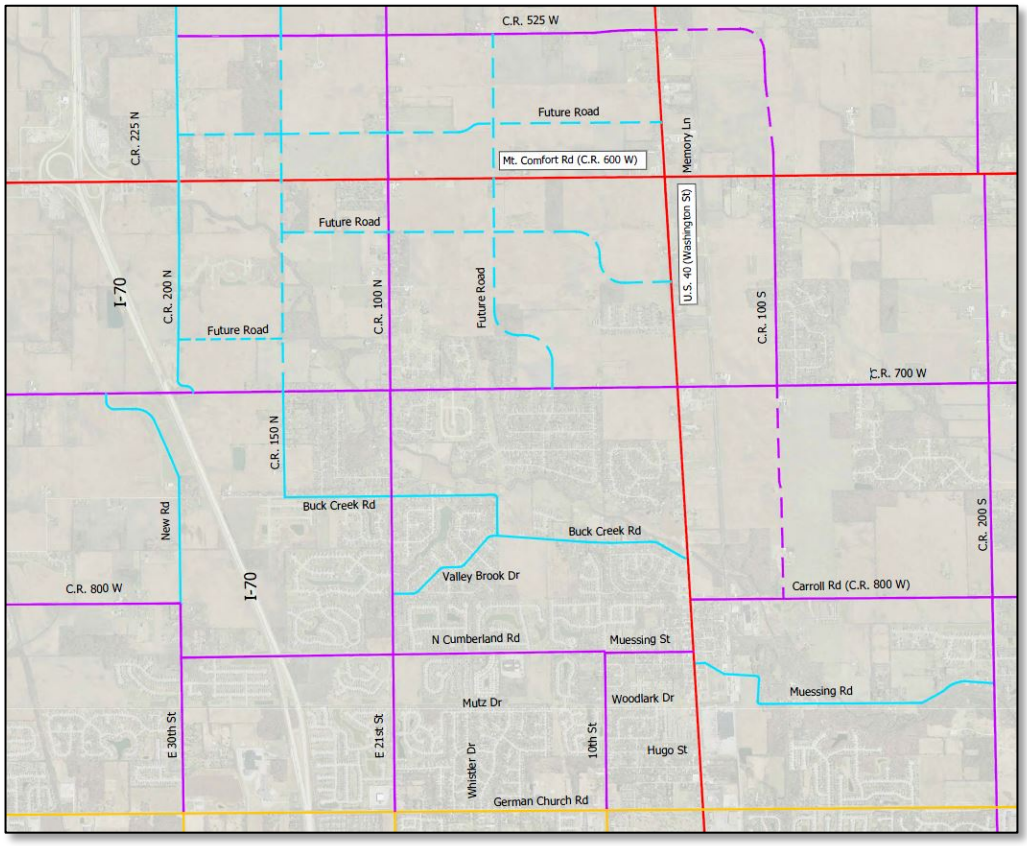
Town of Cumberland, Indiana
Transportation Master Plan

March 25, 2020



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Purpose

The purpose of the Town of Cumberland Transportation Master Plan is to evaluate the ability of the existing roadway system to accommodate future traffic volumes and identify recommendations for improvements to mitigate future traffic congestion within the study area. The Town of Cumberland wants to ensure it preserves the transportation system considering all users. As such, in addition to the above the following elements were also incorporated into the Transportation Master Plan:

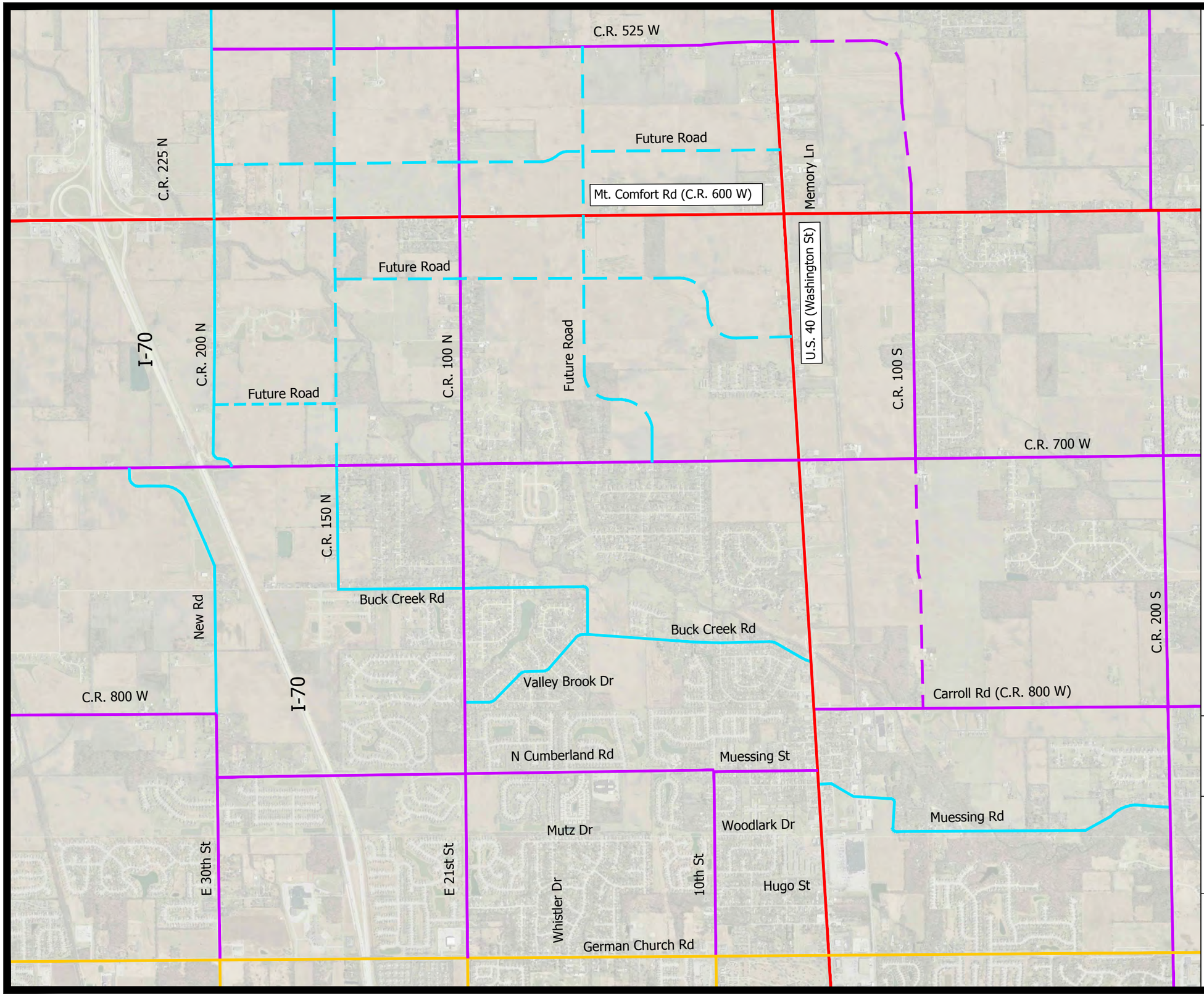
- Thoroughfare Plan Update (2016)
- Access Management Plan for Mount Comfort Road and US 40 (2016)
- Buck Creek Road Corridor Study
- Complete Streets Policy

An update of the Town's asset management system was also conducted as a part of this effort.

Study Area

The study area includes the major corridors and intersections within the current town limits, as well as roadways projected to be within the Town of Cumberland at some point in the future. Specifically, the east-west limits of the study area are from German Church Road to Mount Comfort Road (CR 600 W) while the north-south limits are from US 40 (Washington Street) to 21st Street (CR 100 N). The study area is illustrated in **Figure 1**.

The major roadways that serve the study area are US 40 (Washington Street), Mount Comfort Road (CR 600 W), and German Church Road. In addition to these arterials, the minor collector of Buck Creek Road is of particular interest to this study. Buck Creek Road changes jurisdictions between the Town of Cumberland and Hancock County within the study area, and has seen rapid residential development in recent years.



GRAPHIC SCALE

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(IN FEET)

1 inch = 2000ft.

Original Size 11"x 17"

LEGEND

Existing	Future	Functional Classification
	N/A	Primary Arterial
	N/A	Secondary Arterial
		Major Collector
		Minor Collector

NOTES

1. All roadway classifications should include pedestrian & bicycle accommodations. See Figure 2 Multi-Use Paths, Bike Lanes, and Sidewalks Map.
2. All existing roadways not classified under any of the above classifications fall under the category of Local Road.

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Figure 1

Study Area Map & Functional Classifications

Methodology

The study methodology included information gathering and roadway assessment, public involvement and meetings, traffic forecasting and analysis, and development of recommended improvements and a complete streets policy.

A stakeholder meeting was held to brief the town staff and public stakeholders on the planning process, introduce them to the concept of complete streets, and gain input on important transportation issues. This meeting was held on October 30, 2019.

Additional public outreach occurred at the Town of Cumberland's annual Weinhachtsmarkt event, which takes place annually on the first Saturday in December. This year's event was on December 7, 2019. The Weinhachtsmarkt is a well-attended event on a closed section of US 40 in Old Town Cumberland that celebrates the holidays and the Town's German heritage. Flyers with information about the Transportation Management Plan were provided at a town booth during the event, with Town staff available to receive questions.

Data was obtained from INDOT and the Town of Cumberland to provide background information on the study area roadways. Historical annual average daily traffic (AADT) volumes were obtained from INDOT's Traffic Count Database System (TCDS) for all count stations on major roadways within the study area.

The historical traffic count data from INDOT was augmented by 24-hour counts and/or peak hour turning movement counts on study area roadways of particular interest to the Town. Specifically, 24-hour volume counts were collected at three locations on Buck Creek Road in June 2019. In addition, turning movement counts were collected at the intersection of US 40 and Mount Comfort Road for the peak AM (6:30 AM – 8:30 AM) and PM (4:30 PM – 6:30 PM) periods on Tuesday, September 3, 2019.

Existing conditions analyses were conducted for each of the major roadway segments in the study area. Planning-level capacity analyses were completed based on the methodologies in the Highway Capacity Manual to identify roadway segments experiencing traffic congestion within the study area.

Future roadway conditions were analyzed using the same methodology used for the existing conditions analyses. The future conditions analyses utilized a 20-year projection of existing traffic volumes. The projected traffic volumes were developed based on annual growth rates

determined from historical AADT data from the INDOT Traffic Count Database System. In the event that the historical data resulted in roadway with a 20-year projected traffic volume less than existing traffic, a 0.5% annual growth rate was applied instead.

Crash data from 2012 – 2017 was obtained from the Indianapolis Metropolitan Planning Organization and analyzed as a part of the planning process. The crash data was reviewed in conjunction with the roadway inventory and capacity analyses to help further identify areas in need of improvements.

Existing Conditions

The most current traffic volumes were obtained from the INDOT Traffic Count Database System for the major roadways within the study area. These data were augmented with 24-hour tube count data and turning movement counts as needed. The count data was used to establish a baseline for the existing conditions analysis. Existing roadway characteristics and traffic data were used to determine roadway segment level of service for the major roads and key intersections contained in the study area.

Major Roadway Segments

The existing roadway laneage, geometry, and functional classification for major roadway segments within the study area were determined based on data provided by the Town of Cumberland and INDOT, as well as from aerial imagery and site visits. The functional classifications for the study roadways are illustrated in **Figure 1** on page 6. The existing average daily traffic (AADT) volumes and historical traffic data are provided in **Appendix B**.

Existing capacity analyses were developed based on the existing roadway geometry, functional classification, speed limits, and AADT. Typically, roadway congestion comparisons utilize a term know as Level of Service (LOS). Roadway LOS is a qualitative measure of roadway performance based on roadway capacity, traffic volume, intersection delay, and average speed, as outlined in the Transportation Research Board's *Highway Capacity Manual* (HCM).

The roadway segment LOS and the associated traffic conditions for each LOS designation are described in **Table 1**. Roadway LOS is presented as a letter designation ranging from LOS A (free-flow operations and minimal delays) to LOS F (extreme congestion, low speeds, and long delays).

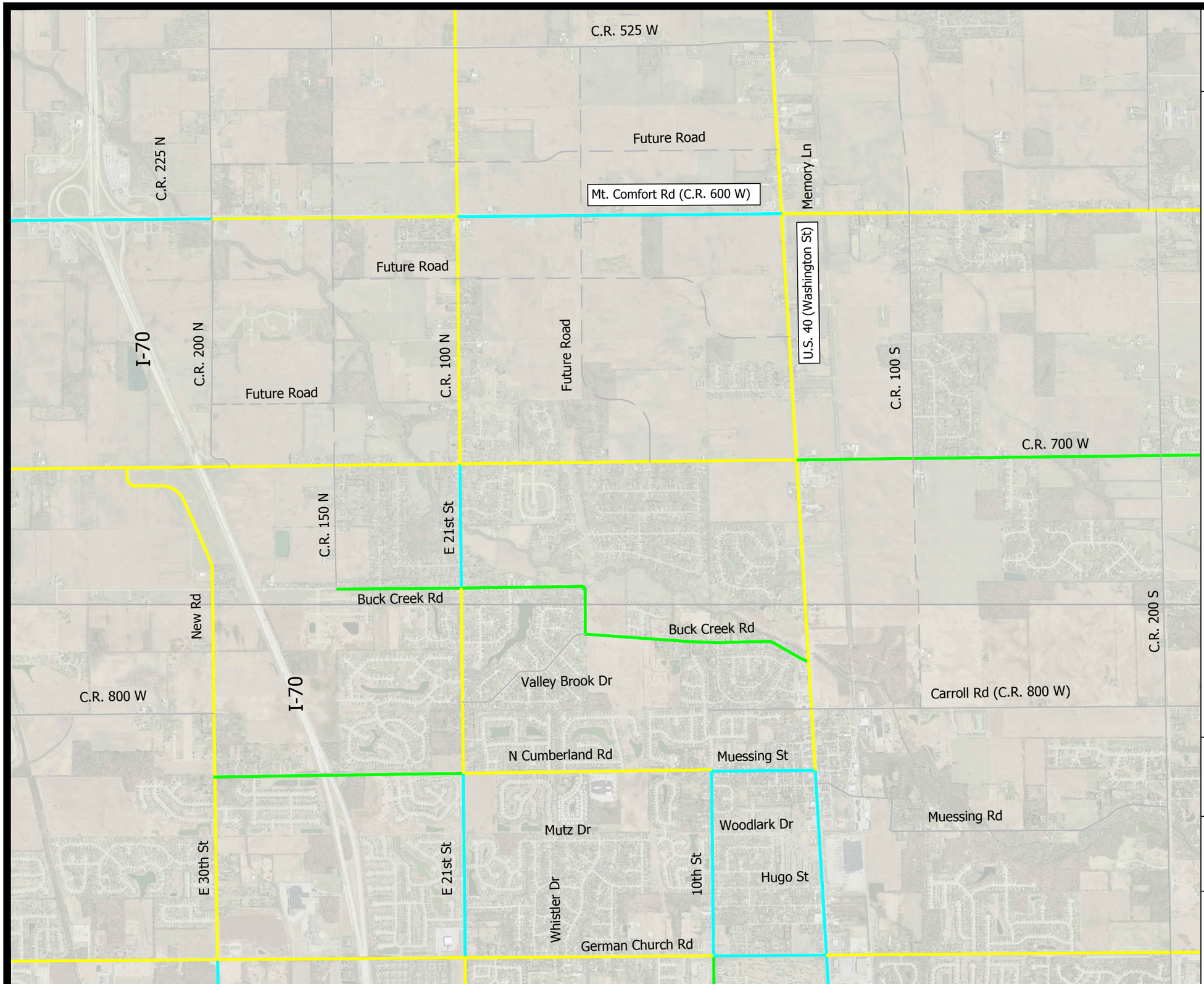
Table 1 – Roadway Level of Service (LOS) Descriptions

LOS		Description
Acceptable	A	Free-flow traffic operations at average travel speeds. Vehicles completely unimpeded in ability to maneuver. Minimal delay at signalized intersections.
	B	Reasonably unimpeded traffic operations at average travel speeds. Vehicle maneuverability slightly restricted. Low traffic delays.
	C	Stable traffic operations. Lane changes becoming more restricted. Travel speeds reduced to half of average free flow travel speeds. Longer intersection delays.
Unacceptable	D	Small increases in traffic flow can cause increased delays. Delays likely attributable to increase traffic, reduced signal progression and adverse timing.
	E	Significant delays. Travel speeds reduced to one third of average free flow travel speed.
	F	Extremely low speeds. Intersection congestion. Long delays. Extensive traffic queues at intersections.

Source: Highway Capacity Manual, *Special Report 209*, Transportation Research Board, Washington, D.C., 2000.

For planning level analyses, most municipalities consider LOS A - LOS C as the range of acceptable operations and LOS D - LOS F as the range of unacceptable traffic conditions. HCM methodologies were used to determine roadway capacities and levels of service for the major roadway segments within the study area. Volume thresholds for each level of service designation were developed for each type of roadway within the study area using ARTPLAN. ARTPLAN is a planning level analysis tool which utilizes methodologies provided in the Highway Capacity Manual. The volume thresholds for each LOS designation and roadway type are provided in **Appendix B**.

Figure 2 illustrates the existing (2020) level of service (LOS) for the main study area roadways. According to the planning-level traffic analysis, no study area roadways are currently operating with less than acceptable level of service. It is important to remember that this is a planning-level analysis and that there may be specific spot locations with traffic needs currently. However, on a roadway segment basis Cumberland has sufficient capacity to handle current traffic loading. For example, while there may be specific spots that merit additional study (such as for added turn lanes at an intersection) the number of lanes between intersections is sufficient for the current traffic levels.



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LEGEND

Level of Service

- A
- B
- C
- D
- E
- F

- Roadways
- Future Roadways

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Figure 2

2020 Level of Service

Roadway Inventory and Review

The primary study area roadways were reviewed in light of their laneage, roadway geometry, pavement width, and traffic congestion to determine if they had sufficient capacity and adhered to the design recommendations in the thoroughfare plan, which is included as a part of this Transportation Master Plan. The most recent five-years of crash data (2012-2017) was also analyzed for each primary study area roadway to look for any trends that could be addressed through roadway improvements.

US 40 (East Washington St) – East/West Arterial Roadway

US 40 (East Washington Street) is a primary arterial that runs east/west through the Town of Cumberland. The existing pavement width on US 40 is approximately 60 feet. The recommended width for a principal arterial is 70 feet, including a 16 foot median.

The roadway segment level of service on US 40 within the Town of Cumberland ranges from LOS B to LOS C under existing conditions, indicating that US 40 generally has sufficient capacity in Cumberland to accommodate existing traffic volumes.

German Church Rd – North/South Arterial Roadway

German Church Road is a secondary arterial that runs north/south through the Town of Cumberland. The existing pavement width on German Church Road is approximately 26 feet. This width is consistent with the thoroughfare recommendations.

Mount Comfort Rd – North/South Arterial Roadway

Mount Comfort Road (CR 600 W) is a primary arterial that runs north/south through the Town of Cumberland. The existing pavement width on Mount Comfort Road is approximately 40 feet. The recommended width for a principal arterial is 70 feet, including a 16 foot median.

Muessing St / Cumberland Rd – North/South Collector Roadway

Muessing Street / Cumberland Road is a major collector that runs north/south through the Town of Cumberland. The existing pavement width on Muessing Street / Cumberland Road is approximately 20 feet. The recommended width for a major collector is 24 feet.

BUCK CREEK RD – NORTH/SOUTH COLLECTOR ROADWAY

Buck Creek Road is a minor collector that runs north/south through the Town of Cumberland. The existing pavement width on Buck Creek Road is approximately 20 feet. The recommended width for a minor collector is 24 feet.

CR 700 W – NORTH/SOUTH COLLECTOR ROADWAY

CR 700 W is a major collector that runs north/south through the Town of Cumberland. The existing pavement width on CR 700 W is approximately 20 feet. The recommended width for a major collector is 24 feet.

10TH ST – EAST/WEST COLLECTOR ROADWAY

10th Street is a major collector that runs east/west through the Town of Cumberland. The existing pavement width on 10th Street is approximately 24 feet. This width is consistent with the thoroughfare recommendations.

21ST ST – EAST/WEST COLLECTOR ROADWAY

21st Street / CR 100 N is a major collector that runs east/west through the Town of Cumberland. The existing pavement width on 21st Street / CR 100 N is approximately 22 feet. The recommended width for a major collector is 24 feet.

30TH ST – EAST/WEST COLLECTOR ROADWAY

30th Street is a major collector that runs east/west through the Town of Cumberland. The existing pavement width on 30th Street is approximately 24 feet. This width is consistent with the thoroughfare recommendations.

Future Conditions

Future annual average daily traffic (AADT) volumes for the year 2040 were estimated to determine the future conditions of the study area roadway network. The future traffic demand was evaluated with the existing roadway network to determine the future year network deficiencies. As in the base year analysis, the key metric in determination of traffic congestion is level of service (LOS).

Projected Background Area Growth

Historical 24-hour AADT volumes were used to establish projected traffic volumes for the horizon year (2040). These projected volumes were used to study future traffic conditions in the study area. Future 2040 AADTs were projected by determining the compound annual growth rate (CAGR) for one or more count stations on each study area roadway. Where future 2040 AADTs were lower than existing volumes, a 0.5% growth rate per year was used. The future year 2040 AADT volumes are summarized in **Table 2.** The raw count station data and calculated growth rate for each study area roadway is provided in **Appendix B**.

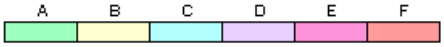
Figure 3 illustrates the projected 2040 level of service (LOS) for the main study area roadways. According to the planning-level traffic analysis, no study area roadways are currently operating with less than acceptable level of service. It is important to remember that this is a planning-level analysis and that there may be specific spot locations with traffic needs currently. However, on a roadway segment basis Cumberland has sufficient capacity to handle current traffic loading. For example, while there may be specific spots that merit additional study (such as for added turn lanes at an intersection) the number of lanes between intersections is sufficient for the current traffic levels.

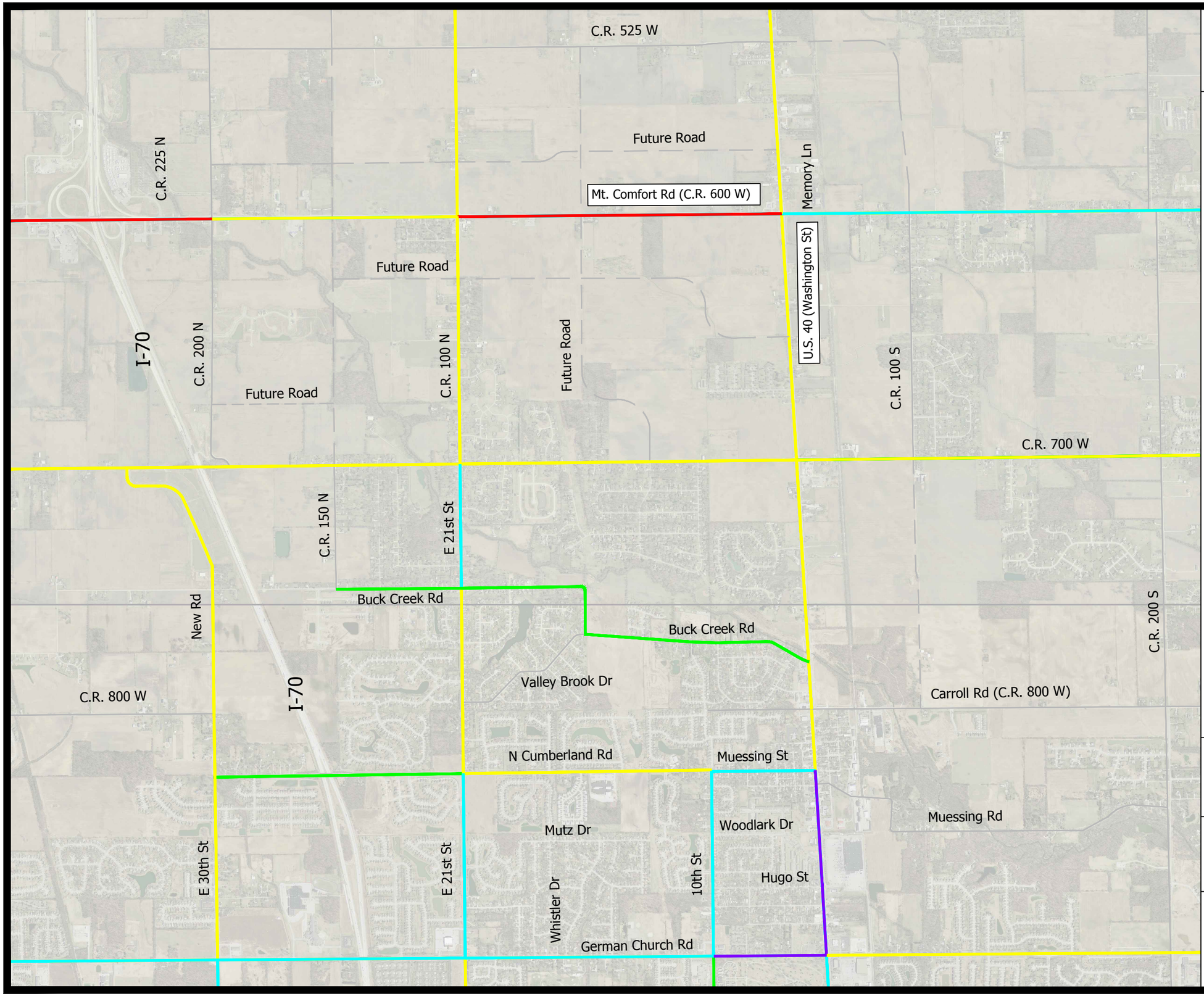
Table 2 – Traffic Volume Projections

Location	Station ID	$AADT_1$ (Year)	$AADT_2$ (Year)	Compound Annual Growth Rate	2020 Projected AADT	2040 Projected AADT
US-40 (East of County Line Rd)	300110	13,792 (2013)	12,911 (2017)	-1.64%	13,106	14,483
US-40 (100' East of Helfin St)	491100	15,330 (2016)	16,886 (2019)	3.27%	17,439	33,221
21st St (West of Lakeside Ln)	30W090	3,729 (2012)	3,070 (2019)	-2.74%	3,085	3,410
21st St (100' East of German Church Rd)	491997	5,913 (2013)	5,764 (2019)	-0.42%	5,793	6,433
Muessing St (0.20 mi. N of US-40)	49W303	3,760 (2013)	4,437 (2019)	2.80%	4,561	8,375
German Church Rd (0.1 mi N of US-40)	491617	9,951 (2013)	11,026 (2019)	1.72%	11,216	15,789
10th St (100' East of German Church Rd)	49W092	6,486 (2013)	6,065 (2019)	-1.11%	6,095	6,769
30th St (0.3 mi East of German Church Rd)	49W251	4,437 (2013)	10,367 (2019)	2.01%	10,576	15,757
CR 700 W (100' N of I-70)	300594	2,490 (2010)	3,779 (2019)	4.74%	3,958	10,004
Mt Comfort Rd (N 600 W) (N of US-40)	300608	10,639 (2016)	11,121 (2017)	4.53%	12,703	30,816
Mt Comfort Rd (N 600 W) (S of I-70)	300504	11,676 (2012)	13,028 (2017)	2.22%	13,914	21,564
Mt Comfort Rd (N 600 W) (S of US-40)	300503	4,327 (2012)	5,155 (2017)	3.56%	5,726	11,536
Buck Creek Rd (Hopkins - Beckley)	--	--	1,493 (2019)	3.27%**	1,542	2,934
Buck Creek Rd (Valley Brook - Lakeside)	--	--	699 (2019)	3.27%**	722	1,378
Buck Creek Rd (Brownstone - Sacramento)	--	--	1,003 (2019)	3.27%**	1,036	1,975

Notes: Where calculated growth rate is negative a minimum 0.5% growth rate was used.
*Recent growth observed on 30th St is unrealistic over the long term; rate from nearby CR 150 N used instead.
**No historical counts on Buck Creek Rd; rate from nearby US 40 used instead.

Level of Service (by color, corresponds to figures with 2020 and 2040 LOS).





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- F

Roadways

Future Roadways

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Figure 3

2040 Level of Service

Future Blue Line Bus Rapid Transit (BRT)

The Blue Line is a proposed bus rapid transit (BRT) service proposed along Washington Street (US 40) between the Town of Cumberland and Indianapolis International Airport. The Blue Line would replace the existing bus service in the Town of Cumberland, which is currently provided by IndyGo Route 8. A handout with information about the Blue Line and a map of the proposed route is included in **Appendix C**.

IndyGo Route 8 is the most heavily traveled route in the IndyGo system. In Cumberland, the eastern terminus of Route 8 at the Meijer shopping center had approximately 130 daily boardings in 2012[1]. The Blue Line will be replace and improve the existing service, providing fast, frequent and reliable transit service. As such, some reduction in vehicular traffic on Washington Street is expected with the opening of the Blue Line due to mode shift (some people who currently drive along the corridor will ride the BRT). Specifically, a reduction of 7-9 percent is anticipated during the AM and PM peak hours[1].

Once the Blue Line is constructed left-turns on Washington Street will be restricted to signalized intersections only. In the Town of Cumberland this means that the existing two-way left-turn lane will not be available for Arthur Street, Monroe Street, or for the few driveways between German Church Road and Hugo Street. This will increase left-turn volumes at German Church Road and at Hugo Street. Furthermore, movements from these unsignalized side streets will be restricted to right-turns only. The prohibition of left-turns from these roadways will increase the number of southbound left-turns made from Hugo Street onto Washington Street.

Identification of Roadway Needs

Potential improvement projects for the study area roadways were developed as a part of this study. Specifically, consideration was given for both short-term and medium/long-term improvements. The short-term improvements consist of "quick fix" type changes that can be implemented quickly without major expense. Medium/long-term improvements are more extensive and would need to be designed and programmed for future construction.

Short-Term Roadway Needs

WASHINGTON STREET (US 40)

- Woodlark Drive / Meijer RI-RO driveway
    - At the mid-block crossing the pedestrian crossing warning sign (W11-2) is missing from the push-button activated warning light pole in the eastbound direction.
    - The right-in/right-out restriction on the Meijer driveway at this location is indicated only by the channelizing islands in the driveway. A "Do Not Enter" sign (R5-1) is recommended to be installed in the grass strip portion of the channelizing island. The sign should be installed facing approximately northeast to maximize visibility by potential westbound left-turning drivers. In addition, a "No Left Turn" symbol sign (R3-2) is recommended to be installed on US 40 facing westbound traffic in advance of the intersection.

- German Church Road to Helfin Street

  Crosswalks are currently indicated by stamped concrete and/or brick pavements between German Church Road and Helfin Street. While this is aesthetically pleasing it is not compliant with the MUTCD as these pavers alone would not constitute a legal crosswalk. White, retroreflective pavement marking lines must be used to officially establish a legal crosswalk. The pavers themselves are permissible but must be augmented with pavement markings. Adding crosswalk pavement markings will also help improve the visibility of the crosswalks (especially the mid-block locations).

CR 700 W

- Pennsy Trail Crossing of CR 700W
    - The warning signs on CR 700 W for the Pennsy Trail crossing appear to be undersized. Both the advanced sign and the sign near the crossing are currently pedestrian warning signs (W11-2); however the signs at the crossing are from a prior version of the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD). It is recommended that these signs be replaced with 30"x30" Bicycle and Pedestrian warning signs (W11-15), which are typically used roadway crossing locations of shared use paths. The signs nearest the crossing should be augmented with a "Trail Xing" plaque (W11-15P) below the warning sign, while the advanced signs should continue to include the "500 FEET" plaque. It is also recommended that these signs be fluorescent yellow-green in color to maximize visibility. However, note that the use of this color will also necessitate the replacement of the "500 FEET" plaques to match.

MUNSIE STREET

- Pennsy Trail Crossing of Munsie Street
    - The warning signs on Munsie Street for the Pennsy Trail crossing appear to be undersized. Both the advanced sign and the sign near the crossing are currently pedestrian warning signs (W11-2); however the signs at the crossing are from a prior version of the MUTCD. It is recommended that these signs be replaced with 30"x30" Bicycle and Pedestrian warning signs (W11-15), which are typically used roadway crossing locations of shared use paths. The signs nearest the crossing should be augmented with a "Trail Xing" plaque (W11-15P) below the warning sign, while the advanced signs should continue to include the "500 FEET" plaque. It is also recommended that these signs be fluorescent yellow-green in color to maximize visibility. However, note that the use of this color will also necessitate the replacement of the "500 FEET" plaques to match.

      Because Munsie is low-speed roadway with narrow widths, smaller signs (24" minimum) may be used if the 30-inch signs are unworkable due to geometric and/or right-of-way constraints.

BUCK CREEK ROAD

- Please refer to "Buck Creek Road: Improvement Concepts" on Page 44 for short-term roadway needs on Buck Creek Road.

Medium/Long-Term Roadway Needs

WASHINGTON STREET (US 40)

- German Church Road to Muessing Street:
  Analyses indicated that with projected traffic volumes for the year 2040, the level of service on Washington Street is expected to deteriorate from LOS C to LOS D on the segment from German Church Road to Muessing Street. This result indicates that a capacity improvement may be needed on this segment by the horizon year. However, due to the historic buildings flanking this section of Washington Street widening is not feasible. It should be noted that while the level of service is expected to be LOS D during the peak hours, Washington Street is not projected to be over capacity.
  Since additional lanes cannot be added to Washington Street, ensuring adequate traffic operations on nearby east-west roadways is paramount. As area-wide traffic volumes increase, drivers will begin to bypass the most congested segment of Washington Street. Therefore, improving 10th Street and 21st Street to better handle increased traffic volumes is recommended. This will allow these east-west connectors to act as a "relief valve" during periods when Washington Street is busiest.
- Cross-Section Improvements
  - The updated thoroughfare plan recommended 10-foot multi-use paths be constructed along both sides of Washington Street (US 40). These paths would be especially advantageous between the Meijer shopping center and German Church Road. This section of Washington Street is the portion of Cumberland that will be served by the upcoming Blue Line bus rapid transit. Multi-use paths along this portion of US 40 could be connected to the trailhead for the Pennsy Trail adjacent to the Town Hall. It would also be beneficial to upgrade the existing sidewalk on the east side of German Church Road to a 10-foot multi-use trail to provide another north-south connection between Washington Street and the Pennsy Trail.

- In addition to the multi-use trail, the thoroughfare plan recommends a wider median (16 feet) than is currently present along Washington Street (approximately 12 feet). A 16-foot median would be an improvement over the existing conditions, provided that sufficient right-of-way can be acquired. Improvements to the outside of the roadway (multi-use path, landscape strip, etc.) should be prioritized over creating a wider median. The primary benefit of the wider median is that it would allow a raised median to be constructed adjacent to center turn lanes along Washington Street, which would aid with access management.
- The Blue Line bus rapid transit may bring significant changes western portion of the Washington Street corridor in the Town of Cumberland. It is recommended that improvements to this corridor only be considered in conjunction with or after the design of the Blue Line.

- Future Development and Access Management:

  At present, there are large areas of land that are undeveloped along US 40 to the east of Carroll Road. This area is a prime location for future growth, which could lead to issues with traffic operations and/or traffic safety if the parcels are developed without consideration of the functioning of the overall corridor. The Town of Cumberland has been proactive in planning for this future development by creating an access management plan for this corridor. This access management plan has been incorporated as a part of this Transportation Master Plan. It is recommended that US 40 be developed based on the recommendations in the access management plan.

GERMAN CHURCH ROAD

- Washington Street to 10th Street:

  Analyses indicated that with projected traffic volumes for the year 2040, the level of service on German Church Road is expected to deteriorate from LOS C to LOS D on the segment from Washington Street to 10th Street. This result indicates that a capacity improvement may be needed on this segment by the horizon year. However, the cemeteries located adjacent to both sides of German Church Road will made widening difficult if not impossible. It should be noted that while a segment level of service of LOS

D is projected for this segment, German Church Road is not expected to be over capacity in the horizon year. Similarly to Washington Street, traffic operations on German Church Road can be helped somewhat by ensuring that nearby north-south corridors in Cumberland are improved as needed such that they can serve as a "relief valve" during periods when German Church Road is busiest.

- Cross-Section Improvements

  The updated thoroughfare plan recommended 10-foot multi-use paths be constructed along both sides of German Church Road. While the Cumberland Trail System has an excellent north-south multi-use path on the east side of town (Buck Creek Trail), there is limited pedestrian connectivity on the west side of town. The construction of a multi-use path on German Church Road would be an excellent opportunity to create more trail connections and enable residents to traverse much of the town without having to leave the trail system. With the right-of-way limitations resulting from the presence of cemeteries on either side of German Church Road, it is recommended that future improvements focus on improving access for non-motorized users.

HUGO STREET

- Intersection with Washington Street:

  Increased southbound left-turn volumes are expected on Hugo Street following the construction of the Blue Line BRT service. This is due to the restricted access that will be implemented on Washington Street at unsignalized intersections to accommodate the BRT. Depending on how traffic redistributes following the opening of the Blue Line this could cause operational issues at the signalized intersection of Washington Street and Hugo Street. It is recommended that this intersection be monitored in the future to determine if the single-lane southbound approach and permissive-only left-turn phasing are sufficient to accommodate traffic demand. Recommended improvements to mitigate these possible issues include the following:

  - Construction of a southbound dedicated left-turn lane. The southbound approach would be reconfigured to include a left-turn lane and a shared through/right-turn lane.
  - Protected/Permissive left-turn phasing for the northbound and southbound approaches. With dedicated left-turn lanes on northbound and southbound Hugo

Street the traffic signal could potentially be modified to include a left-turn arrow phase for the northbound and southbound traffic, if desired.

CR 700 W

- Cross-Section Improvements

  CR 700 W has an existing pavement width of approximately 20 feet. It is recommended that in the future CR 700 W be widened to a minimum of 24 feet to comply with the recommended cross-section from the thoroughfare plan update. The provision of curb and gutter and sidewalks and/or 10-foot multi-use path is also recommended. Existing multi-use path is present on the west side of CR 700 W along the frontage of the Grants Corner subdivision.

- Intersection with CR 200 N

  There is currently limited sight distance at the intersection of CR 700 W and CR 200 N. While this intersection is not within the existing town limits, Cumberland is pursuing the annexation of the nearby area (west of CR 700 W and south of I-70). The sight distance issue at the intersection is primarily due to the vertical curve to the north for the bridge over I-70. The sight distance problem is exacerbated by the increasing truck volumes on CR 700 W, as truckers avoid the congestion near Mount Comfort Road and CR 300 N. Further complicating this intersection are the sharp curves on CR 200 N just east of CR 700 W. Following the annexation there are two options that should be considered:

  - Relocate the western terminus of CR 200 N farther south to provide additional sight distance at the intersection.
  - Remove the current intersection of CR 700 W and CR 200 N by constructing a cul-de-sac on the western terminus of CR 200 N(Before the sharp curved pair). Construct a new roadway farther to the south beginning at CR 150 N (west of CR 700 W) that passes through the land proposed for annexation. This new roadway will form a new 4-legged intersection with CR 700 W south of the existing intersection at 200 N. East of CR 700 W this new roadway can form a new intersection with CR 200 N(Approximately 1,300 feet east of CR 700 W) to

provide connectivity. This new roadway will both alleviate the sight distance concerns and allow access for the development of the newly annexed parcels.

MUESSING STREET / CUMBERLAND ROAD

- Cross-Section Improvements

  Muessing Street / Cumberland Road has an existing pavement width of approximately 20 feet. It is recommended that in the future this roadway be widened to a minimum of 24 feet to comply with the recommended cross-section from the thoroughfare plan update. The provision of curb and gutter and sidewalks and/or 10-foot multi-use path is also recommended if feasible.

10TH STREET

- Cross-Section Improvements
  - The town desires to provide a pedestrian / bicycle connection between German Church Road and the Buck Creek Trail. 10th Street has an existing sidewalk along the south side of the road between Hugo Street and Muessing Street. From east of Muessing Street to Winding Hart Drive there is an existing sidewalk along the north side of the street. Sidewalk and/or multi-use path is recommended between Hugo Street and German Church Road to complete this pedestrian connection to the west. The connection between Winding Hart Drive and Buck Creek will be provided along existing residential streets (Tapp Drive and Harvest Glen Drive). There is currently sidewalk on both sides of Tapp Drive and Harvest Glen Drive, with the exception of the final 300 feet on the east end of Harvest Glen Drive. Therefore, sidewalks are recommended for this segment to complete the connection to Buck Creek Road. Finally, a multi-use trail is recommended between Buck Creek Road and the Buck Creek Trail in Lions Park.

WOODLARK DRIVE

- Cross-Section Improvements
    - There are existing sidewalks on Woodlark Drive between E New York Street / Taftwood Drive and 10th Street. However, pedestrian/bicycle facilities are not present on Woodlark Drive between Washington Street and E New York Street / Taftwood Drive and 10th Street. Sidewalk and/or multi-use trails are therefore recommended on Woodlark Street between E New York Street / Taftwood Drive and Washington Street. This will allow for a pedestrian/bicycle connection between the Cumberland trail system and National Road Park.

EAST 21ST STREET

- Cross-Section Improvements
    - East 21st Street / CR W 100 N has an existing multi-use path along the north side of the roadway between the Buck Creek Trail and approximately 150 feet west of Valley Brook Drive. This path provides an excellent east-west trail on the north side of town, complementing the Pennsy Trail to the south. It is recommended that this multi-use path be extended westward to connect to a future multi-use path on German Church Road.
    - East 21st Street has an existing pavement width of approximately 22 feet. It is recommended that in the future this roadway be widened to a minimum of 24 feet to comply with the recommended cross-section from the thoroughfare plan update.

MOUNT COMFORT ROAD (CR 600 W)

- Future Development and Access Management:

  At present, Mount Comfort Road is primarily undeveloped between US 40 and CR 200 N. This area is a prime location for future growth, which could lead to issues with traffic operations and/or traffic safety if the parcels are developed without consideration of the functioning of the overall corridor. The Town of Cumberland has been proactive in planning for this future development by creating an access management plan for this

corridor. This access management plan has been incorporated as a part of this Transportation Master Plan. It is recommended that Mount Comfort Road be developed based on the recommendations in the access management plan.

- Cross-Section Improvements
    - The updated thoroughfare plan recommended 10-foot multi-use paths be constructed along both sides of Mount Comfort Road. It is recommended that the town incorporate multi-use paths into the plans as the Mount Comfort corridor develops. The path should extend south to connect with the eastern terminus of the Pennsy Trail.
    - In addition to the multi-use trail, the thoroughfare plan recommends two lanes in each direction separated by a 16-foot raised median. These additional travel lanes will also be needed based upon the traffic projections and segment level of service analyses. It is recommended that Mount Comfort Road be reconstructed per the primary arterial typical section from the updated thoroughfare plan as the corridor develops. Traffic impact studies should be performed for proposed developments of significant size. If the additional lanes are not required based on projected horizon year traffic with a proposed development, then the necessary right-of-way should be planned for and/or acquired.

BUCK CREEK ROAD

- Please refer to “Buck Creek Road: Improvement Concepts” on Page 44 for medium/long-term roadway needs on Buck Creek Road.

Buck Creek Road: Corridor Study

The Town of Cumberland, Indiana has acquired the services of BF&S to provide a corridor study of Buck Creek Road. The purpose of this study is to document the existing conditions on the roadway and identify opportunities to improve connectivity, roadway safety, and general roadway conditions. The study corridor is shown in **Figure 4** on the following page. The study will be implemented as part of Cumberland's overall Transportation Master Plan, which is also being updated at this time.

As stated in the Town's Thoroughfare Plan, Buck Creek Road is classified as a minor collector and carries a moderate level of traffic for a two-lane roadway. It was originally constructed as a rural road by Hancock County many years ago, but has since become a crucial north-south thoroughfare for the Town of Cumberland. Portions of Buck Creek Road are still within Hancock County's jurisdiction but it is envisioned that the entirety of Buck Creek between Washington Street (US 40) and I-70 will eventually become part of the Town.

The corridor study has two primary work components: the first is the evaluation of existing conditions and the identification of roadway improvements that can be implemented on a short-term basis (within the next 5 to 10 years), while the second deals with a longer-term evaluation of the corridor with a look to forecasted future land uses and anticipated travel demand.

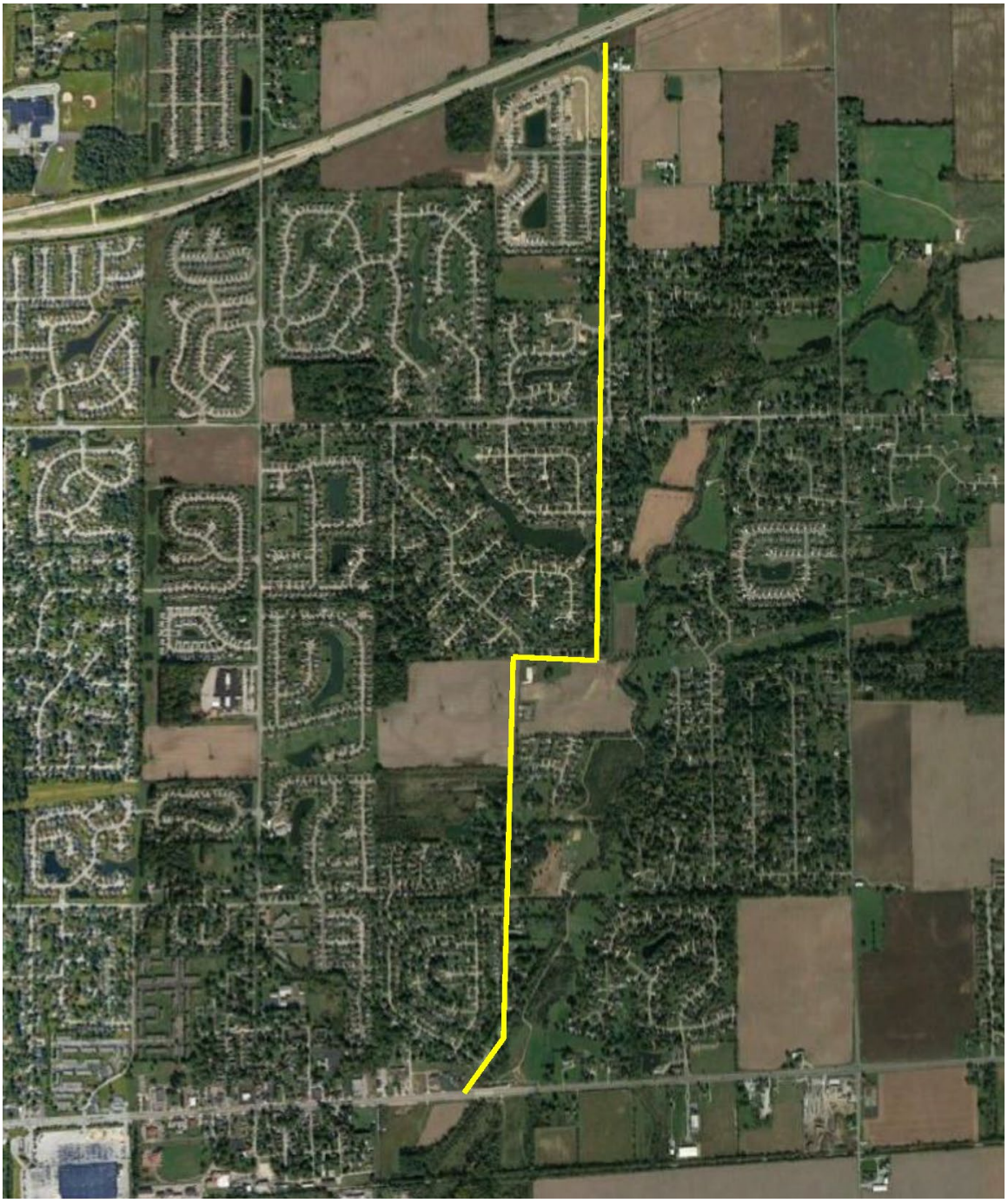


Figure 4 – Buck Creek Road Study Corridor

Buck Creek Road: Existing and Forecasted Conditions

LAND USE AND DEVELOPMENT

Buck Creek Road traverses a variety of land uses, including commercial development, residential, and agricultural uses. The existing zoning in the Town of Cumberland is presented in **Appendix D**. The primary land use along Buck Creek Road is residential single-family homes. Numerous subdivisions have been created in the last several years and many new homes have been constructed, which places increasing strain on Buck Creek Road and the surrounding transportation network. **Figure 5** presents an aerial photo of the study area from 2003, with areas highlighted that have since become residential neighborhoods.

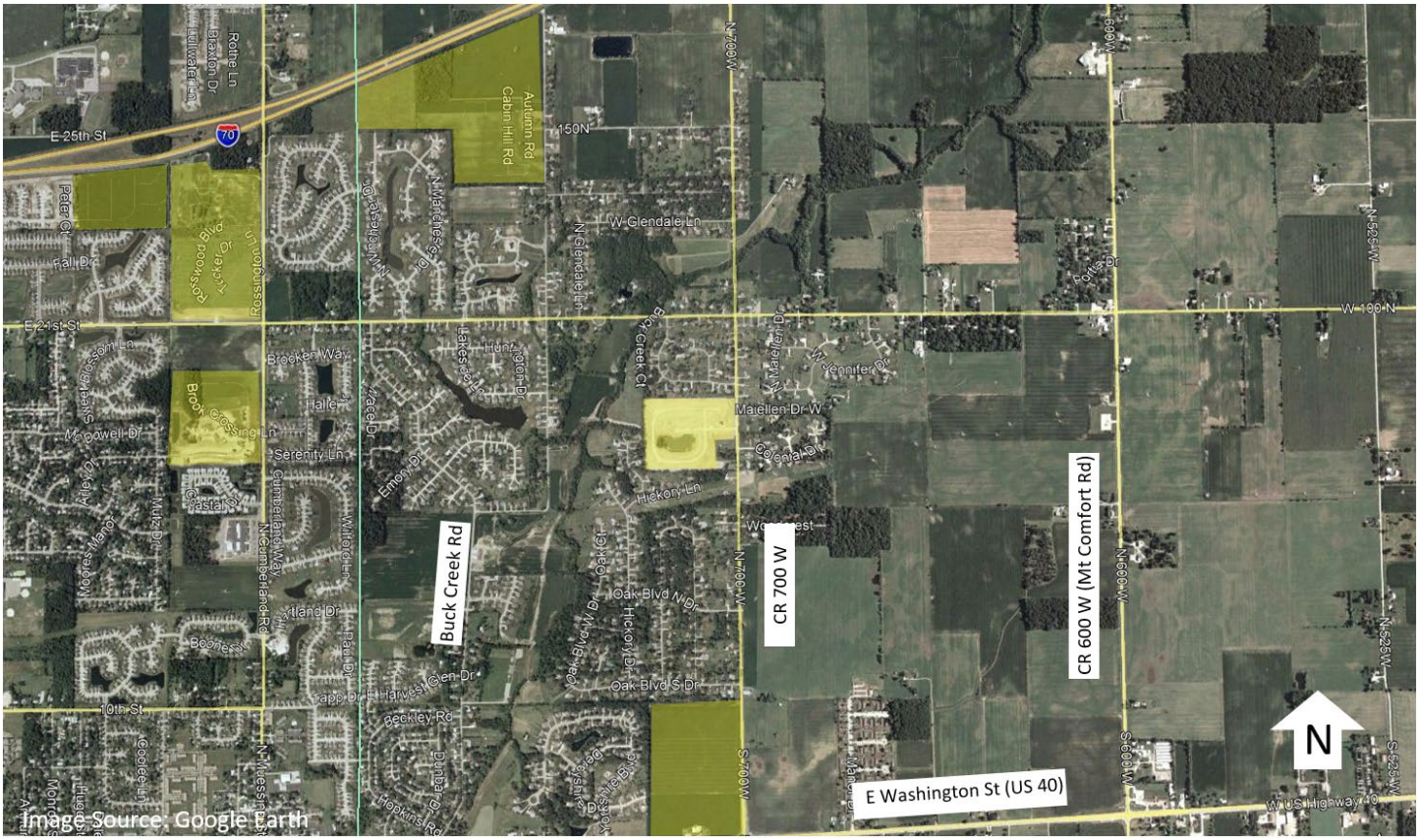


Figure 5 – Location of Recent Residential Subdivisions (Since 2003)

While the amount of growth in the Town of Cumberland and surrounding community has been impressive, additional growth is still anticipated. The Town's recent effort to expand the Cumberland Trail System (such as the recent completion of the Buck Creek Trail) has added a very desirable amenity in the vicinity of the Buck Creek corridor, which should further spur growth in the area. The following subdivisions are currently under development based upon the investigation of aerial photos and analysis of zoning data:

- Autumn Woods: This subdivision is located along the west side of Buck Creek Road at the corridor's northern terminus. Sections 1-4 of Autumn Woods appear to be mostly complete. The remaining portion of PUD for this community, which contains approximately 29 additional acres to the west, is undeveloped. Primary access to this subdivision will be provided by Buck Creek Road.
- Cobblefield Estates: This subdivision is located on the northwest corner of the intersection of 21st Street and Buck Creek Road. Cobblefield Estates is mostly built out now with a few vacant lots remaining. Access to these homes is provided on both 21st Street and on Buck Creek Road. In addition, several homes in the Cobblefield Estates neighborhood have driveways directly onto Buck Creek Road.
- Valley Brook Farms: This subdivision is located along the west side of Buck Creek Road (to the northwest of the two 90-degree curves on Buck Creek) and appears fully built out. Sections 6 and 7 of Valley Brook Farms are separated from the rest of the subdivision separated by a lake. Both portions of Valley Brook Farms have access onto both Buck Creek Road and 21st Street. Approximately 182 homes are accessible via the all-way stop intersection of Valley Brook Drive and Buck Creek Road (one of the 90-degree turns on Buck Creek Road). In addition, several homes in Valley Brook Farms have driveways directly onto Buck Creek Road.
- Huntington Heights: This subdivision is located to the northeast of the intersection of Buck Creek Road and 21st Street. A few of the homes in Huntington Heights have driveways on Buck Creek Road. The intersection of Buck Creek Road and Sacramento Drive provides access to this subdivision as well. It appears that there are remaining lots in the central portion of Huntington Heights that have yet to be developed.
- Cumberland Trails: This subdivision is located to the southeast of the intersection of Buck Creek Road and Valley Brook Drive, and is mostly undeveloped, with the exception of New Life Church (Cumberland Trails Phase 1) and a few duplexes with direct access

onto Buck Creek Road in Cumberland Trails Phase 2. There are currently no plans to complete the undeveloped portion of the subdivision as Cumberland Trails was abandoned in 2009 and rezoned as agriculture except for the existing duplexes.

- First Baptist Church of Cumberland Property: Across from the Cumberland Trails subdivision is approximately 44 acres of vacant owned by the First Baptist Church of Cumberland. This land is currently being utilized for agricultural purposes but is covered by a residential PUD according to the Town's zoning map.
- Cumberland Heights: This subdivision is located along the west side of Buck Creek Road to the north of US 40, and is fully built out. Access to Cumberland Heights is available from Buck Creek Road via Hopkins Road or Beckley Road. In addition, the subdivision can be reached from US 40 via Granby Drive.

Buck Creek was identified as an important asset for the Town of Cumberland in the Cumberland Comprehensive Plan. The plan recommended the Buck Creek floodway area be preserved as a greenway including a multi-use trail. The Town of Cumberland successfully realized that vision with the completion of the Buck Creek Trail in 2018. The Buck Creek Trail is a three-mile multi-purpose trail which runs along Buck Creek. Buck Creek Trail provides connections to many Cumberland neighborhoods, as well as interconnectivity between the 21st Street Trail and the Cumberland Pennsy Trail. A trailhead and parking area are provided at Lions Park. Lions Park is located east of Buck Creek Road, adjacent to the creek. In addition to the trailhead, Lions Park also includes a baseball field, tennis and basketball courts, and two playgrounds and picnic shelters. The access driveway to Lions Park is located on the east side of Buck Creek Road approximately 180 feet north of Beckley Road.

ROADWAY FUNCTION AND DESIGN

Buck Creek Road is classified as a minor collector and carries a moderate level of traffic for a two-lane roadway. It was originally constructed as a rural road by Hancock County many years ago, but has since become a crucial north-south thoroughfare for the Town of Cumberland. Portions of Buck Creek Road are still within Hancock County's jurisdiction but it is envisioned that the entirety of Buck Creek between Washington Street (US 40) and I-70 will eventually become part of the Town.

The design characteristics and speed limits of Buck Creek Road reflect its rural origin. Buck Creek Road generally consists of two ten (10) foot lanes with no shoulders. The roadway does widen out slightly at the southern terminus, becoming approximately 28 feet wide (exclusive of gutter pan) at the intersection of Buck Creek Road and US 40. Speed limits on Buck Creek Road range from between 35 and 40 miles-per-hour (mph). The portion of Buck Creek Road between Beckley Road and to US 40 has roll curb along the west side of the road, although it is mostly buried after several pavement overlays over the years. Most recently, Buck Creek Road had mill and overlay projects performed from US 40 to Valley Brook Drive (2018), from E 21st Street to Brownstone Court (2019), and from Harvest Moon Drive to I-70 cul-de-sac (2019). These overlays also installed centerline, edgeline, and stop bar pavement markings as a way to enhance the safety of the corridor. No widening was performed as part of these overlays, but the new pavement markings assisted in delineating lane widths and edge of pavement. While these projects did not address any current drainage issues, there are two major areas where drainage problems exist in high-volume rain events. Approximately 600 feet south of the intersection with Valley Brook Drive there is a low spot where water can gather at the driveway of 493 Buck Creek Road. This area was of major concern previously due to a water line leak that caused large ponding in the area. Once the water line leak was corrected the issue has been mitigated significantly. However, the area still should be observed and monitored during a large rain event to log whether water is still held in and near the driveway. The second area of drainage concern is approximately 900 feet north of US 40. This area holds water when Buck Creek overflows the typical high water mark. Due to the creek's proximity to the roadway there may not be a good alternative or positive improvement, however the area should be investigated to see if there is an alternative to keep water from gathering on the roadway.

INTERSECTIONS AND TRAFFIC CONTROL

There are twelve intersections on Buck Creek Road, not including driveway approaches. All Buck Creek Road intersections are controlled by a stop sign. With the exception of the Buck Creek Road intersections with US 40, Valley Brook Drive, and 21st Street, the intersections are all controlled by a stop sign on the minor road approach only. **Table 3** presents a listing of the Buck Creek intersections and associated traffic control.

Table 3 – Buck Creek Road Intersections

Intersection	Type of Traffic Control	Controlled Approach
US-40 & Buck Creek Rd	Stop Sign	Southbound Buck Creek Road
Hopkins Rd & Buck Creek Rd	Stop Sign	Eastbound Hopkins Road
Beckley Rd & Buck Creek Rd	Stop Sign	Eastbound Beckley Road
Harvest Glen Dr & Buck Creek Rd	Stop Sign	Eastbound Harvest Glen Drive
Buckley Blvd & Buck Creek Rd	Stop Sign	Westbound Buckley Boulevard
Valley Brook Dr & Buck Creek Rd	Stop Sign	All-way Stop Controlled
Lakeside Ln & Buck Creek Rd	Stop Sign	Eastbound Lakeside Lane
E 21st St & Buck Creek Rd	Stop Sign	All-way Stop Controlled
Brownstone Ct & Buck Creek Rd	Stop Sign	Eastbound Brownstone Court
W Sacramento Dr & Buck Creek Rd	Stop Sign	Westbound Sacramento Drive
150N & Buck Creek Rd	Stop Sign	Westbound 150N
Harvest Moon Dr & Buck Creek Rd	Stop Sign	Eastbound Harvest Moon Drive

In addition to the intersection signage there are 3 distinct signed speed zones on Buck Creek Road. The 3 zones are signed either 35 mph or 40 mph. The 40 mph section is on roadway that is owned by Hancock County, not the Town of Cumberland. There are warning signs leading into the 90 degree turn approximately 950 feet east of Valley Brook Drive. These signs do not have advisory speed plaques and the turn area will be discussed in the crash analysis section of this report.

ROADWAY LIGHTING

Roadway lighting is present on at several locations along Buck Creek Road, including luminaires at some of the intersections. The luminaires are primarily co-located on utility poles. **Table 4** presents an inventory of the lighting present along Buck Creek Road. The purpose of the lighting inventory was to determine where existing roadway lighting was present. It should be noted that the inventory was conducted by visual inspection only. While the details included should be accurate, the inventory should only be relied on for location and lamp wattage (where it could be observed).

Table 4 – Buck Creek Road Lighting Inventory

Location	Corner/Side of Road	Luminaire Type	Pole Type	Wattage
US-40 & Buck Creek Rd	Northwest Corner	Decorative	Luminaire Pole	Unknown
Hopkins Rd & Buck Creek Rd	Southwest Corner	Cobra-head	Utility Pole	150W
Buck Creek Rd (500' North of Hopkins Rd)	West Side	Cobra-head	Utility Pole	150W
Buck Creek Rd (725' south of Beckley Rd)	East Side	Cobra-head	Utility Pole	150W
Buck Creek Rd (450' South of Beckley Rd)	West Side	Cobra-head	Luminaire Pole (wood)	150W
Buckley Rd & Buck Creek Rd	Southwest Corner	Cobra-head	Luminaire Pole (wood)	150W
Harvest Glen Dr & Buck Creek Rd	East Side of Intersection	Cobra-head	Utility Pole	150W
Buckley Blvd & Buck Creek Rd	Southeast Corner	Cobra-head	Utility Pole	200W
Buck Creek Rd (600' South of Valley Brook Dr)	East Side	NEMA Head	Utility Pole	Unknown
Valley Brook Dr & Buck Creek Rd	West Side of Intersection	Cobra-head	Luminaire Pole	100W
Buck Creek Rd (450' East of Valley Brook Dr)	North Side	Cobra-head	Utility Pole	Unknown
Lakeside Ln & Buck Creek Rd	Southwest Corner	Cobra-head	Luminaire Pole	100W
Buck Creek Rd (100' North of 21st / W 100 N)	West Side	NEMA Head	Utility Pole	Unknown
Buck Creek Rd (300' North of 21st / W 100 N)	West Side	NEMA Head	Utility Pole	100W
Buck Creek Rd (500' North of 21st / W 100 N)	West Side	NEMA Head	Utility Pole	Unknown
Brownstone Ct & Buck Creek Rd	Brownstone Ct Median	Decorative Globe	Luminaire Pole	Unknown
Harvest Moon Dr & Buck Creek Rd	NW & SW Corners	Decorative Acorn	Luminaire Pole	Unknown
Buck Creek Rd (750' North of Harvest Moon Dr)	East Side	NEMA Head	Utility Pole	Unknown

EXISTING TRAFFIC VOLUMES

Existing traffic volumes on surrounding roadways in the study vicinity were collected from INDOT's Traffic Count Database System. Specifically, counts on US 40, W 100 N, Muessing Road, and Mt. Comfort Road were analyzed to determine the existing (or most recent) daily traffic counts in the vicinity of Buck Creek Road. **Table 5** presents these annual average daily traffic (AADT) volumes.

Table 5 – Traffic on Roadways Surrounding Buck Creek Road

Location	Station ID	AADT (Year)
US-40 (East of County Line Rd)	300110	12,911 (2017)
US-40 (100' East of Helfin St)	491100	16,886 (2019)
21st St (West of Lakeside Ln)	30W090	3,070 (2019)
Muessing St (0.20 mi. N of US-40)	49W303	3,760 (2013)
Mt Comfort Rd (N 600 W) (N of US-40)	300608	10,639 (2016)

In addition to the AADT data for surrounding roadways, 24-hour volume counts were collected at three locations on Buck Creek Road in June 2019. Specifically, counts were collected on Buck Creek Road at the following locations:

1. Between Hopkins Road and Beckley Road
2. Between Valley Brook Drive and Lakeside Lane
3. Between Brownstone Court and Sacramento Drive

The 24-hour count volumes and associated AADTs are presented in tabular form in **Table 6**, and are illustrated in **Figure 6**.

Table 6 – Traffic on Buck Creek Road

Location	24-Hr Count (06/26/2019)	2019 AADT
Between Hopkins & Beckley	1,651	1,493
Between Valley Brook & Lakeside	773	699
Between Brownstone & Sacramento	1,003	1,003

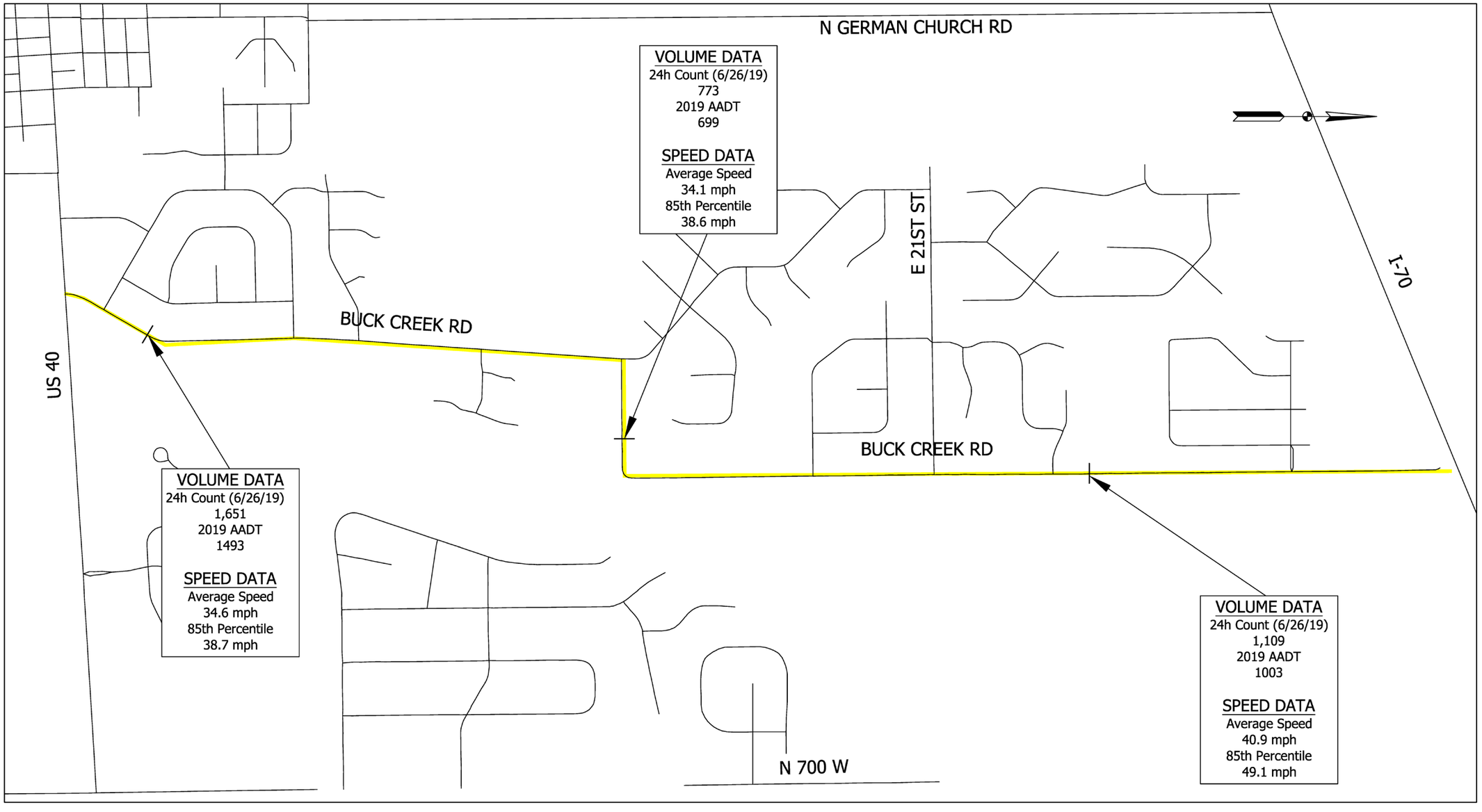


Figure 6 –Buck Creek Road Traffic Data Collected

FUTURE TRAVEL DEMAND

Future travel demand on Buck Creek Road was estimated based upon historical growth rates on surrounding roadways. Historical traffic volumes on surrounding roadways in the study vicinity were collected from INDOT's Traffic Count Database System. Specifically, counts on US 40, W 100 N, Muessing Road, and Mt. Comfort Road were analyzed to determine recent traffic trends in the study area. **Table 7** presents these annual average daily traffic (AADT) volumes and associated compound annual growth rate. Since no historical data is available on Buck Creek Road itself, growth rates at the nearest count stations were evaluated instead. As shown in Table 7, the annual growth rate in the vicinity of Buck Creek Road ranged from -2.74% to 4.53%. The annual growth rate at the count station on US 40 (100 feet east of Helfin Street), 3.27% per year, was selected to estimate growth on Buck Creek Road.

Table 7 – Traffic Growth Near Buck Creek Road

Location	Station ID	$AADT_1$ (Year)	$AADT_2$ (Year)	Annual % Growth
US-40 (East of County Line Rd)	300110	13,792 (2013)	12,911 (2017)	-1.64%
US-40 (100' East of Helfin St)	491100	15,330 (2016)	16,886 (2019)	**3.27%**
21st St (West of Lakeside Ln)	30W090	3,729 (2012)	3,070 (2019)	-2.74%
Muessing St (0.20 mi. N of US-40)	49W303	4,437 (2019)	3,760 (2013)	2.80%
Mt Comfort Rd (N 600 W) (N of US-40)	300608	11,121 (2017)	10,639 (2016)	4.53%

The projected traffic volumes on Buck Creek Road are presented in **Table 8.** As shown in Table 8, AADTs on Buck Creek Road are expected to be approximately 2,900 vehicles per day (vpd) on the southern portion, approximately 1,400 vpd in the middle section between Valley Brook Drive and Lakeside Lane, and approximately 2,000 vpd north of 21st Street.

Table 8 – Projected Traffic on Buck Creek Road

Location	2019 AADT	Annual % Growth	2020 AADT	2040 AADT
Between Hopkins & Beckley	1,493	3.27%	1,542	2,934
Between Valley Brook & Lakeside	699		722	1,378
Between Brownstone & Sacramento	1,003		1,036	1,975

BICYCLE AND PEDESTRIAN FACILITIES

Bicyclists and pedestrians on the Buck Creek corridor are primarily served by the Cumberland Trail System. Between US 40 and 21st Street, the Buck Creek Trail runs along Buck Creek, which is located to the east of Buck Creek Road. Buck Creek Trail then runs parallel to 21st Street until reaching Buck Creek Road. The trail runs along the west side of Buck Creek Road between 21st Street and its northern terminus near Harvest Moon Drive. The trail consists of concrete sidewalk between 21st Street and Brownstone Court. From Brownstone Court to Harvest Moon Drive, Buck Creek Trail is a wider multi-use trail made of asphalt.

Easier access to the Buck Creek Trail near Valley Brook Drive and Lions Park is desired by the Town of Cumberland. The Buck Creek trail generally runs parallel to Buck Creek Road but is located up to a quarter mile to the east of the road. Some possible ideas for improving access to the trail include the following:

- Construct a path from Valley Brook Drive to the Buck Creek Trail. This path would be adjacent to (or through) the New Life Church property and the abandoned Cumberland Trails subdivision.
- Install a crosswalk at or near the entrance to Lions Park to facilitate access to the Buck Creek Trail.

Buck Creek Road: Corridor Problem Identification

CRASH ANALYSIS

Crash data from 2012 through 2017 was received from the Indianapolis MPO in order to analyze and understand the potential issues along the Buck Creek Road corridor. After review of the recorded crashes (11 crashes from 2012 through 2017), no known trends were discovered. The highest occurrence of crash type was run-off road type crashes, 6 of the 11. Beyond the recorded crashes, there have been multiple discussions with Town officials that describe the 90 degree turn area as an issue, especially during winter and snow events. Based on qualitative analysis it is estimated that 5 to 7 slide offs occur at the eastern 90 degree turn every winter. Most slide offs do not result in injury or even an official crash report, however many times the Town snow removal team are the first on the scene and contact towing companies.

TRAVEL SPEEDS

Traffic counters that recorded travel speed were placed at 3 separate locations along Buck Creek Road. These locations, discussed previously, resulted in the below listed speed results:

- Between Hopkins and Beckley: 85th percentile – 38.7 mph
- Between Valley Brook and Lakeside: 85th percentile – 38.6 mph
- Between Brownstone and Sacramento: 85th percentile – 49.1 mph (2-way)
  - 51.5 mph southbound
  - 47.6 mph northbound

There does not appear to be a speeding issue south of 21st Street, it is in line with the posted 35 and 40 mph speed zones. However, the speeds north of 21st Street are higher than anticipated. This could be to a number of factors:

- Wider roadway and no current pavement markings
- Straight road with no sight issues
- Dead end roadway with only a few access points (4 subdivision/roads)
- Motorists expecting Buck Creek Road to cross Interstate 70.

While this area is still developing, it appears that it could become a higher pedestrian and bicycle area, especially with the new housing at the north end and the connectivity to the Buck Creek Trail. There are a few recommendations and items of note with this area:

- The pavement markings on Buck Creek Road are in process currently (both centerline and edge line markings). This should assist in presenting a narrower lane width which will assist in lowering speeds.
- There are currently no pedestrian crossings or signage regarding pedestrians. Suggest adding signage on the trail on the west side of Buck Creek Road to bring attention to the pedestrian movements.

GEOMETRIC DEFICIENCIES

The current layout of Buck Creek Road presents two areas where geometric improvements could be considered. These will be listed from south to north through the corridor

- US 40 and Buck Creek Road Intersection
  - There is an accident history of 4 crashes at this intersection in 2015 and 2016. Two of these crashes were the result of failing to yield the right-of-way, which could be an indicator of a sight distance issue from Buck Creek Road onto US 40. Sight distance measurements should be performed and analyzed.
  - The stop sign and stop bar on Buck Creek Road runs perpendicular to Buck Creek Road, which is a potential issue with sight lines.
- Buck Creek Road at the two 90 degree turns
  - The western 90 degree turn is an intersection with Valley Brook Drive stop controlled for all 3 approaches. There is no accident history and this intersection appears to be geometrically safe.
  - The eastern 90 degree turn has a down slope and no signage approaches from the west. From the north there is a single right-turn warning sign without advisory speed plaque.

For the length of the corridor the pavement width appears to be insufficient for a minor collector. According the thoroughfare plan, an existing roadway minor collector should have 2 10' lanes with 2' shoulders. Currently there is a lack of shoulder present through many sections of the corridor which could be remedied if the corridor was brought up to compliance of, at a minimum, the existing minor collector cross section. Cross-sections for collector roadways from the Town of Cumberland Thoroughfare Plan are presented in **Figure 7.**

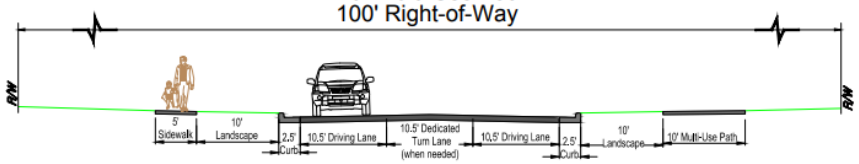
LIGHTING

There is no consistent lighting throughout the corridor. The current lighting is spot specific for some intersections and major road changes. As the area continues to develop consistent and uniform roadway lighting would be beneficial to the area.

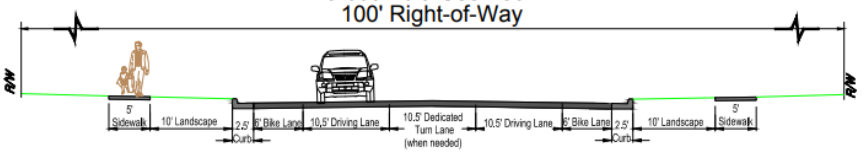
Figure 7 – Collector Cross-Sections from Thoroughfare Plan

Future Major / Minor Collector

With Multi-Use Path
100' Right-of-Way



Without Multi-Use Path
100' Right-of-Way



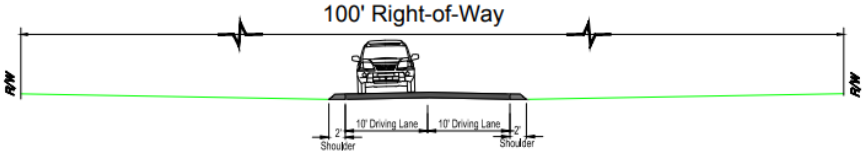
Notes:

1. This typical cross-section represents the desirable right-of-way width and components for a future collector roadway (either major or minor).
2. Dedicated left-turn and right-turn lanes to be provided at intersections as needed.

Existing Major / Minor Collector

Existing typical cross-section varies
Examples: C.R. 700 W & E 21st St (C.R. 100 N)

100' Right-of-Way



Notes:

1. Existing right-of-way width appears to vary from 50' to 100'
2. Existing landscape width varies: typically 10' wide
3. Existing sidewalk width varies: None, 6' or 8'
4. The pedestrian and bicycle components shown above for Future Collectors should be added wherever possible.

Buck Creek Road: Improvement Concepts

Potential improvement concepts for the Buck Creek Road corridor were developed as a part of this study. Specifically, consideration was given for both short-term and medium/long-term improvements. The short-term improvements consist of "quick fix" type changes that can be implemented quickly without major expense. Medium/long-term improvements are more extensive and would need to be designed and programmed for future construction.

SHORT-TERM IMPROVEMENTS

In the short-term, there are several potential improvements to the signing and pavement markings on the Buck Creek Road corridor that could be implemented as short-term improvements:

- The stop signs are not consistent on all approaches at the intersection of Valley Brook Drive and Buck Creek Road. This intersection has all-way stop control and stop signs are present on all approaches. However, there is only an "ALL WAY" plaque on the westbound approach. Based on crash data, the lack of these plaques on the other approaches has not been an issue but it is recommended that they be installed for consistency and MUTCD compliance.
- As previously mentioned, the eastern 90-degree curve is a location that the Town identified as having issues with run-off road crashes during winter and snow events. During the course of the study it was found that there is only an advance warning sign (Turn sign; MUTCD code W1-1) installed on the southbound approach to the curve. The installation of a turn warning sign in advance of the 90-degree curve is recommended for the northbound approach to the curve as well.
- The Town has recently resurfaced much of Buck Creek Road. As part of this resurfacing, new pavement markings have been installed on the portions south of 21st Street. Although Buck Creek Road is relatively narrow, edgeline markings have been installed in addition to centerline striping. This is a cost-effective improvement that should help with some of the run-off road crashes that have occurred previously on this corridor. At the time field observations were conducted for this study pavement markings had not yet been installed on Buck Creek Road to the north of 21st Street. The same striping treatment is recommended for this northern portion of Buck Creek Road. It is understood

that these pavement markings are planned for that section of Buck Creek Road and they may have already been installed.

- Improved pedestrian facilities on Buck Creek Road would be beneficial for improving access to Buck Creek Trail and connectivity to the greater Cumberland Trail System. A path is recommended from Valley Brook Drive to the Buck Creek Trail. This path would be adjacent to (or through) the New Life Church property and the abandoned Cumberland Trails subdivision. This trail connection would greatly improve access to the trail for the residents of Valley Brook Farms and other nearby homes. In addition, improved pedestrian access to Lions Park is also recommended. A crosswalk should be installed at or near the entrance to Lions Park. Proper warning signage should be installed and the use of a rectangular rapid flash beacon (RRFB) should be considered. While no national warrants currently exist for justifying the installation of a RRFB, some states and jurisdictions have begun to develop their own guidelines. The City of Boulder, Colorado has produced one such document: *Pedestrian Crossing Treatment Installation Guidelines (2011)*. The Town of Cumberland might consider creating a simple set of guidelines to decide which locations are most appropriate for RRFB treatment. Items to consider would include vehicular traffic volume, existing pedestrian crossing volumes (and perhaps anticipated pedestrian volumes), number of residents within a five-minute walk of the crosswalk, etc.
- The intersection of US 40 and Buck Creek Road may have an issue with sight distance. Specifically, visibility to the east appears to be somewhat restricted by the bridge railing on US 40 over Buck Creek. Sight distance measurements should be performed and analyzed to verify if this is an issue at the intersection.

  A minor adjustment to stop sign and pavement markings on the southbound approach of Buck Creek Road could help improve visibility for motorists turning onto US 40. Currently, the stop bar and stop sign are installed perpendicular to the general alignment of Buck Creek Road. It is recommended that the stop bar be adjusted such that it is oriented parallel to the crosswalk across Buck Creek Road. It is also recommended that the centerline pavement marking be adjusted to become perpendicular to the stop bar, which should help guide vehicles to stop closer to US 40 and in a better position to see towards the east. Additionally, it is recommended that hatching be added to the shoulder to improve visibility. This concept is illustrated in **Figure 8**.

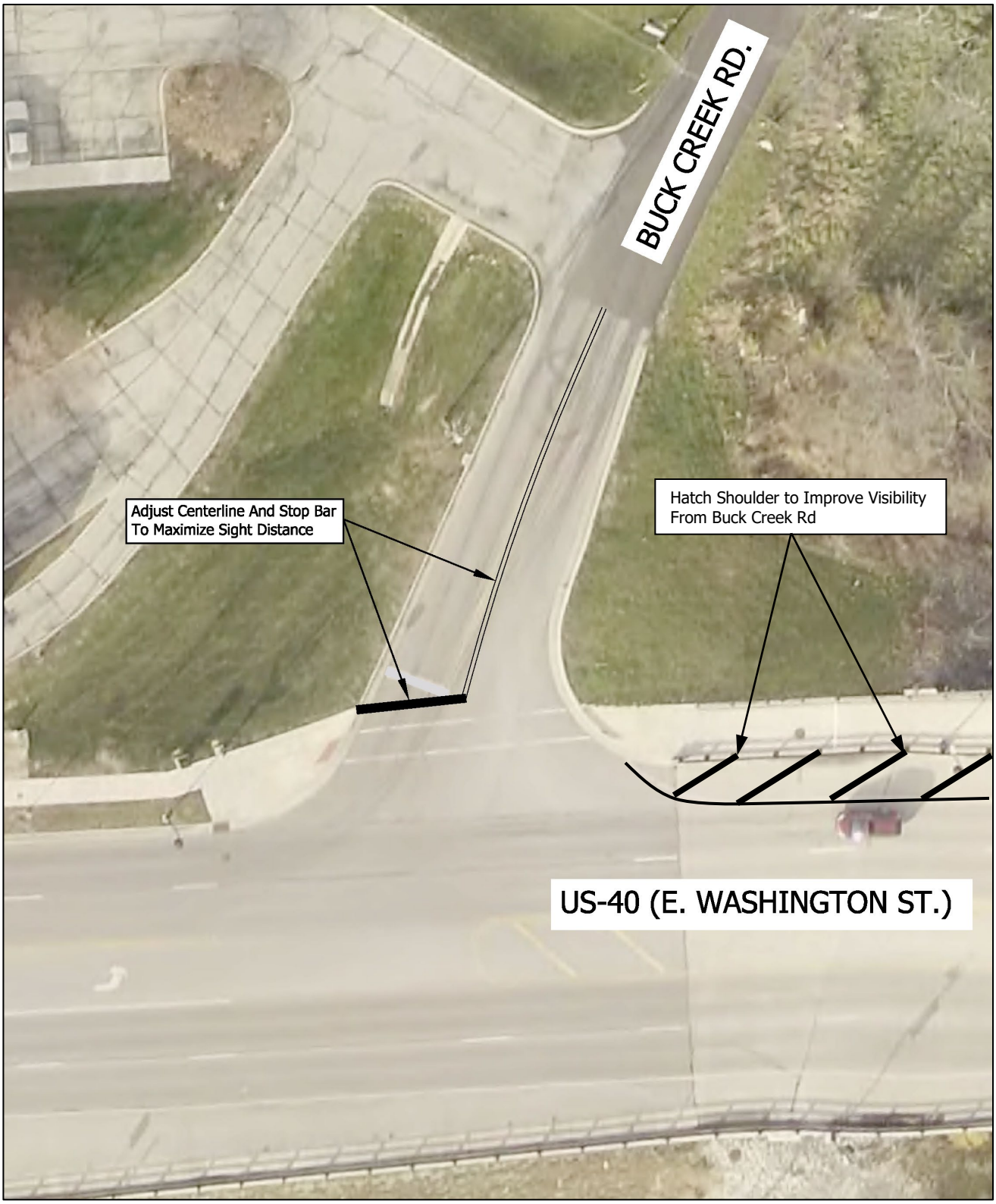


Figure 8 – US 40 & Buck Creek Road Striping Improvement Concept

MEDIUM/LONG-TERM IMPROVEMENTS

In the medium to long-term, there are several more substantial improvements that can be considered for the Buck Creek Road corridor:

- Owing to its history as a rural roadway constructed by Hancock County, Buck Creek Road is quite narrow. The roadway does not meet the design requirements for existing major/minor collector roadways as defined in the town's thoroughfare plan update. It is recommended that Buck Creek Road be improved to meet this standard, widening the roadway to include two 10' lanes and 2' shoulders. Widening Buck Creek Road would be expected to improve the roadway safety on the corridor. The crash types to most likely benefit from this improvement are run off road crashes, animal crashes, and backing crashes.
- There are two major areas where drainage problems exist in high-volume rain events. Approximately 600 feet south of the intersection with Valley Brook Drive there is a low spot where water can gather at the driveway of 493 Buck Creek Road. This area was of major concern previously due to a water line leak that caused large ponding in the area. Once the water line leak was corrected the issue has been mitigated significantly. However, the area still should be observed and monitored during a large rain event to log whether water is still held in and near the driveway. The second area of drainage concern is approximately 900 feet north of US 40. This area holds water when Buck Creek overflows the typical high-water mark. Due to the creek's proximity to the roadway there may not be a good alternative or positive improvement, however the area should be investigated to see if there is an alternative to keep water from gathering on the roadway.
- The eastern 90-degree curve has a noted crash history during winter and snow events. The sharp curve coupled with the downhill approach from the south results in run-off road crashes in snowy/icy conditions. It is recommended that the curve be flattened out (increasing its radius) and improvements are made to the grades heading into the curve.

- Depending on the results of the sight distance evaluation at the intersection of US 40 and Buck Creek Road, as well as the minor adjustments recommended for the pavement markings, further improvements may need to be considered. The following options can be evaluated in the future if necessary:
    - Signalization

      A traffic signal would remove any concerns regarding sight distance at the intersection. However, a traffic signal should only be considered if the intersection meets one or more of the traffic signal warrants from the MUTCD. Based on past crash data at the intersection and traffic counts collected on Buck Creek Road as a part of this study, the intersection is not currently expected to meet any traffic signal warrants. With further development and traffic growth this could change, so the town should continue to monitor this intersection.
    - Reduce Intersection Skew

      Another option to improve sight distance at the intersection is to realign the terminus of Buck Creek Road to reduce the amount of skew at the intersection with US 40. This would help sight distance as drivers would not have to turn their heads around as far to see westbound traffic on US 40. However, moving Buck Creek at all to the east would probably affect the bridge. Moving Buck Creek farther west to make it intersect with US 40 at more of a perpendicular angle would require significant right-of-way from the bank on the northwest corner of the intersection. Both options have significant drawbacks which hurt their feasibility.

Thoroughfare Plan Update

In 2016 the Town of Cumberland updated their thoroughfare plan. This plan is an integral part of the Transportation Master Plan.

The purpose of a thoroughfare plan is to document the planned roadway thoroughfares of the Town. Typical components of a thoroughfare plan include a functional classification map of existing and future thoroughfares as well as typical cross-sections of each functional classification which show the anticipated right-of-way needs. A thoroughfare plan is an optional subset of a municipality's Comprehensive Plan. Comprehensive plans establish the vision and policy guidelines for the growth and land use of a municipality for a twenty (20) year period. The report titled Town of Cumberland, Indiana Thoroughfare Plan (dated May 9th, 2016 is the Town's most current thoroughfare plan. This section of the report will serve as an update to the Town's thoroughfare plan to correspond with the Transportation Master Plan.

Statutory Requirements

The 500 series of the Indiana Code (IC) 36-7-4 provides the requirements and guidelines of a municipality's comprehensive plan. Section 506 of the Indiana Code (IC 36-7-4-506) lists the specific requirements and guidelines of thoroughfare plans. The following provides a brief summary of IC-36-7-4-506:

a) A thoroughfare plan may determine lines for new, extended, widened, or narrowed public ways (thoroughfares) within the municipality.

b) The thoroughfare plan does not in itself constitute the opening, establishment, or acceptance of public land for purposes of the thoroughfares.

c) Once established, thoroughfares may be located, changed, widened, straightened, or vacated only in the manner indicated by the comprehensive plan and thoroughfare plan.

d) The plan commission may recommend the order in which thoroughfare improvements should be made.

Scope of Thoroughfare Plan

The previously discussed Indiana Code lists the specific requirements and guidelines of thoroughfare plans. A thoroughfare plan should consist of the following components at a minimum to adhere to the Indiana Code requirements:

Component #1: A functional classification map of existing and future thoroughfares.

Component #2: Typical cross-sections of each functional classification which shows the anticipated right-of-way needed for the thoroughfares.

The two (2) components listed above meet the requirements of the Indiana Code by documenting the planned thoroughfares. Additional assessment and traffic analysis can be performed if needed based on the specific needs of the municipality. However, any additional components should only be included in a thoroughfare plan if they further advance the vision and goals of the municipality's comprehensive plan.

The scope of this thoroughfare plan update was determined based on discussions with the Town Planner and the Street / Park Superintendent to meet the vision and goals of the Cumberland 2031 Plan. The functional classification map and typical cross-sections of the 2007 thoroughfare plan needed to be updated based on the current goals of the Town, specifically:

Goal #1: New thoroughfares would be needed to promote proper access driveway management along the primary arterials of Mount Comfort Road and U.S. 40.

Goal #2: Typical cross-sections would need to be updated to account for the revised functional classifications and the current design practices of complete streets.

The following pages of this report further document the scope of this thoroughfare plan update to meet these two (2) goals.

Goal #1 – Thoroughfares to Promote Access Management

The Cumberland 2031 Plan provides an updated future land use map titled Town of Cumberland - Comp Plan Map[2] dated May 2010. The future land use map shows office park, mixed use commercial / residential, and other commercial uses along the primary arterials of Mount Comfort Road and U.S. 40. Most of the land adjacent to these arterials is vacant. It is important that access driveways are properly located so that traffic safety and mobility are maintained along these arterials as land development occurs. This is accomplished by performing the following tasks:

Task #1: Update the Town's thoroughfare plan to provide for future, lower functional classification of roadways in the surrounding area for which less restrictive driveway access will be located.

Task #2: Develop an access management plan along the Mount Comfort and U.S. 40 arterials to recommend the location and configuration for more restrictive driveway access.

TASK #1: THOROUGHFARE PLAN UPDATE

Task #1 is accomplished via this thoroughfare plan update. Figure 1 is an updated functional classification map for the Town's thoroughfare plan. The figure shows the recommended future collectors surrounding the primary arterials of Mount Comfort Road and U.S. 40. The collectors have been located along property lines and to provide for ½ mile spacing for the major intersections along the arterials whenever possible. The purpose of the new collectors is to provide for less restrictive access driveways for new development so that access driveways along the primary arterials are more restrictive.

A sub-set goal of the updated thoroughfare plan is to revise the functional classification of existing thoroughfares to better match the Town's current vision. The functional classification map provided in the Cumberland Connections 2025, the current INDOT functional classifications[3], and the Cumberland 2031 Plan were all reviewed. Discussions were held with the Town Planner and Street / Park Superintendent to further understand the Town's current vision. Figure 1 shows the recommended functional classifications of the Town's thoroughfares. The following briefly summarizes the revisions from the Cumberland Connections 2025 report.

1) The classification of "Collector" was further categorized into "Major Collector" and "Minor Collector."
2) Several "Secondary Arterials" were revised to be "Major Collectors."

Task #2: Access Management Plan

Task #2 is accomplished via an Access Management Plan for both Mount Comfort Road (I-70 to C.R. 100 S) and U.S. 40 (Carroll Rd to C.R. 525 W). An access management plan recommends the proper spacing and configuration for future access driveways along heavily travelled thoroughfares. The purpose of an access management plan is to maintain traffic safety and mobility along the thoroughfares while also providing the proper level of driveway accessibility for future land development. This is achieved by adhering to the principles and guidelines as listed in the INDOT Access Management Guide[4]. An Access Management Plan for both Mount Comfort Road and U.S. 40 was conjointly prepared along with this thoroughfare plan in a separate report[5] which recommends the driveway spacing along these corridors.

Goal #2 – Updated Typical Cross Sections

The cross-sections of the thoroughfares needed to be updated for each of the functional classifications in order to meet the current needs of the Town. Specifically, the updated cross-sections need to account for the revised functional classifications and the current design practices of complete streets. "Complete streets" is the general term used to describe current roadway design practices that incorporate pedestrian and bicycle needs. This is in contrast to the previous generation of roadway designs which did not place as much emphasis on pedestrian and bicycle needs. Please refer to page 60 of this Transportation Master Plan for more information about complete streets, as well as the town policy regarding complete streets. **Figure A2** in **Appendix A** is a map showing each of the existing and future multi-use paths, bike lanes, and sidewalks which will promote pedestrian / bicycle connectivity and complete streets.

The following figures in **Appendix A** provide the updated typical cross-sections for each functional classification:

Figure A3:	Typical Cross-Sections	Arterials
Figure A4:	Typical Cross-Sections	Collectors
Figure A5:	Typical Cross-Sections	Local Roads

These cross-sections have been updated to match the updated functional classifications and takes into account current design practices for complete streets. Some of the complete streets practices that have been incorporated into the updated cross-sections are as follows:

1) ***Automobile Lane Width*** - The automobile lane widths have been reduced from the unnecessary 12' foot lanes to 11' lanes for the arterials and 10' or 10.5' lanes for collectors. This reduction in automobile lane width allows for better accommodation of pedestrian and bicycle needs within the available right-of-way while still maintaining the necessary automobile lane widths.

2) ***Multi-Use Paths, Bike Lanes, and Sidewalks*** - A 10' multi-use path is recommended along both sides for the primary arterials of Mount Comfort Road and U.S. 40. Providing pedestrian and bicycle accommodations along both sides will reduce pedestrians / bicycles crossing the arterials for the sole purpose of using the only accommodations which are along the opposite side of the roadway. Alternatives to the multi-use paths could include one-way / two-way cycle tracks and separate sidewalks. For collector roadways, a multi-use path is only needed for one side of the roadway. On-street bicycle lanes should be provided for collectors when a multi-use path can't be provided.

Access Management

The purpose of access management is to maintain traffic safety and mobility along primary arterials while also providing the proper level of driveway accessibility for future land development. Based on feedback from the Town of Cumberland and review of prior studies, the most critical corridors are:

- Mount Comfort Road from I-70 to C.R. 100 S.
- U.S. 40 (Washington Street) from Carroll Road (C.R. 800 W) to C.R. 525 W.

While this Transportation Master Plan focuses on these two corridors, these principals should be considered for all Cumberland roadways as development occurs. The 2016 Access Management Plan recommended the configurations and locations of future access driveways along these primary arterials. The recommendations were based on the principles established in the INDOT Access Management Guide[6]. The access plan was developed in conjunction with an update to the Town's thoroughfare plan, which is also included as part of the Transportation Master Plan.

Access Management Principles

The INDOT Access Management Guide provides guidelines and principles to assist both INDOT and local municipalities in planning for the appropriate level of driveway access for the public roadway system. The guide recommends that local agencies develop an Access Management Plan for heavily travelled thoroughfares to assist in the planning process. The guide stresses that there are numerous factors to consider when determining the appropriate level of access and that each individual access situation should be evaluated on a case-by-case basis. However, the following three (3) key principles from the Guide apply to all access driveway situations:

1. ROADWAY FUNCTIONAL CLASSIFICATION

   The functional classification system designates the main function of an individual road. The main function of lower classified roadways such as a local street is to provide land access. The main function for higher classified roadways such as an arterial is to facilitate the through movement of traffic. The collector roadway classification provides a variable mix of both traffic movement and land access. A specific roadway classification

can be designated as either minor or major (secondary or primary) to further clarify its main function.

2. PRESERVE THE FUNCTIONAL AREA OF INTERSECTIONS

   The functional area of an intersection includes the areas beyond the junction of the intersecting roadways that is critical to the proper function of the intersection. This functional area includes the approaches and vehicle departure areas where motorists are responding to the traffic control devices at the intersection, accelerating and decelerating, and maneuvering into the appropriate lane to stop or complete a turn. Access driveways located too close to intersections (i.e. within the functional area) can cause serious traffic conflicts that impair the function of the affected facilities. Vehicle queue lengths that extend back along a roadway from an intersection through an access driveway indicate that the access driveway is within the functional area of the intersection and hence located too close to that intersection.

3. MINIMIZE CONFLICT POINTS

   When two vehicle travel paths cross each other they create a conflict point. Minimizing the number of conflict points or a certain type of conflict point is a safety tool used for intersections. The left-turn movement out of an unsignalized access driveway is usually the conflict point that is best to minimize along a primary arterial roadway to improve safety conditions. This is because that movement requires a gap along both directions of a heavily travelled roadway in order to safely complete the movement. The more traffic volume along the mainline roadway, the less gaps that are available for the left-turn out, the more likely that drivers will attempt to use un-safe gaps, which then results in more vehicle crashes.

Recommended Access for Mt. Comfort Rd and U.S. 40

MAJOR INTERSECTIONS

The first step in recommending the location and configuration for driveway access along these primary arterials is to first recommend the location and traffic control of the major intersections. A major intersection should be defined as the intersection of two roadways that are classified as a collector or higher (as opposed to the intersection with a local road or an access driveway).

The location and configuration of local road intersections and access driveways should then be located in relation to the major intersections.

Figure A6 in **Appendix A** shows the location of existing traffic signals along U.S. 40 from I-465 to C.R. 500 W. Of specific interest is the existing traffic signal spacing from Post Road to Muessing Street which is typically ¼ mile. Several of these traffic signals are not located at major intersections, but instead located at access driveways. Although the corridor can function with this traffic signal spacing, this is less than the recommended traffic signal spacing of ½ mile for a primary arterial as per the INDOT Access Management Guide. Also, the corridor requires a 6-lane divided roadway cross-section (three through lanes in each direction) and lengthy right-turn lanes from I-465 to just south of German Church Road in order for the corridor to function with the ¼ mile traffic signal spacing.

Figure A7 in **Appendix A** shows the recommended location of future traffic signals along the study limits of U.S. 40 and Mount Comfort Road. This figure represents the recommended traffic signal spacing of ½ mile. In addition, traffic signals are typically located at the major intersections (i.e. at the intersections of roadways that are classified as a collector or higher).

Local Roadways and Access Driveways

Intersections with local roadways or access driveways should then be spaced in relation to the location of the major intersections as identified on Figure A7. The following figures in **Appendix A** summarize the recommended driveway access along Mount Comfort Road and U.S. 40:

- Mount Comfort Road — **Figure A8(a)** through **Figure A8(d)**
- U.S. 40 — **Figure A9(a)** through **Figure A9(e)**

The specific location and configuration for intersections with local roads or access driveways will need to be determined on a case-by-case basis using the principles of the INDOT Access Management Guide. Ideally, the left-turn out movement should be limited to the proposed traffic signals located at the ½ mile spacing of the major intersections. Left-in / right-in / right-out (LI/RI/RO) intersections which prevent the left-turn out movement via a raised center median should be located at the intersections with local roadways at ¼ mile spacing between the major intersections (i.e. ¼ mile spacing between the traffic signals). Access driveways between the

traffic signals and LI/RI/RO should be located outside the functional area of nearby intersections and should ideally be a right-in / right-out (RI/RO) configuration via a raised center median. Ideally, there would only be one RI/RO access driveway located at the midpoint between the traffic signals and the LI/RI/RO (on either side of the roadway). The left-turn out movement would then be consolidated to occur at the major intersections only (e.g. at the traffic signals). Less restrictive access driveways would then be located along the future local roads which connect to the existing and future collectors, which intersect with the primary arterials, of which the major intersections are controlled by a traffic signal.

Minimum Separation Distances

Figures A8(a) through A9(e) provide the recommended location and configuration for major intersections, local road intersections, and access driveways. These recommendations represent the ideal intersection spacing which provides the optimal balance between traffic safety, traffic efficiency, and land accessibility. However, the specific location and configuration may need to vary from the recommendations in certain circumstances depending on how land is specifically developed. In these situations the specific location and configuration of driveway access should be determined on a case-by-case basis using the three (3) key principles of the INDOT Access Management Guide as previously discussed on page 3 of this report:

1. Roadway Functional Classification
2. Preserve the Functional Area of Intersections
3. Minimize Conflict Points

Of specific interest is principle #2: Preserve the Functional Area of Intersections. Unfortunately there is no industry standard "minimum" intersection separation distance that can be prescribed within an access management plan that preserves the functional area of nearby intersections for every possible traffic and land development situation. Minimum driveway distances listed in roadway design manuals such as the Indiana Design Manual[7] or the INDOT Driveway Permit Manual[8] should be used with caution as these "minimum" distances only account for the physical operation of a design vehicle (e.g. the ability for a car or truck to physically make the turning movements) and therefore do not account for future traffic operations (e.g. 20-year horizon traffic) or the human element as it relates to traffic safety (e.g. the probability of a vehicle making a left-turn out movement from the minor street that misjudges the gaps in the major street traffic stream, thereby causing a crash).

In some situations a brief qualitative assessment is all that is needed to determine the specific minimum intersection spacing (i.e. engineering judgment based on the access management principles). In some situations the performance of quantitative analysis within a traffic impact study may be needed such as vehicle queue lengths of horizon year traffic volumes. The INDOT Applicant's Guide to Traffic Impact Studies9 provides guidelines to help determine when a traffic impact study may be needed and the necessary scope items for different land development situations.

Roundabout Corridors

Consideration should be made for implementing roundabout corridors along the study extents of Mount Comfort Road and U.S. 40, specifically Mount Comfort Road. The roundabouts would be located at the major intersections at the ½ mile spacing in lieu of the traffic signals. The left-in / right-in / right-out (LI/RI/RO) access configurations would be located in between the roundabouts at the ¼ mile spacing for intersections with the local roads. Right-in / right-out (RI/RO) access driveways would then be located in between the roundabouts and LI/RI/RO intersections, ideally at the midpoint. Raised center medians would be located along the primary arterials to implement the LI/RI/RO and RI/RO intersections. Some existing traffic signals along the arterials would be converted to roundabouts. **Figure A10** in **Appendix A** shows the locations of the potential roundabouts.

As one can see, the recommended spacing and general configuration for major intersections (roundabouts), local road intersections (LI/RI/RO), and access driveways (RI/RO) are very similar to the access recommendations previously discussed for the traditional traffic signal. However, the main beneficial difference for the roundabout corridor is the improvement on facilitating the left-turn out movement. In addition to making the left-turn out movement at the major intersections (roundabouts), the left-turn out movement can also be facilitated by making a right-turn out movement at either the LI/RI/RO or RI/RO locations, then making a U-turn at the roundabout.

If additional information is needed on roundabout corridors, an excellent example can be found along the existing Shiloh Road in Billings, Montana. Several reports are available which document the benefits of the Shiloh Road roundabout corridor including a brief summary report[10] and the Environmental Assessment report[11]. A key note from these reports is that the roundabout corridor was the option with the least construction cost, most likely because additional through lanes would have been needed with the traditional traffic signal option at ¼ mile spacing. Consideration should then be made for implementing roundabout corridors along Mount Comfort Road and U.S. 40, specifically Mount Comfort Road, as they would provide the optimal solution for traffic safety, traffic efficiency, and land accessibility. Additional study may be needed to assess the benefits and costs of the roundabout corridor concept.

Complete Streets Policy

I. DEFINITION

"Complete Streets" is an integrated and comprehensive approach to a community's transportation network. A Complete Streets Policy is intended to guide and influence every-day decision making with incremental improvements and ultimately long-term results. Complete Streets are not special, one-time only or one-size-fits all projects.

Complete Streets look different and are unique to their community but include responsive infrastructure and design that allow safe, accessible and convenient travel for people along and across streets for all users. Complete Streets are roadways designed to safely and comfortably accommodate all users, of all ages and abilities, including but not limited to pedestrians, bicyclists, micro-mobility users, public transit users, school bus riders, motorists, delivery and service personnel, freight haulers, and emergency responders.

Publicly owned rights of way should safely accommodate destination-based and recreational users as well as provide opportunities where appropriate for rest and directional information within the public realm. By adopting a Complete Streets policy, the Town of Cumberland is making a conscious decision to plan, design, construct, operate and maintain the entire right of way in its community to enable safe access for all residents and visitors.

This policy is a signal that the Cumberland community and its leaders will prioritize making its street network safer for people who walk, bike, ride transit or drive. This policy is also a complementary component of Cumberland's updated 2020 Transportation Master Plan.

A. BENEFITS OF COMPLETE STREETS POLICY

This approach to street design enhances quality of life for Cumberland residents and visitors. Complete Streets are also economic drivers, increasing the visibility of local businesses and providing multiple ways to access and visit local destinations. This vital component and consideration for the transportation system creates a walkable and vibrant Cumberland, ultimately attracting and retaining businesses and residents. Complete Streets means more transportation choices for a diverse range of residents and visitors while balancing those choices with community, environmental, economic, safety and individual benefits.

There are countless individual and community wide benefits to safe walking or biking to school, work, or other local destinations. This growing list of active transportation means reduced vehicle miles traveled, increased physical activity and increased public transportation. This increase in options begin to address a wide variety of challenges, such as pollution, climate change, traffic congestion, social isolation and physical inactivity.

Complete Streets policies and the associated design approaches have been being developed and applied over the last 20 years. They are a vital part of livable communities, ensuring that everyone regardless of age, income, ability, ethnicity or race have safe, comfortable and convenient modes

of travel and access to daily destinations. This means streets for pedestrians, bicyclists, micro-mobility users, public transit users, school bus riders, motorists, delivery and service personnel, freight haulers, and emergency responders.

It is estimated that 1/3 of all Hoosiers do not drive cars. While much is known about designing and implementing Complete Streets, and many examples exist, more often than not, streets prioritize one mode over the others. In the past ten years, the number of pedestrians struck and killed by drivers while walking has increased by 30% (Smart Growth America; Dangerous by Design 2019). A Complete Streets policy illustrates a commitment to improving the quality of life while proactively taking steps to eliminate dangerous street conditions and outline a new measure of success for Cumberland's streets. While there is a need to provide safe and efficient streets for automobiles, it is imperative to recognize and prioritize the safety of all residents, visitors and users of streets., no matter how they travel.

II. RELATIONSHIP TO OTHER PLANS

In 2018, the Town of Cumberland was awarded funds through the Indy Metropolitan Planning Organization (MPO) to develop a Transportation Master Plan. Cumberland's 2020 Transportation Master Plan includes an updated thoroughfare plan, integration of access and asset management plans, review and inclusion of regional transit impact studies, a corridor study for Buck Creek Road and a Complete Streets policy and Implementation Plan.

This Complete Streets policy is an independent policy that follows an established framework for Complete Streets, was reviewed and approved by The Plan Commission and adopted by The

Town Council on April 1, 2020. However, it is also a key component of the overall Cumberland Transportation Master Plan. Both documents will, at times, reference one another as well as existing and future planning and zoning documents.

This policy is also intended to be in conformity and consistent with existing Town of Cumberland Planning and Zoning codes and regulations. Any unrealized inconsistencies or conflicts will be addressed in an ongoing bases via necessary updates, revisions or text amendments prepared by Staff and presented to the applicable review boards and councils (Town Council, Plan Commission, etc.) for final approval. In the event that an ordinance or code is in conflict with the current adopted Complete Streets policy (and Transportation Master Plan), the Complete Streets policy takes precedence

III. OUTREACH AND ENGAGEMENT

Complete Streets policies rely on community participation and buy in to ensure long-term success. During the development and preparation of this Complete Streets Policy, the consultant team worked with Town of Cumberland leadership and staff to provide outreach and engagement opportunities. A brief timeline of activities tracking the development of this policy are as follows:

- Complete Streets concepts and principles presentation, Town Council Meeting 2015
- Indy MPO Funding Awarded, Fall 2018
- Consultants hired, Spring 2019
- Team kick-off meeting, September 3, 2019
- Consultant Team Progress Meeting, October 22, 2019
- Stakeholder meeting October 29, 2019
- Complete Streets Presentation, November 20, 2019, Town Council Meeting
- Community Outreach Table, Weihnachtsmarkt, December 7, 2019
- Present to Planning Commission, March 25, 2020
- Present to Town Council for final approval and adoption, April 1, 2020

IV. COMPLETE STREETS FRAMEWORK

A comprehensive framework of Complete Streets policy elements has been developed by Smart Growth America and the National Complete Streets Coalition. The ten elements serve as a model of best practices and are outlined and addressed below for application to the Cumberland Complete Streets Policy as part of the 2020 Transportation Master Plan.

A. VISION AND INTENT

This policy seeks to integrate people and place into the planning, design, construction, operation and maintenance of Cumberland's transportation infrastructure and network. A well-planned, well-designed, and context sensitive transportation network supports improved quality of life and economic development. A Complete Streets approach means improved mobility, access and connectivity, public health benefits, increased safety, enhanced neighborhoods, businesses and institutions.

Cumberland will plan for, design, construct, operate and maintain appropriate facilities that support and provide for Complete Streets. This policy will encompass all new construction projects as well as retrofit and reconstruction efforts that transform Cumberland to community that invests in equitable transportation infrastructure while maintaining its small-town identity and character.

B. ALL USERS AND MODES

Cumberland's Complete Streets policy ensures the safe, convenient and equitable access to its transportation network for all residents and visitors. This means roadways and an infrastructure network that can accommodate all users, including but not limited to, pedestrians, bicyclists, micro-mobility users, transit and school bus riders, emergency vehicles, and delivery and service vehicles. These 'users' include people of all ages, ethnicities and socioeconomic backgrounds.

This policy will focus non-motorized connectivity improvements to services, schools, parks, civic uses, regional transit connections and commercial uses. Complete Streets improvements will benefit Cumberland's populations of older adults, low-income households and people with disabilities by enabling access to everyday community destinations. These improvements will also improve secondary access into the community from future transit expansions, such as the

IndyGO Blue Line project, making Cumberland a destination center and increasing economic development possibilities.

C. COMMITMENT IN ALL PHASES

All transportation needs, projects and improvements present an opportunity to create safer alternate routes and more accessible streets for Cumberland. The Town of Cumberland, through this policy, is committed to applying the 10 elements of Complete Streets, as defined by Smart Growth America and the National Complete Streets Coalition, at the onset of transportation, roadway and other infrastructure projects. This policy is also one component of the 2020 Transportation Master Plan for the Town of Cumberland, which details best practice design guidelines for new project design elements and retrofitting projects.

This commitment extends to aspects of the ongoing operation and maintenance of the transportation network.

Preventative maintenance projects may not always require Complete Streets improvements and will be evaluated on a case-by-case basis. These activities include cleaning, sweeping, spot repair, concrete joint repair, pothole repairs, mowing, sewer and drainage or other utility repairs; provided these activities do not take place with other tangible or significant improvement.

Periodic maintenance and updates shall be considered for Complete Streets improvements. These activities and projects may include re-striping, re-milling, re-surfacing, 'road diets', or widening of bicycle and pedestrian lanes

All other new transportation and roadway improvement projects, such as intersection improvements, road widening, road extensions shall be held to this Complete Streets policy. Requests for waivers will be evaluated on a case by case basis and are subject to any applicable exceptions outlined in Section D. Town Staff will use the Complete Streets Checklist to review and evaluate all public and private projects to ensure consistency within the Complete Streets policy.

D. EXCEPTIONS

The Town of Cumberland recognizes that not all Complete Streets elements will be required or provided in every project. The effective implementation of this Complete Streets policy requires a transparent and thorough exceptions process to justify an exemption. The exceptions outlined in this section follow the Federal Highway Administration guidance and best practices. The following situational conditions exempt adherence to Complete Streets policy elements:

i. Emergency repairs requiring a rapid response, i.e. water main leaks. Temporary accommodations for all modes shall still be made. Opportunities to improve multi-modal access should still be considered.

ii. A documented absence of current or future need in the current, adopted Transportation Plan.

iii. Full accommodation along corridors or roadways where a specific user(s) is expressly prohibited i.e. interstates, greenways, pedestrian malls.

iv. Cost of associated improvements to meet Complete Streets standards is excessively disproportionate to the need or anticipated use. This will be evaluated and considered on a case by case basis.

v. Transit accommodations are not required if no planned or existing transit line exists in the current local and regional Transportation Plans.

vi. When a comparable project adjacent to the same corridor has already been planned and designed within the last year and will provide access and facilities not included in the project being reviewed.

Requested exceptions shall be reviewed by the Town of Cumberland Planning & Zoning Department. Requests will be presented by staff along with recommendations to the Town Council and/or Plan Commission for action, documented with the Town of Cumberland, and posted for public notice. Exceptions shall conform to the allowable exceptions detailed above.

E. JURISDICTION

The Complete Streets policy applies to all streets and land within public Right-of-Ways (ROW). Projects must be coordinated between applicable Town of Cumberland departments including Public Works, Planning & Development and other departments as needed, as well as with utility companies, public safety organizations, transportation, and parks.

New private projects that include improvements within the public ROW are required to comply with the Complete Streets policy. Owners of private streets are required to adhere to the policy.

Projects and improvements must be coordinated between appropriate jurisdictional agencies and with transit organizations. All relevant Federal, State, County and Municipal agencies will be encouraged to foster and support Cumberland's Complete Streets policy where projects occur within or connect to Cumberland's transportation network.

Additionally, the Town will also coordinate with adjacent municipalities to facilitate stronger connections and effective infrastructure networks.

F. DESIGN

This policy seeks to create a connected network of facilities accommodating multi-modal travel that is consistent with and supportive of Cumberland's residents and visitors. While all streets are different, the needs of various users will be balanced in a flexible manner and accepted standards will be applied, as appropriate.

All improvements within the public ROW will conform to the standards outlined in the design menus below. These standards are part of the 2020 Transportation Master Plan, please see the thoroughfare plan update and typical cross section recommendations in Appendix A. These design guidelines were developed based on current best practices as defined by INDOT and the Town of Cumberland. The Town acknowledges that design practices and plans will evolve, this policy shall refer to the most current, adopted applicable plans.

Complete Streets components, their size and placement, are dictated by roadway type, width and location per the Transportation Master Plan. All cross-section types will include facilities to address the following users or modes within the ROW:

Pedestrians
Mobility assistance devices (wheelchair, walker, cane)
Bicycles
Micro-mobility (scooters, etc.)
Motor vehicles
Commercial vehicles
Transit and School vehicles
Emergency vehicles
Delivery vehicles

When exceptions apply, projects must justify the absence of a component. This policy will also welcome and encourage innovation and non-traditional design options on a case-by-case basis where a comparable level of safety is still present for all users.

G. LAND USE AND CONTEXT

Context and character of the Town of Cumberland shall be reflected through the implementation of its Complete Streets policy. The goal is to preserve the environmental resources and scenic, aesthetic and historical character of Cumberland's streets and roadways while improving (or maintaining) mobility, access, safety, equity and infrastructure conditions. Solutions shall be developed to fit the context of Cumberland while also being flexible to meet the needs of a corridor.

As a component of the **2020 Transportation Master Plan**, this Complete Streets policy is consistent with Cumberland's long-term transportation network and vision. All Cumberland projects with land use considerations, i.e. school location, property acquisition, parks, etc., shall be consistent with the Complete Streets policy and vision. This policy will focus non-motorized connectivity improvements to services, schools, parks, civic uses, regional connection and commercial uses.

H. PERFORMANCE MEASURES

Measuring progress and success of Complete Streets improvements will be an ongoing process. Periodic and sustained evaluation is key to understanding the effectiveness of this Policy. Cumberland will measure the success of this policy through multiple criteria. Performance measure data will be collected and reviewed by staff on an annual basis and presented to the Plan Commission and Town Council. The performance measures are detailed as follows:

i. General
   - Linear feet of sidewalks built or improved
   - Percent of residents within 5 minute walk to a trail
   - Number of new bike facilities (bike lanes, sharrows, bikeways)
   - Linear feet of new bikeways
   - New connections (gaps between facilities)

ii. Safety
   - Number of new crosswalks
   - Number of improved crosswalks (at existing marked crossings)
   - Number of built or improved curb ramps (ADA)
   - Review of ARIES crash data

iii. User Data
   - Bicycle and pedestrian user counts
   - Transportation mode split data

iii. Equity
   - Accessibility measures
   - Infrastructure presence among multiple neighborhoods

I. IMPLEMENTATION

A commitment to Complete Streets requires implementation steps and procedures. These steps ensure consistency with other community guidelines and policies and create a systematic approach to implementing the policy.

The Town of Cumberland intends the Complete Streets Policy to take effect upon its adoption. The implementation plan includes the following steps:

1. The Planning & Development Department, Department of Public Works and Plan Commission will oversee the implementation of the Complete Streets Policy.

2. The Planning & Development director, Plan Commission, Town Manager and Town Council shall review and propose revisions to any applicable ordinances, policies and regulations needed to support the implementation of Complete Streets.
3. The Public Works Department will establish a review/application procedure to ensure the principles of Complete Streets are applied to projects. This will include a Complete Streets Checklist. A sample checklist is provided in Section V.
4. The Planning & Development Dept. and Dept. of Public Works, in conjunction with the Town Council, will create an Implementation Advisory Committee. The committee shall include Town Staff and community members representing a cross section of stakeholders.
5. The Planning & Development Dept. and Dept. of Public Works will organize and offer a training workshop to educate stakeholders and assist in educating design and development professionals regarding the Complete Streets Policy and how to navigate the application and approval process. Key process steps will be outlined and available on-line to assist applicants in navigating the Complete Streets Policy requirements in Step 3.
6. The Implementation Advisory Committee will transition into a Complete Streets Advisory Committee upon completion of implementation steps 1-5. The Committee will focus on reviewing the Complete Streets Policy for updates and revisions as needed. Town staff will track and document performance measures for annual review by the Town Council.

V. SAMPLE CHECKLIST

Please refer to **Appendix E** for the sample checklist.

[1] *Blue Line Alternatives Analysis Final Report,* HNTB Corporation, December 2013, https://d16db69sqbolil.cloudfront.net/mpo-website/downloads/Regional/Regional-Transit/Blue-Line_AA_-Final-Report.pdf
[2] *Town of Cumberland - Comp Plan Map*, Cumberland Planning Department, May 2010, http://www.town.cumberland.in.us/egov/documents/1429288198_63644.pdf

[3] *INDOT Functional Classification website*, http://www.in.gov/indot/2615.htm

[4] *INDOT Access Management Guide*, AECOM Transportation and Bernardin Lochmueller and Associates, Inc., September 2009.

[5] *Town of Cumberland, Indiana, Access Management Plan, Mount Comfort Road and U.S. 40*, Butler, Fairman and Seufert, Inc., May 9th, 2016.
[6] *INDOT Access Management Guide*, AECOM Transportation and Bernardin Lochmueller and Associates, Inc., September 2009.

[7] *Indiana Design Manual*, INDOT, on-going, http://www.in.gov/indot/design_manual/

[8] *INDOT Driveway Permit Manual,* 1996, http://www.in.gov/indot/files/driveway.pdf

[9] *INDOT Applicant's Guide to Traffic Impact Studies*, May 2015, http://www.in.gov/indot/files/Permits_ApplicantsGuidetoTrafficImpactStudy_2015.pdf

[10] *Design and Operations of a Roundabout Corridor - Shiloh Road Corridor Case Study in Billings*, MT, Kirk Spalding, http://www.westernite.org/annualmeetings/alaska11/Compendium/Moderated%20Session%20Papers/3C-Spalding.pdf

[11] *Environmental Assessment and Programmatic Section 4(f) Evaluations, Shiloh Road Corridor*, Montana Department of Transportation (MDOT) and Federal Highway Administration (FHWA), December 2006, https://archive.org/details/473244F5-1DA0-4FD6-8DEB-81B7CD86E993