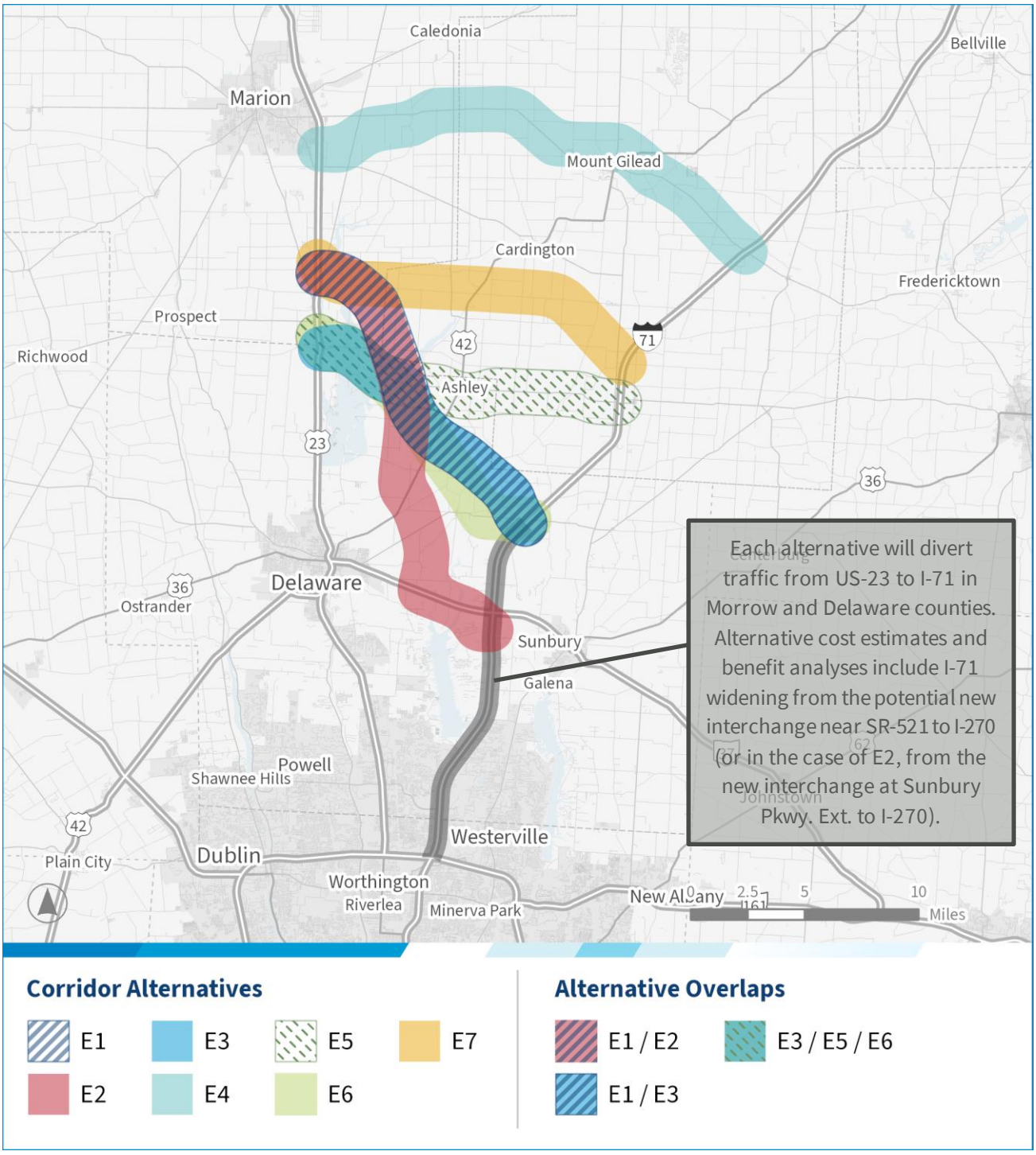
The purpose of this memo is to document the travel demand forecasting assumptions, the resulting utilization of each alternative corridor, and estimated benefits compared to the no build for a 20-year analysis period (2036 – 2055). All analysis results are summarized for a 20-county analysis study area unless otherwise noted.

CORRIDOR CONCEPTS OVERVIEW

The generalized corridor swaths representing corridor alternatives E1 – E7 are presented in **Figure 1**. Note, **Figure 1** also depicts the various overlaps among the seven corridor swaths. In the Corridor Concepts Technical Memo, conceptual centerlines and interchange locations are presented. These centerlines and interchange locations are representative of how each alternative was coded into a hybrid version of the Ohio Statewide Model (OSWM) applied for this analysis. An overview of each corridor alternative is presented in **Table 1**. **Table 2** provides a summary of each corridor alternative interchange locations.

Furthermore, as referenced in **Figure 1**, a widening of I-71 was included as a part of this evaluation. The interstate widening extends from I-270 to the potential new interchange of the US-23 to I-71 Connector, or in the case of E4, E5 or E7, the widening extends to the existing US-36/SR-37 interchange.

FIGURE 1. CORRIDOR ALTERNATIVE CONCEPTS



Source: ODOT

TABLE 1. CORRIDOR ALTERNATIVE CONCEPT DESCRIPTIONS

Corridor ID	Description and General Concept
E1	Swath located in Marion, Morrow, and Delaware counties including 15 miles of new freeway on new alignment between US-23 (north of Waldo) and I-71 (south of Marengo).
E2	Swath located in Delaware County including 16 miles of new freeway on new alignment and a 3-mile freeway upgrade of US-36/SR-37, connecting to I-71 via the Sunbury Parkway interchange.
E3	Swath located in Delaware County including a 5-mile freeway upgrade of SR-229 between US-23 and Ashley and 12 miles of new freeway on new alignment (including a bypass of Ashley) connecting to I-71 south of Marengo.
E4	Swath located in Marion and Morrow counties including 11 miles of new freeway on new alignment with a bypass of Mt. Gilead and an 11-mile freeway upgrade of SR-95.
E5	Swath located in Delaware County including an 11-mile freeway upgrade of SR-229 and a 3-mile new freeway on new alignment bypass of Ashley.
E6	Swath located in Delaware County including a 4-mile freeway upgrade of SR-229, 7 miles of new freeway on new alignment from SR-229 to SR-521 near Kilbourne, and a 3-mile freeway upgrade of SR-521 connecting to I-71.
E7	Swath located in Marion, Delaware, and Morrow counties including 14 miles of new freeway on new alignment from the SR-529/Waldo area to I-71 north of Marengo (generally following the Waldo-Fulton Road corridor).

Definitions:

Freeway upgrade: Existing roadway corridor is expanded to meet freeway facility design and operational standards.

New freeway on new alignment: New freeway corridor is primarily located within new greenfield right-of-way (and in some cases may repurpose and expand existing roadway corridors).

TABLE 2. PROPOSED INTERCHANGE SUMMARY

Corridor ID	Interchange Locations	Total Interchanges
E1	US-23; US-42 (south of Ashley); I-71	3
E2	US-23; US-42 (south of Ashley); US-36/SR-37 (west of Alum Creek Lake); North Old State Road; US-36/SR-37 (at Sunbury Parkway Extension); I-71	6
E3	US-23; Peters Road; SR-229 (west of Ashley); US-42 (south of Ashley); I-71	5
E4	US-23; SR-98; Whetstone River Road (in Claridon); SR-746; SR-95 (west of Mt. Gilead); SR-61; Williamsport-Bloomingrove Road (east of Mt. Gilead); I-71	8
E5	US-23; Peters Road (west of Ashley); SR-229 (west of Ashley); US-42; SR-229 (east of Ashley); Worthington-New Haven Road; I-71	7
E6	US-23; SR-229 (west of Ashley); US-42 (south of Ashley); SR-521 (east of Kilbourne); I-71	5
E7	US-23; US-42 (north of Ashley); I-71	3

UTILIZATION ANALYSIS

Methodology

The Ohio Statewide Model (OSWM) served as the primary travel demand analysis tool supporting estimates of future vehicle volumes and speeds within the analysis study area, leading to the quantification of benefits as part of the benefit-cost analysis. Use of the OSWM and data assumptions were customized to meet the analysis needs and context. The benefits analysis is consistent with the United States Department of Transportation's Benefit-Cost Analysis Guidance for Discretionary Grant Programs, dated December 2023.

Assumptions and Updates

The analytical process and assumptions to estimate benefits are different from prior analysis in the 23Connect Preliminary Feasibility Study. Assumptions for this study include:

- **Study area** – Expands analysis area from approximately 6 counties to 20 counties to capture all counties between Toledo and Columbus along the corridor, as well as counties between Columbus and Sandusky.
- **Horizon years** – Forecasts travel demand in 2035 and 2055 to estimate total benefits for the 20-year period 2036 to 2055.
- **Population forecasts** – Incorporates the official population growth forecast by county from the Ohio Department of Development (ODOD).
- **Employment forecasts** – Updates employment forecasts based on the 2020 Census and Intel development impacts for the MORPC region.

- **Updated Mid-Ohio Regional Planning Commission (MORPC) Transportation Improvement Program (TIP) and Metropolitan Transportation Plan (MTP)** – Updates the no build network to reflect the current MORPC TIP and MTP projects anticipated to be open to traffic by 2035.
- **Updated freight flows** – Uses the Freight Analysis Framework (FAF) (the Federal Highway Administration's (FHWA) national dataset) and updates to FAF5, which includes significant growth in truck traffic across the system compared to FAF4 (used in the 23 Connect Preliminary Feasibility Study analysis).
- **Tolls** – Tolling of corridor alternatives assumed the same per-mile rates as applied to the Ohio Turnpike. Electronic toll collection (E-Z Pass), which allows discounts, was assumed for 59% of autos and 89% of trucks to arrive at weighted average toll rate for autos and for trucks. These E-Z Pass utilization rates are consistent with the validated OSWM model of record, which has a 2020 base year.
    - Note, the comparative evaluation results (benefits) presented in this technical memo assumed free, non-tolled corridors. A separate tolling feasibility assessment with various tolling tests is presented in the *Tolling Feasibility Assessment Technical Memo*. In this memo, change in travel demand by corridor for free and tolled corridors are presented together for comparison. The travel demand estimates associated with tolling carry through to the tolling feasibility assessment.
    - To estimate volume diversions from tolled facilities, the model converts toll dollars to equivalent in-vehicle travel time minutes, based on assumed values of travel time savings. There is one toll rate for passenger vehicles and one for medium and heavy trucks, which are roughly double those of passenger vehicles. The equivalent travel time minutes affect path choices through the network. For example, an assumed value of time of $18 per hour for passenger vehicles would convert a $3 toll into 10 minutes of perceived travel time, which would be added to the actual travel time for any trip that used that facility. The implication for this analysis is that tolled alternatives do not attract as many trips to the proposed new facilities as their free counterparts because some potential users would choose to avoid the tolls and are willing to spend extra travel time on other facilities in more congested conditions (up to 10 minutes in this example).

Travel Demand Findings

The travel demand model forecasts vehicle miles traveled (VMT) and vehicle hours traveled (VHT) for OSWM network roadways in the study area, including freeways, expressways, major and most minor arterials, freeway ramps, and frontage and connector roads that are important to represent traffic circulation. It is important to remember that the modeling analysis assumed fixed trip tables, meaning that the demand between origins and destinations (O-D) does not change; therefore, any changes to VMT and VHT are due to changes in routing through the network.

The VMT and VHT values are summarized in aggregate for the entire study area and are the primary inputs used to calculate the monetized benefits of each concept, including travel time savings, safety metrics, and vehicle operating costs. While VHT is a more direct indicator of potential project benefits due to reduced congestion (delay), calculations of safety improvements require a more thorough accounting of the amount of travel shifted from higher-risk facilities to lower-risk facilities, which is very specific to the set of projects considered under each alternative.

With that context in mind, **Table 3** . Change in DailY Vehicle Hours Traveled from No Buildand **Table 4** summarize the changes in VHT and VMT, respectively, for the notional opening year 2035 and design year 2055. This same information is represented visually in **Figure 2.** The basis for comparison is the no build concept. For both forecast years, all the alternatives show clear decreases in VHT along with increases in VMT, compared with the no build. Comparing toll scenarios to free scenarios for each concept, the toll scenarios are forecast to offer slightly greater reductions in congested VHT compared with the free scenarios. For changes in VMT, the free scenarios are forecast to result in substantially greater increases in VMT. These patterns result from providing faster travel path options through the highway network, which allow travelers to bypass more direct but more congested facilities. When tolls are added, not as many travelers take the longer but faster alternative corridors.

Across the concepts, Alternatives E1, E2, E3, and E6 demonstrate the largest reductions in VHT, with the substantially larger reductions in the more congested 2055 forecasts. Notably, E1 and E3 are forecast to have a slight edge in VHT reduction in 2035, but E2 is forecast to provide the largest reduction in VHT in 2055 relative to the no build option.

It should be noted that this analysis does not assume any improvements from the 23 Connect study. For Alternative E2, this means that the ongoing and planned Sunbury Parkway improvements, which would provide additional capacity and relieve some of the traffic burden on parallel portions of US-36/SR-37, are not part of the no build or any of the concept alternatives. The Sunbury Parkway improvements are based on design specifications that may not reflect the capacities needed for the level of demand assumed in this analysis. To make the analysis work for Alternative E2, this portion of US-36/SR-37 was modeled as a full freeway connection to I-71.

TABLE 3. CHANGE IN DAILY VEHICLE HOURS TRAVELED FROM NO BUILD

	E1	E2	E3	E4	E5	E6	E7
2035							
Free	-2,306	-2,058	-2,357	-1,013	-868	-2,135	-575
Toll	-2,863	-2,253	-2,681	-823	-961	-2,057	-507
2055							
Free	-6,446	-7,137	-6,447	-3,972	-4,626	-6,208	-3,985
Toll	-6,876	-7,495	-6,984	-3,353	-4,716	-6,448	-3,652

TABLE 4. CHANGE IN DAILY VEHICLE MILES TRAVELED FROM NO BUILD

	E1	E2	E3	E4	E5	E6	E7
2035							
Free	111,125	113,768	102,104	15,793	20,244	89,802	38,781
Toll	55,217	58,222	59,485	8,424	8,702	58,558	20,999
2055							
Free	138,618	136,635	144,678	37,194	79,123	141,013	111,325
Toll	93,398	78,435	100,440	36,518	46,820	113,635	75,050

FIGURE 2. DAILY VHT AND VMT CHANGE FROM NO BUILD, 2035 AND 2055

Table 5. presents average daily traffic along each alternative corridor in the presumed opening year (2035) and the difference between free and toll alternatives (assuming existing OTIC rates). For each concept alternative, there is greater utilization of the new facilities in the free scenarios than the toll scenario due to travelers seeking to avoid tolls.

TABLE 5. AVERAGE DAILY TRAFFIC (2035) BY ALTERNATIVE

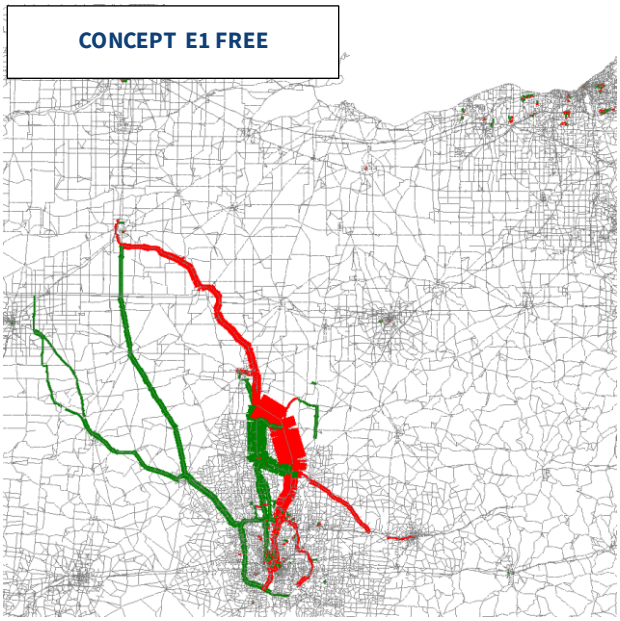
Corridor ID	Free	Toll	Difference
E1	24,600	20,900	-3,700
E2	25,000	19,500	-5,500
E3	24,000	20,700	-3,300
E4	5,900	4,500	-1,400
E5	7,000	5,100	-1,900
E6	20,800	18,000	-2,800
E7	4,800	2,000	-2,800

The differences in daily traffic volumes between each of the concept alternatives (build) and the no build are shown in **Figure 3** through **Figure 9**. Each figure shows the travel demand modeling network links **with increases in volumes shown in red** and **decreases shown in green** for the opening year 2035. The width of the line corresponds to the scale of the volume decrease. For each concept, free scenarios are shown on the left and toll scenarios on the right. Consistent with **Table 5.** , there are greater volume shifts in the free scenarios due to travelers seeking to avoid tolls.

The figures indicate where in the network larger changes in traffic volume are expected to occur. Concepts E1, E2, E3, and E6 show significant volume reductions on US-23 in Delaware County and lower reductions on a primary alternative route from Northwest Ohio to Central Ohio (US-68 to SR-31 to US-33 to I-270). Concepts E1, E2, E3, and E6 also show volume increases on US-23/SR-15 from I-75 to the Waldo area. The patterns of increases and decreases for these four alternatives, including decreased volumes on I-270 around the southwest side of Greater Columbus offsetting increased volumes on I-270 around the northeast side of the metro area, implies a shift in traffic flow between I-75 and I-70 due to the provision of faster travel along the more northerly path using US-23 and the proposed facilities (E1, E2, E3, or E6). A substantial portion of this shift would likely be through truck movements, which comprise a large share of long-distance trips that would navigate between I-75 and I-70.

In contrast, significant volume changes for Concepts E4, E5, and E7 show up mostly in the alternative corridor, where there are positive changes on the proposed facilities and connecting roadways as well as smaller increases to I-71 traffic through Delaware County. Smaller decreases in volumes are mostly west-east roadways running parallel to and close to the E4, E5, and E7 corridors. Concepts E5 and E7 also show small decreases in traffic on US-23 between Waldo and Delaware and on US-36/37 between Delaware and I-71.

FIGURE 3. 2035 DAILY VOLUME (BUILD-NO BUILD): CONCEPT E1



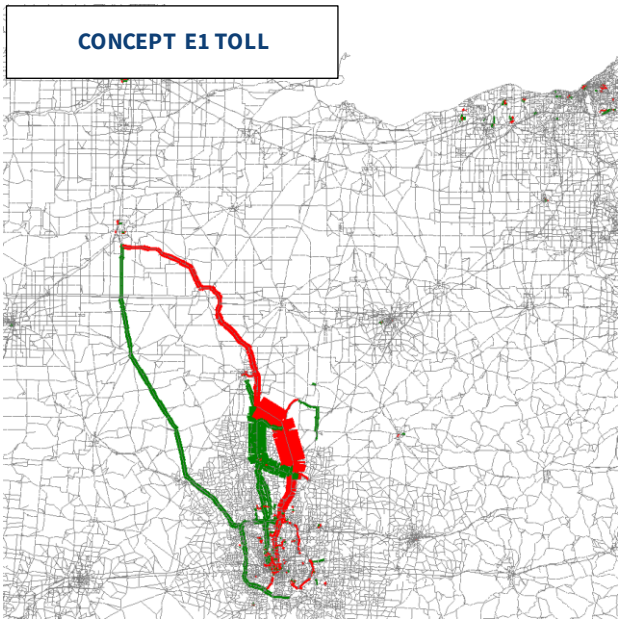
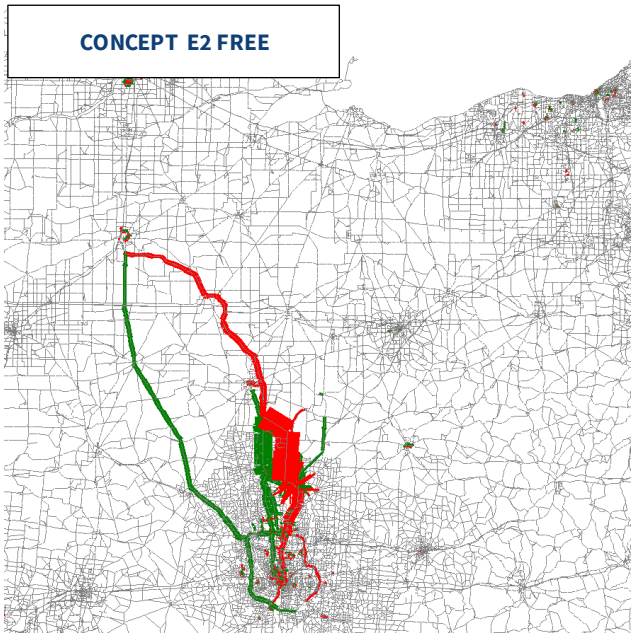


FIGURE 4. 2035 DAILY VOLUME (BUILD-NO BUILD): CONCEPT E2



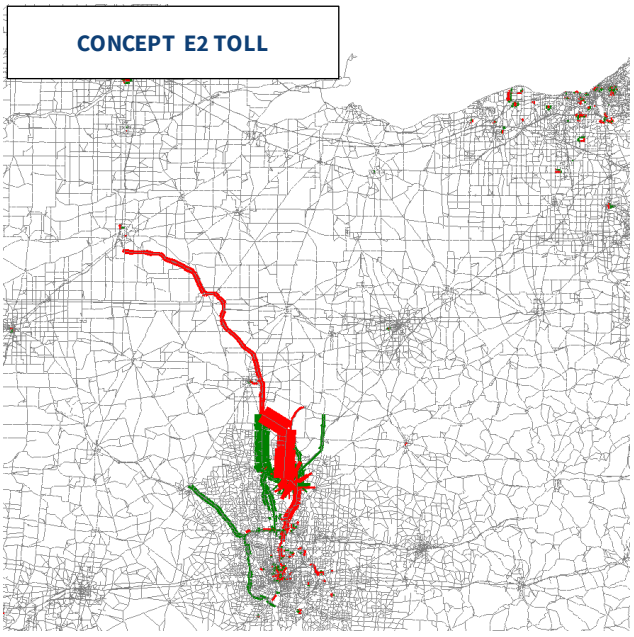


FIGURE 6. 2035 DAILY VOLUME (BUILD-NO BUILD): CONCEPT E3

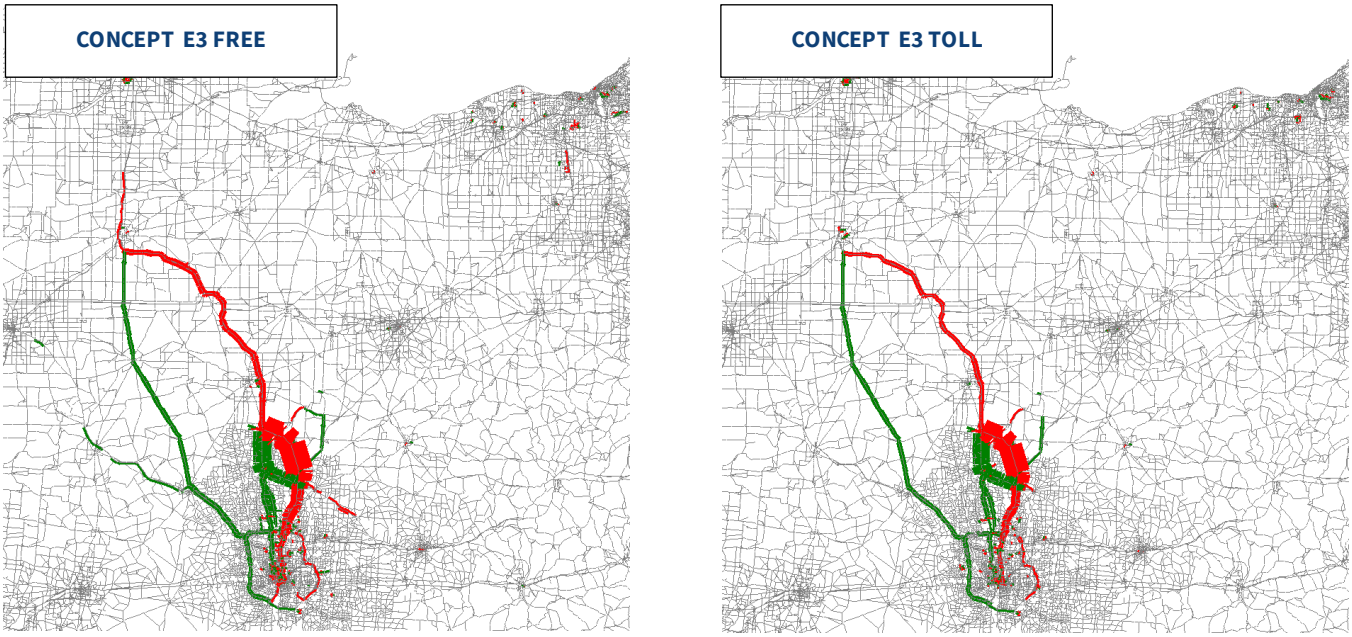


FIGURE 5. 2035 DAILY VOLUME (BUILD-NO BUILD): CONCEPT E4

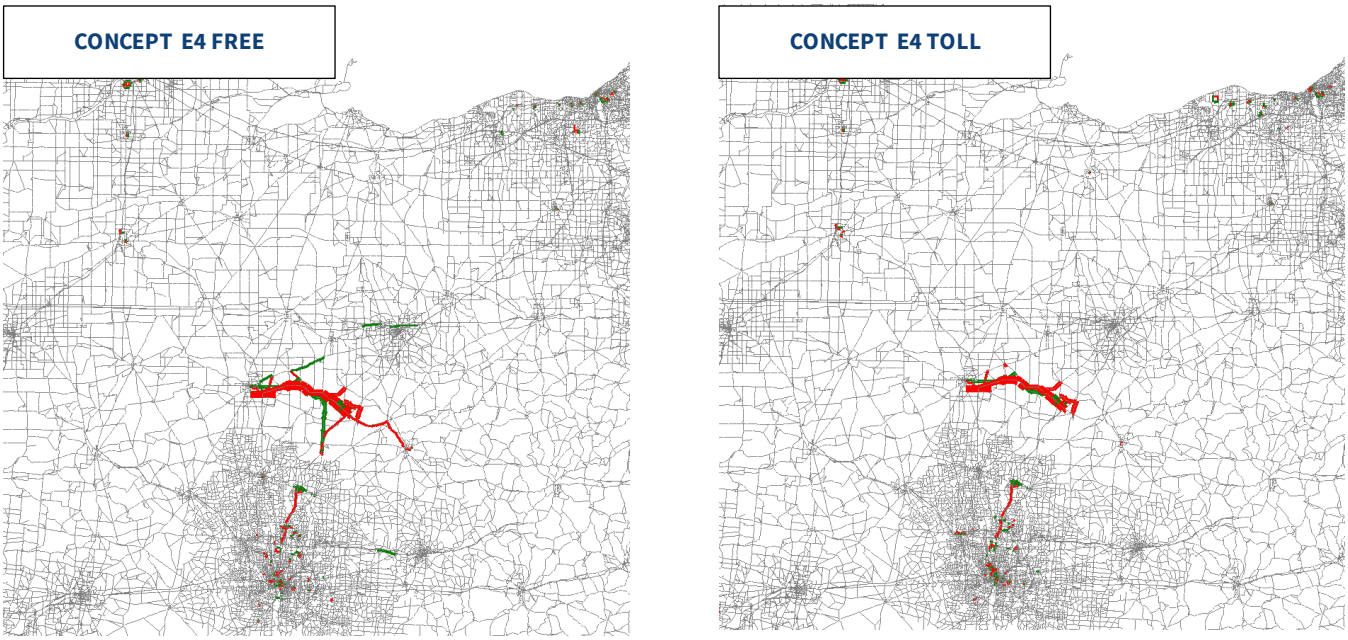


FIGURE 8. 2035 DAILY VOLUME (BUILD-NO BUILD): CONCEPT E5

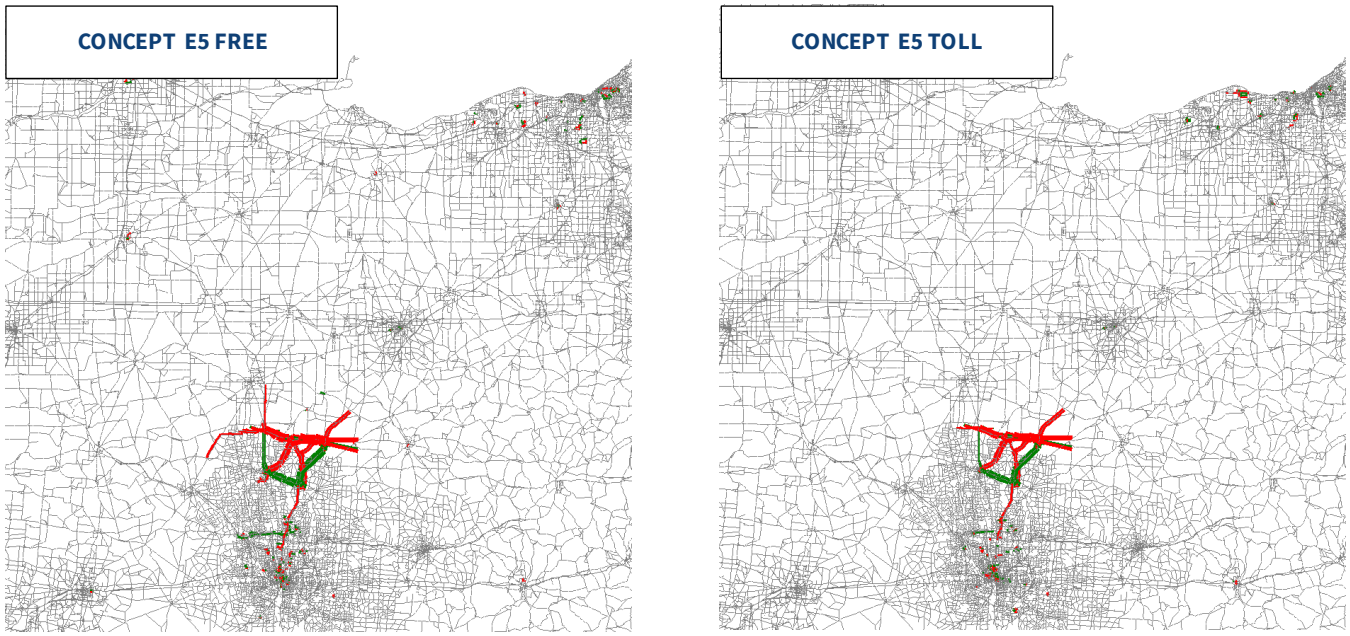


FIGURE 7. 2035 DAILY VOLUME (BUILD-NO BUILD): CONCEPT E6

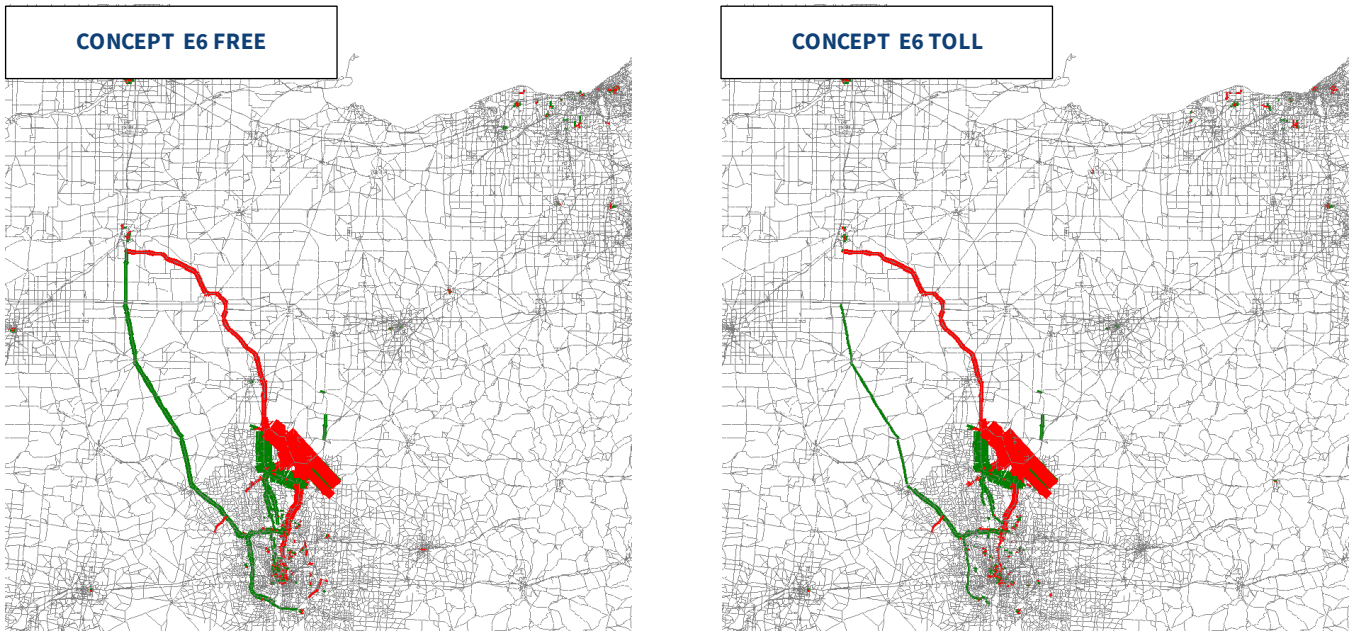
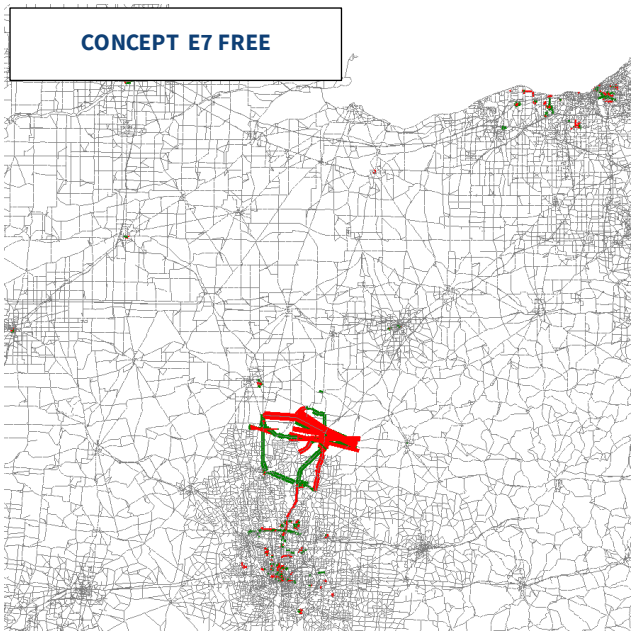
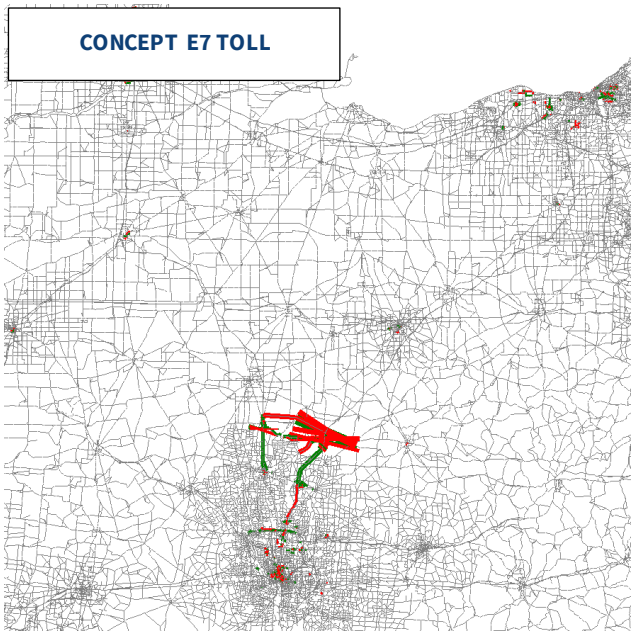


FIGURE 9. 2035 DAILY VOLUME (BUILD-NO BUILD): CONCEPT E7





BENEFITS ANALYSIS

The assumptions and methodologies supporting the benefits analysis are consistent with USDOT Benefit-Cost Analysis Guidance for Discretionary Grant Programs updated in December 2023. Two fundamental components include:

- **Discount rate** – Set at 3.1% based on the USDOT guidance and Office of Budget and Management guidance from December 2023.
- **Benefits included** – Travel time savings and other standard benefits included in benefit cost analysis including crash reductions, fuel savings, and vehicle operating costs.

Benefits of each alternative are cumulative over a 20-year analysis period (2036 to 2055) based on OSWM analysis conducted in 2035 and 2055 with a linear trendline applied to estimate benefits during the intermediate years. Benefits are compiled on all roadways included in the model network across a 20-county analysis area. Benefits were analyzed for only the free (non-tolled) alternatives.

Benefits measure the economic value of outcomes that are reasonably expected to result from the implementation of each corridor alternative compared to the no build. Benefits typically accrue to the users of the transportation system because of changes to the characteristics of the trips they make and can also be experienced by the public at large. In this analysis, the focus is solely on transportation system users (therefore benefits associated with air quality, job creation, or public health are not estimated). Some transportation improvements may result in a mix of positive and negative outcomes, such as increased vehicle operating costs which result from shifts to routes with longer distances but shorter travel times. In such cases, those negative outcomes would be characterized as "disbenefits" and subtracted from the overall total of estimated benefits, rather than being added to total costs.

Travel Time Savings

In the prior section, **Figure 2** presented total vehicle hours of travel by corridor alternative. This is multiplied by values of time (current dollars per hour) by vehicle type to estimate total monetized savings.

While the benefits analysis considers travel time savings for all vehicle trips in the study area (including trips not using the alternative corridor but receiving travel time benefits resulting from traffic diversions and improved speeds), a side analysis is conducted to understand actual travel time benefits for trips between Toledo and Columbus. Total travel distance and travel times from I-75 at the I-475 interchange (in Perrysburg) to I-270 (in Worthington) are summarized by alternative corridor and analysis year in **Table 6**.

- The current no build travel time (following a routing of I-75 to US-68 to SR-15 to US-23) is estimated at 1hr 53min with the congested travel time being estimated at 2hr 2min.
- In 2035, the no build congested travel time increases 6 minutes to 2hr 8min, and by 2055 the no build congested travel time increases another 17 minutes to 2hr 25min.

TABLE 6. CORRIDOR TRAVEL DISTANCE AND TRAVEL TIMES

Alternative	Total Travel Distance	Free Flow Travel Time	Congested (AM) Travel Time		
			2025	2035	2055
No Build	119 miles	1h 53m	2h 02m	2h 08m	2h 25m
E1	123 miles	1h 49m	Not Constructed	1h 50m	1h 51m
E2	123 miles	1h 49m		1h 50m	1h 51m
E3	121 miles	1h 45m		1h 46m	1h 47m
E4	147 miles	2h 08m		2h 09m	2h 10m
E5	130 miles	1h 53m		1h 54m	1h 55m
E6	122 miles	1h 49m		1h 49m	1h 50m
E7	130 miles	1h 56m		1h 57m	1h 57m

The travel time savings from I-475 to I-270 were analyzed for each alternative compared to the no build and are presented in **Table 7**. Alternative E3 shows the highest total savings, including 8 minutes of savings in free flow conditions, and 22 minutes (2035) and 38 minutes of savings in congested conditions (in 2055).

TABLE 7. TRAVEL TIME REDUCTIONS (FROM I-475 TO I-270)

Alternative	No Build (NB) – Alternative (Free Flow)	Congested (AM)	
		NB – Alt. (2035)	NB – Alt. (2055)
E1	4 min	18 min	34 min
E2	4 min	18 min	34 min
E3	8 min	22 min	38 min
E4	-15 min	-1 min	15 min
E5	0 min	14 min	30 min
E6	4 min	19 min	35 min
E7	-3 min	11 min	28 min

Travel time savings are compiled uniquely by vehicle type (auto or truck based on different values of time) and facility type (freeway/expressway/arterial or collector/local) based on change in vehicle hours of travel. Total travel time savings by alternative for autos and trucks is presented in **Figure 10**. On average, 82% of travel time savings across the alternatives are from autos. Alternative E7 and Alternative E1 show the highest share of truck travel time savings (27% Alternative E7, 22% Alternative E1). Total travel time savings by alternative, segmented by facility type is presented in **Figure 11**. On average, 70% of travel time savings across the alternatives are on collector/local roadways within the OSWM network. Alternatives E4, E5, and E6 show the highest share of freeway/expressway/arterial roadway travel time savings, averaging 44%. Generally, this pattern indicates that most travel time savings are accruing to regional and local trips, rather than long distance trips using existing freeways and arterials within the study area.

FIGURE 10. MONETIZED TRAVEL TIME SAVINGS BY ALTERNATIVE (VEHICLES)

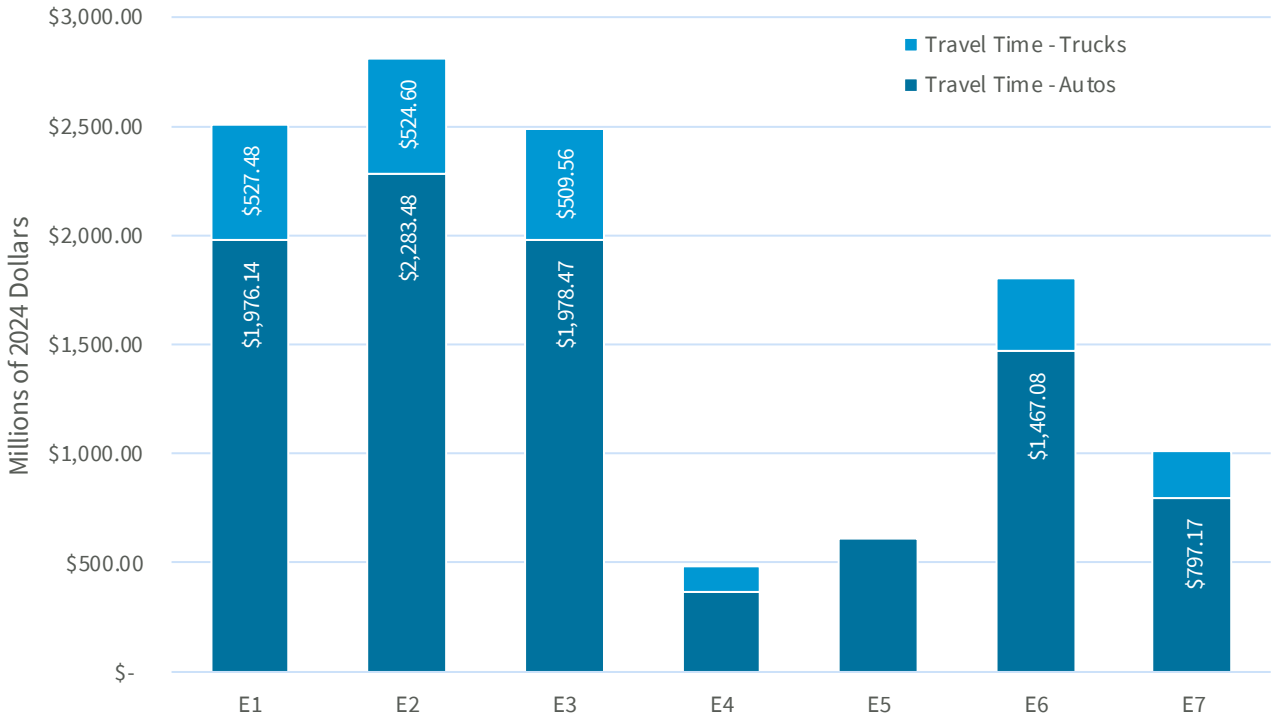
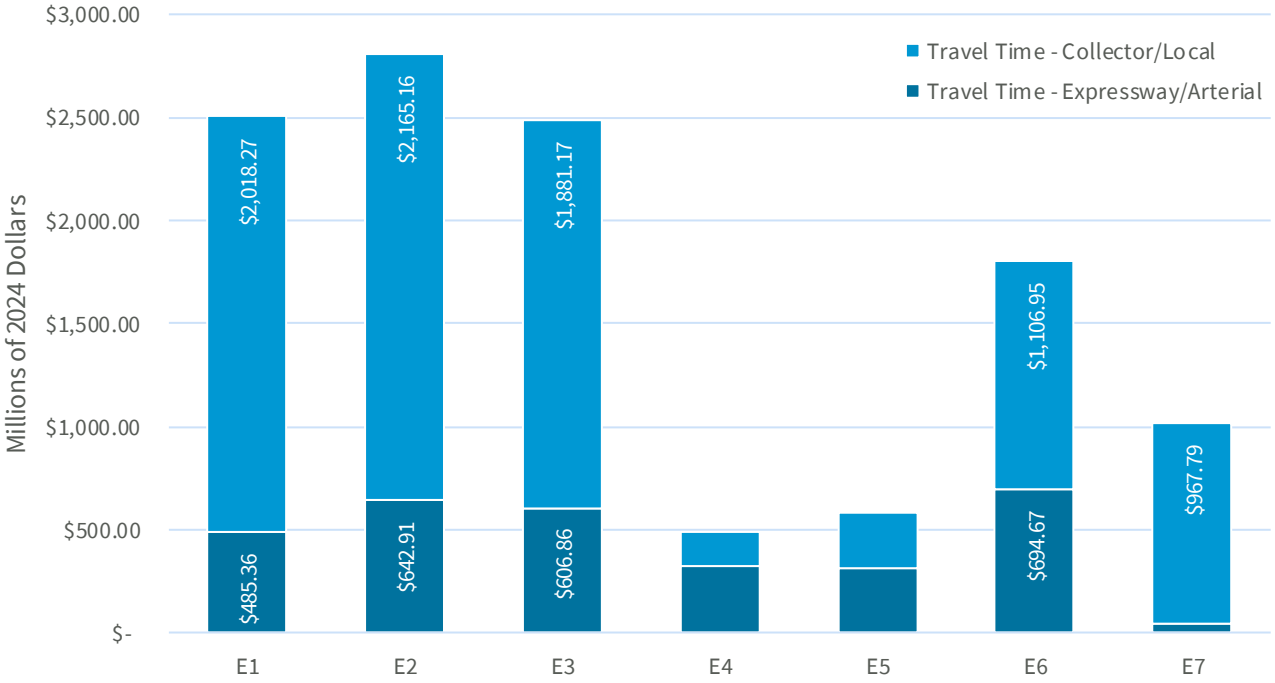


FIGURE 11. MONETIZED TRAVEL TIME SAVINGS BY ALTERNATIVE (BY FACILITY TYPE)



As shown in **Table 8**, Alternatives E1, E2, and E3 all show total travel time savings approaching or above $2.5 billion for the 20-year period. E6 is the next highest, ranging from $1.5 to $1.8 billion. Alternatives E4, E5, and E7 travel time savings are all $1 billion or less.

TABLE 8. TOTAL TRAVEL TIME SAVINGS (MILLIONS OF 2024 DOLLARS)

Corridor ID	Travel Time Savings
E1	$ 2,503.63
E2	$ 2,808.08
E3	$ 2,488.03
E4	$ 486.52
E5	$ 583.27
E6	$ 1,801.63
E7	$ 1,015.49

Crash Savings

A key goal of many transportation infrastructure improvements is to reduce the likelihood of fatalities, injuries, and property damage that result from crashes on the facility by reducing the number of such crashes and/or their severity.

The safety benefits from a project that generates a reduction in crash risk or severity estimates both the type(s) of crash(es) the project is likely to affect and the expected effectiveness of the project in reducing the frequency or severity of such crashes. The severity of prevented crashes is measured through the number of injuries and fatalities, and the extent of any property damage. To estimate crash reductions, Ohio-specific crash modification factors (CMFs) are used to relate different types of safety improvements to crash outcomes. CMFs are estimated by analyzing crash data and types and relating outcomes to different types of road improvements or safety treatments. Crash savings are also accrued to vehicle trips that divert to a roadway with a facility type having lower crash frequency and severity.

Crash savings are estimated for fatal, injury, and property damage only (PDO) crashes using rates published in Table A-1 of the FHWA guidance and are presented in **Figure 12** segmented by freeways/expressways/arterials and collectors/local facility types. Total crash savings by alternative for the study area over the 20 year period are presented in **Table 9**. Alternative E2 shows the highest total crash savings, approaching nearly $3 billion for the 20-year period. Alternative E1, E3, and E6 all see total crash savings more than $2 billion, while alternatives E4, E5, and E7 all have crash savings at $1 billion or less.

FIGURE 12. CRASH SAVINGS BY ALTERNATIVE (BY FACILITY TYPE)

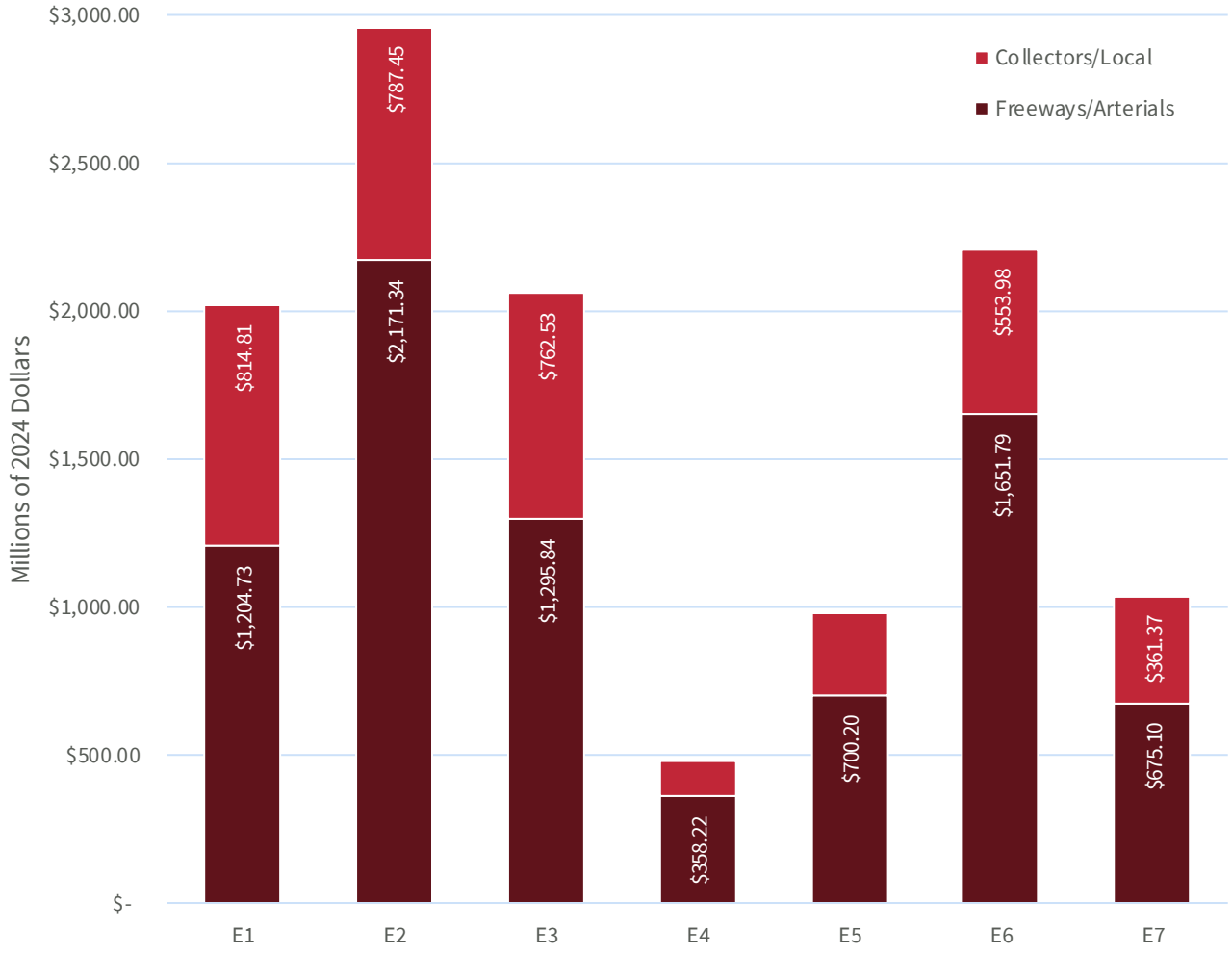


TABLE 9. CRASH SAVINGS (MILLIONS OF 2022 DOLLARS)

Corridor ID	Crash Savings
E1	$2,019.54
E2	$2,958.79
E3	$2,058.37
E4	$478.11
E5	$977.25
E6	$2,205.76
E7	$1,036.47

Fuel Savings

As noted in **Figure 2**, each alternative results in decreases in VHT (improved speeds) and increases in VMT (more longer vehicle travel paths) within the study area. The change in speed impacts fuel consumption, particularly where vehicles are now able to divert from highly congested or lower speed facilities (less efficient fuel consumption) to free flow or higher speed facilities (more efficient fuel consumption). These decreases in VHT translate to fuel savings based on average fuel costs per gallon and fuel consumption rates (miles per gallon by speed range). The increase in VMT results in more total fuel consumption.

Table 10 presents the results, showing that Alternatives E1, E2, and E3 all surpass $200 million in total fuel savings, while the other alternatives range from a high of $157 million in savings (Alternative E6) to a low of $98 million in fuel savings (Alternative E7).

TABLE 10. FUEL SAVINGS (MILLIONS OF 2024 DOLLARS)

Corridor ID	Fuel Savings
E1	$182.00
E2	$201.73
E3	$198.18
E4	$122.07
E5	$115.33
E6	$157.64
E7	$100.68

Vehicle Operating Costs

As noted in **Figure 2**, each alternative results in increases in VMT (more longer vehicle travel paths) within the study area. Because the modeling approach within the OSWM does not redistribute traffic (change origins and destinations) but only reassigns traffic to the network (moving trips to lower travel time paths), the increase in VMT is due to longer travel distance to achieve lower overall travel time. Vehicle operating costs are represented as a disbenefit and are associated with standard per mile costs such as maintenance and repair, tires, and depreciation.

Table 11 presents the results, showing that Alternatives E1, E2, E3, and E6 show the highest disbenefit (or cost) due to the higher VMT increase associated with these alternatives.

TABLE 11. VEHICLE OPERATING COSTS (MILLIONS OF 2024 DOLLARS)

Corridor ID	Vehicle Operating Costs
E1	$(306.86)
E2	$(293.82)
E3	$(287.72)
E4	$(37.20)
E5	$(92.14)
E6	$(253.33)
E7	$(148.23)

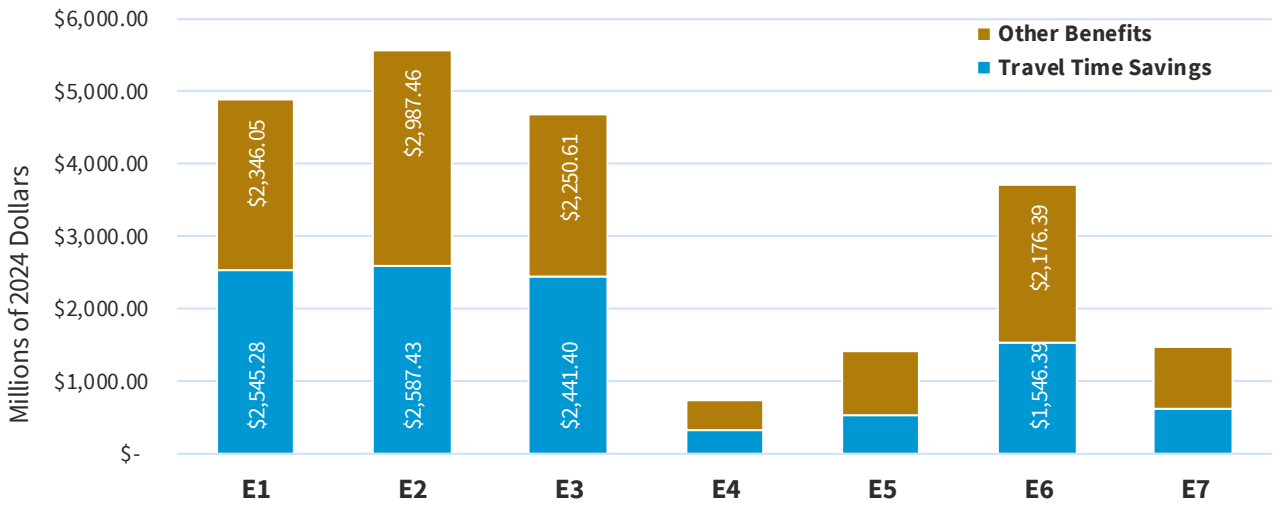
Total Benefits

Total benefits by alternative are presented in **Table 12** and Error! Reference source not found.. Travel time savings average 47% of total benefits across the seven alternatives, with a high of 57% in Alternative E1 to a low of 42% in Alternative E7.

TABLE 12. TOTAL BENEFITS BY ALTERNATIVE

Corridor	E1	E2	E3	E4	E5	E6	E7
Travel Time	$2,545.28	$2,587.43	$2,441.40	$319.19	$530.28	$1,546.39	$622.94
Crashes	$2,275.44	$2,892.66	$2,188.60	$367.77	$819.74	$2,182.60	$855.70
Fuel	$255.95	$255.45	$248.00	$99.31	$130.80	$178.04	$98.65
Vehicle Operating	$(185.34)	$(160.64)	$(186.00)	$(33.68)	$(49.94)	$(184.25)	$(91.23)
Total Benefit	**$4,891.32**	**$5,574.88**	**$4,692.01**	**$752.59**	**$1,430.88**	**$3,722.78**	**$1,486.05**

FIGURE 13. TOTAL BENEFITS BY ALTERNATIVE



The most significant differentiators across these benefits by alternative are:

- The noticeably higher crash savings in Alternative E2 compared to all other alternatives, particularly its closest competitors in terms of total benefits (E1 and E3). There is more than $600 million in additional savings in Alternative E2 compared to Alternatives E1 and E3.
- Travel time savings for Alternatives E1, E2, and E3 in the free scenario are nearly the same (within a + or – 5% range).

Ranking

Total benefits for the 20-year analysis period within the 20-county analysis study area are presented in **Table 13** along with the ranking.

TABLE 13. TOTAL BENEFITS (MILLIONS OF 2024 DOLLARS)

Alternative	Total Benefits	Free Rank
E1	$4,398.30	**3**
E2	$5,674.79	**1**
E3	$4,456.86	**2**
E4	$1,049.50	**7**
E5	$1,583.71	**6**
E6	$3,911.70	**4**
E7	$2,004.40	**5**

Preliminary Environmental Screening Technical Memo

US-23 to I-71 Connector Joint Plan – Interim Report – HB 96

INTRODUCTION

This memorandum provides a technical summary of the Preliminary Environmental Screening related to the corridor alternatives currently under evaluation as part of the US-23 to I-71 Connector Joint Plan, a planning effort led by the Ohio Department of Transportation (ODOT) and the Ohio Turnpike and Infrastructure Commission (OTIC) in response to House Bill 54, Section 755.60 (further amended by HB 96). The legislation directs the agencies to jointly evaluate the feasibility of a new connection between U.S. Route 23 (US-23) and Interstate 71 (I-71) in northern Delaware, Marion, or Morrow counties through a range of options, including upgrades to existing highways or construction of new freeways and toll roads.

PRELIMINARY ENVIRONMENTAL SCREENING OVERVIEW

The purpose of this memo is to establish a shared baseline of the environmental issues present within the study area and document potential environmental impacts related to seven conceptual freeway corridor alternatives (E1 through E7) that could connect US-23 to I-71. There are three objectives of this environmental screening:

1. **Document the range of human- and natural-environment constraints**: streams, wetlands, floodplains, reservoirs, parkland, cultural resources, farmland, community facilities, and development density as identified through a desktop review of agency-curated spatial and non-spatial data.
2. **Quantify those constraints in a uniform, side-by-side format** so that corridors can be compared objectively on their potential to avoid or minimize impacts, and on the schedule, cost, and permitting complexity their constraints are likely to introduce.
3. **Inform study area and alternative refinement** by allowing ODOT and OTIC to weigh environmental risk alongside anticipated utilization and benefits, engineering feasibility, and funding considerations before investing additional time and money in formally defining alternatives under the Preliminary Engineering phase of the Project Development Process.

The analysis intentionally remains at a reconnaissance level appropriate to the current planning phase. It draws solely on desktop information; no field verification, agency consultation, or formal determinations under the National Environmental Policy Act (NEPA) or related statutes have yet occurred. Accordingly, the findings should be viewed as indicators of relative risk rather than definitive statements of impact. Detailed environmental studies and public engagement will be undertaken during the subsequent Preliminary Engineering phase and be evaluated at a level suitable for NEPA documentation and formal decision-making.

Overview of Corridors

Table 1 contains a narrative description of the seven corridors as shown in **Figure 1**.

TABLE 1. CORRIDOR ALTERNATIVE CONCEPT DESCRIPTIONS

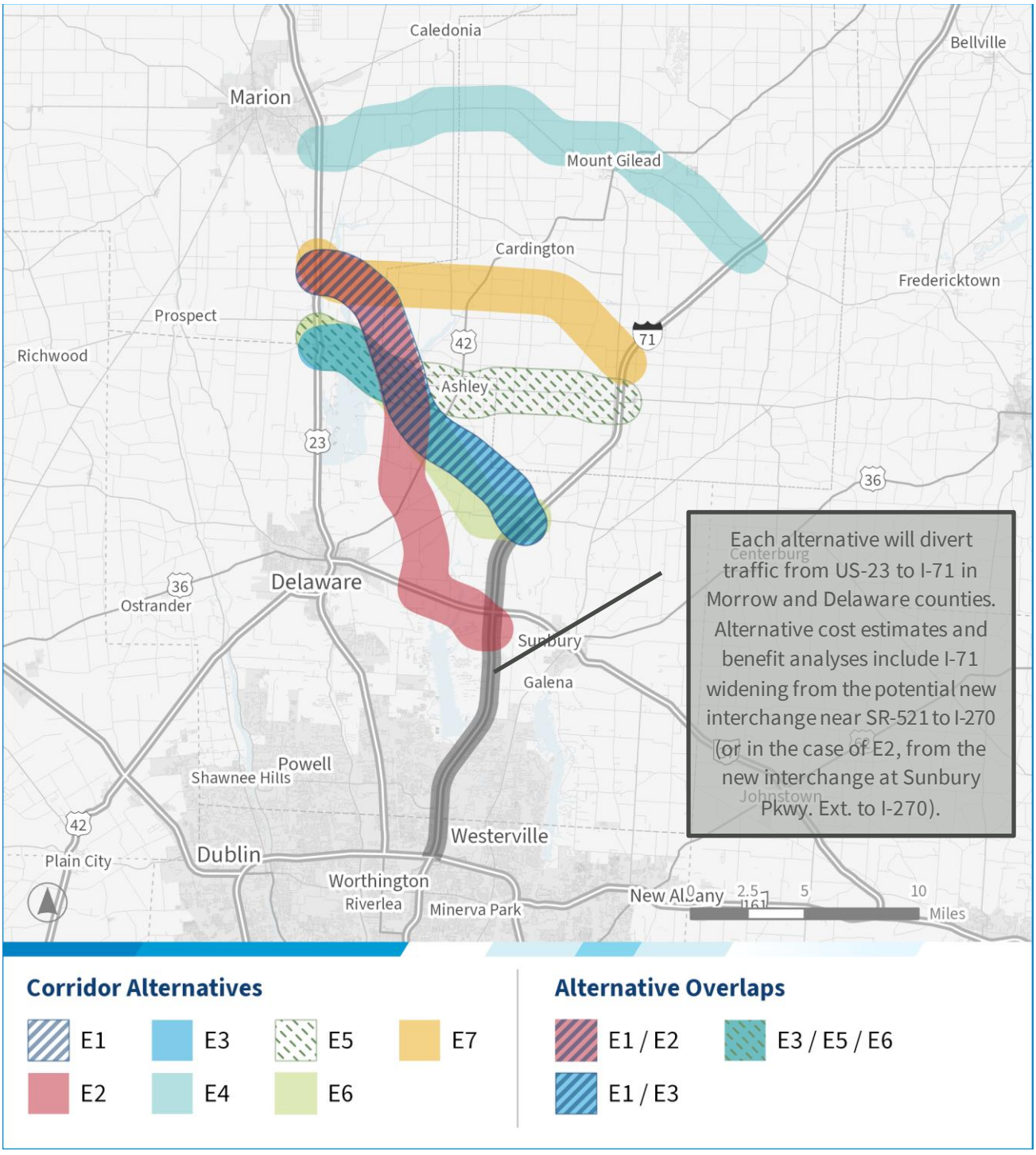
Corridor ID	Description and General Concept
E1	Swath located in Marion, Morrow, and Delaware counties including 15 miles of new freeway on new alignment between US-23 (north of Waldo) and I-71 (south of Marengo).
E2	Swath located in Delaware County including 16 miles of new freeway on new alignment and a 3-mile freeway upgrade of US-36/SR-37, connecting to I-71 via the Sunbury Parkway interchange.
E3	Swath located in Delaware County including a 5-mile freeway upgrade of SR-229 between US-23 and Ashley and 12 miles of new freeway on new alignment (including a bypass of Ashley) connecting to I-71 south of Marengo.
E4	Swath located in Marion and Morrow Counties including 11 miles of new freeway on new alignment with a bypass of Mt. Gilead and an 11-mile freeway upgrade of SR-95.
E5	Swath located in Delaware County including an 11-mile freeway upgrade of SR-229 and a 3-mile new freeway on new alignment bypass of Ashley.
E6	Swath located in Delaware County including a 4-mile freeway upgrade of SR-229, 7 miles of new freeway on new alignment from SR-229 to SR-521 near Kilbourne, and a 3-mile freeway upgrade of SR-521 connecting to I-71.
E7	Swath located in Marion, Delaware, and Morrow counties including 14 miles of new freeway on new alignment from the SR-529/Waldo area to I-71 north of Marengo (generally following the Waldo-Fulton Road corridor).

Definitions:

Freeway upgrade: Existing roadway corridor is expanded to meet freeway facility design and operational standards.

New freeway on new alignment: New freeway corridor is primarily located within new greenfield right-of-way (and in some cases may repurpose and expand existing roadway corridors).

FIGURE 1. CORRIDOR ALTERNATIVE CONCEPTS



METHODOLOGY

This high-level community impact and environmental screening evaluated seven alternatives to identify previously documented resources located within the corridors. This screening is used to understand potential issues that may require further action, documentation, mitigation, or avoidance during the development and delivery of each alternative. This screening supplements the benefit-cost analysis of each corridor that was prepared by other team members. The level of detail is consistent with the expected depth of understanding of community and environmental issues typically found at this stage of project development.

Categories of community resources reviewed for this analysis include public buildings, cemeteries, parks and recreation areas, agricultural land and districts, dams and reservoirs, drinking water protection areas, and percentage of developed areas. Categories of environmental impacts reviewed include streams, wetlands, wooded habitat, endangered species, floodplains, landfills and other regulated materials sites, and historical and archaeological resources. The combination of these analyses informs decisions to continue project development activities and pursue funding to advance improvements.

Data Sources

Secondary sources for spatial and non-spatial datasets include:

- National Hydrography Dataset (NHD) Streams – United Stated Geologic Survey (USGS)
- Mussel Streams – ODOT GIS
- Floodplains – Marion County GIS, Morrow County GIS, Delaware County GIS
- National Wetland Inventory – ODOT GIS
- National Land Cover Database (for wooded areas and agricultural lands) – ODOT GIS
- Dams – ODNR GIS
- Historic landfills, Bureau of Underground Storage Tank Regulations (BUSTR) LUST locations – ODOT GIS
- Structures (public buildings, schools, cemeteries) – carto.nationalmap.gov
- ODNR lands – ODNR GIS
- Agricultural districts – Marion County GIS, Morrow County GIS, Delaware County GIS
- Source Water Protection Areas (groundwater) and Corridor Management Zones (surface water) – Ohio EPA GIS
- Building footprints – Marion County GIS, Morrow County GIS, Delaware County GIS
- National Register of Historic Places (NRHP) listings and State Historic Preservation Office (SHPO) determinations of eligibility – SHPO database
- Ohio Genealogical Society (OGS) cemeteries – SHPO database

After acquiring data from these sources, a GIS database was created to centralize and preserve all the environmental layers for future reference. The environmental team geospatially defined the environmental resources and overlayed them on the corridor mapping for analysis.

Additional data sources that were reviewed for information and to verify the presence of additional issues as part of the qualitative evaluation of advantages and risks associated with each corridor.

- ODOT TIMS – historic bridges, floodplains
- USGS Streamstats
- Google Earth imagery
- County Auditor and OGRIP parcel data
- Land and Wildlife Conservation Fund (LWCF) website mapping
- Ohio Regulated Properties Search (ORPS) tool
- Local park district websites
- Natural Resources Conservation Service (NRCS) soils report
- ODNR Water Trails and Boating & Paddling Access mapping
- US Census TIGERweb mapping
- ODOT STIP for planned major improvements within study area
- Information regarding planned developments
- Prior scans and technical memos from 23Connect and STDA Alternatives Analysis

Evaluation Bands Used for Screening

The preliminary environmental screening focused on two concentric evaluation bands. The inner band extends 150 feet to either side of the conceptual centerline (approximately 300 feet in total) of the corridor and reflects the lateral width required for a four-lane, limited-access freeway with shoulders, median, cut-and-fill slopes, and drainage. Resources intersecting this 300-ft inner band were treated as direct impacts that would almost certainly demand right-of-way, permitting, or mitigation once design advances.

Encircling the inner band is a one-mile-wide band that captures both the area in which the conceptual centerline could plausibly shift during preliminary engineering and the zone most likely to experience secondary effects such as noise, altered access, utility relocation, or induced development. Resources mapped in this larger band were tabulated separately to show where avoidance or minimization opportunities remain if the alignment is refined.

Identification of Key Issues

The quantitative analysis results of the screening were synthesized into a comparative assessment and supplemented with a qualitative evaluation of corridor risk and complexity. These assessments are presented in one-page

environmental profiles for each corridor that summarize the highest-risk resources identified and anticipated permitting requirements. The comparative assessment also identifies environmental challenges for each corridor. Corridor risk rankings were placed in a side-by-side comparison matrix, which allows the team to recommend corridors with the lowest environmental barriers for further advancement.

CORRIDOR EVALUATIONS

Environmental Constraints

To differentiate the seven conceptual corridors, the project team identified a set of priority constraints (resources that, if disturbed, typically trigger lengthy reviews, costly mitigation, or design limitations). Each constraint is summarized below, with an emphasis on why it matters to project delivery and how the degree of impact varies among the alternatives.

- **Reservoirs and Dams (Federal and State)** – Section 408 of the Clean Water Act requires a review by the USACE to confirm that the project does not impair the usefulness of the federal project. The engineering and environmental analysis for substantial changes to a reservoir or dam add cost and increase uncertainty due to the potential for redesigns or extensive coordination and/or mitigation. Minimizing impacts to reservoirs and avoiding impacts to dams reduces the cost and schedule risks. Impacts to federal reservoirs vary among the alternatives.

- **Streams** – Stream impacts are subject to the Clean Water Act. Section 404 is under the jurisdiction of the USACE. Section 401 is under the jurisdiction of OEPA. Stream impacts also trigger concerns for threatened and endangered species, such as mussels. Stream impacts for a project of this magnitude require mitigation, often at 1.5:1 or 2:1 ratio. Stream mitigation pricing is currently approximately $400 per linear foot. Therefore, every mile of stream impact has a mitigation cost of $3.16 million to $4.22 million. Mussel surveys and relocations add to the costs for stream impacts. Mussel survey costs are driven by the listing of the stream (Ohio Mussel Survey Protocol), the number of crossings and length of stream impact. Overall stream length within the corridors, as well as length of identified mussel streams, vary among the alternatives. Impacts to listed streams with known populations of Federally listed T&E mussel species, may also require additional agency coordination, surveys and biological assessments.

- **Wooded habitat** – In addition to the beneficial effects for air quality, temperature regulation, visual and acoustic buffering, and community enjoyment, wooded areas provide wildlife habitat. Suitable Wooded Habitat (SWH) is the terminology used for wooded areas that may provide roosting and brood-rearing habitat for threatened and endangered bat species. The habitat is considered higher quality when within 50 feet of a stream. It is lower quality when within 100 feet of existing roadways. For the current analysis, the areas have not been classified by proximity to streams or roadways. The total acres of woodlands are used for comparison of alternatives. Loss of wooded bat habitat requires bat presence/absence surveys and/or mitigation. Mitigation costs for habitat can vary widely due to availability.

- **Floodplains** – Executive Order (EO) 11988 requires use of an 8-step process to determine the project's potential involvement with floodplains and consider alternatives for avoidance. EO 11988 is used as a framework for evaluation of floodplain impacts under NEPA. In general, lateral encroachments on floodplains

are discouraged with an emphasis on consideration of alternatives. Crossing streams with associated floodplains are less problematic. All floodplain impacts require analysis to verify that the flood storage capacity is not diminished, among other considerations. Impacts to floodplains vary among the alternatives. In addition, floodplain areas can be assumed to be more likely to have unmapped wetlands.

- **Cemeteries** – Cemeteries and graveyards are prioritized for avoidance and are relocated only in unusual circumstances. The presence of cemeteries constrains the designer and limits the ability to avoid other impacts. All the corridors contain multiple cemeteries, either publicly mapped or with approximate locations in the SHPO OGS cemetery database. Cemeteries located near the center of the one-mile corridor were noted as a greater concern due to greater difficulty in avoidance.
- **Parks and recreation areas** – For projects using federal transportation funds, publicly owned parks are subject to protection under Section 4(f) of the U.S. Department of Transportation Act. Parks that have been acquired or improved with Land and Water Conservation Funds (LWCF) are subject to protection under Section 6(f) of the LWCF Act. Section 6(f) impacts are among the most time-consuming issues to address for a project. Impacts to 6(f) lands require mitigation in the form of property of equal usefulness and value, preferred to be adjacent to the impacted park. In practical terms, this requires the project sponsor to work with the park officials to identify additional properties they would be willing to accept, appraise the properties per federal requirements, conduct environmental studies on the replacement properties, and coordinate with ODNR and NPS to obtain approval of the replacement land. In essence, the property has twice the cost: first for the proposed right-of-way acquisition, and second for the replacement property. Further complicating this process is that replacement land must be acquired from willing sellers. The alternatives vary on their potential impact to Delaware Wildlife Area (part of Delaware State Park site), Delaware Stine Wildlife Area, Delaware-Whetstone Wildlife Area, Alum Creek State Park, and Mt. Gilead State Park. Several of the corridors also contain local parks and recreation areas. It is likely that Delaware State Park impacts will be subject to Section 6(f) and possible that Alum Creek Park impacts also will be, depending on how agencies are currently interpreting the impact limits from use of Land and Water Conservation Funds.
- **Drinking Water Source Protection** – Source Water Protection Areas (SWPA) are delineated by OEPA. SWPAs include surface water intake protection zones and groundwater recharge areas. Inner Management Zones have the highest protection priority. Drinking water protection requirements may include construction strategies to avoid and manage incidents such as spills from fueling or storage of chemicals. It may also require special separation of roadway drainage within the most sensitive areas. At the current level of detail, it is unknown whether such an issue would occur with this project. The corridors vary on the impacts within source water protection areas and corridor management zones.
- **Agricultural lands** – The Farmland Protection Policy Act (FPPA) requires coordination with the Natural Resources Conservation Service (NRCS). FPPA coordination primarily serves to inform the NEPA decision and does not require NRCS approval of the project. For this project, the primary farmland issues are likely to be related to state law. Per Ohio Revised Code (ORC) 929.05, impacts to more than ten acres or ten percent of an individual property under one ownership within an agricultural district requires coordination with the Ohio Department of Agriculture (ODA). ODA must review the proposed action and provide a finding as to whether the project's public benefits outweigh the impact on the district. Agricultural land cover types (pasture, crop) constitute 61-82% of the corridors. According to the Natural Resources Conservation Service data, most of the

soils within this area are classified as prime farmland or prime farmland if drained. There are no locations designated as farmland of statewide importance, farmland of local importance, or unique farmland. For the purposes of this analysis, all areas that are classified as crop or pasture in the National Landcover Database are assumed to be prime farmland. All corridors will impact several hundred acres of this land. There is a difference among the corridors for the designated agricultural districts, ranging from less than 1% to 21%. Parcel data for Marion and Morrow Counties contains the designation, allowing for more accuracy in those counties. For Delaware County, the agricultural district locations were obtained from zoning maps which may skew the findings for corridors that are primarily within Delaware County. Therefore, overall farmland impacts are used for comparison with limited reliance on agricultural district information. Farmland impacts are difficult to mitigate. The primary strategy is to avoid splitting farm parcels to minimize ancillary loss of farmland outside the areas needed for the roadway.

- **Developed areas** – At the current level of detail, it is not possible to confidently state the number of residential or commercial relocations; however, the corridors can be compared on the number and density of development as a proxy for the ability to avoid and minimize impacts to populated areas. Population is a concern not only for potential relocations, but also for potential noise impacts for residences and other noise sensitive land uses that remain within 500 feet of the new roadway. This topic also includes a qualitative evaluation of the impacts to planned developments that are not reflected in the current building density calculations and associated planned roadway improvements, such as those at US-23/SR-229 and I-71/US-36/US-37.

Resources with minimal variation among the alternatives and/or that can be managed during further development are not detailed in the corridor comparison when a specific resource of concern is present. Data for critical issues are noted in the corridor profiles. These issues are available in the comparison matrix. Items for management during further development include:

- **Wetlands** – Wetlands are subject to protection under the Clean Water Act, similar to streams. Those with federal jurisdiction are overseen by USACE under Section 404 and OEPA under Section 401. Non-federal wetlands are regulated by OEPA. Available data from the National Wetland Inventory (NWI) is of limited utility in comparing the alternatives because relatively flat areas, unfarmed and wooded areas, particularly in floodplain, are likely to contain wetlands that are not shown. Based upon these limitations, there is not enough variance among the alternatives to utilize this factor as a priority comparison factor. Wetland impacts will require mitigation; however, not enough information is available at this stage to compare the alternatives on this basis.
- **Historical Architecture and Archaeology** – Properties that are listed or eligible for listing in the National Register of Historic Places (NRHP) are protected under Section 106 of the National Historic Preservation Act. Historical architecture sites, along with archaeological sites that are important for preservation in place, are also protected under Section 4(f) of the US DOT Act. Section 106 requires identification of historic resources and a determination of the project's effect on the resources. Any resource determined to be adversely affected will require mitigation. Among all the corridors, there are six NRHP-listed historic sites and one NRHP-listed archaeological site. In addition, seven sites are shown with Determinations of Eligibility for the National Register prior or pending review. NRHP-listed and eligible properties within all the corridors will need to be prioritized for avoidance. However, since very little of the area has been subjected to history/architecture or

archaeological investigations, there is limited information to use this factor for comparison of alternatives. One NRHP-listed archaeological site is present near US 23/SR 229 that should be avoided. This is noted on the applicable alternatives. No other large or unavoidable sites are anticipated, and this issue can be managed in future development by prioritizing Phase I History/Architecture Surveys for corridors carried forward for further study.

- **Public buildings and services** – Several of the corridors contain public buildings within the one-mile corridor. Post offices (E4, E5) typically present substantial challenges for federal right-of-way acquisition and should be considered for avoidance. Other public buildings (schools, township halls, fire stations, sheriff office) may be prioritized for avoidance, based upon community feedback. None of these resources are located such that avoidance does not appear feasible.
- **Dams and reservoirs (local and private)** – While impacts are not desirable, impacts to privately owned lakes can be managed if not avoidable.
- **Regulated Materials** – A series of laws and regulations apply to regulated wastes. Generally, impacts to regulated materials sites do not require avoidance, other than considerations of cost. A search of existing databases reveals no National Priority List (NPL), non-NPL, Superfund, or other critical sites of regulated materials. If no such complex sites exist, the primary issue is typically existing and abandoned landfills. Any excavation within 300 feet of a landfill requires a permit from OEPA under rule 513. One corridor (E7) contains an abandoned dump. The locations and boundaries are unclear. This was a township dump and can typically be managed during further development if not avoidable. There are several typical leaking underground storage tanks (LUST) sites and land uses that would require evaluation if impacted. No issues have been identified that would be relevant to the comparison of alternatives
- **Threatened and Endangered Species** – Threatened and Endangered (T&E) species are protected under various federal and state laws and regulations under the jurisdiction of USFWS and ODNR. Impacts on T&E species are not specifically used as a comparison factor. Impacts on habitats for the most likely species are used as a proxy for the comparison. The corridors are located within the known range of several bat species. Wooded habitat is used as a proxy for potential impacts to these species. Similarly, protected state and federal mussel species are likely within the designated mussel streams. The length of Group 1 and Group 2 streams serves as a proxy for impacts to these species. No designated critical habitats are located within the corridors. Other protected animal and plant species and their common habitats may be present within the corridors. Locations of known sites have been obtained from ODNR and will be used to inform avoidance options for alternatives that are carried forward for further study.

CORRIDOR PROFILES

This section provides a profile for each of the seven corridor alternatives (E1–E7). As noted above, each corridor was evaluated using a uniform 300-ft band to estimate the magnitude of impacts and a one-mile band to allow for an evaluation of the potential for avoidance. The values for the one-mile corridor include the resources identified within the 300-ft band.

Environmental Profile - Corridor E1

Issue	Detail
Reservoirs and Dams (Federal and State)	No impacts in 300-ft/Unnamed Lake Dam within 1-mile band
Streams	1.6 miles of stream within 300-ft band/31.3 miles within 1-mile band (see **Figure 2**) 809 feet of Group 2 stream within 300-ft band/13,424 feet within 1-mile band
Wooded Habitat	94.7 acres within 300-ft band/1,514 acres within 1-mile band
Floodplains	30 acres within 300-ft band/774 acres within 1-mile band
Cemeteries	No cemeteries in 300-ft band/2 cemeteries within 1-mile band
Parks and Recreation	No areas of state park within 300-ft band/21 acres within 1-mile band
Drinking Water	0.01 sq. mi. of Corridor Management Zone within 300-ft band/0.35 sq. mi. within 1-mile band
Agriculture Lands	422 acres within 300-ft band/8,240 acres within 1-mile (see **Figure 3**)
Populated Areas	87 buildings in 300-ft band – density 0.38% 1,358 buildings in 1-mile band – density 0.35%
Other issues	1 identified NRHP-eligible site within 1-mile band Unnamed Lake Dam within 1-mile; Linden Conservation Club dam (private)

E1 Risk Summary (see **Figure 4**)

Advantages: Likely no impacts to federal or state dams and reservoirs, and landfills; lower impacts to streams, drinking water protection areas, floodplains, wooded habitats, public buildings, cemeteries, and parks. Lower building count. Moderate overall area of agricultural land and agricultural districts.

Risks: One known historic site within 1-mile corridor. Much of area not previously surveyed for cultural resources. Need to investigate avoidance of historic resources if identified. Need to verify avoidance of cemeteries.

Focus Areas:

1. The northern section (identical with E2 and overlaps with E7) includes the Olentangy River (Group 2 mussel stream), and a tributary to the river. There is suitable wooded habitat along the riparian corridor. Wetlands are indicated along the river, and there are likely additional unmapped wetlands present in wooded areas.

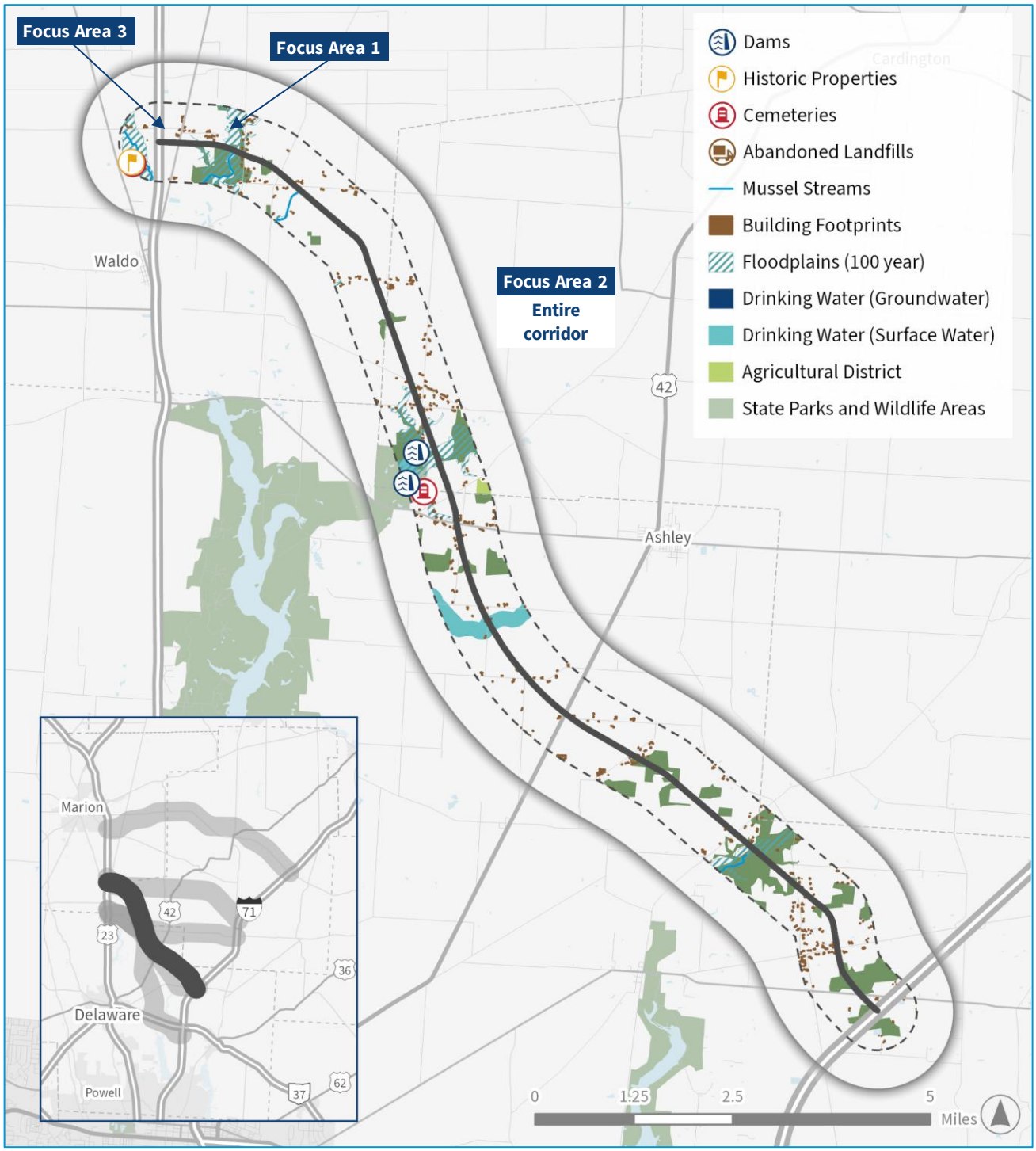
2. Agricultural district parcels span the entire corridor. Research on farm operations and coordination with NRCS may help identify if adjacent parcels have common farm operators. Alignments can evaluate how to minimize splitting of farms and disruption to operations.

3. A residential cluster is present along St. James Road. If not acquiring these properties and relocating residents, it would be desirable to attempt to maintain a 500-ft+ distance (measured from the edge of travel lanes, not edge of right-of-way) to minimize the potential for noise impacts.

FIGURE 2. CR 146 @ WHETSTONE CREEK CROSSING (LOOKING NW)

FIGURE 3. US-23 @ BETHLEHEM RD (LOOKING SE)

FIGURE 4. ALTERNATIVE E1 – ENVIRONMENTAL RESOURCES



Environmental Profile - Corridor E2

Issue	Detail
Reservoirs and Dams (Federal and State)	Entire 1-mile band crosses Alum Creek Reservoir (federal) Section 408 likely /Unnamed Lake Dam within 1-mile (see **Figure 5**)
Streams	2.9 miles of stream within 300-ft band/47.7 miles within 1-mile band 630 feet of Group 2 stream within 300-ft band/14,179 feet within 1-mile band
Wooded Habitat	83.7 acres within 300-ft band/1,958 acres within 1-mile band
Floodplains	43 acres within 300-ft band/1,002 acres within 1-mile band
Cemeteries	3 cemeteries within 1-mile band
Parks and Recreation	6.9 acres of state park within 300-ft band/681 acres within 1-mile band Recreational boating paddling access for Alum Creek within 300-ft band
Drinking Water	0.27 sq. mi. of Corridor Management Zone within 300-ft band/3.31 sq. mi. within 1-mile band
Agriculture Lands	585 acres within 300-ft band/10,421 acres within 1-mile (see **Figure 6** and **Figure 7**)
Populated Areas	71 buildings in 300-ft band – density 0.36% 1,906 buildings in 1-mile band – density 0.62%
Other issues	2 identified NRHP-eligible sites within 1-mile band Hagar dam (private) within 1-mile band Agricultural districts near Waldo Berlin Business Park on US 36/SR 37

E2 Risk Summary (see **Figure 8**)

Advantages: No impact on public buildings and landfills. Smaller impacts to reservoirs, drinking water protection areas, and wooded areas. Moderate impacts to Group 2 streams, floodplains, and parks. Lower building count.

Risks: Greater potential impact on agricultural lands. Possibly higher impacts to designated agricultural districts subject to NRCS coordination. Highest potential impacts to streams overall and for Group 1 streams. Impacts to Delaware State Park and Alum Creek State Park are subject to Section 4(f) requirements. Both may be subject to Section 6(f) requirements. Two known historic sites within 1-mile corridor. Locally sponsored business park on US-36/SR-37. Conflicts with existing project construction at the US-36/SR-37 I-71 node.

Focus areas:

1. The northern section (identical with E1 and overlaps with E7)

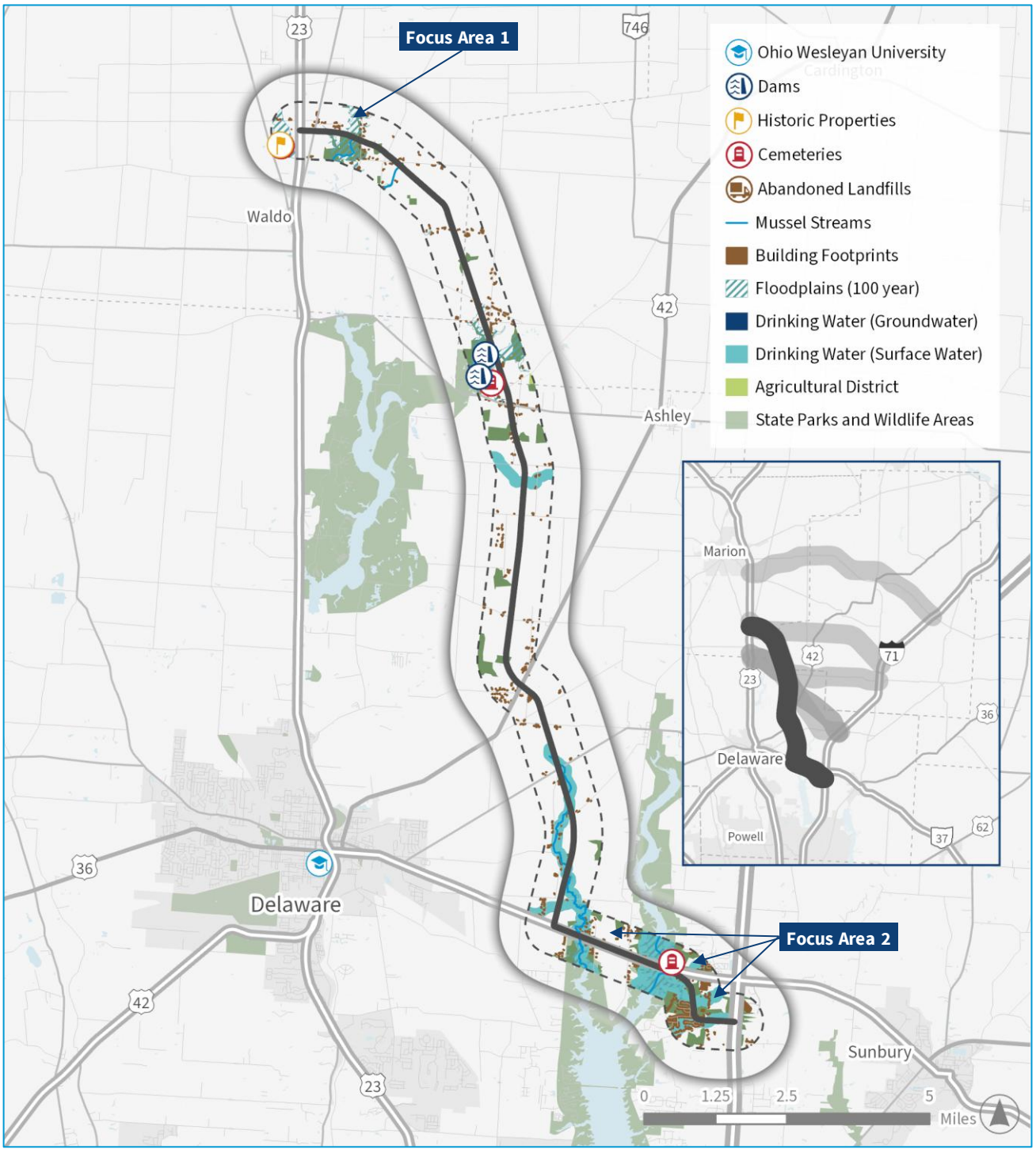
2. Only the existing US-36/37 bridge and right-of-way span the reservoir. Converting the under-construction, 50-mph Sunbury Parkway interchange to freeway geometry would widen the footprint, force additional relocations, trigger a new Section 4(f) review, reopen NEPA (EA/EIS) for added impacts, violate the 0.75-mi AASHTO spacing, and undermine Berlin Township's 1,800-acre Business Park/TIF that depends on multiple signalized accesses.

FIGURE 5. US-36/SR-37 @ AFRICA RD (LOOKING NW)

FIGURE 6. US-42 @ KELLY MCMASTER RD (LOOKING SW)

FIGURE 7. US-42 @ PITTMAN RD (LOOKING NW)

FIGURE 8. ALTERNATIVE E2 – ENVIRONMENTAL RESOURCES



Environmental Profile - Corridor E3

Issue	Detail
Reservoirs and Dams (Federal and State)	Delaware Reservoir (federal) Section 408 likely (see **Figure 9** and **Figure 10**)
Streams	1.4 miles of stream within 300-ft band/26.1 miles within 1-mile band (see **Figure 12**) 831 feet of Group 2 stream within 300-ft band/12,778 feet within 1-mile band
Wooded Habitat	138.2 acres within 300-ft band/2,262 acres within 1-mile band
Floodplains	85 acres within 300-ft band/1,537 acres within 1-mile band
Cemeteries	2 cemeteries within 300-ft band/5 cemeteries within 1-mile band (see **Figure 11**)
Parks and Recreation	72.1 acres of state park within 300-ft band/933 acres within 1-mile band
Drinking Water	0.07 sq. mi. of Corridor Management Zone within 300-ft band/1.28 sq. mi. within 1-mile band
Agriculture Lands	308 acres within 300-ft band/5,888 acres within 1-mile
Populated Areas	55 buildings in 300-ft band – density 0.52% 755 buildings in 1-mile band – density 0.34%
Other issues	1 NRHP-listed archaeological site and 1 NRHP-eligible site within 1-mile band Linden Conservation Club dam (private)

E3 Risk Summary (see **Figure 13**)

Advantages: Lower overall impacts to streams, agricultural lands, agricultural districts. Low building count.

Risks: Higher impacts to floodplains, wooded habitat, and state parks. Impacts on Delaware Reservoir which is subject to Section 408. Mayfield Cemetery and Norton Cemetery are centrally located in the corridor. Potential impacts to Delaware State Park and Alum Creek State Park. Each of them may be subject to Section 6(f) requirements. One historic site and one archaeological site are within the 1-mile band.

Focus area:

1. The area at US 23 and SR 229 is challenging, with many resources close together making avoidance difficult, including: Delaware Reservoir, Delaware State Park/Wildlife Area and shooting range, Norton Cemetery, Olentangy River (Group 2 stream), and an NRHP-listed archaeological site between US 23 and the river.

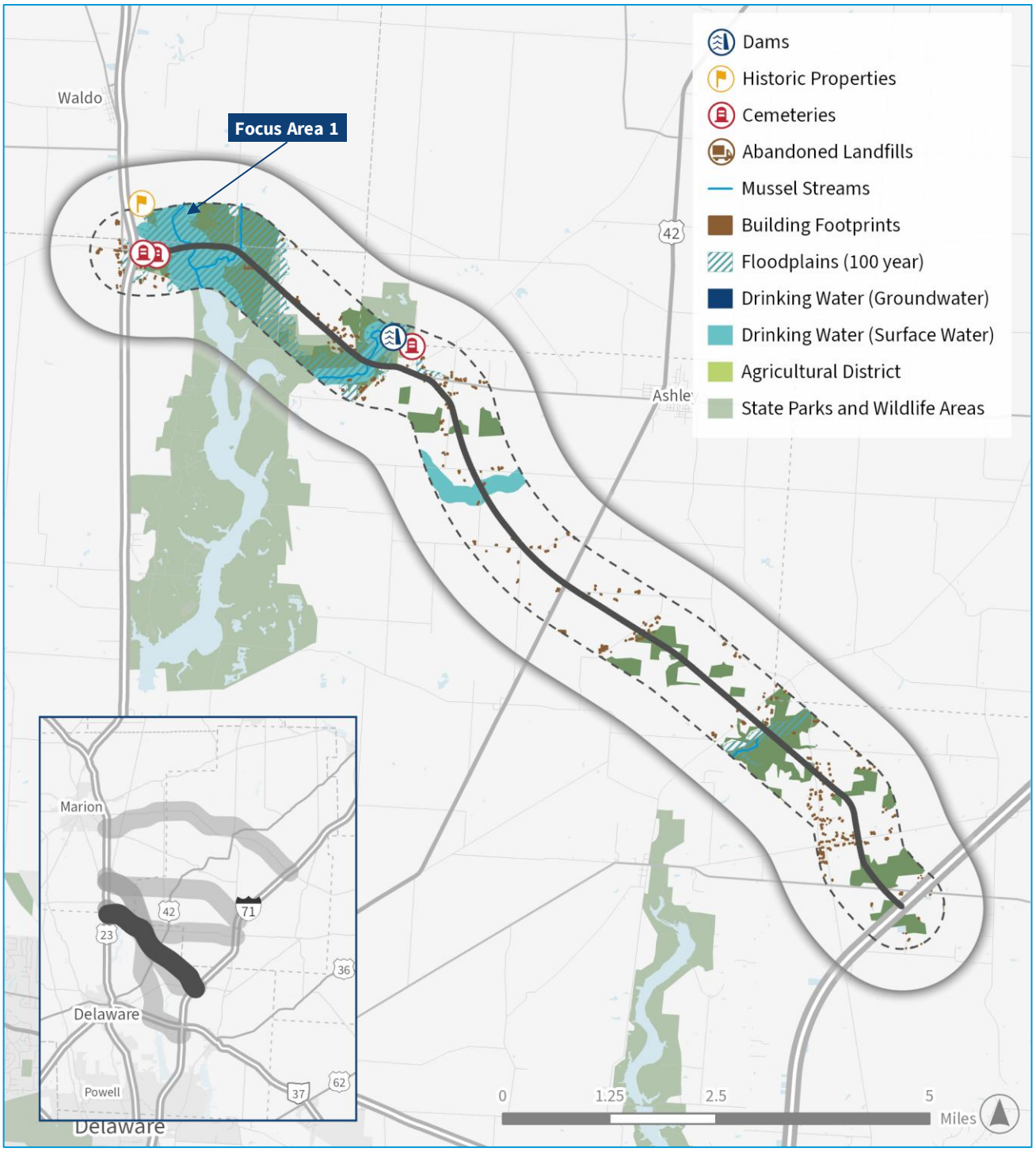
FIGURE 9. US-229 @ DELAWARE LAKE (1) (LOOKING NE)

FIGURE 10. US-229 @ DELAWARE LAKE (2) (LOOKING NE)

FIGURE 11. US-229 @ US-23 (LOOKING NW) – NORTON CEMETARY AND VICINITY OF NRHP-LISTED ARCHAEOLOGICAL SITE

FIGURE 12. US-229 @ DELAWARE STATE NORTH TIP (LOOKING NW) – WHETSONE CREEK CROSSING

FIGURE 13. ALTERNATIVE E3 – ENVIRONMENTAL RESOURCES



Environmental Profile - Corridor E4

Issue	Detail
Reservoirs and Dams (Federal and State)	Mt. Gilead Lower Lake and Mt. Gilead Upper Lake (state) within 1-mile band
Streams	2.5 miles of stream within 300-ft band/50.9 miles within 1-mile band 1,183 feet of Group 2 stream within 300-ft band/10,568 feet within 1-mile band
Wooded Habitat	137.9 acres within 300-ft band/2,446 acres within 1-mile band
Floodplains	32 acres within 300-ft band/973 acres within 1-mile band
Cemeteries	No cemeteries within 300-ft band/7 cemeteries within 1-mile band
Parks and Recreation	164 acres of state park within 1-mile band - Mt. Gilead Lake, campground, and associated recreational boating Mt. Gilead soccer fields within 1-mile band, Mt. Gilead Middle School and High School athletic fields within 1-mile band
Drinking Water	0.02 sq. mi. of Source Water Protection Area within 300-ft corridor/0.44 sq. mi. within 1-mile band
Agriculture Lands	568 acres within 300-ft band/10,613 acres within 1-mile
Populated Areas	243 buildings in 300-ft band – density 0.86% 3,764 buildings in 1-mile band – density 0.66%
Other issues	McGonapil and Strait's Lake dams (private) Edison Post Office, Heritage Elementary School, Morrow County Sheriff's office, and Morrow County Correctional Facility within 1-mile band Agricultural districts throughout, with clusters west of Mt. Gilead and south of Marion

E4 Risk Summary (see **Figure 14**)

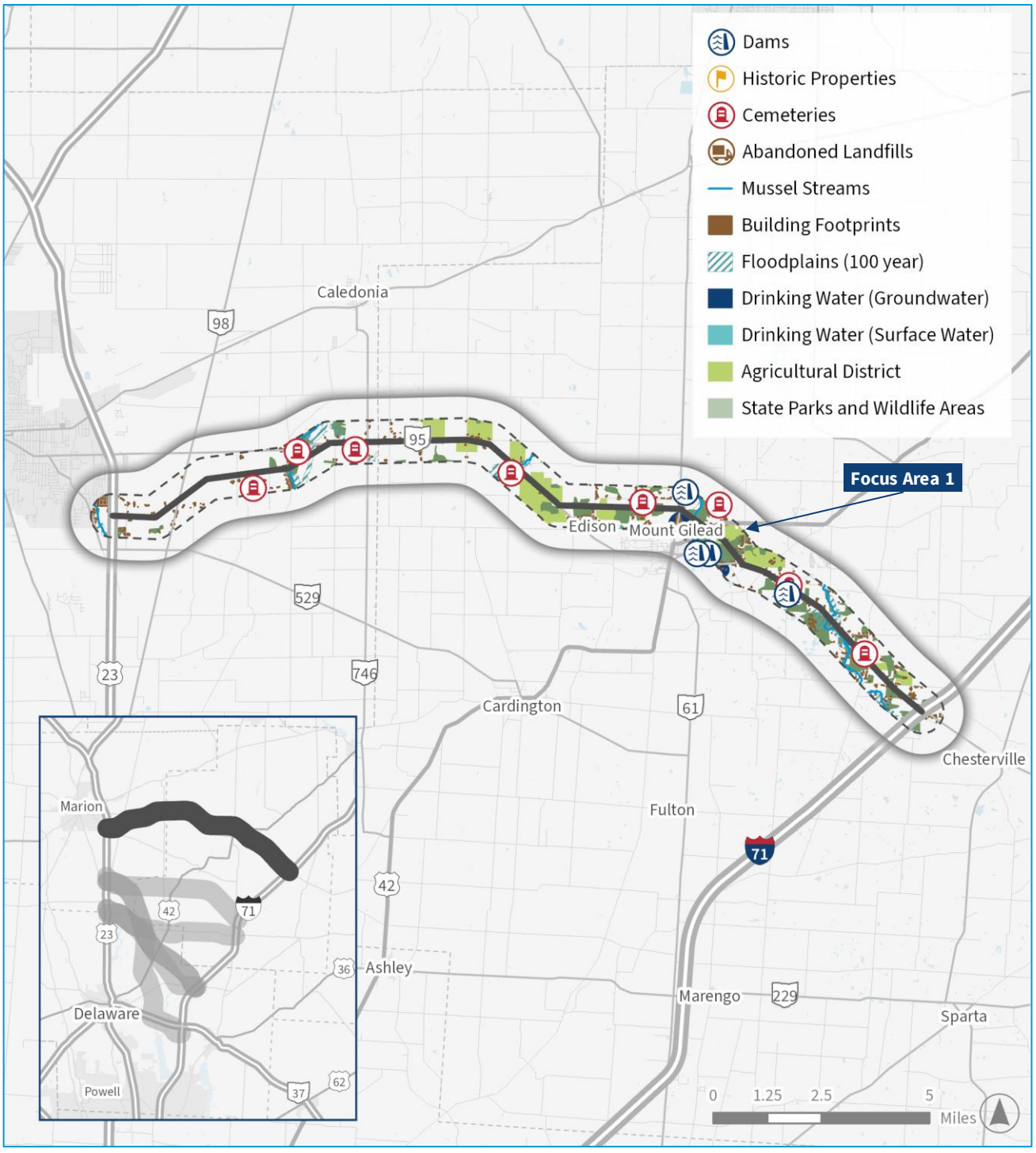
Advantages: No impact to federal dams and reservoirs. Lower impacts to floodplains. Impacts to Mt. Gilead State Park may be avoidable. Low impact to drinking water source protection areas.

Risks: Greater overall impact to streams, Group 2 streams, public buildings, wooded habitat, agricultural lands, and agricultural districts. Possible impacts to local park would be subject to Section 4(f) requirements, as well as the school athletic fields if they are open for public use. Possible highest impact to buildings.

Focus area:

1. The area from SR 95 to SR 61 is dense with resources, including agricultural districts, wooded areas (likely wet), Mt. Gilead Lake and campground, Sams Creek, Whetstone Creek, and the Mt. Gilead soccer fields. This collection of closely spaced resources will make avoidance difficult.

FIGURE 14. ALTERNATIVE E4 – ENVIRONMENTAL RESOURCES



Environmental Profile - Corridor E5

Issue	Detail
Reservoirs and Dams (Federal and State)	Delaware Reservoir (federal) Section 408 likely
Streams	1.3 miles of stream within 300-ft band/32.0 miles within 1-mile band 334 feet of Group 2 stream within 300-ft band/10,018 feet within 1-mile band
Wooded Habitat	80.1 acres within 300-ft band/2,274 acres within 1-mile band
Floodplains	87 acres within 300-ft band/1,657 acres within 1-mile band
Cemeteries	3 cemeteries within 300-ft band/5 cemeteries within 1-mile band
Parks and Recreation	65.2 acres of state park within 300-ft band/917 acres within 1-mile band Village of Ashley Park and Pool within 1-mile band
Drinking Water	0.06 sq. mi. of Corridor Management Zone within 300-ft band/1.20 sq. mi. within 1-mile band
Agriculture Lands	325 acres within 300-ft band/5,785 acres within 1-mile (see **Figure 16**)
Populated Areas	185 buildings in 300-ft band – density 1.19% (see **Figure 15**) 2,111 buildings in 1-mile band – density 0.78%
Other issues	6 identified NRHP-listed or eligible sites within 1-mile band/1 NRHP-listed archaeological site within 1-mile band Ashley Waterworks Reservoir, Ashley Post Office, Buckeye Valley East Elementary, Ashley Village Hall, Ashley Police Department, and Delaware County EMS within 1-mile band

E5 Risk Summary (see **Figure 17**)

Advantages: Lower overall stream impacts, Group 2 streams, wooded habitat, agricultural lands and districts.

Risks: Greater impacts to Delaware Reservoir (subject to Section 408), floodplains, Delaware State Park. Alum Creek Cemetery, Morehouse Cemetery, and Norton Cemetery are centrally located in the corridor. Larger number of buildings. Impacts to public buildings and Village of Ashley Park. Seven historic sites are within the 1-mile band, including NRHP-listed archaeological stie.

Focus areas:

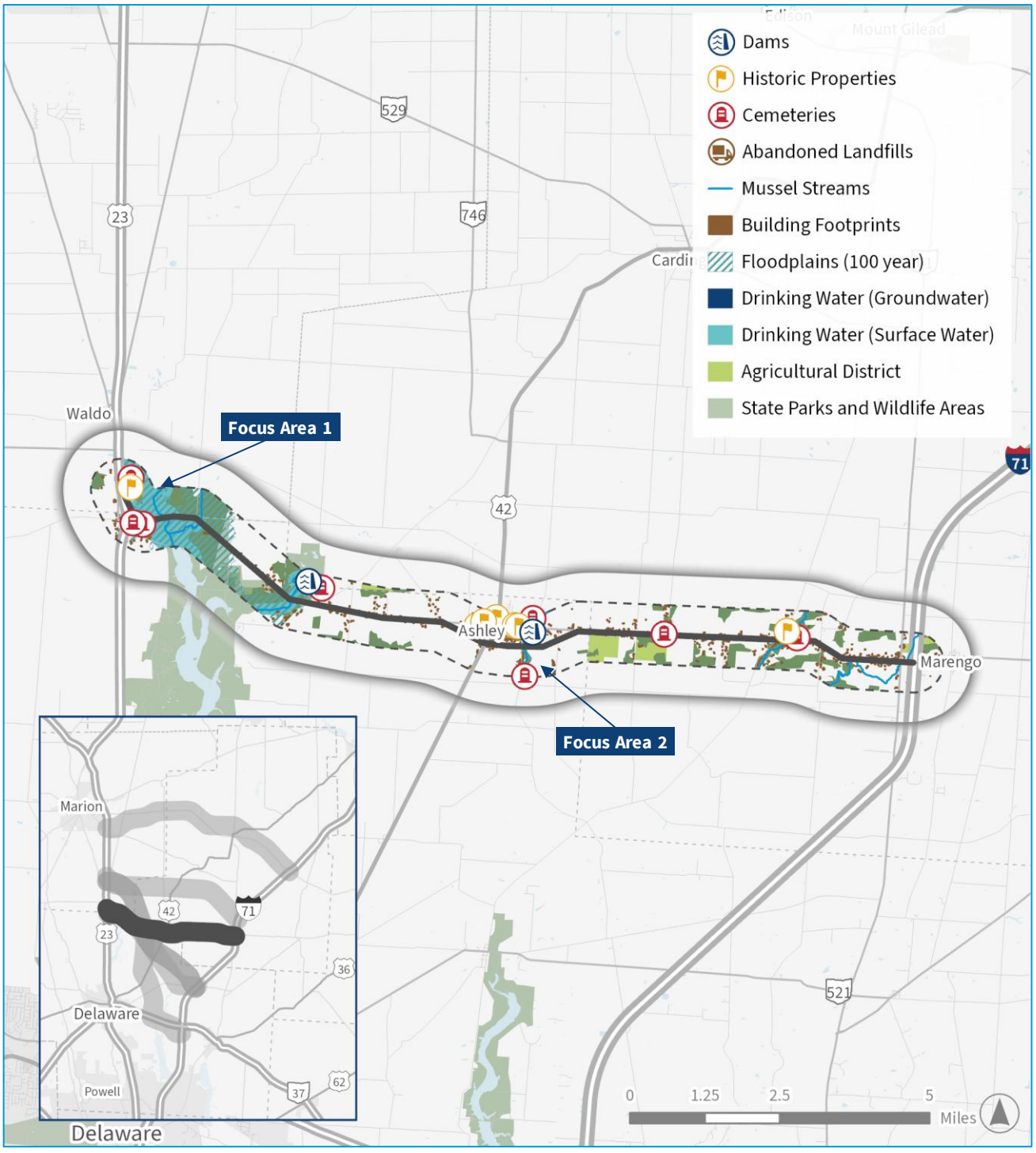
1. Corridor E5 contains the same concerns near US-23 and SR-229 as discussed in E3.

2. In addition, corridor E5 crosses Alum Creek using an existing structure on SR-229. Widening the existing crossing could cut off access to the residential areas on both sides. Creating a new crossing of Alum Creek may be challenging due to the length of stream that is parallel to SR 229. Lateral encroachments may dramatically increase the stream impacts compared to what is currently estimated.

FIGURE 15. SR-229 @ J & J AUTOPARTS (LOOKING W) – VILLAGE OF ASHLEY

FIGURE 16. I-71@ SR-229 @ (LOOKING W)

FIGURE 17. ALTERNATIVE E5 – ENVIRONMENTAL RESOURCES



Environmental Profile - Corridor E6

Issue	Detail
Reservoirs and Dams (Federal and State)	Delaware Reservoir (federal) Section 408 likely
Streams	1.7 miles of stream within 300-ft band/32.9 miles within 1-mile band 654 feet of Group 2 stream within 300-ft band/16,874 feet within 1-mile band
Wooded Habitat	102.4 acres within 300-ft band/2,390 acres within 1-mile band
Floodplains	81 acres within 300-ft band/1,638 acres within 1-mile band
Cemeteries	1 cemetery within 300-ft band/3 cemeteries within 1-mile band
Parks and Recreation	64.1 acres of state park within 300-ft band/1,635 acres within 1-mile band
Drinking Water	0.07 sq. mi. of Corridor Management Zone within 300-ft band/1.53 sq. mi. within 1-mile band
Agriculture Lands	325 acres within 300-ft band/5,785 acres within 1-mile band
Populated Areas	77 buildings in 300-ft band – density 0.51% 1,009 buildings in 1-mile band – density 0.42%
Other issues	1 NRHP-listed archaeological site within 1-mile band Swagler, Stevenson, Linden Conservation Club dams (private) within 1-mile band

E6 Risk Summary (see **Figure 18**)

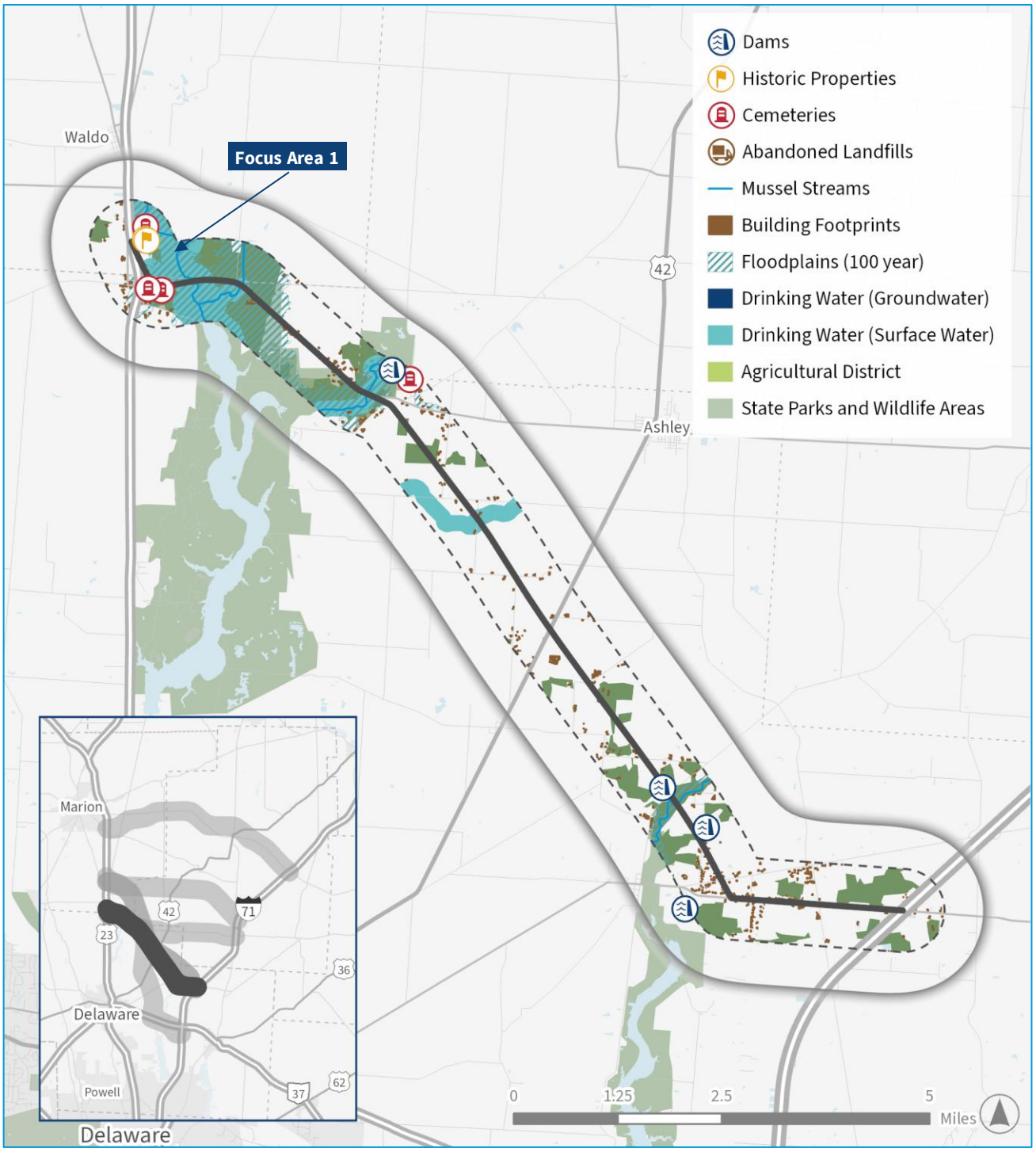
Advantages: Lower impacts to public buildings, agricultural lands and districts. Moderate buildings count.

Risks: Greater potential impacts to Group 2 streams, floodplains, wooded habitat, and state parks. Larger area of drinking water source protection within corridor. Impacts to Delaware Reservoir and Alum Creek Reservoir (both subject to Section 408). Mayfield Cemetery is centrally located in the corridor. One NRHP-listed archaeological site is within the 1-mile band.

Focus area:

1. In addition to the dispersed impacts that may be hard to minimize (Delaware Reservoir, Alum Creek Reservoir), Corridor E6 contains the areas of concern at US-23/SR-229 that overlaps E3 and E5.

FIGURE 18. ALTERNATIVE E6 –ENVIRONMENTAL RESOURCES



Environmental Profile - Corridor E7

Issue	Detail
Reservoirs and Dams (Federal and State)	No impacts
Streams	1.5 miles of stream within 300-ft corridor/29.0 miles within 1-mile band 408 feet of Group 2 stream within 300-ft band/6,556 feet within 1-mile band
Wooded Habitat	68.7 acres within 300-ft band/1,291 acres within 1-mile band
Floodplains	34 acres within 300-ft band/560 acres within 1-mile band
Cemeteries	3 cemeteries within 1-mile band
Parks and Recreation	9.7 acres of state park within 300-ft corridor/125 acres within 1-mile band
Drinking Water	No impacts
Agriculture Lands	443 acres within 300-ft band/8,331 acres within 1-mile (see **Figure 19**)
Populated Areas	70 buildings in 300-ft band – density 0.30% (see **Figure 20**) 1,485 buildings in 1-mile band – density 0.39%
Other issues	1 NRHP-listed site (Samuel P. Brown house) within 300-ft band/3 NRHP-listed or eligible sites within 1-mile band Jenkins dam (private) Westfield Township Dump (abandoned) within 300-ft band Agricultural district clusters near Ashley and Waldo

E7 Risk Summary (see **Figure 21**)

Advantages: No impacts to federal or state dams, reservoirs and drinking water protection areas; lower impacts to streams, Group 2 mussel streams, floodplains, wooded habitats, public buildings, cemeteries, and parks. Lower building count. Moderate overall area of agricultural land.

Risks: Highest impacts to known agricultural districts. Three known historic sites within 1-mile band, including 1 NRHP-listed site centrally located in corridor. Abandoned landfill in corridor. Greatest percentage of overall stream impacts predicted to be mussel streams (46% of total).

Focus Areas:

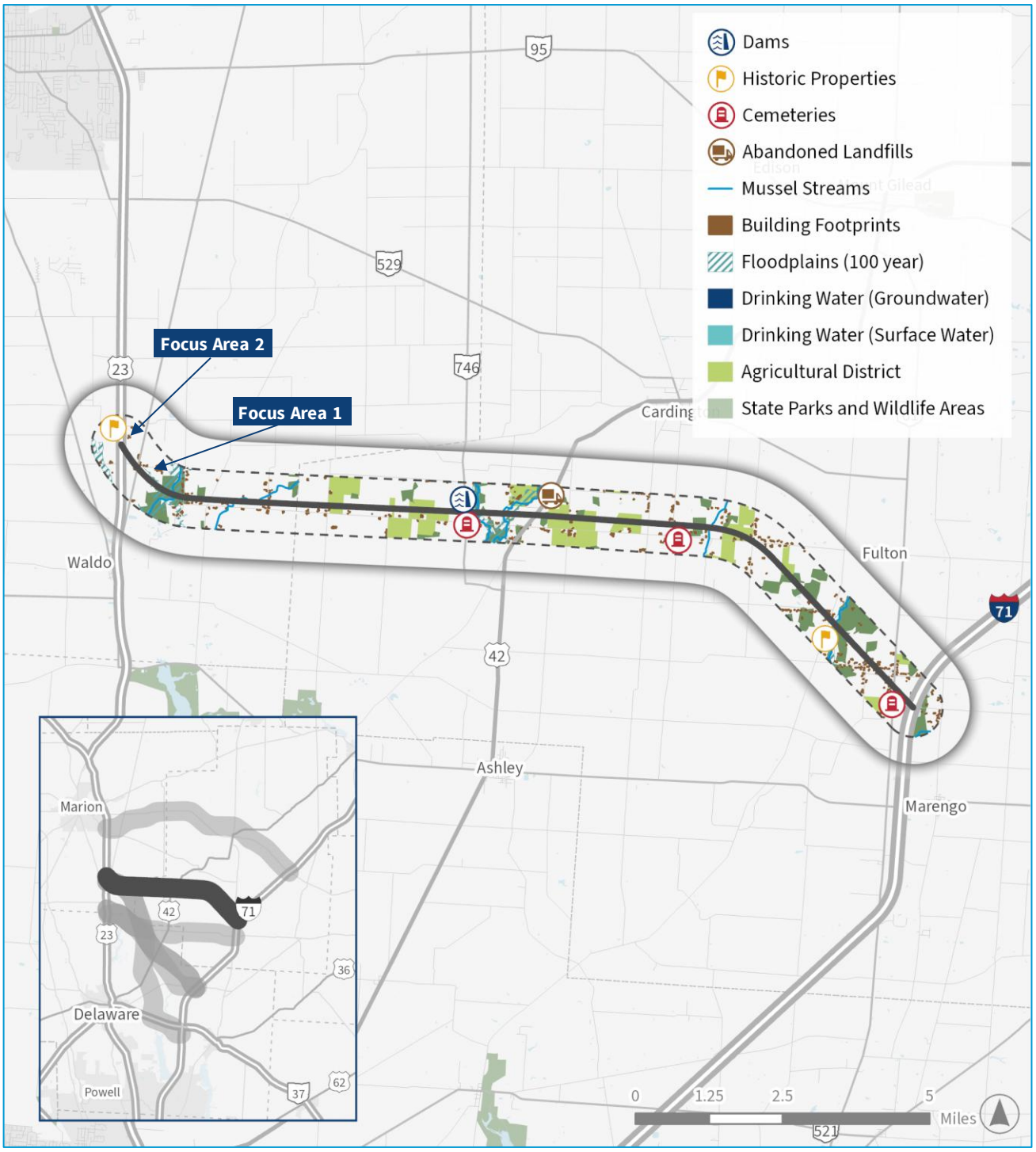
1. The northern section (overlaps E1 and E2) includes the Olentangy River (Group 2 mussel stream), and a tributary to the river. There is suitable wooded habitat along the riparian corridor. Wetlands are indicated along the river, and there are likely additional unmapped wetlands present in wooded areas.

2. A residential cluster is present along St. James Road. If not acquiring these properties and relocating residents, it would be desirable to attempt to maintain a 500-ft+ distance (measured from the edge of travel lanes, not edge of right-of-way) to minimize the potential for noise impacts.

FIGURE 19. I-71 @ TR-191 (LOOKING W)

FIGURE 20. WALDO-FULTON RD @ READER RD (LOOKING W)

FIGURE 21. ALTERNATIVE E7 – ENVIRONMENTAL RESOURCES



COMPARISON OF CORRIDORS

Comparison Matrix

The following comparison matrices translate corridor data into an at-a-glance appraisal of relative environmental risk for each corridor. For every resource category, the numeric values measured in the 300-foot and one-mile evaluation bands are displayed side-by-side and shaded on a graduated color scale: the lighter (blue) the cell, the smaller the impact; the darker (red) the cell, the larger the impact.

Comparison Matrix – Part 1

Resource		Corridor E1	E2	E3	E4	E5	E6	E7
Ecological and Natural Resources								
All streams	Length within 300-ft corridor (miles)	1.6	2.9	1.4	2.5	1.3	1.7	1.5
	Length within 1-mile corridor (miles)	31.3	47.7	26.1	50.9	32.0	32.9	29.0
Group 1 mussel streams	Length within 300-ft corridor (feet)	905	3,387	617	1,358	1,946	620	3,168
	Length within 1-mile corridor (feet)	18,347	47,641	14,015	44,818	42,908	13,991	41,009
Group 2 mussel streams	Length within 300-ft corridor (feet)	809	630	831	1,183	334	654	408
	Length within 1-mile corridor (feet)	13,424	14,179	12,778	10,568	10,018	16,874	6,556
Floodplains	Area within 300-ft corridor (acres)	30	43	85	32	87	81	34
	Area within 1-mile corridor (acres)	774	1,002	1,537	973	1,657	1,638	560
Wetlands	Area within 300-ft corridor (acres)	14.1	16.7	18.2	16.8	10.5	18.2	6.6
	Area within 1-mile corridor (acres)	227.8	424.5	328.2	456.1	314.8	353.8	174.4
Wooded habitat	Area within 300-ft corridor (acres)	94.7	83.7	138.2	137.9	80.1	106.1	68.7
	Area within 1-mile corridor (acres)	1,514	1,958	2,262	2,446	2,274	2,390	1,291

Comparison scale Best — Worst

Comparison Matrix – Part 2

Resource		Corridor E1	E2	E3	E4	E5	E6	E7
Community Resources								
Public buildings	Number within 1-mile corridor	0	0	0	4	5	0	0
Cemeteries	Cemeteries within 300-ft corridor	0	0	2	0	3	1	0
	Cemeteries within 1-mile corridor	5	6	5	7	5	3	3
Parks and recreation	State Parks Within 300-ft corridor - acres	0.0	6.9	72.1	0.0	65.2	64.1	9.7
	State Parks Within 1-mile corridor - acres	21	681	933	164	917	1,635	125
	Local Parks within 1-mile corridor-number	0	0	0	2	1	0	0
Agricultural lands	Area within 300-ft corridor (acres)	422	585	308	568	409	325	443
	Area within 1-mile corridor (acres)	8,240	10,421	5,888	10,613	6,491	5,785	8,331
Agricultural districts	Area within 300-ft corridor (acres)	78.2	75.1	0.0	131.3	3.5	0.9	136.2
	Area within 1-mile corridor (acres)	1,143	1,169	9	2,981	327	12	2,110
Drinking water protection areas	Area within 300-ft corridor (sq.mi.)	0.01	0.27	0.07	0.02	0.06	0.07	0.00
	Area within 1-mile corridor (sq.mi.)	0.35	3.31	1.28	0.44	1.20	1.53	0.00
Cultural Resources								
Historical architecture	NRHP-listed or eligible properties-300-ft corridor	0	0	0	0	0	0	1
	NRHP-listed or eligible properties-1-mile corridor	1	2	1	0	6	0	3
Archaeological sites	NRHP-listed or eligible properties 1-mile corridor	0	0	1	0	1	1	0

Comparison scale Best — Worst

Comparison Matrix – Part 3

Resource		Corridor E1	E2	E3	E4	E5	E6	E7
Dams and Reservoirs								
Dams, reservoirs - federal	within 300-ft corridor	0	1	1	0	1	1	0
	within 1-mile corridor	1	2	2	0	2	2	0
Dams, reservoirs - state	within 300-ft corridor	0	0	0	0	0	0	0
	within 1-mile corridor	0	0	0	2	0	0	0
Dams, reservoirs - local/private	within 300-ft corridor	1	0	1	0	0	1	1
	within 1-mile corridor	1	1	1	2	2	3	1
Regulated Materials								
Landfills	Within 300-ft corridor/ 1-mile corridor	0	0	0	0	0	0	1
LUST sites	Number within 300-ft corridor	0	1	0	1	0	0	0
	Number within 1-mile corridor	0	4	1	8	8	1	0
Development Density								
Building footprints compared to corridor area	Building Count within 300-ft corridor	87	71	55	243	185	77	70
	Percentage of Building Footprint within 300-ft corridor	0.38%	0.36%	0.52%	0.86%	1.19%	0.51%	0.30%
	Building Count within 1-mile corridor	1,358	1,906	755	3,764	2,111	1,009	1,485
	Percentage of Building Footprint within 1-mile corridor	0.35%	0.62%	0.34%	0.66%	0.78%	0.42%	0.39%

Comparison scale Best … Worst

Summary Ranking

Based on the preliminary screening of environmental issues presented in this memo, following is a comparative ranking for corridors based upon the greatest potential for avoidance and minimization of impacts to the human and natural environment:

Rank	Corridor ID	Rationale
1	E1	E1 avoids all federal reservoirs and state-park lands, eliminating the need for known Section 4(f), Section 6(f), or USACE §408 approvals. Its environmental footprint is the smallest of the seven corridors (approximately 1.6 mi of streams and 30 acres of floodplain within the 300-ft study band) resulting in comparatively low mitigation cost and permitting effort. Anticipated relocations are on the lower side (~87 structures), and only one National Register–eligible resource has been identified, streamlining right-of-way acquisition and Section 106 coordination.
2	E7	E7 mirrors many of E1's advantages: no reservoir crossings, approximately 1.5 mi of streams, and 34 acres of floodplain. Relocations are low (~70 structures) and parkland impacts are negligible. The principal delivery challenges are a crossing of the state's largest contiguous block of Agricultural Districts (≈ 8,300 acres) and three NRHP-eligible sites, which will lengthen NRCS consultations and Section 106 reviews, respectively.
3	E3	E3 minimizes displacement (~55 structures) and stream impacts (~1.4 mi) but must span Delaware Reservoir and Delaware State Park. This crossing along SR-229 introduces both a USACE §408 review and Section 4(f)/6(f) conversion, and it places potentially 85 acres of floodplain in the construction footprint. These federal actions increase complexity, mitigation requirements, and schedule uncertainty relative to E1 and E7. This constrained western span of the corridor through Delaware Reservoir and State Park presents significant risks due to parkland impacts and flood-plain encroachment. Additionally, E3's tie-ins at US-23 and SR-229 overlap ongoing ODOT projects, creating potential schedule conflicts and design re-work.
4	E6	E6 repurposes long stretches of the SR-229/SR-521 corridor, keeping relocations to a moderate ~77 structures, but it must clear two separate federal reservoirs (Delaware Reservoir/State Park on the west end and Alum Creek Reservoir near Kilbourne). The Delaware span would trigger both a Section 4(f)/6(f) conversion and a USACE §408 review, while the Alum Creek crossing introduces a second §408 action, pushing the total flood-plain footprint to roughly 81 acres and exposing additional Group-2 streams. Additionally, E6's tie-ins at US-23 and SR-229 overlap ongoing ODOT projects, creating potential schedule conflicts and design re-work.
5	E2	E2 records the greatest cumulative stream impact (≈ 2.9 mi) and would require traversing the Olentangy River, Whetstone Creek, Big Run, and Alum Creek. Its 16-mile green-field segment between US-23 and US-36/SR-37 cuts through a broad block of prime farmland, invoking Farmland Conversion Impact Rating reviews. The three-mile upgrade of US-36/SR-37 at its southern extent to freeway standards, plus reconstruction of the partially built Sunbury Parkway/I-71 system interchange, must be threaded along the Alum Creek Reservoir dam and wetlands, adding wet-land mitigation, dam-safety coordination, and likely USACE §408 review

Rank	Corridor ID	Rationale
		complexity. The US-36/SR-37 portion adjacent to Alum Creek Reservoir in particular presents significant risk because reservoir-dam proximity, dense wetlands, and interchange reconstruction converge in one location.
6	E5	While E5 limits stream impacts (~1.3 mi) and repurposes 11 mi of existing SR-229, it still must span Delaware Reservoir and Delaware State Park (sharing the same constraint as E3 and E6). Again, this constrained western span across the reservoir presents a significant risk because it concentrates park-land impacts, Zone A flood-plain encroachment, and dam-safety coordination. Conversely, the eastern segment, where SR-229 is widened and Ashley bypassed, would involve acquiring roughly 45–70 residences and 10–25 commercial structures and passes several NRHP-eligible farmsteads east of Ashley, elevating right-of-way cost and Section 106 workload.
7	E4	E4, the longest of all corridors evaluated, presents the greatest environmental risk. The route, which follows SR-95, touches roughly 164 acres of Mt. Gilead State Park and about 2.5 miles of streams. It also registers the highest potential development impacts total (≈ 243 structures), including homes, two public schools, county offices, and the county fairgrounds. A western intrusion into the state-park would trigger large Section 4(f)/6(f) conversion, likely LWCF replacement, wetland fills, and dam-safety coordination for the park lake.

CONCLUSION

Based on this desktop-level review of priority environmental constraints, **Corridors E1 and E7 show the greatest inherent capacity to avoid or minimize environmental impacts**. Both alignments avoid reservoirs, state-park lands, and broad flood-hazard zones for much of their length, keeping permitting, right-of-way, and schedule risks low.

In contrast, Corridors E2, E3, E4, E5, and E6 are a patchwork of “lower-risk” and “higher-risk” segments where overlapping constraints could materially complicate environmental approvals, ROW acquisition, and project timing.

Viewing the study area, any alternative that advances will have to grapple with three recurring factors:

1. Reservoirs and State Parks Are the Dominant Risk Drivers

- Delaware and Alum Creek Reservoirs are federally owned flood-control dams; any bridge, embankment, or causeway modification invokes a USACE §408 permission in addition to standard Section 404/401 permits.
- Delaware, Alum Creek, and Mt. Gilead State Parks present unavoidable Section 4(f)/6(f) issues. Conversion of even small acreages will require a “no prudent and feasible alternative” finding, protracted agency coordination, and in-kind land replacement.

- High impacts to Delaware, Alum Creek, and Mt. Gilead State Parks forest and ecological areas (E2, E3, E4, E5 and E6) present unavoidable complexity, high studies and coordination effort, extreme mitigation requirements, and schedule uncertainty.
- Corridors that avoid both a reservoir and state-park acreage (E1, E7) eliminate two of the most time-consuming federal actions, giving them a clear delivery advantage.

2. Stream Density and Flood-Plain Breadth Vary Sharply by Alignment

- North–south movement in this study area quickly intersects the Olentangy and Alum Creek stream networks as well as large FEMA floodplains.
- E1 and E7 thread the narrowest flood-plain zones (≈30–34 acres in the build band) and cross the fewest linear feet of streams, reducing mitigation acreage and the likelihood of complex hydraulic design.
- E2, E4, and E6 capture the highest stream mileage (>2.5 mi in the 300-ft band for E2 and E4) and >80 acres of flood-plain, driving up aquatic mitigation cost and exposing the project to potential FEMA map revisions.

3. Existing Development and Planned Growth Present Risks

- Relocation density ranges an order of magnitude (from ~55 structures in E3 to ~243 in E4) directly affecting communities, ROW cost, schedule, and potential relocation complexity.
- Active or pending local projects (e.g., the Sunbury Parkway interchange in E2 and on-going project development at US-23 and SR-229 (E3, E5, and E6) create compounded risk: redesign costs, sunk-fund exposure, and potential development opposition.
- Large contiguous Agricultural Districts fall mainly under E7 and portions of E6/E4, requiring coordination with the Ohio Department of Agriculture and possible Farmland Conversion Impact Ratings under NRCS rules and have the highest impacts on active farms in the region.

Limitation

This analysis is based upon a review of secondary source environmental data only. The full comparison of alternatives will require consideration of each corridor's ability to address the project's transportation purpose and need, design issues, and cost/benefit. If a corridor fails to even minimally meet the project's purpose, it should not move forward into comparison based upon environmental issues.

Tolling Financial Feasibility Assessment Technical Memo

US-23 to I-71 Connector Joint Plan – Interim Report – HB 96

FINANCIAL FEASIBILITY ASSESSMENT

This technical memorandum provides a summary of the sketch-level tolling analysis and financial feasibility assessment for each of the seven (7) US-23 to I-71 corridor alternatives (see the *Corridor Concepts Technical Memorandum*) being considered as part of the US-23 to I-71 Connector Joint Plan, a planning effort led by the Ohio Department of Transportation (ODOT) and the Ohio Turnpike and Infrastructure Commission (OTIC) in response to House Bill 54, Section 755.60 (further amended by HB 96). Michael Baker provided assessment of tolling viability based on general costs, revenue, and implementation constraints using the North Carolina Department of Transportation (NCDOT) Financial Feasibility Screening Tool (FFST) on each alternative.

Michael Baker developed unit costs to implement tolling on each corridor alternative. These costs ($/lane-mile) included toll system capital, operating, and processing costs. Revenue leakage based on recommended collection methods was estimated. The portion of costs covered by toll revenue address project expenses with roadway improvements; including, but not limited to, engineering, right-of-way acquisition, construction, financing, and toll road operations and maintenance.

The overall financial feasibility of the corridor alternatives was evaluated and summarized. This coarse level feasibility summary was based on comparing the costs for the construction and operation of the new tolled facility, offset by the toll revenue generated by the tolled alternative. Michael Baker provided a summary of the potential for developing and financing project improvements using toll revenue generated from the project. An annual net revenue stream was calculated for each of the alternatives by subtracting operating costs and revenue leakage from the estimated annual gross toll revenue.

Assessment Framework

The information provided below describes the NCDOT FFST, its required input data, and its evaluation methodology. The information is an edited version of text sourced from the NC Toll Project Development Policy Handbook[1] (December 2019).

The FFST methodology is consistent with generally accepted forecasting principles used for evaluating tolled facilities simplified with industry standard assumptions. The tool generates order-of-magnitude forecasts of the ability of toll revenues to cover not only operating and maintenance costs, but also the ability to contribute upfront funding toward construction costs through financing.

[1] https://connect.ncdot.gov/projects/planning/Planning%20Document%20Library/NCTollProjDevtPolicyHandbook_FINAL.pdf

The FFST is meant to be illustrative in nature and is intended to provide a scale of possible outcomes rather than a precise estimate. The assessment is not adequate to support the financing of a project, and more detailed analyses are required to support decision making on whether to move forward as a toll candidate.

The FFST provides flexibility to assess new facilities or the conversion or upgrade of existing infrastructure to tolled facilities. This memo briefly describes the analytical framework of the financial tool, including modeling inputs, basic assumptions, and suggested parameters, to provide a preliminary determination of the viability of the subject corridor alternatives.

Toll Collection System

The toll collection system proposed for each of the US-23 to I-71 corridor alternatives is an All-Electronic Tolling (AET) system. This will include electronic tolling by in-vehicle transponders such as E-Z Pass and Toll by Plate. The Ohio Turnpike recently implemented a hybrid tolling system on their mainline facility of I-80/I-90/I-76 across northern Ohio from Indiana to Pennsylvania. This hybrid system includes Open Road Tolling (ORT) lanes for electronic and Toll by Plate toll collection and traditional lanes for cash/credit payment. The ORT lane design implemented on the Ohio Turnpike was selected as the tolling concept of operations for this analysis of the US-23 to I-71 connector.

Toll Plaza Infrastructure

Each US-23 to I-71 corridor alternative consists of a four-lane facility with two lanes in each direction. Toll collection will be all electronic via mainline highway toll collection points on segments midblock between interchanges. No ramp plaza installations were considered for the US-23 to I-71 corridor alternatives. The number of segments for each corridor alternative is identified in **Table 1**. It is assumed that bidirectional (i.e., Eastbound and Westbound) toll collection points will be located at the same milepost of the segment to cost-effectively deploy toll plaza gantry infrastructure.

This analysis assumes that all vehicles on all segments of the proposed corridors will pass through a toll collection point. Toll collection points on some segments may be omitted with minimal revenue loss, but further detailed study of corridor alternative traffic volumes by segment, interchange demand, corridor travel patterns, and revenue impacts would be required to facilitate that decision. Toll infrastructure and operating and maintenance costs are a small portion of the total corridor alternative project costs, so reducing the number of toll collection points will not have a significant impact on the overall corridor alternative financial viability. **Table 1** includes two columns of toll collection point counts per corridor alternative: the first that includes a toll collection point for each segment as assumed in this analysis, and the second a reduced number of toll collection points based on the following:

- Corridor Alternative E2 – consider eliminating two (2) toll collection points at SR-36 / US-37
- Corridor Alternative E3 – consider eliminating one (1) toll collection point at SR-229
- Corridor Alternative E4 – consider eliminating two (2) toll collection points west of SR-95
- Corridor Alternative E5 – consider eliminating two (2) toll collection points at SR-229 and west of Ashley

TABLE 1. TOLL GANTRY LOCATION SUMMARY

Corridor ID	Length (miles)	Interchanges	Mainline Toll Collection Points (Corridor Segments between Interchanges) *Used in Analysis*	Reduced Mainline Toll Collection Points *For Future Study*
E1	15	3	2	2
E2	19	6	5	3
E3	17	5	4	3
E4	22	8	7	5
E5	14	7	6	4
E6	14	5	4	4
E7	15	3	2	2

This analysis assumes an AET system with detectors to collect toll from in-vehicle transponders and cameras to capture license plates with a bill-by-mail system for all other transactions. Toll infrastructure construction costs vary between each corridor alternative due to the number of tolled segments. The following describes the general toll system equipment layout at each toll gantry.

Gantry: Toll collection equipment will be mounted to two (2) gantries over each direction of travel, one for approach travel and the second for departure travel functions. The gantries are ODOT Overhead Sign Supports per Standard Construction Drawing TC-15.116 as implemented on the ORT lanes of the existing OTIC system. In total, each tolling location will include four (4) gantries to account for both directions of travel.

Toll Collection: The system requires multiple pieces of hardware to capture vehicles at various speeds, within travel lanes, while changing lanes, and while using the shoulders during incidents, maintenance of traffic (MOT), or other atypical conditions. Four (4) in-pavement loops will be placed in each travel lane plus the shoulders for vehicle detection. This results in an array of sixteen (16) loops per direction of travel and 32 total loops per plaza including both directions of travel. To meet national interoperability requirements, OTIC must use multi-protocol detection to read all devices in the national transponder network. This multi-protocol detection system includes Automated Vehicle Identification (AVI) devices mounted to the gantries and an Automated Vehicle Classification (AVS) system which uses piezoelectric sensors in the pavement and LiDAR sensors attached to the gantries for vehicle classification (number of axles and height). Also mounted to the gantries is the Violation Enforcement System (VES) and Digital Video Auditing System (DVAS) which use primary and secondary cameras with optical character recognition (OCR). The VES/DVAS cameras work with illuminators aimed backwards on the approach gantry and infrared sensors aimed forward on the departure gantry to capture license plate images for toll collection by mail. Each plaza will include a single prefabricated shelter to house communication and toll equipment for both the eastbound and westbound gantries.

The back-office bill by mail process includes manual double check of plate images that cannot be automatically read by the OCR.

System Considerations

Each of the proposed US-23 to I-71 corridor alternatives would add a non-contiguous toll facility distant from the existing OTIC system. OTIC currently has toll collection contracts with outside vendors to handle roadside and back-office toll collection, processing, and maintenance. This sketch-level feasibility assessment uses the per plaza cost of software and back-office implementation from the 2019 ORT system conversion but does not calculate detailed costs to expand or enhance existing network storage and capability to process additional transactions.

OTIC currently has 26 fiber strands on an existing backbone along the entire length of the existing Turnpike system. Additional communication will be needed with the new US-23 to I-71 facility to connect the new facility back to OTIC Headquarters in Berea, OH. A fiber backbone along the corridor could be provided as a primary communication system or for redundancy to a wireless network. Communication back to the existing system back office is assumed via a wireless network.

Detector loops and piezoelectric sensors in pavement are a high maintenance item with an estimated 5-year lifespan. This analysis assumes gantries, roadside toll equipment, and operational back office systems are replaced or upgraded on a 10-year cycle.

Analysis Input Data

The FFST relies on user-inputs to provide basic project information. The tool, however, provides "reasonable assumptions" as default values for certain elements that the user can supersede if better data is available. **Table 2** summarizes the model inputs required for each project type.

TABLE 2. FINANCIAL FEASIBILITY SCREENING TOOL SUPPORTING DATA & ASSUMPTIONS

Category	Item	Value	Source
Traffic Characteristics	Toll-Paying Volume (autos and trucks)	Varies by alternative	ODOT
	Share of Toll Exempt Vehicles (such as high-occupancy vehicles)	No exemptions - 0%	OTIC/ODOT
	Vehicles Allowed	All vehicles allowed	OTIC/ODOT
Toll Pricing / Revenue	Toll Rate ($/mile)	$0.0563 Autos, $0.1503 Trucks (2010$)	ODOT
	Revenue Ramp-Up	60% 1st Year 80% 2nd Year 95% 3rd Year	NC Tool (FFST Default)
	Revenue Leakage Rate	Approximately 6%	NC Tool
Capital Costs	Construction Duration	5 years per alternative	ODOT
	Roadway Capital Improvement Cost	Varies by alternative	ODOT
	Indexation Base Year of Capital Improvement Costs	Year 2025	ODOT
	Toll System Implementation Cost ($/lane-mile)	Varies by alternative	MBI
	Indexation Base Year of Toll System Capital Costs	2025	MBI
Roadway Operating Costs	Roadway Maintenance ($/lane-mile)	$8,400 (annually)	ODOT
	Indexation Base Year of Roadway Maintenance	2025	ODOT
Tolling System Operations & Maintenance Costs	ETC Toll Cost ($ per transaction)	$0.35	MBI
	VTC Toll Cost ($ per transaction)	$1.00	MBI
	Annual Toll System Maintenance ($/lane-mile)	80,000 (2018$)	NC Tool
	% Paid by Credit Card	90%	NC Tool
	Credit Card Fees	2.2%	NC Tool

	Indexation Base Year of O & M costs	2025	PTC
Financing Assumptions	Debt Service Coverage Ratio	2.0 (BBB Credit)	NC Tool
	Average Market Rate for Transportation Bonds	4.5%	NC Tool

Inputs are differentiated into four categories for the assessment: project information, traffic characteristics, toll pricing, and costs.

Project Information

This category groups general characteristics of the project. Some of the data are used as descriptive information to summarize the characteristics of the facility. Other data entries are necessary to estimate roadway capacity and other parameters for each year of the study period (e.g., number of transactions, revenues).

- Corridor name
- Length of tolled project (centerline miles)
- Number of lanes (total, both directions)
- Project location – County (or counties) to reflect the geographical location of the project.

Traffic Characteristics

This category includes information about the existing and expected traffic conditions. This study used information from the regional/statewide travel demand model as provided by ODOT.

- **Opening Year** – Year the toll project is expected to open, 2035 for this feasibility analysis.
- **Opening Year Annual Average Daily Traffic (AADT)** – Bi-directional estimate of traffic volume in opening year. AADT is assumed to be the demand willing to pay a toll and to reflect the annualized daily travel normalized for seasonal and weekday/weekend variations. Enter length-weighted AADT across all roadway segments.
- **Design Year** – Future forecast year of traffic demand, usually 20 years from the opening year, 2055 for this feasibility analysis.
- **Design Year AADT** – Bi-directional estimate of traffic volume for design year, usually covering at least a 20-year projection into the future from the opening year. AADT is assumed to be the demand willing to pay a toll and to reflect the annualized daily travel normalized for seasonal and weekday/weekend variations. Enter length-weighted AADT across all roadway segments.
- **AADT Average Annual Growth Rate (%)** – The average annual traffic growth rate is automatically calculated based on opening year AADT and design year AADT. It is common practice to reduce traffic growth projection over the long term, especially after the design year. Hence, past the design year, the FFST reduces the average annual growth rate. The maximum annual growth rate after the design year is 0.75%. This approach provides a more conservative forecast that considers a more mature facility, future capacity constraints, and uncertainty in socioeconomic growth.
- **Truck percentage (%)** – The average percent of truck traffic between the opening year and design year.

- **Intermediate access points** – This parameter refers to whether there are multiple access points (i.e., points of ingress or egress) where vehicles can enter/exit the tolled project. Intermediate ingress and egress points may also include access to surrounding roadway networks directly to or from the tolled roads.
- **Share of Toll-Exempt Vehicles (%)** – Share of AADT allowed to use the tolled roadway for free (e.g., emergency vehicles, transit buses/vanpools, high occupancy vehicles).
- **Trip length percent (%)** – Average length travelled by vehicles as opposed to entire trip length. If there are no intermediate access points, trip length is 100%. If intermediate access points are available, three options are provided by the FFST: High (90%), Medium (75%), and Low (50%).

Toll Pricing

The general assumption is that tolls will be collected electronically via overhead mainline gantries using both electronic toll collection (ETC) and video toll collection (VTC). This section of the FFST provides the suggested ETC and VTC toll rates. ETC rates, by default, are 35% lower compared to VTC transactions, which is consistent with North Carolina's policy. The *Utilization and Benefits Technical Memorandum* describes the toll rates that were used to establish the traffic volume diversion used in the ODOT travel demand model for the tolled corridor alternative scenarios. To meet the expediency goals of this study and to provide a baseline of known data, toll rates for the tolling analysis are the same per-mile rates as applied to the existing Ohio Turnpike.

- **Car toll rate ($/mile)** – Weighted average of $0.06/mile, assuming 59% electronic (E-Z Pass)
- **Truck toll rate ($/mile)** – For vehicles with three or more axles, weighted average of $0.15/mile, assuming 89% electronic (E-Z Pass)
- **Annual rate increase (%)** – Annual rate to increase toll rates, suggested default value is 2%
- **Indexation base year** – Year of constant-dollar value of toll rates

Costs

This category groups capital, operations, and maintenance cost data necessary to evaluate the net revenue potential of a candidate tolled roadway project. Data inputs include:

- **Indexation base year** – Year of constant-dollar value of costs
- **Construction duration** (years)
- **Tolled Corridor Alternative Capital Costs** – See **Table 3** for the Roadway and Toll System Capital Costs that were used in the financial feasibility analysis.
- **Roadway Capital Improvement Cost** – Total capital cost for highway construction; this includes engineering, construction administration, right-of-way, and contingency costs. For details, see the *Cost Estimate Technical Memorandum, Appendix I: Construction Costing Detailed Methodology*.

- **Toll System Capital Costs** – Costs of all associated systems, software, and offsite components to successfully process toll transactions (e.g., computer technology, gantries, transponder readers). Costs were developed using actual costs from the 2019 OTIC implementation of Open Road Tolling (ORT) zones on the existing Ohio Turnpike system. For details, see *Appendix D1: ORT Zone Cost Estimate*.
- **Tolling Renewal and Replacement Costs** – Recurring, non-annual maintenance activities needed to maintain and upgrade the system over time.
- **Tolling System Operations and Maintenance Costs** – Cost to operate and maintain the tolling system is commonly divided into two main categories: fixed costs and variable costs. Variable costs are related to vehicle transaction costs while fixed costs are related to contracts for equipment maintenance, utilities, insurance, and administrative staff.
- **Roadway Operations and Maintenance Costs** – Covers routine (e.g., mowing, sign repair) and preventive maintenance repairs (i.e., mill and overlay) but excludes major rehabilitation or reconstruction repairs. For details, see the *Cost Estimate Technical Memorandum*.

TABLE 3. CAPITAL COST SUMMARY (MILLIONS OF 2025 DOLLARS)

Corridor ID	Roadway Capital Improvement Cost	Toll System Capital Cost	Total Capital Cost
E1	$555.7	$6.8	$562.5
E2	$971.2	$19.0	$990.2
E3	$699.8	$10.2	$710.0
E4	$1,012.0	$22.2	$1,034.2
E5	$951.4	$19.1	$970.5
E6	$780.9	$12.2	$793.1
E7	$549.9	$6.4	$556.3

Estimation of Toll Revenue

Traffic demand for this assessment is a function of:

- Forecast number of vehicles willing to pay the subject toll
- Forecast share of trucks and passenger cars willing to pay the subject toll
- Method of collection

The FFST uses the opening year AADT to estimate baseline volumes under tolled conditions. This demand accounts for the traffic that would divert to other highways to avoid paying a toll. Additional adjustments to estimate gross toll revenues include an annual inflationary toll rate increase, set at 2.5% (tracking with growth in CPI), and a three-year ramp-up period for toll collections. The FFST does not account for fines for recovery of lost revenue because of toll violations.

Annualization Factor

Annual revenue estimates were calculated by multiplying average daily VMT by an annualization factor. The analysis assumes that AADT estimates provided by ODOT have accounted for weekday/weekend and seasonal variations in demand, thus the factor assumption is '365'.

Revenue Ramp-up

Traffic in the first few years after opening is adjusted downward to reflect the time that it takes the driving public to recognize any potential benefits of using a new toll facility. The FFST currently uses a three-year ramp-up period based on previous traffic and revenues studies conducted in North Carolina and industry standards with similar projects.

- First year – 60%
- Second year – 80%
- Third year – 95%

ETC Market Share

Tolls are collected electronically via overhead mainline gantries using both electronic toll collection (ETC) and video toll collection (VTC). VTC transactions occur when no valid transponder transaction is recorded. Recovery of revenue involves license plate image processing, vehicle owner identification, video toll invoicing, payment processing and violation processing. VTC without an ETC transponder and identified through VTC will be billed by mail. Assumed ETC and VTC transaction shares start at 60%/40% at the beginning of the 40-year operating cycle with ETC shares increasing to 80% at year '11' of the cycle moving forward.

Unbillable And Uncollectible Toll Transactions

Gross toll revenues were adjusted to reflect unbillable and uncollectible VTC transactions. Assumed revenue leakage for this study due to missing, blocked, or damaged license plates, unreadable images, or other reasons; at 8% at the beginning of the operating cycle with leakage decreasing to 4% at year '11' of the cycle moving forward.

Determination of Financial Feasibility

Using traffic and revenue inputs, along with cost information, the FFST calculates the ability of a toll project candidate to generate revenue to cover its own costs of operation and maintenance (O&M) and to assess its ability to fund all or a portion of the capital costs through toll financing. Prior to the implementation of tolls and issuance of debt, however, significant additional analyses will be required.

The assessment integrates the revenue forecast, and the O&M expenditures forecast, to determine "net" cash flows available for debt service. The use of net toll revenues in the analysis assumes that O&M costs are paid from toll revenues first, and then the remaining toll revenues are available for debt service payments. Debt providers require annual debt service coverage ratios for all project financings, and minimums are established based on the perceived level of risk. Since terms and covenants of bonds vary from transaction to transaction, a debt service coverage ratio (DSCR) of '2.0' was assumed for the purposes of this assessment, which is illustrative of a Better Business Bureau (BBB) category rating. For reference, this matches the Pennsylvania Turnpike policy of a DSCR of 2.0; while the current required OTIC DSCR is 1.2 with a goal of 1.7.

Cash flows available after covering for debt service are then discounted by 4.5% to determine the amount of debt a project can use for financing (i.e., bond capacity). The discount rate (4.5%) reflects the current average market rate for bonds sold in the capital markets frequently used for toll candidates. The feasibility assessment is tied to three condition levels:

1. **Likely covers O&M and portion of capital costs** – The project presents positive financial flexibility, that is, future toll revenues will likely cover not only operating and maintenance costs, but also the ability to contribute upfront funding towards construction costs through financing.
2. **Likely covers O&M only** – The project has potential financial flexibility, that is, future toll revenues will likely cover operating and maintenance costs but are not enough to contribute upfront funding towards construction costs through financing.
3. **Likely will not cover O&M** – The project will likely require additional funding sources to operate and maintain.

Condition levels are further divided into three equal parts to indicate how projects perform within each of the financial feasibility condition levels. The feasibility assessment uses two performance criteria:

- **Operating Margin (%)** – Measure of operating efficiency. A higher margin is desirable. Example: An operating margin of 20% means that 80% of revenues are used to operate and maintain the toll road. A negative margin means that O&M costs exceed revenues.
- **Bonding Capacity (%)** – Measures the capacity of borrowing debt backed by future toll revenues to fund all or a portion of the capital costs. A higher percentage is desirable. Example: A bonding capacity of 30% means that 30% of capital costs can be supported through a toll revenue financing.

Preliminary Assessment

Table 4 shows selected inputs and calculation results of applying the FFST to the seven alternatives over a 40-year operating schedule from the opening year 2035 to 2075. **Opening year AADT** indicates the distance-weighted volume of toll paying vehicles using the US-23 connector. The **AADT CAGR** indicates the compound average growth rate from the opening year to design year implied by the forecasted traffic volumes provided by ODOT. **Capital Costs** show total costs associated with roadway construction, design, and right-of-way acquisition as well as the cost of implementing a tolling system. These costs are indexed to 2030, the beginning of the 5-year construction schedule.

TABLE 4. ASSESSMENT SUMMARY SCHEDULE ROLL-UP (40-YEAR OPERATING MARGIN; MILLIONS OF 2035-2075 DOLLARS)

Category	E1	E2	E3	E4	E5	E6	E7
Opening Year AADT (2035)	20,885	19,455	20,650	4,435	5,005	18,020	1,940
AADT CAGR (2035-2055)	0.8%	1.4%	0.9%	0.4%	3.3%	1.1%	6.3%
Capital Costs ($2030)	$636.4	$1,120.3	$803.3	$1,170.1	$1,098.1	$897.3	$629.4
Gross Toll Revenues	$1,685.2	$2,133.2	$1,401.5	$345.0	$477.0	$1,182.9	$305.2
O & M Costs	$1,373.8	$1,927.5	$1,166.0	$1,224.7	$902.9	$1,106.5	$867.5
Operating Revenues	**$311.4**	**$205.7**	**$235.5**	**($879.7)**	**($425.9)**	**$76.4**	**($562.3)**
Operating/Gross Toll Revenues	18.5%	9.6%	16.8%	-	-	6.5%	-
Available for Debt ($2030)	$30.1	$3.9	$20.3	-	-	-	-
Bonding Capacity	4.7%	0.3%	2.5%	-	-	-	-

Gross Toll Revenue was calculated based on traffic volume and toll rates as described above, incorporating inflation for each year in the operating schedule. The value for each alternative as shown in **Table 4** is the sum of values for each year summed over the entire operating schedule. As with revenue, **O&M Costs** were calculated for each year in the schedule, adjusted for inflation, and then summed over the schedule to yield the value presented in the table for each alternative. Subtracting O&M costs from gross toll revenues yields **Operating Revenue**.

Alternatives E1, E2, E3, and E6 result in positive operating revenues (highlighted in green) showing that these alternatives' gross toll revenues cover O&M costs. Alternatives E4, E5, and E7 result in negative operating revenues

(highlighted in red) showing that these alternatives' gross toll revenues do not cover O&M costs. The alternatives whose revenues cover O&M costs also have **Operating Margins** (Operating/Gross Toll Revenues).

Operating margins were then discounted, as described above, to determine "net" cashflows **Available for Debt** service to cover capital costs. Alternatives, E1, E2, and E3 all have a relatively small **Bonding Capacity** (Available for Debt/Capital Costs), with E1 performing the best with the highest bonding capacity at 4.7%. Based on this analysis, the results of the three feasibility condition levels are:

- Alternatives E1, E2, and E3 display the first feasibility condition "Likely covers O&M and portion of Capital Costs".
- Alternative E6 falls into the second feasibility condition, "Likely covers O&M only"
- The remaining alternatives (E4, E5, E7) display the third feasibility condition "Likely will not cover O&M". The primary cause for the poor performance of alternatives E4, E5, and E7 is the magnitude of O&M costs compared with the relatively low forecasted gross toll revenue.

Toll Rate Exploratory Analysis

As a supplement to the initial feasibility assessment described above, a sensitivity analysis exploring different toll rates was conducted to determine the impact on the assessment given the small bonding capacities yielded from using the toll rates present on the Ohio Turnpike (shown in **Table 2**). Moreover, it is recognized that US-23 to I-71 connector is a unique facility, different in nature from the existing Ohio Turnpike and that comparable facility toll rates are higher.

The Maryland Transportation Authority (MDTA) Intercounty Connector (ICC) is a strong comparable facility. The ICC, signed MD-200, is similar to the US-23 to I-71 connector in several ways: approximately 17 miles in length; all-electronic toll collection; and provides a suburban connection in the Baltimore-Washington region between two non-tolled interstates (I-370 and I-95). The ICC operates with variable pricing in peak, off-peak, and overnight periods, but the off-peak rates provide a good comparable rate for this analysis. As shown in **Table 5**, the ICC and the Pennsylvania Turnpike have a similar electronic (E-Z Pass) rate for autos.

Another toll facility that is similar to the proposed US-23 to I-71 connector is the Tampa Hillsborough Expressway Authority (THEA) Lee Roy Selmon Expressway (FL-618). The Selmon Expressway length is 17 miles, toll collection is all electronic, and it provides a premium connection between non-tolled freeways. The review also considered The West Virginia Parkways Authority West Virginia Turnpike, which spans the state from north to south with three mainline toll plazas on I-77. The payment at each plaza is the same ($4.50), but the per mile cost varies across the system based on length of trip. As shown in **Table 5**, the average auto rate for a full system trip, similar to the Selmon Expressway, is more than 50% higher than the MD and PA examples.

All rates shown in **Table 5** are current as of July 2025 from online toll rate calculators. Additional notes:

1. All truck rates shown are an average of all truck classifications
2. MDTA ICC overnight rates (60% lower than off-peak) were not used
3. MDTA ICC rates shown are E-Z Pass; pay-by plate and video tolls are 25% and 50% higher, respectively

4. WV Turnpike auto rates are out-of-state E-Z Pass; the Commercial Discount Plan is 35% less
5. WV Turnpike truck rates shown are non-WV E-Z Pass; cash rates are 15% higher; WV E-Z Pass rates are discounted 8%
6. WV Turnpike rates vary by segment; rates shown are for travel across full system
7. WV Turnpike total length is 88 miles, but 57 miles is the minimum length between interchanges that pays the maximum rate
8. PA Turnpike truck rates shown are for high profile (>7'-6") vehicles

TABLE 5. COMPARABLE TOLL RATES

Facility	MDTA ICC MD 200	THEA Selmon Expressway FL-618	West Virginia Turnpike I-77	Pennsylvania Turnpike I-76
Length (mi)	17.6	17	57	359
Auto Rate	$ 0.17 / $ 0.22 Off-Peak / Peak	$ 0.27	$ 0.26	$ 0.17 / $ 0.34 (E-Z Pass / No E-Z Pass)
Truck Rate	$ 0.93 / $ 1.21 Off-Peak / Peak	$ 0.81	$ 0.79	$ 0.42 / $ 0.84 (E-Z Pass / No E-Z Pass)
Truck / Auto Ratio	5.5	3.0	3.0	2.5

The sensitivity analysis proceeded by testing an array of different toll rates for the alternatives that yielded the most promising results from the preliminary assessment: E1, E2, E3, and E6. Toll rates ranged from $0.10 to $0.60 per mile for autos and 2.5 times that amount for trucks. The FFST, calibrated to approximate ODOT travel model results, was used to estimate traffic diversion and revenue generated estimated at these higher toll rates. **Figures 1-4** show results from the sensitivity analysis.

Daily toll revenue and demand elasticity was plotted for each of the alternatives. As can be seen in **Figures 1-4**, toll revenue initially increases, then reaches a maximum and then begins to decrease as the amount of vehicle diversion starts to erode the revenue totals. The demand elasticity measures how sensitive travelers are to any given toll rate by comparing the amount of vehicle toll diversion to the amount of revenue generated. Locations on the elasticity plot that are relatively "flat" and have the smallest absolute values represent toll rates that maximize the generation of revenue while having the least amount of toll diversion. These "optimal" toll rates balance the economic feasibility of using the facility with the financial feasibility (revenue generation) and occur at lower toll rates than those where revenue only is maximized. The circles on the charts show where this balance is achieved. These resulting toll values were carried forward to complete an updated feasibility assessment.

FIGURE 1. TOLL RATE SENSITIVITY ANALYSIS – ALTERNATIVE E1

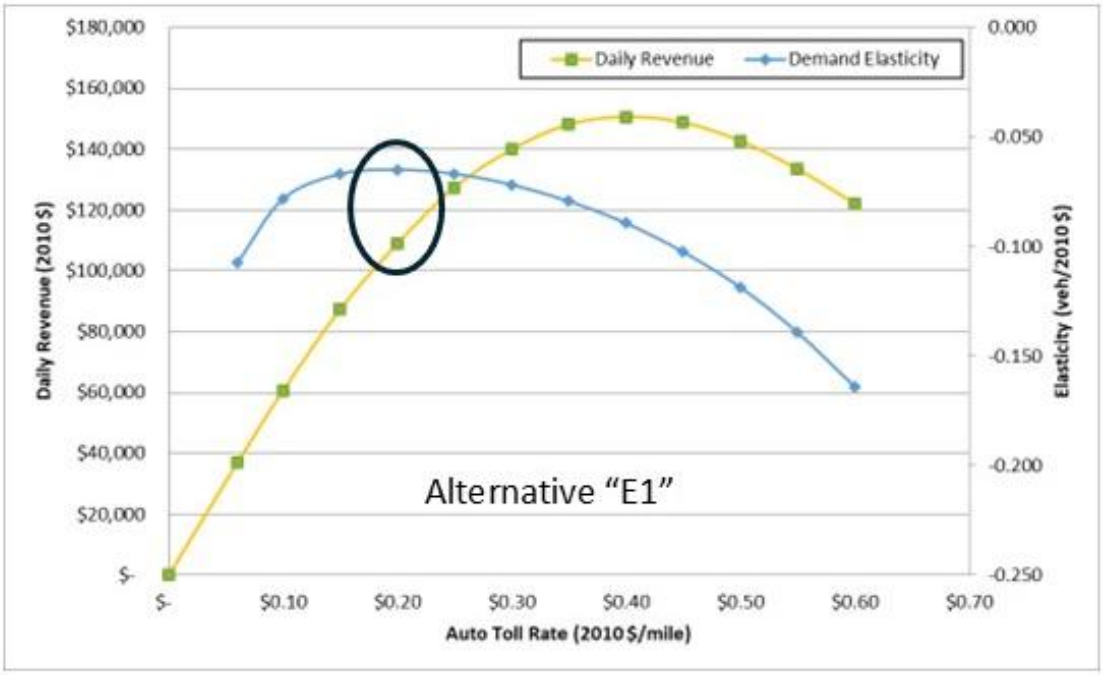


FIGURE 2. TOLL RATE SENSITIVITY ANALYSIS – ALTERNATIVE E2

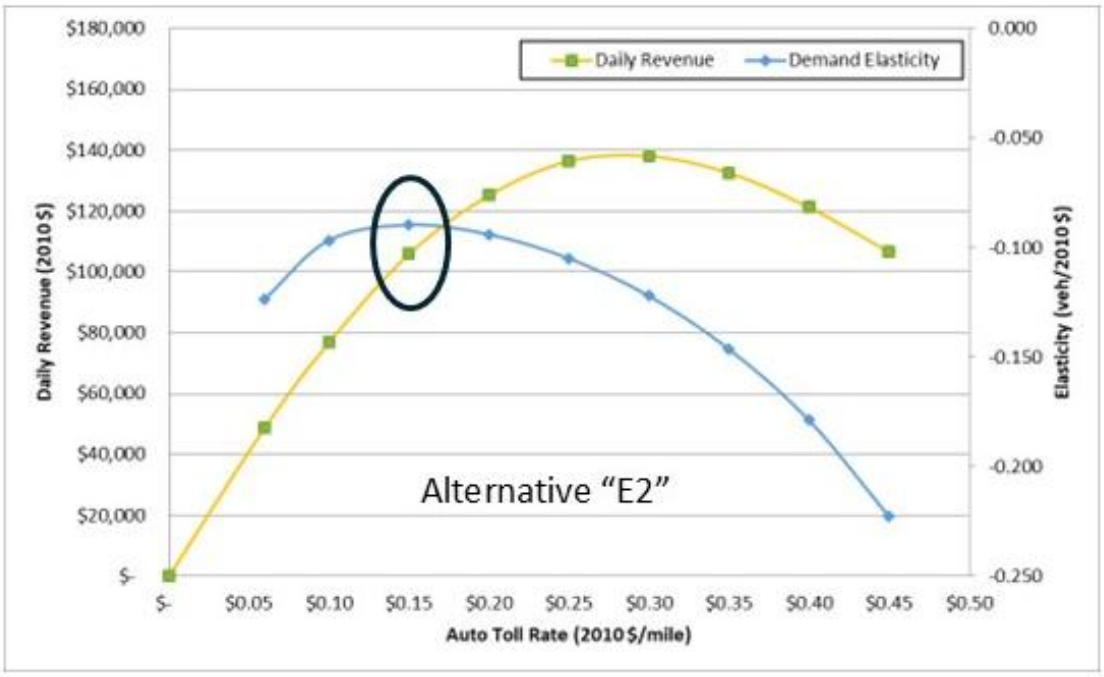


FIGURE 3. TOLL RATE SENSITIVITY ANALYSIS – ALTERNATIVE E3

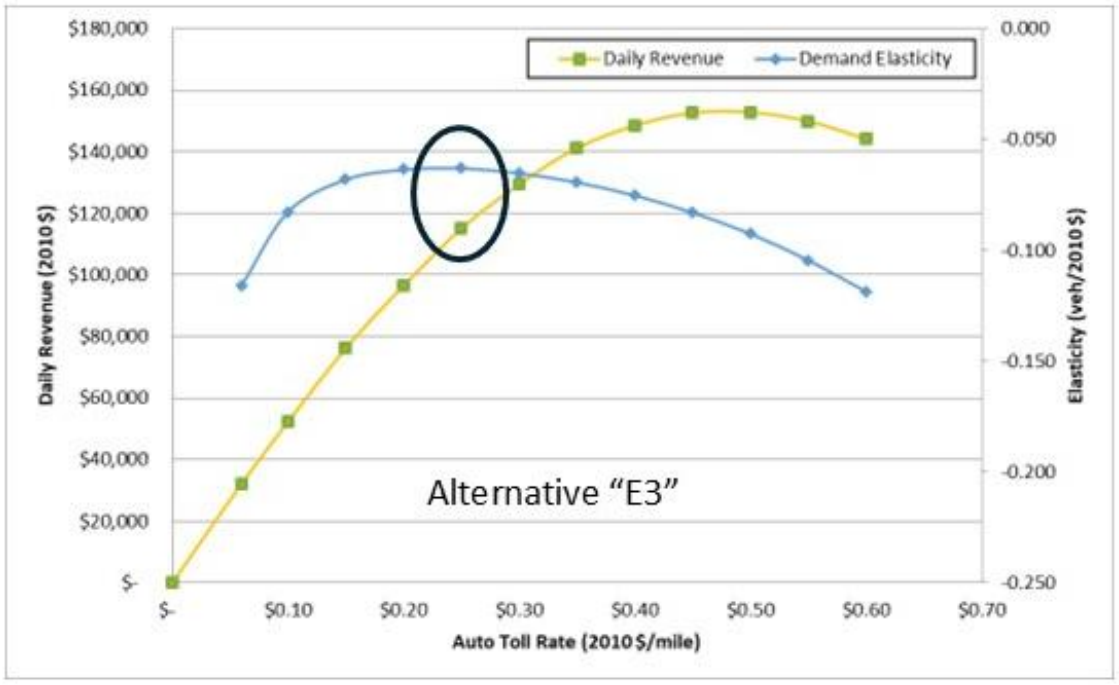


FIGURE 4. TOLL RATE SENSITIVITY ANALYSIS – ALTERNATIVE E6

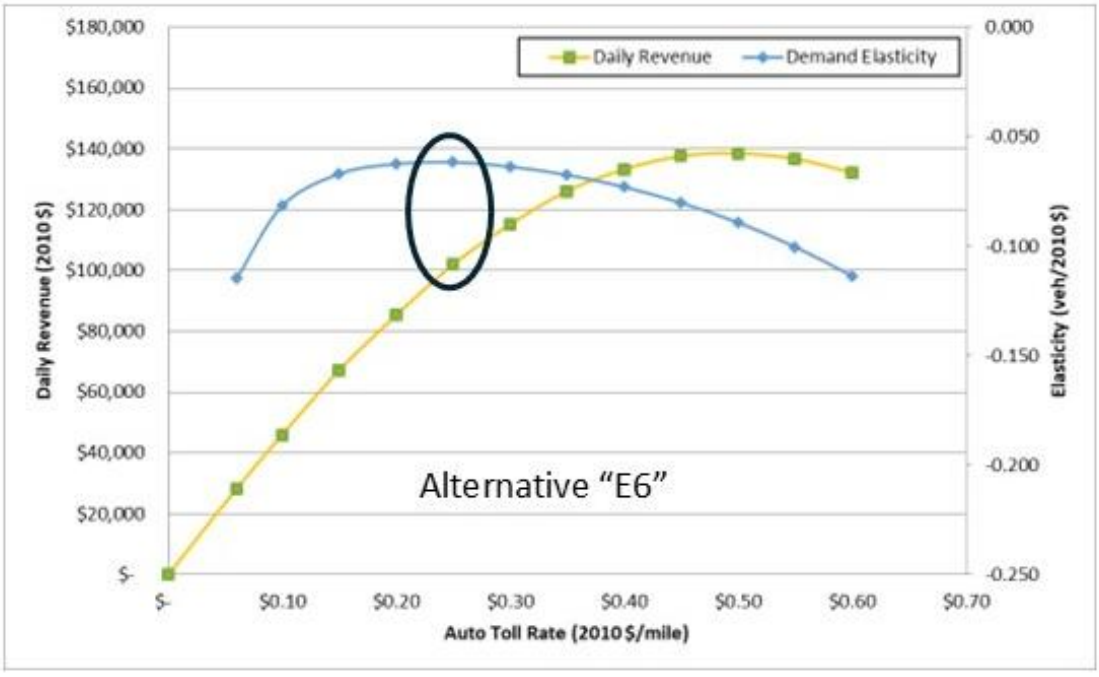


Table 6 shows selected inputs and assessment results of applying the FFST to the best performing alternatives from the first screening at the optimized toll rates. Most of the information in this table echoes the information contained in **Table 4**, with the addition of the optimized toll rates for each alternative used in the assessment.

Overview of assessment results using optimized tolls:

- Optimized toll rates are much larger in magnitude than the Turnpike rates used in the initial feasibility assessment.
- Gross toll revenues are greater by about four times the initial assessment.
- Operating revenues are much higher resulting in greater revenue available to apply toward bonding capital costs, resulting in a much greater bonding capacity.

TABLE 6. ASSESSMENT SUMMARY SCHEDULE WITH OPTIMIZED TOLL RATES
(40-YEAR OPERATING MARGIN; MILLIONS OF 2035-2075 DOLLARS)

Category	E1	E2	E3	E6
Opening Year AADT (2035)	18,315	17,390	17,855	15,660
Toll Rate (Auto/Truck)	$0.20/$0.50	$0.15/$0.38	$0.25/$0.63	$0.25/$0.63
Capital Costs ($2030)	$ 636.4	$ 1,120.3	$ 803.3	$ 897.3
Gross Toll Revenues	$ 4,883.4	$ 4,728.0	$ 5,150.1	$ 4,555.6
O & M Costs	$ 1,350.3	$ 1,848.5	$ 1,160.2	$ 1,102.4
Operating Revenues	**$ 3,533.2**	**$ 2,879.6**	**$ 3,990.0**	**$ 3,453.2**
Operating/Gross Toll Revenues	72.4%	60.9%	77.5%	75.8%
Available for Debt ($2030)	$ 521.8	$ 408.1	$ 589.4	$ 504.0
Bonding Capacity	82.0%	36.4%	73.4%	56.2%

Next Steps / Considerations

Under the initial assessment that reflected Turnpike toll rates, even the best performing alternatives (E1, E2, and E3) will need nearly all their capital costs funded by sources other than toll revenue. It is important to note that the magnitude of traffic volumes, thus toll revenue, likely represents an "upside" condition as the travel model used to generate the traffic volumes includes capacity improvements in the I-71 corridor that are not currently tolled in the analyses but may be in the future.

Using the "optimized" toll rates, derived from the sensitivity analysis, bonding capacities have increased resulting in a significant increase in the amount of capital costs that can be funded via toll revenues. As a result, alternatives E1 and E3 are able to finance most of their capital costs and warrant a subsequent, more detailed examination of their financial feasibility.

Future considerations that could improve the feasibility of the subject alternatives include:

- Considering a more aggressive toll rate increase schedule. In the current analysis, toll rate increases are tied to the consumer price index.
- Reducing the number of toll plazas for some alternatives, thus reducing capital costs and making the alternatives more efficient. Further analysis using the travel demand model can flag access/egress locations with relatively low demand and productivity.
- Evaluate impact to other facilities south of the proposed connector (US-23 through Delaware, I-71 to I-270) based on lower volumes on the connector due to higher toll rates.
    - More volume on US-23 through Delaware (less operational benefit to existing facility with lower volume electing to take the new tolled connector)
    - Less volume on I-71 between US 36 and I-270 (improved performance with added lane)

Tolling Statutory Authority Technical Memo

US-23 to I-71 Connector Joint Plan – Interim Report – HB 96

EXECUTIVE SUMMARY

Section 755.60(D) of House Bill 54 directs the Ohio Department of Transportation (ODOT) and the Ohio Turnpike and Infrastructure Commission (OTIC) to determine whether OTIC has sufficient statutory authority to designate and toll a new or upgraded freeway connecting U.S. Route 23 to Interstate 71 in Delaware, Marion, or Morrow counties.

Key Findings:

- **New facility:** ORC Chapter 5537 fully authorizes OTIC to plan, finance, construct, toll, and operate new highways statewide. No state legislative changes are required.
- **Conversion of Existing Roads:** OTIC may acquire and toll an existing state route (e.g., SR 229, US 36/SR 37) if ODOT transfers operational control and FHWA approves tolling under 23 U.S.C. §129(a)(1)(C). (Only applies if federal funding is used)
- **Federal Prerequisites:** All federal requirements (e.g. NEPA, toll agreements, civil rights review, and interoperability) can be met under current law.
- **Prohibition against ODOT utilizing "quick take":** ODOT is not permitted to utilize the "quick take" accelerated eminent domain process contained in ORC Chapter 163 because toll roads are not open to the public without charge.
- **OTIC's authority to exercise eminent domain proceedings –** ORC Section 5537.06(A) establishes the process by which OTIC acquires property for the construction of the Ohio turnpike system which includes Section 163.06(B) even if there is a toll imposed on the road. This language appears to give OTIC more flexibility to exercise "quick take" proceedings. OTIC must keep and operate the toll road.

Conclusion: OTIC possesses full legal authority to designate, toll, and implement through the construction of a new toll road subject to established procedural steps as long as the required statutory process for doing so is followed. If the plan involves the conversion of a state route or previously federally funded road, additional research would be needed to effectuate the conversion. Potential barriers exist with respect to ODOT's ability to deliver this proposal as a toll project.

OVERVIEW AND PURPOSE

This report supports the joint ODOT–OTIC planning effort to evaluate the feasibility of a freeway connection between US 23 and I-71. Pursuant to Section 755.60(D) of HB 54 (further amended by HB 96), this analysis addresses whether OTIC's existing legal framework under Ohio Revised Code Chapter 5537 is sufficient to permit this proposed freeway

connection to be constructed as a turnpike project. The report also summarizes relevant federal statutory and regulatory considerations.

OTIC STATUTORY AUTHORITY UNDER OHIO LAW

Tolling authority in Ohio is governed by statute and is currently limited to designated state agencies. Under the Ohio Revised Code (ORC), OTIC is the primary entity authorized to develop, finance, and operate toll facilities pursuant to ORC Chapter 5537. Since its creation in 1949, OTIC has operated as an independent, revenue-bond-financed body corporate and politic. A series of statutory changes have broadened the Commission's scope:

- In 1991, Sub. SB 7 modernized the original Turnpike Act and confirmed that tolls may continue after outstanding bonds are retired.
- In 1993, Am. Sub. HB 154 converted OTIC from a project-by-project pledge to a statewide "system" pledge, allowing revenues from one facility to support another.
- In 1996, Am. Sub. HB 335 added mandatory public-hearing requirements before any toll increase or expansion of responsibility.
- In 2007, HB 699 strengthened budget oversight by requiring Office of Budget & Management (OBM) approval of new debt and Master Trust changes.
- In 2013, Am. Sub. HB 51 renamed the agency as the Ohio Turnpike and Infrastructure Commission, expanded the voting membership, and expressly authorized OTIC to issue bonds for *statewide transportation infrastructure* projects in addition to traditional turnpike projects.

These legislative enactments have provided OTIC broad statewide tolling and bonding authority that extends beyond the original 241-mile Ohio Turnpike corridor. The sections that follow summarize current provisions of ORC Chapter 5537.

Enabling Authority

OTIC possesses broad statutory authority to construct, maintain, and operate toll roadways defined as turnpike projects. This authority includes the ability to set and collect tolls and to issue bonds for project financing:

- **ORC §5537.02(A)** empowers OTIC with the "construction, operation, and maintenance of the Ohio turnpike system.
- **ORC §5537.01(B)** defines a "turnpike project" as any express or limited access highway (and related infrastructure) that OTIC constructs, operates, or improves including bridges, interchanges, rights-of-way, and utilities.
- **ORC §5537.08, 5537.09, and 5537.11** authorizes the Commission to issue revenue and refunding bonds secured solely by toll receipts.

Jurisdiction and Flexibility

OTIC is not geographically limited to the existing Ohio Turnpike corridor. Under §5537.03(A) the Commission may locate a turnpike project anywhere in the state, provided it meets statutory and financial-feasibility requirements.

Project Governance and Oversight

OTIC is subject to several governance standards:

- **ORC §5537.04(A)(10)** requires coordination with ODOT on access and egress points.
- **ORC §5537.06(A)** permits the taking of land to acquire any public or private property necessary, convenient, or proper for the construction, maintenance, or efficient operation of the Ohio Turnpike and to institute appropriation proceedings in accordance with Sections §§163.01 to 163.22.
- **ORC § 5537.17** mandates an independent annual audit and requires an annual report; records are subject to Ohio's Public Records Act (ORC 149.43).
- **ORC §5537.13(C)(2) and 5537.28** require toll revenues to be applied first to operating expenses, maintenance, and debt service; any surplus may be spent only on other transportation purposes approved by OTIC.
- **ORC §5537.27** provides the means through which a political subdivision or government agency can submit a written application to the commission requesting the construction or operation of a turnpike project.
- **ORC §5537.24** establishes the Turnpike Legislative Review Committee (TLRC), a legislative body that provides oversight.

Table 1 summarizes the State statutory basis for key project components and their implications for the US23 – I-71 corridor. Collectively, these provisions confirm that OTIC already possesses full authority, under existing state law, to designate, develop, and operate a toll-financed freeway between US23 and I-71 as a turnpike project.

TABLE 1. STATUTORY BASIS FOR KEY PROJECT COMPONENTS

Subject	Controlling ORC Section(s)	Implications for Project
Corporate Existence & Purpose	§5537.02(A)	Declares OTIC "a body both corporate and politic empowered to *construct, maintain, repair, and operate turnpike projects* and collect tolls." No geographic restriction is stated.
Definition of "Turnpike Project"	§5537.01(B)	Includes *any express highway* and related facilities that OTIC constructs, owns, or operates and that is financed in whole or in part with OTIC-issued debt or toll revenue. A new freeway between US 23 and I-71 meets this definition so long as OTIC adopts a formal resolution designating it as such.
Eminent Domain	§5537.06(A)	Permits the taking of land to acquire any public or private property necessary, convenient, or proper for the construction, maintenance, or efficient operation of the Ohio Turnpike and to institute appropriation proceedings in accordance with Sections §§163.01 to 163.22
Bonding & Pledging Tolls	§5537.08 §5537.11 §5537.13	OTIC may issue revenue bonds and pledge toll receipts; the state's full faith and credit are not pledged (§5537.11). A statutory sinking fund (§5537.13) must be maintained.
Rate-Setting Procedure	§5537.26	Any *initial* toll schedule or *subsequent* increase requires: (1) at least 90 days' notice, (2) three public hearings in the affected region, and (3) written notice to the Speaker of the House and President of the Senate.
Use of Revenues	§5537.13(C)(2) §5537.28	Cost of maintaining, improving, repairing, constructing, and operating the Ohio turnpike system and its different parts and sections, and to create and maintain any reserves for those purposes.
Public Records & Annual Audit	§ 5537.17, ORC 149.43	OTIC must publish an annual report and undergo an annual independent audit; records are subject to the Ohio Public-Records Act.
Legislative Oversight	§5537.24	Establishes the Turnpike Legislative Review Committee (TLRC)

Federal Legal Framework

Currently OTIC is not required to comply with federal tolling requirements as OTIC does not accept federal funds. If circumstances change and OTIC seeks to utilize federal funds for toll projects, the following provisions (see **Table 2**) of Title 23 of the U.S. Code and related FHWA policies would likely be applicable:

TABLE 2. APPLICABLE FEDERAL CODE AND POLICIES

Subject	Authority	Implications for Project
Tolling Authority	23 U.S.C. §129(a)(1)(A), (C)	Permits tolling of new highways or reconstructed non-Interstate roads (e.g., SR 229).
Revenue Use	23 U.S.C. §129(a)(3)	Tolls must be used for O&M, debt service, and other Title 23-eligible purposes, with annual FHWA certification.
NEPA Compliance	42 U.S.C. §4332; 23 CFR Part 771	Environmental review must assess tolling impacts and diversion. FHWA toll approval cannot precede NEPA clearance.
Interoperability	23 CFR § 950.7	ETC systems must accept nationally interoperable transponders.
Relocation / Labor	42 U.S.C. §4601; 23 U.S.C. §§113, 313	Compliance with Uniform Relocation Act, Buy America, Davis-Bacon.

PROCESS TO DESIGNATE AND DELIVER A NEW TURNPIKE PROJECT

If selected for implementation as a turnpike project, OTIC would follow the process outlined below:

1. **Commission Resolution** – Enter into MOU regarding terms of partnership
2. **ODOT Concurrence** – Approve partnership
3. **ODOT–OTIC Transfer MOU** – OTIC obtains operating control or easement (applicable if upgrading existing route).
4. **Commission Resolution** – Designate connector as turnpike project.
5. **ODOT Concurrence** – Approve system interchanges.
6. **Traffic & Revenue (T&R) Study** – Investment-grade forecast.
7. **OTIC/ODOT Resolution to Acquire Any Necessary Land §5537.06 (A); Sections §§163.01 to 163.22**
8. **Survey and Evaluation of Land -- Sections §§163.01 to 163.22**
9. **Negotiation for land acquisition or Appropriation Sections §§163.01 to 163.22**
10. **NEPA + §129 Agreement (new highway)** – Combined environmental and toll application (only applicable if federal funding is to be used).
11. **Public Hearings & Toll Notice** – §5537.26 compliance.
12. **Bond Resolution and Issuance –** Under §§5537.08.10.
13. **Construction** – Traditional or P3.
14. **Open & Operate** – ETC interoperability; TLRC briefings; annual audit.

OTHER CONDITIONS AND CONSTRAINTS

Conversion of Free Roads: ORC § 5531.12 prohibits ODOT from tolling without specific authorization. OTIC may toll if it acquires the facility.

Constitutional Considerations: The Ohio Constitution does not prohibit tolling. However, it does require that public revenues, including tolls, be used for public purposes (Ohio Const. Art. VIII, §2). Any tolling legislation must demonstrate public benefit, procedural fairness, and appropriate oversight mechanisms.

ODOT Statutory Authority:

- Under current Ohio law, there is a general prohibition against ODOT putting tolls on existing nontoll roads. ORC §5531.12(C)(1)
- ODOT can institute tolling on new highways and new lanes added to existing nontoll highways if they do not reduce the number of nontoll lanes. ORC §5531.12(C)(2)
- If ODOT imposes tolls as part of the project, it would not have the ability to utilize "quick take" which is an accelerated eminent domain process used to acquire the property necessary for road projects. Section 19, Article I, Ohio Constitution and ORC §163.06(B) limit the use of quick take to roads that are open to the public

without charge. Without this authority, the land acquisition process will be time consuming and will delay construction.

CONCLUSION

New Alternative

OTIC's statutory powers under ORC Chapter 5537, combined with existing FHWA tolling authority under 23 U.S.C. §129, provide a clear legal path to develop and toll a new freeway connector between US 23 and I-71. No new laws are required.

Conversion Alternative

OTIC may legally acquire and toll an upgraded state route with ODOT's consent. Federal tolling is authorized under §129(a)(1)(C), provided reconstruction extends the facility's useful life and toll revenue is properly governed.

Final Conclusion

The Commission's current statutory authority is sufficient to designate and toll a US 23 to I-71 connector as a turnpike project. If the plan involves the conversion of a state route or previously federally funded road, additional research would be needed to effectuate the conversion. Potential barriers exist with respect to ODOT's ability to deliver this proposal as a toll project.