

June 30, 2017

Ms. Megan Riechmann, AICP
Project Manager
Great Rivers Greenway
6178 Delmar Boulevard
University City, Missouri 63112

RE: Traffic Study and Safety Evaluation
Proposed Pedestrian Crossing for Cliff Cave Park Trail Entrance
Telegraph Road (Missouri Route 231) at Erb Road
St. Louis County, Missouri
CBB Job #52-17

Dear Megan,

In accordance with your request, CBB has completed a traffic and safety analysis addressing a proposed pedestrian crossing at the signalized intersection of Telegraph Road and Erb Road to the Cliff Cave Park Trail Entrance on the east side of Telegraph Road.

The purpose of the traffic study and safety evaluation was to evaluate the impact of the bicycle and pedestrian trips that would be generated by the proposed crossing on the adjacent roads as compared to current operating conditions and determine the ability of motorists, bicyclists, and pedestrians to safely navigate the intersection. Where necessary, roadway improvements (lane additions and/or traffic control modifications) were recommended for consideration. The focus of our analysis was the AM and PM peak hours of a typical weekday as well as the midday peak hour on a Saturday.

Existing Roadway

Telegraph Road (MO Route 231) is a major arterial highway that runs primarily north-south through the study area owned and maintained by the Missouri Department of Transportation (MoDOT). The road provides five lanes, two in each direction with a center two-way left-turn lane. The posted speed limit along Telegraph Road is 40 miles per hour (mph). The road provides dedicated bike lanes on both sides. Sidewalks are provided along both sides of Telegraph Road to the north of Erb Road but only on the west side to the south of the subject intersection. Signal timing along the Telegraph Road corridor was recently optimized in 2014 by MoDOT.



Erb Road is a major collector roadway that runs east-west and provides two lanes, one in each direction within the study area which is owned and maintained by St Louis County Department of Transportation (SLCDOT). The posted speed limit is 30 miles per hour (mph). Sidewalks are provided along both sides of the roadway but are not continuous along the south side.

The intersection of Telegraph Road and Erb Road is a three-legged intersection with Telegraph Road making up the north and south legs and Erb Road making up the west leg. Eastbound left-turns are protected with an eastbound-only phase. Northbound left-turns operate under protected-plus-permissive phasing with flashing yellow arrow. The eastbound approach provides two left-turn lanes and one channelized right-turn lane. The northbound approach provides one left-turn lane and two through lanes with a bike lane and shoulder. The southbound approach provides two through lanes and one channelized right-turn lane with a bike lane and shoulder. An aerial view of the intersection is shown in **Figure 1**.

The intersection of Telegraph Road at Erb Road operates as part of a coordinated system along the Telegraph Road corridor. The cycle length matches other signals along the corridor during the AM and Saturday Midday peak hours. During the PM peak hour, the intersection of Telegraph Road and Erb Road operates at a “half-cycle” interval with a 75-second cycle length as compared to the 150-second cycle lengths at adjacent intersections along the corridor.

All lane widths are 12 feet, except for the channelized right-turn lanes, which are 19.5 feet at the southbound approach and 17 feet at the eastbound approach. There is currently one marked crosswalk on the west leg of the intersection for north-south crossings. The distance across Telegraph Road from the face of the eastbound right-turn channel island to the outside northbound through-lane is 65 feet. The distance to the east side of the bike lane is 60 feet.

The driveways nearest to each approach are: a right-in/right-out for a shopping plaza and Walgreens located approximately 265 feet back from the southbound approach stop bars; a residential driveway approximately 400' back of the northbound approach stop bars; and another Walgreens driveway approximately 300' back of the eastbound approach stop bars. Intersection sight distance appeared to be sufficient for all movements (see **Figures 2 and 3** for reference).

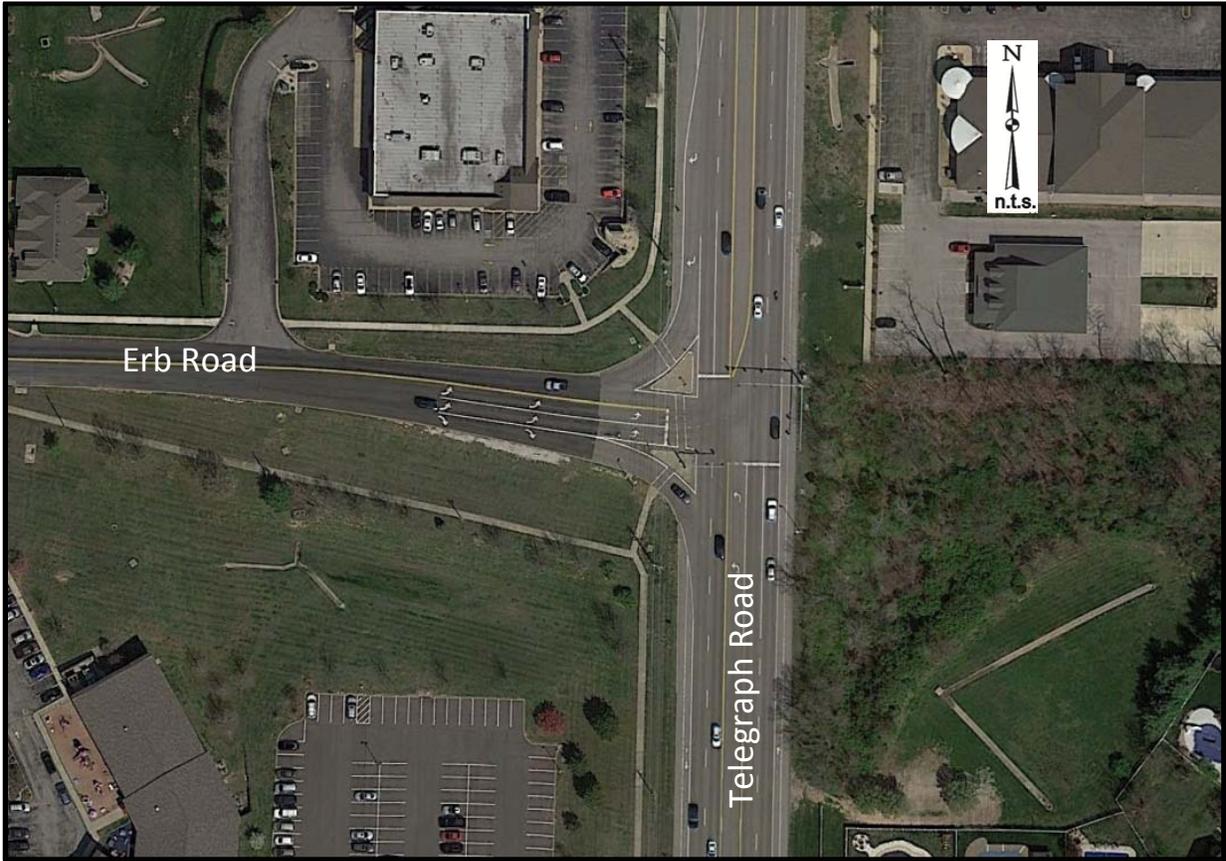


Figure 1. Telegraph Road at Erb Road Intersection



Figure 2. Telegraph Road at Erb Road – Eastbound Approach Looking North



Figure 3. Telegraph Road at Erb Road – Eastbound Approach Looking South



Existing Traffic Flows

Video method counts were performed at the intersection of Telegraph Road and Erb Road to document vehicle, bicycle and pedestrian use from 7:00 a.m. to 6:00 p.m. during each day from Thursday, June 8 to Saturday, June 10, 2017. The 11-hour cumulative volumes counted for Thursday, Friday and Saturday, including bicycle and pedestrian crossings, are summarized in **Exhibit 1**.

The weekday AM and PM peak hours were determined to be 7:15 to 8:15 a.m. and 5:00 to 6:00 p.m., respectively, while the Saturday Midday peak hour was 12:15 to 1:15 p.m. The existing traffic volumes during the peak hours, including bicycle and pedestrian crossings, are summarized in **Exhibit 2**.

CBB checked the weekday school dismissal volumes in addition to the previously mentioned peak hours. The total intersection volume during the school dismissal peak hour was 2,815 as compared to the PM peak which was 3,030. The only school dismissal approach that had a higher volume than in the PM peak hour was the northbound left-turn, which had 78 vph, as compared to 65 vph during the PM peak and 75 vph during the Saturday midday peak hour. Therefore, no operational analyses were completed for that time period.

During the AM peak period, traffic was oriented heaviest northbound with queues from the signal occasionally reaching around 300 feet. Eastbound and southbound movements were moderate. One pedestrian and one cyclist were observed crossing Telegraph Road during the AM peak hour. The cyclist crossed roughly 200 feet south of the intersection, and the pedestrian crossed near the shopping center right-in/right-out driveway to the north.

During the PM peak period, traffic was heaviest southbound with queues occasionally extending to and briefly blocking the shopping center's right-out movement before clearing. Northbound traffic was also heavy, and eastbound traffic was moderate. Three cyclists were observed crossing Telegraph Road during the PM peak hour, two of which were observed crossing north of the intersection near the shopping center right-in/right-out driveway. Another crossing occurred just south of the intersection, roughly 75 feet.

During peak hours, no bicycles were counted crossing Telegraph Road directly at the Erb Road intersection. No more than four pedestrians crossed any leg of the intersection during each peak hour.

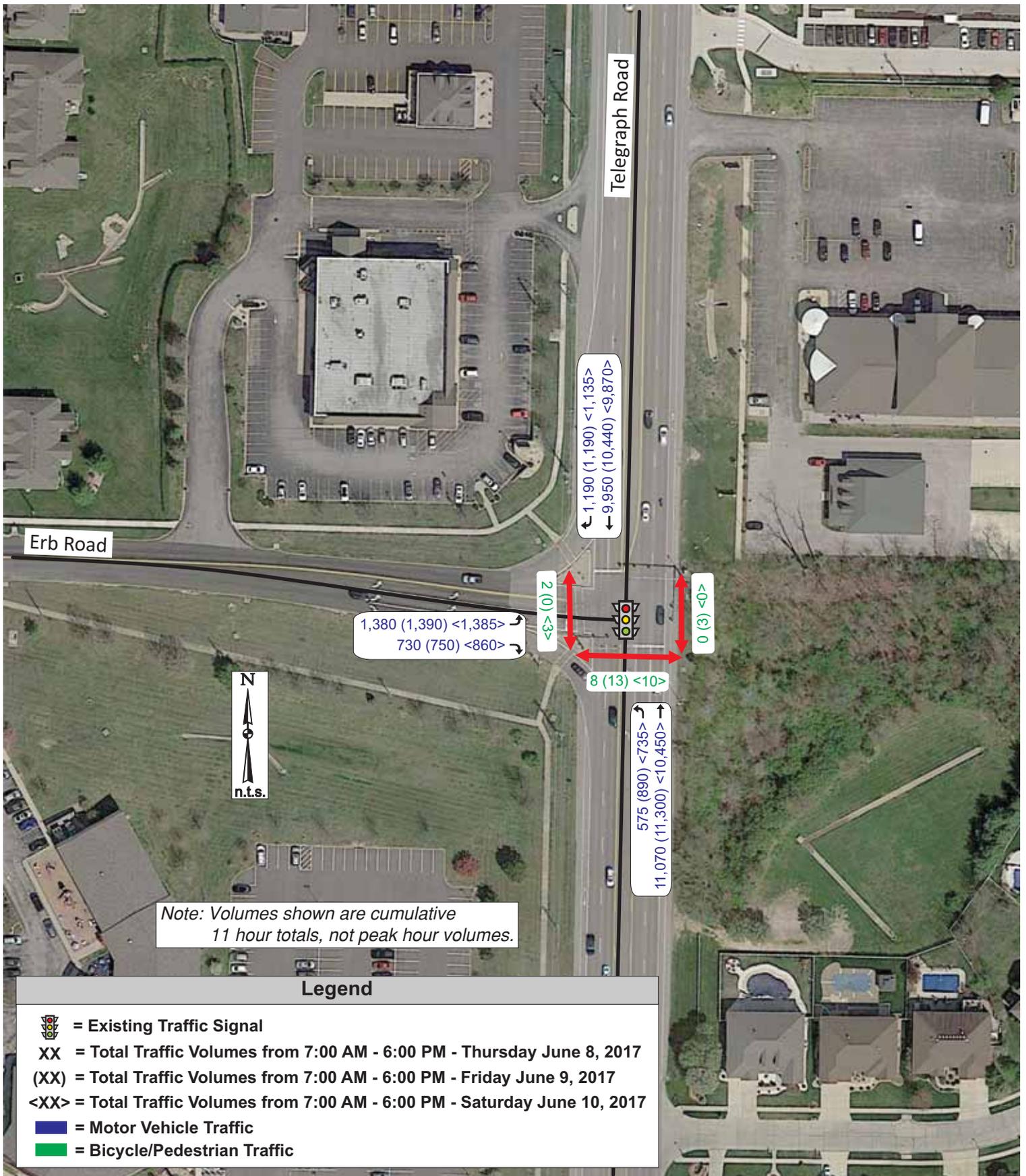


Exhibit 1: 11 Hour Traffic Volumes

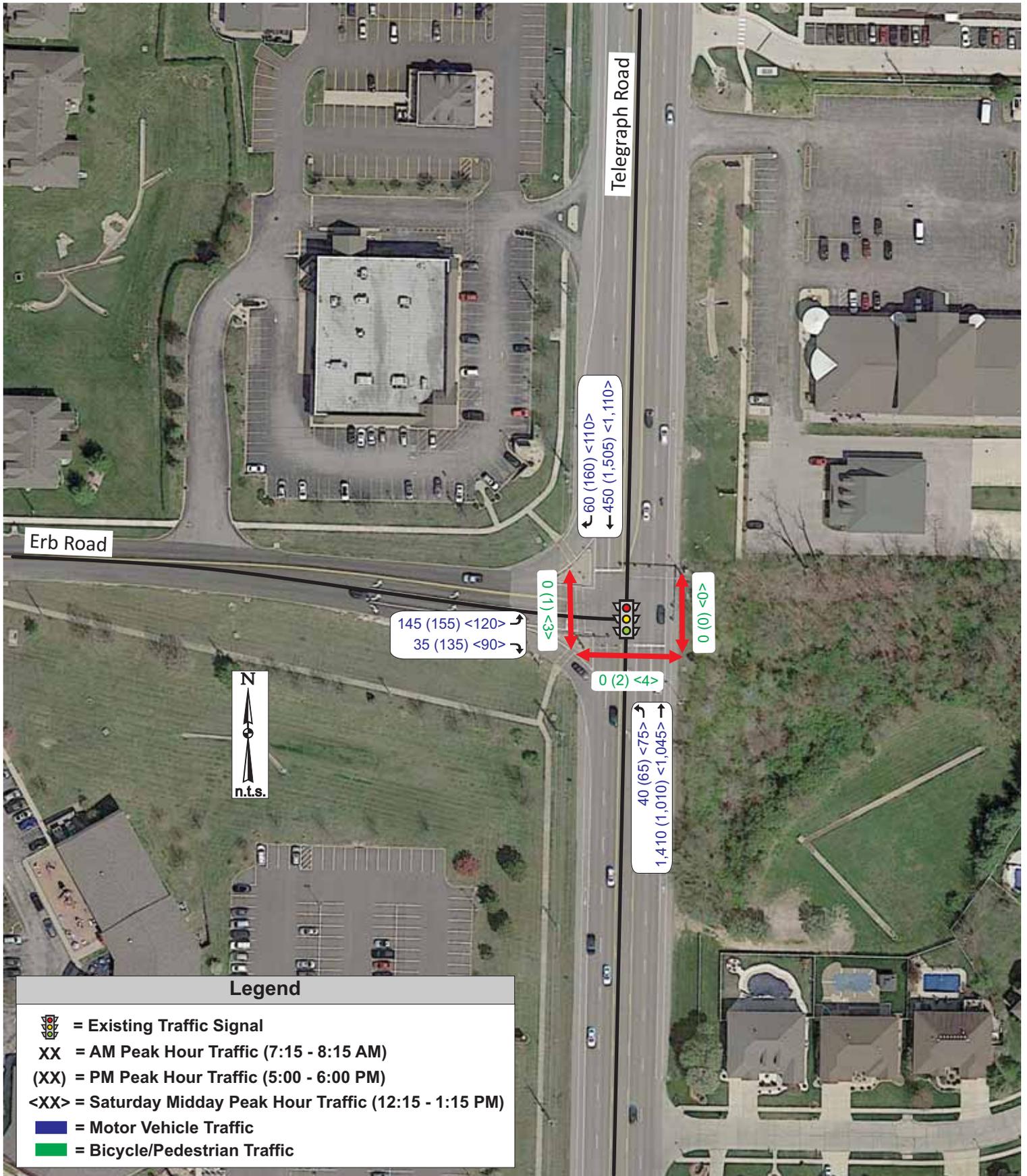


Exhibit 2: Existing Traffic Volumes



Proposed Pedestrian Connection to Cliff Cave Park

The Great Rivers Greenway (GRG) district is proposing a new trail connection to Cliff Cave Park at Telegraph Road opposite Erb Road. Pedestrian accommodations across Telegraph Road at Erb Road are proposed along with the trail, including a pedestrian plaza, a painted crosswalk across the south leg of the intersection, handicap ramps, and push-button activated pedestrian signals. The preliminary plan lacks detail regarding the crosswalk width, the pedestrian push button and pedestrian heads as the plan indicates those features will be “design-build.” The proposed site plan is shown in **Exhibit 3**.

To accommodate the pedestrian phase crossing across Telegraph Road, the eastbound phase of the traffic signal will need to be increased to 33 seconds. The pedestrian time includes seven seconds of a “walk” time, 20 seconds of a “flashing don’t walk” time (the amount of time it takes to cross the 70-foot roadway at 3.5 feet per second), and six seconds of yellow plus all-red time.

Trail Connection Crossing Usage Estimate

GRG did not provide any crossing projections for the pedestrians and/or bicyclists crossing Telegraph Road to access Cliff Cave Park. As a result, two scenarios were assumed for the analysis of the new Telegraph Road crossing. The first scenario assumes “60 pedestrian calls per hour,” which assumes the pedestrian button is pushed for approximately 80 to 90% of the cycles. Half of the pedestrians were assumed to go north of Telegraph Road and half were assumed to travel to the south on Telegraph Road. The second scenario is “pedestrian recall,” which assumes the pedestrian phase is activated every cycle automatically. The proposed trail connection to the park is not expected to generate additional vehicle traffic through the subject intersection.

The trail crossings were added to the 2017 Existing Traffic Volumes to reflect the 2017 Build Traffic Volumes for the weekday AM and PM peak hour as well as the midday Saturday peak hours, as shown in **Exhibit 4**.

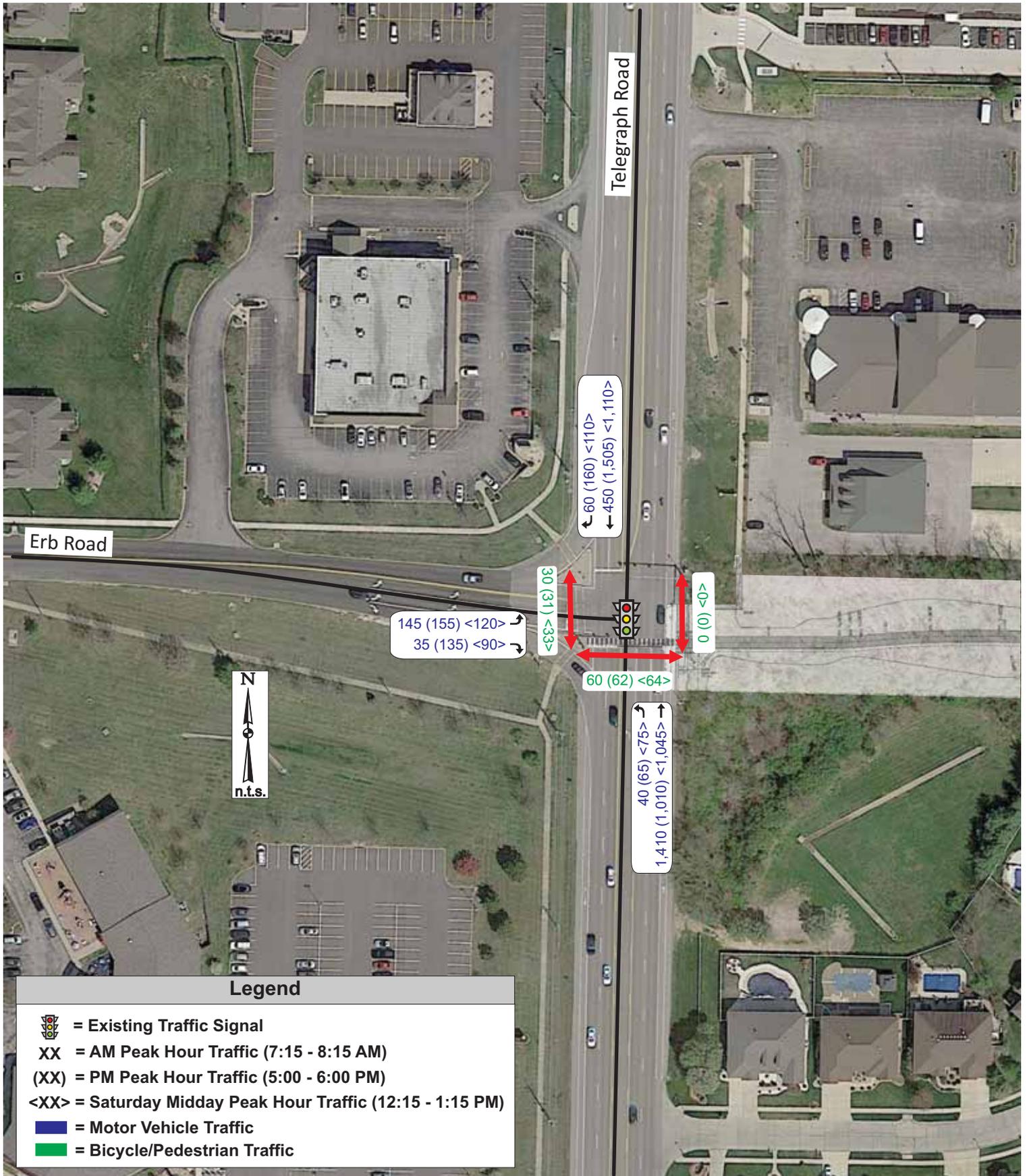


Exhibit 4: 2017 Build Traffic Volumes



2017 TRAFFIC ANALYSIS

Study Procedures: The baseline and forecasted operating conditions were analyzed using SYNCHRO 8, a macro-level analytical traffic flow model. SYNCHRO is based on study procedures outlined in the *Highway Capacity Manual*, published by the Transportation Research Board. This manual, which is used universally by traffic engineers to measure roadway capacity, establishes six levels of traffic service: Level A ("Free Flow"), to Level F ("Fully Saturated"). Levels of service (LOS) are measures of traffic flow, which consider such factors as speed, delay, traffic interruptions, safety, driver comfort, and convenience. Level C, which is normally used for highway design, represents a roadway with volumes ranging from 70% to 80% of its capacity. However, Level D is often considered acceptable for peak period conditions in urban and suburban areas.

The thresholds that define level of service at an intersection are based upon the type of control used (i.e., whether it is signalized or unsignalized) and the calculated delay. For signalized and all-way stop intersections, the average control delay per vehicle is estimated for each movement and aggregated for each approach and then the intersection as a whole. At intersections with partial (side-street) stop control, delay is calculated for the minor movements only since motorists on the main road are not required to stop.

Level of service is directly related to control delay. At signalized intersections, the level of service criteria differ from that at unsignalized intersections primarily because varying transportation facilities create different driver expectations. The expectation is that a signalized intersection is designed to carry higher traffic volumes, and consequently may experience greater delay than an unsignalized intersection. **Table 1** summarizes the thresholds used in the analysis for signalized intersection.

Table 1: Level of Service Thresholds

| Level of Service (LOS) | Control Delay per Vehicle (sec/veh) | |
|------------------------|-------------------------------------|----------------------------|
| | Signalized Intersections | Unsignalized Intersections |
| A | ≤ 10 | 0-10 |
| B | > 10-20 | > 10-15 |
| C | > 20-35 | > 15-25 |
| D | > 35-55 | > 25-35 |
| E | > 55-80 | > 35-50 |
| F | > 80 | > 50 |



2017 Operating Conditions: The study intersections were evaluated using the methodologies described above. **Table 2** summarizes the results of the Existing operating conditions and the 2017 Build operating conditions during the weekday AM, weekday PM, and Saturday Midday peak hours.

Under Existing Conditions, the study intersection operates at a highly desirable LOS A overall during the AM, PM, and Saturday Midday peak hours. The northbound and southbound approaches operate at LOS A during each peak hour, and the eastbound approach operates at LOS D or better during each peak hour.

The proposed pedestrian connection to Cliff Cave Park could add a significant amount of pedestrian traffic crossing Telegraph Road, but no vehicle traffic would be added. Changes to vehicular levels of service would be incurred as a result of the increase in eastbound green time required to accommodate pedestrian crossings. The full crossing time consists of the “walk time”, typically seven (7) seconds, the “don’t walk” or clearance time and the yellow/all-red time (about 6 seconds). The clearance time is based on the crossing distance (70 feet) divided by the design walking speed (3.5 ft/sec) which equals 20 seconds.

Two scenarios for pedestrian timing were analyzed for the 2017 Build Conditions: “60 pedestrian calls per hour,” in which the push-button is activated 60 times during each peak hour, which assumes the pedestrian button is pushed approximately 80 to 90% of the cycles, and a worst-case scenario of “pedestrian recall,” which assumes the pedestrian phase is activated every cycle automatically.

The total amount of time (33 seconds) needed to accommodate pedestrians for east-west crossing would account for an overly large portion of the 75 second cycle during the PM peak hour; therefore, CBB tested another signal alternative with the full 150-second cycle used during the PM peak, which would match the cycle length of the adjacent signals and better maintain progression along the corridor. The 150-second cycle would also benefit north-south platooning along Telegraph Road as it would coordinate more directly with intersections along the corridor. However, it would require eastbound vehicles on Erb Road to wait longer for their green.

Under 2017 Build Conditions, the intersection of Telegraph Road and Erb Road would operate at LOS B overall during the AM and Saturday Midday peak hours in both pedestrian timing scenarios with little difference between the two. As can be seen in Table 4, the overall intersection would operate more efficiently at LOS B with a 150-second cycle as compared to LOS D (with pedestrian recall) and LOS C (with the 60 ped calls per hour) using the existing 75-second cycle. With a 150-second cycle, eastbound queues and delay would be longer but still acceptable. The southbound approach would fail during the PM peak hour under the 2017 Build Condition with the 75-second cycle and ped recall since the green time required to allow the pedestrian crossing would not leave enough green time to adequately serve the heavy southbound traffic flow.



Table 2: 2017 Existing and 2017 Build Conditions

| Intersection / Approach | Weekday AM Peak Hour | | | Weekday PM Peak Hour | | | | | Saturday Midday Peak Hour | | |
|------------------------------------------------|----------------------|-----------------|-----------------|-----------------------------|-----------------------|------------------|---------------------|------------------|---------------------------|-----------------|-----------------|
| | Existing | Build | | Existing 75-Sec Cycle | Build 60 Ped Calls | | Build Ped Recall | | Existing | Build | |
| | | 60 Ped Calls | Ped Recall | | 75-Sec Cycle | 150-Sec Cycle | 75-Sec Cycle | 150-Sec Cycle | | 60 Ped Calls | Ped Recall |
| Telegraph Road at Erb Road (Signalized) | | | | | | | | | | | |
| Eastbound Erb Road Approach | D (51.1) | C (34.7) | C (33.3) | C (24.1) | B (11.5) | D (41.4) | B (10.7) | D (39.8) | C (28.7) | B (16.5) | B (15.9) |
| 95 th Percentile Queue | 100' | 80' | 80' | 65' | 45' | 110' | 45' | 110' | 60' | 45' | 45' |
| Northbound Telegraph Road Approach | A (1.0) | A (7.5) | A (8.3) | A (4.9) | B (10.8) | A (6.5) | B (12.6) | A (7.2) | A (2.1) | A (6.6) | A (7.6) |
| 95 th Percentile Queue | 25' | 170' | 170' | 80' | 185' | 185' | 185' | 185' | 30' | 100' | 100' |
| Southbound Telegraph Road Approach | A (4.0) | A (8.8) | A (9.3) | A (9.8) | D (48.8) | B (18.7) | F (89.4) | B (19.5) | A (6.1) | B (15.9) | B (17.5) |
| 95 th Percentile Queue | 65' | 110' | 110' | 355' | 1,130' | 705' | 1,125' | 705' | 70' | 160' | 160' |
| Overall | A (5.9) | B (10.1) | B (10.6) | A (9.7) | C (31.4) | B (16.9) | D (53.7) | B (17.5) | A (6.2) | B (11.9) | B (13.0) |



2037 FORECASTED TRAFFIC ANALYSIS

2037 No-Build (Existing plus 20 years of Background Growth) Traffic Volumes: These volumes included an annual growth rate of 0.5%, which represents a global increase of approximately 10.5% over 2017 Existing Conditions for the 20-year design horizon period. The 2037 No-Build Traffic Volumes for the weekday AM, weekday PM, and Saturday midday peak hours are shown in **Exhibit 5**.

2037 Build (2037 No-Build plus Proposed Pedestrian Connection to Cliff Clave Park) Traffic Volumes: The pedestrian crossings were assumed to increase by 10.5% to 70 calls per hour across Telegraph Road in the 20-year conditions. The 2037 Build Traffic Volumes for the weekday midday, weekday PM, and Saturday midday peak hours are shown in **Exhibit 6**.

20-Year Operating Conditions: The study intersection was re-evaluated using the same methodologies described above. **Table 5** summarizes the results of the 2037 Forecasted No-Build and the 2037 Forecasted Build operating conditions with average delays for the study intersections during the weekday AM, weekday PM, and Saturday midday peak hours.

Under 2037 No-Build Conditions, the study intersection operates at a highly desirable LOS A overall during the AM and Saturday Midday peak hours and at LOS B overall during the PM peak hour.

Under 2037 Build Conditions, the intersection of Telegraph Road and Erb Road would operate at LOS B overall during the AM and Saturday Midday peak hours in both pedestrian timing scenarios with little difference between the two. As can be seen in Table 6, the overall intersection would operate more efficiently at LOS B with a 150-second cycle as compared to LOS E (with pedestrian recall) and LOS D (with the 70 ped calls per hour) using the existing 75-second cycle. Eastbound queues and delays would still be acceptable with a 150-second cycle. With a 150-second cycle, eastbound queues and delay would be longer but still acceptable. The southbound approach would fail during the PM peak hour under the 2037 Build Condition with the 75-second cycle and under both ped conditions since the green time required to allow the pedestrian crossing would not leave enough green time to adequately serve the heavy southbound traffic flow.

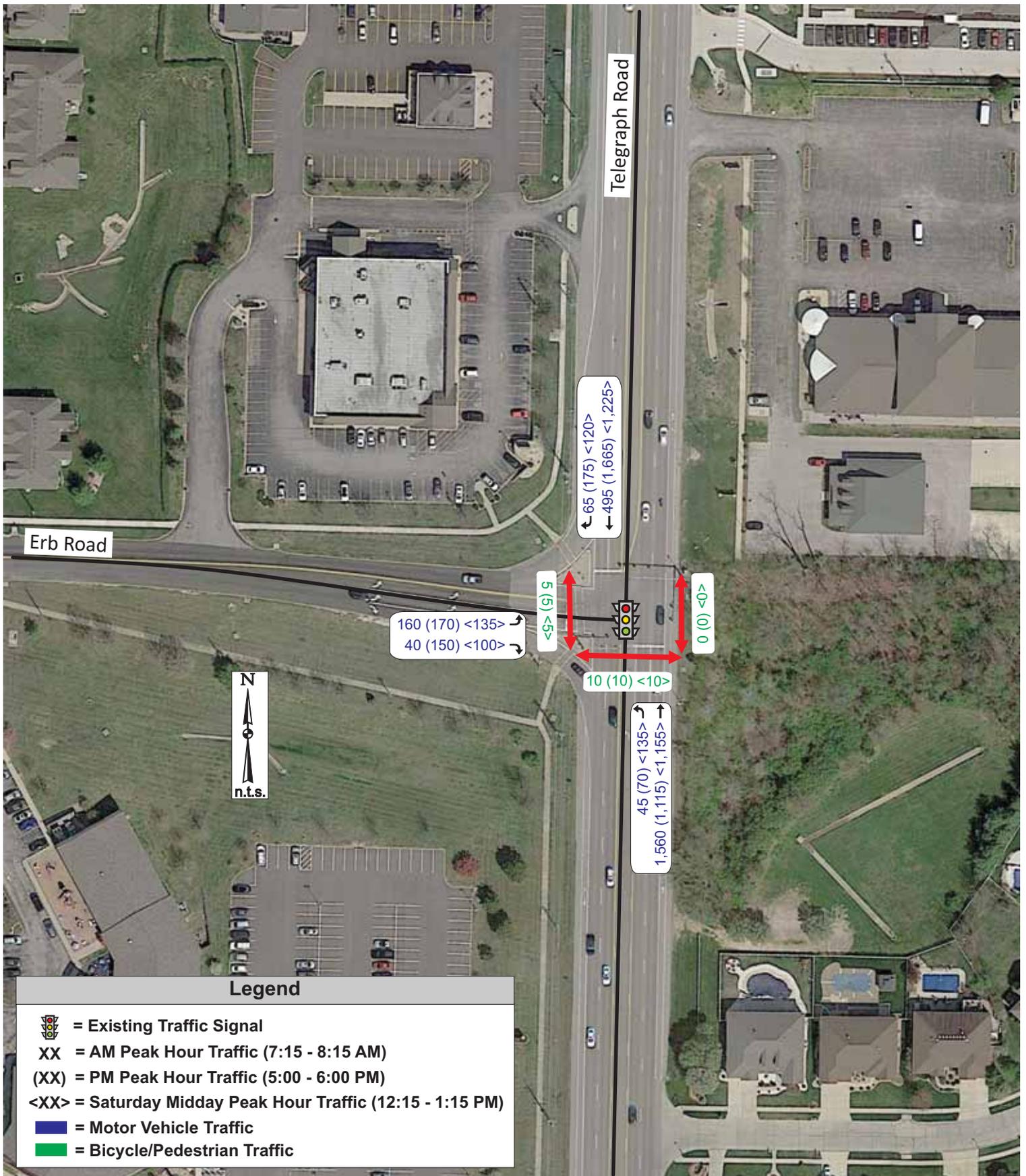


Exhibit 5: 2037 No-Build Traffic Volumes

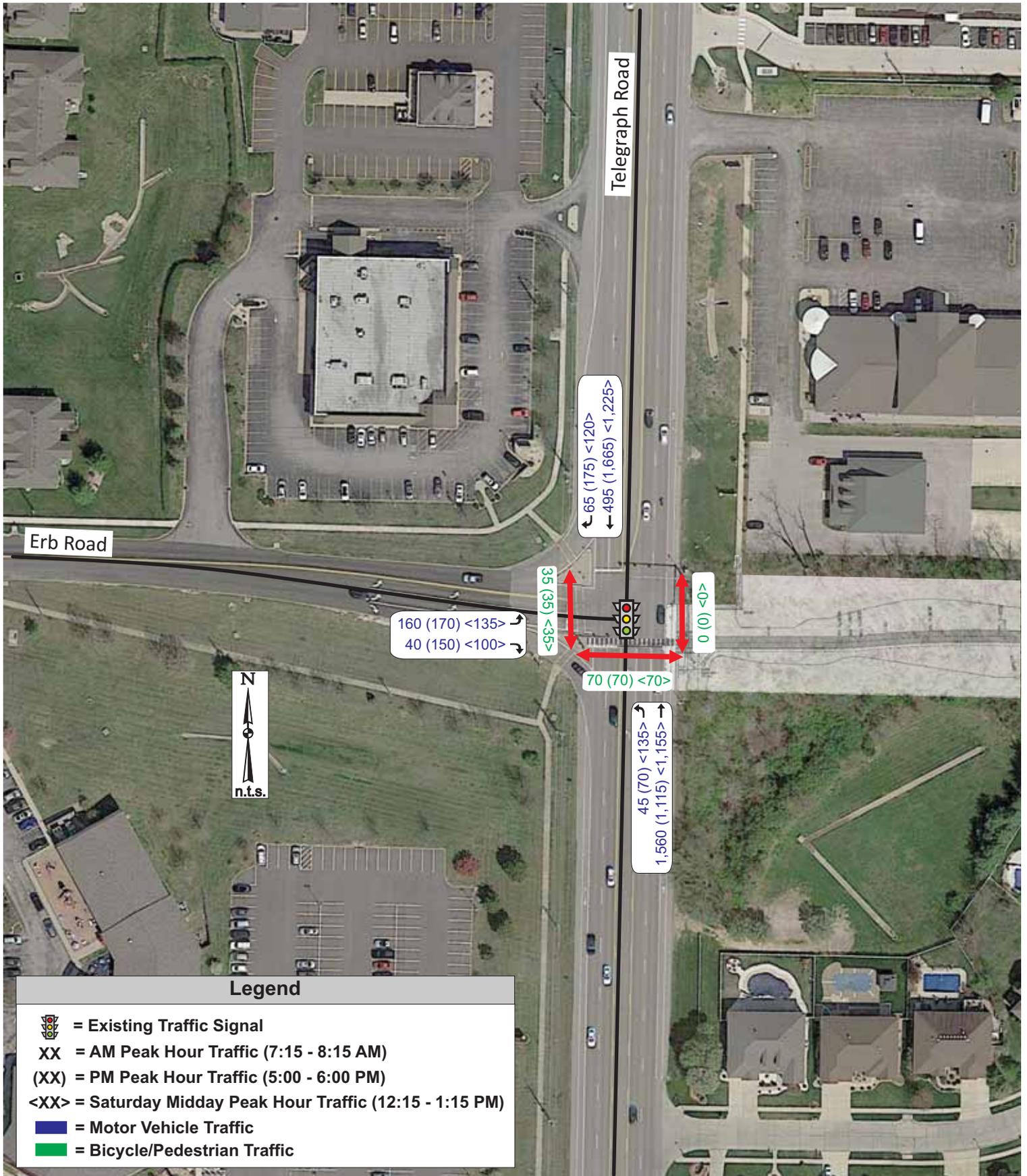


Exhibit 6: 2037 Build Traffic Volumes



Table 3: 2037 No-Build and 2037 Build Conditions

| Intersection / Approach | Weekday AM Peak Hour | | | Weekday PM Peak Hour | | | | Saturday Midday Peak Hour | | | |
|------------------------------------------------|----------------------|-----------------|-----------------|----------------------------|-------------------------|-----------------|-----------------------|---------------------------|----------------|-----------------|-----------------|
| | 2037 No-Build | 2037 Build | | 2037 No-Build 75-Sec Cycle | 2037 Build 70 Ped Calls | | 2037 Build Ped Recall | | 2037 No-Build | 2037 Build | |
| | | 70 Ped Calls | Ped Recall | | 75-Sec Cycle | 150-Sec Cycle | 75-Sec Cycle | 150-Sec Cycle | | 70 Ped Calls | Ped Recall |
| Telegraph Road at Erb Road (Signalized) | | | | | | | | | | | |
| Eastbound Erb Road Approach | D (52.1) | C (34.8) | C (33.4) | C (25.3) | B (11.6) | D (43.4) | B (10.8) | D (43.4) | C (29.2) | B (16.7) | B (16.0) |
| 95 th Percentile Queue | 105' LT | 90' | 90' | 70' LT | 50' | 120' | 50' | 120' | 70' LT | 50' | 50' |
| Northbound Telegraph Road Approach | A (1.3) | A (9.0) | A (10.0) | A (5.2) | B (11.7) | A (7.9) | B (13.8) | A (7.9) | A (2.7) | A (8.0) | A (9.3) |
| 95 th Percentile Queue | 30' TH | 330' | 330' | 90' TH | 215' | 215' | 215' | 215' | 35' TH | 120' | 120' |
| Southbound Telegraph Road Approach | A (4.1) | A (8.9) | A (9.5) | B (10.9) | E (79.5) | C (22.5) | F (135.0) | C (22.5) | A (6.6) | B (17.4) | B (19.3) |
| 95 th Percentile Queue | 75' TH | 120' | 120' | 425' TH | 1315' | 840' | 1315' | 840' | 85' TH | 185' | 185' |
| Overall | A (6.2) | B (11.2) | B (11.8) | B (10.5) | D (48.2) | B (19.7) | E (78.7) | B (19.7) | A (6.8) | B (13.2) | B (14.6) |



SAFETY

Crash History

Crash history for the intersection of Telegraph Road at Erb Road was obtained from The Missouri Highway Patrol and is summarized in **Table 4**. The intersection averaged 7.5 crashes per year between 2011 and 2016. Most of the crashes were rear end type, which usually lead to minor injuries if any at all. Angle crashes were the second most common type of crash. Most angle crashes involved northbound left-turns where the northbound turning vehicle failed to yield to oncoming southbound traffic or a southbound vehicle failed to stop at a red light.

One pedestrian crash occurred in the six-year period. This crash involved a southbound right-turning vehicle striking a crossing pedestrian due to obstructed vision.

Thirteen of the 45 crashes resulted in one or more injuries. No deaths were caused by crashes at this intersection.

Table 4: Crash History at Telegraph Road and Erb Road Intersection

| Crash Type | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Total |
|-----------------------|----------|----------|----------|----------|----------|-----------|-----------|
| Rear End | 3 | 3 | 2 | 3 | 4 | 4 | 19 |
| Angle | 1 | 1 | 4 | 0 | 4 | 3 | 13 |
| Sideswipe | 2 | 0 | 1 | 0 | 0 | 1 | 4 |
| Other | 1 | 2 | 0 | 0 | 0 | 1 | 4 |
| Fixed Object | 0 | 1 | 0 | 0 | 1 | 2 | 4 |
| Pedestrian/Bicycle | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Total | 7 | 7 | 7 | 3 | 9 | 12 | 45 |
| Crashes with Injuries | 1 | 4 | 3 | 0 | 3 | 2 | 13 |

Based on the SLCDOT website, average daily traffic (ADT) along Erb Road is approximately 4,240 vehicles per day (vpd). Furthermore, CBB assumed an ADT of 29,000 vpd for Telegraph Road which is about 10 times the PM peak hour volume. From the ADT and crash totals, it was estimated that the intersection has a crash rate of 0.618 crashes per million entering vehicles (MEV). The rate for crashes involving injuries was 0.179 per MEV. The standard crash rate for this type of intersection according to MoDOT is 0.206 crashes per MEV; therefore, the intersection of Telegraph Road and Erb Road has a crash rate that is higher than normal for that type of intersection. Both MoDOT and SLCDOT have indicated that the intersection is not on their high priority list for crash locations.



Design

There are several measures already in place which contribute to safety within the intersection of Telegraph Road and Erb Road. These measures include intersection lighting, traffic signals, pedestrian signal indications, marked crosswalks, and a protected left-turn phase for the side street. Therefore, the idea of a pedestrian crossing across Telegraph Road at this location is reasonable. In fact, if a major crossing to a park is extended to the highway, a marked crosswalk would seem to be mandatory for safety.

There are no ADA concerns beyond the lack of a north-south connection on the east side of Telegraph Road. This lack of connection has been cited as the reason there is no existing marked crossing of Telegraph Road at Erb Road. MoDOT has no programmed improvements at the intersection, but it is highly likely that a resurfacing project will be carried out within the next five years. Per MoDOT policy regarding ADA compliance, they would likely add a pedestrian crossing and upgrade the signals per PROWAG standards as part of the resurfacing project with or without the proposed trail connection.

The site plan meets AASHTO standards by including ramps at the crosswalks and placing stop bars four feet back from the crosswalks. It is MoDOT's preference that the striping style for the new crosswalk across the south leg and the existing crossing across the west leg should match with the standard crosswalk (note the continental style markings shown on the proposed plan).

NACTO standards for bicycle accommodations dictate that the northbound stop bar should extend through the northbound bike lane if the new crosswalk is marked. Additionally, the southbound bike lane is not continuous through the intersection. Southbound bike lane accommodations through the intersection should be addressed in the future, possibly when MoDOT completes their resurfacing project.

MoDOT previously issued a permit for the proposed crossing and found that the plan submitted by GRG met their standards. If no crossing is marked, CBB understands that GRG will not build a trail connection to the right-of-way. As proposed, GRG's current plan for a marked crossing is not only prudent but should be considered mandatory for the safety of trail users and other persons wishing to cross Telegraph Road. As drawn, we understand that GRG's design meets MoDOT minimum requirements; and therefore, the current design meets the agency's minimum safety expectations.



If acceptable to MoDOT and GRG, there are additional improvements that could be considered but are not mandatory:

- Providing wider crosswalks and ADA ramps matching the width of the trail, which is ten (10) feet, see Figure 4; and
- Modifying the eastbound right-turn channel to an “Australian Right-Turn Lane” configuration which has the pedestrian cross a straight segment of road in the right-turn channel at ninety degrees, see Figure 4.

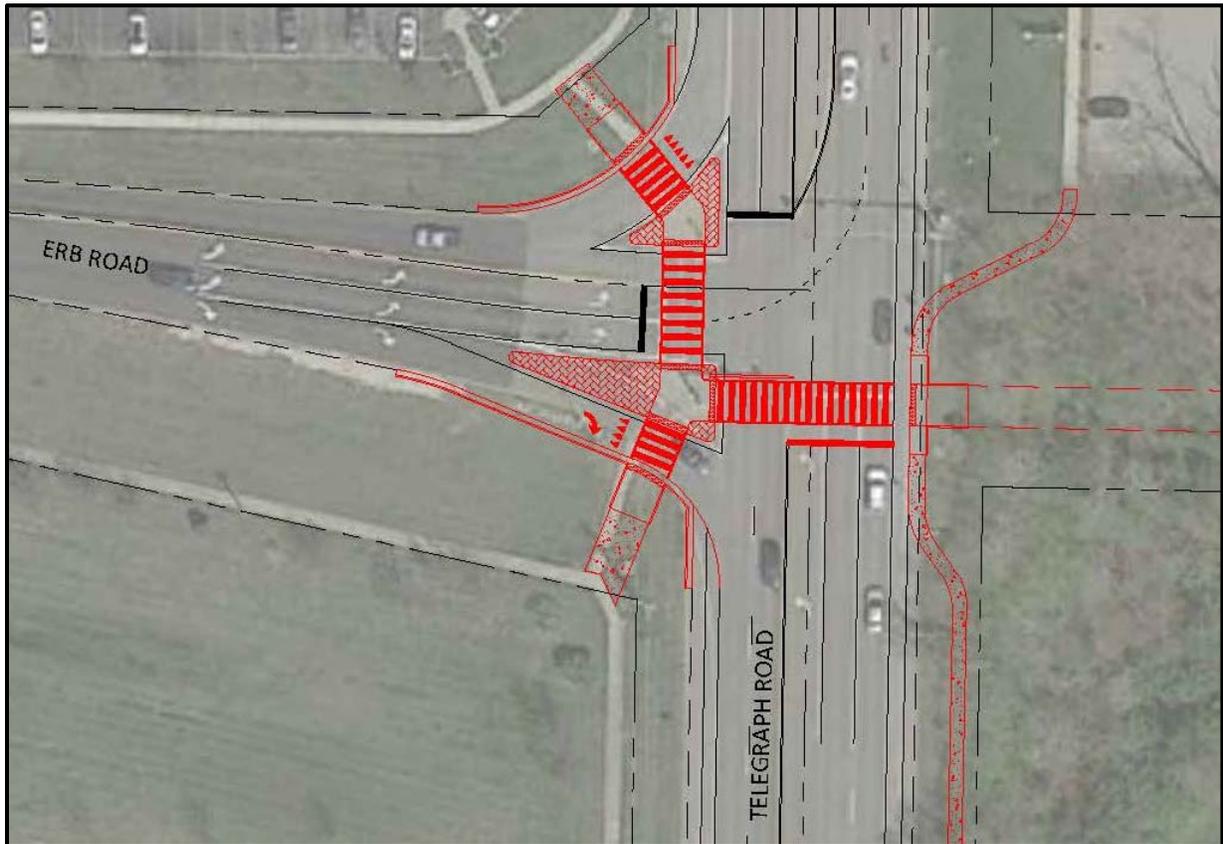


Figure 4. Potential Improvements to Proposed Crossing



SUMMARY

CBB completed the preceding study to address the traffic impacts associated with GRG's proposed pedestrian crossing and connection to Cliff Cave Park Trail at the intersection of Telegraph Road and Erb Road in St. Louis County, Missouri. The following summary is provided:

- A pedestrian crossing is proposed across the south leg of Telegraph Road at Erb Road which would provide access to a trail connection to Cliff Cave Park trail further east.
- The intersection of Telegraph Road at Erb Road operates at a highly desirable LOS A under 2017 Existing Conditions during each peak hour.
- The proposed development was assumed to generate 60 new pedestrian crossings during the weekday AM and PM peak hours as well as Saturday midday peak hours in the opening year. No new vehicle traffic would be created by the proposed crossing.
- Two pedestrian scenarios were considered for 2017 Build Conditions. The first scenario was "60 pedestrian calls per hour," which assumes the pedestrian button is pushed for approximately 80 to 90% of the cycles. The second scenario was "pedestrian recall," which assumes the pedestrian signal was actuated each cycle automatically.
- Under 2017 Existing conditions, the intersection operates with a 75-second half-cycle during the PM peak hour. Under 2017 Build Conditions, the cycle would need to be doubled to 150 seconds to match adjacent intersections and provide the time necessary for an east-west pedestrian crossing without disrupting progression along Telegraph Road.
- Under 2017 Build Conditions, the intersection would operate at a desirable LOS B overall during each peak hour under either pedestrian scenario if the PM cycle length is increased to the full 150 seconds.
- Under 2037 No-Build Conditions, the intersection of Telegraph Road and Erb Road is forecasted to operate at LOS A overall during the weekday AM and Saturday Midday peak hours and at LOS B overall during the weekday PM peak hour.
- Under 2037 Build Conditions, the intersection would operate at a desirable LOS B overall during each peak hour under either pedestrian scenario if the PM cycle length is increased to the full 150 seconds.
- Historical crash data from 2011 to 2016 indicates that the intersection of Telegraph Road and Erb Road averages 7.5 crashes per year and has a crash rate of 0.618 crashes per million entering vehicles.
- It is CBB's professional opinion that GRG's currently proposed crossing is not only prudent, but mandatory if the trail extends to the right of way. Further, it is CBB's opinion that GRG's currently proposed crossing meets MoDOT's minimum design requirements for reasonably safe operations.



- CBB recommends consideration of additional, optional, measures which may improve efficient traffic flow and safety further including: matching the trail width with ten-foot wide crosswalks and ADA ramps and modifying the eastbound right-turn channel to an “Australian Right-Turn Lane” configuration.

We trust that the information contained in this report addresses your concerns related to the safety and operations of the proposed trail crossing at Telegraph Road and Erb Road in St. Louis County, Missouri.

Sincerely,

A handwritten signature in black ink that reads "Lee Cannon".

Lee Cannon, P.E., PTOE
Principal – Traffic Engineer