



**HAM-32-6.82**  
**Eight Mile Intersection Improvements**  
**PID 110991**

Feasibility Study

September 11, 2020

Prepared for:

Ohio Department of Transportation  
District 8  
505 South SR 741  
Lebanon, Ohio 45036

Prepared by:

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# 1.0 INTRODUCTION

The Ohio Department of Transportation (ODOT) is proposing improvements to the intersection of SR 32 and Eight Mile Road, as well as repair of a landslide just east of the intersection. The project is located in southeast Hamilton County (See Figure 1, Project Location Map) and is one of 68 projects within the Eastern Corridor Segments II and III study area which were identified in the *Conceptual Alternatives Implementation Plan for Segment II/III of the Eastern Corridor Study (PID 86462)*. The existing SR 32/Eight Mile Road intersection is a three-leg, unsignalized intersection with safety and congestion issues. This project is needed to improve the operation of the intersection in order to increase safety and enhance traffic capacity through the intersection. In addition to the intersection improvements, the proposed project includes the repair of a landslide along the south side of eastbound SR 32, just east of the intersection with Eight Mile.

## 1.1 PROJECT HISTORY

The SR 32/Eight Mile Road intersection has been experiencing safety issues for many years. ODOT has implemented various low-cost improvements to try to improve safety at the intersection with minimal results. The intersection was therefore the subject of a safety study in October 2017 because of the higher than expected crash frequencies. This intersection was also placed on the 2017 HSIP Priority Locations List. The existing safety and capacity issues at this intersection were officially identified in the *Transportation Needs Analysis* prepared for Eastern Corridor Segments II and III (PID 86462) dated July 31, 2017. This document identified transportation needs in the Segments II and III study area of the Eastern Corridor Program, a multi-modal transportation improvement program extending from downtown Cincinnati and communities through eastern Hamilton County and into western Clermont County, Ohio. The Eastern Corridor Program is a coordinated series of regional transportation improvement studies and projects in varying stages of planning, construction, and completion. The Segments II and III study area extends between the Red Bank Corridor (Segment I) and the I-275/SR 32 interchange in the Eastgate Area of Clermont County (Segment IV) encompassing key routes through this area including SR 32. Transportation needs in the Segments II and III study area were identified through technical studies and confirmed and refined through community and stakeholder input. Technical studies conducted included: traffic count updates; crash data review; evaluation of major intersections, roadway movements, and ramp junction operations; travel time studies; travel pattern analyses; and roadway geometry assessments (curves, elevation, sightlines). In addition to technical studies, the project team conducted extensive public and stakeholder outreach to learn how communities prioritized transportation needs with respect to community goals, objectives, and ongoing planning. The SR 32/Eight Mile Road intersection was an area that was identified in the Needs Analysis as an area having both safety and capacity issues. Excerpts from the Transportation Needs Analysis relevant to this project can be found in Attachment A.

ODOT began to develop solutions for the transportation needs identified in the Needs Analysis in the Fall of 2017. Solutions were developed through extensive input from five Advisory Committees comprised of



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stakeholders from six focus areas identified within the Segments II and III study area. Advisory Committee members included elected officials, transportation planning professionals, and community and interest group representatives. Advisory Committee members assisted with identifying, evaluating, and prioritizing recommended solutions for transportation needs within their assigned focus area, as well as developing strategies for implementation. Each Advisory Committee convened for four work sessions throughout this process for a combined total of 20 meetings. Two public meetings were also held throughout the development and refinement of the transportation concepts. Through this process, 68 transportation projects were recommended for the Segments II and III study area and are identified in the *Conceptual Alternatives Implementation Plan* dated June 21, 2019. The proposed project to improve the SR 32/Eight Mile Road Intersection was one of the projects identified in the Implementation Plan.

In addition to the intersection improvements, the project includes the repair of a landslide in the same area. ODOT is proceeding with the landslide repair concurrently with the intersection improvements in order to minimize Maintenance of Traffic impacts that would result if the landslide repair and intersection improvements proceeded as two separate projects.

## 2.0 PURPOSE AND NEED

### 2.1 PROJECT PURPOSE

The purpose of the proposed project is to improve safety and mobility/congestion of the SR 32/Eight Mile Road Intersection. In addition, the project will address a geotechnical slide located just east of the intersection in order to stabilize the slope and ensure long-term mobility of the traveling public on SR 32.

### 2.2 NEED ELEMENTS

#### 2.2.1 Safety

As part of the *Transportation Needs Analysis*, crash data were analyzed for the three-year period from 2013 to 2015. During this period, there were a total of 14 crashes, of which the most common collision was an angle collision. Of the 14 total crashes, 11 (80%) of the crashes occurred as a result of vehicles turning onto or from Eight Mile Road. Causal factors for these turn-related crashes are restricted sight distance, excessive speed, and inadequate traffic control. The five angle crashes and the three fixed-object crashes all involved vehicles making a westbound to southbound left turn onto Eight Mile Road and striking the guardrail on the west side of the road.

#### 2.2.2 Mobility/Congestion

Highway Capacity Software 2010 (HCS 2010), which implements the *Highway Capacity Manual* procedures, was used to evaluate the SR 32/Eight Mile Road intersection. The intersection analysis evaluated the overall intersection operations and the capacities of individual movements. A Level of



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Service (LOS) analysis was performed as part of the *Transportation Needs Analysis* under the existing year conditions (2015), No Build opening year (2022) and No Build design year (2042) for both the AM and PM peak hours. The Highway Capacity Manual defines LOS as a qualitative measure that describes operational conditions within a traffic stream, generally in terms of measures like speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. LOS ranges from LOS A, which indicates free-flow operations, and LOS F, which indicates severe congestion with the road in a state of constant traffic jam. The results of the LOS analysis, which are shown in Table 1, indicate that traffic on Eight Mile Road waiting to enter SR 32 is currently LOS F during both the AM and PM peak hours for existing traffic conditions. As traffic conditions continue to worsen in this area, the congestion at this intersection will result in worsening delays during both the AM and PM peak hours. For both AM and PM peak periods, the volume to capacity (v/c) ratio of the intersection exceeds 1.0 for future years 2022 and 2042, indicating that the intersection is congested and needs improvements.



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Source: Stantec, 2016.

Table 1: LOS Analysis for SR 32/Eight Mile Road Intersection			
AM Peak Hour			
Year	Movement	LOS	V/C Ratio
2015	Northbound Left Turn Queue =118 ft.	F	0.75
2022	Northbound Left Turn Queue =188 ft.	F	1.07
2042	Northbound Left Turn Queue =253 ft.	F	1.39

PM Peak Hour			
Year	Movement	LOS	V/C Ratio
2015	Northbound Left Turn Queue =88 ft.	F	0.75
	Northbound Right Turn Queue = 200 ft.	F	0.87
2022	Northbound Left Turn Queue = 135 ft.	F	1.72
	Northbound Right Turn Queue = 343 ft.	F	1.15
2042	Northbound Left Turn Queue = 165 ft.	F	3.76
	Northbound Right Turn Queue = 483 ft.	F	1.41



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### 2.2.3 Facility Deficiency

A landslide occurred along approximately 125 feet of SR 32 on the south side of eastbound SR 32, just east of the intersection with Eight Mile.

## 3.0 ALTERNATIVES

Thirteen different alternatives were investigated as part of the *Conceptual Alternatives Implementation Plan* in the area of the SR 32/Eight Mile Road intersection and the SR 32 hill. These alternatives were developed to address the primary and secondary needs previously identified by the Needs Analysis and discussed in Section 2.2. These alternatives ranged in scope from simple vegetation clearing, to constructing a roundabout, to creating a grade separated interchange at the Eight Mile Road intersection. Of the 13 alternatives investigated, only five were recommended for further study in the implementation plan. The remaining eight alternatives are not being considered for further study for various reasons such as high construction costs, low benefit to cost ratio, unfavorable traffic analysis results, and right of way concerns. Table 2 provides a decision matrix that shows the decision criteria that were used to evaluate each of the preliminary alternatives and No Build Alternative. Further information about all 13 alternatives is provided in Attachment B.

In the *Conceptual Alternatives Implementation Plan*, projects were given a priority level. Projects listed as high priority projects are those that should be implemented first when funding becomes available. Projects identified as high priority are those that would result in an immediate improvement of a specific transportation need. These projects typically have very favorable benefit/cost ratios and provide significant improvements to traffic operations and/or transportation network. Medium priority projects should be implemented after the high priority projects when funding becomes available. These projects also provide a transportation benefit but may have received a slightly lower level of stakeholder or public support than high priority projects. Low priority projects, while still providing some transportation improvement, do not provide as great a transportation improvement as medium and high priority projects.

Only two of the five alternatives recommended for further study were given a high priority in the implementation plan. These two projects were the construction of a signalized green tee intersection at Eight Mile Road and vegetation removal in the median of SR 32 to improve sight distance for vehicles on Eight Mile Road. The Build Alternative for this study is the construction of the green tee intersection. The vegetation clearing project was added to ODOT's 2019 pruning contract and was completed last year.



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**Table 2: Preliminary Alternatives Comparison Matrix**

	Safety	Traffic Operations	Constructability Issues	Construction Cost	R/W Impacts	Environmental/Community Impacts	Supports and/or Facilitates Multi-Modal	Improve Regional Connectivity	Improve Local Access	Recommendation
1. No Build Alternative	Neutral	Neutral	N/A	\$0	None	None	Neutral	Neutral	Neutral	Not Recommended
2. Alternative I-3A: Eight Mile Road Left Turn Lane Extension and Grade Improvements	Improves	Neutral	Complex	<\$5 Million	Property Takes	Minimal	Neutral	Neutral	Neutral	No Further Study
3. Alternative I-3B: Signalized Green Tee Intersection at SR 32 and Eight Mile Road	Neutral	Improves	Complex	\$2.0 to \$3.1M	Property Takes	Minimal	Neutral	Neutral	Neutral	Advance/High Priority
4. Alternative I-3C: Roundabout at Eight Mile Road and S.R. 32 Intersection	Neutral	Improves	Complex	<\$5 Million	Property Takes	Moderate	Neutral	Neutral	Neutral	No Further Study
5. Alternative I-3D-1: S.R. 32 Grade-Separated Interchange at Eight Mile Road	Improves	Improves	Complex	>10 Million	Relocations	Moderate	Neutral	Neutral	Neutral	No Further Study
6. Alternative I-3D-2: New S.R. 32 Alignment and Grade-Separation at Eight Mile Road	Improves	Improves	Complex	\$15.8 M to \$23.7 M	5 Residential Relocations	Moderate	Neutral	Neutral	Neutral	No Further Study
7. Alternative I-3E: New S.R. 32 Eastbound Alignment and Grade Separation over Eight Mile Road	Neutral	Improves	Complex	\$11.7 M to \$17.5 M	6 Residential Relocations	Moderate	Neutral	Neutral	Neutral	Advance/Medium Priority
8. Alternative I-3G: Relocate S.R. 32 and Eight Mile Road Intersection and Change to a Signalized Green Tee	Neutral	Improves	Moderate	\$5-10 Million	Relocations	Moderate	Neutral	Neutral	Degrades	No Further Study
9. Alternative I-3H: Relocate S.R. 32 and Eight Mile Road Intersection and Change to a Roundabout	Neutral	Degrades	Moderate	\$3.3 to \$4.9 Million	4 Residential Relocations	Moderate	Neutral	Neutral	Neutral	No Further Study
10. Alternative 32-18-1: New S.R. 32 Alignment to Achieve 6% Grade: Grade-Separated Interchanges at Eight Mile Road & Beechwood Road	Improves	Improves	Complex	>\$10 Million	Relocations	High	Neutral	Improves	Degrades	No Further Study
11. Alternative 32-18-2: New S.R. Alignment to Achieve 6% Grade: Grade-Separated Interchanges at Eight Mile Road & Beechwood Road	Improves	Improves	Complex	>10 Million	Relocations	High	Neutral	Improves	Degrades	No Further Study
12. Alternative 32-18-3: New S.R. 32 Alignment to Achieve 6% Grade: Grade-Separated Interchanges at Eight Mile Road & Beechwood Road	Neutral	Improves	Complex	\$37.4M to \$56.1M	6 residential relocations; 6 commercial relocations	High	Neutral	Improves	Degrades	Advance/Low Priority
13. Alternative 32-15: Realign Curve on Eastbound S.R. 32 Hill*	Improves	Improves	Complex	>10 Million	Relocations	High	Neutral	Neutral	Degrades	Advance with other Alternatives
14. Alternative I-3F: Removal of Vegetation at Intersection of S.R 32 and Eight Mile Road	Improves	Neutral	Minimal	\$15 to \$22.5 K	None	Minimal	Neutral	Neutral	Neutral	Advance/High Priority
*Alternative was not evaluated by itself but was evaluated as part of Concepts I-3d, I-3e, and 32-18.										

### 3.1 NO BUILD ALTERNATIVE

Under the No Build Alternative, none of the primary or secondary project needs described in Section 2.0 will be addressed. The SR 32/Eight Mile Road intersection would continue to operate in the condition that it exists today and would continue to experience safety and congestion issues.



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### 3.2 BUILD ALTERNATIVE

The Build Alternative, as identified in the Implementation Plan, consists of installing a signalized continuous green tee intersection at SR 32 and Eight Mile Road. A proposed traffic signal would manage flow through the intersection and control turn movements to and from Eight Mile Road. A dedicated westbound lane on SR 32 would allow westbound traffic to flow continuously through intersection, bypassing the signal. This concept also develops a second thru lane heading east on SR 32 which would serve as a truck climbing lane. This alternative includes improvements on Eight Mile Road such as adding a turn lane at the intersection to improve capacity and raising the profile of Eight Mile Road to improve grade. To further understand the impacts of this build alternative, Stage 1 plans have been developed for the roadway portion of the project and can be found in Attachment C.

Should the Build Alternative move forward, it will be combined with the landslide repair project noted above that would correct a slide affecting approximately 125' of the eastbound lanes of SR 32 just east of the intersection with Eight Mile Road. However, at this time the landslide correction was not included in the Stage 1 plans (Attachment C). The impacts of the landslide repair were not relevant to the alternative decision since it has independent utility and will need to proceed regardless of which alternative is chosen.

## 4.0 KEY ISSUES

This section summarizes the technical studies and information that were considered as part of the evaluation of the Eight Mile Road intersection improvement alternative.

### 4.1 TRAFFIC ANALYSIS

Under the No Build Alternative, the intersection would continue to operate with a LOS E/F as described in Section 2.0. The existing intersection would also continue to operate with a higher than average crash rate.

Under the Build Alternative, the addition of a green tee traffic signal, a 450-foot eastbound through/right turn lane on SR 32, and a 375-foot northbound right turn lane on Eight Mile Road reduces overall congestion at the intersection. An operational analysis was performed using the Highway Capacity Software (HCS) for the build alternative as part of the *Conceptual Alternatives Implementation Plan*. This analysis shows the overall level-of-service (LOS) for the intersection in 2042 for the AM peak hour is LOS B and for the PM peak hour is LOS C. Output from the HCS software is included in Attachment B.

Traffic signal warrants were completed SR 32/Eight Mile Road intersection as part of the *Conceptual Alternatives Implementation Plan*. The intersection meets all three vehicular volume warrants (Warrant #1, Warrant #2, and Warrant #3) exceeding minimum requirements for each warrant. Calculations



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supporting the warrant analysis which were developed as part of the *Conceptual Alternatives Implementation Plan* are included in Attachment B.

An ECAT analysis was performed at the intersection and showed that 1.7 crashes per year are expected at the intersection. The analysis also shows that similar intersections around the country are expected to experience 1.3 crashes per year. So, in terms of safety, this intersection is performing slightly worse than average under existing conditions. While traffic signal control has a disbenefit compared to stop sign control, the build alternative to convert the intersection to traffic signal controlled, with a green tee configuration is expected to reduce crashes compared to a traditional traffic signal controlled intersection by 4.2% according to the CMF Clearinghouse web site.

## 4.2 ROADWAY DESIGN ISSUES

Under the No Build Alternative there are several existing geometric deficiencies that will not be addressed. These deficiencies include intersection sight distance and vertical grade. The required stopping sight distance for a design speed of 55 mph is 495 feet; however, the stopping sight distance is 350 feet for eastbound vehicles and 415 feet for westbound vehicles. The intersection sight distance for northbound vehicles on Eight Mile Road is 300 feet for vehicles making right turns onto SR 32 and 310 feet for vehicles making left turns. The required intersection sight distance is 610 feet for left-turning vehicles, and 530 feet for right-turning vehicles. Eight Mile Road exceeds the maximum grade criterion at this intersection, which is 10% for urban arterial at 35 mph according to ODOT's Location & Design Volume 1, Figure 203-1. This criterion is exceeded by the right-turn lane on northbound Eight Mile Road; right-turning vehicles on northbound Eight Mile Road experience grades of nearly 15%, as measured in the field. Some of the sight distance issues identified in the No Build Alternative have been corrected by the 2019 pruning contract as mentioned in Section 3.0, but many others still exist.

The Build Alternative addresses many of the sight distance and grade issues that exist in the No Build Condition. The Build Alternative includes adjustments to Eight Mile Road which improve the stopping sight distances and vertical grades along the road. Additionally, a new traffic signal will be installed at the intersection which effectively replaces the need to provide the full intersection sight distance. According to L&D Vol.1 Section 201.3.2 intersection sight distances are not generally needed at signalized intersections. Full intersection sight distance is not needed at signalized intersections because the traffic signal dictates which vehicles get the right of way. Drivers no longer need to wait for appropriate gaps in traffic long enough to make "go/no go" decisions. Even though the full intersection sight distance is not required under the Build Alternative, other project improvements, such as the SR 32 widening west of the intersection, should improve overall sight distance at the intersection from the No Build Alternative.

Under the Build Alternative a raised median island will be placed on SR 32 in order to channelize left turns from Eight Mile Road as vehicles enter SR 32 going westbound. This channelizing island is necessary for efficient operations of the green tee intersection. Evaluation of the design of the channelizing island revealed that a design exception for the shoulder widths surrounding that island will be required. The proposed design maximizes the size of the median island in order to increase its



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effectiveness as a channelizing device. The proposed shoulder widths around the island are four feet on three sides of the island and two feet on the remaining side. See Figure 2 for a plan of the raised median island. According to *Ohio Department of Transportation's Location and Design Manual* (L&D Manual) Volume 1, Figure 301-4, for arterial streets with a speed limit of 50 mph or more, the minimum shoulder width, with curb, is eight feet. Section 3.5.2 of the L&D Manual provides additional guidance for curb located on high speed facilities. According to this section curb placed on high speed facilities should be avoided except for special situations. This situation should qualify as a special situation and curb should be permitted due to its channelizing benefits. The manual continues to say that if present, curb should be no closer than four feet to the edge of traveled way and should be no taller than four inches. The American Association State Highway and Transportation Officials' *A Policy on Geometric Design of Highways and Streets* provides even more guidance in this situation. This manual states that curbs placed on high speed facilities should not have vertical faces but should be sloping faced. Accordingly, the build alternative utilizes ODOT Type 3 Curb. This curb is a four-inch sloping faced curb which is located four feet from the edge of traveled way for all high speed approaches. The side of the median island with only a two foot shoulder is adjacent to an acceleration lane where it is anticipated that vehicles will be traveling no faster than 35 mph. Placing the curb eight feet away from all traveled ways would drastically reduce the size of the raised median island making it ineffective at channelizing vehicles.

### 4.3 MAINTENANCE OF TRAFFIC

A detailed maintenance of traffic (MOT) study on the Build Alternative was performed as a part of the feasibility study to determine the best MOT alternative. Consideration was given to the question of if the intersection improvement project should be built in conjunction with the landslide repair project or if they should be built separately.

It was determined through study that the most cost effective and least disruptive MOT scheme will be to build both projects concurrently. Eight Mile Road will be closed for three to six months while the landslide is repaired and Eight Mile Road improvements are constructed. During this time eastbound SR 32 traffic will be shifted onto the westbound alignment.

See Attachment D for a full evaluation and discussion of the MOT alternatives investigated.

### 4.4 RIGHT OF WAY REQUIREMENTS

No new right-of-way would be required for the No Build Alternative.

While the exact amount of right-of-way required for the Build Alternative has not been determined at this time, it is anticipated that new permanent and/or temporary right of way will be required from approximately 11 parcels.



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### 4.5 UTILITY ISSUES

Based on utility coordination through OHIO811, Duke Energy has aerial electric lines and underground gas lines in the project area. Aerial communication lines in the project area owned by Cincinnati Bell and Charter Communications. Greater Cincinnati Water Works and Clermont County Water Resources own water distribution lines in the area. The Metropolitan Sewer District of Greater Cincinnati owns sanitary facilities in the project area. Further coordination with the utility providers will occur throughout project development. Utility relocations will not be required for the No Build Alternative, however, there will likely be some electric, communication, gas, or water relocations required for the Build Alternative.

### 4.6 ENVIRONMENTAL ANALYSIS

The following is a summary of the environmental resources within the project area and the anticipated involvement with those resources with the implementation of the Build Alternative (project). Information for environmental features in the study area was obtained from secondary sources as well as a field survey of the project area conducted by Stantec as part of the Level 1 Ecological Survey Report (ESR). Environmental maps and other information referenced in this section are included in the references figures.

**Rivers, Streams, and Wetlands:** The proposed project is expected to impact five (5) potentially jurisdictional streams – Stream 3, Stream 4, Stream 5, Stream 6, and Stream 8, totaling 779 feet of stream impact. It is anticipated that there would be one (1) potentially jurisdictional wetland – Wetland A impacted by the project, totaling 0.055 acre. In addition, one (1) potentially jurisdictional ditch – Ditch 1 would be impacted, totaling 0.007 acre. All impacted streams are primary headwater habitat streams with small drainage areas (<1 mi<sup>2</sup>) and located in the Dry Run-Little Miami River watershed (HUC-12 050902021405). The entire project area occurs within an OEPA Nationwide Permit “Possibly Eligible” area. Wetland A is a small palustrine, emergent, Category 1 feature. Figure 3 in Attachment D identifies the streams and wetlands in the project area. Detailed information regarding stream and wetland impacts is included in the Level 1 ESR, included in Attachment E.

**Floodplain:** There is a 100-year floodplain identified along Dry Run within the project area. (See Figure 4) No significant impacts or fills within the floodplain are anticipated with the project.

**Threatened and Endangered Species:** There is 1.38 acres of suitable wooded habitat (SWH) for the federal endangered Indiana bat (*Myotis sodalis*) and federal threatened northern long-eared bat (*Myotis septentrionalis*), in the form of steep sloped, scrubby Upland Forest (UF) and a small area of Floodplain Forest (FF) adjacent to Dry Run, located within the preliminary construction limits. All 1.38 acres of SWH occurs within 100 feet of existing edge of pavement. No other federal threatened or endangered species occurs within the preliminary construction limits. Marginal suitable habitat for the state threatened Kirtland’s snake (*Clonophis kirtlandii*) occurs within the preliminary construction limits. However, construction of the HAM- 32-6.82 project is considered “Not Likely to Impact” Kirtland’s snake. There is no suitable habitat within the project area for any other state threatened or endangered species. Additional



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information regarding potential impacts to threatened and endangered species is included in the Level 1 ESR included in Attachment E.

**Cultural Resources:** Based on a review of the State Historic Preservation Office's online mapping, there are no known eligible or listed on the National Register of Historic Places (NRHP). (See Figure 5)

**Section 4(f)/6(f):** There are no publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites within the project area. Therefore, there would be no Section 4(f) or 6(f) impacts as a result of this project.

**Air Quality:** This project is exempt from MSAT analysis (it does not add capacity, a new interchange, relocate thru lanes significantly closer to sensitive areas, or add an auxiliary lane of significant length). The project is located in Hamilton County, which is an ozone marginal nonattainment area. The project is not on OKI's FY 2020-2023 Transportation Improvement Program dated March 9, 2019, nor is it on the ODOT's FY 2018-2021 Statewide Transportation Improvement Program (STIP) dated May 2017. Therefore, a request will need to be made to OKI to place the project on the TIP to ensure that it is included in the latest regional conformity analysis prior to project implementation. The project is located in Hamilton County, which is not a PM<sub>2.5</sub> non-attainment area. Therefore, no PM<sub>2.5</sub> analysis is required. The State of Ohio is in attainment for Carbon Monoxide (CO) at this time and no coordination or analysis is required.

**Noise Levels:** The project does involve an alteration of existing Eight Mile Road which significantly changes the vertical alignment and it also adds an auxiliary turn lane along SR 32. There are approximately 12 residential buildings within 500 feet of the project area. As a result a noise analysis may be required for this project.

**Drinking Water Resources:** There are no sole source aquifers or other source water protection areas within the project area, so there will be no project impacts to these resources. See Source Water Protection Map provided on Figure 6.

**Farmland:** Based on review of appropriate mapping, the proposed project is located in a non-urbanized area. Based on the scope and type of work, the proposed project meets the terms and conditions of the Memorandum of Understanding between the Natural Resource Conservation Service and the Ohio Department of Transportation Projects Involving Farmlands (Agreement No. 19552), executed on March 15, 2016. Therefore, completion of the Farmland Conversion Impact Rating (FCIR) Form is not warranted and no further coordination is required.

**Regulated Materials:** Based on a review of the Ohio Regulated Properties Search (ORPS) Tool mapping, there are no identified hazardous materials in the vicinity of the project. (See ORPS Analysis Map provided on Figure 7.

**Underserved Populations:** U.S. Census data provided on ODOT's TIMS mapping was used to identify underserved populations in the project area. This data is summarized in Table 2. The proposed project



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would not result in residential or business displacements and there would be no impacts to underserved populations as a result of the proposed project.

Table 3: Percent Underserved Population by Block Group in the HAM- 32-6.82 Project Area			
	Block Group 390610249024 (Percent)	Block Group 390610249011 (Percent)	Block Group 390610251011 (Percent)
Minority	16.31	13.50	7.8
Low-Income	11.30	49.72	5.6
Limited English Proficiency	0.0	3.7	2.4
Elderly	0.0	10.0	7.1

Source: Transportation Information Mapping System, accessed April 12, 2020.

**Public Involvement:** As discussed in Section 1.1, Project History, the need for improvements to the SR 32/Eight Mile Road intersection project was identified in the *Eastern Corridor Segments II and III (PID 86462) Transportation Needs Analysis*, which was prepared in July 31, 2017. This study was followed by the *Conceptual Alternatives Implementation Plan for Eastern Corridor Segments II and III (PID 86462)*, prepared in June 21, 2019, which identified the proposed improvement of the SR 32/Eight Mile as one of 68 projects that should be prioritized for implementation. The public involvement process for each of these studies is detailed in the reports cited above and summarized briefly as follows.

**Transportation Needs Analysis:** During the Needs Analysis study, stakeholder input was gathered through an Eastern Corridor Development Team (ECDT) meeting, which included Eastern Corridor Partners, community representatives, and leadership of the Eastern Corridor communities, business associations, and other stakeholder groups that have an interest in the Eastern Corridor Program. In addition, a series of Focus Area Workshops were held for smaller geographic areas within the Eastern Corridor area to gather public input regarding community values and priorities and the transportation needs of the focus areas. To reach all residents within the Eastern Corridor area, an online interactive survey was conducted which solicited information from residents and commuters about transportation issues in Segments II and III of the Eastern Corridor. ODOT also held a Public Open House to update the public on the Eastern



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Corridor Segments II and III Transportation Needs Analysis Study and provide an opportunity for the public to provide comments on the needs identified for the six focus areas.

*Conceptual Alternatives Implementation Plan:* As part of the development of the Implementation Plan, Advisory Committees were established for the six Focus Areas within Segments II and III. These committees included elected officials, transportation planning professionals, and community and interest group representatives, as well as representatives of the Sierra Club, Tri-State Trails/Green Umbrella, and the Ohio-Kentucky-Indiana (OKI) Regional Council of Governments. Each Focus Group held four meetings with ODOT over the course of the study to further refine transportation needs in the Focus Areas and assist with developing solution concepts. Two Public Open House Meetings also were held throughout the development and refinement of the transportation concepts to ensure that the public had an opportunity to provide input at key decision points.

### 4.7 COST ESTIMATE

A preliminary construction cost estimate for the Build Alternative has been developed as a part of this study. The preliminary cost estimate is provided in Attachment F. More detailed construction costs, including right-of-way cost estimates will be developed during development of the Preferred Alternative.

## 5.0 COMPARISON OF ALTERNATIVES

A detailed comparative evaluation matrix, which summarizes purpose and need, environmental, engineering, traffic, and public input evaluation criteria for the alternatives is provided in Table 3.

Table 4: Evaluation Matrix		
Feature/Consideration	Preliminary Alternatives	
	No Build Alternative	Build Alternative (Signalized Green Tee Intersection Improvements)
Purpose and Need – Primary Need		
Address capacity issues on Eight Mile Road.	No	Yes
Address safety issues for vehicles turning at Eight Mile Road.	No	Yes
Address deficient sight distance and roadway grade issues	No	Yes Deficient sight distance issues addressed and roadway grade issues improved
Cultural Resources		
NRHP-Listed Sites	No impact or minimal impact	No impact or minimal impact
Section 4(f)/6(f) Sites	No impact or minimal impact	No impact or minimal impact



## FEASIBILITY STUDY

HAM-32-6.82  
Eight Mile Intersection Improvements  
PID 110991

Table 4: Evaluation Matrix		
Feature/Consideration	Preliminary Alternatives	
	No Build Alternative	Build Alternative (Signalized Green Tee Intersection Improvements)
<b>Ecological Resources</b>		
Streams	No impact or minimal impact	Expected impact of 779 feet to potentially jurisdictional streams
Wetlands	No impact or minimal impact	Expected impact of 0.055 acres to a potentially jurisdictional wetland.
Jurisdictional Ditches	No impact or minimal impact	Expected impact of 0.07 acres to a potentially jurisdictional ditch
Threatened & Endangered Species	No impact or minimal impact	Potential bat habitat Potential Kirtland's Snake habitat
<b>100-Year Floodplain</b>		
100-Year Floodplain Encroachment	No impact	No impact or minimal impact
<b>Hazardous Materials</b>		
Regulated Materials Review	To Be Determined	To Be Determined
<b>Drinking Water Resources</b>		
Sole-Source Aquifer	No impact or minimal impact	No impact or minimal impact
Source Water Protection Area	No impact or minimal impact	No impact or minimal impact
<b>Air Quality and Noise</b>		
Air Quality	No impact or minimal impact	No impact or minimal impact
Traffic Noise	No impact or minimal impact	Potential impact to 12 residences.
<b>Community and Land Use</b>		
Relocations	None	None
Right-of-Way	No impact or minimal impact	New permanent and/or temporary ROW required from 11 parcels
Traditionally Underserved Populations (TUP)	No impact or minimal impact	No impact or minimal impact
<b>Stakeholder/Public Involvement<sup>1</sup></b>		
Public Meeting Questionnaire	Preferred by public (51% support)	Not preferred by public (49% support)
<b>Engineering Considerations</b>		
Traffic Analysis	AM LOS F PM LOS F	AM LOS B PM LOS C
Safety Analysis	Experiences higher crash rates compared to similar unsignalized intersections	Reduces crashes compared to traditional traffic signal controlled intersections.

<sup>1</sup> Percentages derived from responses received at the Public Open Houses as part of the Conceptual Alternatives Implementation Plan.



## FEASIBILITY STUDY

HAM-32-6.82

Eight Mile Intersection Improvements

PID 110991

Table 4: Evaluation Matrix		
Feature/Consideration	Preliminary Alternatives	
	No Build Alternative	Build Alternative (Signalized Green Tee Intersection Improvements)
Roadway Design Issues	Deficient intersection sight distance and vertical grades	Sight distance issues resolved with traffic signal. Grade issues improved with profile adjustment. Design exception will be required for shoulder width on SR 32
Maintenance of Traffic	No impact or minimal impact	3-6 month closure of Eight Mile Road for construction
Utilities	No Impact or minimal impact	Some utility relocations may be required
Preliminary Cost Estimates		
Preliminary Construction Costs	\$0.00	\$2,375,822.34
Conclusion		
Recommended as Preferred Alternative?	No	Yes

## 6.0 PREFERRED ALTERNATIVE

The SR 32/ Eight Mile Road ranks on ODOT's statewide crash list. ODOT is therefore looking for an intersection improvement alternative to improve the safety at this intersection. The safety and congestion needs have been clearly defined in the *Needs Analysis Report*. Several conceptual alternatives were also developed to address these needs in the *Conceptual Alternative Implementation Plan*. From these reports and associated analysis which included traffic analysis, preliminary engineering, environmental red flag analysis, and extensive public involvement, the Eight Mile green tee intersection improvement project emerged as the preferred alternative for this intersection moving forward. Out of the two alternatives considered in this feasibility study, the Build Alternative is the only alternative that addresses the primary needs of the project.



## FEASIBILITY STUDY

HAM-32-6.82  
Eight Mile Intersection Improvements  
PID 110991

## 7.0 REFERENCES

Stantec Consulting Services Inc., 2019. *Conceptual Alternatives Implementation Plan for Segment II/III of the Eastern Corridor Study (PID 86462)*. Lebanon, Ohio

Stantec Consulting Services Inc. 2017 . *Transportation Needs Analysis prepared for Eastern Corridor Segments II and III (PID 86462)*. Lebanon, Ohio



## **FEASIBILITY STUDY**

HAM-32-6.82  
Eight Mile Intersection Improvements  
PID 110991

# **FIGURES**



# FIGURE 1. PROJECT LOCATION MAP

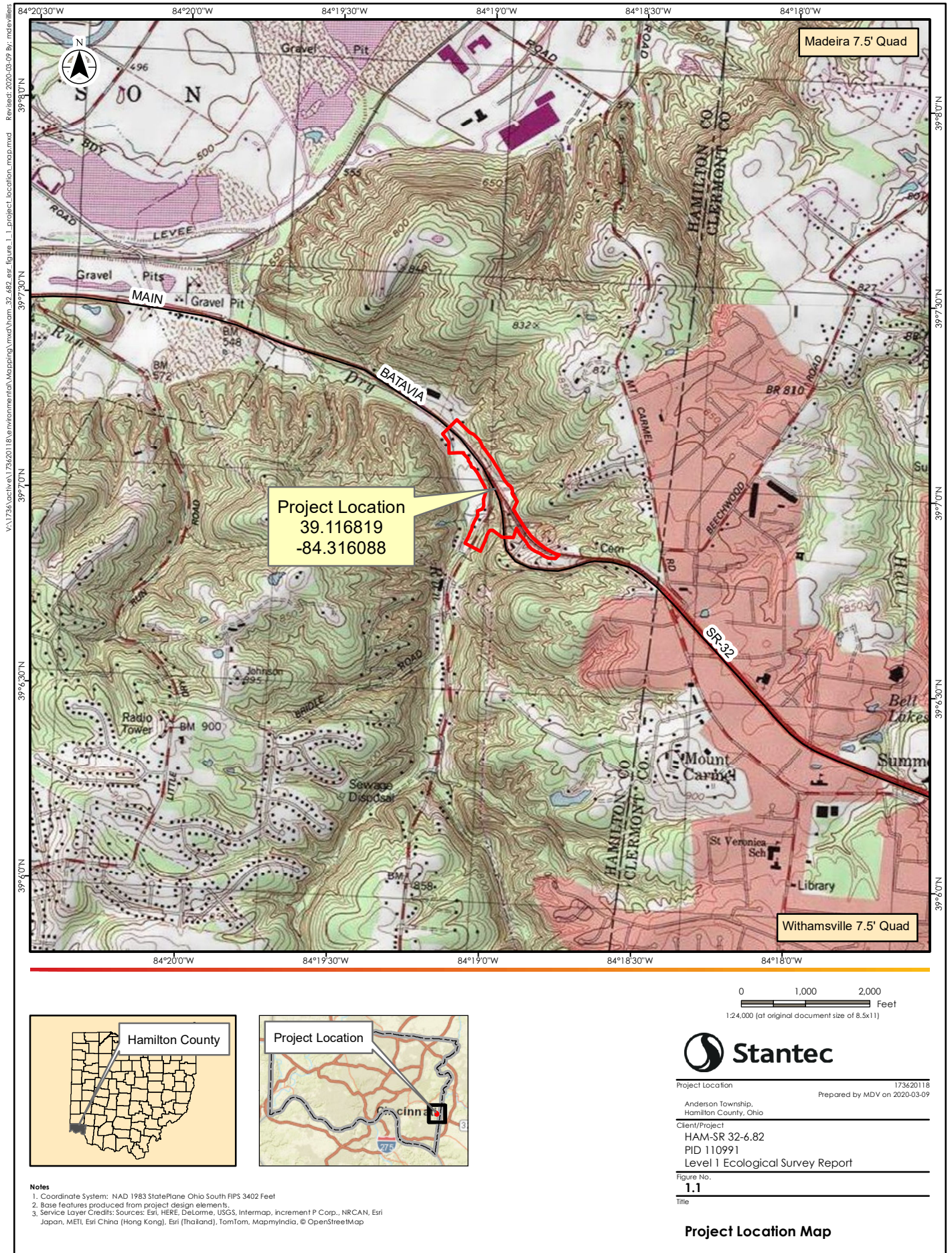


FIGURE 2. RAISED MEDIAN ISLAND PLAN

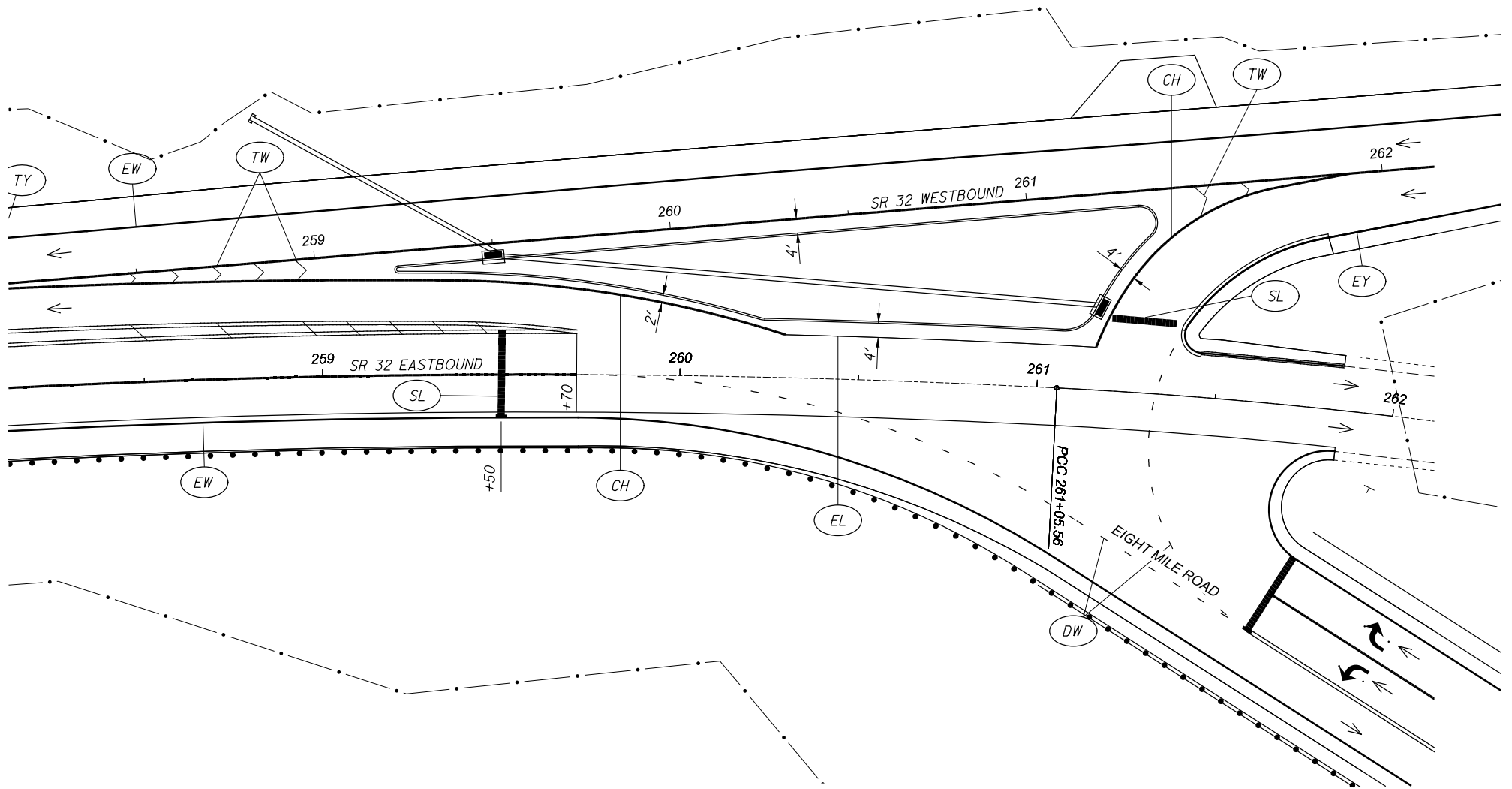


FIGURE 3. ECOLOGICAL RESOURCES

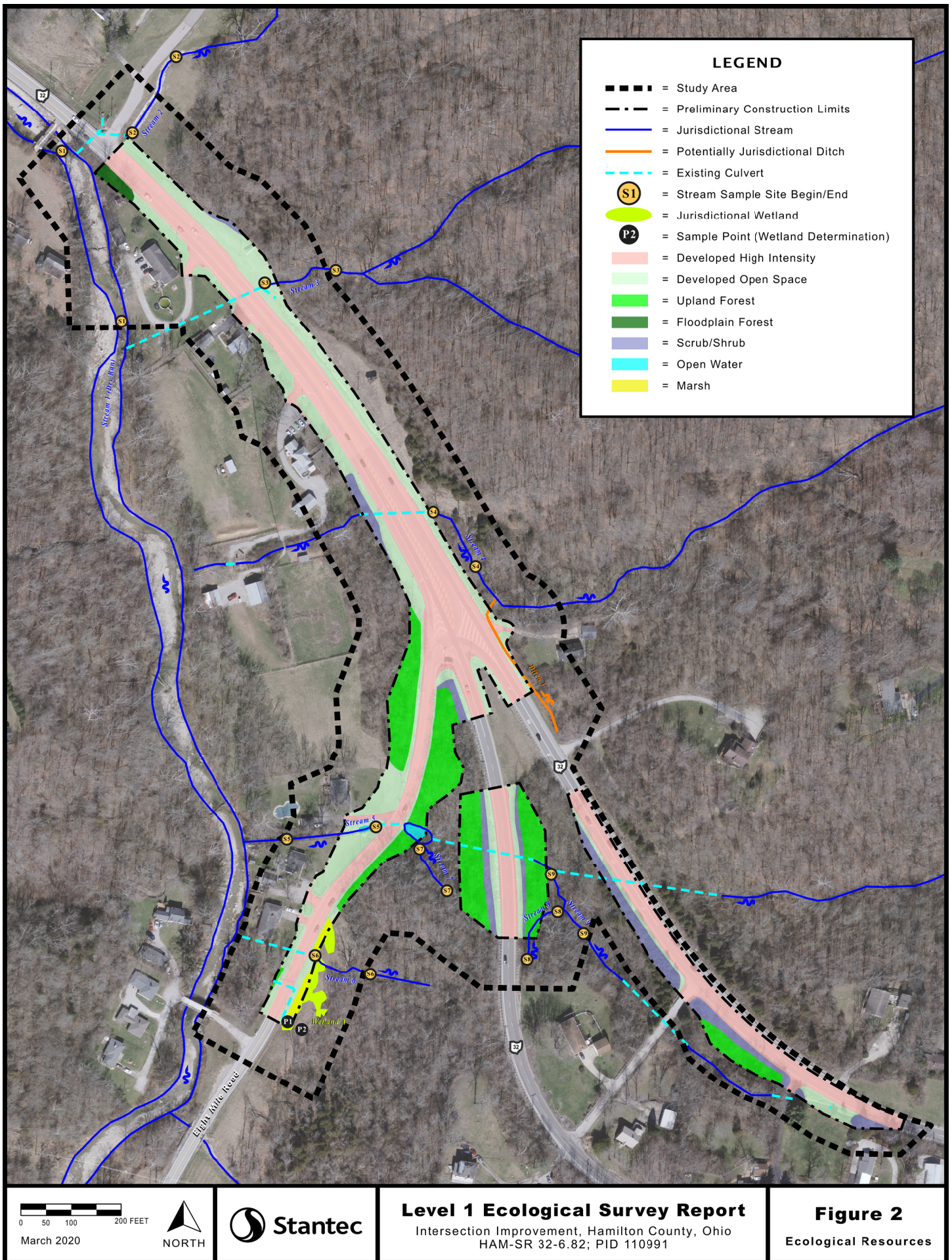


FIGURE 4. FLOODPLAINS

National Flood Hazard Layer FIRMette



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) <i>Zone A, V, A99</i>
		With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>
		Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i>
		Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>
		Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i>
		Area with Flood Risk due to Levee <i>Zone D</i>

OTHER AREAS		Area of Minimal Flood Hazard <i>Zone X</i>
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard <i>Zone D</i>
		Channel, Culvert, or Storm Sewer
OTHER FEATURES		Levee, Dike, or Floodwall
		Coastal Transect Baseline
MAP PANELS		Profile Baseline
		Hydrographic Feature

OTHER AREAS		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall

OTHER AREAS		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall

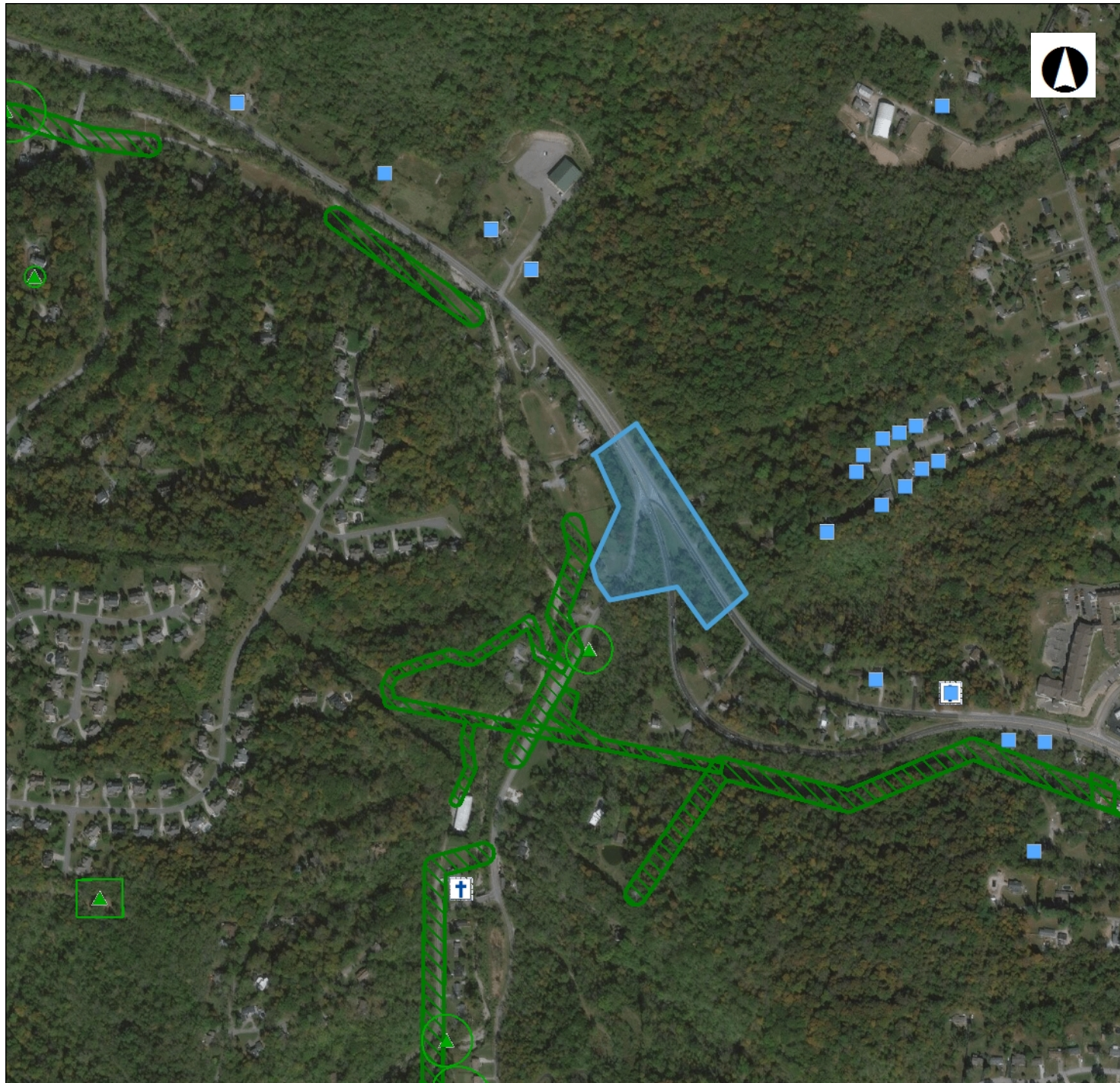
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/11/2020 at 11:53:54 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

# FIGURE 5. CULTURAL RESOURCES



State Historic  
Preservation Office

## Legend

### NR Listings

- Listed
- ⊙ National Historic Landmark
- ✕ Delisted

- ◆ NR Determinations of Eligibi
- ▲ Archaeological Sites
- Historic Structures
- Historic Bridges
- Historic Tax Credit Projects

### OGS Cemeteries

- ⚰ Confident
- ⚰ Not Confident

### Historic Markers

- ★ UTM Zone Split
- ▨ NR Boundaries
- OAI Site Boundaries
- ▨ Phase1
- ▨ Phase2

0 0.14 0.27 Miles



1: 10,745

## Copyright/Disclaimer

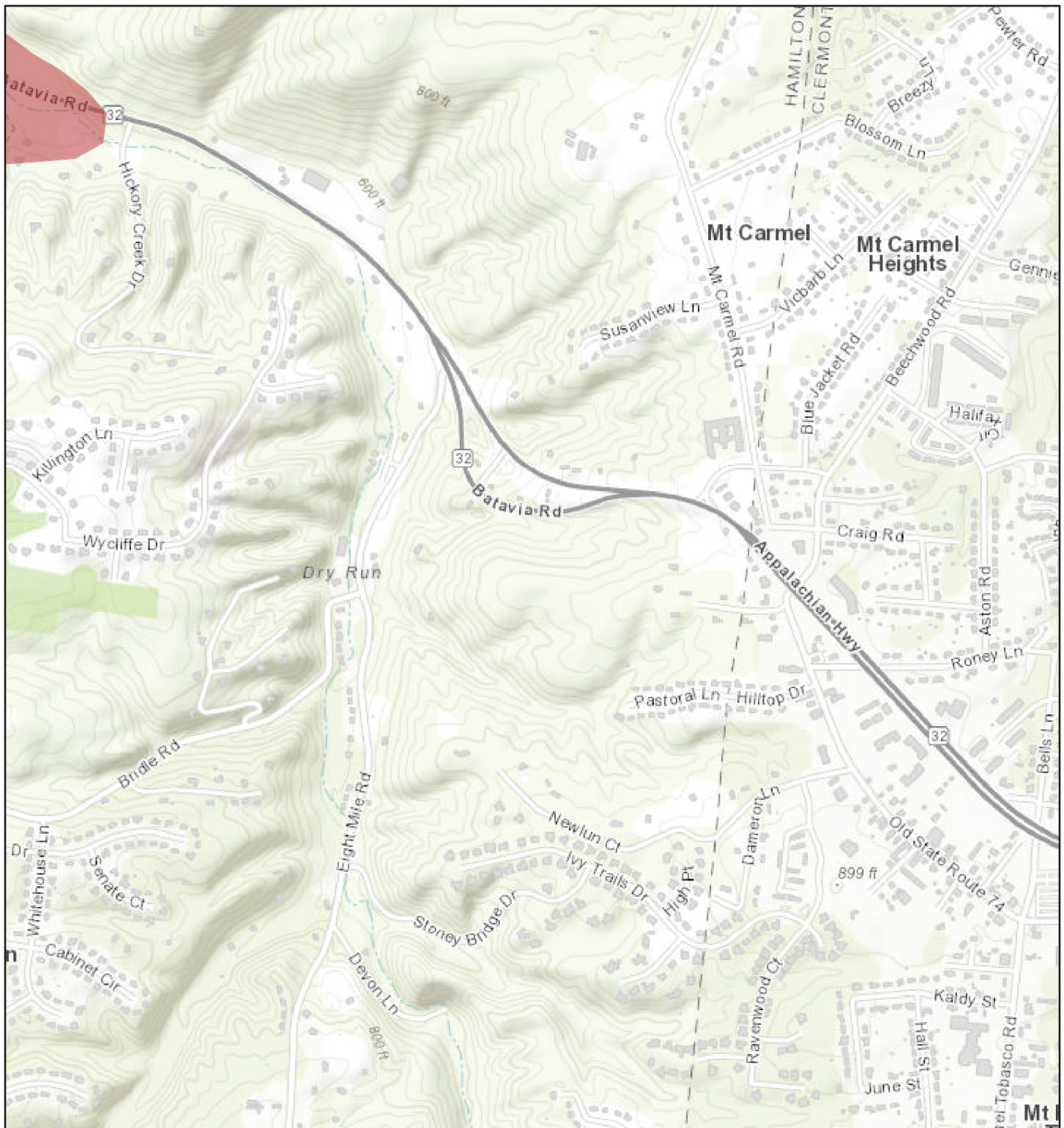
This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.

Datum: [Datum]

Projection: WGS\_1984\_Web\_Mercator\_Auxiliary\_Sphere

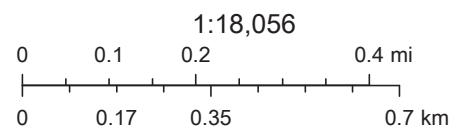


**FIGURE 6. DRINKING WATER RESOURCES**  
**Drinking Water Source Protection Areas**



4/11/2020 4:57:35 PM

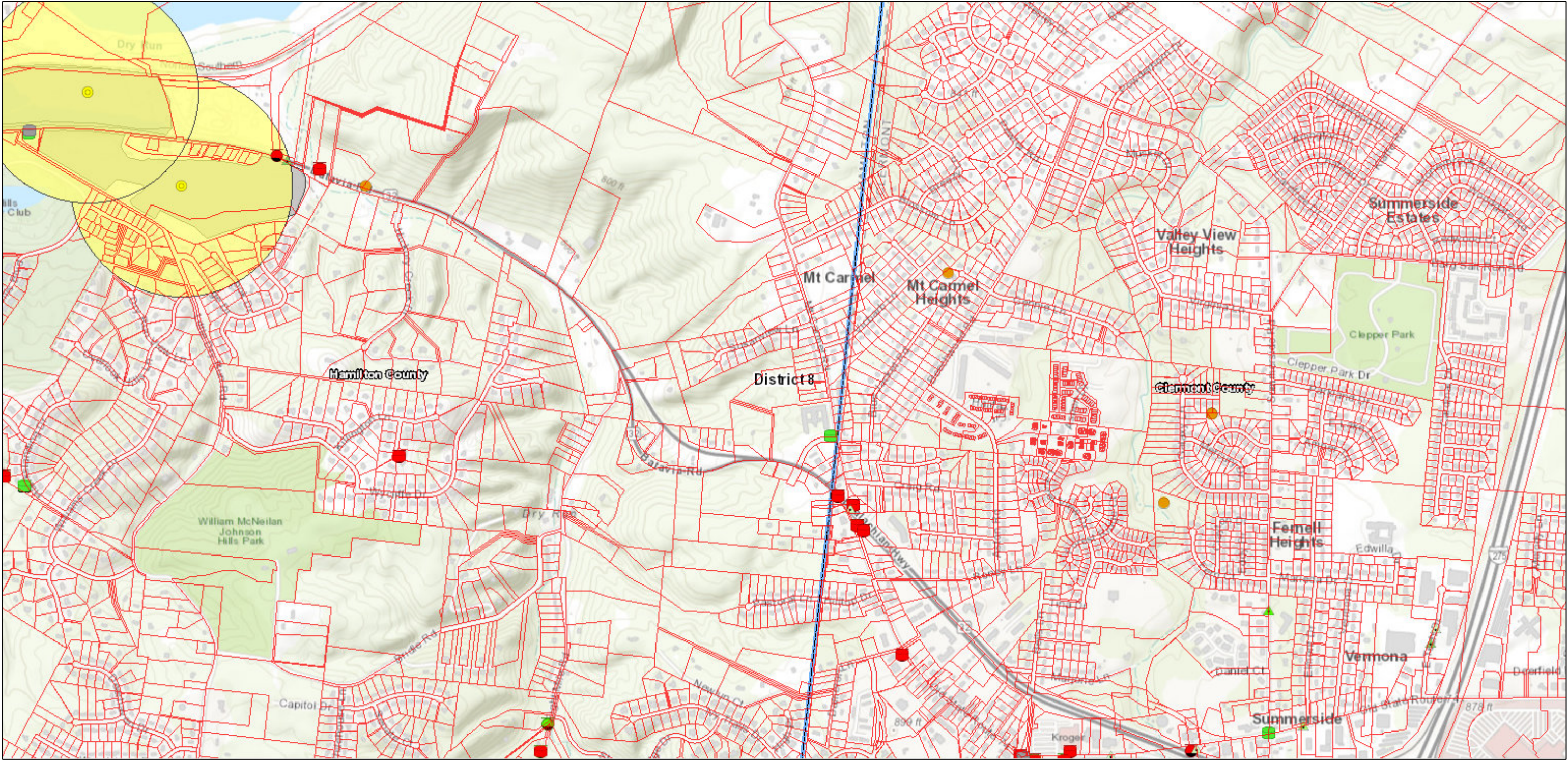
- |  |  |
|--|--|
| <span style="display: inline-block; width: 15px; height: 10px; background-color: red; border: 1px solid black;"></span> Sole Source Aquifers                       | <span style="display: inline-block; width: 15px; height: 10px; border: 1px solid black;"></span> Lake Erie-Potential Influence Zone                        |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: lightgreen; border: 1px solid black;"></span> Ohio River (surface water)          | <span style="display: inline-block; width: 15px; height: 10px; background-color: pink; border: 1px solid black;"></span> Inland (surface water)            |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: lightgreen; border: 1px solid black;"></span> Ohio River-Zone of Critical Concern | <span style="display: inline-block; width: 15px; height: 10px; background-color: pink; border: 1px solid black;"></span> Emergency Management Zone         |
| <span style="display: inline-block; width: 15px; height: 10px; border: 1px solid black;"></span> Ohio River-Zone of High Concern                                   | <span style="display: inline-block; width: 15px; height: 10px; background-color: yellow; border: 1px solid black;"></span> Corridor Management Zone        |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: lightblue; border: 1px solid black;"></span> Lake Erie (surface water)            | <span style="display: inline-block; width: 15px; height: 10px; background-color: lightblue; border: 1px solid black;"></span> Source Water Protection Area |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: purple; border: 1px solid black;"></span> Lake Erie-Critical Assessment Zone      | <span style="display: inline-block; width: 15px; height: 10px; background-color: blue; border: 1px solid black;"></span> Inner Management Zone             |



Division of Drinking and Ground Waters, Ohio EPA, Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User

FIGURE 7. REGULATED MATERIALS PROPERTIES

ORPS Analysis Map



4/11/2020 5:39:10 PM

1:18,056

Parcels

SEMS (US EPA)

SUPERFUND (NON-NPL)

SUPERFUND NPL

Non-NPL - 0.1-mile Buffer

NPL - 1/2-mile Buffer

RCRA (US EPA)

CESQG

LQG

SQG

TRANSFER FACILITY

TRANSPORTER

TSD

UNSPECIFIED UNIVERSE

OTHER HAZARDOUS WASTE ACTIVITIES

RCRA Sites Tenth-of-a-Mile Buffer

TSD

Federal Engineering Controls (US EPA)

Engineering Controls

Federal Institutional Controls (US EPA)

Institutional Controls

BUSTR - UST Locations (BUSTR/OGRIP)

UST Status Unknown

Active UST

Inactive UST

BUSTR - LUST Locations (BUSTR/OGRIP)

LUST Status Unknown

Active LUST

Inactive LUST

Coal Gas Generators

DERR Database (OEPA-DERR)

DERR Database

Impoundment Sites

00.20.40.8

00.350.71.4

mi

km

Ohio Department of Natural Resources

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Web AppBuilder for ArcGIS

City of Cincinnati, LINK-GIS/PDS, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA | State of Ohio GISSC | Ohio Department of Natural Resources |