ENGINEERING ASSESSMENT

US 41 at Hillsdale Road Intersection Improvements

Vanderburgh County
Des. No. 1400005

August 21, 2019

Prepared for:	**INDOT Vincennes District** **3650 Old US Hwy 41** **Vincennes, IN 47591**
Project Manager:	**Mr. Matthew Bullock** **(812) 830-9683** **MBullock1@indot.in.gov**

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Purpose of Report:

The purpose of this report is to document the engineering assessment phase of project development.

Project Location:

The Hillsdale Road intersection is located at RP 11.07 along US 41 in Vanderburgh County, situated at the southeast corner of the Town of Darmstadt. The project intersection lies within the Evansville MPO urbanized boundary.

Purpose and Need:

The existing intersection experiences a crash history that merits an evaluation of causes and applicable countermeasures. Traffic growth over a period of years has contributed to the safety concerns for vehicles entering US 41 from Hillsdale Road. This Engineering Assessment examines alternative intersection treatments that will improve the traffic operations and improve the overall safety performance of this intersection.

Existing Facility:

US 41 is classified as a Principal Arterial - Other on the National Highway System (NHS). The area surrounding the intersection is rural/suburban. US 41 is a 4-lane divided highway with a 60 MPH posted speed limit. The pavement material is asphalt. There is a single left turn lane for each NB and SB US 41. The lane widths are 12 feet. There are 10-foot paved shoulders along the outside travel lanes and 4-foot paved shoulders along the median edges. The median width is 64 feet as measured between the inside thru lanes. The width of the paved median surface as measured longitudinally along the US 41 centerline is 38 feet. The terrain is generally level.

Hillsdale Road is an east-west, two-lane local roadway with a posted speed limit of 45 MPH. The Hillsdale Road approaches have no auxiliary lanes. The existing roadway width is approximately 20 feet. Hillsdale Road connects two north-south local collector roadways; Browning Road (approximately one mile east) and Old State Road (approximately 0.3 mile west).

A single set of CSX railroad track is approximately parallel to US 41, situated approximately 135 feet west of the US 41 centerline. There is 2-lane bridge carrying Hilldale Road over Little Pigeon Creek whose west abutment is approximately 160 feet east of the US 41 centerline.

The traffic volumes along US 41 are significantly higher than those along Hillsdale Road (approximately 90% vs. 10%.) Commercial truck volume is approximately 13% along

US 41.

Existing Land Use:

The land uses adjoining the US 41 / Hillsdale Road intersection are residential, commercial and agricultural.

Existing Drainage:

Little Pigeon Creek crosses under US 41 approximately 1,045 feet north of Hillsdale Road (60” x 48” RC box culvert) and crosses under Hillsdale Road approximately 200 feet east of the US 41 centerline (bridge). A tributary of Little Pigeon Creek crosses under US 41 approximately 1,590 feet south of Hillsdale Road.

The existing roadside drainage along US 41 is conveyed in ditches and pipes into Little Pigeon Creek or its tributaries.

Existing Utilities:

Several underground utilities and overhead electric distribution and located within the project area. An electric substation is located at the southwest quadrant of the intersection, approximately 225 feet west of the US 41 centerline.

The following utilities cross US 41 relative to the Hillsdale Road centerline:

- 4 each fiber optic cable (approximately 20 feet south)
- Water pipe (approximately 55 feet south)
- Electric (overhead) (approximately 25’ north)
- Sanitary sewer pipe (approximately 120 feet north)

The following utilities are under Hillsdale Road relative to the US 41 centerline:

- Fiber optic cable (approximately 100 feet west)
- Fiber optic cable (approximately 150 feet west)
- Water pipe (approximately 210 feet west)
- Fiber optic cable (approximately 250 feet west)
- Sanitary sewer pipe (approximately 90 feet east)
- Fiber optic cable (approximately 100 feet west)
- Fiber optic cable (approximately 150 feet west)
- Fiber optic cable (approximately 290 feet east)

The following utilities parallel US 41:

- Sanitary sewer pipe (approximately 80’ east)

- Water pipe (south of Hillsdale Road) (approximately 85 feet east)

The following utilities parallel Hillsdale Road west of US 41:
- Fiber optic cable (approximately 20 feet north)
- Fiber optic cable (approximately 13 feet north)
- Water pipe (approximately 10 to 14 feet south)
- 3 each fiber optic cable (approximately 18 to 26 feet south)

The following utilities parallel Hillsdale Road east of US 41:
- Fiber optic cable (approximately 15 feet south)
- Water pipe (approximately 18 feet south)
- 3 each fiber optic cable (approach) (approximately 22 feet south)
- Gas (at Walnut Road and east) (approximately 17’ north)
- Electric (overhead) (both sides)

Field Check:

A field check was held December 2, 2015 with the minutes provided in the appendices.

Coordination:

A conference call meeting was held on was held December 18, 2018. The minutes of this meeting are provided in the appendices.

Previous Studies:

A Corridor Study was completed in 2018 that examined the traffic operations for a large segment of the US 41 corridor. The project intersection is included in that study. The Corridor Study recommends that the Hillsdale Road intersection be converted to a J-Turn intersection with the west approach closed. The Corridor Study also recommends that the close-by intersections of Radio Avenue (0.25 mi north) and Old State Road/Campbell Road (0.50 mile north) be modified. The recommended modification for Radio Avenue is closure and the recommended modification for Old State Road/Campbell Road is a J-Turn with the east approach closed and Old State Road north of Campbell Road realigned to intersect Campbell Road.

This assessment has taken the recommendations of the 2018 Corridor Study under consideration and has examined the traffic redistribution effects with the Hillsdale Road intersection improvements.

A Mini-Scope that was completed by INDOT in 2013 is included in the appendices.

Traffic Analysis:

Traffic count data was obtained at all intersections within the area bordered by Hillsdale Road, Old State Road, Campbell Road and Walnut Road. This area encompasses the traffic network for considering local redistribution for various intersection modification scenarios. The obtained traffic data was provided by INDOT for all intersections within the study area.

An analysis of the network was conducted to determine the impact of redistributed traffic on the intersections (1) when converting the Radio Avenue intersection to a right-in / right-out configuration and; (2) when converting the west leg of Hillsdale Road to a right-in / right-out configuration.

The existing local road network north of Hillsdale Road and east of US 41 (Radio Avenue, Walnut Road and Campbell Road) consists of low volume streets serving primarily low-density residential properties. Old State Road is a north-south major collector roadway. Hillsdale Road is an east-west local road linking Old State Road (major collector) and Browning Road (major collector). Wortman Road is an east-west local road linking Darmstadt Road (minor arterial) and Old State Road (major collector).

The general findings of the network analysis is that (1) converting the Radio Avenue intersection at US 41 to a right-in / right-out configuration will have no significant impact on the local street intersections and; (2) reconfiguring the west leg of the Hillsdale Road intersection to a right-in / right out access and not providing a south median U-turn (MUT) at US 41 will exacerbate the operational deficiencies at the Old State Road/Campbell Road intersection at US 41.

Intersection Alternatives

A Two-Way Stop-Controlled (TWSC) (existing), conventional traffic signal, J-Turn and R-Cut alternatives were examined for traffic operations. The general findings are a conventional traffic signal, J-Turn and R-Cut intersections will significantly outperform the TWSC configuration and the J-Turn intersection significantly outperforms the traffic signal alternatives. A summary table of intersection traffic operation performance is included in the appendices.

Crash Data and Analysis:

Crash data was obtained for the period extending from January 2016 through December 2018. The crash data was gleaned to include only those crashes that occurred within the limits of the Hillsdale Road intersection. This data was then used to determine crash index values using RoadHAT. The cataloged crash data is included in the appendices. The following table summarizes the severity of crashes at the Hillsdale Road / US 41 intersection:

Crash Severity	2016	2017	2018	Total
Property Damage	2	4	3	9
Non-Incapacitating Injury	0	1	0	1
Incapacitating Injury	0	2	3	5
Fatal	1	0	0	1
Totals	**3**	**7**	**6**	**16**

In reviewing the RoadHAT report, these are important factors:

<u>Index of Crash Frequency:</u>

The index of crash frequency (I_{CF}) measures the difference between expected and reported number of crashes divided by the standard deviation of the difference estimate. For example, I_{CF} = 2 indicates that the number of crashes exceeds the expected number of crashes for that location by two standard deviations.

<u>Index of Crash Cost:</u>

The index of crash cost (I_{CC}) measures the difference between expected and estimated crash cost at the location divided by the standard deviation of the difference. For example, I_{CC} = 2 implies that the crash cost at the location exceeds the expected crash cost for that location by two standard deviations. This method uses crash cost to incorporate severity.

The Index of Crash Frequency was found to be 2.58. The Index of Crash Cost was determined to be 2.56.

According to the Traffic Engineering Handbook, 6th Edition, potential factors in Right-Angle Crashes include restricted sight distance, excessive speed, inadequate roadway lighting, inadequate advance warning signs, large traffic volumes, and inadequate traffic control devices. Countermeasures to address these accidents include removal of the sight obstruction, provide all-way stop or signal, install or improve warning signs, reduce speed limit with enforcement, install rumble strips, install or improve lighting, install or improve warning signs, or reroute traffic.

Left & right turn crashes can be caused by large turn volumes, restricted sight distance, and excessive speed. Possible countermeasures include adding turn lanes, prohibiting left turns, rerouting left turn traffic, providing a traffic signal with a turn phase, removing sight obstructions, reducing the speed limit and improving enforcement.

Rear end crashes can be caused by large turning volumes, slippery pavement, or inadequate roadway lighting. Potential countermeasures include prohibiting left turns, provide turn lanes, increasing the corner radius for right turns, reducing the speed limit with enforcement, overlaying the pavement or use an ultra-thin bonded wearing course, provide adequate drainage, groove the pavement, provide "Slippery When Wet" signs, and improve the lighting.

The findings of the crash analysis indicate that the most frequent accident type is right angle collisions (56%) followed by left turn collisions (19%). With 75% of the intersection collision involving cross-traffic conflicts, the most likely factor leading to crashes is traffic volume.

Alternatives:

No-Build

The current performance of the existing two-way stop intersection indicates that an improvement to this intersection is desirable both on a safety basis and a level-of-service basis. This alternative is not recommended because it will perpetuate these undesirable measures.

Slotted Turn Lanes

This alternative was considered to improve visibility for left-turning vehicles on US 41 prior to initiating the turn maneuver. This alternative would not provide the desired safety improvements for vehicles entering US 41 from Hillsdale Road.

Traffic Signal (Conventional)

Installing a conventional traffic signal will provide improved safety performance for turning movements, however the highest percentage (approximately 90%) of intersection traffic is the through movement along US 41. The delay introduced to the northbound and southbound through movements would negatively impact corridor mobility by introducing intersection delay for the through movements.

If implemented, the Hillsdale Road approaches would require a significant amount of reconstruction in order to accommodate left turn lanes for eastbound and westbound traffic entering US 41. It is estimated the construction cost for this alternative would be $2 million to reconstruct 500 feet of both the east and west approaches in order to accommodate EB and WB left turn lanes, construct SB and NB right-turn lanes, install the new traffic signal, remove the reverse crown along the outside SB lane and reconstruct the median opening. The east approach bridge over Little Pigeon Creek would need to be widened to accommodate the added lane. The profile grade along the west approach would have to be raised to improve the stopping sight distance and the sharp vertical breaks at the railroad crossing would need to be removed for continuous travel under a green light condition. There would be significant right-of-way impacts and utility impacts associated with the alternative.

A CFM countermeasure value of 0.23 (77% reduction) applies to the angle crash category when converting a stop-controlled intersection to a signal-controlled intersection as published in the Crash Modifications Factors Clearinghouse. However, it may be expected that rear-end crashes will increase as indicated by a CFM countermeasure value of 1.58 (58% increase). The high speeds, high traffic volume and significant volume of commercial trucks (approximately 13%) make this alternative less desirable.

This alternative is not recommended because similar angle crash reduction benefits can be attained by other alternative treatments without increasing rear-end crashes while not significantly restricting the mobility for through traffic along US 41.

Traffic Signal (R-Cut - partial)
An R-Cut intersection was considered as an alternative treatment to a conventional traffic signal installation. Traffic signals at the median U-turns were examined with no traffic signal at the main intersection for US 41 left turns onto Hillsdale Road due to their low volumes.

The WB movement for 2020 AM traffic was used to test the R-Cut signal and compare to the conventional signal performance. This directional movement was chosen because it is the critical conflict movement for both AM and PM volumes. It was found that there would be no performance benefit to a R-Cut traffic signal as compared to a conventional signal for this specific project. The R-Cut alternative is not recommended because it does not exceed the performance of a conventional traffic signal installation.

J-Turn RECOMMENDED
Converting the existing intersection to a J-Turn configuration will improve the safety performance while maintaining corridor mobility. A CFM countermeasure value of 0.20 (80% reduction) applies to the angle crash category as published in the Crash Modifications Factors Clearinghouse. The predicted reduction in angle crashes and the low impact on corridor mobility meet the desired objectives of this project.

The J-Turn will add additional travel time for the eastbound and westbound traffic movements as compared to a conventional traffic signal. The added travel time is estimated to be approximately two minutes.

This alternative is recommended to advance to project development and ultimately to implementation.

J-Turn with West Approach Right-in/Right-out & No South Median U-Turn (MUT)
Converting the existing intersection to a J-Turn configuration with right-in / right-out access will provide similar safety and operation benefits as the full J-turn intersection. Eliminating the south MUT alternative was considered in combination with the restricted access at the west approach. The directional movements that would be eliminated are the eastbound left turn, the eastbound through and the northbound left turn.

This alternative is not recommended because it would be disruptive to the local road network and it would direct additional traffic to the Old State Road / US 41 intersection. The Old State Road / US 41 west approach currently operates at a level of service F. Adding a dedicated left turn lane at this approach was tested and was found to not improve the west approach level of service.

Roundabout
Installing a multi-lane roundabout would provide improved intersection safety but would have a negative impact on US 41 mobility. The approaches along Hillsdale Road would require significant reconstruction to attain adequate entry geometrics and sight lines.

Roundabouts provide safety benefits in several ways. Many potential vehicle conflict points are eliminated, crash severity potential is significantly reduced by nearly eliminating right-angle conflicts and reducing speeds through the intersection. A CFM countermeasure value of 0.17 (83% reduction) applies to the angle crash category as published in the Crash Modifications Factors Clearinghouse

The US 41 traffic volumes represent approximately 90% of the traffic through the Hillsdale Road intersection. Reducing operating speeds for all vehicles to accommodate Hillsdale Road traffic is inefficient from a traffic operations perspective. The appreciable truck volumes (approximately 13%) along US 41 would exacerbate those inefficiencies.

The construction cost for a multi-lane roundabout at this location is estimated to be approximately $3 million. Approach work on Hillsdale Road would require grade modifications to the west leg and a bridge reconstruction on the east leg. This alternative was rejected because similar safety benefits can be attained by implementing a J-turn intersection while not significantly impacting the mobility for through traffic along US 41.

Interchange
Constructing a new interchange at this location would provide improved safety while limiting the impact on US 41 corridor mobility. However, the cost and impacts associated with this type of intersection improvement would be of the highest magnitude as compared to the alternatives. Construction cost for a standard diamond configuration would be approximately $18 million, and the property and environmental impacts would be significant. This alternative was rejected due to the high costs and impacts.

Grade Separation on New Alignment
This alternative examined a realignment of Hillsdale Road with bridge structures spanning over US 41, the CSX railroad and Little Pigeon Creek. Connector roadways would be built off the realigned roadway to the existing Hillsdale Road to maintain local access to US 41. The existing Hillsdale Road intersection would be converted to right-in right-out access at US 41. This alternative would cost approximately $12 million to construct, and the property and environmental impacts would be significant. This alternative was rejected due to the high costs and impacts.

Recommended Alternative:

This section provides information on developing this project as a J-Turn intersection.

Design Criteria

US 41 is a Principal Arterial highway on the National Highway System (NHS). Hillsdale Road is a Local Road. This project intends to make improvements to the existing at-grade intersection.

Project Location: RP 10.86 to 11.28
38.0795 N
87.5549 W

US 41

AADT (2020):	21,200 vpd
AADT (2045):	27,200 vpd
Design Speed:	60 MPH
Design Criteria:	3R (Non-Freeway)
Functional Classification:	Principal Arterial - Other
Rural / Urban:	Rural
Terrain:	Level
Access Control:	Partial

Hillsdale Road

AADT (2020)	1,825 vpd
AADT (2045)	2,350 vpd
Design Speed:	45 MPH
Design Criteria:	3R (Non-Freeway)
Functional Classification:	Local Road
Rural / Urban:	Rural
Terrain:	Level

Project Description

The newly configured intersection will maintain all traffic movements. The westbound and eastbound left-turns and through traffic on Hillsdale Road will turn right, cross the two US 41 thru lanes, enter the J-turn median lane, proceed through the median U-turn, stop for on oncoming US 41 traffic, and complete the U-turn movement onto US 41.

The median deceleration lane for left turns onto Hillsdale Road are established as a deceleration length of 530 feet (profile grades less than 2.00%), storage length of 50 feet (DHV < 60) and a taper length of 100 feet for a total minimum length of 680 feet. The separation between the deceleration lane taper and the inside U-turn edge is 150’. These dimensions result in the median U-turn being situated approximately 950 feet from the intersection centerlines of US 41 and Hillsdale Road.

The existing intersection with Radio Avenue is recommended to be converted to a right-in / right-out configuration in conjunction with this project. The Radio Avenue intersection is approximately 350 feet north of the U-turn for the north J-turn lane. There is an extremely low volume of traffic utilizing this intersection. Eliminating the westbound left-turn movement will remove a potential conflict between left turns onto southbound US 41 from the north MUT and Radio Avenue.

The traffic analysis indicates that modifying the Radio Avenue access will not have a significant impact on the local road network's traffic operations. The existing pavement width along Radio Avenue, Walnut Avenue and Campbell Avenue vary from approximately 12 feet to 15 feet. Reconstructing Walnut Road is not recommended in association with the modifications to Radio Avenue due to the marginal benefits that would result.

The 2018 Corridor Study recommended removing the west approach to Hillsdale Road. Traffic data indicates that the Hillsdale Road corridor is a significant link in the local road network, terminating at north-south collectors both east and west of US 41. The nearest east-west links to Hillsdale Road that connect the east and west sides of US 41 are located approximately one mile north (Boonville-New Harmony Road) and 1.6 miles south (Mt. Pleasant Road). Because of the potential disruption to the local road network and the associated community impacts, the west leg of the Hillsdale Road / US 41 intersection is recommended to remain operational.

A northbound right-turn lane is warranted based upon traffic volumes for 2020. The southbound right-turn lane does not meet the warrant threshold for 2020 or 2045. However, a southbound right-turn lane is recommended because; (1) it will provide acceleration space for vehicles completing the J-turn maneuver, (2) it will allow vehicles completing the westbound through movement through the MUT and entering the southbound lanes to stay out of the through traffic stream, (3) it will provide corridor consistency for planned modifications to intersections north and south of Hillsdale Road, and (4) it will provide an alternative access for the southbound to westbound movement at the time the Old State Road / US 41 intersection modifications are constructed.

Due to the narrowed existing median, the north MUT section will require construction of a loon that will extend beyond the apparent existing right-of-way. Guardrail will be required along the perimeter of the loon due to the embankment slope conditions. Constructing the southbound right-turn lane will require work outside of the apparent existing right-of-way to reconstruct the fill slope and the roadside ditch between US 41 and the CSX track set. Guardrail is anticipated along the shoulder for this right-turn lane due the slope conditions of the existing embankment.

The south MUT will utilize a portion of the existing northbound right-turn lane to complete the turning maneuver. The existing northbound right-turn lane serving the commercial entrance south of Hillsdale Road should be extended to Hillsdale Road.

The south MUT has a grade differential of approximately 2 feet between the northbound and southbound inside edge of travel lane, separated by a horizontal distance of approximately 67 feet. The MUT can be constructed with a centerline profile grade of 3% or less, which is acceptable for at-grade intersections. The available intersection sight distance will exceed minimum requirements.

Improvements

The following improvements are included in this recommendation:

- Add a northbound J-Turn lane and MUT in the median.
- Add a southbound J-Turn lane and MUT in the median.
- Extend the existing northbound right-turn lane for the east approach.
- Add a southbound right-turn lane for the west approach.
- Reconstruct the median opening to accommodate dedicated northbound and southbound left turn lanes.
- Reverse the crown on the southbound outside lane to improve intersection sight lines at the west approach.
- Reconstruct the west approach to the east edge of the railroad header.
- Mill and resurface the existing pavement within the project limits.
- Mill and resurface the east approach to the west bridge joint (bridge over Little Pigeon Creek).
- Install highway lighting along the northbound and southbound lanes for the length extending from the south MUT to the north MUT.
- Install new signage.
- Install new pavement markings within the project limits.

<u>Modifying Radio Avenue:</u>

- Reconstruct the median to remove the southbound left turn and the westbound left turn.
- Install new signs and pavement markings.

<u>Future Improvement Considerations:</u>
The Corridor Study identified US 41 intersection improvements at Hillsdale Road, Radio Avenue and Old State Road/Campbell Road that may be developed at some point in the future. This assessment of alternative improvements at Hillsdale Road and the recommended alternative are generally consistent with the conclusions of the Corridor Study. The following modifications are identified in the Corridor Study:

- Remove the Hillsdale Road west approach at US 41.
- Do not provide a south MUT at Hillsdale Road.
- Remove the Radio Avenue intersection at US 41.
- Remove the Campbell Road east approach at US 41.
- Construct a continuous link between Campbell Road and Old State Road on the east side of US 41.
- Construct improvements to Campbell Road and Walnut Avenue.

<u>Maintenance of Traffic During Construction</u>:

The recommended alternative (J-Turn) can be constructed under traffic. The construction activity will primarily occur within the median with one lane of traffic for both northbound and southbound US 41 traffic on the existing outside lanes. The paved intersection median at Hillsdale Road should remain open while the median lanes are constructed. The outside lanes of US 41 should be constructed in the second phase. The final phase of construction should be completing work in the median through the intersection. During this phase, only right turns out of the east and west approaches will be permitted.

Posting I-69 as an alternate route (4 miles east) during construction should be considered to remove a portion of through traffic along US 41 through the work zone and to provide motorists with an option to avoid the construction zone.

The construction speed limit should be posted at 50 mph. Temporary traffic barriers should be utilized to protect the work zone.

A queuing analysis was completed to estimate the sensitivity to traffic backups when applying a lane-drop along US 41 to provide safe working room during construction. The method used to conduct the analysis was the INDOT Queuing Analysis spreadsheet (version 1.26). The analysis indicates that the queuing is within policy limits for both northbound and southbound lane-drops. A copy of the analysis is included in the appendices.

Cost Estimate:

The cost estimate for the Recommended Alternate is as follows:

Construction Cost (CN)……………………………	$ 2,100,000
Preliminary Engineering (PE)……………………	$ 170,000
Environmental Documentation……………………	$ 40,000
Right of Way Engineering and Acquisition……...	$ 50,000
Railroad and Utility Coordination……………….	$ 150,000
Construction Engineering………………………….	$ 200,000
Total Project Cost………………………………….	$ 2,710,000

Environmental Issues:

The construction activity for this project will be confined primarily to staying within the apparent existing right-of-way. A length of temporary right-of way will be needed along the west side of US 41 to reshape the roadside ditch. A small area of permanent right-of-way will be required at the north end of the project along the west apparent existing right-of-way to accommodate the J-turn loon and guardrail installation. Since the property owner along the west side of US 41 is CSX railroad, an Agreement may be utilized instead of acquiring right-of-way (temporary or permanent). The final decision should be made during the plan development process.

It is anticipated that less than one acre of unpaved surface will be disturbed during construction and that more than 0.5 acre of combined temporary and permanent right-of-way will be required. It does not appear that any regulated wetlands or streams will be impacted.

Railroad Agreement:

A Railroad Agreement with CSX should be initiated as soon as possible. The agreement should cover the work that will be required within CSX apparent property. This work includes grading, seeding, pavement construction, guardrail installation and drainage structure modifications, as well as flagging during construction (if needed).

Survey Requirements:

The survey limits will extend from 1,500 feet south of Hillsdale Road to 1,500 feet north of Hillsdale Road, and 600 feet west to 600 feet east of the US 41 centerline. The median area survey extends to 700 feet north of Radio Avenue. Much of this information has already been gathered from a previous scope-of-work for this project. A supplemental survey will be necessary to obtain current information in order to update the changed elements.

Right of Way Impacts:

Temporary right-of-way will be required along the southbound outside shoulder for construction of the north J-Turn loon and a southbound right turn lane. There is a single property owner at this location (CSX railroad). An additional amount of pavement surface will be constructed for the west approach which also extends into CSX apparent property. The additional permanent right-of-way need is approximately 0.18 acres and the temporary right-of-way is approximately 0.70 acres. The right-of-way needs may be included in the Railroad Agreement as opposed to acquisition.

Utilities Impacts:

There are several utilities that exist within the project limits as detailed previously in this report. It is not anticipated that any utility relocations will be required as a part of this project.

Drainage Structures:

Culverts located within the project limits:

- 48” RCP under the west approach with concrete headwalls/wingwalls approximately 88’ west of US 41 centerline. This structure will need to be extended at both the south and north ends to accommodate approach widening. This structure is in good condition with a current rating of 7.
- There are 2 median inlets south of Hillsdale Road that will require adjustments due to median regrading.
- There are 2 median inlets north of Hillsdale Road that will require adjustments due to median regrading.

Changes to Proposal:

The Project Manager and the District Scoping Engineer shall be consulted if deviation from the proposal is determined to be necessary during a later phase of project development. The person initiating the change shall send a memo to the Project Manager for concurrence. The memo shall include justification for the change and the estimated cost difference.

Report Concurrence Block:

This document was prepared by:

Michael Koyak

Date: 8 /23 /2019

Michael J. Koyak, P.E.,
First Group Engineering, Inc.

Reviewed by:

David Reamer

Date: 9/3/2019

David Reamer
Vincennes District Asset Engineer

Reviewed by:

Duane D. Decker

Date: 9/3/2019

Duane Decker
District Scoping Manager

Reviewed by:

Khalil I Dughaish

Date: 9/6/2019

Khalil Dughaish
District System Asset Manager

APPENDICES TABLE OF CONTENTS:

APPENDIX A

Call Application Report Project (Mini Scope)

Date:	11/21/2013	District:	*VINCENNES*
DES:	1400005	Sub-District:	Evansville
Proposed FY:	2019	Asset Group:	SAFETY

Project Location

Route:	US 41	City/Town:	Evansville	County:	Vanderburgh			NHS:	Yes
RP Start:	10.90	RP End:	11.1	AADT FY:	2011	AADT:	26042.0	NBI #:	NA
Length:	0.2	# Lanes:	4	Lane Mi:	0.8	% Trucks:	11.0%	Str #:	NA
Func. Class:	Principal Arterial (Freeway/Expressway)			Area:	Urban	Number of Counties:		1	
Bridge/ Culvert Length (FT):	NA			Bridge Area (SFT):	NA		Year Built:	NA	

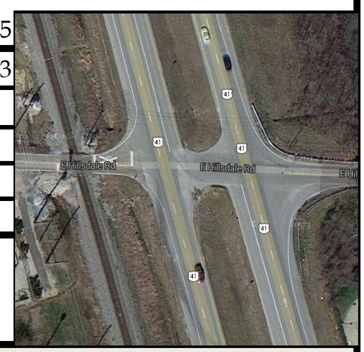
Location Description: US 41 and Hillsdale Road Intersection, 2.04 miles North of SR 57

Existing Conditions and Description of Problem

WHAT IS THE CURRENT AND PROJECTED CONDITION AND WHY IS THIS A PROBLEM (INITIAL STATEMENT OF ESSENTIAL PROJECT NEED) AND CONSIDER DATE AND OTHER ISSUES TO THE PROBLEM (FOCUS ON PROBLEM):

Due to customers requests in increase volume and accidents at the intersection of US 41 & Hillsdale, the District conducted a traffic study and analysis of the intersection. The traffic study found that the existing conditions warrant a signal in accordance to the Indiana Manual on Uniform Traffic Control Devices (IMUTCD).

TYPE OF LAST MAJOR TREATMENT: HMA PM Overlay **DATE:** 2005



PROJECT CONDITION RATINGS:		**LOS:**	NA	**Crash Rate:**	2.43
Wearing Surface:	NA	**Deck:**	NA	**Bridge/Culvert Super:**	NA
Bridge/Culvert Sub:	NA	**Bridge Scour:**	NA	**Bridge Paint:**	NA
Type I Culverts/ pipes:	NA	**Channel:**	NA	**Roadway:**	NA
IRI: NA		**PCR:** NA		**RUT:** NA	**Friction #:** NA

INTENT/ PURPOSE OF PROJECT (INITIAL STATEMENT OF ESSENTIAL PROJECT PURPOSE:

The purpose of the project is to improve the safety of the intersection of US 41 and Hillsdale Rd as well as improving the level of service for Hillsdale Rd approaches.

Alternatives

PRELIMINARY ALTERNATIVES THAT ARE CONTEMPLATED (ANALYSED) WITH COSTS:

1. Install a traffic signal, install right-turn lanes along US 41, increase corner radii, increase the left-turn lane lengths along US 41. $2,173,000 - Recommended
2. Same as (1), but add another lane on east approach. This would be much more costly than alternative (1) because the bridge on the east approach would have to be bought (not on INDOT R/W) and widened as well as relocate a water and sewage line on the south side of the bridge. Level of Service is not significantly improved with added lane east approach.
3. Same as (1), but add another lane on west approach. This would be much more costly than alternative (1) because of a power station on southwest corner of intersection and railroad on west approach. Level of Service is not significantly improved.

CONSEQUENCES IF NO ACTION IS TAKEN (DO NOTHING ALTERNATIVE IS SELECTED):

If no improvement is made at this intersection, then the pattern of accidents will continue and the LOS for the east approach will continue to be an F.

SECONDARY CONSIDERATIONS OR GOALS WITH COSTS:

There are no secondary considerations besides those mentioned above.

Attach extra sheets as necessary to fully describe the alternatives.

Will Further Analysis/Assessment be required beyond this form? NO

Project Recommendations and Costs

QUANTIFIABLE PRIMARY GOAL(S) OF PROJECT (WHAT ARE WE PURCHASING SUCH AS CONDITION, SERVICE LIFE, LOS, OR CRF):

GOAL: The goal of this project is to decrease the amount of accidents at the intersection. The signal should decrease the total number of accidents by 15% by installing a signal. Installing right-turn lanes along US 41 will decrease the accidents by 8%. Increasing the left-turn lane lengths will decrease the accidents by 40%.

Estimated Total Project Costs:		$2,173,000.00		COMMENTS
In-House Design:	NO	**COST:**	**$0.00**	There are no anticipated in-house design costs.
R/W:	NO	**COST:**	**$0.00**	No new right-of-way should be needed.
PE:	YES	**COST:**	**$174,000.00**	There are anticipated PE costs.
GEOTECH:	YES	**COST:**	**$52,000.00**	Geotech design will be needed.
Hydraulics:	NO	**COST:**	**$0.00**	Hydraulic design should not be needed.
Maintenance of Traffic:	YES	**COST:**	**$87,000.00**	The roadway will remain open during construction.
Railroad:	YES	**COST:**	**$100,000.00**	Railroad coordination will be needed. A RR agreement is needed.
Environmental Study:	YES	**COST:**	**$0.00**	CE 1. Permits may be needed.
Utilities:	YES	**COST:**	**$20,000.00**	There are anticipated utility concerns.
Pavement:	YES	**COST:**	**$0.00**	A pavement design will be needed.
CN:	YES	**COST:**	**$1,740,000.00**	This is total construction cost.
Other Considerations:	NO	**COST:**	**$0.00**	There are no other anticipated costs associated with this.

Other Projects within Limits

DES:	**0200849**	**FY:**	**2016**	**Work Type:**	**PM Overlay**	**Location:**	**RP 4.12 to RP 12.00**
DES:		**FY:**		**Work Type:**		**Location:**	
DES:		**FY:**		**Work Type:**		**Location:**	

Miscellaneous Notes

ANTCIPATED NUMBER OF CONSTRUCTION SEASONS TO COMPLETE(1, 2 or 3 seasons):	1 FY
ANTCIPATED NUMBER OF YEARS TO COMPLETE DESIGN (1, 2 or 3 fiscal years):	1

CALL HISTORY: This was not submitted in a previous call.

Attachments

Pictures	YES	Asset Team Scoring Sheet:	YES	Mobility History:	NO
Spreadsheets (calcs):	NO	Engineer Assessment:	NO		
Solution Schematic:	YES	Bridge/Culvert Inspection Report:	NO		
Cost Calculations:	YES	Accident History:	YES		
Location Map:	YES	Pathway Data:	NO		

Additional Comments

Other items relevant to the project not specifically listed elsewhere

NOTE: Appropriate environmental and assessment processes need to be followed.

Report Prepared By and Approved By

Name:	Brittney Smith / Damon Brown	Title:	Scoping Engineer / Traffic Planning Engineer
TSD:	Valerie Cockrum	**APPROVED ON:**	12/31/2013

NOTE: Any changes require a re-submittal of Call Application Report.

REVISED: 11/18/2013 **REVISED BY:** **Andrew Fitzgerald, PTOE, PE**

APPENDIX B

First Group ENGINEERING, INC.

Consulting Engineers
5925 Lakeside Blvd.
Indianapolis, IN 46278
Phone (317) 290-9549
Fax (317) 290-9560

6949 Kennedy Avenue
Unit F
Hammond, IN 46323
Phone (219) 844-6752
Fax (219) 844-6795

Engineering Assessment Field Check Minutes for US 41 at Hillsdale Road Intersection Improvements Vanderburgh County, Indiana Des. No. 1400005

Name of Attendee	Representing	Telephone Number	E-Mail
Shawn Will	INDOT – Project Manager	(812) 895-7358	shwill@indot.in.gov
David Farmer	INDOT – Railroad	(812) 895-7365	dfarmer@indot.in.gov
Khalil Dughaish	INDOT – Technical Services	(812) 895-7377	kdughaish@indot.in.gov
Damon Brown	INDOT – Traffic Planning	(812) 895-7457	dabrown@indot.in.gov
Alex Loehrlein	INDOT - Utilities	(812) 453-7291	aloehrlein@indot.in.gov
John Stoll	Vanderburgh County Engineer	(812) 435-5773	jstoll@vanderburghgov.org
Jeff Hicks	First Group Engineering	317-216-7705 #208	JHicks@FirstGroupEngineering.com
Jeff Brechbill	First Group Engineering	317-216-7705 #217	JBrechbill@FirstGroupEngineering.com

The Engineering Assessment Field Check for this project was held at 10:00 AM Eastern Time on Wednesday, December 2, 2015 at the project site, which is located approximately 2.04 miles north of SR 57 in Vanderburgh County, Indiana. A summary of the major items discussed is shown below.

1. Jeff Brechbill gave a brief introduction, project history, and project overview.

    - Originally large US 41 corridor reconstruction project
    - Project cancelled in 2009
    - Became a spot improvement – intersection project
    - Engineering Assessment (mini-scope) – by INDOT 2013
    - Recommendations included southbound right turn lane, northbound right turn lane, extension of both northbound and southbound left turn lanes to provide deceleration
    - Traffic signals were found to be warranted
    - First Group is currently providing an Abbreviated Engineering Assessment to come up with specific scope of work, considering Open Roads potential cost savings

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2. INDOT and the Evansville MPO are requesting proposals for a corridor study of US 41 from the Lloyd Expressway to I-64, which includes this intersection. Any potential impacts to this project are unknown at this time. Due to the timing of the project, it was agreed that the results of the corridor study will not be incorporated into this Engineering Assessment.

3. A developer plans to construct apartment buildings on the property north of Hillsdale Rd. west of the railroad tracks. The developer is requesting that the property be re-zoned at a December 8th meeting. If re-zoning is approved, they plan to construct 300 units of 3-story apartments and possibly additional commercial development. If re-zoning is denied, they plan to construct 300 units of 2-story apartments instead.
[Darmstadt Town Council rejected the rezoning request for a 3-level apartment complex on December 8. The developer indicated that he still plans to construct over 300 units of 2-story apartments. The council is requiring the developer to conduct a traffic impact study.]

4. It was stated that the apartment developer requested that improvements to accommodate increased traffic be added to this project. However, it was discussed that INDOT does not typically make improvements based on possible future developments. Jeff Brechbill stated that they will use the traffic counts and projections previously provided to them unless new traffic information is provided and requested by INDOT to be used instead.

5. Vanderburgh County has no plans to replace the existing bridge on Hillsdale Road just east of the intersection. Due to proximity of intersection, it would need to be widened or reconstructed to add turn lanes on the east approach. Damon stated that the addition of turn lanes on both the east and west Hillsdale Road approaches would not significantly improve the Level of Service (LOS) of the intersection with current traffic and projections based on current traffic. Therefore, no turn lanes will be added on Hillsdale Road.

6. It was agreed that no southbound right turn lane will be added. The survey shows no existing right-of-way on that side beyond the existing edge of pavement. The traffic counts for this movement are extremely low, it would require right-of-way or an easement from the railroad, and Open Roads considerations have influenced the decision not to provide the southbound turn lane.

7. Traffic signalization is recommended. As part of the original Mini-Scope, INDOT had performed a signal warrant analysis and determined that signals are warranted. Puck detection was requested at scope of work meeting.

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8. Two viable Alternates appear to meet project objectives: 1) Remove adverse crown from the outside southbound travel lane and reconstruct Hillsdale Road to provide adequate Stopping Sight Distance over the train tracks. 2) Reconstruct US 41 southbound lanes to raise the profile grade to provide a smoother transition through the intersection. Both Alternates would require lowering the posted speed of Hillsdale Road to 30 mph.

9. John Stoll indicated that the County is willing to allow the lowering of the speed limit on Hillsdale Road west of US 41 to 30 mph. He said that he would ask their attorney, but does not anticipate that it will be a problem. The new speed limit signs could be placed as part of this project.

10. Conceptual roadway profiles for Hillsdale Road were shown to attendees for the two alternates. First Group mentioned that the railroad tracks and their proximity to US 41 will require Hillsdale Road to be raised west of the railroad tracks for both alternates. The driveway/access for the Electric Substation on the south side of Hillsdale Road on the west side of the railroad tracks would be closed and relocated to the west side of the Electric Substation due to the grade raise of Hillsdale Road in both alternates.

11. Since both alternates require a significant grade raise on Hillsdale Road west of the railroad tracks and have similar project limits, it is likely more cost-effective to choose the alternate that does not involve reconstruction of the US 41 southbound lanes.

12. An easement will be needed from CSX railroad for this project, as it is unlikely they would sell permanent right-of-way to INDOT.

13. Intersection lighting was discussed. It was decided that street lighting would be added to the proposed traffic signal poles to improve visibility at the intersection, as long as it can be provided within the project budget.

14. An R-cut was suggested as a possible third alternate by Damon Brown. The possibility was discussed, and one concern raised was the visibility of eastbound vehicles on Hillsdale Road on the east side of the railroad tracks. As a result, the profile of Hillsdale Road would still need to be raised to improve sight distance, so the overall cost of this would likely be considerably higher. This will be discussed in the Abbreviated Engineering Assessment.

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15. Northbound and southbound left turn lengths for US 41 were discussed. The mini-scope had indicated that they should be extended to provide adequate deceleration in accordance with the INDOT Design Manual. In considering Open Roads, it was decided that the AASHTO values for deceleration would be provided instead.

16. It was discussed and agreed upon that the northbound right turn lane will be extended to match into the existing northbound right turn lane just south of the gas station on the southeast corner of US 41 and Hillsdale Road.

17. INDOT has an upcoming paving project on US 41, and it may include a new guardrail end treatment on the southeast corner of US 41 at Hillsdale Road. First Group will review the plans to verify this.

18. INDOT utilities will look at sanitary sewer locations. Water may need to be relocated if it is located under pavement. It was noted that a waterline recently broke in this area.

19. It was decided that First Group will wait to hear the results of the zoning request and further direction before proceeding with finalizing the Abbreviated Engineering Assessment.

END OF MINUTES

If any revisions are necessary please contact Jeff Brechbill at *JBrechbill@FirstGroupEngineering.com*.

First Group ENGINEERING, INC.

MEETING MINUTES

Date: December 18, 2018
Project: Intersection Improvements, U.S. 41 at Hillsdale Road, Vanderburgh County, Indiana
Des No: 1400005
Engineering Assessment and Design

A conference call was held at 2:00 PM on Tuesday December 18, 2018 for the purpose of developing a path forward to complete the Engineering Assessment for which First Group Engineering (FGE) is currently under contract with INDOT and determine an overall project schedule.

Invitees to this meeting included:

Matthew Bullock, INDOT (Project Manager)
Duane Decker, INDOT
Alan Davis, INDOT
Terry Bough, INDOT
Khalil Dughaish, INDOT
David Reamer, INDOT
Jeff Brechbill, FGE
Mike Koyak, FGE

The following items were discussed:

1. A supplemental agreement to the contract is necessary due to major changes in the planning for the US 41 corridor since the onset of the original contract.

2. FGE noted that a final Engineering Assessment has not been completed as a part of the current contract with INDOT. FGE has developed drawings for intersection improvements to install a traffic signal. The current drawings also address profile grade issues (west approach) related to the existing railroad crossing.

3. INDOT asked that FGE develop an Engineering Assessment that looks at alternative intersection designs to the Hillsdale Road intersection. The Engineering Assessment should evaluate the traffic impacts to the Radio Avenue intersection and the Old State Road intersection along U.S. 41 for each alternative design at Hillsdale Road.

4. The Engineering Assessment will include costs and benefits for each intersection alternative at Hillsdale Road.

5. INDOT will provide crash data for the project area.

6. The estimated costs (and justification for) for improvements to the Radio Avenue and/or Old State Road intersection(s), if any, should be estimated and included in the Engineering Assessment for each alternative design at Hillsdale Road.

7. INDOT indicated the MPO believes there may be more buy-in for alternative intersection designs than in the past.

8. INDOT would like to meet with representatives of the MPO and the County to discuss details of the alternative intersection designs at Hillsdale Road. FGE will prepare estimated costs of improvements for use at this meeting.

9. INDOT will provide traffic count data so that FGE can estimate impacts to U.S. 41 intersections at Radio Avenue and Old State Road resulting from traffic avoiding the Hillsdale Road intersection after an alternative intersection is constructed. FGE will make engineering judgments on traffic diversion from Hillsdale Road resulting from the installation of locally non-favored intersection treatments. INDOT will assist FGE in determining diversion rates.

10. The J-turn intersection is favored in the Corridor Study and is an alternative for the Engineering Assessment to examine, however; INDOT indicated that closing county roads is not preferred at his time.

11. INDOT asked that FGE examine if the location of the median cut for a J-turn will interfere with traffic operations at the existing Radio Avenue intersection.

12. INDOT asked that the Engineering Assessment include an alternative for a J-turn with a right-in/right-out (west approach) at the Hillsdale Avenue intersection. This alternative would eliminate the need for a median U-turn south of Hillsdale Road.

13. INDOT noted that the Engineering Assessment should include consideration for longer-term improvements at the Radio Avenue and Old State Road intersections that are consistent with the Corridor Study.

14. The Engineering Assessment/design project will be in 2 phases. The first phase is the Engineering Assessment. The second phase is design of the preferred alternative.

15. There is a desire to include public engagement beyond that of a public meeting as an element of the design contract.

16. INDOT will provide additional information to FGE for costs/benefits of traffic signals, J-turn and R-cut that has already been compiled by others for intersections within the project area.

17. FGE noted that a design fee cannot be accurately determined until a preferred alternative is decided.

18. FGE will obtain new utility locates and will conduct a site visit to verify, to the extent possible, the field information received.

19. The professional fees for the supplemental agreement will include conducting a Public Meeting. Recommendations will be presented at the Public Meeting. To expedite the project, the meeting will take place after the Engineering Assessment is completed and before design begins.

20. The project is currently programmed for a letting on 5/7/20. This results in Stage 3 plans being due by 12/13/19. INDOT indicated they discussed internally moving the project out 6 months (Nov. 2020 letting. Challenges to the schedule include railroad coordination and getting through the environmental process.

Regarding a revised project schedule:

- FGE said it would be 60 to 90 calendar days to complete the Engineering Assessment as described in this meeting. Note: FGE prefers the 90 days due adding an assessment of impacts to the Radio Avenue and the Old State Road intersections.
- FGE noted that it typically takes 60 calendar days to obtain a NTP from INDOT on contracts. INDOT indicated this process may possibly be streamlined on their end.
- FGE noted that railroad coordination could take up to 18 months depending on the alternative chosen and the need for a railroad agreement. INDOT will check internally with Michael Farmer to get his opinion on the time needed.

Revised Engineering Assessment NTP:	February 2019
Meeting w/ MPO & County:	March 2019
Revised Engineering Assessment Complete:	May 2019
Public Meeting:	June 2019
Design NTP:	TBD
Stage 3 Plans:	6/18/2020
Tracings:	8/2/2020
RFC:	9/2/2020
Letting:	11/10/2020

The above meeting notes represent the writer’s interpretation of discussions. If your interpretation varies significantly or if there are important omissions, please contact me and I will revise the record.

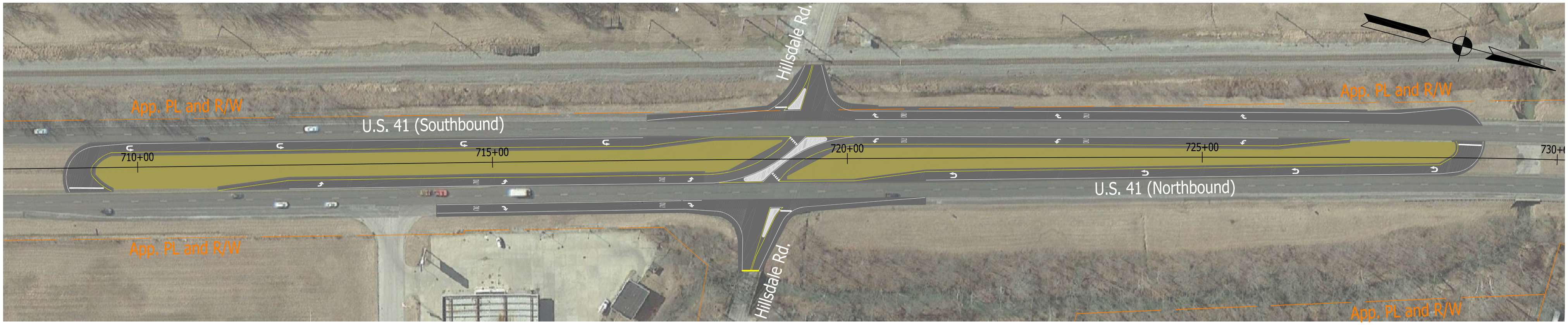
Sincerely,

Michael Koyak

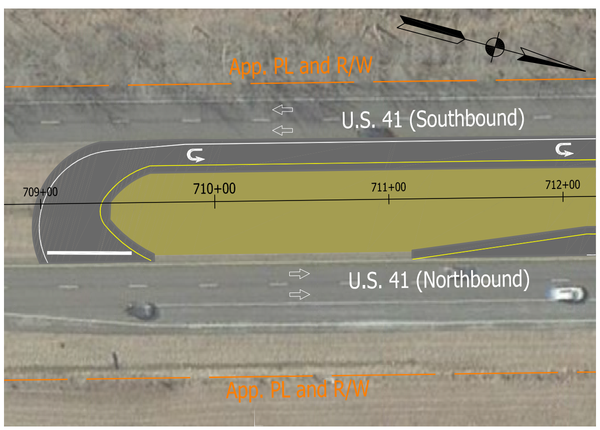
Michael Koyak, P.E.
First Group Engineering, Inc.

Cc: All invitees (via email)

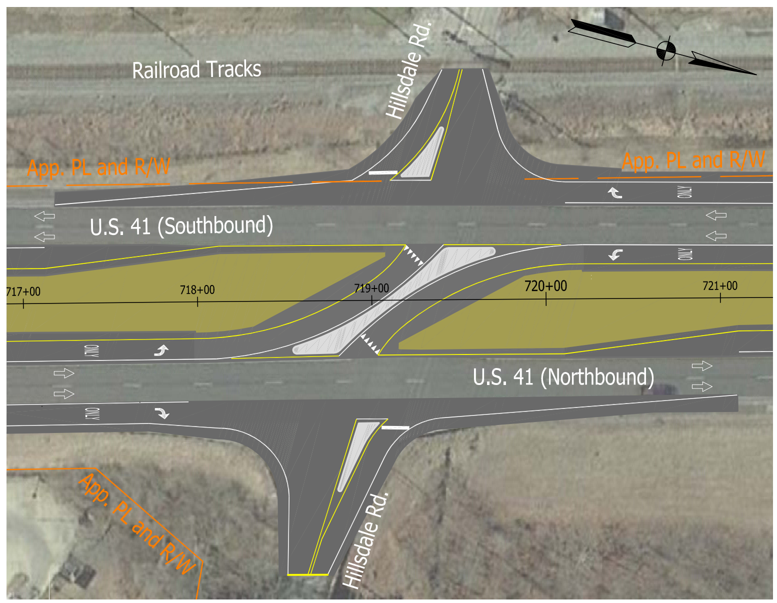
APPENDIX C



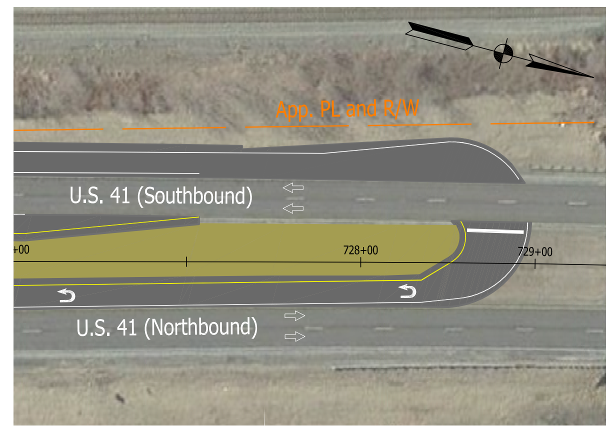
U.S. 41 and Hillsdale Rd. J-Turn Intersection Configuration



South End of J-Turn

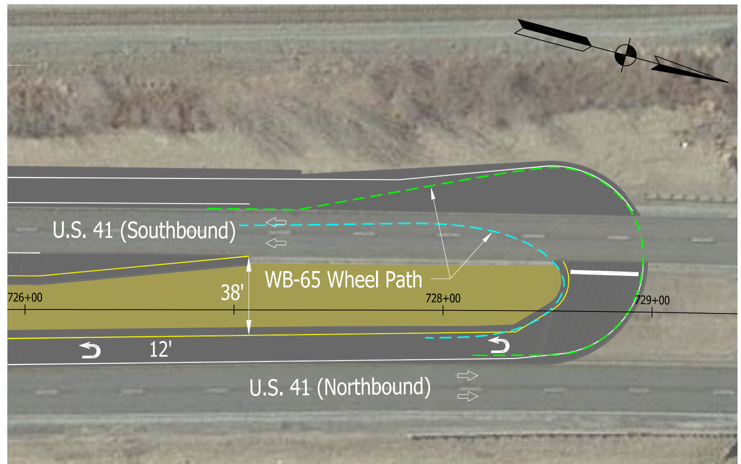


U.S. 41 and Hillsdale Rd. Intersection

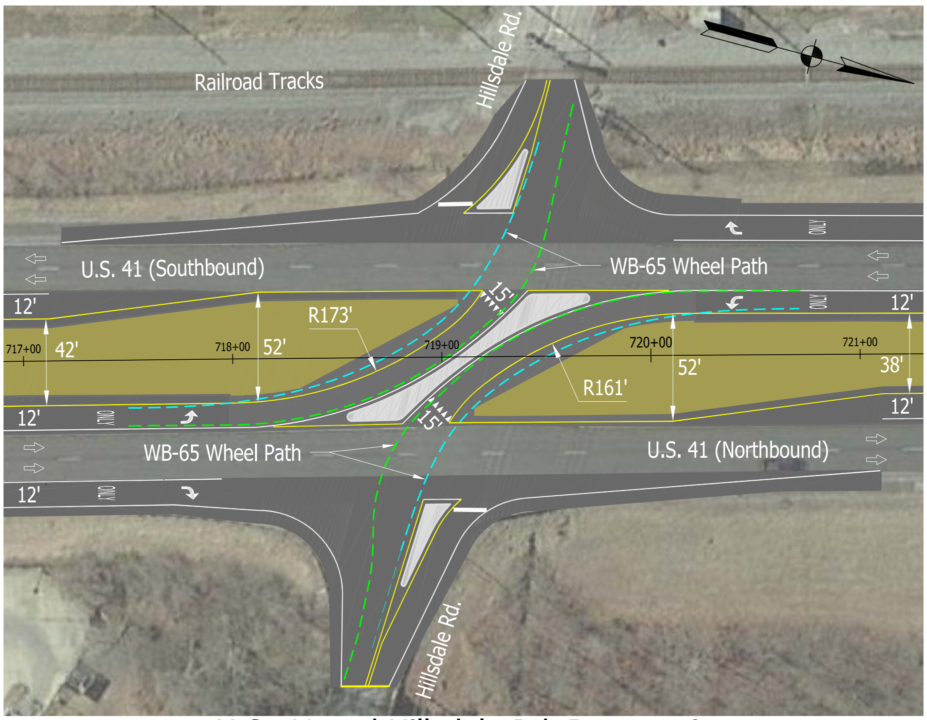


North End of J-Turn

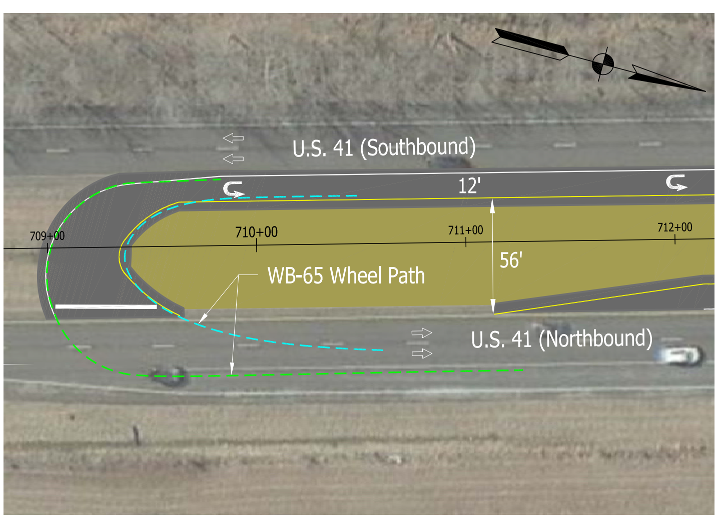
J-TURN LAYOUT
U.S. 41 AT HILLSDALE ROAD
VANDERBURGH COUNTY



North End of J-Turn

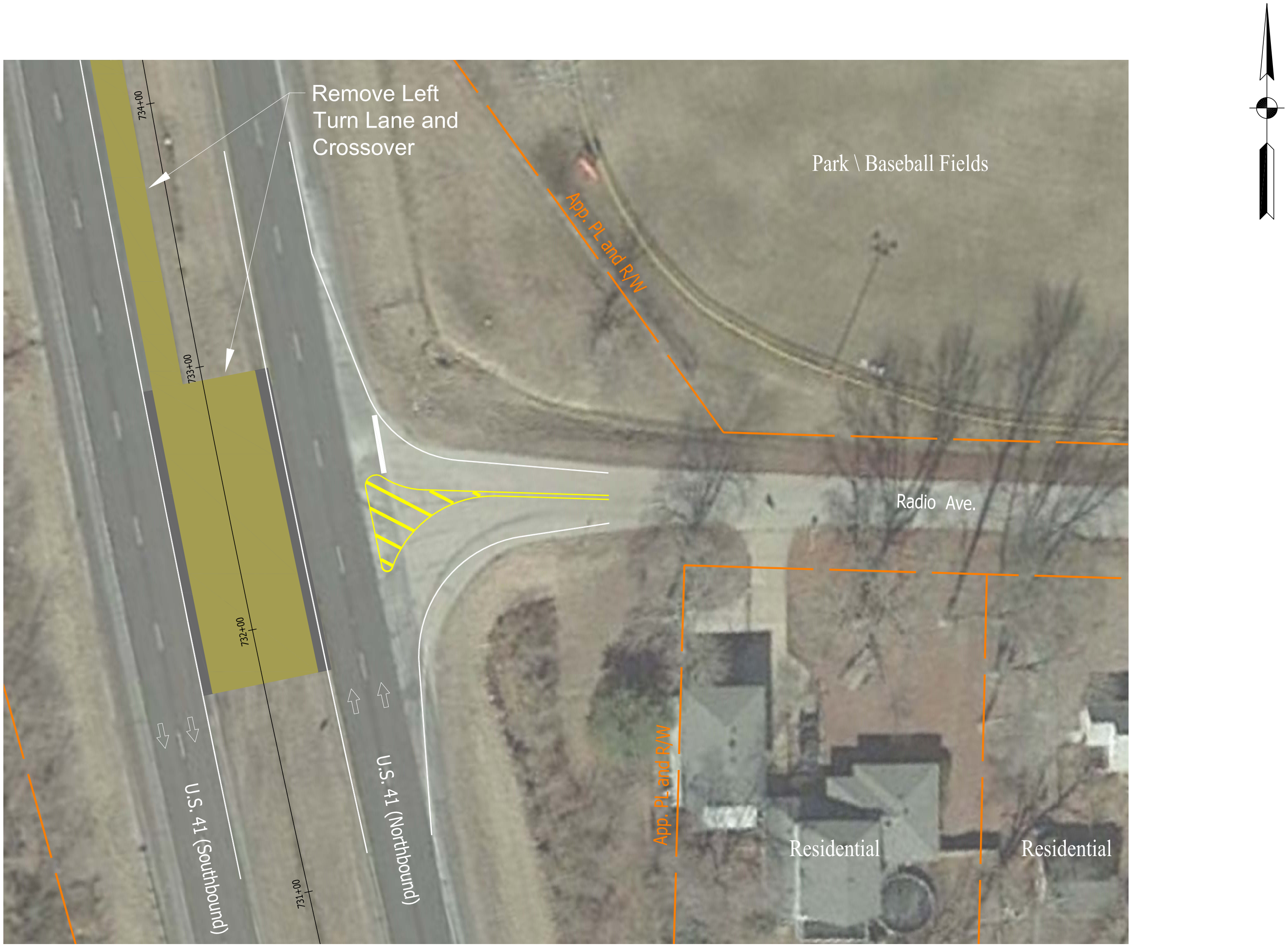


U.S. 41 and Hillsdale Rd. Intersection



South End of J-Turn

J-TURN LAYOUT
TRUCK TURN PATH AND DIMENSIONS
U.S. 41 AT HILLSDALE ROAD
VANDERBURGH COUNTY



REMOVE CROSSOVER AT RADIO AVE.
U.S. 41 AT HILLSDALE ROAD
VANDERBURGH COUNTY

APPENDIX D

Crash Analysis for US 41 and Hillsdale Rd, Evansville, Vanderburgh County
1/1/2016-12/31/2018

	2016	2017	2018	TOTALS	
1.) SEVERITY	***2016***	***2017***	***2018***	***TOTALS***	
a. Property Damage ……………………………………	2	4	3	9	*56%*
b. Non-Incapacitating Injury ………………………	0	1	0	1	*6%*
c. Incapacitating Injury …………………..............	0	2	3	5	*31%*
d. Fatality …………………………………………	1	0	0	1	*6%*
e. Unknown ………………………………………	0	0	0	0	*0%*
	---	---	---	---	*100%*
TOTALS	***3***	***7***	***6***	***16***	

2.) COLLISION DIAGRAM	***2016***	***2017***	***2018***	***TOTALS***	
a. Rear End Collision ....…………………….......	0	1	0	1	*6%*
b. Head-On Collision ....……................	0	0	0	0	*0%*
c. Sideswipe ....……………...…............	0	1	0	1	*6%*
d. Off Road Collision ....……………............	0	0	2	2	*13%*
e. Right Angle Collision ……………………...........	1	4	4	9	*56%*
f. Lt. Turn Collision ………………….....................	2	1	0	3	*19%*
g. Rt. Turn Collision ……………….......................	0	0	0	0	*0%*
h. Animal …………………………………….......	0	0	0	0	*0%*
i. Backing ....…………….............	0	0	0	0	*0%*
j. Object in Roadway.........................……………	0	0	0	0	*0%*
k. Unknown.......................…………….............	0	0	0	0	*0%*
	---	---	---	---	*100%*
TOTALS	***3***	***7***	***6***	***16***	

3.) SURFACE CONDITION	***2016***	***2017***	***2018***	***TOTALS***	
a. Dry ………………………………………………	3	6	4	13	*81%*
b. Wet ………………………………………………	0	1	2	3	*19%*

	2016	2017	2018	TOTALS	
c. Snow/Ice/Slush ………………………..................	0	0	0	0	*0%*
d. Other………………………………………………	0	0	0	0	*0%*
e. Unknown…………………………………………	0	0	0	0	*0%*
	---	**---**	**---**	**---**	*100%*
TOTALS	***3***	***7***	***6***	***16***	

4.) CONTRIBUTING CIRCUMSTANCE	***2016***	***2017***	***2018***	***TOTALS***	
a. Unsafe Speed ………………………………..........	0	0	0	0	*0%*
b. Disregard Signal ………………………………....	0	0	0	0	*0%*
c. Failure toYield R/W …………………………….	2	4	4	10	*63%*
d. Brake Failure or Defective ………………………	0	0	0	0	*0%*
e. Following Too Closely …………………………	0	1	0	1	*6%*
f. Animal/Object in Roadway ……………………	0	0	0	0	*0%*
g. Cell Phone Usage ……………………………..	0	0	0	0	*0%*
h. Left of Center ……………………………...........	0	0	0	0	*0%*
i. Distracted ……………………………..................	0	0	0	0	*0%*
j. Improper Lane Change ………………………......	0	0	0	0	*0%*
k. Alcohol …………………………………….........	0	0	0	0	*0%*
l. Fatigue/Sleep………………………..................	0	0	0	0	*0%*
m. Overcorrect / Oversteer ……………...................	0	1	1	2	*13%*
n. Improper Turning …..	1	1	0	2	*13%*
0 Other …………………………………………….	0	0	1	1	*6%*
	---	**---**	**---**	**---**	*100%*
TOTALS	***3***	***7***	***6***	***16***	

5.) MONTH	***2016***	***2017***	***2018***	***TOTALS***	
a. January (01)………………………………….....	0	0	2	2	*13%*
b. February (02) ………………………………........	0	0	0	0	*0%*
c. March (03) ……………………………………….	0	1	0	1	*6%*

	2016	2017	2018	TOTALS	
d. April (04)……………………………………………	0	2	1	3	*19%*
e. May (05)………………………………………………	0	0	0	0	*0%*
f. June (06)………………………………………………	2	1	1	4	*25%*
g. July (07)…………………………………………….	0	0	0	0	*0%*
h. August (08)…………………………………………	1	1	0	2	*13%*
i. September (09)…………………………………...	0	0	2	2	*13%*
j. October (10)………………………………………	0	0	0	0	*0%*
k. November (11)…………………………………...	0	1	0	1	*6%*
l. December (12)……………………………………	0	1	0	1	*6%*
m. Unknown……………………………………………	0	0	0	0	*0%*
	---	---	---	---	*100%*
TOTALS	***3***	***7***	***6***	***16***	

6.) DAY OF WEEK	***2016***	***2017***	***2018***	***TOTALS***	
a. Sunday………………………………………………	1	2	1	4	*25%*
b. Monday………………………………………………	1	2	2	5	*31%*
c. Tuesday………………………………………………	0	0	0	0	*0%*
d. Wednesday…………………………………………	0	0	2	2	*13%*
e. Thursday…………………………………………….	1	1	0	2	*13%*
f. Friday…………………………………………………	0	2	0	2	*13%*
g. Saturday……………………………………………	0	0	1	1	*6%*
h. Unknown……………………………………………	0	0	0	0	*0%*
	---	---	---	---	*100%*
TOTALS	***3***	***7***	***6***	***16***	

7.) HOUR OF DAY	***2016***	***2017***	***2018***	***TOTALS***	
a. 6-7AM (0600)……………………………………	0	0	1	1	*6%*
b. 7-8AM (0700)……………………………………	0	0	1	1	*6%*

c.	8-9AM (0800)..	1	0	0	1	*6%*
d.	9-10AM (0900)......................................	0	0	1	1	*6%*
e.	10-11AM (1000).....................................	0	2	1	3	*19%*
f.	11A-12N (1100).....................................	0	0	0	0	*0%*
g.	12N-1P (1200).......................................	0	0	0	0	*0%*
h.	1-2PM (1300)..	0	1	1	2	*13%*
i.	2-3PM (1400)..	0	1	0	1	*6%*
j.	3-4PM (1500)..	0	2	1	3	*19%*
k.	4-5PM (1600)..	1	0	0	1	*6%*
l.	5-6PM (1700)..	1	0	0	1	*6%*
		---	**---**	**---**	**---**	*94%*
	Daylight Sub-Totals	**3**	**6**	**6**	**15**	
m.	6-7PM (1800)..	0	1	0	1	*6%*
n.	7-8PM (1900)..	0	0	0	0	*0%*
o.	8-9PM (2000)..	0	0	0	0	*0%*
p.	9-10PM (2100)......................................	0	0	0	0	*0%*
q.	10-11PM (2200).....................................	0	0	0	0	*0%*
r.	11P-12M (2300).....................................	0	0	0	0	*0%*
s.	12M-1A (2400)......................................	0	0	0	0	*0%*
t.	1-2AM (0100)..	0	0	0	0	*0%*
u.	2-3AM (0200)..	0	0	0	0	*0%*
v.	3-4AM (0300)..	0	0	0	0	*0%*
w.	4-5AM (0400)..	0	0	0	0	*0%*
x.	5-6AM (0500)..	0	0	0	0	*0%*
y.	Unknown...	0	0	0	0	*0%*
		---	**---**	**---**	**---**	*6%*
	Nighttime Sub-Totals	**0**	**1**	**0**	**1**	
		---	**---**	**---**	**---**	*100%*
	GRAND TOTALS	***3***	***7***	***6***	***16***	

8.) ROAD CHARACTER	***2016***	***2017***	***2018***	***TOTALS***	
a. Straight/Level	3	7	6	16	*100%*
b. Straight/Grade	0	0	0	0	*0%*
c. Straight/Hillcrest	0	0	0	0	*0%*
d. Curve/Level	0	0	0	0	*0%*
e. Curve/Grade	0	0	0	0	*0%*
f. Curve/Hillcrest	0	0	0	0	*0%*
g. Unknown...	0	0	0	0	*0%*
	---	**---**	**---**	**---**	*100%*
TOTALS	***3***	***7***	***6***	***16***	

9.) DIRECTIONAL ANALYSIS / COLLISION INVOLVED	***2016***	***2017***	***2018***	***TOTALS***	
a. WB w/ SBlt	0	0	0	0	
b. EB w/ NB	0	0	1	1	*6%*
c. WB w/ SB	0	0	2	2	*13%*
d. WBlt w/ SB	0	0	0	0	*0%*
e. SB w/ SB	0	0	0	0	*0%*
f. NB w/ Embankment, Ditch	0	0	1	1	*6%*
g. NB w/ WB	0	2	1	3	*19%*
h. NB U-Turn w/ SB	0	0	0	0	*0%*
i. EB w/ WBlt	0	0	0	0	*0%*
j. SB w/ Deer/Rock	0	0	0	0	*0%*
k. NB w/ Deer/Coyote	0	0	0	0	*0%*
l. NB w/ SBlt	0	0	0	0	*0%*
m. SB w/ Embankment, Ditch	0	0	1	1	*6%*
n. WB w/ WB	0	1	0	1	*6%*
o. WBrt w/ SB	0	0	0	0	*0%*
p. SB U-Turn w/ NBlt	0	0	0	0	*0%*

q. WB w/ NB ……………………………………....	0	1	0	1	*6%*
r. WBlt w/SBlt …...	0	0	0	0	*0%*
s. WBlt w/EB …..	1	1	0	2	*13%*
t. SBlt w/ NB…..	1	0	0	1	*6%*
u. SB w/WB …...	1	1	0	2	*13%*
v. NB w/ NB …………………………………….…...	0	1	0	1	*6%*
	---	---	---	---	
TOTALS	***3***	***7***	***6***	***16***	*100%*

10.) REFERENCED LOCATIONS	***2016***	***2017***	***2018***	***TOTALS***	
a. At Intersection ………………………….………	2	6	3	11	*69%*
b. Zero to Hundred Feet East ………………………	0	0	0	0	*0%*
c. Zero to Hundred Feet North ……………………...	0	0	2	2	*13%*
d. Zero to Hundred Feet South ……………………...	0	1	0	1	*6%*
e. Zero to Hundred Feet West ……………………...	1	0	1	2	*13%*
f. Hundred to Thousand Feet East …………………	0	0	0	0	*0%*
g. Hundred to Thousand Feet North ………………..	0	0	0	0	*0%*
h. Hundred to Thousand Feet South ………………..	0	0	0	0	*0%*
i. Hundred to Thousand Feet West …………..…….	0	0	0	0	*0%*
j. Between 1,000 and 1,500 Feet	0	0	0	0	*0%*
	---	---	---	---	*100%*
TOTALS	***3***	***7***	***6***	***16***	

Index of Crash Frequency and Cost - Form F1

Page 1/2

Location	Hillsdale Road	
U.S. 41		
GIS		
Post		
Analyst		
Date	4/18/2019	

INPUT	
Road Facility Type	Unsignalized Rural State-Local Intersection
Major Road AADT (veh/day)	24500
T-intersection Indicator (1 if present, 0 otherwise)	0
First Year with Crash Data (yyyy)	2016
Last Year with Crash Data (yyyy)	2018
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	7
Non-Incapacitating and Possible Injury Crashes	2
Property Damage Only Crashes	16
Route or Road Type	Unsignalized Rural State-State Intersection
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	525500
Non-Incapacitating and Possible Injury Crashes	33100
Property Damage Only Crashes	5600
Crash Cost Year (yyyy)	2013
OUTPUT	
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.084
Non-Incapacitating and Possible Injury Crashes	0.51
Property Damage Only Crashes	1.49
All Crashes	2.08
Index of Crash Frequency	**2.58**
Index of Crash Cost	**2.56**

Index of Crash Frequency and Cost - Form F1

Page 2/2

Location	Hillsdale Road	
U.S. 41		
GIS		
Post		
Analyst		
Date	4/18/2019	

Comments: w/ deer strikes

Benefit Cost Analysis - Form F5

Page 1/2

Location	Hillsdale Road	
U.S. 41		
GIS		
Post		
Analyst		
Date	4/18/2019	

INPUT	
Number of Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	7
Non-Incapacitating and Possible Injury Crashes	2
Property Damage Only Crashes	16
Countermeasure 1	
Countermeasure Description	J-Turn
Number of Target Crashes (crash/period)	
Fatal and Incapacitating Injury Crashes	4
Non-Incapacitating and Possible Injury Crashes	5
Property Damage Only Crashes	16
Crash Reduction Factors (%)	
Fatal and Incapacitating Injury Crashes	50
Non-Incapacitating and Possible Injury Crashes	50
Property Damage Only Crashes	50
Countermeasure Service Life (years)	20
Countermeasure Capital Cost ($)	500000
Countermeasure Annual Maintenance Cost ($)	10000
Countermeasure Salvage Value ($)	100000
Route Type	Unsignalized Rural State-State Intersection
Average Crash Costs ($)	
Fatal and Incapacitating Injury Crashes	525500
Non-Incapacitating and Possible Injury Crashes	33100
Property Damage Only Crashes	5600
Crash Cost Year (yyyy)	2013
First Year with Crash Data (yyyy)	2016
Last Year with Crash Data (yyyy)	2018

Benefit Cost Analysis - Form F5

Page 2/2

Location	Hillsdale Road	
U.S. 41		
GIS		
Post		
Analyst		

Date	4/18/2019
Expected Crash Frequency (crash/year)	
Fatal and Incapacitating Injury Crashes	0.084
Non-Incapacitating and Possible Injury Crashes	0.51
Property Damage Only Crashes	1.49
All Crashes	2.08
Present Year (yyyy)	2019
Implementation Year (yyyy)	2021
Inflation Rate (%)	2
Interest Rate (%)	4
Annual Traffic Growth Rate (%)	2
Total Traffic Growth Factor (%)	1.1
Future Traffic Growth Period (years)	20
OUTPUT	
Equivalent Annual Benefit ($)	58,837
Equivalent Annual Cost ($)	40,156
Present Worth Benefit ($)	1,470,914
Present Worth Cost ($)	1,003,899
Net Annual Benefit ($)	**18,681**
Present Worth Net Benefit ($)	**467,014**
Benefit-Cost Ratio	**1.47**

Comments: w/ deer strikes

APPENDIX E

August 2019

Intersection Modification Impacts
Local Road Network

LOS Comparison for Modification Scenarios fat Network Intersections (2020 & 2045 AM Peak Hour - Critical Movements)

Intersection	AM	No-Build (No Modifications)				With Radio Avenue R-in / R-out				With Hillsdale Rd. (west) & Radio Avenue R-in / R-out, and No South MUT			
		NB	SB	WB	EB	NB	SB	WB	EB	NB	SB	WB	EB
Hillsdale / US 41 J-Turn	2020	B	A	B	B	B	A	B	B	~	A	B	B
	2045	B	B	C	C	B	B	C	C				
Hillsdale / US 41 TWSC	2020	B	A	F	E	B	A	F	F				
	2045	B	B	^	F								
*Hillsdale / US 41 (EB removed) TWSC	2020	B	A	E	x								
	2045												
Radio / US 41 OWSC	2020	~	A	D	x	~	~	B	x				
	2045	~	B	E	x	~	~	B	x				
Old State Rd-Campbell / US 41 TWSC	2020	B	B	F	F	B	B	F	F	B	B	F	**F
	2045	B	B	^	F	B	B	^	^				
Campbell / Walnut TWSC	2020	A	x	A	~	A	x	A	~				
	2045	A	x	A	~	A	x	A	~				
Hillsdale / Walnut TWSC	2020	A	B	A	A	A	A	A	A				
	2045	B	B	A	A	B	B	A	A				
Hillsdale / Old State TWSC	2020	~	A	A	x	~	A	A	x				
	2045	~	A	B	x	~	A	B	x				
Radio / Walnut TWSC	2020	A	A	A	A	A	A	A	A				
	2045	A	A	A	A	A	A	A	A				

*Tested once to compare removing the west approach under the TWSC condition. No significant difference in operations

**A dedicated left turn lane was added at west approach for this computation. Does not improve LOS for critical WB or EB movements.

~Non-critical

^not computable

APPENDIX F

August 2019

US 41 at Hillsdale Road
Intersection Performance Summary Table

2020 (Radio R-in/R-out) - Delay: AM (PM)					
Type	**EB**	**WB**	**NB**	**SB**	**ALL**
TWSC	51.9 (317.0)	302.4 (1301.9)			
Signal	31.5 (22.0)	26.7 (23.2)	13.5 (7.2)	14.5 (7.4)	15.5 (8.3)
J-Turn (Main)	12.4 (13.2)	12.5 (14.9)			
J-Turn (north)		14.4 (14.9)			
J-Turn (south)	11.6 (14.2)				

2020 (Radio R-in/R-out) - LOS: AM (PM)					
Type	**EB**	**WB**	**NB**	**SB**	**ALL**
TWSC	F (F)	F (F)			
Signal	C (C)	C (C)	B (A)	B (A)	B (A)
J-Turn (Main)	B (B)	B (B)			
J-Turn (north)		B (B)			
J-Turn (south)	B (B)				

2045 (Radio R-in/R-out) - Delay: AM (PM)					
Type	**EB**	**WB**	**NB**	**SB**	**ALL**
TWSC	823.9 (432.8)	^ (^)			
Signal	20.3 (15.7)	23.9 (16.9)	4.0 (5.1)	4.4 (5.3)	6.2 (5.9)
J-Turn (Main)	14.3 (15.6)	15.9 (23.7)			
J-Turn (north)		18.6 (19.0)			
J-Turn (south)	12.8 (17.0)				

^ Not computable

2045 (Radio R-in/R-out) - LOS: AM (PM)					
Type	**EB**	**WB**	**NB**	**SB**	**ALL**
TWSC	F (F)	F+ (F+)			
Signal	C (B)	C (B)	A (A)	A (A)	A (A)
J-Turn (Main)	B (C)	C (C)			
J-Turn (north)		C (C)			
J-Turn (south)	B (C)				

US 41 at Hillsdale Road
Intersection Performance Summary Table

August 2019

COMPARE R-CUT TO J-TURN & CONVENTIONAL SIGNAL

Test the AM WB movement (heaviest conflicting directional movement)

2020 R-CUT - Delay (AM)					
Type	**EB**	**WB**	**NB**	**SB**	**ALL**
Stop (Main)		12.5			
*Travel1			60		
Signal (median)		27.1			
**Travel2				60	
Total Time					159.6
	Total WB =	39.6			

2020 J-Turn - Delay (AM)					
Type	**EB**	**WB**	**NB**	**SB**	**ALL**
Stop (Main)		12.5			
*Travel1			60		
Stop (median)		14.4			
**Travel2				60	
Total Time					146.9
	Total WB =	26.9			

Signal Intersection WB =	26.7	delay at approach
J-Turn WB =	26.9	delay at approaches
R-CUT WB =	39.6	delay at approaches

R-CUT provides no added benefit for the critical movement (WB Hillsdale Road)

*Travel1 = estimated time from main intersection stop to median turn
**Travel2 = estimated time from median turn to origination (in opposing lane)

APPENDIX G

US 41 / Hillsdale Road Intersection Improvements
Preliminary Construction Cost Estimate - Engineering Assessment Stage

Clearing Right-of-Way	LS	1	$ 20,000.00	$ 20,000.00
Field Office	MOS	12	$ 1,759.13	$ 21,109.56
Excavation, Common	CYS	7300	$ 16.98	$ 123,954.00
Erosion Control & Temp Seeding	LS	1	$ 50,000.00	$ 50,000.00
Borrow	CYS	1800	$ 11.00	$ 19,800.00
Underdrains, 6"	LFT	6000	$ 5.76	$ 34,560.00
Aggregate for Underdrains	CYS	325	$ 44.31	$ 14,400.75
Geotextiles for Underdrains	SYS	1300	$ 3.00	$ 3,900.00
Subgrade Treatment	SYS	7500	$ 4.80	$ 36,000.00
Structure Backfill	CYS	100	$ 35.00	$ 3,500.00
Compacted Aggregate	TON	200	$ 40.00	$ 8,000.00
Milling, Asphalt, 2.5 IN	SYS	15000	$ 1.65	$ 24,750.00
QC/QA-HMA Surface, 9.5 mm	TON	1300	$ 65.00	$ 84,500.00
QC/QA-HMA Intermediate, 12.5 mm	TON	870	$ 65.00	$ 56,550.00
QC/QA-HMA Base, 19.0 mm	TON	4900	$ 68.00	$ 333,200.00
Prime Coat	TON	8	$ 531.57	$ 4,252.56
Tack Coat	TON	5	$ 526.65	$ 2,633.25
HMA Wedge & Level	TON	175	$ 85.00	$ 14,875.00
Guardrail, W-Beam	LFT	1400	$ 21.26	$ 29,764.00
Guardrail Transition, Type TGB	EACH	2	$ 2,485.23	$ 4,970.46
Guardrail End Section, Type OS	EACH	2	$ 2,924.58	$ 5,849.16
Pipe, 15"	LFT	400	$ 45.22	$ 18,088.00
Pipe, 48" RCP (Extend)	Lft	40	$ 205.00	$ 8,200.00
Inlet, w/ Safety Grate (Median)	EACH	4	$ 2,058.72	$ 8,234.88
Pipe Anchor, 48"	EACH	2	$ 2,000.00	$ 4,000.00
Maintaining Traffic	LS	1	$ 200,000.00	$ 200,000.00
Signs	LS	1	$ 175,000.00	$ 175,000.00
Lighting	LS	1	$ 150,000.00	$ 150,000.00
Pavement Markings	LS	1	$ 10,000.00	$ 10,000.00
Directional Bore (15" pipe)	LFT	150	$ 100.00	$ 15,000.00
Construction Engineering	LS	1	$ 29,400.00	$ 29,400.00
Mobilization and Demobilization	LS	1	$ 75,700.00	$ 75,700.00
			2018 unit price basis =	$ 1,590,191.62
			2018 w/ 20% contingency =	$ 1,908,230.00
			2019 (4% inflation) =	$ 1,984,560.00
			2020 (4% inflation) =	$ 2,063,940.00
			2021 (4% inflation) =	$ 2,146,500.00

APPENDIX H

INDIANA DEPARTMENT OF TRANSPORTATION

Report for IHCP Queuing Analysis

Prepared by:	**Shawn Strange**	Position:	**Engineer**
Prepared for:	**INDOT**	Position:	**District Traffic**

Work Zone Information

Route:	US 41
Mile marker:	MM XXX.XX
Positive Direction:	North
Contract:	X-XXXXX
Work Year:	2021
Work Month:	JUN
Work Type:	Construction
Work Description:	Intersection J Turn
Permanent Speed Limit:	50 mph
Work Zone Speed Limit:	50 mph
Workzone Lane Width:	11 ft
Channelizing Devices:	Typically Drums, Cones, or Barrier Wall.
Additional Information:	Lane Drop for Roadside Work

Queuing Formula

$$L = L_0 + \frac{(V - C) * 1\,hr}{(k * N)}$$

Where:

- L= Length of Queue for Specified Hour (mi)
- L_0= Length of Queue in the Hour Prior to Specified Hour (mi)
- V= Hourly Volume (PCE/hr)
- C= Hourly Capacity (PCE/hr)
- k= Jam Density (PCE/mi/lane)
- N= Number of Storage Lanes Upstream of Restriction (lanes)

Jam Density (k)=	190 PCE/mi/ln
N for SB=	1 ln
N for NB=	1 ln

Traffic Information

Count Information	Count Station Number:	820260
	Month, Year of Count:	SEP, 2018
	Rural/Urban:	Rural

Factors to Adjust Counts to Annual Value in Current Year

Annual Adj. Factor:	1.01
Monthly Adj. Factor:	0.98

Factors to Project Annual Value in Current Year to Work Month and Year

Annual Adj. Factor:	1.020
Monthly Adj. Factor:	0.906

Assumed Percent Reduction of Traffic Due to Detouring

Southbound

Monday-Thursday:	0%
Friday:	0%
Saturday-Sunday:	0%

Northbound

Monday-Thursday:	0%
Friday:	0%
Saturday-Sunday:	0%

Traffic Volumes

Time	Southbound Volumes (PCE/hr)				Northbound Volumes (PCE/hr)			
	Weekday	Friday	Saturday	Sunday	Weekday	Friday	Saturday	Sunday
Midnight to 1 am	138	138	138	138	116	116	116	116
1 am to 2 am	159	159	159	159	120	120	120	120
2 am to 3 am	109	109	109	109	136	136	136	136
3 am to 4 am	134	134	134	134	111	111	111	111
4 am to 5 am	303	303	303	303	292	292	292	292
5 am to 6 am	812	812	812	812	937	937	937	937
6 am to 7 am	1306	1306	1306	1306	1011	1011	1011	1011
7 am to 8 am	1586	1586	1586	1586	977	977	977	977
8 am to 9 am	1088	1088	1088	1088	805	805	805	805
9 am to 10 am	946	946	946	946	737	737	737	737
10 am to 11 am	969	969	969	969	797	797	797	797
11 am to Noon	889	889	889	889	871	871	871	871
Noon to 1 pm	1021	1021	1021	1021	904	904	904	904
1 pm to 2 pm	974	974	974	974	888	888	888	888
2 pm to 3 pm	1098	1098	1098	1098	1001	1001	1001	1001
3 pm to 4 pm	1138	1138	1138	1138	1196	1196	1196	1196
4 pm to 5 pm	1132	1132	1132	1132	1201	1201	1201	1201
5 pm to 6 pm	1293	1293	1293	1293	1429	1429	1429	1429
6 pm to 7 pm	841	841	841	841	1058	1058	1058	1058
7 pm to 8 pm	742	742	742	742	642	642	642	642
8 pm to 9 pm	457	457	457	457	538	538	538	538
9 pm to 10 pm	336	336	336	336	405	405	405	405
10 pm to 11 pm	267	267	267	267	218	218	218	218
11 pm to Midnight	197	197	197	197	164	164	164	164

Note: All Traffic Volumes are in PCEs/hr as defined in the IHCP.

Summary of Alternatives

Southbound

Alternative 1 (Lane Drop for Daytime Work): Within Policy Limits

Northbound

Alternative 1 (Lane Drop for Daytime Work): Within Policy Limits

Policy Limits Criteria:

i) No queues of any length for > 6 continuous hours or 12 hours in a calendar day
ii) No queues >0.5 mi for > 4 continuous hours
iii) No queues >1.0 mi for > 2 continuous hours
iv) No queues >1.5 mi

Alternative 1

Capacities for Southbound Traffic (PCE/hr)

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Midnight to 1 am	1550	1550	1550	1550	1550	1550	1550
1 am to 2 am	1550	1550	1550	1550	1550	1550	1550
2 am to 3 am	1550	1550	1550	1550	1550	1550	1550
3 am to 4 am	1550	1550	1550	1550	1550	1550	1550
4 am to 5 am	1550	1550	1550	1550	1550	1550	1550
5 am to 6 am	1550	1550	1550	1550	1550	1550	1550
6 am to 7 am	1550	1550	1550	1550	1550	1550	1550
7 am to 8 am	1550	1550	1550	1550	1550	1550	1550
8 am to 9 am	1550	1550	1550	1550	1550	1550	1550
9 am to 10 am	1550	1550	1550	1550	1550	1550	1550
10 am to 11 am	1550	1550	1550	1550	1550	1550	1550
11 am to Noon	1550	1550	1550	1550	1550	1550	1550
Noon to 1 pm	1550	1550	1550	1550	1550	1550	1550
1 pm to 2 pm	1550	1550	1550	1550	1550	1550	1550
2 pm to 3 pm	1550	1550	1550	1550	1550	1550	1550
3 pm to 4 pm	1550	1550	1550	1550	1550	1550	1550
4 pm to 5 pm	1550	1550	1550	1550	1550	1550	1550
5 pm to 6 pm	1550	1550	1550	1550	1550	1550	1550
6 pm to 7 pm	1550	1550	1550	1550	1550	1550	1550
7 pm to 8 pm	1550	1550	1550	1550	1550	1550	1550
8 pm to 9 pm	1550	1550	1550	1550	1550	1550	1550
9 pm to 10 pm	1550	1550	1550	1550	1550	1550	1550
10 pm to 11 pm	1550	1550	1550	1550	1550	1550	1550
11 pm to Midnight	1550	1550	1550	1550	1550	1550	1550

Legend:

Values that are less than the Recommended Non-work Capacity

Summary:

Recommended Non-work Capacity = 2075

Number of Hours per week of restrictions = 168 hr(s)

Alternative 1

Capacities for Northbound Traffic (PCE/hr)

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Midnight to 1 am	1550	1550	1550	1550	1550	1550	1550
1 am to 2 am	1550	1550	1550	1550	1550	1550	1550
2 am to 3 am	1550	1550	1550	1550	1550	1550	1550
3 am to 4 am	1550	1550	1550	1550	1550	1550	1550
4 am to 5 am	1550	1550	1550	1550	1550	1550	1550
5 am to 6 am	1550	1550	1550	1550	1550	1550	1550
6 am to 7 am	1550	1550	1550	1550	1550	1550	1550
7 am to 8 am	1550	1550	1550	1550	1550	1550	1550
8 am to 9 am	1550	1550	1550	1550	1550	1550	1550
9 am to 10 am	1550	1550	1550	1550	1550	1550	1550
10 am to 11 am	1550	1550	1550	1550	1550	1550	1550
11 am to Noon	1550	1550	1550	1550	1550	1550	1550
Noon to 1 pm	1550	1550	1550	1550	1550	1550	1550
1 pm to 2 pm	1550	1550	1550	1550	1550	1550	1550
2 pm to 3 pm	1550	1550	1550	1550	1550	1550	1550
3 pm to 4 pm	1550	1550	1550	1550	1550	1550	1550
4 pm to 5 pm	1550	1550	1550	1550	1550	1550	1550
5 pm to 6 pm	1550	1550	1550	1550	1550	1550	1550
6 pm to 7 pm	1550	1550	1550	1550	1550	1550	1550
7 pm to 8 pm	1550	1550	1550	1550	1550	1550	1550
8 pm to 9 pm	1550	1550	1550	1550	1550	1550	1550
9 pm to 10 pm	1550	1550	1550	1550	1550	1550	1550
10 pm to 11 pm	1550	1550	1550	1550	1550	1550	1550
11 pm to Midnight	1550	1550	1550	1550	1550	1550	1550

Legend:

Values that are less than the Recommended Non-work Capacity

Summary:

Recommended Non-work Capacity = 2075

Number of Hours per week of restrictions = 168 hr(s)

Alternative 1

Queuing for Southbound Traffic (mi)

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Midnight to 1 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 am to 2 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 am to 3 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 am to 4 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 am to 5 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 am to 6 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6 am to 7 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 am to 8 am	0.2	0.2	0.2	0.2	0.2	0.2	0.2
8 am to 9 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9 am to 10 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 am to 11 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 am to Noon	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Noon to 1 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 pm to 2 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 pm to 3 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 pm to 4 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 pm to 5 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 pm to 6 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6 pm to 7 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 pm to 8 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8 pm to 9 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9 pm to 10 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 pm to 11 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 pm to Midnight	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Legend:

Queues greater than zero, but less than 1.5 miles
Queues greater than or equal to 1.5 miles

Summary:

Maximum Queue Length = 0.2 mi
Total queue length-hours = 1 mi-hrs
Total hours with queue = 7 hrs

Alternative 1

Queuing for Northbound Traffic (mi)

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Midnight to 1 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 am to 2 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 am to 3 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 am to 4 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 am to 5 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 am to 6 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6 am to 7 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 am to 8 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8 am to 9 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9 am to 10 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 am to 11 am	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 am to Noon	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Noon to 1 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1 pm to 2 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 pm to 3 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 pm to 4 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 pm to 5 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 pm to 6 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6 pm to 7 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7 pm to 8 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8 pm to 9 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9 pm to 10 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10 pm to 11 pm	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11 pm to Midnight	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Legend:

Queues greater than zero, but less than 1.5 miles

Queues greater than or equal to 1.5 miles

Summary:

Maximum Queue Length = 0.0 mi

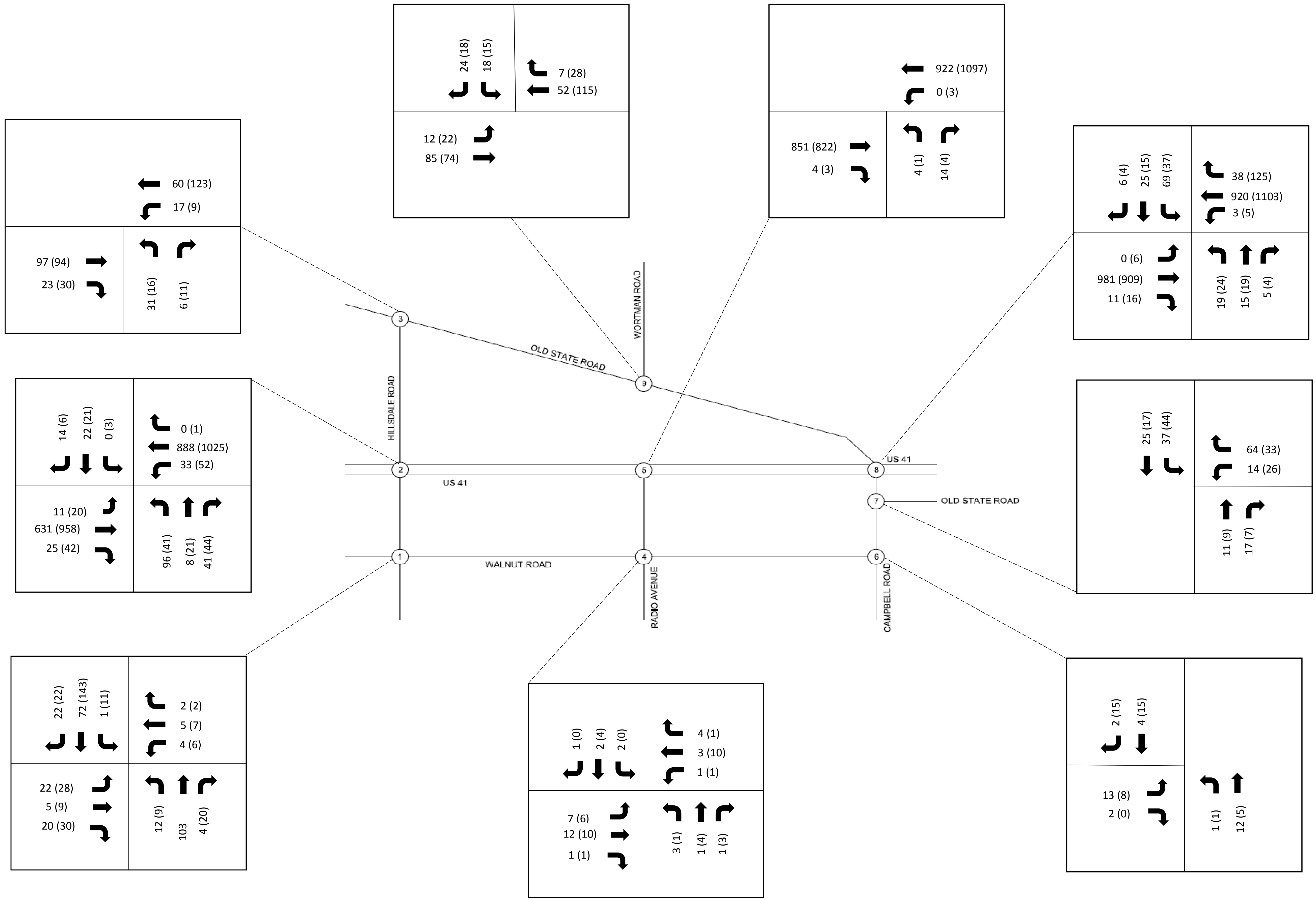
Total queue length-hours = 0 mi-hrs

Total hours with queue = 0 hrs

APPENDIX I

Peak Hour Traffic
AM (PM)

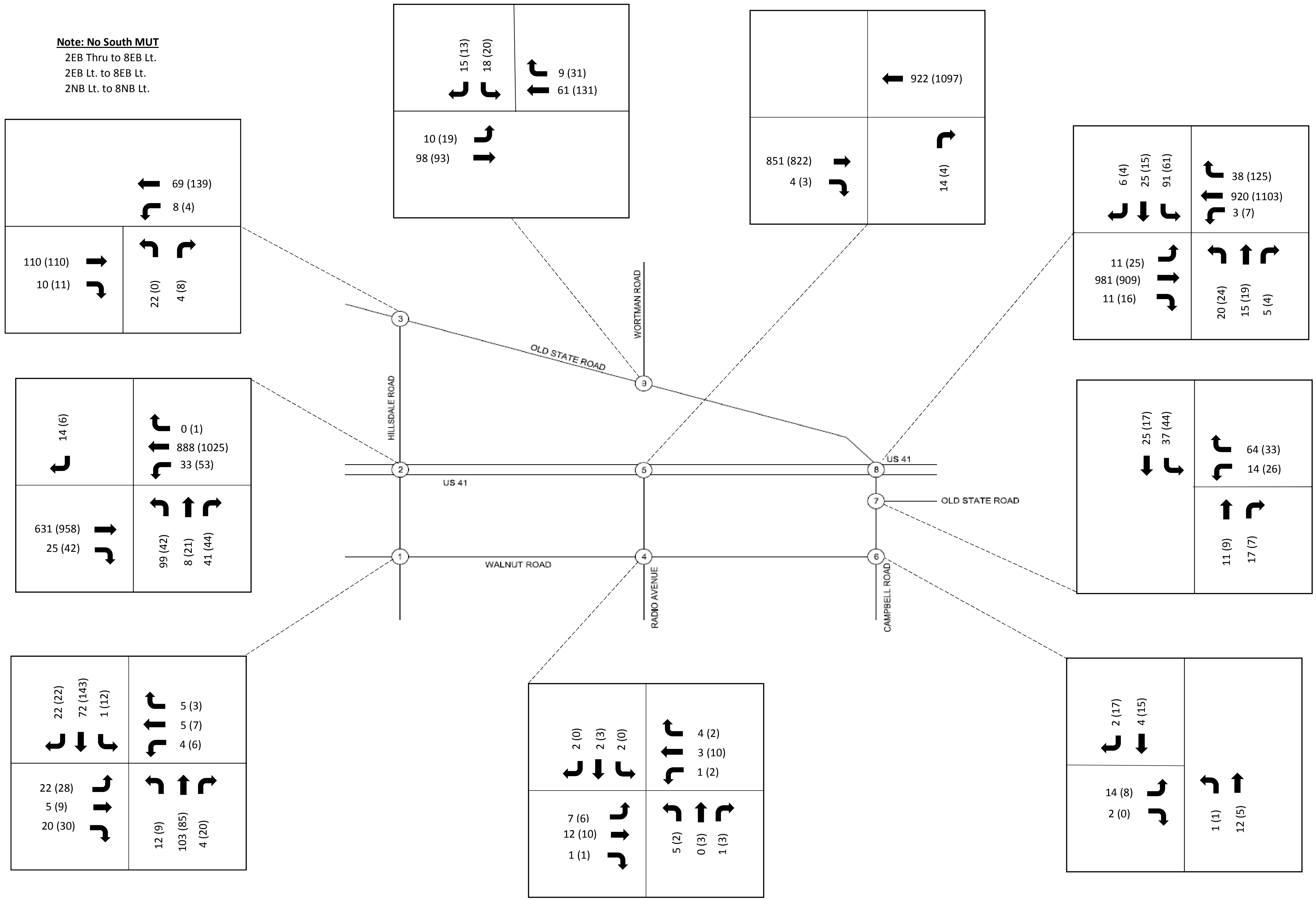
2020 No Build



Peak Hour Traffic
AM (PM)

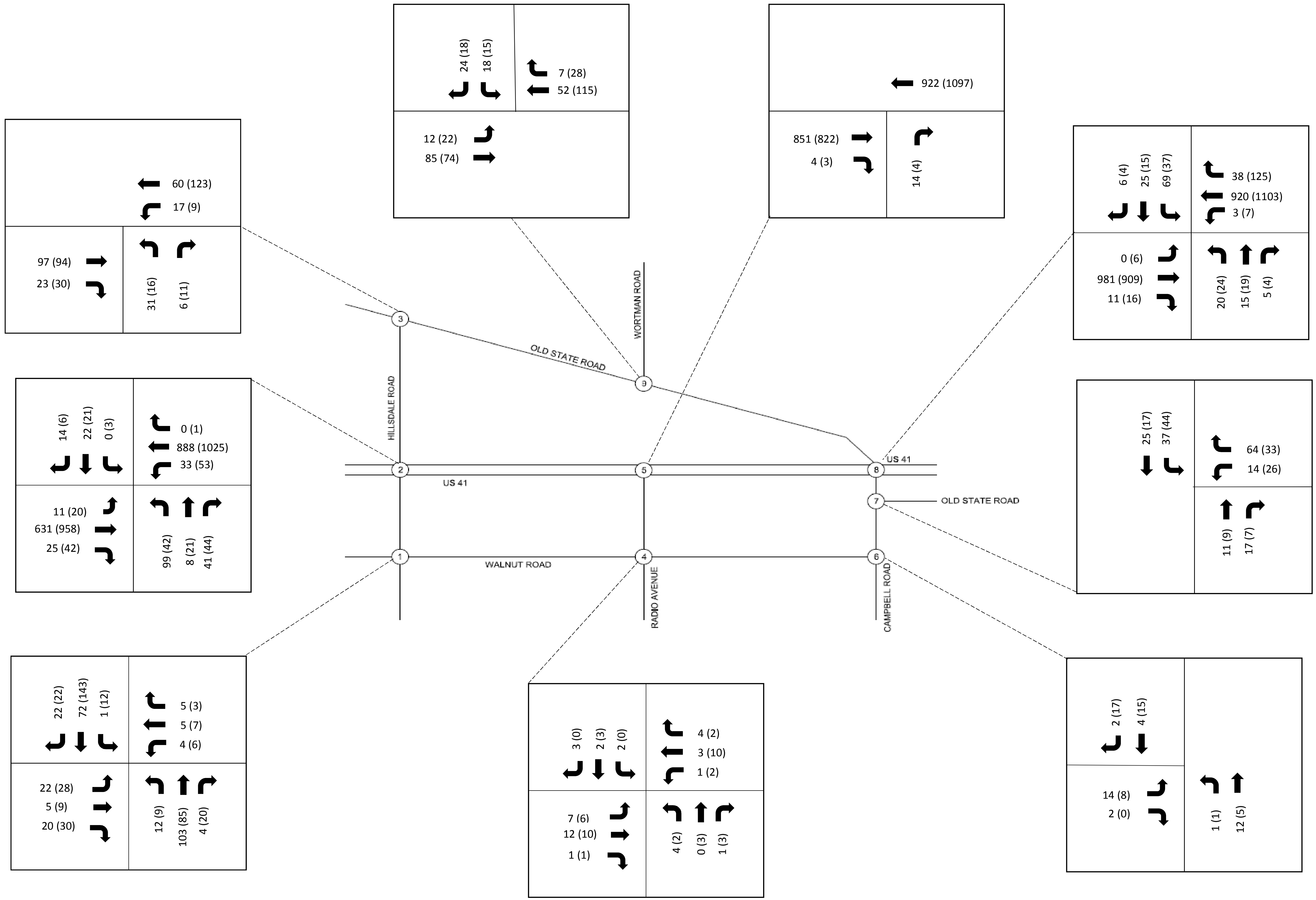
2020 R-in/R-out
@ Hillsdale Rd. (west)
@ Radio Ave.

<u>**Note: No South MUT**</u>
2EB Thru to 8EB Lt.
2EB Lt. to 8EB Lt.
2NB Lt. to 8NB Lt.



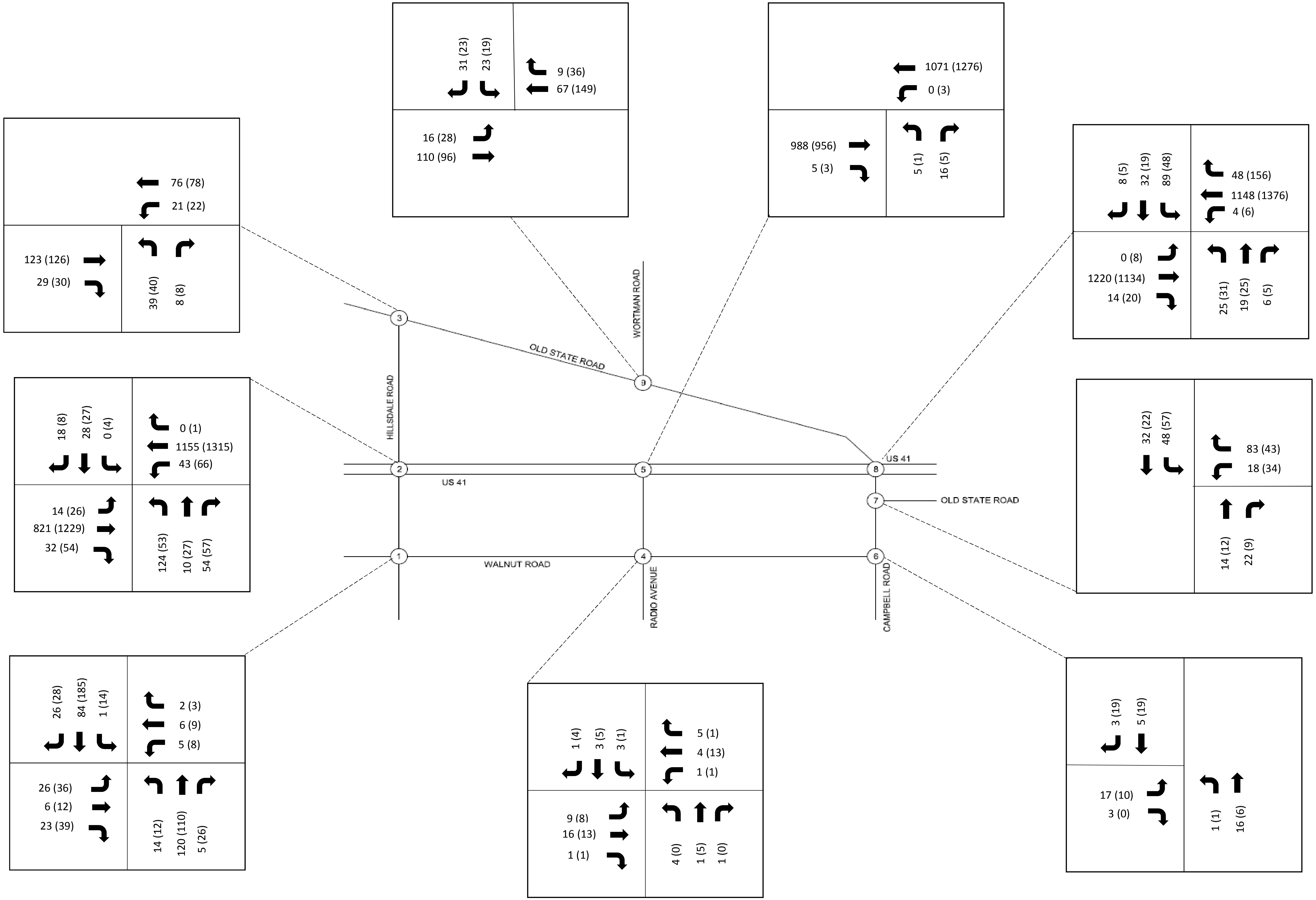
Peak Hour Traffic
AM (PM)

2020 R-in / R-out
@ Radio Ave.



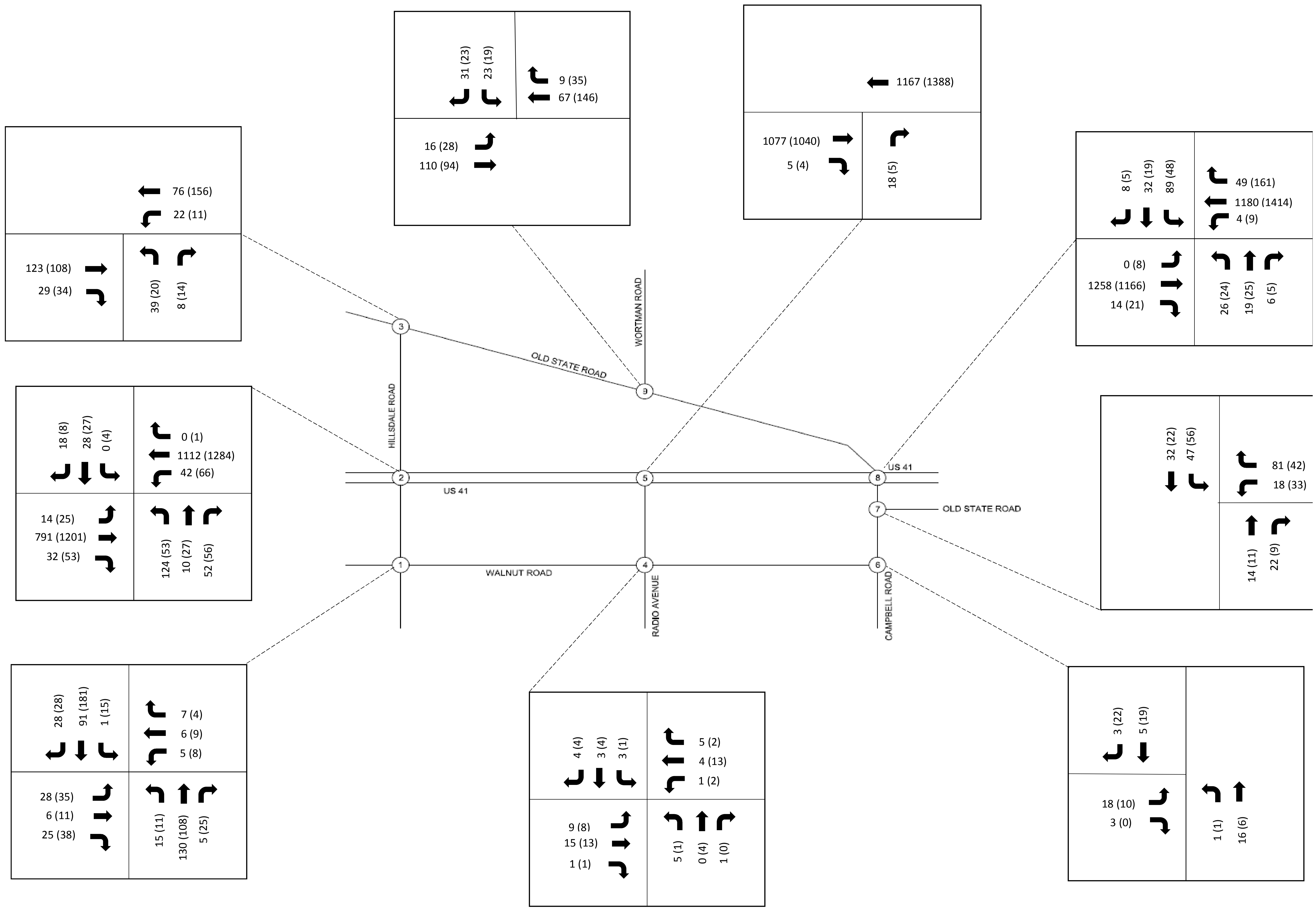
Peak Hour Traffic
AM (PM)

2045 No Build



Peak Hour Traffic
AM (PM)

2045 R-in / R-out
@ Radio Ave.



APPENDIX J

INDIANA DEPARTMENT OF TRANSPORTATION

PROJECT TRAFFIC FORECAST REPORT

DES No.: 1400005

US-41 At Hillsdale Road, 2.04 miles N of SR 57

From RP 10+90 to RP 11+1

Vanderburgh County

Prepared For

Matthew Bullock

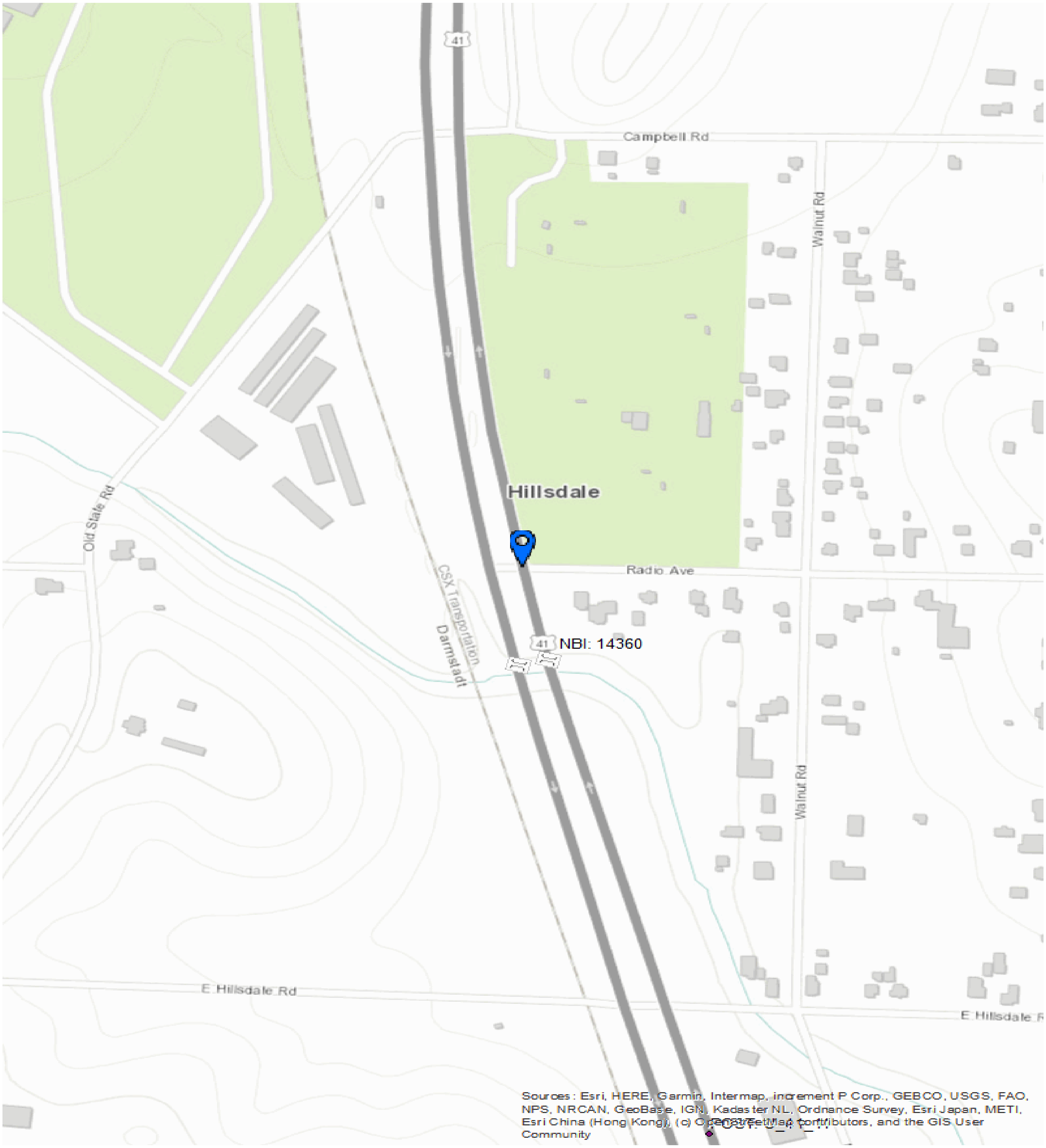
On

01/02/2019

By

INDOT, Office of Traffic Statistics
Technical Planning Support & Programming Division
Gregory A. Katter, PE, Supervisor
100 N. Senate Ave, N955
Indianapolis, Indiana 46204
INDOTTrafficForecasts@indot.IN.gov

PROJECT TRAFFIC FORECAST REPORT



INDIANA DEPARTMENT OF TRANSPORTATION

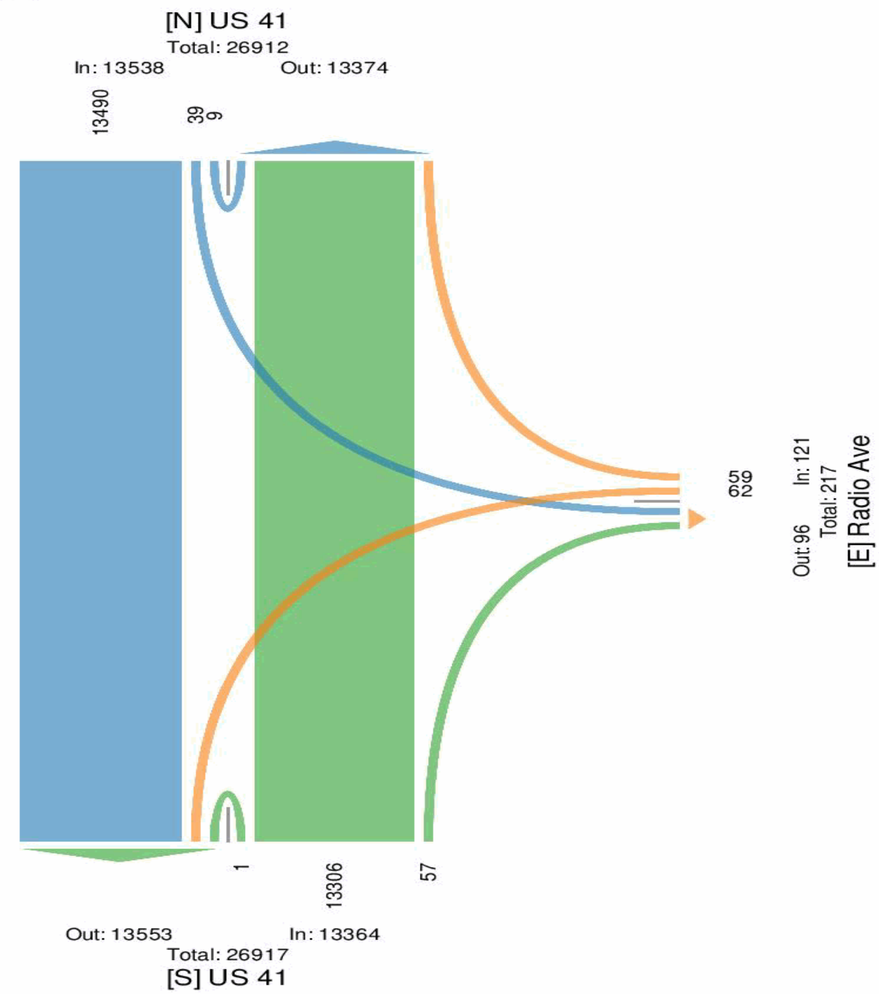
May 22, 2019 10:29 am

PROJECT TRAFFIC FORECAST REPORT

Intersection: 1

EMPO/INDOT US 41 @ Radio Ave - TMC
Thu May 2, 2019
Full Length (2 PM-2 PM (+1))
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 650491, Location: 38.083135, -87.556062

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US



PROJECT TRAFFIC FORECAST REPORT

Location: At Hillsdale Road, 2.04 miles N of SR 57

The table below contains the projected Annual Average Daily Traffic (AADT) in each requested year for each approach and movement.

The per year growth rate used for each approach is indicated in the table below. It is applied as a straight line growth.

For the purpose of this report a commercial vehicle would fall into FHWA Scheme F Classes 4 through 13. They are identified by MioVision as either an Articulated Truck, a Bus, or a Single-Unit Truck.

Daily Movement Forecast

Approach Road Name	Approach Direction	Movement	Total	Count Year AADT	Growth Rate	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045	Commercial Percentage
RADIO AV	East	Right	59	52	0.00%	52	52	52	52	1.70%
RADIO AV	East	Left	62	55	0.00%	55	55	55	55	1.61%
RADIO AV	East	U-Turn	0	0	0.00%	0	0	0	0	0.00%
RADIO AV	East	Total	121	107	0.00%	107	107	107	107	0.00%
US 41	North	Thru	13,490	11,939	0.00%	11,939	11,939	11,939	11,939	13.05%
US 41	North	Left	39	35	0.00%	35	35	35	35	0.00%
US 41	North	U-Turn	9	8	0.00%	8	8	8	8	0.00%
US 41	North	Total	13,538	11,981	0.00%	11,981	11,981	11,981	11,981	0.00%
US 41	South	Right	57	50	0.00%	50	50	50	50	3.51%
US 41	South	Thru	13,306	11,776	0.00%	11,776	11,776	11,776	11,776	12.69%
US 41	South	U-Turn	1	1	0.00%	1	1	1	1	0.00%
US 41	South	Total	13,364	11,827	0.00%	11,827	11,827	11,827	11,827	0.00%

Growth Rate Notes

INDIANA DEPARTMENT OF TRANSPORTATION

May 22, 2019 10:29 am

PROJECT TRAFFIC FORECAST REPORT

Location: At Hillsdale Road, 2.04 miles N of SR 57

The table below contains the projected traffic volumes in each requested year for approach and movement during the morning and afternoon peak hour.
The morning and afternoon peak hours are those 60 minute periods during which the most vehicles pass through the intersection.

AM PM Peak Movement Forecast

Approach Direction	Growth Rate	Movement	Interval	Total Vehicles	Commercial % AADT	Count Year AADT	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045
East	0.00%	Left	6:45 AM	5	0.00%	4	4	4	4	4
East	0.00%	Right	6:45 AM	16	0.00%	14	14	14	14	14
East	0.00%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
North	0.00%	Left	6:45 AM	0	0.00%	0	0	0	0	0
North	0.00%	Thru	6:45 AM	1042	13.53%	922	922	922	922	922
North	0.00%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
South	0.00%	Thru	6:45 AM	962	11.12%	851	851	851	851	851
South	0.00%	Right	6:45 AM	4	0.00%	4	4	4	4	4
South	0.00%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
East	0.00%	Left	3:45 PM	1	0.00%	1	1	1	1	1
East	0.00%	Right	3:45 PM	4	25.00%	4	4	4	4	4
East	0.00%	U-Turn	3:45 PM	0	0.00%	0	0	0	0	0
North	0.00%	Left	3:45 PM	3	0.00%	3	3	3	3	3
North	0.00%	Thru	3:45 PM	1239	7.91%	1,097	1,097	1,097	1,097	1,097
North	0.00%	U-Turn	3:45 PM	1	0.00%	1	1	1	1	1
South	0.00%	Thru	3:45 PM	929	9.15%	822	822	822	822	822
South	0.00%	Right	3:45 PM	3	0.00%	3	3	3	3	3
South	0.00%	U-Turn	3:45 PM	0	0.00%	0	0	0	0	0

It should be recognized by users of this forecast that the base year AADT has an accuracy of plus or minus 10%. It should also be understood that while this report may include forecasts with up to six apparent significant figures, the accuracy should not be interpreted as being greater than two significant figures. It is the responsibility of designers to exercise professional judgement when using this data to influence decisions.

INDIANA DEPARTMENT OF TRANSPORTATION

May 23, 2019 9:42 am

PROJECT TRAFFIC FORECAST REPORT

DES No.: 1400005

US-41 At Hillsdale Road, 2.04 miles N of SR 57

From RP 10+90 to RP 11+1

Vanderburgh County

Prepared For

Matthew Bullock

On

01/02/2019

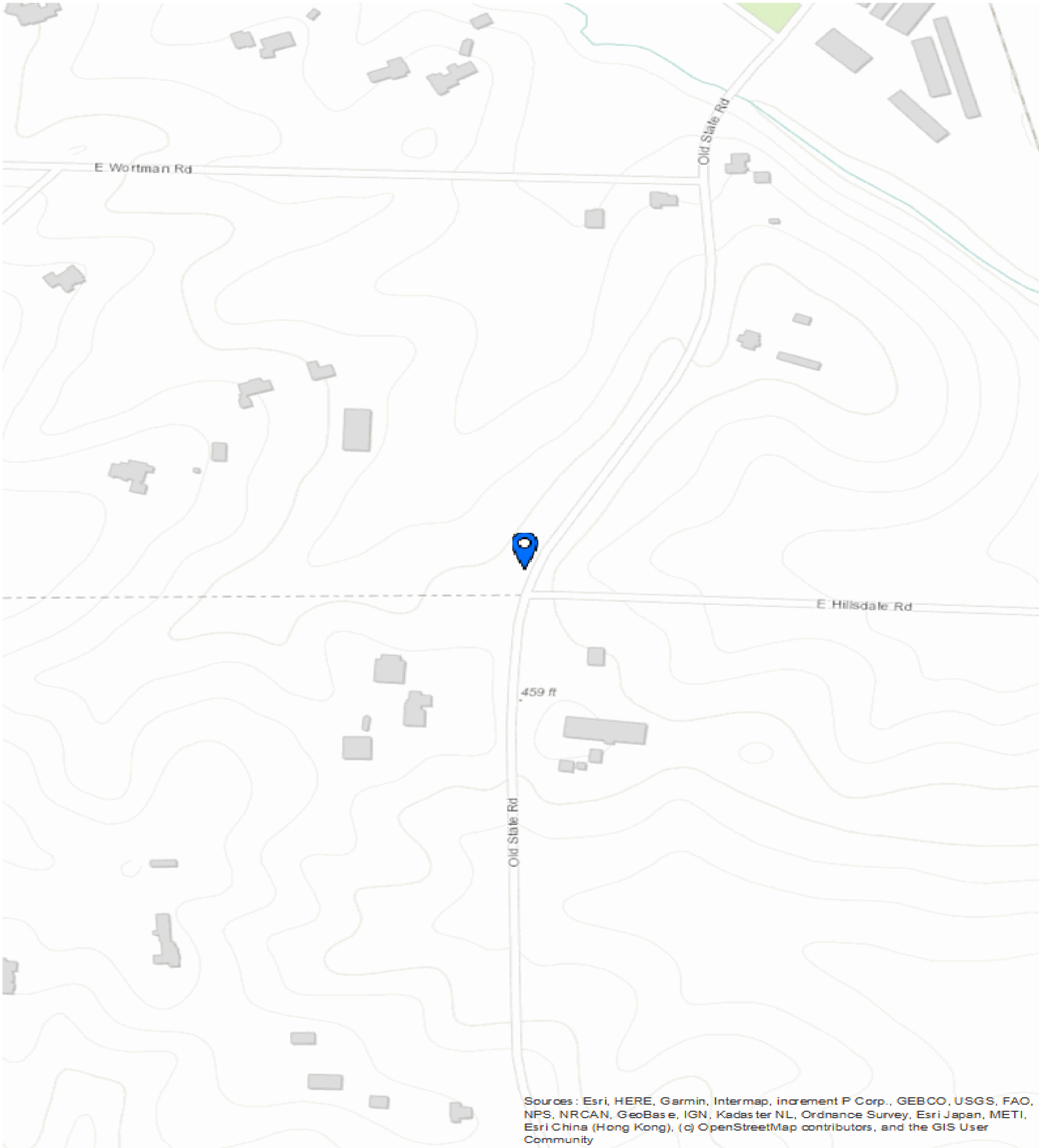
By

INDOT, Office of Traffic Statistics
Technical Planning Support & Programming Division
Gregory A. Katter, PE, Supervisor
100 N. Senate Ave, N955
Indianapolis, Indiana 46204
INDOTTrafficForecasts@indot.IN.gov

INDIANA DEPARTMENT OF TRANSPORTATION

May 23, 2019 9:42 am

PROJECT TRAFFIC FORECAST REPORT



INDIANA DEPARTMENT OF TRANSPORTATION

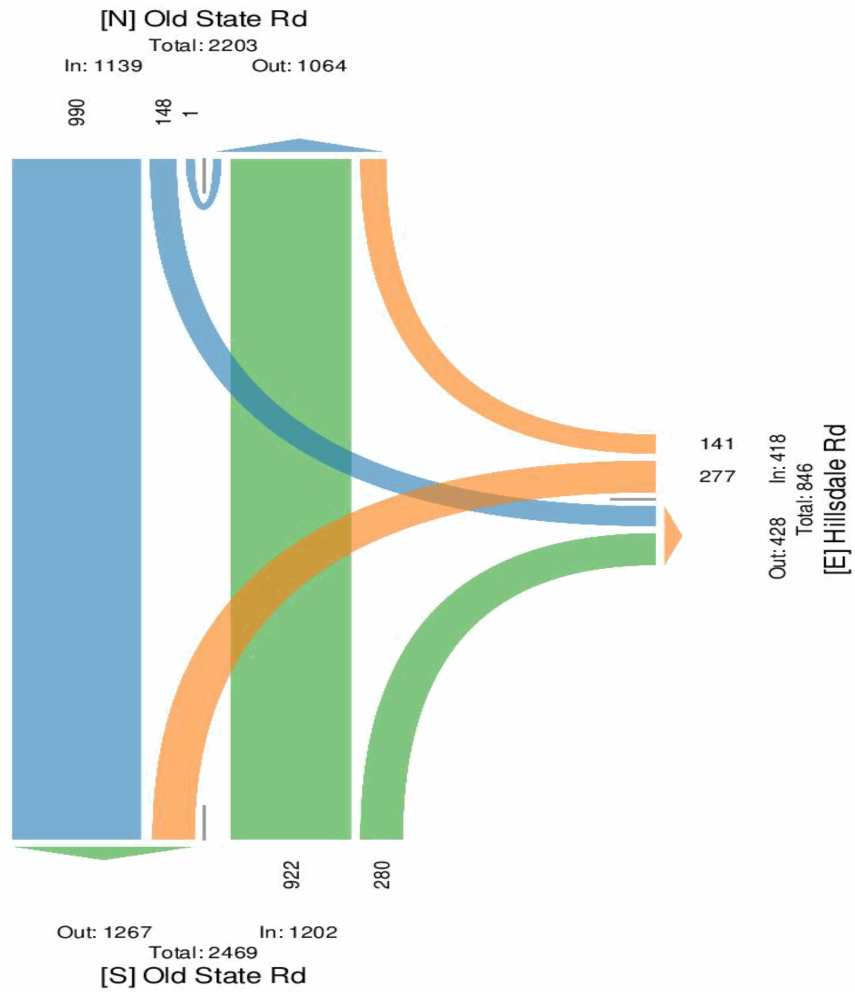
May 23, 2019 9:42 am

PROJECT TRAFFIC FORECAST REPORT

Intersection: 1

EMPO/INDOT Old State Rd @ Hillsdale Rd - TMC
Wed May 1, 2019
Full Length (12 PM-12 PM (+1))
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 650505, Location: 38.079693, -87.560941

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US



INDIANA DEPARTMENT OF TRANSPORTATION

May 23, 2019 9:42 am

PROJECT TRAFFIC FORECAST REPORT

Location: At Hillsdale Road, 2.04 miles N of SR 57

The table below contains the projected Annual Average Daily Traffic (AADT) in each requested year for each approach and movement.

The per year growth rate used for each approach is indicated in the table below. It is applied as a straight line growth.

For the purpose of this report a commercial vehicle would fall into FHWA Scheme F Classes 4 through 13. They are identified by MioVision as either an Articulated Truck, a Bus, or a Single-Unit Truck.

Daily Movement Forecast

Approach Road Name	Approach Direction	Movement	Total	Count Year AADT	Growth Rate	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045	Commercial Percentage
HILLSDALE RD	East	Right	141	128	0.00%	128	128	128	128	4.26%
HILLSDALE RD	East	Left	277	252	0.00%	252	252	252	252	1.08%
HILLSDALE RD	East	U-Turn	0	0	0.00%	0	0	0	0	0.00%
HILLSDALE RD	East	Total	418	380	0.00%	380	380	380	380	0.00%
OLD STATE RD SB	North	Thru	990	900	0.00%	900	900	900	900	1.72%
OLD STATE RD SB	North	Left	148	135	0.00%	135	135	135	135	4.73%
OLD STATE RD SB	North	U-Turn	1	1	0.00%	1	1	1	1	0.00%
OLD STATE RD SB	North	Total	1,139	1,035	0.00%	1,035	1,035	1,035	1,035	0.00%
OLD SR	South	Right	280	255	0.00%	255	255	255	255	2.86%
OLD SR	South	Thru	922	838	0.00%	838	838	838	838	1.84%
OLD SR	South	U-Turn	0	0	0.00%	0	0	0	0	0.00%
OLD SR	South	Total	1,202	1,093	0.00%	1,093	1,093	1,093	1,093	0.00%

Growth Rate Notes

INDIANA DEPARTMENT OF TRANSPORTATION

May 23, 2019 9:42 am

PROJECT TRAFFIC FORECAST REPORT

Location: At Hillsdale Road, 2.04 miles N of SR 57

The table below contains the projected traffic volumes in each requested year for approach and movement during the morning and afternoon peak hour.
The morning and afternoon peak hours are those 60 minute periods during which the most vehicles pass through the intersection.

AM PM Peak Movement Forecast

Approach Direction	Growth Rate	Movement	Interval	Total Vehicles	Commercial % AADT	Count Year AADT	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045
East	0.00%	Left	6:45 AM	34	0.00%	31	31	31	31	31
East	0.00%	Right	6:45 AM	7	0.00%	6	6	6	6	6
East	0.00%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
North	0.00%	Left	6:45 AM	19	0.00%	17	17	17	17	17
North	0.00%	Thru	6:45 AM	66	4.55%	60	60	60	60	60
North	0.00%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
South	0.00%	Thru	6:45 AM	97	1.03%	88	88	88	88	88
South	0.00%	Right	6:45 AM	23	0.00%	21	21	21	21	21
South	0.00%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
East	0.00%	Left	4:30 PM	18	0.00%	16	16	16	16	16
East	0.00%	Right	4:30 PM	12	0.00%	11	11	11	11	11
East	0.00%	U-Turn	4:30 PM	0	0.00%	0	0	0	0	0
North	0.00%	Left	4:30 PM	10	0.00%	9	9	9	9	9
North	0.00%	Thru	4:30 PM	135	0.00%	123	123	123	123	123
North	0.00%	U-Turn	4:30 PM	0	0.00%	0	0	0	0	0
South	0.00%	Thru	4:30 PM	94	0.00%	85	85	85	85	85
South	0.00%	Right	4:30 PM	30	0.00%	27	27	27	27	27
South	0.00%	U-Turn	4:30 PM	0	0.00%	0	0	0	0	0

It should be recognized by users of this forecast that the base year AADT has an accuracy of plus or minus 10%. It should also be understood that while this report may include forecasts with up to six apparent significant figures, the accuracy should not be interpreted as being greater than two significant figures. It is the responsibility of designers to exercise professional judgement when using this data to influence decisions.

INDIANA DEPARTMENT OF TRANSPORTATION

May 22, 2019 12:09 pm

PROJECT TRAFFIC FORECAST REPORT

DES No.: 1400005

US-41 At Hillsdale Road, 2.04 miles N of SR 57

From RP 10+90 to RP 11+1

Vanderburgh County

Prepared For

Matthew Bullock

On

01/02/2019

By

INDOT, Office of Traffic Statistics
Technical Planning Support & Programming Division
Gregory A. Katter, PE, Supervisor
100 N. Senate Ave, N955
Indianapolis, Indiana 46204
INDOTTrafficForecasts@indot.IN.gov

INDIANA DEPARTMENT OF TRANSPORTATION

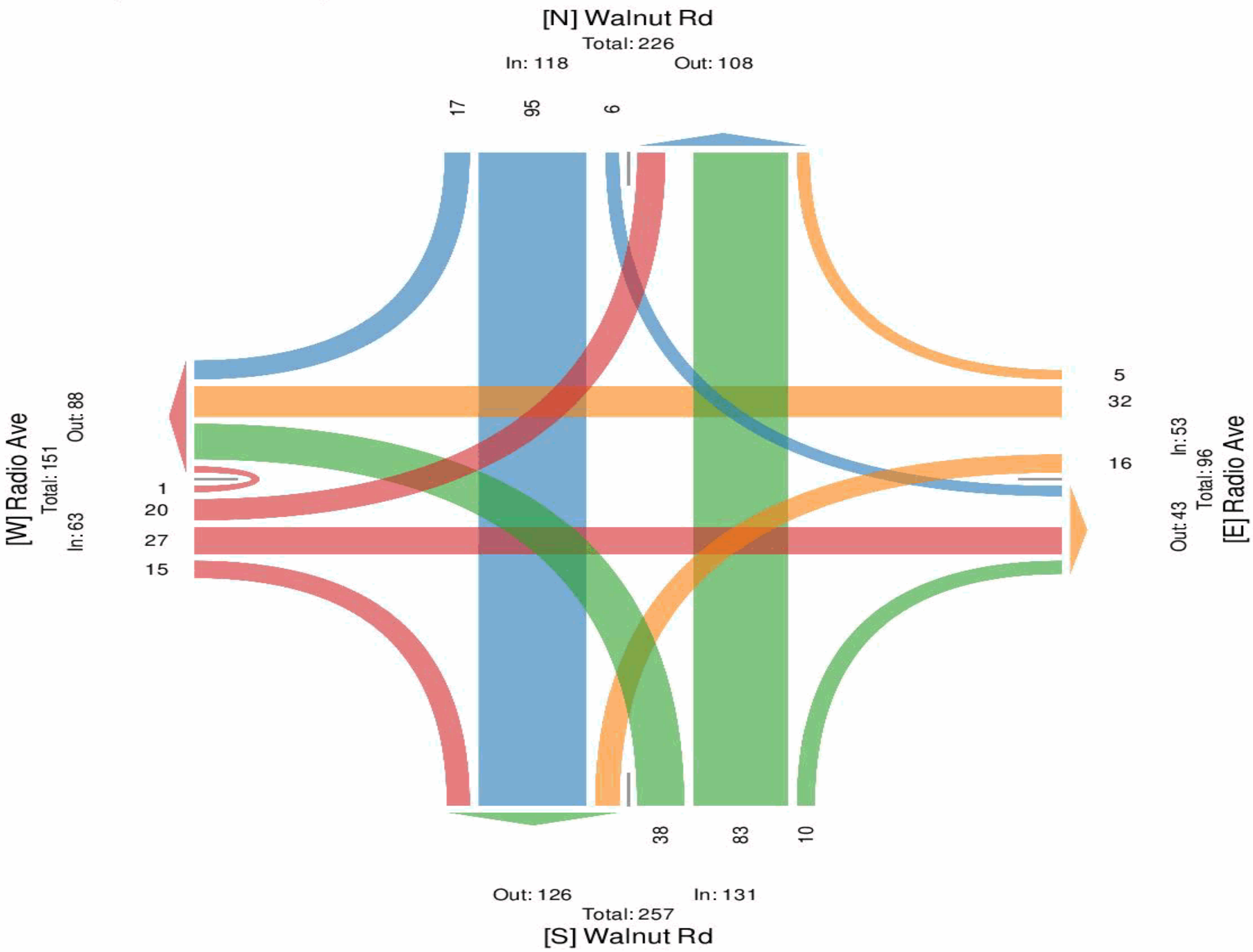
May 22, 2019 12:09 pm

PROJECT TRAFFIC FORECAST REPORT

Intersection: 1

EMPO/INDOT Radio Ave @ Walnut Rd - TMC
Wed May 1, 2019
Full Length (12 PM-12 PM (+1))
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 650497, Location: 38.083017, -87.553573

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US



INDIANA DEPARTMENT OF TRANSPORTATION

May 22, 2019 12:09 pm

PROJECT TRAFFIC FORECAST REPORT

Location: At Hillsdale Road, 2.04 miles N of SR 57

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The per year growth rate used for each approach is indicated in the table below. It is applied as a straight line growth.

For the purpose of this report a commercial vehicle would fall into FHWA Scheme F Classes 4 through 13. They are identified by MioVision as either an Articulated Truck, a Bus, or a Single-Unit Truck.

Daily Movement Forecast

Approach Road Name	Approach Direction	Movement	Total	Count Year AADT	Growth Rate	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045	Commercial Percentage
RADIO AV	East	Right	5	5	0.00%	5	5	5	5	40.00%
RADIO AV	East	Thru	32	29	0.00%	29	29	29	29	3.13%
RADIO AV	East	Left	16	15	0.00%	15	15	15	15	6.25%
RADIO AV	East	U-Turn	0	0	0.00%	0	0	0	0	0.00%
RADIO AV	East	Total	53	48	0.00%	48	48	48	48	0.00%
WALNUT RD	North	Right	17	15	0.00%	15	15	15	15	0.00%
WALNUT RD	North	Thru	95	87	0.00%	87	87	87	87	2.11%
WALNUT RD	North	Left	6	5	0.00%	5	5	5	5	0.00%
WALNUT RD	North	U-Turn	0	0	0.00%	0	0	0	0	0.00%
WALNUT RD	North	Total	118	107	0.00%	107	107	107	107	0.00%
WALNUT RD	South	Right	10	9	0.00%	9	9	9	9	30.00%
WALNUT RD	South	Thru	83	76	0.00%	76	76	76	76	1.21%
WALNUT RD	South	Left	38	35	0.00%	35	35	35	35	2.63%
WALNUT RD	South	U-Turn	0	0	0.00%	0	0	0	0	0.00%
WALNUT RD	South	Total	131	119	0.00%	119	119	119	119	0.00%
RADIO AV	West	Right	15	14	0.00%	14	14	14	14	0.00%
RADIO AV	West	Thru	27	25	0.00%	25	25	25	25	3.70%
RADIO AV	West	Left	20	18	0.00%	18	18	18	18	5.00%
RADIO AV	West	U-Turn	1	1	0.00%	1	1	1	1	0.00%
RADIO AV	West	Total	63	57	0.00%	57	57	57	57	0.00%

Growth Rate Notes

INDIANA DEPARTMENT OF TRANSPORTATION

May 22, 2019 12:09 pm

PROJECT TRAFFIC FORECAST REPORT

Location: At Hillsdale Road, 2.04 miles N of SR 57

The table below contains the projected traffic volumes in each requested year for approach and movement during the morning and afternoon peak hour.
The morning and afternoon peak hours are those 60 minute periods during which the most vehicles pass through the intersection.

AM PM Peak Movement Forecast

Approach Direction	Growth Rate	Movement	Interval	Total Vehicles	Commercial % AADT	Count Year AADT	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045
East	0.00%	Left	6:45 AM	2	0.00%	2	2	2	2	2
East	0.00%	Thru	6:45 AM	2	50.00%	2	2	2	2	2
East	0.00%	Right	6:45 AM	1	0.00%	1	1	1	1	1
East	0.00%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
North	0.00%	Left	6:45 AM	1	0.00%	1	1	1	1	1
North	0.00%	Thru	6:45 AM	3	0.00%	3	3	3	3	3
North	0.00%	Right	6:45 AM	4	0.00%	4	4	4	4	4
North	0.00%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
South	0.00%	Left	6:45 AM	8	0.00%	7	7	7	7	7
South	0.00%	Thru	6:45 AM	13	0.00%	12	12	12	12	12
South	0.00%	Right	6:45 AM	1	100.00%	1	1	1	1	1
South	0.00%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
West	0.00%	Left	6:45 AM	3	0.00%	3	3	3	3	3
West	0.00%	Thru	6:45 AM	1	0.00%	1	1	1	1	1
West	0.00%	Right	6:45 AM	1	0.00%	1	1	1	1	1
West	0.00%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
East	0.00%	Left	5:15 PM	0	0.00%	0	0	0	0	0
East	0.00%	Thru	5:15 PM	4	0.00%	4	4	4	4	4
East	0.00%	Right	5:15 PM	0	0.00%	0	0	0	0	0
East	0.00%	U-Turn	5:15 PM	0	0.00%	0	0	0	0	0
North	0.00%	Left	5:15 PM	1	0.00%	1	1	1	1	1
North	0.00%	Thru	5:15 PM	11	0.00%	10	10	10	10	10
North	0.00%	Right	5:15 PM	1	0.00%	1	1	1	1	1
North	0.00%	U-Turn	5:15 PM	0	0.00%	0	0	0	0	0
South	0.00%	Left	5:15 PM	7	0.00%	6	6	6	6	6
South	0.00%	Thru	5:15 PM	11	0.00%	10	10	10	10	10
South	0.00%	Right	5:15 PM	1	0.00%	1	1	1	1	1
South	0.00%	U-Turn	5:15 PM	0	0.00%	0	0	0	0	0
West	0.00%	Left	5:15 PM	1	0.00%	1	1	1	1	1
West	0.00%	Thru	5:15 PM	4	0.00%	4	4	4	4	4
West	0.00%	Right	5:15 PM	3	0.00%	3	3	3	3	3
West	0.00%	U-Turn	5:15 PM	0	0.00%	0	0	0	0	0

It should be recognized by users of this forecast that the base year AADT has an accuracy of plus or minus 10%. It should also be understood that while this report may include forecasts with up to six apparent significant figures, the accuracy should not be interpreted as being greater than two significant figures. It is the responsibility of designers to exercise professional judgement when using this data to influence decisions.

PROJECT TRAFFIC FORECAST REPORT

DES No.: 1400005

US-41 At Hillsdale Road, 2.04 miles N of SR 57

From RP 10+90 to RP 11+1

Vanderburgh County

Prepared For

Matthew Bullock

On

01/02/2019

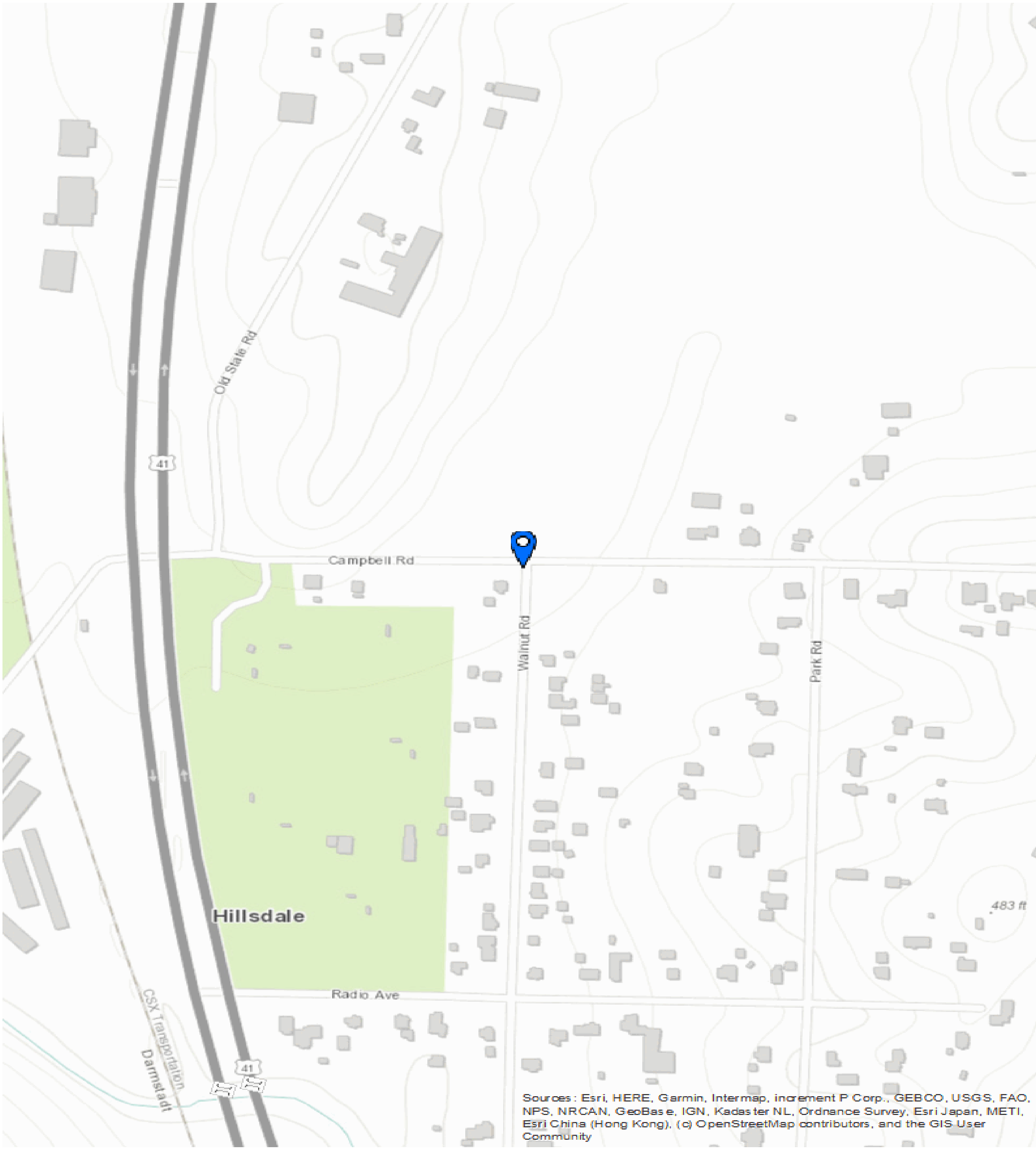
By

INDOT, Office of Traffic Statistics
Technical Planning Support & Programming Division
Gregory A. Katter, PE, Supervisor
100 N. Senate Ave, N955
Indianapolis, Indiana 46204
INDOTTrafficForecasts@indot.IN.gov

INDIANA DEPARTMENT OF TRANSPORTATION

May 23, 2019 9:01 am

PROJECT TRAFFIC FORECAST REPORT



INDIANA DEPARTMENT OF TRANSPORTATION

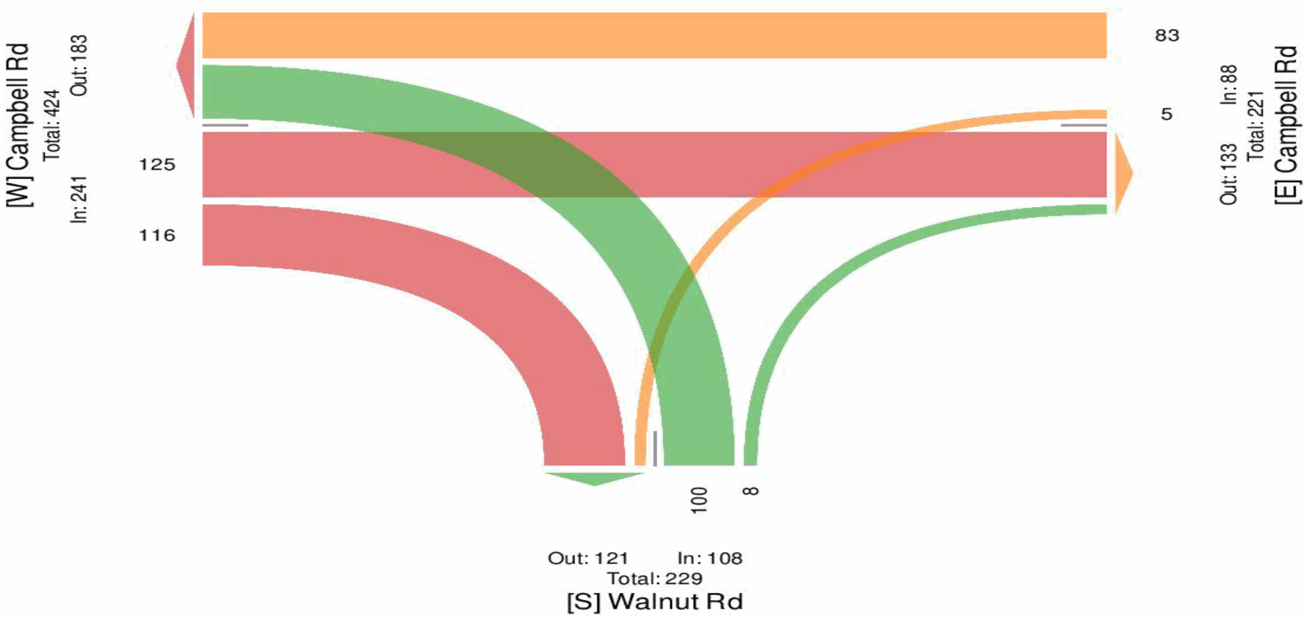
May 23, 2019 9:01 am

PROJECT TRAFFIC FORECAST REPORT

Intersection: 1

EMPO/INDOT Campbell Rd @ Walnut Rd - TMC
Wed May 1, 2019
Full Length (12 PM-12 PM (+1))
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 650500, Location: 38.08659, -87.553434

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US



PROJECT TRAFFIC FORECAST REPORT

Location: At Hillsdale Road, 2.04 miles N of SR 57

The table below contains the projected Annual Average Daily Traffic (AADT) in each requested year for each approach and movement.

The per year growth rate used for each approach is indicated in the table below. It is applied as a straight line growth.

For the purpose of this report a commercial vehicle would fall into FHWA Scheme F Classes 4 through 13. They are identified by MioVision as either an Articulated Truck, a Bus, or a Single-Unit Truck.

Daily Movement Forecast

Approach Road Name	Approach Direction	Movement	Total	Count Year AADT	Growth Rate	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045	Commercial Percentage
CAMPBELL RD	East	Thru	83	76	0.01%	76	76	76	76	6.02%
CAMPBELL RD	East	Left	5	5	0.01%	5	5	5	5	0.00%
CAMPBELL RD	East	U-Turn	0	0	0.01%	0	0	0	0	0.00%
CAMPBELL RD	East	Total	88	80	0.01%	80	80	80	80	0.00%
WALNUT RD	South	Right	8	7	0.01%	7	7	7	7	12.50%
WALNUT RD	South	Left	100	91	0.01%	91	91	91	91	2.00%
WALNUT RD	South	U-Turn	0	0	0.01%	0	0	0	0	0.00%
WALNUT RD	South	Total	108	98	0.01%	98	98	98	99	0.00%
CAMPBELL RD	West	Right	116	106	0.01%	106	106	106	106	1.72%
CAMPBELL RD	West	Thru	125	114	0.01%	114	114	114	114	2.40%
CAMPBELL RD	West	U-Turn	0	0	0.01%	0	0	0	0	0.00%
CAMPBELL RD	West	Total	241	220	0.01%	220	220	220	220	0.00%

Growth Rate Notes

INDIANA DEPARTMENT OF TRANSPORTATION

May 23, 2019 9:01 am

PROJECT TRAFFIC FORECAST REPORT

Location: At Hillsdale Road, 2.04 miles N of SR 57

The table below contains the projected traffic volumes in each requested year for approach and movement during the morning and afternoon peak hour.
The morning and afternoon peak hours are those 60 minute periods during which the most vehicles pass through the intersection.

AM PM Peak Movement Forecast

Approach Direction	Growth Rate	Movement	Interval	Total Vehicles	Commercial % AADT	Count Year AADT	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045
East	0.01%	Left	6:45 AM	1	0.00%	1	1	1	1	1
East	0.01%	Thru	6:45 AM	13	7.69%	12	12	12	12	12
East	0.01%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
South	0.01%	Left	6:45 AM	14	0.00%	13	13	13	13	13
South	0.01%	Right	6:45 AM	2	0.00%	2	2	2	2	2
South	0.01%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
West	0.01%	Thru	6:45 AM	4	0.00%	4	4	4	4	4
West	0.01%	Right	6:45 AM	2	0.00%	2	2	2	2	2
West	0.01%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
East	0.01%	Left	5:00 PM	1	0.00%	1	1	1	1	1
East	0.01%	Thru	5:00 PM	5	0.00%	5	5	5	5	5
East	0.01%	U-Turn	5:00 PM	0	0.00%	0	0	0	0	0
South	0.01%	Left	5:00 PM	9	0.00%	8	8	8	8	8
South	0.01%	Right	5:00 PM	0	0.00%	0	0	0	0	0
South	0.01%	U-Turn	5:00 PM	0	0.00%	0	0	0	0	0
West	0.01%	Thru	5:00 PM	17	0.00%	15	15	15	15	15
West	0.01%	Right	5:00 PM	17	0.00%	15	15	15	15	15
West	0.01%	U-Turn	5:00 PM	0	0.00%	0	0	0	0	0

It should be recognized by users of this forecast that the base year AADT has an accuracy of plus or minus 10%. It should also be understood that while this report may include forecasts with up to six apparent significant figures, the accuracy should not be interpreted as being greater than two significant figures. It is the responsibility of designers to exercise professional judgement when using this data to influence decisions.

INDIANA DEPARTMENT OF TRANSPORTATION

May 23, 2019 10:13 am

PROJECT TRAFFIC FORECAST REPORT

DES No.: 1400005

US-41 At Hillsdale Road, 2.04 miles N of SR 57

From RP 10+90 to RP 11+1

Vanderburgh County

Prepared For

Matthew Bullock

On

01/02/2019

By

INDOT, Office of Traffic Statistics
Technical Planning Support & Programming Division
Gregory A. Katter, PE, Supervisor
100 N. Senate Ave, N955
Indianapolis, Indiana 46204
INDOTTrafficForecasts@indot.IN.gov

INDIANA DEPARTMENT OF TRANSPORTATION

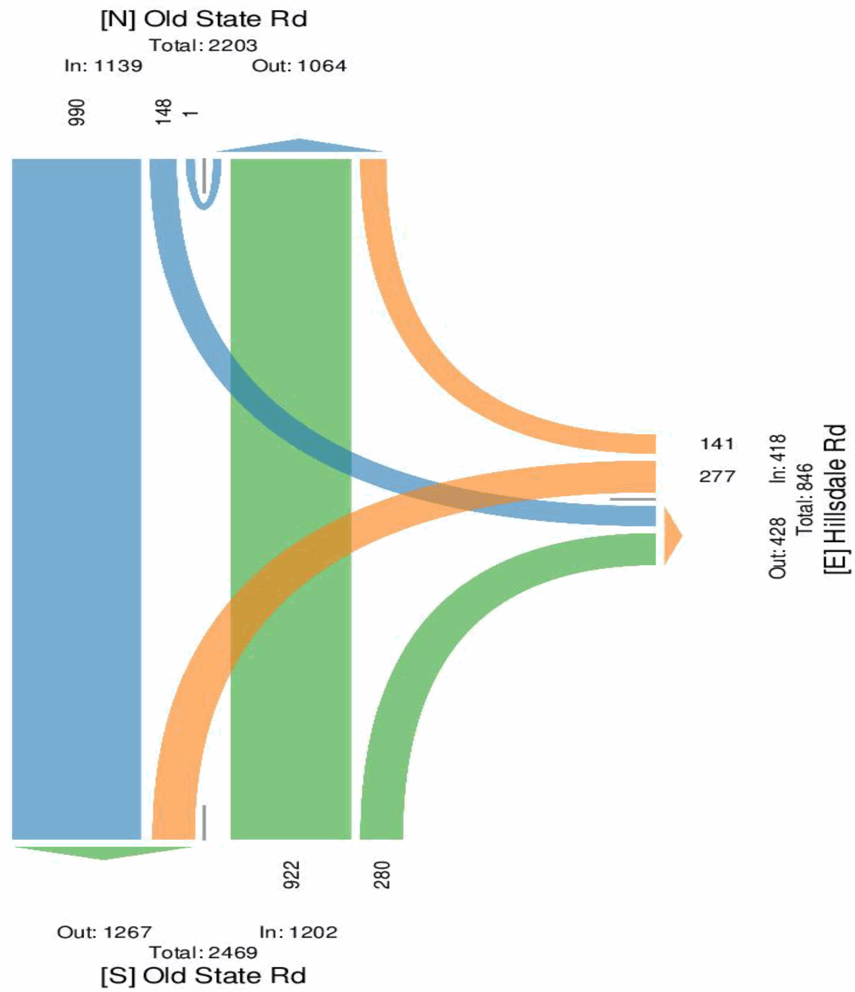
May 23, 2019 10:13 am

PROJECT TRAFFIC FORECAST REPORT

Intersection: 1

EMPO/INDOT Old State Rd @ Hillsdale Rd - TMC
Wed May 1, 2019
Full Length (12 PM-12 PM (+1))
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 650505, Location: 38.079693, -87.560941

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US



INDIANA DEPARTMENT OF TRANSPORTATION

May 23, 2019 10:13 am

PROJECT TRAFFIC FORECAST REPORT

Location: At Hillsdale Road, 2.04 miles N of SR 57

The table below contains the projected Annual Average Daily Traffic (AADT) in each requested year for each approach and movement.

The per year growth rate used for each approach is indicated in the table below. It is applied as a straight line growth.

For the purpose of this report a commercial vehicle would fall into FHWA Scheme F Classes 4 through 13. They are identified by MioVision as either an Articulated Truck, a Bus, or a Single-Unit Truck.

Daily Movement Forecast

Approach Road Name	Approach Direction	Movement	Total	Count Year AADT	Growth Rate	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045	Commercial Percentage
HILLSDALE RD	East	Right	141	128	0.00%	128	128	128	128	4.26%
HILLSDALE RD	East	Left	277	252	0.00%	252	252	252	252	1.08%
HILLSDALE RD	East	U-Turn	0	0	0.00%	0	0	0	0	0.00%
HILLSDALE RD	East	Total	418	381	0.00%	381	381	381	381	0.00%
OLD STATE RD	North	Thru	990	900	0.00%	900	900	900	900	1.72%
OLD STATE RD	North	Left	148	135	0.00%	135	135	135	135	4.73%
OLD STATE RD	North	U-Turn	1	1	0.00%	1	1	1	1	0.00%
OLD STATE RD	North	Total	1,139	1,035	0.00%	1,035	1,035	1,035	1,035	0.00%
OLD SR SB	South	Right	280	280	0.00%	280	280	280	280	2.86%
OLD SR SB	South	Thru	922	922	0.00%	922	922	922	922	1.84%
OLD SR SB	South	U-Turn	0	0	0.00%	0	0	0	0	0.00%
OLD SR SB	South	Total	1,202	1,202	0.00%	1,202	1,202	1,202	1,202	0.00%

Growth Rate Notes

INDIANA DEPARTMENT OF TRANSPORTATION

May 23, 2019 10:13 am

PROJECT TRAFFIC FORECAST REPORT

Location: At Hillsdale Road, 2.04 miles N of SR 57

The table below contains the projected traffic volumes in each requested year for approach and movement during the morning and afternoon peak hour.
The morning and afternoon peak hours are those 60 minute periods during which the most vehicles pass through the intersection.

AM PM Peak Movement Forecast

Approach Direction	Growth Rate	Movement	Interval	Total Vehicles	Commercial % AADT	Count Year AADT	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045
East	0.00%	Left	6:45 AM	34	0.00%	31	31	31	31	31
East	0.00%	Right	6:45 AM	7	0.00%	6	6	6	6	6
East	0.00%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
North	0.00%	Left	6:45 AM	19	0.00%	17	17	17	17	17
North	0.00%	Thru	6:45 AM	66	4.55%	60	60	60	60	60
North	0.00%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
South	0.00%	Thru	6:45 AM	97	1.03%	97	97	97	97	97
South	0.00%	Right	6:45 AM	23	0.00%	23	23	23	23	23
South	0.00%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
East	0.00%	Left	4:30 PM	18	0.00%	16	16	16	16	16
East	0.00%	Right	4:30 PM	12	0.00%	11	11	11	11	11
East	0.00%	U-Turn	4:30 PM	0	0.00%	0	0	0	0	0
North	0.00%	Left	4:30 PM	10	0.00%	9	9	9	9	9
North	0.00%	Thru	4:30 PM	135	0.00%	123	123	123	123	123
North	0.00%	U-Turn	4:30 PM	0	0.00%	0	0	0	0	0
South	0.00%	Thru	4:30 PM	94	0.00%	94	94	94	94	94
South	0.00%	Right	4:30 PM	30	0.00%	30	30	30	30	30
South	0.00%	U-Turn	4:30 PM	0	0.00%	0	0	0	0	0

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INDIANA DEPARTMENT OF TRANSPORTATION

May 29, 2019 12:47 pm

PROJECT TRAFFIC FORECAST REPORT

DES No.: 1400005

US-41 At Hillsdale Road, 2.04 miles N of SR 57

From RP 10+90 to RP 11+1

Vanderburgh County

Prepared For

Matthew Bullock

On

01/02/2019

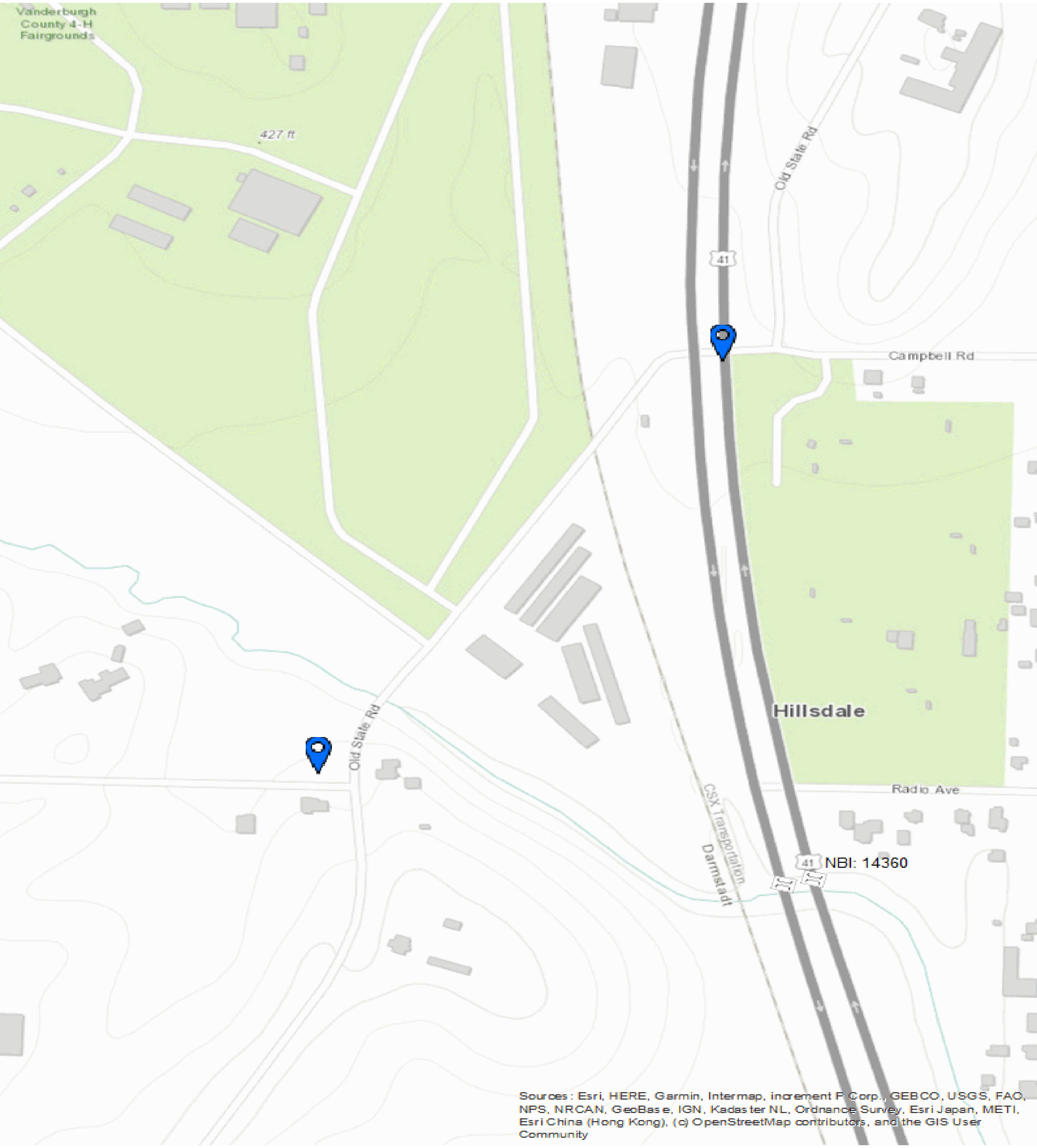
By

INDOT, Office of Traffic Statistics
Technical Planning Support & Programming Division
Gregory A. Katter, PE, Supervisor
100 N. Senate Ave, N955
Indianapolis, Indiana 46204
INDOTTrafficForecasts@indot.IN.gov

INDIANA DEPARTMENT OF TRANSPORTATION

May 29, 2019 12:47 pm

PROJECT TRAFFIC FORECAST REPORT



INDIANA DEPARTMENT OF TRANSPORTATION

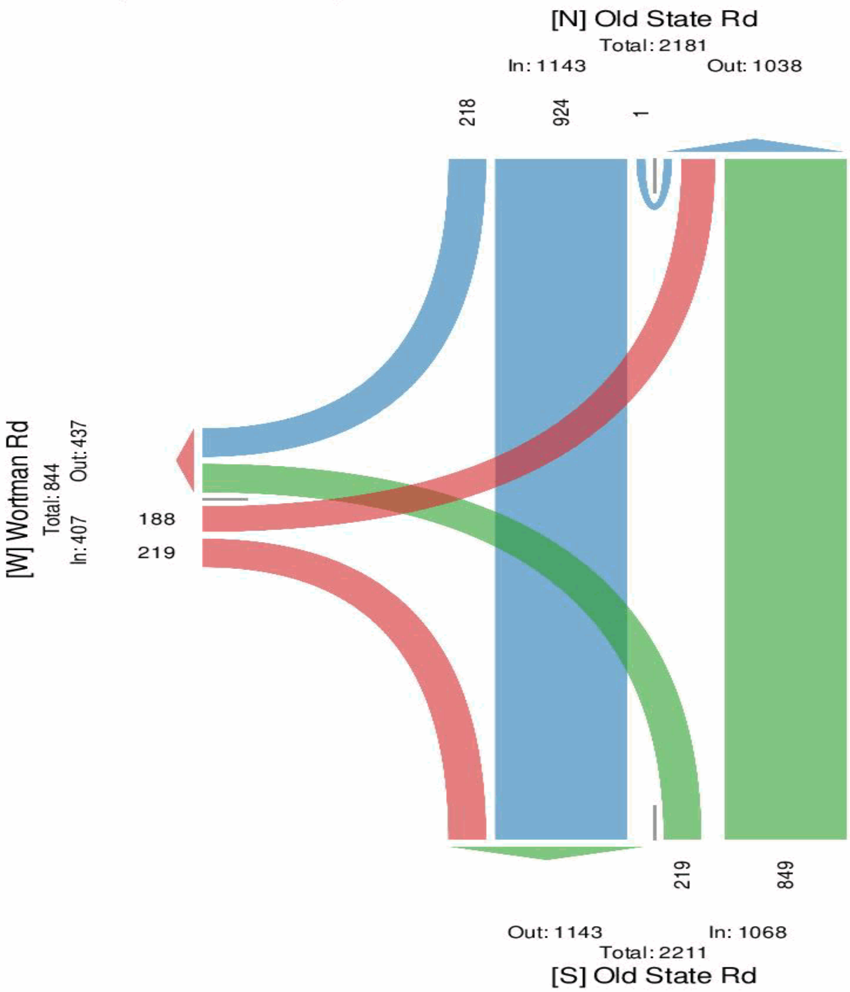
May 29, 2019 12:47 pm

PROJECT TRAFFIC FORECAST REPORT

Intersection: 1

EMPO/INDOT Old State Rd @ Wortman Rd - TMC
Wed May 1, 2019
Full Length (12 PM-12 PM (+1))
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 650503, Location: 38.083096, -87.559539

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US



INDIANA DEPARTMENT OF TRANSPORTATION

May 29, 2019 12:47 pm

PROJECT TRAFFIC FORECAST REPORT

Location: At Hillsdale Road, 2.04 miles N of SR 57

The table below contains the projected Annual Average Daily Traffic (AADT) in each requested year for each approach and movement.

The per year growth rate used for each approach is indicated in the table below. It is applied as a straight line growth.

For the purpose of this report a commercial vehicle would fall into FHWA Scheme F Classes 4 through 13. They are identified by MioVision as either an Articulated Truck, a Bus, or a Single-Unit Truck.

Daily Movement Forecast

Approach Road Name	Approach Direction	Movement	Total	Count Year AADT	Growth Rate	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045	Commercial Percentage
OLD STATE RD	North	Right	218	198	0.00%	198	198	198	198	7.34%
OLD STATE RD	North	Thru	924	840	0.00%	840	840	840	840	1.52%
OLD STATE RD	North	U-Turn	1	1	0.00%	1	1	1	1	0.00%
OLD STATE RD	North	Total	1,143	1,039	0.00%	1,039	1,039	1,039	1,039	0.00%
OLD STATE RD	South	Thru	849	772	0.00%	772	772	772	772	1.89%
OLD STATE RD	South	Left	219	199	0.00%	199	199	199	199	1.37%
OLD STATE RD	South	U-Turn	0	0	0.00%	0	0	0	0	0.00%
OLD STATE RD	South	Total	1,068	971	0.00%	971	971	971	971	0.00%
WORTHMAN RD	West	Right	219	199	0.00%	199	199	199	199	5.02%
WORTHMAN RD	West	Left	188	171	0.00%	171	171	171	171	6.92%
WORTHMAN RD	West	U-Turn	0	0	0.00%	0	0	0	0	0.00%
WORTHMAN RD	West	Total	407	370	0.00%	370	370	370	370	0.00%

Growth Rate Notes

INDIANA DEPARTMENT OF TRANSPORTATION

May 29, 2019 12:47 pm

PROJECT TRAFFIC FORECAST REPORT

Location: At Hillsdale Road, 2.04 miles N of SR 57

The table below contains the projected traffic volumes in each requested year for approach and movement during the morning and afternoon peak hour.
The morning and afternoon peak hours are those 60 minute periods during which the most vehicles pass through the intersection.

AM PM Peak Movement Forecast

Approach Direction	Growth Rate	Movement	Interval	Total Vehicles	Commercial % AADT	Count Year AADT	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045
North	0.00%	Thru	6:45 AM	57	5.26%	52	52	52	52	52
North	0.00%	Right	6:45 AM	8	25.00%	7	7	7	7	7
North	0.00%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
South	0.00%	Left	6:45 AM	13	0.00%	12	12	12	12	12
South	0.00%	Thru	6:45 AM	93	1.08%	85	85	85	85	85
South	0.00%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
West	0.00%	Left	6:45 AM	20	5.00%	18	18	18	18	18
West	0.00%	Right	6:45 AM	26	0.00%	24	24	24	24	24
West	0.00%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
North	0.00%	Thru	4:30 PM	127	0.00%	115	115	115	115	115
North	0.00%	Right	4:30 PM	31	0.00%	28	28	28	28	28
North	0.00%	U-Turn	4:30 PM	0	0.00%	0	0	0	0	0
South	0.00%	Left	4:30 PM	24	0.00%	22	22	22	22	22
South	0.00%	Thru	4:30 PM	81	0.00%	74	74	74	74	74
South	0.00%	U-Turn	4:30 PM	0	0.00%	0	0	0	0	0
West	0.00%	Left	4:30 PM	16	0.00%	15	15	15	15	15
West	0.00%	Right	4:30 PM	20	0.00%	18	18	18	18	18
West	0.00%	U-Turn	4:30 PM	0	0.00%	0	0	0	0	0

It should be recognized by users of this forecast that the base year AADT has an accuracy of plus or minus 10%. It should also be understood that while this report may include forecasts with up to six apparent significant figures, the accuracy should not be interpreted as being greater than two significant figures. It is the responsibility of designers to exercise professional judgement when using this data to influence decisions.

INDIANA DEPARTMENT OF TRANSPORTATION

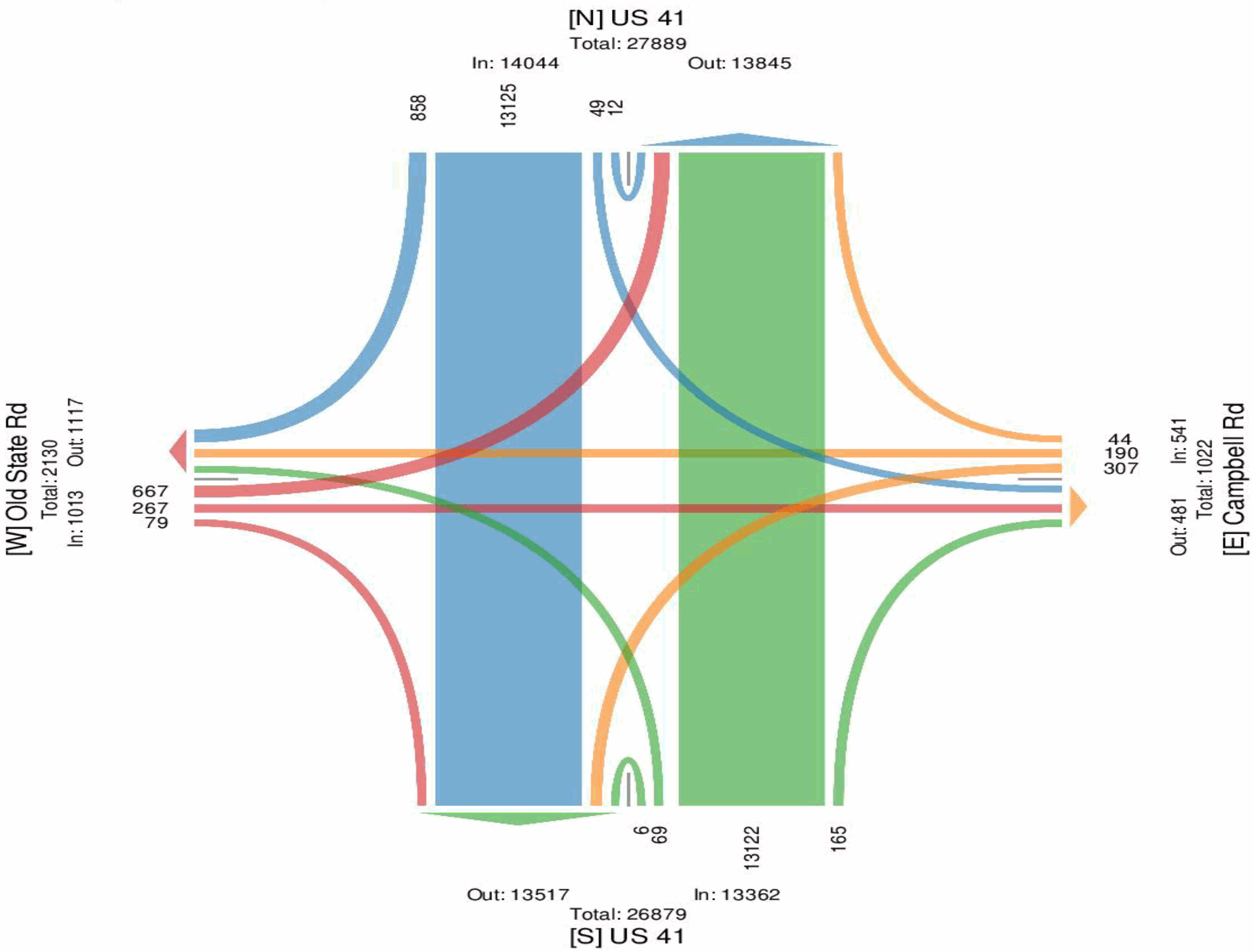
May 29, 2019 12:47 pm

PROJECT TRAFFIC FORECAST REPORT

Intersection: 2

EMPO/INDOT US 41 @ Campbell Rd - TMC
Thu May 2, 2019
Full Length (2 PM-2 PM (+1))
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 650494, Location: 38.086613, -87.556556

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US



INDIANA DEPARTMENT OF TRANSPORTATION

May 29, 2019 12:47 pm

PROJECT TRAFFIC FORECAST REPORT

Location: At Hillsdale Road, 2.04 miles N of SR 57

The table below contains the projected Annual Average Daily Traffic (AADT) in each requested year for each approach and movement.

The per year growth rate used for each approach is indicated in the table below. It is applied as a straight line growth.

For the purpose of this report a commercial vehicle would fall into FHWA Scheme F Classes 4 through 13. They are identified by MioVision as either an Articulated Truck, a Bus, or a Single-Unit Truck.

Daily Movement Forecast

Approach Road Name	Approach Direction	Movement	Total	Count Year AADT	Growth Rate	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045	Commercial Percentage
OLD STATE RD	East	Right	44	39	0.01%	39	39	39	39	0.00%
OLD STATE RD	East	Thru	190	168	0.01%	168	168	168	169	1.05%
OLD STATE RD	East	Left	307	272	0.01%	272	272	272	272	0.65%
OLD STATE RD	East	U-Turn	0	0	0.01%	0	0	0	0	0.00%
OLD STATE RD	East	Total	541	479	0.01%	479	479	479	480	0.00%
US 41	North	Right	858	759	1.00%	767	805	843	957	2.68%
US 41	North	Thru	13,125	11,616	1.00%	11,732	12,313	12,893	14,636	13.11%
US 41	North	Left	49	43	1.00%	44	46	48	55	2.04%
US 41	North	U-Turn	12	11	1.00%	11	11	12	13	8.33%
US 41	North	Total	14,044	12,429	1.00%	12,553	13,175	13,796	15,660	0.00%
US 41 SB	South	Right	165	165	1.00%	167	175	183	208	4.85%
US 41 SB	South	Thru	13,122	13,122	1.00%	13,253	13,909	14,565	16,534	12.65%
US 41 SB	South	Left	69	69	1.00%	70	73	77	87	2.90%
US 41 SB	South	U-Turn	6	6	1.00%	6	6	7	8	16.67%
US 41 SB	South	Total	13,362	13,362	1.00%	13,496	14,164	14,832	16,836	0.00%
OLD STATE RD	West	Right	79	70	0.01%	70	70	70	70	1.27%
OLD STATE RD	West	Thru	267	236	0.01%	236	236	237	237	1.87%
OLD STATE RD	West	Left	667	590	0.01%	590	591	591	592	1.65%
OLD STATE RD	West	U-Turn	0	0	0.01%	0	0	0	0	0.00%
OLD STATE RD	West	Total	1,013	897	0.01%	897	897	897	899	0.00%

Growth Rate Notes

INDIANA DEPARTMENT OF TRANSPORTATION

May 29, 2019 12:47 pm

PROJECT TRAFFIC FORECAST REPORT

Location: At Hillsdale Road, 2.04 miles N of SR 57

The table below contains the projected traffic volumes in each requested year for approach and movement during the morning and afternoon peak hour.
The morning and afternoon peak hours are those 60 minute periods during which the most vehicles pass through the intersection.

AM PM Peak Movement Forecast

Approach Direction	Growth Rate	Movement	Interval	Total Vehicles	Commercial % AADT	Count Year AADT	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045
East	0.01%	Left	6:45 AM	21	0.00%	19	19	19	19	19
East	0.01%	Thru	6:45 AM	17	0.00%	15	15	15	15	15
East	0.01%	Right	6:45 AM	6	0.00%	5	5	5	5	5
East	0.01%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
North	1.00%	Left	6:45 AM	3	0.00%	3	3	3	3	4
North	1.00%	Thru	6:45 AM	1029	13.99%	911	920	966	1,011	1,148
North	1.00%	Right	6:45 AM	43	9.30%	38	38	40	42	48
North	1.00%	U-Turn	6:45 AM	1	0.00%	1	1	1	1	1
South	1.00%	Left	6:45 AM	0	0.00%	0	0	0	0	0
South	1.00%	Thru	6:45 AM	971	10.92%	971	981	1,029	1,078	1,223
South	1.00%	Right	6:45 AM	11	0.00%	11	11	12	12	14
South	1.00%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
West	0.01%	Left	6:45 AM	78	3.85%	69	69	69	69	69
West	0.01%	Thru	6:45 AM	28	0.00%	25	25	25	25	25
West	0.01%	Right	6:45 AM	7	0.00%	6	6	6	6	6
West	0.01%	U-Turn	6:45 AM	0	0.00%	0	0	0	0	0
East	0.01%	Left	4:00 PM	27	0.00%	24	24	24	24	24
East	0.01%	Thru	4:00 PM	21	0.00%	19	19	19	19	19
East	0.01%	Right	4:00 PM	5	0.00%	4	4	4	4	4
East	0.01%	U-Turn	4:00 PM	0	0.00%	0	0	0	0	0
North	1.00%	Left	4:00 PM	6	0.00%	5	5	5	6	6
North	1.00%	Thru	4:00 PM	1234	7.29%	1,092	1,103	1,158	1,212	1,376
North	1.00%	Right	4:00 PM	140	0.00%	124	125	131	138	156
North	1.00%	U-Turn	4:00 PM	1	0.00%	1	1	1	1	1
South	1.00%	Left	4:00 PM	6	0.00%	6	6	6	7	8
South	1.00%	Thru	4:00 PM	900	9.00%	900	909	954	999	1,134
South	1.00%	Right	4:00 PM	16	6.25%	16	16	17	18	20
South	1.00%	U-Turn	4:00 PM	0	0.00%	0	0	0	0	0
West	0.01%	Left	4:00 PM	42	0.00%	37	37	37	37	37
West	0.01%	Thru	4:00 PM	17	0.00%	15	15	15	15	15
West	0.01%	Right	4:00 PM	4	0.00%	4	4	4	4	4
West	0.01%	U-Turn	4:00 PM	0	0.00%	0	0	0	0	0

It should be recognized by users of this forecast that the base year AADT has an accuracy of plus or minus 10%. It should also be understood that while this report may include forecasts with up to six apparent significant figures, the accuracy should not be interpreted as being greater than two significant figures. It is the responsibility of designers to exercise professional judgement when using this data to influence decisions.

INDIANA DEPARTMENT OF TRANSPORTATION

June 5, 2019 10:07 am

PROJECT TRAFFIC FORECAST REPORT

DES No.: 1400005

US-41 US 41 at Hillsdale Rd

From RP 10+90 to RP 11+1

Vanderburgh County

Prepared For

Matthew Bullock

On

06/03/2019

By

INDOT, Office of Traffic Statistics
Technical Planning Support & Programming Division
Gregory A. Katter, PE, Supervisor
100 N. Senate Ave, N955
Indianapolis, Indiana 46204
INDOTTrafficForecasts@indot.IN.gov

INDIANA DEPARTMENT OF TRANSPORTATION

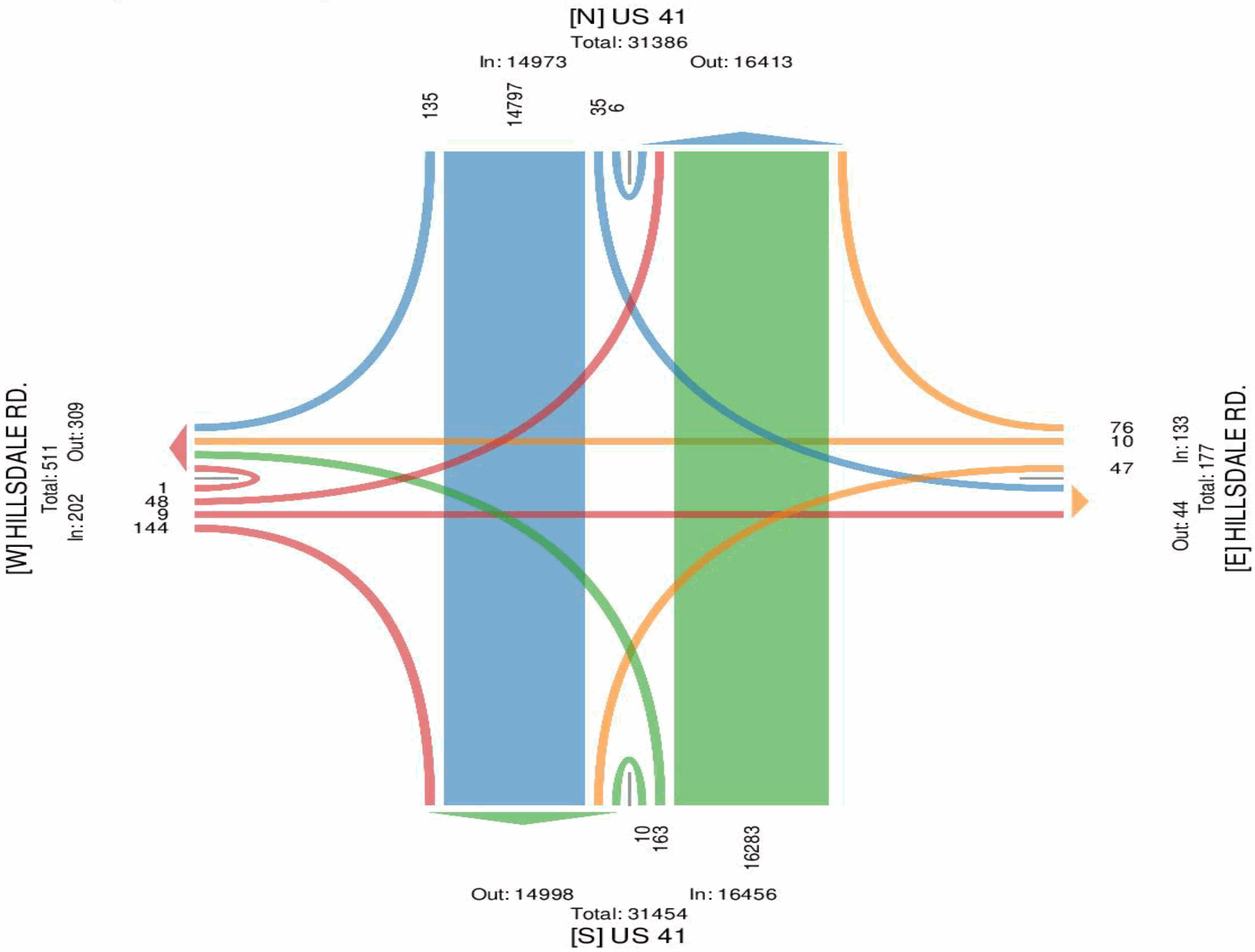
June 5, 2019 10:07 am

PROJECT TRAFFIC FORECAST REPORT

Intersection: 1

VD US 41 and HILLSDALE RD. EVANSVILLW VANDER... - TMC
Mon Jan 25, 2016
Full Length (12 PM-6 PM, 6 AM-12 PM)
All Classes (Lights, Articulated Trucks, Buses and Single-Unit Trucks)
All Movements
ID: 288172, Location: 38.079492, -87.554662

Provided by: Indiana DOT
100 N. Senate Ave., Indianapolis, IN, 46204, US



INDIANA DEPARTMENT OF TRANSPORTATION

June 5, 2019 10:07 am

PROJECT TRAFFIC FORECAST REPORT

Location: US 41 at Hillsdale Rd

The table below contains the projected Annual Average Daily Traffic (AADT) in each requested year for each approach and movement.

The per year growth rate used for each approach is indicated in the table below. It is applied as a straight line growth.

For the purpose of this report a commercial vehicle would fall into FHWA Scheme F Classes 4 through 13. They are identified by MioVision as either an Articulated Truck, a Bus, or a Single-Unit Truck.

Daily Movement Forecast

Approach Road Name	Approach Direction	Movement	Total	Count Year AADT	Growth Rate	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045	Commercial Percentage
HILLSDALE RD	East	Right	76	82	1.00%	85	90	94	106	0.00%
HILLSDALE RD	East	Thru	10	11	1.00%	11	12	12	14	0.00%
HILLSDALE RD	East	Left	47	51	1.00%	53	55	58	66	0.00%
HILLSDALE RD	East	Total	133	144	1.00%	150	157	164	185	0.00%
US 41	North	Right	135	146	1.00%	152	159	166	188	0.74%
US 41	North	Thru	14,797	15,996	1.00%	16,635	17,435	18,235	20,634	2.86%
US 41	North	Left	35	38	1.00%	39	41	43	49	0.00%
US 41	North	U-Turn	6	6	1.00%	7	7	7	8	0.00%
US 41	North	Total	14,973	16,186	1.00%	16,833	17,643	18,452	20,880	0.00%
US 41 SB	South	Left	163	176	1.00%	183	192	201	227	0.00%
US 41 SB	South	U-Turn	10	11	1.00%	11	12	12	14	0.00%
US 41 SB	South	Total	16,456	17,789	1.00%	18,500	19,390	20,279	22,948	0.00%
US 41 SB	South	Thru	16,283	17,602	1.00%	18,306	19,186	20,066	22,706	2.01%
HILLSDALE RD	West	Right	144	156	1.00%	162	170	177	201	0.00%
HILLSDALE RD	West	Thru	9	10	1.00%	10	11	11	13	0.00%
HILLSDALE RD	West	Left	48	52	1.00%	54	57	59	67	0.00%
HILLSDALE RD	West	U-Turn	1	1	1.00%	1	1	1	1	0.00%
HILLSDALE RD	West	Total	202	218	1.00%	227	238	249	282	0.00%

Growth Rate Notes

INDIANA DEPARTMENT OF TRANSPORTATION

June 5, 2019 10:07 am

PROJECT TRAFFIC FORECAST REPORT

Location: US 41 at Hillsdale Rd

The table below contains the projected traffic volumes in each requested year for approach and movement during the morning and afternoon peak hour.
The morning and afternoon peak hours are those 60 minute periods during which the most vehicles pass through the intersection.

AM PM Peak Movement Forecast

Approach Direction	Growth Rate	Movement	Interval	Total Vehicles	Commercial % AADT	Count Year AADT	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045
East	1.00%	Left	8:00 AM	2	0.00%	2	2	2	2	3
East	1.00%	Thru	8:00 AM	1	0.00%	1	1	1	1	1
East	1.00%	Right	8:00 AM	12	0.00%	13	14	14	15	17
North	1.00%	Left	8:00 AM	3	0.00%	3	3	3	3	4
North	1.00%	Thru	8:00 AM	775	6.32%	838	872	913	955	1,081
North	1.00%	Right	8:00 AM	8	0.00%	9	9	10	10	12
North	1.00%	U-Turn	8:00 AM	0	0.00%	0	0	0	0	0
South	1.00%	Left	8:00 AM	21	0.00%	23	24	25	26	30
South	1.00%	Thru	8:00 AM	2756	0.76%	2,979	3,098	3,247	3,396	3,843
South	1.00%	U-Turn	8:00 AM	0	0.00%	0	0	0	0	0
West	1.00%	Left	8:00 AM	9	0.00%	10	10	11	11	13
West	1.00%	Thru	8:00 AM	1	0.00%	1	1	1	1	1
West	1.00%	Right	8:00 AM	7	0.00%	8	8	9	9	10
West	1.00%	U-Turn	8:00 AM	0	0.00%	0	0	0	0	0
East	1.00%	Left	4:30 PM	5	0.00%	5	5	5	6	6
East	1.00%	Thru	4:30 PM	0	0.00%	0	0	0	0	0
East	1.00%	Right	4:30 PM	4	0.00%	4	4	4	5	5
North	1.00%	Left	4:30 PM	3	0.00%	3	3	3	3	4
North	1.00%	Thru	4:30 PM	2314	0.56%	2,501	2,601	2,726	2,851	3,226
North	1.00%	Right	4:30 PM	14	0.00%	15	16	16	17	19
North	1.00%	U-Turn	4:30 PM	2	0.00%	2	2	2	2	3
South	1.00%	Left	4:30 PM	22	0.00%	24	25	26	27	31
South	1.00%	Thru	4:30 PM	1351	2.00%	1,460	1,518	1,591	1,664	1,883
South	1.00%	U-Turn	4:30 PM	0	0.00%	0	0	0	0	0
West	1.00%	Left	4:30 PM	3	0.00%	3	3	3	3	4
West	1.00%	Thru	4:30 PM	1	0.00%	1	1	1	1	1
West	1.00%	Right	4:30 PM	17	0.00%	18	19	20	21	23
West	1.00%	U-Turn	4:30 PM	0	0.00%	0	0	0	0	0

It should be recognized by users of this forecast that the base year AADT has an accuracy of plus or minus 10%. It should also be understood that while this report may include forecasts with up to six apparent significant figures, the accuracy should not be interpreted as being greater than two significant figures. It is the responsibility of designers to exercise professional judgement when using this data to influence decisions.

INDIANA DEPARTMENT OF TRANSPORTATION

PROJECT TRAFFIC FORECAST REPORT

DES No.: 1400005

US-41 Hillsdale Rd and Walnut Road

From RP 11+90 to RP 10+1

Vanderburgh County

Prepared For

Matthew Bullock

On

06/03/2019

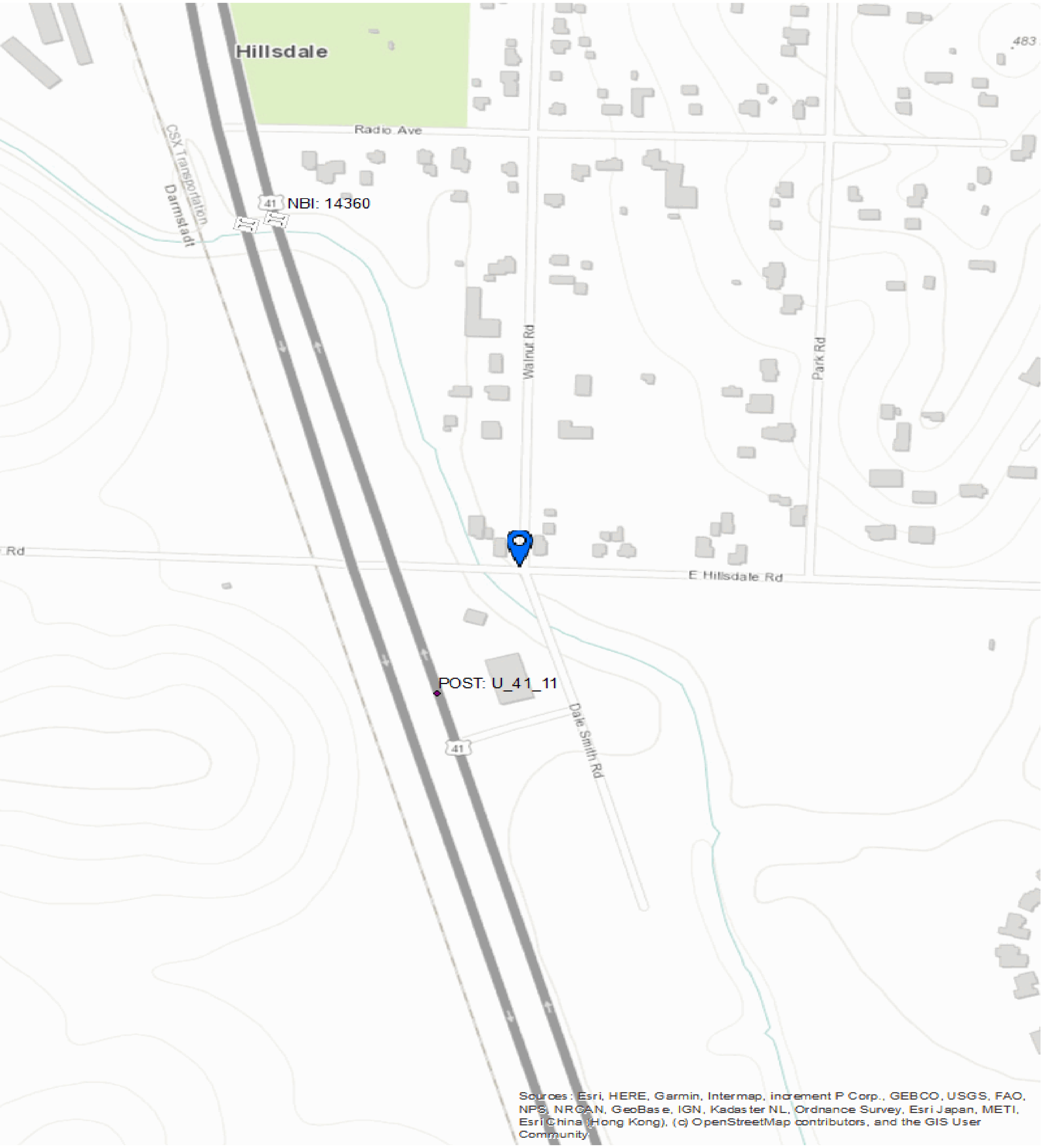
By

INDOT, Office of Traffic Statistics
Technical Planning Support & Programming Division
Gregory A. Katter, PE, Supervisor
100 N. Senate Ave, N955
Indianapolis, Indiana 46204
INDOTTrafficForecasts@indot.IN.gov

INDIANA DEPARTMENT OF TRANSPORTATION

June 19, 2019 7:54 am

PROJECT TRAFFIC FORECAST REPORT



INDIANA DEPARTMENT OF TRANSPORTATION

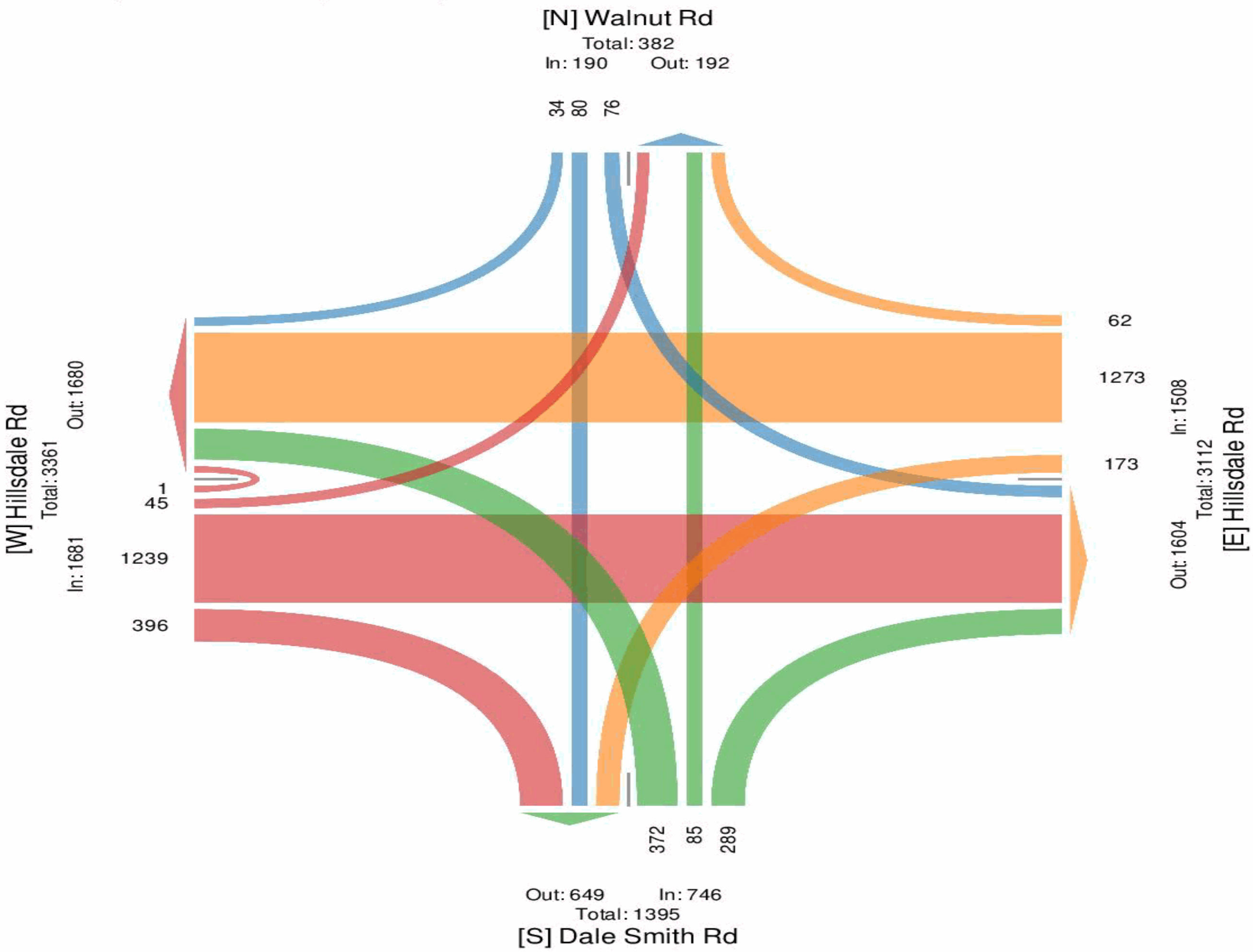
June 19, 2019 7:54 am

PROJECT TRAFFIC FORECAST REPORT

Intersection: 1

EMPO/INDOT 82S001, 82S002, 82S003, 82S004 - TMC
Tue Jun 11, 2019
Full Length (6 AM-6 AM (+1))
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 667438, Location: 38.079445, -87.553619, Site Code: 82S001

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US



INDIANA DEPARTMENT OF TRANSPORTATION

June 19, 2019 7:54 am

PROJECT TRAFFIC FORECAST REPORT

Location: Hillsdale Rd and Walnut Road

The table below contains the projected Annual Average Daily Traffic (AADT) in each requested year for each approach and movement.

The per year growth rate used for each approach is indicated in the table below. It is applied as a straight line growth.

For the purpose of this report a commercial vehicle would fall into FHWA Scheme F Classes 4 through 13. They are identified by MioVision as either an Articulated Truck, a Bus, or a Single-Unit Truck.

Daily Movement Forecast

Approach Road Name	Approach Direction	Movement	Total	Count Year AADT	Growth Rate	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045	Commercial Percentage
HILLSDALE RD	East	Right	62	58	0.00%	58	58	58	58	1.61%
HILLSDALE RD	East	Thru	1,273	1,183	0.00%	1,183	1,183	1,183	1,183	1.65%
HILLSDALE RD	East	Left	173	161	0.00%	161	161	161	161	1.73%
HILLSDALE RD	East	U-Turn	0	0	0.00%	0	0	0	0	0.00%
HILLSDALE RD	East	Total	1,508	1,401	0.00%	1,401	1,401	1,401	1,401	0.00%
WALNUT RD	North	Right	34	32	0.00%	32	32	32	32	2.94%
WALNUT RD	North	Thru	80	74	0.00%	74	74	74	74	3.75%
WALNUT RD	North	Left	76	71	0.00%	71	71	71	71	0.00%
WALNUT RD	North	U-Turn	0	0	0.00%	0	0	0	0	0.00%
WALNUT RD	North	Total	190	177	0.00%	177	177	177	177	0.00%
WALNUT RD	South	Right	289	268	0.00%	268	268	268	268	2.08%
WALNUT RD	South	Thru	85	79	0.00%	79	79	79	79	3.53%
WALNUT RD	South	Left	372	346	0.00%	346	346	346	346	2.42%
WALNUT RD	South	U-Turn	0	0	0.00%	0	0	0	0	0.00%
WALNUT RD	South	Total	746	693	0.00%	693	693	693	693	0.00%
HILLSDALE RD	West	Right	396	368	0.00%	368	368	368	368	3.28%
HILLSDALE RD	West	Thru	1,239	1,151	0.00%	1,151	1,151	1,151	1,151	1.29%
HILLSDALE RD	West	Left	45	42	0.00%	42	42	42	42	4.44%
HILLSDALE RD	West	U-Turn	1	1	0.00%	1	1	1	1	0.00%
HILLSDALE RD	West	Total	1,681	1,562	0.00%	1,562	1,562	1,562	1,562	0.00%

Growth Rate Notes

INDIANA DEPARTMENT OF TRANSPORTATION

June 19, 2019 7:54 am

PROJECT TRAFFIC FORECAST REPORT

Location: Hillsdale Rd and Walnut Road

The table below contains the projected traffic volumes in each requested year for approach and movement during the morning and afternoon peak hour.
The morning and afternoon peak hours are those 60 minute periods during which the most vehicles pass through the intersection.

AM PM Peak Movement Forecast

Approach Direction	Growth Rate	Movement	Interval	Total Vehicles	Commercial % AADT	Count Year AADT	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2030	Design Year AADT 2045
East	0.00%	Left	7:00 AM	13	0.00%	12	12	12	12	12
East	0.00%	Thru	7:00 AM	111	0.00%	103	103	103	103	103
East	0.00%	Right	7:00 AM	4	0.00%	4	4	4	4	4
East	0.00%	U-Turn	7:00 AM	0	0.00%	0	0	0	0	0
North	0.00%	Left	7:00 AM	4	0.00%	4	4	4	4	4
North	0.00%	Thru	7:00 AM	5	0.00%	5	5	5	5	5
North	0.00%	Right	7:00 AM	2	0.00%	2	2	2	2	2
North	0.00%	U-Turn	7:00 AM	0	0.00%	0	0	0	0	0
South	0.00%	Left	7:00 AM	24	0.00%	22	22	22	22	22
South	0.00%	Thru	7:00 AM	5	0.00%	5	5	5	5	5
South	0.00%	Right	7:00 AM	21	9.52%	20	20	20	20	20
South	0.00%	U-Turn	7:00 AM	0	0.00%	0	0	0	0	0
West	0.00%	Left	7:00 AM	1	0.00%	1	1	1	1	1
West	0.00%	Thru	7:00 AM	77	1.30%	72	72	72	72	72
West	0.00%	Right	7:00 AM	24	8.33%	22	22	22	22	22
West	0.00%	U-Turn	7:00 AM	0	0.00%	0	0	0	0	0
East	0.00%	Left	4:45 PM	10	0.00%	9	9	9	9	9
East	0.00%	Thru	4:45 PM	92	1.09%	85	85	85	85	85
East	0.00%	Right	4:45 PM	22	4.55%	20	20	20	20	20
East	0.00%	U-Turn	4:45 PM	0	0.00%	0	0	0	0	0
North	0.00%	Left	4:45 PM	6	0.00%	6	6	6	6	6
North	0.00%	Thru	4:45 PM	7	0.00%	7	7	7	7	7
North	0.00%	Right	4:45 PM	2	0.00%	2	2	2	2	2
North	0.00%	U-Turn	4:45 PM	0	0.00%	0	0	0	0	0
South	0.00%	Left	4:45 PM	30	0.00%	28	28	28	28	28
South	0.00%	Thru	4:45 PM	10	0.00%	9	9	9	9	9
South	0.00%	Right	4:45 PM	32	0.00%	30	30	30	30	30
South	0.00%	U-Turn	4:45 PM	0	0.00%	0	0	0	0	0
West	0.00%	Left	4:45 PM	12	0.00%	11	11	11	11	11
West	0.00%	Thru	4:45 PM	154	0.00%	143	143	143	143	143
West	0.00%	Right	4:45 PM	24	0.00%	22	22	22	22	22
West	0.00%	U-Turn	4:45 PM	0	0.00%	0	0	0	0	0

It should be recognized by users of this forecast that the base year AADT has an accuracy of plus or minus 10%. It should also be understood that while this report may include forecasts with up to six apparent significant figures, the accuracy should not be interpreted as being greater than two significant figures. It is the responsibility of designers to exercise professional judgement when using this data to influence decisions.

PROJECT TRAFFIC FORECAST REPORT

DES No.: 1400005

US-41 Campbell Rd and Old State Rd

From RP 11+90 to RP 10+1

Vanderburgh County

Prepared For

Matthew Bullock

On

06/03/2019

By

INDOT, Office of Traffic Statistics
Technical Planning Support & Programming Division
Gregory A. Katter, PE, Supervisor
100 N. Senate Ave, N955
Indianapolis, Indiana 46204
INDOTTrafficForecasts@indot.IN.gov

INDIANA DEPARTMENT OF TRANSPORTATION

June 19, 2019 8:24 am

PROJECT TRAFFIC FORECAST REPORT

INDIANA DEPARTMENT OF TRANSPORTATION

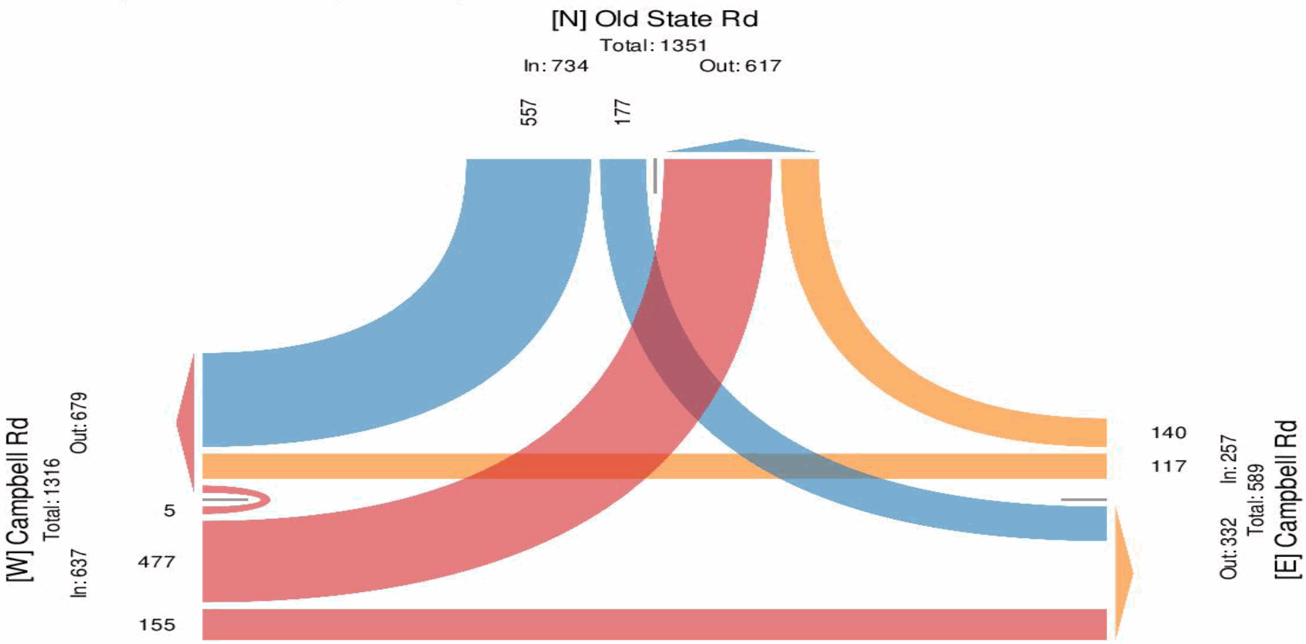
June 19, 2019 8:24 am

PROJECT TRAFFIC FORECAST REPORT

Intersection: 1

EMPO/INDOT 82S005, 82S006, 82S007 - TMC
Tue Jun 11, 2019
Full Length (6 AM-6 AM (+1))
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 667442, Location: 38.086617, -87.556025, Site Code: 82S005

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US



INDIANA DEPARTMENT OF TRANSPORTATION

June 19, 2019 8:24 am

PROJECT TRAFFIC FORECAST REPORT

Location: Campbell Rd and Old State Rd

The table below contains the projected Annual Average Daily Traffic (AADT) in each requested year for each approach and movement.

The per year growth rate used for each approach is indicated in the table below. It is applied as a straight line growth.

For the purpose of this report a commercial vehicle would fall into FHWA Scheme F Classes 4 through 13. They are identified by MioVision as either an Articulated Truck, a Bus, or a Single-Unit Truck.

Daily Movement Forecast

Approach Road Name	Approach Direction	Movement	Total	Count Year AADT	Growth Rate	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2035	Design Year AADT 2045	Commercial Percentage
CAMPBELL RD	East	Right	140	130	0.00%	130	130	130	130	2.86%
CAMPBELL RD	East	Thru	117	109	0.00%	109	109	109	109	2.56%
CAMPBELL RD	East	U-Turn	0	0	0.00%	0	0	0	0	0.00%
CAMPBELL RD	East	Total	257	239	0.00%	239	239	239	239	0.00%
OLD STATE RD SB	North	Right	557	517	0.00%	517	517	517	517	0.90%
OLD STATE RD SB	North	Left	177	164	0.00%	164	164	164	164	1.70%
OLD STATE RD SB	North	U-Turn	0	0	0.00%	0	0	0	0	0.00%
OLD STATE RD SB	North	Total	734	682	0.00%	682	682	682	682	0.00%
OLD STATE RD SB	West	Thru	155	144	0.00%	144	144	144	144	1.29%
OLD STATE RD SB	West	Left	477	443	0.00%	443	443	443	443	0.84%
OLD STATE RD SB	West	U-Turn	5	5	0.00%	5	5	5	5	0.00%
OLD STATE RD SB	West	Total	637	592	0.00%	592	592	592	592	0.00%

Growth Rate Notes

INDIANA DEPARTMENT OF TRANSPORTATION

June 19, 2019 8:24 am

PROJECT TRAFFIC FORECAST REPORT

Location: Campbell Rd and Old State Rd

The table below contains the projected traffic volumes in each requested year for approach and movement during the morning and afternoon peak hour.
The morning and afternoon peak hours are those 60 minute periods during which the most vehicles pass through the intersection.

AM PM Peak Movement Forecast

Approach Direction	Growth Rate	Movement	Interval	Total Vehicles	Commercial % AADT	Count Year AADT	Construction Year AADT 2020	Intermediate Year 1 AADT 2025	Intermediate Year 2 AADT 2035	Design Year AADT 2045
East	0.00%	Thru	9:15 AM	12	0.00%	11	11	11	11	11
East	0.00%	Right	9:15 AM	18	0.00%	17	17	17	17	17
East	0.00%	U-Turn	9:15 AM	0	0.00%	0	0	0	0	0
North	0.00%	Left	9:15 AM	15	6.67%	14	14	14	14	14
North	0.00%	Right	9:15 AM	69	4.35%	64	64	64	64	64
North	0.00%	U-Turn	9:15 AM	0	0.00%	0	0	0	0	0
West	0.00%	Left	9:15 AM	40	2.50%	37	37	37	37	37
West	0.00%	Thru	9:15 AM	27	0.00%	25	25	25	25	25
West	0.00%	U-Turn	9:15 AM	0	0.00%	0	0	0	0	0
East	0.00%	Thru	5:00 PM	10	0.00%	9	9	9	9	9
East	0.00%	Right	5:00 PM	7	0.00%	7	7	7	7	7
East	0.00%	U-Turn	5:00 PM	0	0.00%	0	0	0	0	0
North	0.00%	Left	5:00 PM	28	0.00%	26	26	26	26	26
North	0.00%	Right	5:00 PM	35	0.00%	33	33	33	33	33
North	0.00%	U-Turn	5:00 PM	0	0.00%	0	0	0	0	0
West	0.00%	Left	5:00 PM	47	0.00%	44	44	44	44	44
West	0.00%	Thru	5:00 PM	18	0.00%	17	17	17	17	17
West	0.00%	U-Turn	5:00 PM	3	0.00%	3	3	3	3	3

It should be recognized by users of this forecast that the base year AADT has an accuracy of plus or minus 10%. It should also be understood that while this report may include forecasts with up to six apparent significant figures, the accuracy should not be interpreted as being greater than two significant figures. It is the responsibility of designers to exercise professional judgement when using this data to influence decisions.

EMPO/INDOT US 41 @ Hillsdale Rd - TMC

Tue Jul 16, 2019
Full Length (6 AM-6 AM (+1))
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 679143, Location: 38.079492, -87.554662

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US

Leg	Hillsdale Rd				US 41				Hillsdale Rd				
Direction	Westbound				Northbound				Eastbound				
Time	R	T	U	App	R	T	L	App	T	L	U	App	Int
2019-07-16 6:00AM	7	9	0	**16**	4	132	0	**136**	2	0	0	**2**	**154**
6:15AM	12	9	0	**21**	1	187	4	**192**	6	0	0	**6**	**219**
6:30AM	9	23	0	**32**	1	195	2	**198**	13	0	0	**13**	**243**
6:45AM	10	20	0	**30**	3	162	8	**173**	9	0	0	**9**	**212**
Hourly Total	38	61	0	**99**	9	676	14	**699**	30	0	0	**30**	**828**
7:00AM	9	16	0	**25**	7	128	3	**138**	9	0	0	**9**	**172**
7:15AM	13	33	1	**47**	6	157	3	**166**	11	0	0	**11**	**224**
7:30AM	11	24	0	**35**	2	172	3	**177**	15	0	0	**15**	**227**
7:45AM	8	28	0	**36**	10	168	2	**180**	21	0	0	**21**	**237**
Hourly Total	41	101	1	**143**	25	625	11	**661**	56	0	0	**56**	**860**
8:00AM	8	20	0	**28**	3	142	3	**148**	7	1	0	**8**	**184**
8:15AM	6	14	0	**20**	1	140	2	**143**	7	0	0	**7**	**170**
8:30AM	10	17	0	**27**	5	146	3	**154**	12	0	0	**12**	**193**
8:45AM	8	14	0	**22**	10	146	2	**158**	24	1	0	**25**	**205**
Hourly Total	32	65	0	**97**	19	574	10	**603**	50	2	0	**52**	**752**
9:00AM	11	15	0	**26**	5	127	3	**135**	7	0	0	**7**	**168**
9:15AM	4	15	0	**19**	7	156	1	**164**	8	0	0	**8**	**191**
9:30AM	8	13	0	**21**	10	142	6	**158**	9	0	0	**9**	**188**
9:45AM	7	17	0	**24**	6	158	2	**166**	4	1	0	**5**	**195**
Hourly Total	30	60	0	**90**	28	583	12	**623**	28	1	0	**29**	**742**
10:00AM	6	10	0	**16**	7	138	6	**151**	6	0	0	**6**	**173**
10:15AM	9	13	0	**22**	6	173	2	**181**	9	1	0	**10**	**213**
10:30AM	6	17	0	**23**	9	138	2	**149**	13	0	0	**13**	**185**
10:45AM	8	15	0	**23**	13	143	3	**159**	19	0	0	**19**	**201**
Hourly Total	29	55	0	**84**	35	592	13	**640**	47	1	0	**48**	**772**
11:00AM	13	13	0	**26**	10	158	1	**169**	9	0	0	**9**	**204**
11:15AM	10	8	0	**18**	8	164	1	**173**	14	0	0	**14**	**205**
11:30AM	18	17	0	**35**	7	170	1	**178**	8	0	0	**8**	**221**
11:45AM	16	12	0	**28**	8	187	1	**196**	10	1	0	**11**	**235**
Hourly Total	57	50	0	**107**	33	679	4	**716**	41	1	0	**42**	**865**
12:00PM	4	24	0	**28**	9	188	3	**200**	15	1	0	**16**	**244**
12:15PM	7	10	0	**17**	6	170	3	**179**	13	0	0	**13**	**209**
12:30PM	5	17	0	**22**	9	170	7	**186**	13	0	0	**13**	**221**
12:45PM	8	9	0	**17**	4	136	0	**140**	19	3	0	**22**	**179**
Hourly Total	24	60	0	**84**	28	664	13	**705**	60	4	0	**64**	**853**
1:00PM	9	13	0	**22**	6	157	8	**171**	21	0	0	**21**	**214**
1:15PM	11	19	0	**30**	6	175	3	**184**	8	0	0	**8**	**222**
1:30PM	8	13	0	**21**	5	158	2	**165**	11	0	0	**11**	**197**
1:45PM	13	24	0	**37**	4	100	3	**107**	11	0	0	**11**	**155**
Hourly Total	41	69	0	**110**	21	590	16	**627**	51	0	0	**51**	**788**
2:00PM	5	11	0	**16**	11	185	1	**197**	4	0	0	**4**	**217**
2:15PM	9	6	0	**15**	6	212	0	**218**	9	0	0	**9**	**242**
2:30PM	6	13	0	**19**	7	176	2	**185**	9	0	0	**9**	**213**
2:45PM	4	12	0	**16**	6	163	3	**172**	6	0	0	**6**	**194**
Hourly Total	24	42	0	**66**	30	736	6	**772**	28	0	0	**28**	**866**
3:00PM	5	18	0	**23**	8	193	5	**206**	15	0	0	**15**	**244**
3:15PM	16	5	0	**21**	6	187	3	**196**	11	0	0	**11**	**228**
3:30PM	11	18	0	**29**	8	214	1	**223**	12	2	0	**14**	**266**
3:45PM	7	15	0	**22**	11	238	6	**255**	23	1	0	**24**	**301**
Hourly Total	39	56	0	**95**	33	832	15	**880**	61	3	0	**64**	**1039**
4:00PM	11	13	0	**24**	13	240	4	**257**	18	0	0	**18**	**299**
4:15PM	15	16	0	**31**	10	257	9	**276**	20	0	0	**20**	**327**
4:30PM	9	14	0	**23**	9	231	6	**246**	21	0	0	**21**	**290**

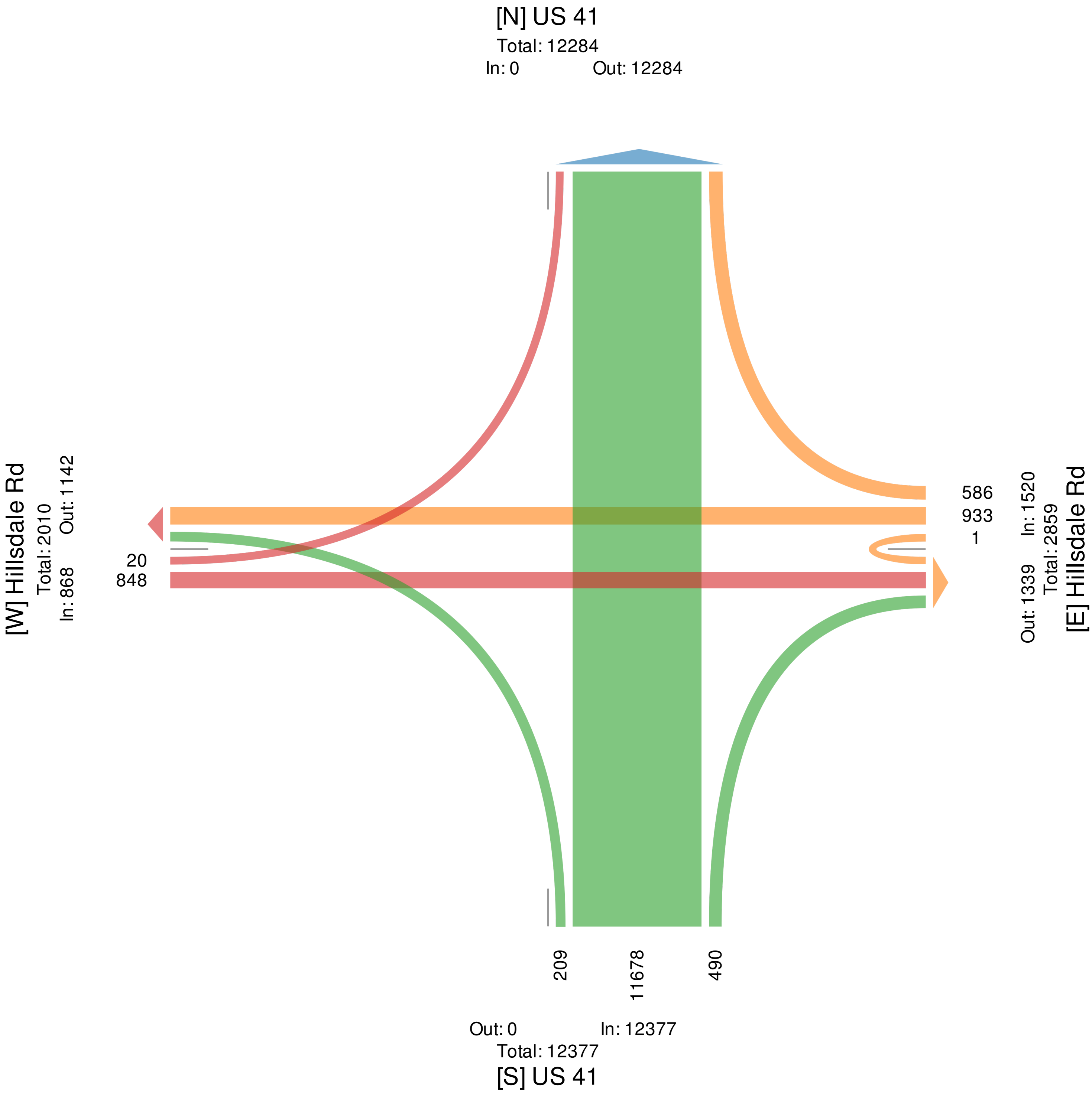
Leg Direction	Hillsdale Rd Westbound				US 41 Northbound				Hillsdale Rd Eastbound				
Time	R	T	U	**App**	R	T	L	**App**	T	L	U	**App**	**Int**
4:45PM	10	8	0	**18**	13	221	4	**238**	20	1	0	**21**	**277**
Hourly Total	45	51	0	**96**	45	949	23	**1017**	79	1	0	**80**	**1193**
5:00PM	6	10	0	**16**	15	240	6	**261**	31	1	0	**32**	**309**
5:15PM	15	16	0	**31**	10	246	1	**257**	18	0	0	**18**	**306**
5:30PM	15	13	0	**28**	14	238	3	**255**	13	0	0	**13**	**296**
5:45PM	9	12	0	**21**	17	170	3	**190**	18	0	0	**18**	**229**
Hourly Total	45	51	0	**96**	56	894	13	**963**	80	1	0	**81**	**1140**
6:00PM	13	10	0	**23**	8	174	2	**184**	18	0	0	**18**	**225**
6:15PM	6	10	0	**16**	6	158	1	**165**	11	0	0	**11**	**192**
6:30PM	5	18	0	**23**	9	135	3	**147**	14	0	0	**14**	**184**
6:45PM	9	8	0	**17**	9	134	2	**145**	15	0	0	**15**	**177**
Hourly Total	33	46	0	**79**	32	601	8	**641**	58	0	0	**58**	**778**
7:00PM	6	12	0	**18**	7	130	3	**140**	17	1	0	**18**	**176**
7:15PM	9	17	0	**26**	1	166	4	**171**	18	0	0	**18**	**215**
7:30PM	4	11	0	**15**	7	121	2	**130**	10	1	0	**11**	**156**
7:45PM	4	7	0	**11**	4	149	4	**157**	8	0	0	**8**	**176**
Hourly Total	23	47	0	**70**	19	566	13	**598**	53	2	0	**55**	**723**
8:00PM	5	10	0	**15**	5	143	1	**149**	12	0	0	**12**	**176**
8:15PM	6	9	0	**15**	14	129	2	**145**	17	1	0	**18**	**178**
8:30PM	4	5	0	**9**	8	125	3	**136**	12	0	0	**12**	**157**
8:45PM	0	8	0	**8**	9	81	2	**92**	8	0	0	**8**	**108**
Hourly Total	15	32	0	**47**	36	478	8	**522**	49	1	0	**50**	**619**
9:00PM	4	7	0	**11**	5	87	0	**92**	10	0	0	**10**	**113**
9:15PM	2	3	0	**5**	2	78	2	**82**	6	0	0	**6**	**93**
9:30PM	3	4	0	**7**	2	99	3	**104**	4	0	0	**4**	**115**
9:45PM	6	3	0	**9**	6	60	1	**67**	0	0	0	**0**	**76**
Hourly Total	15	17	0	**32**	15	324	6	**345**	20	0	0	**20**	**397**
10:00PM	2	1	0	**3**	4	40	2	**46**	3	0	0	**3**	**52**
10:15PM	2	1	0	**3**	2	58	3	**63**	4	0	0	**4**	**70**
10:30PM	1	3	0	**4**	1	27	1	**29**	3	0	0	**3**	**36**
10:45PM	2	6	0	**8**	1	42	1	**44**	0	0	0	**0**	**52**
Hourly Total	7	11	0	**18**	8	167	7	**182**	10	0	0	**10**	**210**
11:00PM	0	2	0	**2**	0	40	2	**42**	1	0	0	**1**	**45**
11:15PM	0	1	0	**1**	2	33	1	**36**	0	0	0	**0**	**37**
11:30PM	0	2	0	**2**	3	32	0	**35**	3	0	0	**3**	**40**
11:45PM	1	3	0	**4**	0	33	1	**34**	2	0	0	**2**	**40**
Hourly Total	1	8	0	**9**	5	138	4	**147**	6	0	0	**6**	**162**
2019-07-17 12:00AM	1	0	0	**1**	2	19	0	**21**	0	0	0	**0**	**22**
12:15AM	1	0	0	**1**	1	19	2	**22**	2	1	0	**3**	**26**
12:30AM	0	0	0	**0**	0	17	0	**17**	1	0	0	**1**	**18**
12:45AM	0	2	0	**2**	0	15	1	**16**	3	0	0	**3**	**21**
Hourly Total	2	2	0	**4**	3	70	3	**76**	6	1	0	**7**	**87**
1:00AM	1	1	0	**2**	0	18	1	**19**	1	0	0	**1**	**22**
1:15AM	0	1	0	**1**	1	20	0	**21**	2	0	0	**2**	**24**
1:30AM	1	0	0	**1**	1	19	0	**20**	1	0	0	**1**	**22**
1:45AM	0	0	0	**0**	0	13	0	**13**	0	0	0	**0**	**13**
Hourly Total	2	2	0	**4**	2	70	1	**73**	4	0	0	**4**	**81**
2:00AM	0	1	0	**1**	1	13	0	**14**	0	0	0	**0**	**15**
2:15AM	0	0	0	**0**	0	13	1	**14**	0	0	0	**0**	**14**
2:30AM	0	0	0	**0**	1	13	0	**14**	0	0	0	**0**	**14**
2:45AM	0	1	0	**1**	1	17	0	**18**	1	0	0	**1**	**20**
Hourly Total	0	2	0	**2**	3	56	1	**60**	1	0	0	**1**	**63**
3:00AM	2	0	0	**2**	0	27	0	**27**	2	0	0	**2**	**31**
3:15AM	0	4	0	**4**	0	22	0	**22**	0	0	0	**0**	**26**
3:30AM	1	0	0	**1**	0	20	0	**20**	0	0	0	**0**	**21**
3:45AM	0	2	0	**2**	0	26	1	**27**	2	0	0	**2**	**31**
Hourly Total	3	6	0	**9**	0	95	1	**96**	4	0	0	**4**	**109**
4:00AM	1	1	0	**2**	0	54	0	**54**	0	0	0	**0**	**56**
4:15AM	4	1	0	**5**	2	51	0	**53**	1	0	0	**1**	**59**
4:30AM	0	1	0	**1**	0	57	1	**58**	3	0	0	**3**	**62**

Leg Direction	Hillsdale Rd Westbound				US 41 Northbound				Hillsdale Rd Eastbound				
Time	R	T	U	App	R	T	L	App	T	L	U	App	Int
4:45AM	6	3	0	**9**	0	74	0	**74**	0	0	0	**0**	**83**
Hourly Total	11	6	0	**17**	2	236	1	**239**	4	0	0	**4**	**260**
5:00AM	5	8	0	**13**	0	97	1	**98**	4	0	0	**4**	**115**
5:15AM	10	6	0	**16**	1	125	1	**127**	3	0	0	**3**	**146**
5:30AM	8	11	0	**19**	0	137	4	**141**	9	1	0	**10**	**170**
5:45AM	6	8	0	**14**	2	124	0	**126**	6	1	0	**7**	**147**
Hourly Total	29	33	0	**62**	3	483	6	**492**	22	2	0	**24**	**578**
Total	586	933	1	**1520**	490	11678	209	**12377**	848	20	0	**868**	**14765**
% Approach	38.6%	61.4%	0.1%	-	4.0%	94.4%	1.7%	-	97.7%	2.3%	0%	-	-
% Total	4.0%	6.3%	0%	**10.3%**	3.3%	79.1%	1.4%	**83.8%**	5.7%	0.1%	0%	**5.9%**	-
Motorcycles	2	0	0	**2**	0	10	0	**10**	1	0	0	**1**	13
% Motorcycles	0.3%	0%	0%	**0.1%**	0%	0.1%	0%	**0.1%**	0.1%	0%	0%	**0.1%**	0.1%
Cars	456	690	0	**1146**	412	7860	136	**8408**	602	17	0	**619**	10173
% Cars	77.8%	74.0%	0%	**75.4%**	84.1%	67.3%	65.1%	**67.9%**	71.0%	85.0%	0%	**71.3%**	68.9%
Light Goods Vehicles	118	234	1	**353**	72	2246	60	**2378**	224	3	0	**227**	2958
% Light Goods Vehicles	20.1%	25.1%	100%	**23.2%**	14.7%	19.2%	28.7%	**19.2%**	26.4%	15.0%	0%	**26.2%**	20.0%
Single-Unit Trucks	9	6	0	**15**	5	463	9	**477**	13	0	0	**13**	505
% Single-Unit Trucks	1.5%	0.6%	0%	**1.0%**	1.0%	4.0%	4.3%	**3.9%**	1.5%	0%	0%	**1.5%**	3.4%
Articulated Trucks	1	2	0	**3**	1	1077	4	**1082**	8	0	0	**8**	1093
% Articulated Trucks	0.2%	0.2%	0%	**0.2%**	0.2%	9.2%	1.9%	**8.7%**	0.9%	0%	0%	**0.9%**	7.4%
Buses	0	1	0	**1**	0	22	0	**22**	0	0	0	**0**	23
% Buses	0%	0.1%	0%	**0.1%**	0%	0.2%	0%	**0.2%**	0%	0%	0%	**0%**	0.2%

*L: Left, R: Right, T: Thru, U: U-Turn

EMPO/INDOT US 41 @ Hillsdale Rd - TMC
Tue Jul 16, 2019
Full Length (6 AM-6 AM (+1))
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 679143, Location: 38.079492, -87.554662

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US



EMPO/INDOT US 41 @ Hillsdale Rd - TMC
Tue Jul 16, 2019
AM Peak (Jul 16 2019 7:15AM - 8:15 AM)
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 679143, Location: 38.079492, -87.554662

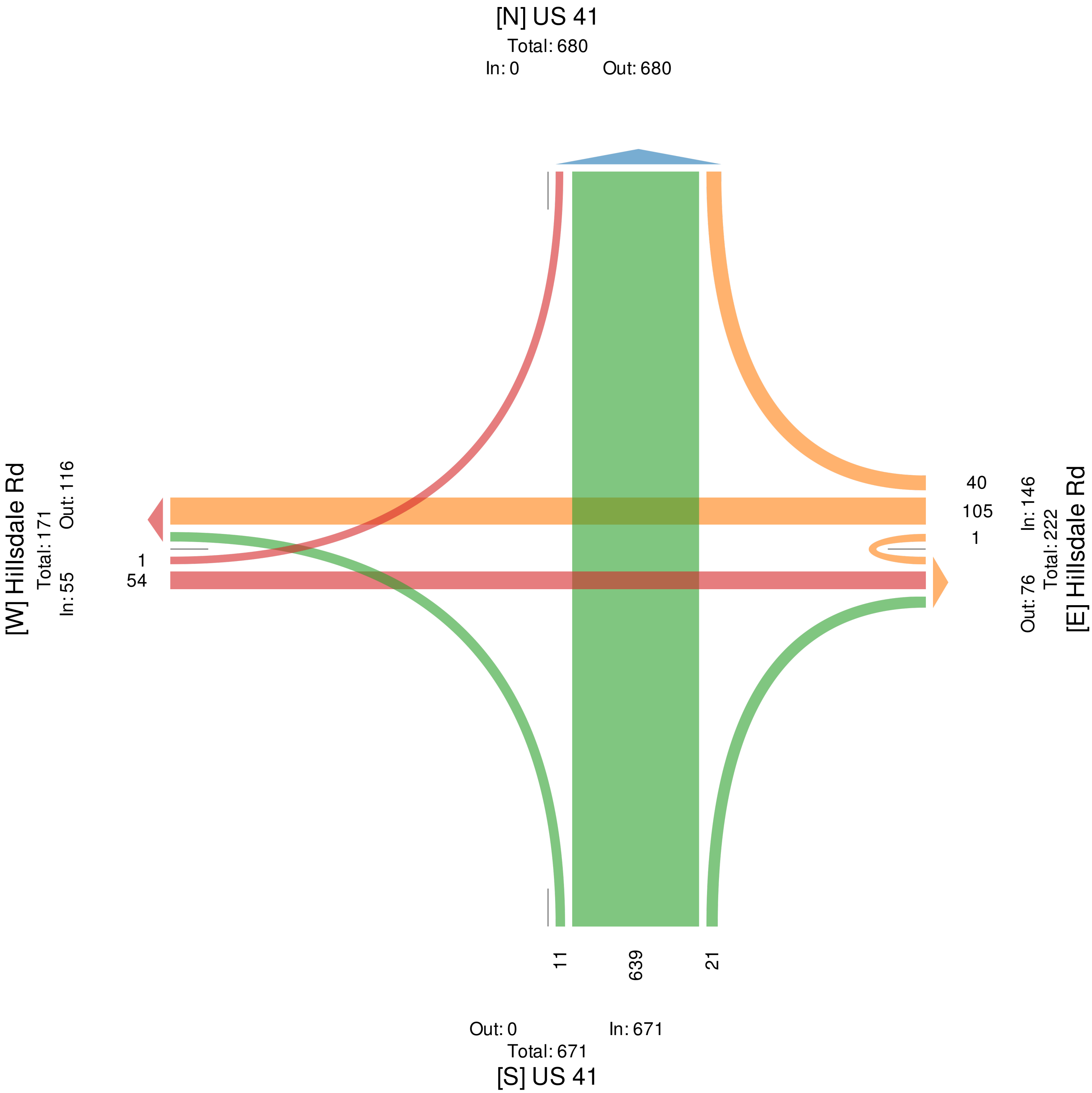
Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US

Leg	Hillsdale Rd				US 41				Hillsdale Rd				
Direction	Westbound				Northbound				Eastbound				
Time	R	T	U	**App**	R	T	L	**App**	T	L	U	**App**	**Int**
2019-07-16 7:15AM	13	33	1	**47**	6	157	3	**166**	11	0	0	**11**	**224**
7:30AM	11	24	0	**35**	2	172	3	**177**	15	0	0	**15**	**227**
7:45AM	8	28	0	**36**	10	168	2	**180**	21	0	0	**21**	**237**
8:00AM	8	20	0	**28**	3	142	3	**148**	7	1	0	**8**	**184**
Total	40	105	1	**146**	21	639	11	**671**	54	1	0	**55**	**872**
% Approach	27.4%	71.9%	0.7%	-	3.1%	95.2%	1.6%	-	98.2%	1.8%	0%	-	-
% Total	4.6%	12.0%	0.1%	**16.7%**	2.4%	73.3%	1.3%	**76.9%**	6.2%	0.1%	0%	**6.3%**	-
PHF	0.769	0.795	0.250	**0.777**	0.525	0.929	0.917	**0.932**	0.643	0.250	-	**0.655**	0.920
Motorcycles	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Motorcycles	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Cars	29	82	0	**111**	14	396	7	**417**	38	1	0	**39**	567
% Cars	72.5%	78.1%	0%	**76.0%**	66.7%	62.0%	63.6%	**62.1%**	70.4%	100%	0%	**70.9%**	65.0%
Light Goods Vehicles	10	23	1	**34**	6	144	2	**152**	15	0	0	**15**	201
% Light Goods Vehicles	25.0%	21.9%	100%	**23.3%**	28.6%	22.5%	18.2%	**22.7%**	27.8%	0%	0%	**27.3%**	23.1%
Single-Unit Trucks	1	0	0	**1**	1	47	1	**49**	0	0	0	**0**	50
% Single-Unit Trucks	2.5%	0%	0%	**0.7%**	4.8%	7.4%	9.1%	**7.3%**	0%	0%	0%	**0%**	5.7%
Articulated Trucks	0	0	0	**0**	0	50	1	**51**	1	0	0	**1**	52
% Articulated Trucks	0%	0%	0%	**0%**	0%	7.8%	9.1%	**7.6%**	1.9%	0%	0%	**1.8%**	6.0%
Buses	0	0	0	**0**	0	2	0	**2**	0	0	0	**0**	2
% Buses	0%	0%	0%	**0%**	0%	0.3%	0%	**0.3%**	0%	0%	0%	**0%**	0.2%

*L: Left, R: Right, T: Thru, U: U-Turn

EMPO/INDOT US 41 @ Hillsdale Rd - TMC
Tue Jul 16, 2019
AM Peak (Jul 16 2019 7:15AM - 8:15 AM)
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 679143, Location: 38.079492, -87.554662

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US



EMPO/INDOT US 41 @ Hillsdale Rd - TMC

Tue Jul 16, 2019
Midday Peak (Jul 16 2019 11:30AM - 12:30 PM)
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 679143, Location: 38.079492, -87.554662

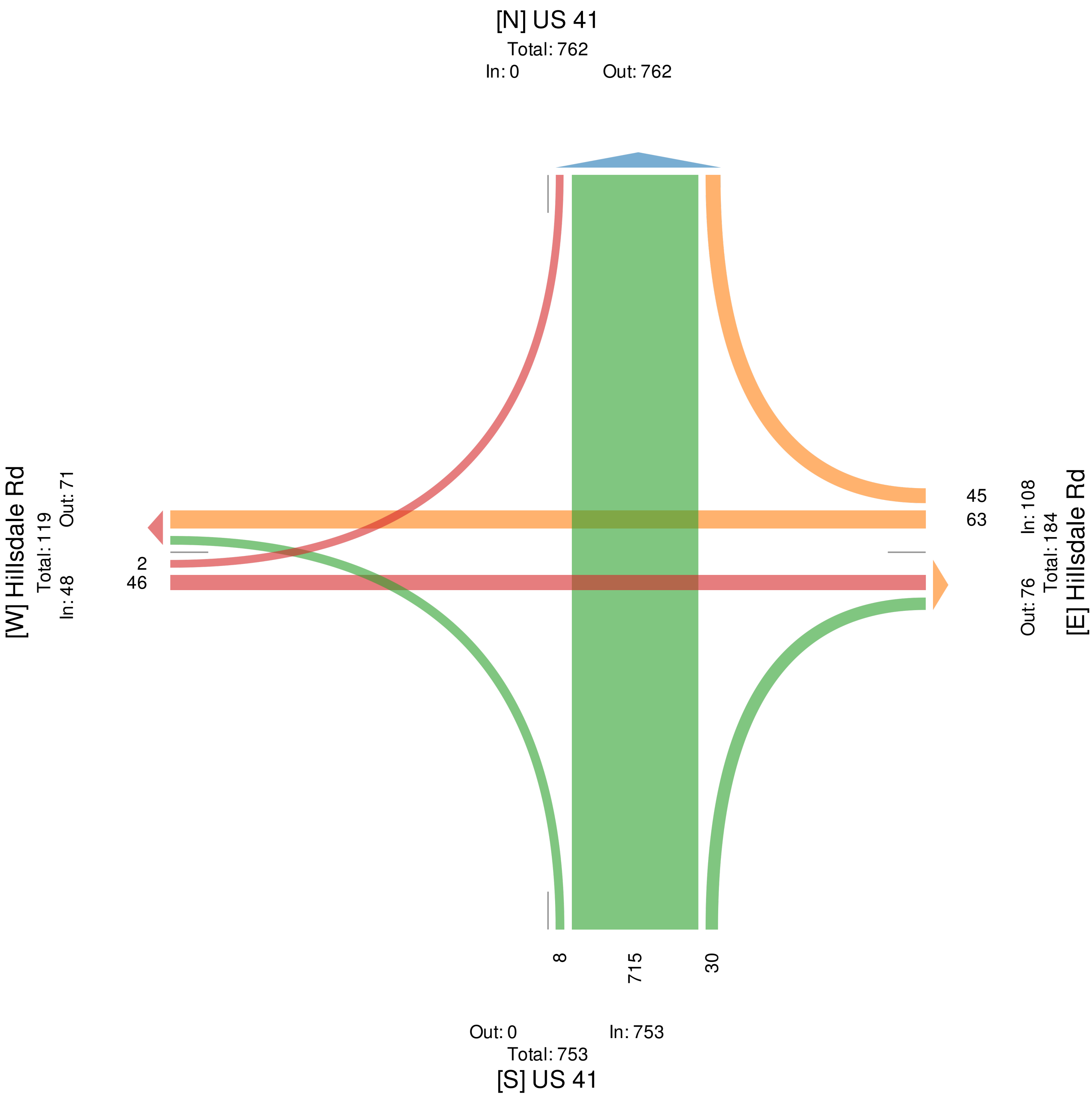
Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US

Leg Direction	Hillsdale Rd Westbound				US 41 Northbound				Hillsdale Rd Eastbound				
Time	R	T	U	**App**	R	T	L	**App**	T	L	U	**App**	**Int**
2019-07-16 11:30AM	18	17	0	**35**	7	170	1	**178**	8	0	0	**8**	**221**
11:45AM	16	12	0	**28**	8	187	1	**196**	10	1	0	**11**	**235**
12:00PM	4	24	0	**28**	9	188	3	**200**	15	1	0	**16**	**244**
12:15PM	7	10	0	**17**	6	170	3	**179**	13	0	0	**13**	**209**
Total	45	63	0	**108**	30	715	8	**753**	46	2	0	**48**	**909**
% Approach	41.7%	58.3%	0%	-	4.0%	95.0%	1.1%	-	95.8%	4.2%	0%	-	-
% Total	5.0%	6.9%	0%	**11.9%**	3.3%	78.7%	0.9%	**82.8%**	5.1%	0.2%	0%	**5.3%**	-
PHF	0.625	0.656	-	**0.771**	0.833	0.951	0.667	**0.941**	0.767	0.500	-	**0.750**	0.931
Motorcycles	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Motorcycles	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Cars	32	44	0	**76**	21	463	4	**488**	36	2	0	**38**	602
% Cars	71.1%	69.8%	0%	**70.4%**	70.0%	64.8%	50.0%	**64.8%**	78.3%	100%	0%	**79.2%**	66.2%
Light Goods Vehicles	13	14	0	**27**	7	152	3	**162**	9	0	0	**9**	198
% Light Goods Vehicles	28.9%	22.2%	0%	**25.0%**	23.3%	21.3%	37.5%	**21.5%**	19.6%	0%	0%	**18.8%**	21.8%
Single-Unit Trucks	0	4	0	**4**	2	25	1	**28**	1	0	0	**1**	33
% Single-Unit Trucks	0%	6.3%	0%	**3.7%**	6.7%	3.5%	12.5%	**3.7%**	2.2%	0%	0%	**2.1%**	3.6%
Articulated Trucks	0	1	0	**1**	0	72	0	**72**	0	0	0	**0**	73
% Articulated Trucks	0%	1.6%	0%	**0.9%**	0%	10.1%	0%	**9.6%**	0%	0%	0%	**0%**	8.0%
Buses	0	0	0	**0**	0	3	0	**3**	0	0	0	**0**	3
% Buses	0%	0%	0%	**0%**	0%	0.4%	0%	**0.4%**	0%	0%	0%	**0%**	0.3%

*L: Left, R: Right, T: Thru, U: U-Turn

EMPO/INDOT US 41 @ Hillsdale Rd - TMC
Tue Jul 16, 2019
Midday Peak (Jul 16 2019 11:30AM - 12:30 PM)
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 679143, Location: 38.079492, -87.554662

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US



EMPO/INDOT US 41 @ Hillsdale Rd - TMC
Tue Jul 16, 2019
PM Peak (Jul 16 2019 3:45PM - 4:45 PM) - Overall Peak Hour
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 679143, Location: 38.079492, -87.554662

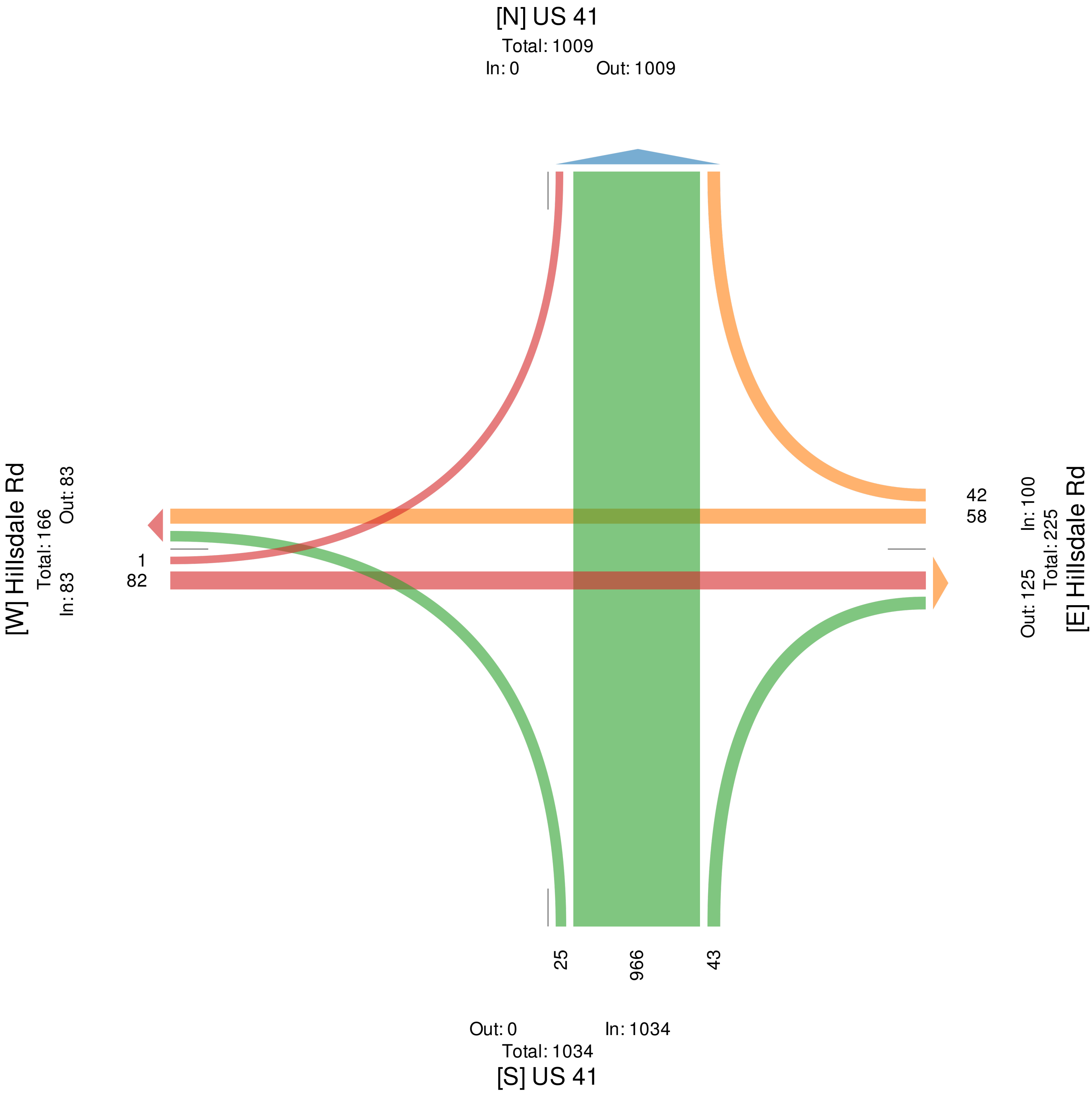
Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US

Leg	Hillsdale Rd				US 41				Hillsdale Rd				
Direction	Westbound				Northbound				Eastbound				
Time	R	T	U	**App**	R	T	L	**App**	T	L	U	**App**	**Int**
2019-07-16 3:45PM	7	15	0	**22**	11	238	6	**255**	23	1	0	**24**	**301**
4:00PM	11	13	0	**24**	13	240	4	**257**	18	0	0	**18**	**299**
4:15PM	15	16	0	**31**	10	257	9	**276**	20	0	0	**20**	**327**
4:30PM	9	14	0	**23**	9	231	6	**246**	21	0	0	**21**	**290**
Total	42	58	0	**100**	43	966	25	**1034**	82	1	0	**83**	**1217**
% Approach	42.0%	58.0%	0%	-	4.2%	93.4%	2.4%	-	98.8%	1.2%	0%	-	-
% Total	3.5%	4.8%	0%	**8.2%**	3.5%	79.4%	2.1%	**85.0%**	6.7%	0.1%	0%	**6.8%**	-
PHF	0.700	0.906	-	**0.806**	0.827	0.940	0.694	**0.937**	0.891	0.250	-	**0.865**	0.930
Motorcycles	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Motorcycles	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Cars	32	43	0	**75**	34	674	18	**726**	61	1	0	**62**	863
% Cars	76.2%	74.1%	0%	**75.0%**	79.1%	69.8%	72.0%	**70.2%**	74.4%	100%	0%	**74.7%**	70.9%
Light Goods Vehicles	9	15	0	**24**	9	175	6	**190**	21	0	0	**21**	235
% Light Goods Vehicles	21.4%	25.9%	0%	**24.0%**	20.9%	18.1%	24.0%	**18.4%**	25.6%	0%	0%	**25.3%**	19.3%
Single-Unit Trucks	1	0	0	**1**	0	44	1	**45**	0	0	0	**0**	46
% Single-Unit Trucks	2.4%	0%	0%	**1.0%**	0%	4.6%	4.0%	**4.4%**	0%	0%	0%	**0%**	3.8%
Articulated Trucks	0	0	0	**0**	0	71	0	**71**	0	0	0	**0**	71
% Articulated Trucks	0%	0%	0%	**0%**	0%	7.3%	0%	**6.9%**	0%	0%	0%	**0%**	5.8%
Buses	0	0	0	**0**	0	2	0	**2**	0	0	0	**0**	2
% Buses	0%	0%	0%	**0%**	0%	0.2%	0%	**0.2%**	0%	0%	0%	**0%**	0.2%

*L: Left, R: Right, T: Thru, U: U-Turn

EMPO/INDOT US 41 @ Hillsdale Rd - TMC
Tue Jul 16, 2019
PM Peak (Jul 16 2019 3:45PM - 4:45 PM) - Overall Peak Hour
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 679143, Location: 38.079492, -87.554662

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US



EMPO/INDOT US 41 @ Hillsdale Rd - TMC
Tue Jul 16, 2019
Full Length (6 AM-6 AM (+1))
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 680180, Location: 38.079492, -87.554662

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US

Leg	US 41				Hillsdale Rd				Hillsdale Rd				
Direction	Southbound				Westbound				Eastbound				
Time	R	T	L	**App**	T	L	U	**App**	R	T	U	**App**	**Int**
2019-07-16 6:00AM	0	163	2	**165**	0	8	0	**8**	3	0	0	**3**	**176**
6:15AM	0	151	4	**155**	2	12	0	**14**	1	2	0	**3**	**172**
6:30AM	0	182	9	**191**	4	19	0	**23**	2	4	0	**6**	**220**
6:45AM	0	171	4	**175**	4	24	0	**28**	3	4	0	**7**	**210**
Hourly Total	0	667	19	**686**	10	63	0	**73**	9	10	0	**19**	**778**
7:00AM	0	214	7	**221**	2	18	0	**20**	3	2	0	**5**	**246**
7:15AM	0	224	7	**231**	6	30	0	**36**	4	4	0	**8**	**275**
7:30AM	0	230	7	**237**	5	21	0	**26**	4	7	0	**11**	**274**
7:45AM	0	211	12	**223**	5	26	0	**31**	3	9	0	**12**	**266**
Hourly Total	0	879	33	**912**	18	95	0	**113**	14	22	0	**36**	**1061**
8:00AM	0	174	5	**179**	5	18	0	**23**	5	4	0	**9**	**211**
8:15AM	0	160	5	**165**	0	15	0	**15**	3	2	0	**5**	**185**
8:30AM	0	168	7	**175**	3	15	0	**18**	2	6	0	**8**	**201**
8:45AM	0	171	18	**189**	2	16	0	**18**	2	7	0	**9**	**216**
Hourly Total	0	673	35	**708**	10	64	0	**74**	12	19	0	**31**	**813**
9:00AM	1	164	5	**170**	3	14	0	**17**	1	2	0	**3**	**190**
9:15AM	2	165	4	**171**	4	12	0	**16**	1	3	0	**4**	**191**
9:30AM	2	158	3	**163**	6	13	0	**19**	2	5	0	**7**	**189**
9:45AM	0	155	1	**156**	6	13	0	**19**	1	2	0	**3**	**178**
Hourly Total	5	642	13	**660**	19	52	0	**71**	5	12	0	**17**	**748**
10:00AM	0	155	5	**160**	7	9	0	**16**	1	1	0	**2**	**178**
10:15AM	0	162	5	**167**	6	10	0	**16**	0	5	0	**5**	**188**
10:30AM	0	167	7	**174**	7	12	0	**19**	1	6	0	**7**	**200**
10:45AM	0	174	14	**188**	4	14	0	**18**	4	5	0	**9**	**215**
Hourly Total	0	658	31	**689**	24	45	0	**69**	6	17	0	**23**	**781**
11:00AM	0	179	7	**186**	5	9	0	**14**	3	3	0	**6**	**206**
11:15AM	0	196	12	**208**	4	8	0	**12**	2	2	0	**4**	**224**
11:30AM	0	218	7	**225**	7	11	0	**18**	2	2	0	**4**	**247**
11:45AM	1	210	8	**219**	7	9	0	**16**	2	2	0	**4**	**239**
Hourly Total	1	803	34	**838**	23	37	0	**60**	9	9	0	**18**	**916**
12:00PM	0	180	13	**193**	9	17	1	**27**	3	4	0	**7**	**227**
12:15PM	0	204	9	**213**	3	9	0	**12**	0	5	0	**5**	**230**
12:30PM	0	199	9	**208**	10	15	0	**25**	2	4	0	**6**	**239**
12:45PM	0	196	15	**211**	0	9	0	**9**	0	7	0	**7**	**227**
Hourly Total	0	779	46	**825**	22	50	1	**73**	5	20	0	**25**	**923**
1:00PM	1	174	15	**190**	5	12	0	**17**	0	6	0	**6**	**213**
1:15PM	0	177	6	**183**	7	16	0	**23**	3	2	0	**5**	**211**
1:30PM	1	175	9	**185**	2	13	0	**15**	2	2	0	**4**	**204**
1:45PM	1	190	8	**199**	9	18	0	**27**	1	3	0	**4**	**230**
Hourly Total	3	716	38	**757**	23	59	0	**82**	6	13	0	**19**	**858**
2:00PM	0	198	2	**200**	4	8	0	**12**	1	3	0	**4**	**216**
2:15PM	2	186	7	**195**	2	5	0	**7**	1	2	0	**3**	**205**
2:30PM	0	210	8	**218**	8	7	0	**15**	1	1	0	**2**	**235**
2:45PM	0	186	5	**191**	9	6	0	**15**	0	1	0	**1**	**207**
Hourly Total	2	780	22	**804**	23	26	0	**49**	3	7	0	**10**	**863**
3:00PM	0	213	10	**223**	9	15	0	**24**	2	6	0	**8**	**255**
3:15PM	0	215	8	**223**	4	3	0	**7**	3	2	0	**5**	**235**
3:30PM	0	265	9	**274**	7	12	0	**19**	2	6	0	**8**	**301**
3:45PM	1	276	13	**290**	9	13	0	**22**	1	9	0	**10**	**322**
Hourly Total	1	969	40	**1010**	29	43	0	**72**	8	23	0	**31**	**1113**
4:00PM	0	253	14	**267**	11	6	0	**17**	1	5	0	**6**	**290**
4:15PM	0	221	15	**236**	14	10	0	**24**	2	4	0	**6**	**266**
4:30PM	0	194	17	**211**	13	9	0	**22**	1	4	0	**5**	**238**

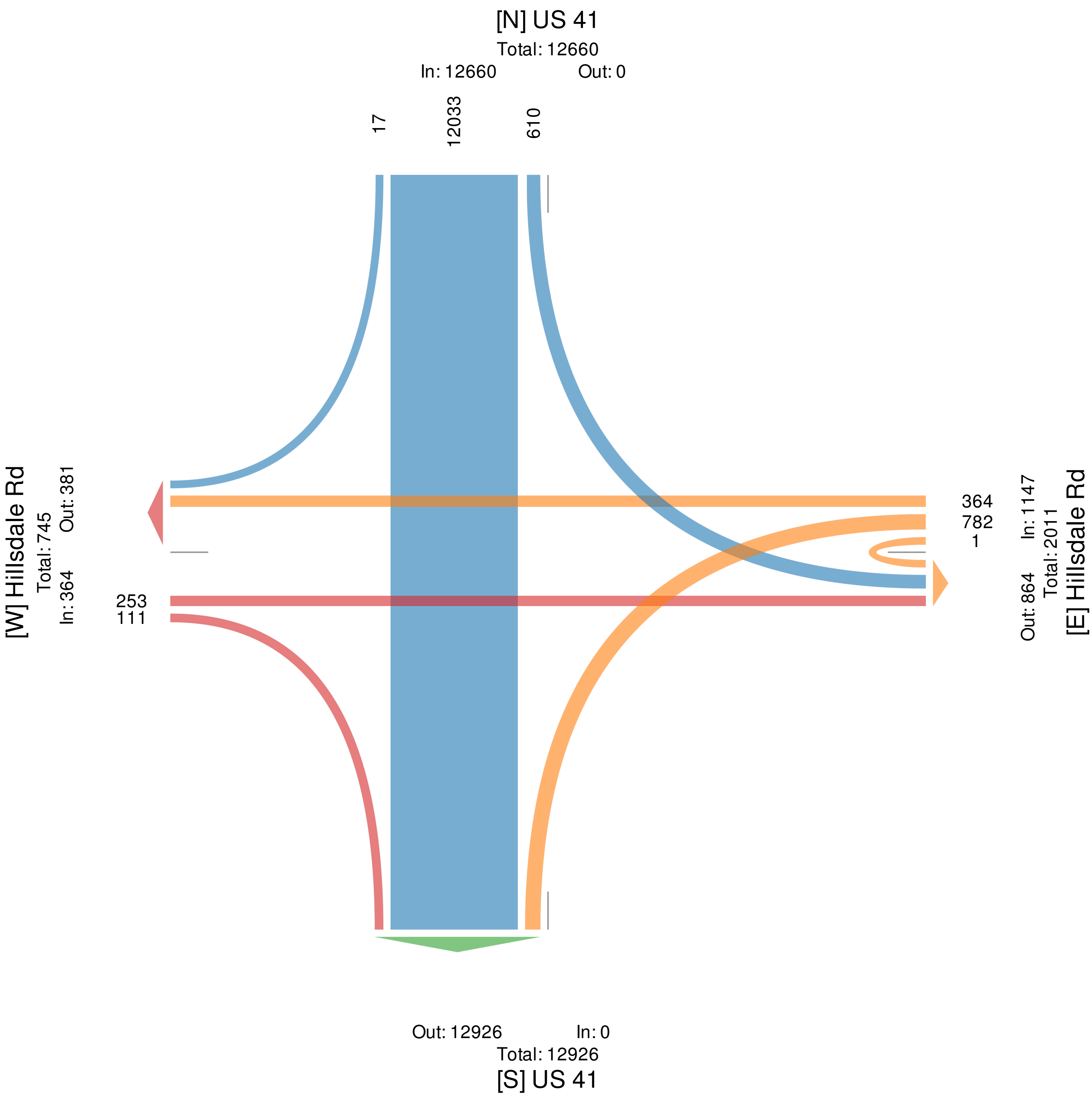
Leg Direction	US 41 Southbound				Hillsdale Rd Westbound				Hillsdale Rd Eastbound				
Time	R	T	L	**App**	T	L	U	**App**	R	T	U	**App**	**Int**
4:45PM	0	195	13	**208**	2	10	0	**12**	2	8	0	**10**	**230**
Hourly Total	0	863	59	**922**	40	35	0	**75**	6	21	0	**27**	**1024**
5:00PM	0	200	24	**224**	8	8	0	**16**	0	9	0	**9**	**249**
5:15PM	0	181	13	**194**	8	9	0	**17**	2	5	0	**7**	**218**
5:30PM	0	181	11	**192**	5	10	0	**15**	4	3	0	**7**	**214**
5:45PM	0	162	11	**173**	6	11	0	**17**	2	5	0	**7**	**197**
Hourly Total	0	724	59	**783**	27	38	0	**65**	8	22	0	**30**	**878**
6:00PM	0	149	16	**165**	0	12	0	**12**	1	2	0	**3**	**180**
6:15PM	1	141	7	**149**	6	5	0	**11**	1	4	0	**5**	**165**
6:30PM	0	128	11	**139**	7	13	0	**20**	2	4	0	**6**	**165**
6:45PM	0	109	13	**122**	7	4	0	**11**	0	2	0	**2**	**135**
Hourly Total	1	527	47	**575**	20	34	0	**54**	4	12	0	**16**	**645**
7:00PM	0	199	12	**211**	6	9	0	**15**	2	3	0	**5**	**231**
7:15PM	0	121	11	**132**	9	12	0	**21**	1	8	0	**9**	**162**
7:30PM	0	109	9	**118**	6	8	0	**14**	1	2	0	**3**	**135**
7:45PM	0	76	6	**82**	7	4	0	**11**	0	5	0	**5**	**98**
Hourly Total	0	505	38	**543**	28	33	0	**61**	4	18	0	**22**	**626**
8:00PM	0	100	6	**106**	6	5	0	**11**	0	4	0	**4**	**121**
8:15PM	3	107	16	**126**	4	7	0	**11**	1	2	0	**3**	**140**
8:30PM	0	119	11	**130**	4	4	0	**8**	0	2	0	**2**	**140**
8:45PM	0	108	7	**115**	2	8	0	**10**	0	0	0	**0**	**125**
Hourly Total	3	434	40	**477**	16	24	0	**40**	1	8	0	**9**	**526**
9:00PM	0	74	9	**83**	3	5	0	**8**	1	1	0	**2**	**93**
9:15PM	0	75	4	**79**	2	2	0	**4**	2	2	0	**4**	**87**
9:30PM	0	68	4	**72**	5	2	0	**7**	0	0	0	**0**	**79**
9:45PM	0	51	0	**51**	2	1	0	**3**	1	0	0	**1**	**55**
Hourly Total	0	268	17	**285**	12	10	0	**22**	4	3	0	**7**	**314**
10:00PM	0	49	3	**52**	2	1	0	**3**	0	0	0	**0**	**55**
10:15PM	0	61	3	**64**	3	1	0	**4**	0	0	0	**0**	**68**
10:30PM	0	55	2	**57**	1	3	0	**4**	0	0	0	**0**	**61**
10:45PM	0	33	0	**33**	1	6	0	**7**	0	0	0	**0**	**40**
Hourly Total	0	198	8	**206**	7	11	0	**18**	0	0	0	**0**	**224**
11:00PM	1	36	1	**38**	1	2	0	**3**	1	0	0	**1**	**42**
11:15PM	0	25	0	**25**	1	1	0	**2**	0	0	0	**0**	**27**
11:30PM	0	23	0	**23**	0	2	0	**2**	0	3	0	**3**	**28**
11:45PM	0	27	2	**29**	3	0	0	**3**	2	0	0	**2**	**34**
Hourly Total	1	111	3	**115**	5	5	0	**10**	3	3	0	**6**	**131**
2019-07-17 12:00AM	0	17	0	**17**	0	0	0	**0**	0	0	0	**0**	**17**
12:15AM	0	19	2	**21**	1	1	0	**2**	0	0	0	**0**	**23**
12:30AM	0	21	1	**22**	0	0	0	**0**	0	0	0	**0**	**22**
12:45AM	0	38	2	**40**	1	2	0	**3**	0	1	0	**1**	**44**
Hourly Total	0	95	5	**100**	2	3	0	**5**	0	1	0	**1**	**106**
1:00AM	0	27	1	**28**	0	2	0	**2**	0	0	0	**0**	**30**
1:15AM	0	20	2	**22**	0	1	0	**1**	0	0	0	**0**	**23**
1:30AM	0	38	1	**39**	0	0	0	**0**	0	0	0	**0**	**39**
1:45AM	0	18	0	**18**	0	0	0	**0**	0	0	0	**0**	**18**
Hourly Total	0	103	4	**107**	0	3	0	**3**	0	0	0	**0**	**110**
2:00AM	0	21	0	**21**	0	1	0	**1**	0	0	0	**0**	**22**
2:15AM	0	15	0	**15**	0	1	0	**1**	0	0	0	**0**	**16**
2:30AM	0	21	0	**21**	0	0	0	**0**	0	0	0	**0**	**21**
2:45AM	0	22	1	**23**	0	1	0	**1**	0	0	0	**0**	**24**
Hourly Total	0	79	1	**80**	0	3	0	**3**	0	0	0	**0**	**83**
3:00AM	0	21	1	**22**	0	0	0	**0**	0	1	0	**1**	**23**
3:15AM	0	20	0	**20**	0	4	0	**4**	0	0	0	**0**	**24**
3:30AM	0	17	0	**17**	0	0	0	**0**	0	0	0	**0**	**17**
3:45AM	0	17	1	**18**	0	3	0	**3**	0	1	0	**1**	**22**
Hourly Total	0	75	2	**77**	0	7	0	**7**	0	2	0	**2**	**86**
4:00AM	0	31	0	**31**	0	1	0	**1**	1	0	0	**1**	**33**
4:15AM	0	41	0	**41**	0	1	0	**1**	0	0	0	**0**	**42**
4:30AM	0	49	3	**52**	0	2	0	**2**	1	0	0	**1**	**55**

Leg Direction	US 41 Southbound				Hillsdale Rd Westbound				Hillsdale Rd Eastbound				
Time	R	T	L	**App**	T	L	U	**App**	R	T	U	**App**	**Int**
4:45AM	0	44	0	**44**	0	4	0	**4**	0	0	0	**0**	**48**
Hourly Total	0	165	3	**168**	0	8	0	**8**	2	0	0	**2**	**178**
5:00AM	0	52	2	**54**	0	9	0	**9**	1	2	0	**3**	**66**
5:15AM	0	70	2	**72**	2	5	0	**7**	0	1	0	**1**	**80**
5:30AM	0	90	8	**98**	3	12	0	**15**	1	2	0	**3**	**116**
5:45AM	0	108	1	**109**	1	8	0	**9**	0	6	0	**6**	**124**
Hourly Total	0	320	13	**333**	6	34	0	**40**	2	11	0	**13**	**386**
Total	17	12033	610	**12660**	364	782	1	**1147**	111	253	0	**364**	**14171**
% Approach	0.1%	95.0%	4.8%	-	31.7%	68.2%	0.1%	-	30.5%	69.5%	0%	-	-
% Total	0.1%	84.9%	4.3%	**89.3%**	2.6%	5.5%	0%	**8.1%**	0.8%	1.8%	0%	**2.6%**	-
Motorcycles	0	17	1	**18**	0	0	0	**0**	0	0	0	**0**	18
% Motorcycles	0%	0.1%	0.2%	**0.1%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0.1%
Cars	17	8210	438	**8665**	262	594	1	**857**	72	184	0	**256**	9778
% Cars	100%	68.2%	71.8%	**68.4%**	72.0%	76.0%	100%	**74.7%**	64.9%	72.7%	0%	**70.3%**	69.0%
Light Goods Vehicles	0	2368	153	**2521**	99	167	0	**266**	39	66	0	**105**	2892
% Light Goods Vehicles	0%	19.7%	25.1%	**19.9%**	27.2%	21.4%	0%	**23.2%**	35.1%	26.1%	0%	**28.8%**	20.4%
Single-Unit Trucks	0	453	14	**467**	2	18	0	**20**	0	3	0	**3**	490
% Single-Unit Trucks	0%	3.8%	2.3%	**3.7%**	0.5%	2.3%	0%	**1.7%**	0%	1.2%	0%	**0.8%**	3.5%
Articulated Trucks	0	967	4	**971**	1	2	0	**3**	0	0	0	**0**	974
% Articulated Trucks	0%	8.0%	0.7%	**7.7%**	0.3%	0.3%	0%	**0.3%**	0%	0%	0%	**0%**	6.9%
Buses	0	18	0	**18**	0	1	0	**1**	0	0	0	**0**	19
% Buses	0%	0.1%	0%	**0.1%**	0%	0.1%	0%	**0.1%**	0%	0%	0%	**0%**	0.1%

*L: Left, R: Right, T: Thru, U: U-Turn

EMPO/INDOT US 41 @ Hillsdale Rd - TMC
Tue Jul 16, 2019
Full Length (6 AM-6 AM (+1))
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 680180, Location: 38.079492, -87.554662

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US



EMPO/INDOT US 41 @ Hillsdale Rd - TMC
Tue Jul 16, 2019
AM Peak (Jul 16 2019 7AM - 8 AM)
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 680180, Location: 38.079492, -87.554662

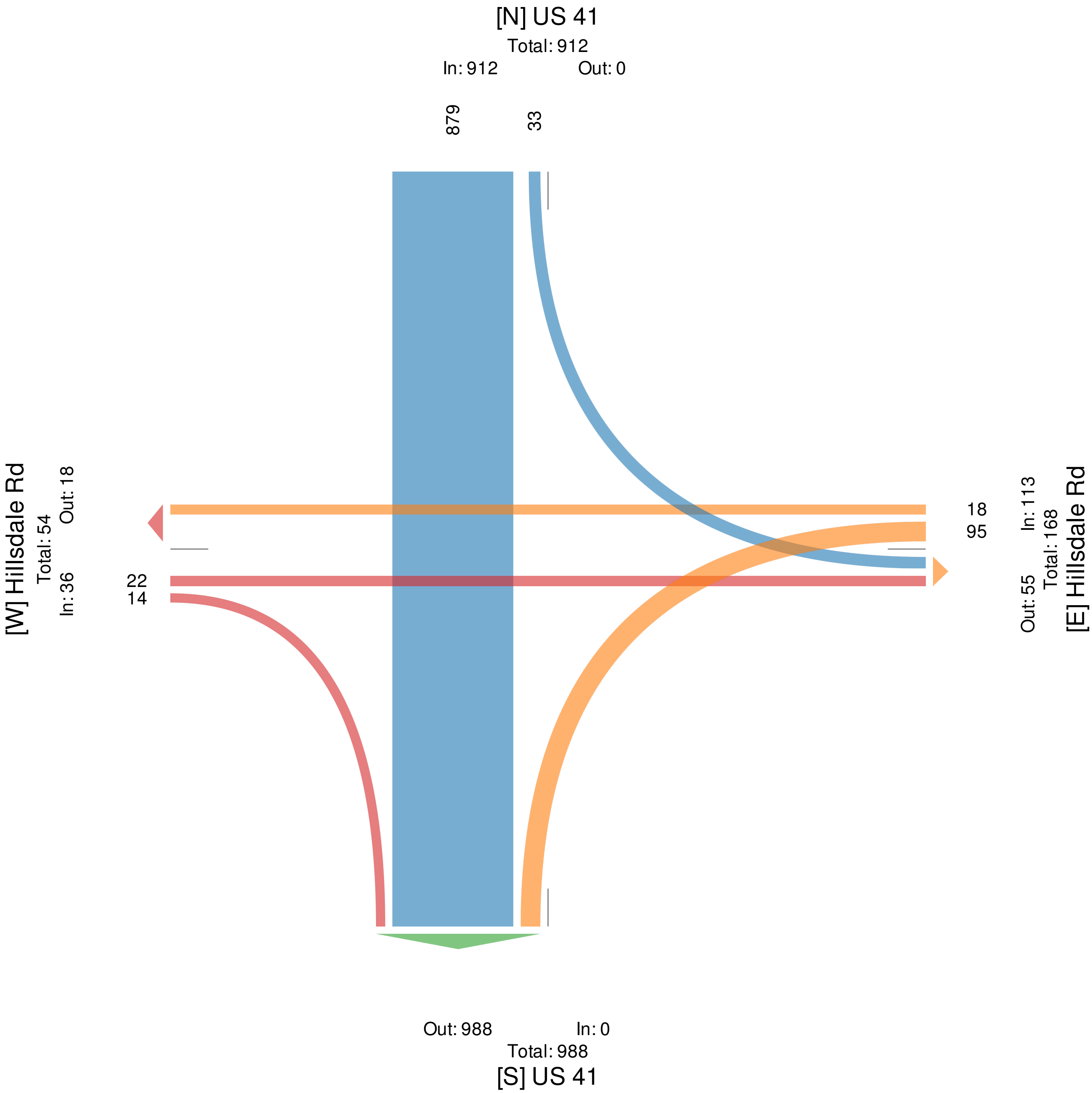
Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US

Leg	US 41				Hillsdale Rd				Hillsdale Rd				
Direction	Southbound				Westbound				Eastbound				
Time	R	T	L	**App**	T	L	U	**App**	R	T	U	**App**	**Int**
2019-07-16 7:00AM	0	214	7	**221**	2	18	0	**20**	3	2	0	**5**	**246**
7:15AM	0	224	7	**231**	6	30	0	**36**	4	4	0	**8**	**275**
7:30AM	0	230	7	**237**	5	21	0	**26**	4	7	0	**11**	**274**
7:45AM	0	211	12	**223**	5	26	0	**31**	3	9	0	**12**	**266**
Total	0	879	33	**912**	18	95	0	**113**	14	22	0	**36**	**1061**
% Approach	0%	96.4%	3.6%	-	15.9%	84.1%	0%	-	38.9%	61.1%	0%	-	-
% Total	0%	82.8%	3.1%	**86.0%**	1.7%	9.0%	0%	**10.7%**	1.3%	2.1%	0%	**3.4%**	-
PHF	-	0.955	0.688	**0.962**	0.750	0.792	-	**0.785**	0.875	0.611	-	**0.750**	0.965
Motorcycles	0	2	0	**2**	0	0	0	**0**	0	0	0	**0**	2
% Motorcycles	0%	0.2%	0%	**0.2%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0.2%
Cars	0	625	21	**646**	11	75	0	**86**	11	16	0	**27**	759
% Cars	0%	71.1%	63.6%	**70.8%**	61.1%	78.9%	0%	**76.1%**	78.6%	72.7%	0%	**75.0%**	71.5%
Light Goods Vehicles	0	180	11	**191**	7	16	0	**23**	3	6	0	**9**	223
% Light Goods Vehicles	0%	20.5%	33.3%	**20.9%**	38.9%	16.8%	0%	**20.4%**	21.4%	27.3%	0%	**25.0%**	21.0%
Single-Unit Trucks	0	19	1	**20**	0	4	0	**4**	0	0	0	**0**	24
% Single-Unit Trucks	0%	2.2%	3.0%	**2.2%**	0%	4.2%	0%	**3.5%**	0%	0%	0%	**0%**	2.3%
Articulated Trucks	0	52	0	**52**	0	0	0	**0**	0	0	0	**0**	52
% Articulated Trucks	0%	5.9%	0%	**5.7%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	4.9%
Buses	0	1	0	**1**	0	0	0	**0**	0	0	0	**0**	1
% Buses	0%	0.1%	0%	**0.1%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0.1%

*L: Left, R: Right, T: Thru, U: U-Turn

EMPO/INDOT US 41 @ Hillsdale Rd - TMC
Tue Jul 16, 2019
AM Peak (Jul 16 2019 7AM - 8 AM)
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 680180, Location: 38.079492, -87.554662

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US



EMPO/INDOT US 41 @ Hillsdale Rd - TMC
Tue Jul 16, 2019
Midday Peak (Jul 16 2019 11:30AM - 12:30 PM)
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 680180, Location: 38.079492, -87.554662

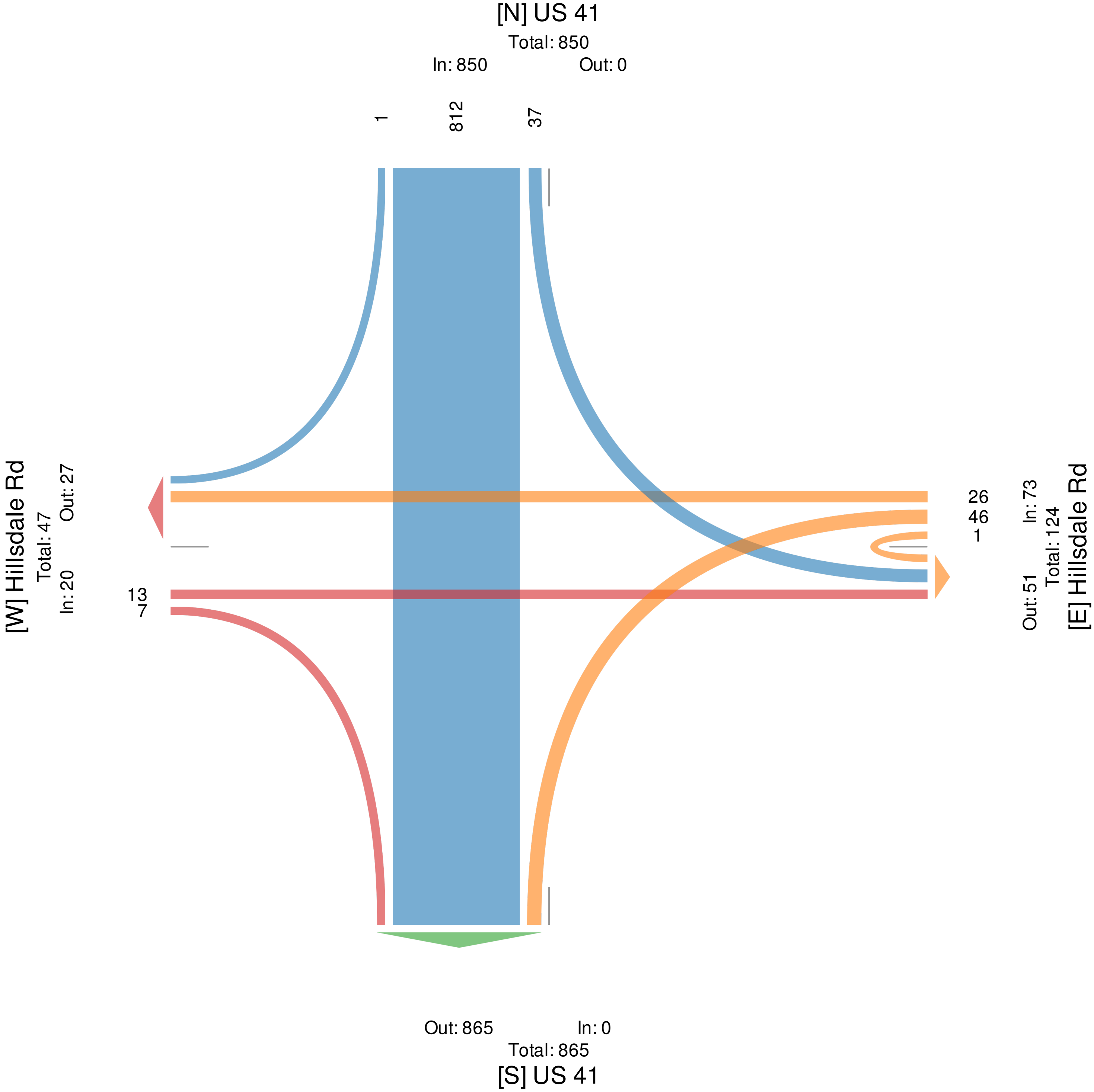
Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US

Leg	US 41				Hillsdale Rd				Hillsdale Rd				
Direction	Southbound				Westbound				Eastbound				
Time	R	T	L	**App**	T	L	U	**App**	R	T	U	**App**	**Int**
2019-07-16 11:30AM	0	218	7	**225**	7	11	0	**18**	2	2	0	**4**	**247**
11:45AM	1	210	8	**219**	7	9	0	**16**	2	2	0	**4**	**239**
12:00PM	0	180	13	**193**	9	17	1	**27**	3	4	0	**7**	**227**
12:15PM	0	204	9	**213**	3	9	0	**12**	0	5	0	**5**	**230**
Total	1	812	37	**850**	26	46	1	**73**	7	13	0	**20**	**943**
% Approach	0.1%	95.5%	4.4%	-	35.6%	63.0%	1.4%	-	35.0%	65.0%	0%	-	-
% Total	0.1%	86.1%	3.9%	**90.1%**	2.8%	4.9%	0.1%	**7.7%**	0.7%	1.4%	0%	**2.1%**	-
PHF	0.250	0.931	0.712	**0.944**	0.722	0.676	0.250	**0.676**	0.583	0.650	-	**0.714**	0.954
Motorcycles	0	4	0	**4**	0	0	0	**0**	0	0	0	**0**	4
% Motorcycles	0%	0.5%	0%	**0.5%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0.4%
Cars	1	563	30	**594**	20	33	1	**54**	2	8	0	**10**	658
% Cars	100%	69.3%	81.1%	**69.9%**	76.9%	71.7%	100%	**74.0%**	28.6%	61.5%	0%	**50.0%**	69.8%
Light Goods Vehicles	0	153	6	**159**	4	9	0	**13**	5	4	0	**9**	181
% Light Goods Vehicles	0%	18.8%	16.2%	**18.7%**	15.4%	19.6%	0%	**17.8%**	71.4%	30.8%	0%	**45.0%**	19.2%
Single-Unit Trucks	0	37	1	**38**	1	4	0	**5**	0	1	0	**1**	44
% Single-Unit Trucks	0%	4.6%	2.7%	**4.5%**	3.8%	8.7%	0%	**6.8%**	0%	7.7%	0%	**5.0%**	4.7%
Articulated Trucks	0	51	0	**51**	1	0	0	**1**	0	0	0	**0**	52
% Articulated Trucks	0%	6.3%	0%	**6.0%**	3.8%	0%	0%	**1.4%**	0%	0%	0%	**0%**	5.5%
Buses	0	4	0	**4**	0	0	0	**0**	0	0	0	**0**	4
% Buses	0%	0.5%	0%	**0.5%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0.4%

*L: Left, R: Right, T: Thru, U: U-Turn

EMPO/INDOT US 41 @ Hillsdale Rd - TMC
Tue Jul 16, 2019
Midday Peak (Jul 16 2019 11:30AM - 12:30 PM)
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 680180, Location: 38.079492, -87.554662

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US



EMPO/INDOT US 41 @ Hillsdale Rd - TMC

Tue Jul 16, 2019
PM Peak (Jul 16 2019 3:30PM - 4:30 PM) - Overall Peak Hour
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 680180, Location: 38.079492, -87.554662

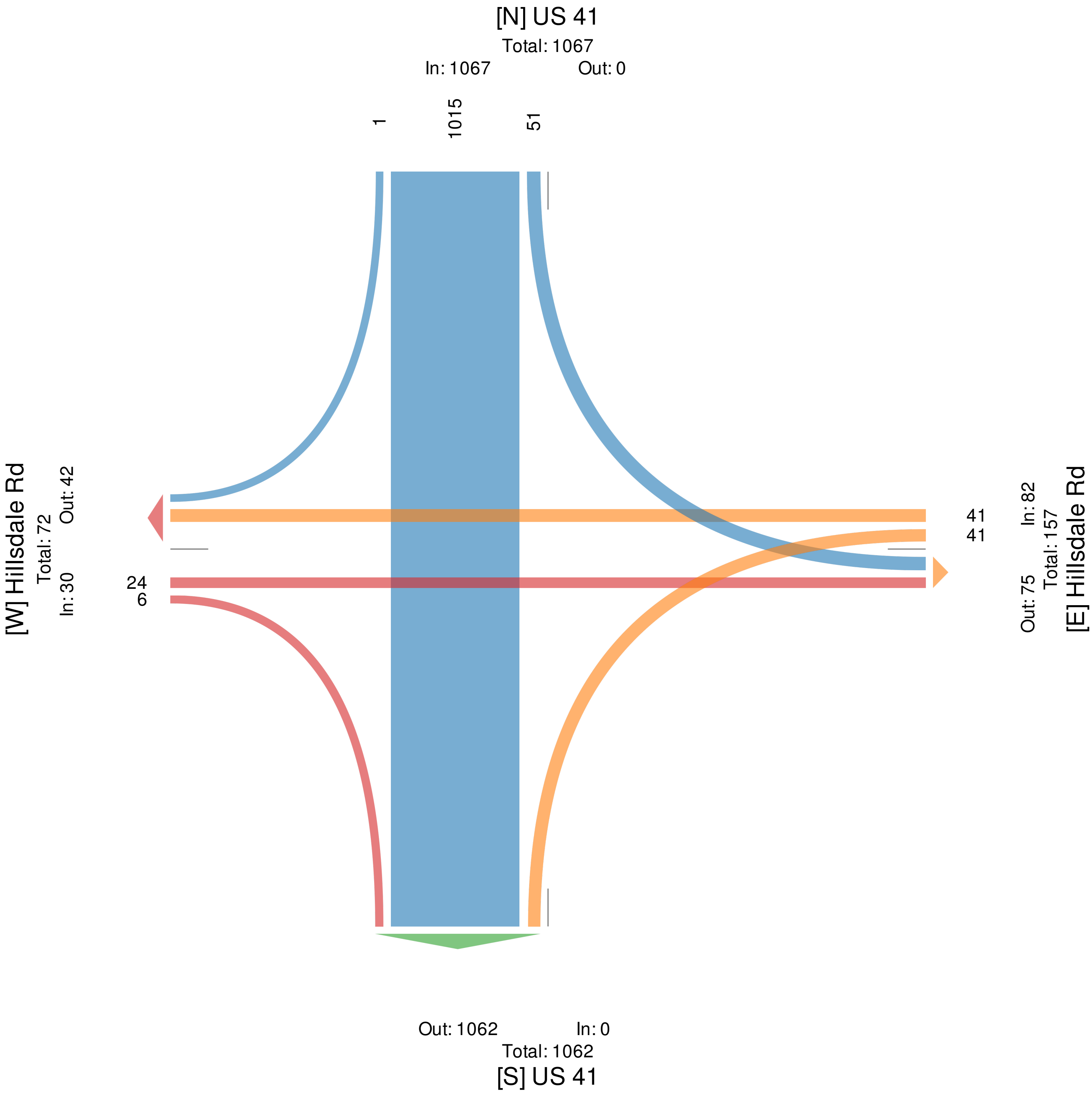
Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US

Leg Direction	US 41 Southbound				Hillsdale Rd Westbound				Hillsdale Rd Eastbound				
Time	R	T	L	**App**	T	L	U	**App**	R	T	U	**App**	**Int**
2019-07-16 3:30PM	0	265	9	**274**	7	12	0	**19**	2	6	0	**8**	**301**
3:45PM	1	276	13	**290**	9	13	0	**22**	1	9	0	**10**	**322**
4:00PM	0	253	14	**267**	11	6	0	**17**	1	5	0	**6**	**290**
4:15PM	0	221	15	**236**	14	10	0	**24**	2	4	0	**6**	**266**
Total	1	1015	51	**1067**	41	41	0	**82**	6	24	0	**30**	**1179**
% Approach	0.1%	95.1%	4.8%	-	50.0%	50.0%	0%	-	20.0%	80.0%	0%	-	-
% Total	0.1%	86.1%	4.3%	**90.5%**	3.5%	3.5%	0%	**7.0%**	0.5%	2.0%	0%	**2.5%**	-
PHF	0.250	0.919	0.850	**0.920**	0.732	0.788	-	**0.854**	0.750	0.667	-	**0.750**	0.915
Motorcycles	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0
% Motorcycles	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0%
Cars	1	727	37	**765**	28	29	0	**57**	4	17	0	**21**	843
% Cars	100%	71.6%	72.5%	**71.7%**	68.3%	70.7%	0%	**69.5%**	66.7%	70.8%	0%	**70.0%**	71.5%
Light Goods Vehicles	0	197	14	**211**	13	12	0	**25**	2	7	0	**9**	245
% Light Goods Vehicles	0%	19.4%	27.5%	**19.8%**	31.7%	29.3%	0%	**30.5%**	33.3%	29.2%	0%	**30.0%**	20.8%
Single-Unit Trucks	0	34	0	**34**	0	0	0	**0**	0	0	0	**0**	34
% Single-Unit Trucks	0%	3.3%	0%	**3.2%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	2.9%
Articulated Trucks	0	56	0	**56**	0	0	0	**0**	0	0	0	**0**	56
% Articulated Trucks	0%	5.5%	0%	**5.2%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	4.7%
Buses	0	1	0	**1**	0	0	0	**0**	0	0	0	**0**	1
% Buses	0%	0.1%	0%	**0.1%**	0%	0%	0%	**0%**	0%	0%	0%	**0%**	0.1%

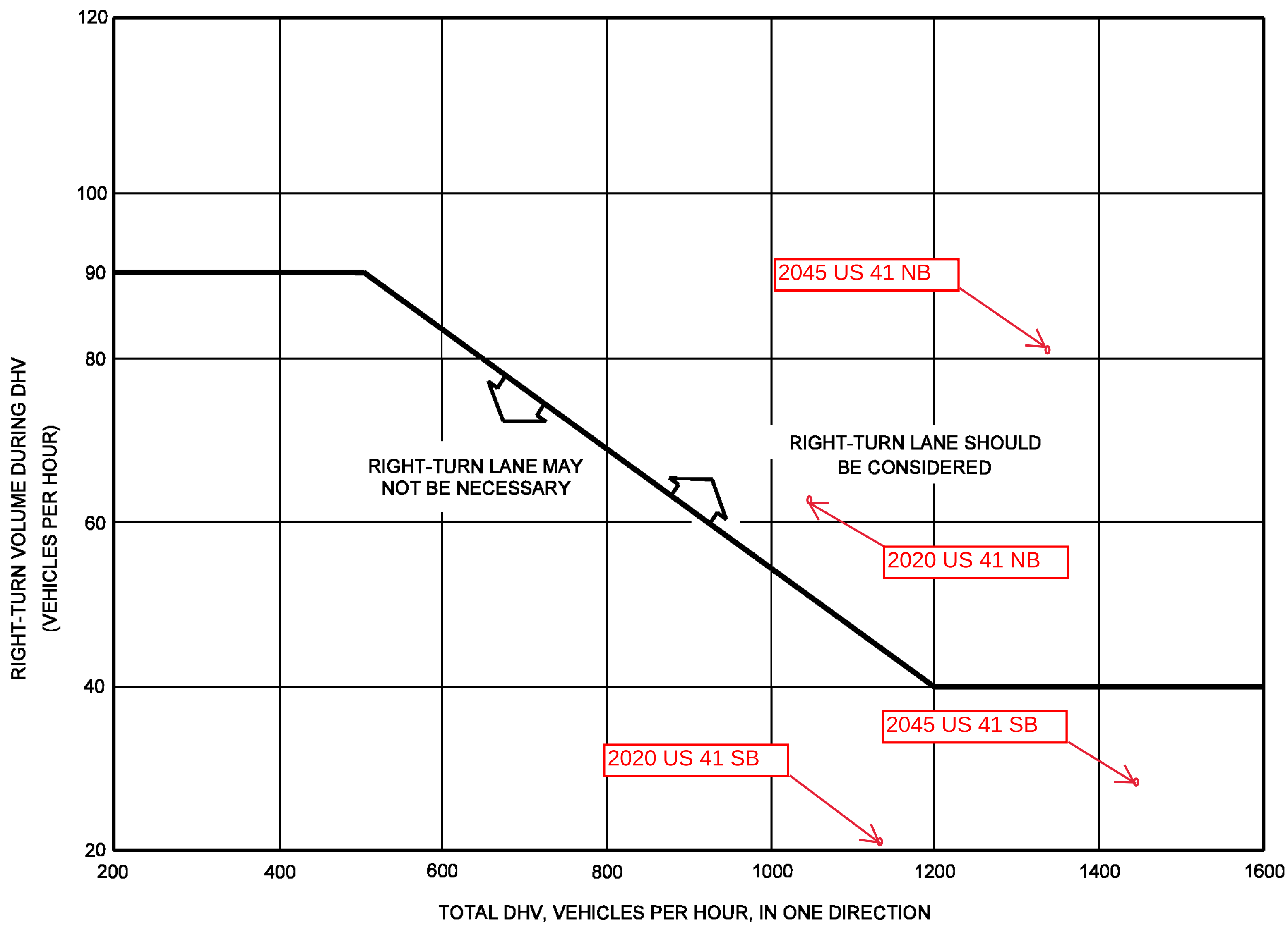
*L: Left, R: Right, T: Thru, U: U-Turn

EMPO/INDOT US 41 @ Hillsdale Rd - TMC
Tue Jul 16, 2019
PM Peak (Jul 16 2019 3:30PM - 4:30 PM) - Overall Peak Hour
All Classes (Motorcycles, Cars, Light Goods Vehicles, Single-Unit Trucks, Articulated Trucks, Buses)
All Movements
ID: 680180, Location: 38.079492, -87.554662

Provided by: Indiana DOT
100 N. Senate Ave.,
Indianapolis, IN, 46204, US



APPENDIX K



GUIDELINES FOR RIGHT-TURN LANES AT UNSIGNALIZED
INTERSECTION ON 4-LANE HIGHWAYS

Figure 46-4B

APPENDIX L

U.S. Fish and Wildlife Service
National Wetlands Inventory

July 3, 2019

Wetlands

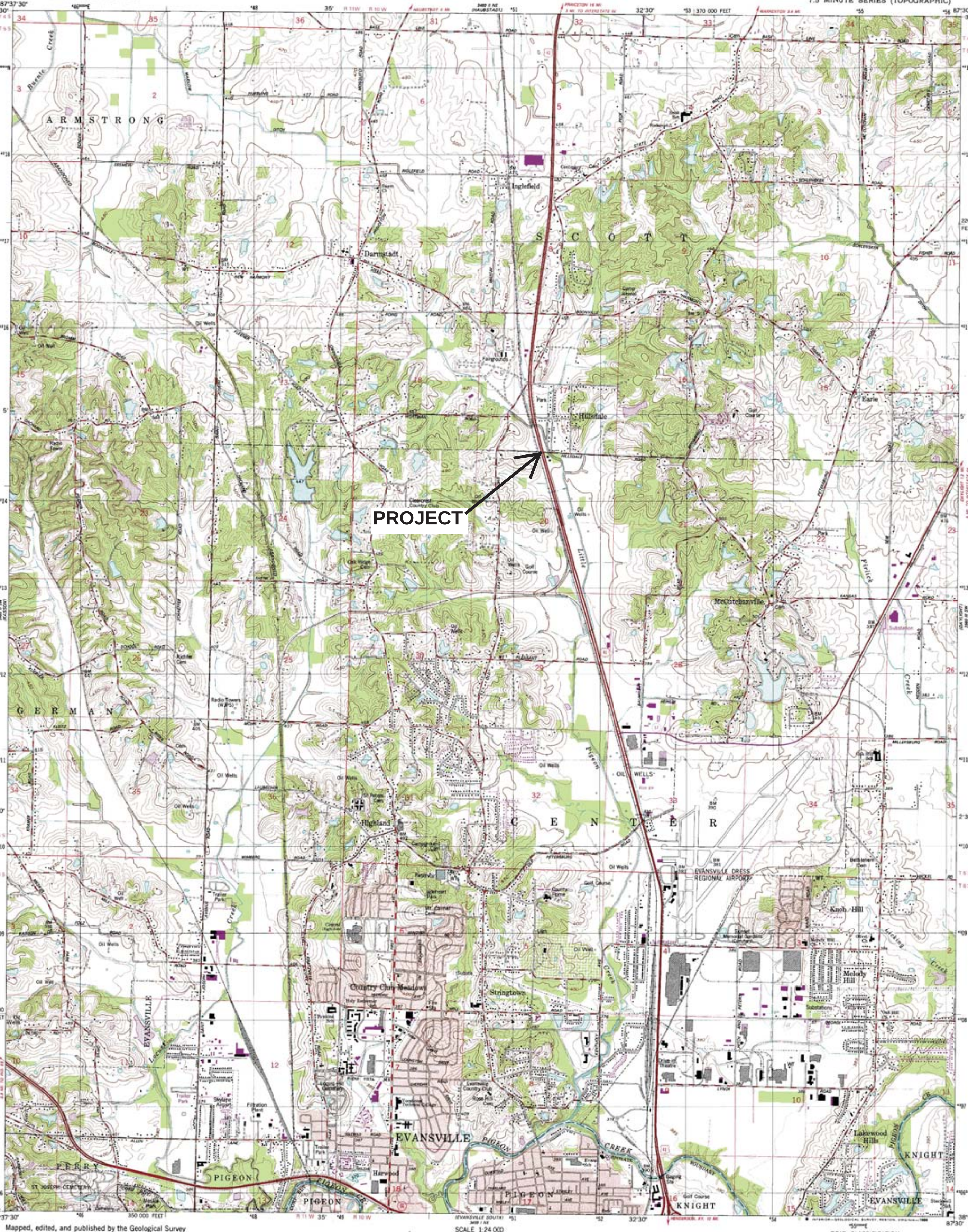
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

EVANSVILLE NORTH QUADRANGLE
INDIANA–VANDERBURGH CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey in cooperation with Indiana Department of Natural Resources

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1958. Field checked 1961. Revised from aerial photographs taken 1973. Field checked 1976. Map edited 1981

Polyconic projection. 10,000-foot grid ticks based on Indiana coordinate system, west zone
1000-meter Universal Transverse Mercator grid, zone 16
1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 3 meters south and 2 meters east as shown by dashed corner ticks

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Red tint indicates areas in which only landmark buildings are shown

UTM GRID AND 1988 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225 OR RESTON, VIRGINIA 22092, AND INDIANA DEPARTMENT OF NATURAL RESOURCES, INDIANAPOLIS, INDIANA 46204
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

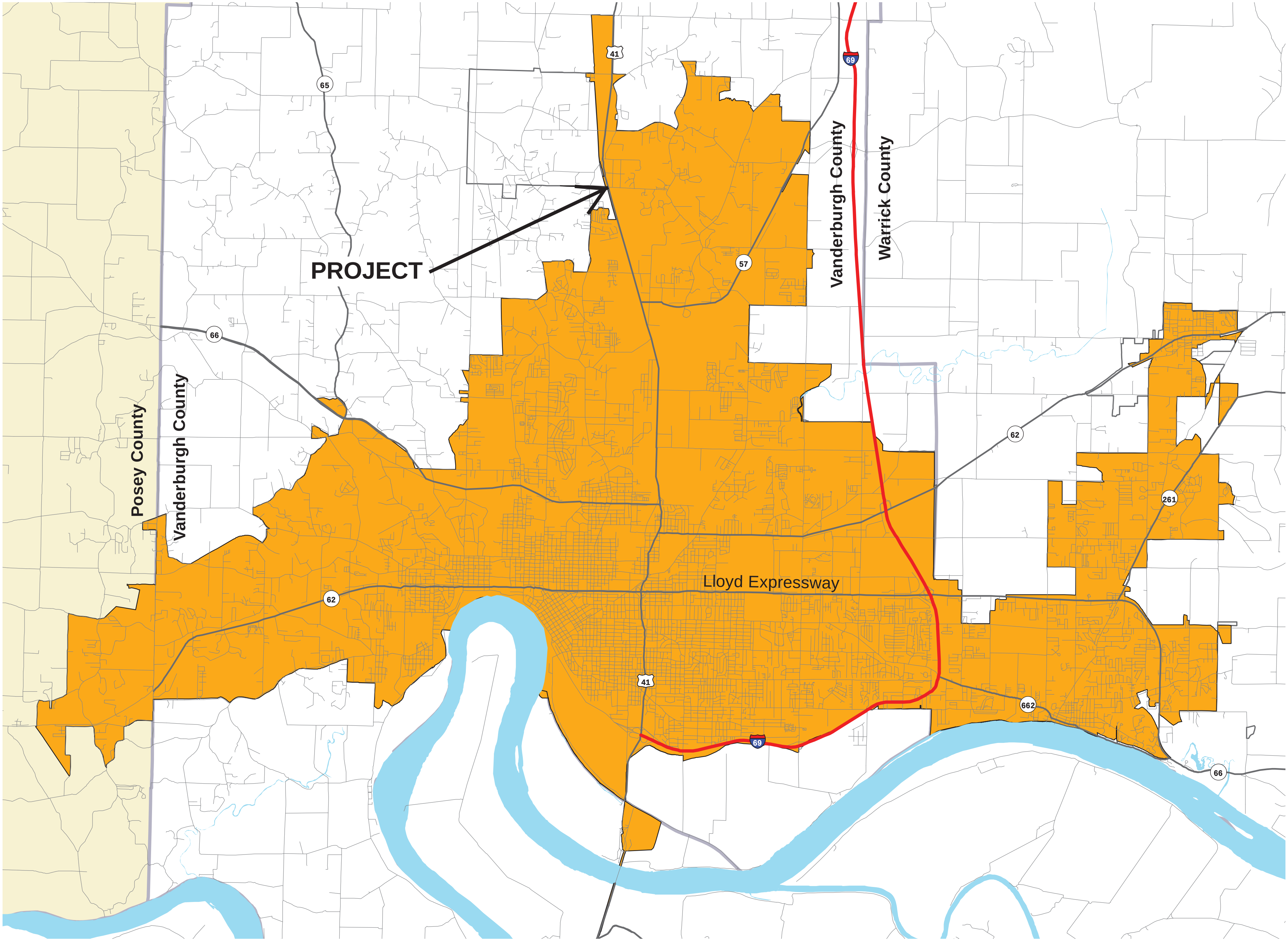
QUADRANGLE LOCATION

Revisions shown in purple and woodland compiled in cooperation with State of Indiana agencies from aerial photographs taken 1983 and other sources. This information not field checked
Map edited 1988

ROAD CLASSIFICATION
Primary highway, hard surface — Light-duty road, hard or improved surface
Secondary highway, hard surface — Unimproved road
Interstate Route — U. S. Route — State Route

EVANSVILLE NORTH, IND.
38087-A5-TF-024
1981
PHOTOREVISED 1988
DMA 3460 II SE–SERIES V851

Indiana Urbanized Boundary



APPENDIX M

Hillsdale Road / US 41: (Looking northwest)

Hillsdale Road / US 41: East Approach (Looking west)

Hillsdale Road / US 41: East Approach (Looking east)

Hillsdale Road / US 41: Median (Looking east)

Hillsdale Road / US 41: Median (Looking south)

Hillsdale Road / US 41: Median (Looking north)

Hillsdale Road / US 41: West Approach (Looking west)

Hillsdale Road / US 41: West Approach (Looking east)

Hillsdale Road at Walnut Road (looking east)

Hillsdale Road at Walnut Road (looking west)

Walnut Road at Hillsdale Road (looking north)

Hillsdale Road at Walnut Road (looking south)


Radio Avenue at Walnut Road (looking west)


Radio Avenue at Walnut Road (looking east)

Walnut Road at Radio Avenue (looking north)

Walnut Road at Radio Avenue (looking south)


Campbell Road at Walnut Road (looking east)


Campbell Road at Walnut Road (looking west)

Walnut Road at Campbell Road (looking north)

APPENDIX N

HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_NO BUILD_Hillsdale-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Hillsdale Road
North/South Street Name:	Walnut Avenue
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		1	72	22			12	102	4
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		1	78	24			13	111	4
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	22	5	20		4	5	2
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	24	5	22		4	5	2
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		1		13		51			12	
Lane Capacity		1467		1484		790			701	
v/c		0.00		0.01		0.06			0.02	
95% Queue Length		0.0		0.0		0.2			0.1	
Control Delay		7.5		7.4		9.9			10.2	
LOS		A		A		A			B	
Approach Delay		0.1		0.8		9.9			10.2	
Approach LOS						A			B	
Intersction Delay		2.5								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound				SouthBound		
Priority	7	8	9 |		10	11	12
Movement	L	T	R |		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3 |		4U	4	5	6
	U	L	T	R |		U	L	T	R
Volume, V_x		1	72	22			12	102	4
Flow Rate, v_x		1	78	24			13	111	4

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9 |		10	11	12
	L	T	R |		L	T	R
Volume, V_x	22	5	20		4	5	2
Flow Rate, v_x	24	5	22		4	5	2

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3 |		4U	4	5	6
	U	L	T	R |		U	L	T	R
Flow Rate, v_x		1	78	24			13	111	4
Conflicting Flow, v_c,x		115					102		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9 |		10	11	12
	L	T	R |		L	T	R
Flow Rate, v_x	24	5	22		4	5	2
Conflicting Flow, v_c,x	235	234	90		245	243	113

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		115		102	235	234	90	245	243	113
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1467		1484	717	665	965	707	657	937

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	115	102
Potential Capacity, c_p,x	1467	1484
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1467	1484
Probability of Queue-free State, p_0,j	0.999	0.991
Major L-Shared Probability Queue-free State, p*_0,j	0.999	0.991

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	90	113
Potential Capacity, c_p,x	965	937
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	965	937
Probability of Queue-free State, p_0,j	0.977	0.998

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	234	243
Potential Capacity, c_p,x	665	657
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.990	0.990
Movement Capacity, c_m,x	658	650
Probability of Queue-free State, p_0,j	0.992	0.992

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	235	245
Potential Capacity, c_p,x	717	707
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.982	0.982
Major L, Minor T Impedance Factor, p'	0.986	0.986
Capacity Adjustment Factor, f_x	0.984	0.964
Movement Capacity, c_m,x	705	681

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		51			12	
Movement Capacity, c_m,x	705	658	965	681	650	937
Shared Capacity, c_SH		790			701	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		1		13	24	5	22	4	5	2
Movement Capacity		1467		1484	705	658	965	681	650	937
Lane Configuration						LTR			LTR	
Shared Capacity						790			701	
Control Delay		7.5		7.4		9.9			10.2	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.999	0.991
Delay to Major Left-turning Vehicles, d_MLT	7.5	7.4
Major Street Through Vehicles in Shared Lane, v_i1	78	111
Major Street Turning Vehicles in Shared Lane, v_i2	25	17
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2	1500	1500
Delay to Rank 1 Vehicles, d_Rank1	0.0	0.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		1		13		51			12	
Lane Capacity		1467		1484		790			701	
v/c		0.00		0.01		0.06			0.02	
95% Queue Length		0.0		0.0		0.2			0.1	
Control Delay		7.5		7.4		9.9			10.2	
LOS		A		A		A			B	
Approach Delay		0.1		0.8		9.9			10.2	
Approach LOS						A			B	
Intersction Delay		2.5								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_NO BUILD_Hillsdale-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Hillsdale Road
North/South Street Name:	Walnut Avenue
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		11	143	22			9	85	20
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		12	155	24			10	92	22
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	28	9	30		6	7	2
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	30	10	33		7	8	2
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		12		10		73			16	
Lane Capacity		1469		1390		704			611	
v/c		0.01		0.01		0.10			0.03	
95% Queue Length		0.0		0.0		0.3			0.1	
Control Delay		7.5		7.6		10.7			11.0	
LOS		A		A		B			B	
Approach Delay		0.5		0.7		10.7			11.0	
Approach LOS						B			B	
Interstction Delay		2.8								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		NorthBound					SouthBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:									
Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		11	143	22			9	85	20
Flow Rate, v_x		12	155	24			10	92	22

Minor Street:							
Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	28	9	30		6	7	2
Flow Rate, v_x	30	10	33		7	8	2

Step 3: CONFLICTING FLOW RATES

Major Street:									
Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		12	155	24			10	92	22
Conflicting Flow, v_c,x		114					179		

Minor Street:							
Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	30	10	33		7	8	2
Conflicting Flow, v_c,x	319	325	167		335	326	103

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS										
Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS										
Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT										
Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		114		179	319	325	167	335	326	103
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1469		1390	632	591	874	616	591	949

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance				
Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	114	179
Potential Capacity, c_p,x	1469	1390
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1469	1390
Probability of Queue-free State, p_0,j	0.992	0.993
Major L-Shared Probability Queue-free State, p*_0,j	0.991	0.992

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	167	103
Potential Capacity, c_p,x	874	949
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	874	949
Probability of Queue-free State, p_0,j	0.963	0.998

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	325	326
Potential Capacity, c_p,x	591	591
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.983	0.983
Movement Capacity, c_m,x	582	581
Probability of Queue-free State, p_0,j	0.983	0.987

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	319	335
Potential Capacity, c_p,x	632	616
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.971	0.967
Major L, Minor T Impedance Factor, p'	0.978	0.975
Capacity Adjustment Factor, f_x	0.975	0.938
Movement Capacity, c_m,x	616	578

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		73			16	
Movement Capacity, c_m,x	616	582	874	578	581	949
Shared Capacity, c_SH		704			611	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		12		10	30	10	33	7	8	2
Movement Capacity		1469		1390	616	582	874	578	581	949
Lane Configuration						LTR			LTR	
Shared Capacity						704			611	
Control Delay		7.5		7.6		10.7			11.0	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.991	0.992
Delay to Major Left-turning Vehicles, d_MLT	7.5	7.6
Major Street Through Vehicles in Shared Lane, v_i1	155	92
Major Street Turning Vehicles in Shared Lane, v_i2	36	32
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2	1500	1500
Delay to Rank 1 Vehicles, d_Rank1	0.1	0.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		12		10		73			16	
Lane Capacity		1469		1390		704			611	
v/c		0.01		0.01		0.10			0.03	
95% Queue Length		0.0		0.0		0.3			0.1	
Control Delay		7.5		7.6		10.7			11.0	
LOS		A		A		B			B	
Approach Delay		0.5		0.7		10.7			11.0	
Approach LOS						B			B	
Intersction Delay		2.8								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_NO BUILD_Hillsdale-US 41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	11	631	25		0	33	888	0
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		12	686	27			36	965	0
Percent Heavy Vehicles	3	3				3	3		
Number of Lanes	0	1	2	0		0	1	2	0
Lane Configuration		L	T	TR			L	T	TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	96	8	41		0	22	14
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	104	9	45		0	24	15
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		12		36		158			39	
Lane Capacity		703		876		111			115	
v/c		0.02		0.04		1.42			0.34	
95% Queue Length		0.1		0.1		11.1			1.4	
Control Delay		10.2		9.3		302.4			51.9	
LOS		B		A		F			F	
Approach Delay		0.2		0.3		302.4			51.9	
Approach LOS						F			F	
Intersction Delay		26.1								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	11	631	25		0	33	888	0
Flow Rate, v_x		12	686	27			36	965	0

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	96	8	41		0	22	14
Flow Rate, v_x	104	9	45		0	24	15

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		12	686	27			36	965	0
Conflicting Flow, v_c,x		965					713		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	104	9	45		0	24	15
Conflicting Flow, v_c,x	1290	1760	357		1408	1774	483

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.5	6.5	6.9	7.5	6.5	6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.16		4.16	7.56	6.56	6.96	7.56	6.56	6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		965		713	1290	1760	357	1408	1774	483
t_c,x		4.16		4.16	7.56	6.56	6.96	7.56	6.56	6.96
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		703		876	120	83	637	98	81	527

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	965	713
Potential Capacity, c_p,x	703	876
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	703	876
Probability of Queue-free State, p_0,j	0.983	0.959
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	357	483
Potential Capacity, c_p,x	637	527
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	637	527
Probability of Queue-free State, p_0,j	0.930	0.971

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	1760	1774
Potential Capacity, c_p,x	83	81
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.943	0.943
Movement Capacity, c_m,x	78	76
Probability of Queue-free State, p_0,j	0.889	0.687

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	1290	1408
Potential Capacity, c_p,x	120	98
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.648	0.838
Major L, Minor T Impedance Factor, p'	0.727	0.875
Capacity Adjustment Factor, f_x	0.706	0.814
Movement Capacity, c_m,x	85	80

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		158			39	
Movement Capacity, c_m,x	85	78	637	80	76	527
Shared Capacity, c_SH		111			115	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		12		36	104	9	45	0	24	15
Movement Capacity		703		876	85	78	637	80	76	527
Lane Configuration		L		L		LTR			LTR	
Shared Capacity						111			115	
Control Delay		10.2		9.3		302.4			51.9	

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		12		36		158			39	
Lane Capacity		703		876		111			115	
v/c		0.02		0.04		1.42			0.34	
95% Queue Length		0.1		0.1		11.1			1.4	
Control Delay		10.2		9.3		302.4			51.9	

LOS	B	A	F	F
Approach Delay	0.2	0.3	302.4	51.9
Approach LOS			F	F
Intersction Delay	26.1			

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_NO BUILD_Hillsdale-US 41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	20	958	42		0	52	1025	1
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		22	1041	46			57	1114	1
Percent Heavy Vehicles	3	3				3	3		
Number of Lanes	0	1	2	0		0	1	2	0
Lane Configuration		L	T	TR			L	T	TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	41	21	44		3	21	6
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	45	23	48		3	23	7
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		22		57		115			33	
Lane Capacity		616		632		34			34	
v/c		0.04		0.09		3.35			0.96	
95% Queue Length		0.1		0.3		13.3			3.4	
Control Delay		11.1		11.3		1301.9			317.0	
LOS		B		B		F			F	
Approach Delay		0.2		0.5		1301.9			317.0	
Approach LOS						F			F	
Intersction Delay		66.4								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	20	958	42		0	52	1025	1
Flow Rate, v_x		22	1041	46			57	1114	1

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	41	21	44		3	21	6
Flow Rate, v_x	45	23	48		3	23	7

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		22	1041	46			57	1114	1
Conflicting Flow, v_c,x		1115					1087		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	45	23	48		3	23	7
Conflicting Flow, v_c,x	1789	2336	543		1803	2358	558

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.5	6.5	6.9	7.5	6.5	6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.16		4.16	7.56	6.56	6.96	7.56	6.56	6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1115		1087	1789	2336	543	1803	2358	558
t_c,x		4.16		4.16	7.56	6.56	6.96	7.56	6.56	6.96
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		616		632	51	36	481	49	35	471

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1115	1087
Potential Capacity, c_p,x	616	632
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	616	632
Probability of Queue-free State, p_0,j	0.965	0.911
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	543	558
Potential Capacity, c_p,x	481	471
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	481	471
Probability of Queue-free State, p_0,j	0.901	0.986

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	2336	2358
Potential Capacity, c_p,x	36	35
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.878	0.878
Movement Capacity, c_m,x	31	30
Probability of Queue-free State, p_0,j	0.272	0.248

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	1789	1803
Potential Capacity, c_p,x	51	49
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.218	0.239
Major L, Minor T Impedance Factor, p'	0.354	0.375
Capacity Adjustment Factor, f_x	0.349	0.338
Movement Capacity, c_m,x	18	17

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach		WestBound				EastBound	
Movement	7	8	9	|	10	11	12
Lane Configuration		LTR		|		LTR	
Shared Flow Rate, v_y		115				33	
Movement Capacity, c_m,x	18	31	481		17	30	471
Shared Capacity, c_SH		34				34	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		22		57	45	23	48	3	23	7
Movement Capacity		616		632	18	31	481	17	30	471
Lane Configuration		L		L		LTR			LTR	
Shared Capacity						34			34	
Control Delay		11.1		11.3		1301.9			317.0	

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		22		57		115			33	
Lane Capacity		616		632		34			34	
v/c		0.04		0.09		3.35			0.96	
95% Queue Length		0.1		0.3		13.3			3.4	
Control Delay		11.1		11.3		1301.9			317.0	

LOS	B	B	F	F
Approach Delay	0.2	0.5	1301.9	317.0
Approach LOS			F	F
Intersction Delay	66.4			

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_NO BUILD_Hillsdale-Old State-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Old State
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			97	23			17	60	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			105	25			18	65	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration				TR			LT		
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	31		6				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	34		7				
Percent Heavy Vehicles	3		3				
Number of Lanes	0	1	0		0	0	0
Lane Configuration		LR					
RT channelized?							
Flared Approach | Storage	No	|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				18		40				
Lane Capacity				1449		780				
v/c				0.01		0.05				
95% Queue Length				0.0		0.2				
Control Delay				7.5		9.9				
LOS				A		A				
Approach Delay				1.7		9.9				
Approach LOS						A				
Intersction Delay		2.1								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			97	23			17	60	
Flow Rate, v_x			105	25			18	65	

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	31		6				
Flow Rate, v_x	34		7				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			105	25			18	65	
Conflicting Flow, v_c,x							130		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	34		7				
Conflicting Flow, v_c,x	220		118				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				130	220		118			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1449	766		931			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		130
Potential Capacity, c_p,x		1449
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1449
Probability of Queue-free State, p_0,j		0.987
Major L-Shared Probability Queue-free State, p*_0,j		0.987

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	118	
Potential Capacity, c_p,x	931	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	931	
Probability of Queue-free State, p_0,j	0.993	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	220	
Potential Capacity, c_p,x	766	
Pedestrian Impedance Factor, p_p,x	1.000	
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x	0.987	
Movement Capacity, c_m,x	756	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LR				
Shared Flow Rate, v_y		40				
Movement Capacity, c_m,x	756		931			
Shared Capacity, c_SH		780				

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				18	34		7			
Movement Capacity				1449	756		931			
Lane Configuration				LT		LR				
Shared Capacity						780				
Control Delay				7.5		9.9				

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	NB	SB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j		0.987
Delay to Major Left-turning Vehicles, d_MLT		7.5
Major Street Through Vehicles in Shared Lane, v_i1		65
Major Street Turning Vehicles in Shared Lane, v_i2		18
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2 1500
Delay to Rank 1 Vehicles, d_Rank1 0.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				18		40				
Lane Capacity				1449		780				
v/c				0.01		0.05				
95% Queue Length				0.0		0.2				
Control Delay				7.5		9.9				
LOS				A		A				
Approach Delay				1.7		9.9				
Approach LOS						A				
Intersction Delay		2.1								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_NO BUILD_Hillsdale-Old State-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Old State
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			94	30			9	123	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			102	33			10	134	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration				TR			LT		
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	16		11				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	17		12				
Percent Heavy Vehicles	3		3				
Number of Lanes	0	1	0		0	0	0
Lane Configuration		LR					
RT channelized?							
Flared Approach | Storage	No	|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				10		29				
Lane Capacity				1443		786				
v/c				0.01		0.04				
95% Queue Length				0.0		0.1				
Control Delay				7.5		9.8				
LOS				A		A				
Approach Delay				0.6		9.8				
Approach LOS						A				
Intersction Delay		1.2								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound					EastBound		
Priority	7	8	9	|		10	11	12
Movement	L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			94	30			9	123	
Flow Rate, v_x			102	33			10	134	

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	16		11				
Flow Rate, v_x	17		12				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			102	33			10	134	
Conflicting Flow, v_c,x							135		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	17		12				
Conflicting Flow, v_c,x	272		118				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				135	272		118			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1443	716		931			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		135
Potential Capacity, c_p,x		1443
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1443
Probability of Queue-free State, p_0,j		0.993
Major L-Shared Probability Queue-free State, p*_0,j		0.993

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	118	
Potential Capacity, c_p,x	931	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	931	
Probability of Queue-free State, p_0,j	0.987	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	272	
Potential Capacity, c_p,x	716	
Pedestrian Impedance Factor, p_p,x	1.000	
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x	0.993	
Movement Capacity, c_m,x	710	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LR				
Shared Flow Rate, v_y		29				
Movement Capacity, c_m,x	710		931			
Shared Capacity, c_SH		786				

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				10	17		12			
Movement Capacity				1443	710		931			
Lane Configuration				LT		LR				
Shared Capacity						786				
Control Delay				7.5		9.8				

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	NB	SB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j		0.993
Delay to Major Left-turning Vehicles, d_MLT		7.5
Major Street Through Vehicles in Shared Lane, v_i1		134
Major Street Turning Vehicles in Shared Lane, v_i2		10
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2 1500
Delay to Rank 1 Vehicles, d_Rank1 0.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				10		29				
Lane Capacity				1443		786				
v/c				0.01		0.04				
95% Queue Length				0.0		0.1				
Control Delay				7.5		9.8				
LOS				A		A				
Approach Delay				0.6		9.8				
Approach LOS						A				
Intersction Delay		1.2								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_NO BUILD_Radio-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Radio Ave / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Radio Ave
North/South Street Name:	Walnut Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		2	2	1			3	1	1
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		2	2	1			3	1	1
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	7	12	7		1	3	4
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	8	13	8		1	3	4
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		2		3		28			9	
Lane Capacity		1614		1612		951			978	
v/c		0.00		0.00		0.03			0.01	
95% Queue Length		0.0		0.0		0.1			0.0	
Control Delay		7.2		7.2		8.9			8.7	
LOS		A		A		A			A	
Approach Delay		2.9		4.3		8.9			8.7	
Approach LOS						A			A	
Intersction Delay		7.7								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound			SouthBound		
Priority	7	8	9	10	11	12
Movement	L	T	R	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound				WestBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume, V_x		2	2	1		3	1	1
Flow Rate, v_x		2	2	1		3	1	1

Minor Street:

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume, V_x	7	12	7	1	3	4
Flow Rate, v_x	8	13	8	1	3	4

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound				WestBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Flow Rate, v_x		2	2	1		3	1	1
Conflicting Flow, v_c,x		2				3		

Minor Street:

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Flow Rate, v_x	8	13	8	1	3	4
Conflicting Flow, v_c,x	19	16	3	26	16	2

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		2		3	19	16	3	26	16	2
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1614		1612	992	876	1078	983	876	1080

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	2	3
Potential Capacity, c_p,x	1614	1612
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1614	1612
Probability of Queue-free State, p_0,j	0.999	0.998
Major L-Shared Probability Queue-free State, p*_0,j	0.999	0.998

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	3	2
Potential Capacity, c_p,x	1078	1080
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1078	1080
Probability of Queue-free State, p_0,j	0.993	0.996

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	16	16
Potential Capacity, c_p,x	876	876
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.997	0.997
Movement Capacity, c_m,x	873	873
Probability of Queue-free State, p_0,j	0.985	0.996

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	19	26
Potential Capacity, c_p,x	992	983
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.993	0.982
Major L, Minor T Impedance Factor, p'	0.995	0.986
Capacity Adjustment Factor, f_x	0.991	0.979
Movement Capacity, c_m,x	983	962

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		28			9	
Movement Capacity, c_m,x	983	873	1078	962	873	1080
Shared Capacity, c_SH		951			978	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		2		3	8	13	8	1	3	4
Movement Capacity		1614		1612	983	873	1078	962	873	1080
Lane Configuration						LTR			LTR	
Shared Capacity						951			978	
Control Delay		7.2		7.2		8.9			8.7	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.999	0.998
Delay to Major Left-turning Vehicles, d_MLT	7.2	7.2
Major Street Through Vehicles in Shared Lane, v_i1	2	1
Major Street Turning Vehicles in Shared Lane, v_i2	3	4
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2	1500	1500
Delay to Rank 1 Vehicles, d_Rank1	0.0	0.0

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		2		3		28			9	
Lane Capacity		1614		1612		951			978	
v/c		0.00		0.00		0.03			0.01	
95% Queue Length		0.0		0.0		0.1			0.0	
Control Delay		7.2		7.2		8.9			8.7	
LOS		A		A		A			A	
Approach Delay		2.9		4.3		8.9			8.7	
Approach LOS						A			A	
Intersction Delay		7.7								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_NO BUILD_Radio-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Radio Ave / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Radio Ave
North/South Street Name:	Walnut Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		0	4	0			1	4	3
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		0	4	0			1	4	3
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	6	10	1		1	10	1
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	7	11	1		1	11	1
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		0		1		18			13	
Lane Capacity		1606		1611		922			901	
v/c		0.00		0.00		0.02			0.01	
95% Queue Length		0.0		0.0		0.1			0.0	
Control Delay		7.2		7.2		9.0			9.1	
LOS		A		A		A			A	
Approach Delay		0.0		0.9		9.0			9.1	
Approach LOS						A			A	
Interscction Delay		6.6								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound			SouthBound		
Priority	7	8	9	10	11	12
Movement	L	T	R	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound				WestBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume, V_x		0	4	0		1	4	3
Flow Rate, v_x		0	4	0		1	4	3

Minor Street:

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume, V_x	6	10	1	1	10	1
Flow Rate, v_x	7	11	1	1	11	1

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound				WestBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Flow Rate, v_x		0	4	0		1	4	3
Conflicting Flow, v_c,x		8				4		

Minor Street:

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Flow Rate, v_x	7	11	1	1	11	1
Conflicting Flow, v_c,x	18	14	4	18	13	6

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		8		4	18	14	4	18	13	6
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1606		1611	993	878	1076	993	880	1074

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	8	4
Potential Capacity, c_p,x	1606	1611
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1606	1611
Probability of Queue-free State, p_0,j	1.000	0.999
Major L-Shared Probability Queue-free State, p*_0,j	1.000	0.999

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	4	6
Potential Capacity, c_p,x	1076	1074
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1076	1074
Probability of Queue-free State, p_0,j	0.999	0.999

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	14	13
Potential Capacity, c_p,x	878	880
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.999	0.999
Movement Capacity, c_m,x	878	879
Probability of Queue-free State, p_0,j	0.988	0.988

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	18	18
Potential Capacity, c_p,x	993	993
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.987	0.987
Major L, Minor T Impedance Factor, p'	0.990	0.990
Capacity Adjustment Factor, f_x	0.989	0.989
Movement Capacity, c_m,x	982	982

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		18			13	
Movement Capacity, c_m,x	982	878	1076	982	879	1074
Shared Capacity, c_SH		922			901	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		0		1	7	11	1	1	11	1
Movement Capacity		1606		1611	982	878	1076	982	879	1074
Lane Configuration						LTR			LTR	
Shared Capacity						922			901	
Control Delay		7.2		7.2		9.0			9.1	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	1.000	0.999
Delay to Major Left-turning Vehicles, d_MLT	7.2	7.2
Major Street Through Vehicles in Shared Lane, v_i1	4	4
Major Street Turning Vehicles in Shared Lane, v_i2	0	4
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2							1500		1500			
Delay to Rank 1 Vehicles, d_Rank1							0.0		0.0			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound				
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		0		1		18			13	
Lane Capacity		1606		1611		922			901	
v/c		0.00		0.00		0.02			0.01	
95% Queue Length		0.0		0.0		0.1			0.0	
Control Delay		7.2		7.2		9.0			9.1	
LOS		A		A		A			A	
Approach Delay		0.0		0.9		9.0			9.1	
Approach LOS						A			A	
Intersction Delay		6.6								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_NO BUILD_Radio-US 41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Radio Ave / US 41
Major Street Direction:	North-South
East/West Street Name:	Radio Ave
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			851	4		0	0	922	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			925	4			0	1002	
Percent Heavy Vehicles						0	3		
Number of Lanes	0	0	2	0		0	1	2	0
Lane Configuration			T	TR			L	T	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	4		14				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	4		15				
Percent Heavy Vehicles	3		3				
Number of Lanes	1	0	1		0	0	0
Lane Configuration	L		R				
RT channelized?			No				
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				0	4		15			
Lane Capacity				725	125		542			
v/c				0.00	0.03		0.03			
95% Queue Length				0.0	0.1		0.1			
Control Delay				10.0	34.9		11.8			
LOS				A	D		B			
Approach Delay				0.0		17.0				
Approach LOS						C				
Intersction Delay										

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound	
Priority		7	8	9		10	11	12
Movement		L	T	R		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume, V_x			851	4	0	0	922	
Flow Rate, v_x			925	4		0	1002	

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume, V_x	4		14			
Flow Rate, v_x	4		15			

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Flow Rate, v_x			925	4		0	1002	
Conflicting Flow, v_c,x						929		

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Flow Rate, v_x	4		15			
Conflicting Flow, v_c,x	1428		465			

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.5		6.9			
Stage I										
Stage II										
t_c,HV				2.0	2.0		2.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.16	6.86		6.96			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				929	1428		465			
t_c,x				4.16	6.86		6.96			
t_f,x				2.23	3.53		3.33			
c_p,x				725	125		542			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x			929	
Potential Capacity, c_p,x			725	
Pedestrian Impedance Factor, p_p,x			1.000	
Movement Capacity, c_m,x			725	
Probability of Queue-free State, p_0,j			1.000	
Major L-Shared Probability Queue-free State, p*_0,j				

Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x		465		
Potential Capacity, c_p,x		542		
Pedestrian Impedance Factor, p_p,x		1.000		
Movement Capacity, c_m,x		542		
Probability of Queue-free State, p_0,j		0.972		

Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				

Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				

Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x		1428		
Potential Capacity, c_p,x		125		
Pedestrian Impedance Factor, p_p,x		1.000		
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x		1.000		
Movement Capacity, c_m,x		125		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
Lane Configuration	L		R	|			
Shared Flow Rate, v_y	4		15				
Movement Capacity, c_m,x	125		542				
Shared Capacity, c_SH							

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				0	4		15			
Movement Capacity				725	125		542			
Lane Configuration				L	L		R			
Shared Capacity										
Control Delay				10.0	34.9		11.8			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				0	4		15			
Lane Capacity				725	125		542			
v/c				0.00	0.03		0.03			
95% Queue Length				0.0	0.1		0.1			
Control Delay				10.0	34.9		11.8			

LOS	A	D		B
Approach Delay	0.0		17.0	
Approach LOS			C	
Intersction Delay				

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_NO BUILD_Radio-US 41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Radio Ave / US 41
Major Street Direction:	North-South
East/West Street Name:	Radio Ave
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			822	3		0	3	1097	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			893	3			3	1192	
Percent Heavy Vehicles						0	3		
Number of Lanes	0	0	2	0		0	1	2	0
Lane Configuration			T	TR			L	T	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	1		4				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	1		4				
Percent Heavy Vehicles	3		3				
Number of Lanes	1	0	1		0	0	0
Lane Configuration	L		R				
RT channelized?			No				
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				3	1		4			
Lane Capacity				746	112		555			
v/c				0.00	0.01		0.01			
95% Queue Length				0.0	0.0		0.0			
Control Delay				9.8	37.6		11.5			
LOS				A	E		B			
Approach Delay				0.0		16.7				
Approach LOS						C				
Intersction Delay										

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			822	3		0	3	1097	
Flow Rate, v_x			893	3			3	1192	

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	1		4				
Flow Rate, v_x	1		4				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			893	3			3	1192	
Conflicting Flow, v_c,x							897		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	1		4				
Conflicting Flow, v_c,x	1498		448				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.5		6.9			
Stage I										
Stage II										
t_c,HV				2.0	2.0		2.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.16	6.86		6.96			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				897	1498		448			
t_c,x				4.16	6.86		6.96			
t_f,x				2.23	3.53		3.33			
c_p,x				746	112		555			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		897
Potential Capacity, c_p,x		746
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		746
Probability of Queue-free State, p_0,j		0.996
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	448	
Potential Capacity, c_p,x	555	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	555	
Probability of Queue-free State, p_0,j	0.992	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	1498	
Potential Capacity, c_p,x	112	
Pedestrian Impedance Factor, p_p,x	1.000	
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x	0.996	
Movement Capacity, c_m,x	112	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration	L		R			
Shared Flow Rate, v_y	1		4			
Movement Capacity, c_m,x	112		555			
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				3	1		4			
Movement Capacity				746	112		555			
Lane Configuration				L	L		R			
Shared Capacity										
Control Delay				9.8	37.6		11.5			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				3	1		4			
Lane Capacity				746	112		555			
v/c				0.00	0.01		0.01			
95% Queue Length				0.0	0.0		0.0			
Control Delay				9.8	37.6		11.5			

LOS	A	E		B
Approach Delay	0.0		16.7	
Approach LOS			C	
Intersction Delay				

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_NO BUILD_Campbell-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Campbell Road
North/South Street Name:	Walnut Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			4	2			1	12	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			4	2			1	13	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	1		0	1	1	0
Lane Configuration			T	R			L	T	
Median Type					Undivided				
Median Storage									
RT channelized?				No					
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	13		2				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	14		2				
Percent Heavy Vehicles	3		3				
Number of Lanes	1	0	1		0	0	0
Lane Configuration	L		R				
RT channelized?			No				
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				1	14		2			
Lane Capacity				1608	994		1076			
v/c				0.00	0.01		0.00			
95% Queue Length				0.0	0.0		0.0			
Control Delay				7.2	8.7		8.4			
LOS				A	A		A			
Approach Delay				0.6		8.6				
Approach LOS						A				
Intersction Delay		4.0								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		NorthBound					SouthBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			4	2			1	12	
Flow Rate, v_x			4	2			1	13	

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	13		2				
Flow Rate, v_x	14		2				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			4	2			1	13	
Conflicting Flow, v_c,x							7		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	14		2				
Conflicting Flow, v_c,x	20		4				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				7	20		4			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1608	995		1076			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x			7	
Potential Capacity, c_p,x			1608	
Pedestrian Impedance Factor, p_p,x			1.000	
Movement Capacity, c_m,x			1608	
Probability of Queue-free State, p_0,j			0.999	
Major L-Shared Probability Queue-free State, p*_0,j				

Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x		4		
Potential Capacity, c_p,x		1076		
Pedestrian Impedance Factor, p_p,x		1.000		
Movement Capacity, c_m,x		1076		
Probability of Queue-free State, p_0,j		0.998		

Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				

Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				

Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x		20		
Potential Capacity, c_p,x		995		
Pedestrian Impedance Factor, p_p,x		1.000		
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x		0.999		
Movement Capacity, c_m,x		994		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
Lane Configuration	L		R	|			
Shared Flow Rate, v_y	14		2				
Movement Capacity, c_m,x	994		1076				
Shared Capacity, c_SH							

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				1	14		2			
Movement Capacity				1608	994		1076			
Lane Configuration				L	L		R			
Shared Capacity										
Control Delay				7.2	8.7		8.4			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				1	14		2			
Lane Capacity				1608	994		1076			
v/c				0.00	0.01		0.00			
95% Queue Length				0.0	0.0		0.0			
Control Delay				7.2	8.7		8.4			

LOS		A	A		A
Approach Delay		0.6		8.6	
Approach LOS				A	
Intersction Delay	4.0				

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_NO BUILD_Campbell-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Campbell Road
North/South Street Name:	Walnut Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			15	15			1	5	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			16	16			1	5	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	1		0	1	1	0
Lane Configuration			T	R			L	T	
Median Type					Undivided				
Median Storage									
RT channelized?				No					
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	8		0				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	9		0				
Percent Heavy Vehicles	3		3				
Number of Lanes	1	0	1		0	0	0
Lane Configuration	L		R				
RT channelized?			No				
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				1	9		0			
Lane Capacity				1573	989		1060			
v/c				0.00	0.01		0.00			
95% Queue Length				0.0	0.0		0.0			
Control Delay				7.3	8.7		8.4			
LOS				A	A		A			
Approach Delay				1.2		8.7				
Approach LOS						A				
Intersction Delay		1.7								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		NorthBound					SouthBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			15	15			1	5	
Flow Rate, v_x			16	16			1	5	

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	8		0				
Flow Rate, v_x	9		0				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			16	16			1	5	
Conflicting Flow, v_c,x							33		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	9		0				
Conflicting Flow, v_c,x	24		16				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				33	24		16			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1573	990		1060			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		33
Potential Capacity, c_p,x		1573
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1573
Probability of Queue-free State, p_0,j		0.999
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	16	
Potential Capacity, c_p,x	1060	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	1060	
Probability of Queue-free State, p_0,j	1.000	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	24	
Potential Capacity, c_p,x	990	
Pedestrian Impedance Factor, p_p,x	1.000	
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x	0.999	
Movement Capacity, c_m,x	989	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration	L		R			
Shared Flow Rate, v_y	9		0			
Movement Capacity, c_m,x	989		1060			
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				1	9		0			
Movement Capacity				1573	989		1060			
Lane Configuration				L	L		R			
Shared Capacity										
Control Delay				7.3	8.7		8.4			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				1	9		0			
Lane Capacity				1573	989		1060			
v/c				0.00	0.01		0.00			
95% Queue Length				0.0	0.0		0.0			
Control Delay				7.3	8.7		8.4			

LOS		A	A			A
Approach Delay		1.2		8.7		
Approach LOS				A		
Intersction Delay	1.7					

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_NO BUILD_Campbell-OSR-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell Rd / OSR
Major Street Direction:	East-West
East/West Street Name:	Campbell Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		37	25					11	17
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		40	27					12	18
Percent Heavy Vehicles		3							
Number of Lanes	0	1	1	0		0	0	1	1
Lane Configuration		L	T					T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					14		64
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					15		70
Percent Heavy Vehicles					3		3
Number of Lanes	0	0	0		1	0	1
Lane Configuration					L		R
RT channelized?							No
Flared Approach | Storage		|				|	
Percent Grade						0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0		0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		40						15		70
Lane Capacity		1576						851		1066
v/c		0.03						0.02		0.07
95% Queue Length		0.1						0.1		0.2
Control Delay		7.3						9.3		8.6
LOS		A						A		A
Approach Delay		4.4							8.7	
Approach LOS									A	
Intersction Delay		5.7								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		NorthBound					SouthBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		37	25					11	17
Flow Rate, v_x		40	27					12	18

Minor Street:

Approach		NorthBound					SouthBound		
Movement		7	8	9	|		10	11	12
		L	T	R	|		L	T	R
Volume, V_x							14		64
Flow Rate, v_x							15		70

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		40	27					12	18
Conflicting Flow, v_c,x		30							

Minor Street:

Approach		NorthBound					SouthBound		
Movement		7	8	9	|		10	11	12
		L	T	R	|		L	T	R
Flow Rate, v_x							15		70
Conflicting Flow, v_c,x							120		12

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1						7.1		6.2
Stage I										
Stage II										
t_c,HV		1.0						1.0		1.0
P_HV		0.03						0.03		0.03
t_c,G								0.2		0.1
G								0		0
t_3,LT		0.0						0.7		0.0
t_c										
Single Stage		4.13						6.43		6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.03						0.03		0.03
t_f		2.23						3.53		3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		30						120		12
t_c,x		4.13						6.43		6.23
t_f,x		2.23						3.53		3.33
c_p,x		1576						874		1066

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0		0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	30	
Potential Capacity, c_p,x	1576	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	1576	
Probability of Queue-free State, p_0,j	0.974	
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x		12
Potential Capacity, c_p,x		1066
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1066
Probability of Queue-free State, p_0,j		0.935

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		120
Potential Capacity, c_p,x		874
Pedestrian Impedance Factor, p_p,x		1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		0.974
Movement Capacity, c_m,x		851

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration				L		R
Shared Flow Rate, v_y				15		70
Movement Capacity, c_m,x				851		1066
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		40						15		70
Movement Capacity		1576						851		1066
Lane Configuration		L						L		R
Shared Capacity										
Control Delay		7.3						9.3		8.6

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		40						15		70
Lane Capacity		1576						851		1066
v/c		0.03						0.02		0.07
95% Queue Length		0.1						0.1		0.2
Control Delay		7.3						9.3		8.6

LOS	A	A		A
Approach Delay	4.4		8.7	
Approach LOS			A	
Intersction Delay	5.7			

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_NO BUILD_Campbell-OSR-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell Rd / OSR
Major Street Direction:	East-West
East/West Street Name:	Campbell Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		44	17					9	7
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		48	18					10	8
Percent Heavy Vehicles		3							
Number of Lanes	0	1	1	0		0	0	1	1
Lane Configuration		L	T					T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					26		33
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					28		36
Percent Heavy Vehicles					3		3
Number of Lanes	0	0	0		1	0	1
Lane Configuration					L		R
RT channelized?							No
Flared Approach | Storage		|				|	
Percent Grade						0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0		0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		48						28		36
Lane Capacity		1593						843		1069
v/c		0.03						0.03		0.03
95% Queue Length		0.1						0.1		0.1
Control Delay		7.3						9.4		8.5
LOS		A						A		A
Approach Delay		5.3							8.9	
Approach LOS									A	
Interstction Delay		6.2								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound				SouthBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		44	17					9	7
Flow Rate, v_x		48	18					10	8

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					26		33
Flow Rate, v_x					28		36

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		48	18					10	8
Conflicting Flow, v_c,x		17							

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					28		36
Conflicting Flow, v_c,x					124		10

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1						7.1		6.2
Stage I										
Stage II										
t_c,HV		1.0						1.0		1.0
P_HV		0.03						0.03		0.03
t_c,G								0.2		0.1
G								0		0
t_3,LT		0.0						0.7		0.0
t_c										
Single Stage		4.13						6.43		6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.03						0.03		0.03
t_f		2.23						3.53		3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		17						124		10
t_c,x		4.13						6.43		6.23
t_f,x		2.23						3.53		3.33
c_p,x		1593						869		1069

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0		0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	17	
Potential Capacity, c_p,x	1593	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	1593	
Probability of Queue-free State, p_0,j	0.970	
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x		10
Potential Capacity, c_p,x		1069
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1069
Probability of Queue-free State, p_0,j		0.966

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		124
Potential Capacity, c_p,x		869
Pedestrian Impedance Factor, p_p,x		1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		0.970
Movement Capacity, c_m,x		843

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration				L		R
Shared Flow Rate, v_y				28		36
Movement Capacity, c_m,x				843		1069
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		48						28		36
Movement Capacity		1593						843		1069
Lane Configuration		L						L		R
Shared Capacity										
Control Delay		7.3						9.4		8.5

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		48						28		36
Lane Capacity		1593						843		1069
v/c		0.03						0.03		0.03
95% Queue Length		0.1						0.1		0.1
Control Delay		7.3						9.4		8.5

LOS	A	A		A
Approach Delay	5.3		8.9	
Approach LOS			A	
Intersction Delay	6.2			

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_NO BUILD_OSR-41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell-Old St Rd/ US 41
Major Street Direction:	North-South
East/West Street Name:	Campbell/OSR
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:									
Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	0	981	11		0	3	920	38
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		0	1066	12			3	1000	41
Percent Heavy Vehicles	13	13				13	13		
Number of Lanes	0	1	2	0		0	1	2	1
Lane Configuration		L	T	TR			L	T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:							
Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	19	15	5		69	25	6
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	21	16	5		75	27	7
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		0		3		42			109	
Lane Capacity		602		582		50			58	
v/c		0.00		0.01		0.85			1.88	
95% Queue Length		0.0		0.0		3.6			10.3	
Control Delay		11.0		11.2		213.9			568.0	
LOS		B		B		F			F	
Approach Delay		0.0		0.0		213.9			568.0	
Approach LOS						F			F	
Intersction Delay		31.2								

Step 1: MOVEMENT PRIORITIES

Major Street:									
Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	0	981	11		0	3	920	38
Flow Rate, v_x		0	1066	12			3	1000	41

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	19	15	5		69	25	6
Flow Rate, v_x	21	16	5		75	27	7

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		0	1066	12			3	1000	41
Conflicting Flow, v_c,x		1041					1078		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	21	16	5		75	27	7
Conflicting Flow, v_c,x	1592	2120	539		1548	2085	500

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.5	6.5	6.9	7.5	6.5	6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
P_HV		0.13		0.13	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.36		4.36	7.56	6.56	6.96	7.56	6.56	6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.13		0.13	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.33		2.33	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1041		1078	1592	2120	539	1548	2085	500
t_c,x		4.36		4.36	7.56	6.56	6.96	7.56	6.56	6.96
t_f,x		2.33		2.33	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		602		582	71	49	484	77	52	514

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1041	1078
Potential Capacity, c_p,x	602	582
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	602	582
Probability of Queue-free State, p_0,j	1.000	0.994
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	539	500
Potential Capacity, c_p,x	484	514
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	484	514
Probability of Queue-free State, p_0,j	0.989	0.987

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	2120	2085
Potential Capacity, c_p,x	49	52
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.994	0.994
Movement Capacity, c_m,x	49	51
Probability of Queue-free State, p_0,j	0.666	0.471

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	1592	1548
Potential Capacity, c_p,x	71	77
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.469	0.662
Major L, Minor T Impedance Factor, p'	0.580	0.738
Capacity Adjustment Factor, f_x	0.573	0.730
Movement Capacity, c_m,x	41	56

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		42			109	
Movement Capacity, c_m,x	41	49	484	56	51	514
Shared Capacity, c_SH		50			58	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		0		3	21	16	5	75	27	7
Movement Capacity		602		582	41	49	484	56	51	514
Lane Configuration		L		L		LTR			LTR	
Shared Capacity						50			58	
Control Delay		11.0		11.2		213.9			568.0	

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		0		3		42			109	
Lane Capacity		602		582		50			58	
v/c		0.00		0.01		0.85			1.88	
95% Queue Length		0.0		0.0		3.6			10.3	
Control Delay		11.0		11.2		213.9			568.0	

LOS	B	B	F	F
Approach Delay	0.0	0.0	213.9	568.0
Approach LOS			F	F
Intersction Delay	31.2			

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_NO BUILD_OSR-41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Campbell/OSR - US 41
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	0	981	11		0	3	920	38
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		0	1066	12			3	1000	41
Percent Heavy Vehicles	13	13				13	13		
Number of Lanes	0	1	2	0		0	1	2	1
Lane Configuration		L	T	TR			L	T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	19	15	5		69	25	6
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	21	16	5		75	27	7
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		1	1	0
Lane Configuration		LTR			L		TR
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR		L		TR
Flow Rate		0		3		42		75		34
Lane Capacity		602		582		50		56		62
v/c		0.00		0.01		0.85		1.34		0.54
95% Queue Length		0.0		0.0		3.6		6.6		2.2
Control Delay		11.0		11.2		213.9		356.0		116.9
LOS		B		B		F		F		F
Approach Delay		0.0		0.0		213.9			281.9	
Approach LOS						F			F	
Intersction Delay		17.5								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	0	981	11		0	3	920	38
Flow Rate, v_x		0	1066	12			3	1000	41

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	19	15	5		69	25	6
Flow Rate, v_x	21	16	5		75	27	7

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		0	1066	12			3	1000	41
Conflicting Flow, v_c,x		1041					1078		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	21	16	5		75	27	7
Conflicting Flow, v_c,x	1592	2120	539		1548	2085	500

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.5	6.5	6.9	7.5	6.5	6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
P_HV		0.13		0.13	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.36		4.36	7.56	6.56	6.96	7.56	6.56	6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.13		0.13	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.33		2.33	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1041		1078	1592	2120	539	1548	2085	500
t_c,x		4.36		4.36	7.56	6.56	6.96	7.56	6.56	6.96
t_f,x		2.33		2.33	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		602		582	71	49	484	77	52	514

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x		1041	1078	
Potential Capacity, c_p,x		602	582	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Movement Capacity, c_m,x		602	582	
Probability of Queue-free State, p_0,j		1.000	0.994	
Major L-Shared Probability Queue-free State, p*_0,j				

Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x		539	500	
Potential Capacity, c_p,x		484	514	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Movement Capacity, c_m,x		484	514	
Probability of Queue-free State, p_0,j		0.989	0.987	

Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				

Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x		2120	2085	
Potential Capacity, c_p,x		49	52	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Capacity Adjustment Factor, f_x		0.994	0.994	
Movement Capacity, c_m,x		49	51	
Probability of Queue-free State, p_0,j		0.666	0.471	

Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x		1592	1548	
Potential Capacity, c_p,x		71	77	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Major L, Minor T Adjusted Impedance Factor, p"		0.469	0.662	
Major L, Minor T Impedance Factor, p'		0.580	0.738	
Capacity Adjustment Factor, f_x		0.573	0.730	
Movement Capacity, c_m,x		41	56	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR		L		TR
Shared Flow Rate, v_y		42		75		34
Movement Capacity, c_m,x	41	49	484	56	51	514
Shared Capacity, c_SH		50				62

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		0		3	21	16	5	75	27	7
Movement Capacity		602		582	41	49	484	56	51	514
Lane Configuration		L		L		LTR		L		TR
Shared Capacity						50				62
Control Delay		11.0		11.2		213.9		356.0		116.9

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR		L		TR
Flow Rate		0		3		42		75		34
Lane Capacity		602		582		50		56		62
v/c		0.00		0.01		0.85		1.34		0.54
95% Queue Length		0.0		0.0		3.6		6.6		2.2
Control Delay		11.0		11.2		213.9		356.0		116.9

LOS	B	B	F	F		F
Approach Delay	0.0	0.0	213.9		281.9	
Approach LOS			F		F	
Intersction Delay	17.5					

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_NO BUILD_OSR-41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell-Old St Rd/ US 41
Major Street Direction:	North-South
East/West Street Name:	Campbell/OSR
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:									
Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	6	909	16		0	5	1103	125
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		7	988	17			5	1199	136
Percent Heavy Vehicles	13	13				13	13		
Number of Lanes	0	1	2	0		0	1	2	1
Lane Configuration		L	T	TR			L	T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:							
Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	24	19	4		37	15	4
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	26	21	4		40	16	4
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		7		5		51			61	
Lane Capacity		458		622		43			33	
v/c		0.01		0.01		1.20			1.83	
95% Queue Length		0.0		0.0		4.9			6.8	
Control Delay		13.0		10.8		352.3			653.4	
LOS		B		B		F			F	
Approach Delay		0.1		0.0		352.3			653.4	
Approach LOS						F			F	
Interstion Delay		23.5								

Step 1: MOVEMENT PRIORITIES

Major Street:									
Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound			EastBound		
Priority	7	8	9	10	11	12
Movement	L	T	R	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume, V_x	0	6	909	16	0	5	1103	125
Flow Rate, v_x		7	988	17		5	1199	136

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume, V_x	24	19	4	37	15	4
Flow Rate, v_x	26	21	4	40	16	4

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Flow Rate, v_x		7	988	17		5	1199	136
Conflicting Flow, v_c,x		1335				1005		

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Flow Rate, v_x	26	21	4	40	16	4
Conflicting Flow, v_c,x	1628	2355	503	1727	2228	599

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.5	6.5	6.9	7.5	6.5	6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
P_HV		0.13		0.13	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.36		4.36	7.56	6.56	6.96	7.56	6.56	6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.13		0.13	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.33		2.33	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1335		1005	1628	2355	503	1727	2228	599
t_c,x		4.36		4.36	7.56	6.56	6.96	7.56	6.56	6.96
t_f,x		2.33		2.33	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		458		622	67	35	511	56	42	442

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1335	1005
Potential Capacity, c_p,x	458	622
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	458	622
Probability of Queue-free State, p_0,j	0.986	0.991
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	503	599
Potential Capacity, c_p,x	511	442
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	511	442
Probability of Queue-free State, p_0,j	0.991	0.990

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	2355	2228
Potential Capacity, c_p,x	35	42
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.977	0.977
Movement Capacity, c_m,x	34	41
Probability of Queue-free State, p_0,j	0.391	0.602

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	1628	1727
Potential Capacity, c_p,x	67	56
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.588	0.382
Major L, Minor T Impedance Factor, p'	0.678	0.506
Capacity Adjustment Factor, f_x	0.672	0.502
Movement Capacity, c_m,x	45	28

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		51			61	
Movement Capacity, c_m,x	45	34	511	28	41	442
Shared Capacity, c_SH		43			33	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		7		5	26	21	4	40	16	4
Movement Capacity		458		622	45	34	511	28	41	442
Lane Configuration		L		L		LTR			LTR	
Shared Capacity						43			33	
Control Delay		13.0		10.8		352.3			653.4	

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		7		5		51			61	
Lane Capacity		458		622		43			33	
v/c		0.01		0.01		1.20			1.83	
95% Queue Length		0.0		0.0		4.9			6.8	
Control Delay		13.0		10.8		352.3			653.4	

LOS	B	B	F	F
Approach Delay	0.1	0.0	352.3	653.4
Approach LOS			F	F
Intersction Delay	23.5			

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_NO BUILD_OSR-41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build w/EB_LTL PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell-Old St Rd/ US 41
Major Street Direction:	North-South
East/West Street Name:	Campbell/OSR
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	6	909	16		0	5	1103	125
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		7	988	17			5	1199	136
Percent Heavy Vehicles	13	13				13	13		
Number of Lanes	0	1	2	0		0	1	2	1
Lane Configuration		L	T	TR			L	T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	24	19	4		37	15	4
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	26	21	4		40	16	4
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		1	1	0
Lane Configuration		LTR			L		TR
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR		L		TR
Flow Rate		7		5		51		40		21
Lane Capacity		458		622		43		28		51
v/c		0.01		0.01		1.20		1.42		0.41
95% Queue Length		0.0		0.0		4.9		4.7		1.5
Control Delay		13.0		10.8		352.3		529.2		118.5
LOS		B		B		F		F		F
Approach Delay		0.1		0.0		352.3			389.8	
Approach LOS						F			F	
Intersction Delay		17.0								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	6	909	16		0	5	1103	125
Flow Rate, v_x		7	988	17			5	1199	136

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	24	19	4		37	15	4
Flow Rate, v_x	26	21	4		40	16	4

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		7	988	17			5	1199	136
Conflicting Flow, v_c,x		1335					1005		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	26	21	4		40	16	4
Conflicting Flow, v_c,x	1628	2355	503		1727	2228	599

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.5	6.5	6.9	7.5	6.5	6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
P_HV		0.13		0.13	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.36		4.36	7.56	6.56	6.96	7.56	6.56	6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.13		0.13	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.33		2.33	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1335		1005	1628	2355	503	1727	2228	599
t_c,x		4.36		4.36	7.56	6.56	6.96	7.56	6.56	6.96
t_f,x		2.33		2.33	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		458		622	67	35	511	56	42	442

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1335	1005
Potential Capacity, c_p,x	458	622
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	458	622
Probability of Queue-free State, p_0,j	0.986	0.991
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	503	599
Potential Capacity, c_p,x	511	442
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	511	442
Probability of Queue-free State, p_0,j	0.991	0.990

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	2355	2228
Potential Capacity, c_p,x	35	42
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.977	0.977
Movement Capacity, c_m,x	34	41
Probability of Queue-free State, p_0,j	0.391	0.602

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	1628	1727
Potential Capacity, c_p,x	67	56
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.588	0.382
Major L, Minor T Impedance Factor, p'	0.678	0.506
Capacity Adjustment Factor, f_x	0.672	0.502
Movement Capacity, c_m,x	45	28

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR		L		TR
Shared Flow Rate, v_y		51		40		21
Movement Capacity, c_m,x	45	34	511	28	41	442
Shared Capacity, c_SH		43				51

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		7		5	26	21	4	40	16	4
Movement Capacity		458		622	45	34	511	28	41	442
Lane Configuration		L		L		LTR		L		TR
Shared Capacity						43				51
Control Delay		13.0		10.8		352.3		529.2		118.5

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR		L		TR
Flow Rate		7		5		51		40		21
Lane Capacity		458		622		43		28		51
v/c		0.01		0.01		1.20		1.42		0.41
95% Queue Length		0.0		0.0		4.9		4.7		1.5
Control Delay		13.0		10.8		352.3		529.2		118.5

LOS	B	B	F	F		F
Approach Delay	0.1	0.0	352.3		389.8	
Approach LOS			F		F	
Intersction Delay	17.0					

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_NO BUILD_Wortman-OSR-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Wortman Rd / OSR
Major Street Direction:	North-South
East/West Street Name:	Wortman Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		12	85					52	7
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		13	92					57	8
Percent Heavy Vehicles		3							
Number of Lanes	0	1	1	0		0	0	1	1
Lane Configuration		L	T					T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					18		24
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					20		26
Percent Heavy Vehicles					3		3
Number of Lanes	0	0	0		1	0	1
Lane Configuration					L		R
RT channelized?							No
Flared Approach | Storage		|				|	
Percent Grade						0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0		0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		13						20		26
Lane Capacity		1532						806		1007
v/c		0.01						0.02		0.03
95% Queue Length		0.0						0.1		0.1
Control Delay		7.4						9.6		8.7
LOS		A						A		A
Approach Delay		0.9							9.1	
Approach LOS									A	
Intersction Delay										

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		12	85					52	7
Flow Rate, v_x		13	92					57	8

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					18		24
Flow Rate, v_x					20		26

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		13	92					57	8
Conflicting Flow, v_c,x		64							

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					20		26
Conflicting Flow, v_c,x					175		57

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1						7.1		6.2
Stage I										
Stage II										
t_c,HV		1.0						1.0		1.0
P_HV		0.03						0.03		0.03
t_c,G								0.2		0.1
G								0		0
t_3,LT		0.0						0.7		0.0
t_c										
Single Stage		4.13						6.43		6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.03						0.03		0.03
t_f		2.23						3.53		3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		64						175		57
t_c,x		4.13						6.43		6.23
t_f,x		2.23						3.53		3.33
c_p,x		1532						813		1007

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0		0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	64	
Potential Capacity, c_p,x	1532	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	1532	
Probability of Queue-free State, p_0,j	0.991	
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x		57
Potential Capacity, c_p,x		1007
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1007
Probability of Queue-free State, p_0,j		0.974

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		175
Potential Capacity, c_p,x		813
Pedestrian Impedance Factor, p_p,x		1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		0.991
Movement Capacity, c_m,x		806

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration				L		R
Shared Flow Rate, v_y				20		26
Movement Capacity, c_m,x				806		1007
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		13						20		26
Movement Capacity		1532						806		1007
Lane Configuration		L						L		R
Shared Capacity										
Control Delay		7.4						9.6		8.7

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		13						20		26
Lane Capacity		1532						806		1007
v/c		0.01						0.02		0.03
95% Queue Length		0.0						0.1		0.1
Control Delay		7.4						9.6		8.7

LOS	A	A		A
Approach Delay	0.9		9.1	
Approach LOS			A	
Intersction Delay				

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_NO BUILD_Wortman-OSR-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Wortman Rd / OSR
Major Street Direction:	North-South
East/West Street Name:	Wortman Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		22	74					115	28
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		24	80					125	30
Percent Heavy Vehicles		3							
Number of Lanes	0	1	1	0		0	0	1	1
Lane Configuration		L	T					T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					15		18
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					16		20
Percent Heavy Vehicles					3		3
Number of Lanes	0	0	0		1	0	1
Lane Configuration					L		R
RT channelized?							No
Flared Approach | Storage		|				|	
Percent Grade						0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0		0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		24						16		20
Lane Capacity		1419						721		923
v/c		0.02						0.02		0.02
95% Queue Length		0.1						0.1		0.1
Control Delay		7.6						10.1		9.0
LOS		A						B		A
Approach Delay		1.7							9.5	
Approach LOS									A	
Intersction Delay		1.8								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		22	74					115	28
Flow Rate, v_x		24	80					125	30

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					15		18
Flow Rate, v_x					16		20

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		24	80					125	30
Conflicting Flow, v_c,x		155							

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					16		20
Conflicting Flow, v_c,x					253		125

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1						7.1		6.2
Stage I										
Stage II										
t_c,HV		1.0						1.0		1.0
P_HV		0.03						0.03		0.03
t_c,G								0.2		0.1
G								0		0
t_3,LT		0.0						0.7		0.0
t_c										
Single Stage		4.13						6.43		6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.03						0.03		0.03
t_f		2.23						3.53		3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		155						253		125
t_c,x		4.13						6.43		6.23
t_f,x		2.23						3.53		3.33
c_p,x		1419						733		923

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0		0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	155	
Potential Capacity, c_p,x	1419	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	1419	
Probability of Queue-free State, p_0,j	0.983	
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x		125
Potential Capacity, c_p,x		923
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		923
Probability of Queue-free State, p_0,j		0.979

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		253
Potential Capacity, c_p,x		733
Pedestrian Impedance Factor, p_p,x		1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		0.983
Movement Capacity, c_m,x		721

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration				L		R
Shared Flow Rate, v_y				16		20
Movement Capacity, c_m,x				721		923
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		24						16		20
Movement Capacity		1419						721		923
Lane Configuration		L						L		R
Shared Capacity										
Control Delay		7.6						10.1		9.0

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		24						16		20
Lane Capacity		1419						721		923
v/c		0.02						0.02		0.02
95% Queue Length		0.1						0.1		0.1
Control Delay		7.6						10.1		9.0

LOS	A	B		A
Approach Delay	1.7		9.5	
Approach LOS			A	
Intersction Delay	1.8			

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_NO BUILD_Hillsdale-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Hillsdale Road
North/South Street Name:	Walnut Avenue
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		1	84	26			14	120	5
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		1	91	28			15	130	5
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	26	6	23		5	6	2
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	28	7	25		5	7	2
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		1		15		60			14	
Lane Capacity		1442		1462		751			656	
v/c		0.00		0.01		0.08			0.02	
95% Queue Length		0.0		0.0		0.3			0.1	
Control Delay		7.5		7.5		10.2			10.6	
LOS		A		A		B			B	
Approach Delay		0.1		0.8		10.2			10.6	
Approach LOS						B			B	
Interstction Delay		2.6								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		NorthBound					SouthBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		1	84	26			14	120	5
Flow Rate, v_x		1	91	28			15	130	5

Minor Street:

Approach	NorthBound					SouthBound		
Movement	7	8	9	|		10	11	12
	L	T	R	|		L	T	R
Volume, V_x	26	6	23			5	6	2
Flow Rate, v_x	28	7	25			5	7	2

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		1	91	28			15	130	5
Conflicting Flow, v_c,x		136					120		

Minor Street:

Approach	NorthBound					SouthBound		
Movement	7	8	9	|		10	11	12
	L	T	R	|		L	T	R
Flow Rate, v_x	28	7	25			5	7	2
Conflicting Flow, v_c,x	276	274	105			287	285	133

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		136		120	276	274	105	287	285	133
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1442		1462	675	632	946	663	622	913

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	136	120
Potential Capacity, c_p,x	1442	1462
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1442	1462
Probability of Queue-free State, p_0,j	0.999	0.990
Major L-Shared Probability Queue-free State, p*_0,j	0.999	0.989

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	105	133
Potential Capacity, c_p,x	946	913
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	946	913
Probability of Queue-free State, p_0,j	0.974	0.998

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	274	285
Potential Capacity, c_p,x	632	622
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.988	0.988
Movement Capacity, c_m,x	624	615
Probability of Queue-free State, p_0,j	0.990	0.989

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	276	287
Potential Capacity, c_p,x	675	663
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.977	0.978
Major L, Minor T Impedance Factor, p'	0.983	0.983
Capacity Adjustment Factor, f_x	0.980	0.957
Movement Capacity, c_m,x	662	635

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		60			14	
Movement Capacity, c_m,x	662	624	946	635	615	913
Shared Capacity, c_SH		751			656	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		1		15	28	7	25	5	7	2
Movement Capacity		1442		1462	662	624	946	635	615	913
Lane Configuration						LTR			LTR	
Shared Capacity						751			656	
Control Delay		7.5		7.5		10.2			10.6	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.999	0.989
Delay to Major Left-turning Vehicles, d_MLT	7.5	7.5
Major Street Through Vehicles in Shared Lane, v_i1	91	130
Major Street Turning Vehicles in Shared Lane, v_i2	29	21
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2	1500	1500
Delay to Rank 1 Vehicles, d_Rank1	0.0	0.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		1		15		60			14	
Lane Capacity		1442		1462		751			656	
v/c		0.00		0.01		0.08			0.02	
95% Queue Length		0.0		0.0		0.3			0.1	
Control Delay		7.5		7.5		10.2			10.6	
LOS		A		A		B			B	
Approach Delay		0.1		0.8		10.2			10.6	
Approach LOS						B			B	
Intersction Delay		2.6								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_NO BUILD_Hillsdale-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Hillsdale Road
North/South Street Name:	Walnut Avenue
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		14	185	28			12	110	26
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		15	201	30			13	120	28
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	36	12	39		8	9	3
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	39	13	42		9	10	3
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		15		13		95			22	
Lane Capacity		1428		1330		625			534	
v/c		0.01		0.01		0.15			0.04	
95% Queue Length		0.0		0.0		0.5			0.1	
Control Delay		7.5		7.7		11.8			12.0	
LOS		A		A		B			B	
Approach Delay		0.6		0.7		11.8			12.0	
Approach LOS						B			B	
Intersction Delay		3.1								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound			SouthBound		
Priority	7	8	9	10	11	12
Movement	L	T	R	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound				WestBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume, V_x		14	185	28		12	110	26
Flow Rate, v_x		15	201	30		13	120	28

Minor Street:

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume, V_x	36	12	39	8	9	3
Flow Rate, v_x	39	13	42	9	10	3

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound				WestBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Flow Rate, v_x		15	201	30		13	120	28
Conflicting Flow, v_c,x		148				232		

Minor Street:

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Flow Rate, v_x	39	13	42	9	10	3
Conflicting Flow, v_c,x	413	421	216	434	422	134

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		148		232	413	421	216	434	422	134
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1428		1330	548	523	821	530	522	913

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	148	232
Potential Capacity, c_p,x	1428	1330
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1428	1330
Probability of Queue-free State, p_0,j	0.989	0.990
Major L-Shared Probability Queue-free State, p*_0,j	0.988	0.989

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	216	134
Potential Capacity, c_p,x	821	913
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	821	913
Probability of Queue-free State, p_0,j	0.948	0.996

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	421	422
Potential Capacity, c_p,x	523	522
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.977	0.977
Movement Capacity, c_m,x	511	510
Probability of Queue-free State, p_0,j	0.974	0.981

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	413	434
Potential Capacity, c_p,x	548	530
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.958	0.952
Major L, Minor T Impedance Factor, p'	0.968	0.963
Capacity Adjustment Factor, f_x	0.965	0.914
Movement Capacity, c_m,x	528	485

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		95			22	
Movement Capacity, c_m,x	528	511	821	485	510	913
Shared Capacity, c_SH		625			534	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		15		13	39	13	42	9	10	3
Movement Capacity		1428		1330	528	511	821	485	510	913
Lane Configuration						LTR			LTR	
Shared Capacity						625			534	
Control Delay		7.5		7.7		11.8			12.0	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.988	0.989
Delay to Major Left-turning Vehicles, d_MLT	7.5	7.7
Major Street Through Vehicles in Shared Lane, v_i1	201	120
Major Street Turning Vehicles in Shared Lane, v_i2	46	41
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2	1500	1500
Delay to Rank 1 Vehicles, d_Rank1	0.1	0.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		15		13		95			22	
Lane Capacity		1428		1330		625			534	
v/c		0.01		0.01		0.15			0.04	
95% Queue Length		0.0		0.0		0.5			0.1	
Control Delay		7.5		7.7		11.8			12.0	
LOS		A		A		B			B	
Approach Delay		0.6		0.7		11.8			12.0	
Approach LOS						B			B	
Intersction Delay		3.1								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_NO BUILD_Hillsdale-US 41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	26	1229	54		0	43	1155	1
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		28	1336	59			47	1255	1
Percent Heavy Vehicles	3	3				3	3		
Number of Lanes	0	1	2	0		0	1	2	0
Lane Configuration		L	T	TR			L	T	TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	124	10	54		0	28	18
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	135	11	59		0	30	20
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		28		47		204			50	
Lane Capacity		544		481					24	
v/c		0.05		0.10					2.04	
95% Queue Length		0.2		0.3					6.2	
Control Delay		12.0		13.3					823.9	
LOS		B		B					F	
Approach Delay		0.2		0.5					823.9	
Approach LOS									F	
Intersction Delay										

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	26	1229	54		0	43	1155	1
Flow Rate, v_x		28	1336	59			47	1255	1

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	124	10	54		0	28	18
Flow Rate, v_x	135	11	59		0	30	20

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		28	1336	59			47	1255	1
Conflicting Flow, v_c,x		1257					1395		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	135	11	59		0	30	20
Conflicting Flow, v_c,x	2158	2772	697		2079	2801	628

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.5	6.5	6.9	7.5	6.5	6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.16		4.16	7.56	6.56	6.96	7.56	6.56	6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1257		1395	2158	2772	697	2079	2801	628
t_c,x		4.16		4.16	7.56	6.56	6.96	7.56	6.56	6.96
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		544		481	26	19	381	30	18	423

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				
Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x		1257	1395	
Potential Capacity, c_p,x		544	481	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Movement Capacity, c_m,x		544	481	
Probability of Queue-free State, p_0,j		0.948	0.903	
Major L-Shared Probability Queue-free State, p*_0,j				
Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x		697	628	
Potential Capacity, c_p,x		381	423	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Movement Capacity, c_m,x		381	423	
Probability of Queue-free State, p_0,j		0.846	0.954	
Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				
Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x		2772	2801	
Potential Capacity, c_p,x		19	18	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Capacity Adjustment Factor, f_x		0.856	0.856	
Movement Capacity, c_m,x		16	15	
Probability of Queue-free State, p_0,j		0.317		
Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x		2158	2079	
Potential Capacity, c_p,x		26	30	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Major L, Minor T Adjusted Impedance Factor, p"			0.271	
Major L, Minor T Impedance Factor, p'			0.406	
Capacity Adjustment Factor, f_x			0.343	
Movement Capacity, c_m,x			10	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		204			50	
Movement Capacity, c_m,x		16	381	10	15	423
Shared Capacity, c_SH					24	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		28		47	135	11	59	0	30	20
Movement Capacity		544		481		16	381	10	15	423
Lane Configuration		L		L		LTR			LTR	
Shared Capacity									24	
Control Delay		12.0		13.3					823.9	

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		28		47		204			50	
Lane Capacity		544		481					24	
v/c		0.05		0.10					2.04	
95% Queue Length		0.2		0.3					6.2	
Control Delay		12.0		13.3					823.9	

LOS	B	B	F
Approach Delay	0.2	0.5	823.9
Approach LOS			F
Intersction Delay			

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TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_NO BUILD_Hillsdale-US 41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	26	1229	54		0	66	1315	1
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		28	1336	59			72	1429	1
Percent Heavy Vehicles	3	3				3	3		
Number of Lanes	0	1	2	0		0	1	2	0
Lane Configuration		L	T	TR			L	T	TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	53	27	57		4	27	8
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	58	29	62		4	29	9
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		28		72		149			42	
Lane Capacity		466		481						
v/c		0.06		0.15						
95% Queue Length		0.2		0.5						
Control Delay		13.2		13.8						
LOS		B		B						
Approach Delay		0.3		0.7						
Approach LOS										
Intersction Delay										

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound					EastBound		
Priority	7	8	9	|		10	11	12
Movement	L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	26	1229	54		0	66	1315	1
Flow Rate, v_x		28	1336	59			72	1429	1

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	53	27	57		4	27	8
Flow Rate, v_x	58	29	62		4	29	9

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		28	1336	59			72	1429	1
Conflicting Flow, v_c,x		1430					1395		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	58	29	62		4	29	9
Conflicting Flow, v_c,x	2295	2996	697		2313	3024	715

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.5	6.5	6.9	7.5	6.5	6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.16		4.16	7.56	6.56	6.96	7.56	6.56	6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1430		1395	2295	2996	697	2313	3024	715
t_c,x		4.16		4.16	7.56	6.56	6.96	7.56	6.56	6.96
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		466		481	21	13	381	20	13	371

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				
Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x		1430	1395	
Potential Capacity, c_p,x		466	481	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Movement Capacity, c_m,x		466	481	
Probability of Queue-free State, p_0,j		0.939	0.851	
Major L-Shared Probability Queue-free State, p*_0,j				
Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x		697	715	
Potential Capacity, c_p,x		381	371	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Movement Capacity, c_m,x		381	371	
Probability of Queue-free State, p_0,j		0.837	0.977	
Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				
Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x		2996	3024	
Potential Capacity, c_p,x		13	13	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Capacity Adjustment Factor, f_x		0.799	0.799	
Movement Capacity, c_m,x		11	10	
Probability of Queue-free State, p_0,j				
Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x		2295	2313	
Potential Capacity, c_p,x		21	20	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		149			42	
Movement Capacity, c_m,x		11	381		10	371
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		28		72	58	29	62	4	29	9
Movement Capacity		466		481		11	381		10	371
Lane Configuration		L		L		LTR			LTR	
Shared Capacity										
Control Delay		13.2		13.8						

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		28		72		149			42	
Lane Capacity		466		481						
v/c		0.06		0.15						
95% Queue Length		0.2		0.5						
Control Delay		13.2		13.8						

LOS	B	B
Approach Delay	0.3	0.7
Approach LOS		
Intersction Delay		

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_NO BUILD_Hillsdale-Old State-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Old State
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			123	39			21	76	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			134	42			23	83	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration				TR			LT		
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	39		8				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	42		9				
Percent Heavy Vehicles	3		3				
Number of Lanes	0	1	0		0	0	0
Lane Configuration		LR					
RT channelized?							
Flared Approach | Storage	No	|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				23		51				
Lane Capacity				1394		720				
v/c				0.02		0.07				
95% Queue Length				0.0		0.2				
Control Delay				7.6		10.4				
LOS				A		B				
Approach Delay				1.8		10.4				
Approach LOS						B				
Intersction Delay		2.2								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound			|	EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			123	39			21	76	
Flow Rate, v_x			134	42			23	83	

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	39		8				
Flow Rate, v_x	42		9				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			134	42			23	83	
Conflicting Flow, v_c,x							176		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	42		9				
Conflicting Flow, v_c,x	283		155				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				176	283		155			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1394	705		888			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		176
Potential Capacity, c_p,x		1394
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1394
Probability of Queue-free State, p_0,j		0.984
Major L-Shared Probability Queue-free State, p*_0,j		0.983

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	155	
Potential Capacity, c_p,x	888	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	888	
Probability of Queue-free State, p_0,j	0.990	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	283	
Potential Capacity, c_p,x	705	
Pedestrian Impedance Factor, p_p,x	1.000	
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x	0.983	
Movement Capacity, c_m,x	693	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach		WestBound			EastBound	
Movement	7	8	9	10	11	12
Lane Configuration		LR				
Shared Flow Rate, v_y		51				
Movement Capacity, c_m,x	693		888			
Shared Capacity, c_SH		720				

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				23	42		9			
Movement Capacity				1394	693		888			
Lane Configuration				LT		LR				
Shared Capacity						720				
Control Delay				7.6		10.4				

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	NB	SB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j		0.983
Delay to Major Left-turning Vehicles, d_MLT		7.6
Major Street Through Vehicles in Shared Lane, v_i1		83
Major Street Turning Vehicles in Shared Lane, v_i2		23
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2	1500	
Delay to Rank 1 Vehicles, d_Rank1		0.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				23		51				
Lane Capacity				1394		720				
v/c				0.02		0.07				
95% Queue Length				0.0		0.2				
Control Delay				7.6		10.4				
LOS				A		B				
Approach Delay				1.8		10.4				
Approach LOS						B				
Intersction Delay		2.2								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_NO BUILD_Hillsdale-Old State-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Old State
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			126	30			22	78	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			137	33			24	85	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration				TR			LT		
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	40		8				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	43		9				
Percent Heavy Vehicles	3		3				
Number of Lanes	0	1	0		0	0	0
Lane Configuration		LR					
RT channelized?							
Flared Approach | Storage	No	|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				24		52				
Lane Capacity				1402		717				
v/c				0.02		0.07				
95% Queue Length				0.1		0.2				
Control Delay				7.6		10.4				
LOS				A		B				
Approach Delay				1.8		10.4				
Approach LOS						B				
Intersction Delay		2.2								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			126	30			22	78	
Flow Rate, v_x			137	33			24	85	

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	40		8				
Flow Rate, v_x	43		9				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			137	33			24	85	
Conflicting Flow, v_c,x							170		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	43		9				
Conflicting Flow, v_c,x	286		153				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				170	286		153			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1402	702		890			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		170
Potential Capacity, c_p,x		1402
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1402
Probability of Queue-free State, p_0,j		0.983
Major L-Shared Probability Queue-free State, p*_0,j		0.982

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	153	
Potential Capacity, c_p,x	890	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	890	
Probability of Queue-free State, p_0,j	0.990	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	286	
Potential Capacity, c_p,x	702	
Pedestrian Impedance Factor, p_p,x	1.000	
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x	0.982	
Movement Capacity, c_m,x	690	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LR				
Shared Flow Rate, v_y		52				
Movement Capacity, c_m,x	690		890			
Shared Capacity, c_SH		717				

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				24	43		9			
Movement Capacity				1402	690		890			
Lane Configuration				LT		LR				
Shared Capacity						717				
Control Delay				7.6		10.4				

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	NB	SB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j		0.982
Delay to Major Left-turning Vehicles, d_MLT		7.6
Major Street Through Vehicles in Shared Lane, v_i1		85
Major Street Turning Vehicles in Shared Lane, v_i2		24
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2						1500					
Delay to Rank 1 Vehicles, d_Rank1								0.1			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				24		52				
Lane Capacity				1402		717				
v/c				0.02		0.07				
95% Queue Length				0.1		0.2				
Control Delay				7.6		10.4				
LOS				A		B				
Approach Delay				1.8		10.4				
Approach LOS						B				
Intersction Delay		2.2								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_NO BUILD_Radio-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Radio Ave / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Radio Ave
North/South Street Name:	Walnut Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		3	3	1			4	1	1
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		3	3	1			4	1	1
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	9	16	1		1	4	5
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	10	17	1		1	4	5
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		3		4		28			11	
Lane Capacity		1614		1611		907			972	
v/c		0.00		0.00		0.03			0.01	
95% Queue Length		0.0		0.0		0.1			0.0	
Control Delay		7.2		7.2		9.1			8.7	
LOS		A		A		A			A	
Approach Delay		3.1		4.8		9.1			8.7	
Approach LOS						A			A	
Intersction Delay		7.6								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound			|	SouthBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		3	3	1			4	1	1
Flow Rate, v_x		3	3	1			4	1	1

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	9	16	1		1	4	5
Flow Rate, v_x	10	17	1		1	4	5

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		3	3	1			4	1	1
Conflicting Flow, v_c,x		2					4		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	10	17	1		1	4	5
Conflicting Flow, v_c,x	26	21	4		30	21	2

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		2		4	26	21	4	30	21	2
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1614		1611	983	870	1077	976	870	1080

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	2	4
Potential Capacity, c_p,x	1614	1611
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1614	1611
Probability of Queue-free State, p_0,j	0.998	0.997
Major L-Shared Probability Queue-free State, p*_0,j	0.998	0.997

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	4	2
Potential Capacity, c_p,x	1077	1080
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1077	1080
Probability of Queue-free State, p_0,j	0.999	0.995

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	21	21
Potential Capacity, c_p,x	870	870
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.995	0.995
Movement Capacity, c_m,x	866	866
Probability of Queue-free State, p_0,j	0.980	0.995

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	26	30
Potential Capacity, c_p,x	983	976
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.990	0.975
Major L, Minor T Impedance Factor, p'	0.993	0.981
Capacity Adjustment Factor, f_x	0.988	0.980
Movement Capacity, c_m,x	970	957

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		28			11	
Movement Capacity, c_m,x	970	866	1077	957	866	1080
Shared Capacity, c_SH		907			972	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		3		4	10	17	1	1	4	5
Movement Capacity		1614		1611	970	866	1077	957	866	1080
Lane Configuration						LTR			LTR	
Shared Capacity						907			972	
Control Delay		7.2		7.2		9.1			8.7	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.998	0.997
Delay to Major Left-turning Vehicles, d_MLT	7.2	7.2
Major Street Through Vehicles in Shared Lane, v_i1	3	1
Major Street Turning Vehicles in Shared Lane, v_i2	4	5
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2	1500	1500
Delay to Rank 1 Vehicles, d_Rank1	0.0	0.0

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		3		4		28			11	
Lane Capacity		1614		1611		907			972	
v/c		0.00		0.00		0.03			0.01	
95% Queue Length		0.0		0.0		0.1			0.0	
Control Delay		7.2		7.2		9.1			8.7	
LOS		A		A		A			A	
Approach Delay		3.1		4.8		9.1			8.7	
Approach LOS						A			A	
Intersction Delay		7.6								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_NO BUILD_Radio-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Radio Ave / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Radio Ave
North/South Street Name:	Walnut Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		1	5	4			0	5	0
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		1	5	4			0	5	0
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	8	13	1		1	13	1
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	9	14	1		1	14	1
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		1		0		24			16	
Lane Capacity		1609		1603		917			891	
v/c		0.00		0.00		0.03			0.02	
95% Queue Length		0.0		0.0		0.1			0.1	
Control Delay		7.2		7.2		9.0			9.1	
LOS		A		A		A			A	
Approach Delay		0.7		0.0		9.0			9.1	
Approach LOS						A			A	
Interstction Delay		6.6								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound				SouthBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		1	5	4			0	5	0
Flow Rate, v_x		1	5	4			0	5	0

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	8	13	1		1	13	1
Flow Rate, v_x	9	14	1		1	14	1

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		1	5	4			0	5	0
Conflicting Flow, v_c,x		5					10		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	9	14	1		1	14	1
Conflicting Flow, v_c,x	23	15	8		23	17	5

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		5		10	23	15	8	23	17	5
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1609		1603	987	877	1072	987	875	1075

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	5	10
Potential Capacity, c_p,x	1609	1603
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1609	1603
Probability of Queue-free State, p_0,j	0.999	1.000
Major L-Shared Probability Queue-free State, p*_0,j	0.999	1.000

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	8	5
Potential Capacity, c_p,x	1072	1075
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1072	1075
Probability of Queue-free State, p_0,j	0.999	0.999

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	15	17
Potential Capacity, c_p,x	877	875
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.999	0.999
Movement Capacity, c_m,x	876	874
Probability of Queue-free State, p_0,j	0.984	0.984

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	23	23
Potential Capacity, c_p,x	987	987
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.983	0.983
Major L, Minor T Impedance Factor, p'	0.987	0.987
Capacity Adjustment Factor, f_x	0.986	0.986
Movement Capacity, c_m,x	973	973

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		24			16	
Movement Capacity, c_m,x	973	876	1072	973	874	1075
Shared Capacity, c_SH		917			891	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		1		0	9	14	1	1	14	1
Movement Capacity		1609		1603	973	876	1072	973	874	1075
Lane Configuration						LTR			LTR	
Shared Capacity						917			891	
Control Delay		7.2		7.2		9.0			9.1	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.999	1.000
Delay to Major Left-turning Vehicles, d_MLT	7.2	7.2
Major Street Through Vehicles in Shared Lane, v_i1	5	5
Major Street Turning Vehicles in Shared Lane, v_i2	5	0
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2	1500	1500
Delay to Rank 1 Vehicles, d_Rank1	0.0	0.0

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		1		0		24			16	
Lane Capacity		1609		1603		917			891	
v/c		0.00		0.00		0.03			0.02	
95% Queue Length		0.0		0.0		0.1			0.1	
Control Delay		7.2		7.2		9.0			9.1	
LOS		A		A		A			A	
Approach Delay		0.7		0.0		9.0			9.1	
Approach LOS						A			A	
Intersction Delay		6.6								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_NO BUILD_Radio-US 41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Radio Ave / US 41
Major Street Direction:	North-South
East/West Street Name:	Radio Ave
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			988	5		0	0	1071	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			1074	5			0	1164	
Percent Heavy Vehicles						0	13		
Number of Lanes	0	0	2	0		0	1	2	0
Lane Configuration			T	TR			L	T	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	5		16				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	5		17				
Percent Heavy Vehicles	3		3				
Number of Lanes	1	0	1		0	0	0
Lane Configuration	L		R				
RT channelized?			No				
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				0	5		17			
Lane Capacity				581	88		484			
v/c				0.00	0.06		0.04			
95% Queue Length				0.0	0.2		0.1			
Control Delay				11.2	48.8		12.7			
LOS				B	E		B			
Approach Delay				0.0		21.3				
Approach LOS						C				
Intersction Delay		0.2								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			988	5		0	0	1071	
Flow Rate, v_x			1074	5			0	1164	

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	5		16				
Flow Rate, v_x	5		17				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			1074	5			0	1164	
Conflicting Flow, v_c,x							1079		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	5		17				
Conflicting Flow, v_c,x	1659		540				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.5		6.9			
Stage I										
Stage II										
t_c,HV				2.0	2.0		2.0			
P_HV				0.13	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.36	6.86		6.96			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				1.0	1.0		1.0			
P_HV				0.13	0.03		0.03			
t_f				2.33	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				1079	1659		540			
t_c,x				4.36	6.86		6.96			
t_f,x				2.33	3.53		3.33			
c_p,x				581	88		484			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		1079
Potential Capacity, c_p,x		581
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		581
Probability of Queue-free State, p_0,j		1.000
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	540	
Potential Capacity, c_p,x	484	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	484	
Probability of Queue-free State, p_0,j	0.964	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	1659	
Potential Capacity, c_p,x	88	
Pedestrian Impedance Factor, p_p,x	1.000	
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x	1.000	
Movement Capacity, c_m,x	88	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration	L		R			
Shared Flow Rate, v_y	5		17			
Movement Capacity, c_m,x	88		484			
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				0	5		17			
Movement Capacity				581	88		484			
Lane Configuration				L	L		R			
Shared Capacity										
Control Delay				11.2	48.8		12.7			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				0	5		17			
Lane Capacity				581	88		484			
v/c				0.00	0.06		0.04			
95% Queue Length				0.0	0.2		0.1			
Control Delay				11.2	48.8		12.7			

LOS		B	E		B
Approach Delay		0.0		21.3	
Approach LOS				C	
Intersction Delay	0.2				

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_NO BUILD_Radio-US 41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Radio Ave / US 41
Major Street Direction:	North-South
East/West Street Name:	Radio Ave
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			956	3		0	3	1276	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			1039	3			3	1387	
Percent Heavy Vehicles						0	13		
Number of Lanes	0	0	2	0		0	1	2	0
Lane Configuration			T	TR			L	T	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	1		5				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	1		5				
Percent Heavy Vehicles	3		3				
Number of Lanes	1	0	1		0	0	0
Lane Configuration	L		R				
RT channelized?			No				
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				3	1		5			
Lane Capacity				601	77		497			
v/c				0.01	0.01		0.01			
95% Queue Length				0.0	0.0		0.0			
Control Delay				11.0	52.6		12.3			
LOS				B	F		B			
Approach Delay				0.0		19.0				
Approach LOS						C				
Intersction Delay		0.1								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			956	3		0	3	1276	
Flow Rate, v_x			1039	3			3	1387	

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	1		5				
Flow Rate, v_x	1		5				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			1039	3			3	1387	
Conflicting Flow, v_c,x							1042		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	1		5				
Conflicting Flow, v_c,x	1741		521				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.5		6.9			
Stage I										
Stage II										
t_c,HV				2.0	2.0		2.0			
P_HV				0.13	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.36	6.86		6.96			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				1.0	1.0		1.0			
P_HV				0.13	0.03		0.03			
t_f				2.33	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				1042	1741		521			
t_c,x				4.36	6.86		6.96			
t_f,x				2.33	3.53		3.33			
c_p,x				601	77		497			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				
Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x			1042	
Potential Capacity, c_p,x			601	
Pedestrian Impedance Factor, p_p,x			1.000	
Movement Capacity, c_m,x			601	
Probability of Queue-free State, p_0,j			0.995	
Major L-Shared Probability Queue-free State, p*_0,j				
Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x		521		
Potential Capacity, c_p,x		497		
Pedestrian Impedance Factor, p_p,x		1.000		
Movement Capacity, c_m,x		497		
Probability of Queue-free State, p_0,j		0.989		
Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				
Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				
Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x		1741		
Potential Capacity, c_p,x		77		
Pedestrian Impedance Factor, p_p,x		1.000		
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x		0.995		
Movement Capacity, c_m,x		77		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
Lane Configuration	L		R	|			
Shared Flow Rate, v_y	1		5				
Movement Capacity, c_m,x	77		497				
Shared Capacity, c_SH							

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				3	1		5			
Movement Capacity				601	77		497			
Lane Configuration				L	L		R			
Shared Capacity										
Control Delay				11.0	52.6		12.3			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				3	1		5			
Lane Capacity				601	77		497			
v/c				0.01	0.01		0.01			
95% Queue Length				0.0	0.0		0.0			
Control Delay				11.0	52.6		12.3			

LOS			B	F		B
Approach Delay			0.0		19.0	
Approach LOS					C	
Intersction Delay	0.1					

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_NO BUILD_Campbell-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Campbell Road
North/South Street Name:	Walnut Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			5	3			1	16	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			5	3			1	17	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	1		0	1	1	0
Lane Configuration			T	R			L	T	
Median Type					Undivided				
Median Storage									
RT channelized?				No					
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	17		3				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	18		3				
Percent Heavy Vehicles	3		3				
Number of Lanes	1	0	1		0	0	0
Lane Configuration	L		R				
RT channelized?			No				
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				1	18		3			
Lane Capacity				1605	987		1075			
v/c				0.00	0.02		0.00			
95% Queue Length				0.0	0.1		0.0			
Control Delay				7.2	8.7		8.4			
LOS				A	A		A			
Approach Delay				0.4		8.7				
Approach LOS						A				
Intersction Delay		4.0								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		NorthBound					SouthBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			5	3			1	16	
Flow Rate, v_x			5	3			1	17	

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	17		3				
Flow Rate, v_x	18		3				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			5	3			1	17	
Conflicting Flow, v_c,x							9		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	18		3				
Conflicting Flow, v_c,x	25		5				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				9	25		5			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1605	988		1075			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		9
Potential Capacity, c_p,x		1605
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1605
Probability of Queue-free State, p_0,j		0.999
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	5	
Potential Capacity, c_p,x	1075	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	1075	
Probability of Queue-free State, p_0,j	0.997	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	25	
Potential Capacity, c_p,x	988	
Pedestrian Impedance Factor, p_p,x	1.000	
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x	0.999	
Movement Capacity, c_m,x	987	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration	L		R			
Shared Flow Rate, v_y	18		3			
Movement Capacity, c_m,x	987		1075			
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				1	18		3			
Movement Capacity				1605	987		1075			
Lane Configuration				L	L		R			
Shared Capacity										
Control Delay				7.2	8.7		8.4			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				1	18		3			
Lane Capacity				1605	987		1075			
v/c				0.00	0.02		0.00			
95% Queue Length				0.0	0.1		0.0			
Control Delay				7.2	8.7		8.4			

LOS		A	A			A
Approach Delay		0.4		8.7		
Approach LOS				A		
Intersction Delay	4.0					

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_NO BUILD_Campbell-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Campbell Road
North/South Street Name:	Walnut Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			19	19			1	6	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			21	21			1	7	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	1		0	1	1	0
Lane Configuration			T	R			L	T	
Median Type					Undivided				
Median Storage									
RT channelized?				No					
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	10		0				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	11		0				
Percent Heavy Vehicles	3		3				
Number of Lanes	1	0	1		0	0	0
Lane Configuration	L		R				
RT channelized?			No				
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				1	11		0			
Lane Capacity				1561	982		1054			
v/c				0.00	0.01		0.00			
95% Queue Length				0.0	0.0		0.0			
Control Delay				7.3	8.7		8.4			
LOS				A	A		A			
Approach Delay				1.0		8.7				
Approach LOS						A				
Intersction Delay		1.7								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound				SouthBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			19	19			1	6	
Flow Rate, v_x			21	21			1	7	

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	10		0				
Flow Rate, v_x	11		0				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			21	21			1	7	
Conflicting Flow, v_c,x							41		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	11		0				
Conflicting Flow, v_c,x	29		21				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				41	29		21			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1561	983		1054			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				
Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x			41	
Potential Capacity, c_p,x			1561	
Pedestrian Impedance Factor, p_p,x			1.000	
Movement Capacity, c_m,x			1561	
Probability of Queue-free State, p_0,j			0.999	
Major L-Shared Probability Queue-free State, p*_0,j				
Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x		21		
Potential Capacity, c_p,x		1054		
Pedestrian Impedance Factor, p_p,x		1.000		
Movement Capacity, c_m,x		1054		
Probability of Queue-free State, p_0,j		1.000		
Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				
Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				
Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x		29		
Potential Capacity, c_p,x		983		
Pedestrian Impedance Factor, p_p,x		1.000		
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x		0.999		
Movement Capacity, c_m,x		982		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration	L		R			
Shared Flow Rate, v_y	11		0			
Movement Capacity, c_m,x	982		1054			
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				1	11		0			
Movement Capacity				1561	982		1054			
Lane Configuration				L	L		R			
Shared Capacity										
Control Delay				7.3	8.7		8.4			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				1	11		0			
Lane Capacity				1561	982		1054			
v/c				0.00	0.01		0.00			
95% Queue Length				0.0	0.0		0.0			
Control Delay				7.3	8.7		8.4			

LOS		A	A		A
Approach Delay		1.0		8.7	
Approach LOS				A	
Intersction Delay	1.7				

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_NO BUILD_Campbell-OSR-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell Rd / OSR
Major Street Direction:	East-West
East/West Street Name:	Campbell Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		48	32					14	22
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		52	35					15	24
Percent Heavy Vehicles		3							
Number of Lanes	0	1	1	0		0	0	1	1
Lane Configuration		L	T					T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					18		83
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					20		90
Percent Heavy Vehicles					3		3
Number of Lanes	0	0	0		1	0	1
Lane Configuration					L		R
RT channelized?							No
Flared Approach | Storage		|				|	
Percent Grade						0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0		0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		52						20		90
Lane Capacity		1564						807		1061
v/c		0.03						0.02		0.09
95% Queue Length		0.1						0.1		0.3
Control Delay		7.4						9.6		8.7
LOS		A						A		A
Approach Delay		4.4							8.9	
Approach LOS									A	
Intersction Delay		5.8								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound				SouthBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		48	32					14	22
Flow Rate, v_x		52	35					15	24

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					18		83
Flow Rate, v_x					20		90

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		52	35					15	24
Conflicting Flow, v_c,x		39							

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					20		90
Conflicting Flow, v_c,x					154		15

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1						7.1		6.2
Stage I										
Stage II										
t_c,HV		1.0						1.0		1.0
P_HV		0.03						0.03		0.03
t_c,G								0.2		0.1
G								0		0
t_3,LT		0.0						0.7		0.0
t_c										
Single Stage		4.13						6.43		6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.03						0.03		0.03
t_f		2.23						3.53		3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		39						154		15
t_c,x		4.13						6.43		6.23
t_f,x		2.23						3.53		3.33
c_p,x		1564						835		1061

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0		0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	39	
Potential Capacity, c_p,x	1564	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	1564	
Probability of Queue-free State, p_0,j	0.967	
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x		15
Potential Capacity, c_p,x		1061
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1061
Probability of Queue-free State, p_0,j		0.915

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		154
Potential Capacity, c_p,x		835
Pedestrian Impedance Factor, p_p,x		1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		0.967
Movement Capacity, c_m,x		807

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration				L		R
Shared Flow Rate, v_y				20		90
Movement Capacity, c_m,x				807		1061
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		52						20		90
Movement Capacity		1564						807		1061
Lane Configuration		L						L		R
Shared Capacity										
Control Delay		7.4						9.6		8.7

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		52						20		90
Lane Capacity		1564						807		1061
v/c		0.03						0.02		0.09
95% Queue Length		0.1						0.1		0.3
Control Delay		7.4						9.6		8.7

LOS	A	A		A
Approach Delay	4.4		8.9	
Approach LOS			A	
Intersction Delay	5.8			

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_NO BUILD_Campbell-OSR-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell Rd / OSR
Major Street Direction:	East-West
East/West Street Name:	Campbell Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		57	22					12	9
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		62	24					13	10
Percent Heavy Vehicles		3							
Number of Lanes	0	1	1	0		0	0	1	1
Lane Configuration		L	T					T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					34		43
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					37		47
Percent Heavy Vehicles					3		3
Number of Lanes	0	0	0		1	0	1
Lane Configuration					L		R
RT channelized?							No
Flared Approach | Storage		|				|	
Percent Grade						0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0		0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		62						37		47
Lane Capacity		1586						795		1064
v/c		0.04						0.05		0.04
95% Queue Length		0.1						0.1		0.1
Control Delay		7.4						9.7		8.5
LOS		A						A		A
Approach Delay		5.3							9.1	
Approach LOS									A	
Intersction Delay		6.3								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound			SouthBound		
Priority	7	8	9	10	11	12
Movement	L	T	R	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound				WestBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume, V_x		57	22				12	9
Flow Rate, v_x		62	24				13	10

Minor Street:

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume, V_x				34		43
Flow Rate, v_x				37		47

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound				WestBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Flow Rate, v_x		62	24				13	10
Conflicting Flow, v_c,x		23						

Minor Street:

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Flow Rate, v_x				37		47
Conflicting Flow, v_c,x				161		13

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1						7.1		6.2
Stage I										
Stage II										
t_c,HV		1.0						1.0		1.0
P_HV		0.03						0.03		0.03
t_c,G								0.2		0.1
G								0		0
t_3,LT		0.0						0.7		0.0
t_c										
Single Stage		4.13						6.43		6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.03						0.03		0.03
t_f		2.23						3.53		3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		23						161		13
t_c,x		4.13						6.43		6.23
t_f,x		2.23						3.53		3.33
c_p,x		1586						828		1064

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0		0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	23	
Potential Capacity, c_p,x	1586	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	1586	
Probability of Queue-free State, p_0,j	0.961	
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x		13
Potential Capacity, c_p,x		1064
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1064
Probability of Queue-free State, p_0,j		0.956

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		161
Potential Capacity, c_p,x		828
Pedestrian Impedance Factor, p_p,x		1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		0.961
Movement Capacity, c_m,x		795

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration				L		R
Shared Flow Rate, v_y				37		47
Movement Capacity, c_m,x				795		1064
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		62						37		47
Movement Capacity		1586						795		1064
Lane Configuration		L						L		R
Shared Capacity										
Control Delay		7.4						9.7		8.5

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		62						37		47
Lane Capacity		1586						795		1064
v/c		0.04						0.05		0.04
95% Queue Length		0.1						0.1		0.1
Control Delay		7.4						9.7		8.5

LOS	A	A		A
Approach Delay	5.3		9.1	
Approach LOS			A	
Intersction Delay	6.3			

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_NO BUILD_OSR-41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell-Old St Rd/ US 41
Major Street Direction:	North-South
East/West Street Name:	Campbell/OSR
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	0	1220	14		0	4	1148	48
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		0	1326	15			4	1248	52
Percent Heavy Vehicles	13	13				13	13		
Number of Lanes	0	1	2	0		0	1	2	1
Lane Configuration		L	T	TR			L	T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	25	19	6		89	32	8
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	27	21	7		97	35	9
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		0		4		54			140	
Lane Capacity		473		455					10	
v/c		0.00		0.01					14.54	
95% Queue Length		0.0		0.0					19.1	
Control Delay		12.6		13.0					6846.6	
LOS		B		B					F	
Approach Delay		0.0		0.0					6846.6	
Approach LOS									F	
Interstction Delay										

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	0	1220	14		0	4	1148	48
Flow Rate, v_x		0	1326	15			4	1248	52

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	25	19	6		89	32	8
Flow Rate, v_x	27	21	7		97	35	9

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		0	1326	15			4	1248	52
Conflicting Flow, v_c,x		1300					1341		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	27	21	7		97	35	9
Conflicting Flow, v_c,x	1984	2642	671		1930	2598	624

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.5	6.5	6.9	7.5	6.5	6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
P_HV		0.13		0.13	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.36		4.36	7.56	6.56	6.96	7.56	6.56	6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.13		0.13	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.33		2.33	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1300		1341	1984	2642	671	1930	2598	624
t_c,x		4.36		4.36	7.56	6.56	6.96	7.56	6.56	6.96
t_f,x		2.33		2.33	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		473		455	36	23	397	39	24	426

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x		1300	1341	
Potential Capacity, c_p,x		473	455	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Movement Capacity, c_m,x		473	455	
Probability of Queue-free State, p_0,j		1.000	0.990	
Major L-Shared Probability Queue-free State, p*_0,j				

Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x		671	624	
Potential Capacity, c_p,x		397	426	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Movement Capacity, c_m,x		397	426	
Probability of Queue-free State, p_0,j		0.984	0.980	

Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				

Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x		2642	2598	
Potential Capacity, c_p,x		23	24	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Capacity Adjustment Factor, f_x		0.990	0.990	
Movement Capacity, c_m,x		22	24	
Probability of Queue-free State, p_0,j		0.077		

Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x		1984	1930	
Potential Capacity, c_p,x		36	39	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Major L, Minor T Adjusted Impedance Factor, p"			0.076	
Major L, Minor T Impedance Factor, p'			0.191	
Capacity Adjustment Factor, f_x			0.188	
Movement Capacity, c_m,x			7	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		54			140	
Movement Capacity, c_m,x		22	397	7	24	426
Shared Capacity, c_SH					10	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		0		4	27	21	7	97	35	9
Movement Capacity		473		455		22	397	7	24	426
Lane Configuration		L		L		LTR			LTR	
Shared Capacity									10	
Control Delay		12.6		13.0					6846.6	

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		0		4		54			140	
Lane Capacity		473		455					10	
v/c		0.00		0.01					14.54	
95% Queue Length		0.0		0.0					19.1	
Control Delay		12.6		13.0					6846.6	

LOS	B	B	F
Approach Delay	0.0	0.0	6846.6
Approach LOS			F
Intersction Delay			

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_NO BUILD_OSR-41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	w/EB LTR No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell-Old St Rd/ US 41
Major Street Direction:	North-South
East/West Street Name:	Campbell/OSR
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	0	1220	14		0	4	1148	48
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		0	1326	15			4	1248	52
Percent Heavy Vehicles	13	13				13	13		
Number of Lanes	0	1	2	0		0	1	2	1
Lane Configuration		L	T	TR			L	T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	25	19	6		89	32	8
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	27	21	7		97	35	9
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		1	1	0
Lane Configuration		LTR			L		TR
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR		L		TR
Flow Rate		0		4		54		97		43
Lane Capacity		473		455				7		29
v/c		0.00		0.01				13.06		1.47
95% Queue Length		0.0		0.0				13.8		5.0
Control Delay		12.6		13.0				6402.2		537.5
LOS		B		B				F		F
Approach Delay		0.0		0.0					4583.7	
Approach LOS									F	
Intersction Delay										

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	0	1220	14		0	4	1148	48
Flow Rate, v_x		0	1326	15			4	1248	52

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	25	19	6		89	32	8
Flow Rate, v_x	27	21	7		97	35	9

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		0	1326	15			4	1248	52
Conflicting Flow, v_c,x		1300					1341		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	27	21	7		97	35	9
Conflicting Flow, v_c,x	1984	2642	671		1930	2598	624

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.5	6.5	6.9	7.5	6.5	6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
P_HV		0.13		0.13	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.36		4.36	7.56	6.56	6.96	7.56	6.56	6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.13		0.13	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.33		2.33	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1300		1341	1984	2642	671	1930	2598	624
t_c,x		4.36		4.36	7.56	6.56	6.96	7.56	6.56	6.96
t_f,x		2.33		2.33	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		473		455	36	23	397	39	24	426

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1300	1341
Potential Capacity, c_p,x	473	455
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	473	455
Probability of Queue-free State, p_0,j	1.000	0.990
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	671	624
Potential Capacity, c_p,x	397	426
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	397	426
Probability of Queue-free State, p_0,j	0.984	0.980

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	2642	2598
Potential Capacity, c_p,x	23	24
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.990	0.990
Movement Capacity, c_m,x	22	24
Probability of Queue-free State, p_0,j	0.077	

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	1984	1930
Potential Capacity, c_p,x	36	39
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"		0.076
Major L, Minor T Impedance Factor, p'		0.191
Capacity Adjustment Factor, f_x		0.188
Movement Capacity, c_m,x		7

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR		L		TR
Shared Flow Rate, v_y		54		97		43
Movement Capacity, c_m,x		22	397	7	24	426
Shared Capacity, c_SH						29

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		0		4	27	21	7	97	35	9
Movement Capacity		473		455		22	397	7	24	426
Lane Configuration		L		L		LTR		L		TR
Shared Capacity										29
Control Delay		12.6		13.0				6402.2		537.5

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR		L		TR
Flow Rate		0		4		54		97		43
Lane Capacity		473		455				7		29
v/c		0.00		0.01				13.06		1.47
95% Queue Length		0.0		0.0				13.8		5.0
Control Delay		12.6		13.0				6402.2		537.5

LOS	B	B	F		F
Approach Delay	0.0	0.0		4583.7	
Approach LOS				F	
Intersction Delay					

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_NO BUILD_OSR-41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell-Old St Rd/ US 41
Major Street Direction:	North-South
East/West Street Name:	Campbell/OSR
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	0	1220	14		0	4	1148	48
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		0	1326	15			4	1248	52
Percent Heavy Vehicles	13	13				13	13		
Number of Lanes	0	1	2	0		0	1	2	1
Lane Configuration		L	T	TR			L	T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	31	25	5		48	19	5
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	34	27	5		52	21	5
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		0		4		66			78	
Lane Capacity		473		455		14				
v/c		0.00		0.01		4.76				
95% Queue Length		0.0		0.0		9.2				
Control Delay		12.6		13.0		2234.5				
LOS		B		B		F				
Approach Delay		0.0		0.0		2234.5				
Approach LOS						F				
Interstction Delay										

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound					EastBound		
Priority	7	8	9	|		10	11	12
Movement	L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	0	1220	14		0	4	1148	48
Flow Rate, v_x		0	1326	15			4	1248	52

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	31	25	5		48	19	5
Flow Rate, v_x	34	27	5		52	21	5

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		0	1326	15			4	1248	52
Conflicting Flow, v_c,x		1300					1341		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	34	27	5		52	21	5
Conflicting Flow, v_c,x	1977	2642	671		1933	2598	624

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.5	6.5	6.9	7.5	6.5	6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
P_HV		0.13		0.13	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.36		4.36	7.56	6.56	6.96	7.56	6.56	6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.13		0.13	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.33		2.33	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1300		1341	1977	2642	671	1933	2598	624
t_c,x		4.36		4.36	7.56	6.56	6.96	7.56	6.56	6.96
t_f,x		2.33		2.33	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		473		455	36	23	397	39	24	426

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1300	1341
Potential Capacity, c_p,x	473	455
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	473	455
Probability of Queue-free State, p_0,j	1.000	0.990
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	671	624
Potential Capacity, c_p,x	397	426
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	397	426
Probability of Queue-free State, p_0,j	0.986	0.987

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	2642	2598
Potential Capacity, c_p,x	23	24
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.990	0.990
Movement Capacity, c_m,x	22	24
Probability of Queue-free State, p_0,j		0.137

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	1977	1933
Potential Capacity, c_p,x	36	39
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.136	
Major L, Minor T Impedance Factor, p'	0.266	
Capacity Adjustment Factor, f_x	0.263	
Movement Capacity, c_m,x	10	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		66			78	
Movement Capacity, c_m,x	10	22	397		24	426
Shared Capacity, c_SH		14				

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		0		4	34	27	5	52	21	5
Movement Capacity		473		455	10	22	397		24	426
Lane Configuration		L		L		LTR			LTR	
Shared Capacity						14				
Control Delay		12.6		13.0		2234.5				

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		0		4		66			78	
Lane Capacity		473		455		14				
v/c		0.00		0.01		4.76				
95% Queue Length		0.0		0.0		9.2				
Control Delay		12.6		13.0		2234.5				

LOS	B	B	F
Approach Delay	0.0	0.0	2234.5
Approach LOS			F
Intersction Delay			

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_NO BUILD_OSR-41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	w/EB LTR No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell-Old St Rd/ US 41
Major Street Direction:	North-South
East/West Street Name:	Campbell/OSR
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	0	1220	14		0	4	1148	48
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		0	1326	15			4	1248	52
Percent Heavy Vehicles	13	13				13	13		
Number of Lanes	0	1	2	0		0	1	2	1
Lane Configuration		L	T	TR			L	T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	31	25	5		48	19	5
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	34	27	5		52	21	5
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		1	1	0
Lane Configuration		LTR			L		TR
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR		L		TR
Flow Rate		0		4		66		52		26
Lane Capacity		473		455		14				30
v/c		0.00		0.01		4.76				0.88
95% Queue Length		0.0		0.0		9.2				2.9
Control Delay		12.6		13.0		2234.5				317.9
LOS		B		B		F				F
Approach Delay		0.0		0.0		2234.5				
Approach LOS						F				
Intersction Delay										

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	0	1220	14		0	4	1148	48
Flow Rate, v_x		0	1326	15			4	1248	52

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	31	25	5		48	19	5
Flow Rate, v_x	34	27	5		52	21	5

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		0	1326	15			4	1248	52
Conflicting Flow, v_c,x		1300					1341		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	34	27	5		52	21	5
Conflicting Flow, v_c,x	1977	2642	671		1933	2598	624

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.5	6.5	6.9	7.5	6.5	6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
P_HV		0.13		0.13	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.36		4.36	7.56	6.56	6.96	7.56	6.56	6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.13		0.13	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.33		2.33	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1300		1341	1977	2642	671	1933	2598	624
t_c,x		4.36		4.36	7.56	6.56	6.96	7.56	6.56	6.96
t_f,x		2.33		2.33	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		473		455	36	23	397	39	24	426

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1300	1341
Potential Capacity, c_p,x	473	455
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	473	455
Probability of Queue-free State, p_0,j	1.000	0.990
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	671	624
Potential Capacity, c_p,x	397	426
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	397	426
Probability of Queue-free State, p_0,j	0.986	0.987

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	2642	2598
Potential Capacity, c_p,x	23	24
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.990	0.990
Movement Capacity, c_m,x	22	24
Probability of Queue-free State, p_0,j		0.137

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	1977	1933
Potential Capacity, c_p,x	36	39
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.136	
Major L, Minor T Impedance Factor, p'	0.266	
Capacity Adjustment Factor, f_x	0.263	
Movement Capacity, c_m,x	10	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR		L		TR
Shared Flow Rate, v_y		66		52		26
Movement Capacity, c_m,x	10	22	397		24	426
Shared Capacity, c_SH		14				30

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		0		4	34	27	5	52	21	5
Movement Capacity		473		455	10	22	397		24	426
Lane Configuration		L		L		LTR		L		TR
Shared Capacity						14				30
Control Delay		12.6		13.0		2234.5				317.9

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR		L		TR
Flow Rate		0		4		66		52		26
Lane Capacity		473		455		14				30
v/c		0.00		0.01		4.76				0.88
95% Queue Length		0.0		0.0		9.2				2.9
Control Delay		12.6		13.0		2234.5				317.9

LOS	B	B	F	F
Approach Delay	0.0	0.0	2234.5	
Approach LOS			F	
Intersction Delay				

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_NO BUILD_Wortman-OSR-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Wortman Rd / OSR
Major Street Direction:	North-South
East/West Street Name:	Wortman Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		16	110					67	9
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		17	120					73	10
Percent Heavy Vehicles		3							
Number of Lanes	0	1	1	0		0	0	1	1
Lane Configuration		L	T					T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					23		31
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					25		34
Percent Heavy Vehicles					3		3
Number of Lanes	0	0	0		1	0	1
Lane Configuration					L		R
RT channelized?							No
Flared Approach | Storage		|				|	
Percent Grade						0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0		0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		17						25		34
Lane Capacity		1508						750		986
v/c		0.01						0.03		0.03
95% Queue Length		0.0						0.1		0.1
Control Delay		7.4						10.0		8.8
LOS		A						A		A
Approach Delay		0.9							9.3	
Approach LOS									A	
Intersction Delay		2.4								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		16	110					67	9
Flow Rate, v_x		17	120					73	10

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					23		31
Flow Rate, v_x					25		34

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		17	120					73	10
Conflicting Flow, v_c,x		83							

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					25		34
Conflicting Flow, v_c,x					227		73

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1						7.1		6.2
Stage I										
Stage II										
t_c,HV		1.0						1.0		1.0
P_HV		0.03						0.03		0.03
t_c,G								0.2		0.1
G								0		0
t_3,LT		0.0						0.7		0.0
t_c										
Single Stage		4.13						6.43		6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.03						0.03		0.03
t_f		2.23						3.53		3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		83						227		73
t_c,x		4.13						6.43		6.23
t_f,x		2.23						3.53		3.33
c_p,x		1508						759		986

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0		0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	83	
Potential Capacity, c_p,x	1508	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	1508	
Probability of Queue-free State, p_0,j	0.988	
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x		73
Potential Capacity, c_p,x		986
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		986
Probability of Queue-free State, p_0,j		0.966

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		227
Potential Capacity, c_p,x		759
Pedestrian Impedance Factor, p_p,x		1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		0.988
Movement Capacity, c_m,x		750

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration				L		R
Shared Flow Rate, v_y				25		34
Movement Capacity, c_m,x				750		986
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		17						25		34
Movement Capacity		1508						750		986
Lane Configuration		L						L		R
Shared Capacity										
Control Delay		7.4						10.0		8.8

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		17						25		34
Lane Capacity		1508						750		986
v/c		0.01						0.03		0.03
95% Queue Length		0.0						0.1		0.1
Control Delay		7.4						10.0		8.8

LOS	A	A		A
Approach Delay	0.9		9.3	
Approach LOS			A	
Intersction Delay	2.4			

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_NO BUILD_Wortman-OSR-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Wortman Rd / OSR
Major Street Direction:	North-South
East/West Street Name:	Wortman Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		28	96					149	36
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		30	104					162	39
Percent Heavy Vehicles		3							
Number of Lanes	0	1	1	0		0	0	1	1
Lane Configuration		L	T					T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					19		23
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					21		25
Percent Heavy Vehicles					3		3
Number of Lanes	0	0	0		1	0	1
Lane Configuration					L		R
RT channelized?							No
Flared Approach | Storage		|				|	
Percent Grade						0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0		0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		30						21		25
Lane Capacity		1365						650		880
v/c		0.02						0.03		0.03
95% Queue Length		0.1						0.1		0.1
Control Delay		7.7						10.7		9.2
LOS		A						B		A
Approach Delay		1.7							9.9	
Approach LOS									A	
Intersction Delay		1.8								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		28	96					149	36
Flow Rate, v_x		30	104					162	39

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					19		23
Flow Rate, v_x					21		25

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		30	104					162	39
Conflicting Flow, v_c,x		201							

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					21		25
Conflicting Flow, v_c,x					327		162

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1						7.1		6.2
Stage I										
Stage II										
t_c,HV		1.0						1.0		1.0
P_HV		0.03						0.03		0.03
t_c,G								0.2		0.1
G								0		0
t_3,LT		0.0						0.7		0.0
t_c										
Single Stage		4.13						6.43		6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.03						0.03		0.03
t_f		2.23						3.53		3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		201						327		162
t_c,x		4.13						6.43		6.23
t_f,x		2.23						3.53		3.33
c_p,x		1365						665		880

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0		0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	201	
Potential Capacity, c_p,x	1365	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	1365	
Probability of Queue-free State, p_0,j	0.978	
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x		162
Potential Capacity, c_p,x		880
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		880
Probability of Queue-free State, p_0,j		0.972

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		327
Potential Capacity, c_p,x		665
Pedestrian Impedance Factor, p_p,x		1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		0.978
Movement Capacity, c_m,x		650

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration				L		R
Shared Flow Rate, v_y				21		25
Movement Capacity, c_m,x				650		880
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		30						21		25
Movement Capacity		1365						650		880
Lane Configuration		L						L		R
Shared Capacity										
Control Delay		7.7						10.7		9.2

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		30						21		25
Lane Capacity		1365						650		880
v/c		0.02						0.03		0.03
95% Queue Length		0.1						0.1		0.1
Control Delay		7.7						10.7		9.2

LOS	A	B		A
Approach Delay	1.7		9.9	
Approach LOS			A	
Intersction Delay	1.8			

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_5-Rin-out_Hillsdale-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5_Rin-out_AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Hillsdale Road
North/South Street Name:	Walnut Avenue
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		1	72	22			12	103	4
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		1	78	24			13	112	4
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	22	5	20		4	5	5
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	24	5	22		4	5	5
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		1		13		51			15	
Lane Capacity		1466		1484		786			740	
v/c		0.00		0.01		0.06			0.02	
95% Queue Length		0.0		0.0		0.2			0.1	
Control Delay		7.5		7.4		9.9			10.0	
LOS		A		A		A			A	
Approach Delay		0.1		0.8		9.9			10.0	
Approach LOS						A			A	
Intersction Delay		2.6								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound				SouthBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		1	72	22			12	103	4
Flow Rate, v_x		1	78	24			13	112	4

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	22	5	20		4	5	5
Flow Rate, v_x	24	5	22		4	5	5

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		1	78	24			13	112	4
Conflicting Flow, v_c,x		116					102		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	24	5	22		4	5	5
Conflicting Flow, v_c,x	238	235	90		246	245	114

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		116		102	238	235	90	246	245	114
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1466		1484	714	664	965	705	656	936

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	116	102
Potential Capacity, c_p,x	1466	1484
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1466	1484
Probability of Queue-free State, p_0,j	0.999	0.991
Major L-Shared Probability Queue-free State, p*_0,j	0.999	0.991

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	90	114
Potential Capacity, c_p,x	965	936
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	965	936
Probability of Queue-free State, p_0,j	0.977	0.994

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	235	245
Potential Capacity, c_p,x	664	656
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.990	0.990
Movement Capacity, c_m,x	657	649
Probability of Queue-free State, p_0,j	0.992	0.992

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	238	246
Potential Capacity, c_p,x	714	705
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.982	0.982
Major L, Minor T Impedance Factor, p'	0.986	0.986
Capacity Adjustment Factor, f_x	0.980	0.964
Movement Capacity, c_m,x	700	680

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		51			15	
Movement Capacity, c_m,x	700	657	965	680	649	936
Shared Capacity, c_SH		786			740	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		1		13	24	5	22	4	5	5
Movement Capacity		1466		1484	700	657	965	680	649	936
Lane Configuration						LTR			LTR	
Shared Capacity						786			740	
Control Delay		7.5		7.4		9.9			10.0	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.999	0.991
Delay to Major Left-turning Vehicles, d_MLT	7.5	7.4
Major Street Through Vehicles in Shared Lane, v_i1	78	112
Major Street Turning Vehicles in Shared Lane, v_i2	25	17
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2	1500	1500
Delay to Rank 1 Vehicles, d_Rank1	0.0	0.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		1		13		51			15	
Lane Capacity		1466		1484		786			740	
v/c		0.00		0.01		0.06			0.02	
95% Queue Length		0.0		0.0		0.2			0.1	
Control Delay		7.5		7.4		9.9			10.0	
LOS		A		A		A			A	
Approach Delay		0.1		0.8		9.9			10.0	
Approach LOS						A			A	
Intersction Delay		2.6								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_5-Rin-out_Hillsdale-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5_Rin-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Hillsdale Road
North/South Street Name:	Walnut Avenue
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		12	143	22			9	85	20
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		13	155	24			10	92	22
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	28	9	30		6	7	3
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	30	10	33		7	8	3
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		13		10		73			17	
Lane Capacity		1469		1390		701			623	
v/c		0.01		0.01		0.10			0.03	
95% Queue Length		0.0		0.0		0.3			0.1	
Control Delay		7.5		7.6		10.7			10.9	
LOS		A		A		B			B	
Approach Delay		0.6		0.7		10.7			10.9	
Approach LOS						B			B	
Intersction Delay		2.9								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		NorthBound					SouthBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		12	143	22			9	85	20
Flow Rate, v_x		13	155	24			10	92	22

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	28	9	30		6	7	3
Flow Rate, v_x	30	10	33		7	8	3

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		13	155	24			10	92	22
Conflicting Flow, v_c,x		114					179		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	30	10	33		7	8	3
Conflicting Flow, v_c,x	322	327	167		338	328	103

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		114		179	322	327	167	338	328	103
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1469		1390	629	590	874	614	589	949

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	114	179
Potential Capacity, c_p,x	1469	1390
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1469	1390
Probability of Queue-free State, p_0,j	0.991	0.993
Major L-Shared Probability Queue-free State, p*_0,j	0.990	0.992

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	167	103
Potential Capacity, c_p,x	874	949
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	874	949
Probability of Queue-free State, p_0,j	0.963	0.997

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	327	328
Potential Capacity, c_p,x	590	589
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.983	0.983
Movement Capacity, c_m,x	579	579
Probability of Queue-free State, p_0,j	0.983	0.987

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	322	338
Potential Capacity, c_p,x	629	614
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.970	0.966
Major L, Minor T Impedance Factor, p'	0.977	0.974
Capacity Adjustment Factor, f_x	0.974	0.938
Movement Capacity, c_m,x	613	576

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		73			17	
Movement Capacity, c_m,x	613	579	874	576	579	949
Shared Capacity, c_SH		701			623	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		13		10	30	10	33	7	8	3
Movement Capacity		1469		1390	613	579	874	576	579	949
Lane Configuration						LTR			LTR	
Shared Capacity						701			623	
Control Delay		7.5		7.6		10.7			10.9	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.990	0.992
Delay to Major Left-turning Vehicles, d_MLT	7.5	7.6
Major Street Through Vehicles in Shared Lane, v_i1	155	92
Major Street Turning Vehicles in Shared Lane, v_i2	37	32
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2	1500	1500
Delay to Rank 1 Vehicles, d_Rank1	0.1	0.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		13		10		73			17	
Lane Capacity		1469		1390		701			623	
v/c		0.01		0.01		0.10			0.03	
95% Queue Length		0.0		0.0		0.3			0.1	
Control Delay		7.5		7.6		10.7			10.9	
LOS		A		A		B			B	
Approach Delay		0.6		0.7		10.7			10.9	
Approach LOS						B			B	
Intersction Delay		2.9								

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TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_5-Rin-out_Hillsdale-US 41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5_Rin-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	11	631	25		0	33	888	0
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		12	686	27			36	965	0
Percent Heavy Vehicles	3	3				3	3		
Number of Lanes	0	1	2	0		0	1	2	0
Lane Configuration		L	T	TR			L	T	TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	99	8	41		0	22	14
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	108	9	45		0	24	15
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		12		36		161			39	
Lane Capacity		703		876		111			115	
v/c		0.02		0.04		1.45			0.34	
95% Queue Length		0.1		0.1		11.5			1.4	
Control Delay		10.2		9.3		318.1			51.9	
LOS		B		A		F			F	
Approach Delay		0.2		0.3		318.1			51.9	
Approach LOS						F			F	
Interstction Delay		27.9								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound			EastBound		
Priority	7	8	9	10	11	12
Movement	L	T	R	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume, V_x	0	11	631	25	0	33	888	0
Flow Rate, v_x		12	686	27		36	965	0

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume, V_x	99	8	41	0	22	14
Flow Rate, v_x	108	9	45	0	24	15

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Flow Rate, v_x		12	686	27		36	965	0
Conflicting Flow, v_c,x		965				713		

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Flow Rate, v_x	108	9	45	0	24	15
Conflicting Flow, v_c,x	1290	1760	357	1408	1774	483

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.5	6.5	6.9	7.5	6.5	6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.16		4.16	7.56	6.56	6.96	7.56	6.56	6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		965		713	1290	1760	357	1408	1774	483
t_c,x		4.16		4.16	7.56	6.56	6.96	7.56	6.56	6.96
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		703		876	120	83	637	98	81	527

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	965	713
Potential Capacity, c_p,x	703	876
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	703	876
Probability of Queue-free State, p_0,j	0.983	0.959
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	357	483
Potential Capacity, c_p,x	637	527
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	637	527
Probability of Queue-free State, p_0,j	0.930	0.971

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	1760	1774
Potential Capacity, c_p,x	83	81
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.943	0.943
Movement Capacity, c_m,x	78	76
Probability of Queue-free State, p_0,j	0.889	0.687

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	1290	1408
Potential Capacity, c_p,x	120	98
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.648	0.838
Major L, Minor T Impedance Factor, p'	0.727	0.875
Capacity Adjustment Factor, f_x	0.706	0.814
Movement Capacity, c_m,x	85	80

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		161			39	
Movement Capacity, c_m,x	85	78	637	80	76	527
Shared Capacity, c_SH		111			115	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		12		36	108	9	45	0	24	15
Movement Capacity		703		876	85	78	637	80	76	527
Lane Configuration		L		L		LTR			LTR	
Shared Capacity						111			115	
Control Delay		10.2		9.3		318.1			51.9	

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		12		36		161			39	
Lane Capacity		703		876		111			115	
v/c		0.02		0.04		1.45			0.34	
95% Queue Length		0.1		0.1		11.5			1.4	
Control Delay		10.2		9.3		318.1			51.9	

LOS	B	A	F	F
Approach Delay	0.2	0.3	318.1	51.9
Approach LOS			F	F
Intersction Delay	27.9			

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_NO BUILD_Hillsdale-US 41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5_Rin-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	20	958	42		0	53	1025	1
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		22	1041	46			58	1114	1
Percent Heavy Vehicles	3	3				3	3		
Number of Lanes	0	1	2	0		0	1	2	0
Lane Configuration		L	T	TR			L	T	TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	42	21	44		3	21	6
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	46	23	48		3	23	7
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		22		58		116			33	
Lane Capacity		616		632		34			34	
v/c		0.04		0.09		3.46			0.97	
95% Queue Length		0.1		0.3		13.6			3.4	
Control Delay		11.1		11.3		1352.3			320.6	
LOS		B		B		F			F	
Approach Delay		0.2		0.6		1352.3			320.6	
Approach LOS						F			F	
Intersction Delay		69.4								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	20	958	42		0	53	1025	1
Flow Rate, v_x		22	1041	46			58	1114	1

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	42	21	44		3	21	6
Flow Rate, v_x	46	23	48		3	23	7

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		22	1041	46			58	1114	1
Conflicting Flow, v_c,x		1115					1087		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	46	23	48		3	23	7
Conflicting Flow, v_c,x	1791	2338	543		1805	2360	558

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.5	6.5	6.9	7.5	6.5	6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.16		4.16	7.56	6.56	6.96	7.56	6.56	6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1115		1087	1791	2338	543	1805	2360	558
t_c,x		4.16		4.16	7.56	6.56	6.96	7.56	6.56	6.96
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		616		632	50	36	481	49	34	471

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1115	1087
Potential Capacity, c_p,x	616	632
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	616	632
Probability of Queue-free State, p_0,j	0.965	0.909
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	543	558
Potential Capacity, c_p,x	481	471
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	481	471
Probability of Queue-free State, p_0,j	0.901	0.986

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	2338	2360
Potential Capacity, c_p,x	36	34
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.877	0.877
Movement Capacity, c_m,x	31	30
Probability of Queue-free State, p_0,j	0.269	0.244

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	1791	1805
Potential Capacity, c_p,x	50	49
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.214	0.236
Major L, Minor T Impedance Factor, p'	0.350	0.372
Capacity Adjustment Factor, f_x	0.345	0.335
Movement Capacity, c_m,x	17	16

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		116			33	
Movement Capacity, c_m,x	17	31	481	16	30	471
Shared Capacity, c_SH		34			34	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		22		58	46	23	48	3	23	7
Movement Capacity		616		632	17	31	481	16	30	471
Lane Configuration		L		L		LTR			LTR	
Shared Capacity						34			34	
Control Delay		11.1		11.3		1352.3			320.6	

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		22		58		116			33	
Lane Capacity		616		632		34			34	
v/c		0.04		0.09		3.46			0.97	
95% Queue Length		0.1		0.3		13.6			3.4	
Control Delay		11.1		11.3		1352.3			320.6	

LOS	B	B	F	F
Approach Delay	0.2	0.6	1352.3	320.6
Approach LOS			F	F
Intersction Delay	69.4			

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_5-Rin-out_Hillsdale-OSR-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5_R-in-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Old State
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			97	23			17	60	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			105	25			18	65	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration				TR			LT		
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	31		6				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	34		7				
Percent Heavy Vehicles	3		3				
Number of Lanes	0	1	0		0	0	0
Lane Configuration		LR					
RT channelized?							
Flared Approach | Storage	No	|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				18		40				
Lane Capacity				1449		780				
v/c				0.01		0.05				
95% Queue Length				0.0		0.2				
Control Delay				7.5		9.9				
LOS				A		A				
Approach Delay				1.7		9.9				
Approach LOS						A				
Interstction Delay		2.1								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:									
Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			97	23			17	60	
Flow Rate, v_x			105	25			18	65	

Minor Street:									
Approach		WestBound					EastBound		
Movement		7	8	9	|		10	11	12
		L	T	R	|		L	T	R
Volume, V_x		31		6					
Flow Rate, v_x		34		7					

Step 3: CONFLICTING FLOW RATES

Major Street:									
Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			105	25			18	65	
Conflicting Flow, v_c,x							130		

Minor Street:									
Approach		WestBound					EastBound		
Movement		7	8	9	|		10	11	12
		L	T	R	|		L	T	R
Flow Rate, v_x		34		7					
Conflicting Flow, v_c,x		220		118					

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS										
Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS										
Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT										
Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				130	220		118			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1449	766		931			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x			130	
Potential Capacity, c_p,x			1449	
Pedestrian Impedance Factor, p_p,x			1.000	
Movement Capacity, c_m,x			1449	
Probability of Queue-free State, p_0,j			0.987	
Major L-Shared Probability Queue-free State, p*_0,j			0.987	

Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x		118		
Potential Capacity, c_p,x		931		
Pedestrian Impedance Factor, p_p,x		1.000		
Movement Capacity, c_m,x		931		
Probability of Queue-free State, p_0,j		0.993		

Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				

Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				

Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x		220		
Potential Capacity, c_p,x		766		
Pedestrian Impedance Factor, p_p,x		1.000		
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x		0.987		
Movement Capacity, c_m,x		756		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach		WestBound				EastBound	
Movement	7	8	9	|	10	11	12
Lane Configuration		LR		|			
Shared Flow Rate, v_y		40					
Movement Capacity, c_m,x	756		931				
Shared Capacity, c_SH		780					

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				18	34		7			
Movement Capacity				1449	756		931			
Lane Configuration				LT		LR				
Shared Capacity						780				
Control Delay				7.5		9.9				

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	NB	SB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j		0.987
Delay to Major Left-turning Vehicles, d_MLT		7.5
Major Street Through Vehicles in Shared Lane, v_i1		65
Major Street Turning Vehicles in Shared Lane, v_i2		18
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2 1500

Delay to Rank 1 Vehicles, d_Rank1 0.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				18		40				
Lane Capacity				1449		780				
v/c				0.01		0.05				
95% Queue Length				0.0		0.2				
Control Delay				7.5		9.9				
LOS				A		A				
Approach Delay				1.7		9.9				
Approach LOS						A				
Intersction Delay		2.1								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_5-Rin-out_Hillsdale-Old State-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	No-Build PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Old State
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			94	30			9	123	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			102	33			10	134	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration				TR			LT		
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	16		11				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	17		12				
Percent Heavy Vehicles	3		3				
Number of Lanes	0	1	0		0	0	0
Lane Configuration		LR					
RT channelized?							
Flared Approach | Storage	No	|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				10		29				
Lane Capacity				1443		786				
v/c				0.01		0.04				
95% Queue Length				0.0		0.1				
Control Delay				7.5		9.8				
LOS				A		A				
Approach Delay				0.6		9.8				
Approach LOS						A				
Intersction Delay		1.2								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			94	30			9	123	
Flow Rate, v_x			102	33			10	134	

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	16		11				
Flow Rate, v_x	17		12				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			102	33			10	134	
Conflicting Flow, v_c,x							135		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	17		12				
Conflicting Flow, v_c,x	272		118				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				135	272		118			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1443	716		931			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		135
Potential Capacity, c_p,x		1443
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1443
Probability of Queue-free State, p_0,j		0.993
Major L-Shared Probability Queue-free State, p*_0,j		0.993

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	118	
Potential Capacity, c_p,x	931	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	931	
Probability of Queue-free State, p_0,j	0.987	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	272	
Potential Capacity, c_p,x	716	
Pedestrian Impedance Factor, p_p,x	1.000	
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x	0.993	
Movement Capacity, c_m,x	710	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LR				
Shared Flow Rate, v_y		29				
Movement Capacity, c_m,x	710		931			
Shared Capacity, c_SH		786				

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				10	17		12			
Movement Capacity				1443	710		931			
Lane Configuration				LT		LR				
Shared Capacity						786				
Control Delay				7.5		9.8				

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	NB	SB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j		0.993
Delay to Major Left-turning Vehicles, d_MLT		7.5
Major Street Through Vehicles in Shared Lane, v_i1		134
Major Street Turning Vehicles in Shared Lane, v_i2		10
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2						1500						
Delay to Rank 1 Vehicles, d_Rank1								0.1				

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				10		29				
Lane Capacity				1443		786				
v/c				0.01		0.04				
95% Queue Length				0.0		0.1				
Control Delay				7.5		9.8				
LOS				A		A				
Approach Delay				0.6		9.8				
Approach LOS						A				
Intersction Delay		1.2								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_5-Rin-out_Radio-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Radio Ave / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Radio Ave
North/South Street Name:	Walnut Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		2	2	3			4	0	1
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		2	2	3			4	0	1
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	7	12	1		1	3	4
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	8	13	1		1	3	4
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		2		4		22			9	
Lane Capacity		1615		1609		915			978	
v/c		0.00		0.00		0.02			0.01	
95% Queue Length		0.0		0.0		0.1			0.0	
Control Delay		7.2		7.2		9.0			8.7	
LOS		A		A		A			A	
Approach Delay		2.1		5.8		9.0			8.7	
Approach LOS						A			A	
Intersction Delay		7.3								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound				SouthBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		2	2	3			4	0	1
Flow Rate, v_x		2	2	3			4	0	1

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	7	12	1		1	3	4
Flow Rate, v_x	8	13	1		1	3	4

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		2	2	3			4	0	1
Conflicting Flow, v_c,x		1					5		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	8	13	1		1	3	4
Conflicting Flow, v_c,x	21	18	4		24	19	1

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1		5	21	18	4	24	19	1
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1615		1609	989	874	1077	984	873	1081

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1	5
Potential Capacity, c_p,x	1615	1609
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1615	1609
Probability of Queue-free State, p_0,j	0.999	0.997
Major L-Shared Probability Queue-free State, p*_0,j	0.999	0.997

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	4	1
Potential Capacity, c_p,x	1077	1081
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1077	1081
Probability of Queue-free State, p_0,j	0.999	0.996

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	18	19
Potential Capacity, c_p,x	874	873
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.996	0.996
Movement Capacity, c_m,x	871	869
Probability of Queue-free State, p_0,j	0.985	0.996

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	21	24
Potential Capacity, c_p,x	989	984
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.992	0.981
Major L, Minor T Impedance Factor, p'	0.994	0.986
Capacity Adjustment Factor, f_x	0.990	0.985
Movement Capacity, c_m,x	979	969

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		22			9	
Movement Capacity, c_m,x	979	871	1077	969	869	1081
Shared Capacity, c_SH		915			978	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		2		4	8	13	1	1	3	4
Movement Capacity		1615		1609	979	871	1077	969	869	1081
Lane Configuration						LTR			LTR	
Shared Capacity						915			978	
Control Delay		7.2		7.2		9.0			8.7	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.999	0.997
Delay to Major Left-turning Vehicles, d_MLT	7.2	7.2
Major Street Through Vehicles in Shared Lane, v_i1	2	0
Major Street Turning Vehicles in Shared Lane, v_i2	5	5
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2	1500	1500
Delay to Rank 1 Vehicles, d_Rank1	0.0	0.0

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		2		4		22			9	
Lane Capacity		1615		1609		915			978	
v/c		0.00		0.00		0.02			0.01	
95% Queue Length		0.0		0.0		0.1			0.0	
Control Delay		7.2		7.2		9.0			8.7	
LOS		A		A		A			A	
Approach Delay		2.1		5.8		9.0			8.7	
Approach LOS						A			A	
Intersction Delay		7.3								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_5-Rin-out_Radio-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Radio Ave / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Radio Ave
North/South Street Name:	Walnut Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		0	3	0			2	3	3
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		0	3	0			2	3	3
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	6	10	1		2	10	2
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	7	11	1		2	11	2
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		0		2		18			15	
Lane Capacity		1608		1612		921			916	
v/c		0.00		0.00		0.02			0.02	
95% Queue Length		0.0		0.0		0.1			0.1	
Control Delay		7.2		7.2		9.0			9.0	
LOS		A		A		A			A	
Approach Delay		0.0		1.8		9.0			9.0	
Approach LOS						A			A	
Interscton Delay		7.0								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound				SouthBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		0	3	0			2	3	3
Flow Rate, v_x		0	3	0			2	3	3

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	6	10	1		2	10	2
Flow Rate, v_x	7	11	1		2	11	2

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		0	3	0			2	3	3
Conflicting Flow, v_c,x		7					3		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	7	11	1		2	11	2
Conflicting Flow, v_c,x	19	14	3		18	13	5

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		7		3	19	14	3	18	13	5
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1608		1612	992	878	1078	993	880	1075

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	7	3
Potential Capacity, c_p,x	1608	1612
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1608	1612
Probability of Queue-free State, p_0,j	1.000	0.999
Major L-Shared Probability Queue-free State, p*_0,j	1.000	0.999

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	3	5
Potential Capacity, c_p,x	1078	1075
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1078	1075
Probability of Queue-free State, p_0,j	0.999	0.998

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	14	13
Potential Capacity, c_p,x	878	880
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.999	0.999
Movement Capacity, c_m,x	877	879
Probability of Queue-free State, p_0,j	0.988	0.988

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	19	18
Potential Capacity, c_p,x	992	993
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.986	0.986
Major L, Minor T Impedance Factor, p'	0.990	0.990
Capacity Adjustment Factor, f_x	0.988	0.989
Movement Capacity, c_m,x	980	982

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		18			15	
Movement Capacity, c_m,x	980	877	1078	982	879	1075
Shared Capacity, c_SH		921			916	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		0		2	7	11	1	2	11	2
Movement Capacity		1608		1612	980	877	1078	982	879	1075
Lane Configuration						LTR			LTR	
Shared Capacity						921			916	
Control Delay		7.2		7.2		9.0			9.0	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	1.000	0.999
Delay to Major Left-turning Vehicles, d_MLT	7.2	7.2
Major Street Through Vehicles in Shared Lane, v_i1	3	3
Major Street Turning Vehicles in Shared Lane, v_i2	0	5
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2	1500	1500
Delay to Rank 1 Vehicles, d_Rank1	0.0	0.0

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		0		2		18			15	
Lane Capacity		1608		1612		921			916	
v/c		0.00		0.00		0.02			0.02	
95% Queue Length		0.0		0.0		0.1			0.1	
Control Delay		7.2		7.2		9.0			9.0	
LOS		A		A		A			A	
Approach Delay		0.0		1.8		9.0			9.0	
Approach LOS						A			A	
Intersction Delay		7.0								

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TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_5-Rin-out_Radio-US 41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Radio Ave / US 41
Major Street Direction:	North-South
East/West Street Name:	Radio Ave
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			851	4				922	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			925	4				1002	
Percent Heavy Vehicles									
Number of Lanes	0	0	2	0		0	0	2	0
Lane Configuration			T	TR				T	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume			14				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR			15				
Percent Heavy Vehicles			3				
Number of Lanes	0	0	1		0	0	0
Lane Configuration			R				
RT channelized?			No				
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration							R			
Flow Rate							15			
Lane Capacity							542			
v/c							0.03			
95% Queue Length							0.1			
Control Delay							11.8			
LOS							B			
Approach Delay						11.8				
Approach LOS						B				
Interstion Delay		0.1								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			851	4				922	
Flow Rate, v_x			925	4				1002	

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x			14				
Flow Rate, v_x			15				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			925	4				1002	
Conflicting Flow, v_c,x									

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x			15				
Conflicting Flow, v_c,x			465				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage							6.9			
Stage I										
Stage II										
t_c,HV							2.0			
P_HV							0.03			
t_c,G							0.1			
G							0			
t_3,LT							0.0			
t_c										
Single Stage							6.96			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base							3.3			
t_f,HV							1.0			
P_HV							0.03			
t_f							3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x							465			
t_c,x							6.96			
t_f,x							3.33			
c_p,x							542			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	465	
Potential Capacity, c_p,x	542	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	542	
Probability of Queue-free State, p_0,j	0.972	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration			R			
Shared Flow Rate, v_y			15			
Movement Capacity, c_m,x			542			
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate							15			
Movement Capacity							542			
Lane Configuration							R			
Shared Capacity										
Control Delay							11.8			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration							R			
Flow Rate							15			
Lane Capacity							542			
v/c							0.03			
95% Queue Length							0.1			
Control Delay							11.8			

LOS			B
Approach Delay		11.8	
Approach LOS		B	
Intersction Delay	0.1		

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_5-Rin-out_Radio-US 41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Radio Ave / US 41
Major Street Direction:	North-South
East/West Street Name:	Radio Ave
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach	NorthBound					SouthBound			
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			822	3				1097	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			893	3				1192	
Percent Heavy Vehicles									
Number of Lanes	0	0	2	0		0	0	2	0
Lane Configuration			T	TR				T	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume			4				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR			4				
Percent Heavy Vehicles			3				
Number of Lanes	0	0	1		0	0	0
Lane Configuration			R				
RT channelized?			No				
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration							R			
Flow Rate							4			
Lane Capacity							555			
v/c							0.01			
95% Queue Length							0.0			
Control Delay							11.5			
LOS							B			
Approach Delay						11.5				
Approach LOS						B				
Interstction Delay		0.0								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach	NorthBound					SouthBound			
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			822	3				1097	
Flow Rate, v_x			893	3				1192	

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x			4				
Flow Rate, v_x			4				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			893	3				1192	
Conflicting Flow, v_c,x									

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x			4				
Conflicting Flow, v_c,x			448				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage							6.9			
Stage I										
Stage II										
t_c,HV							2.0			
P_HV							0.03			
t_c,G							0.1			
G							0			
t_3,LT							0.0			
t_c										
Single Stage							6.96			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base							3.3			
t_f,HV							1.0			
P_HV							0.03			
t_f							3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x							448			
t_c,x							6.96			
t_f,x							3.33			
c_p,x							555			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach NB SB WB EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	448	
Potential Capacity, c_p,x	555	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	555	
Probability of Queue-free State, p_0,j	0.992	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration			R			
Shared Flow Rate, v_y			4			
Movement Capacity, c_m,x			555			
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate							4			
Movement Capacity							555			
Lane Configuration							R			
Shared Capacity										
Control Delay							11.5			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration							R			
Flow Rate							4			
Lane Capacity							555			
v/c							0.01			
95% Queue Length							0.0			
Control Delay							11.5			

LOS			B
Approach Delay		11.5	
Approach LOS		B	
Intersction Delay	0.0		

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_5-Rin-out_Campbell-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Campbell Road
North/South Street Name:	Walnut Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			4	2			1	12	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			4	2			1	13	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	1		0	1	1	0
Lane Configuration			T	R			L	T	
Median Type					Undivided				
Median Storage									
RT channelized?				No					
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	14		2				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	15		2				
Percent Heavy Vehicles	3		3				
Number of Lanes	1	0	1		0	0	0
Lane Configuration	L		R				
RT channelized?			No				
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				1	15		2			
Lane Capacity				1608	994		1076			
v/c				0.00	0.02		0.00			
95% Queue Length				0.0	0.0		0.0			
Control Delay				7.2	8.7		8.4			
LOS				A	A		A			
Approach Delay				0.6		8.6				
Approach LOS						A				
Intersction Delay		4.2								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach			NorthBound					SouthBound		
Priority			7	8	9	|		10	11	12
Movement			L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			4	2			1	12	
Flow Rate, v_x			4	2			1	13	

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	14		2				
Flow Rate, v_x	15		2				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			4	2			1	13	
Conflicting Flow, v_c,x							7		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	15		2				
Conflicting Flow, v_c,x	20		4				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				7	20		4			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1608	995		1076			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x			7	
Potential Capacity, c_p,x			1608	
Pedestrian Impedance Factor, p_p,x			1.000	
Movement Capacity, c_m,x			1608	
Probability of Queue-free State, p_0,j			0.999	
Major L-Shared Probability Queue-free State, p*_0,j				

Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x		4		
Potential Capacity, c_p,x		1076		
Pedestrian Impedance Factor, p_p,x		1.000		
Movement Capacity, c_m,x		1076		
Probability of Queue-free State, p_0,j		0.998		

Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				

Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				

Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x		20		
Potential Capacity, c_p,x		995		
Pedestrian Impedance Factor, p_p,x		1.000		
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x		0.999		
Movement Capacity, c_m,x		994		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration	L		R			
Shared Flow Rate, v_y	15		2			
Movement Capacity, c_m,x	994		1076			
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				1	15		2			
Movement Capacity				1608	994		1076			
Lane Configuration				L	L		R			
Shared Capacity										
Control Delay				7.2	8.7		8.4			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				1	15		2			
Lane Capacity				1608	994		1076			
v/c				0.00	0.02		0.00			
95% Queue Length				0.0	0.0		0.0			
Control Delay				7.2	8.7		8.4			

LOS		A	A		A
Approach Delay		0.6		8.6	
Approach LOS				A	
Intersction Delay	4.2				

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_5-Rin-out_Campbell-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Campbell Road
North/South Street Name:	Walnut Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:									
Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			15	17			1	5	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			16	18			1	5	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	1		0	1	1	0
Lane Configuration			T	R			L	T	
Median Type					Undivided				
Median Storage									
RT channelized?				No					
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:							
Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	8		0				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	9		0				
Percent Heavy Vehicles	3		3				
Number of Lanes	1	0	1		0	0	0
Lane Configuration	L		R				
RT channelized?			No				
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				1	9		0			
Lane Capacity				1570	989		1060			
v/c				0.00	0.01		0.00			
95% Queue Length				0.0	0.0		0.0			
Control Delay				7.3	8.7		8.4			
LOS				A	A		A			
Approach Delay				1.2		8.7				
Approach LOS						A				
Intersction Delay		1.7								

Step 1: MOVEMENT PRIORITIES

Major Street:									
Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound				SouthBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			15	17			1	5	
Flow Rate, v_x			16	18			1	5	

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	8		0				
Flow Rate, v_x	9		0				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			16	18			1	5	
Conflicting Flow, v_c,x							35		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	9		0				
Conflicting Flow, v_c,x	24		16				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				35	24		16			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1570	990		1060			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x			35	
Potential Capacity, c_p,x			1570	
Pedestrian Impedance Factor, p_p,x			1.000	
Movement Capacity, c_m,x			1570	
Probability of Queue-free State, p_0,j			0.999	
Major L-Shared Probability Queue-free State, p*_0,j				

Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x		16		
Potential Capacity, c_p,x		1060		
Pedestrian Impedance Factor, p_p,x		1.000		
Movement Capacity, c_m,x		1060		
Probability of Queue-free State, p_0,j		1.000		

Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				

Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				

Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x		24		
Potential Capacity, c_p,x		990		
Pedestrian Impedance Factor, p_p,x		1.000		
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x		0.999		
Movement Capacity, c_m,x		989		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
Lane Configuration	L		R	|			
Shared Flow Rate, v_y	9		0				
Movement Capacity, c_m,x	989		1060				
Shared Capacity, c_SH							

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				1	9		0			
Movement Capacity				1570	989		1060			
Lane Configuration				L	L		R			
Shared Capacity										
Control Delay				7.3	8.7		8.4			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				1	9		0			
Lane Capacity				1570	989		1060			
v/c				0.00	0.01		0.00			
95% Queue Length				0.0	0.0		0.0			
Control Delay				7.3	8.7		8.4			

LOS		A	A		A
Approach Delay		1.2		8.7	
Approach LOS				A	
Intersction Delay	1.7				

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_5-Rin-out_Campbell-OSR-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell Rd / OSR
Major Street Direction:	East-West
East/West Street Name:	Campbell Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:									
Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		37	25					11	17
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		40	27					12	18
Percent Heavy Vehicles		3							
Number of Lanes	0	1	1	0		0	0	1	1
Lane Configuration		L	T					T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:							
Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					14		64
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					15		70
Percent Heavy Vehicles					3		3
Number of Lanes	0	0	0		1	0	1
Lane Configuration					L		R
RT channelized?							No
Flared Approach | Storage		|				|	
Percent Grade						0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0		0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		40						15		70
Lane Capacity		1576						851		1066
v/c		0.03						0.02		0.07
95% Queue Length		0.1						0.1		0.2
Control Delay		7.3						9.3		8.6
LOS		A						A		A
Approach Delay		4.4							8.7	
Approach LOS									A	
Interstion Delay		5.7								

Step 1: MOVEMENT PRIORITIES

Major Street:									
Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		NorthBound					SouthBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		37	25					11	17
Flow Rate, v_x		40	27					12	18

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					14		64
Flow Rate, v_x					15		70

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		40	27					12	18
Conflicting Flow, v_c,x		30							

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					15		70
Conflicting Flow, v_c,x					120		12

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1						7.1		6.2
Stage I										
Stage II										
t_c,HV		1.0						1.0		1.0
P_HV		0.03						0.03		0.03
t_c,G								0.2		0.1
G								0		0
t_3,LT		0.0						0.7		0.0
t_c										
Single Stage		4.13						6.43		6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.03						0.03		0.03
t_f		2.23						3.53		3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		30						120		12
t_c,x		4.13						6.43		6.23
t_f,x		2.23						3.53		3.33
c_p,x		1576						874		1066

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0		0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				
Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x		30		
Potential Capacity, c_p,x		1576		
Pedestrian Impedance Factor, p_p,x		1.000		
Movement Capacity, c_m,x		1576		
Probability of Queue-free State, p_0,j		0.974		
Major L-Shared Probability Queue-free State, p*_0,j				
Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x			12	
Potential Capacity, c_p,x			1066	
Pedestrian Impedance Factor, p_p,x			1.000	
Movement Capacity, c_m,x			1066	
Probability of Queue-free State, p_0,j			0.935	
Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				
Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				
Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x			120	
Potential Capacity, c_p,x			874	
Pedestrian Impedance Factor, p_p,x			1.000	
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x			0.974	
Movement Capacity, c_m,x			851	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration				L		R
Shared Flow Rate, v_y				15		70
Movement Capacity, c_m,x				851		1066
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		40						15		70
Movement Capacity		1576						851		1066
Lane Configuration		L						L		R
Shared Capacity										
Control Delay		7.3						9.3		8.6

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		40						15		70
Lane Capacity		1576						851		1066
v/c		0.03						0.02		0.07
95% Queue Length		0.1						0.1		0.2
Control Delay		7.3						9.3		8.6

LOS	A	A		A
Approach Delay	4.4		8.7	
Approach LOS			A	
Intersction Delay	5.7			

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_5-Rin-out_Campbell-OSR-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell Rd / OSR
Major Street Direction:	East-West
East/West Street Name:	Campbell Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		44	17					9	7
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		48	18					10	8
Percent Heavy Vehicles		3							
Number of Lanes	0	1	1	0		0	0	1	1
Lane Configuration		L	T					T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					26		33
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					28		36
Percent Heavy Vehicles					3		3
Number of Lanes	0	0	0		1	0	1
Lane Configuration					L		R
RT channelized?							No
Flared Approach | Storage		|				|	
Percent Grade						0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0		0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		48						28		36
Lane Capacity		1593						843		1069
v/c		0.03						0.03		0.03
95% Queue Length		0.1						0.1		0.1
Control Delay		7.3						9.4		8.5
LOS		A						A		A
Approach Delay		5.3							8.9	
Approach LOS									A	
Intersction Delay		6.2								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound				SouthBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:									
Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		44	17					9	7
Flow Rate, v_x		48	18					10	8

Minor Street:							
Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					26		33
Flow Rate, v_x					28		36

Step 3: CONFLICTING FLOW RATES

Major Street:									
Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		48	18					10	8
Conflicting Flow, v_c,x		17							

Minor Street:							
Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					28		36
Conflicting Flow, v_c,x					124		10

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS										
Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1						7.1		6.2
Stage I										
Stage II										
t_c,HV		1.0						1.0		1.0
P_HV		0.03						0.03		0.03
t_c,G								0.2		0.1
G								0		0
t_3,LT		0.0						0.7		0.0
t_c										
Single Stage		4.13						6.43		6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS										
Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.03						0.03		0.03
t_f		2.23						3.53		3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT										
Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		17						124		10
t_c,x		4.13						6.43		6.23
t_f,x		2.23						3.53		3.33
c_p,x		1593						869		1069

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance				
Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0		0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	17	
Potential Capacity, c_p,x	1593	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	1593	
Probability of Queue-free State, p_0,j	0.970	
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x		10
Potential Capacity, c_p,x		1069
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1069
Probability of Queue-free State, p_0,j		0.966

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		124
Potential Capacity, c_p,x		869
Pedestrian Impedance Factor, p_p,x		1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		0.970
Movement Capacity, c_m,x		843

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration				L		R
Shared Flow Rate, v_y				28		36
Movement Capacity, c_m,x				843		1069
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		48						28		36
Movement Capacity		1593						843		1069
Lane Configuration		L						L		R
Shared Capacity										
Control Delay		7.3						9.4		8.5

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		48						28		36
Lane Capacity		1593						843		1069
v/c		0.03						0.03		0.03
95% Queue Length		0.1						0.1		0.1
Control Delay		7.3						9.4		8.5

LOS	A		A		A
Approach Delay	5.3			8.9	
Approach LOS				A	
Intersction Delay	6.2				

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_5-Rin-out_OSR-US 41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5_Rin-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Old State Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	0	981	11		0	3	920	38
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		0	1066	12			3	1000	41
Percent Heavy Vehicles	3	3				3	3		
Number of Lanes	0	1	2	0		0	1	2	0
Lane Configuration		L	T	TR			L	T	TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach		WestBound					EastBound		
Movement		7	8	9	|		10	11	12
		L	T	R	|		L	T	R
Volume		20	15	5			69	25	6
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		22	16	5			75	27	7
Percent Heavy Vehicles		3	3	3			3	3	3
Number of Lanes		0	1	0			0	1	0
Lane Configuration			LTR					LTR	
RT channelized?									
Flared Approach | Storage		No	|				No	|	
Percent Grade			0					0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		0		3		43			109	
Lane Capacity		658		637		49			56	
v/c		0.00		0.01		0.89			1.94	
95% Queue Length		0.0		0.0		3.7			10.5	
Control Delay		10.5		10.7		228.0			600.0	
LOS		B		B		F			F	
Approach Delay		0.0		0.0		228.0			600.0	
Approach LOS						F			F	
Intersction Delay		33.0								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound			EastBound		
Priority	7	8	9	10	11	12
Movement	L	T	R	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume, V_x	0	0	981	11	0	3	920	38
Flow Rate, v_x		0	1066	12		3	1000	41

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume, V_x	20	15	5	69	25	6
Flow Rate, v_x	22	16	5	75	27	7

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Flow Rate, v_x		0	1066	12		3	1000	41
Conflicting Flow, v_c,x		1041				1078		

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Flow Rate, v_x	22	16	5	75	27	7
Conflicting Flow, v_c,x	1592	2120	539	1568	2105	521

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.5	6.5	6.9	7.5	6.5	6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.16		4.16	7.56	6.56	6.96	7.56	6.56	6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1041		1078	1592	2120	539	1568	2105	521
t_c,x		4.16		4.16	7.56	6.56	6.96	7.56	6.56	6.96
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		658		637	71	49	484	74	50	498

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				
Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x		1041	1078	
Potential Capacity, c_p,x		658	637	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Movement Capacity, c_m,x		658	637	
Probability of Queue-free State, p_0,j		1.000	0.995	
Major L-Shared Probability Queue-free State, p*_0,j				
Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x		539	521	
Potential Capacity, c_p,x		484	498	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Movement Capacity, c_m,x		484	498	
Probability of Queue-free State, p_0,j		0.989	0.987	
Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				
Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x		2120	2105	
Potential Capacity, c_p,x		49	50	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Capacity Adjustment Factor, f_x		0.995	0.995	
Movement Capacity, c_m,x		49	50	
Probability of Queue-free State, p_0,j		0.666	0.455	
Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x		1592	1568	
Potential Capacity, c_p,x		71	74	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Major L, Minor T Adjusted Impedance Factor, p"		0.453	0.663	
Major L, Minor T Impedance Factor, p'		0.567	0.738	
Capacity Adjustment Factor, f_x		0.560	0.730	
Movement Capacity, c_m,x		40	54	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		43			109	
Movement Capacity, c_m,x	40	49	484	54	50	498
Shared Capacity, c_SH		49			56	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		0		3	22	16	5	75	27	7
Movement Capacity		658		637	40	49	484	54	50	498
Lane Configuration		L		L		LTR			LTR	
Shared Capacity						49			56	
Control Delay		10.5		10.7		228.0			600.0	

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		0		3		43			109	
Lane Capacity		658		637		49			56	
v/c		0.00		0.01		0.89			1.94	
95% Queue Length		0.0		0.0		3.7			10.5	
Control Delay		10.5		10.7		228.0			600.0	

LOS	B	B	F	F
Approach Delay	0.0	0.0	228.0	600.0
Approach LOS			F	F
Intersction Delay	33.0			

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_R-in-out_Old State-Wortman.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Old State Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Wortman Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		12	85					52	7
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		13	92					57	8
Percent Heavy Vehicles		0							
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration		LT							TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					18		24
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					20		26
Percent Heavy Vehicles					0		3
Number of Lanes	0	0	0		0	1	0
Lane Configuration						LR	
RT channelized?							
Flared Approach | Storage		|			No	|	
Percent Grade						0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0		0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		LT							LR	
Flow Rate		13							46	
Lane Capacity		1551							909	
v/c		0.01							0.05	
95% Queue Length		0.0							0.2	
Control Delay		7.3							9.2	
LOS		A							A	
Approach Delay		1.0							9.2	
Approach LOS									A	
Intersction Delay		2.4								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		12	85					52	7
Flow Rate, v_x		13	92					57	8

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					18		24
Flow Rate, v_x					20		26

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		13	92					57	8
Conflicting Flow, v_c,x		64							

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					20		26
Conflicting Flow, v_c,x					179		60

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1						7.1		6.2
Stage I										
Stage II										
t_c,HV		1.0						1.0		1.0
P_HV		0.00						0.00		0.03
t_c,G								0.2		0.1
G								0		0
t_3,LT		0.0						0.7		0.0
t_c										
Single Stage		4.10						6.40		6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.00						0.00		0.03
t_f		2.20						3.50		3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		64						179		60
t_c,x		4.10						6.40		6.23
t_f,x		2.20						3.50		3.33
c_p,x		1551						815		1002

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0		0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	64	
Potential Capacity, c_p,x	1551	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	1551	
Probability of Queue-free State, p_0,j	0.992	
Major L-Shared Probability Queue-free State, p*_0,j	0.991	

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x		60
Potential Capacity, c_p,x		1002
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1002
Probability of Queue-free State, p_0,j		0.974

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		179
Potential Capacity, c_p,x		815
Pedestrian Impedance Factor, p_p,x		1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		0.991
Movement Capacity, c_m,x		808

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration					LR	
Shared Flow Rate, v_y					46	
Movement Capacity, c_m,x				808		1002
Shared Capacity, c_SH					909	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		13						20		26
Movement Capacity		1551						808		1002
Lane Configuration		LT							LR	
Shared Capacity									909	
Control Delay		7.3							9.2	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	NB	SB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.991	
Delay to Major Left-turning Vehicles, d_MLT	7.3	
Major Street Through Vehicles in Shared Lane, v_i1	92	
Major Street Turning Vehicles in Shared Lane, v_i2	13	
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2		1500
Delay to Rank 1 Vehicles, d_Rank1	0.1	

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		LT							LR	
Flow Rate		13							46	
Lane Capacity		1551							909	
v/c		0.01							0.05	
95% Queue Length		0.0							0.2	
Control Delay		7.3							9.2	
LOS		A							A	
Approach Delay		1.0							9.2	
Approach LOS									A	
Intersction Delay		2.4								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_R-in-out_Old State-Wortman.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Old State Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Wortman Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		22	74					115	28
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		24	80					125	30
Percent Heavy Vehicles		0							
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration		LT							TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					15		18
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					16		20
Percent Heavy Vehicles					0		3
Number of Lanes	0	0	0		0	1	0
Lane Configuration						LR	
RT channelized?							
Flared Approach | Storage		|			No	|	
Percent Grade						0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0		0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		LT							LR	
Flow Rate		24							36	
Lane Capacity		1437							806	
v/c		0.02							0.04	
95% Queue Length		0.1							0.1	
Control Delay		7.5							9.7	
LOS		A							A	
Approach Delay		1.8							9.7	
Approach LOS									A	
Interstction Delay		1.8								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		22	74					115	28
Flow Rate, v_x		24	80					125	30

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					15		18
Flow Rate, v_x					16		20

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		24	80					125	30
Conflicting Flow, v_c,x		155							

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					16		20
Conflicting Flow, v_c,x					268		140

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1						7.1		6.2
Stage I										
Stage II										
t_c,HV		1.0						1.0		1.0
P_HV		0.00						0.00		0.03
t_c,G								0.2		0.1
G								0		0
t_3,LT		0.0						0.7		0.0
t_c										
Single Stage		4.10						6.40		6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.00						0.00		0.03
t_f		2.20						3.50		3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		155						268		140
t_c,x		4.10						6.40		6.23
t_f,x		2.20						3.50		3.33
c_p,x		1437						725		905

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0		0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	155	
Potential Capacity, c_p,x	1437	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	1437	
Probability of Queue-free State, p_0,j	0.983	
Major L-Shared Probability Queue-free State, p*_0,j	0.983	

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x		140
Potential Capacity, c_p,x		905
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		905
Probability of Queue-free State, p_0,j		0.978

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		268
Potential Capacity, c_p,x		725
Pedestrian Impedance Factor, p_p,x		1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		0.983
Movement Capacity, c_m,x		712

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration					LR	
Shared Flow Rate, v_y					36	
Movement Capacity, c_m,x				712		905
Shared Capacity, c_SH					806	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		24						16		20
Movement Capacity		1437						712		905
Lane Configuration		LT							LR	
Shared Capacity									806	
Control Delay		7.5							9.7	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	NB	SB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.983	
Delay to Major Left-turning Vehicles, d_MLT	7.5	
Major Street Through Vehicles in Shared Lane, v_i1	80	
Major Street Turning Vehicles in Shared Lane, v_i2	24	
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2		1500
Delay to Rank 1 Vehicles, d_Rank1	0.1	

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		LT							LR	
Flow Rate		24							36	
Lane Capacity		1437							806	
v/c		0.02							0.04	
95% Queue Length		0.1							0.1	
Control Delay		7.5							9.7	
LOS		A							A	
Approach Delay		1.8							9.7	
Approach LOS									A	
Intersction Delay		1.8								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_2w5-Rin-out_Hillsdale-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	2w & 5_Rin-out_AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Hillsdale Road
North/South Street Name:	Walnut Avenue
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		1	72	22			12	103	4
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		1	78	24			13	112	4
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	22	5	20		4	5	5
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	24	5	22		4	5	5
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		1		13		51			15	
Lane Capacity		1466		1484		786			740	
v/c		0.00		0.01		0.06			0.02	
95% Queue Length		0.0		0.0		0.2			0.1	
Control Delay		7.5		7.4		9.9			10.0	
LOS		A		A		A			A	
Approach Delay		0.1		0.8		9.9			10.0	
Approach LOS						A			A	
Intersction Delay		2.6								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		NorthBound					SouthBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		1	72	22			12	103	4
Flow Rate, v_x		1	78	24			13	112	4

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	22	5	20		4	5	5
Flow Rate, v_x	24	5	22		4	5	5

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		1	78	24			13	112	4
Conflicting Flow, v_c,x		116					102		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	24	5	22		4	5	5
Conflicting Flow, v_c,x	238	235	90		246	245	114

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		116		102	238	235	90	246	245	114
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1466		1484	714	664	965	705	656	936

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	116	102
Potential Capacity, c_p,x	1466	1484
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1466	1484
Probability of Queue-free State, p_0,j	0.999	0.991
Major L-Shared Probability Queue-free State, p*_0,j	0.999	0.991

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	90	114
Potential Capacity, c_p,x	965	936
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	965	936
Probability of Queue-free State, p_0,j	0.977	0.994

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	235	245
Potential Capacity, c_p,x	664	656
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.990	0.990
Movement Capacity, c_m,x	657	649
Probability of Queue-free State, p_0,j	0.992	0.992

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	238	246
Potential Capacity, c_p,x	714	705
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.982	0.982
Major L, Minor T Impedance Factor, p'	0.986	0.986
Capacity Adjustment Factor, f_x	0.980	0.964
Movement Capacity, c_m,x	700	680

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		51			15	
Movement Capacity, c_m,x	700	657	965	680	649	936
Shared Capacity, c_SH		786			740	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		1		13	24	5	22	4	5	5
Movement Capacity		1466		1484	700	657	965	680	649	936
Lane Configuration						LTR			LTR	
Shared Capacity						786			740	
Control Delay		7.5		7.4		9.9			10.0	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.999	0.991
Delay to Major Left-turning Vehicles, d_MLT	7.5	7.4
Major Street Through Vehicles in Shared Lane, v_i1	78	112
Major Street Turning Vehicles in Shared Lane, v_i2	25	17
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2	1500	1500
Delay to Rank 1 Vehicles, d_Rank1	0.0	0.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		1		13		51			15	
Lane Capacity		1466		1484		786			740	
v/c		0.00		0.01		0.06			0.02	
95% Queue Length		0.0		0.0		0.2			0.1	
Control Delay		7.5		7.4		9.9			10.0	
LOS		A		A		A			A	
Approach Delay		0.1		0.8		9.9			10.0	
Approach LOS						A			A	
Intersction Delay		2.6								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_2w5-Rin-out_Hillsdale-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	2w5_Rin-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Hillsdale Road
North/South Street Name:	Walnut Avenue
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		12	143	22			9	85	20
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		13	155	24			10	92	22
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	28	9	30		6	7	3
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	30	10	33		7	8	3
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		13		10		73			17	
Lane Capacity		1469		1390		701			623	
v/c		0.01		0.01		0.10			0.03	
95% Queue Length		0.0		0.0		0.3			0.1	
Control Delay		7.5		7.6		10.7			10.9	
LOS		A		A		B			B	
Approach Delay		0.6		0.7		10.7			10.9	
Approach LOS						B			B	
Intersction Delay		2.9								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound			|	SouthBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		12	143	22			9	85	20
Flow Rate, v_x		13	155	24			10	92	22

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	28	9	30		6	7	3
Flow Rate, v_x	30	10	33		7	8	3

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		13	155	24			10	92	22
Conflicting Flow, v_c,x		114					179		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	30	10	33		7	8	3
Conflicting Flow, v_c,x	322	327	167		338	328	103

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		114		179	322	327	167	338	328	103
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1469		1390	629	590	874	614	589	949

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	114	179
Potential Capacity, c_p,x	1469	1390
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1469	1390
Probability of Queue-free State, p_0,j	0.991	0.993
Major L-Shared Probability Queue-free State, p*_0,j	0.990	0.992

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	167	103
Potential Capacity, c_p,x	874	949
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	874	949
Probability of Queue-free State, p_0,j	0.963	0.997

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	327	328
Potential Capacity, c_p,x	590	589
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.983	0.983
Movement Capacity, c_m,x	579	579
Probability of Queue-free State, p_0,j	0.983	0.987

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	322	338
Potential Capacity, c_p,x	629	614
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.970	0.966
Major L, Minor T Impedance Factor, p'	0.977	0.974
Capacity Adjustment Factor, f_x	0.974	0.938
Movement Capacity, c_m,x	613	576

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		73			17	
Movement Capacity, c_m,x	613	579	874	576	579	949
Shared Capacity, c_SH		701			623	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		13		10	30	10	33	7	8	3
Movement Capacity		1469		1390	613	579	874	576	579	949
Lane Configuration						LTR			LTR	
Shared Capacity						701			623	
Control Delay		7.5		7.6		10.7			10.9	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.990	0.992
Delay to Major Left-turning Vehicles, d_MLT	7.5	7.6
Major Street Through Vehicles in Shared Lane, v_i1	155	92
Major Street Turning Vehicles in Shared Lane, v_i2	37	32
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2	1500	1500
Delay to Rank 1 Vehicles, d_Rank1	0.1	0.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		13		10		73			17	
Lane Capacity		1469		1390		701			623	
v/c		0.01		0.01		0.10			0.03	
95% Queue Length		0.0		0.0		0.3			0.1	
Control Delay		7.5		7.6		10.7			10.9	
LOS		A		A		B			B	
Approach Delay		0.6		0.7		10.7			10.9	
Approach LOS						B			B	
Intersction Delay		2.9								

This TWSC text report was created in HCS™ TWSC Version 7.8 on 8/19/2019 2:52:55 PM

HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_2w5-Rin-out_Hillsdale-OSR-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	2w & 5_R-in-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Old State
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			110	10			9	60	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			120	11			10	65	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration				TR			LT		
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	31		4				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	34		4				
Percent Heavy Vehicles	3		3				
Number of Lanes	0	1	0		0	0	0
Lane Configuration		LR					
RT channelized?							
Flared Approach | Storage	No	|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				10		38				
Lane Capacity				1449		786				
v/c				0.01		0.05				
95% Queue Length				0.0		0.2				
Control Delay				7.5		9.8				
LOS				A		A				
Approach Delay				1.0		9.8				
Approach LOS						A				
Intersction Delay		1.8								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound			EastBound		
Priority	7	8	9	10	11	12
Movement	L	T	R	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume, V_x			110	10		9	60	
Flow Rate, v_x			120	11		10	65	

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume, V_x	31		4			
Flow Rate, v_x	34		4			

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Flow Rate, v_x			120	11		10	65	
Conflicting Flow, v_c,x						130		

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Flow Rate, v_x	34		4			
Conflicting Flow, v_c,x	210		125			

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				130	210		125			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1449	776		923			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		130
Potential Capacity, c_p,x		1449
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1449
Probability of Queue-free State, p_0,j		0.993
Major L-Shared Probability Queue-free State, p*_0,j		0.993

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	125	
Potential Capacity, c_p,x	923	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	923	
Probability of Queue-free State, p_0,j	0.995	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	210	
Potential Capacity, c_p,x	776	
Pedestrian Impedance Factor, p_p,x	1.000	
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x	0.993	
Movement Capacity, c_m,x	771	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach		WestBound			EastBound	
Movement	7	8	9	10	11	12
Lane Configuration		LR				
Shared Flow Rate, v_y		38				
Movement Capacity, c_m,x	771		923			
Shared Capacity, c_SH		786				

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				10	34		4			
Movement Capacity				1449	771		923			
Lane Configuration				LT		LR				
Shared Capacity						786				
Control Delay				7.5		9.8				

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	NB	SB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j		0.993
Delay to Major Left-turning Vehicles, d_MLT		7.5
Major Street Through Vehicles in Shared Lane, v_i1		65
Major Street Turning Vehicles in Shared Lane, v_i2		10
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2						1500				
Delay to Rank 1 Vehicles, d_Rank1								0.1		

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				10		38				
Lane Capacity				1449		786				
v/c				0.01		0.05				
95% Queue Length				0.0		0.2				
Control Delay				7.5		9.8				
LOS				A		A				
Approach Delay				1.0		9.8				
Approach LOS						A				
Intersction Delay		1.8								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_2w5-Rin-out_Hillsdale-OSR-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	2w & 5 Rin-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Old State
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			120	4			0	123	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			130	4			0	134	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration				TR			LT		
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	8		0				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	9		0				
Percent Heavy Vehicles	3		3				
Number of Lanes	0	1	0		0	0	0
Lane Configuration		LR					
RT channelized?							
Flared Approach | Storage	No	|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				0		9				
Lane Capacity				1443		721				
v/c				0.00		0.01				
95% Queue Length				0.0		0.0				
Control Delay				7.5		10.1				
LOS				A		B				
Approach Delay				0.0		10.1				
Approach LOS						B				
Intersction Delay		0.3								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			120	4			0	123	
Flow Rate, v_x			130	4			0	134	

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	8		0				
Flow Rate, v_x	9		0				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			130	4			0	134	
Conflicting Flow, v_c,x							135		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	9		0				
Conflicting Flow, v_c,x	266		133				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				135	266		133			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1443	721		914			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		135
Potential Capacity, c_p,x		1443
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1443
Probability of Queue-free State, p_0,j		1.000
Major L-Shared Probability Queue-free State, p*_0,j		1.000

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	133	
Potential Capacity, c_p,x	914	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	914	
Probability of Queue-free State, p_0,j	1.000	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	266	
Potential Capacity, c_p,x	721	
Pedestrian Impedance Factor, p_p,x	1.000	
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x	1.000	
Movement Capacity, c_m,x	721	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LR				
Shared Flow Rate, v_y		9				
Movement Capacity, c_m,x	721		914			
Shared Capacity, c_SH		721				

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				0	9		0			
Movement Capacity				1443	721		914			
Lane Configuration				LT		LR				
Shared Capacity						721				
Control Delay				7.5		10.1				

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	NB	SB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j		1.000
Delay to Major Left-turning Vehicles, d_MLT		7.5
Major Street Through Vehicles in Shared Lane, v_i1		134
Major Street Turning Vehicles in Shared Lane, v_i2		0
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2						1500						
Delay to Rank 1 Vehicles, d_Rank1									0.0			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound				EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12	
Lane Configuration				LT		LR					
Flow Rate				0		9					
Lane Capacity				1443		721					
v/c				0.00		0.01					
95% Queue Length				0.0		0.0					
Control Delay				7.5		10.1					
LOS				A		B					
Approach Delay				0.0		10.1					
Approach LOS						B					
Intersction Delay		0.3									

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_J-Turn_5Rin-out_Hill-US 41x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	J-Turn_5Rin-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	11	631	25		0	33	888	0
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		12	686	27			36	965	0
Percent Heavy Vehicles	3	3				3	3		
Number of Lanes	0	1	2	0		0	1	2	0
Lane Configuration		L	T	TR			L	T	TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume			148				36
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR			161				39
Percent Heavy Vehicles			3				3
Number of Lanes	0	0	1		0	0	1
Lane Configuration			R				R
RT channelized?			No				No
Flared Approach | Storage		|				|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		12		36			161			39
Lane Capacity		703		876			637			527
v/c		0.02		0.04			0.25			0.07
95% Queue Length		0.1		0.1			1.0			0.2
Control Delay		10.2		9.3			12.5			12.4
LOS		B		A			B			B
Approach Delay		0.2		0.3		12.5			12.4	
Approach LOS						B			B	
Intersction Delay		1.5								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound			EastBound		
Priority	7	8	9	10	11	12
Movement	L	T	R	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume, V_x	0	11	631	25	0	33	888	0
Flow Rate, v_x		12	686	27		36	965	0

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume, V_x			148			36
Flow Rate, v_x			161			39

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Flow Rate, v_x		12	686	27		36	965	0
Conflicting Flow, v_c,x		965				713		

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Flow Rate, v_x			161			39
Conflicting Flow, v_c,x			357			483

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1			6.9			6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0			2.0			2.0
P_HV		0.03		0.03			0.03			0.03
t_c,G							0.1			0.1
G							0			0
t_3,LT		0.0		0.0			0.0			0.0
t_c										
Single Stage		4.16		4.16			6.96			6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2			3.3			3.3
t_f,HV		1.0		1.0			1.0			1.0
P_HV		0.03		0.03			0.03			0.03
t_f		2.23		2.23			3.33			3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		965		713			357			483
t_c,x		4.16		4.16			6.96			6.96
t_f,x		2.23		2.23			3.33			3.33
c_p,x		703		876			637			527

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x		965	713	
Potential Capacity, c_p,x		703	876	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Movement Capacity, c_m,x		703	876	
Probability of Queue-free State, p_0,j		0.983	0.959	
Major L-Shared Probability Queue-free State, p*_0,j				

Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x		357	483	
Potential Capacity, c_p,x		637	527	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Movement Capacity, c_m,x		637	527	
Probability of Queue-free State, p_0,j		0.747	0.926	

Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				

Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				

Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration			R			R
Shared Flow Rate, v_y			161			39
Movement Capacity, c_m,x			637			527
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		12		36			161			39
Movement Capacity		703		876			637			527
Lane Configuration		L		L			R			R
Shared Capacity										
Control Delay		10.2		9.3			12.5			12.4

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		12		36			161			39
Lane Capacity		703		876			637			527
v/c		0.02		0.04			0.25			0.07
95% Queue Length		0.1		0.1			1.0			0.2
Control Delay		10.2		9.3			12.5			12.4

LOS	B	A		B		B
Approach Delay	0.2	0.3	12.5		12.4	
Approach LOS			B		B	
Intersction Delay	1.5					

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_J-Turn_5Rin-out_Hill-US 41x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	J-Turn_5Ri-o_Jadd AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	11	631	47		0	33	987	8
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		12	686	51			36	1073	9
Percent Heavy Vehicles	3	3				3	3		
Number of Lanes	0	1	2	0		0	1	2	0
Lane Configuration		L	T	TR			L	T	TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume			148				36
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR			161				39
Percent Heavy Vehicles			3				3
Number of Lanes	0	0	1		0	0	1
Lane Configuration			R				R
RT channelized?			No				No
Flared Approach | Storage		|				|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		12		36			161			39
Lane Capacity		635		858			626			483
v/c		0.02		0.04			0.26			0.08
95% Queue Length		0.1		0.1			1.0			0.3
Control Delay		10.8		9.4			12.7			13.1
LOS		B		A			B			B
Approach Delay		0.2		0.3		12.7			13.1	
Approach LOS						B			B	
Intersction Delay		1.5								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	11	631	47		0	33	987	8
Flow Rate, v_x		12	686	51			36	1073	9

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x			148				36
Flow Rate, v_x			161				39

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		12	686	51			36	1073	9
Conflicting Flow, v_c,x		1082					737		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x			161				39
Conflicting Flow, v_c,x			368				541

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1			6.9			6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0			2.0			2.0
P_HV		0.03		0.03			0.03			0.03
t_c,G							0.1			0.1
G							0			0
t_3,LT		0.0		0.0			0.0			0.0
t_c										
Single Stage		4.16		4.16			6.96			6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2			3.3			3.3
t_f,HV		1.0		1.0			1.0			1.0
P_HV		0.03		0.03			0.03			0.03
t_f		2.23		2.23			3.33			3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1082		737			368			541
t_c,x		4.16		4.16			6.96			6.96
t_f,x		2.23		2.23			3.33			3.33
c_p,x		635		858			626			483

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1082	737
Potential Capacity, c_p,x	635	858
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	635	858
Probability of Queue-free State, p_0,j	0.981	0.958
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	368	541
Potential Capacity, c_p,x	626	483
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	626	483
Probability of Queue-free State, p_0,j	0.743	0.919

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration			R			R
Shared Flow Rate, v_y			161			39
Movement Capacity, c_m,x			626			483
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		12		36			161			39
Movement Capacity		635		858			626			483
Lane Configuration		L		L			R			R
Shared Capacity										
Control Delay		10.8		9.4			12.7			13.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		12		36			161			39
Lane Capacity		635		858			626			483
v/c		0.02		0.04			0.26			0.08
95% Queue Length		0.1		0.1			1.0			0.3
Control Delay		10.8		9.4			12.7			13.1

LOS	B	A		B		B
Approach Delay	0.2	0.3	12.7		13.1	
Approach LOS			B		B	
Intersction Delay	1.5					

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_J-Turn_Hill-US 41x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	J-Turn_AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	11	631	47		0	33	984	8
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		12	686	51			36	1070	9
Percent Heavy Vehicles	3	3				3	3		
Number of Lanes	0	1	2	0		0	1	2	0
Lane Configuration		L	T	TR			L	T	TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume			145				36
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR			158				39
Percent Heavy Vehicles			3				3
Number of Lanes	0	0	1		0	0	1
Lane Configuration			R				R
RT channelized?			No				No
Flared Approach | Storage		|				|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		12		36			158			39
Lane Capacity		637		858			626			484
v/c		0.02		0.04			0.25			0.08
95% Queue Length		0.1		0.1			1.0			0.3
Control Delay		10.8		9.4			12.7			13.1
LOS		B		A			B			B
Approach Delay		0.2		0.3		12.7			13.1	
Approach LOS						B			B	
Intersction Delay		1.4								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9			10	11	12
Movement		L	T	R			L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume, V_x	0	11	631	47	0	33	984	8
Flow Rate, v_x		12	686	51		36	1070	9

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume, V_x			145			36
Flow Rate, v_x			158			39

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Flow Rate, v_x		12	686	51		36	1070	9
Conflicting Flow, v_c,x		1078				737		

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Flow Rate, v_x			158			39
Conflicting Flow, v_c,x			368			539

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1			6.9			6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0			2.0			2.0
P_HV		0.03		0.03			0.03			0.03
t_c,G							0.1			0.1
G							0			0
t_3,LT		0.0		0.0			0.0			0.0
t_c										
Single Stage		4.16		4.16			6.96			6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2			3.3			3.3
t_f,HV		1.0		1.0			1.0			1.0
P_HV		0.03		0.03			0.03			0.03
t_f		2.23		2.23			3.33			3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1078		737			368			539
t_c,x		4.16		4.16			6.96			6.96
t_f,x		2.23		2.23			3.33			3.33
c_p,x		637		858			626			484

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1078	737
Potential Capacity, c_p,x	637	858
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	637	858
Probability of Queue-free State, p_0,j	0.981	0.958
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	368	539
Potential Capacity, c_p,x	626	484
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	626	484
Probability of Queue-free State, p_0,j	0.748	0.919

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration			R			R
Shared Flow Rate, v_y			158			39
Movement Capacity, c_m,x			626			484
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		12		36			158			39
Movement Capacity		637		858			626			484
Lane Configuration		L		L			R			R
Shared Capacity										
Control Delay		10.8		9.4			12.7			13.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		12		36			158			39
Lane Capacity		637		858			626			484
v/c		0.02		0.04			0.25			0.08
95% Queue Length		0.1		0.1			1.0			0.3
Control Delay		10.8		9.4			12.7			13.1

LOS	B	A		B		B
Approach Delay	0.2	0.3	12.7		13.1	
Approach LOS			B		B	
Intersction Delay	1.4					

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_J-Turn_5Rin-out_Hill-US 41x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	J-Turn_5Rin-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	14	791	32		0	42	1112	0
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		15	860	35			46	1209	0
Percent Heavy Vehicles	3	3				3	3		
Number of Lanes	0	1	2	0		0	1	2	0
Lane Configuration		L	T	TR			L	T	TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume			210				46
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR			228				50
Percent Heavy Vehicles			3				3
Number of Lanes	0	0	1		0	0	1
Lane Configuration			R				R
RT channelized?			No				No
Flared Approach | Storage		|				|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		15		46			228			50
Lane Capacity		567		748			556			439
v/c		0.03		0.06			0.41			0.11
95% Queue Length		0.1		0.2			2.0			0.4
Control Delay		11.5		10.1			15.9			14.3
LOS		B		B			C			B
Approach Delay		0.2		0.4		15.9			14.3	
Approach LOS						C			B	
Intersction Delay		2.0								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	14	791	32		0	42	1112	0
Flow Rate, v_x		15	860	35			46	1209	0

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x			210				46
Flow Rate, v_x			228				50

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		15	860	35			46	1209	0
Conflicting Flow, v_c,x		1209					895		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x			228				50
Conflicting Flow, v_c,x			447				604

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1			6.9			6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0			2.0			2.0
P_HV		0.03		0.03			0.03			0.03
t_c,G							0.1			0.1
G							0			0
t_3,LT		0.0		0.0			0.0			0.0
t_c										
Single Stage		4.16		4.16			6.96			6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2			3.3			3.3
t_f,HV		1.0		1.0			1.0			1.0
P_HV		0.03		0.03			0.03			0.03
t_f		2.23		2.23			3.33			3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1209		895			447			604
t_c,x		4.16		4.16			6.96			6.96
t_f,x		2.23		2.23			3.33			3.33
c_p,x		567		748			556			439

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1209	895
Potential Capacity, c_p,x	567	748
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	567	748
Probability of Queue-free State, p_0,j	0.973	0.939
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	447	604
Potential Capacity, c_p,x	556	439
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	556	439
Probability of Queue-free State, p_0,j	0.589	0.886

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration			R			R
Shared Flow Rate, v_y			228			50
Movement Capacity, c_m,x			556			439
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		15		46			228			50
Movement Capacity		567		748			556			439
Lane Configuration		L		L			R			R
Shared Capacity										
Control Delay		11.5		10.1			15.9			14.3

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		15		46			228			50
Lane Capacity		567		748			556			439
v/c		0.03		0.06			0.41			0.11
95% Queue Length		0.1		0.2			2.0			0.4
Control Delay		11.5		10.1			15.9			14.3

LOS	B	B		C		B
Approach Delay	0.2	0.4	15.9		14.3	
Approach LOS			C		B	
Intersction Delay	2.0					

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_J-Turn_5Ri-o_Jadd_Hill-US 41x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	J-Turn_5Ri-o_Jadd AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	14	791	60		0	42	1267	13
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		15	860	65			46	1377	14
Percent Heavy Vehicles	3	3				3	3		
Number of Lanes	0	1	2	0		0	1	2	0
Lane Configuration		L	T	TR			L	T	TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume			210				46
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR			228				50
Percent Heavy Vehicles			3				3
Number of Lanes	0	0	1		0	0	1
Lane Configuration			R				R
RT channelized?			No				No
Flared Approach | Storage		|				|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		15		46			228			50
Lane Capacity		483		728			543			382
v/c		0.03		0.06			0.42			0.13
95% Queue Length		0.1		0.2			2.1			0.4
Control Delay		12.7		10.3			16.3			15.8
LOS		B		B			C			C
Approach Delay		0.2		0.3		16.3			15.8	
Approach LOS						C			C	
Intersction Delay		2.0								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	14	791	60		0	42	1267	13
Flow Rate, v_x		15	860	65			46	1377	14

Minor Street:

Approach		WestBound					EastBound		
Movement		7	8	9	|		10	11	12
		L	T	R	|		L	T	R
Volume, V_x				210					46
Flow Rate, v_x				228					50

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		15	860	65			46	1377	14
Conflicting Flow, v_c,x		1391					925		

Minor Street:

Approach		WestBound					EastBound		
Movement		7	8	9	|		10	11	12
		L	T	R	|		L	T	R
Flow Rate, v_x				228					50
Conflicting Flow, v_c,x				463					696

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1			6.9			6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0			2.0			2.0
P_HV		0.03		0.03			0.03			0.03
t_c,G							0.1			0.1
G							0			0
t_3,LT		0.0		0.0			0.0			0.0
t_c										
Single Stage		4.16		4.16			6.96			6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2			3.3			3.3
t_f,HV		1.0		1.0			1.0			1.0
P_HV		0.03		0.03			0.03			0.03
t_f		2.23		2.23			3.33			3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1391		925			463			696
t_c,x		4.16		4.16			6.96			6.96
t_f,x		2.23		2.23			3.33			3.33
c_p,x		483		728			543			382

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1391	925
Potential Capacity, c_p,x	483	728
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	483	728
Probability of Queue-free State, p_0,j	0.968	0.937
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	463	696
Potential Capacity, c_p,x	543	382
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	543	382
Probability of Queue-free State, p_0,j	0.580	0.869

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration			R			R
Shared Flow Rate, v_y			228			50
Movement Capacity, c_m,x			543			382
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		15		46			228			50
Movement Capacity		483		728			543			382
Lane Configuration		L		L			R			R
Shared Capacity										
Control Delay		12.7		10.3			16.3			15.8

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		15		46			228			50
Lane Capacity		483		728			543			382
v/c		0.03		0.06			0.42			0.13
95% Queue Length		0.1		0.2			2.1			0.4
Control Delay		12.7		10.3			16.3			15.8

LOS	B	B		C		C
Approach Delay	0.2	0.3	16.3		15.8	
Approach LOS			C		C	
Intersction Delay	2.0					

This TWSC text report was created in HCS™ TWSC Version 7.8 on 8/20/2019 10:56:38 AM

HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_J-Turn_5Rin-out_Hill-US 41x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	J-Turn_5Rin-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	20	958	42		0	53	1025	1
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		22	1041	46			58	1114	1
Percent Heavy Vehicles	3	3				3	3		
Number of Lanes	0	1	2	0		0	1	2	0
Lane Configuration		L	T	TR			L	T	TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume			107				30
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR			116				33
Percent Heavy Vehicles			3				3
Number of Lanes	0	0	1		0	0	1
Lane Configuration			R				R
RT channelized?			No				No
Flared Approach | Storage		|				|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		22		58			116			33
Lane Capacity		616		632			481			471
v/c		0.04		0.09			0.24			0.07
95% Queue Length		0.1		0.3			0.9			0.2
Control Delay		11.1		11.3			14.9			13.2
LOS		B		B			B			B
Approach Delay		0.2		0.6		14.9			13.2	
Approach LOS						B			B	
Intersction Delay		1.3								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound				EastBound		
Priority		7	8	9		10	11	12
Movement		L	T	R		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume, V_x	0	20	958	42	0	53	1025	1
Flow Rate, v_x		22	1041	46		58	1114	1

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume, V_x			107			30
Flow Rate, v_x			116			33

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Flow Rate, v_x		22	1041	46		58	1114	1
Conflicting Flow, v_c,x		1115				1087		

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Flow Rate, v_x			116			33
Conflicting Flow, v_c,x			543			558

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1			6.9			6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0			2.0			2.0
P_HV		0.03		0.03			0.03			0.03
t_c,G							0.1			0.1
G							0			0
t_3,LT		0.0		0.0			0.0			0.0
t_c										
Single Stage		4.16		4.16			6.96			6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2			3.3			3.3
t_f,HV		1.0		1.0			1.0			1.0
P_HV		0.03		0.03			0.03			0.03
t_f		2.23		2.23			3.33			3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1115		1087			543			558
t_c,x		4.16		4.16			6.96			6.96
t_f,x		2.23		2.23			3.33			3.33
c_p,x		616		632			481			471

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1115	1087
Potential Capacity, c_p,x	616	632
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	616	632
Probability of Queue-free State, p_0,j	0.965	0.909
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	543	558
Potential Capacity, c_p,x	481	471
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	481	471
Probability of Queue-free State, p_0,j	0.758	0.931

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration			R			R
Shared Flow Rate, v_y			116			33
Movement Capacity, c_m,x			481			471
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		22		58			116			33
Movement Capacity		616		632			481			471
Lane Configuration		L		L			R			R
Shared Capacity										
Control Delay		11.1		11.3			14.9			13.2

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		22		58			116			33
Lane Capacity		616		632			481			471
v/c		0.04		0.09			0.24			0.07
95% Queue Length		0.1		0.3			0.9			0.2
Control Delay		11.1		11.3			14.9			13.2

LOS	B	B		B		B
Approach Delay	0.2	0.6	14.9		13.2	
Approach LOS			B		B	
Intersction Delay	1.3					

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_J-Turn_5Ri-0_Jadd_Hill-US 41x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	J-Turn_5Ri-o_Jadd PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	20	961	63		0	53	1067	22
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		22	1045	68			58	1160	24
Percent Heavy Vehicles	3	3				3	3		
Number of Lanes	0	1	2	0		0	1	2	0
Lane Configuration		L	T	TR			L	T	TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume			107				30
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR			116				33
Percent Heavy Vehicles			3				3
Number of Lanes	0	0	1		0	0	1
Lane Configuration			R				R
RT channelized?			No				No
Flared Approach | Storage		|				|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		22		58			116			33
Lane Capacity		580		617			472			447
v/c		0.04		0.09			0.25			0.07
95% Queue Length		0.1		0.3			1.0			0.2
Control Delay		11.4		11.4			15.1			13.7
LOS		B		B			C			B
Approach Delay		0.2		0.5		15.1			13.7	
Approach LOS						C			B	
Intersction Delay		1.2								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	20	961	63		0	53	1067	22
Flow Rate, v_x		22	1045	68			58	1160	24

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x			107				30
Flow Rate, v_x			116				33

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		22	1045	68			58	1160	24
Conflicting Flow, v_c,x		1184					1113		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x			116				33
Conflicting Flow, v_c,x			557				592

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1			6.9			6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0			2.0			2.0
P_HV		0.03		0.03			0.03			0.03
t_c,G							0.1			0.1
G							0			0
t_3,LT		0.0		0.0			0.0			0.0
t_c										
Single Stage		4.16		4.16			6.96			6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2			3.3			3.3
t_f,HV		1.0		1.0			1.0			1.0
P_HV		0.03		0.03			0.03			0.03
t_f		2.23		2.23			3.33			3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1184		1113			557			592
t_c,x		4.16		4.16			6.96			6.96
t_f,x		2.23		2.23			3.33			3.33
c_p,x		580		617			472			447

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1184	1113
Potential Capacity, c_p,x	580	617
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	580	617
Probability of Queue-free State, p_0,j	0.963	0.907
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	557	592
Potential Capacity, c_p,x	472	447
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	472	447
Probability of Queue-free State, p_0,j	0.753	0.927

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration			R			R
Shared Flow Rate, v_y			116			33
Movement Capacity, c_m,x			472			447
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		22		58			116			33
Movement Capacity		580		617			472			447
Lane Configuration		L		L			R			R
Shared Capacity										
Control Delay		11.4		11.4			15.1			13.7

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		22		58			116			33
Lane Capacity		580		617			472			447
v/c		0.04		0.09			0.25			0.07
95% Queue Length		0.1		0.3			1.0			0.2
Control Delay		11.4		11.4			15.1			13.7

LOS	B	B		C		B
Approach Delay	0.2	0.5	15.1		13.7	
Approach LOS			C		B	
Intersction Delay	1.2					

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_J-Turn_5Rin-out_Hill-US 41x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	J-Turn_5Rin-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	25	1201	53		0	66	1284	1
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		27	1305	58			72	1396	1
Percent Heavy Vehicles	3	3				3	3		
Number of Lanes	0	1	2	0		0	1	2	0
Lane Configuration		L	T	TR			L	T	TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume			186				39
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR			202				42
Percent Heavy Vehicles			3				3
Number of Lanes	0	0	1		0	0	1
Lane Configuration			R				R
RT channelized?			No				No
Flared Approach | Storage		|				|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		27		72			202			42
Lane Capacity		480		495			390			380
v/c		0.06		0.14			0.52			0.11
95% Queue Length		0.2		0.5			2.9			0.4
Control Delay		12.9		13.5			23.7			15.6
LOS		B		B			C			C
Approach Delay		0.3		0.7		23.7			15.6	
Approach LOS						C			C	
Intersction Delay		2.2								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	25	1201	53		0	66	1284	1
Flow Rate, v_x		27	1305	58			72	1396	1

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x			186				39
Flow Rate, v_x			202				42

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		27	1305	58			72	1396	1
Conflicting Flow, v_c,x		1397					1363		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x			202				42
Conflicting Flow, v_c,x			682				698

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1			6.9			6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0			2.0			2.0
P_HV		0.03		0.03			0.03			0.03
t_c,G							0.1			0.1
G							0			0
t_3,LT		0.0		0.0			0.0			0.0
t_c										
Single Stage		4.16		4.16			6.96			6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2			3.3			3.3
t_f,HV		1.0		1.0			1.0			1.0
P_HV		0.03		0.03			0.03			0.03
t_f		2.23		2.23			3.33			3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1397		1363			682			698
t_c,x		4.16		4.16			6.96			6.96
t_f,x		2.23		2.23			3.33			3.33
c_p,x		480		495			390			380

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1397	1363
Potential Capacity, c_p,x	480	495
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	480	495
Probability of Queue-free State, p_0,j	0.943	0.855
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	682	698
Potential Capacity, c_p,x	390	380
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	390	380
Probability of Queue-free State, p_0,j	0.482	0.889

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration			R			R
Shared Flow Rate, v_y			202			42
Movement Capacity, c_m,x			390			380
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		27		72			202			42
Movement Capacity		480		495			390			380
Lane Configuration		L		L			R			R
Shared Capacity										
Control Delay		12.9		13.5			23.7			15.6

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		27		72			202			42
Lane Capacity		480		495			390			380
v/c		0.06		0.14			0.52			0.11
95% Queue Length		0.2		0.5			2.9			0.4
Control Delay		12.9		13.5			23.7			15.6

LOS	B	B		C		C
Approach Delay	0.3	0.7	23.7		15.6	
Approach LOS			C		C	
Intersction Delay	2.2					

This TWSC text report was created in HCS™ TWSC Version 7.8 on 8/20/2019 10:33:57 AM

HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_J-Turn_5Ri-o_Jadd_Hill-US 41x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	J-Turn_5Ri-o_Jadd PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	25	1205	80		0	66	1408	11
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		27	1310	87			72	1530	12
Percent Heavy Vehicles	3	3				3	3		
Number of Lanes	0	1	2	0		0	1	2	0
Lane Configuration		L	T	TR			L	T	TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume			186				39
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR			202				42
Percent Heavy Vehicles			3				3
Number of Lanes	0	0	1		0	0	1
Lane Configuration			R				R
RT channelized?			No				No
Flared Approach | Storage		|				|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		27		72			202			42
Lane Capacity		422		480			380			340
v/c		0.06		0.15			0.53			0.12
95% Queue Length		0.2		0.5			3.0			0.4
Control Delay		14.1		13.8			24.7			17.1
LOS		B		B			C			C
Approach Delay		0.3		0.6		24.7			17.1	
Approach LOS						C			C	
Intersction Delay		2.2								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	25	1205	80		0	66	1408	11
Flow Rate, v_x		27	1310	87			72	1530	12

Minor Street:

Approach	WestBound					EastBound		
Movement	7	8	9	|		10	11	12
	L	T	R	|		L	T	R
Volume, V_x			186					39
Flow Rate, v_x			202					42

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		27	1310	87			72	1530	12
Conflicting Flow, v_c,x		1542					1397		

Minor Street:

Approach	WestBound					EastBound		
Movement	7	8	9	|		10	11	12
	L	T	R	|		L	T	R
Flow Rate, v_x			202					42
Conflicting Flow, v_c,x			698					771

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1			6.9			6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0			2.0			2.0
P_HV		0.03		0.03			0.03			0.03
t_c,G							0.1			0.1
G							0			0
t_3,LT		0.0		0.0			0.0			0.0
t_c										
Single Stage		4.16		4.16			6.96			6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2			3.3			3.3
t_f,HV		1.0		1.0			1.0			1.0
P_HV		0.03		0.03			0.03			0.03
t_f		2.23		2.23			3.33			3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1542		1397			698			771
t_c,x		4.16		4.16			6.96			6.96
t_f,x		2.23		2.23			3.33			3.33
c_p,x		422		480			380			340

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1542	1397
Potential Capacity, c_p,x	422	480
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	422	480
Probability of Queue-free State, p_0,j	0.936	0.851
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	698	771
Potential Capacity, c_p,x	380	340
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	380	340
Probability of Queue-free State, p_0,j	0.469	0.875

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration			R			R
Shared Flow Rate, v_y			202			42
Movement Capacity, c_m,x			380			340
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		27		72			202			42
Movement Capacity		422		480			380			340
Lane Configuration		L		L			R			R
Shared Capacity										
Control Delay		14.1		13.8			24.7			17.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L			R			R
Flow Rate		27		72			202			42
Lane Capacity		422		480			380			340
v/c		0.06		0.15			0.53			0.12
95% Queue Length		0.2		0.5			3.0			0.4
Control Delay		14.1		13.8			24.7			17.1

LOS	B	B		C		C
Approach Delay	0.3	0.6	24.7		17.1	
Approach LOS			C		C	
Intersction Delay	2.2					

This TWSC text report was created in HCS™ TWSC Version 7.8 on 8/20/2019 10:59:51 AM

HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_JnoSMUT_5Rin-out_Hillsdale-US 41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5Rin-out/no sMUT AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			631	25		0	33	987	8
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			686	27			36	1073	9
Percent Heavy Vehicles						3	3		
Number of Lanes	0	0	2	1		0	1	2	1
Lane Configuration			T	R			L	T	R
Median Type					Undivided				
Median Storage									
RT channelized?				No					No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume			148				14
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR			161				15
Percent Heavy Vehicles			3				3
Number of Lanes	0	0	1		0	0	1
Lane Configuration			R				R
RT channelized?			No				No
Flared Approach | Storage		|				|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L			R			R
Flow Rate				36			161			15
Lane Capacity				876			650			486
v/c				0.04			0.25			0.03
95% Queue Length				0.1			1.0			0.1
Control Delay				9.3			12.3			12.6
LOS				A			B			B
Approach Delay				0.3		12.3			12.6	
Approach LOS						B			B	
Intersction Delay		1.3								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			631	25		0	33	987	8
Flow Rate, v_x			686	27			36	1073	9

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x			148				14
Flow Rate, v_x			161				15

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			686	27			36	1073	9
Conflicting Flow, v_c,x							713		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x			161				15
Conflicting Flow, v_c,x			343				536

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1			6.9			6.9
Stage I										
Stage II										
t_c,HV				2.0			2.0			2.0
P_HV				0.03			0.03			0.03
t_c,G							0.1			0.1
G							0			0
t_3,LT				0.0			0.0			0.0
t_c										
Single Stage				4.16			6.96			6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2			3.3			3.3
t_f,HV				1.0			1.0			1.0
P_HV				0.03			0.03			0.03
t_f				2.23			3.33			3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				713			343			536
t_c,x				4.16			6.96			6.96
t_f,x				2.23			3.33			3.33
c_p,x				876			650			486

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				
Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x			713	
Potential Capacity, c_p,x			876	
Pedestrian Impedance Factor, p_p,x			1.000	
Movement Capacity, c_m,x			876	
Probability of Queue-free State, p_0,j			0.959	
Major L-Shared Probability Queue-free State, p*_0,j				
Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x		343	536	
Potential Capacity, c_p,x		650	486	
Pedestrian Impedance Factor, p_p,x		1.000	1.000	
Movement Capacity, c_m,x		650	486	
Probability of Queue-free State, p_0,j		0.753	0.969	
Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				
Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				
Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration			R			R
Shared Flow Rate, v_y			161			15
Movement Capacity, c_m,x			650			486
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				36			161			15
Movement Capacity				876			650			486
Lane Configuration				L			R			R
Shared Capacity										
Control Delay				9.3			12.3			12.6

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L			R			R
Flow Rate				36			161			15
Lane Capacity				876			650			486
v/c				0.04			0.25			0.03
95% Queue Length				0.1			1.0			0.1
Control Delay				9.3			12.3			12.6

LOS		A		B		B
Approach Delay		0.3	12.3		12.6	
Approach LOS			B		B	
Intersction Delay	1.3					

This TWSC text report was created in HCS™ TWSC Version 7.8 on 8/21/2019 3:21:07 PM

HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_AM_5-Rin-out_NMUT-x.xtw
Analyst:	Mike Koyak
Agency:	INDOT
Date Performed:	8/22/2019
Time Analyzed:	2020 AM N-MUT w/5Ri-o
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	Hillsdale Road @ US 41
Units:	U.S. Customary
Intersection Name:	South MUT
Major Street Direction:	North-South
East/West Street Name:	South MUT
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume								922	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR								1002	
Percent Heavy Vehicles									
Number of Lanes	0	0	0	0		0	0	2	0
Lane Configuration								T	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	107						
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	116						
Percent Heavy Vehicles	3						
Number of Lanes	1	0	0		0	0	0
Lane Configuration	L						
RT channelized?							
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)		0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration					L					
Flow Rate					116					
Lane Capacity					497					
v/c					0.23					
95% Queue Length					0.9					
Control Delay					14.4					
LOS					B					
Approach Delay						14.4				
Approach LOS						B				
Intersction Delay		1.5								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x								922	
Flow Rate, v_x								1002	

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	107						
Flow Rate, v_x	116						

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x								1002	
Conflicting Flow, v_c,x									

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	116						
Conflicting Flow, v_c,x	501						

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage					7.5					
Stage I										
Stage II										
t_c,HV					2.0					
P_HV					0.03					
t_c,G					0.2					
G					0					
t_3,LT					0.7					
t_c										
Single Stage					6.86					
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base					3.5					
t_f,HV					1.0					
P_HV					0.03					
t_f					3.53					

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x					501					
t_c,x					6.86					
t_f,x					3.53					
c_p,x					497					

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x		0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				
Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				
Major L-Shared Probability Queue-free State, p*_0,j				
Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				
Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				
Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				
Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x		501		
Potential Capacity, c_p,x		497		
Pedestrian Impedance Factor, p_p,x		1.000		
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x		1.000		
Movement Capacity, c_m,x		497		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration	L					
Shared Flow Rate, v_y	116					
Movement Capacity, c_m,x	497					
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate					116					
Movement Capacity					497					
Lane Configuration					L					
Shared Capacity										
Control Delay					14.4					

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration					L					
Flow Rate					116					
Lane Capacity					497					
v/c					0.23					
95% Queue Length					0.9					
Control Delay					14.4					

LOS		B	
Approach Delay			14.4
Approach LOS			B
Intersction Delay	1.5		

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_5-Rin-out_NMUT-x.xtw
Analyst:	Mike Koyak
Agency:	INDOT
Date Performed:	8/22/2019
Time Analyzed:	2020 PM N-MUT w/5Ri-o
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	Hillsdale Road @ US 41
Units:	U.S. Customary
Intersection Name:	South MUT
Major Street Direction:	North-South
East/West Street Name:	South MUT
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume								1097	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR								1192	
Percent Heavy Vehicles									
Number of Lanes	0	0	0	0		0	0	2	0
Lane Configuration								T	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	63						
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	68						
Percent Heavy Vehicles	3						
Number of Lanes	1	0	0		0	0	0
Lane Configuration	L						
RT channelized?							
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)		0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration					L					
Flow Rate					68					
Lane Capacity					432					
v/c					0.16					
95% Queue Length					0.6					
Control Delay					14.9					
LOS					B					
Approach Delay						14.9				
Approach LOS						B				
Intersction Delay		0.8								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x								1097	
Flow Rate, v_x								1192	

Minor Street:

Approach		WestBound					EastBound		
Movement		7	8	9	|		10	11	12
		L	T	R	|		L	T	R
Volume, V_x		63							
Flow Rate, v_x		68							

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x								1192	
Conflicting Flow, v_c,x									

Minor Street:

Approach		WestBound					EastBound		
Movement		7	8	9	|		10	11	12
		L	T	R	|		L	T	R
Flow Rate, v_x		68							
Conflicting Flow, v_c,x		596							

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage					7.5					
Stage I										
Stage II										
t_c,HV					2.0					
P_HV					0.03					
t_c,G					0.2					
G					0					
t_3,LT					0.7					
t_c										
Single Stage					6.86					
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base					3.5					
t_f,HV					1.0					
P_HV					0.03					
t_f					3.53					

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x					596					
t_c,x					6.86					
t_f,x					3.53					
c_p,x					432					

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x		0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				
Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				
Major L-Shared Probability Queue-free State, p*_0,j				
Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				
Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				
Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				
Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x		596		
Potential Capacity, c_p,x		432		
Pedestrian Impedance Factor, p_p,x		1.000		
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x		1.000		
Movement Capacity, c_m,x		432		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration	L					
Shared Flow Rate, v_y	68					
Movement Capacity, c_m,x	432					
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate					68					
Movement Capacity					432					
Lane Configuration					L					
Shared Capacity										
Control Delay					14.9					

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration					L					
Flow Rate					68					
Lane Capacity					432					
v/c					0.16					
95% Queue Length					0.6					
Control Delay					14.9					

LOS		B	
Approach Delay			14.9
Approach LOS			B
Intersction Delay	0.8		

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	TWSC1.xtw
Analyst:	Mike Koyak
Agency:	INDOT
Date Performed:	8/22/2019
Time Analyzed:	2020 AM S-MUT w/5Ri-o
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	Hillsdale Road @ US 41
Units:	U.S. Customary
Intersection Name:	South MUT
Major Street Direction:	North-South
East/West Street Name:	South MUT
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			667						
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			725						
Percent Heavy Vehicles									
Number of Lanes	0	0	2	0		0	0	0	0
Lane Configuration			T						
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					22		
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					24		
Percent Heavy Vehicles					3		
Number of Lanes	0	0	0		1	0	0
Lane Configuration					L		
RT channelized?							
Flared Approach | Storage		|				|	
Percent Grade						3	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0			0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration								L		
Flow Rate								24		
Lane Capacity								572		
v/c								0.04		
95% Queue Length								0.1		
Control Delay								11.6		
LOS								B		
Approach Delay									11.6	
Approach LOS									B	
Interstction Delay										

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			667						
Flow Rate, v_x			725						

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					22		
Flow Rate, v_x					24		

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			725						
Conflicting Flow, v_c,x									

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					24		
Conflicting Flow, v_c,x					363		

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage								7.5		
Stage I										
Stage II										
t_c,HV								2.0		
P_HV								0.03		
t_c,G								0.2		
G								3		
t_3,LT								0.7		
t_c										
Single Stage								7.46		
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base								3.5		
t_f,HV								1.0		
P_HV								0.03		
t_f								3.53		

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x								363		
t_c,x								7.46		
t_f,x								3.53		
c_p,x								572		

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0			0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		363
Potential Capacity, c_p,x		572
Pedestrian Impedance Factor, p_p,x		1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		1.000
Movement Capacity, c_m,x		572

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration				L		
Shared Flow Rate, v_y				24		
Movement Capacity, c_m,x				572		
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate								24		
Movement Capacity								572		
Lane Configuration								L		
Shared Capacity										
Control Delay								11.6		

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration								L		
Flow Rate								24		
Lane Capacity								572		
v/c								0.04		
95% Queue Length								0.1		
Control Delay								11.6		

LOS	B	
Approach Delay		11.6
Approach LOS		B
Intersction Delay		

This TWSC text report was created in HCS™ TWSC Version 7.8 on 8/22/2019 8:05:57 AM

HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2020_PM_5-Rin-out_SMUT-x.xtw
Analyst:	Mike Koyak
Agency:	INDOT
Date Performed:	8/22/2019
Time Analyzed:	2020 PM S-MUT w/5Ri-o
Jurisdiction:	Vincennes
Analysis Year:	2020
Project Description:	Hillsdale Road @ US 41
Units:	U.S. Customary
Intersection Name:	South MUT
Major Street Direction:	North-South
East/West Street Name:	South MUT
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			1020						
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			1109						
Percent Heavy Vehicles									
Number of Lanes	0	0	2	0		0	0	0	0
Lane Configuration			T						
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					24		
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					26		
Percent Heavy Vehicles					3		
Number of Lanes	0	0	0		1	0	0
Lane Configuration					L		
RT channelized?							
Flared Approach | Storage		|				|	
Percent Grade						3	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0			0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration								L		
Flow Rate								26		
Lane Capacity								419		
v/c								0.06		
95% Queue Length								0.2		
Control Delay								14.2		
LOS								B		
Approach Delay									14.2	
Approach LOS									B	
Interstion Delay										

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

	WestBound				EastBound		
Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			1020						
Flow Rate, v_x			1109						

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					24		
Flow Rate, v_x					26		

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			1109						
Conflicting Flow, v_c,x									

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					26		
Conflicting Flow, v_c,x					554		

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage								7.5		
Stage I										
Stage II										
t_c,HV								2.0		
P_HV								0.03		
t_c,G								0.2		
G								3		
t_3,LT								0.7		
t_c										
Single Stage								7.46		
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base								3.5		
t_f,HV								1.0		
P_HV								0.03		
t_f								3.53		

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x								554		
t_c,x								7.46		
t_f,x								3.53		
c_p,x								419		

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0			0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		554
Potential Capacity, c_p,x		419
Pedestrian Impedance Factor, p_p,x		1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		1.000
Movement Capacity, c_m,x		419

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration				L		
Shared Flow Rate, v_y				26		
Movement Capacity, c_m,x				419		
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate								26		
Movement Capacity								419		
Lane Configuration								L		
Shared Capacity										
Control Delay								14.2		

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration								L		
Flow Rate								26		
Lane Capacity								419		
v/c								0.06		
95% Queue Length								0.2		
Control Delay								14.2		

LOS	B	
Approach Delay		14.2
Approach LOS		B
Intersction Delay		

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_5-Rin-out_NMUT-x.xtw
Analyst:	Mike Koyak
Agency:	INDOT
Date Performed:	8/22/2019
Time Analyzed:	2045 AM N-MUT w/5Ri-o
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	Hillsdale Road @ US 41
Units:	U.S. Customary
Intersection Name:	South MUT
Major Street Direction:	North-South
East/West Street Name:	South MUT
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume								1167	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR								1268	
Percent Heavy Vehicles									
Number of Lanes	0	0	0	0		0	0	2	0
Lane Configuration								T	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	134						
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	146						
Percent Heavy Vehicles	3						
Number of Lanes	1	0	0		0	0	0
Lane Configuration	L						
RT channelized?							
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)		0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration					L					
Flow Rate					146					
Lane Capacity					409					
v/c					0.36					
95% Queue Length					1.6					
Control Delay					18.6					
LOS					C					
Approach Delay						18.6				
Approach LOS						C				
Intersction Delay		1.9								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x								1167	
Flow Rate, v_x								1268	

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	134						
Flow Rate, v_x	146						

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x								1268	
Conflicting Flow, v_c,x									

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	146						
Conflicting Flow, v_c,x	634						

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage					7.5					
Stage I										
Stage II										
t_c,HV					2.0					
P_HV					0.03					
t_c,G					0.2					
G					0					
t_3,LT					0.7					
t_c										
Single Stage					6.86					
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base					3.5					
t_f,HV					1.0					
P_HV					0.03					
t_f					3.53					

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x					634					
t_c,x					6.86					
t_f,x					3.53					
c_p,x					409					

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x		0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	634	
Potential Capacity, c_p,x	409	
Pedestrian Impedance Factor, p_p,x	1.000	
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x	1.000	
Movement Capacity, c_m,x	409	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration	L					
Shared Flow Rate, v_y	146					
Movement Capacity, c_m,x	409					
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate					146					
Movement Capacity					409					
Lane Configuration					L					
Shared Capacity										
Control Delay					18.6					

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration					L					
Flow Rate					146					
Lane Capacity					409					
v/c					0.36					
95% Queue Length					1.6					
Control Delay					18.6					

LOS		C	
Approach Delay			18.6
Approach LOS			C
Intersction Delay	1.9		

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_5-Rin-out_NMUT-x.xtw
Analyst:	Mike Koyak
Agency:	INDOT
Date Performed:	8/22/2019
Time Analyzed:	2045 AM N-MUT w/5Ri-o
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	Hillsdale Road @ US 41
Units:	U.S. Customary
Intersection Name:	South MUT
Major Street Direction:	North-South
East/West Street Name:	South MUT
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume								1388	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR								1509	
Percent Heavy Vehicles									
Number of Lanes	0	0	0	0		0	0	2	0
Lane Configuration								T	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	80						
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	87						
Percent Heavy Vehicles	3						
Number of Lanes	1	0	0		0	0	0
Lane Configuration	L						
RT channelized?							
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)		0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration					L					
Flow Rate					87					
Lane Capacity					343					
v/c					0.25					
95% Queue Length					1.0					
Control Delay					19.0					
LOS					C					
Approach Delay						19.0				
Approach LOS						C				
Interscton Delay		1.0								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x								1388	
Flow Rate, v_x								1509	

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	80						
Flow Rate, v_x	87						

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x								1509	
Conflicting Flow, v_c,x									

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	87						
Conflicting Flow, v_c,x	754						

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage					7.5					
Stage I										
Stage II										
t_c,HV					2.0					
P_HV					0.03					
t_c,G					0.2					
G					0					
t_3,LT					0.7					
t_c										
Single Stage					6.86					
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base					3.5					
t_f,HV					1.0					
P_HV					0.03					
t_f					3.53					

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x					754					
t_c,x					6.86					
t_f,x					3.53					
c_p,x					343					

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x		0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				
Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				
Major L-Shared Probability Queue-free State, p*_0,j				
Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				
Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				
Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				
Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x		754		
Potential Capacity, c_p,x		343		
Pedestrian Impedance Factor, p_p,x		1.000		
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x		1.000		
Movement Capacity, c_m,x		343		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration	L					
Shared Flow Rate, v_y	87					
Movement Capacity, c_m,x	343					
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate					87					
Movement Capacity					343					
Lane Configuration					L					
Shared Capacity										
Control Delay					19.0					

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration					L					
Flow Rate					87					
Lane Capacity					343					
v/c					0.25					
95% Queue Length					1.0					
Control Delay					19.0					

LOS		C	
Approach Delay			19.0
Approach LOS			C
Intersction Delay	1.0		

This TWSC text report was created in HCS™ TWSC Version 7.8 on 8/22/2019 8:23:11 AM

HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_5-Rin-out_SMUT-x.xtw
Analyst:	Mike Koyak
Agency:	INDOT
Date Performed:	8/22/2019
Time Analyzed:	2045 AM S-MUT w/5Ri-o
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	Hillsdale Road @ US 41
Units:	U.S. Customary
Intersection Name:	South MUT
Major Street Direction:	North-South
East/West Street Name:	South MUT
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			837						
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			910						
Percent Heavy Vehicles									
Number of Lanes	0	0	2	0		0	0	0	0
Lane Configuration			T						
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					28		
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					30		
Percent Heavy Vehicles					3		
Number of Lanes	0	0	0		1	0	0
Lane Configuration					L		
RT channelized?							
Flared Approach | Storage		|				|	
Percent Grade						3	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0			0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration								L		
Flow Rate								30		
Lane Capacity								493		
v/c								0.06		
95% Queue Length								0.2		
Control Delay								12.8		
LOS								B		
Approach Delay									12.8	
Approach LOS									B	
Interstion Delay										

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			837						
Flow Rate, v_x			910						

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					28		
Flow Rate, v_x					30		

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			910						
Conflicting Flow, v_c,x									

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					30		
Conflicting Flow, v_c,x					455		

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage								7.5		
Stage I										
Stage II										
t_c,HV								2.0		
P_HV								0.03		
t_c,G								0.2		
G								3		
t_3,LT								0.7		
t_c										
Single Stage								7.46		
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base								3.5		
t_f,HV								1.0		
P_HV								0.03		
t_f								3.53		

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x								455		
t_c,x								7.46		
t_f,x								3.53		
c_p,x								493		

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0			0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		455
Potential Capacity, c_p,x		493
Pedestrian Impedance Factor, p_p,x		1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		1.000
Movement Capacity, c_m,x		493

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration				L		
Shared Flow Rate, v_y				30		
Movement Capacity, c_m,x				493		
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate								30		
Movement Capacity								493		
Lane Configuration								L		
Shared Capacity										
Control Delay								12.8		

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration								L		
Flow Rate								30		
Lane Capacity								493		
v/c								0.06		
95% Queue Length								0.2		
Control Delay								12.8		

LOS	B	
Approach Delay		12.8
Approach LOS		B
Intersction Delay		

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_5-Rin-out_SMUT-x.xtw
Analyst:	Mike Koyak
Agency:	INDOT
Date Performed:	8/22/2019
Time Analyzed:	2045 PM S-MUT w/5Ri-o
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	Hillsdale Road @ US 41
Units:	U.S. Customary
Intersection Name:	South MUT
Major Street Direction:	North-South
East/West Street Name:	South MUT
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			1279						
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			1390						
Percent Heavy Vehicles									
Number of Lanes	0	0	2	0		0	0	0	0
Lane Configuration			T						
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					31		
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					34		
Percent Heavy Vehicles					3		
Number of Lanes	0	0	0		1	0	0
Lane Configuration					L		
RT channelized?							
Flared Approach | Storage		|				|	
Percent Grade						3	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0			0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration								L		
Flow Rate								34		
Lane Capacity								333		
v/c								0.10		
95% Queue Length								0.3		
Control Delay								17.0		
LOS								C		
Approach Delay									17.0	
Approach LOS									C	
Interstion Delay		0.4								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			1279						
Flow Rate, v_x			1390						

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					31		
Flow Rate, v_x					34		

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			1390						
Conflicting Flow, v_c,x									

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					34		
Conflicting Flow, v_c,x					695		

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage								7.5		
Stage I										
Stage II										
t_c,HV								2.0		
P_HV								0.03		
t_c,G								0.2		
G								3		
t_3,LT								0.7		
t_c										
Single Stage								7.46		
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base								3.5		
t_f,HV								1.0		
P_HV								0.03		
t_f								3.53		

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x								695		
t_c,x								7.46		
t_f,x								3.53		
c_p,x								333		

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0			0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		695
Potential Capacity, c_p,x		333
Pedestrian Impedance Factor, p_p,x		1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		1.000
Movement Capacity, c_m,x		333

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration				L		
Shared Flow Rate, v_y				34		
Movement Capacity, c_m,x				333		
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate								34		
Movement Capacity								333		
Lane Configuration								L		
Shared Capacity										
Control Delay								17.0		

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration								L		
Flow Rate								34		
Lane Capacity								333		
v/c								0.10		
95% Queue Length								0.3		
Control Delay								17.0		

LOS		C	
Approach Delay			17.0
Approach LOS			C
Intersction Delay	0.4		

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_5-Rin-out_Hillsdale-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5_Rin-out_AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Hillsdale Road
North/South Street Name:	Walnut Avenue
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:									
Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		1	91	28			15	130	5
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		1	99	30			16	141	5
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:							
Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	28	6	25		5	6	7
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	30	7	27		5	7	8
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		1		16		64			20	
Lane Capacity		1429		1450		730			692	
v/c		0.00		0.01		0.09			0.03	
95% Queue Length		0.0		0.0		0.3			0.1	
Control Delay		7.5		7.5		10.4			10.4	
LOS		A		A		B			B	
Approach Delay		0.1		0.8		10.4			10.4	
Approach LOS						B			B	
Intersction Delay		2.7								

Step 1: MOVEMENT PRIORITIES

Major Street:									
Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound				SouthBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		1	91	28			15	130	5
Flow Rate, v_x		1	99	30			16	141	5

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	28	6	25		5	6	7
Flow Rate, v_x	30	7	27		5	7	8

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		1	99	30			16	141	5
Conflicting Flow, v_c,x		147					129		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	30	7	27		5	7	8
Conflicting Flow, v_c,x	300	296	114		310	308	144

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		147		129	300	296	114	310	308	144
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1429		1450	650	614	936	641	604	901

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	147	129
Potential Capacity, c_p,x	1429	1450
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1429	1450
Probability of Queue-free State, p_0,j	0.999	0.989
Major L-Shared Probability Queue-free State, p*_0,j	0.999	0.988

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	114	144
Potential Capacity, c_p,x	936	901
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	936	901
Probability of Queue-free State, p_0,j	0.971	0.992

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	296	308
Potential Capacity, c_p,x	614	604
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.987	0.987
Movement Capacity, c_m,x	606	596
Probability of Queue-free State, p_0,j	0.989	0.989

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	300	310
Potential Capacity, c_p,x	650	641
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.976	0.976
Major L, Minor T Impedance Factor, p'	0.982	0.982
Capacity Adjustment Factor, f_x	0.974	0.953
Movement Capacity, c_m,x	633	611

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		64			20	
Movement Capacity, c_m,x	633	606	936	611	596	901
Shared Capacity, c_SH		730			692	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		1		16	30	7	27	5	7	8
Movement Capacity		1429		1450	633	606	936	611	596	901
Lane Configuration						LTR			LTR	
Shared Capacity						730			692	
Control Delay		7.5		7.5		10.4			10.4	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.999	0.988
Delay to Major Left-turning Vehicles, d_MLT	7.5	7.5
Major Street Through Vehicles in Shared Lane, v_i1	99	141
Major Street Turning Vehicles in Shared Lane, v_i2	32	22
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2	1500	1500
Delay to Rank 1 Vehicles, d_Rank1	0.0	0.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		1		16		64			20	
Lane Capacity		1429		1450		730			692	
v/c		0.00		0.01		0.09			0.03	
95% Queue Length		0.0		0.0		0.3			0.1	
Control Delay		7.5		7.5		10.4			10.4	
LOS		A		A		B			B	
Approach Delay		0.1		0.8		10.4			10.4	
Approach LOS						B			B	
Intersction Delay		2.7								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_5-Rin-out_Hillsdale-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5_Rin-out_PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Hillsdale Road
North/South Street Name:	Walnut Avenue
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		15	181	28			11	108	25
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		16	197	30			12	117	27
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	35	11	38		8	9	4
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	38	12	41		9	10	4
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		16		12		91			23	
Lane Capacity		1432		1335		632			551	
v/c		0.01		0.01		0.14			0.04	
95% Queue Length		0.0		0.0		0.5			0.1	
Control Delay		7.5		7.7		11.7			11.8	
LOS		A		A		B			B	
Approach Delay		0.6		0.7		11.7			11.8	
Approach LOS						B			B	
Intersction Delay		3.1								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound				SouthBound		
Priority	7	8	9		10	11	12
Movement	L	T	R		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound				WestBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume, V_x		15	181	28		11	108	25
Flow Rate, v_x		16	197	30		12	117	27

Minor Street:

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume, V_x	35	11	38	8	9	4
Flow Rate, v_x	38	12	41	9	10	4

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound				WestBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Flow Rate, v_x		16	197	30		12	117	27
Conflicting Flow, v_c,x		145				227		

Minor Street:

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Flow Rate, v_x	38	12	41	9	10	4
Conflicting Flow, v_c,x	407	413	212	426	415	131

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		145		227	407	413	212	426	415	131
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1432		1335	553	528	826	537	527	916

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	145	227
Potential Capacity, c_p,x	1432	1335
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1432	1335
Probability of Queue-free State, p_0,j	0.989	0.991
Major L-Shared Probability Queue-free State, p*_0,j	0.987	0.990

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	212	131
Potential Capacity, c_p,x	826	916
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	826	916
Probability of Queue-free State, p_0,j	0.950	0.995

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	413	415
Potential Capacity, c_p,x	528	527
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.977	0.977
Movement Capacity, c_m,x	516	515
Probability of Queue-free State, p_0,j	0.977	0.981

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	407	426
Potential Capacity, c_p,x	553	537
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.959	0.955
Major L, Minor T Impedance Factor, p'	0.968	0.965
Capacity Adjustment Factor, f_x	0.964	0.917
Movement Capacity, c_m,x	533	492

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		91			23	
Movement Capacity, c_m,x	533	516	826	492	515	916
Shared Capacity, c_SH		632			551	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		16		12	38	12	41	9	10	4
Movement Capacity		1432		1335	533	516	826	492	515	916
Lane Configuration						LTR			LTR	
Shared Capacity						632			551	
Control Delay		7.5		7.7		11.7			11.8	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.987	0.990
Delay to Major Left-turning Vehicles, d_MLT	7.5	7.7
Major Street Through Vehicles in Shared Lane, v_i1	197	117
Major Street Turning Vehicles in Shared Lane, v_i2	47	39
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2	1500	1500
Delay to Rank 1 Vehicles, d_Rank1	0.1	0.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		16		12		91			23	
Lane Capacity		1432		1335		632			551	
v/c		0.01		0.01		0.14			0.04	
95% Queue Length		0.0		0.0		0.5			0.1	
Control Delay		7.5		7.7		11.7			11.8	
LOS		A		A		B			B	
Approach Delay		0.6		0.7		11.7			11.8	
Approach LOS						B			B	
Intersction Delay		3.1								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_5-Rin-out_Radio-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Radio Ave / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Radio Ave
North/South Street Name:	Walnut Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:									
Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		3	3	4			5	0	1
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		3	3	4			5	0	1
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:							
Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	9	15	1		1	4	5
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	10	16	1		1	4	5
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		3		5		27			11	
Lane Capacity		1615		1606		905			969	
v/c		0.00		0.00		0.03			0.01	
95% Queue Length		0.0		0.0		0.1			0.0	
Control Delay		7.2		7.2		9.1			8.8	
LOS		A		A		A			A	
Approach Delay		2.2		6.0		9.1			8.8	
Approach LOS						A			A	
Intersction Delay		7.3								

Step 1: MOVEMENT PRIORITIES

Major Street:									
Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound				SouthBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		3	3	4			5	0	1
Flow Rate, v_x		3	3	4			5	0	1

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	9	15	1		1	4	5
Flow Rate, v_x	10	16	1		1	4	5

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		3	3	4			5	0	1
Conflicting Flow, v_c,x		1					8		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	10	16	1		1	4	5
Conflicting Flow, v_c,x	28	24	5		32	26	1

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1		8	28	24	5	32	26	1
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1615		1606	979	868	1075	973	866	1081

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1	8
Potential Capacity, c_p,x	1615	1606
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1615	1606
Probability of Queue-free State, p_0,j	0.998	0.997
Major L-Shared Probability Queue-free State, p*_0,j	0.998	0.997

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	5	1
Potential Capacity, c_p,x	1075	1081
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1075	1081
Probability of Queue-free State, p_0,j	0.999	0.995

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	24	26
Potential Capacity, c_p,x	868	866
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.995	0.995
Movement Capacity, c_m,x	863	861
Probability of Queue-free State, p_0,j	0.981	0.995

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	28	32
Potential Capacity, c_p,x	979	973
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.990	0.976
Major L, Minor T Impedance Factor, p'	0.992	0.982
Capacity Adjustment Factor, f_x	0.987	0.981
Movement Capacity, c_m,x	966	954

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		27			11	
Movement Capacity, c_m,x	966	863	1075	954	861	1081
Shared Capacity, c_SH		905			969	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		3		5	10	16	1	1	4	5
Movement Capacity		1615		1606	966	863	1075	954	861	1081
Lane Configuration						LTR			LTR	
Shared Capacity						905			969	
Control Delay		7.2		7.2		9.1			8.8	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.998	0.997
Delay to Major Left-turning Vehicles, d_MLT	7.2	7.2
Major Street Through Vehicles in Shared Lane, v_i1	3	0
Major Street Turning Vehicles in Shared Lane, v_i2	8	7
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2							1500		1500			
Delay to Rank 1 Vehicles, d_Rank1							0.0		0.0			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		3		5		27			11	
Lane Capacity		1615		1606		905			969	
v/c		0.00		0.00		0.03			0.01	
95% Queue Length		0.0		0.0		0.1			0.0	
Control Delay		7.2		7.2		9.1			8.8	
LOS		A		A		A			A	
Approach Delay		2.2		6.0		9.1			8.8	
Approach LOS						A			A	
Intersction Delay		7.3								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_5-Rin-out_Radio-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Radio Ave / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Radio Ave
North/South Street Name:	Walnut Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		1	4	4			1	4	0
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		1	4	4			1	4	0
Percent Heavy Vehicles		3					3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration			LTR					LTR	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	8	13	1		2	13	2
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	9	14	1		2	14	2
Percent Heavy Vehicles	3	3	3		3	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		1		1		24			18	
Lane Capacity		1611		1605		916			904	
v/c		0.00		0.00		0.03			0.02	
95% Queue Length		0.0		0.0		0.1			0.1	
Control Delay		7.2		7.2		9.0			9.1	
LOS		A		A		A			A	
Approach Delay		0.8		1.5		9.0			9.1	
Approach LOS						A			A	
Intersction Delay		6.9								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound				SouthBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		1	4	4			1	4	0
Flow Rate, v_x		1	4	4			1	4	0

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	8	13	1		2	13	2
Flow Rate, v_x	9	14	1		2	14	2

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		1	4	4			1	4	0
Conflicting Flow, v_c,x		4					9		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	9	14	1		2	14	2
Conflicting Flow, v_c,x	23	15	7		23	17	4

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.1	6.5	6.2	7.1	6.5	6.2
Stage I										
Stage II										
t_c,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		0.9		0.9	0.9	0.9	0.9	0.9	0.9	0.9
P_HV		0.03		0.03	0.03	0.03	0.03	0.03	0.03	0.03
t_f		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		4		9	23	15	7	23	17	4
t_c,x		4.13		4.13	7.13	6.53	6.23	7.13	6.53	6.23
t_f,x		2.23		2.23	3.53	4.03	3.33	3.53	4.03	3.33
c_p,x		1611		1605	986	877	1073	987	875	1076

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	4	9
Potential Capacity, c_p,x	1611	1605
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1611	1605
Probability of Queue-free State, p_0,j	0.999	0.999
Major L-Shared Probability Queue-free State, p*_0,j	0.999	0.999

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	7	4
Potential Capacity, c_p,x	1073	1076
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	1073	1076
Probability of Queue-free State, p_0,j	0.999	0.998

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	15	17
Potential Capacity, c_p,x	877	875
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.999	0.999
Movement Capacity, c_m,x	876	873
Probability of Queue-free State, p_0,j	0.984	0.984

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	23	23
Potential Capacity, c_p,x	986	987
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"	0.982	0.983
Major L, Minor T Impedance Factor, p'	0.987	0.987
Capacity Adjustment Factor, f_x	0.985	0.986
Movement Capacity, c_m,x	971	972

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		24			18	
Movement Capacity, c_m,x	971	876	1073	972	873	1076
Shared Capacity, c_SH		916			904	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		1		1	9	14	1	2	14	2
Movement Capacity		1611		1605	971	876	1073	972	873	1076
Lane Configuration						LTR			LTR	
Shared Capacity						916			904	
Control Delay		7.2		7.2		9.0			9.1	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	EB	WB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.999	0.999
Delay to Major Left-turning Vehicles, d_MLT	7.2	7.2
Major Street Through Vehicles in Shared Lane, v_i1	4	4
Major Street Turning Vehicles in Shared Lane, v_i2	5	1
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

	1U	1	4U	4	7	8	9	10	11	12
Saturation Flow Rate for Major Street Right-Turn, s_i2						1500		1500		
Delay to Rank 1 Vehicles, d_Rank1						0.0		0.0		

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration						LTR			LTR	
Flow Rate		1		1		24			18	
Lane Capacity		1611		1605		916			904	
v/c		0.00		0.00		0.03			0.02	
95% Queue Length		0.0		0.0		0.1			0.1	
Control Delay		7.2		7.2		9.0			9.1	
LOS		A		A		A			A	
Approach Delay		0.8		1.5		9.0			9.1	
Approach LOS						A			A	
Intersction Delay		6.9								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_5-Rin-out_Radio-US 41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Radio Ave / US 41
Major Street Direction:	North-South
East/West Street Name:	Radio Ave
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			1077	5				1167	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			1171	5				1268	
Percent Heavy Vehicles									
Number of Lanes	0	0	2	0		0	0	2	0
Lane Configuration			T	TR				T	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume			18				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR			20				
Percent Heavy Vehicles			3				
Number of Lanes	0	0	1		0	0	0
Lane Configuration			R				
RT channelized?			No				
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration							R			
Flow Rate							20			
Lane Capacity							450			
v/c							0.04			
95% Queue Length							0.1			
Control Delay							13.4			
LOS							B			
Approach Delay						13.4				
Approach LOS						B				
Intersction Delay		0.1								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			1077	5				1167	
Flow Rate, v_x			1171	5				1268	

Minor Street:

Approach		WestBound					EastBound		
Movement		7	8	9	|		10	11	12
		L	T	R	|		L	T	R
Volume, V_x				18					
Flow Rate, v_x				20					

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			1171	5				1268	
Conflicting Flow, v_c,x									

Minor Street:

Approach		WestBound					EastBound		
Movement		7	8	9	|		10	11	12
		L	T	R	|		L	T	R
Flow Rate, v_x				20					
Conflicting Flow, v_c,x				588					

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage							6.9			
Stage I										
Stage II										
t_c,HV							2.0			
P_HV							0.03			
t_c,G							0.1			
G							0			
t_3,LT							0.0			
t_c										
Single Stage							6.96			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base							3.3			
t_f,HV							1.0			
P_HV							0.03			
t_f							3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x							588			
t_c,x							6.96			
t_f,x							3.33			
c_p,x							450			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach NB SB WB EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	588	
Potential Capacity, c_p,x	450	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	450	
Probability of Queue-free State, p_0,j	0.956	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration			R			
Shared Flow Rate, v_y			20			
Movement Capacity, c_m,x			450			
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate							20			
Movement Capacity							450			
Lane Configuration							R			
Shared Capacity										
Control Delay							13.4			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration							R			
Flow Rate							20			
Lane Capacity							450			
v/c							0.04			
95% Queue Length							0.1			
Control Delay							13.4			

LOS			B
Approach Delay		13.4	
Approach LOS		B	
Intersction Delay	0.1		

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_5-Rin-out_Radio-US 41-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Radio Ave / US 41
Major Street Direction:	North-South
East/West Street Name:	Radio Ave
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			1040	4				1388	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			1130	4				1509	
Percent Heavy Vehicles									
Number of Lanes	0	0	2	0		0	0	2	0
Lane Configuration			T	TR				T	
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume			5				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR			5				
Percent Heavy Vehicles			3				
Number of Lanes	0	0	1		0	0	0
Lane Configuration			R				
RT channelized?			No				
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration							R			
Flow Rate							5			
Lane Capacity							464			
v/c							0.01			
95% Queue Length							0.0			
Control Delay							12.9			
LOS							B			
Approach Delay						12.9				
Approach LOS						B				
Intersction Delay		0.0								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			1040	4				1388	
Flow Rate, v_x			1130	4				1509	

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x			5				
Flow Rate, v_x			5				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			1130	4				1509	
Conflicting Flow, v_c,x									

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x			5				
Conflicting Flow, v_c,x			567				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage							6.9			
Stage I										
Stage II										
t_c,HV							2.0			
P_HV							0.03			
t_c,G							0.1			
G							0			
t_3,LT							0.0			
t_c										
Single Stage							6.96			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base							3.3			
t_f,HV							1.0			
P_HV							0.03			
t_f							3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x							567			
t_c,x							6.96			
t_f,x							3.33			
c_p,x							464			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	567	
Potential Capacity, c_p,x	464	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	464	
Probability of Queue-free State, p_0,j	0.988	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration			R			
Shared Flow Rate, v_y			5			
Movement Capacity, c_m,x			464			
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate							5			
Movement Capacity							464			
Lane Configuration							R			
Shared Capacity										
Control Delay							12.9			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration							R			
Flow Rate							5			
Lane Capacity							464			
v/c							0.01			
95% Queue Length							0.0			
Control Delay							12.9			

LOS			B
Approach Delay		12.9	
Approach LOS		B	
Intersction Delay	0.0		

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_5-Rin-out_Campbell-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Campbell Road
North/South Street Name:	Walnut Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			5	3			1	16	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			5	3			1	17	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	1		0	1	1	0
Lane Configuration			T	R			L	T	
Median Type					Undivided				
Median Storage									
RT channelized?				No					
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	18		3				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	20		3				
Percent Heavy Vehicles	3		3				
Number of Lanes	1	0	1		0	0	0
Lane Configuration	L		R				
RT channelized?			No				
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				1	20		3			
Lane Capacity				1605	987		1075			
v/c				0.00	0.02		0.00			
95% Queue Length				0.0	0.1		0.0			
Control Delay				7.2	8.7		8.4			
LOS				A	A		A			
Approach Delay				0.4		8.7				
Approach LOS						A				
Intersction Delay		4.1								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound			SouthBound		
Priority	7	8	9	10	11	12
Movement	L	T	R	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound				WestBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume, V_x			5	3		1	16	
Flow Rate, v_x			5	3		1	17	

Minor Street:

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume, V_x	18		3			
Flow Rate, v_x	20		3			

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound				WestBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Flow Rate, v_x			5	3		1	17	
Conflicting Flow, v_c,x						9		

Minor Street:

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Flow Rate, v_x	20		3			
Conflicting Flow, v_c,x	25		5			

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				9	25		5			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1605	988		1075			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		9
Potential Capacity, c_p,x		1605
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1605
Probability of Queue-free State, p_0,j		0.999
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	5	
Potential Capacity, c_p,x	1075	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	1075	
Probability of Queue-free State, p_0,j	0.997	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	25	
Potential Capacity, c_p,x	988	
Pedestrian Impedance Factor, p_p,x	1.000	
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x	0.999	
Movement Capacity, c_m,x	987	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration	L		R			
Shared Flow Rate, v_y	20		3			
Movement Capacity, c_m,x	987		1075			
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				1	20		3			
Movement Capacity				1605	987		1075			
Lane Configuration				L	L		R			
Shared Capacity										
Control Delay				7.2	8.7		8.4			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				1	20		3			
Lane Capacity				1605	987		1075			
v/c				0.00	0.02		0.00			
95% Queue Length				0.0	0.1		0.0			
Control Delay				7.2	8.7		8.4			

LOS		A	A		A
Approach Delay		0.4		8.7	
Approach LOS				A	
Intersction Delay	4.1				

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_5-Rin-out_Campbell-Walnut-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell Rd / Walnut Rd
Major Street Direction:	East-West
East/West Street Name:	Campbell Road
North/South Street Name:	Walnut Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			19	22			1	6	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			21	24			1	7	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	1		0	1	1	0
Lane Configuration			T	R			L	T	
Median Type					Undivided				
Median Storage									
RT channelized?				No					
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	10		0				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	11		0				
Percent Heavy Vehicles	3		3				
Number of Lanes	1	0	1		0	0	0
Lane Configuration	L		R				
RT channelized?			No				
Flared Approach | Storage		|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				1	11		0			
Lane Capacity				1557	982		1054			
v/c				0.00	0.01		0.00			
95% Queue Length				0.0	0.0		0.0			
Control Delay				7.3	8.7		8.4			
LOS				A	A		A			
Approach Delay				1.0		8.7				
Approach LOS						A				
Intersction Delay		1.6								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound				SouthBound		
Priority	7	8	9 |		10	11	12
Movement	L	T	R |		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3 |	4U		4	5	6
	U	L	T	R |	U		L	T	R
Volume, V_x			19	22			1	6	
Flow Rate, v_x			21	24			1	7	

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9 |		10	11	12
	L	T	R |		L	T	R
Volume, V_x	10		0				
Flow Rate, v_x	11		0				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3 |	4U		4	5	6
	U	L	T	R |	U		L	T	R
Flow Rate, v_x			21	24			1	7	
Conflicting Flow, v_c,x							45		

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9 |		10	11	12
	L	T	R |		L	T	R
Flow Rate, v_x	11		0				
Conflicting Flow, v_c,x	29		21				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				45	29		21			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1557	983		1054			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		45
Potential Capacity, c_p,x		1557
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1557
Probability of Queue-free State, p_0,j		0.999
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	21	
Potential Capacity, c_p,x	1054	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	1054	
Probability of Queue-free State, p_0,j	1.000	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	29	
Potential Capacity, c_p,x	983	
Pedestrian Impedance Factor, p_p,x	1.000	
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x	0.999	
Movement Capacity, c_m,x	982	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration	L		R			
Shared Flow Rate, v_y	11		0			
Movement Capacity, c_m,x	982		1054			
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				1	11		0			
Movement Capacity				1557	982		1054			
Lane Configuration				L	L		R			
Shared Capacity										
Control Delay				7.3	8.7		8.4			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				L	L		R			
Flow Rate				1	11		0			
Lane Capacity				1557	982		1054			
v/c				0.00	0.01		0.00			
95% Queue Length				0.0	0.0		0.0			
Control Delay				7.3	8.7		8.4			

LOS		A	A		A	
Approach Delay		1.0		8.7		
Approach LOS				A		
Intersction Delay	1.6					

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_5-Rin-out_Campbell-OSR-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell Rd / OSR
Major Street Direction:	East-West
East/West Street Name:	Campbell Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		47	32					14	22
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		51	35					15	24
Percent Heavy Vehicles		3							
Number of Lanes	0	1	1	0		0	0	1	1
Lane Configuration		L	T					T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					18		81
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					20		88
Percent Heavy Vehicles					3		3
Number of Lanes	0	0	0		1	0	1
Lane Configuration					L		R
RT channelized?							No
Flared Approach | Storage		|				|	
Percent Grade						0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0		0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		51						20		88
Lane Capacity		1564						810		1061
v/c		0.03						0.02		0.08
95% Queue Length		0.1						0.1		0.3
Control Delay		7.4						9.6		8.7
LOS		A						A		A
Approach Delay		4.4							8.9	
Approach LOS									A	
Intersction Delay		5.7								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		NorthBound					SouthBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		47	32					14	22
Flow Rate, v_x		51	35					15	24

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					18		81
Flow Rate, v_x					20		88

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		51	35					15	24
Conflicting Flow, v_c,x		39							

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					20		88
Conflicting Flow, v_c,x					152		15

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1						7.1		6.2
Stage I										
Stage II										
t_c,HV		1.0						1.0		1.0
P_HV		0.03						0.03		0.03
t_c,G								0.2		0.1
G								0		0
t_3,LT		0.0						0.7		0.0
t_c										
Single Stage		4.13						6.43		6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.03						0.03		0.03
t_f		2.23						3.53		3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		39						152		15
t_c,x		4.13						6.43		6.23
t_f,x		2.23						3.53		3.33
c_p,x		1564						837		1061

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0		0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				
Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x		39		
Potential Capacity, c_p,x		1564		
Pedestrian Impedance Factor, p_p,x		1.000		
Movement Capacity, c_m,x		1564		
Probability of Queue-free State, p_0,j		0.967		
Major L-Shared Probability Queue-free State, p*_0,j				
Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x			15	
Potential Capacity, c_p,x			1061	
Pedestrian Impedance Factor, p_p,x			1.000	
Movement Capacity, c_m,x			1061	
Probability of Queue-free State, p_0,j			0.917	
Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				
Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				
Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x			152	
Potential Capacity, c_p,x			837	
Pedestrian Impedance Factor, p_p,x			1.000	
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x			0.967	
Movement Capacity, c_m,x			810	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration				L		R
Shared Flow Rate, v_y				20		88
Movement Capacity, c_m,x				810		1061
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		51						20		88
Movement Capacity		1564						810		1061
Lane Configuration		L						L		R
Shared Capacity										
Control Delay		7.4						9.6		8.7

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		51						20		88
Lane Capacity		1564						810		1061
v/c		0.03						0.02		0.08
95% Queue Length		0.1						0.1		0.3
Control Delay		7.4						9.6		8.7

LOS	A	A		A
Approach Delay	4.4		8.9	
Approach LOS			A	
Intersction Delay	5.7			

This TWSC text report was created in HCS™ TWSC Version 7.8 on 8/20/2019 9:58:26 AM

HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_5-Rin-out_Campbell-OSR-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Campbell Rd / OSR
Major Street Direction:	East-West
East/West Street Name:	Campbell Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		56	22					11	9
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		61	24					12	10
Percent Heavy Vehicles		3							
Number of Lanes	0	1	1	0		0	0	1	1
Lane Configuration		L	T					T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					33		42
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					36		46
Percent Heavy Vehicles					3		3
Number of Lanes	0	0	0		1	0	1
Lane Configuration					L		R
RT channelized?							No
Flared Approach | Storage		|				|	
Percent Grade						0	

Pedestrian Volumes and Adjustments

Approach	EB	WB	NB	SB
Movement	13	14	15	16
Flow (ped/hr)	0	0		0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		61						36		46
Lane Capacity		1587						799		1066
v/c		0.04						0.04		0.04
95% Queue Length		0.1						0.1		0.1
Control Delay		7.4						9.7		8.5
LOS		A						A		A
Approach Delay		5.3							9.1	
Approach LOS									A	
Intersction Delay		6.3								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		EastBound					WestBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	NorthBound				SouthBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		56	22					11	9
Flow Rate, v_x		61	24					12	10

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					33		42
Flow Rate, v_x					36		46

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		EastBound					WestBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		61	24					12	10
Conflicting Flow, v_c,x		22							

Minor Street:

Approach	NorthBound				SouthBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					36		46
Conflicting Flow, v_c,x					158		12

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1						7.1		6.2
Stage I										
Stage II										
t_c,HV		1.0						1.0		1.0
P_HV		0.03						0.03		0.03
t_c,G								0.2		0.1
G								0		0
t_3,LT		0.0						0.7		0.0
t_c										
Single Stage		4.13						6.43		6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.03						0.03		0.03
t_f		2.23						3.53		3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	EB		WB			NorthBound			SouthBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		22						158		12
t_c,x		4.13						6.43		6.23
t_f,x		2.23						3.53		3.33
c_p,x		1587						831		1066

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	EB	WB	NB	SB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0		0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	22	
Potential Capacity, c_p,x	1587	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	1587	
Probability of Queue-free State, p_0,j	0.962	
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x		12
Potential Capacity, c_p,x		1066
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1066
Probability of Queue-free State, p_0,j		0.957

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x		158
Potential Capacity, c_p,x		831
Pedestrian Impedance Factor, p_p,x		1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		0.962
Movement Capacity, c_m,x		799

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	NorthBound			SouthBound		
Movement	7	8	9	10	11	12
Lane Configuration				L		R
Shared Flow Rate, v_y				36		46
Movement Capacity, c_m,x				799		1066
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		61						36		46
Movement Capacity		1587						799		1066
Lane Configuration		L						L		R
Shared Capacity										
Control Delay		7.4						9.7		8.5

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	EB		WB		NorthBound			SouthBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L						L		R
Flow Rate		61						36		46
Lane Capacity		1587						799		1066
v/c		0.04						0.04		0.04
95% Queue Length		0.1						0.1		0.1
Control Delay		7.4						9.7		8.5

LOS	A		A		A
Approach Delay	5.3			9.1	
Approach LOS				A	
Intersction Delay	6.3				

This TWSC text report was created in HCS™ TWSC Version 7.8 on 8/20/2019 10:00:26 AM

HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM__5-Rin-out_Old State-US 41.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	8/2/2019
Time Analyzed:	5_Rin-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Old State Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Old State Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	0	1258	14		0	4	1180	49
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		0	1367	15			4	1283	53
Percent Heavy Vehicles	3	0				3	3		
Number of Lanes	0	1	2	0		0	1	2	1
Lane Configuration		L	T	TR			L	T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	26	19	6		89	32	8
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	28	21	7		97	35	9
Percent Heavy Vehicles	0	3	3		0	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		0		4		55			140	
Lane Capacity		523		486						
v/c		0.00		0.01						
95% Queue Length		0.0		0.0						
Control Delay		11.9		12.5						
LOS		B		B						
Approach Delay		0.0		0.0						
Approach LOS										
Intersction Delay										

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach		WestBound					EastBound		
Priority		7	8	9	|		10	11	12
Movement		L	T	R	|		L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x	0	0	1258	14		0	4	1180	49
Flow Rate, v_x		0	1367	15			4	1283	53

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	26	19	6		89	32	8
Flow Rate, v_x	28	21	7		97	35	9

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		0	1367	15			4	1283	53
Conflicting Flow, v_c,x		1336					1383		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	28	21	7		97	35	9
Conflicting Flow, v_c,x	2042	2720	691		1985	2674	641

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.5	6.5	6.9	7.5	6.5	6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
P_HV		0.00		0.03	0.00	0.03	0.03	0.00	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.10		4.16	7.50	6.56	6.96	7.50	6.56	6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.00		0.03	0.00	0.03	0.03	0.00	0.03	0.03
t_f		2.20		2.23	3.50	4.03	3.33	3.50	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1336		1383	2042	2720	691	1985	2674	641
t_c,x		4.10		4.16	7.50	6.56	6.96	7.50	6.56	6.96
t_f,x		2.20		2.23	3.50	4.03	3.33	3.50	4.03	3.33
c_p,x		523		486	34	20	384	37	22	415

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1336	1383
Potential Capacity, c_p,x	523	486
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	523	486
Probability of Queue-free State, p_0,j	1.000	0.991
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	691	641
Potential Capacity, c_p,x	384	415
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	384	415
Probability of Queue-free State, p_0,j	0.983	0.979

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	2720	2674
Potential Capacity, c_p,x	20	22
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.991	0.991
Movement Capacity, c_m,x	20	21
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	2042	1985
Potential Capacity, c_p,x	34	37
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		55			140	
Movement Capacity, c_m,x		20	384		21	415
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		0		4	28	21	7	97	35	9
Movement Capacity		523		486		20	384		21	415
Lane Configuration		L		L		LTR			LTR	
Shared Capacity										
Control Delay		11.9		12.5						

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		0		4		55			140	
Lane Capacity		523		486						
v/c		0.00		0.01						
95% Queue Length		0.0		0.0						
Control Delay		11.9		12.5						

LOS	B	B
Approach Delay	0.0	0.0
Approach LOS		
Intersction Delay		

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM__5-Rin-out_Old State-US 41.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	8/2/2019
Time Analyzed:	5_Rin-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Old State Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Old State Road
North/South Street Name:	US 41
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume	0	8	1166	21		0	9	1414	161
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		9	1267	23			10	1537	175
Percent Heavy Vehicles	3	0				3	3		
Number of Lanes	0	1	2	0		0	1	2	1
Lane Configuration		L	T	TR			L	T	R
Median Type					Undivided				
Median Storage									
RT channelized?									No
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	24	25	5		48	19	5
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	26	27	5		52	21	5
Percent Heavy Vehicles	0	3	3		0	3	3
Number of Lanes	0	1	0		0	1	0
Lane Configuration		LTR				LTR	
RT channelized?							
Flared Approach | Storage	No	|			No	|	
Percent Grade		0				0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		9		10		59			78	
Lane Capacity		376		528						
v/c		0.02		0.02						
95% Queue Length		0.1		0.1						
Control Delay		14.8		11.9						
LOS		B		B						
Approach Delay		0.1		0.1						
Approach LOS										
Interstction Delay										

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound			EastBound		
Priority	7	8	9	10	11	12
Movement	L	T	R	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume, V_x	0	8	1166	21	0	9	1414	161
Flow Rate, v_x		9	1267	23		10	1537	175

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume, V_x	24	25	5	48	19	5
Flow Rate, v_x	26	27	5	52	21	5

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Flow Rate, v_x		9	1267	23		10	1537	175
Conflicting Flow, v_c,x		1712				1290		

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Flow Rate, v_x	26	27	5	52	21	5
Conflicting Flow, v_c,x	2095	3028	645	2221	2864	768

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1		4.1	7.5	6.5	6.9	7.5	6.5	6.9
Stage I										
Stage II										
t_c,HV		2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0
P_HV		0.00		0.03	0.00	0.03	0.03	0.00	0.03	0.03
t_c,G					0.2	0.2	0.1	0.2	0.2	0.1
G					0	0	0	0	0	0
t_3,LT		0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
t_c										
Single Stage		4.10		4.16	7.50	6.56	6.96	7.50	6.56	6.96
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2		2.2	3.5	4.0	3.3	3.5	4.0	3.3
t_f,HV		1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0
P_HV		0.00		0.03	0.00	0.03	0.03	0.00	0.03	0.03
t_f		2.20		2.23	3.50	4.03	3.33	3.50	4.03	3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		1712		1290	2095	3028	645	2221	2864	768
t_c,x		4.10		4.16	7.50	6.56	6.96	7.50	6.56	6.96
t_f,x		2.20		2.23	3.50	4.03	3.33	3.50	4.03	3.33
c_p,x		376		528	31	13	412	25	16	342

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x	1712	1290
Potential Capacity, c_p,x	376	528
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	376	528
Probability of Queue-free State, p_0,j	0.977	0.981
Major L-Shared Probability Queue-free State, p*_0,j		

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	645	768
Potential Capacity, c_p,x	412	342
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Movement Capacity, c_m,x	412	342
Probability of Queue-free State, p_0,j	0.987	0.984

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x	3028	2864
Potential Capacity, c_p,x	13	16
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Capacity Adjustment Factor, f_x	0.959	0.959
Movement Capacity, c_m,x	12	15
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	2095	2221
Potential Capacity, c_p,x	31	25
Pedestrian Impedance Factor, p_p,x	1.000	1.000
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LTR			LTR	
Shared Flow Rate, v_y		59			78	
Movement Capacity, c_m,x		12	412		15	342
Shared Capacity, c_SH						

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		9		10	26	27	5	52	21	5
Movement Capacity		376		528		12	412		15	342
Lane Configuration		L		L		LTR			LTR	
Shared Capacity										
Control Delay		14.8		11.9						

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		L		L		LTR			LTR	
Flow Rate		9		10		59			78	
Lane Capacity		376		528						
v/c		0.02		0.02						
95% Queue Length		0.1		0.1						
Control Delay		14.8		11.9						

LOS	B	B
Approach Delay	0.1	0.1
Approach LOS		
Intersction Delay		

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_R-in-out_Old State-Wortman-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Old State Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Wortman Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		16	110					67	9
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		17	120					73	10
Percent Heavy Vehicles		0							
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration		LT							TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					23		31
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					25		34
Percent Heavy Vehicles					0		3
Number of Lanes	0	0	0		0	1	0
Lane Configuration						LR	
RT channelized?							
Flared Approach | Storage		|			No	|	
Percent Grade						0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0		0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		LT							LR	
Flow Rate		17							59	
Lane Capacity		1527							868	
v/c		0.01							0.07	
95% Queue Length		0.0							0.2	
Control Delay		7.4							9.5	
LOS		A							A	
Approach Delay		1.0							9.5	
Approach LOS									A	
Intersction Delay		2.5								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		16	110					67	9
Flow Rate, v_x		17	120					73	10

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					23		31
Flow Rate, v_x					25		34

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		17	120					73	10
Conflicting Flow, v_c,x		83							

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					25		34
Conflicting Flow, v_c,x					232		78

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1						7.1		6.2
Stage I										
Stage II										
t_c,HV		1.0						1.0		1.0
P_HV		0.00						0.00		0.03
t_c,G								0.2		0.1
G								0		0
t_3,LT		0.0						0.7		0.0
t_c										
Single Stage		4.10						6.40		6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.00						0.00		0.03
t_f		2.20						3.50		3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		83						232		78
t_c,x		4.10						6.40		6.23
t_f,x		2.20						3.50		3.33
c_p,x		1527						761		980

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0		0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				
Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x		83		
Potential Capacity, c_p,x		1527		
Pedestrian Impedance Factor, p_p,x		1.000		
Movement Capacity, c_m,x		1527		
Probability of Queue-free State, p_0,j		0.989		
Major L-Shared Probability Queue-free State, p*_0,j		0.988		
Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x			78	
Potential Capacity, c_p,x			980	
Pedestrian Impedance Factor, p_p,x			1.000	
Movement Capacity, c_m,x			980	
Probability of Queue-free State, p_0,j			0.966	
Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				
Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				
Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x			232	
Potential Capacity, c_p,x			761	
Pedestrian Impedance Factor, p_p,x			1.000	
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x			0.988	
Movement Capacity, c_m,x			751	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration					LR	
Shared Flow Rate, v_y					59	
Movement Capacity, c_m,x				751		980
Shared Capacity, c_SH					868	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		17						25		34
Movement Capacity		1527						751		980
Lane Configuration		LT							LR	
Shared Capacity									868	
Control Delay		7.4							9.5	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	NB	SB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.988	
Delay to Major Left-turning Vehicles, d_MLT	7.4	
Major Street Through Vehicles in Shared Lane, v_i1	120	
Major Street Turning Vehicles in Shared Lane, v_i2	17	
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2 1500
Delay to Rank 1 Vehicles, d_Rank1 0.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		LT							LR	
Flow Rate		17							59	
Lane Capacity		1527							868	
v/c		0.01							0.07	
95% Queue Length		0.0							0.2	
Control Delay		7.4							9.5	
LOS		A							A	
Approach Delay		1.0							9.5	
Approach LOS									A	
Intersction Delay		2.5								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_5-Rin-out_OSR-Wortman-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5-Rin-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Old State Rd / US 41
Major Street Direction:	North-South
East/West Street Name:	Wortman Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume		28	94					146	35
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR		30	102					159	38
Percent Heavy Vehicles		0							
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration		LT							TR
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume					19		23
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR					21		25
Percent Heavy Vehicles					0		3
Number of Lanes	0	0	0		0	1	0
Lane Configuration						LR	
RT channelized?							
Flared Approach | Storage		|			No	|	
Percent Grade						0	

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0		0
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		LT							LR	
Flow Rate		30							46	
Lane Capacity		1388							748	
v/c		0.02							0.06	
95% Queue Length		0.1							0.2	
Control Delay		7.7							10.1	
LOS		A							B	
Approach Delay		1.9							10.1	
Approach LOS									B	
Intersction Delay		1.9								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x		28	94					146	35
Flow Rate, v_x		30	102					159	38

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x					19		23
Flow Rate, v_x					21		25

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x		30	102					159	38
Conflicting Flow, v_c,x		197							

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x					21		25
Conflicting Flow, v_c,x					341		178

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage		4.1						7.1		6.2
Stage I										
Stage II										
t_c,HV		1.0						1.0		1.0
P_HV		0.00						0.00		0.03
t_c,G								0.2		0.1
G								0		0
t_3,LT		0.0						0.7		0.0
t_c										
Single Stage		4.10						6.40		6.23
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base		2.2						3.5		3.3
t_f,HV		0.9						0.9		0.9
P_HV		0.00						0.00		0.03
t_f		2.20						3.50		3.33

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x		197						341		178
t_c,x		4.10						6.40		6.23
t_f,x		2.20						3.50		3.33
c_p,x		1388						659		863

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0		0
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x		197		
Potential Capacity, c_p,x		1388		
Pedestrian Impedance Factor, p_p,x		1.000		
Movement Capacity, c_m,x		1388		
Probability of Queue-free State, p_0,j		0.978		
Major L-Shared Probability Queue-free State, p*_0,j		0.977		

Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x			178	
Potential Capacity, c_p,x			863	
Pedestrian Impedance Factor, p_p,x			1.000	
Movement Capacity, c_m,x			863	
Probability of Queue-free State, p_0,j			0.971	

Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				

Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				

Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x			341	
Potential Capacity, c_p,x			659	
Pedestrian Impedance Factor, p_p,x			1.000	
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x			0.977	
Movement Capacity, c_m,x			644	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach		WestBound			EastBound	
Movement	7	8	9	10	11	12
Lane Configuration					LR	
Shared Flow Rate, v_y					46	
Movement Capacity, c_m,x				644		863
Shared Capacity, c_SH					748	

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate		30						21		25
Movement Capacity		1388						644		863
Lane Configuration		LT							LR	
Shared Capacity									748	
Control Delay		7.7							10.1	

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	NB	SB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j	0.977	
Delay to Major Left-turning Vehicles, d_MLT	7.7	
Major Street Through Vehicles in Shared Lane, v_i1	102	
Major Street Turning Vehicles in Shared Lane, v_i2	30	
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2 1500
Delay to Rank 1 Vehicles, d_Rank1 0.2

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration		LT							LR	
Flow Rate		30							46	
Lane Capacity		1388							748	
v/c		0.02							0.06	
95% Queue Length		0.1							0.2	
Control Delay		7.7							10.1	
LOS		A							B	
Approach Delay		1.9							10.1	
Approach LOS									B	
Intersction Delay		1.9								

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HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_AM_5-Rin-out_Hillsdale-OSR-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5_R-in-out AM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Old State
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			123	29			22	76	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			134	32			24	83	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration				TR			LT		
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	39		8				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	42		9				
Percent Heavy Vehicles	3		3				
Number of Lanes	0	1	0		0	0	0
Lane Configuration		LR					
RT channelized?							
Flared Approach | Storage	No	|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				24		51				
Lane Capacity				1407		723				
v/c				0.02		0.07				
95% Queue Length				0.1		0.2				
Control Delay				7.6		10.4				
LOS				A		B				
Approach Delay				1.8		10.4				
Approach LOS						B				
Intersction Delay		2.2								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound			EastBound		
Priority	7	8	9	10	11	12
Movement	L	T	R	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Volume, V_x			123	29		22	76	
Flow Rate, v_x			134	32		24	83	

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume, V_x	39		8			
Flow Rate, v_x	42		9			

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound				SouthBound		
Movement	1U	1	2	3	4U	4	5	6
	U	L	T	R	U	L	T	R
Flow Rate, v_x			134	32		24	83	
Conflicting Flow, v_c,x						165		

Minor Street:

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Flow Rate, v_x	42		9			
Conflicting Flow, v_c,x	280		149			

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				165	280		149			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1407	708		894			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements	1	4
Conflicting Flow, v_c,x		165
Potential Capacity, c_p,x		1407
Pedestrian Impedance Factor, p_p,x		1.000
Movement Capacity, c_m,x		1407
Probability of Queue-free State, p_0,j		0.983
Major L-Shared Probability Queue-free State, p*_0,j		0.982

Minor-Street Right-Turn Movements	9	12
Conflicting Flow, v_c,x	149	
Potential Capacity, c_p,x	894	
Pedestrian Impedance Factor, p_p,x	1.000	
Movement Capacity, c_m,x	894	
Probability of Queue-free State, p_0,j	0.990	

Major-Street U-Turn Movements	1U	4U
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Shared L/U Capacity, c_SH		
Probability of Queue-free State, p_0,j		

Minor-Street Through Movements	8	11
Conflicting Flow, v_c,x		
Potential Capacity, c_p,x		
Pedestrian Impedance Factor, p_p,x		
Capacity Adjustment Factor, f_x		
Movement Capacity, c_m,x		
Probability of Queue-free State, p_0,j		

Minor-Street Left-Turn Movements	7	10
Conflicting Flow, v_c,x	280	
Potential Capacity, c_p,x	708	
Pedestrian Impedance Factor, p_p,x	1.000	
Major L, Minor T Adjusted Impedance Factor, p"		
Major L, Minor T Impedance Factor, p'		
Capacity Adjustment Factor, f_x	0.982	
Movement Capacity, c_m,x	695	

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach	WestBound			EastBound		
Movement	7	8	9	10	11	12
Lane Configuration		LR				
Shared Flow Rate, v_y		51				
Movement Capacity, c_m,x	695		894			
Shared Capacity, c_SH		723				

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				24	42		9			
Movement Capacity				1407	695		894			
Lane Configuration				LT		LR				
Shared Capacity						723				
Control Delay				7.6		10.4				

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	NB	SB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j		0.982
Delay to Major Left-turning Vehicles, d_MLT		7.6
Major Street Through Vehicles in Shared Lane, v_i1		83
Major Street Turning Vehicles in Shared Lane, v_i2		24
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

Saturation Flow Rate for Major Street Right-Turn, s_i2 1500
Delay to Rank 1 Vehicles, d_Rank1 0.1

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				24		51				
Lane Capacity				1407		723				
v/c				0.02		0.07				
95% Queue Length				0.1		0.2				
Control Delay				7.6		10.4				
LOS				A		B				
Approach Delay				1.8		10.4				
Approach LOS						B				
Intersction Delay		2.2								

This TWSC text report was created in HCS™ TWSC Version 7.8 on 8/20/2019 9:33:41 AM

HCS7 Two-Way Stop-Control Text Report

TWO-WAY STOP CONTROL (TWSC) Analysis

File Name:	2045_PM_5-Rin-out_Hillsdale-OSR-x.xtw
Analyst:	MJK
Agency:	INDOT
Date Performed:	5/29/2019
Time Analyzed:	5_R-in-out PM Peak
Jurisdiction:	Vincennes
Analysis Year:	2045
Project Description:	US 41 / Hillsdale
Units:	U.S. Customary
Intersection Name:	Hillsdale Rd / Old State
Major Street Direction:	North-South
East/West Street Name:	Hillsdale Road
North/South Street Name:	Old State Road
Analysis Time Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume			108	34			11	156	
Peak Hour Factor, PHF					0.92				
Hourly Flow Rtae, HFR			117	37			12	170	
Percent Heavy Vehicles							3		
Number of Lanes	0	0	1	0		0	0	1	0
Lane Configuration				TR			LT		
Median Type					Undivided				
Median Storage									
RT channelized?									
Left-Turn Lane Storage									
Upstream Signal?					Not Present				

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume	20		14				
Peak Hour Factor, PHF				0.92			
Hourly Flow Rtae, HFR	22		15				
Percent Heavy Vehicles	3		3				
Number of Lanes	0	1	0		0	0	0
Lane Configuration		LR					
RT channelized?							
Flared Approach | Storage	No	|				|	
Percent Grade		0					

Pedestrian Volumes and Adjustments

Approach	NB	SB	WB	EB
Movement	13	14	15	16
Flow (ped/hr)	0	0	0	
Lane Width (ft)				
Walking Speed (ft/sec)				
Pedestrian Blockage Factor, f_pb				

Delay, Queue Length, and Level of Service

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				12		37				
Lane Capacity				1420		742				
v/c				0.01		0.05				
95% Queue Length				0.0		0.2				
Control Delay				7.6		10.1				
LOS				A		B				
Approach Delay				0.6		10.1				
Approach LOS						B				
Interstion Delay		1.3								

Step 1: MOVEMENT PRIORITIES

Major Street:

Approach		NorthBound					SouthBound		
Priority	1U	1	2	3	|	4U	4	5	6
Movement	U	L	T	R	|	U	L	T	R

Minor Street:

Approach	WestBound				EastBound		
Priority	7	8	9	|	10	11	12
Movement	L	T	R	|	L	T	R

Step 2: MOVEMENT DEMAND VOLUMES AND FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Volume, V_x			108	34			11	156	
Flow Rate, v_x			117	37			12	170	

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Volume, V_x	20		14				
Flow Rate, v_x	22		15				

Step 3: CONFLICTING FLOW RATES

Major Street:

Approach		NorthBound					SouthBound		
Movement	1U	1	2	3	|	4U	4	5	6
	U	L	T	R	|	U	L	T	R
Flow Rate, v_x			117	37			12	170	
Conflicting Flow, v_c,x							154		

Minor Street:

Approach	WestBound				EastBound		
Movement	7	8	9	|	10	11	12
	L	T	R	|	L	T	R
Flow Rate, v_x	22		15				
Conflicting Flow, v_c,x	329		136				

Step 4: CRITICAL HEADWAYS and FOLLOW-UP HEADWAYS

CRITICAL HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_c,base										
Single Stage				4.1	7.1		6.2			
Stage I										
Stage II										
t_c,HV				1.0	1.0		1.0			
P_HV				0.03	0.03		0.03			
t_c,G					0.2		0.1			
G					0		0			
t_3,LT				0.0	0.7		0.0			
t_c										
Single Stage				4.13	6.43		6.23			
Stage I										
Stage II										

FOLLOW-UP HEADWAYS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
t_f,base				2.2	3.5		3.3			
t_f,HV				0.9	0.9		0.9			
P_HV				0.03	0.03		0.03			
t_f				2.23	3.53		3.33			

Step 5: POTENTIAL CAPACITIES

NO UPSTREAM SIGNAL EFFECTS PRESENT

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
	U	L	U	L	L	T	R	L	T	R
v_c,x				154	329		136			
t_c,x				4.13	6.43		6.23			
t_f,x				2.23	3.53		3.33			
c_p,x				1420	663		910			

Steps 6 - 9: MOVEMENT CAPACITIES

Pedestrian Impedance

Approach	NB	SB	WB	EB

Movement	13	14	15	16
Pedestrian Flow Rate v_x	0	0	0	
Lane Width, w				
Walking Speed, S_p				
Pedestrian Blockage Factor, f_pb				

Major-Street Left-Turn Movements		1	4	
Conflicting Flow, v_c,x			154	
Potential Capacity, c_p,x			1420	
Pedestrian Impedance Factor, p_p,x			1.000	
Movement Capacity, c_m,x			1420	
Probability of Queue-free State, p_0,j			0.992	
Major L-Shared Probability Queue-free State, p*_0,j			0.991	

Minor-Street Right-Turn Movements		9	12	
Conflicting Flow, v_c,x		136		
Potential Capacity, c_p,x		910		
Pedestrian Impedance Factor, p_p,x		1.000		
Movement Capacity, c_m,x		910		
Probability of Queue-free State, p_0,j		0.983		

Major-Street U-Turn Movements		1U	4U	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Shared L/U Capacity, c_SH				
Probability of Queue-free State, p_0,j				

Minor-Street Through Movements		8	11	
Conflicting Flow, v_c,x				
Potential Capacity, c_p,x				
Pedestrian Impedance Factor, p_p,x				
Capacity Adjustment Factor, f_x				
Movement Capacity, c_m,x				
Probability of Queue-free State, p_0,j				

Minor-Street Left-Turn Movements		7	10	
Conflicting Flow, v_c,x		329		
Potential Capacity, c_p,x		663		
Pedestrian Impedance Factor, p_p,x		1.000		
Major L, Minor T Adjusted Impedance Factor, p"				
Major L, Minor T Impedance Factor, p'				
Capacity Adjustment Factor, f_x		0.991		
Movement Capacity, c_m,x		657		

Step 10: FINAL CAPACITY ADJUSTMENTS

SHARED-LANE CAPACITY OF MINOR STREET APPROACHES

Approach		WestBound		|		EastBound	
Movement	7	8	9	|	10	11	12
Lane Configuration		LR		|			
Shared Flow Rate, v_y		37					
Movement Capacity, c_m,x	657		910				
Shared Capacity, c_SH		742					

Step 11: CONTROL DELAY

CONTROL DELAY TO RANK 2 THROUGH 4 MOVEMENTS

Approach	NB		SB			WestBound			EastBound	
Movement	1U	1	4U	4	7	8	9	10	11	12
Flow Rate				12	22		15			
Movement Capacity				1420	657		910			
Lane Configuration				LT		LR				
Shared Capacity						742				
Control Delay				7.6		10.1				

CONTROL DELAY TO RANK 1 MOVEMENTS

Approach	NB	SB
Movement	2	5
Number of Major Street Through Lanes, N	1	1
Proportion of Rank 1 vehicles not blocked, p*_0,j		0.991
Delay to Major Left-turning Vehicles, d_MLT		7.6
Major Street Through Vehicles in Shared Lane, v_i1		170
Major Street Turning Vehicles in Shared Lane, v_i2		12
Saturation Flow Rate for Major Street Through, s_i1	1800	1800

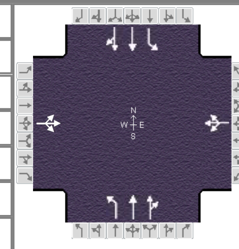
Saturation Flow Rate for Major Street Right-Turn, s_i2						1500					
Delay to Rank 1 Vehicles, d_Rank1								0.1			

Steps 12 - 13: APPROACH/INTERSECTION CONTROL DELAY and 95% QUEUE LENGTHS

Approach	NB		SB		WestBound			EastBound		
Movement	1U	1	4U	4	7	8	9	10	11	12
Lane Configuration				LT		LR				
Flow Rate				12		37				
Lane Capacity				1420		742				
v/c				0.01		0.05				
95% Queue Length				0.0		0.2				
Control Delay				7.6		10.1				
LOS				A		B				
Approach Delay				0.6		10.1				
Approach LOS						B				
Intersction Delay		1.3								

This TWSC text report was created in HCS™ TWSC Version 7.8 on 8/20/2019 9:38:00 AM

HCS7 Signalized Intersection Results Summary

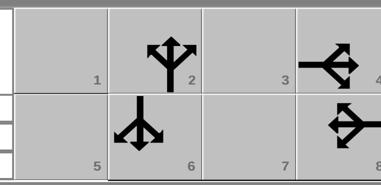


General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	7/15/2019	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	US 41	Analysis Year	2019	Analysis Period	1> 7:00
Intersection	Hillsdale Road	File Name	2020 No Build_SIGNAL_AM Peakx.xus		
Project Description	2020 AM Peak				

Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	22	14	96	8	41	11	631	25	33	888	0

Signal Information				
Cycle, s	82.5	Reference Phase	2	
Offset, s	0	Reference Point	End	
Uncoordinated	Yes	Simult. Gap E/W	On	
Force Mode	Fixed	Simult. Gap N/S	On	

Green	40.0	11.2	19.3	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		12.0		12.0		6.0		6.0
Phase Duration, s		15.2		23.3		44.0		44.0
Change Period, (*Y+R* $_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.1		3.1
Queue Clearance Time (g_s), s		3.5		7.7		16.0		15.0
Green Extension Time (g_e), s		0.0		0.2		4.0		4.0
Phase Call Probability		0.56		0.96		1.00		1.00
Max Out Probability		0.00		0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		0			145		11	330	326	33	888	0
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0			1753		636	1900	1874	790	1900	1885
Queue Service Time (g_s), s		0.0			5.7		1.0	8.9	9.0	2.2	13.0	0.0
Cycle Queue Clearance Time (g_c), s		0.0			5.7		14.0	8.9	9.0	11.2	13.0	0.0
Green Ratio (*g/C*)					0.23		0.48	0.48	0.48	0.48	0.48	0.48
Capacity (*c*), veh/h					410		295	921	908	384	1842	
Volume-to-Capacity Ratio (*X*)		0.000			0.354		0.037	0.358	0.359	0.086	0.482	0.000
Back of Queue (*Q*), ft/ln (50 th percentile)		0			57.6		3.5	87.6	86.6	9.7	126.6	0
Back of Queue (*Q*), veh/ln (50 th percentile)		0.0			2.3		0.1	3.5	3.5	0.4	5.1	0.0
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh					26.4		19.0	13.3	13.3	16.8	14.3	
Incremental Delay (d_2), s/veh		0.0			0.2		0.0	0.1	0.1	0.0	0.1	0.0
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh					26.6		19.0	13.3	13.4	16.8	14.4	
Level of Service (LOS)					C		B	B	B	B	B	

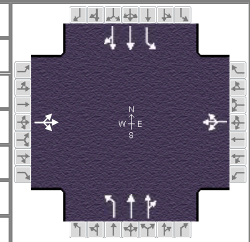
	EB		WB		NB		SB	
Approach Delay, s/veh / LOS	31.5	C	26.6	C	13.4	B	14.5	B
Intersection Delay, s/veh / LOS	15.4				B			

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.28	B	2.31	B	1.67	B	1.67	B
Bicycle LOS Score / LOS	0.55	A	0.73	A	1.04	A	1.25	A

 HCS™ Streets Version 7.8 Generated: 8/21/2019 4:23:35 PM

HCS7 Signalized Intersection Results Summary

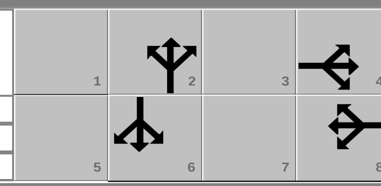
General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	7/15/2019	Area Type	Other
Jurisdiction		Time Period		PHF	0.92
Urban Street	US 41	Analysis Year	2019	Analysis Period	1> 7:00
Intersection	Hillsdale Road	File Name	2020 No Build_SIGNAL_PM Peakx.xus		
Project Description	2020 PM Peak				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	3	21	6	41	21	44	20	958	42	52	1025	1

Signal Information				
Cycle, s	78.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	50.0	20.0	0.0	0.0	0.0	0.0
Yellow	4.0	4.0	0.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		8.0		8.0		6.0		6.0
Phase Duration, s		24.0		24.0		54.0		54.0
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.2		3.2
Queue Clearance Time (g_s), s		3.0		6.2		15.4		18.1
Green Extension Time (g_e), s		0.2		0.2		6.2		6.2
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.04		0.05

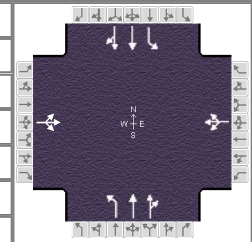
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h		33			115		22	548	539	57	558	558
Adjusted Saturation Flow Rate (s), veh/h/ln		1805			1599		513	1900	1871	527	1900	1899
Queue Service Time (g_s), s		0.0			1.0		1.8	11.3	11.3	4.7	11.6	11.6
Cycle Queue Clearance Time (g_c), s		1.0			4.2		13.4	11.3	11.3	16.1	11.6	11.6
Green Ratio (g/C)		0.26			0.26		0.64	0.64	0.64	0.64	0.64	0.64
Capacity (c), veh/h		514			474		345	1218	1200	354	1218	1218
Volume-to-Capacity Ratio (X)		0.063			0.243		0.063	0.450	0.450	0.160	0.458	0.458
Back of Queue (Q), ft/ln (50 th percentile)		10.9			40.3		4.6	90.6	89.2	12.6	92.6	92.6
Back of Queue (Q), veh/ln (50 th percentile)		0.4			1.6		0.2	3.6	3.6	0.5	3.7	3.7
Queue Storage Ratio (RQ) (50 th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		22.0			23.1		10.5	7.1	7.1	11.1	7.1	7.1
Incremental Delay (d_2), s/veh		0.0			0.1		0.0	0.1	0.1	0.1	0.1	0.1
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh		22.0			23.2		10.5	7.2	7.2	11.2	7.2	7.2
Level of Service (LOS)		C			C		B	A	A	B	A	A
Approach Delay, s/veh / LOS	22.0	C		23.2	C		7.2	A		7.4	A	
Intersection Delay, s/veh / LOS	8.3						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.28	B	2.28	B	1.64	B	1.64	B
Bicycle LOS Score / LOS	0.54	A	0.68	A	1.40	A	1.45	A

 HCS™ Streets Version 7.8 Generated: 8/21/2019 5:41:29 PM

HCS7 Signalized Intersection Results Summary

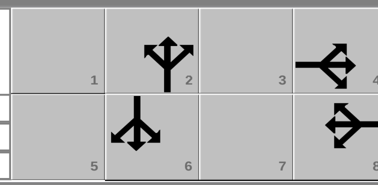
General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	7/15/2019	Area Type	Other
Jurisdiction		Time Period		PHF	0.92
Urban Street	US 41	Analysis Year	2019	Analysis Period	1> 7:00
Intersection	Hillsdale Road	File Name	2045 No Build_SIGNAL_AM Peakx.xus		
Project Description	2045 AM Peak				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	28	18	124	10	54	14	821	32	43	1155	0

Signal Information			
Cycle, s	58.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	40.0	10.7	0.0	0.0	0.0	0.0
Yellow	4.0	4.0	0.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		8.0		8.0		6.0		6.0
Phase Duration, s		14.7		14.7		44.0		44.0
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.1		3.1
Queue Clearance Time (g_s), s		3.4		10.5		12.2		11.3
Green Extension Time (g_e), s		0.4		0.3		7.1		7.1
Phase Call Probability		0.98		0.98		1.00		1.00
Max Out Probability		0.00		0.00		0.02		0.02

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		0			204		15	467	460	47	1255	0
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0			1375		449	1900	1875	613	1900	1885
Queue Service Time (g_s), s		0.0			7.2		1.0	6.1	6.1	2.1	9.3	0.0
Cycle Queue Clearance Time (g_c), s		0.0			8.5		10.2	6.1	6.1	8.2	9.3	0.0
Green Ratio (*g/C*)					0.18		0.68	0.68	0.68	0.68	0.68	0.68
Capacity (*c*), veh/h					353		358	1294	1276	476	2587	
Volume-to-Capacity Ratio (*X*)		0.000			0.578		0.043	0.361	0.361	0.098	0.485	0.000
Back of Queue (*Q*), ft/ln (50 th percentile)		0			63.1		1.9	33	32.5	4.9	49.7	0
Back of Queue (*Q*), veh/ln (50 th percentile)		0.0			2.5		0.1	1.3	1.3	0.2	2.0	0.0
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh					23.3		6.9	4.0	4.0	5.7	4.5	
Incremental Delay (d_2), s/veh		0.0			0.6		0.0	0.1	0.1	0.0	0.1	0.0
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh					23.9		6.9	4.0	4.0	5.7	4.5	
Level of Service (LOS)					C		A	A	A	A	A	

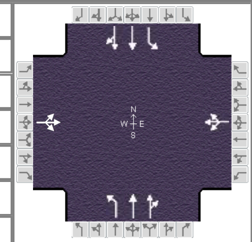
	EB		WB		NB		SB	
Approach Delay, s/veh / LOS	20.3	C	23.9	C	4.1	A	4.6	A
Intersection Delay, s/veh / LOS	6.3				A			

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.28	B	2.28	B	1.62	B	1.62	B
Bicycle LOS Score / LOS	0.57	A	0.82	A	1.27	A	1.56	B

 HCS™ Streets Version 7.8 Generated: 8/21/2019 4:36:11 PM

HCS7 Signalized Intersection Results Summary

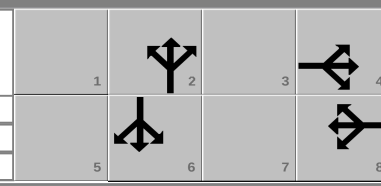
General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	7/15/2019	Area Type	Other
Jurisdiction		Time Period		PHF	0.92
Urban Street	US 41	Analysis Year	2019	Analysis Period	1> 7:00
Intersection	Hillsdale Road	File Name	2045 No Build_SIGNAL_PM Peakx.xus		
Project Description	2045 PM Peak				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	4	27	8	53	27	57	26	1229	54	66	1315	1

Signal Information			
Cycle, s	47.2	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	30.0	9.2	0.0	0.0	0.0	0.0
Yellow	4.0	4.0	0.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



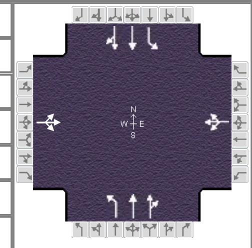
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		8.0		8.0		6.0		6.0
Phase Duration, s		13.2		13.2		34.0		34.0
Change Period, (*Y+R c*), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.2		3.2
Queue Clearance Time (g_s), s		2.9		5.6		14.6		18.2
Green Extension Time (g_e), s		0.3		0.3		9.6		9.1
Phase Call Probability		0.92		0.92		1.00		1.00
Max Out Probability		0.00		0.00		0.30		0.37

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		42			149		28	702	693	72	715	715
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1806			1617		380	1900	1871	393	1900	1899
Queue Service Time (g_s), s		0.0			1.2		2.2	10.1	10.1	6.1	10.4	10.4
Cycle Queue Clearance Time (g_c), s		0.9			3.6		12.6	10.1	10.1	16.2	10.4	10.4
Green Ratio (*g/C*)		0.19			0.19		0.64	0.64	0.64	0.64	0.64	0.64
Capacity (*c*), veh/h		436			421		311	1208	1190	318	1208	1208
Volume-to-Capacity Ratio (*X*)		0.097			0.354		0.091	0.581	0.582	0.225	0.592	0.592
Back of Queue (*Q*), ft/ln (50 th percentile)		8.2			30.8		3.6	47.7	47.1	10.1	49.1	49.1
Back of Queue (*Q*), veh/ln (50 th percentile)		0.3			1.2		0.1	1.9	1.9	0.4	2.0	2.0
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh		15.7			16.7		8.7	5.0	5.0	9.7	5.0	5.0
Incremental Delay (d_2), s/veh		0.0			0.2		0.0	0.2	0.2	0.1	0.2	0.2
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		15.7			16.9		8.7	5.1	5.1	9.8	5.2	5.2
Level of Service (LOS)		B			B		A	A	A	A	A	A
Approach Delay, s/veh / LOS	15.7	B		16.9	B		5.2	A		5.4	A	
Intersection Delay, s/veh / LOS	6.0						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.27	B	2.27	B	1.62	B	1.62	B
Bicycle LOS Score / LOS	0.56	A	0.73	A	1.66	B	1.73	B

HCS7 Signalized Intersection Results Summary

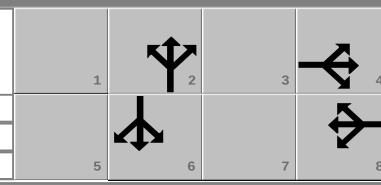
General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	7/15/2019	Area Type	Other
Jurisdiction		Time Period		PHF	1.00
Urban Street	US 41	Analysis Year	2019	Analysis Period	1> 7:00
Intersection	Hillsdale Road	File Name	2020 5Rin-out_SIGNAL_AM Peakx.xus		
Project Description	2020 AM Peak w/ Radio Rin-out				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	22	14	99	8	41	11	631	25	33	888	0

Signal Information			
Cycle, s	82.6	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	40.0	11.2	19.3	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		12.0		12.0		6.0		6.0
Phase Duration, s		15.2		23.3		44.0		44.0
Change Period, ($Y+R_c$), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.1		3.1
Queue Clearance Time (g_s), s		3.5		7.8		16.0		15.0
Green Extension Time (g_e), s		0.0		0.2		4.0		4.0
Phase Call Probability		0.56		0.97		1.00		1.00
Max Out Probability		0.00		0.00		0.00		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		0			148		11	330	326	33	888	0
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0			1754		636	1900	1874	790	1900	0
Queue Service Time (g_s), s		0.0			5.8		1.0	9.0	9.0	2.2	13.0	0.0
Cycle Queue Clearance Time (g_c), s		0.0			5.8		14.0	9.0	9.0	11.2	13.0	0.0
Green Ratio (*g/C*)					0.23		0.48	0.48	0.48	0.48	0.48	
Capacity (*c*), veh/h					411		295	920	908	384	1841	
Volume-to-Capacity Ratio (*X*)		0.000			0.360		0.037	0.359	0.359	0.086	0.482	0.000
Back of Queue (*Q*), ft/ln (50 th percentile)		0			59		3.5	87.6	86.6	9.7	126.6	0
Back of Queue (*Q*), veh/ln (50 th percentile)		0.0			2.4		0.1	3.5	3.5	0.4	5.1	0.0
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh					26.5		19.0	13.3	13.3	16.8	14.3	
Incremental Delay (d_2), s/veh		0.0			0.2		0.0	0.1	0.1	0.0	0.1	0.0
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh					26.7		19.0	13.4	13.4	16.8	14.4	
Level of Service (LOS)					C		B	B	B	B	B	

	EB		WB		NB		SB	
Approach Delay, s/veh / LOS	31.5	C	26.7	C	13.5	B	14.5	B
Intersection Delay, s/veh / LOS	15.5				B			

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.28	B	2.31	B	1.67	B	1.67	B
Bicycle LOS Score / LOS	0.55	A	0.73	A	1.04	A	1.25	A

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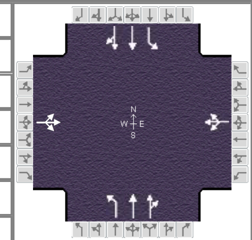
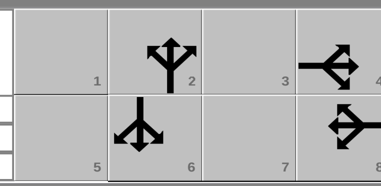
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	7/15/2019	Area Type	Other
Jurisdiction		Time Period		PHF	0.92
Urban Street	US 41	Analysis Year	2019	Analysis Period	1> 7:00
Intersection	Hillsdale Road	File Name	2020_5Rin-out_SIGNAL_PM Peakx.xus		
Project Description	2020 PM Peak w/ Radio Rin-out				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	3	21	6	42	21	44	20	958	42	53	1025	1

Signal Information										
Cycle, s	78.0	Reference Phase	2							
Offset, s	0	Reference Point	End	Green	50.0	20.0	0.0	0.0	0.0	0.0
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	4.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0



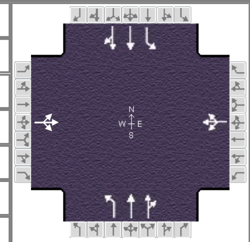
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		8.0		8.0		6.0		6.0
Phase Duration, s		24.0		24.0		54.0		54.0
Change Period, (*Y+R c*), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.2		3.2
Queue Clearance Time (*g s*), s		3.0		6.2		15.4		18.2
Green Extension Time (*g e*), s		0.2		0.2		6.2		6.2
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		0.04		0.05

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		33			116		22	548	539	58	558	558
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1805			1597		513	1900	1871	527	1900	1899
Queue Service Time (*g s*), s		0.0			1.1		1.8	11.3	11.3	4.8	11.6	11.6
Cycle Queue Clearance Time (*g c*), s		1.0			4.2		13.4	11.3	11.3	16.2	11.6	11.6
Green Ratio (*g/C*)		0.26			0.26		0.64	0.64	0.64	0.64	0.64	0.64
Capacity (*c*), veh/h		514			474		345	1218	1200	354	1218	1218
Volume-to-Capacity Ratio (*X*)		0.063			0.245		0.063	0.450	0.450	0.163	0.458	0.458
Back of Queue (*Q*), ft/ln (50 th percentile)		10.9			40.9		4.6	90.6	89.2	12.8	92.6	92.6
Back of Queue (*Q*), veh/ln (50 th percentile)		0.4			1.6		0.2	3.6	3.6	0.5	3.7	3.7
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (*d 1*), s/veh		22.0			23.1		10.5	7.1	7.1	11.1	7.1	7.1
Incremental Delay (*d 2*), s/veh		0.0			0.1		0.0	0.1	0.1	0.1	0.1	0.1
Initial Queue Delay (*d 3*), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		22.0			23.2		10.5	7.2	7.2	11.2	7.2	7.2
Level of Service (LOS)		C			C		B	A	A	B	A	A
Approach Delay, s/veh / LOS	22.0	C		23.2	C		7.2	A		7.4	A	
Intersection Delay, s/veh / LOS	8.3						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.28	B	2.28	B	1.64	B	1.64	B
Bicycle LOS Score / LOS	0.54	A	0.68	A	1.40	A	1.46	A

HCS7 Signalized Intersection Results Summary

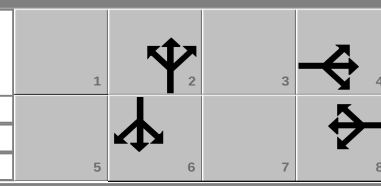
General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	7/15/2019	Area Type	Other
Jurisdiction		Time Period		PHF	0.92
Urban Street	US 41	Analysis Year	2019	Analysis Period	1> 7:00
Intersection	Hillsdale Road	File Name	2045_5Rin-out_SIGNAL_AM Peakx.xus		
Project Description	2045 AM Peak w/ Radio Rin-out				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	28	18	124	10	52	14	791	32	42	1112	0

Signal Information			
Cycle, s	58.7	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	40.0	10.7	0.0	0.0	0.0	0.0
Yellow	4.0	4.0	0.0	0.0	0.0	0.0
Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		8.0		8.0		6.0		6.0
Phase Duration, s		14.7		14.7		44.0		44.0
Change Period, (*Y+R c*), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.1		3.1
Queue Clearance Time (g_s), s		3.4		10.5		11.6		10.7
Green Extension Time (g_e), s		0.4		0.3		6.6		6.6
Phase Call Probability		0.98		0.98		1.00		1.00
Max Out Probability		0.00		0.00		0.01		0.01

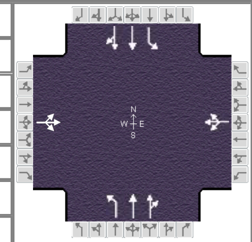
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		0			202		15	450	444	46	1209	0
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0			1370		470	1900	1874	632	1900	0
Queue Service Time (g_s), s		0.0			7.1		0.9	5.8	5.8	1.9	8.7	0.0
Cycle Queue Clearance Time (g_c), s		0.0			8.5		9.6	5.8	5.8	7.7	8.7	0.0
Green Ratio (*g/C*)					0.18		0.68	0.68	0.68	0.68	0.68	
Capacity (*c*), veh/h					352		373	1295	1277	491	2590	
Volume-to-Capacity Ratio (*X*)		0.000			0.575		0.041	0.348	0.348	0.093	0.467	0.000
Back of Queue (*Q*), ft/ln (50 th percentile)		0			62.3		1.8	31.2	30.8	4.6	46.2	0
Back of Queue (*Q*), veh/ln (50 th percentile)		0.0			2.5		0.1	1.2	1.2	0.2	1.8	0.0
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh					23.3		6.6	3.9	3.9	5.5	4.4	
Incremental Delay (d_2), s/veh		0.0			0.6		0.0	0.1	0.1	0.0	0.0	0.0
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh					23.9		6.6	4.0	4.0	5.5	4.4	
Level of Service (LOS)					C		A	A	A	A	A	
Approach Delay, s/veh / LOS	20.3	C		23.9	C		4.0	A		4.4	A	
Intersection Delay, s/veh / LOS	6.2						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.28	B	2.28	B	1.62	B	1.62	B
Bicycle LOS Score / LOS	0.57	A	0.82	A	1.24	A	1.52	B

 HCS™ Streets Version 7.8 Generated: 8/21/2019 6:02:56 PM

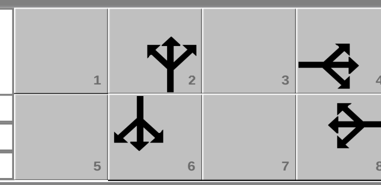
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	7/15/2019	Area Type	Other
Jurisdiction		Time Period		PHF	0.92
Urban Street	US 41	Analysis Year	2019	Analysis Period	1> 7:00
Intersection	Hillsdale Road	File Name	2045_5Rin-out_SIGNAL_PM Peakx.xus		
Project Description	2045 PM Peak w/ Radio Rin-out				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	4	27	8	53	27	56	25	1201	53	66	1284	1

Signal Information										
Cycle, s	47.2	Reference Phase	2							
Offset, s	0	Reference Point	End	Green	30.0	9.2	0.0	0.0	0.0	0.0
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	4.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Red	0.0	0.0	0.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8		2		6
Case Number		8.0		8.0		6.0		6.0
Phase Duration, s		13.2		13.2		34.0		34.0
Change Period, (*Y+R c*), s		4.0		4.0		4.0		4.0
Max Allow Headway (*MAH*), s		3.2		3.2		3.2		3.2
Queue Clearance Time (*g s*), s		2.9		5.6		14.0		17.5
Green Extension Time (*g e*), s		0.3		0.3		9.2		8.8
Phase Call Probability		0.92		0.92		1.00		1.00
Max Out Probability		0.00		0.00		0.27		0.33

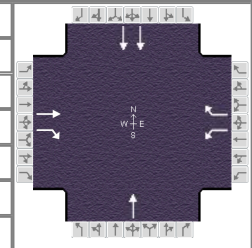
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h		42			148		27	686	677	72	698	698
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1806			1617		393	1900	1871	405	1900	1899
Queue Service Time (*g s*), s		0.0			1.1		2.0	9.7	9.7	5.8	10.0	10.0
Cycle Queue Clearance Time (*g c*), s		0.9			3.6		12.0	9.7	9.7	15.5	10.0	10.0
Green Ratio (*g/C*)		0.19			0.19		0.64	0.64	0.64	0.64	0.64	0.64
Capacity (*c*), veh/h		435			421		319	1208	1190	327	1208	1208
Volume-to-Capacity Ratio (*X*)		0.097			0.351		0.085	0.568	0.569	0.220	0.578	0.578
Back of Queue (*Q*), ft/ln (50 th percentile)		8.2			30.6		3.3	45.6	45.5	9.8	47	47
Back of Queue (*Q*), veh/ln (50 th percentile)		0.3			1.2		0.1	1.8	1.8	0.4	1.9	1.9
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00			0.00		0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (*d 1*), s/veh		15.7			16.7		8.4	4.9	4.9	9.3	4.9	4.9
Incremental Delay (*d 2*), s/veh		0.0			0.2		0.0	0.2	0.2	0.1	0.2	0.2
Initial Queue Delay (*d 3*), s/veh		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh		15.7			16.9		8.4	5.0	5.1	9.5	5.1	5.1
Level of Service (LOS)		B			B		A	A	A	A	A	A
Approach Delay, s/veh / LOS	15.7		B	16.9		B	5.1		A	5.3		A
Intersection Delay, s/veh / LOS	5.9						A					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.27	B	2.27	B	1.62	B	1.62	B
Bicycle LOS Score / LOS	0.56	A	0.73	A	1.63	B	1.70	B

 HCS™ Streets Version 7.8 Generated: 8/21/2019 6:04:40 PM

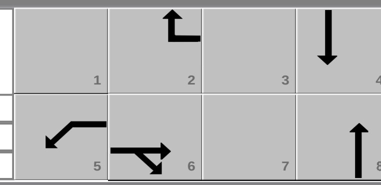
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst		Analysis Date	8/22/2019	Area Type	Other
Jurisdiction		Time Period		PHF	0.92
Urban Street	RCUT	Analysis Year	2019	Analysis Period	1> 7:00
Intersection	SB 41 / North MUT	File Name	R_North R-Cut_2020 AMxx.xus		
Project Description	2020 AM w/ 5Rin-out				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		0	0	107		0		0			922	

Signal Information										
Cycle, s	100.0	Reference Phase	2	Green	30.0	60.0	0.0	0.0	0.0	0.0
Offset, s	0	Reference Point	Begin	Yellow	4.0	4.0	0.0	0.0	0.0	0.0
Uncoordinated	Yes	Simult. Gap E/W	Off	Red	1.0	1.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	Off							



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		6	5	2		8		4
Case Number		7.3	2.0	3.0		8.0		8.0
Phase Duration, s		0.0	35.0	35.0		65.0		65.0
Change Period, (*Y+R c*), s		5.0	5.0	5.0		5.0		5.0
Max Allow Headway (*MAH*), s		0.0	3.1	0.0		0.0		3.0
Queue Clearance Time (*g s*), s			6.8					17.3
Green Extension Time (*g e*), s		0.0	0.2	0.0		0.0		2.6
Phase Call Probability			1.00					1.00
Max Out Probability			0.00					0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		6	16	5		12		8			4	
Adjusted Flow Rate (*v*), veh/h		0	0	116		0		0			1002	
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1900	1610	1810		1610		1900			1809	
Queue Service Time (*g s*), s		0.0	0.0	4.8		0.0		0.0			15.3	
Cycle Queue Clearance Time (*g c*), s		0.0	0.0	4.8		0.0		0.0			15.3	
Green Ratio (*g/C*)		0.96	0.00	0.90		0.30		0.60			0.60	
Capacity (*c*), veh/h		2	2	543		483		1140			2171	
Volume-to-Capacity Ratio (*X*)		0.000	0.000	0.214		0.000		0.000			0.462	
Back of Queue (*Q*), ft/ln (50 th percentile)		0	0	54.2		0		0			144.2	
Back of Queue (*Q*), veh/ln (50 th percentile)		0.0	0.0	2.2		0.0		0.0			5.8	
Queue Storage Ratio (*RQ*) (50 th percentile)		0.00	0.00	0.00		0.00		0.00			0.00	
Uniform Delay (*d 1*), s/veh		0.0	0.0	26.2		0.0		0.0			11.1	
Incremental Delay (*d 2*), s/veh		0.0	0.0	0.9		0.0		0.0			0.7	
Initial Queue Delay (*d 3*), s/veh		0.0	0.0	0.0		0.0		0.0			0.0	
Control Delay (*d*), s/veh		0.0	0.0	27.1		0.0		0.0			11.8	
Level of Service (LOS)				C							B	

	EB		WB		NB		SB	
Approach Delay, s/veh / LOS	0.0		27.1	C	0.0		11.8	B
Intersection Delay, s/veh / LOS	13.4				B			

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.96	B	1.93	B	1.88	B	1.66	B
Bicycle LOS Score / LOS	0.49	A		F	0.49	A	1.31	A

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