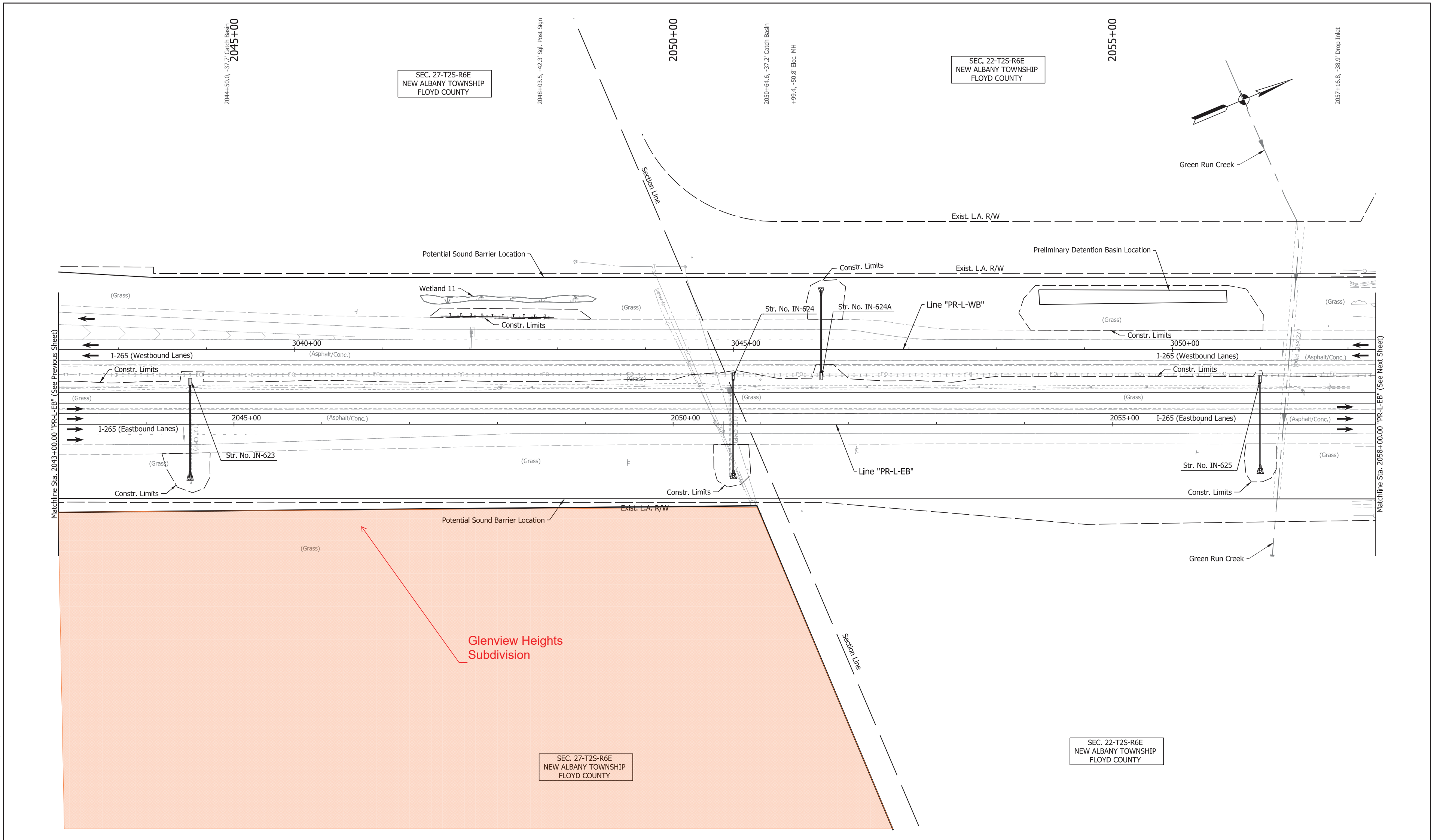

Note:
For Geometric information see Geometric Layout Sheets GEO-01 to GEO-13.

Historic Property Boundary

DRAFT
NOT FOR CONSTRUCTION

RECOMMENDED FOR APPROVAL	DESIGN ENGINEER	DATE
DESIGNED: MDS	DRAWN: RJS	
CHECKED: KRC	CHECKED: KRC	

INDIANA
DEPARTMENT OF TRANSPORTATION

PLAN SHEET
LINE "PR-L-EB"
STA. 2043+00 TO STA. 2058+00

HORIZONTAL SCALE	BRIDGE FILE
1"=50'	N/A
VERTICAL SCALE	DESIGNATION
N/A	1900162
SURVEY BOOK	SHEETS PLN-37
ELECTRONIC	287 of 1131
CONTRACT	PROJECT
R-42570	1900162

kleisure
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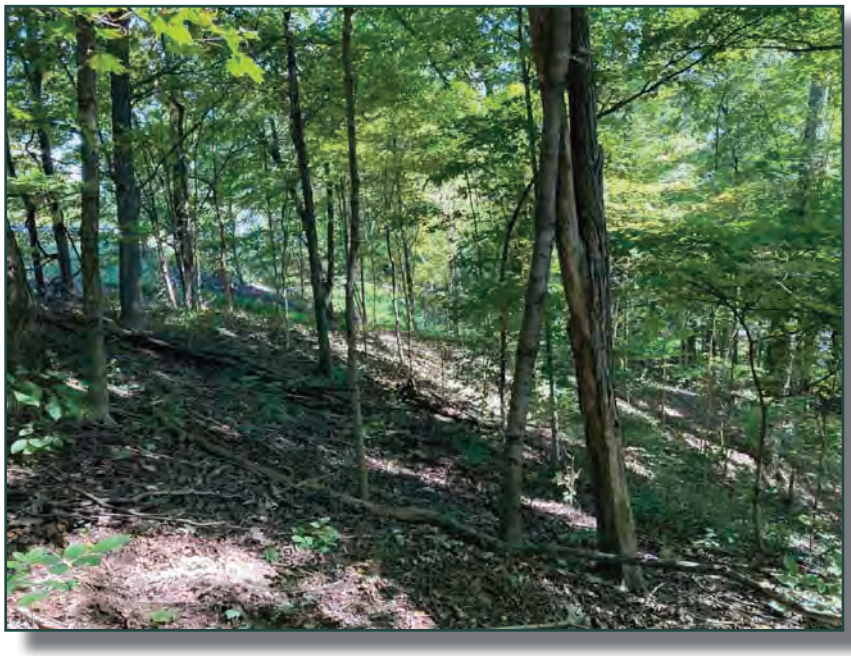
model: PLN-04 [Sheet]

APPENDIX F: Report Abstracts

Contract Publication Series 21-300

A PHASE IA ARCHAEOLOGICAL RECONNAISSANCE FOR THE PROPOSED IMPROVE 64: I-64 ADDED TRAVEL LANES FROM US 150 TO MAIN STREET NEAR NEW ALBANY IN FLOYD COUNTY, INDIANA (INDOT DES. NO. 1900162; DHPA NO. 27559).



by
Sidney Travis, MA

Prepared for

HNTB

Prepared by

cra
cultural resource analysts, inc

Kentucky | West Virginia | Wyoming
Indiana | Louisiana | Tennessee | Virginia

Contract Publication Series 21-300

A PHASE IA ARCHAEOLOGICAL RECONNAISSANCE FOR THE PROPOSED IMPROVE 64: I-64 ADDED TRAVEL LANES FROM US 150 TO MAIN STREET NEAR NEW ALBANY IN FLOYD COUNTY, INDIANA (INDOT DES. NO. 1900162; DHPA NO. 27559)

by
Sidney Travis, MA
With a contribution by Aaron Harth

Prepared for

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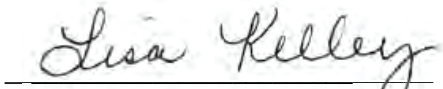
CRA Project No.: I210277



Lisa J. Kelley, RPA 4535
Principal Investigator

January 5, 2022

Lead Agency: Indiana Department of Transportation Des No. 1900162
Indiana State Museum Accession #: 71.19.1829

ABSTRACT

Between September 20 and October 6, 2021, Cultural Resource Analysts, Inc., personnel conducted a phase Ia archaeological reconnaissance for the proposed I-64 improvements project in Floyd County, Indiana (Indiana Department of Transportation Des. No. 1900162; Indiana Division of Historic Preservation and Archaeology No. 27559). The 142.5 ha (352.2 acre) survey area is situated along I-64, I-265, and US 150. Systematic shovel testing and visual walkovers were used throughout the survey area.

A literature review indicated that six previously conducted surveys overlapped with portions of the current survey area. Three of the overlapping surveys were reinvestigated due to their age; however, the other three surveys were more recently conducted and those overlapping areas were not reinvestigated. The records review also indicated that there were no previously recorded archaeological sites located within, or near, the survey area.

Three previously unrecorded archaeological sites (12FL222─12FL224) were found during the current reconnaissance. Site 12FL222 is an urban historic site, representing at least two historic structures, one of which was an African-American school that operated from 1875 to 1907. Site 12FL223 is a mid-nineteenth- to twentieth-century farmstead associated with non-extant structures. Site 12FL224 is a historic scatter that dates approximately between the late nineteenth and twentieth century based on the artifacts. Due to their inability to convey significant information about the history of the area, Sites 12FL223 and 12FL224 are both recommended as ineligible for inclusion the National Register of Historic Places and no further work is recommended. However, the National Register of Historic Places eligibility of Site 12FL222 could not be assessed with the data derived from the phase Ia and the site may contain intact deposits that could provide important information about the history of New Albany. Therefore, project avoidance or further work to assess its integrity and National Register of Historic Places eligibility is recommended for Site 12FL222.

Two cemeteries (Lewis and Westhaven) were identified during the records review near the current survey area. The Lewis Cemetery is located at least more than 100 ft away from proposed project-related ground disturbances. Furthermore, planned project-related ground disturbances near the Westhaven Cemetery will be within the existing disturbed right-of-way and will not impact cemetery property. Therefore, a cemetery development plan is not recommended for the project.

Contract Publication Series 21-161

HISTORIC PROPERTY REPORT FOR THE PROPOSED IMPROVE 64 PROJECT IN GEORGETOWN, LAFAYETTE, AND NEW ALBANY TOWNSHIPS, FLOYD COUNTY, INDIANA (INDOT DES. NO. 1900162; DHPA NO. 27559)

by
Alyssa Reynolds, MS

Prepared for

HNTB Corporation

Prepared by

cra
cultural resource analysts, inc

Kentucky | West Virginia | Wyoming
Indiana | Louisiana | Tennessee | Virginia

Contract Publication Series 21-161

HISTORIC PROPERTY REPORT FOR THE PROPOSED IMPROVE 64 PROJECT IN GEORGETOWN, LAFAYETTE, AND NEW ALBANY TOWNSHIPS, FLOYD COUNTY, INDIANA (INDOT DES. NO. 1900162; DHPA NO. 27559)

by

Alyssa Reynolds, MS

Prepared for

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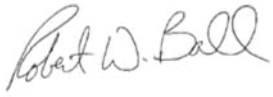
CRA Project No.: I210146



Robert Ball, MHP
Principal Investigator

December 22, 2021

INDOT Des. No.: 1900162
DHPA No.: 27559

ABSTRACT

This report documents the identification and evaluation efforts for properties included in the Area of Potential Effects (APE) for the proposed Improve 64 Project in Floyd County, Indiana (Indiana Department of Transportation [INDOT] Des. No. 1900162). Above-ground resources located within the project APE were identified and evaluated in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and the regulations implementing Section 106 (36 CFR Part 800).

As a result of the NHPA, as amended, and CFR Part 800, federal agencies are required to take into account the impact of federal undertakings upon historic properties in the area of the undertaking. Historic properties include buildings, structures, sites, objects, and/or districts that are eligible for or listed in the National Register of Historic Places (NRHP). As this project is receiving funding from the Federal Highway Administration (FHWA), it is subject to a Section 106 review.

The APE contains no properties listed in the NRHP. The APE contains four Indiana Historic Sites and Structures Inventory (IHSSI)-rated "outstanding" properties: the Frank and George Devol Double House (IHSSI No. 043-446-34246), the Horatio Devol House (IHSSI No. 043-446-34245), the Reyse (Roy[s]ce)-Friend House) (IHSSI No. 043-046-3420), and the James Carr House (IHSSI No. 043-046-34202). CRA recommends all four of these resources as being eligible for inclusion in the NRHP under Criterion C.

INDIANA ARCHAEOLOGICAL SHORT REPORT

State Form 54566 (R3 / 3-22)

INDIANA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF HISTORIC PRESERVATION AND ARCHAEOLOGY
402 West Washington Street, Room W274
Indianapolis, Indiana 46204-2739
Telephone Number: (317) 232-1646
Fax Number: (317) 232-0693
E-mail: dhpa@dnr.IN.gov

Where applicable, the use of this form is recommended but not required by the Division of Historic Preservation and Archaeology (DHPA).

Name(s) of author(s)	Date *(month, day, year)*
Sidney Travis, MA	October 21, 2022

Title of project
An Addendum to A Phase Ia Archaeological Reconnaissance for the Proposed Improve 64: I-64 Added Travel Lanes from US 150 to Main Street Near New Albany in Floyd County, Indiana (INDOT Des. No. 1900162)

This document is being used to report on the results of:
☐ Records check only ☐ Records check and Phase 1a archaeological reconnaissance
☒ An addendum to a previous archaeological report. *For an addendum, provide the following information.*

Name(s) of author(s) of previous report
Sidney Travis, MA

Title of previous report
A Phase Ia Archaeological Reconnaissance for the Proposed Improve 64: I-64 Added Travel Lanes from US 150 to Main Street Near New Albany in Floyd County, Indiana (INDOT Des. No. 1900162; DHPA No. 27559)

Date of previous report *(month, day, year)*	DHPA number
1/5/2022	27559

PROJECT OVERVIEW

Description of project
The Indiana Department of Transportation (INDOT) is proposing to improve I-64 by adding travel lanes along sections of I-64, I-265, and US 150 in Floyd County, Indiana (Figures 1 and 2). The initial survey for the proposed project was conducted in 2021, and additional, more specific project details can be found in the original report (Travis 2022). Since the original survey, project plans have been altered, and there are new areas that require additional archaeological investigation. The addendum area for the new areas of the proposed project encompasses approximately 1.9 ha (4.8 acres) of paved roadways, road right-of-way (ROW), woods, and commercial properties (Figure 3).

INDOT designation number(s)	Project number	DHPA number	DHPA plan number
1900162	CRA Project No. I220311 CRA Publication Series No. 22-341	27559	N/A

Prepared for: *(Company / Institution / Agency)*
HNTB Corporation

Name of contact
Kia Gillette

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Name of principal investigator
Lisa J. Kelley

Name of company / institution
Cultural Resource Analysts, Inc.

Address *(number and street, city, state, and ZIP code)*
201 NW Fourth Street, Evansville, Indiana 47708

Telephone number	E-mail address
(812) 253-3009	amartin@crai-ky.com

Signature of principal investigator *(Required)*	Date *(month, day, year)*
Lisa Kelley	October 21, 2022

PROJECT LOCATION

County	USGS 7.5' series topographic quadrangle	Civil township
Floyd	Georgetown and New Albany	Lafayette, Georgetown, and New Albany

Legal Location

Grid alignment
SW

1/4	1/4	1/4	1/4	Section	Township	Range

traffic. Although the decline in river transportation negatively impacted the county, New Albany successfully adapted to the railroad era (HLFI 2008). By the late nineteenth century, New Albany was the terminus of the Louisville, New Albany, and Chicago; the Louisville, Evansville, and St. Louis; and the Ohio and Mississippi Railroads (Cottom 1889). In turn, industries including lumber, textile/rail part manufactures, glass production, and machine shops, to name a few, replaced the steamboat in economic prosperity in New Albany (HLFI 2008:14). However, outside of the city, the county remained largely agrarian with small farms that produced milk and beef cattle, hogs, chicken, wheat, corn, oats, and berries (Kramer 2015). Today, Floyd County remains largely rural except for the intensive development of New Albany.

In addition to the file search, a review of available historic maps was initiated to help identify potential properties (structures) or historic archaeological site locations within the survey area. Maps reviewed and their findings are described in detail in Travis (2022:34–35, Figures 10 and 11). For this addendum, no new archaeological sites were recorded in tandem with mapped structures within the survey area. There also are no properties listed in the National Register of Historic Places, the Indiana Register of Historic Sites and Structures, or the Indiana Historic Sites and Structures Inventory within or near the addendum survey area.

Records check *(Check all that apply)*

- ☐ The project area does not have the potential to contain archaeological resources. *Provide explanation / justification.*
- ☐ There are previously recorded archaeological resources within the project area, but those resources do not warrant additional archaeological investigation. *Provide explanation / justification.*
- ☒ The project area contains previously recorded archaeological resources that warrant additional investigation and/or the project area has the potential to contain archaeological resources. *Provide explanation / justification.*
  - ☒ Based upon the records check results, a reconnaissance has been conducted.
- ☐ A cemetery is located within or adjacent to the project area.

Explanation / justification

There appear to be undisturbed and unsurveyed landforms within the survey area that warrant an archaeological investigation.

Phase 1a archaeological reconnaissance *(Check all that apply)*

- ☐ No Phase 1a reconnaissance was conducted.
- ☒ Phase 1a reconnaissance located no archaeological resources.
- ☐ Previously recorded sites were in the project area.
  - ☐ Artifacts and/or features at a previously recorded site(s) within the project area were not discovered. *List the site(s) below.*
- ☐ Phase 1a reconnaissance has identified landforms conducive to buried archaeological deposits. *Describe below.*

List sites.

N/A

Describe landforms.

The landforms vary depending on the location within the addendum survey area (see Travis 2022:23–26). The western portion consists of hillsides with varying slope and exposed bedrock cliff sides where the interstate was cut into the landform. The northern portion of the addendum survey area consists of hillsides and rolling uplands; however, the area has been leveled in areas due to urbanization. The eastern portion of the addendum survey area also is situated on rolling uplands, but much of the area is urbanized.

Number of shovel probes excavated	Number of cores / auger probes
7	0

Describe disturbances. Attach photographs documenting disturbances.

Disturbances were prevalent throughout the majority of the addendum survey area. Primary causes of disturbance included paved roadways, steep interstate road embankments, sidewalks, large roadside ditches, culverts, and interstate medians (see Figures 4 and 5; Figures 6 and 7). Marked buried utilities were also noted in the survey area, including fiber optic and sewer (Figures 8 and 9). Marked utilities were located along the suburban roadways within the addendum survey area.

Actual area surveyed *(hectares)*	Actual area surveyed *(acres)*
1.8	4.4

Explain results of fieldwork.

A small portion of the addendum survey area did not exhibit obvious surface disturbance and was shovel tested. These areas were located in the woods beyond the westbound I-64 lane, west of Ivy Court, and south of the Wesley Chapel UMC. Upon the subsurface investigation, the majority of the shovel tests displayed disturbances, likely from the ditching and embanking of I-64. One general soil profile consisting of a brown (10YR 4/3) clay loam A horizon from the ground surface to approximately 19 cm bgs was located within the addendum survey area. The A horizon was underlain with a dark yellowish brown (10YR 4/6) clay loam Bt horizon. This profile is most consistent with the Gilford soils mapped in the vicinity.

RECOMMENDATIONS

Records check *(Check all that apply)*

- ☐ No archaeological investigation is recommended before the project is allowed to proceed because the records check has determined that the project area does not have the potential to contain archaeological resources.
- ☐ A Phase 1a archaeological reconnaissance is recommended.
- ☒ Based upon the records check results, a Phase 1a archaeological reconnaissance was recommended and has been conducted.
- ☐ A cemetery development plan may be required under Indiana Code 14-21-1-26.5 because project ground disturbance will be within 100 feet of a cemetery.

Phase 1a archaeological reconnaissance *(Check all that apply)*

- ☒ It is recommended that the project be allowed to proceed as planned because the Phase 1a archaeological reconnaissance has located no archaeological sites within the project area and/or previously recorded sites that were investigated warrant no additional investigation.
- ☐ It is recommended that Phase 1c archaeological subsurface reconnaissance be conducted before the project is allowed to proceed. The Phase 1a archaeological reconnaissance has determined that the project area includes landforms which have the potential to contain buried archaeological deposits.

Other recommendations / commitments

The survey did not locate any newly recorded archaeological sites or the potential for intact buried archaeological deposits. Based on this evidence, archaeological clearance is recommended.

Pursuant to IC-14-21-1, if any archaeological artifacts or human remains are uncovered during construction, demolition, or earthmoving activities, state law (Indiana Code 14-21-1-27 and 29) requires that the discovery must be reported to the Department of Natural Resources within two (2) business days. In that event, please call (317) 232-1646.

REQUIRED ATTACHMENTS

- ☒ Figure showing project location within Indiana
- ☒ USGS topographic map showing the project area *(1:24,000 scale)*
- ☒ Aerial photograph showing the project area, land use and survey methods
- ☒ Photographs of the project area, including, if applicable, photographs documenting disturbances
- ☐ Project plans *(if available)*

Other attachments

References Cited; Figures 1–9; Table 1

References cited *(See short report instructions for required references to be consulted)*

See attachments

Comments

No comments

CURATION

Location of project documentation

Survey notes and photographs will be retained at the office of CRA in Evansville, Indiana.

Contract Publication Series 22-133

ADDENDUM TO HISTORIC PROPERTY REPORT FOR THE PROPOSED IMPROVE 64 PROJECT IN GEORGETOWN, LAFAYETTE, AND NEW ALBANY TOWNSHIPS, FLOYD COUNTY, INDIANA (INDOT DES. NO. 1900162; DHPA NO. 27559)

by
Alyssa Reynolds, MS

Prepared for

HNTB

Prepared by

cra
cultural resource analysts, inc

Kentucky | West Virginia | Wyoming
Indiana | Louisiana | Tennessee | Virginia

Contract Publication Series 22-133

ADDENDUM TO HISTORIC PROPERTY REPORT FOR THE PROPOSED IMPROVE 64 PROJECT IN GEORGETOWN, LAFAYETTE, AND NEW ALBANY TOWNSHIPS, FLOYD COUNTY, INDIANA (INDOT DES. NO. 1900162; DHPA NO. 27559)

by

Alyssa Reynolds, MS

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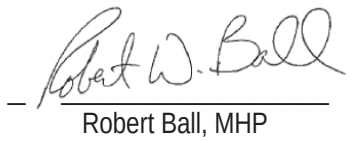
CRA Project No.: I210146



Robert Ball, MHP
Principal Investigator

April 14, 2022

INDOT Des. No.: 1900162
DHPA No.: 27559

MANAGEMENT SUMMARY

Cultural Resource Analysts, Inc. (CRA), under contract with HNTB Corporation (HNTB), completed an addendum to the Historic Property Report (HPR) for the proposed Improve 64 Project in Floyd County, Indiana (Indiana Department of Transportation [INDOT] Des. No. 1900162). The HPR was released and consulting parties were notified of its availability on January 10, 2022; the Indiana State Historic Preservation Officer (SHPO) responded to the findings in the HPR in a letter dated February 9, 2022.

In its response, the SHPO stated its disagreement with the recommendations in the HPR, and advised that the Finchland Subdivision (INDOT 54-79 and 131) and the Glenview Heights Subdivision (INDOT 40-53) are eligible for inclusion in the National Register of Historic Places (NRHP), based on information from the Residential Planning and Development in Indiana, 1940–1973 Multiple Property Documentation Form (MPDF) (Higgins 2018). They also recommended that a portion of the West End Historic District (IHSSI No. 043-446-08001-182) is eligible for listing in the NRHP. The SHPO recommended that CRA also evaluate resources individually within the Oakwood Hills Subdivision (INDOT 20-25) as some of the resources may be considered individually eligible utilizing the MPDF. Additionally, the SHPO requested additional information about the Village Pines Subdivision and recommended that the subdivision should not have been evaluated for the NRHP using the MPDF.

This addendum report documents additional research, historic context development, and evaluation of these aforementioned resources. The size of the project area has slightly increased to accommodate minimal changes associated with this road project. As a result of this investigation, the Area of Potential Effects (APE) still contains no properties listed in the NRHP, as the size of the APE did not change from the January 2022 HPR to the addendum report. CRA recommends that the Glenview Heights Subdivision (INDOT 40-50) and the Finchland Subdivision (INDOT 54-79 and 131) are eligible for listing in the NRHP under Criterion A using the MPDF in accordance with the SHPO's determination. CRA does not recommend that the Finchland Subdivision (INDOT 54-79 and 131) is eligible for listing in the NRHP under Criterion B. CRA continues to recommend that the West End Historic District (IHSSI No. 043-446-08001-182) is ineligible for listing in the NRHP. CRA recommends that one individual property, INDOT 23, is eligible for listing in the NRHP.

The APE for the January 2022 HPR contained no properties listed in the NRHP. The APE contained four Indiana Historic Sites and Structures Inventory (IHSSI)-rated "outstanding" properties: the Frank and George Devol Double House (IHSSI No. 043-446-34246), the Horatio Devol House (IHSSI No. 043-446-34245), the Reyse (Roy[s]ce)-Friend House) (IHSSI No. 043-046-3420), and the James Carr House (IHSSI No. 043-046-34202). CRA recommended all four of these resources as being eligible for inclusion in the NRHP under Criterion C.

APPENDIX G: Vibration Discussion

1. VIBRATION

1.1 HIGHWAY TRAFFIC-INDUCED VIBRATION

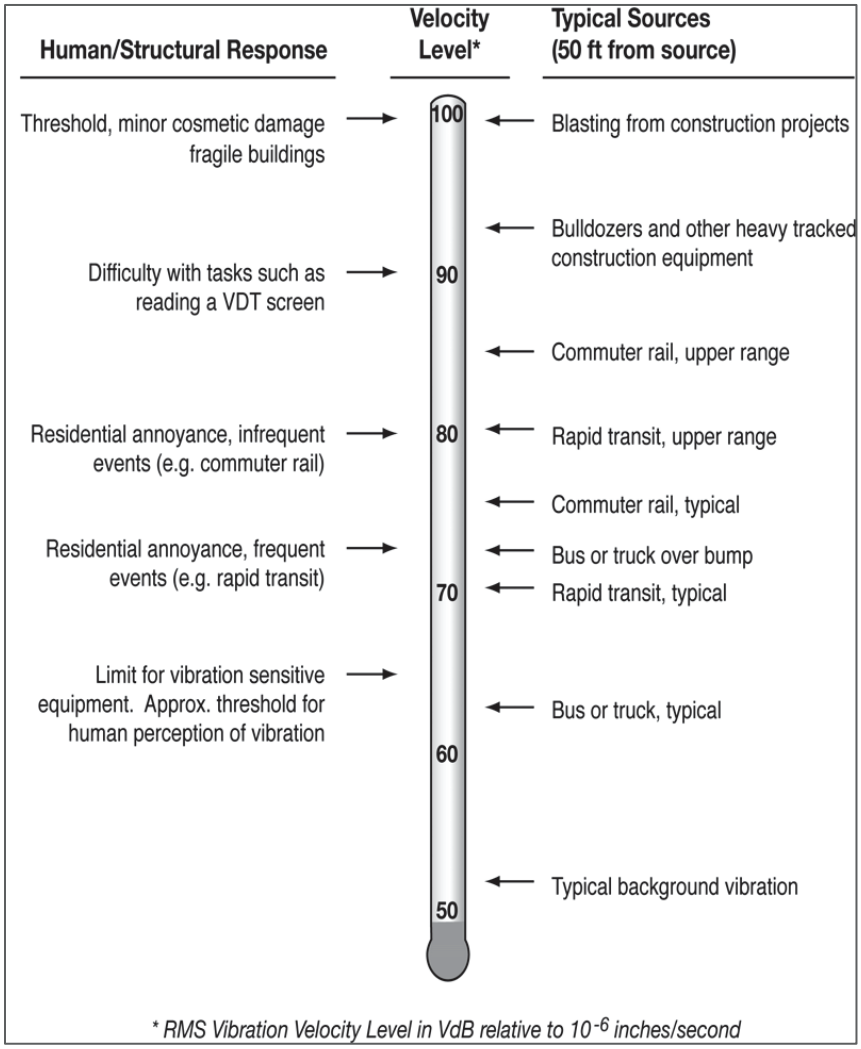
There are no Federal requirements directed specifically to highway traffic-induced vibration. Studies to assess the impact of highway traffic-induced vibrations have shown that both measured and predicted vibration levels are less than any known criteria for structural damage to buildings. In fact, normal living activities (e.g., closing doors, walking across floors, operating appliances) within a building have been shown to create greater levels of vibration than highway traffic.

The Federal Transit Administration (FTA) has published guidance for conducting vibration assessments associated with transit projects, including bus rapid transit projects, FTA's (2018) *Transit Noise and Vibration Impact Assessment Manual* (FTA Manual). This guidance was used as a technical reference for assessing potential effects to historic properties found within the I-64 Added Travel Lanes Project Area of Potential Effect (APE).

Because of their rubber tires and suspension systems, automobiles, trucks and buses do not typically generate enough ground-borne vibration to be a concern—except under specific situations, such as where there are pavement irregularities adjacent to sensitive locations. For most issues related to traffic-induced vibration, such as rattling of windows, the cause is typically generated by air-borne noise and directly related to roadway surface conditions such as potholes, bumps, expansion joints, or other discontinuities in the road surface. Air-borne noise occurs when energy is transmitted by air until it reaches a structural element, such as a building or window, and causes it to vibrate. Ground-borne vibration, on the other hand, occurs when energy is transmitted through the adjacent ground to create an oscillatory motion that can be described in terms of the displacement, velocity, or acceleration. Displacement, in the case of a vibrating floor, is the distance that a point on the floor moves away from its static position.

Vibration amplitudes are usually expressed as either peak particle velocity (PPV) or the root mean square (RMS) vibration velocity level. PPV is often used in the monitoring of construction vibration, such as blasting, since it is related to the stresses that are experienced by buildings. PPV is not considered the appropriate measurement for evaluating the human experience to vibration; RMS, which is expressed in vibration decibels (VdB), is a better measurement to evaluate the human response to vibration.

Figure 1, which is excerpted from the FTA Manual, illustrates common RMS vibration velocity levels expressed in VdB from vibration sources, as well as the human and structural response to them. Figure 1 presents typical levels of ground-borne vibration ranging from approximately 50 VdB (below perceptibility) to 100 VdB (the threshold of potential damage). Background vibration, which is usually around 50 VdB, is typically well below the threshold of human perception.



Source: FTA Manual (FTA 2018).

Figure 1. Typical levels of ground-borne vibration.

The I-64 Added Travel Lanes Project will improve the roadway surface and minimize irregularities which will reduce potential sources of highway traffic-induced vibration. This will

have a positive effect on the potential for highway traffic-induced vibration when compared to existing conditions.

No adverse effects to historic properties are anticipated from highway traffic-induced vibration.

1.2 Construction Vibration Impacts

Vibration impacts could occur in residential areas and at other vibration-sensitive land uses from activities associated with construction of the project, such as excavation, demolition, and vibratory compaction, as well as pile-driving at bridges, possible noise walls, and retaining walls. The potential for vibration impact would be greatest at locations near pile-driving for bridges and other structures, pavement demolition for removal, and vibratory compactor operations.

Vibration levels produced by construction equipment were obtained from the FTA Manual and are presented in Table 1. The construction equipment with the highest potential vibration level for roadway construction is the vibratory roller, and the highest potential vibration level for pile driving is with the impact pile driver.

Table 1. Vibration Source Levels for Construction Equipment.

Equipment		Peak Particle Velocity (PPV) at 25 ft. (in/sec)	Approximate RMS Vibration Velocity Value at 25 ft. (VdB)
Pile driver (impact)	Upper range	1.518	112
	Typical	0.644	104
Pile driver (sonic)	Upper range	0.734	105
	Typical	0.17	93
Vibratory roller		0.21	94
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: Table 7-4 from FTA Manual (FTA 2018).

Based on the typical vibration levels listed in Table 1, calculations were performed to determine distances at which construction vibration impacts would occur. The calculations were performed in accordance with the methodology found in Section 7.2 of the FTA Manual.

For buildings near pile-driving activities, construction vibration impact could extend to approximately 140 feet from the construction site for buildings extremely susceptible to vibration damage. For buildings near roadway construction activities, construction vibration impacts could extend to approximately 40 feet from the construction site[1].

As a conservative approach, historic districts and properties with structures within 140 feet of all interstate construction activities would have the potential for an adverse effect due to construction vibration. They are:

1. West End Historic District
2. Horatio Devol House
3. Frank & George Devol Double House
4. James Carr House
5. Rese (Roy(s)ce)-Friend House
6. House (INDOT 23)

[1] Distances were determined using Eq. 7-2 of the FTA Manual (FTA 2018), the PPV for Pile Driver (impact) and Vibratory Roller from Table 7-4, and the criteria for Buildings extremely susceptible to vibration damage in Table 7-5 (0.12 in/sec). Based on Eq. 7.2, the PPV will be less than 0.12 in/sec for each piece of equipment at 140 feet and 40 feet from the source, respectively.

7. Glenview Heights Subdivision
8. Finchland Subdivision

In order to avoid vibration impacts resulting from construction activities the contractor will be required to prepare a construction Vibration Monitoring and Control Plan. The plan will include the following key elements:

- Identifying buildings that are sensitive to vibration;
- Conducting pre-construction surveys of residences, historic buildings, and other vibration-sensitive structures in the project corridor to determine the appropriate vibration limits for the type of structure and conditions of the structure;
- Developing and implementing a vibration monitoring program for construction activities;
- Conducting post-construction surveys;
- Phasing construction activities that create vibration so that multiple sources of vibration do not occur at the same time;
- Prohibiting or limiting certain activities that create higher vibration levels during specific nighttime hours;
- Developing a method for responding to community complaints; and,
- Keeping the public informed of proposed construction schedules, and identifying activities known to be a source of vibration.

Maximum threshold values for historic properties that the contractor will be required to meet are included in Table 2. As previously discussed, peak particle velocity (PPV) is the appropriate measurement to evaluate the potential for building damage. Therefore, the threshold values presented in Table 2 are expressed in PPV. These values are identified in the FTA Manual as the thresholds above which building or structural damage could occur as the result of vibration during construction.

Table 2. Construction Vibration Thresholds (PPV).

Type of Structure	Ground-borne Vibration Impact Level (PPV)
Not Fragile (engineered concrete and masonry buildings (no plaster))	0.30 in/sec
Fragile (non-engineered timber and masonry buildings)	0.20 in/sec
Extremely Fragile (buildings, ruins, ancient monuments)	0.12 in/sec

Source: Table 7-5 Construction Vibration Damage Criteria Building/Structural Categories II, III, and IV, from FTA Manual (FTA 2018).

Because the contractor will be required to keep vibration levels under the values in Table 2, no adverse effects to historic properties are anticipated from construction-induced vibration.

1.3 Annoyance

In addition to potential physical impacts to structures, construction vibration can be annoying to people. Although temporary human annoyance to vibration would not constitute an adverse effect under Section 106, it is acknowledged that it could occur. Distances at which annoyance from construction vibration could occur were determined using the vibration annoyance criterion of 75 VdB for Category 3 (primarily daytime) land uses and frequent vibration events given in Table 6-3 of the FTA Manual (FTA 2018). For buildings near pile-driving activities, annoyance from construction vibration could extend to approximately 430 feet from the construction site. For buildings near roadway construction activities, annoyance from construction vibration could extend to approximately 110 feet from the construction site[2].

References:

Federal Transit Administration
2018 *Transit Noise and Vibration Impact Assessment Manual,* FTA Report No. 0123. U.S. Department of Transportation, Federal Transit Administration. Retrieved from chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf.

[2] Distances were determined using Eq. 7-3 in the FTA Manual (FTA 2018), the Lv for Pile Driver (impact) and Vibratory Roller from Table 7-4, and the criteria described in the paragraph (75 VdB). Based on Eq. 7-3, the Lv will be less than 75 VdB for each piece of equipment at these distances.