INITIAL FINDINGS

This Stage 0 Feasibility Study, undertaken by the Regional Planning Commission (RPC) and the City of Slidell, evaluated the relative feasibility of a series of improvements to *Northshore Boulevard between the S. I-12 Service Road and US 190*.

As a Stage 0 study, this document presents initial findings only, which would be subject to further review and evaluation as part of the project development process.



Northshore Boulevard has a four-lane section with no shoulders within 65 feet of apparent right-of-way. There is a 16-foot-wide median in the corridor extending from the S. I-12 Service Road to US 190. A total of 7 median openings can be found along the corridor along with 20 driveways. Northshore Boulevard has three fully actuated traffic signals located at the north and south entrances to the Northshore Square Mall and in the center of the corridor maintained by the City of Slidell.

The purpose of this project is to find solutions which address existing traffic congestion, transportation mobility, and safety issues along Northshore Boulevard.

The need for this study includes a desire by the City and RPC to address the number of crashes found along the corridor. By way of the Local Road Safety Program (LSRP), Northshore Boulevard has the highest number of crashes of any locally owned roadway in St. Tammany Parish as of the 2014-2016 crash profile. Northshore Boulevard is a principal arterial and passes through one of the City's retail hubs. Proposed changes in land use and commercial activity along the corridor will likely increase traffic volumes on the corridor. This study examined three alternatives to improve safety, traffic operations, and access to Northshore Boulevard.

A Project Management Committee (PMC) met three times during the project to review analyses and provide input to initial findings. The PMC consisted of representatives from the RPC and the City of Slidell with invitations extended to LADOTD District 62, and St. Tammany Parish.

Initial recommendations for improvements on Northshore Boulevard, along with an estimate of their costs using DOTD unit or project costs for comparable work, include the following:

• <u>Concept #1: Update to existing traffic signal timing</u> the current traffic signals in the corridor appear to favor driveways over corridor progression. As the levels of traffic generated by the mall have decreased, there may be an opportunity to *retime signals* at a minimal expense to the City.

This concept should be implemented as an initial steptoimprovetrafficoperationsonNorthshoreBoulevard.Theimmediatebenefitwouldbeto



Concept #1 would retime signals on Northshore Boulevard to improve traffic flow



improve traffic flow and performance (decrease queue build-up in some areas) on Northshore Boulevard, but it would have no effect on the reduction of conflict points (*Figure 1*).

• <u>Concept #2: Superstreet/Roundabout</u> <u>Alternative 1</u> – a combination of retiming signals with right out access, with driveway closures or limitations (right- in/right-out only) and J-turns as well as a roundabout located at the southern limits near the current Northshore Boulevard at Northshore Square Mall South Driveway.

In this application, the roundabout will allow for better progression and reduce conflict points at the intersection; as well as removing the signal will help with the proximity of the existing signal spacing. It offers better flow and access to sites along Northshore Boulevard, as well as address safety issues at some driveways by reducing the number of potential traffic movements and reducing the greatest number of total conflict points along the corridor (Figure 1).

Constructing this improvement would require right-of-way to be acquired. The initial findings would be to shift the roundabout east toward Northshore Square Mall to avoid impacting businesses on the west side of the corridor. However, this would require adjustments to the retention pond in front of the Mall. Capacity lost in the pond would need to be gained elsewhere on the site. The existing north driveway at the Mall would likely remain, pending the outcome of the design and further traffic analysis phase, but be converted to right-out only. Access to the Mall site from US 190 would remain unaffected.

Northshore Boulevard would also shift slightly eastward to follow the roundabout location, the exact amount of shift and impact to other business driveways would need to be determined during design. Cost estimates shown for this improvement have been estimated using costs for the development of the roundabout intersection at Northshore Boulevard and US 190.



driveways at Northshore Square Mall

This project also offers an opportunity to extend pedestrian and cycle access along Northshore Boulevard to tie the corridor to the Tammany Trace south of US 190.

• <u>Concept #3: Superstreet/Round-about Alternative 2</u> – a combination of retiming signals with right out access, with driveway closures or limitations (right-in/right-out only) and J-turns as well as a roundabout located near the current Northshore Boulevard at Shared Walmart / Home Depot Driveway.

In this application, the roundabout will allow for better progression and reduce conflict points at the intersection; as well as removing the signal will help with the proximity of the existing signal spacing. It





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Northshore Blvd: US 190 to I-12 Stage 0 Feasibility Study Concept #3: Superstreet/Roundabout 2 6440 A. S. U -**1** 11/1 Ast, Min g 190 Change in Conflict Points: -21

Figure 1. Northshore Boulevard Concept Alternatives Graphic Source: Burk-Kleinpeter, Inc., 2019. This page left intentionally blank

Category	<u>Concept #1</u> Re-Time Signals	<u>Concept #2</u> Superstreet Roundabout Alternative #1	<u>Concept #3</u> Superstreet Roundabout Alternative #2
Construction Costs	\$74,000	\$5,422,000	\$6,116,800
Engineering	\$20,000	\$435,000	\$490,000
Utilities		\$609,000	\$565,500
Right-of-Way		\$2,370,000	\$2,528,000
Contingency	\$18,500	\$1,355,500	\$1,529,200
Initial Cost Estimate	\$112,500	\$10,191,500	\$11,229,500

<u>Table 1</u>: Initial Cost Estimate of Improvement Concepts Northshore Boulevard, S. I-12 Service Road to north of US 190

Notes: Based upon DOTD unit costs for comparable projects. Cost for roundabout construction based upon State Project No.H.012812, US 190 Northshore and Camp Villere, as posted in the St. Tammany Urbanized Area Transportation Improvement Program (TIP), as administered by the RPC.

offers *better flow and access to sites* along Northshore Boulevard, as well as *address safety issues at some driveways* by *reducing* the number of potential *traffic movements* and *reducing a lower number of conflict points* along the corridor than Concept 2(*Figure 1*).

Constructing this improvement would require right-of-way to be acquired. The initial findings would be to shift the roundabout east toward Northshore Square Mall to avoid impacting businesses on the west side of the corridor. However, this would require adjustments to the retention pond in front of the Mall. Capacity lost in the pond would need to be gained elsewhere on the site. Existing driveways at the Mall would likely remain, pending the outcome of the design and further traffic analysis phase, but be converted to right-in on the south and right-out on the north only. Access to the Mall site from US 190 would remain unaffected.

Northshore Boulevard would also shift slightly eastward to follow the roundabout location, the exact amount of shift and impact to other business driveways would need to be determined during design. Cost estimates shown for this improvement have been estimated using costs for the development of the roundabout intersection at Northshore Boulevard and US 190.

This project also offers an opportunity to extend pedestrian and cycle access along Northshore Boulevard to tie the corridor to the Tammany Trace south of US 190.

Analysis of these concepts impact on future traffic operations does incorporate *growth in local traffic as a result of some minor market driven redevelopment of commercial spaces along Northshore Boulevard*. The results of these analyses, documented in the Future Analysis section of the report, completed using VISTRO and SIDRA, indicate that the improvements shown *provide enough capacity to accommodate a minimal amount of future growth*.

Should a development of regional significance be added to the corridor, analysis of these additional trips' impact to Northshore Boulevard would need to be completed. In addition, should plans for a future I-12 interchange between Lacombe and Northshore Boulevard come to fruition, this would provide an alternative for residents of East Lacombe and Western Slidell to access the interstate corridor and might lead to a decrease in some of the pass through traffic volumes found on Northshore Boulevard.

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Introduction

Project Overview

This Stage 0 Feasibility Study, undertaken by the Regional Planning Commission (RPC) and the City of Slidell, evaluated the relative feasibility of a series of improvements to Northshore Boulevard between the S. I-12 Service Road and US 190, as illustrated on Figure 1.

Project Area Description

The project study area is a 0.5-mile corridor within the Slidell UZA. The study area encompasses approximately 233 acres of land adjacent to the corridor, all of which has been developed commercially. Although a combination of market forces and changing tastes has closed some of these retail spaces, including the interior of the Northshore Square Mall in 2018, many of the standalone commercial buildings and drive-up retail centers have retained almost full occupancy.



The posted speed limit on Northshore Boulevard is 40 miles per hour. The apparent right-of-way is 65 feet wide (between the outer pavement markings). The pavement, configured as a four-lane section with no shoulders, is approximately 22 feet wide, with two 10 to 11-foot travel lanes in each direction. There is a 16-foot-wide median in the corridor extending from the S. I-12 Service Road to US 190. A total of 7 median openings can be found along the corridor along with 20 driveways. Northshore Boulevard has three traffic signals located at the north and south entrances to the Northshore Square Mall and in the center of the corridor. All three are fully actuated traffic signals maintained by the City of Slidell.

Purpose and Need for this Project

The purpose of this project is to find solutions which address existing traffic congestion, transportation mobility, and safety issues along Northshore Boulevard.

The need for this study is as follows:

- 1) Northshore Boulevard is a roadway owned and maintained by the City of Slidell. It is a locally owned roadway on the National Highway System network and provides an important connection between US 190 and I-12.
- 2) Northshore Boulevard is functionally classified as an urban principal arterial on the functional class network for the Slidell Urbanized area.
- 3) By way of the Local Road Safety Program (LSRP), Northshore Boulevard has the highest number of crashes of any locally owned roadway in St. Tammany Parish as of the latest crash profile, 2014-2016.
- 4) Over the past several years, changes in land use and commercial activity along the corridor have provided an opportunity to reexamine operations of and access to Northshore Boulevard.

Management Committee Participation and Coordination

A Project Management Committee (PMC) was formed and met three times during the project. The PMC consisted of representatives from the RPC and the City of Slidell with invitations extended to LADOTD District 62, and St. Tammany Parish. Meeting Summaries and Communication Summaries are included as Appendix A.

SITE INVESTIGATION, DATA COLLECTION & ANALYSIS

Daily Traffic Data Collection

National Data and Surveying (NDS) collected 7-day, 24– hour counts on Northshore Boulevard between October 13 and October 19, 2019, while area schools were in session. These counts, collected at two locations, included total data by 15-minute, hour, day and by vehicle classification. Classification data followed the FHWA thirteen (13) category vehicle classifications currently used for most reporting requirements and serve as the basis for most vehicle classification counting efforts.



Count locations on Northshore Boulevard included one station between the North Mall driveway and the Walmart

and Home Depot driveway, and south of the Walmart/Home Depot driveway and north of Gause Boulevard/US 190. Detailed data for each day appears within Appendix B.

Table 2 provides a breakdown of data by day and general vehicle type (cars, buses, heavy trucks, pedestrians, and bicycles). Examination of this data led to the identification of the count period used for the peak-hour data collection effort on Northshore Boulevard described in the next section.

Table 2: Average Daily Traffic Count Data

Northshore Boulevard, S. I-12 Service Road to north of US 190

Location#1 - between North Mall driveway and Walmart/Home Depot driveway

Date	Northbound Total	Southbound Total	Daily Total
Sun 10/13	10,179	8,929	19,108
Mon 10/14	12,286	10,371	22,657
Tu 10/15	12,123	10,600	22,723
Wed 10/16	12,145	10,751	22,896
Th 10/17	12,936	11,123	24,059
Fr 10/18	14,117	12,160	26,277
Sat 10/19	13,135	11,532	24,667
7-day Average	12,417 (54%)	10,781 (46%)	23,198

Location#2 – between Walmart/Home Depot driveway and north of Gause Boulevard/US 190

Date	Northbound Total	Southbound Total	Daily Total
Sun 10/13	8,805	8,845	17,650
Mon 10/14	11,090	10,542	21,632
Tu 10/15	11,269	10,814	22,083
Wed 10/16	11,079	10,723	21,802
Th 10/17	11,541	11,086	22,627
Fr 10/18	12,561	11,999	24,560
Sat 10/19	11,512	11,085	22,597
7-day Average	11,122 (51%)	10,728 (49%)	21,850



STUDY AREA - Northshore Blvd: US 190 to I-12 S. Service Rd - Traffic Study RPC Task SL-1.2NSB; FY-20 UPWP





<u>Figure 2.</u> Northshore Boulevard Study Area aphic Source: Burk-Kleinpeter, Inc., 201

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Peak-Hour Traffic Turning Movement Counts

NDS collected peak-hour turning movement data on November 7, 2019 during the designated peak-hour windows of 7:00-8:45 am and 4:00-5:45 pm. Within these count windows, the actual peak hours of traffic were 7:45-8:45 am and 4:30-5:30 pm. Figure 3 provides a summary of the peak-hour data provided to the RPC within a separate Appendix C deliverable.

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Peak-Period Traffic Observations

BKI completed individual intersection peak period observations during the period when traffic data collection took place. These observations took place at the three signalized intersections in the project limits:

- <u>Traffic Observation Location #1</u> the intersections of Northshore Boulevard with Starbucks Coffee Shopping Center/Northshore Square North Driveway (#1);
- <u>Traffic Observation Location #2</u> the Walmart/Home Depot shared driveway (#2);
- <u>Traffic Observation Location #3</u> Northshore Square South Driveway (#3).

This discussion of each location includes photos taken at these locations at the time of the observations in order to illustrate the conditions witnessed.



<u>**Traffic Observation Location #1**</u>: Northshore @ Starbucks/Northshore Square North Driveway AM Peak Period Observation

The AM Peak Period Observation for the intersection of Northshore Boulevard and Starbucks/Northshore Square took place on November 6, 2019 from 7:00 AM to 9:00 AM. The posted speed limit for Northshore Boulevard is 40 MPH and the driveways for both Starbucks and Northshore Square are not signed but are commercial drives. Northshore Boulevard is a four-lane divided highway with left-turn pockets both Northbound and Southbound for traffic turning into Starbucks (Northbound) and Northshore Square



(Southbound). The driveway at Starbucks is a one-lane entrance and a two-lane exit with a shared thru/right lane and a dedicated left lane with a median separation. The driveway at Northshore Square has a two-lane entrance and a two-lane exit with a shared thru/left lane and a dedicated right lane with a median separation. There were no pedestrian movements observed at the intersection.

During the AM peak period, each approach was observed for queue lengths, operational issues, and other noteworthy events. Southbound Northshore experiences the longest

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Queue of stopped traffic south of Starbucks/Northshore Mall Mall north driveway during AM Peak



queues during the peak period but only for a very brief period. During these periods, queues of stopped traffic can back up to the I-12 off/on ramp intersection (as shown in the picture to the left). This was observed on two occasions.

The Southbound left-turn lane acts as a de facto U-turn lane (as shown in the top photo to the left). Motorists choosing to make this maneuver have trouble completing the Southbound Uturn movement in a single turn. The current geometric layout of the location requires some motorists to make a 2 or 3-point turn in order to turn their vehicle through the intersection and complete the U-turn to travel north to the I-12 interchange.

Another issue that appears at this approach to the intersection is the backup from the downstream signal near the shared Home Depot/Walmart Driveway. Between 8:15 and 8:30 am, the queue from the downstream signal begins to back up into the Starbucks/Northshore Square North Driveway intersection and block the intersection (as shown in the middle photo to the left).

The approach has very little congestion and doesn't appear to have any unmet demand. Even when longer queues are present, the back of queue easily clears the intersection. The signal timing appears to allow good progression southbound from the I-12 signal through the Starbucks/Northshore Square Mall North driveway signal.

The Northbound approach to the intersection appears to operate well.

Traffic appears to favor the required lane assignment movement following the intersection as I-12 East traffic needs to be in the right lane and all other traffic needs to be in the left due to the right lane drop after the intersection.

Prepared by National Data & Surveying Services

Northshore Blvd & North Shore Square Mall N Dwy









Prepared by National Data & Surveying Services Northshore Blvd & The Home Depot/Walmart Dwy Peak Hour Turning Movement Count Northshore Blvd ID: 19-16037-003 Day: Thursday City: Slidell Date: 11/07/2019 SOUTHBOUND 07:30 AM - 08:30 AM AM 36 684 0 867 07:00 AM - 09:00 AM 6 AM DOH NONE NOON () 0 0 0 0 NOON NONE PEAK 04:45 PM - 05:45 PM 52 905 0 22 970 04:00 PM - 06:00 PM PM PIV 4 ᢙ Ŀ Dwy AM NOON PM PM NOON The AM 0 2 0 0 0 0 0 0 Home The Home Depot/Walmart 0 218 🗢 142 EASTBOUND WESTBOUND CONTROL 0 0 ← 0 0 Depot/Walmart Dwy ٥ 🖒 0 0 0 Signalized 0 🗲 0 0 0 0 93 0 249 TEV 1745 0 2219 0 0 0 PM AM NOON 0 0 0.93 0 PHF 0.94 0 0 0 \Rightarrow 52 125 7 1 0 2 0 0 1 Ŷ ค 1 1 0 AM NOON PM PM NOON AM 1031 1 166 Auto (AM) PM 699 0 PM Truck (AM) +643 131 0 0 NOON 0 0 0 NOOM 121 5 20 84 5 10 9 1 10 736 0 106 768 0 AM AM 0 + + 0 NORTHBOUND 50 🧣 **F**0 **F**0 2 7 **h** t r • Northshore Blvd 0 742 104 19 2 0 Auto (NOON) Truck (NOON) £N/A ←N/A €N/A £N/A ♦N/A €N/A NOOR N/A. 0 0 N/A J LN/A L N/A 00 220 M 34 PA M 0 N/A FN/A **₽** N/A N/A 🧣 000 00 t N/A PM 0 N/A N/A NOON 0 NOON AM AM Auto (PM) Truck (PM) AM AM 0 891 NOON NOON 0 🕇 + 0 + 85 ↑ 0 PM 0 + + PM 000 00 248 10 . . 1 + 0⁰ AM NOON NOON 0 🔿 0 +0 0 PRO N PM **F** 0 0 **F**0 125 0 1 t r 0 1 0

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Northshore Blvd & North Shore Square Mall S Dwy



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Prepared by National Data & Surveying Services

Peak Hour Turning Movement Count

There are no excessive or long queues as the longest queues were observed to be around 5 to 6 vehicles deep; however, there does appear to be quite a bit of a heavy vehicle presence.

The approach has no congestion itself and doesn't appear to have any unmet demand. The signal timing appears to allow good progression Northbound from the downstream signalized shared Home Depot/Walmart intersection through the Starbucks/ Northshore Square signal.

The Starbucks approach to the intersection sees quite a bit of traffic as can be expected; especially between 7:20 – 7:50 AM. The queue length can grow to 7 vehicles in length and wrap around the parking lot. Around 7:30 AM, there were several vehicles present at the approach and the signal skipped the phase for the approach causing a backup of cars in the queue (as shown in the top and middle photos to the right).

The approach had some congestion itself from the times stated above; however, there did not appear to be any unmet demand.

The Northshore Square approach has very little traffic from its approach, the max queue is about 2 vehicles and this approach thus has no operational issues. The approach has no congestion and no unmet demand (as shown in the bottom photo to the right).



Queue of stopped traffic south of Starbucks/Northshore Mall north driveway during AM Peak





The intersection itself during the AM peak appears to operate very well and has minimal congestion. The signal timing that appears on the Traffic Signal Inventory (TSI), provided by the City of Slidell, shows a -2 second cycle length for phases 4 and 8. The signal did appear to operate in the sequence provided on the TSI; however, it was noticed that on four occasions in the peak period the signal came out of the sequence and served phases 2 and 6 before phases 2 and 5. This occurred even when vehicles were present in the detection zone for phase 5. Also, it was noted that the timing plan from the TSI shows that the yellow time for all approaches is 5 seconds where it was noticed in the field that it is 4 seconds. It should be noted that the signal rests in phases 2 and 6 if there are no minor movement detection calls.







Traffic Observation Location #1:

Northshore @ Starbucks/Northshore Square North Driveway PM Peak Period Observation

The PM Peak Period Observation for the intersection of Northshore Boulevard and Starbucks/Northshore Square took place on November 6, 2019 from 4:00 to 6:00 PM. During the PM peak period, each approach was lengths, observed for queue operational issues, and other noteworthy events.

As in the AM observation period, Southbound Northshore experienced the longest queues during the peak period (as shown in the top and middle photo to the left).

The queues get back past the I-12 off/on ramp intersection, this was noticed to occur on four occasions. During these longer queueing events, the queue blocks the I-12 Frontage Road traffic from turning onto Northshore Boulevard. As in the AM period, observations confirmed the Southbound left-turn lane has a heavy U-turn movement (as shown in the bottom photo to the left).

The geometrical issue from the AM concerning the U-turns appears again in the PM as several cars have trouble completing the Southbound U-turn movement and several make 2 or 3-point turning maneuvers to complete the maneuver. One difference from the AM observation is that there appeared to be red light running to make the U-turn movement. This was observed to occurred on 4 occasions.

Another issue that repeats from the AM Peak Period Observation is the backup from the downstream signal at the share Home Depot/Walmart driveway. It is a longer and more lingering issue in the PM Peak as it happens over a longer period of time between 4:45 and 5:15; the queue from this signal begins to back up into the Starbucks intersection and blocks the intersection (as shown in the top photo to the right).

The approach has more congestion compared to the AM, but it doesn't appear to have any unmet demand due to signal timing. Even with some congestion issues there appears to be good progression Southbound from the I-12 off/on ramp signal through the Starbucks/Northshore Square signal.

The Northbound approach to the intersection appears to operate well and very similar to that of the AM Peak Period Observation. There are longer queues in the PM for the approach, as the longest queues were around 12 vehicles deep (as shown in the middle photo to the right).

The approach has no congestion itself and doesn't appear to have any unmet demand. The signal timing appears to allow good progression Northbound from the downstream Taco Bell signal through the Starbucks/Northshore Square signal. For brief periods, there does appear to be some backup from the I-12 off/on ramp signal that gets within a few car lengths of blocking the intersection but never did during the observation.

The Starbucks approach to the intersection sees much less traffic volume compared to the AM and has very short queues--usually between 2 and 3 vehicles--with no unmet demand (as shown in the bottom photo to the right).

The Northshore Square approach saw more traffic volume in the PM; the max



Queue of traffic on Northshore Boulevard during PM Peak south of Starbucks driveway



Northshore Square Mall north driveway



Queue of traffic entering and departing Starbucks during PM Peak



queue is about 6 vehicles. The approach did not see any operational issues; however, it was noticed that several vehicles that desired to make a Southbound U-Turn would turn left into Northshore Square and use the parking lot to U-turn and then proceed to turn right onto Northbound Northshore Boulevard. The approach has no congestion and no unmet demand (as shown in the top photo to the left).

The intersection itself during the PM peak appears to operate at an acceptable level for most of the time

but does have some minimal congestion issues. The signal timing appears to operate close to the sequence shown on the Traffic Signal Inventory provided by the City of Slidell; however, it was noted that the timing plan from the TSI shows that the yellow time for all approaches is 5 seconds where it was noticed in the field it is 4 seconds. The signal rests in phases 2 and 6 if there are no minor movement detection calls as observed in the AM.

<u>**Traffic Observation Location #2:**</u> Northshore @ Walmart/Home Depot shared driveway AM Peak Period Observation

The AM Peak Period Observation for the intersection of Northshore Boulevard and the shared driveway with Walmart/Home Depot took place on November 13, 2019 from 7:00 to 9:00 AM. The posted speed limit for Northshore Boulevard is 40 MPH and the Walmart/Home Depot shared driveway is not signed but is a commercial drive. Northshore Boulevard is a four-lane divided highway with a left-turn pocket Northbound for traffic turning into the Walmart/Home Depot entrance, etc. The Walmart/Home Depot approach is a one-lane entrance and a two-lane exit with a dedicated left turn lane and a dedicated right turn lane with a median separation. There is no pedestrian movement at the intersection.

During the AM peak period, each approach was observed for queue lengths, operational issues, and other noteworthy events. Southbound Northshore Boulevard experiences the longest queues during the peak period but very briefly. The queues get back close to the Starbucks/Northshore Square intersection, but



more of the longer queues are back to in front of Wendy's (as labeled on the map on page 11 as shown in the bottom photo to the left). The approach had a little congestion and did not appear to have any unmet demand, just a long queue.

The Northbound approach to the intersection appears to have queues that go past the downstream Home Depot intersection at the longest. While these queues occur briefly

during the AM, they do provide an operational issue and block the Home Depot intersection (as shown in the top photo to the right). The approach had a little congestion and did not appear to have any unmet demand due to signal timing.

The Walmart/Home Depot shared driveway approach to the intersection saw very little traffic volume in the AM; however, this approach's signal timing appeared to cause the operational issues and longer queues on the other two approaches.

While the TSIs provided by the City shows a timing plan cycle length of 50 seconds and a Walmart/Home Depot shared driveway phase length of 9 seconds of green; the in-field conditions appear to be same of that of the PM timing plan provided on the TSI.

The Walmart/Home Depot shared driveway receives roughly 35 seconds of green no matter demand or detection calls. This is causing a lot of wasted time serving this very low





volume phase in the morning; the cause of this is not known as it is obviously a controller issue. The max queue is about 6 vehicles in the AM, but with the signal timing there is no congestion or unmet demand coming out of the driveway (as shown in the lower picture to the right).

The signal appears to not be operating at all according to the provided TSI for the AM timing plan. The signal appears again to be in the PM timing plan including timings as well as in sequencing. It was also noticed that the signal has the signal heads for a right turn overlap from Walmart/Home Depot shared driveway to Southbound Northshore Boulevard but this overlap right never appeared. Also the timing plan states a yellow time of 5 seconds for each approach where the field conditions shows a 4 second yellow time for each approach.



Queue of northbound traffic on Northshore Boulevard during PM Peak



Queue of northbound traffic on Northshore Boulevard during PM Peak



Traffic Observation Location #2: Northshore @ Walmart/Home Depot shared driveway PM Peak Period Observation

The PM Peak Period Observation for the intersection of Northshore Boulevard with the Walmart/Home Depot shared driveway took place on November 13, 2019 from 4:00 to 6:00 PM. During the PM peak period, each approach was observed for queue lengths, operational issues and other noteworthy events.

Southbound Northshore Boulevard experienced the longest queues during the peak period but very briefly. The queues are longer than in the AM peak and get back close to the Starbucks/Northshore Square intersection (as shown in the top photo to the left).

The approach had a little congestion during this time; however, the approach did not appear to have any unmet demand, just a long queue. The Northbound approach to the intersection appears to have gueues that go past the upstream Home Depot intersection at its longest. While these queues occurred more frequently than the AM; the left turn pocket experienced queues that also blocked the left through lane on Northbound Northshore Boulevard. These queues blocked the Home Depot driveway (as shown in the middle and bottom photos to the left).

The approach has the periods of congestion mentioned above, the through movement did not appear to have any unmet demand due to signal timing; however, the left turn movement into the Taco Bell did have a small amount of unmet demand.

The Walmart/Home Depot shared driveway approach saw more traffic volume in the PM than in the AM peak period. Once again as from the AM observation, this approach's signal timing appeared to cause the operational issues and the longer queues on the other two approaches. While the TSI timings provided by the City match the timings observed in the field during the PM observation; the Walmart/Home Depot shared driveway still appears to receive too much green time for traffic using the approach. While there are longer queues in the PM than in the AM, there



is still quite a bit of wasted green time for the exit from the development (on average between 10-15 seconds). The longer queues get around 8 to 9 vehicles and can have some heavy vehicles (as shown in the top photo to the right). It was also noticed that the signal has the signal heads for a right turn overlap from Walmart/Home Depot shared driveway to Southbound Northshore Boulevard, but this overlap never appeared. Also, the timing plan states a yellow time of 5 seconds for each approach where the field conditions shows a 4 second yellow time for each approach.

<u>**Traffic Observation Location #3:**</u> Northshore @ Northshore Square South Driveway AM Peak Period Observation

The AM Peak Period Observation for the intersection of Northshore Boulevard and Northshore Square Mall South Driveway took place on November 20, 2019 from 7:00 to 9:00 AM. The driveways for the intersection of Northshore Boulevard and Northshore Square Mall South Driveway are not signed but are commercial drives. Northshore Boulevard is a four-lane divided highway with left-turn pockets both Northbound and Southbound for traffic turning into Home Depot (Northbound) and Northshore Square (Southbound). The commercial driveway across from the Mall (*which serves Home Depot and Burger King*)

as labeled on page 11) is a two-lane entrance and a two-lane exit with a shared thru/left lane and a dedicated right lane with a striped median separation. Northshore Square Mall South Driveway is a two-lane entrance and a two-lane exit with a shared thru/left lane and a dedicated right lane with a median separation. There is minor pedestrian movement at the intersection.

During the AM peak period, each approach was observed for queue lengths, operational issues, and other noteworthy events. Southbound



Northshore Boulevard experiences the longest queues during the peak period but very briefly. The queues get back close to the signalized Walmart/Home Depot shared driveway on three occasions. On most occasions however, the queue is very short and there appears to be good progression (as shown in the bottom picture to the right).

The approach had a little congestion during this time; however, the approach did not appear to have any unmet demand, just a long queue.

The Northbound approach to the inter section appears to have queues that are about 7 vehicles at its longest and there appears to be good progression from the US 190 intersection.

The intersection to the north Boulevard (Northshore @ Walmart/Home Depot shared driveway) has queuing that does back up and impedes the progress of Northbound traffic, this was noted to occur 9 times during the observation, with the longest queues observed occurring during this observation period (as shown in the top and middle photos to the left).

The approach had a little congestion during this time; however, the approach did not appear to have any unmet demand, just a long queue with some blockage.

The driveway serving Home Depot and Burger King did not have a lot of traffic during the observation, but the traffic signal timing forces off this phase in coordination sequence due to the timing plan even if there are calls on the approach. When the queue for the left turn from the approach gets a queue over 3-4 vehicles then the back





Queue of northbound traffic on Northshore Boulevard near the Northshore Square Mall South driveway during PM Peak



Queue of traffic northbound on Northshore Boulevard at Northshore

of queue will have a hard timing getting through the signal on green; thus, there is some unmet demand at the approach on some cycles. On most occasions however, there is about one or two car queues that easily clear the intersection.

The Northshore Square Mall South Driveway approach has very little traffic, the max queue is about 2 vehicles and thus has no operational issues. The approach has no congestion and no unmet demand.

The signal appears to be operating according to the provided TSI for the AM timing plan according to the sequencing. The signal appears to run the 50 sec designated cycle but gives extra time to phases 2 and 6. Also, the timing plan states a yellow time of 5 seconds for each approach where the field conditions shows a 4 second yellow time for each approach.

<u>**Traffic Observation Location #3:**</u> Northshore @ Northshore Square South Driveway PM Peak Period Observation

The PM Peak Period Observation for the intersection of Northshore Boulevard and Northshore Square Mall South Driveway took place on November 20, 2019 from 4:00 to 6:00 PM. During the PM peak period,

each approach was observed for queue lengths, operational issues, and other noteworthy events. Northshore Boulevard experiences more traffic in the PM peak and sees longer queue lengths both Northbound and Southbound. The longest Southbound queue during the PM peak gets back to the shared Walmart/Home Depot driveway slows down the right turning traffic from the shared Walmart/Home Depot driveway onto Southbound Northshore, this was noticed to occur on three occasions during the observation (as shown in the middle photo to the right).

The northbound Northshore Boulevard approach (as shown in the bottom photo to the right) has longer queueing in the PM than in the AM, but the bigger operational issue comes from the shared Walmart/Home Depot driveway. Once again in the PM, as it was in the AM, queued traffic from the signal backs up into the Home Depot/Northshore Square intersection. The longer queues of the approach were about 7 to 8 vehicles (as shown in the bottom photo to the right).

The Southbound and Northbound approach had a little congestion during this time; however, the approaches did not appear to have any unmet demand,



Queue of traffic leaving Burger King across from Northshore Mall South driveway during PM Peak



during PM Peak

just a long queue with some blockage. The Home Depot/Burger King approach does see substantially more traffic in the PM peak than in the AM peak, as can be expected. When the queue for the left turn from the approach gets a queue over 3-4 vehicles, then the back of queue will have a hard timing getting through the signal on green; thus, there is some unmet demand at the approach on some cycles.

The Northshore Square approach has very little traffic from its approach, the max queue is about 2 vehicles and has no operational issues. The approach has no congestion and no unmet demand.

The signal appears to be operating according to the provided TSI for the PM timing plan according to the sequencing. The signal appears to run the 50 sec designated cycle but gives extra time to phases 2 and 6. Also the timing plan states a yellow time of 5 seconds for each approach where the field conditions shows a 4 second yellow time for each approach.

EXISTING CONDITIONS (PEAK PERIOD TRAFFIC OPERATIONS)

VISTRO analyses were conducted to determine the existing levels of delay and level-of-service for the signalized intersections along Northshore Boulevard. It focused on the peak of traffic during the AM and PM peak periods. This analysis shows that all three intersections operate within an acceptable level-of-service (i.e. generally below capacity) during the AM peak period. Traffic during the AM Peak (*Figure 3*) remained higher northbound as a greater number of vehicles appear to travel from US 190 to I-12. Increased traffic demands on Northshore Boulevard during the PM peak southbound (*Figure 3*) creates a higher demand for left turns and through movements rendering also an acceptable level-of-service for all three intersections (*Table 3*). Detailed results for the analysis are in Appendix E.

Location	AM Pea	k Period	PM Peak Period	
Location	Delay/LOS	Queue	Delay/LOS	Queue
Northshore Boulevard @ Starbucks and Northshore Square Mall North Driveway	16.9 s(B)	227 ft	30.8 s (C)	441 ft
Northshore Boulevard @ Shared Driveway for Walmart and Home Depot	30.3 s (C)	469 ft	36.1 s (D)	600 ft
Northshore Boulevard @ Northshore Square Mall South Driveway	9.3 s (A)	71 ft	24.1 s (C)	291 ft

Table 3: Existing Peak-Hour Traffic Operations Level-of-Service (LOS) and Delay Northshore Boulevard, S. I-12 Service Road to north of US 190

The unacceptable level-of-service in the existing condition occurs in some of the approaches to the intersections. The unacceptable delays occur at the Southbound Northshore Blvd. approach (*Table 4*) to the Northshore Boulevard @ Shared Driveway for Walmart and Home Depot Intersection. The approach results for the existing AM and PM condition are shown in Tables 3 and 4 respectively.

As noted in the data summaries (*Figure 2*), PM Peak traffic volumes on Northshore Boulevard are, on average, 36% higher southbound and 10% higher northbound than in the AM. Lower traffic volumes at the various signalized driveway approaches on the corridor also offer an opportunity to reallocate green time away from these minor movements and to Northshore Boulevard. Moving green time away from driveways will mean motorists waiting for the signal to turn on Northshore Boulevard will wait longer. Eventually, the number of stopped cars on these approaches will increase between cycles. Maintaining detection loops and cameras at these locations provides some assurance that the signal cycle will continue

to move and flush these driveways with some regularity and not hold cars in these driveways longer than necessary.

Table 4: Existing AM Peak-Hour Traffic Operations Level-of-Service (LOS) and Delay Northshore Boulevard, S. I-12 Service Road to north of US 190

Location			Existing AM Peak Approach					
Northshore Boulevard @	NE	}	SB		EE	3	WE	3
Starbucks and Northshore	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	LOS
Square Mall North Driveway	13.7s (B)	153 ft	20.1s (C)	227 ft	17.5 s (B)	44 ft	16.9 s (B)	14 ft
Northshore Boulevard @	NB		SB		EB		WB	
Shared Driveway for	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	LOS
Walmart and Home Depot	16.3s (B)	239 ft	48.0 s (D)	469 ft	21.0 s (C)	88 ft	-	-
Northshore Boulevard @	NE	}	SB		EE	3	WE	3
Northshore Square Mall South Driveway	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	LOS
	7.3s (A)	43 ft	11.4s (B)	71 ft	7.8 s (A)	4 ft	11.3 s (B)	4 ft

Table 5: Existing PM Peak-Hour Traffic Operations Level-of-Service (LOS) and Delay

Northshore Boulevard, S. I-12 Service Road to north of US 190

Location	Existing AM Peak Approach									
Northshore Boulevard @	NE	}	SB		EE	3	WE	3		
Starbucks and Northshore	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	LOS		
Square Mall North Driveway	26.1s (C)	358 ft	37.0s (D)	441 ft	25.8 s (C)	46 ft	20.8 s (C)	60 ft		
Northshore Boulevard @	NB		SB		EB		WB			
Shared Driveway for	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	LOS		
Walmart and Home Depot	15.7s (B)	229 ft	59.7s (E)	600 ft	25.7s (C)	243 ft	-	-		
Northshore Boulevard @ Northshore Square Mall South Driveway	NE	3	SB		EE	3	WE	3		
	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	LOS		
	22.8s (C)	258 ft	25.4s (B)	291 ft	31.5 s (C)	85 ft	15.6 s (B)	31 ft		

CRASH DATA SUMMARY, 2015-2017

Crash data for the study area was provided by the RPC for the years 2015-2017. An analysis of this data, prepared by Soll Planning in accord with the project scope, appears in Appendix D. It identified crash location, type, and severity. It demonstrated a concentration of crashes on Northshore Boulevard near the North Mall entrance and in the southern-most 600 feet of the road leading to US 190. Of the 211 crashes examined over the three years, 97.6% were either no injury or complaint, while 2.4% were either moderate or severe.

The bulk of collisions included in the analysis were rear-end collisions (37.9%). Right- angle crashes were the second most common type (23.4%) and same-direction sideswipes (16.1%) were the third most common collision type. The remaining 22.5% included left-turns (same direction), left turns (opposite direction), right turns (across traffic), other types, and non-collision incidents. A reduction in conflict points will help eliminate some of these crash types and provide for better safety along the corridor. A conflict point comparison between the existing conditions and each concept in Table 6.

Table 6: Conflict Point Comparison

Northshore Boulevard, S. I-12 Service Road to north of US 190

Location	Number of Conflict Points					
	Existing	Concept #1	Concept #2	Concept #3		
Northshore Boulevard @ Starbucks and Northshore Square Mall North Driveway	39	39	24	24		
Northshore Boulevard @ Shared Driveway for Walmart and Home Depot	10	10	8	18		
Northshore Boulevard @ Northshore Square Mall South Driveway	38	38	24	24		

CONCEPT/ALTERNATIVES DEVELOPMENT

The purpose of the Stage 0 Feasibility Study is to identify and evaluate alternatives which appear to the reduce crashes, improve safety, and solve deficiencies on the corridor identified as a result of the traffic data collection, observations, and future trip demand calculations. This level of study does not include recommendations, but offers an initial guide to specific projects which, with further development and review, could benefit traffic operations.

Based upon the review of existing traffic operations combined with review and input from the project steering committee, the following alternatives have been identified for consideration:

- **Concept #1: Update to traffic signal timing** the current traffic signals in the corridor appear to favor driveways over corridor progression. As the levels of traffic generated by the mall have decreased, there may be an opportunity to re-evaluate signal timings to improve traffic flow and performance (decrease queue build-up in some areas) on Northshore Boulevard;
- Concept #2: Superstreet/Roundabout Alternative 1 a combination of retiming signals with right out access, with driveway closures or limitations (right-in/right-out only) and J-turns as well as a roundabout located at the southern limits near the current Northshore Boulevard at Northshore Square Mall South Driveway. This may offer better flow and access to sites along Northshore Boulevard on both sides of the Boulevard, as well as address safety issues at some driveways by reducing the number of potential traffic movements and reduce conflict points along the corridor;
- Concept #3: Superstreet/Roundabout Alternative 2 a combination of retiming signals with right
 out access, with driveway closures or limitations (right-in/right-out only) and J-turns as well as a
 roundabout located near the current Northshore Boulevard at Shared Walmart / Home Depot
 Driveway. This may offer better flow and access to sites along Northshore Boulevard, as well as
 address safety issues at some driveways by reducing the number of potential traffic movements
 and reduce conflict points along the corridor.

Concept/Alternative Evaluation and Analysis of Future Traffic Operations

A review of the potential impacts for these alternatives considered potential impacts as expressed using four variables across a range of apparent impacts from high to low. These variables, and the scale used appear as part of the evaluation table below (*Table 7*).

Table 7: Evaluation of Alternative Concepts

Northshore Boulevard, S. I-12 Service Road to north of US 190

R.O.W.= right-of-way

No impacts from

project

	Concept		Utilities	Displacements		Safet	y	Impacts to Business Access	
1	Upd	ate to Signal Timing							
2	Superstreet/Roundabout Atl. 1								
3	Sup	erstreet/Roundabout A	lt. 2						
				Scal	e				
		Utilities		Displacemer	nts	Sa	fety	Imp	Dacts to Business Access
Hi	gh	Relocation required with easement	R.C takir).W. needed in ng/relocating b	cluding uildings	uding Increase conflict ildings points		Adv	verse impacts from project
Mec	lium	Minimal impact on utilities (no easement	R.O.'	W. needed but adverse effe	with no	No ch conflic	ange in t points	So	me impacts from project

Construction within existing

R.O.W.

Concept #1 – Update to Signal Timing

Low

No Impact on utilities

As this concept occurs with no changes in equipment or facilities, the impact to adjacent areas is negligible. It will not impact utilities, require displacements (as no construction is required), or impact business access. This <u>alternative will have</u> <u>no change in conflict points</u>. The relative benefits of retiming the signals in the corridor include better coordination and movement of the north-south movements along the corridor as well as solving some of the unused times at a few of the intersections as mentioned in the peak



Reduce conflict

points

period observations. This update to signal timing will also work with the current infrastructure in place and will not require any displacements or have adverse impacts on utilities and business access. While the signal retiming would greatly benefit the progression of north-south traffic in the future 2024 and 2049; it does adversely affect some of the side drive movements especially at the Northshore Boulevard at the Shared Driveway for Walmart and Home Depot intersection.

<u>Concept #2 – Super Street/Roundabout Alternative 1</u>

This <u>concept will not fit in the existing right-of-way</u> at the southern intersection of the project as the required space needed for the roundabout will exceed the existing limits. The <u>impact to adjacent</u> <u>buildings will be minimal</u>; however, the parking at Taco Bell, Burger King and Raising Canes will be affected and will see a <u>reduction in parking spaces</u> depending on the size and exact final location of the proposed roundabout. <u>Utilities in the area of the roundabout will need to be replaced</u> and depending on the exact location of the roundabout a small portion of the detention pond to the west may need to

be filled in. There will be <u>some modifications to business access on the western side of Northshore</u> <u>Boulevard as most independent driveways would become right-in/right-out</u>.

This concept would modify the northern intersection limits of Northshore Boulevard at Starbucks and Northshore Square Mall North Driveway into just right-out movements out of the driveways. This will reduce conflict points at the intersection and allow for the removal of phases from the traffic signal providing better progression for the north and south movements but also still allow full access to the drives from the north and south movements. The inclusion of an unsignalized U-turn (J-turn) southbound of the Northshore Boulevard at Starbucks and Northshore Square Mall North Driveway intersection will provide the opportunity for a heavier left turn volume from the Starbucks drive approach to complete that maneuver away from the intersection with little delay. This concept would also modify the Northshore Boulevard at Shared Driveway for Walmart and Home Depot into just a right-out movement for the driveway. Once again, this will eliminate a phase from the signal, would not require the northbound thru movement to stop and will provide good progression north and south. The concept includes the replacement of the signal at the Northshore Boulevard at Northshore Square Mall South Driveway with a roundabout. The *roundabout will allow for better progression and reduce* conflict points at the intersection; as well as removing the signal will help with the proximity of the existing signal spacing. Placing the roundabout at his location will provide the same access to Dillard's and allow for a lower impact on the retention pond adjacent to the corridor to the east.

Concept #3 – Super Street/Roundabout Alternative 2

This <u>concept will not fit in the existing right-of-way</u> at the proposed roundabout location near the intersection of Northshore Boulevard and Shared Driveway for Walmart and Home Depot. The limits of the project required space for the roundabout will exceed the existing limits. The <u>impact to adjacent</u> <u>buildings will be minimal; however, the parking at Taco Bell, Mattress Firm and Dillard's will be affected</u> as these sites will see a reduction in parking. <u>Utilities near the roundabout location would see</u> <u>significant impact as well as a much larger portion of the detention pond to the west</u> would need to be adjusted. There will be <u>some modifications to business access on the western side of Northshore</u> <u>Boulevard</u> as most independent driveways would become right-in/right-out.

This concept would *modify the northern intersection limits of Northshore Boulevard at Starbucks and* Northshore Square Mall North Driveway into just right-out movements out of the driveways just as Concept #2. This will reduce conflict points at the intersection and allow for the removal of phases from the traffic signal providing better progression for the north and south movements but also still allow full access to the drives from the north and south movements. The inclusion of an *unsignalized U- turn* (J-turn) southbound of the Northshore Boulevard at Starbucks and Northshore Square Mall North Driveway intersection will provide the opportunity for a heavier left turn volume from the Starbucks drive approach to complete that maneuver away from the intersection with little delay. The concept includes the replacement of the signal at the Northshore Boulevard at Shared Driveway for Walmart and Home Depot with a roundabout. The roundabout will allow for better progression and reduce conflict points at the intersection; as well as removing the signal will help with the close proximity of the existing signal spacing; however placing the roundabout in this location would have more impacts on the detention pond to the west. This concept would also modify the Northshore Boulevard at Taco Bell and Northshore Square Mall South Driveway into just a right-out movement for the driveways. Once again, this will eliminate a phase from the signal. This will reduce conflict points at the intersection and allow for the removal of phases from the traffic signal providing better progression and improve lost signal time. This concept will still allow full access to the drives from the north and south movements. The proximity of the signal to the roundabout could however cause adverse effects on the roundabout.

FUTURE TRAFFIC OPERATIONS ANALYSIS

Change in Background Traffic Volumes

The RPC's New Orleans Regional Travel Demand Model, which can provide forecast of travel demand based upon growth in population and employment combined with existing network capacity and committed improvement projects, estimates that existing traffic (without new development) would grow 1.3% annually. This value has been used to help calculate the baseline of future peak-period traffic without the addition of future development-based trips.

Traffic Impacts from Future Development Sites

The impact of future developments adjacent to Northshore Boulevard on the trip generation was evaluated using ITE *Trip Generation 10th Edition*. Details to accompany this analysis are in Appendix E. The methodology included identification of the potential development spots and estimating the anticipated number of trips associated with each.

The procedure for estimating these trips is briefly outlined here:

- Identifying developed and undeveloped sites (as shown on Figure 3).
- Developing three scenarios for future development (as shown in Table 8 and detailed in Appendix E).
- Using the fitted curve equations or trip rate variables for land use in the ITE *Trip Generation 10th Edition* an estimate of the number in-bound and out-bound trips during the peaks and Saturdays was prepared. As all new development is expected to be commercial or office, the analysis used a category appropriate to the description provided.
- The total number of trips generated during the peaks and Saturday were distributed through the adjacent driveways and intersections on the corridor using a proportionate split based upon the observed volume of traffic and to turning movements based upon the directionality percentages recorded in the traffic observations described above (*as detailed in Appendix E*).

Table 8:Anticipated Trip Generation Scenarios for Future DevelopmentNorthshore Boulevard, S. I-12 Service Road to north of US 190

Scenario 1. Toys R Us and 2 vacant storefronts fill in on West Side								
Weekday Pe	ak AM Hour	Weekday Pe	eak PM Hour	Satu	rday			
In	Out	In Out In O						
20 12 63 67 783 784								

Scenario 2. Offices fill in portion of Existing Mall on East Side								
Weekday Pe	Weekday Peak AM Hour Weekday Peak PM Hour			Satu	rday			
In	Out	In	Out	In	Out			
676	226	116	348	N/A	N/A			

Scenario 3. Two Department Stores and Pier One Site become occupied with similar use (shopping)								
Weekday Pe	eak AM Hour	Weekday Peak PM Hour		Satu	rday			
In	Out	In	Out	In	Out			
70	40	182	184	2,374	2,376			

Table compiled by Soll Planning, LLC. 2019.

Northshore Boulevard: US 190 to I-12 Stage 0 Feasibility Study, Slidell, LA





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Traffic Operations Analysis (Microsimulation)

The future traffic operations analysis was conducted for each Concept with both the future traffic conditions from the provided RPC growth rate as well as the Trip Generation Numbers from Scenario 1. The analysis was conducted for the AM and PM peak hours in the years 2024 and 2049 with traffic being moved and redistributed as needed in the different Concepts depending upon movements that were no longer allowed, etc.

The traffic analysis was performed using both the VISTRO and SIDRA software packages and all analysis files may be found in the accompanying flash drive.

Concept #1 – Update to Signal Timing

The traffic operations analysis for Concept #1 was performed in VISTRO, the results for the delay and level of service for each intersection is shown in Table 9.

While Concept 1 provides acceptable levels of delay for the overall intersections, each approach needed a review for potential delay issues. A closer look at each approach reveled that there were unacceptable levels of delay at the Northshore Boulevard at Shared Driveway for Walmart and Home Depot Intersection in the 2024 PM Peak and unacceptable levels of delay at all three intersection in the 2049 PM Peak (Table 10).

<u>Table 9:</u> Future Peak-Hour Traffic Operations Level-of-Service (LOS) and Delay

Northshore Boulevard, S. I-12 Service Road to north of US 190

Location	AM Pea	k Period	PM Peak Period		
Location	Delay/LOS	Delay	Delay/LOS	Delay	
Northshore Boulevard @Northshore Square Mall North Driveway	22.0s (C)	336 ft	23.7s (C)	493 ft	
Northshore Boulevard @ Shared Driveway for Walmart and Home Depot	8.4s (A)	151 ft	16.4s (B)	303 ft	
Northshore Boulevard @ Northshore Square Mall South Driveway	7.7s (A)	114 ft	12.7s (B)	169 ft	

Analysis Year 2024

Analysis Year 2049

Location	AM Peak	Period	PM Peak Period		
	LOS Delay		LOS	Delay	
Northshore Boulevard @ Northshore Square Mall North Driveway	25.9s (C)	550 ft	30.1s (C)	691 ft	
Northshore Boulevard @ Shared Driveway for Walmart and Home Depot	12.8s (B)	239 ft	25.8s (C)	553 ft	
Northshore Boulevard @ Northshore Square Mall South Driveway	8.2s (A)	124 ft	26.3s (C)	355 ft	

<u>Table 10:</u> Peak-Hour Traffic Operations Level-of-Service (LOS) and Delay, Year 2024 and 2049 Northshore Boulevard Concept 1

Location			20	024 AM Pe	ak Concept	: 1			
Location				Аррі					
Northshore Boulevard @ Starbucks	Ν	В	S	В	E	В	Ŵ	/В	
and Northshore Square Mall North	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	
Driveway	16.8s (B)	222 ft	27.1s (C)	336 ft	21.6 (C)	64 ft	24.9s (C)	24 ft	
Northshore Boulevard @ Shared	N	В	S	В	E	В	W	/B	
Driveway for Walmart and Home	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	
Depot	3.4s (A)	46 ft	9.2s (A)	151 ft	33.7s (C)	105 ft	-	-	
Northshore Boulevard @	N	В	S	В	E	В	WB		
Northshore Square Mall South	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	
Driveway	6.2s (A)	107 ft	7.0s (A)	114 ft	31.3s (C)	42 ft	26.4s (C)	9 ft	
Location			20	024 PM Pe	ak Concept	1			
				Арри	oach				
Northshore Boulevard @ Starbucks	N	В	S	В	E	В	W	/B	
and Northshore Square Mall North	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	
Driveway	16.8s (B)	325 ft	29.1s (C)	493 ft	32.4s (C)	54 ft	31.1s (C)	101 ft	
Northshore Boulevard @ Shared	N	В	S	В	E	В	WB		
Driveway for Walmart and Home	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	
Depot	7.6s (A)	155 ft	14.7s (B)	303 ft	42.2s (D)	319 ft	-	-	
Northshore Boulevard @	N	NB		SB		EB		WB	
Northshore Square Mall South	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	
Driveway	11.4s (B)	156 ft	12.6s (B)	169 ft	22.8s (C)	56 ft	16.5s (B)	28 ft	
Location			20	049 AM Pe	ak Concept	: 1			
		_		Аррі	roach	_		-	
Northshore Boulevard @ Starbucks	N	В	S	В	E	В	W	/B	
and Northshore Square Mall North	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	
Driveway	17.1s (B)	353 ft	33.3s (C)	550 ft	33.3s (C)	132 ft	37.9s (D)	48 ft	
Northshore Boulevard @ Shared	N	В	S	В	E	В	W	/B	
Driveway for Walmart and Home	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	
	5./s (A)	66 ft	18.9s (B)	239 ft	23.2s (C)	88 ft	-	-	
Northshore Boulevard @	N to the te	В	5	В	E	В	W	В	
Northshore Square Mail South	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	
Driveway	7.5\$ (A)	111 π	8.55 (A)	124 π	16.15 (B)	14 ft	21.35 (C)	10 π	
Location			20	J49 PIVI Pe		1			
Northshara Baulayard @ Starbusks	N	D	ç	Аррі		D	10	/D	
and Northshore Square Mall North		Duouo		D Oueue		D Oueue		Oueue	
Driveway		Queue	Delay/LOS	Queue		Queue	Delay/LOS	Queue	
Northshare Deviewand @ Charad	21.55 (C)	D	37.05 (D)	091 IL	30.35 (D)	80 IL	34.85 (C)	152 IL	
Northshore Boulevard @ Shared	Delew/LOS	B	S Delau/LOS	B Oueue	E Delau/LOS		VV	B	
Depot						150 ft	Delay/LUS	105	
Northchara Daulouard	10.05 (B)	200 IL	20.35 (C)	333 IL	47.05 (D)	450 IL	- \^	- /B	
normanore Boulevaru @		0	3	0	E Dalau/LOC	0	VV		
Northshore Square Mall South	Delavitos		Delavirus		Delavinns		Delay/ICIS	()[[0]10	
Northshore Boulevard @ Shared Driveway for Walmart and Home Depot Northshore Boulevard @ Northshore Square Mall South Driveway Location Northshore Boulevard @ Starbucks and Northshore Square Mall North Driveway Northshore Boulevard @ Shared Driveway for Walmart and Home Depot Northshore Boulevard @	N Delay/LOS 5.7s (A) Delay/LOS 7.5s (A) Delay/LOS 21.5s (C) N Delay/LOS 16.6s (B) N	B Queue 66 ft Queue 111 ft 111 ft Queue 501 ft B Queue 285 ft B	S Delay/LOS 18.9s (B) Delay/LOS 8.5s (A) 20 S Delay/LOS 37.6s (D) S Delay/LOS 26.5s (C) S	B Queue 239 ft B Queue 124 ft 049 PM Per Appr B Queue 691 ft B Queue 553 ft B	E Delay/LOS 23.2s (C) E Delay/LOS 16.1s (B) ak Concept oach E Delay/LOS 36.3s (D) E Delay/LOS 47.0s (D) E	B Queue 88 ft Queue 14 ft 14 ft 1 Queue 80 ft 8 Queue 80 ft B LOS 450 ft B Queue	W Delay/LOS 21.3s (C) 21.3s (C) W Delay/LOS 34.8s (C) W Delay/LOS - W	/B Queue - /B Queue 10 ft /B Queue 152 ft /B LOS - /B	

<u>Concept #2 – Superstreets/Roundabout Alternative 1</u>

The traffic operations analysis for Concept #2 was performed in SIDRA, the results for the delay and level of service for each intersection is shown in Table 11.

Table 11: Future Peak-Hour Traffic Operations Level-of-Service (LOS) and Delay

Northshore Boulevard Concept 2

Analysis Year 2024

Location	AM Pea	k Period	PM Peak Period		
	Delay/LOS	Queue	Delay/LOS	Queue	
Northshore Boulevard @ Northshore Square Mall North Driveway	14.8s (B)	204 ft	20.8s (C)	272 ft	
Northshore Boulevard @ Shared Driveway for Walmart and Home Depot	3.2s (A)	76 ft	3.7s (A)	76 ft	
Northshore Boulevard @ Northshore Square Mall South Driveway	1.1s (A)	5 ft	3.9s (A)	66 ft	

Analysis Year 2049

Location	AM Pea Delav/LOS	k Period Queue	PM Peak Period Delay/LOS Queue		
Northshore Boulevard @ Northshore Square Mall North Driveway	17.0s (B)	417 ft	22.5s (C)	480 ft	
Northshore Boulevard @ Shared Driveway for Walmart and Home Depot	6.1s (A)	201 ft	8.6s (A)	249 ft	
Northshore Boulevard @ Northshore Square Mall South Driveway	1.5s (A)	53 ft	11.9s (B)	31 ft	

While Concept #2 provides acceptable levels of delay for the overall intersections, each approach needed a review for potential delay issues. A closer look at each approach reveled that there were acceptable levels of delay at all approaches withing the study limits in both the AM and PM Peak periods for both the 2024 traffic and 2049 traffic (*Table 12*).

Table 12:Peak-Hour Traffic Operations Level-of-Service (LOS) and Delay, Year 2024 and 2049Northshore Boulevard Concept 2

Location		2024 AM Peak Concept 2							
Location	Approach								
Northshore Boulevard @	NB		SB		EB		WB		
Starbucks and Northshore Square	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	
Mall North Driveway	17.4s (B)	204 ft	13.9s (B)	161 ft	2.9 (A)	20 ft	3.2s (A)	5 ft	
Northshore Boulevard @ Shared	NB		SB		EB		WB		
Driveway for Walmart and Home	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	
Depot	0.8s (A)	39 ft	4.5s (A)	76 ft	13.1s (B)	27 ft	-	-	
Northshore Boulevard @	NB		SB		EB		WB		
Northshore Square Mall South	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	
Driveway	1.2s (A)	34 ft	0.8s (A)	26 ft	4.0s (A)	5 ft	5.1s (A)	34 ft	

Table 12:Peak-Hour Traffic Operations Level-of-Service (LOS) and Delay, Year 2024 and 2049Northshore Boulevard Concept 2

Location			2024	PM Pea Appr	ak Concept oach	2		
Northshore Boulevard @	NB		SB		EB		WB	
Starbucks and Northshore	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue
Square Mall North Driveway	24.2s (C)	272 ft	19.6s (B)	234 ft	3.7s (A)	12 ft	4.2s (A)	16 ft
Northshore Boulevard @ Shared	NB		SB		EB	-	WB	
Driveway for Walmart and Home	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue
Depot	0.9s (A)	46 ft	2.1s (A)	68 ft	16.7s (B)	76 ft	-	-
Northshore Boulevard @	NB		SB		EB		WB	
Northshore Square Mall South	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue
Driveway	4.6s (A)	61 ft	2.7s (A)	66 ft	6.6s (A)	15 ft	7.8s (A)	16 ft
Location			2049	AM Pe	ak Concept	2		
Location				Appr	oach			
Northshore Boulevard @	NB		SB		EB		WB	
Starbucks and Northshore	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue
Square Mall North Driveway	20.6s (C)	417 ft	14.8s (B)	272 ft	4.3s (A)	40 ft	6.5s (A)	11 ft
Northshore Boulevard @ Shared	NB		SB	SB EB			WB	
Driveway for Walmart and Home	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue
Depot	0.9s (A)	62 ft	10.8s (B)	202 ft	18.0s (B)	48 ft	-	-
Northshore Boulevard @	NB		SB		EB		WB	
Northshore Square Mall South	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue
Driveway	1.7s (A)	53 ft	1.1s (A)	40 ft	4.3s (A)	7 ft	6.3s (A)	3 ft
Location			2049	PM Pea	ak Concept	2		
				Appr	oach			
Northshore Boulevard @	NB		SB		EB		WB	
Starbucks and Northshore	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue
Square Mall North Driveway	24.6s (C)	480 ft	22.5s (C)	443 ft	6.9s (A)	26 ft	8.1s (A)	35 ft
Northshore Boulevard @ Shared	NB		SB		EB		WB	
Driveway for Walmart and Home	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	LOS	Delay/LOS	LOS
Depot	1.5s (A)	80ft	9.4s (A)	249 ft	29.1s (C)	156 ft	-	-
Northshore Boulevard @	NB		SB		EB		WB	
Northshore Square Mall South	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue
Driveway	14.8s (B)	173 ft	9.2s (A)	181 ft	12.0s (B)	31 ft	16.4s (B)	34 ft

<u>Concept #3 – Superstreets/Roundabout Alternative 2</u>

The traffic operations analysis for Concept #3 was performed in SIDRA, the results for the delay and level of service for each intersection is shown in Table 13.

The operational analysis of Concept #3 shows acceptable levels of service and delay for each intersection in the 2024 peak conditions; however, in the 2049 peak conditions the Northshore Boulevard at Shared Driveway for Walmart and Home Depot experienced unacceptable levels of delay in the PM Peak.

Looking at the results by approaches for each intersection in 2024 for the peak periods shows acceptable levels of delay in 2024; however, a look at 2049 peak periods (*Table 14*) shows unacceptable delays at the Northshore Boulevard at Shared Driveway for Walmart and Home Depot intersection as well as the

Northshore Boulevard at Northshore Square Mall South Driveway. In 2049, it appears as though the volume of traffic becomes large that it breaks down the roundabout as well as with the proximity of the traffic signal to the south will cause backup as well.

Table 13: Future Peak-Hour Traffic Operations Level-of-Service (LOS) and Delay

Northshore Boulevard Concept 3

Analysis Year 2024

location	AM Pea	k Period	PM Peak Period		
	Delay/LOS Queue		Delay/LOS	Queue	
Northshore Boulevard @ Northshore Square Mall North Driveway	19.4s (B)	321 ft	20.0s (C)	410 ft	
Northshore Boulevard @ Shared Driveway for Walmart and Home Depot	1.1s (A)	30 ft	2.6 sec (A)	48 ft	
Northshore Boulevard @ Northshore Square Mall South Driveway	18.9s (B)	190 ft	15.2s (B)	227 ft	

Analysis Year 2049

Location	AM Pea	k Period	PM Peak Period		
	Delay/LOS	Queue	Delay/LOS	Queue	
Northshore Boulevard@ Northshore Square Mall North Driveway	19.3s (B)	509 ft	18.6s (B)	686 ft	
Northshore Boulevard @ Shared Driveway for Walmart and Home Depot	1.4s (A)	43 ft	69.3s (E)	706 ft	
Northshore Boulevard @ Northshore Square Mall South Driveway	16.8s (B)	341 ft	30.0s (C)	630 ft	

Table 14:Peak-Hour Traffic Operations Level-of-Service (LOS) and Delay, Year 2024 and 2049Northshore Boulevard Concept 3

Location	2024 AM Peak Concept 3							
Location				Appro	ach			
Northshore Boulevard @	NB		SB		EB		WB	
Starbucks and Northshore	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue
Square Mall North Driveway	30.1s (C)	321 ft	11.3s (B)	175 ft	2.7 (A)	35 ft	4.1s (A)	7 ft
Northshore Boulevard @	NB	5	SB		EB		WB	
Shared Driveway for Walmart	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue
and Home Depot	0.9s (A)	29 ft	1.0s (A)	30 ft	3.2s (A)	6 ft	-	-
Northshore Boulevard @	NB	5	SB	1	EB		WB	5
Northshore Square Mall South	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue
Driveway	22.1s (C)	190 ft	16.3s (B)	142 ft	2.2s (A)	7 ft	2.8s (A)	2 ft
			2024	PM Peal	< Concept	3		
Location			Approa		ach			
Northshore Boulevard @	NB	5	SB	SB		EB		5
Starbucks and Northshore	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue
Square Mall North Driveway	29.2s (C)	410 ft	12.9s (B)	261 ft	3.0s (A)	15 ft	5.6s (A)	24 ft
Northshore Boulevard @	NB		SB		EB		WB	
Shared Driveway for Walmart	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue
and Home Depot	2.4s (A)	39 ft	2.0s (A)	48 ft	4.5s (A)	18 ft	-	-
Northshore Boulevard @	NB	5	SB	1	EB		WB	5
Northshore Square Mall South	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue
Driveway	15.0s (B)	195 ft	17.7s (B)	227 ft	3.1s (A)	19 ft	2.7s (A)	13 ft
Location			2049	AM Peal	k Concept	3		
Location				Appro	ach			
Northshore Boulevard @	NB	6	SB		EB		WE	6
Starbucks and Northshore	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue
Square Mall North Driveway	28.1s (C)	509 ft	12.3s (B)	282 ft	3.9s (A)	46 ft	6.9s (A)	12 ft
Northshore Boulevard @	NB	5	SB		EB		WE	6
Shared Driveway for Walmart	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue
and Home Depot	1.1s (A)	43 ft	1.3.s (A)	42 ft	3.7s (A)	8 ft	-	-
Northshore Boulevard @	NB	5	SB		EB		WB	
Northshore Square Mall South	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue
Driveway	19.4s (B)	341 ft	14.5s (B)	234 ft	3.2s (A)	13 ft	4.7s (A)	4 ft

<u>Table 14:</u>	Peak-Hour Traffic Operations Level-of-Service (LOS) and Delay, Year 2024 and 2049
	Northshore Boulevard Concept 3

Location	2049 PM Peak Concept 3								
Location				Appro	ach				
Northshore Boulevard @	NE	NB		SB			WB		
Starbucks and Northshore	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	
Square Mall North Driveway	25.5s (C)	686 ft	20.6s (C)	525 ft	7.4s (A)	39 ft	10.2s (B)	56 ft	
Northshore Boulevard @	NB		SB		EB		WB	3	
Shared Driveway for Walmart	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	LOS	Delay/LOS	LOS	
and Home Depot	39.2s (D)	380 ft	122.9s (F)	706 ft	13.2s (B)	52 ft	-	-	
Northshore Boulevard @	NE	5	SB		EB		WB	3	
Northshore Square Mall South	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	Delay/LOS	Queue	
Driveway	47.2s (D)	630 ft	11.4s (B)	369 ft	4.3s (A)	63 ft	47.2s (D)	138 ft	

Stage Zero Environmental Checklist and Preliminary Scope and Budget Worksheet

The Stage Zero Environmental Checklist was completed for the project study area (Northshore Boulevard, south of the S. I-12 Service Road, to north of the US 190 Intersection). This checklist, along with the Preliminary Scope and Budget Worksheet are included in Appendix F of this report. No sites or areas of concern were identified using the Stage Zero Environmental Checklist and accompanying database search. Database search did identify underground storage tanks adjacent to the corridor at two gas stations.

Appendices

- A. Project Management Committee Meeting Summaries
- B. Average Daily Traffic (ADT) Data
- C. Peak-Hour Traffic Data
- D. Crash Analysis
- E. HCM Analysis Results
- F. Stage 0 Environmental Checklist and DOTD/MPO Preliminary Scope and Budget Checklist

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Appendix A: Project Management Committee Meeting Summaries

Appendix B: Average Daily Traffic Data

(made via electronic submittal to RPC)

Appendix C: Peak-Hour Traffic Data

(made via electronic submittal to RPC)

Appendix D: Crash Analysis

Appendix E: HCS Results

(made via electronic submittal to RPC)

Appendix F: Stage 0 Feasibility Study Checklist and DOTD/MPO Stage 0 Preliminary Scope and Budget Checklist