



INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

Design Memorandum No. 22-23

November 10, 2022

TO: All Design, Operations, and District Personnel, and Consultants

FROM: /s/ Louis Feagans
Louis Feagans
Statewide Technical Services Director
INDOT - Asset Management

SUBJECT: Engineering Assessment Manual Revisions

REVISES: INDOT's Engineering Assessment Manual September 2018, Sections 1-1.04, 3-2.0, 3-3.02(05), 3-3.03(02), 3-3.05(02), 3-3.05(05), 3-4.03(02), and 3-4.03(03) Figures 3-3A, 3-3B, and 3-4B

EFFECTIVE: Stage 1 Submittals on or after February 1, 2023

The INDOT Engineering Assessment Manual has been revised and approved.

New guidance was added to aid in determining when alternatives and crash analysis are required. In addition, all assets are to be checked for prior Emergency Relief permanent repairs, and hydraulic analysis requirements were also introduced for various project work types.

The maintenance of traffic plan was expanded to include identification of significant projects, construction staging, and work zone impacts/costs.

Other revisions were also introduced to expand guidance on developing cost estimates, asset history, field inspection checklist and scope addenda.

This manual applies as follows:

1. For active projects in the program, all projects that have not yet had a Stage 1 submission.
2. For the internal INDOT Asset Management Call Process, the FY28 Call.

The Engineering Assessment Manual is available from the INDOT Designers webpage, <https://www.in.gov/indot/2731.htm>, under the heading Engineering Assessment.

Please contact Paul South, psouth@indot.in.gov with any questions.

Engineering Assessment Manual Revision Overview

EA Section	Title	Revision
1-1.04	Definitions	Additional terms are defined.
3-2.0	Determine Engineering Assessment Level	Added “Work Type Scope Requirements” matrix to guide when an alternative analysis is needed and when a crash analysis is recommended.
3-3.02(05)	Asset History	New section. Note historical asset projects and check for previous emergency repairs.
3-3.03(02)	Hydraulic Analysis Requirements	New section. Defines hydraulic requirements for various project work types.
3-3.05(02)	Maintenance of Traffic Plan	Expanded to include identification of significant projects, construction staging, and work zone impacts/costs.
3-3.05(05)	Cost Estimate	Expanded guidance on developing cost estimates. Added a table for breaking out asset-specific costs.
3-4.01(02)	Existing Facility Information - Road / Safety / Mobility	Section removed and incorporated into 3-4.03(02) and 3-4.03(03)
3-4.01(03)	Existing Facility Information – Bridge / Culvert	Section removed and incorporated into 3-4.03(02) and 3-4.03(03)
Figure 3-3A	Field Inspection Checklist	Revised with more details/items
Figure 3-3B	Crash Analysis Format	New section for required crash data
Figure 3-4B	Engineer’s Report/Abbreviated Engineer’s Report Addendum Format	New section with details for addenda

Engineering Assessment Manual Revisions:

1-1.04 Definitions [Rev. Nov. 2022]

Asset Owner/Engineer. District staff within the Technical Services Division that are the asset leads for the following asset groups: Bridge / Roadway / Safety / Mobility.

Calendar year: the period of time of 12 months starting from the first of January of any given year.

Engineer. Individual responsible for conducting engineering assessment and developing documents for same. May be either an Asset Engineer or a Scoping Engineer.

INDOT Engineering Assessment SharePoint site. Available here:

<https://ingov.sharepoint.com/sites/INDOTEngineeringAssessment/>

Note that access to this site is done through requesting access; this is not managed through ITAP but through SharePoint directly. Access may also be requested through a District Scoping Manager.

IDM. [The Indiana Design Manual.](#)

Itemized Cost Estimate. A cost estimate is the summation of individual cost elements, using established methods and valid data, to estimate the future costs of a project, based on what is known at the time of scope development. The itemization is based on the known and assumed items of work that compose the bulk of the expected or anticipated project scope.

Preventive Maintenance (PM) Project: A project that is governed by the standards found in Chapter 56 of the IDM. Project work types that fall within this category are found in IDM Figures [602-1B](#), [602-1C](#), and Figure [412-1A](#).

TMP. Transportation Management Plan. A transportation management plan (TMP) is an overall strategy for accommodating traffic during construction. The TMP not only must address the alternatives confined to the project site, but it must also evaluate the impact traffic will have on the entire corridor. The TMP will address the proposed traffic-control plan, alternative traffic control applications, the effect traffic will have on other facilities, local concerns, cost effectiveness of various alternatives, etc. See IDM Section 503-2.0 in [Chapter 503](#) for greater detail regarding TMP documentation and process.

3-2.0 DETERMINE ENGINEERING ASSESSMENT LEVEL [REV. NOV. 2022]

Step	By Whom	Output
Engineering Assessment Determination	District Scoping Managers	<ul style="list-style-type: none"> Determine the level of engineering assessment required for each project Determination of responsible personnel to conduct engineering assessment and develop the required scoping document (i.e. INDOT or consultant, etc.)

Engineering Assessment Level	Criteria	Engineering Assessment Product
Non-Complex	<ul style="list-style-type: none"> Directed alternative; no alternative analysis required 	Abbreviated engineering assessment = Abbreviated Engineer's Report (AbbEngRpt)
Complex	<ul style="list-style-type: none"> No clear alternative: alternative analysis required Historic bridges Interchange access Safety analysis with no directed treatment Mobility analysis with no directed treatment 	Full engineering assessment = Full Engineer's Report (EngRpt)

WORK TYPE SCOPE REQUIREMENTS

Work Type	Alternative Analysis Required	Crash Analysis	Scope Document Recommended
ROAD			
HMA, PM Overlay	No	Recommended	AbbEngRpt
HMA, Minor Structural Overlay or HMA, Functional Overlay	No	Required (3R) Recommended (Partial 3R)	AbbEngRpt
HMA, Structural Overlay	No	Required (3R) Recommended (Partial 3R)	AbbEngRpt
PCCP Patching	No	Recommended	AbbEngRpt
Conc Pav't Restoration	No	Recommended	AbbEngRpt

Work Type	Alternative Analysis Required	Crash Analysis	Scope Document Recommended
Conc Pav't Preservation	No	Recommended	AbbEngRpt
Profiling, PCCP	No	Recommended	AbbEngRpt
Surface Treatments, all types	No	Recommended	AbbEngRpt
Shoulder Rehab & Repair	Maybe	Recommended	AbbEngRpt or EngRpt
Crack and Seat, all types	No	Recommended	AbbEngRpt
Rubblize	No	Recommended	EngRpt
Full-depth reclamation	No	Recommended	AbbEngRpt or EngRpt (5)
PCCP on PCCP Pav't	No	Required	EngRpt
Storm sewer repair/replace (4)	Yes	Not Recommended	EngRpt
Pump/lift station	Yes	Not Recommended	EngRpt
Pav't replacement, all types	Maybe	Required	AbbEngRpt or EngRpt (5)
Slide correction	Yes	Recommended	EngRpt
BRIDGE			
Bridge replacement, all types (2) (S)	Maybe (6)	Required	EngRpt
New bridge (2) (S)	Yes	Required	EngRpt
Bridge rehabilitation or repair (3) (S)	Maybe (6)	Recommended	AbbEngRpt
Bridge deck overlay (either type) (S)	No	Recommended	AbbEngRpt
Replace superstructure (2) (S)	No	Required	EngRpt
Replace deck (S)	No	Required	EngRpt
Bridge widening (2) (S)	No	Required	EngRpt
Bridge painting	No	Not Recommended	AbbEngRpt
Substr repair/rehabilitation (3) (S)	No	Recommended	AbbEngRpt
Bridge maintenance or repair (S)	No	Recommended	AbbEngRpt
Repair/replace joints (S)	No	Recommended	AbbEngRpt

Work Type	Alternative Analysis Required	Crash Analysis	Scope Document Recommended
Arch reconstruction / repair (S)	No	Recommended	AbbEngRpt
Small structure replacement (4) (S)	Maybe	Required	AbbEngRpt or EngRpt (5)
New small structure (4) (S)	Maybe	Required	AbbEngRpt or EngRpt (5)
Small structure pipe lining (4) (S)	Maybe	Recommended	AbbEngRpt or EngRpt (5)
Small culvert, all types (4) (S)	No	Recommended	AbbEngRpt
SAFETY			
Curve correction	Maybe	Required	AbbEngRpt or EngRpt
Sight correction, all types	Maybe	Required	AbbEngRpt or EngRpt
Signal modification	No	Recommended	AbbEngRpt
Intersection modification	Yes	Required	EngRpt
Access control revision	No	Recommended	AbbEngRpt
Added lane(s)	Maybe	Required	AbbEngRpt or EngRpt
Pedestrian improvements	No	Recommended	AbbEngRpt
Highway lighting	No	Recommended	AbbEngRpt
Barrier install (new or modernization)	No	Recommended	AbbEngRpt
Signs & marking projects	No	Recommended	AbbEngRpt
MOBILITY			
New interchange	Yes	Required	EngRpt
Interchange modification	Yes	Required	EngRpt
Add capacity	Yes	Required	EngRpt
Reduce capacity (road diet)	Yes	Required	EngRpt
Add travel lane (interstate)	Yes	Required	EngRpt
Add turn lane @ intersection	No	Required	AbbEngRpt

Notes:

- (1) The Engineer developing the scope document shall ensure that the 3R/Partial 3R determination for a project is valid per the IDM
- (2) Bridge replacement requires a structure, size and type (SS&T) report during design per IDM Chapter 14. Details relative to SS&T should not be explored during the engineering assessment of this type of project.
- (3) Rehabilitation work is non-complex minus rehabilitation on a historic structure.
- (4) Requires hydraulic analysis which should be done as part of the engineering assessment process

- (5) Given the nature of the particular project's context, the District Asset Engineer may direct a specific project alternative, thus eliminating the need for an EngRpt. The Scoping Engineer shall note the selection of a preferred alternative by the Asset Engineer in question within the scope document.
- (6) Rehabilitation or replacement of a historic structure does require an alternative analysis per the HBAA process (see Section 3-3.03).
- (S) The project is considered a spot improvement based on the work type. If the work type is not clear, District Asset Engineers may provide definition regarding a project being a spot or linear improvement.

Engineering judgement should be used to ensure that the project context is reviewed with each project's work type. Work type alone cannot dictate the level of engineering assessment required for an individual project.

Each project must have a type of engineer's assessment document completed prior to moving through the Department's Asset Management Project Prioritization Process.

3-3.02(05) Asset History [Rev. Nov. 2022]

Engineering Assessment Level: Both (Non-complex and Complex)

The asset history provides life cycle context to the proposed (recommended) alternative. For pavement and bridge assets, this information is available in the following locations:

- Road: [PK and Pavement Histories Reference](#), available through INDOT GIS.
- Bridge: BIAS, SPMS and District Bridge Asset Engineer
- Safety based histories may be available through the respective District Traffic Engineer.

For all assets, the Scoping Engineer shall check for previous Emergency Relief permanent repairs. For major pavement (Minor Structural or above) or bridge projects (Deck Replacement or above), check to see if there has been a previous permanent ER repair made within the project limits. ER projects are tracked in a GIS layer and can be viewed on INDOT's intranet site (link forthcoming).

If the project is found to have had a previous permanent ER repair, the Scoping Engineer shall consider alternatives that could prevent or limit the need for another such repair in a similar future event.

If the project is found to have had a previous permanent ER repair, the Scoping Engineer shall consider alternatives that could prevent or limit the need for another such repair in a similar future event.

3-3.05(02) Maintenance of Traffic Plan [Rev. Nov. 2022]

Engineering Assessment Level: Both (Non-complex and Complex)

The Maintenance of Traffic (MOT) Plan is an integral part of the project scope, and critical to the development of a cost estimate that accurately reflects the project's financial requirements. Do not defer selection of a conceptual maintenance of traffic plan until the design phase of the project, as the maintenance of traffic plan may add significant cost to a project. The Scoping Engineer shall ensure that the initial MOT plan considers and balances worker safety as well as IHCP minimum lane requirements (where applicable). In developing a project scope, the Scoping Engineer has the following requirements relative to the Maintenance of Traffic Plan:

Identify significant projects: The scope shall determine mobility significance per Chapter 503 and provide a statement to that effect in the engineering assessment document. The Scoping Engineer should document the project's mobility significance with the [Significant Work Zone Impact Determination Worksheet \(SWZIDW\)](#) and include that worksheet with the completed scope document .

Mobility Significant Project Statement:

"This project is considered a mobility significant project per IDM Section 503-2.02. The following is the temporary traffic control plan concept that may be used for the project:"

Not Mobility Significant Project Statement:

"This project is not considered a mobility significant project per IDM Section 503-2.02. The following is the temporary traffic control plan concept that may be used for the project:"

- **Identify construction staging approaches:** Analyze the options for maintenance of traffic during construction as outlined in IDM Chapter 503. The Scoping Engineer preparing the engineering assessment may choose to utilize the [Traffic Control Plan Checklist](#) to facilitate initial definition of the environment for the maintenance of traffic plan.

Where a series of proposed projects are along the same corridor or along corridors of close proximity, a single MOT plan covering all projects should be used. If circumstances prohibit a single MOT plan, the individual plans should be coordinated.

- **Assess / analyze expected work zone impacts:** There are projects where the maintenance of traffic plan may warrant an alternative analysis due to the impact of the plan on the overall scope of the project. The Scoping Engineer may be required to analyze multiple MOT alternatives to facilitate the best fit concept for the recommended project alternate that maintains a safe work environment as well as a concept that maximizes motorist safety. In some cases, the feasibility of the maintenance of traffic plan is the required alternative analysis for a project. This analysis, when done, shall be documented within the draft TMP or in the scope document for the project.
- **Develop preliminary cost estimates for work zone implementation:** The maintenance of traffic plan initially developed by the Scoping Engineer should be developed to the degree needed to facilitate cost estimation for the project.

The Designer should evaluate the maintenance of traffic concept provided in the engineering assessment document to ensure relevance and completeness prior to developing the final maintenance of traffic plan.

3-3.05(05) Cost Estimate [Rev. Nov. 2022]

Engineering Assessment Level: Both (Non-complex and Complex)

The estimating process, during engineering assessment, includes determining the costs associated with all phases of a candidate project. The development of a complete and reasonable estimate is critical to a successful project scoping package and facilitates the project selection process. The estimate developed, as part of the engineering assessment process, is used to program the funding of the design, Right of Way (ROW) and construction for the project.

For non-complex engineering assessments, cost estimates should be developed for the directed alternative. For complex engineering assessments, cost estimates are required for all alternatives under consideration. The cost estimate should be for the current year only. Document all assumptions and generally round cost items to \$10,000 to avoid the false impression of precision.

A reasonable amount of contingency should be included to account for the unknowns that may arise during the detailed design of the project. Contingency values account for change in conditions, standards, specifications and policy implementations that occur between the time the project is scoped and time of construction, as well as other minor work items not easily estimated at the time of scoping.

The following are the cost estimating requirements / guidelines:

- Itemized cost estimates are required for all project of the following types:
 - Roadway, rehabilitation through reconstruction
 - ADA upgrades
 - Safety
 - Mobility
 - Large culvert/small structure (spans from 48" through 20'), all types
 - Bridge deck overlay
 - Small culvert

- Non-itemized cost estimates may be developed by INDOT staff for bridge work not listed above.
- Cost estimates may have up to a 20% contingency as part of the estimate
- Unit prices for cost estimates shall be based on historical bid prices, restricted to the past three years of data, specific to the District
- HMA pay item cost histories are restricted to the past two years of data only due to industry fluctuations, specific to the District
- Where bid history for a unit price is not available for a specific District, additional Districts' histories may be used to facilitate development of a unit cost
- Cost estimate must include significant MOT items (temporary concrete barrier, crossovers, etc)

3-4.03(02) Project Location [Rev. Nov. 2022]

Example:

This project is located on SR 18, 2.45 miles west of US 41 at reference post 5+27 in Benton County. The GPS coordinates are 40°37'19.0" North and 87°25'38.9" West. The project is in the Indiana Department of Transportation's Crawfordsville District, West Lafayette Sub-District. This location is in a rural planning organization region, the Kankakee-Iroquois Regional Planning Commission.

Road / Safety / Mobility

<i>Pavt Section ID (PK):</i>		<i>From RP+Offset</i>	
<i>Route:</i>		<i>To RP+Offset</i>	
<i>Location:</i>		<i>State Log Mile From</i>	
		<i>State Log Mile To</i>	

<i>District:</i>				
<i>Subdistrict:</i>			<i>Pavement Area:</i>	
<i>County:</i>			<i>Underdrains?</i>	
<i>Project Length:</i>			<i>Curbs Present?</i>	
<i># Through Lanes:</i>			<i>ADA Deficiencies?</i>	
<i># Lane Miles:</i>			<i>Small Culverts?</i>	

Bridge / Culvert

<i>Str Number:</i>		<i>RP+Offset:</i>	<i>0+0.0</i>
<i>Route:</i>	<i>SR17</i>	<i>Year Built:</i>	<i>xxxx</i>
<i>Location:</i>	<i>From SR 25 to 1.30 mi N of SR 25 (Northern Ave), City of Logansport</i>	<i>Last Rehab:</i>	<i>yyyy</i>

<i>District:</i>	
<i>Subdistrict:</i>	
<i>County:</i>	

3-4.03(03) Existing Facility Information [Rev. Nov. 2022]

All Projects

Basic Design Elements	
<i>Functional Class</i>	<i>Interstate</i>
<i>Posted Speed</i>	<i>70 mph</i>
<i>Member Road Systems</i>	<i>On NHS</i>
	<i>On National Truck Network</i>

Basic Geometric Criteria	
<i>Design Speed</i>	<i>55 mph</i>
<i>Design Criteria</i>	<i>Partial 3R (Non-Freeway)</i>
<i>IDM Figure Reference</i>	<i>Fig 56-4E/F</i>
<i>Terrain</i>	<i>Level</i>
<i>Rural/Urban</i>	<i>Rural</i>
<i>Access Control</i>	<i>None</i>

1. Asset History: Road / Safety / Mobility

<u>Year</u>	<u>Project Type</u>	<u>Contract #</u>	<u>Work Type</u>
2019	Minor Treatment	Maint	Crack Seal
2015	Surface Treatment	Maint	Chip Seal
2006	Resurface	RS27576	HMA Overlay, Minor Str
1989	Resurface	RS18045	Resurface (Non 3R)

2. Asset History: Bridge / Culvert

Project Type	Year	Work Type
Built	2012	
Rehab	2016	
Rehab	2026	
Rehab	2034	

3. Road / Safety / Mobility

Approach Cross Section			
<i>IDM Figure Reference</i>	<i>IDM Fig 56-4C/E/F</i>		
<i>Travel Lane Count</i>	<i>2</i>	<i>Travel Lane Width</i>	<i>12' (existing)</i> <i>12' (proposed)</i>
<i>Shoulder Width (Usable)</i>	<i>None (curbed)</i>	<i>Shoulder Width (Paved)</i>	<i>None (curbed)</i>
<i>Mainline Pavement</i>	<i>HMA on Conc</i>	<i>Shoulder Pavement</i>	<i>None (curbed)</i>
Alignment			
<i>Horizontal</i>	<i>Tangent</i>	<i>Vertical</i>	<i>Straight grade (exist)</i>

- Pavement History:
 - a. Project History: Last functional project / last structural project
 - b. Maintenance History: Last major treatment / last minor treatment
- Condition Data: ((Add DBA data requirements))

4. Bridge / Culvert

Please note that the following information is integrated into INDOT's online GIS application "INDOT Project Scope" and will automatically populate in that application.

Bridge

Structure Number:	<u>I94-21-02188 CEBL</u>
NBI Number:	049020
Feature Intersected:	US 20, Willow Creek, & CSX RR
Historic Structure:	No
Last Inspection Date:	4/10/2018
Surface Type:	
Deck Width (o-o Copings):	
Str Length (o-o Br Floor):	
Deck Area:	55,544 sft
Skew Angle:	40°
Superstructure Type:	4 - Steel continuous
# Spans:	
Span Length(s):	
Approach Rd Width:	63 ft
Lanes Carried (over):	3
Inventory Rating:	38 Tons
Operating Rating:	64 Tons
Unofficial Sufficiency Rating:	89.7

Structure Inspection Observations: STR NO

Deck	7	Some transverse cracking visible underneath in areas without deck pans
Wearing Surface	7	
Superstructure	8	Beam repairs performed in 2006 & 2014. Some surface rust present
Substructure	7	Pedestals have been replaced. No cracking noticed in the new pedestals. Some beam seat pedestal corners are cracked and some are spalled.
Channel Protection	8	A-jacks scour countermeasures installed along stream bank

3-3A Field Inspection Checklist [Rev. Nov. 2022]

Note this is available as a stand-alone document upon request from a District Scoping Manager.

Project Location

Location: _____

Work Type: _____

Design Speed _____ *mph* *Posted Speed* _____ *mph*

Initial Investigation

- Review existing plans, previous studies, or reports (including previous assessments completed) (note or collect old plans in project folder)
- Review traffic data
- Review crash data (if required); will further crash analysis be required?
- Identify apparent deficiencies / needs from Asset Engineer(s)

- Identify apparent functional, structural, hydraulic, geometric, or safety deficiencies
- Review other projects in the area: possible project bundling?
- Review other projects in the area (INDOT and LPA): possible MOT conflicts?

- Determine functional classification
- Determine NHS & National Truck Network status
- Determine if the project is located in a flood plain, karst area or other designated sensitive region

Field Investigation / Assessment Review

*Photos: include photos of existing conditions (pavement, culverts, bridge items, etc). **Photo critical features***

Person(s) Attending Field Review / conducting assessment review:

Virtual or in field assessment?: _____

Verify project purpose and need:

Existing Infrastructure Conditions

General Conditions:

Check reasonableness of project termini: _____

Identify potential constructability issues & solutions: _____

Identify traffic generators (e.g., schools, residential, industrial, commercial developments): _____

Note land use (e.g., residential, commercial, industrial, agricultural, woodland, wetland, and existing drive locations): _____

Access control type: _____

Evaluate and note condition (state of repair) and presence (or lack thereof) of existing infrastructure (pavement, bridge, small structure, drainage appurtenances, traffic control devices, etc). If no infrastructure items exist within project limits please note. Identify any existing sub-standard infrastructure

Pavement, mainline:

Pavement, shoulder:

Pavement, other:

Curb & gutter:

Guardrail (note height to top of rail):

Turn lanes:

Interchange ramps:

PTR/WIM stations:

Sheet signs:

Panel signs:

Sidewalk:

Sidewalk ramps:

Assessment of pedestrian / non-motorized traffic / ADA concerns:

Bridge / Large Culvert

Existing condition notes (note if work will be required underneath the bridge)

Roadway over/under:

Stream/river under:

Deck:

Deck joints:

Deck drains:

Railing:

Beams:

Paint:

Terminal joints:

Abutments:

RCBAs:

Slope wall:

Approach guardrail (note height to top of rail):

Field entrances in any quadrant adjacent/near bridge:

Scour issues or concerns:

Can the underside of the structure be accessed by construction vehicles?

Drainage

Existing condition notes

Existing drainage patterns and features:

Municipal storm sewer:

Slope stability concerns / settlement areas:

Traffic Control

Identify traffic control (e.g., signals, flashing beacons, two-way and four-way stop, railroad crossing protection)

Traffic Control – Signals

Not Applicable?

Intersection

Type

Ped Signals?

Ped Push
Buttons?

Traffic Loops?

Environmental

Validate possible impacts to significant features including:

- Historical structures:
- Archeological sites:
- Cemeteries:
- Churches:
- Hospitals:
- Fire Stations:
- Police Stations:
- Schools:
- Parks / playgrounds:
- Wetlands:
- Private septic systems:
- Private or public wells:

Will tree clearing be required?:

Are there bats present, and how does that impact any tree clearing?:

Potential environmental commitment issues?:

Utilities

Does INDOT have ITS facilities within the project?:

Identify any overhead or underground utility markers:

Identify street lighting and its ownership, and if relocation is required:

Right-of-Way

Identify ROW that may require acquisition:

Identify ROW that may require re-acquisition:

Railroad

Identify active or abandoned railroads:

Identify locations for potential Near Terminus actions (upgrading RR crossing safety devices) within project:

3-3B Crash Analysis Format [Rev. Nov. 2022]

Note this is available as a stand-alone document upon request from a District Scoping Manager.

Crash data was reviewed as part of this assessment and a RoadHAT analysis was prepared. A total of xx recorded crashes took place within the project limits during the three-year crash study period (20aa through 20bb). The following tables summarize the number and types of crashes, as well as the RoadHAT results.

Crash History

Icc		Number of Crashes	
Icf		Number of Fatal and Incapacitating Crashes	
First Year of Crash Data		Number of Non-Incapacitating Crashes	
Last Year of Crash Data		Number of Property Damage Only Crashes	

Crash Patterns: Manner of Collision

Manner of Collision	Number	Percent
Backing Crash	X (Y)	
Collision With Animal (Including Deer) *	X (Y)	
Collision With Object in Road	X (Y)	
Head On (Between Motor Vehicles)	X (Y)	
Left Turn, Right Turn or Angle	X (Y)	
Opposite Direction Sideswipe	X (Y)	
Ran Off Road	X (Y)	
Rear End	X (Y)	
Same Direction Sideswipe	X (Y)	
Other	X (Y)	
Total	X (Y)	

X (Y): X indicates the number of crash type

Y indicates those resulting in injury

*In almost all cases, deer crashes and other animal crashes should be removed from the analysis completely prior to completing the RoadHAT report.

The top two tables shall be included in the Crash Analysis section of the scope document (AbbEngRpt or EngRpt). Include a summary analysis of the analysis as well as recommendations based on the analysis' findings.

Example:

The RoadHAT analysis resulted in an Index of Crash Frequency (ICF) of 1.26 and an Index of Crash Cost (ICC) of 3.13. This analysis indicates that this road section is not performing as expected and that the number of crashes significantly exceeds the expected number of crashes for this type of roadway. The high value of the ICC indicates that the crash severity is higher than should be expected for this type of roadway. Based on the existing crash patterns, this report will focus alternative development to integrate crash mitigation treatments that will facilitate reduction of the rear end, right angle, and sideswipe crash types. The following crash mitigation treatments were reviewed to improve the overall safety of the corridor:

- *Install a Two-way Left Turn Lane (TWLTL)*
- *Pave deteriorated shoulder (8ft)*
- *Install centerline rumble strips*
- *Install edge line rumble strips*

Crash Pattern Analysis

Pavement Condition Percentages

Type	Number	Percent	Standard Value* Comparison:
On Snowy or Icy Pavement			11.18%
On Wet Pavement			15.49%
On Dry Pavement			73.17%
On Other Condition Pavement			0.16%

*Standard values are based on 2014-2018 data for all state-owned facilities. Standard values are included for comparison purposes only.

Lighting Condition Percentages

Type	Number	Percent	Standard Value* Comparison:
Dark (Lighted or Unlighted)			32.76%
Dawn/Dusk			5.49%
Daylight			61.66%
Other			0.10%

*Standard values are based on 2014-2018 data for all state-owned facilities. Standard values are included for comparison purposes only.

Weather Condition Percentages

Type	Number	Percent	Standard Value* Comparison:
Clear			62.39%
Cloudy			18.33%
Fog (Or Smoke or Smog)			0.68%
Rain			9.79%
Snow or Sleet			6.41%
Blowing Material			2.13%
Severe Cross Winds			0.26%

*Standard values are based on 2014-2018 data for all state-owned facilities. Standard values are included for comparison purposes only.

The RoadHAT output, crash statistics summary and crash diagrams shall be included as attachments to this report appendix.

3-4B Engineer's Report / Abbreviated Engineer's Report Addendum Format [Rev. Nov. 2022]

Note this is available as a stand-alone document upon request from a District Scoping Manager.

The following is the addendum format required to document and approve scope revisions:

**ADDENDUM No. [#]
TO (ABBREVIATED) ENGINEER'S REPORT**

Project Number: [Des#]
Route / Feature [INDOT Road] [over/under] [Feature Crossed]
Crossed:
Project Location: [SPMS Project Location Description]
Date: [Document date]

ADDENDUM JUSTIFICATION:

[Provide a brief reason and/or justification for addendum.]

REVISION TO ORIGINAL SCOPE DOCUMENT:

The (Abbreviated) Engineer's Report is being revised as follows:

Any sections of the original report that are being revised shall be shown in this section. For example, if the project scope is changing from a HMA PM overlay to a Minor Structural overlay, the revision of the "Recommended Alternative" section of the report will be placed herein complete as a revised section. If a section is not changing, it does not need to be placed in this document. This addendum document will be attached to the front of the original scope document to show the revision history for the scope of a project.

Attach any documents that support the addendum (pavement design memo, etc).

The questions below must remain; remove statements below questions that are not required.

Does the revision change the project's Purpose & Need statement? Yes No

[Insert revised Purpose & Need statement here]

Does the revision change the project's recommended alternative? Yes No

[Insert revised recommended alternative statement here]

Does the revision change the project's cost estimate? Yes No

Remove table below if cost is not revised; state in the comments section if there is no change to a specific portion of project cost. For example, the CN cost may increase without changing the ROW requirements or railroad costs.

<i>Estimated Total Project Costs</i>	<i>Revised Amount</i>	<i>Original Amount</i>
Right of Way Purchase		
Right of Way Services		
Preliminary Engineering		
Railroad PE		
Railroad CN		
Utilities PE (UT1)		
Utilities CE (UT2)		
Construction Total:		
Construction Engineering (CE)		
Other Considerations		
TOTAL:		

Does the revision change the project's environmental impacts? Yes No

Remove table below if there are no revisions to the project's environmental impacts due to the proposed addendum.

	<i>Description</i>	<i>Notes</i>
<input type="checkbox"/>	Additional coordination with resource agencies	
<input type="checkbox"/>	Red Flag/HAZMAT revisions	
<input type="checkbox"/>	Section 106/4F/6F/Archaeology	
<input type="checkbox"/>	Waters Report Update	
<input type="checkbox"/>	Change to public involvement requirements	
PCE	CE type revision	

Does the revision require additional Right-of-Way? Yes No

[Summarize the revised Right-of-Way needs]

Does the revision change the project's schedule (design or construction)? Yes No

[Provide revised project schedule]

Does the revision require additional coordination with utility companies? Yes No

[Provide revised project schedule]

ADDENDUM CONCURRENCE

This document was prepared by:

_____ [Date]
[Name]
[Title]

Reviewed by:
Scope Manager Review

_____ [Date]
[Name]
[Title]

Reviewed by:
Asset Engineer Review

_____ [Date]
[Name]
[Title]

Approved by:
System Asset Manager Review

_____ [Date]
[Name]
Systems Asset Manager, [District]